Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Intake Camshaft Actuator Solenoid Circuit – Bank 1	P0010	Detects a VVT system error by monitoring the circuit for electrical integrity	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		System supply voltage is within limits Output driver is commanded on, Ignition switch is in crank or run position	> 11 Volts, and < 32 Volts	20 failures out of 25 samples 250 ms /sample, continuous	Trips 2 B Type

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Intake Camshaft System Performance – Bank 1	P0011	Detects a VVT system error by comparing the desired and actual cam positions when VVT is activated	Camshaft position error [absolute value of (desired position - actual position)] is compared to thresholds to determine if excessive	(Intake cam Bank 1)Cam Position Error > KtPHSD_phi_CamPosErrorLimIc1 Deg (see Supporting Table)	The following DTC's are NOT active: P0010 IntkCMP B1 Circuit P0340, P0341, Intake B1 Cam sensors P0335, P0336, Crank sensors P0016, P0017, P0018, P0019 Cam to crank rationality	System Voltage > 11 Volts, and System Voltage < 32 Volts Desired cam position cannot vary more than 7.5 Cam Deg for at least KtPHSD_t_StablePositionTimeIc1 seconds (see Supporting Table)	200 failures out of 1000 samples	Trips 2 B Type

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Engine is running VVT is enabled Desired camshaft position > 0 Power Take Off (PTO) not active		100 ms /sample	
Crankshaft Position (CKP)-Camshaft Position (CMP) Correlation Bank 1 Sensor A	P0016	Detects cam to crank misalignment by monitoring if cam sensor pulse for bank 1 sensor A occurs during the incorrect crank position	4 cam sensor pulses more than 11 crank degrees before or 11 crank degrees after nominal position in one cam revolution.		Engine Speed Crankshaft and camshaft position signals are synchronized Cam phaser is in "parked" position No Active DTCs:	< 1200 P0335, P0336 P0340, P0341	4 failures out of 5 samples if the engine is being assisted by the starter 24 failures out of 30 samples if the engine is running	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					No Pending DTCs:	5VoltReferenceA_FA 5VoltReferenceB_FA P0341	without assistance from the starter One sample per cam rotation	
O2S Heater Control Circuit Bank 1 Sensor 1	P0030	This DTC checks the Heater Output Driver circuit for electrical integrity.	Voltage low during driver open state (indicates short-to-ground or open circuit) or voltage high during driver closed state (indicates short to		Ign Switch Ignition Voltage Engine Speed	= Crank or Run position 11.0 volts < Ign Voltage < > 400 RPM	20 failures samples 250 ms /sample Continuous	2 trips Type B
Supercharger Bypass Valve Control Circuit	P0033	Electrical Integrity of Supercharger Bypass Valve Control Circuitry	ECM detects that commanded and actual states of output driver do not match		Ignition Voltage Ignition Voltage Engine Speed	>= 11.00 Volts <= 32.00 Volts > 0	20 failures out of 25 samples 1 sample every 250 msec	Type X 0 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
O2S Heater Control Circuit Bank 1 Sensor 2	P0036	This DTC checks the Heater Output Driver circuit for electrical integrity.	Voltage low during driver open state (indicates short-to-ground or open circuit) or voltage high during driver closed state (indicates short to voltage).		Ign Switch position Ignition Voltage Engine Speed	= Crank or Run position 11.0 volts < Ign Voltage < 32.0 volts > 400 RPM	20 failures out of 25 samples 250 ms /sample Continuous	2 trips Type B
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).		Ign Switch position Ignition Voltage Engine Speed	= Crank or Run position 11.0 volts < Ign Voltage < 32.0 volts > 400 RPM	20 failures out of 25 samples 250 ms /sample Continuous	2 trips Type B
HO2S Heater Resistance Bank 1	P0053	Detects an oxygen sensor heater having an	Learned Heater Resistance.	Calculated Heater Resistance <	No Active DTC's	ECT_Sensor_FA P2610 IAT_SensorFA	Once per valid cold start	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Sensor 1		incorrect or out of range resistance value.		2.8 ohms -OR- Calculated Heater Resistance > 9.5 ohms	Coolant – IAT Coolant Temp Ignition Voltage Engine Soak Time Engine Run Time	< 8.0 ºC -30.0 ºC ≤ Coolant ≤ 45.0 ºC < 32.0 volts > 28800 seconds < 3.00 seconds		
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	No Active DTC's Coolant – IAT Coolant Temp Ignition Voltage Engine Soak Engine Run	ECT_Sensor_FA P2610 IAT_SensorFA < 8.0 ºC -30.0 ºC ≤ Coolant ≤ 45.0 < 32.0 volts > 28800 seconds < 3.00 seconds	Once per valid cold start	2 trips Type B
O2S Heater Control Circuit Bank 2 Sensor 2	P0056	This DTC checks the Heater Output Driver circuit for electrical	Voltage low during driver open state (indicates short-to-ground or open circuit) or voltage		Ign Switch position Ignition Voltage	= Crank or Run position 11.0 volts < Ign Voltage < 32.0 volts	20 failures out of 25 samples	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		integrity.	high during driver closed state (indicates short to voltage).		Engine Speed	> 400 RPM	250 ms /sample Continuous	
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 < 2.8 ohms -OR- Calculated Heater Resistance > 9.5 ohms	No Active DTC's Coolant – IAT Coolant Temp Ignition Voltage Engine Soak Time Engine Run Time	ECT_Sensor_FA P2610 IAT_SensorFA < 8.0 ºC -30.0 ºC ≤ Coolant ≤ 45.0 ºC < 32.0 volts > 28800 seconds < 3.00 seconds	Once per valid cold start	2 trips Type B
HO2S Heater Resistance Bank 2 Sensor 2	P0060	Detects an oxygen sensor heater having an incorrect or out of range	Learned Heater Resistance.	Calculated Heater Resistance < 4.1 ohms -OR-	No Active DTC's Coolant – IAT Coolant Temp Ignition Voltage	ECT_Sensor_FA < 8.0 ºC -30.0 ºC ≤ Coolant ≤ 45.0 ºC < 32.0 volts	Once per	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		resistance value.		Calculated Heater Resistance > 10.8 ohms	Engine Soak Time Engine Run Time	> 28800 seconds < 3.00 seconds		
MAP / MAF / Throttle Position Correlation	P0068	Detect when MAP and MAF do not match estimated engine airflow as established by the TPS	1) Difference between measured MAP and estimated MAP exceeds threshold (kPa), or P0651 (5 Volt Ref), or P0107 (MAP circuit low), or P0108 (MAP circuit high) have failed this key cycle, then MAP portion of diagnostic fails	Table, f(TPS). See supporting tables	Engine Speed	> 800 RPM	Continuously fail MAP and MAF portions of diagnostic for 0.1875 sec	Trips: 1 Type: A MIL: YES
						Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	Continuous in primary processor	
			2) Absolute difference between MAF and estimated MAF exceed	Table, f(TPS). See supporting tables				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			threshold (grams/sec), or P0102 (MAF circuit low), or P0103 (MAF circuit hi) have failed this key cycle, or maximum MAF versus RPM (Table) is greater than or equal to maximum MAF versus battery voltage, then MAF portion of diagnostic fails	Table, f(RPM). See supporting tables Table, f(Volts). See supporting tables				
Barometric Pressure (BARO) - Supercharger Inlet Pressure Correlation (supercharged application)	P006D	Compares baro sensor to the calculated baro estimate (part throttle calculation or unthrottled Supercharger	Difference between baro sensor reading and estimated baro when distance since last estimated baro	> 15.0 kPa	No Active DTCs:	AmbientAirPressCktFA ECT_Sensor_Ckt_FA IAT_SensorFA MAF_SensorFA AfterThrottlePressureFA_SC TPS_FA TPS_Performance_FA	20 failures out of 25 samples 1 sample every 250 msec	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		Inlet Pressure)	update OR Difference between baro sensor reading and estimated baro when distance since last estimated baro update	<= 0.01 miles > 25.0 kPa > 0.01 miles		VehicleSpeedSensor_FA		
Intake Air Temperature Sensor 2 Circuit Performance	P0096	Detects an IAT2 sensor that has stuck in range by comparing to IAT and engine coolant temperature at startup	ABS(Power Up IAT - Power Up IAT2) AND ABS(Power Up ECT – Power Up IAT2) > ABS(Power Up ECT	> 20 deg C	Time between current ignition cycle and the last time the engine was running No Active DTCs:	> 28800 seconds ECT_Sensor_FA	Executes once at the beginning of each ignition cycle if enable conditions are met	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			– Power Up IAT) AND P0116 is passing			ECT_Sensor_Ckt_FA IAT_SensorFA IAT2_SensorFA P0116 Test Aborted = FALSE P0116 Test Complete = TRUE		
Intake Air Temperature Sensor 2 Circuit Low (High Temperature)	P0097	Detects a continuous short to ground in the IAT 2 signal circuit or the IAT 2 sensor	Raw IAT 2 Input	< 45 Ohms (~150 deg C)	Engine Run Time Coolant Temp Vehicle Speed No Active DTCs:	> 0.0 seconds < 150 deg C >= 0.00 MPH ECT_Sensor_Ckt_FA ECT_Sensor_Ckt_FP VehicleSpeedSensorError	50 failures out of 63 samples 1 sample every 100 msec	Type B 2 trips
Intake Air Temperature Sensor 2 Circuit High (Low Temperature)	P0098	Detects a continuous open circuit in the IAT 2 signal circuit or the IAT 2 sensor	Raw IAT 2 Input	> 420000 Ohms (~-60 deg C)	Engine Run Time Coolant Temp Vehicle Speed Engine Air Flow No Active DTCs:	> 0.0 seconds > -40 deg C <= 318.00 MPH >= 512 gm/sec ECT_Sensor_Ckt_FA	50 failures out of 63 samples 1 sample every 100 msec	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						ECT_Sensor_Ckt_FP VehicleSpeedSensorError MAF_SensorFA MAF_SensorFP MAF_SensorTFTKO		
Radiator Coolant Temp Sensor Circuit Low Voltage	P00B3	This DTC detects a short to ground in the RCT signal circuit or the RCT sensor.	RCT Resistance (@ 150ºC)	< 55 Ohms	Engine run time Or IAT min	> 0.0 seconds ≤ 150.0 °C	5 failures out of 25 samples 1 sec /sample Continuous	2 trips Type B
Radiator Coolant Temp Sensor Circuit High Voltage	P00B4	Circuit Continuity This DTC detects a short to high or open in	RCT Resistance (@ -60ºC)	> 160500 Ohms	Engine run time Or	> 10.0 seconds	5 failures out of 25 samples	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		the RCT signal circuit or the RCT sensor.			IAT min	≥ -7.0 °C	1 sec /sample Continuous	
Radiator Coolant Temp - Engine Coolant Temp (ECT) Correlation	P00B6	This DTC detects a difference between ECT and RCT after a soak condition.	A failure will be reported if any of the following occur: 1) Absolute difference between ECT at power up & RCT at power up is ≥ an IAT based threshold table lookup value(fast fail).	See "P00B6: Fail if power up ECT exceeds RCT by these values" in the Supporting tables section	No Active DTC's	VehicleSpeedSensor_FA IAT_SensorCircuitFA RCT_Sensor_Ckt_FA ECT_Sensor_Ckt_FA IgnitionOffTimeValid	1 failure 500 msec /sample Once per valid cold start	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						TimeSinceEngineRunning Valid		
			2) Absolute difference between ECT at power up & RCT at power up is > by 19.3 C and a block heater has not been detected.		Engine Off Soak Time	> 28800 seconds		
					Non-volatile memory initization	= Not occurred		
			3) ECT at power up > IAT at power up by 19.3 C and the time spent cranking the engine without starting is greater than 10.0 seconds with the LowFuelConditionDiag					
				= False	Test complete this trip	= False		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Test aborted this trip	= False		
					IAT	≥ -7 ºC		
					LowFuelCondition			
					Diag	= False		
					Block Heater detection is enabled when either of the following occurs:			
					1) ECT at power up > IAT at power up by	> 19.3 ºC		
					2) Cranking time	< 10.0 Seconds		
					Block Heater is detected and diagnostic is aborted when 1)or 2) occurs. Diagnostic is aborted when 3) or 4) occurs:			
					1a) Vehicle drive time	> 400 Seconds with		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					1b) Vehicle speed	> 14.9 MPH and		
					1c) Additional Vehicle drive time is provided to 1a when Vehicle speed is below 1b as follows:	0.00 times the seconds with vehicle speed below 1b		
					1d) IAT drops from power up IAT	≥ 3.3 ºC		
					2a) ECT drops from power up ECT	≥ 1 ºC Within		
					2b) Engine run time	< 30 Seconds		
					3) Engine run time with vehicle speed below 1b	> 1800 Seconds		
					4) Minimum IAT during test	> -7.0 ºC		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Mass Air Flow System Performance (naturally aspirated)	P0101	Determines if the MAF sensor is stuck within the normal operating range	Filtered Throttle Model Error AND ABS(Measured Flow – Modeled Air Flow) Filtered AND ABS(Measured MAP – MAP Model 2) Filtered	<= 400 kPa*(g/s) > 21 grams/sec > 22.0 kPa	Engine Speed Engine Speed Coolant Temp Coolant Temp Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together)	>= 450 RPM <= 5800 RPM > -7 Deg C < 125 Deg C > -20 Deg C < 125 Deg C >= 0.00 Filtered Throttle Model multiplied by TPS Residual Weight Factor based on RPM Modeled Air Flow multiplied by MAF Residual Weight Factor based on RPM and MAF Residual Weight Factor	Continuous Calculation are performed every 12.5 msec	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						Based on MAF Estimate MAP Model 2 multiplied by MAP2 Residual Weight Factor based on RPM See table "IFRD Residual Weighting Factors".		
					No Active DTCs:	MAP_SensorCircuitFA EGRValve_FP EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA ECT_Sensor_Ckt_FA IAT_SensorFA IAT_SensorFP CylDeacSystemTFTKO		
Mass Air Flow System	P0101	Determines if the MAF sensor is	See table "Supercharger		Engine Speed Engine Speed	>= 450 RPM <= 5800 RPM	Continuous	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Performance (supercharged)		stuck within the normal operating range	Intake Flow Rationality Diagnostic Failure Matrix" for combinations of model failures that can set this DTC. TPS model fails when Filtered Throttle Model Error MAF model fails when ABS(Measured Flow – Modeled Air Flow) Filtered MAP1 model fails when ABS(Measured MAP – MAP Model	 > 400 kPa*(g/s) > 21 grams/sec	Coolant Temp Coolant Temp Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together)	> -7 Deg C < 125 Deg C > -20 Deg C < 125 Deg C >= 0.00 RPM 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	Calculation are performed every 12.5 msec	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			1) Filtered MAP2 model fails when ABS(Measured MAP – MAP Model 2) Filtered SCIAP1 model fails when ABS(Measured SCIAP – SCIAP Model 1) Filtered SCIAP2 model fails when ABS(Measured SCIAP – SCIAP Model 2) Filtered	> 22.0 kPa > 22.0 kPa > 14.0 kPa > 14.0 kPa		MAP1 Residual Weight Factor based on RPM and Boost Residual Weight Factor based on % of Boost MAP Model 2 multiplied by MAP2 Residual Weight Factor based on RPM and Boost Residual Weight Factor based on % of Boost SCIAP Model 1 multiplied by SCIAP1 Residual Weight Factor based on RPM and Boost Residual Weight Factor based on % of Boost SCIAP Model 2 multiplied by SCIAP2 Residual Weight Factor based on		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						RPM and Boost Residual Weight Factor based on % of Boost 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 IAT2_SensorFA IAT2_SensorCircuitFP SCIAP_SensorCircuitFA SCIAP_SensorCircuitFP AmbientAirDefault_SC		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
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	<= 300 Hz (~ 1.06 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
Mass Air Flow Sensor Circuit High Frequency	P0103	Detects a high frequency output from the MAF sensor	MAF Output	>= 14500 Hz (~ 975.38 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	P0106	Determines if the MAP sensor is stuck within the normal operating range	Filtered Throttle Model Error AND ABS(Measured MAP – MAP Model	<= 400 kPa*(g/s)	Engine Speed Engine Speed Coolant Temp Coolant Temp Intake Air Temp	>= 450 RPM <= 5800 RPM > -7 Deg C < 125 Deg C > -20 Deg C	Continuous Calculations are performed	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
(naturally aspirated)			1) Filtered AND ABS(Measured MAP – MAP Model 2) Filtered	> 22.0 kPa > 22.0 kPa	Intake Air Temp Minimum total weight factor (all factors multiplied together)	< 125 Deg C >= 0.00 Filtered Throttle Model multiplied by TPS Residual Weight Factor based on RPM MAP Model 1 multiplied by MAP1 Residual Weight Factor based on RPM MAP Model 2 multiplied by MAP2 Residual Weight Factor based on RPM See table "IFRD Residual	every 12.5 msec	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						Weighting Factors".		
					No Active DTCs:	MAP_SensorCircuitFA EGRValve_FP EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensorFA ECT_sensor_FA ECT_Sensor_FP IAT_SensorFA IAT_SensorCircuitFP CylDeacSystemTFTKO		
Manifold Absolute Pressure Sensor Performance (supercharged)	P0106	Determines if the MAP sensor is stuck within the normal operating range	See table "Supercharger Intake Flow Rationality Diagnostic Failure Matrix" for combinations of model failures that can set this DTC.		Engine Speed Engine Speed Coolant Temp Coolant Temp Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied	>= 450 RPM <= 5800 RPM > -7 Deg C < 125 Deg C > -20 Deg C < 125 Deg C	Continuous Calculation are performed every 12.5 msec	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			TPS model fails when Filtered Throttle Model Error	> 400 kPa*(g/s)	together)	>= 0.00 Filtered Throttle Model multiplied by TPS Residual Weight Factor based on RPM		
			MAF model fails when ABS(Measured Flow – Modeled Air Flow) Filtered	> 21 grams/sec		Modeled Air Flow multiplied by MAF Residual Weight Factor based on RPM and MAF Residual Weight Factor Based on MAF Estimate		
			MAP1 model fails when ABS(Measured MAP – MAP Model 1) Filtered	> 22.0 kPa		MAP Model 1 multiplied by MAP1 Residual Weight Factor based on RPM and Boost Residual Weight Factor based on % of Boost		
			MAP2 model fails when ABS(Measured MAP – MAP Model 2) Filtered	> 22.0 kPa		MAP Model 2 multiplied by		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			SCIAP1 model fails when ABS(Measured SCIAP – SCIAP Model 1) Filtered SCIAP2 model fails when ABS(Measured SCIAP – SCIAP Model 2) Filtered	> 14.0 kPa > 14.0 kPa		MAP2 Residual Weight Factor based on RPM and Boost Residual Weight Factor based on % of Boost SCIAP Model 1 multiplied by SCIAP1 Residual Weight Factor based on RPM and Boost Residual Weight Factor based on % of Boost SCIAP Model 2 multiplied by SCIAP2 Residual Weight Factor based on RPM and Boost Residual Weight Factor based on % of Boost See table "IFRD Residual Weighting Factors".		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					No Active DTCs:	MAP_SensorCircuitFA EGRValve_FP EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensorFA ECT_sensor_FA ECT_Sensor_FP IAT_SensorFA IAT_SensorCircuitFP CylDeacSystemTFTKO IAT2_SensorFA IAT2_SensorCircuitFP SCIAP_SensorCircuitFA SCIAP_SensorCircuitFP AmbientAirDefault_SC		
Manifold Absolute Pressure Sensor Circuit Low	P0107	Detects a continuous short to low or open in either the signal circuit or the MAP sensor.	MAP Voltage	< 3.0 % of 5 Volt Range (0.2 Volts = 3.5 kPa)	Continuous		320 failures out of 400 samples 1 sample every 12.5 msec	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Manifold Absolute Pressure Sensor Circuit High	P0108	Detects an open sensor ground or continuous short to high in either the signal circuit or the MAP sensor.	MAP Voltage	> 90.0 % of 5 Volt Range (4.5 Volts = 115.0 kPa)	Continuous		320 failures out of 400 samples 1 sample every 12.5 msec	Type B 2 trips
Intake Air Temperature Sensor Circuit Performance	P0111	Detects an IAT sensor that has stuck in range by comparing to IAT2 and engine coolant temperature at startup	ABS(Power Up IAT - Power Up IAT2) AND ABS(Power Up ECT – Power Up IAT) > ABS(Power Up ECT – Power Up IAT2) AND P0116 is failing	> 20 deg C	Time between current ignition cycle and the last time the engine was running No Active DTCs:	> 28800 seconds ECTSensor_FA ECT_Sensor_Ckt_FA IAT_SensorCircuitFA IAT2_SensorCircuitFA P0116 Test Aborted = FALSE	Executes once at the beginning of each ignition cycle if enable conditions are met	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						P0116 Test Complete = TRUE		
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 ECT_Sensor_Ckt_FP VehicleSpeedSensorError	50 failures out of 63 samples 1 sample every 100 msec	Type B 2 trips
Intake Air Temperature Sensor Circuit High (Low Temperature)	P0113	Detects a continuous open circuit in the IAT signal circuit or the IAT sensor	Raw IAT Input	> 420000 Ohms (~-60 deg C)	Engine Run Time Coolant Temp Vehicle Speed Engine Air Flow No Active DTCs:	> 0.0 seconds > -40 deg C <= 318.00 MPH <= 512 gm/sec ECT_Sensor_Ckt_FA ECT_Sensor_Ckt_FP VehicleSpeedSensorError MAF_SensorFA MAF_SensorFP	50 failures out of 63 samples 1 sample every 100 msec	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						MAF_SensorTFTKO		
Engine Coolant Temperature (ECT) Sensor Performance	P0116	This DTC detects ECT temp sensor stuck in mid range.	A failure will be reported if any of the following occur: 1) ECT at power up > IAT at power up by an IAT based table lookup value after a minimum 28800 second soak (fast fail).	See "P0116: Fail if power up ECT exceeds IAT by these values" in the Supporting tables section.	No Active DTC's Non-volatile memory initization	VehicleSpeedSensor_FA IAT_SensorFA ECT_Sensor_Ckt_FA IgnitionOffTimeValid TimeSinceEngineRunning Valid = Not occurred	1 failure 500 msec /sample Once per valid cold start	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			2) ECT at power up > IAT at power up by 15.0 C after a minimum 28800 second soak and a block heater has not been detected. 3) ECT at power up > IAT at power up by 15.0 C after a minimum 28800 seconds soak and the time spent cranking the engine without starting is greater than 10.0 seconds with the LowFuelConditionDiag	= False	Test complete this trip Test aborted this trip IAT	= False = False ≥ -7 ºC		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					LowFuelCondition Diag	= False		
					Block Heater detection is enabled when either of the following occurs:			
					1) ECT at power up > IAT at power up by	> 15.0 ºC		
					2) Cranking time	< 10.0 Seconds		
					Block Heater is detected and diagnostic is aborted when 1) or 2) occurs. Diagnostic is aborted when 3) or 4) occurs:			
					1a) Vehicle drive time 1b) Vehicle speed	> 400 Seconds with > 14.9 MPH		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					1c) Additional Vehicle drive time is provided to 1a when Vehicle speed is below 1b as follows:	0.00 times the seconds with vehicle speed below 1b		
					1d) IAT drops from power up IAT	≥ 8.0 ºC		
					2a) ECT drops from power up ECT	> 256 ºC Within		
					2b) Engine run time	≤ 0 Seconds		
					3) Engine run time with vehicle speed below 1b	> 1800 Seconds		
					4) Minimum IAT during test	≤ -7 ºC		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Engine Coolant Temp Sensor Circuit Low	P0117	This DTC detects a short to ground in the ECT signal circuit or the ECT sensor.	ECT Resistance (@ 150ºC)	< 45 Ohms			5 failures out of 6 samples 1 sec /sample Continuous	2 trips Type B
Engine Coolant Temp Sensor Circuit High	P0118	Circuit Continuity This DTC detects a short to high or open in the ECT signal circuit or the ECT sensor.	ECT Resistance (@ -60ºC)	> 450000 Ohms	Engine run time Or IAT min	> 10.0 seconds ≥ -7.0 °C	5 failures out of 6 samples 1 sec /sample Continuous	2 trips Type B
TPS1 Circuit	P0120	Detects a continuous or	Secondary TPS1 Voltage <	0.325		Run/crank voltage or Powertrain relay voltage >	19 / 39 counts or 14	Trips: 1

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		intermittent short or open in TPS1 circuit on the secondary processor but sensor is in range on the primary processor	or Secondary TPS1 Voltage >	4.75		6.00 and reduced power is false, else the failure will be reported for all conditions No 5 V reference #2 error No 5 V reference #2 DTC (P0651)	counts continuous; 12.5 ms/count in the secondary processor	Type: A MIL: 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	> 400 kPa*(g/s) > 21 grams/sec	Engine Speed Engine Speed Coolant Temp Coolant Temp Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together)	>= 450 RPM <= 5800 RPM > -7 Deg C < 125 Deg C > -20 Deg C < 125 Deg C >= 0.00	Continuous Calculation are performed every 12.5 msec	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						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 See table "IFRD Residual Weighting Factors".		
					No Active DTCs:	MAP_SensorCircuitFA EGRValve_FP EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensorFA ECT_sensor_FA ECT_Sensor_FP		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						IAT_SensorFA IAT_SensorCircuitFP CylDeacSystemTFTKO		
Throttle Position Sensor Performance (supercharged)	P0121	Determines if the Throttle Position Sensor input is stuck within the normal operating range	See table "Supercharger Intake Flow Rationality Diagnostic Failure Matrix" for combinations of model failures that can set this DTC. TPS model fails when Filtered Throttle Model Error MAF model fails when ABS(Measured Flow – Modeled Air Flow) Filtered	 > 400 kPa*(g/s) > 21 grams/sec	Engine Speed Engine Speed Coolant Temp Coolant Temp Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together)	>= 450 RPM <= 5800 RPM > -7 Deg C < 125 Deg C > -20 Deg C < 125 Deg C >= 0.00 Filtered Throttle Model multiplied by TPS Residual Weight Factor based on RPM Modeled Air Flow multiplied by MAF Residual Weight Factor	Continuous Calculation are performed every 12.5 msec	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						based on RPM and MAF Residual Weight Factor Based on MAF Estimate		
			MAP1 model fails when ABS(Measured MAP – MAP Model 1) Filtered	> 22.0 kPa		MAP Model 1 multiplied by MAP1 Residual Weight Factor based on RPM and Boost Residual Weight Factor based on % of Boost		
			MAP2 model fails when ABS(Measured MAP – MAP Model 2) Filtered	> 22.0 kPa		MAP Model 2 multiplied by MAP2 Residual Weight Factor based on RPM and Boost Residual Weight Factor based on % of Boost		
			SCIAP1 model fails when ABS(Measured SCIAP – SCIAP Model 1) Filtered	> 14.0 kPa		SCIAP Model 1 multiplied by SCIAP1 Residual Weight Factor based on RPM and Boost Residual Weight Factor based on %		
			SCIAP2 model fails when ABS(Measured SCIAP – SCIAP					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			Model 2) Filtered	> 14.0 kPa		of Boost SCIAP Model 2 multiplied by SCIAP2 Residual Weight Factor based on RPM and Boost Residual Weight Factor based on % of Boost See table "IFRD Residual Weighting Factors".		
					No Active DTCs:	MAP_SensorCircuitFA EGRValve_FP EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensorFA ECT_sensor_FA ECT_Sensor_FP IAT_SensorFA IAT_SensorCircuitFP CylDeacSystemTFTKO		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						IAT2_SensorFA IAT2_SensorCircuitFP SCIAP_SensorCircuitFA SCIAP_SensorCircuitFP AmbientAirDefault_SC		
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 processor	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 processor	
TPS1 Circuit	P0123	Detects a	Primary TPS1			Run/crank voltage or	79 / 159	Trips:

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
High		continuous or intermittent short in TPS1 circuit on both processors or just the primary processor	Voltage >	4.75		Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	counts; 57 counts continuous; 3.125 ms /count in the primary processor	1 Type: A MIL: YES
			Secondary TPS1 Voltage >	4.75		No 5 V reference #2 error No 5 V reference #2 DTC (P0651)	19 / 39 counts or 14 counts continuous; 12.5 ms/count in the secondary processor	
Engine Coolant Temperature Below Stat Regulating Temperature	P0128	This DTC detects if the engine coolant temperature rises too slowly due to an ECT or Cooling system	Actual accumulated airflow is >	See “**P0128: Maximum Accumulated Airflow for IAT and Start-up ECT**	No Active DTC's	MAP_SensorFA MAF_SensorFA TPS_Performance_FA TPS_FA TPS_ThrottleAuthorityDefaulted IAT_SensorFA	30 failures to set DTC 1 sec /sample Once per	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		fault	predicted accumulated airflow before:	**conditions**“ in the Supporting tables section.		ECT_Sensor_Ckt_FA ECT_Sensor_Perf_FA VehicleSpeedSensor_FA	ignition key	
					Engine not run time	≥ 1800 seconds		
			Range #1 (Primary)		Engine run time	≥ 120 seconds		
			ECT reaches 75.0 °C when IAT min is ≤ 54.5°C and ≥ 10.0°C.		Fuel Condition	Ethanol ≤ 87%		
					Range #1 (Primary) Test			
					ECT at start run	≤ 70.0 °C		
					Average Airflow	≥ 5.0 gps		
			Range #2 (Alternate)		Vehicle speed	> 5 mph for at least 2.4 miles		
			ECT reaches 55.0 °C when IAT min is < 10.0°C and ≥ -7.0°C.					
					Range #2 (Alternate) Test			
					ECT at start run	≤ 50.0 °C		
					Average Airflow	≥ 5.0 gps		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Vehicle speed	> 5 mph for at least 2.4 miles		
					Accumulated Airflow Adjustments 1) Max. airflow amount added when accumulating airflow is	50.0 gps		
					2) Zero Airflow accumulated when airflow is	< 12.0 gps		
					3) With AFM active Airflow added to acculmulated is multiplyed by	50.00%		
					4) With Decel Fuel Cut Off active,			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					acculmulated airflow is reduced by multiplying actual airflow by	1.00 times		
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 when IAT min is < 54.5°C and ≥ 10.0°C.	See “P0128: Maximum Accumulated Time for IAT and Start-up ECT conditions“ in the Supporting tables section.	No Active DTC's Engine not run time	MAF_SensorFA IAT_SensorFA THMR_RCT_Sensor_Ckt_FA THMR_ECT_Sensor_Ckt_FA ≥ 1800 seconds	1 failure to set DTC 1 sec /sample Once per ignition key cycle	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Engine run time	10 ≤ Eng Run Tme ≤ 1600 seconds		
			Range #2 (Alternate) ECT reaches target temperature of 65.0 °C when IAT min is < 10.0°C and ≥ -7.0°C.		Fuel Condition	Ethanol ≤ 87%		
					Range #1 (Primary) Test			
					ECT at start run	-7.0 ≤ ECT ≤ 70.0 °C		
					Average Airflow	≥ 17.0 gps		
					Range #2 (Alternate) Test			
					ECT at start run	-7.0 ≤ ECT ≤ 60.0 °C		
					Average Airflow	≥ 17.0 gps		
Supercharger	P012B	Determines if the	See table		Engine Speed	>= 450 RPM	Continuous	Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Inlet Absolute Pressure (SCIAP) Sensor Performance		Supercharger Inlet Absolute Pressure Sensor input is stuck within the normal operating range	"Supercharger Intake Flow Rationality Diagnostic Failure Matrix" for combinations of model failures that can set this DTC. TPS model fails when Filtered Throttle Model Error MAF model fails when ABS(Measured Flow – Modeled Air Flow) Filtered MAP1 model fails when ABS(Measured	 > 400 kPa*(g/s) > 21 grams/sec	Engine Speed Coolant Temp Coolant Temp Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together)	<= 5800 RPM > -7 Deg C < 125 Deg C > -20 Deg C < 125 Deg C >= 0.00 Filtered Throttle Model multiplied by TPS Residual Weight Factor based on RPM Modeled Air Flow multiplied by MAF Residual Weight Factor based on RPM and MAF Residual Weight Factor Based on MAF Estimate	Calculation are performed every 12.5 msec	2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			MAP – MAP Model 1) Filtered MAP2 model fails when ABS(Measured MAP – MAP Model 2) Filtered SCIAP1 model fails when ABS(Measured SCIAP – SCIAP Model 1) Filtered SCIAP2 model fails when ABS(Measured SCIAP – SCIAP Model 2) Filtered	> 22.0 kPa > 22.0 kPa > 14.0 kPa > 14.0 kPa		MAP Model 1 multiplied by MAP1 Residual Weight Factor based on RPM and Boost Residual Weight Factor based on % of Boost MAP Model 2 multiplied by MAP2 Residual Weight Factor based on RPM and Boost Residual Weight Factor based on % of Boost SCIAP Model 1 multiplied by SCIAP1 Residual Weight Factor based on RPM and Boost Residual Weight Factor based on % of Boost SCIAP Model 2 multiplied by SCIAP2 Residual		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						Weight Factor based on RPM and Boost Residual Weight Factor based on % of Boost See table "IFRD Residual Weighting Factors".		
					No Active DTCs:	MAP_SensorCircuitFA EGRValve_FP EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensorFA ECT_sensor_FA ECT_Sensor_FP IAT_SensorFA IAT_SensorCircuitFP		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						CylDeacSystemTFTKO IAT2_SensorFA IAT2_SensorCircuitFP SCIAP_SensorCircuitFA SCIAP_SensorCircuitFP AmbientAirDefault_SC		
Supercharger Inlet Absolute Pressure (SCIAP) Sensor Circuit Low	P012C	Detects a continuous short to low or open in either the signal circuit or the SCIAP sensor.	SCIAP Voltage	< 3.0 % of 5 Volt Range (0.2 Volts = 3.5 kPa)	Continuous		320 failures out of 400 samples 1 sample every 12.5 msec	Type B 2 trips
Supercharger Inlet Absolute Pressure (SCIAP) Sensor Circuit High	P012D	Detects an open sensor ground or continuous short to high in either the signal circuit or the SCIAP sensor.	SCIAP Voltage	> 90.0 % of 5 Volt Range (4.5 Volts = 115.0 kPa)	Continuous		320 failures out of 400 samples 1 sample every 12.5 msec	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
O2S Circuit Low Voltage Bank 1 Sensor 1	P0131	This DTC determines if the O2 sensor circuit is shorted to low.	Measure Oxygen Sensor Signal.	Oxygen Sensor signal is < 50 mvolts	No Active DTC's AIR intrusive test	TPS_ThrottleAuthorityDefaulted MAP_SensorFA AIR System FA Ethanol Composition Sensor FA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA = Not active	380 failures out of 475 samples Frequency: Continuous in 100 milli - second loop	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Fuel intrusive test	= Not active		
					Idle intrusive test	= Not active		
					EGR intrusive test	= Not active		
					System Voltage	10.0 volts < system voltage< 32.0 volts		
					EGR Device Control	= Not active		
					Idle Device Control	= Not active		
					Fuel Device Control	= Not active		
					AIR Device Control	= Not active		
					Low Fuel Condition Diag	= False		
					Equivalence Ratio	0.9922 ≤ equiv. ratio ≤ 1.0137		
					Throttle Position	3 % <= Throttle <= 70 %		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Fuel Control State	= Closed Loop		
					Closed Loop Active	= TRUE		
					All Fuel Injectors for active Cylinders	Enabled (On)		
					Fuel Condition	Ethanol <= 87%		
					Fuel State	DFCO not active		
					All of the above met for			
					Time	> 2.0 seconds		
O2S Circuit High Voltage Bank 1 Sensor 1	P0132	This DTC determines if the O2 sensor circuit is shorted to high.	Measure Oxygen Sensor Signal.	Oxygen Sensor signal is > 1050 mvolts	No Active DTC's	TPS_ThrottleAuthorityDefaulted MAP_SensorFA MAF_SensorFA EvapPurgeSolenoidCircuit_FA	100 failures out of 125 samples Frequency: Continuous in 100 milli - second loop	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA		
					AIR intrusive test	= Not active		
					Fuel intrusive test	= Not active		
					Idle intrusive test	= Not active		
					EGR intrusive test	= Not active		
					System Voltage	10.0 volts < system voltage< 32.0 volts		
					EGR Device Control	= Not active		
					Idle Device	= Not active		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Fuel Device Control	= Not active		
					AIR Device Control	= Not active		
					Low Fuel Condition Diag	= False		
					Equivalence Ratio	0.9922 ≤ equiv. ratio ≤ 1.0137		
					Throttle Position	0.0 % <= Throttle <= 70.0 %		
					Fuel Control State	= Closed Loop		
					Fuel Control State	not = Power Enrichment		
					Closed Loop	= TRUE		
					All Fuel Injectors for active Cylinders	Enabled (On)		
					Fuel State	DFCO not active		
					Fuel Condition	Ethanol <= 87%		
					All of the above met for			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Time	> 2 seconds		
O2S Slow Response Bank 1 Sensor 1	P0133	This DTC determines if the O2 sensor response time is degraded.	The average response time is caluclated over the test time, and compared to the threshold. Or If Slope Time L/R or R/L Switches are below the threshold.	Refer to “P0133 - O2S Slow Response Bank 1 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	No Active DTC's	TPS_ThrottleAuthorityDefaulted MAP_SensorFA IAT_SensorFA ECT_Sensor_FA AmbientAirDefault MAF_SensorFA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA AIR System FA	Sample time is 60 seconds Frequency: Once per trip	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
				the signal is transitioning between 600 mvolts and 300 mvolts. An average rich to lean and lean to rich time are each calculated separately.		EthanolCompositionSensor_FA		
						EngineMisfireDetected_FA		
					Bank 1 Sensor 1 DTC's not active	= P0131, P0132 or P0134		
					System Voltage	10.0 volts < system voltage< 32.0 volts		
					EGR Device Control	= Not active		
					Idle Device Control	= Not active		
					Fuel Device Control	= Not active		
					AIR Device Control	= Not active		
					Low Fuel Condition Diag	= False		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						= Not Valid, See definition of **Multiple DTC Use_Green Sensor Delay Criteria** (B1S1, B2S1) in Supporting Tables tab.		
					Green O2S Condition			
					O2 Heater on for Learned Htr resistance	>= 40 seconds		
					Engine Coolant	= Valid		
					IAT	> 55 ºC		
					Engine Run Time	> -40 ºC		
					Time since any AFM status change	> 30 seconds		
					Time since Purge On to Off change	> 0.0 seconds		
					Time since Purge Off to On change	> 0.0 seconds		
					Purge duty cycle	>= 0 % duty cycle		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						15 gps <= engine airflow		
					Engine airflow	<= 55 gps		
					Engine speed	1000 <= RPM <= 3000		
					Fuel	< 87 % Ethanol		
					Baro	> 70 kpa		
					Throttle Position	>= 5 %		
					Low Fuel Condition Diag	= False		
					Fuel Control State	= Closed Loop		
					Closed Loop Active	= TRUE		
					LTM fuel cell	= Enabled		
					Transient Fuel Mass	<= 100.0 mgrams		
					Baro	= Not Defaulted		
					Fuel Control State	not = Power Enrichment		
					Fuel State	DFCO not active		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Commanded Proportional Gain	>= 0.0 %		
					All of the above met for			
					Time	> 4.5 seconds		
O2S Circuit Insufficient Activity Bank 1 Sensor 1	P0134	This DTC determines if the O2 sensor circuit is open.	Measure Oxygen Sensor Signal.	350 mvolts < Oxygen Sensor signal < 550 mvolts	No Active DTC's	TPS_ThrottleAuthorityDefaulted MAF_SensorFA EthanolCompositionSensor_FA	400 failures out of 500 samples. Minimum of 0 delta TPS changes required to report fail.	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
							Delta TPS is incremented when the TPS % change >= 0.0 %	
					System Voltage AFM Status Heater Warm-up delay Predicted Exhaust Temp (by location) Engine Run Time Fuel	10.0 volts < system voltage< 32.0 volts = All Cylinders active = Complete = Wamed Up > 30 seconds <= 87 % Ethanol	Frequency: Continuous 100msec loop	
O2S Heater Performance Bank 1 Sensor 1	P0135	This DTC determines if the O2 sensor heater is functioning	Measured Heater Current.	Measured Heater current < 0.3 amps -OR- Measured	No Active DTC's System Voltage	ECT_Sensor_FA 10.0 volts < system voltage< 32.0 volts	8 failures out of 10 samples	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		properly by monitoring the current through the heater circuit.		Heater current > 3.1 amps	Heater Warm-up delay B1S1 O2S Heater Duty Cycle O2S Heater device control	= Complete > zero = Not active	Frequency: 1 tests per trip 5 seconds delay between tests and 1 second execution rate	
					All of the above met for			
					Time	> 120 seconds		
O2S Circuit Low Voltage Bank 1 Sensor 2	P0137	This DTC determines if the O2 sensor circuit is shorted to low.	Measure Oxygen Sensor Signal.	Oxygen Sensor signal is < 50 mvolts	No Active DTC's	TPS_ThrottleAuthorityDefaulted MAP_SensorFA AIR System FA	430 failures out of 540 samples Frequency:	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						Ethanol Composition Sensor FA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA	Continuous in 100 milli - second loop	
					AIR intrusive test	= Not active		
					Fuel intrusive test	= Not active		
					Idle intrusive test	= Not active		
					EGR intrusive test	= Not active		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					System Voltage	10.0 volts < system voltage< 32.0 volts		
					EGR Device Control	= Not active		
					Idle Device Control	= Not active		
					Fuel Device Control	= Not active		
					AIR Device Control	= Not active		
					Low Fuel Condition Diag	= False		
					Equivalence Ratio	0.9922 ≤ equiv. ratio ≤ 1.0137		
					Throttle Position	3 % <= Throttle <= 70 %		
					Fuel Control State	= Closed Loop		
					Closed Loop Active	= TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					All Fuel Injectors for active Cylinders Fuel Condition Fuel State	Enabled (On) Ethanol <= 87% DFCO not active		
					All of the above met for			
					Time	> 2.0 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	No Active DTC's	TPS_ThrottleAuthorityDefaulted MAP_SensorFA MAF_SensorFA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA	100 failures out of 125 samples Frequency: Continuous in 100 milli - second loop	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt _FA FuelInjectorCircuit_FA		
					AIR intrusive test	= Not active		
					Fuel intrusive test	= Not active		
					Idle intrusive test	= Not active		
					EGR intrusive test	= Not active		
					System Voltage	10.0 volts < system voltage< 32.0 volts		
					EGR Device Control	= Not active		
					Idle Device Control	= Not active		
					Fuel Device Control	= Not active		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					AIR Device Control	= Not active		
					Low Fuel Condition Diag	= False		
					Equivalence Ratio	0.9922 ≤ equiv. ratio ≤ 1.0137		
					Throttle Position	3.0 % <= Throttle <= 70.0 %		
					Fuel Control State	= Closed Loop		
					Fuel Control State	not = Power Enrichment		
					Closed Loop Active	= TRUE		
					All Fuel Injectors for active Cylinders	Enabled (On)		
					Fuel State	DFCO not active		
					Fuel Condition	Ethanol <= 87%		
					All of the above met for			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Time	> 2 seconds		
O2 Sensor Slow Response Rich to Lean Bank 1 Sensor 2	P013A	This DTC determines if the post catalyst O2 sensor has Slow Response in a predefined Rich to Lean voltages range during Rich to Lean transition. The diagnostic is an intrusive test which runs in a DFCO mode to achieve the required response.	The 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 upper and lower voltage thresholds) is greater than the airflow threshold.	1) B1S2 EWMA normalized integral value > 8.5 units OR 2) Accumulated air flow during slow rich to lean test > 65 grams (upper threshold is 450 mvolts and lower threshold is 150 mvolts)	No Active DTC's	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc= FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed	1 trips Type A EWMA

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA		
					B1S2 Failed this key cycle	P013B, P013E, P013F, P2270 or P2271		
					System Voltage	10.0 volts < system voltage< 32.0 volts		
					Learned heater resistance	= Valid		
					ICAT MAT Burnoff delay	= Not Valid		
					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		
					Post fuel cell	= enabled		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					DTC's Passed DTC's Passed	= P2270 (and P2272 (if applicable)) = P013E (and P014A (if applicable))		
					After above conditions are met: DFCO mode is continued (wo driver initiated pedal input).			
O2 Sensor Slow Response Lean to Rich Bank 1 Sensor 2	P013B	This DTC determines if the post catalyst O2 sensor has Slow Response in a predefined Lean to Rich voltages range during Lean to Rich transition. The diagnostic is an	The EWMA of the Post O2 sensor normalized integral value is greater than the threshold. OR The Accumulated mass air flow monitored during	1) B1S2 EWMA normalized integral value > 30.0 units OR 2) Accumulated air flow during slow lean to rich test > 140	No Active DTC's	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc= FALSE for the given Fuel Bank OR	1 trips Type A EWMA

Component/	Fault	Monitor Strategy	Malfunction	Threshold	Secondary	Enable	Time	MIL
System	Code	Description	Criteria	Value	Parameters	Conditions	Required	illum.
		intrusive test which increases the delivered A/F ratio to achieve the required rich threshold.	the Slow Response Test (between the lower and upper voltage thresholds) is greater than the airflow threshold.	grams (lower threshold is 350 mvolts and upper threshold is 650 mvolts)	B1S2 Failed this key cycle System Voltage Learned heater resistance	MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA P013A, P013E, P013F, P2270 or P2271 10.0 volts < system voltage< 32.0 volts = Valid	NaPOPD_b_RapidResponseActive = TRUE, 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.
					ICAT MAT Burnoff delay	= 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		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Post fuel cell	= enabled
					DTC's Passed	= P2270 (and P2272 (if applicable))
					DTC's Passed	= P013E (and P014A (if applicable))
					DTC's Passed	= P013A (and P013C (if applicable))
					DTC's Passed	= P2271 (and P2273 (if applicable))
					DTC's Passed	= P013F (and P014B (if applicable))
					After above conditions are met: Fuel Enrich mode continued.	
					During test: Fuel EQR must stay between:	0.95 <= EQR <= 1.10
O2 Sensor Slow Response	P013C	This DTC determines if the post catalyst O2	The EWMA of the Post O2 sensor normalized integral	1) B1S2 EWMA normalized integral value >	No Active DTC's	TPS_ThrottleAuthorityDefaulted	Frequency: Once per trip	1 trips Type A EWMA

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Rich to Lean Bank 2 Sensor 2		sensor has Slow Response in a predefined Rich to Lean voltages range during Rich to Lean transition. The diagnostic is an intrusive test which runs in a DFCO mode to achieve the required response.	value is greater than the threshold. OR The Accumulated mass air flow monitored during the Slow Response Test (between the upper and lower voltage thresholds) is greater than the airflow threshold.	8.5 units OR 2) Accumulated air flow during slow rich to lean test > 65 grams (upper threshold is 450 mvolts and lower threshold is 150 mvolts)		ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA	Note: if NaPOPD_b_ResetFastRespFunc= FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, 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.
						EthanolCompositionSensor_FA		
					B2S2 Failed this key cycle	P013D, P014A, P014B, P2272 or P2273		
					System Voltage	10.0 volts < system voltage< 32.0 volts		
					Learned heater resistance	= Valid		
					ICAT MAT Burnoff delay	= Not Valid		
					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		
					Post fuel cell	= enabled		
					DTC's Passed	= P2270 (and P2272 (if applicable))		
					DTC's Passed	= P013E (and P014A (if applicable))		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					After above conditions are met: DFCO mode is continued (wo driver initiated pedal input).			
O2 Sensor Slow Response Lean to Rich Bank 2 Sensor 2	P013D	This DTC determines if the post catalyst O2 sensor has Slow Response in a predefined Lean to Rich voltages range during Lean to Rich transition. The diagnostic is an intrusive test which increases the delivered A/F ratio to achieve the required rich threshold.	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.	1) B1S2 EWMA normalized integral value > 30.0 units OR 2) Accumulated air flow during slow lean to rich test > 140 grams (lower threshold is 350 mvolts and upper threshold is 650 mvolts)	No Active DTC's	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc= FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed	1 trips Type A EWMA

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA		
					B2S2 Failed this key cycle	P013C, P014A, P014B, P2272 or P2273		
					System Voltage	10.0 volts < system voltage< 32.0 volts		
					Learned heater resistance	= Valid		
					ICAT MAT Burnoff delay	= Not Valid		
					Green O2S Condition	= Not Valid, See definition of **Multiple DTC Use_Green Sensor Delay Criteria** (B1S2, B2S2) in Supporting Tables tab.		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						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.)		
					Green Cat System Condition			
					Low Fuel Condition Diag	= False		
					Post fuel cell	= enabled		
					DTC's Passed	= P2270 (and P2272 (if applicable))		
					DTC's Passed	= P013E (and P014A (if applicable))		
					DTC's Passed	= P013A (and P013C (if applicable))		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					DTC's Passed	= P2271 (and P2273 (if applicable))		
					DTC's Passed	= P013F (and P014B (if applicable))		
					After above conditions are met: Fuel Enrich mode continued.			
					During test: Fuel EQR must stay between:	0.95 <= EQR <= 1.10		
O2 Sensor Delayed Response Rich to Lean Bank 1 Sensor 2	P013E	This DTC determines if the post 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	Post O2 sensor cannot go below the threshold voltage. AND The Accumulated mass air flow monitored during the Delayed Response Test is	1) Post O2S signal > 450 mvolts AND 2) Accumulated air flow during stuck rich test > 50 grams.	No Active DTC's	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc= FALSE for the given Fuel Bank OR	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		DFCO mode to achieve the required response.	greater than the threshold.				NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed	
						MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA		
					B1S2 Failed this key cycle	P013A, P013B, P013F, P2270 or P2271		
					System Voltage	10.0 volts < system voltage< 32.0 volts		
					Learned heater resistance	= Valid		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					ICAT MAT Burnoff delay	= Not Valid		
					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		
					Post fuel cell	= enabled		
					DTC's Passed	= P2270 and P2272 (if applicable)		
					Number of fueled cylinders	≤ 8 cylinders		
					After above conditions are met: DFCO mode is entered (wo driver initiated pedal input).			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
O2 Sensor Delayed Response Lean to Rich Bank 1 Sensor 2	P013F	This DTC determines if the post catalyst O2 sensor has an initial delayed response to an A/F change from Lean to Rich. The diagnostic is an intrusive test which increases the delivered A/F ratio to achieve the required rich threshold.	Post O2 sensor cannot go above the threshold voltage. AND The Accumulated mass air flow monitored during the Delayed Response Test is greater than the threshold.	1) Post O2S signal < 350 mvolts AND 2) Accumulated air flow during lean to rich test > 250 grams.	No Active DTC's	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc= FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed.	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						EngineMisfireDetected_FA EthanolCompositionSensor_FA		
					B1S2 Failed this key cycle	P013A, P013B, P013E, P2270 or P2271		
					System Voltage	10.0 volts < system voltage< 32.0 volts		
					Learned heater resistance	= Valid		
					ICAT MAT Burnoff delay	= Not Valid		
					Green O2S Condition	= Not Valid, See definition of **Multiple DTC Use_Green Sensor Delay Criteria** (B1S2, B2S2) in Supporting Tables tab.		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						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.)		
					Green Cat System Condition			
					Low Fuel Condition Diag	= False		
					Post fuel cell	= enabled		
					DTC's Passed	= P2270 (and P2272 (if applicable))		
					DTC's Passed	= P013E (and P014A (if applicable))		
					DTC's Passed	= P013A (and P013C (if applicable))		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					DTC's Passed	= P2271 (and P2273 (if applicable))		
					Number of fueled cylinders	≥ 0 cylinders		
					After above conditions are met: Fuel Enrich mode entered.			
					During test: Fuel EQR must stay between:	0.95 <= EQR <= 1.10		
O2S Circuit Insufficient Activity Bank 1 Sensor 2	P0140	This DTC determines if the O2 sensor circuit is open.	Measure Oxygen Sensor Signal.	410 mvolts < Oxygen Sensor signal < 490 mvolts	No Active DTC's	TPS_ThrottleAuthorityDefaulted MAF_SensorFA EthanolCompositionSensor_FA	590 failures out of 740 samples. Minimum of 0 delta TPS changes required to report fail.	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
							Delta TPS is incremented when the TPS % change >= 0.0 %	
					System Voltage AFM Status Heater Warm-up delay Predicted Exhaust Temp (by location) Engine Run Time Fuel	10.0 volts < system voltage < 32.0 volts = All Cylinders active = Complete = Wamed Up > 30 seconds <= 87 % Ethanol	100msec loop Frequency: Once per trip for post sensors	
O2S Heater Performance Bank 1	P0141	This DTC determines if the O2 sensor	Measured Heater Current.	Measured Heater current < 0.3 amps	No Active DTC's	ECT_Sensor_FA	8 failures out of 10 samples	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Sensor 2		heater is functioning properly by monitoring the current through the heater circuit.		-OR- Measured Heater current > 2.9 amps	System Voltage Heater Warm-up delay B1S2 O2S Heater Duty Cycle O2S Heater device control **All of the above met for** Time	10.0 volts < system voltage< 32.0 volts = Complete > zero = Not active > 120 seconds	Frequency: 1 tests per trip 5 seconds delay between tests and 1 second execution rate	
O2 Sensor Delayed Response	P014A	This DTC determines if the post catalyst O2	Post O2 sensor cannot go below the threshold voltage.	1) Post O2S signal > 450 mvolts	No Active DTC's	TPS_ThrottleAuthorityDefaulted	Frequency: Once per trip	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Rich to Lean Bank 2 Sensor 2		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.	AND The Accumulated mass air flow monitored during the Delayed Response Test is greater than the threshold.	AND 2) Accumulated air flow during stuck rich test > 50 grams.		ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA	Note: if NaPOPD_b_ResetFastRespFunc= FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, 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.
						EthanolCompositionSensor_FA		
					B2S2 Failed this key cycle	P013C, P013D, P014B, P2272 or P2273		
					System Voltage	10.0 volts < system voltage< 32.0 volts		
					Learned heater resistance	= Valid		
					ICAT MAT Burnoff delay	= Not Valid		
					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		
					Post fuel cell	= enabled		
					DTC's Passed	= P2270 and P2272 (if applicable)		
					Number of fueled cylinders	≤ 8 cylinders		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					After above conditions are met: DFCO mode is entered (wo driver initiated pedal input).			
O2 Sensor Delayed Response Lean to Rich Bank 2 Sensor 2	P014B	This DTC determines if the post catalyst O2 sensor has an initial delayed response to an A/F change from Lean to Rich. The diagnostic is an intrusive test which increases the delivered A/F ratio to achieve the required rich threshold.	Post O2 sensor cannot go above the threshold voltage. AND The Accumulated mass air flow monitored during the Delayed Response Test is greater than the threshold.	1) Post O2S signal < 350 mvolts AND 2) Accumulated air flow during lean to rich test > 250 grams.	No Active DTC's	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc= FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA		
					B2S2 Failed this key cycle	P013C, P013D, P014A, P2272 or P2273		
					System Voltage	10.0 volts < system voltage< 32.0 volts		
					Learned heater resistance	= Valid		
					ICAT MAT Burnoff delay	= Not Valid		
					Green O2S Condition	= Not Valid, See definition of **Multiple DTC Use_Green Sensor Delay Criteria** (B1S2, B2S2) in Supporting Tables tab.		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						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.)		
					Green Cat System Condition			
					Low Fuel Condition Diag	= False		
					Post fuel cell	= enabled		
					DTC's Passed	= P2270 (and P2272 (if applicable))		
					DTC's Passed	= P013E (and P014A (if applicable))		
					DTC's Passed	= P013A (and P013C (if applicable))		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					DTC's Passed Number of fueled cylinders	= P2271 (and P2273 (if applicable)) ≥ 0 cylinders		
					After above conditions are met: Fuel Enrich mode entered.			
					During test: Fuel EQR must stay between:	0.95 <= EQR <= 1.10		
O2S Circuit Low Voltage Bank 2 Sensor 1	P0151	This DTC determines if the O2 sensor circuit is shorted to low.	Measure Oxygen Sensor Signal.	Oxygen Sensor signal is < 50 mvolts	No Active DTC's	TPS_ThrottleAuthorityDefaulted MAP_SensorFA AIR System FA Ethanol Composition Sensor FA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA	380 failures out of 475 samples Frequency: Continuous in 100 milli - second loop	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA		
					AIR intrusive test	= Not active		
					Fuel intrusive test	= Not active		
					Idle intrusive test	= Not active		
					EGR intrusive test	= Not active		
					System Voltage	10.0 volts < system voltage< 32.0 volts		
					EGR Device Control	= Not active		
					Idle Device Control	= Not active		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Fuel Device Control	= Not active		
					AIR Device Control	= Not active		
					Low Fuel Condition Diag	= False		
					Equivalence Ratio	0.9922 ≤ equiv. ratio ≤ 1.0137		
					Throttle Position	3 % <= Throttle <= 70 %		
					Fuel Control State	= Closed Loop		
					Closed Loop Active	= TRUE		
					All Fuel Injectors for active Cylinders	Enabled (On)		
					Fuel Condition	Ethanol <= 87%		
					Fuel State	DFCO not active		
					All of the above met for			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Time	> 2.0 seconds		
O2S Circuit High Voltage Bank 2 Sensor 1	P0152	This DTC determines if the O2 sensor circuit is shorted to high.	Measure Oxygen Sensor Signal.	Oxygen Sensor signal is > 1050 mvolts	No Active DTC's AIR intrusive test	TPS_ThrottleAuthorityDefaulted MAP_SensorFA MAF_SensorFA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA = Not active	100 failures out of 125 samples Frequency: Continuous in 100 milli - second loop	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Fuel intrusive test	= Not active		
					Idle intrusive test	= Not active		
					EGR intrusive test	= Not active		
					System Voltage	10.0 volts < system voltage< 32.0 volts		
					EGR Device Control	= Not active		
					Idle Device Control	= Not active		
					Fuel Device Control	= Not active		
					AIR Device Control	= Not active		
					Low Fuel Condition Diag	= False		
					Equivalence Ratio	0.9922 ≤ equiv. ratio ≤ 1.0137		
					Throttle Position	0.0 % <= Throttle <= 70.0 %		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Fuel Control State	= Closed Loop		
					Fuel Control State	not = Power Enrichment		
					Closed Loop Active	= TRUE		
					All Fuel Injectors for active Cylinders	Enabled (On)		
					Fuel State	DFCO not active		
					Fuel Condition	Ethanol <= 87%		
					All of the above met for			
					Time	> 2 seconds		
O2S Slow Response Bank 2 Sensor 1	P0153	This DTC determines if the O2 sensor response time is degraded.	The average response time is caluclated over the test time, and compared to the threshold.	Refer to “P0153 - O2S Slow Response Bank 2 Sensor 1" Pass/Fail Threshold table	No Active DTC's	TPS_ThrottleAuthorityDefaulted MAP_SensorFA IAT_SensorFA ECT_Sensor_FA	Sample time is 60 seconds Frequency:	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			Or If Slope Time L/R or R/L Switches are below the threshold.	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	Bank 2 Sensor 1 DTC's not active	AmbientAirDefault MAF_SensorFA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA AIR System FA EthanolCompositionSensor_FA EngineMisfireDetected_FA = P0151, P0152 or P0154	Once per trip	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
				lean and lean to rich time are each calculated separately	System Voltage	10.0 volts < system voltage< 32.0 volts		
					EGR Device Control	= Not active		
					Idle Device Control	= Not active		
					Fuel Device Control	= Not active		
					AIR Device Control	= Not active		
					Low Fuel Condition Diag	= False		
					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	>= 40 seconds		
					Engine Coolant	= Valid		
					IAT	> 55 ºC		
						> -40 ºC		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Engine Run Time	> 30 seconds		
					Time since any AFM status change	> 0.0 seconds		
					Time since Purge On to Off change	> 0.0 seconds		
					Time since Purge Off to On change	> 0.0 seconds		
					Purge duty cycle	>= 0 % duty cycle		
					Engine airflow	15 gps <= engine airflow <= 55 gps		
					Engine speed	1000 <= RPM <= 3000		
					Fuel	< 87 % Ethanol		
					Baro	> 70 kpa		
					Throttle Position	>= 5 %		
					Low Fuel Condition Diag	= False		
					Fuel Control State	= Closed Loop		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Closed Loop Active	= TRUE
					LTM fuel cell	= Enabled
					Transient Fuel Mass	<= 100.0 mgrams
					Baro	= Not Defaulted
					Fuel Control State	not = Power Enrichment
					Fuel State	DFCO not active
					Commanded Proportional Gain	>= 0.0 %
					All of the above met for	
					Time	> 4.5 seconds
O2S Circuit Insufficient Activity Bank 2 Sensor 1	P0154	This DTC determines if the O2 sensor circuit is open.	Measure Oxygen Sensor Signal.	350 mvolts < Oxygen Sensor signal < 550 mvolts	No Active DTC's	TPS_ThrottleAuthorityDefaulted MAF_SensorFA	400 failures out of 500 samples.	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						EthanolCompositionSensor_FA	Minimum of 0 delta TPS changes required to report fail. Delta TPS is incremented when the TPS % change >= 0.0 %	
					System Voltage	10.0 volts < system voltage< 32.0 volts		
					AFM Status	= All Cylinders active		
					Heater Warm-up delay	= Complete	Frequency: Continuous	
					Predicted Exhaust Temp (by location)	= Wamed Up		
					Engine Run Time	> 30 seconds	100msec loop	
					Fuel	<= 87 % Ethanol		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
O2S Heater Performance Bank 2 Sensor 1	P0155	This DTC determines if the O2 sensor heater is functioning properly by monitoring the current through the heater circuit.	Measured Heater Current.	Measured Heater current < 0.3 amps -OR- Measured Heater current > 3.1 amps	No Active DTC's System Voltage Heater Warm-up delay B2S1 O2S Heater Duty Cycle O2S Heater device control **All of the above met for** Time	ECT_Sensor_FA 10.0 volts < system voltage< 32.0 volts = Complete > zero = Not active > 120 seconds	8 failures out of 10 samples Frequency: 1 tests per trip 5 seconds delay between tests and 1 second execution rate	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
O2S Circuit Low Voltage Bank 2 Sensor 2	P0157	This DTC determines if the O2 sensor circuit is shorted to low.	Measure Oxygen Sensor Signal.	Oxygen Sensor signal is < 50 mvolts	No Active DTC's AIR intrusive test	TPS_ThrottleAuthorityDefaulted MAP_SensorFA AIR System FA Ethanol Composition Sensor FA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA = Not active	430 failures out of 540 samples Frequency: Continuous in 100 milli - second loop	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Fuel intrusive test	= Not active		
					Idle intrusive test	= Not active		
					EGR intrusive test	= Not active		
					System Voltage	10.0 volts < system voltage< 32.0 volts		
					EGR Device Control	= Not active		
					Idle Device Control	= Not active		
					Fuel Device Control	= Not active		
					AIR Device Control	= Not active		
					Low Fuel Condition Diag	= False		
					Equivalence Ratio	0.9922 ≤ equiv. ratio ≤ 1.0137		
					Throttle Position	3 % <= Throttle <= 70 %		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Fuel Control State	= Closed Loop		
					Closed Loop Active	= TRUE		
					All Fuel Injectors for active Cylinders	Enabled (On)		
					Fuel Condition	Ethanol <= 87%		
					Fuel State	DFCO not active		
					All of the above met for			
					Time	> 2.0 seconds		
O2S Circuit High Voltage Bank 2 Sensor 2	P0158	This DTC determines if the O2 sensor circuit is shorted to high.	Measure Oxygen Sensor Signal.	Oxygen Sensor signal is > 1050 mvolts	No Active DTC's	TPS_ThrottleAuthorityDefaulted MAP_SensorFA MAF_SensorFA EvapPurgeSolenoidCircuit_FA	100 failures out of 125 samples Frequency: Continuous in 100 milli - second loop	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA		
					AIR intrusive test	= Not active		
					Fuel intrusive test	= Not active		
					Idle intrusive test	= Not active		
					EGR intrusive test	= Not active		
					System Voltage	10.0 volts < system voltage< 32.0 volts		
					EGR Device Control	= Not active		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Idle Device Control	= Not active		
					Fuel Device Control	= Not active		
					AIR Device Control	= Not active		
					Low Fuel Condition Diag	= False		
					Equivalence Ratio	0.9922 ≤ equiv. ratio ≤ 1.0137		
					Throttle Position	3.0 % <= Throttle <= 70.0 %		
					Fuel Control State	= Closed Loop		
					Fuel Control State	not = Power Enrichment		
					Closed Loop Active	= TRUE		
					All Fuel Injectors for active Cylinders	Enabled (On)		
					Fuel State	DFCO not active		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Fuel Condition	Ethanol <= 87%		
					All of the above met for			
					Time	> 2 seconds		
O2 Sensor Delayed Response Rich to Lean Bank 1 Sensor 1	P015A	This DTC determines if the pre catalyst O2 sensor has an initial delayed response to an A/F change from Rich to Lean. The diagnostic is an intrusive test which runs in a DFCO mode to achieve the required response.	The EWMA of the Pre O2 sensor normalized R2L time delay value OR [The Accumulated time monitored during the R2L Delayed Response Test (Gross failure). AND Pre O2 sensor	> 0.46 EWMA (sec) ≥ 1.60 Seconds > 550 mvolts	No Active DTC's	TPS_ThrottleAuthorityDefaulted MAP_SensorFA IAT_SensorFA ECT_Sensor_FA AmbientAirDefault MAF_SensorFA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA	Frequency: Once per trip Note: if NaESPD_b_FastInitResplsActive = TRUE for the given Fuel Bank OR NaESPD_b_RapidResponseIsActive = TRUE, multiple tests per trip are allowed	1 trips Type A EWMA

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			voltage is above]			FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA AIR System FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EthanolCompositionSensor_FA EngineMisfireDetected_FA P0131 P0132 P0134		
					System Voltage EGR Device Control Idle Device Control Fuel Device Control AIR Device Control	10.0 < Volts < 32.0 = Not active = Not active = Not active = Not active		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Low Fuel Condition Diag	= False		
					Green O2S Condition	= Not Valid, See definition of **Multiple DTC Use_Green Sensor Delay Criteria** (B1S1, B2S1) in Supporting Tables tab.		
					O2 Heater (pre sensor) on for	≥ 40 seconds		
					Learned Htr resistance	= Valid		
					Engine Coolant	> 55 ºC		
					IAT	> -40 ºC		
					Engine run Accum	> 30 seconds		
					Engine Speed to initially enable	950 ≤ RPM ≤ 2000		
					Engine Speed range to keep test enabled (after initially	850 ≤ RPM ≤ 2100		
					Engine Airflow	3 ≤ gps ≤ 20		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Vehicle Speed to initially enable	44.7 ≤ MPH ≤ 80.8		
					Vehicle Speed range to keep test enabled (after initially	38.5 ≤ MPH ≤ 85.7 mph		
					Closed loop integral	0.74 ≤ C/L Int ≤ 1.08		
					Closed Loop Active	= TRUE		
					Evap	not in control of purge		
					Ethanol	not in estimate mode		
					Post fuel cell	= enabled		
					EGR Intrusive diagnostic	= not active		
					All post sensor heater delays	= not active		
					O2S Heater (post sensor) on Time	≥ 80.0 sec		
					Predicted Catalyst temp	600 ≤ ºC ≤ 900		
					Fuel State	= DFCO possible		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					All of the above met for at least 0.5 seconds, and then the Force Cat Rich intrusive stage is requested.			
					Pre O2S voltage B1S1 at end of Cat Rich stage Fuel State Number of fueled cylinders	≥ 700 mvolts = DFCO active ≤ 7 cylinders		
					After above conditions are met: DFCO entered (wo driver initiated pedal input).			
O2 Sensor Delayed Response Lean to Rich Bank 1 Sensor 1	P015B	This DTC determines if the pre catalyst O2 sensor has an initial delayed response to an A/F change from	The EWMA of the Pre O2 sensor normalized L2R time delay value OR	> 0.42 EWMA (sec)	No Active DTC's	TPS_ThrottleAuthorityDefaulted MAP_SensorFA IAT_SensorFA ECT_Sensor_FA AmbientAirDefault MAF_SensorFA	Frequency: Once per trip Note: if NaESPD_b_FastInitResplsActive = TRUE for the	1 trips Type A EWMA

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		Lean 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). AND Pre O2 sensor voltage is below] OR At end of Cat Rich stage the Pre O2 sensor output is	≥ 1.78 Seconds < 350 mvolts < 700 mvolts		EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA AIR System FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EthanolCompositionSensor_FA EngineMisfireDetected_FA P0131 P0132 P0134	given Fuel Bank OR NaESPD_b_RapidResponseIsActive = TRUE, 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.
					System Voltage	10.0 < Volts < 32.0		
					EGR Device Control	= Not active		
					Idle Device Control	= Not active		
					Fuel Device Control	= Not active		
					AIR Device Control	= Not active		
					Low Fuel Condition Diag	= False		
					Green O2S Condition	= Not Valid, See definition of **Multiple DTC Use_Green Sensor Delay Criteria** (B1S1, B2S1) in Supporting Tables tab.		
					O2 Heater (pre sensor) on for	≥ 40 seconds		
					Learned Htr resistance	= Valid		
					Engine Coolant	> 55 ºC		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					IAT Fuel State Number of fueled cylinders	> -40 ºC = DFCO inhibit ≥ 2 cylinders		
					When above conditions are met: Fuel Enrich mode entered (Test begins)			
					During test: Engine Airflow must stay between: and the delta Engine Airflow over 12.5msec must be :	 0 ≤ gps ≤ 20 <= 1.2 gps		
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	The EWMA of the Pre O2 sensor normalized R2L time delay value OR	> 0.46 EWMA (sec)	No Active DTC's	TPS_ThrottleAuthorityDefaulted MAP_SensorFA IAT_SensorFA ECT_Sensor_FA AmbientAirDefault MAF_SensorFA	Frequency: Once per trip Note: if NaESPD_b_FastInitRespIsActive = TRUE for the	1 trips Type A EWMA

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		Rich to Lean. The diagnostic is an 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). AND Pre O2 sensor voltage is above]	≥ 1.54 Seconds > 550 mvolts		EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA AIR System FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EthanolCompositionSensor_FA EngineMisfireDetected_FA P0131 P0132 P0134	given Fuel Bank OR NaESPD_b_RapidResponseIsActive = TRUE, 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.
					System Voltage	10.0 < Volts < 32.0		
					EGR Device Control	= Not active		
					Idle Device Control	= Not active		
					Fuel Device Control	= Not active		
					AIR Device Control	= Not active		
					Low Fuel Condition Diag	= False		
					Green O2S Condition	= Not Valid, See definition of **Multiple DTC Use_Green Sensor Delay Criteria** (B1S1, B2S1) in Supporting Tables tab.		
					O2 Heater (pre sensor) on for	≥ 40 seconds		
					Learned Htr resistance	= Valid		
					Engine Coolant	> 55 ºC		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					IAT	> -40 ºC		
					Engine run Accum	> 30 seconds		
					Engine Speed to initially enable	950 ≤ RPM ≤ 2000		
					Engine Speed range to keep test enabled (after initially	850 ≤ RPM ≤ 2100		
					Engine Airflow	3 ≤ gps ≤ 20		
					Vehicle Speed to initially enable	44.7 ≤ MPH ≤ 80.8		
					Vehicle Speed range to keep test enabled (after initially	38.5 ≤ MPH ≤ 85.7 mph		
					Closed loop integral	0.74 ≤ C/L Int ≤ 1.08		
					Closed Loop Active	= TRUE		
					Evap	not in control of purge		
					Ethanol	not in estimate mode		
					Post fuel cell	= enabled		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					EGR Intrusive diagnostic	= not active		
					All post sensor heater delays	= not active		
					O2S Heater (post sensor) on Time	≥ 80.0 sec		
					Predicted Catalyst temp	600 ≤ ºC ≤ 900		
					Fuel State	= DFCO possible		
					All of the above met for at least 0.5 seconds, and then the Force Cat Rich intrusive stage is requested.			
					Pre O2S voltage B1S1 at end of Cat Rich stage	≥ 700 mvolts		
					Fuel State	= DFCO active		
					Number of fueled cylinders	≤ 7 cylinders		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					After above conditions are met: DFCO entered (wo driver initiated pedal input).			
O2 Sensor Delayed Response Lean to Rich Bank 2 Sensor 1	P015D	This DTC determines if the pre catalyst O2 sensor has an initial delayed response to an A/F change from Lean to Rich. The diagnostic is an intrusive test which runs in an enriched fuel mode to achieve the required response.	The EWMA of the Pre O2 sensor normalized L2R time delay value OR [The Accumulated time monitored during the L2R Delayed Response Test (Gross failure). AND Pre O2 sensor voltage is below] OR	> 0.42 EWMA (sec) ≥ 1.90 Seconds < 350 mvolts	No Active DTC's	TPS_ThrottleAuthorityDefaulted MAP_SensorFA IAT_SensorFA ECT_Sensor_FA AmbientAirDefault MAF_SensorFA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA AIR System FA	Frequency: Once per trip Note: if NaESPD_b_FastInitRespIsActive = TRUE for the given Fuel Bank OR NaESPD_b_RapidResponseIsActive = TRUE, multiple tests per trip are allowed	1 trips Type A EWMA

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			At end of Cat Rich stage the Pre O2 sensor output is	< 700 mvolts		FuelTrimSystemB1_FA FuelTrimSystemB2_FA EthanolCompositionSensor_FA EngineMisfireDetected_FA P0131 P0132 P0134		
					System Voltage	10.0 < Volts < 32.0		
					EGR Device Control	= Not active		
					Idle Device Control	= Not active		
					Fuel Device Control	= Not active		
					AIR Device Control	= Not active		
					Low Fuel Condition Diag	= False		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Green O2S Condition	= Not Valid, See definition of **Multiple DTC Use_Green Sensor Delay Criteria** (B1S1, B2S1) in Supporting Tables tab.		
					O2 Heater (pre sensor) on for	≥ 40 seconds		
					Learned Htr resistance	= Valid		
					Engine Coolant	> 55 ºC		
					IAT	> -40 ºC		
					Fuel State	= DFCO inhibit		
					Number of fueled cylinders	≥ 2 cylinders		
					When above conditions are met: Fuel Enrich mode entered (Test begins)			
					During test: Engine Airflow must stay between:	0 ≤ gps ≤ 20		
					and the delta			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Engine Airflow over 12.5msec must be :	<= 1.2 gps		
O2S Circuit Insufficient Activity Bank 2 Sensor 2	P0160	This DTC determines if the O2 sensor circuit is open.	Measure Oxygen Sensor Signal.	410 mvolts < Oxygen Sensor signal < 490 mvolts	No Active DTC's	TPS_ThrottleAuthorityDefaulted MAF_SensorFA	590 failures out of 740 samples.	2 trips Type B
						EthanolCompositionSensor_FA	Minimum of 0 delta TPS changes required to report fail. Delta TPS is incremented when the TPS % change >= 0.0 %	
					System Voltage	10.0 volts < system voltage< 32.0 volts		
					AFM Status	= All Cylinders active		
					Heater Warm-up delay	= Complete	100msec loop	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Predicted Exhaust Temp (by location) Engine Run Time Fuel	= Wamed Up > 30 seconds <= 87 % Ethanol	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	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	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		the heater circuit.			B2S2 O2S Heater Duty Cycle O2S Heater device control	> zero = Not active	5 seconds delay between tests and 1 second execution rate	
					All of the above met for			
					Time	> 120 seconds		
Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Fuel System Too Lean Bank 1	P0171	Determines if the fuel control system is in a lean condition, based on the filtered long-term	The filtered long-term fuel trim metric	>= **Long Term Trim Lean Table**	Engine speed BARO Coolant Temp MAP Inlet Air Temp MAF	375 <rpm< 7000 > 70 kPa -40 <°C< 150 10 <kPa< 255 -20 <°C< 150 1.0 <g/s< 510.0	Frequency: 100 ms Continuous Loop Development	2 Trip(s) Type B
			AND					
			The filtered short-	>= 0.100				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		and short-term fuel trim.	term fuel trim metric (NOTE: any value < 0.95 effectively nullifies the short-term fuel trim criteria)		Fuel Level	> 10 % or if fuel sender is faulty the diagnostic will bypass the fuel level criteria.	data indicates that the Fuel Adjustment System Diagnostic (FASD) is typically enabled during **(66)** % of the EPAIII drive cycle. This is also typical of real-world driving, however values will vary (higher or lower) based on the actual conditions	
					Long Term Fuel Trim data accumulation:	> 25.0 seconds of data must accumulate on each trip, with at least 15.0 seconds of data in the current fuel trim cell before a pass or fail decision can be made.		
					Sometimes, certain Long-Term Fuel Trim Cells are not utilized for control and/or diagnosis	**Please see "Long-Term Fuel Trim Cell Usage" in Supporting Tables Tab for a list of cells utilized for diagnosis**		
					Closed Loop Long Term FT	Enabled Enabled **Please see "Closed Loop Enable Criteria" and "Long Term FT Enable**		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						Criteria" in Supporting Tables.	conditions present during the drive cycle.	
					Fuel Consumed ("Virtual Flex Fuel Sensor" applications only)	If > 0.2 liters of fuel are consumed after a refuel event then the Virtual Flex Fuel Sensor (VFFS) logic may disable Long Term FT for a few seconds while it "learns" the new ethanol concentration. (VFFS apps only)		
					EGR Diag. Catalyst Diag. Post O2 Diag. Device Control EVAP Diag.	Intrusive Test Not Active Intrusive Test Not Active Intrusive Test Not Active Not Active “tank pull down” Not Active		
					No active DTCs:			
					IAC_SystemRPM_FA			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					MAP_SensorFA MAF_SensorFA MAF_SensorTFTKO AIR System FA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSensorCircuit_FA Ethanol Composition Sensor FA FuelInjectorCircuit_FA EngineMisfireDetected_FA EGRValvePerformance_FA EGRValveCircuit_FA MAP_EngineVacuumStatus AmbientAirDefault_NA O2S_Bank_1_Sensor_1_FA			
Fuel System Too Rich Bank 1	P0172	Determines if the fuel control system is in a	Passive Test: The filtered Non-Purge Long Term Fuel	<= **Non Purge Rich Limit** Table		Secondary Parameters and Enable Conditions are identical to those for	Frequency: 100 ms Continuous	2 Trip(s) Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		rich condition, based on the filtered long-term fuel trim metric. There are two methods to determine a Rich fault. They are Passive and Intrusive. A Passive Test decision cannot be made when Purge is enabled. The Intrusive test is described below:	Trim metric			P0171, with the exception that fuel level is not considered.	Loop Development data indicates that the Fuel Adjustment System Diagnostic (FASD) is typically enabled during **(66)** % of the EPAIII drive cycle. This is also typical of real-world driving, however values will vary (higher	
			AND					
			The filtered Short Term Fuel Trim metric (NOTE: any value > 1.05 effectively nullifies the short-term fuel trim criteria)	<= 2.000				
			Intrusive Test: The filtered Purge Long Term Fuel Trim metric	<= **Purge Rich Limit** Table				
			AND					
			The filtered Non-Purge Long Term Fuel Trim metric AND The filtered Short Term Fuel Trim	<= **Non Purge Rich Limit** Table <= 2.000 All of above for				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			metric (NOTE: value > 1.05 indicates cal-out)	3 out of 5 intrusive segments			or lower) based on the actual conditions present during the drive cycle.	
		Intrusive Test: 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	Segment Def'n: Segments can last up to 30 seconds and are separated by the lesser of 20 seconds of purge-on time or enough time to purge 16 grams of vapor. A maximum of 5 completed segments or 20 attempts are allowed for each intrusive test. After an intrusive test report is					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		test passes without checking the filtered Non-Purge Long Term fuel trim metric. Performing intrusive tests too frequently may also affect EVAP and EPAIII emissions, and the execution frequency of other diagnostics.	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.					
Fuel System Too Lean Bank 2	P0174	Determines if the fuel control system is in a	The filtered long-term fuel trim metric	>= **Long Term Trim Lean** Table	Engine speed BARO Coolant Temp	375 <rpm< 7000 > 70 kPa -40 <°C< 150	Frequency: 100 ms Continuous	2 Trip(s) Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		lean condition, based on the filtered long-term and short-term fuel trim.			MAP Inlet Air Temp MAF Fuel Level	10 <kPa< 255 -20 <°C< 150 1.0 <g/s< 510.0 > 10 % or if fuel sender is faulty the diagnostic will bypass the fuel level criteria.	Loop Development data indicates that the Fuel Adjustment System Diagnostic (FASD) is typically enabled during **(66)** % of the EPAIII drive cycle. This is also typical of real-world driving, however values will vary (higher or lower)	
			AND					
			The filtered short-term fuel trim metric (NOTE: any value < 0.95 effectively nullifies the short-term fuel trim criteria)	>= 0.100	Long Term Fuel Trim data accumulation:	> 25.0 seconds of data must accumulate on each trip, with at least 15.0 seconds of data in the current fuel trim cell before a pass or fail decision can be made.		
					Sometimes, certain Long-Term Fuel Trim Cells are not utilized for control and/or diagnosis	**Please see "Long-Term Fuel Trim Cell Usage" in Supporting Tables Tab for a list of cells utilized for diagnosis**		
					Closed Loop Long Term FT	Enabled Enabled		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						Please see "Closed Loop Enable Criteria" and "Long Term FT Enable Criteria" in Supporting Tables.	s. (5 sec. or lower) based on the actual conditions present during the drive cycle.	
					Fuel Consumed ("Virtual Flex Fuel Sensor" applications only)	If > 0.2 liters of fuel are consumed after a refuel event then the Virtual Flex Fuel Sensor (VFFS) logic may disable Long Term FT for a few seconds while it "learns" the new ethanol concentration. (VFFS apps only)		
					EGR Diag. Catalyst Diag. Post O2 Diag. Device Control EVAP Diag.	Intrusive Test Not Active Intrusive Test Not Active Intrusive Test Not Active Not Active “tank pull down” Not Active		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					No active DTCs:			
					IAC_SystemRPM_FA MAP_SensorFA MAF_SensorFA MAF_SensorTFTKO AIR System FA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSensorCircuit_FA Ethanol Composition Sensor FA FuelInjectorCircuit_FA EngineMisfireDetected_FA EGRValvePerformance_FA EGRValveCircuit_FA MAP_EngineVacuumStatus AmbientAirDefault_NA O2S_Bank_2_Sensor_1_FA			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
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. There are two methods to determine a Rich fault. They are Passive and Intrusive. A Passive Test decision cannot be made when Purge is enabled. The Intrusive test is described below:	Passive Test: The filtered Non-Purge Long Term Fuel Trim metric	<= **Non Purge Rich Limit** Table		Secondary Parameters and Enable Conditions are identical to those for P0174, with the exception that fuel level is not considered.	Frequency: 100 ms Continuous Loop Development data indicates that the Fuel Adjustment System Diagnostic (FASD) is typically enabled during **(66)** % of the EPAIII drive cycle. This is also typical of real-world driving,	2 Trip(s) Type B
			AND					
			The filtered Short Term Fuel Trim metric (NOTE: any value > 1.05 effectively nullifies the short-term fuel trim criteria)	<= 2.000				
			Intrusive Test: The filtered Purge Long Term Fuel Trim metric	<= **Purge Rich Limit** Table				
			AND					
			The filtered Non-Purge Long Term Fuel Trim metric	<= **Non Purge Rich Limit** Table				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			AND				however values will vary (higher or lower) based on the actual conditions present during the drive cycle.	
			The filtered Short Term Fuel Trim metric (NOTE: value > 1.05 indicates cal-out)	<= 2.000 All of above for 3 out of 5 intrusive segments				
		Intrusive Test: When the filtered Purge 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 >	Segment Def'n: Segments can last up to 30 seconds and are separated by the lesser of 20 seconds of purge-on time or enough time to purge 16 grams of vapor. A maximum of 5 completed segments or 20 attempts are allowed for each intrusive test.					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		Term fuel trim > **Purge Rich Limit** Table the test passes without checking the filtered Non-Purge Long Term fuel trim metric. Performing intrusive tests too frequently may also affect EVAP and EPAIII emissions, and the execution frequency of other diagnostics.	intrusive test. After an intrusive test report is completed, another intrusive test cannot occur for 300 seconds to allow sufficient time to purge excess vapors from the canister. During this period, fuel trim will pass if the filtered Purge-on Long Term fuel trim > Purge Rich Limit Table for at least 200 seconds, indicating that the canister has been purged.					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Fuel Composition Sensor Circuit Low	P0178	Detects Out of Range Low Frequency Signal The ethanol sensor is designed to measure ethanol concentrations from E0 (50Hz) to E100 (150Hz), with a specified accuracy of 5% ethanol (i.e. 5Hz). Therefore, values less than 45Hz or greater than 155Hz are considered as faults	Flex Fuel Sensor Output Frequency	< 45 Hertz	Powertrain Relay	> 11.0 Volts < 32.0 Volts	50 failures out of 63 samples 100 ms loop Continuous	2 trip(s) Type B
Fuel Composition	P0179	Detects Out of Range High	Flex Fuel Sensor Output Frequency	> 155 Hertz	Powertrain Relay	> 11.0 Volts	50 failures out of 63	2 trip(s)

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Sensor Circuit High		Frequency Signal The ethanol sensor is designed to measure ethanol concentrations from E0 (50Hz) to E100 (150Hz), with a specified accuracy of 5% ethanol (i.e. 5Hz). Therefore, values less than 45Hz or greater than 155Hz are considered as faults.		<= 185 Hertz	Relay	< 32.0 Volts	samples 100 ms loop Continuous	Type B
Engine Oil Temperature (EOT) Circuit Low	P0197	Detects a short to ground in the Engine Oil Temperature	Engine Oil Temperature Sensor (EOT) Circuit Resistance	< 25 ohms	Diagnostic enabled/disable	Enabled	20 failures out of 50 samples Sampled	1 trip(s) Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		(EOT) Sensor signal					every 1 second	
Engine Oil Temperature (EOT) Circuit High	P0198	Detects an open circuit or continuous short to high in the Engine Oil Temperature (EOT) Sensor signal	Engine Oil Temperature Sensor (EOT) Circuit Resistance	> 450000 ohms	Diagnostic enabled/disabled Engine Run Time OR ECT Sensor Circuit	Enabled > 20.0 seconds >= -20 Deg C	20 failures out of 50 samples Sampled every 1 second	1 trip(s) Type C
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 Continuous	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Injector 2	P0202	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control ciruit do not match		Powertrain Relay Voltage within range and stable according to Enable Conditions Engine Running	11 volts ≤ Voltage ≤ 32 volts greater than 5 seconds	20 failures out of 25 samples 250 ms /sample Continuous	2 trips Type B
Injector 3	P0203	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control ciruit do not match		Powertrain Relay Voltage within range and stable according to Enable Conditions Engine Running	11 volts ≤ Voltage ≤ 32 volts greater than 5 seconds	20 failures out of 25 samples 250 ms /sample Continuous	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Injector 4	P0204	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control ciruit do not match		Powertrain Relay Voltage within range and stable according to Enable Conditions Engine Running	11 volts ≤ Voltage ≤ 32 volts greater than 5 seconds	20 failures out of 25 samples 250 ms /sample Continuous	2 trips Type B
Injector 5	P0205	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control ciruit do not match		Powertrain Relay Voltage within range and stable according to Enable Conditions Engine Running	11 volts ≤ Voltage ≤ 32 volts greater than 5 seconds	20 failures out of 25 samples 250 ms /sample Continuous	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Injector 6	P0206	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control ciruit do not match		Powertrain Relay Voltage within range and stable according to Enable Conditions Engine Running	11 volts ≤ Voltage ≤ 32 volts greater than 5 seconds	20 failures out of 25 samples 250 ms /sample Continuous	2 trips Type B
Injector 7	P0207	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control ciruit do not match		Powertrain Relay Voltage within range and stable according to Enable Conditions Engine Running	11 volts ≤ Voltage ≤ 32 volts greater than 5 seconds	20 failures out of 25 samples 250 ms /sample Continuous	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Injector 8	P0208	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control ciruit do not match		Powertrain Relay Voltage within range and stable according to Enable Conditions Engine Running	11 volts ≤ Voltage ≤ 32 volts greater than 5 seconds	20 failures out of 25 samples 250 ms /sample Continuous	2 trips Type B
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 < 0.25 or Secondary TPS2 Voltage > 4.59			Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions 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 processor	Trips: 1 Type: A MIL: YES
TPS2 Circuit	P0222	Detects a	Primary TPS2			Run/crank voltage or	79 / 159	Trips:

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Low		continuous or intermittent short or open in TPS2 circuit on both processors or just the primary processor	Voltage <	0.25		Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	counts; 57 counts continuous; 3.125 ms /count in the primary processor	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 processor	
TPS2 Circuit High	P0223	Detects a continuous or intermittent short in TPS1 circuit on both processors or just the primary	Primary TPS2 Voltage >	4.59		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	79 / 159 counts; 57 counts continuous; 3.125 ms /count in the primary	Trips: 1 Type: A MIL: YES

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		processor					processor	
			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 processor	
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 Engine Speed	11 volts ≤ Voltage ≤ 32 volts ≥ 0 RPM	8 failures out of 10 samples 250 ms /sample Continuous	2 trips Type B
Supercharger Intercooler Coolant Pump	P023A	Electrical Integrity of Supercharger	ECM detects that commanded and actual states of		Ignition Voltage Ignition Voltage Engine Speed	>= 11.00 Volts <= 32.00 Volts > 0	20 failures out of 25 samples	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Control Circuit		Intercooler Coolant Pump Control Circuitry	output driver do not match				1 sample every 250 msec	
Random Misfire Detected Cylinder 1 Misfire Detected Cylinder 2 Misfire Detected Cylinder 3 Misfire Detected Cylinder 4 Misfire Detected	P0300 P0301 P0302 P0303 P0304 P0305 P0306	These DTC's will determine if a random or a cylinder specific misfire is occurring by monitoring crankshaft velocity	Deceleration index vs. Engine Speed Vs Engine load Deceleration index calculation is tailored to specific veh. Tables used are 1st tables encountered that are not max of range. Undetectable region at a given speed/load point is where all tables are max of range point. see Algorithm	**(>**Idle SCD AND > Idle SCD ddt Tables) **OR** (>SCD Delta AND > SCD Delta ddt Tables) **OR** (>Idle Cyl Mode AND > Idle Cyl Mode ddt Tables) **OR** (>Cyl Mode AND > Cyl Mode ddt Tables)	Engine Run Time ECT If ECT at startup ECT System Voltage + Throttle delta - Throttle delta	> 2 crankshaft revolutions -7 ºC < ECT < 125 ºC < -7 ºC 21 ºC < ECT < 125 ºC 9.00 <volts< 32.00 < 40.00 % per 25 ms < 40.00 % per 25 ms	Emission Exceedence = any (5) failed 200 rev blocks out of (16) 200 rev block tests Failure reported for (1) Exceedence in 1st (16) 200 rev block tests, or (4) Exceedences thereafter.	2 Trips Type B (Mil Flashes with Catalyst Damaging Misfire)

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Detected	P0306		See Algorithm Description Document for additional details.	Tables) **OR** (>Rev Mode Table) **OR** (> AFM Table in Cyl Deact mode)			3 thresholds	
Cylinder 5 Misfire Detected	P0307						any Catalyst Exceedence = (1) 200 rev block as data supports for catalyst damage. Failure reported with (1 or 3) Exceedences in FTP, or	
Cylinder 6 Misfire Detected	P0308							
Cylinder 7 Misfire Detected			Misfire Percent Emission Failure Threshold	≥ 1.19 % P0300 ≥ 1.39 % emission				
Cylinder 8 Misfire								

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Detected			Misfire Percent Catalyst Damage When engine speed and load are less than the FTP cals (3) catalyst damage exceedences are allowed.	>"Catalyst Damaging Misfire Percentage" Table whenever secondary conditions are met. ≤ 0 FTP rpm AND ≤ 0 FTP % load	Engine Speed Engine Load Misfire counts (at low speed/loads, one cylinder may not cause cat damage)	> 2000 rpm AND > 30 % load AND < 180 counts on one cylinder	(1) Exceedence outside FTP. Continuous	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Engine Speed	375 < rpm < (Engine Speed Limit) - 400 Engine speed limit is a function of inputs like Gear and temperature typical Engine Speed Limit = 6000 rpm	4 cycle delay	
				disable conditions:	No active DTCs:	TPS_FA EnginePowerLimited MAF_SensorTFTKO MAP_SensorTFTKO IAT_SensorTFTKO ECT_Sensor_Ckt_TFTKO 5VoltReferenceB_FA CrankSensorTestFailedTKO CrankSensorFaultActive CrankIntakeCamCorrelationFA	4 cycle delay	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						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 Fuel Level Low	> 1000 rpm LowFuelConditionDiagnost	500 cycle delay	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Cam and Crank Sensors	in sync with each other	4 cycle delay	
					Misfire requests TCC unlock	Not honored because Transmission in hot mode	4 cycle delay	
					Fuel System Stat	≠ Fuel Cut	4 cycle delay	
					Active Fuel Management	Transition in progress	7 cycle delay	
					Undetectable engine speed and engine load region	invalid speed load range in **decel index** tables	4 cycle delay	
					Abusive Engine Over Speed	> 8192 rpm	0 cycle delay	
					Below zero torque (except CARB approved 3000 rpm to redline triangle.)	<" Zero torque engine load" in Supporting Tables tab	4 cycle delay	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Below zero torque: TPS (area) Veh Speed	 ≤ 0 % > 30 mph	4 cycle delay	
					EGR Intrusive test	Active	0 cycle delay	
					Manual Trans Throttle Position AND Automatic transmission shift	Clutch shift > 95.00 %	4 cycle delay 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:	4 engine cycles after misfire 3 Engine cycles after misfire		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Abnormal engine speed oscillations: (Rough road etc) Off Idle, number of consecutive decelerating cylinders after accelerating,: (Number of decels can vary with misfire detection equation) TPS Engine Speed Veh Speed SCD Cyl Mode Rev Mode	 > 3 % > 1000 rpm > 3 mph = 4 consecutive cyls = 4 consecutive cyls = 4 consecutive cyls		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Rough Road Section:			
					Monitor Rough Road	1 (1=Yes)		
					RoughRoadSource	WheelSpeedInECM		
					IF Rough Road is monitored, then ONE of the following Rough Road Sources will be used:			
					Rough Road Source = "TOSS"			
					Rough Road	detected		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Rough Road Source = "WheelSpeedIn ECM" ABS/TCS system RoughRoad VSES Rough Road Source = "FromABS" ABS/TCS system RoughRoad VSES	 active detected active active detected active		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Crankshaft Position System Variation Not Learned	P0315	Monitor for valid crankshaft error compensation factors	Sum of Compensation factors	≥ 4.0040 OR ≤ 3.9960	OBD Manufacturer Enable Counter	0	0.50 seconds Frequency Continuous 100 msec	1 Trips Type A
Knock Sensor (KS) Module Performance E38 & E67 controllers	P0324	This diagnostic will detect a failed internal ECM component associated with knock control	Any Cylinder's Avg Gain Signal **or** All Cylinder's Raw Signals	> 4.50 Volts ≤ 0.20 Volts	Engine Speed Cylinder Air Mass No Active DTC's Engine Speed Cylinder Air Mass	≥ 400 RPM > 50 milligrams KS_Ckt_Perf_B1B2_FA ≥ 400 RPM > 50 milligrams	50 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Knock Sensor (KS) Circuit Bank 1 E38 & E67 controllers	P0325	This diagnostic checks for an open in the knock sensor circuit	Gated Low Pass Filter Voltage	> 4.0 Volts or < 1.24 Volts	Diagnostic Enabled (1 = Enabled) Engine Speed ECT Enginer Run Time Power Take Off	= 1 ≥ 400 RPM ≥ -40 deg. C ≥ 2 seconds = Not Active	50 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2
Knock Sensor (KS) Circuit Bank 1 E37 controllers	P0325	This diagnostic checks for an open in the knock sensor circuit	Gated FFT Output	< **OpenCircuit Thresh** See Supporting Tables for **OpenCircuit Thresh**	Diagnostic Enabled (1 = Enabled) Engine Speed ECT Engine Run Time No Active DTC's	= 1 ≥ 1800 RPM ≥ -40 deg. C ≥ 1 seconds KS_Ckt_Perf_B1B2_FA	50 Failures out of 63 Samples 100 msec rate	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Power Take-Off	= Not Active		
Knock Sensor (KS) Performance Bank 1 E38 & E67 controllers	P0326	This diagnostic checks for an overactive knock sensor caused by excessive knock or noisy engine components	Knock Fast Retard (spark degrees)	> (FastRtdMax + 4.0) degrees spark See Supporting Tables for FastRtdMax	Diagnostic Enabled (1 = Enabled) Knock Detection Enabled	= 1 > 0 Knock Detection Enabled is calculated by multiplying the following three factors: FastAttackRate FastAttackCoolGain FastAttackBaroGain (see Supporting Tables)	31 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2
					Engine Speed MAP	≥ 400 RPM ≥ 10 kPa		
					Power Take Off	= Not Active		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Knock Sensor (KS) Performance Bank 1 E37 controllers	P0326	This diagnostic checks for an overactive knock sensor caused by excessive knock or noisy engine components	Knock Fast Retard (spark degrees)	> (FastRtdMax + 5.0 degrees spark See Supporting Tables for FastRtdMax	Diagnostic Enabled (1 = Enabled) Knock Detection Enabled Engine Speed MAP No Active DTC's Power Take-Off	= 1 > 0 **Knock Detection Enabled** is calculated by multiplying the following three factors: FastAttackRate FastAttackCoolGain FastAttackBaroGain (see Supporting Tables) ≥ 400 RPM ≥ 10 kPa GetTPSR_ThrotAuth Default = Not Active	50 Failures out of 63 Samples 100 msec rate	
Knock Sensor	P0327	This diagnostic	Sensor Input Signal	> 2.86 Volts	ECT	≥ -40 deg. C	50 Failures	Type:

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
(KS) Circuit Low Bank 1 E38 & E67 controllers		checks for an out of range low knock sensor signal	Line **or** Sensor Return Signal Line	> 2.80 Volts < 1.48 Volts	Engine Run Time	≥ 2 seconds	out of 63 Samples	B MIL: YES Trips: 2
					Valid Oil Temp Required? (1= Yes, 0 = No) <u>If Yes:</u> Engine Oil Temp and ValidOilTemp Model or No OilTemp Sensor DTC's <u>If No:</u> No Eng Oil Temp enable criteria	= 0 < 256 deg. C EngOilModeledTemp Valid EngOilTempSensor CircuitFA	100 msec rate	
Knock Sensor (KS) Circuit Low Bank 1	P0327	This diagnostic checks for an out of range low	Sensor Input Signal Line	< **ShortLow ThreshSig** (Volts)	ECT Enginer Run Time	≥ -40 deg. C ≥ 1 seconds	50 Failures out of 63 Samples	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
E37 controllers		knock sensor signal	**or** Sensor Return Signal Line	< **ShortLow ThreshRet** (Volts) See Supporting Tables for **ShortLow ThreshSig** and **ShortLow ThreshRet**	Valid Oil Temp Required? (1= Yes, 0 = No) <u>If Yes:</u> Engine Oil Temp and ValidOilTemp Model or No OilTempSensor DTC's <u>If No:</u> No Eng Oil Temp enable criteria	= 1 < 150 deg. C EngOilModeledTemp Valid EngOilTempSensorCircuit FA	100 msec rate	

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 1 E38 & E67 controllers	P0328	This diagnostic checks for an out of range high knock sensor signal	Sensor Input Signal Line **or** Sensor Return Signal Line	< 2.02 Volts > 3.76 Volts	ECT Enginer Run Time	≥ -40 deg. C ≥ 2 seconds	50 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2
					Valid Oil Temp Required? (1= Yes, 0 = No) <u>If Yes:</u> Engine Oil Temp and ValidOilTemp Model or No OilTempSensor <u>If No:</u> No Eng Oil Temp enable criteria	= 0 < 256 deg. C EngOilModeledTemp Valid EngOilTempSensor 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 1 E37 controllers	P0328	This diagnostic checks for an out of range high knock sensor signal	Sensor Input Signal Line	> **ShortHi ThreshSig** (Volts)	ECT Engine Run Time	≥ -40 deg. C ≥ 1 seconds	50 Failures out of 63 Samples	
			or Sensor Return Signal Line	> **ShortHi ThreshRet** (Volts)	Valid Oil Temp Required? (1= Yes, 0 = No)	= 1	100 msec rate	
				See Supporting Tables for **ShortHi ThreshSig** and **ShortHi ThreshRet**	<u>If Yes:</u> Engine Oil Temp and ValidOilTemp Model or No OilTempSensor DTC's <u>If No:</u>	< 150 deg. C EngOilModeledTemp Valid EngOilTempSensorCircuit FA		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					No Eng Oil Temp enable criteria			
Knock Sensor (KS) Circuit Bank 2 E38 & E67 controllers	P0330	This diagnostic checks for an open in the knock sensor circuit	Gated Low Pass Filter Voltage	> 4.0 Volts or < 1.24 Volts	Diagnostic Enabled (1 = Enabled) Engine Speed ECT Enginer Run Power Take Off	= 1 ≥ 400 RPM ≥ -40 deg. C ≥ 2 seconds = Not Active	50 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2
Knock Sensor (KS) Circuit Bank 2 E37 controllers	P0330	This diagnostic checks for an open in the knock sensor circuit	Gated FFT Output	< **OpenCircuit Thresh** See Supporting Tables for **OpenCircuit Thresh**	Diagnostic Enabled (1 = Enabled) Engine Speed ECT Engine Run Time No Active DTC's Power Take-Off	= 1 ≥ 1800 RPM ≥ -40 deg. C ≥ 1 seconds KS_Ckt_Perf_B1B2_FA = Not Active	50 Failures out of 63 Samples 100 msec rate	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Knock Sensor (KS) Circuit Low Bank 2 E38 & E67 controllers	P0332	This diagnostic checks for an out of range low knock sensor signal	Sensor Input Signal Line **or** Sensor Return Signal Line	> 2.86 Volts < 1.48 Volts	ECT Enginer Run Time	≥ -40 deg. C ≥ 2 seconds	50 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2
					Valid Oil Temp Required? <u>If Yes:</u> Engine Oil Temp and ValidOilTemp Model or No OilTempSensor <u>If No:</u> No Eng Oil Temp enable	= 0 < 256 deg. C EngOilModeledTemp Valid EngOilTempSensor CircuitFA		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					criteria			
Knock Sensor (KS) Circuit Low Bank 2 E37 controllers	P0332	This diagnostic checks for an out of range low knock sensor signal	Sensor Input Signal Line **or** Sensor Return Signal Line	< **ShortLow ThreshSig** (Volts) < **ShortLow ThreshRet** (Volts) See Supporting Tables for **ShortLow ThreshSig** and **ShortLow ThreshRet**	ECT Engine Run Time Valid Oil Temp Required? (1= Yes, 0 = No) <u>If Yes:</u> Engine Oil Temp and ValidOilTemp Model or No OilTempSensor DTC's	≥ -40 deg. C ≥ 1 seconds = 1 < 150 deg. C EngOilModeledTemp Valid EngOilTempSensorCircuit FA	50 Failures out of 63 Samples 100 msec rate	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					If No: No Eng Oil Temp enable criteria			
Knock Sensor (KS) Circuit High Bank 2 E38 & E67 controllers	P0333	This diagnostic checks for an out of range high knock sensor signal	Sensor Input Signal Line **or** Sensor Return Signal Line	< 2.02 Volts > 3.76 Volts	ECT Engine Run Time	≥ -40 deg. C ≥ 2 seconds	50 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2
					Valid Oil Temp Required? If Yes: Engine Oil Temp and ValidOilTemp Model or No OilTempSensor	= 0 < 256 deg. C EngOilModeledTemp Valid EngOilTempSensor CircuitFA		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					If No: No Eng Oil Temp enable criteria			
Knock Sensor (KS) Circuit High Bank 2 E37 controllers	P0333	This diagnostic checks for an out of range high knock sensor signal	Sensor Input Signal Line **or** Sensor Return Signal Line	> **ShortHi ThreshSig** (Volts) > **ShortHi ThreshRet** (Volts) See Supporting Tables for **ShortHi ThreshSig** and **ShortHi ThreshRet**	ECT Engine Run Time Valid Oil Temp Required? (1= Yes, 0 = No) If Yes: Engine Oil Temp and ValidOilTemp Model or	≥ -40 deg. C ≥ 1 seconds = 1 < 150 deg. C EngOilModeledTemp Valid	50 Failures out of 63 Samples 100 msec rate	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					No OilTempSensor DTC's If No: No Eng Oil Temp enable criteria	EngOilTempSensorCircuit FA		
Crankshaft Position (CKP) Sensor A Circuit	P0335	Determines if a fault exists with the crank position sensor signal	Engine-Cranking Crankshaft Test: Time since last crankshaft position sensor pulse received	>= 4.0 seconds	Engine-Cranking Crankshaft Test: Starter engaged AND (cam pulses being received OR (DTC P0101 AND DTC P0102 AND DTC	 = FALSE = FALSE	Engine-Cranking Crankshaft Test: Continuous every 100 msec	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					P0103 AND Engine Air Flow	= FALSE > 3.0 grams/second))		
			Time-Based Crankshaft Test: No crankshaft pulses received	>= 0.3 seconds	Time-Based Crankshaft Test: Engine is Running Starter is not engaged No DTC Active:	5VoltReferenceB_FA	Time-Based Crankshaft Test: Continuous every 12.5 msec	
			Event-Based Crankshaft Test: No crankshaft pulses received		Event-Based Crankshaft Test: Engine is Running OR Starter is engaged No DTC Active:	5VoltReferenceA_FA	Event-Based Crankshaft Test: 2 failures out of 10 samples	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						5VoltReferenceB_FA P0340 P0341	One sample per engine revolution	
Crankshaft Position (CKP) Sensor A Performance	P0336	Determines if a performance fault exists with the crank position sensor signal	Crank Re-synchronization Test: Time in which 25 or more crank re-synchronizations occur Time-Based Crankshaft Test: No crankshaft synchronization gap found	< 20.0 seconds >= 0.4 seconds	Crank Re-synchronization Test: Engine Air Flow Cam-based engine speed No DTC Active: Time-Based Crankshaft Test: Engine is Running Starter is not engaged No DTC Active:	>= 3.0 grams/second > 450 RPM 5VoltReferenceB_FA P0335 5VoltReferenceB_FA	Crank Re-synchronization Test: Continuous every 250 msec Time-Based Crankshaft Test: Continuous every 12.5 msec	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			Engine Start Test during Crank: Time since starter engaged without detecting crankshaft synchronization gap	>= 1.5 seconds	Engine Start Test during Crank: Starter engaged AND (cam pulses being received OR (DTC P0101 AND DTC P0102 AND DTC P0103 AND Engine Air Flow	= FALSE = FALSE = FALSE > 3.0 grams/second))	Engine Start Test during Crank: Continuous every 100 msec	
			Event-Based Crankshaft Test: Crank Pulses received in one		Event-Based Crankshaft Test: Engine is Running		Event-Based Crankshaft Test: 8 failures out of 10	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			engine revolution OR Crank Pulses received in one engine revolution	< 51 seconds > 65 seconds	OR Starter is engaged No DTC Active:	5VoltReferenceA_FA 5VoltReferenceB_FA P0340 P0341	samples One sample per engine revolution	
Camshaft Position (CMP) Sensor Circuit Bank 1 Sensor A	P0340	Determines if a fault exists with the cam position bank 1 sensor A signal	Engine Cranking Camshaft Test: Time since last camshaft position sensor pulse received OR Time that starter has been engaged without a camshaft sensor pulse	 >= 5.5 seconds >= 4.0 seconds	Engine Cranking Camshaft Test: Starter engaged AND (cam pulses being received OR (DTC P0101 AND DTC P0102 AND DTC P0103 AND	 = FALSE = FALSE = FALSE	Engine Cranking Camshaft Continuous every 100 msec	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Engine Air Flow	> 3.0 grams/second))		
			Time-Based Camshaft Test: Fewer than 4 camshaft pulses received in a time	> 3.0 seconds	Time-Based Camshaft Test: Engine is Running Starter is not engaged No DTC Active:	5VoltReferenceA_FA	Time-Based Camshaft Test: Continuous every 100 msec	
			Fast Event-Based Camshaft Test: No camshaft pulses received during first 24 MEDRES events (There are 24 MEDRES events per engine cycle)		Fast Event-Based Camshaft Test: Crankshaft is synchronized Starter must be engaged to enable the diagnostic, but the diagnostic		Fast Event-Based Camshaft Continuous every MEDRES event	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					will not disable when the starter is disengaged No DTC Active:	5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensor_FA		
			Slow Event-Based Camshaft Test: The number of camshaft pulses received during 100 engine cycles	= 0	Slow Event-Based Camshaft Test: Crankshaft is synchronized No DTC Active:	5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensor_FA	Slow Event-Based Camshaft 8 failures out of 10 samples Continuous every engine cycle	
Camshaft Position (CMP) Sensor Performance Bank 1 Sensor A	P0341	Determines if a performance fault exists with the cam position bank 1 sensor A signal	Fast Event-Based Camshaft Test: The number of camshaft pulses received during first		Fast Event-Based Camshaft Test: Crankshaft is synchronized Starter must be		Fast Event-Based Camshaft Continuous every MEDRES	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			24 MEDRES events is less than 2 or greater than 8 (There are 24 MEDRES events per engine cycle)		engaged to enable the diagnostic, but the diagnostic will not disable when the starter is disengaged No DTC Active:	5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensor_FA	event	
			<u>Slow Event-Based Camshaft Test:</u> The number of camshaft pulses received during 100 engine cycles OR	< 398 > 402	<u>Slow Event-Based Camshaft Test:</u> Crankshaft is synchronized No DTC Active:	5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensor_FA	<u>Slow Event-Based Camshaft</u> 8 failures out of 10 samples Continuous every engine cycle	
IGNITION CONTROL #1	P0351	This diagnostic checks the circuit	The ECM detects that the		Engine running Ignition Voltage	> 5.00 Volts	50 Failures out of	Type: B

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
CIRCUIT		for electrical integrity during operation. Monitors EST for Cylinder 3 (Cylinders 3 and 6 for V6 with waste spark)	commanded state of the driver and the actual state of the control circuit do not match.				63 Samples 100 msec rate	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	The ECM detects that the commanded state of the driver and the		Engine running Ignition Voltage	> 5.00 Volts	50 Failures out of 63 Samples	Type: B MIL: YES

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		operation. Monitors EST for Cylinder 5 (if applicable)	actual state of the control circuit do not match.				100 msec rate	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 EST for Cylinder 7 (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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
IGNITION CONTROL #8 CIRCUIT	P0358	This diagnostic checks the circuit for electrical integrity during operation. Monitors EST for Cylinder 8 (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
Catalyst System Low Efficiency Bank 1	P0420	Oxygen Storage	Normalized Ratio OSC Value (EWMA filtered)	< 0.360	***Valid Idle Period Criteria***		1 test attempted per valid idle period Minimum of 1 test per trip Maximum of 8 tests per trip	Type A 1 Trip(s)
		The catalyst washcoat contains Cerium Oxide. Cerium Oxide reacts with NO and O2 during lean A/F excursions to store the excess oxygen (I.e. Cerium Oxidation). During rich A/F excursions, Cerium Oxide reacts with CO and H2 to release this stored			Throttle Position	< 1.00 %		
					Vehicle Speed	< 1.24 MPH		
					Engine speed	> 1100 RPM for a minimum of 5 seconds since end of last idle period.		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		oxygen (I.e. Cerium Reduction). This is referred to as the Oxygen Storage Capacity, or OSC. CatMon's strategy is to "measure" the OSC of the catalyst through forced Lean and Rich A/F excursions. Normalized Ratio OSC Value Calculation Information and Definitions = 1. Raw OSC Calculation = (post cat O2 Resp time - pre cat O2 Resp time) 2. BestFailing OSC value from a calibration table (based on temp and exhaust gas flow) 3. WorstPassing OSC value (based on temp and exhaust gas flow) Normalized Ratio Calculation = (1-2) / (3-2)			Engine run time	≥ MinimumEngineRunTime, **This is a function of Coolant Temperature, please see Supporting Tables**	Frequency: Fueling Related : 12.5 ms OSC Measurements: 100 ms Temp Prediction: 1000ms	
					Tests attempted this trip	< 255		
					The catalyst diagnostic has not yet completed for the current trip.			
					Catalyst Idle Conditions Met Criteria			
					General Enable met and the Valid Idle Period Criteria met			
					Green Converter Delay	Not Active		
					Induction Air	*-20 < ° C < 250*		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		A Normalized Ratio of 1 essentially represents a good part and a ratio of 0 essentially represents a very bad part.			Intrusive test(s): Fueltrim Post O2 EVAP EGR	Not Active		
					RunCrank Voltage	> 10.90 Volts		
					Ethanol Estimation	NOT in Progress		
		The Catalyst Monitoring Test is done during idle. Several conditions must be meet in order to execute this test. These conditions and their related values are listed in the secondary parameters area of this document.			ECT	*40 < ° C < 125*		
					Barometric Pressure	> 70 KPA		
					Idle Time before going intrusive is	< 50 Seconds		
					Idle time is incremented if Vehicle speed	< 1.24 MPH and the throttle position < 1.00 % as identified in the Valid Idle Period Criteria section.		
					Short Term Fuel Trim	*0.90 < ST FT < 1.10*		
					Predicted catalyst temp > MinCatTemp table			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					(degC) (refer to "Supporting Tables" tab) AND Engine Airflow > MinAirflowToWarmCatalyst table (g/s) (refer to "Supporting Tables" tab) (Based on engine coolant at the time the WarmedUpEvents counter resets to 0.) for at least 15 seconds with a closed throttle time < 90 seconds consecutively (closed throttle consideration involves having the TPS < the value as stated in the Valid Idle Period Criteria Section) . Also, in order to increment the WarmedUpEvents counter (counter must exceed 15 cal value), either the vehicle speed must exceed the vehicle speed cal or the TPS must exceed the TPS cal as stated in the Valid Idle Period Criteria section above.			
					Closed loop fueling Enabled			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Please see "Closed Loop Enable Criteria" section of the "Supporting Tables" tab for details.			
					PRNDL is in Drive Range on an Auto Transmission vehicle.			
					Idle Stable Criteria :: Must hold true from after Catalyst Idle Conditions Met to the end of test			
					MAF	*4.00 < g/s < 11.00*		
					Predicted catalyst temperature	< 900 degC		
					Engine Fueling Criteria at Beginning of Idle Period			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					The following fueling related must also be met from between 4 and 7 seconds after the Catalyst Idle Conditions Met Criteria has been met for at least 4 seconds prior to allowing intrusive control			
					Number of pre-O2 switches	>= 2 grams/second		
					Short Term Fuel Trim Avg	*0.900 < ST FT Avg < 1.100*		
					Rapid Step Response (RSR) feature will initiate multiple tests:			
					If the difference between current EWMA value and the current OSC Normalized Ratio value is > 0.580 and the current OSC Normalized Ratio value is < 0.230			
					Maximum of 24 RSR tests to detect failure when RSR is enabled.			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Green Converter Delay Criteria			
					This is part of the check for the Catalyst Idle Conditions Met Criteria section			
					The diagnostic will not be enabled until the following has been met:			
					Predicted catalyst temperature > 0 ° C for 0 seconds non-continuously. Note: this feature is only enabled when the vehicle is new and cannot be enabled in service			
					PTO Not Active			
					General Enable			
					DTC's Not Set			
					MAF_SensorFA			
					AmbPresDfltdStatus			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					IAT_SensorCircuitFA			
					ECT_Sensor_FA			
					O2S_Bank_1_Sensor_1_FA			
					O2S_Bank_1_Sensor_2_FA			
					O2S_Bank_2_Sensor_1_FA			
					O2S_Bank_2_Sensor_2_FA			
					FuelTrimSystemB1_FA			
					FuelTrimSystemB2_FA			
					EngineMisfireDetected_FA			
					EvapPurgeSolenoidCircuit_FA			
					IAC_SystemRPM_FA			
					EGRValvePerformance_FA			
					EGRValveCircuit_FA			
					CamSensor_FA			
					CrankSensorFaultActive			
					TPS_Performance_FA			
					EnginePowerLimited			
					VehicleSpeedSensor_FA			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Catalyst System Low Efficiency Bank 2	P0430	Oxygen Storage	Normalized Ratio OSC Value (EWMA filtered)	< 0.360	***Valid Idle Period Criteria***		1 test attempted per valid idle period Minimum of 1 test per trip Maximum of 8 tests per trip Frequency: Fueling Related : 12.5 ms OSC Measurements: 100 ms Temp Prediction:	Type A 1 Trip(s)

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		The catalyst washcoat contains Cerium Oxide. Cerium Oxide reacts with NO and O2 during lean A/F excursions to store the excess oxygen (I.e. Cerium Oxidation). During rich A/F excursions, Cerium Oxide reacts with CO and H2 to release this stored oxygen (I.e. Cerium Reduction). This is referred to as the Oxygen Storage Capacity, or OSC. CatMon's strategy is to "measure" the OSC of the catalyst through forced Lean and Rich A/F excursions Normalized Ratio OSC Value Calculation Information and Definitions = 1. Raw OSC Calculation = (post cat O2 Resp time - pre cat O2 Resp time) 2. BestFailing OSC value from a calibration table (based on temp and			Throttle Position	< 1.00 %			
					Vehicle Speed	< *1.24 MPH*		
					Engine speed	> 1100 RPM for a minimum of 5 seconds since end of last idle period.		
					Engine run time	<u>></u> MinimumEngineRunTime**, This is a function of Coolant Temperture, please see Supporting Tables**		
					Tests attempted this trip	< 255		
					The catalyst diagnostic has not yet completed for the current trip.			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		calibration table (based on temp and exhaust gas flow) 3. WorstPassing OSC value (based on temp and exhaust gas flow) Normalized Ratio Calculation = (1-2) / (3-2) A Normalized Ratio of 1 essentially represents a good part and a ratio of 0 essentially represents a very bad part.			***Catalyst Idle Conditions Met Criteria***			
					General Enable met and the Valid Idle Period Criteria met			
					Green Converter Delay	Not Active		
					Induction Air	*-20 < ° C < 250*		
					Intrusive test(s): Fueltrim Post O2 EVAP EGR	=Not Active		
					RunCrank Voltage	> 10.90 Volts		
					Ethanol Estimation	NOT in Progress		
		The Catalyst Monitoring Test is done during idle. Several conditions must be meet in order to execute this test.			ECT	*40 < ° C < 125*		
					Barometric Pressure	> 70 KPA		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		These conditions and their related values are listed in the secondary parameters area of this document.						
					Idle Time before going intrusive is	< 50 Seconds		
					Idle time is incremented if Vehicle speed	< 1.24 MPH and the throttle position < 1.00 % as identified in the Valid Idle Period Criteria section.		
					Short Term Fuel Trim	*0.90 < ST FT < 1.10*		
					Predicted catalyst temp > MinCatTemp table (degC) (refer to "Supporting Tables" tab) AND Engine Airflow > MinAirflowToWarmCatalyst table (g/s) (refer to "Supporting Tables" tab) (Based on engine coolant at the time the WarmedUpEvents counter resets to 0.) for at least 15 seconds with a closed throttle time < 90 seconds consecutively (closed throttle consideration involves having the			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					TPS < the value as stated in the Valid Idle Period Criteria Section) . Also, in order to increment the WarmedUpEvents counter (counter must exceed 15 cal value), either the vehicle speed must exceed the vehicle speed cal or the TPS must exceed the TPS cal as stated in the Valid Idle Period Criteria section above.			
					Closed loop fueling Enabled **Please see "Closed Loop Enable Criteria" section of the "Supporting Tables" tab for details.**			
					PRNDL			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					is in Drive Range on an Auto Transmission vehicle.			
					Idle Stable Criteria :: Must hold true from after Catalyst Idle Conditions Met to the end of test			
					MAF	*4.00 < g/s < 11.00*		
					Predicted catalyst temperature	< 900 degC		
					Engine Fueling Criteria at Beginning of Idle Period			
					The following fueling related must also be met from between 4 and 7 seconds after the Catalyst Idle Conditions Met Criteria has been met for at least 4 seconds prior to allowing intrusive control			
					Number of pre-O2 switches	>= 2		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Short Term Fuel Trim Avg	*0.90 < ST FT Avg < 1.10*		
					Rapid Step Response (RSR) feature will initiate multiple tests:			
					If the difference between current EWMA value and the current OSC Normalized Ratio value is > 0.570 and the current OSC Normalized Ratio value is < 0.170			
					Maximum of 24 RSR tests to detect failure when RSR is enabled.			
					Green Converter Delay Criteria			
					This is part of the check for the Catalyst Idle Conditions Met Criteria section			
					The diagnostic will not be enabled until the following has been met:			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Predicted catalyst temperature > 0 ° C for 0 seconds non-continuously. Note: this feature is only enabled when the vehicle is new and cannot be enabled in service			
					PTO Not Active			
					General Enable			
					DTC's Not Set			
					MAF_SensorFA			
					AmbPresDfltdStatus			
					IAT_SensorCircuitFA			
					ECT_Sensor_FA			
					O2S_Bank_1_Sensor_1_FA			
					O2S_Bank_1_Sensor_2_FA			
					O2S_Bank_2_Sensor_1_FA			
					O2S_Bank_2_Sensor_2_FA			
					FuelTrimSystemB1_FA			
					FuelTrimSystemB2_FA			
					EngineMisfireDetected_FA			
					EvapPurgeSolenoidCircuit_FA			
					IAC_SystemRPM_FA			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					EGRValvePerformance_FA			
					EGRValveCircuit_FA			
					CamSensor_FA			
					CrankSensorFaultActive			
					TPS_Performance_FA			
					EnginePowerLimited			
					VehicleSpeedSensor_FA			
Evaporative Emission (EVAP) System Small Leak Detected	P0442	This DTC will detect a small leak (≥ 0.020”) in the EVAP system between the fuel fill cap and the purge solenoid. The engine off natural vacuum method (EONV) is used. EONV is an evaporative system leak detection diagnostic that	The total delta from peak pressure to peak vacuum during the test is normalized against a calibration pressure threshold table that is based upon fuel level and ambient temperature. (See P0442: EONV Pressure Threshold Table on Supporting Tables Tab). The normalized value is		Fuel Level Drive Time Drive length ECT Baro Odometer	10 % ≤ Percent ≤ 90 % ≥ 600 seconds ≥ 5.0 miles ≥ 70 °C ≥ 70 kPa ≥ 10.0 miles	Once per trip, during hot soak (up to 2400 sec.). No more than 2 unsuccessful attempts between completed tests.	1 trip Type A EWMA Average run length is 6 under normal conditions Run length is 2 to

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		diagnostic that runs when the vehicle is shut off when enable conditions are met. Prior to sealing the system and performing the diagnostic, the fuel volatility is analyzed. In an open system (Canister Vent Solenoid [CVS] open) high volatility fuel creates enough flow to generate a measurable pressure differential relative to	normalized value is calculated by the following equation: 1 - (peak pressure - peak vacuum) / pressure threshold. The normalized value is entered into EWMA (with 0= perfect pass and 1= perfect fail).		Time since last complete test if normalized result and EWMA is passing OR Time since last complete test if normalized result or EWMA is failing Estimated ambient temperature at end of drive Estimate of Ambient Air Temperature Valid	≥ 17 hours ≥ 10 hours 0 °C ≤ Temperature ≤ 34 °C		is 3 to 6 trips after code clear or non-volatile reset

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		atmospheric.						
			When EWMA is	> 0.60 (EWMA Fail Threshold)	**Conditions for Estimate of Ambient Air Temperature to be valid:**			
			, the DTC light is illuminated.					
		After the volatility check, the vent solenoid will close. After the vent is closed, typically a build up of pressure from the hot soak begins (phase-1). The pressure typically will peak and then begin to decrease as the fuel cools.	The DTC light can be turned off if the EWMA is	≤ 0.35 (EWMA Re-Pass	**1. Cold Start** Startup delta deg C (ECT-IAT)	≤ 8 °C		
					OR **2. Short Soak and Previous EAT Valid**			
			and stays below the EWMA fail threshold for 2 additional consecutive trips.		Previous time since engine off	≤ 7200 seconds		
					OR **3. Not a Cold Start and**			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		When the pressure drops (-62.27) Pa from peak pressure, the vent is then opened for 60 seconds to normalize the system pressure. The vent is again closed to begin the vacuum portion of the test (phase-2). As the fuel temperature continues to fall, a vacuum will begin forming. The vacuum will continue until it reaches a vacuum peak.			**Previous EAT Valid and between Short and Long Soak** Previous time since engine off AND Must expire Estimate of Ambient Temperature Valid Conditioning Time. **"P0442: Estimate of Ambient Temperature Valid Conditioning Time" in**	7200 seconds < Time < 25200 seconds Vehicle Speed ≥ 29.2 mph AND Mass Air Flow ≥ 0 g/sec		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		When the pressure rises 62.27 Pa from vacuum peak, the test then completes. If the key is turned on while the diagnostic test is in progress, the test will abort.			**Supporting Tables Tab.** 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	< 25200 seconds Vehicle Speed ≥ 29.2 mph AND Mass Air Flow ≥ 0 g/sec		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Time. **Please see "P0442: Estimate of Ambient Temperature Valid Conditioning Time" in Supporting Tables Tab.** OR **5. Long Soak** Previous time since engine off	≥ 25200 seconds		
				Abort Conditions:	**1. High Fuel Volatility** During the volatility phase,			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					pressure in the fuel tank is integrated vs. time. If the integrated pressure is then test aborts and unsuccessful attempts is incremented. OR **2. Vacuum Refueling Detected** See P0454 Fault Code for information on vacuum refueling algorithm.	< -5		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					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**			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Override Failed Device control using an off-board tool to control the vent solenoid, cannot exceed during the EONV test OR **7. Key up during EONV test** No active DTCs:	0.50 seconds FuelLevelDataFault MAF_SensorFA ECT_Sensor_FA IAT_SensorFA VehicleSpeedSensor_FA		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						IgnitionOffTimeValid 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	2 trips Type B
Evaporative	P0446	This DTC will	Vent Restriction		Fuel Level	10 ≤ Percent ≤ 90	Once per	2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Emission (EVAP) Vent System Performance		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.	Prep Test: Vented Vacuum OR Vented Vacuum for 60 seconds Vent Restriction Test: Tank Vacuum for 5 seconds BEFORE Purge Volume After setting the DTC for the first time, 2 liters of fuel must be consumed before setting the DTC for the second time.	< -623 Pa > 1245 Pa > 2989 Pa ≥ 6 liters	System Voltage Startup IAT Startup ECT BARO No active DTCs:	11 volts ≤ Voltage ≤ 32 volts 4 °C ≤ Temperature ≤ 30 °C ≤ 35 °C ≥ 70 kPa MAP_SensorFA TPS_FA VehicleSpeedSensor_FA IAT_SensorCircuitFA ECT_Sensor_FA AmbientAirDefault EnginePowerLimited P0443 P0449 P0452 P0453 P0454	Cold Start Time is dependent on driving conditions Maximum time before test abort is 1000 seconds	Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
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	2 trips Type B
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	The tank vacuum sensor voltage is compared to a window about the nominal sensor voltage offset (~1.5		This test will execute whenever the engine-off natural vacuum small leak test		This test is executed during an engine-off natural vacuum	1 trip Type A EWMA Averag e run

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		prior to the phase-1 or phase-2 portions of the engine-off natural vacuum small leak test.	volts) Upper voltage threshold (voltage addition above the nominal voltage) Lower voltage threshold (voltage subtraction below the nominal voltage) The difference between tank vacuum sensor voltage and the nominal offset voltage is then normalized against the appropriate threshold listed above to produce a ratio between 0.0 and 1.0. This normalized re-zero	 0.2 volts 0.2 volts	(P0442) executes		small leak test. The number of times that it executes can range from zero to two per engine-off period. The length of the test is determined by the refueling rationality test, which can take up to 600 seconds to complete.	length: 6 Run length is 2 trips after code clear or non-volatile reset

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			ratio is then filtered with a EWMA (with 0= perfect pass and 1=perfect fail). When EWMA is , the DTC light is illuminated. The DTC light can be turned off if the EWMA is and stays below the EWMA fail threshold for 2 additional consecutive trips.	> 0.73 (EWMA Fail Threshold) ≤ 0.40 (EWMA Re-Pass				
Fuel Tank Pressure	P0452	This DTC will detect a fuel tank	Fuel tank pressure sensor signal	< 0.15 volts (3 % of Vref or ~	Time delay after sensor power up		80 failures out of 100	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
(FTP) Sensor Circuit Low Voltage		pressure sensor signal that is too low out of range.	The normal operating range of the fuel tank pressure sensor is 0.5 volts (~1245 Pa) to 4.5 volts (~ -3736 Pa).	1681 Pa)	for sensor warm-up ECM State ≠ crank Stops 6.0 seconds after key-off	is 0.10 seconds	samples 100 ms / sample Continuous	
Fuel Tank Pressure (FTP) Sensor Circuit High Voltage	P0453	This DTC will detect a fuel tank pressure sensor signal that is too high out of range.	Fuel tank pressure sensor signal The normal operating range of the fuel tank pressure sensor is 0.5 volts (~1245 Pa) to 4.5 volts (~ -3736 Pa).	> 4.85 volts (97% of Vref or ~ -4172 Pa)	Time delay after sensor power up for sensor warm-up ECM State ≠ crank Stops 6.0 seconds after key-off	is 0.10 seconds	80 failures out of 100 samples 100 ms / sample Continuous	2 trips Type B
Fuel Tank	P0454	This DTC will	If an abrupt change		This test will		This test is	1 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Pressure (FTP) Sensor Circuit Intermittent		detect intermittent tank vacuum sensor signals that would have caused the engine-off natural vacuum small leak test to abort due to an apparent re-fueling event.	in tank vacuum is detected the engine-off natural vacuum test is aborted due to an apparent refueling event. Subsequent to the abort, a refueling rationality test is executed to confirm that a refueling event occurred. If a refueling is confirmed, then the test sample is considered passing. Otherwise, the sample is considered failing indicating an intermittent signal problem.		execute whenever the engine-off natural vacuum small leak test (P0442) executes		executed during an engine-off natural vacuum small leak test. The test can only execute up to once per engine-off period. The length of the test is determined by the refueling rationality test, which can take up to 600 seconds to	Type A

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
							complete.	
			An abrupt change is defined as a change in vacuum: in the span of 1.0 seconds. But in 12.5 msec. A refueling event is confirmed if the fuel level has a persistent change for 30 seconds.	> 112 Pa < 249 Pa of 15 %			The test will report a failure if 2 out of 3 samples are failures. 12.5 ms / sample Continuous when vent solenoid is closed.	
Evaporative Emission (EVAP) System Large Leak Detected	P0455	This DTC will detect a weak vacuum condition (large leak or purge	Purge volume while Tank vacuum After setting the	> 14 liters ≤ 2740 Pa	Fuel Level System Voltage BARO	10 % ≤ Percent ≤ 90 % 11 volts ≤ Voltage ≤ 32 volts ≥ 70 kPa	Once per cold start Time is dependent	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		blockage) in the EVAP system. Purge valve is controlled (to allow purge flow) and vent valve is commanded closed.	DTC for the first time, 2 liters of fuel must be consumed before setting the DTC for the second time. <u>Weak Vacuum Follow-up Test</u> (fuel cap replacement test) Passes if tank vacuum Note: Weak Vacuum Follow-up Test can only report a pass.	≥ 2740 Pa	No active DTCs: <u>Cold Start Test</u> If ECT > IAT, Startup temperature	MAP_SensorFA TPS_FA VehicleSpeedSensor_FA IAT_SensorCircuitFA ECT_Sensor_FA AmbientAirDefault EnginePowerLimited P0443 P0449 P0452 P0453 P0454	on driving conditions Maximum time before test abort is 1000 seconds <u>Weak Vacuum Follow-up Test</u> With large leak detected, the follow-up test is limited to	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					delta (ECT-IAT): Cold Test Timer Startup IAT Startup ECT Weak Vacuum Follow-up Test This test can run following a weak vacuum failure or on a hot restart.	≤ 8 °C ≤ 1000 seconds 4 °C ≤ Temperature ≤ 30 °C ≤ 35 °C	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 50 miles.	< 3 liters	Engine Running No active DTCs:	 VehicleSpeedSensor_FA	250 ms / sample Continuous	2 trips Type B
Fuel Level	P0461	This DTC will			Engine Running		250 ms /	2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Sensor 1 Performance (For use on vehicles with mechanical transfer pump dual fuel tanks)		detect a fuel sender stuck in range in the primary fuel tank.			No active DTCs:	VehicleSpeedSensor_FA	sample Continuous	Type B
			Fuel Level in Primary Tank Remains in an Unreadable Range too Long					
			If fuel volume in primary tank is AND Fuel volume in secondary tank and remains in this condition for OR	>= 23.0 liters < 3.5 liters 87 miles.				
			After Refuel Event					
			If the secondary fuel volume changes by 14.0 liters from engine “off” to engine “on” the		The shutdown primary tank volume + 3.0 liters must be	< 23.0 liters		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			primary volume should change by 3.0 liters. OR					
			Distance Traveled without a Primary Fuel Level Change					
			Delta Fuel Volume change over an accumulated 50 miles.	< 3 liters				
Fuel Level Sensor 1 Performance (For use on vehicles with electric transfer pump dual fuel tanks)	P0461	This DTC will detect a fuel sender stuck in range in the primary fuel tank.			Engine Running No active DTCs:	VehicleSpeedSensor_FA	250 ms / sample Continuous	2 trips Type B
			Fuel Level in Primary and Secondary Tanks Remains in an Unreadable Range					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			too Long					
			If fuel volume in primary tank is AND Fuel volume in secondary tank and remains in this condition for OR	>= 23.0 liters < 3.5 liters 87 miles.				
			During Fuel Transfer					
			During fuel transfer, when the enable conditions are met, at least 3.0 liters of fuel will be transferred from the secondary tank and 3.0 liters of fuel will be transfered into the primary tank within 0 seconds.		Transfer Pump is commanded on No device control for the transfer pump Fuel Volume in Secondary Tank Vehicle Speed	 < 10 liters < 0 mph		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			There is a short delay of 20 seconds to allow fuel slosh to settle before the fail timer begins. If the secondary tank volume does decrease by the cal amount but the primary volume does not increase by the cal amount after the fail timer has expired, then P0461 sets. OR					
			Distance Traveled without a Primary Fuel Level Change					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			Delta Fuel Volume change over an accumulated 50 miles.	< 3 liters				
Fuel Level Sensor 1 Circuit Low Voltage	P0462	This DTC will detect a fuel sender stuck out of range low in the primary fuel tank.	Fuel level Sender % of 5V range	< 10 %	Run/Crank Voltage Run/Crank voltage goes to 0 volts at key off	11 volts ≤ Voltage ≤ 32 volts	100 failures out of 125 samples 100 ms / sample Continuous	2 trips Type B
Fuel Level Sensor 1 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	100 failures out of 125 samples 100 ms / sample Continuous	2 trips Type B
Fuel Level	P0464	This DTC will	If a change in fuel		This test will		This test is	1 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Sensor 1 Circuit Intermittent		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.	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.		execute whenever the engine-off natural vacuum small leak test (P0442) executes		executed during an engine-off natural vacuum small leak test. The test can only execute up to once per engine-off period. The length of the test is determined by the refueling rationality test, which can take up to 600	Type A

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			An intermintant change in fuel level is defined as: The fuel level changes and does not remain for 30 seconds during a 600 second refueling rationality test.	by 15 % > 15 %			seconds to complete. The test will report a failure if 2 out of 3 samples are failures. 100 ms / sample	
Cooling Fan 1 Relay Control Circuit (ODM)	P0480	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Run/Crank Voltage Engine Speed	11 volts ≤ Voltage ≤ 32 volts ≥ 400 RPM	20 failures out of 25 samples 250 ms / sample Continuous with fan	2 trips Type B Not used on systems with Mecha

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
							operation	nical Fan)
Cooling Fan 2 Relay Control Circuit (ODM)	P0481	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Run/Crank Voltage Engine Speed	11 volts ≤ Voltage ≤ 32 volts ≥ 400 RPM	20 failures out of 25 samples 250 ms / sample Continuous with fan operation	2 trips Type B Not used on systems with Mechanical Fan)
Evaporative Emission (EVAP) System Flow During Non-Purge	P0496	This DTC will determine if the purge solenoid is leaking to engine manifold vacuum. This test will run	Tank Vacuum for 5 seconds BEFORE Test time	> 2491 Pa ≥ refer to "P0496: Purge Valve Leak Test Engine	Fuel Level System Voltage BARO Startup IAT Startup ECT Engine Off Time	10 % ≤ Percent ≤ 90 % 11 volts ≤ Voltage ≤ 32 volts ≥ 70 kPa 4 °C ≤ Temperature ≤ 30 °C ≤ 35 °C ≥ 28800.0 seconds	Once per cold start Cold start: max time is 1000 seconds	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		with the purge valve closed and the vent valve closed.		Vacuum Test Time (Cold Start) as a Function of Fuel Level table" in Supporting Tables Tab.	No active DTCs:	MAP_SensorFA TPS_FA VehicleSpeedSensor_FA IAT_SensorCircuitFA ECT_Sensor_FA AmbientAirDefault EnginePowerLimited P0443 P0449 P0452 P0453 P0454		
Transmission Output Speed Sensor (TOSS)	P0502	No activity in the TOSS circuit	TOSS Raw Speed	<= 60 RPM	Maximum Engine Torque Minimum Engine Torque	<= 8191.9 N-m >= 68.0 N-m	>= 4.50 sec	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Maximum Engine Torque in Park or Neutral	<= 8191.9 N-m		
					Minimum Engine Torque in Park or Neutral	>= 90.0 N-m		
					Minimum Throttle opening	>= 3.5 %		
					Minimum Engine Speed when there is a Brake DTC: P0572, P0573, P0703. **Cald Out by matched threshold with below. **	>= 1500 RPM		
					Minimum Engine Speed when	>= 1500 RPM		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					there is no Brake DTC			
					Maximum Engine Speed	<= 6500 RPM		
					Minimum Transmission Fluid Temperature	>= -40.0 º C.		
					Disable P0502 if PTO Active	Enabled		
					Engine Speed	<= 7500 RPM >= 200 RPM for >= 5.0 sec		
					Vehicle Speed	<= 318 MPH for >= 5.0 sec		
					Ignition Voltage Ignition Voltage	<= 32.0 volts >= 11.0 volts		
					No Active DTCs: 	EngineTorqureInaccurate AcceleratorEffectivePstnValid P0503 Active this Key On		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Transmission Output Speed Sensor (TOSS)	P0503	TOSS Signal Intermittent	Loop-to-Loop change in TOSS	>= 350 RPM	Disable P0502 if PTO Active	Enabled	>= 3.25 sec	Type B 2 trips
					Engine Speed	<= 7500 RPM >= 200 RPM for >= 5.0 sec		
					Vehicle Speed	<= 318 MPH for >= 5.0 sec		
					Ignition Voltage Ignition Voltage Time since Selected Gear Range Change Time since 4WD Range change Loop-to-Loop Input Speed Change Raw Output Speed Output Speed change	<= 32.0 volts >= 11.0 volts >= 6 sec >= 6 sec <= 500 RPM For >= 2 Sec. > 300 RPM for >= 2 Sec. <= 150 RPM for >= 2 Sec.		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Disabled For Following DTCS:	ShiftSolenoidFaults (TCM)		
Low Engine Speed Idle System	P0506	This DTC will determine if a low idle exists	Filtered Engine Speed Error	< 91.00 rpm	Baro	> 70 kPa	Diagnostic ru	2 trips Type B
			filter coefficient	0.003	Coolant Temp	> 60 °C and < 123 °C	every 12.5 ms loop	
					Engine run time	≥ 60 sec	Diagnostic reports	
					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 enable	
					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	> 88.00 pct < 16.00 pct		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						PTO not active		
						Transfer Case not in 4WD LowState		
						Off-vehicle device control (service bay control) must not be active.		
					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		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						EnginePowerLimited		
						TPS_FA		
						TPS_Performance_FA		
						VehicleSpeedSensor_FA		
						FuelLevelDataFault		
						LowFuelConditionDiagnostic		
						Clutch Sensor FA		
					All of the above met for Idle time	> 10 sec		
High Engine Speed Idle System	P0507	This DTC will determine if a high idle exists	Filtered Engine Speed Error	> -182.00 rpm	Baro	> 70 kPa	Diagnostic ru	2 trips Type B
			filter coefficient	0.003	Coolant Temp	> 60 °C and < 123 °C	every 12.5 ms loop	
					Engine run time	≥ 60 sec	Diagnostic reports	
					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 enable	
					IAT	> -20 °C	conditions are met	
					Vehicle speed	≤ 1.24 mph		
				Commanded RPM delta		≤ 25 rpm		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					For manual transmissions: Clutch Pedal TOT Threshold or Clutch Pedal BOT Threshold	> 88.00 pct < 16.00 pct		
						PTO not active		
						Transfer Case not in 4WD LowState		
						Off-vehicle device control (service bay control) must not be active.		
					No active DTCs	AmbientAirDefault		
						ECT_Sensor_FA		
						EGRValveCircuit_FA		
						EGRValvePerformance_FA		
						IAT_SensorCircuitFA		
						EvapFlowDuringNonPurge_FA		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						FuelTrimSystemB1_FA		
						FuelTrimSystemB2_FA		
						FuelInjectorCircuit_FA		
						MAF_SensorFA		
						EngineMisfireDetected_FA		
						IgnitionOutputDriver_FA		
						EnginePowerLimited		
						TPS_FA		
						TPS_Performance_FA		
						VehicleSpeedSensor_FA		
						FuelLevelDataFault		
						LowFuelConditionDiagnostic		
						Clutch Sensor FA		
					All of the above met for Idle time	> 10 sec		
Engine Oil Pressure (EOP) Sensor Performance	P0521	Determines if the Engine Oil Pressure (EOP) Sensor is stuck or biased in range	**To fail a currently passing test:** The filtered, weighted difference between measured EOP and predicted		Diagnostic enabled/disable	Enabled	Performed every 100 msec	2 trip(s) Type B
					Oil Pressure Sensor In Use	Present		
					Filtered engine oil pressure test			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			EOP (a function of engine speed and engine oil temp.):	< -50.0 kPa OR > 47.0 kPa	weighting (function of engine speed, engine oil temperature, predicted oil pressure, and engine load stability). Details on Supporting Tables Tab (P0521 Section)	>= 0.30 weighting No active DTC's Fault bundles: CrankSensorFA ECT_Sensor_FA MAF_SensorFA IAT_SensorFA EOPCircuit_FA		
			To pass a currently failing The filtered, weighted difference between measured EOP and predicted EOP (a function of engine speed and engine oil temp.):	> -47.0 kPa AND < 44.0 kPa				
Engine Oil Pressure	P0522	Determines if the Engine Oil	(Engine Oil Pressure Sensor		Engine Running	= True	50 failures out of 63	2 trip(s)

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
(EOP) Sensor Circuit Low Voltage		Pressure (EOP) Sensor circuit voltage is too low	Circuit Voltage) / 5 Volts	< 5 percent	Ignition Voltage Sensor Present Diagnostic enabled/disable	<= 32.0 V and >= 11.0 V Yes Enabled	samples Performed every 100 msec	Type B
Engine Oil Pressure (EOP) Sensor Circuit High Voltage	P0523	Determines if the Engine Oil Pressure (EOP) Sensor circuit voltage is too high	(Engine Oil Pressure Sensor Circuit Voltage) / 5 Volts	> 85 percent	Engine Running Ignition Voltage Sensor Present Diagnostic enabled/disable	= True <= 32.0 V and >= 11.0 V Yes Enabled	220 failures out of 255 samples Performed every 100 msec	2 trip(s) Type B
Air Conditioning Refrigerant Pressure Sensor Circuit Low Voltage	P0532	Determines if the Air Conditioning Refrigerant Pressure circuit voltage is too low	(AC Pressure Sensor Voltage) / 5 Volts	< 2.0 percent	AC Pressure Sensor diagnostic enabled	Enabled	120 failures	1 Trip(s) Type C
					AC pressure sensor present	Present	Performed every 25 msec	
Air Conditioning Refrigerant Pressure Sensor Circuit	P0533	Determines if the Air Conditioning Refrigerant Pressure circuit voltage is too	(AC Pressure Sensor Voltage) / 5 Volts	> 98.0 percent	AC Pressure Sensor diagnostic enabled	Enabled	120 failures	1 Trip(s) Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
High Voltage		high			AC pressure sensor present	Present	Performed every 25 msec	
Brake Booster Pressure Sensor Performance	P0556	Determines if the Brake Booster Vacuum Sensor is stuck or skewed within the normal operating range by comparing the engine vacuum to the brake booster vacuum when the engine is producing a large amount of vacuum	Engine vs brake booster vacuum sensor values are compared when % throttle < value for a time period. When throttle once again > calibrated value, min and max vacuum sensor values are normalized and subtracted from a 1st order lag filter value of 1. A properly operating vacuum sensor would have a normalized result of 1 or greater. If the		Throttle Area (with idle included) for Ignition Voltage BrkBoostVacDiff For time period o AND Vacuum Delta Diagnostic enabled/disable No active DTC's	<= 1 Percent for > 3 second <= 32.0 V and >= 11.0 V > 0.3 kPa >= 0.2 Seconds >= 6.0 kPa Enabled Fault bundles: MAP_SensorFA GetTPSR_FaultActive_TPS	Pass counter incremented when enable conditions are met, pass achieved when Performed every 100	2 trip(s) Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			1 or greater. If the normalized result is greater than 1 it is considered 1. The 1st order lag filter value would be 0 in 1st order lag fail threshold 1st order lag re-pass threshold	 > 0.5 < 0.6			msec	
Brake Booster Pressure Sensor Circuit Low Voltage	P0557	Determines if the Brake Booster Pressure Sensor circuit voltage is too low	(Brake Booster Pressure Sensor Voltage) / 5 Volts	< 2.0 percent	Brake booster diagnostic enabled/disable Brake booster pressure sensor present	Enabled Yes	320 failures out of 400 samples Performed every 12.5 msec	2 trip(s) Type B
Brake Booster Pressure Sensor Circuit High Voltage	P0558	Determines if the Brake Booster Pressure Sensor circuit voltage is too high	(Brake Booster Pressure Sensor Voltage) / 5 Volts	> 87.0 percent	Brake booster diagnostic enabled/disable Brake booster pressure sensor present	Enabled Yes	2000 failures out of 2400 samples Performed every 12.5 msec	2 trip(s) Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Cruise Control Mutil-Functon Switch Circuit	P0564	Detect when cruise control multi-function switch circuit (analog) voltage is in an illegal range	Cruise Control analog circuit voltage must be in an "illegal range" for greater than a calibratable period of time for cruise switch states that are received over serial data		CAN cruise switch diagnostic enable in ECM	TRUE -1	fail continuously for greater than 0.500 seconds	Type: C MIL: NO Trips: 1

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
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 -1	fail continuously for greater than 90.000 seconds	Type: C MIL: NO Trips: 1

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
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 -1	fail continuously for greater than 90.000 seconds fail	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 -1	10 / 16 counts	Type: C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
								MIL: NO
								Trips: 1
Brake Pedal Position Sensor Circuit Range/Performance	P057B	This diagnostic monitors the Brake Pedal Position Sensor for a stuck in range failure	**DTC Fail:** Calculated brake pedal position delta and resulting filtered EWMA calculation(supporting table) is less than a value for a	0.4 threshold / 2 counts	Brake Pedal Position Range	TRUE X	Performed every 25 msec	Type: A
					Ignition voltage	> 10 volts		MIL: YES
					EWMA Filter Value	0.3		Trips: 1
			DTC Pass: Calculated brake pedal position delta and resulting filtered EWMA calculation(supporting table) is greater than a value for a calibratable number	0.4 threshold / 1 counts				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			of EWMA tests):		No active DTC's	P057C / P057D		
					Criteria to Run Complete Test:			
					shift lever	In park at least once this key on		
					shift lever position	≠ park		
					vehicle speed	> 5		
					accelerator pedal position	< 5		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					calculated brake pedal position delta samples	1000 samples	Each calculated difference test is a minimum of 25 seconds (1000 counts @ 25ms)	
					Fast Test To Pass Criteria: calculated brake pedal position delta samples	50 samples	Each calculated difference test is a minimum of seconds (1000 counts @ 25ms)	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Brake Pedal Position Sensor Circuit Low	P057C	Detects low circuit failure when brake pedal position is below calibratable value	If x of y faults occur, default brake pedal position to zero for duration of fault	0.25	Brake Pedal Position Diagnostic Enable	TRUE -1	20 / 32 counts	Type: A MIL: YES Trips: 1
Brake Pedal Position Sensor Circuit High	P057D	Detects high circuit failure when brake pedal position is above calibratable value	If x of y faults occur, default brake pedal position to zero for duration of fault	4.75	Brake Pedal Position Diagnostic Enable	TRUE -1	20 / 32 counts	Type: A MIL: YES Trips:

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
								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 Diagnostic reports a fault if 5 failures occur after the first pass	Type A 1 trips
Control Module Not Programmed	P0602	This DTC will be stored if the PCM is a service PCM that has not been programmed.	Output state invalid		PCM State	= crank or run PCM is identified through calibration as a Service	Diagnostic runs at powerup	Type A 1 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Control Module Long Term Memory Reset	P0603	Non-volatile memory checksum error at controller power-up	Checksum at power-up does not match checksum at power-down				Diagnostic runs at powerup Diagnostic reports a fault if 1	Type A 1 trips
ECM RAM Failure	P0604	Indicates that the ECM is unable to correctly read data from or write data to RAM	Primary processor data pattern written doesn't match the pattern read for a count >	1 count if found on first memory scan. 5 counts if found on subsequent scans.			Will finish first memory scan within 30 seconds at all engine conditions - diagnostic runs continuously	Trips: 1 Type: A MIL: YES
			Secondary processor battery backed RAM failed checksum twice for original values at power up and the				Completion at intilization, <500 ms	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			defaulted values					
			Secondary processor copy of calibration area to RAM failed for a count >	2 counts			Completion at intilization, <500 ms	
			Secondary Processor data pattern written doesn't match the pattern read consecutive times				Will finish within 30 seconds at all engine conditions.	
			Secondary Processor TPS or APPS minimum learned values fail compliment check continuously				0.0625 sec continuous	
ECM Processor	P0606	Indicates that the ECM has detected an internal processor	When drag is active Secondary processor detects Primary's calculated throttle position is	45.98 %.		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all	0.1875 sec in the secondary processor	Trips: 1 Type: A MIL:

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		integrity fault	greater > than Secondary Processor calculated Throttle Position by			conditions		YES
			Secondary processor detects Primary's calculated throttle position is greater > than Secondary's calculated Throttle Position when driver is commanding the throttle from APP by	6.04 %.		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions		
			Secondary processor detects Primary's calculated throttle position is greater > than	39.26 %.		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			Secondary's calculated Throttle Position when reduce engine power is active by			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 were not executed in the correct order.	0.1250 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	0.1250 sec continuous	
			Software tasks on	0.5000 sec		Run/crank voltage or	0.5000 sec	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			the Primary Processor in the 50 ms loop were not executed or were not executed in the correct order.	continuous		Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	continuous	
			Software tasks on the Primary Processor in the 100 ms loop were not executed or were not executed in the correct order.	1.0000 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	1.0000 sec continuous	
			Software tasks on the Primary Processor in the 250 ms loop were not executed or were not executed in the correct order.	2.5000 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	2.5000 sec continuous	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			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 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	
			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			Run/crank voltage or Powertrain relay voltage >	In the primary	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			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			6.00 and reduced power is false, else the failure will be reported for all conditions	processor, 159 / 400 counts intermittent or 39 counts continuous; 39 counts continuous @ initialization	
			Loss or invalid message of SPI communication from the Primary Processor at initialization detected by the			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	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			Secondary Processor or loss or invalid message of SPI communication from the Primary Processor after a valid message was recieved by the Secondary Processor				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			Run/crank voltage or Powertrain relay voltage >	0.1000 sec continuous	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			minimum learned values fail compliment check			6.00 and reduced power is false, else the failure will be reported for all conditions		
			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 be reported for all conditions	12.5 ms continuous	
			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			Run/crank voltage or	12.5ms	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			processor checks stack beginning and end point for pattern written at initialization.			Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	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	12.5ms 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		
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 >	41		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions Engine Running TPS minimum learn is not active No Pedal related errors or diagnostic faults. Diagnostic is enabled (Only applicable for Legacy accelerator pedals)	Consecutive checks within 200ms or 2 / 2 counts; 175 ms/count	Trips: 1 Type: A MIL: YES

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			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 Primary processor Pedal Sync Error is FALSE	44 / 40 counts or 39 counts continuous; 12.5 ms/count in the secondary processor	
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 powerup	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	4.875 5.125			19 / 39 counts or 0.1875 continuous; 12.5 ms/count in	Trips: 1 Type: A MIL: YES

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			filtered Vref1 and Primary Vref1 >	0.049		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	primary processor	
			Secondary Processor Vref1 < or Secondary Processor Vref1 >	4.875 5.125			19 / 39 counts or 15 counts continuous; 12.5 ms/count in secondary processor	
Malfunction Indicator Lamp (MIL) Control Circuit (ODM)	P0650	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Run/Crank Voltage Remote Vehicle Start is not active	11 volts ≤ Voltage ≤ 32 volts	20 failures out of 25 samples 250 ms / sample Continuous	2 trip Type B NO MIL
5 Volt Reference #2 Circuit	P0651	Detects a continuous or intermittent short	Primary Processor Vref2 < or Primary	4.875			19 / 39 counts or 0.1875 sec	Trips: 1 Type:

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		on th 5 volt reference circuit #2	Processor Vref2 > or the difference between Primary filtered Vref2 and Primary Vref2 >	5.125 0.049		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	continuous; 12.5 ms/count in primary processor	A MIL: YES
			Secondary Processor Vref2 < or Secondary Processor Vref2 >	4.875 5.125			19 / 39 counts or 15 counts continuous; 12.5 ms/count in secondary processor	
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		Run/Crank Voltage	11 volts ≤ Voltage ≤ 32 volts	8 failures out of 10 samples	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			match.				250 ms / sample Continuous	
Powertrain Relay Feedback Circuit High	P0690	This DTC is a check to determine if the Powertrain relay is functioning properly.	PT Relay feedback voltage is Stuck Test: PT Relay feedback voltage is when commanded 'OFF'	≥ 18 volts > 3 volts	Powertrain relay commanded "ON" No active DTCs:	PowertrainRelayStateOn_FA	5 failures out of 6 samples 1 second / sample Stuck Test: 100 ms/ sample Continous failures ≥ 4 seconds	2 trips Type B
Fuel Pump Control Module (FPCM)	P069E	Monitors the FPCM MIL request line to determine when	Fuel Pump Control Module Emissions-Related DTC set			Time since power-up > 3 seconds	Continuous	1 trips Type A (No MIL)

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Requested MIL		the FPCM has detected a MIL						
Transmission Control Module (TCM) Requested MIL Illumination	P0700	Monitors the TCM MIL request line to determine when the TCM has detected a MIL	Transmission Control Module Emissions-Related DTC set			Time since power-up > 3 seconds	Continuous	1 trips Type A (No MIL)
Clutch Pedal Position Sensor Circuit Range / Performance	P0806	Detects if Clutch Pedal Position Sensor is Stuck in a range indicative of a vehicle NOT in gear, when the vehicle is determined to be in gear. Gear determination is made by verifying that engine RPM/ Vehicle Speed	Filtered Clutch Pedal Position Error when the vehicle is determined to be in gear	> 1 %	N/V Ratio	Must match actual gear (i.e. vehicle in gear)	25 ms loop Continuous	1 Trip(s) Type A
					Transfer Case	Not in 4WD Low range		
					vehicle speed	> 0.0 MPH		
					Engine Torque	> **EngTorqueThreshold** Table		
					Clutch Pedal Position	< **ResidualErrEnableLow** Table		
					OR			
					Clutch Pedal Position	> ***ResidualErrEnableHigh*** *Table*		
					No Active DTCs:			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		(N/V) ratio represents a valid gear.			ClutchPositionSensorCktLo FA ClutchPositionSensorCktHi FA CrankSensorFA VehicleSpeedSensor_FA			
Clutch Pedal Position Sensor Circuit Low	P0807	Detects Continuous Circuit Short to Low or Open	Clutch Position Sensor Circuit	< 4 % of Vref	Engine Not Cranking System Voltage	> 9.0 Volts	25 ms loop Continuous	1 Trip(s Type A
			for	200 counts out of 250 samples				
Clutch Pedal Position Sensor Circuit High	P0808	Detects Continuous Circuit Short to High	Clutch Position Sensor Circuit	> 96 % of Vref	Engine Not Cranking System Voltage	> 9.0 Volts	25 ms loop Continuous	1 Trip(s) Type A
			for	200 counts out of 250 samples				
Clutch Pedal Position Not Learned	P080A	Monitor for Valid Clutch Pedal Fully Applied Learn Position values	Fully Applied Learn Position	< 9.0 %	OBD Manufacturer Enable Counter	= 0	250 ms loop Continuous	1 Trip(s) Type A
			OR					
			Fully Applied Learn Position	> 35.0 %				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Skip Shift Solenoid Control Circuit Low (Manual Transmission Only)	P080C	This DTC checks for an open and shorted low circuit while the device is commanded off.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Run/Crank Voltage Engine Speed	11 volts ≤ Voltage ≤ 32 volts > 250 RPM	5 failures out of 6 samples 250 ms / sample Continuous with device off	2 trips Type B
Skip Shift Solenoid Control Circuit High (Manual Transmission Only)	P080D	This DTC checks for a shorted high circuit while the device is commanded on.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Run/Crank Voltage Engine Speed	11 volts ≤ Voltage ≤ 32 volts > 250 RPM	5 failures out of 6 samples 250 ms / sample Continuous with device	2 trips Type B
Traction Control Torque	P0856	Determines if torque request from the EBTCM	**With GMLAN:** Serial		**With GMLAN:** Serial	 No loss of communication	**With GMLAN:**	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Request Circuit		is valid	Communication 2's complement message - ($140 for PPEI2 or $1C7/$1C9 for PPEI3 engine	Message <> 2's complement of message	communication to EBTCM Power Mode Engine Running	= Run = True	Count of 2's complement values not equal >= 10	
			OR				**OR**	
			Serial Communication message ($140 for PPEI2 or $1C7/$1C9 for PPEI3 engine torque or $1CA for	Message rolling count value <> previous message rolling count value plus one	Status of traction in GMLAN message ($380 for PPEI2 or $4E9 for PPEI3)	= Traction Present	3 rolling count failures out of 10	1 trip(s)
			OR					
			Too many minimum limit torque request transitions occur from TRUE to FALSE to TRUE within a time period	Requested torque intervention type toggles from not increasing request to increasing			>= 3 multi-transitions out of 5 samples	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			Torque request greater than allowed	request			>= 6 out of 10 samples above 250 Nm Performed every 25	
			With PWM: PWM Duty cycle **OR** PWM Duty cycle	< 4 Pct > 96 Pct	**With PWM:** Traction Status for PWM ($2B3C Class2 Engine Run Time	= Traction Present > 2 Seconds	**With PWM:** 3 failures out of 30 Performed every 50 msec	Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
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	<= 400 kPa*(g/s) > 21 grams/sec > 22.0 kPa) > 22.0 kPa	Engine Speed Engine Speed Coolant Temp Coolant Temp Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together)	>= 450 RPM <= 5800 RPM > -7 Deg C < 125 Deg C > -20 Deg C < 125 Deg C >= 0.00 Filtered Throttle Model multiplied by TPS Residual Weight Factor based on RPM Modeled Air Flow multiplied by MAF Residual Weight Factor based on RPM and MAF Residual Weight Factor Based on MAF Estimate	Continuous Calculation are performed every 12.5 msec	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						MAP Model 1 multiplied by MAP1 Residual Weight Factor based on RPM MAP Model 2 multiplied by MAP2 Residual Weight Factor based on RPM See table "IFRD Residual Weighting Factors".		
					No Active DTCs:	MAP_SensorCircuitFA EGRValve_FP EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensorFA ECT_sensor_FA ECT_Sensor_FP IAT_SensorFA		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						IAT_SensorCircuitFP CylDeacSystemTFTKO		
Inlet Airflow System Performance (supercharged)	P1101	Determines if there are multiple air induction problems affecting airflow and/or manifold pressure.	See table "Supercharger Intake Flow Rationality Diagnostic Failure Matrix" for combinations of model failures that can set this DTC. TPS model fails when Filtered Throttle Model Error MAF model fails when ABS(Measured Flow – Modeled Air Flow) Filtered	 > 400 kPa*(g/s) > 21 grams/sec	Engine Speed Engine Speed Coolant Temp Coolant Temp Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together)	>= 450 RPM <= 5800 RPM > -7 Deg C < 125 Deg C > -20 Deg C < 125 Deg C >= 0.00 RPM 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	Continuous Calculation are performed every 12.5 msec	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			MAP1 model fails when ABS(Measured MAP – MAP Model 1) Filtered	> 22.0 kPa		Residual Weight Factor Based on MAF Estimate MAP Model 1 multiplied by MAP1 Residual Weight Factor based on RPM and Boost Residual Weight Factor based on % of Boost		
			MAP2 model fails when ABS(Measured MAP – MAP Model 2) Filtered	> 22.0 kPa		MAP Model 2 multiplied by MAP2 Residual Weight Factor based on RPM and Boost Residual Weight Factor based on % of Boost		
			SCIAP1 model fails when ABS(Measured SCIAP – SCIAP Model 1) Filtered	> 14.0 kPa		SCIAP Model 1 multiplied by SCIAP1 Residual Weight Factor based on RPM and Boost Residual Weight Factor based on %		
			SCIAP2 model fails when ABS(Measured SCIAP – SCIAP					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			Model 2) Filtered	> 14.0 kPa		of Boost SCIAP Model 2 multiplied by SCIAP2 Residual Weight Factor based on RPM and Boost Residual Weight Factor based on % of Boost See table "IFRD Residual Weighting Factors".		
					No Active DTCs:	MAP_SensorCircuitFA EGRValve_FP EGRValvePerformance_F MAF_SensorCircuitFA CrankSensorFA ECT_sensor_FA ECT_Sensor_FP IAT_SensorFA IAT_SensorCircuitFP CylDeacSystemTFTKO IAT2_SensorFA		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						IAT2_SensorCircuitFP SCIAP_SensorCircuitFA SCIAP_SensorCircuitFP AmbientAirDefault_SC		
EngineMetal	P1258	The objective of	Engine Coolant	≥ 132 °C	Engine Run	≥ 10 Seconds	Fault present	1 trips
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.	GMLan Message: "Wheel Sensor Rough Road Magnitude Validity"	= 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"
ABS System Rough Road	P1381	This diagnostic detects if the	Loss of GMLan Message: "Wheel	= FALSE	Vehicle Speed	VSS ≥ 5 mph	40 failures out of 80	1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Detection Communication Fault		rough road information is no longer being received from the ABS controller, and misfire is present. When this occurs, misfire will continue to run.	Sensor Rough Road Magnitude"		Engine Speed Engine Load RunCrankActive Active DTC	rpm < 8192 load < 60 = TRUE P0300, MIL Request	samples 250 ms /sample Continuous	Type C "Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Cold Start Emissions Reduction System Fault	P1400	Model based test computes power from exhaust flow and thermal energy resulting from elevated idle speed and retarded spark advance. Detects if the cold start emission reduction system has failed resulting in the delivered power being out of range.	Average desired accumulated exhaust power - Average estimated accumulated exhaust power OR Average desired accumulated exhaust power - Average estimated accumulated exhaust power (EWMA filtered)	< -5.00 KJ/s (high RPM failure mode) > 1.15 KJ/s (low RPM failure mode)	Cold Start Emission Reduction Strategy Is Active. The strategy is considered active if either the Spark cat light off or Idle cat light off strategies are considered active. Spark CLO is considered active when the CatLightOffDesiredSparkRetard (function of idle RPM and air per cylinder and scaled based on coolant and engine run time) <= 4.40 degrees of Spark Idle CLO is considered active if the desired RPM exceeds a base RPM value (function of coolant) plus an RPM offset. The amount of RPM offset to be considered catalyst light off is also a function of coolant temperature and gear state. Refer to "Supporting Tables" for details.	Vehicle Speed: < 1.24 MPH OBD Manufacturer: 0	Runs once per trip when the cold start emission reduction strategy is active Frequency: 100ms Loop Test completes after 10 seconds of accumulated qualified data.	Type A 1 Trip(s)

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Throttle Position	< 0.50 percent		
					A change in throttle position (tip-in/tip-out) will initiate a delay in the calculation of the average qualified residual value. When the delay timer > 5.00 seconds the diagnostic will continue the calculation.			
					For Manual Transmission vehicles, the clutch must be fully engaged. Clutch Pedal Position < 16.00 OR The clutch must be fully disengaged. Clutch Pedal Position > 88.00			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					General Enable			
					DTC's Not Set			
					MAF_SensorFA			
					MAP_SensorFA			
					IAT_SensorCircuitFA			
					IAT2_SensorCircuitFA			
					ECT_Sensor_FA			
					CrankSensorFaultActive			
					IAC_SystemRPM_FA			
					TPS_FA			
					VehicleSpeedSensor_FA			
					EngineMisfireDetected_FA			
					IgnitionOutputDriver_FA			
					ControllerProcessorPerf_FA			
					5VoltReferenceA_FA			
					5VoltReferenceB_FA			
					FuelInjectorCircuit_FA			
					TransmissionEngagedState_FA			
					Clutch Sensor FA			
					P050A (ColdStrt_IAC_SysPerf)			
					P050B (ColdStrtIgnTmngPerf)			
Replicated Transmission	P150A	No activity in the RTOS Signal	RTOS Sensor Raw Speed	<= 60 RPM	Transmission output Speed	>= 1000 RPM	>= 4.50 Fail Time (Sec)	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Output Speed (RTOS) Sensor		circuit			Angular Velocity			
					Engine Speed	<= 7500 RPM >= 200 RPM for >= 5.0 sec		
					Vehicle Speed	<= 124 MPH for >= 5.0 sec		
					Ignition Voltage Ignition Voltage Disabled For Following DTCS:	<= 32.0 volts >= 9.0 volts VehicleSpeedSensor_FA P150B		
Replicated Transmission Output Speed (RTOS) Sensor	P150B	RTOS Signal Circuit Intermittent	RTOS Sensor Loop-to-Loop speed change	>= 350 RPM	Raw Transmission Output Speed Output Speed change	> 300 RPM for >= 2 sec. <= 150 RPM for >= 2 sec.	>= 3.25 Fail Time (Sec)	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Engine Speed	<= 7500 RPM >= 200 RPM for >= 5.0 sec		
					Vehicle Speed	<= 124 MPH for >= 5.0 sec		
					Ignition Voltage Ignition Voltage Disabled For Following DTCS:	<= 32.0 volts >= 9.0 volts VehicleSpeedSensor_FA		
Transmission Engine Speed Request Circuit	P150C	Determines if engine speed request from the TCM is valid	Serial Communication rolling count value	+ 1 from previous $19D message (PTEI3)	Diagnostic enable bit	1	Diagnostic runs in 12.5 ms loop	2 trips Type B
			Transmission engine speed protection	not equal to 2's complement of transmission engine speed request + Transmission alive rolling count	Engine run time	0.50 sec		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					# of Protect Errors	10 protect errors out of 10 samples		
					# of Alive Rolling Errors	6 rolling count errors out of 10 samples		
					No idle diagnostic 506/507 code	IAC_SystemRPM_FA		
					No Serial communication loss to TCM	(U0101)		
					Engine Running	= TRUE		
					Power mode	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 >	6.036 %. 6.036 %.	Engine Running or Ignition Voltage >	Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions 11	0.1875 sec in the secondary processor	Trips: 1 Type: A MIL: YES

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					and Ignition Voltage > and Throttle is being Controlled and Communication Fault (SPI is not set) and TPS minimum learn is not active Ignition voltage failure is false (P1682)	5.4		
		Detect throttle control is driving the throttle in the incorrect direction	Thottle Position >	39.761 %.	(Throttle is being Controlled and TPS minimum learn is active) or Reduce Engine Power 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	0.1375 sec continuous	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		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 %		Engine Running or Ignition Voltage > 11 and Ignition Voltage > 5.4 and Throttle is being Controlled and Communication Fault (SPI is not set) and TPS minimum learn	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	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					is not active Ignition voltage failure is false			
Remote Vehicle Speed Limiting Signal Circuit	P162B	Determines if the speed request from OnStar is valid	**Password Protect error** - Serial Communication message - ($3ED)	Message <> two's complement of message	Vehicle Requested Speed Limit	< 318 MPH - Can be lower speed if being requested by another non_ECM module	>= 10 Password Protect errors out of 10 samples	1 trip(s) Type C
			OR					
			Rolling count error - Serial Communication message ($3ED)	Message <> previous message rolling count value +			>= 10 Rolling count errors out of 10 samples	
							Performed every 25 msec	
Ignition Voltage Correlation	P1682	Detect a continuous or intermittent out of correlation between the	|Run/Crank – PT Relay Ignition| >	XX Volts	Powertrain commanded on and		XX / XX counts or XX sec continuous; 12.5	Trips: 1 Type: A MIL:

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		Run/Crank Ignition Voltage & the Powertrain Relay Ignition Voltage			(Run/crank voltage > or PT Relay Ignition voltage > and Run/crank voltage >	Table, f(IAT). See supporting tables XX XX	msec/count in main processor	YES
Fuel Level Sensor 2 Performance (For use on vehicles with electric transfer pump dual fuel	P2066	This DTC will detect a fuel sender stuck in range in the secondary fuel tank.	Fuel Level in Primary and Secondary Tanks		Engine Running No active DTCs:	VehicleSpeedSensor_FA	250 ms / sample Continuous	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
tanks)			Remains in an Unreadable Range too Long					
			If fuel volume in primary tank is AND Fuel volume in secondary tank and remains in this condition for OR	>= 23.0 liters < 3.5 liters 87 miles				
			During fuel tranfer					
			When the enable conditions are met, 3.0 liters of fuel will be transferred from the secondary tank and 3.0 liters of fuel will be transfered into the primary tank within 0 seconds. There is a short delay of 20 seconds		Transfer Pump is commanded on No device control for the transfer pump Fuel Volume in Secondary Tank	 < 10 liters		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			to allow fuel slosh to settle before the fail timer begins. If the secondary tank volume does not decrease by the cal amount but the primary volume does increase by the cal amount after the fail timer has expired, then P2066 sets. OR		Vehicle Speed	< 0 mph		
			After a Refuel Event					
			If the primary fuel volume changes by 20 liters from engine “off” to					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			engine “on” the secondary volume should change by 3 liters. Otherwise, P2066 will set. OR					
			Distance Traveled without a Secondary Fuel Level Change					
			If the vehicle is driven a distance of 88 miles without the secondary fuel level changing by 3 liters, then the sender must be stuck. OR The secondary fuel sender is stuck in the deadband	> 10 liters.	Volume in Secondary Tank and Volume in Secondary Tank Secondary Full Transfer Pump On Time	>= 4 liters < 10 liters >= 200 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			AND If the vehicle is driven a distance of 88 miles without the secondary fuel level changing by 3 liters, then the sender must be stuck.					
Fuel Level Sensor 2 Performance (For use on vehicles with mechanical transfer pump dual fuel tanks)	P2066	This DTC will detect a fuel sender stuck in range in the secondary fuel tank.			Engine Running No active DTCs:	 VehicleSpeedSensor_FA	250 ms / sample Continuous	2 trips Type B
			Fuel Level in Secondary Tank Remains in an Unreadable Range too Long					
			If fuel volume in primary tank is AND Fuel volume in	>= 23.0 liters				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			secondary tank and remains in this condition for OR	< 3.5 liters 87 miles				
			Fuel Level is in a Readable Range for both Primary and Secondary Tanks too Long					
			Volume in Primary Tank AND Volume in Secondary Tank and remains in this condition for OR	< 23 liters > 4 liters 2430 seconds				
			Distance Traveled without a Secondary Fuel Level Change					
			If the vehicle is		Volume in			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			driven a distance of 88 miles without the secondary fuel level changing by 3 liters, then the sender must be stuck.		Secondary Tank	>= 3.5 liters		
Fuel Level Sensor 2 Circuit Low Voltage (For use on vehicles with dual fuel tanks)	P2067	This DTC will detect a fuel sender stuck out of range low in the secondary fuel tank.	Fuel level Sender % of 5V range	< 10 %	Run/Crank Voltage Run/Crank voltage goes to 0 volts at key off	11 volts ≤ Voltage ≤ 32 volts	100 failures out of 125 samples 100 ms / sample Continuous	2 trips Type B
Fuel Level Sensor 2 Circuit High Voltage (For use on vehicles with	P2068	This DTC will detect a fuel sender stuck out of range low in the secondary 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	100 failures out of 125 samples 100 ms / sample	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
dual fuel tanks)							Continuous	
Post Catalyst Fuel Trim System Low Limit Bank 1 (Too Rich)	P2096	Determines if the post catalyst O2 sensor based fuel control system has been unable to adapt to a rich exhaust gas condition that results in an emissions correlated failure.	Rich Fail Counts: 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, and evaluation starts again.	> 190 out of 240 samples Note: 10 sample counts = 1 second	The following must be true for:	> 0.0 sec	Frequency: Continuous Monitoring in 100ms loop	2 Trip(s) Type B
					PTO:	NOT active		
					Intrusive diagnostic fuel control:	FALSE (i.e. catalyst monitor diagnostic)		
					Long Term Secondary Fuel Trim Enabled	Please see "**Long Term Secondary Fuel Trim Enable Criteria**" in Supporting Tables		
					Ambient air pressure	>= 70 kPa		
					Engine air flow	>= 0 g/s and <= 10000 g/s		
					Intake manifold air pressure	>= 0 kPa and <= 200 kPa		
					Induction air temperature	>= -20 °C and <= 200 °C		
					Start up coolant temperature	> -20 °C		
					NO ACTIVE DTCs:			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					AmbientAirDefault_NA AIR System FA Ethanol Composition Sensor FA ECT_Sensor_FA EGRValveCircuit_FA EGRValvePerformance_FA IAT_Sensor_FA CamSnsrLctnAny_FA EvapEmissionSystem_FA EvapFlowDuringNonPurge_FA FuelTankPressureSensorCircuit_FA EvapPurgeSolenoidCircuit_FA EvapSmallLeak_FA EvapVentSolenoidCircuit_FA FuelInjectorCircuit_FA MAF_SensorFA MAF_SensorTFTKO MAP_SensorFA MAP_EngineVacuumStatus EngineMisfireDetected_FA A/F Imbalance Bank1 O2S_Bank_1_Sensor_1_FA O2S_Bank_1_Sensor_2_FA			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		Additional notes, strategy and enable requirements:						
		If the post catalyst O2 voltage is outside a control window, the integral offset is adjusted in an attempt to move the voltage back inside the control window. The offset value is used to adjust the front O2 sensor control to bias the bulk average exhaust air/fuel ratio either lean or rich. The integral offset value is retained	**The above specified Sample Counter will increment if:**					
			The current post O2 airflow mode is a selected cell:			See supporting tables: **Selected Cells**		
			AND					
			Accumulated Cell Count is greater than (counts spent in the given cell while enabled)			See supporting tables: **Cell Accum Min**		
			The above specified Fail Counter will increment if the Sample Counter increments AND:					
			Filtered post O2 voltage is beyond the fail threshold:			See supporting tables: > **O2 Rich Thresh**		
			for more than this many counts:			See supporting tables: **Out of Window Count**		
			AND					
			The post catalyst O2 integral offset is:			See supporting tables: <= **Integral Offset Min**		
			Note - the Post O2 filter coefficient is:			See supporting tables: **Post O2 Filt Coefficient**		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		between trips.						
		Re-Pass Feature						
		If a fault is active from a prior trip and the above fail threshold is not met on the current trip, a Re-Pass sample counter must exceed a threshold in order for a pass to be reported.	Re-Pass sample counter is This counter will increment if neither the filtered post O2 voltage nor the integral offset are in failing regions (see fail conditions specified above)	>= 215 counts Note: 10 sample counts = 1 second	If neither a pass nor a fail can be reported before the sample counter reaches its threshold, no report is made (indeterminate state).			
		High Vapor (HV) Delay Feature						
		The diagnostic is at risk of reporting a false fail when excessively High Vapor (HV) conditions that	Canister purging is active and Long term fuel correction for	<= 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 and the diagnostic will	
					Integral offset is outside the	See supporting tables: **HV Integral Offset Low**		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		impact the fuel control system are present. This HV condition is indicated when the criteria to the right are met. In this situation, the diagnostic will temporarily stop evaluation. When the HV condition subsides, evaluation will resume			window defined by:	and **HV Integral Offset High**	temporarily stop evaluation.	
			If HV has caused the diagnostic to stop evaluation, evaluation will resume when long term fuel correction is for	> 0.86 >= 5.0 sec		Note: When either the filtered post O2 voltage or the integral offset returns to the above defined windows, the diagnostic will immediately resume evaluation.		
			If HV has caused the diagnostic to stop evaluation, evaluation will resume when the purge valve closes for	>= 5.0 sec				
Post Catalyst Fuel Trim System High Limit Bank 1 (Too Lean)	P2097	Determines if the post catalyst O2 sensor based fuel control system has been unable to adapt	Lean Fail Counts: Note: If the fail count threshold is reached, a fail is	> 190 out of 240 samples Note: 10 sample counts = 1 second	Same enable conditions for P2096, P2097, P2098, P2099 (see P2096 enable		Frequency: Continuous Monitoring in 100ms loop	2 Trip(s) Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		to a lean exhaust gas condition that results in an emissions correlated failure.	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, and evaluation starts again.		conditions)			
		Additional notes, strategy and enable requirements:						
		If the post catalyst O2 voltage is outside a control window, the integral offset is adjusted in an attempt to move the voltage back	**The above specified Sample Counter will increment if:**					
			The current post O2 airflow mode is a selected cell:			See supporting tables: **Selected Cells**		
			AND					
			Accumulated Cell Count is greater than			See supporting tables: **Cell Accum Min**		
			(counts spent in the given cell while enabled)					
			The above specified Fail Counter will increment if the Sample Counter increments AND:					
			Filtered post O2 voltage is beyond the fail threshold:			See supporting tables: < **O2 LeanThresh**		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		inside the control window. The offset value is used to adjust the front O2 sensor control to bias the bulk average exhaust air/fuel ratio either lean or rich. The integral offset value is retained between trips.						
						for more than this many counts: See supporting tables: **Out of Window Count**		
			AND					
			The post catalyst O2 integral offset is:			See supporting tables: >= **Integral Offset Max**		
			Note - the Post O2 filter coefficient is:			See supporting tables: **Post O2 Filt Coefficient**		
		Re-Pass Feature: same for P2096, P2097, P2098, P2099 (see P2096 for details)						
		High Vapor (HV) Delay Feature: same as rich fault for bank 1 (see P2096)						
Post Catalyst Fuel Trim System Low Limit Bank 2 (Too Rich)	P2098	Same as bank 1 rich fault (see P2096)	Rich Fail Counts: Note: Same as bank 1 rich fault (see P2096)	> 190 out of 240 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	2 Trip(s) Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					NOTE: The Bank1 faults listed in the P2096 section are replaced by:			
					A/F Imbalance Bank2 O2S_Bank_2_Sensor_1_FA O2S_Bank_2_Sensor_2_FA			
		Additional notes, strategy and enable requirements: same as bank 1 rich fault (see P2096)						
		Re-Pass Feature: same for P2096, P2097, P2098, P2099 (see P2096 for details)						
		High Vapor (HV) Delay Feature						
		The diagnostic is at risk of reporting a false fail when excessively High Vapor (HV) conditions that impact the fuel control system are present. This HV condition is indicated when the criteria to the	Canister purging is active and Long term fuel correction is for	<= 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 and the diagnostic will temporarily stop evaluation.	
			If HV has caused the diagnostic to stop evaluation, evaluation will resume when long term fuel correction		Integral offset is outside the window defined by:	See supporting tables: **HV Integral Offset Low** and **HV Integral Offset High**		
						Note: When either the filtered post O2 voltage or		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		right are met. In this situation, the diagnostic will temporarily stop evaluation. When the HV condition subsides, evaluation will resume	is for If HV has caused the diagnostic to stop evaluation, evaluation will resume when the purge valve closes for	> 0.86 >= 5.0 sec >= 5.0 sec		the integral offset returns to the above defined windows, the diagnostic will immediately resume evaluation.		
Post Catalyst Fuel Trim System High Limit Bank 2 (Too Lean)	P2099	Same as bank 1 lean fault (see P2097)	Lean Fail Counts: Note: Same as bank 1 lean fault (see P2097)	> 190 out of 240 samples Note: 10 sample counts = 1 second	Same enable conditions for P2096, P2097, P2098, P2099 (see P2096 enable conditions) NOTE: The Bank1 faults listed in the P2096 section are replaced by: A/F Imbalance Bank2 O2S_Bank_2_Sensor_1_FA O2S_Bank_2_Sensor_2_FA		Frequency: Continuous Monitoring in 100ms loop	2 Trip(s) Type B
		Additional notes, strategy and enable requirements: same as bank 1 lean fault (see P2097)						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		Re-Pass Feature: same for P2096, P2097, P2098, P2099 (see P2096 for details)						
		High Vapor (HV) Delay Feature: same as rich fault for bank 2 (see P2098)						
Throttle Actuator Control - Position Performance	P2101	Detect a throttle positioning error	The throttle model and actual Throttle position differ by > or The actual Throttle position and throttle model differ by >	6.036 %. 6.036 %.	Engine Running or Ignition Voltage > and Ignition Voltage > and Throttle is being Controlled and Communication Fault (SPI is not set) and TPS minimum learn	Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions 11 5.5	15 / 15 counts; 12.5 msec/count in the primary processor	Trips: 1 Type: A MIL: YES

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					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 processor	
			Thottle Position >	39.06 %.	Reduce Engine Power is Active			
Throttle return to default	P2119	Throttle unable to return to default throttle position after de-energizing ETC motor.	TPS1 Voltage >	1.689	Throttle de-energized	No 5V reference error or fault for # 2 5V reference circuit (P0651)	0.4969 sec continuous	Trips: 1
			AND TPS2 Voltage >	1.789				Type: C
			On the main processor		No TPS circuit faults			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
								MIL: NO
			Or		PT Relay Voltage > 5.500			
			TPS1 Voltage > AND TPS2 Voltage > On the secondary processor	1.689 1.789				
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	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 No 5 V reference #2 error	19 / 39 counts or 13 counts continuous; 12.5 msec/count in the secondary processor	Trips: 1 Type: A MIL: YES

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		processor				No 5 V reference #2 DTC (P0651)		
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 13 counts continuous; 12.5 ms/count in the primary processor	Trips: 1 Type: A MIL: YES
			Secondary APP1 Voltage <	0.463		No 5 V reference #2 error No 5 V reference #2 DTC (P0651)	19 / 39 counts or 13 counts continuous; 12.5 ms/count in the secondary processor	
APP1 Circuit High	P2123	Detects a continuous or intermittent short	Primary APP1 Voltage >	4.75		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is	19 / 39 counts or 13 counts	Trips: 1 Type:

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		in APP1 circuit on both processors or just the primary processor				false, else the failure will be reported for all conditions	continuous; 12.5 ms/count in the primary processor	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 13 counts continuous; 12.5 ms/count in the secondary processor	
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	Secondary APP2 Voltage < 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 13 counts continuous; 12.5 msec/count in the secondary processor	Trips: 1 Type: A MIL: YES

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		primary processor				No 5 V reference #1 error No 5 V reference #1 DTC (P0641)		
APP2 Circuit Low	P2127	Detects a continuous or intermittent short or open in APP2 circuit on both processors or just the primary processor	Primary APP2 Voltage <	0.325		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	19 / 39 counts or 13 counts continuous; 12.5 ms/count in the primary processor	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 13 counts continuous; 12.5 ms/count in the secondary processor	
APP2 Circuit Low	P2128	Detects a continuous or	Primary APP2 Voltage >	2.6		Run/crank voltage or Powertrain relay voltage >	19 / 39 counts or 13	Trips: 1

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		intermittent short in APP2 circuit on both processors or just the primary processor				6.00 and reduced power is false, else the failure will be reported for all conditions	counts continuous; 12.5 ms/count in the primary processor	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 13 counts continuous; 12.5 ms/count in the secondary processor	
Throttle Position (TP) Sensor 1-2 Correlation	P2135	Detects a continuous or intermittent correlation fault between TPS sensors #1 and #2 on primary or secondary	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	79 / 159 counts or 58 counts continuous; 3.125 ms/count in the primary processor	Trips: 1 Type: A MIL: YES

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		processor	Difference between (normalized min 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 secondary processor	
			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		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						circuit (P0651)		
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 APP1 displaced and APP2 displaced >	6.004 % offset at min. pedal position with a linear threshold to 10.004 % 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
			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)		
			Difference between APP1 displaced and APP2 displaced >	6.004 % offset at min. pedal position with a linear threshold to 10.004 % at		Run/Crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all	19 / 39 counts or 15 counts continuous; 12.5	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
				max. pedal position		conditions	ms/count in the secondary processor	
			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,		
Minimum Throttle Position Not Learned	P2176	TP sensors were not in the minmum learn window after multiple attempts to learn the minimum.	During TPS min learn on the Primary processor, TPS Voltage >	0.935		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	2.0 secs continuous	Trips: 1
			or					Type: A
			During TPS min learn on the Secondary processor, TPS Voltage >	0.935	No TPS circuit errors No TPS circuit faults P1682 is not			MIL: YES

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					active Minimum TPS learn active			
			and					
			Number of learn attempts >	10 counts				
			AND TPS2 Voltage >	1.789	Throttle de-energized			
			On the Primary processor OR		No TPS circuit faults			
			TPS1 Voltage >	1.689	PT Relay Voltage >	5.5		
			AND TPS2 Voltage >	1.789				
			On the Secondary processor					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Cooling System Performance	P2181	This DTC detects thermostat malfunction (i.e. stuck open)	Engine Coolant Temp (ECT) is ≤ target temperature of 75 Deg C and normalized ratio is ≤ than 2. When above is present for more than 5 seconds, fail counts start.		No Active DTC's	MAF_SensorFA IAT_SensorFA	30 failures out of 90 samples 1 sec /sample	2 trips Type B
			Engine total airgrams is accumulated when 17 ≤ AirFlow ≤ 450 grams per second.			THMR_RCT_Sensor_Ckt_FA THMR_ECT_Sensor_Ckt_FA	Once per ignition key cycle	
			Ratio Definition:		Engine not run time	≥ 1800 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			Current temp difference between ECT and RCT minus PwrUp difference divided by total airgrams. Note: Minimum total airgrams is 500.0 grams.		Engine run time Fuel Condition ECT at Power Up IAT min Airflow	90 ≤ Time ≤ 1370 seconds Ethanol ≤ 87% -7.0 ≤ ECT ≤ 70.0 °C -7°C ≤ IAT ≤ 55°C. 17.0 ≤ Airflow ≤ 450.0 GPS		
Air Fuel Imbalance Bank 1	P219A	Determines if the air-fuel delivery system is imbalanced by monitoring the pre and post catalyst O2	Bank 1 Filtered Length Ratio variable	> 0.36 at any time during the trip	System Voltage	*10 <= V <= 32 for >= 4 seconds*	Frequency: Continuous Monitoring of O2 voltage signal in 12.5ms loop	2 Trip(s) Type B
					ECT	> -20 oC		
					Engine Run Time	>= 100 seconds		
					Engine speed	*425 <= rpm <= 2500*		
			OR		Engine speed			

Component/	Fault	Monitor Strategy	Malfunction	Threshold	Secondary	Enable	Time	MIL
System	Code	Description	Criteria	Value	Parameters	Conditions	Required	illum.
		sensor voltage characteristics. To improve S/N, pre-catalyst O2 voltages between 1000 and 0 millivolts are ignored. This feature is enabled at Air Per Cylinder values <= 0 mg/cylinder. Note: If the first voltage value is >= the second voltage value, AND/OR the Air Per Cylinder	Bank 1 AFM (DoD) Filtered Length Ratio variable (AFM applications only)	> 8192.00 at any time during the trip	change during the current 2.50 sec sample period is <=	*8192 rpm*	The AFIM Filtered Length Ratio variable is updated after every 2.50 seconds of valid data. The first report is delayed for 63 seconds to allow time for the AFIM Filtered Length Ratio variable to saturate.	
			AND		Mass Airflow	*15.0 <= g/s <= 65.0*		
			Bank 1 Filtered Post catalyst O2 voltage is NOT between Note: If the first voltage value is >= the second voltage value, this is an indication that the post catalyst O2 data is not used for diagnosis on this application.	1000 and 0 millivolts	Air Per Cylinder	*260 <= mg/cylinder <= 2000*		
					Air Per Cylinder change during the current 2.50 sec sample period is <=	*8192 mg/cylinder*		
					% Ethanol	<= 87 %		
					Positive (rising) Delta O2 voltage during previous 12.5ms is OR	> 0.0 millivolts		
					OR			
					Negative (falling) Delta	< 0.0 millivolts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		value is equal to zero, the feature is not used on this application and the full pre-catalyst O2 voltage range is utilized.			O2 voltage during previous 12.5ms is		This minimizes the possibility of reporting a pass before a potential failure could be detected.	
					For AFM (Cylinder Deactivation) vehicles only	No AFM state change during current 2.50 second sample period.		
					O2 sensor switches	>= 1 times during current 2.50 second sample period		
					Quality Factor	>= 0.80 in the current operating region		
		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,	The Quality Factor (QF) calibrations are located in a 17x17 lookup table versus engine speed and load (see Supporting Tables). A QF of “1” is an indication that	No EngineMisfireDetected_FA			
					No MAP_SensorFA			
					No MAF_SensorFA			
					No ECT_Sensor_FA			
					No Ethanol Composition Sensor FA			
					No TPS_ThrottleAuthorityDefaulted			
					No FuelInjectorCircuit_FA			
					No AIR System FA			
					No O2S_Bank_1_Sensor_1_FA			
					No O2S_Bank_2_Sensor_1_FA			
					No EvapPurgeSolenoidCircuit_FA			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		voltage over a fixed time period of 2.50 seconds. The reason we use String Length is because it comprehends both O2 signal frequency and amplitude in one metric. The busier the O2 voltage (an indication of imbalance), the longer the String Length will be.	based on robustness to false diagnosis in the current operating 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	we were able to achieve at least 4sigma/2sigma robustness in that speed/load region. QF values less than “1” indicate that we don’t 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 0.80 identify regions where	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 Active			
					PTO Not Active			
					Traction Control Not Active			
					Fuel Control Status			
					Closed Loop Long Term FT	Enabled Enabled **Please see "Closed Loop Enable Criteria" and "Long Term FT Enable Criteria" in Supporting Tables.**		
					Cumulative (absolute) delta	*< 100 g/s*		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			filtered using a common first-order lag filter. The result is the AFIM Filtered Length Ratio	where diagnosis is not possible.	MAF during the current 2.50 second sample period is	*Note: This protects against false diagnosis during severe transient maneuvers.*		
					Data collection is suspended under the following circumstances:	- for 1.0 seconds after AFM transitions - for 1.0 seconds after Closed Loop transitions from Off to On - for 1.0 seconds after purge transitions from Off to On or On to Off - for 2.0 seconds after the AFIM diagnostic transitions from Disabled to Enabled		
Air Fuel Imbalance Bank 2	P219B	Determines if the air-fuel delivery system is imbalanced by monitoring the pre and post	Bank 2 Filtered Length Ratio variable	> 0.36 at any time during the trip	System Voltage	*10 <= V <= 32 for >= 4 seconds*	Frequency: Continuous Monitoring of O2 voltage signal in 12.5ms loop	2 Trip(s) Type B
					ECT	> -20 oC		
					Engine Run Time	>= 100 seconds		
					Engine speed	*425 <= rpm <= 2500*		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		catalyst O2 sensor voltage characteristics. To improve S/N, pre-catalyst O2 voltages between 1000 and 0 millivolts are ignored. This feature is enabled at Air Per Cylinder values <= 0 mg/cylinder. Note: If the first voltage value is >= the second voltage value, AND/OR the Air	**OR**		Engine speed change during the current 2.50 sec sample period is <=	*8192 rpm*	The AFIM Filtered Length Ratio variable is updated after every 2.50 seconds of valid data. The first report is delayed for 63 seconds to allow time for the AFIM Filtered Length Ratio variable to	
			Bank 2 AFM (DoD) Filtered Length Ratio variable (AFM applications only)	> 8192.00 at any time during the trip				
			AND		Mass Airflow	*15.0 <= g/s <= 65.0*		
			Bank 2 Filtered Post catalyst O2 voltage is NOT between Note: If the first voltage value is >= the second voltage value, this is an indication that the post catalyst O2 data is not used for diagnosis on this application.	1000 and 0 millivolts	Air Per Cylinder	*260 <= mg/cylinder <= 2000*		
					Air Per Cylinder change during the current 2.50 sec sample period is <=	*8192 mg/cylinder*		
					% Ethanol	<= 87 %		
					Positive (rising) Delta O2 voltage during previous 12.5ms is	> 0.0 millivolts		
					OR			
					Negative	< 0.0 millivolts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		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.			(falling) Delta O2 voltage during previous 12.5ms is		saturate. This minimizes the possibility of reporting a pass before a potential failure could be detected.	
					For AFM (Cylinder Deactivation) vehicles only	No AFM state change during current 2.50 second sample period.		
					O2 sensor switches	>= 1 times during current 2.50 second sample period		
					Quality Factor	>= 0.80 in the current operating region		
		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	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	The Quality Factor (QF) calibrations are located in a 17x17 lookup table versus engine speed and load (see Supporting Tables). A QF of “1” is an	No EngineMisfireDetected_FA			
					No MAP_SensorFA			
					No MAF_SensorFA			
					No ECT_Sensor_FA			
					No Ethanol Composition Sensor FA			
					No TPS_ThrottleAuthorityDefaulted			
					No FuelInjectorCircuit_FA			
					No AIR System FA			
					No O2S_Bank_1_Sensor_1_FA			
					No O2S_Bank_2_Sensor_1_FA			

Component/	Fault	Monitor Strategy	Malfunction	Threshold	Secondary	Enable	Time	MIL
System	Code	Description	Criteria	Value	Parameters	Conditions	Required	illum.
		of the O2 sensor voltage over a fixed time period of 2.50 seconds. The reason we use String Length is because it comprehends both O2 signal frequency and amplitude in one metric. The busier the O2 voltage (an indication of imbalance), the longer the String Length will be.	between 0 and 1, based on robustness to false diagnosis in the current operating 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	indication that we were able to achieve at least 4sigma/2sigma robustness in that speed/load region. QF values less than “1” indicate that we don’t 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 0.80 identify regions	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 Active			
					PTO Not Active			
					Traction Control Not Active			
					Fuel Control Status			
					Closed Loop Long Term FT	Enabled Enabled **Please see "Closed Loop Enable Criteria" and "Long Term FT Enable Criteria" in Supporting Tables.**		
					Cumulative	*< 100 g/s*		

Component/	Fault	Monitor Strategy	Malfunction	Threshold	Secondary	Enable	Time	MIL
System	Code	Description	Criteria	Value	Parameters	Conditions	Required	illum.
			the Length Ratio is filtered using a common first-order lag filter. The result is the AFIM Filtered Length Ratio	identify regions where diagnosis is not possible.	(absolute) delta MAF during the current 2.50 second sample period is	*Note: This protects against false diagnosis during severe transient maneuvers.*		
					Data collection is suspended under the following circumstances:	- for 1.0 seconds after AFM transitions - for 1.0 seconds after Closed Loop transitions from Off to On - for 1.0 seconds after purge transitions from Off to On or On to Off - for 2.0 seconds after the AFIM diagnostic transitions from Disabled to Enabled		
Barometric Pressure (BARO) Sensor Performance	P2227	Detects a noisy or erratic barometric pressure input	Difference between the current Baro sensor reading and the previous Baro sensor reading	> 10.0 kPa	Ignition has been on Vehicle Speed No Active DTCs:	> 10.0 seconds < 62 MPH AmbientAirPressCktFA ECT_Sensor_FA	5 failures out of 25 1 sample every 250	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						IAT_SensorFA MAF_SensorFA AfterThrottlePressure_NA or TPS_FA TPS_Performance_FA VehicleSpeedSensorError	msec	
Barometric Pressure(BARO) Sensor Circuit Low	P2228	Detects a continuous short to low or open in either the signal circuit or the BARO sensor.	BARO Voltage	< 40.0 % of 5 Volt Range (2.0 Volts = 50.9 kPa)	Continuous		20 failures out of 25 samples 1 sample every 12.5 msec	Type B 2 trips
Barometric Pressure(BARO) Sensor Circuit High	P2229	Detects an open sensor ground or continuous short to high in either the signal circuit or the BARO sensor.	BARO Voltage	> 90.0 % of 5 Volt Range (4.5 Volts = 115.0 kPa)	Continuous		20 failures out of 25 samples 1 sample every 12.5 msec	Type B 2 trips
Fuel Conductivity	P2269	Detects the presence of High	Flex Fuel Sensor Output Frequency	> 185 Hertz	Powertrain Relay	> 11.0 Volts	50 failures out of 63	2 trip(s)

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Out Of Range (water in fuel)		Conductivity Fuel (e.g. water in fuel) via a specific range of sensor frequency. High conductivity in the fuel causes a significant upward shift in the sensor's output frequency.			Relay	< 32.0 Volts	samples 100 ms loop Continuous	Type B
O2 Sensor Signal Stuck Lean Bank 1	P2270	This DTC determines if the post catalyst O2	Post O2 sensor cannot achieve the rich threshold	1) Post O2S signal < 700 mvolts	No Active DTC's	TPS_ThrottleAuthorityDefaulted	Frequency: Once per trip	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Sensor 2		sensor is stuck in a normal lean voltage range and thereby can no longer be used for post oxygen sensor fuel control or for catalyst monitoring. The diagnostic is an intrusive test (during coast) which increases the delivered fuel to achieve the required rich threshold.	voltage. AND The Accumulated mass air flow monitored during the Stuck Lean Voltage Test is greater than the threshold before the above voltage threshold is met.	AND 2) Accumulated air flow during stuck lean test > 175 grams.		ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA	Note: if NaPOPD_b_ResetFastRespFunc= FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, 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.
						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		
					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		
					Engine Speed to initially enable test	950 <= RPM <= 2000		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Engine Speed range to keep test enabled (after initially enabled)	850 <= RPM <= 2100		
					Engine Airflow	3 gps <= Airflow <= 20 gps		
					Vehicle Speed to initially enable test	44.7 mph <= Veh Speed <= 80.8 mph		
					Vehicle Speed range to keep test enabled (after initially enabled)	38.5 mph <= Veh Speed <= 85.7 mph		
					Closed loop integral	0.74 <= C/L Int <= 1.08		
					Closed Loop Active	= TRUE		
					Evap	not in control of purge		
					Ethanol	not in estimate mode		
					Post fuel cell	= enabled		
					Power Take Off	= not active		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					EGR Intrusive diagnostic	= not active
					All post sensor heater delays	= not active
					O2S Heater on Time	>= 80.0 sec
					Predicted Catalyst temp	600 ºC <= Cat Temp <= 900 ºC
					Fuel State	= DFCO possible
					All of the above met for at least 0.5 seconds, and then the Force Cat Rich stage is requested.	
					During Stuck Lean test the following must stay TRUE or the test will abort	
					Commanded Fuel	0.95 <= EQR <= 1.10
O2 Sensor Signal Stuck Rich Bank 1 Sensor 2	P2271	This DTC determines if the post catalyst O2 sensor is stuck in	Post O2 sensor cannot achieve the lean threshold voltage.	1) Post O2S signal > 100 mvolts	No Active DTC's	TPS_ThrottleAuthorityDefaulted	Frequency: Once per trip	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		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.	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.	AND 2) Accumulated air flow during stuck rich test > 85 grams.		ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA	Note: if NaPOPD_b_ResetFastRespFunc= FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, 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.
						EthanolCompositionSensor_FA		
					B1S2 Failed this key cycle	P013A, P013B, P013E, P013F or P2270		
					System Voltage	10.0 volts < system voltage< 32.0 volts		
					ICAT MAT Burnoff delay	= Not Valid		
					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		
					Engine Speed	950 <= RPM <= 2000		
					Engine Airflow	3 gps <= Airflow <= 20 gps		
					Vehicle Speed	44.7 mph <= Veh Speed <= 80.8 mph		
					Closed loop integral	0.74 <= C/L Int <= 1.08		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Closed Loop Active	= TRUE
					Evap	not in control of purge
					Ethanol	not in estimate mode
					Post fuel cell	= enabled
					Power Take Off	= not active
					EGR Intrusive diagnostic	= not active
					All post sensor heater delays	= not active
					O2S Heater on Time	>= 80.0 sec
					Predicted Catalyst temp	600 ºC <= Cat Temp <= 900 ºC
					Fuel State	= DFCO possible
					DTC's Passed	= P2270 (and P2272 (if applicable))
					DTC's Passed	= P013E (and P014A (if applicable))
					DTC's Passed	= P013A (and P013C (if applicable))
					After above conditions are met:			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					DFCO mode is continued (wo driver initiated pedal input).			
O2 Sensor Signal Stuck Lean Bank 2 Sensor 2	P2272	This DTC determines if the post catalyst O2 sensor is stuck in a normal lean voltage range and thereby can no longer be used for post oxygen sensor fuel control or for catalyst monitoring. The diagnostic is an intrusive test (during coast) which increases the delivered fuel to achieve the required rich	Post O2 sensor cannot achieve the rich threshold voltage. AND The Accumulated mass air flow monitored during the Stuck Lean Voltage Test is greater than the threshold before the above voltage threshold is met.	1) Post O2S signal < 700 mvolts AND 2) Accumulated air flow during stuck lean test > 175 grams.	No Active DTC's	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc= FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed.	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		required fuel threshold.				FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA		
					B2S2 Failed this key cycle	P013C, P013D, P014A, P014B, P2272 or P2273		
					System Voltage	10.0 volts < system voltage< 32.0 volts		
					ICAT MAT Burnoff delay	= Not Valid		
					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		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Engine Speed to initially enable test	950 <= RPM <= 2000		
					Engine Speed range to keep test enabled (after initially enabled)	850 <= RPM <= 2100		
					Engine Airflow	3 gps <= Airflow <= 20 gps		
					Vehicle Speed to initially enable test	44.7 mph <= Veh Speed <= 80.8 mph		
					Vehicle Speed range to keep test enabled (after initially enabled)	38.5 mph <= Veh Speed <= 85.7 mph		
					Closed loop integral	0.74 <= C/L Int <= 1.08		
					Closed Loop Active	= TRUE		
					Evap	not in control of purge		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Ethanol	not in estimate mode		
					Post fuel cell	= enabled		
					Power Take Off	= not active		
					EGR Intrusive diagnostic	= not active		
					All post sensor heater delays	= not active		
					O2S Heater on Time	>= 80.0 sec		
					Predicted Catalyst temp	600 ºC <= Cat Temp <= 900 ºC		
					Fuel State	= DFCO possible		
					All of the above met for at least 0.5 seconds, and then the Force Cat Rich intrusive stage is requested.			
					During Stuck Lean test the following must stay TRUE or the test will abort			
					Commanded Fuel	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.	1) Post O2S signal > 100 mvolts AND 2) Accumulated air flow during stuck rich test > 85 grams.	No Active DTC's	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc= FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed.	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						EngineMisfireDetected_FA EthanolCompositionSensor_FA		
					B2S2 Failed this key cycle	P013C, P013D, P014A, P014B or P2272		
					System Voltage	10.0 volts < system voltage< 32.0 volts		
					ICAT MAT Burnoff delay	= Not Valid		
					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		
					Engine Speed	950 <= RPM <= 2000		
					Engine Airflow	3 gps <= Airflow <= 20 gps		
					Vehicle Speed	44.7 mph <= Veh Speed <= 80.8 mph		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Closed loop integral	0.74 <= C/L Int <= 1.08		
					Closed Loop Active	= TRUE		
					Evap	not in control of purge		
					Ethanol	not in estimate mode		
					Post fuel cell	= enabled		
					Power Take Off	= not active		
					EGR Intrusive diagnostic	= not active		
					All post sensor heater delays	= not active		
					O2S Heater on Time	>= 80.0 sec		
					Predicted Catalyst temp	600 ºC <= Cat Temp <= 900 ºC		
					Fuel State	= DFCO possible		
					DTC's Passed	= P2270 (and P2272 (if applicable))		
					DTC's Passed	= P013E (and P014A (if applicable))		
					DTC's Passed	= P013A (and P013C (if applicable))		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					After above conditions are met: DFCO mode is continued (wo driver initiated pedal input).			
Transmission Control Torque Request Circuit	P2544	Determines if the torque request from the TCM is valid	**Protect error** - Serial Communication message - ($199 -	Message <> two's complement of message			>= 16 Protect errors during key cycle	2 trip(s)
			OR					
			Rolling count error - Serial Communication message ($199 -	Message <> previous message rolling count value +	Diagnostic enabled/disable	Enabled	>= 6 Rolling count errors out of ten samples	Type B
			OR		Power Mode	= Run		
			RAM Error - Internal ECU fault	Transmission torque request value or request type dual store not equal	Engine Running	= True	>= 3 RAM errors during key cycle	
					Run/Crank Active	> 0.50 Sec		
			OR					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			Range Error - Serial Communication message - ($199 -	> 600 Nm			>= 3 out of 10 samples	
			OR					
			Multi-transition error - Trans torque intervention	Requested torque intervention type toggles from not increasing request to increasing request			>= 3 multi-transitions out of 5 Performed every 12.5 msec	
Torque Management Request Input Signal B	P2548	Determines if the performance launch torque request is valid	**Protect error** - Serial Communication message - ($1C8 Message)	Message <> two's complement of message	Diagnostic enabled/disabled Run/Crank Active and Above minimum voltage threshold	Disabled > 0.50 Sec	>= 10 Protection errors during key cycle	0 trip(s) Type X

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			OR **Rolling count error** - Serial Communication message ($1C8) rolling count value	Message <> previous message rolling count value + one	Voltage No serial communication loss to EBTCM (U0121)	> 6.00 Volts	>= 3 Rolling count errors out of 10 samples Performed every 100 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: Checks the accuracy of the 1 second timer by comparing it with the 12.5 ms timer	Initial value test: Initial ignition off timer value OR Initial ignition off timer value Clock rate test: Time between ignition off timer Time between ignition off timer	< 0 seconds > 10 seconds < 0.8 seconds > 1.2 seconds	ECM is powered down IAT Temperature	-40 °C ≤ Temperature ≤ 125 °C	Initial value test: 3 failures 1.375 sec / sample Clock rate test: 8 failures out of 10 samples	2 trips Type B DTC sets on next key cycle if failure detected

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			Time since last ignition off timer increment	≥ 1.375 seconds			1 second / sample	
			Current ignition off time < old ignition off time				test runs once each key-off	
			Current ignition off timer minus old ignition off timer	≠ 1				
Deactivation System Performance	P3400	Detects a “failed to deactivate” condition when Deactivation Mode allowed:	ABS(Measured MAP – MAP Model	< -10.0 kPa	**DIAGNOSTIC ENABLE CONDITIONS**		100 cylinder deactivation lag residual failures out of 200	2 trip(s) Type B
			AND ((Measured MAP – MAP Model 2) filtered) (*stored from previous all-Cylinder mode event*) - ((Measured MAP – MAP Model	> 10.0 kPa	Total filtered residual weight ECT IAT Engine RPM	>= 0.0 factor > -7 and < 125 Deg C > -20 and < 125 Deg C > 450 and < 5800 RPM MAP Model 2 multiplied by MAP2 Residual Weight Factor based on RPM. See table IFRD Residual	Performed once every	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						Weighting Factors	100 msec	
					LINDER DEACTIVATION ENABLE CONDITI((Conditions below must be met for >= 0 seconds before cylinder deactivation will			
					Engine running	> 30.0 seconds		
					Engine RPM	> **EngSpeedLwrLimitEnabl eTable** AND < **EngSpeedUprLimitEnabl eTable** - Details on Supporting Tables Tab		
					Engine coolant	>= 44.0 and <= 128.0 Deg C		
					Ignition voltage	>= 11.0 and <= 32.0 Volts		
					Pedal Commanded	< 5 Percent		
					Brake booster vacuum	>= 45.0 kPa		
					Engine oil temp	>= 20 and <= 128 Deg C		
					Transmission gear	HalfCylDisabledTransGr and HalfCylDisabledTransGrD		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						eviceControl (when in device control) - See		
					Vehicle speed	>= 11 MPH		
					FCO not active for	>= 3.0 Seconds		
					Time since last cylinder deac mode event	>= 3.0 Seconds		
					Gear shift	Not currently in progress		
					AC Clutch transition	Not currently in progress		
					Tip In Bump	Not active		
					Accelerator pedel delta	<= 50.0 Percent in 12.5 ms		
					Engine oil pressure	>= 187 and <= 455 kPa		
					Filtered engine vacuum	> AllCylToHalfCylVacuum or EcoAllCylToHalfCylVacuum (in Eco mode) - See details on Supporting		
					PRNDL state	HalfCylDisabledPRNDL and		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						HalfCylDisabledPRNDLDeviceControl tables (when in device control) - See details on Supporting		
					Oil aeration present	Aeration enabled by engine RPM > 3100 for 10 seconds, disabled by engine RPM < 3000 for 50		
					After exiting deac mode, must be in all	>= 60 seconds		
					DFCO mode	Not currently in DFCO		
					Fuel shut off mode other than ETC Power management mode	Not currently in fuel shut-off Not active		
					Heater performance	Not in Heater Performance Mode		
					POSD Intrusive	POSD diagnostic not active		
					POPD Intrusive	POPD diagnostic not active		
					Low range 4WD	Not in Low Range 4WD		
					AFM is disabled	Ethanol concentration > 95		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					at high percent ethanol If feature is enabled, AFM is allowed only when percent ethanol learn is not in progress	% disables AFM. Once disabled, ethanol concentration must be < Feature is Disabled		
					IF DEACTIVATED, ANY OF THE CONDITIONS BELOW WILL FORCE			
					If deactivation mode is active then reactivation will occur if:	>= 480 seconds		
					Deac mode activ	>= 600 seconds **OR**		
					Delta vacuum	> 5 or < -5 kPa		
					Engine RPM	> **EngSpeedLwrLimitDisableTable** AND <		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						EngSpeedUprLimitDisableTable - Details on Supporting Tables Tab		
					Engine power limited mode	Active		
					Pedal Commanded	> 6 Percent		
					Piston protection	Active		
					Engine oil temperature	< 18 or > 130 Deg C		
					Engine oil pressure	< 172 or > 470 kPa		
					Oil aeration present	Aeration enabled by engine RPM > 3100 for 10 seconds, disabled by engine RPM < 3000 for 50		
					Engine metal overtemp protection	Active		
					Accelerator pedel delta	<= 50.0 percent in 12.5 ms		
					In device control only, if PNDRL			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					in Park or Neutral, vehicle Transmission gear	<= 5.0 MPH HalfCylDisabledTransGr and HalfCylDisabledTransGrDeviceControl (when in device control) - See		
					PRNDL state	HalfCylDisabledPRNDL and HalfCylDisabledPRNDLDeviceControl tables (when in device control) - See details on Supporting		
					Ignition voltage	< 11.0 or > 32.0 Volts		
					Engine coolant	< 40.0 or > 132.0 Deg C		
					Vehicle speed	< 9.3 MPH		
					Brake booster vacuum	< 41.0 kPa		
					Filtered engine vacuum	> HalfCylToAllCylVacuum or EcoHalfCylToAllCylVacuum (in Eco mode) - See details on Supporting		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					ETC Power management mode	Active		
					Converter overtemp	Active		
					Hot coolant mode	Active		
					Engine running	= False		
					Engine overspeed	Active		
					Engine metal overtemp	Active		
					Cat. temp low	Active		
					POSD Intrusive	Active		
					FWD	In low range		
					Engine misfire	Detected		
					Heater performance	Active		
					POPD Intrusive	Active		
					No active DTC's	Fault bundles: Map_SensorFA		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						VehicleSpeedSensorError ECT_Sensor_FA EOP_Sensor_FA PowertrainRelayFault BrakeBoosterSensorFA CrankSensorFA CamSensorFA IAT_SensorFA CylnderDeacDriverTFTKO FourWheelDriveLowStateV EngineTorqueEstInaccurate TransmissionGearDefaulte EnginePowerLimited		
Cylinder 1 Deactivation Solenoid Control Circuit	P3401	Checks the Solenoid Control Circuit electrical integrity for cylinder #1	The ECM detects that commanded state of driver and actual state of the control circuit do not		Engine RPM Ignition Voltage Diagnostic	>= 400.0 RPM <= 32.0 and >= 11.0 Volts	20 failures out of 25 samples	2 trip(s) Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			match. (Short to ground, short to voltage, open		enabled/disabled	Enabled	Performed every 250 msec	
Cylinder 4 Deactivation Solenoid Control Circuit	P3425	Checks the Solenoid Control Circuit electrical integrity for cylinder #4	The ECM detects that commanded state of driver and actual state of the control circuit do not match. (Short to ground, short to voltage, open		Engine RPM Ignition Voltage Diagnostic enabled/disabled	>= 400.0 RPM <= 32.0 and >= 11.0 Volts Enabled	20 failures out of 25 samples Performed every 250 msec	2 trip(s) Type B
Cylinder 6 Deactivation Solenoid Control Circuit	P3441	Checks the Solenoid Control Circuit electrical integrity for cylinder #6	The ECM detects that commanded state of driver and actual state of the control circuit do not match. (Short to ground, short to voltage, open		Engine RPM Ignition Voltage Diagnostic enabled/disabled	>= 400.0 RPM <= 32.0 and >= 11.0 Volts Enabled	20 failures out of 25 samples Performed every 250 msec	2 trip(s) Type B
Cylinder 7 Deactivation Solenoid Control Circuit	P3449	Checks the Solenoid Control Circuit electrical integrity for	The ECM detects that commanded state of driver and actual state of the		Engine RPM Ignition Voltage	>= 400.0 RPM <= 32.0 and >= 11.0 Volts	20 failures out of 25 samples	2 trip(s) Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		cylinder #7	control circuit do not match. (Short to ground, short to voltage, open		Diagnostic enabled/disabled	Enabled	Performed every 250 msec	
Control Module Communication Bus A Off	U0073	This DTC monitors for a BUS A off condition	Bus off failures	≥ 5 counts	CAN hardware is bus OFF for	> 0.1125 seconds	Diagnostic runs in 12.5 ms loop	2 Trip(s)
			out of these samples	≥ 5 counts	Diagnostic enable timer	> 3.0000 seconds		Type B
Lost Communication With TCM	U0101	This DTC monitors for a loss of communication with the transmission control module	Message is not received from controller for this 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.	2 Trip(s)
			out of these samples	12 counts	Power mode is RUN			Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					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.			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Lost Communication With Fuel Pump Control Module	U0109	This DTC monitors for a loss of communication with the fuel pump control module	Message is not received from controller for this many counts	12 counts	Run/Crank Voltage	11 volts ≤ Voltage ≤ 32 volts	The fail diagnostic runs in the 6.25 ms loop with pass conditions reported to the DFIR in the 1000ms loop.	2 Trip(s)
			out of these samples	12 counts	Power mode is RUN			Type B
					Communication bus is not OFF			
					or is typed as a C code			
					Normal Communication is enabled			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Normal Transmit capability is TRUE			
					The diagnostic system is not disabled			
					The bus has been on for	> 3.0000 seconds		
					A message has been selected to monitor.			
Lost Communication With Anti-Lock Brake System (ABS) Control Module	U0121	This DTC monitors for a loss of communication with the ABS control module.	Message is not received from controller for this many counts	12 counts	Run/Crank Voltage	11 volts ≤ Voltage ≤ 32 volts	The fail diagnostic runs in the 6.25 ms loop with pass conditions reported to the DFIR in the 1000ms loop.	1 Trip(s)

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			out of these samples	12 counts	Power mode is RUN			Type C
					Communication bus is not OFF			**Special Type C**
					or is typed as a C code			
					Normal Communication is enabled			
					Normal Transmit capability is TRUE			
					The diagnostic system is not disabled			
					The bus has been on for	> 3.0000 seconds		
					A message has been selected to monitor.			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
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)
			out of these samples	12 counts	Power mode is RUN			Type C
					Communication bus is not OFF			**Special Type C**
					or is typed as a C code			
					Normal Communication is enabled			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Normal Transmit capability is TRUE			
					The diagnostic system is not disabled			
					The bus has been on for	> 3.0000 seconds		
					A message has been selected to monitor.			

FAPD Section

P2096, P2097, P2098, P2099 Cell Accum Min

Post O2 Air Flow Mode	Bank1 Decel	Bank2 Decel	Bank1 Idle	Bank2 Idle	Bank1 Cruise	Bank2 Cruise	Bank1 Light Accel	Bank2 Light Accel	Bank1 Heavy Accel	Bank2 Heavy Accel
Cell Accum Min Count (10 counts = 1 sec.)	100	100	100	100	100	100	100	100	100	100

P2097, P2099 Integral Offset Max

Post O2 Air Flow Mode	Decel	Idle	Cruise	Light Accel	Heavy Accel
Post O2 Integral Offset Max [mV]	-10	-10	-10	-10	-10

P2096, P2098 Integral Offset Min

Post O2 Air Flow Mode	Decel	Idle	Cruise	Light Accel	Heavy Accel
Post O2 Integral Offset Min [mV]	10	10	10	10	10

P2097, P2099 O2 Lean Thresh

Post O2 Airflow Mode	Bank1 Decel	Bank2 Decel	Bank1 Idle	Bank2 Idle	Bank1 Cruise	Bank2 Cruise	Bank1 Light Accel	Bank2 Light Accel	Bank1 Heavy Accel	Bank2 Heavy Accel
Cell O2 Lean Threshold [mV]	612	612	612	612	622	622	622	622	622	622

P2096, P2098 O2 Rich Thresh

Post O2 Airflow Mode	Bank1 Decel	Bank2 Decel	Bank1 Idle	Bank2 Idle	Bank1 Cruise	Bank2 Cruise	Bank1 Light Accel	Bank2 Light Accel	Bank1 Heavy Accel	Bank2 Heavy Accel
Cell O2 Rich Threshold [mV]	676	676	676	676	666	666	666	666	666	666

P2096, P2097, P2098, P2099 Out Of Window Count

Post O2 Airflow Mode	Decel	Idle	Cruise	Light Accel	Heavy Accel
Cell Out of Window Count (10 counts = 1 sec.)	20	20	20	20	20

P2096, P2097, P2098, P2099 Selected Cells

Post O2 Airflow Mode	Bank1 Decel	Bank2 Decel	Bank1 Idle	Bank2 Idle	Bank1 Cruise	Bank2 Cruise	Bank1 Light Accel	Bank2 Light Accel	Bank1 Heavy Accel	Bank2 Heavy Accel
Cell Post O2 Airflow Mode Selected Cell 0 if not selected, 1 if selected	0	0	0	0	1	1	1	1	1	1

P2096, P2097, P2098, P2099 HV Post Low

Post O2 Airflow Mode	Bank1 Decel	Bank2 Decel	Bank1 Idle	Bank2 Idle	Bank1 Cruise	Bank2 Cruise	Bank1 Light Accel	Bank2 Light Accel	Bank1 Heavy Accel	Bank2 Heavy Accel
Cell KaFAPD_U_HV_PO2_Filt LoThresh	600	600	600	600	600	600	600	600	600	600

P2096, P2097, P2098, P2099 HV Post High

Post O2 Airflow Mode	Bank1 Decel	Bank2 Decel	Bank1 Idle	Bank2 Idle	Bank1 Cruise	Bank2 Cruise	Bank1 Light Accel	Bank2 Light Accel	Bank1 Heavy Accel	Bank2 Heavy Accel
Cell KaFAPD_U_HV_PO2_Filt HiThresh	800	800	800	800	800	800	800	800	800	800

P2096, P2097, P2098, P2099 HV Integral Offset Low

Post O2 Airflow Mode Cell KaFAPD_U_HV_PO2_Int	Bank1 Decel	Bank2 Decel	Bank1 Idle	Bank2 Idle	Bank1 Cruise	Bank2 Cruise	Bank1 Light Accel	Bank2 Light Accel	Bank1 Heavy Accel	Bank2 Heavy Accel
OffLoThresh	-200	-200	-200	-200	-200	-200	-200	-200	-200	-200

P2096, P2097, P2098, P2099 HV Integral Offset High

Post O2 Airflow Mode Cell KaFAPD_U_HV_PO2_Int	Bank1 Decel	Bank2 Decel	Bank1 Idle	Bank2 Idle	Bank1 Cruise	Bank2 Cruise	Bank1 Light Accel	Bank2 Light Accel	Bank1 Heavy Accel	Bank2 Heavy Accel
OffHiThresh	200	200	200	200	200	200	200	200	200	200

P2096, P2097, P2098, P2099 Post O2 Filt Coefficient

Bank and Index	Bank 1 Index 0	Bank 2 Index 0	Bank 1 Index 1	Bank 2 Index 1	Bank 1 Index 2	Bank 2 Index 2	Bank 1 Index 3	Bank 2 Index 3	Bank 1 Index 4	Bank 2 Index 4
Filter Coefficient	0.0900	0.0900	0.0900	0.0900	0.0900	0.0900	0.0900	0.0900	0.0900	0.0900
Current Filtered Post O2 Voltage	0	0	500	500	600	600	700	700	800	800

P0068: MAP / MAF / TPS Correleation

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

X-axis	5.0003	10.0006	14.9994	19.9997	25.0000	30.0003	35.0006	39.9994	99.9985
Data	21.4609	29.4219	22.9688	20.9766	17.3828	14.4688	100.0000	100.0000	100.0000

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

X-axis	5.0003	10.0006	14.9994	19.9997	25.0000	30.0003	35.0006	39.9994	99.9985
Data	15.9531	24.2891	23.2031	28.2188	31.3125	41.9141	255.0000	255.0000	255.0000

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

X-axis	600.00	1400.00	2200.00	3000.00	3800.00	4600.00	5400.00	6200.00	7000.00
Data	25.0000	60.0000	100.0000	140.0000	180.0000	220.0000	250.0000	280.0000	300.0000

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

X-axis	6.00	7.00	8.00	9.00	10.00	11.00	12.00	13.00	14.00
Data	0.0000	18.0000	40.0000	75.0000	135.0000	250.0000	500.0000	500.0000	500.0000

P1682: Ignition Voltage Correleation

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

X-axis	23.0000	85.0000	95.0000	105.0000	125.0000
Data	7.0000	8.6992	9.0000	9.1992	10.0000

P0325/P0330 OpenCircuitThresh

Engine Speed (RPM):	500	1000	1500	2000	2500	3000	3500
OpenCircuitThresh:	9	15	25	33	48	85	85

4000	4500	5000	5500	6000	6500	7000	7500	8000
85	85	85	85	85	85	85	85	85

P0326 Knock Detection Enabled Factors:

FastRtdMax:

X - axis = Engine Speed (RPM)
Y - axis = Manifold Pressure (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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
50	0.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
60	0.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
70	0.0	6.0	8.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
80	0.0	6.0	8.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
90	0.0	6.0	8.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
100	0.0	6.0	8.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
110	0.0	6.0	8.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
120	0.0	6.0	8.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
130	0.0	6.0	8.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
140	0.0	6.0	8.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
150	0.0	6.0	8.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
160	0.0	6.0	8.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
170	0.0	6.0	8.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
180	0.0	6.0	8.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0

Knock Detection Enabled Factors:

Knock Detection Enabled = FastAttackRate * FastAttackCoolGain * FastAttackBaroGain

RPM:	**0**	**512**	**1024**	**1536**	**2048**	**2560**	**3072**	**3584**	**4096**	**4608**	**5120**	**5632**	**6144**	**6656**	**7168**	**7680**	**8192**
FastAttackRate:	2.50	2.50	2.50	2.75	3.00	3.50	3.50	3.50	3.50	4.00	4.00	4.00	4.00	3.00	3.00	3.00	3.00

ECT (deg. C):	**-40**	**-30**	**-20**	**-10**	**0**	**10**	**20**	**30**	**40**	**50**	**60**	**70**	**80**	**90**	**100**	**110**	**120**
FastAttack CoolGain:	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.50	0.75	1.00	1.00	1.00	1.00	1.00	1.00	1.10	1.20

Baro:	**55.00**	**61.25**	**67.50**	**73.75**	**80.00**	**86.25**	**92.50**	**98.75**	**105.00**
FastAttack BaroGain:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

P0327/P0332 ShortLowThresh

Engine Oil Temp (deg C):	**90**	**95**	**100**	**105**	**110**	**115**	**120**	**125**	**130**	**135**	**140**	**145**	**150**	**155**	**160**
ShortLowThreshSig	2.59	2.59	2.59	2.59	2.59	2.59	2.59	2.59	2.59	2.44	2.29	2.14	1.98	1.83	1.68
ShortLowThreshRet	2.69	2.69	2.69	2.69	2.69	2.69	2.69	2.69	2.69	2.38	2.08	1.77	1.47	1.16	0.86

P0328P0333 ShortHiThresh

Engine Oil Temperature (deg C):

Engine Oil Temp (deg C):	**90**	**95**	**100**	**105**	**110**	**115**	**120**	**125**	**130**	**135**	**140**	**145**	**150**	**155**	**160**
ShortHiThreshSig	4.58	4.58	4.58	4.58	4.58	4.58	4.58	4.58	4.58	4.58	4.58	4.58	4.58	4.58	4.58
ShortHiThreshRet	6.66	6.66	6.66	6.66	6.66	6.66	6.66	6.66	6.66	6.66	6.66	6.66	6.66	6.66	6.66

Tables supporting P219A and P219B Diagnostics:

P219A **KtOXYD_cmp_AFIM_LngthThrsh1**

AvgFlow / AvgRPM	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000	3500	4000	4500	5000	6000
40	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
80	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
125	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
160	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
200	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
240	100000	100000	100000	100000	100000	9712	10304	10608	100000	100000	100000	100000	100000	100000	100000	100000	100000
280	100000	100000	7536	7760	9344	10176	10464	10944	12784	13312	14304	100000	100000	100000	100000	100000	100000
320	100000	100000	8224	8704	9840	11456	10672	11392	12224	13568	14240	100000	100000	100000	100000	100000	100000
360	100000	100000	8912	9376	9760	11120	10672	11664	12688	13808	100000	100000	100000	100000	100000	100000	100000
400	100000	7456	8864	8576	9632	10800	11280	12176	12432	12704	100000	100000	100000	100000	100000	100000	100000
440	100000	8384	8704	8832	10112	10928	11328	12160	12256	12048	100000	100000	100000	100000	100000	100000	100000
480	100000	8048	8912	9024	10080	12704	11952	12656	12160	12864	100000	100000	100000	100000	100000	100000	100000
520	100000	8752	9536	9696	10608	12624	12080	12544	13712	100000	100000	100000	100000	100000	100000	100000	100000
560	100000	8656	9632	11296	11216	12800	12736	13776	14064	100000	100000	100000	100000	100000	100000	100000	100000

	640	100000	100000	10256	12080	12304	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
	720	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
	800	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000

P219A **KtOXYD_cmp_AFIM_LngthThrsh1_DoD (AFM applications only)**

AvgFlow / AvgRPM	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000	3500	4000	4500	5000	6000
40	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
80	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
125	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
160	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
200	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
240	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
280	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
320	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
360	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
400	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
440	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
480	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
520	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
560	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
640	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
720	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
800	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000

P219B **KtOXYD_cmp_AFIM_LngthThrsh2**

AvgFlow / AvgRPM	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000	3500	4000	4500	5000	6000
40	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
80	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
125	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
160	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
200	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
240	100000	100000	100000	7232	8272	9248	9408	9984	11408	11344	12208	100000	100000	100000	100000	100000	100000
280	100000	100000	7408	7856	8704	9472	9632	10112	11520	11440	13440	100000	100000	100000	100000	100000	100000
320	100000	100000	7808	8752	9040	9120	9824	10096	11536	12224	13088	100000	100000	100000	100000	100000	100000
360	100000	100000	7872	8432	9232	9760	9888	10560	11728	12176	100000	100000	100000	100000	100000	100000	100000
400	100000	8096	7904	8336	9104	9568	9824	10848	11936	12416	100000	100000	100000	100000	100000	100000	100000
440	100000	7312	7312	7968	8928	9488	9632	10576	11632	12400	100000	100000	100000	100000	100000	100000	100000
480	100000	7808	8112	8336	8816	9792	10640	10720	11552	12896	100000	100000	100000	100000	100000	100000	100000
520	100000	9312	8096	8448	10224	9952	10416	10336	12048	100000	100000	100000	100000	100000	100000	100000	100000
560	100000	7856	8816	9040	10224	11040	9696	9536	13008	100000	100000	100000	100000	100000	100000	100000	100000
640	100000	100000	9008	9328	10608	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
720	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
800	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
	100000																

P219B **KtOXYD_cmp_AFIM_LngthThrsh2_DoD (AFM applications only)**

AvgFlow / AvgRPM	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000	3500	4000	4500	5000	6000
40	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
80	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
125	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
160	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
200	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
240	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
280	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
320	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
360	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
400	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
440	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
480	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
520	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
560	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
640	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
720	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
800	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000

P219A **KtOXYD_K_AFIM_QualFactor1**

AvgFlow / AvgRPM	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
125	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
160	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
200	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
240	0.00	0.00	0.00	0.00	0.00	0.90	0.90	0.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
280	0.00	0.00	1.00	1.00	1.00	1.00	0.90	1.00	1.00	1.00	0.95	0.00	0.00	0.00	0.00	0.00	0.00
320	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00
360	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	0.00	0.00	0.00
400	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
440	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
480	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
520	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	0.00	0.00	0.00	0.00
560	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	0.00	0.00	0.00	0.00
640	0.00	0.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	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

P219A **KtOXYD_K_AFIM_QualFactor1_DoD (AFM applications only)**

AvgFlow / AvgRPM	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
125	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
160	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
200	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
240	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
280	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
320	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
360	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
400	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
440	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
480	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
520	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
560	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
640	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
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

P219B **KtOXYD_K_AFIM_QualFactor2**

AvgFlow / AvgRPM	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
125	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
160	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
200	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
240	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	0.00	0.00
280	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00
320	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00
360	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	0.00	0.00	0.00
400	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
440	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
480	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
520	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	0.00	0.00	0.00	0.00
560	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	0.00	0.00	0.00	0.00
640	0.00	0.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	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

P219B **KtOXYD_K_AFIM_QualFactor2_DoD (AFM applications only)**

AvgFlow / AvgRPM	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
125	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
160	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
200	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
240	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

280	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
320	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
360	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
400	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
440	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
480	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
520	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
560	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
640	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
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

Tables supporting Brake Pedal Position Sensor Diagnostic

P057B

CmpltTestPointWeight

Axis	0.00	0.05	0.08	0.25	0.35	0.45	0.55	0.75	1.00
Curve	0.0	0.5	1.0	1.0	1.0	1.0	1.0	1.0	1.0

FastTestPointWeight

Axis	0.00	0.05	0.08	0.25	0.35	0.45	0.55	0.75	1.00
Curve	0.2	0.5	1.0	1.0	1.0	1.0	1.0	1.0	1.0

Tables supporting Clutch Diagnostics:

P0806

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

Axis	**0**	**6.2485**	**12.497**	**18.7455**	**24.994**	**31.2425**	**37.491**	**43.7395**	**49.988**	**56.2365**	**62.485**	**68.7335**	**74.982**	**81.2305**	**87.479**	**93.7275**	**99.976**
Curve	30.0	30.0	30.0	30.0	30.0	30.0	40.0	72.0	80.0	85.0	-8192.0	-8192.0	-8192.0	-8192.0	-8192.0	-8192.0	-8192.0

P0806

ResidualErrorEnableLow Table — **axis is Gear**

Axis	1st	2nd	3rd	4th	5th	6th	rev	neutral
Curve	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

P0806

ResidualErrorEnableHigh Table — **axis is Gear**

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

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

P0171 & P0174	**Long Term Trim Lean (Lean 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 Lean	1.315	1.315	1.315	1.315	1.315	1.315	1.315	1.315	1.315	1.315	1.315	1.315	1.315	1.315	1.315	1.315	1.315
P0172 & P0175	**Non Purge Rich Limit (Rich 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 Non-Purge	0.755	0.755	0.755	0.755	0.755	0.755	0.755	0.755	0.755	0.755	0.755	0.755	0.755	0.755	0.755	0.755	0.755
P0172 & P0175	**Purge Rich Limit (Triggers Rich Intrusive test)**																
% Ethanol	0.00	6.25	12.50	18.75	25.00	31.25	37.50	43.75	50.00	56.25	62.50	68.75	75.00	81.25	87.50	93.75	100.00
Long Term Fuel Purge Rich	0.760	0.760	0.760	0.760	0.760	0.760	0.760	0.760	0.760	0.760	0.760	0.760	0.760	0.760	0.760	0.760	0.760

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)

'0172, P0174, and P0175	**Long-Term Fuel Trim Cell Usage**															
Cell I.D.	CeFADR_e_	CeFADR_e_	CeFADR_e_	CeFADR_e_	CeFADR_e_	CeFADR_e_	CeFADR_e_	CeFADR_e_	CeFADR_e_	CeFADR_e_	CeFADR_e_	CeFADR_e_	CeFADR_e_	CeFADR_e_	CeFADR_e_	CeFADR_e_Cell15_PurgOffDecel
FASD Cell Usage	CeFADD_e_	CeFADD_e_	CeFADD_e_	CeFADD_e_	CeFADD_e_	CeFADD_e_	CeFADD_e_	CeFADD_e_	CeFADD_e_	CeFADD_e_	CeFADD_e_	CeFADD_e_	CeFADD_e_	CeFADD_e_	CeFADD_e_	CeFADD_e_NonSelectedCell
FASD Enabled In Cell?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	NO	Yes	Yes	Yes	Yes	Yes	Yes	Yes	NO

P1400 Detail

KnlDLC_T_ECT_Axis

Coolant Temperature	-11	-10	1	2	16	17	38	39	100

KalDLC_n_CLO_ThrshOfst[CilDLR_DR]

ɔe considered Cat Light Off	1000	125	125	125	125	125	125	1000	1000

KalDLC_n_CLO_ThrshOfst[CilDLR_PN]

ɔe considered Cat Light Off	1000	125	125	125	125	125	125	1000	1000

KalDLC_n_EngDsrdBase[CilDLR_PN]

Coolant Temperature	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
Base RPM	800	800	800	800	800	750	705	665	600	525	525	525	525	525	525	525	525

KalDLC_n_EngDsrdBase[CilDLR_DR]

Coolant Temperature	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
Base RPM	800	800	800	800	800	750	705	665	600	525	525	525	525	525	525	525	525

P0420 / P0430 Detail

MinimumEngineRunTime

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

MinCatTemp	X_AXIS_PTS
CATD ExhaustWarmMin l	525 0
CATD ExhaustWarmMin l	525 1
CATD ExhaustWarmMin l	525 2
CATD ExhaustWarmMin l	525 3
CATD ExhaustWarmMin l	525 4
CATD ExhaustWarmMin l	525 5
CATD ExhaustWarmMin l	525 6
CATD ExhaustWarmMin l	525 7

MinAirflowToWarmCatalyst

Engine Coolant	0	45	90
MinAirFlowToWrmCat	18	10	6

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

TPS Residual Weight Factor based on RPM

RPM	0	600	1000	1400	1800	2200	2600	3000	3400	3800	4200	4600	5000	5400	5800	6200	6600
	0.000	1.000	1.000	1.000	0.956	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.000	0.339

MAF Residual Weight Factor based on RPM

RPM	0	600	1000	1400	1800	2200	2600	3000	3400	3800	4200	4600	5000	5400	5800	6200	6600
	0.000	0.734	1.000	0.680	0.290	0.488	0.330	0.361	0.430	0.177	0.327	0.279	0.283	0.245	0.272	0.000	0.000

MAF Residual Weight Factor Based on MAF Estimate

gm/sec	0.0	40.0	47.0	56.0	67.0	79.0	93.0	111.0	131.0	156.0	184.0	218.0	259.0	307.0	363.0	431.0	510.0
	1.000	1.000	0.909	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 Residual Weight Factor based on RPM

RPM	0	600	1000	1400	1800	2200	2600	3000	3400	3800	4200	4600	5000	5400	5800	6200	6600
	0.000	0.707	0.754	0.599	0.509	0.695	0.704	0.682	0.700	0.580	1.000	1.000	1.000	0.750	0.750	0.000	0.000

MAP2 Residual Weight Factor based on RPM

RPM	0	600	1000	1400	1800	2200	2600	3000	3400	3800	4200	4600	5000	5400	5800	6200	6600
	0.000	0.818	1.000	0.575	0.406	1.000	0.858	1.000	1.000	0.755	1.000	1.000	1.000	0.508	0.477	0.000	0.000

SCIAP1 Residual Weight Factor based on RPM

RPM	0	600	1000	1400	1800	2200	2600	3000	3400	3800	4200	4600	5000	5400	5800	6200	6600
	0.000	0.674	1.000	1.000	1.000	1.000	0.872	1.000	1.000	0.801	1.000	1.000	1.000	0.682	0.710	0.000	0.000

SCIAP2 Residual Weight Factor based on RPM

RPM	0	600	1000	1400	1800	2200	2600	3000	3400	3800	4200	4600	5000	5400	5800	6200	6600
	0.000	0.827	1.000	1.000	1.000	1.000	0.851	1.000	1.000	0.851	1.000	1.000	1.000	0.649	0.686	0.000	0.000

Boost Residual Weight Factor based on % of Boost

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

	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

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

P0121	T	T	T	F	T	F
P1101	T	T	T	F	T	T

P0108, P012D: MAP/SCIAP Cold Run Time Threshold

X axis is Engine Coolant Temperature in Deg C

Temp	-30	-15	0	15	30
	242.0	188.0	134.0	80.0	0.0

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

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

-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
80	80	80	70	60	45	35	25	25	25	15	15	15	15	15	15	15

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

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

-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
80	80	80	70	60	45	35	25	25	25	15	15	15	15	15	15	15

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

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

	IAT Range		-40	-28	-16	-4	8	20	32	44	56	68	80
	Low	Hi											
Primary	10.0 ° C	54.5 ° C	1000	850	800	600	550	400	375	350	325	250	200
Alternate	-7.0 ° C	10.0 ° C	800	650	600	450	400	300	275	250	225	150	100

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

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

	IAT Range		-40	-28	-16	-4	8	20	32	44	56	68	80
	Low	Hi											
Primary	10.0 ° C	54.5 ° C	1000	850	800	600	550	400	375	350	325	250	200
Alternate	-7.0 ° C	10.0 ° C	800	650	600	450	400	300	275	250	225	150	100

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	0.060	0.077	0.094	0.111	0.128	0.145	0.162	0.179	0.196	0.213	0.230	0.247	0.264	0.281	0.298	63.999
0.000	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
0.070	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
0.087	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
0.104	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
0.121	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
0.138	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
0.155	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
0.172	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0
0.189	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0
0.206	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0

0.223	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	0
0.240	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0
0.257	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0
0.274	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0
0.291	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0
0.308	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0
63.999	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	0.060	0.077	0.094	0.111	0.128	0.145	0.162	0.179	0.196	0.213	0.230	0.247	0.264	0.281	0.298	63.999
0.000	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
0.070	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
0.087	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
0.104	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
0.121	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
0.138	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
0.155	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
0.172	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0
0.189	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0
0.206	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0
0.223	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	0
0.240	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0
0.257	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0
0.274	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0
0.291	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0
0.308	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0
63.999	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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

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

	0.0	10.0	20.0	50.0	80.0
0.0	38	38	38	38	38
6.3	38	38	38	38	38
12.5	38	38	38	38	38
18.8	38	38	38	38	38
25.0	38	38	38	38	38
31.3	38	38	38	38	38
37.5	38	38	38	38	38
43.8	38	38	38	38	38
50.0	38	38	38	38	38
56.3	38	38	38	38	38
62.5	38	38	38	38	38
68.8	38	38	38	38	38
75.0	38	38	38	38	38
81.3	38	38	38	38	38
87.5	38	38	38	38	38
93.8	38	38	38	38	38
100.0	38	38	38	38	38

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

Z axis is Limit for R/L HC switches
Y axis is Average flow during the response test (gps)

X axis is estimated Ethanol percentage
Note: The cell contains the minumum switches

	0.0	10.0	20.0	50.0	80.0
0.0	38	38	38	38	38
6.3	38	38	38	38	38
12.5	38	38	38	38	38
18.8	38	38	38	38	38
25.0	38	38	38	38	38
31.3	38	38	38	38	38
37.5	38	38	38	38	38
43.8	38	38	38	38	38
50.0	38	38	38	38	38
56.3	38	38	38	38	38
62.5	38	38	38	38	38
68.8	38	38	38	38	38
75.0	38	38	38	38	38
81.3	38	38	38	38	38
87.5	38	38	38	38	38
93.8	38	38	38	38	38
100.0	38	38	38	38	38

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

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

	0.0	10.0	20.0	50.0	80.0
0.0	38	38	38	38	38
6.3	38	38	38	38	38
12.5	38	38	38	38	38
18.8	38	38	38	38	38
25.0	38	38	38	38	38
31.3	38	38	38	38	38
37.5	38	38	38	38	38
43.8	38	38	38	38	38
50.0	38	38	38	38	38
56.3	38	38	38	38	38
62.5	38	38	38	38	38
68.8	38	38	38	38	38
75.0	38	38	38	38	38
81.3	38	38	38	38	38
87.5	38	38	38	38	38
93.8	38	38	38	38	38
100.0	38	38	38	38	38

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

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

	0.0	10.0	20.0	50.0	80.0
0.0	38	38	38	38	38
6.3	38	38	38	38	38
12.5	38	38	38	38	38
18.8	38	38	38	38	38
25.0	38	38	38	38	38
31.3	38	38	38	38	38
37.5	38	38	38	38	38
43.8	38	38	38	38	38

50.0	38	38	38	38	38
56.3	38	38	38	38	38
62.5	38	38	38	38	38
68.8	38	38	38	38	38
75.0	38	38	38	38	38
81.3	38	38	38	38	38
87.5	38	38	38	38	38
93.8	38	38	38	38	38
100.0	38	38	38	38	38

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

load / Load	400	**450**	**500**	**550**	**600**	**650**	**700**	**750**	**800**	**900**	**1000**	**1100**	**1200**
8	600	550	500	450	400	288	175	145	115	85	80	60	48
9	700	625	550	475	400	288	175	145	115	85	80	60	45
11	700	625	550	475	400	300	200	163	125	90	80	62	45
12	800	700	600	500	400	313	225	188	150	95	85	65	50
13	825	713	600	488	375	308	240	203	165	105	90	70	55
14	888	757	625	494	363	304	245	210	175	115	95	75	58
15	950	800	650	500	350	300	250	218	185	125	100	80	60

	16	963	819	675	532	388	325	263	228	193	138	105	85	63
	17	975	838	700	563	425	350	275	238	200	150	110	90	65
	18	988	857	725	594	463	375	288	250	213	163	118	95	68
	19	1000	875	750	625	500	400	300	263	225	175	125	100	70
	21	1025	900	775	650	525	425	325	282	238	188	138	110	75
	22	1050	925	800	675	550	450	350	300	250	200	150	120	80
	24	1075	950	825	700	575	475	375	325	275	213	163	130	85
	25	1100	975	850	725	600	500	400	350	300	225	175	140	90
	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	**450**	**500**	**550**	**600**	**650**	**700**	**750**	**800**	**900**	**1000**	**1100**	**1200**
load	**8**	500	450	400	350	300	238	175	145	115	85	80	60	48
	9	500	450	400	350	300	238	175	145	115	85	80	60	45
	11	500	450	400	350	300	250	200	163	125	90	80	60	45
	12	500	450	400	350	300	250	200	175	150	95	85	65	50
	13	500	450	400	350	300	250	200	183	165	105	90	70	55
	14	550	488	425	363	300	257	213	194	175	115	95	75	58
	15	600	525	450	375	300	263	225	205	185	125	100	80	60
	16	613	544	475	407	338	294	250	222	193	138	100	85	63
	17	625	563	500	438	375	325	275	238	200	150	100	90	65
	18	638	582	525	469	413	350	288	250	213	163	113	95	68
	19	650	600	550	500	450	375	300	263	225	175	125	100	70
	21	675	625	575	525	475	400	325	282	238	188	138	110	75
	22	700	650	600	550	500	425	350	300	250	200	150	120	80
	24	725	675	625	575	525	450	375	325	275	213	163	130	85
	25	750	700	650	600	550	475	400	350	300	225	175	140	90
	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))

		400	**500**	**600**	**700**	**800**	**900**	**1000**	**1100**	**1200**	**1400**	**1600**	**1800**	**2000**
load	**8**	600	500	400	175	115	85	80	60	48	32767	32767	32767	32767
Load	**9**	700	550	400	175	115	85	80	60	45	32767	32767	32767	32767
	11	700	550	400	200	125	90	80	62	45	32767	32767	32767	32767
	12	800	600	400	225	150	95	85	65	50	32767	32767	32767	32767
	13	825	600	375	240	165	105	90	70	55	32767	32767	32767	32767
	15	950	650	350	250	185	125	100	80	60	32767	32767	32767	32767
	17	975	700	425	275	200	150	110	90	65	32767	32767	32767	32767
	19	1000	750	500	300	225	175	125	100	70	32767	32767	32767	32767
	22	1050	800	550	350	250	200	150	120	80	32767	32767	32767	32767
	25	1100	850	600	400	300	225	175	140	90	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: SCD Delta ddt

		400	**500**	**600**	**700**	**800**	**900**	**1000**	**1100**	**1200**	**1400**	**1600**	**1800**	**2000**
load	**8**	625	400	300	175	115	85	80	60	48	32767	32767	32767	32767
	9	625	400	300	175	115	85	80	60	45	32767	32767	32767	32767
	11	600	400	300	200	125	90	80	60	45	32767	32767	32767	32767
	12	600	400	300	200	150	95	85	65	50	32767	32767	32767	32767
	13	600	400	300	200	165	105	90	70	55	32767	32767	32767	32767
	15	675	450	300	225	185	125	100	80	60	32767	32767	32767	32767
	17	725	500	375	275	200	150	100	90	65	32767	32767	32767	32767
	19	800	550	450	300	225	175	125	100	70	32767	32767	32767	32767
	22	700	600	500	350	250	200	150	120	80	32767	32767	32767	32767
	25	750	650	550	400	300	225	175	140	90	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	**450**	**500**	**550**	**600**	**650**	**700**	**750**	**800**	**900**	**1000**	**1100**	**1200**
load	**8**	825	775	725	675	625	513	400	338	275	225	170	125	100
Load	**9**	850	800	750	700	650	513	375	313	250	215	165	130	100
	11	875	825	775	725	675	538	400	338	275	200	170	130	100
	12	900	850	800	750	700	563	425	363	300	200	175	135	105
	13	925	875	825	775	725	588	450	375	300	225	180	140	110
	14	938	888	838	788	738	600	463	388	313	238	185	145	113
	15	950	900	850	800	750	613	475	400	325	250	190	150	115
	16	963	913	863	813	763	625	488	413	338	263	195	155	120
	17	975	925	875	825	775	638	500	425	350	275	200	160	125
	18	988	938	888	838	788	650	513	438	363	288	210	170	130
	19	1000	950	900	850	800	663	525	450	375	300	220	180	135
	21	1025	975	925	875	825	682	538	463	388	313	235	190	143
	22	1050	1000	950	900	850	700	550	475	400	325	250	200	150
	24	1075	1025	975	925	875	725	575	500	425	338	263	213	155
	25	1100	1050	1000	950	900	750	600	525	450	350	275	225	160
	27	1125	1075	1025	975	925	775	625	550	475	375	288	238	168
	29	1150	1100	1050	1000	950	800	650	575	500	400	300	250	175

P0300-P0308: Idle Cyl Mode ddt

		400	**450**	**500**	**550**	**600**	**650**	**700**	**750**	**800**	**900**	**1000**	**1100**	**1200**
load	**8**	825	775	725	675	625	513	400	338	275	225	170	120	90
	9	850	800	750	700	650	513	375	313	250	215	165	125	90
	11	875	825	775	725	675	538	400	338	275	200	170	125	100
	12	900	850	800	750	700	563	425	363	300	225	175	130	105
	13	925	875	825	775	725	588	450	388	325	250	180	135	105
	14	938	888	838	788	738	607	475	407	338	263	185	140	108
	15	950	900	850	800	750	625	500	425	350	275	190	145	110
	16	963	913	863	813	763	638	513	438	363	288	195	148	115
	17	975	925	875	825	775	650	525	450	375	300	200	150	120
	18	988	938	888	838	788	663	538	463	388	300	210	160	123
	19	1000	950	900	850	800	675	550	475	400	300	220	170	125
	21	1025	975	925	875	825	694	563	482	400	313	235	175	133
	22	1050	1000	950	900	850	713	575	488	400	325	250	180	140
	24	1075	1025	975	925	875	732	588	507	425	338	263	190	145
	25	1100	1050	1000	950	900	750	600	525	450	350	275	200	150
	27	1125	1075	1025	975	925	775	625	550	475	375	288	213	155
	29	1150	1100	1050	1000	950	800	650	575	500	400	300	225	160

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

		400	**500**	**600**	**700**	**800**	**900**	**1000**	**1100**	**1200**	**1400**	**1600**	**1800**	**2000**	**2200**	**2400**	**2600**	**2800**	**3000**
load	**8**	825	725	625	400	275	225	170	125	110	80	55	45	40	28	22	20	18	14
Load	**9**	850	750	650	375	250	215	165	130	100	70	50	38	36	24	20	16	16	13
	11	875	775	675	400	275	200	170	140	100	65	45	35	32	22	18	13	14	12
	12	900	800	700	425	300	225	180	150	110	70	43	32	28	19	13	11	11	11
	13	925	825	725	450	325	250	200	160	115	75	45	35	24	20	14	12	10	10
	15	950	850	750	500	350	300	220	180	125	80	50	40	28	23	16	13	10	9
	17	975	875	775	550	400	350	250	210	150	85	55	45	32	25	18	14	10	9
	19	1000	900	800	600	450	400	300	240	175	90	60	50	35	25	20	15	11	9
	22	1050	950	850	650	500	450	350	270	200	100	65	60	40	30	24	18	14	11
	25	1100	1000	900	700	550	500	400	300	225	120	80	75	50	40	28	21	17	13
	29	1150	1050	950	750	600	550	450	350	250	140	100	85	65	45	35	24	20	15
	33	1200	1100	1000	800	650	600	500	400	275	160	120	100	80	50	40	28	23	18
	38	1250	1150	1050	850	700	650	550	450	300	180	150	115	90	60	45	32	26	21
	42	1300	1200	1100	900	750	700	600	500	350	250	180	150	100	70	50	38	30	24
	48	1350	1250	1150	950	800	750	650	550	400	300	220	165	110	80	55	44	35	27

54	1400	1300	1200	1000	850	800	700	600	450	350	260	175	120	85	60	48	40	29
61	1450	1350	1250	1050	900	850	750	650	500	400	300	200	130	100	70	55	50	35

	3500	**4000**	**4500**	**5000**	**5500**	**6000**	**6500**	**7000**
8	6	5	5	4	3	3	3	3
9	5	5	5	4	3	3	3	3
11	5	4	4	4	3	3	3	3
12	5	5	4	3	3	3	3	3
13	5	5	4	4	3	3	3	3
15	6	5	4	4	3	3	3	3
17	6	5	4	4	3	3	3	3
19	7	5	5	4	3	3	3	3
22	7	5	5	5	3	3	3	3
25	8	6	5	5	3	3	3	3
29	8	6	5	5	3	3	3	3
33	9	7	5	5	4	3	3	3
38	10	8	6	6	4	4	4	4
42	12	9	6	6	5	4	4	4
48	14	11	7	7	5	5	5	5
54	16	13	9	7	6	5	5	5
61	18	15	11	9	7	6	6	6

P0300-P0308: Cyl Mode ddt

load

	400	**500**	**600**	**700**	**800**	**900**	**1000**	**1100**	**1200**	**1400**	**1600**	**1800**	**2000**	**2200**	**2400**	**2600**	**2800**	**3000**
8	825	725	625	400	275	225	170	120	100	80	55	40	36	28	20	20	18	13
9	850	750	650	375	250	215	165	125	90	70	50	35	32	24	18	14	16	12
11	875	775	675	400	275	200	170	135	100	65	45	30	28	20	16	12	12	11
12	900	800	700	425	300	225	180	145	110	70	43	30	24	15	10	10	10	10
13	925	825	725	450	325	250	200	155	105	75	45	35	20	15	12	9	8	9
15	950	850	750	500	350	300	220	175	115	80	50	40	24	18	13	10	7	8
17	975	875	775	550	400	350	250	200	140	85	55	40	28	20	15	11	7	7
19	1000	900	800	600	450	400	300	240	160	90	60	45	30	23	16	12	8	8
22	1050	950	850	650	500	450	350	270	180	100	60	50	40	28	20	15	10	8
25	1100	1000	900	700	550	500	400	300	200	100	70	65	45	35	24	17	13	9
29	1150	1050	950	750	600	550	450	350	225	100	80	75	60	38	25	20	15	11
33	1200	1100	1000	800	650	600	500	400	250	120	100	90	70	40	30	22	18	14
38	1250	1150	1050	850	700	650	550	450	275	140	125	110	80	50	35	24	21	17
42	1300	1200	1100	900	750	700	600	500	325	200	165	135	90	60	40	26	25	20
48	1350	1250	1150	950	800	750	650	550	375	250	200	150	100	70	45	30	30	23
54	1400	1300	1200	1000	850	800	700	600	425	300	240	165	110	80	50	35	35	25
61	1450	1350	1250	1050	900	850	750	650	500	350	300	185	120	100	60	40	45	30

	3500	**4000**	**4500**	**5000**	**5500**	**6000**	**6500**	**7000**
8	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0
29	0	0	0	0	0	0	0	0
33	0	0	0	0	0	0	0	0
38	0	0	0	0	0	0	0	0
42	0	0	0	0	0	0	0	0
48	0	0	0	0	0	0	0	0
54	0	0	0	0	0	0	0	0
61	0	0	0	0	0	0	0	0

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

load

	1100	1200	1400	1600	1800	2000	2200	2400	2600	2800	3000	3500
8	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	105	55
9	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	110	60
11	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	115	65
12	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	120	70
13	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	125	75
15	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	130	80
17	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	135	90
19	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	140	105
22	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	150	120
25	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	165	140
29	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	180	160
33	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	200	180
38	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	250	200
42	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	300	250
48	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	350	300
54	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	400	350
61	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	450	400

	4000	4500	5000	5500	6000	6500	7000
8	38	30	28	24	22	22	22
9	40	30	24	20	18	18	18
11	45	32	26	18	16	16	16
12	50	35	28	20	18	18	18
13	55	40	30	22	20	20	20
15	60	45	32	24	22	22	22
17	65	50	34	26	24	24	24
19	70	55	38	28	26	26	26
22	80	65	45	32	30	30	30
25	95	75	55	40	35	35	35
29	120	85	65	50	40	40	40
33	150	100	80	60	50	50	50
38	175	120	95	70	60	60	60
42	200	140	110	80	70	70	70
48	225	160	125	90	80	80	80
54	250	180	150	100	90	90	90
61	300	225	175	125	110	110	110

P0300-P0308: AFM Mode Table **OR** (decel index > AFM Table if active fuel management)

load
Load

	400	500	600	700	800	900	1000	1100	1200	1400	1600	1800	2000	2200	2400	2600	2800	3000	3500
11	2000	1600	1200	800	500	400	325	225	190	100	55	45	30	25	20	17	14	11	32767
12	1850	1500	1150	760	450	325	275	200	160	85	45	40	25	20	16	13	12	10	32767
13	1700	1400	1100	725	425	300	250	175	140	70	40	35	23	19	14	11	10	10	32767
14	1550	1300	1050	700	435	260	230	180	125	75	45	32	24	19	15	12	11	9	32767
16	1800	1400	1000	725	450	280	235	190	130	80	50	35	25	20	16	13	11	8	32767
18	2050	1500	950	750	475	300	250	200	140	90	60	40	30	22	18	14	12	8	32767
21	2200	1600	1000	775	525	350	275	225	160	100	70	45	35	26	22	18	12	10	32767
23	2350	1700	1050	800	550	400	300	250	180	110	80	50	40	30	26	20	15	12	32767
27	2500	1800	1100	850	600	450	350	275	200	125	90	60	45	35	30	22	18	14	32767
30	2650	1900	1150	900	650	500	400	300	225	150	100	70	50	40	32	26	20	16	32767
35	2800	2000	1200	950	700	550	450	325	250	175	115	80	55	45	35	30	22	20	32767
40	2950	2100	1250	1000	750	600	500	350	275	200	130	90	65	50	40	35	24	22	32767
45	3100	2200	1300	1050	800	650	550	400	300	225	150	100	85	60	45	40	30	24	32767
51	3250	2300	1350	1100	850	700	600	450	350	250	175	120	100	70	55	45	35	26	32767
58	3400	2400	1400	1150	900	750	650	500	400	275	200	140	110	80	60	50	40	30	32767
65	3550	2500	1450	1200	950	800	700	550	450	300	225	160	120	90	80	65	50	40	32767
74	3700	2600	1500	1250	1000	850	750	600	500	350	250	190	130	100	90	80	60	50	32767

P0300-P0308: Zero torque engine load

Zero Torque: All Cylinders active

RPM	Pct load
400	8.00
500	7.60
600	7.40
700	7.35
800	7.30
900	7.25
1000	7.20
1100	7.15
1200	7.15
1400	7.15
1600	7.15
1800	7.20
2000	7.20
2200	7.25
2400	7.30
2600	7.40
2800	7.50
3000	7.60
3500	10.34
4000	13.08
4500	15.82
5000	18.56
5500	21.30
6000	24.04
6500	26.78
7000	29.52

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

Zero Torque: Active Fuel Management (AFM)

RPM	Pct load
400	10.30
500	10.10
600	10.10
700	10.10
800	10.10
900	10.10
1000	10.10
1100	10.10
1200	10.10
1400	10.10
1600	10.20
1800	10.40
2000	10.60
2200	10.80
2400	11.00
2600	11.20
2800	11.40
3000	11.60
3500	13.71
4000	15.83
4500	17.94
5000	20.06
5500	22.17
6000	24.29
6500	26.41
7000	28.52

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

Catalyst Damaging Misfire Percentage

load
Load

	0	1000	2000	3000	4000	5000	6000	7000
0	11	11	11	10	8	6	5	5
10	11	11	10	8	7	5	5	5
20	11	10	8	6	6	5	5	5
30	10	8	7	6	5	5	5	5
40	8	7	6	5	5	5	5	5
50	7	6	6	5	5	5	5	5
60	6	6	5	5	5	5	5	5
70	6	5	5	5	5	5	5	5
80	5	5	5	5	5	5	5	5
90	5	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	0.16	0.17	0.18	0.19	0.19	0.20	0.21	0.22	0.23	0.24	0.24	0.25	0.26	0.27	0.28	0.29	0.30

P0442: EONV Pressure Threshold Table (in Pascals)

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

	0.0000	6.2499	12.4998	18.7497	24.9996	31.2495	37.4994	43.7493	49.9992	56.2491	62.4990	68.7490	74.9989	81.2488	87.4987	93.7486	99.9985
-10.0000	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749

-4.3750	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749
1.2500	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749
6.8750	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749
12.5000	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749
18.1250	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749
23.7500	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749
29.3750	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749
35.0000	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749
40.6250	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749
46.2500	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749
51.8750	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749
57.5000	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749
63.1250	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749
68.7500	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749
74.3750	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749
80.0000	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749	-336.1749

P0442: Estimate of Ambient Temperature Valid Conditioning Time

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

Axis	Curve
0	300
600	600
1200	600
1800	500
2400	500
3000	700
3600	700
4200	700
4800	671
5400	643
6000	614
6600	586
7200	557
7800	529
8400	500
9000	467
9600	433
10200	400
10800	367
11700	317
12600	300
13500	296
14400	292
15300	288
16200	283
17100	279
18000	275
19200	271
20400	267
21600	263
22800	258
24000	254
25200	250

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

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

Axis	Curve
0	40
6	40

12	40
19	40
25	40
31	40
37	40
44	40
50	40
56	40
62	40
69	40
75	40
81	40
87	40
94	40
100	40

P0461: Transfer Pump Enable

TransferPumpOnTimeLimit (in seconds)
Axis is Fuel Level in %

Axis	Curve
0	0
3	0
6	0
9	0
13	0
16	0
19	0
22	0
25	0
28	0
31	0
34	0
38	0
41	0
44	0
47	0
50	0
53	0
56	0
59	0
63	0
66	0
69	0
72	0
75	0
78	0
81	0
84	0
88	0
91	0
94	0
97	0
100	0

KtEGRD_p_StepDelta

X axis is Kpa BARO

65	70	75	80	85	90	95	100	105
3.1953	3.1953	3.1953	3.1953	3.1953	3.1953	3.1953	3.1953	3.1953

KtEGRD_p_StepMAP_DIFF

X axis is Kpa BARO

65	70	75	80	85	90	95	100	105
0.2656	0.3906	0.5078	0.6328	0.7500	0.7656	0.7813	0.7969	0.8125

KtEGRD_Cnt_StepSamplesPerTrip

X axis is Kpa BARO

65	70	75	80	85	90	95	100	105
8.0000	7.0000	7.0000	6.0000	6.0000	6.0000	5.0000	5.0000	5.0000

KtEGRD_Cnt_SamplesAfterStep

X axis is Kpa BARO

65	70	75	80	85	90	95	100	105
10.0000	10.0000	10.0000	10.0000	10.0000	10.0000	10.0000	10.0000	10.0000

KtEGRD_Cnt_SamplesAfterReset

X axis is Kpa BARO

65	70	75	80	85	90	95	100	105
10.0000	10.0000	10.0000	10.0000	10.0000	10.0000	10.0000	10.0000	10.0000

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_phi_CamPosErrorLimEc1

X axis is Deg C
Y axis is RPM

	-40.0000	-28.0000	-16.0000	-4.0000	8.0000	20.0000	32.0000	44.0000	56.0000	68.0000	80.0000	92.0000	104.0000	116.0000	128.0000	140.0000	152.0000
400	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
800	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
1200	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
1600	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
2000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
2400	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
2800	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
3200	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
3600	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
4000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
4400	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
4800	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
5200	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
5600	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
6000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
6400	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
6800	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000

KtPHSD_phi_CamPosErrorLimIc2

X axis is Deg C
Y axis is RPM

	-40.0000	-28.0000	-16.0000	-4.0000	8.0000	20.0000	32.0000	44.0000	56.0000	68.0000	80.0000	92.0000	104.0000	116.0000	128.0000	140.0000	152.0000
400	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
800	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
1200	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
1600	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
2000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
2400	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
2800	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
3200	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
3600	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
4000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
4400	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
4800	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
5200	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
5600	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
6000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
6400	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
6800	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000

KtPHSD_phi_CamPosErrorLimEc2

X axis is Deg C
Y axis is RPM

	-40.0000	-28.0000	-16.0000	-4.0000	8.0000	20.0000	32.0000	44.0000	56.0000	68.0000	80.0000	92.0000	104.0000	116.0000	128.0000	140.0000	152.0000
400	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
800	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
1200	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
1600	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
2000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
2400	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
2800	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
3200	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
3600	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
4000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
4400	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
4800	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
5200	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
5600	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
6000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
6400	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
6800	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000

KtPHSD_t_StablePositionTimeIc1

X axis is Deg C
Y axis is RPM

	-40.0000	-28.0000	-16.0000	-4.0000	8.0000	20.0000	32.0000	44.0000	56.0000	68.0000	80.0000	92.0000	104.0000	116.0000	128.0000	140.0000	152.0000
400	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

KtPHSD_t_StablePositionTimeEc1

X axis is Deg C
Y axis is RPM

	-40.0000	-28.0000	-16.0000	-4.0000	8.0000	20.0000	32.0000	44.0000	56.0000	68.0000	80.0000	92.0000	104.0000	116.0000	128.0000	140.0000	152.0000
400	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
800	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
1200	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
1600	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
2000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
2400	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
2800	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
3200	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
3600	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
4000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
4400	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
4800	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
5200	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
5600	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
6000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
6400	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
6800	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000

KtPHSD_t_StablePositionTimeIc2

X axis is Deg C
Y axis is RPM

	-40.0000	-28.0000	-16.0000	-4.0000	8.0000	20.0000	32.0000	44.0000	56.0000	68.0000	80.0000	92.0000	104.0000	116.0000	128.0000	140.0000	152.0000
400	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
800	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
1200	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
1600	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
2000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
2400	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
2800	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
3200	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
3600	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
4000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
4400	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
4800	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
5200	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
5600	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
6000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
6400	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
6800	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000

KtPHSD_t_StablePositionTimeEc2

X axis is Deg C
Y axis is RPM

	-40.0000	-28.0000	-16.0000	-4.0000	8.0000	20.0000	32.0000	44.0000	56.0000	68.0000	80.0000	92.0000	104.0000	116.0000	128.0000	140.0000	152.0000
400	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
800	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
1200	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
1600	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
2000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
2400	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
2800	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
3200	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
3600	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
4000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
4400	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000

4800	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
5200	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
5600	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
6000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
6400	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
6800	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000

Closed Loop Enable Criteria

Coolant greater than
KtFSTA_T_ClosedLoopTemp

Start-Up Coolant	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
Coolant	85.0	80.0	75.0	55.0	45.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0

and engine run time greater than
KtFSTA_t_ClosedLoopTime

Start-Up Coolant	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
Close Loop Enable Time	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	70.0	70.0	70.0	70.0

and pre converter 02 sensor voltage greater than
KfFULC_U_O2_SensorReadyThrshHi

	> 550
Voltage	*milliVolts*

or less than
KfFULC_U_O2_SensorReadyThrshLo

	< 350
Voltage	*milliVolts*

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

Long Term FT Enable Criteria

Closed Loop Enable and
Coolant greater than
KfFCLL_T_AdaptiveLoCoolant

	> 35 Celcius
Coolant	

or less than
KfFCLL_T_AdaptiveHiCoolant

	< 140
Coolant	*Celcius*

and MAP less than
KtFCLL_p_AdaptiveLowMAP_Limit

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

and
TPS_ThrottleAuthorityDefaulted = False
and
Flex Fuel Estimate Algorithm is not active
and
Catalyst or EVAP large leak test not intrusive

Secondary Fuel Trim Enable Criteria

Closed Loop Enable and
KfFCLP_U_O2ReadyThrshLo

	< 350
Voltage	*milliVolts*

for
KcFCLP_Cnt_O2RdyCyclesThrsh
> 10 events
events * 12.5 milliseconds)

Long Term Secondary Fuel Trim Enable Criteria

KtFCLP_t_PostIntglDisableTime

Start-Up Coolant	-40	-29	-18	-6	5	16	28	39	50	61	73	84	95	106	118	129	140
Post Integral Enable Time	185.0	185.0	185.0	185.0	110.0	60.0	60.0	60.0	60.0	30.0	30.0	30.0	40.0	40.0	40.0	60.0	60.0

Plus
KtFCLP_t_PostIntglRampInTime

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	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0

and
KeFCLP_T_IntegrationCatalystMax
< 900
Modeled Catalyst Tempera *Celcius*
and
KeFCLP_T_IntegrationCatalystMin
> 500
Modeled Catalyst Tempera *Celcius*
and
KfFCLP_T_CoolantThrsh
> 80 Celcius
Coolant
and
(KeFCLP_Pct_CatAccuSlphrPostDsbl
< 255
Modeled converter sulfur p *Percent*
and
Post Integral < KaFCLP_U_SlphrIntglOfst_Thrsh)

X axis: Post O2 Sensor	CiOXYR_O2_PostCat1	O2_PostCat2
Y axis: Post O2 Mode	iFCLP_Decel	2048	2048
Z: Post Integral threshold	CiFCLP_Idle	2048	2048
	CiFCLP_Cruise	2048	2048
	CiFCLP_LightAccel	2048	2048
	CiFCLP_HeavyAccel	2048	2048

and
PO2S_Bank_1_Snsr_2_FA and PO2S_Bank_2_Snsr_2_FA = False

Tables supporting Engine Oil Temperature Sensor

P0196

FastFailTempDiff — **AXIS is Engine Coolant Temperature at ECM Power-up, Degrees C**

Axis	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
Curve	79.5	79.5	79.5	60.0	60.0	39.8	39.8	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0

TotalAccumulatedFlow — **Axis is Power up Engine Oil temperature, Curve is accumulated engine grams airflow**

Axis	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
Curve	15000	14000	13000	12000	11000	10000	9000	8000	7000	6000	5000	4000	5000	4000	3000	3000	3000

Tables supporting Deactivation System Performance

P3400

EngSpeedLwrLimitEnableTable — **AXIS is Gear State, Curve is Engine Speed**

Axis	1st Gear	2nd Gear	3rd Gear	4th Gear	5thGear	6th Gear	Neutral	Reverse	Park
Curve	950	950	950	950	950	950	950	950	950

EngSpeedUprLimitEnableTable — **AXIS is Gear State, Curve is Engine Speed**

Axis	1st Gear	2nd Gear	3rd Gear	4th Gear	5thGear	6th Gear	Neutral	Reverse	Park
Curve	2800	2800	2800	2800	2800	2800	2800	2800	2800

EngSpeedLwrLimitDisableTable — **AXIS is Gear State, Curve is Engine Speed**

Axis	1st Gear	2nd Gear	3rd Gear	4th Gear	5thGear	6th Gear	Neutral	Reverse	Park
Curve	675	675	675	675	675	675	675	675	675

EngSpeedUprLimitDisableTable — **AXIS is Gear State, Curve is Engine Speed**

Axis	1st Gear	2nd Gear	3rd Gear	4th Gear	5thGear	6th Gear	Neutral	Reverse	Park
Curve	3000	3000	3000	3000	3000	3000	3000	3000	3000

HalfCylToAllCylVacuum — **Horizontal AXIS is Gear State, Vertical axis is Engine RPM**

RPM	1st Gear	2nd Gear	3rd Gear	4th Gear	5th Gear	6th Gear	Neutral	Park	Reverse
0.0	6	6	31	31	30	20	6	6	6
100.0	5	5	31	31	30	20	5	5	5
200.0	4	4	31	31	30	20	4	4	4
300.0	4	4	31	31	30	20	4	4	4
400.0	4	4	31	31	30	20	4	4	4
500.0	4	4	31	31	30	20	4	4	4
600.0	4	4	31	31	30	20	4	4	4
700.0	4	4	31	31	30	20	4	4	4
800.0	4	4	30	31	30	20	4	4	4
900.0	4	4	28	29	29	20	4	4	4
1000.0	4	4	26	29	28	19	4	4	4
1100.0	4	4	25	27	28	17	4	4	4
1200.0	4	4	24	24	25	16	4	4	4
1300.0	4	4	17	17	21	14	4	4	4
1400.0	4	4	10	11	17	11	4	4	4
1500.0	4	4	6	7	13	8	4	4	4
1600.0	4	4	4	5	10	7	4	4	4
1700.0	4	4	4	4	8	6	4	4	4
1800.0	4	4	4	4	4	5	4	4	4
1900.0	4	4	4	4	4	4	4	4	4
2000.0	4	4	4	4	4	4	4	4	4
2100.0	4	4	4	4	4	4	4	4	4
2200.0	4	4	4	4	4	4	4	4	4
2300.0	4	4	4	4	4	4	4	4	4
2400.0	4	4	4	4	4	4	4	4	4
2500.0	4	4	4	4	4	4	4	4	4
2600.0	4	4	4	4	4	4	4	4	4
2700.0	4	4	4	4	4	4	4	4	4
2800.0	4	4	4	4	4	4	4	4	4
2900.0	4	4	4	4	4	4	4	4	4
3000.0	4	4	4	4	4	4	4	4	4
3100.0	4	4	4	4	4	4	4	4	4
3200.0	4	4	4	4	4	4	4	4	4

EcoHalfCylToAllCylVacuum — **Horizontal AXIS is Gear State, Vertical axis is Engine RPM**

RPM	1st Gear	2nd Gear	3rd Gear	4th Gear	5th Gear	6th Gear	Neutral	Park	Reverse
0.0	4	4	4	4	4	4	4	4	4
100.0	4	4	4	4	4	4	4	4	4
200.0	4	4	4	4	4	4	4	4	4
300.0	4	4	4	4	4	4	4	4	4
400.0	4	4	4	4	4	4	4	4	4
500.0	4	4	4	4	4	4	4	4	4
600.0	4	4	4	4	4	4	4	4	4
700.0	4	4	4	4	4	4	4	4	4
800.0	4	4	4	4	4	4	4	4	4
900.0	4	4	4	4	4	4	4	4	4
1000.0	4	4	4	4	4	4	4	4	4
1100.0	4	4	4	4	4	4	4	4	4
1200.0	4	4	4	4	4	4	4	4	4
1300.0	4	4	4	4	4	4	4	4	4
1400.0	4	4	4	4	4	4	4	4	4

1500.0	4	4	4	4	4	4	4	4	4
1600.0	4	4	4	4	4	4	4	4	4
1700.0	4	4	4	4	4	4	4	4	4
1800.0	4	4	4	4	4	4	4	4	4
1900.0	4	4	4	4	4	4	4	4	4
2000.0	4	4	4	4	4	4	4	4	4
2100.0	4	4	4	4	4	4	4	4	4
2200.0	4	4	4	4	4	4	4	4	4
2300.0	4	4	4	4	4	4	4	4	4
2400.0	4	4	4	4	4	4	4	4	4
2500.0	4	4	4	4	4	4	4	4	4
2600.0	4	4	4	4	4	4	4	4	4
2700.0	4	4	4	4	4	4	4	4	4
2800.0	4	4	4	4	4	4	4	4	4
2900.0	4	4	4	4	4	4	4	4	4
3000.0	4	4	4	4	4	4	4	4	4
3100.0	4	4	4	4	4	4	4	4	4
3200.0	4	4	4	4	4	4	4	4	4

HalfCylDisabledPRNDL

PRNDL Drive 1	1
PRNDL Drive 2	1
PRNDL Drive 3	0
PRNDL Drive 4	0
PRNDL Drive 5	0
PRNDL Drive 6	0
PRNDL Neutral	1
PRNDL Reverse	1
PRNDL Park	1
PRNDL Transitional 1	1
PRNDL Transitional 2	1
PRNDL Transitional 4	1
PRNDL Transitional 7	1
PRNDL Transitional 8	1
PRNDL Transitional 11	1
PRNDL Transitional 13	1
PRNDL Transitional Illegal	1
PRNDL Transitional Between State	1

HalfCylDisabledPRNDLDeviceControl

PRNDL Drive 1	1
PRNDL Drive 2	1
PRNDL Drive 3	0
PRNDL Drive 4	0
PRNDL Drive 5	0
PRNDL Drive 6	0
PRNDL Neutral	0
PRNDL Reverse	1
PRNDL Park	0
PRNDL Transitional 1	1
PRNDL Transitional 2	1
PRNDL Transitional 4	1
PRNDL Transitional 7	1
PRNDL Transitional 8	1
PRNDL Transitional 11	1
PRNDL Transitional 13	1
PRNDL Transitional Illegal	1
PRNDL Transitional Between State	1

HalfCylDisabledTransGr — **AXIS is Gear State**

Axis	1st Gear	2nd Gear	3rd Gear	4th Gear	5thGear	6th Gear	Neutral	Reverse	Park
Curve	1	1	0	0	0	0	1	1	1

HalfCylDisabledTransGrDeviceControl — **AXIS is Gear State**

Axis	1st Gear	2nd Gear	3rd Gear	4th Gear	5thGear	6th Gear	Neutral	Reverse	Park
Curve	1	1	0	0	0	0	0	1	0

AllCylToHalfCylVacuum — **Horizontal AXIS is Gear State, Vertical axis is Engine RPM**

RPM	1st Gear	2nd Gear	3rd Gear	4th Gear	5th Gear	6th Gear	Neutral	Park	Reverse
0.0	40	40	56	58	56	56	40	40	40
100.0	40	40	56	58	56	56	40	40	40
200.0	40	40	56	58	56	56	40	40	40
300.0	40	40	56	58	56	56	40	40	40
400.0	40	40	56	58	56	56	40	40	40
500.0	40	40	56	58	56	56	40	40	40
600.0	40	40	56	58	56	55	40	40	40
700.0	40	40	55	58	56	55	40	40	40
800.0	40	40	55	58	56	54	40	40	40
900.0	40	40	54	58	56	54	40	40	40
1000.0	40	40	54	58	56	53	40	40	40
1100.0	40	40	53	57	56	52	40	40	40

1200.0	40	40	53	56	56	52	40	40	40
1300.0	40	40	52	55	55	52	40	40	40
1400.0	40	40	52	55	55	52	40	40	40
1500.0	40	40	51	53	53	52	40	40	40
1600.0	40	40	51	50	51	52	40	40	40
1700.0	40	40	51	50	51	52	40	40	40
1800.0	40	40	51	50	51	52	40	40	40
1900.0	40	40	51	50	51	52	40	40	40
2000.0	40	40	51	50	51	52	40	40	40
2100.0	40	40	51	50	51	52	40	40	40
2200.0	40	40	51	50	51	52	40	40	40
2300.0	40	40	51	50	51	52	40	40	40
2400.0	40	40	51	50	51	52	40	40	40
2500.0	40	40	51	50	51	52	40	40	40
2600.0	40	40	51	50	51	52	40	40	40
2700.0	40	40	51	50	51	52	40	40	40
2800.0	40	40	52	50	51	53	40	40	40
2900.0	40	40	54	54	54	54	40	40	40
3000.0	40	40	55	55	55	55	40	40	40
3100.0	40	40	55	55	55	55	40	40	40
3200.0	40	40	55	55	55	55	40	40	40

EcoAllCylToHalfCylVacuum **Horizontal AXIS is Gear State, Vertical axis is Engine RPM**

RPM	1st Gear	2nd Gear	3rd Gear	4th Gear	5th Gear	6th Gear	Neutral	Park	Reverse
0.0	48	48	48	48	48	48	48	48	48
100.0	48	48	48	48	48	48	48	48	48
200.0	48	48	48	48	48	48	48	48	48
300.0	48	48	48	48	48	48	48	48	48
400.0	48	48	48	48	48	48	48	48	48
500.0	48	48	48	48	48	48	48	48	48
600.0	48	48	48	48	48	48	48	48	48
700.0	48	48	48	48	48	48	48	48	48
800.0	48	48	48	48	48	48	48	48	48
900.0	48	48	48	48	48	48	48	48	48
1000.0	48	48	48	48	48	48	48	48	48
1100.0	48	48	48	48	48	48	48	48	48
1200.0	48	48	48	48	48	48	48	48	48
1300.0	48	48	48	48	48	48	48	48	48
1400.0	48	48	48	48	48	48	48	48	48
1500.0	48	48	48	48	48	48	48	48	48
1600.0	48	48	48	48	48	48	48	48	48
1700.0	48	48	48	48	48	48	48	48	48
1800.0	48	48	48	48	48	48	48	48	48
1900.0	48	48	48	48	48	48	48	48	48
2000.0	48	48	48	48	48	48	48	48	48
2100.0	48	48	48	48	48	48	48	48	48
2200.0	48	48	48	48	48	48	48	48	48
2300.0	48	48	48	48	48	48	48	48	48
2400.0	48	48	48	48	48	48	48	48	48
2500.0	48	48	48	48	48	48	48	48	48
2600.0	48	48	48	48	48	48	48	48	48
2700.0	48	48	48	48	48	48	48	48	48
2800.0	48	48	48	48	48	48	48	48	48
2900.0	48	48	48	48	48	48	48	48	48
3000.0	48	48	48	48	48	48	48	48	48
3100.0	48	48	48	48	48	48	48	48	48
3200.0	48	48	48	48	48	48	48	48	48

P0521

EngSpeedWeightFactorTable **AXIS is Engine RPM, Curve is Weight Factor**

Axis	0	500	900	1100	1500	1750	2000	3500	4000
Curve	0.00	0.00	0.00	0.45	0.45	0.45	0.45	0.45	0.00

EngOilTempWeightFactorTable **AXIS is Engine Oil Temp Deg C, Curve is Weight Factor**

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

EngLoadStabilityWeightFactorTable **AXIS is Delta APC, Curve is Weight Factor**

Axis	0	5	10	20	30	50	100	200	399
Curve	1.00	1.00	1.00	0.30	0.00	0.00	0.00	0.00	0.00

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

Axis	160	170	225	275	360	375	400	500	600
Curve	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00

Cert Doc Bundle Name	Pcodes							
IAC_SystemRPM_FA	P0506	P0507						
TCM_EngSpdReqCkt	P150C							
FuelTrimSystemB1_FA	P0171	P0172						
FuelTrimSystemB2_FA	P0174	P0175						
FuelTrimSystemB1_TFTKO	P0171	P0172						
FuelTrimSystemB2_TFTKO	P0174	P0175						
NA	P2096	P2097	P2098	P2099				
A/F Imbalance Bank1	P219A							
A/F Imbalance Bank2	P219B							
AIRSystemPressureSensor FA	P2430	P2431	P2432	P2433	P2435	P2436	P2437	P2438
AIR System FA	P0411	P2440	P2444					
AIRValveControlCircuit FA	P0412							
AIRPumpControlCircuit FA	P0418							
Clutch Sensor FA	P0806	P0807	P0808					
ClutchPositionSensorCircuitLo FA	P0807							
ClutchPositionSensorCircuitHi FA	P0808							
Ethanol Composition Sensor FA	P0178	P0179	P2269					
EngineMetalOvertempActive	P1258							
FuelInjectorCircuit_FA	P0201	P0202	P0203	P0204	P0205	P0206	P0207	P0208
FuelInjectorCircuit_TFTKO	P0201	P0202	P0203	P0204	P0205	P0206	P0207	P0208

CatalystSysEfficiencyLoB1_FA	P0420							
CatalystSysEfficiencyLoB2_FA	P0430							
AmbientAirPressCktFA	P2228	P2229						
AmbientAirPressCktFA_NoSnsr	P0106	P0107	P0108					
AmbientAirDefault	For Naturally Aspirated Engines:	P0106	P0107	P0108	P2227	P2228	P2229	
	For Super Charged Engines:	P012B	P012C	P012D	P2227	P2228	P2229	
	For Engines with no Baro Sensor:	P0106	P0107	P0108				
IAT_SensorCircuitTFTKO	P0112	P0113						
IAT_SensorCircuitFA	P0112	P0113						
IAT_SensorCircuitFP	P0112	P0113						
IAT_SensorTFTKO	P0111	P0112	P0113					
IAT_SensorFA	P0111	P0112	P0113					
IAT2_SensorCktTFTKO	P0097	P0098						
IAT2_SensorCktTFTKO_NoSnsr	P0112	P0113						
IAT2_SensorCircuitFA	P0097	P0098						
IAT2_SensorCircuitFA_NoSnsr	P0112	P0113						
IAT2_SensorcircuitFP	P0097	P0098						
IAT2_SensorcircuitFP_NoSnsr	P0112	P0113						
IAT2_SensorTFTKO	P0096	P0097	P0098					
IAT2_SensorTFTKO_NoSnsr	P0111	P0112	P0113					
IAT2_SensorFA	P0096	P0097	P0098					
IAT2_SensorFA_NoSnsr	P0111	P0112	P0113					
SuperchargerBypassValveFA	P2261							
CylDeacSystemTFTKO	P3400							
MAF_SensorPerfFA	P0101							
MAF_SensorPerfTFTKO	P0101							

MAP_SensorPerfFA	P0106		
MAP_SensorPerfTFTKO	P0106		
SCIAP_SensorPerfFA	P012B		
SCIAP_SensorPerfTFTKO	P012B		
ThrottlePositionSnsrPerfFA	P0121		
ThrottlePositionSnsrPerfTFTKO	P0121		
MAF_SensorFA	P0101	P0102	P0103
MAF_SensorTFTKO	P0101	P0102	P0103
MAF_SensorFP	P0102	P0103	
MAF_SensorCircuitFA	P0102	P0103	
MAF_SensorCircuitTFTKO	P0102	P0103	
MAP_SensorTFTKO	P0106	P0107	P0108
MAP_SensorFA	P0106	P0107	P0108
SCIAP_SensorFA	P012B	P012C	P012D
SCIAP_SensorTFTKO	P012B	P012C	P012D
SCIAP_SensorCircuitFP	P012C	P012D	
AfterThrottlePressureFA_NA	P0106	P0107	P0108
AfterThrottlePressureFA_SC	P012B	P012C	P012D
AfterThrottleVacuumTFTKO_NA	P0106	P0107	P0108
AfterThrottleVacuumTFTKO_SC	P012B	P012C	P012D
SCIAP_SensorCircuitFA	P012C	P012D	
AfterThrottlePressTFTKO_NA	P0106	P0107	P0108
AfterThrottlePressTFTKO_SC	P012B	P012C	P012D
MAP_SensorCircuitFA	P0107	P0108	
MAP_EngineVacuumStatus	MAP_SensorFA OR P0107, P0108 Pending		
ECT_Sensor_Ckt_FA	P0117	P0118	
ECT_Sensor_Ckt_TPTKO	P0117	P0118	

ECT_Sensor_Ckt_TFTKO	P0117	P0118										
ECT_Sensor_DefaultDetected	P0117	P0118	P0116									
ECT_Sensor_FA	P0117	P0118	P0116	P0128								
ECT_Sensor_TFTKO	P0117	P0118	P0116									
ECT_Sensor_Perf_FA	P0116											
ECT_Sensor_Ckt_FP	P0117	P0118										
ECT_Sensor_Ckt_High_FP	P0118											
ECT_Sensor_Ckt_Low_FP	P0117											
THMR_Insuff_Flow_FA	P00B7											
THMR_Therm_Control_FA	P0597	P0598	P0599									
THMR_RCT_Sensor_Ckt_FA	P00B3	P00B4										
THMR_ECT_Sensor_Ckt_FA	P0117	P0118	P0116	P00B6								
O2S_Bank_ 1_TFTKO	P0131	P0132	P0134	P2A00								
O2S_Bank_ 2_TFTKO	P0151	P0152	P0154	P2A03								
O2S_Bank_1_Sensor_1_FA	P2A00	P0131	P0132	P0133	P0134	P0135	P0053	P1133	P015A	P015B	P0030	
O2S_Bank_1_Sensor_2_FA	P013A	P013B	P013E	P013F	P2270	P2271	P0137	P0138	P0140	P0141	P0054	P0036
O2S_Bank_2_Sensor_1_FA	P2A03	P0151	P0152	P0153	P0154	P0155	P0059	P1153	P015C	P015D	P0050	
O2S_Bank_2_Sensor_2_FA	P013C	P013D	P014A	P014B	P2272	P2273	P0157	P0158	P0160	P0161	P0060	P0056
PO2S_Bank_1_Snsr_2_FA	P0137	P0138	P0140	P0036	P0054	P0141	P2270	P2271				
PO2S_Bank_2_Snsr_2_FA	P0157	P0158	P0160	P0056	P0060	P0161	P2272	P2273				
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
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						
ExhaustCamSensorTFTKO	P0017	P0019	P0365	P0366	P0390	P0391						
ExhaustCamSensorFA	P0017	P0019	P0365	P0366	P0390	P0391						
IntakeCamSensor_FA	P0016	P0018	P0340	P0341	P0345	P0346						
IntakeCamSensor_TFTKO	P0016	P0018	P0340	P0341	P0345	P0346						
ExhaustCamSensor_FA	P0017	P0019	P0365	P0366	P0390	P0391						
ExhaustCamSensor_TFTKO	P0017	P0019	P0365	P0366	P0390	P0391						
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										
CoolingFanSpeedTooHigh_FA	P0495											

FanOutputDriver_FA	P0480	P0481	P0482			
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					
VehicleSpeedSensor_FA	P0502	P0503	P0722	P0723		
VehicleSpeedSensorError	P0502	P0503	P0722	P0723		

LowFuelConditionDiagnostic	Flag set to TRUE if the fuel level < AND No Active DTCs: FuelLevelDataFault P0462 P0463 for at least 30 seconds.
Transfer Pump is Commanded On	Fuel Volume in Primary Fuel Tank < 0.0 liters AND Fuel Volume in Secondary Fuel Tank ≥ 0.0 liters AND Transfer Pump on Time < **TransferPumpOnTimeLimit** Table AND

Transfer Pump had been Off for at least 0.0 seconds
AND
Evap Diagnostic (Purge Valve Leak Test,
AND
Engine Running

EGRValvePerformance_FA	P0401	P042E						
EGRValveCircuit_FA	P0403	P0404	P0405	P0406				
EGRValve_FP	P0405	P0406	P042E					
EGRValveCircuit_TFTKO	P0403	P0404	P0405	P0406				
EGRValvePerformance_TFTKO	P0401	P042E						
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				
EngOilTempSensorCircuitFA	P0197	P0198						
EngOilModeledTempValid	ECT_Se	IAT_SensorCircuitFA						
EngOilPressureSensorCktFA	P0522	P0523						
EngOilPressureSensorFA	P0521	P0522	P0523					
CylnderDeacDriverTFTKO	P3401	P3409	P3417	P3425	P3433	P3441	P3449	

BrakeBoosterSensorFA	P0556	P0557	P0558							
BrakeBoosterVacuumValid	P0556	P0557	P0558							
BrakeBoosterVacuumValid	Vehicle	MAP_Sensor	FA							
CylnderDeacDriverTFTKO	P3401	P3409	P3417	P3425	P3433	P3441	P3449			
EngineTorqueEstInaccurate	Engine	FuelInje	FuelInje	FuelTrim	FuelTrim	MAF_Se	MAP_Se	EGRValuePerforamnce_FA		
PPS1_OutOfRange_Composite	P2122	P2123	P0651							
PPS2_OutOfRange_Composite	P2127	P2128	P0641							
PPS1_OutOfRange_Composite	P2122	P2123	P0651							
PPS2_OutOfRange_Composite	P2127	P2128	P0641							
PPS1_OutOfRange	P2122	P2123								
PPS2_OutOfRange	P2127	P2128								
PPS1_OutOfRange	P2122	P2123								
PPS2_OutOfRange	P2127	P2128								
AcceleratorPedalFailure	P2122	P2123	P2127	P2128	P2138	P0641	P0651			
ControllerRAM_Error_FA	P0604									
ControllerProcessorPerf_FA	P0606									
TPS1_OutOfRange_Composite	P0122	P0123	P0651							
TPS2_OutOfRange_Composite	P0222	P0223	P0652							
TPS_FA	P0120	P0122	P0123	P0220	P0222	P0223	P2135			
TPS_TFTKO	P0120	P0122	P0123	P0220	P0222	P0223	P2135			
TPS_Performance_FA	P0068	P0121	P1516	P2101						
TPS_Performance_TFTKO	P0068	P0121	P1516	P2101						
TPS_FaultPending	P0120	P0122	P0123	P0220	P0222	P0223	P2135			
TPS_ThrottleAuthorityDefaulted	P0068	P0120	P0122	P0123	P0220	P0222	P0223	P1516	P2135	P2176

EnginePowerLimited	P0068	P0606	P0120	P0122	P0123	P0220	P0222	P0223	P0641	P0651		
	P1516	P2101	P2120	P2122	P2123	P2125	P2127	P2128	P2135	P2138	P2176	
5VoltReferenceA_FA	P0641											
5VoltReferenceB_FA	P0651											
TOSS_Fault		ECM:	P0502	P0503								
		TCM:	P0722	P0723								
ShiftSolenoidFaults (TCM)		M30/M70:	P0751	P0752	P0756	P0757						
		MYC/MYD:	P0751	P0752	P0756	P0757	P0973	P0974	P0976	P0977		
			P182C	P1823	P182D	P1825	P182E	P1826	P182F			
TransTurbineSpeedValid(TCM)		M30/M70:	P0716	P0717								
		MYC/MYD:	P0716	P0717	P07BF	P07C0						
Trans_Gear_Defaulted(TCM)		M30/M70:	P0705	P1810	P1815	P1816	P1817	P1818	P1915	P1820	P182A	P1822
KS_CktPerfB1B2_FA	P0324	P0325	P0326	P0327	P0328	P0330	P0332	P0333				
EST_DriverFltActive	P0351	P0352	P0353	P0354	P0355	P0356	P0357	P0358				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Fuel Rail Pressure (FRP) Sensor Performance (rationality)	P018B	This DTC detects a fuel pressure sensor response stuck within the normal operating range	Absolute value of change in fuel pressure as sensed during intrusive test.	<= 30 kPa			Frequency: Continuous; 12.5 ms loop. 60 seconds between intrusive tests that pass Intrusive test requested if fuel system is clamped for >= 5 seconds or fuel pressure error variance <= typically (0.3 to 0.6) (calculated over a 2.5sec period); otherwise report pass	DTC Type A 1 trip
					1. FRP Circuit Low DTC (P018C)	not active		
					2. FRP Circuit High DTC (P018D)	not active		
					3. FuelPump Circuit Low DTC (P0231)	not active	Duration of intrusive test is fueling related (5 to 12 seconds).	
					4. FuelPump Circuit High DTC (P0232)	not active		
					5. FuelPump Circuit Open DTC (P023F)	not active	Intrusive test is run when fuel flow is below Max allowed fuel flow rate (Typical values in the range of 11 to 50 g/s)	
					6. Reference Voltage DTC (P0641)	not active		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
					7. Fuel Pump Control Module Driver Over-temperature DTC's (P064A, P1255) 8. Control Module Internal Performance DTC (P0606) 9. Engine run time 10. Emissions fuel level (PPEI $3FB) AND Engine Run Time 11. Fuel pump control 12. Fuel pump control state 13. Engine fuel flow 14. ECM fuel control system failure (PPEI $1ED)	not active not active >=5 seconds not low > 30 sec enabled normal or FRP Rationality control > 0.047 g/s failure has not occurred		
Fuel Rail Pressure (FRP) Sensor Circuit Low Voltage	P018C	This DTC detects if the fuel pressure sensor circuit is shorted to low	FRP sensor voltage	< 0.14 V	Ignition	Run or Crank	72 failures out of 80 samples 1 sample/12.5 ms	DTC Type A 1 trip
Fuel Rail Pressure (FRP) Sensor Circuit High Voltage	P018D	This DTC detects if the fuel pressure sensor circuit is shorted to high	FRP sensor voltage	> 4.86 V	Ignition	Run or Crank	72 failures out of 80 samples 1 sample/12.5 ms	DTC Type A 1 trip
Fuel Pump Control Circuit Low Voltage	P0231	This DTC detects if the fuel pump control circuit is shorted to low	Fuel Pump Current	> 14.48A	Ignition OR HS Comm	Run or Crank enabled	72 test failures in 80 test samples if Fuel Pump Current <100A 3 test failures in 15 test samples if Fuel Pump Current >=100A	DTC Type A 1 trip

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
					OR Fuel Pump Control AND Ignition Run/Crank Voltage	 enabled 9V < voltage < 32V	1 sample/12.5 ms	
Fuel Pump Control Circuit High Voltage	P0232	This DTC detects if the fuel pump control circuit is shorted to high	Voltage measured at fuel pump circuit	> 3.86 V	Commanded fuel pump output Fuel pump control enable Time that above conditions are met	0% duty cycle (off) False >=4.0 seconds	36 test failures in 40 test samples; 1 sample/12.5ms Pass/Fail determination made only once per trip	DTC Type A 1 trip
Fuel Pump Control Circuit (Open)	P023F	This DTC detects if the fuel pump control circuit is open	Fuel Pump Current AND Fuel Pump Duty Cycle	<=0.5A > 20%	Ignition OR HS Comm OR Fuel Pump Control AND Ignition Run/Crank voltage	Run or Crank Enabled Enabled 9V <voltage< 32V	72 test failures in 80 test samples; 1 sample/12.5ms	DTC Type A 1 trip
Fuel System Control Module Enable Control Circuit	P025A	This DTC detects if there is a fault in the fuel pump control enable circuit	PPEI (PPEI (Powertrain Platform Electrical Interface) Fuel System Request ($1ED)	≠ Fuel Pump Control Module Enable Control Circuit	 Ignition AND PPEI Fuel System Request ($1ED)	 Run or Crank Valid	72 failures out of 80 samples 1 sample/12.5 ms	DTC Type A 1 trip
Control Module Read Only Memory (ROM)	P0601	This DTC will be stored if any software or calibration check sum is incorrect	Calculated Checksum (CRC16)	≠ stored checksum for any of the parts (boot, software, application calibration, system calibration)	Ignition	Run or Crank	1 failure if it occurs during the first ROM test of the ignition cycle, otherwise 5 failures	DTC Type A 1 trip

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
					OR HS Comm OR Fuel Pump Control	 enabled enabled	Frequency: Runs continuously in the background	
Control Module Not Programmed	P0602	Indicates that the FSCM needs to be programmed	This DTC is set via calibration, when KeMEMD_b_NoStartCal	TRUE	 Ignition OR HS Comm OR Fuel Pump Control	 Run or Crank enabled enabled	Runs once at power up	DTC Type A 1 trip
Control Module Long Term Memory Reset	P0603	Non-volatile memory checksum error at controller power-up	Checksum at power-up	≠ checksum at power-down	 Ignition OR HS Comm OR Fuel Pump Control	 Run or Crank enabled enabled	1 failure Frequency: Once at power-up	DTC Type A 1 trip
Control Module Random Access Memory (RAM)	P0604	Indicates that control module is unable to correctly write and read data to and from RAM	Data read	≠ Data written	 Ignition OR HS Comm	 Run or Crank enabled	1 failure if it occurs during the first RAM test of the ignition cycle, otherwise 5 failures Frequency: Runs continuously in the background.	DTC Type A 1 trip

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
					OR Fuel Pump Control	enabled		
Control Module Internal Performance 1. Main Processor Configuration Register Test	P0606	This DTC indicates the FSCM has detected an internal processor fault or external watchdog fault (PID 2032 can tell what causes the fault.)	1. For all I/O configuration register faults: •Register contents	Incorrect value.	Ignition OR HS Comm OR Fuel Pump Control	Run or Crank enabled enabled	Tests 1 and 2 1 failure Frequency: Continuously (12.5ms)	DTC Type A 1 trip
2. Processor clock test			2. For Processor Clock Fault: •EE latch flag in EEPROM. OR • RAM latch flag.	0x5A5A 0x5A	1. For all I/O configuration register faults: •KeMEMD_b_ProcFltCfgRegEnbl 2. For Processor Clock Fault: •KeMEMD_b_ProcFltCLKDiagEnbl	TRUE TRUE	Test 3 3 failures out of 15 samples 1 sample/12.5 ms	
3. External watchdog test			3. For External Watchdog Fault: • Software control of fuel pump driver	Control Lost	3. For External Watchdog Fault: •KeFRPD_b_FPExtWDogDiagEnbl 3. For External Watchdog Fault: •Control Module ROM(P0601) 3. For External Watchdog Fault: •Control Module RAM(P0604)	TRUE not active not active		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Control Module Long Term Memory (EEPROM) Performance	P062F	Indicates that the NVM Error flag has not been cleared	Last EEPROM write	Did not complete	Ignition OR HS Comm OR Fuel Pump Control	Run or Crank enabled enabled	1 test failure Once on controller power-up	DTC Type A 1 trip
5Volt Reference Circuit (Short High/Low/Out of Range)	P0641	Detects continuous short or out of range on the #1 5V sensor reference circuit	Reference voltage AND Output OR Reference voltage AND Output OR Reference voltage AND Output	>= 0.5V inactive . >= 5.5V active <= 4.5V active	Ignition	Run or Crank	15 failures out of 20 samples 1 sample/12.5 ms	DTC Type A 1 trip
			OR Reference voltage	> 102.5% nominal (i.e., 5.125V) OR <97.5% nominal (i.e., 4.875V)				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Fuel Pump Control Module - Driver Over-temperature 1	P064A	This DTC detects if an internal fuel pump driver overtemperature condition exists under normal operating conditions (Tier 1 supplier Continental responsibility)	Module Range of Operation	1. Module is within Acceptable Operation Range (Motorola's responsibility - FSCM is in normal operating range for module voltage versus PWM duty cycle. Linear range from 100% @ 12.5V to 70% @ 18V.)	Ignition OR HS Comm OR Fuel Pump Control AND Ignition Run / Crank	Run or Crank Enabled Enabled 9V<voltage<32V	3 failures out of 15 samples 1 sample/12.5 ms	DTC Type B 2 trips
			AND Fuel pump driver Temp	> 190C	KeFRPD_b_FPOverTempDiagEnbl	TRUE		
Fuel Pump Control Module - Driver Over-temperature 2	P1255	This DTC detects if an internal fuel pump driver overtemperature condition exists under extreme operating conditions (GM's responsibility)	Module Range of Operation	Outside normal range (FSCM is NOT in normal operating range for module voltage versus PWM duty cycle. Linear range from 100% @ 12.5V to 70% @ 18V.)	Ignition OR HS Comm OR Fuel Pump Control AND Ignition Run / Crank	Run or Crank Enabled Enabled 9V<voltage<32V	3 failures out of 15 samples 1 sample/12.5 ms	DTC Type B 2 trips
			AND Fuel pump driver Temp	> 190C	KeFRPD_b_FPOverTempDiagEnbl	TRUE		
Ignition 1 Switch Circuit Low Voltage	P2534	This DTC detects if the Ignition1 Switch circuit is shorted to low or open	Ignition 1 voltage	<= 6 V	Engine	Running	180 failures out of 200 samples 1 sample/25.0 ms	DTC Type A 1 trip

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Fuel Pump Flow Performance (rationality)	P2635	This DTC detects degradation in the performance of the SIDI electronic return-less fuel system	Filtered fuel rail pressure error	<= Low Threshold (function of desired fuel rail pressure and fuel flow rate. 15% of resultant Target Pressure) OR >= High Threshold (function of desired fuel rail pressure and fuel flow rate. 15% of resultant Target Pressure) **(See Supporting Tables tab)**	1. FRP Circuit Low DTC (P018C)	not active	Filtered fuel rail pressure error Time Constant = 12.5 seconds Frequency: Continuous 12.5 ms loop	DTC Type B 2 trips
					2. FRP Circuit High DTC (P018D)	not active		
					3. Fuel Pressure Sensor Performance DTC (P018B)	not active		
					4. FuelPump Circuit Low DTC (P0231)	not active		
					5. FuelPump Circuit High DTC (P0232)	not active		
					6. FuelPump Circuit Open DTC (P023F)	not active		
					7. Reference Voltage DTC (P0641)	not active		
					8. Fuel Pump Control Module Driver Over-temperature DTC's (P064A, P1255)	not active		
					9. Control Module Internal Performance DTC (P0606)	not active		
					10. An ECM fuel control system failure (PPEI $1ED)	has not occurred		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
					11. The Barometric pressure (PPEI $4C1) signal	valid (for absolute fuel pressure sensor)		
					12. Engine run time	>= 30 seconds		
					13. Emissions fuel level (PPEI $3FB) AND Engine Run Time	not low > 30 sec		
					14. Fuel pump control	enabled		
					15. Fuel pump control state	normal		
					16. Battery Voltage	11V<=voltage=<32V		
					17. Fuel flow rate **(See Supporting Tables tab)**	> 0.047 g/s **AND** <= Max allowed fuel flow rate as a function of desired rail pressure & Vbatt (Typical values in the range of 11 to 50 g/s)		
					18. Fuel Pressure Control System	Is not responding to an over-pressurization due to pressure build during DFCO or a decreasing desired pressure command.		
Control Module Communication Bus “A” Off	U0073	Detects that a CAN serial data bus shorted condition has occurred to force the CAN device driver to enter a bus-off state	Bus Status	Off	Power mode	Run/Crank	5 failures out of 5 samples (5 seconds)	DTC Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Lost Communication With ECM/PCM "A"	U0100	Detects that CAN serial data communication has been lost with the ECM	Message $0C9	Undetected	1. Power mode 2. Ignition Run/Crank Voltage 3. U0073	Run/Crank 11V<=voltage=<32V not active	12 failures out of 12 samples (12 seconds)	DTC Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Fuel Rail Pressure (FRP) Sensor Performance (rationality)	P018B	This DTC detects a fuel pressure sensor response stuck within the normal operating range	Absolute value of change in fuel pressure as sensed during intrusive test.	<= 30 kPa			Frequency: Continuous; 12.5 ms loop. 60 seconds between intrusive tests that pass Intrusive test requested if fuel system is clamped for >= 5 seconds or fuel pressure error variance <= typically (0.3 to 0.6) (calculated over a 2.5sec period); otherwise report pass	DTC Type A 1 trip
					1. FRP Circuit Low DTC (P018C)	not active		
					2. FRP Circuit High DTC (P018D)	not active		
					3. FuelPump Circuit Low DTC (P0231)	not active	Duration of intrusive test is fueling related (5 to 12 seconds).	
					4. FuelPump Circuit High DTC (P0232)	not active		
					5. FuelPump Circuit Open DTC (P023F)	not active	Intrusive test is run when fuel flow is below Max allowed fuel flow rate (Typical values in the range of 11 to 50 g/s)	
					6. Reference Voltage DTC (P0641)	not active		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
					7. Fuel Pump Control Module Driver Over-temperature DTC's (P064A, P1255) 8. Control Module Internal Performance DTC (P0606) 9. Engine run time 10. Emissions fuel level (PPEI $3FB) AND Engine Run Time 11. Fuel pump control 12. Fuel pump control state 13. Engine fuel flow 14. ECM fuel control system failure (PPEI $1ED)	not active not active >=5 seconds not low > 30 sec enabled normal or FRP Rationality control > 0.047 g/s failure has not occurred		
Fuel Rail Pressure (FRP) Sensor Circuit Low Voltage	P018C	This DTC detects if the fuel pressure sensor circuit is shorted to low	FRP sensor voltage	< 0.14 V	Ignition	Run or Crank	72 failures out of 80 samples 1 sample/12.5 ms	DTC Type A 1 trip
Fuel Rail Pressure (FRP) Sensor Circuit High Voltage	P018D	This DTC detects if the fuel pressure sensor circuit is shorted to high	FRP sensor voltage	> 4.86 V	Ignition	Run or Crank	72 failures out of 80 samples 1 sample/12.5 ms	DTC Type A 1 trip
Fuel Pump Control Circuit Low Voltage	P0231	This DTC detects if the fuel pump control circuit is shorted to low	Fuel Pump Current	> 14.48A	Ignition OR HS Comm	Run or Crank enabled	72 test failures in 80 test samples if Fuel Pump Current <100A 3 test failures in 15 test samples if Fuel Pump Current >=100A	DTC Type A 1 trip

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
					OR Fuel Pump Control AND Ignition Run/Crank Voltage	 enabled 9V < voltage < 32V	1 sample/12.5 ms	
Fuel Pump Control Circuit High Voltage	P0232	This DTC detects if the fuel pump control circuit is shorted to high	Voltage measured at fuel pump circuit	> 3.86 V	Commanded fuel pump output Fuel pump control enable Time that above conditions are met	0% duty cycle (off) False >=4.0 seconds	36 test failures in 40 test samples; 1 sample/12.5ms Pass/Fail determination made only once per trip	DTC Type A 1 trip
Fuel Pump Control Circuit (Open)	P023F	This DTC detects if the fuel pump control circuit is open	Fuel Pump Current AND Fuel Pump Duty Cycle	<=0.5A > 20%	Ignition OR HS Comm OR Fuel Pump Control AND Ignition Run/Crank voltage	Run or Crank Enabled Enabled 9V <voltage< 32V	72 test failures in 80 test samples; 1 sample/12.5ms	DTC Type A 1 trip
Fuel System Control Module Enable Control Circuit	P025A	This DTC detects if there is a fault in the fuel pump control enable circuit	PPEI (PPEI (Powertrain Platform Electrical Interface) Fuel System Request ($1ED)	≠ Fuel Pump Control Module Enable Control Circuit	 Ignition AND PPEI Fuel System Request ($1ED)	 Run or Crank Valid	72 failures out of 80 samples 1 sample/12.5 ms	DTC Type A 1 trip
Control Module Read Only Memory (ROM)	P0601	This DTC will be stored if any software or calibration check sum is incorrect	Calculated Checksum (CRC16)	≠ stored checksum for any of the parts (boot, software, application calibration, system calibration)	Ignition	Run or Crank	1 failure if it occurs during the first ROM test of the ignition cycle, otherwise 5 failures	DTC Type A 1 trip

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
					OR HS Comm OR Fuel Pump Control	 enabled enabled	Frequency: Runs continuously in the background	
Control Module Not Programmed	P0602	Indicates that the FSCM needs to be programmed	This DTC is set via calibration, when KeMEMD_b_NoStartCal	TRUE	 Ignition OR HS Comm OR Fuel Pump Control	 Run or Crank enabled enabled	Runs once at power up	DTC Type A 1 trip
Control Module Long Term Memory Reset	P0603	Non-volatile memory checksum error at controller power-up	Checksum at power-up	≠ checksum at power-down	 Ignition OR HS Comm OR Fuel Pump Control	 Run or Crank enabled enabled	1 failure Frequency: Once at power-up	DTC Type A 1 trip
Control Module Random Access Memory (RAM)	P0604	Indicates that control module is unable to correctly write and read data to and from RAM	Data read	≠ Data written	 Ignition OR HS Comm	 Run or Crank enabled	1 failure if it occurs during the first RAM test of the ignition cycle, otherwise 5 failures Frequency: Runs continuously in the background.	DTC Type A 1 trip

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
					OR Fuel Pump Control	enabled		
Control Module Internal Performance 1. Main Processor Configuration Register Test	P0606	This DTC indicates the FSCM has detected an internal processor fault or external watchdog fault (PID 2032 can tell what causes the fault.)	1. For all I/O configuration register faults: •Register contents	Incorrect value.	Ignition OR HS Comm OR Fuel Pump Control	Run or Crank enabled enabled	Tests 1 and 2 1 failure Frequency: Continuously (12.5ms)	DTC Type A 1 trip
2. Processor clock test			2. For Processor Clock Fault: •EE latch flag in EEPROM. OR • RAM latch flag.	0x5A5A 0x5A	1. For all I/O configuration register faults: •KeMEMD_b_ProcFltCfgRegEnbl 2. For Processor Clock Fault: •KeMEMD_b_ProcFltCLKDiagEnbl	TRUE TRUE	Test 3 3 failures out of 15 samples 1 sample/12.5 ms	
3. External watchdog test			3. For External Watchdog Fault: • Software control of fuel pump driver	Control Lost	3. For External Watchdog Fault: •KeFRPD_b_FPExtWDogDiagEnbl 3. For External Watchdog Fault: •Control Module ROM(P0601) 3. For External Watchdog Fault: •Control Module RAM(P0604)	TRUE not active not active		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Control Module Long Term Memory (EEPROM) Performance	P062F	Indicates that the NVM Error flag has not been cleared	Last EEPROM write	Did not complete	Ignition OR HS Comm OR Fuel Pump Control	Run or Crank enabled enabled	1 test failure Once on controller power-up	DTC Type A 1 trip
5Volt Reference Circuit (Short High/Low/Out of Range)	P0641	Detects continuous short or out of range on the #1 5V sensor reference circuit	Reference voltage AND Output OR Reference voltage AND Output OR Reference voltage AND Output	>= 0.5V inactive . >= 5.5V active <= 4.5V active	Ignition	Run or Crank	15 failures out of 20 samples 1 sample/12.5 ms	DTC Type A 1 trip
			OR Reference voltage	> 102.5% nominal (i.e., 5.125V) OR <97.5% nominal (i.e., 4.875V)				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Fuel Pump Control Module - Driver Over-temperature 1	P064A	This DTC detects if an internal fuel pump driver overtemperature condition exists under normal operating conditions (Tier 1 supplier Continental responsibility)	Module Range of Operation	1. Module is within Acceptable Operation Range (Motorola's responsibility - FSCM is in normal operating range for module voltage versus PWM duty cycle. Linear range from 100% @ 12.5V to 70% @ 18V.)	Ignition OR HS Comm OR Fuel Pump Control AND Ignition Run / Crank	Run or Crank Enabled Enabled 9V<voltage<32V	3 failures out of 15 samples 1 sample/12.5 ms	DTC Type B 2 trips
			AND Fuel pump driver Temp	> 190C	KeFRPD_b_FPOverTempDiagEnbl	TRUE		
Fuel Pump Control Module - Driver Over-temperature 2	P1255	This DTC detects if an internal fuel pump driver overtemperature condition exists under extreme operating conditions (GM's responsibility)	Module Range of Operation	Outside normal range (FSCM is NOT in normal operating range for module voltage versus PWM duty cycle. Linear range from 100% @ 12.5V to 70% @ 18V.)	Ignition OR HS Comm OR Fuel Pump Control AND Ignition Run / Crank	Run or Crank Enabled Enabled 9V<voltage<32V	3 failures out of 15 samples 1 sample/12.5 ms	DTC Type B 2 trips
			AND Fuel pump driver Temp	> 190C	KeFRPD_b_FPOverTempDiagEnbl	TRUE		
Ignition 1 Switch Circuit Low Voltage	P2534	This DTC detects if the Ignition1 Switch circuit is shorted to low or open	Ignition 1 voltage	<= 6 V	Engine	Running	180 failures out of 200 samples 1 sample/25.0 ms	DTC Type A 1 trip

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Fuel Pump Flow Performance (rationality)	P2635	This DTC detects degradation in the performance of the SIDI electronic return-less fuel system	Filtered fuel rail pressure error	<= Low Threshold (function of desired fuel rail pressure and fuel flow rate. 15% of resultant Target Pressure) OR >= High Threshold (function of desired fuel rail pressure and fuel flow rate. 15% of resultant Target Pressure) **(See Supporting Tables tab)**	1. FRP Circuit Low DTC (P018C)	not active	Filtered fuel rail pressure error Time Constant = 12.5 seconds Frequency: Continuous 12.5 ms loop	DTC Type B 2 trips
					2. FRP Circuit High DTC (P018D)	not active		
					3. Fuel Pressure Sensor Performance DTC (P018B)	not active		
					4. FuelPump Circuit Low DTC (P0231)	not active		
					5. FuelPump Circuit High DTC (P0232)	not active		
					6. FuelPump Circuit Open DTC (P023F)	not active		
					7. Reference Voltage DTC (P0641)	not active		
					8. Fuel Pump Control Module Driver Over-temperature DTC's (P064A, P1255)	not active		
					9. Control Module Internal Performance DTC (P0606)	not active		
					10. An ECM fuel control system failure (PPEI $1ED)	has not occurred		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
					11. The Barometric pressure (PPEI $4C1) signal	valid (for absolute fuel pressure sensor)		
					12. Engine run time	>= 30 seconds		
					13. Emissions fuel level (PPEI $3FB) AND Engine Run Time	not low > 30 sec		
					14. Fuel pump control	enabled		
					15. Fuel pump control state	normal		
					16. Battery Voltage	11V<=voltage=<32V		
					17. Fuel flow rate **(See Supporting Tables tab)**	> 0.047 g/s **AND** <= Max allowed fuel flow rate as a function of desired rail pressure & Vbatt (Typical values in the range of 11 to 50 g/s)		
					18. Fuel Pressure Control System	Is not responding to an over-pressurization due to pressure build during DFCO or a decreasing desired pressure command.		
Control Module Communication Bus “A” Off	U0073	Detects that a CAN serial data bus shorted condition has occurred to force the CAN device driver to enter a bus-off state	Bus Status	Off	Power mode	Run/Crank	5 failures out of 5 samples (5 seconds)	DTC Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Lost Communication With ECM/PCM "A"	U0100	Detects that CAN serial data communication has been lost with the ECM	Message $0C9	Undetected	1. Power mode 2. Ignition Run/Crank Voltage 3. U0073	Run/Crank 11V<=voltage=<32V not active	12 failures out of 12 samples (12 seconds)	DTC Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Fuel Rail Pressure (FRP) Sensor Performance (rationality)	P018B	This DTC detects a fuel pressure sensor response stuck within the normal operating range	Absolute value of fuel pressure change as sensed during intrusive test.	<= 30 kPa	1. FRP Circuit Low DTC (P018C) 2. FRP Circuit High DTC (P018D) 3. FuelPump Circuit Low DTC (P0231) 4. FuelPump Circuit High DTC (P0232) 5. FuelPump Circuit Open DTC (P023F) 6. Reference Voltage DTC (P0641)	not active not active not active not active not active	Frequency: Continuous; 12.5 ms loop. 60 seconds between intrusive tests that pass Intrusive test requested if fuel system is clamped for >= 5 seconds or fuel pressure error variance <= typically (0.3 to 0.6) (calculated over a 2.5sec period); otherwise report pass Duration of intrusive test is fueling related (5 to 12 seconds). Intrusive test is run when fuel flow is below Max allowed fuel flow rate (Typical values in the range of 11 to 50 g/s)	DTC Type A 1 trip

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
					7. Fuel Pump Control Module Driver Over-temperature DTC (P064A) 8. Control Module Internal Performance DTC (P0606) 9. Engine run time 10. Emissions fuel level (PPEI $3FB) 11. Fuel pump control 12. Fuel pump control state 13. Engine fuel flow 14. ECM fuel control system failure (PPEI $1ED)	not active not active >=5 seconds not low enabled normal or FRP Rationality control > 0.047 g/s failure has not occurred		
Fuel Rail Pressure (FRP) Sensor Circuit Low Voltage	P018C	This DTC detects if the fuel pressure sensor circuit is shorted low	FRP sensor voltage	< 0.14 V	Ignition	Run or Crank	72 failures out of 80 samples 1 sample/12.5 ms	DTC Type A 1 trip
Fuel Rail Pressure (FRP) Sensor Circuit High Voltage	P018D	This DTC detects if the fuel pressure sensor circuit is shorted high	FRP sensor voltage	> 4.86 V	Ignition	Run or Crank	72 failures out of 80 samples 1 sample/12.5 ms	DTC Type A 1 trip
Fuel Pump Control Circuit Low Voltage	P0231	This DTC detects if the fuel pump control circuit is shorted to low	Fuel Pump Current	> 14.48A	Ignition OR HS Comm OR Fuel Pump Control	Run or Crank enabled enabled	72 test failures in 80 test samples if Fuel Pump Current <100A 1 sample/12.5 ms	DTC Type A 1 trip

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
					AND Ignition Run/Crank Voltage	 9V < voltage < 32V		
Fuel Pump Control Circuit High Voltage	P0232	This DTC detects if the fuel pump control circuit is shorted to high	Voltage measured at fuel pump circuit	> 3.86 V	Commanded fuel pump output Fuel pump control enable Time that above conditions are met	0% duty cycle (off) False >=4.0 seconds	36 test failures in 40 test samples; 1 sample/12.5ms Pass/Fail determination made only once per trip	DTC Type A 1 trip
Fuel Pump Control Circuit (Open)	P023F	This DTC detects if the fuel pump control circuit is open	Fuel Pump Current AND Fuel Pump Duty Cycle	<=0.5A >20%	 Ignition OR HS Comm OR Fuel Pump Control AND Ignition Run/Crank Voltage	 Run or Crank enabled enabled 9V < voltage < 32V	72 test failures in 80 test samples; 1 sample/12.5ms	DTC Type A 1 trip
Fuel System Control Module Enable Control Circuit	P025A	This DTC detects if there is a fault in the fuel pump control enable circuit	PPEI (PPEI (Powertrain Platform Electrical Interface) Fuel System Request ($1ED)	≠ Fuel Pump Control Module Enable Control Circuit	 Ignition AND PPEI Fuel System Request ($1ED)	 Run or Crank valid	72 failures out of 80 samples 1 sample/12.5 ms	DTC Type A 1 trip

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Control Module Read Only Memory (ROM)	P0601	This DTC will be stored if any software or calibration check sum is incorrect	Calculated Checksum (CRC16)	≠ stored checksum for any of the parts (boot, software, application calibration, system calibration)	Ignition OR HS Comm OR Fuel Pump Control	Run or Crank enabled enabled	1 failure if it occurs during the first ROM test of the ignition cycle, otherwise 5 failures Frequency: Runs continuously in the background	DTC Type A 1 trip
Control Module Not Programmed	P0602	Indicates that the FSCM needs to be programmed	This DTC is set via calibration, when KeMEMD_b_NoStartCal	= TRUE	Ignition OR HS Comm OR Fuel Pump Control	Run or Crank enabled enabled	Runs once at power up	DTC Type A 1 trip
Control Module Long Term Memory Reset	P0603	Non-volatile memory checksum error at controller power-up	Checksum at power-up	≠ checksum at power-down	Ignition OR HS Comm OR Fuel Pump Control	Run or Crank enabled enabled	1 failure Frequency: Once at power-up	DTC Type A 1 trip

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Control Module Random Access Memory (RAM)	P0604	Indicates that control module is unable to correctly write and read data to and from RAM	Data read	≠ Data written	Ignition OR HS Comm OR Fuel Pump Control	Run or Crank enabled enabled	1 failure if it occurs during the first RAM test of the ignition cycle, otherwise 5 failures Frequency: Runs continuously in the background.	DTC Type A 1 trip
Control Module Internal Performance 1. Main Processor Configuration Register Test 2. Processor clock test	P0606	This DTC indicates the FSCM has detected an internal processor fault or external watchdog fault (PID 2032 discriminates the source of the fault)	1. For all I/O configuration register faults: •Register contents 2. For Processor Clock Fault: •EE latch flag in EEPROM. OR • RAM latch flag.	Incorrect value. 0x5A5A 0x5A	Ignition OR HS Comm OR Fuel Pump Control 1. For all I/O configuration register faults: •KeMEMD_b_ProcFltCfgRegEnbl 2. For Processor Clock Fault: •KeMEMD_b_ProcFltCLKDiagEnbl	Run or Crank enabled enabled TRUE TRUE	Tests 1 and 2 1 failure Frequency: Continuously (12.5ms) Test 3 3 failures out of 15 samples 1 sample/12.5 ms	DTC Type A 1 trip

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
3. External watchdog test			3. For External Watchdog Fault: • Software control of fuel pump driver	Control Lost	3. For External Watchdog Fault: •KeFRPD_b_FPExtWDogDiagEnbl 3. For External Watchdog Fault: •Control Module ROM(P0601) 3. For External Watchdog Fault: •Control Module RAM(P0604)	TRUE not active not active		
Control Module Long Term Memory (EEPROM) Performance	P062F	Indicates that the NVM Error flag has not been cleared	Last EEPROM write	Did not complete	Ignition OR HS Comm OR Fuel Pump Control	Run or Crank enabled enabled	1 test failure Once on controller power-up	DTC Type A 1 trip
5Volt Reference Circuit (Short High/Low/Out of Range)	P0641	Detects continuous short or out of range on the #1 5V sensor reference circuit	Reference voltage AND Output OR Reference voltage AND Output OR Reference voltage AND Output	>= 0.5V inactive >= 5.5V active <= 4.5V active	Ignition	Run or Crank	15 failures out of 20 samples 1 sample/12.5 ms	DTC Type A 1 trip

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
			OR Reference voltage	> 105% nominal (i.e., 5.25V) OR <95% nominal (i.e., 4.75V)				
Fuel Pump Control Module - Driver Over-temperature 1	P064A	This DTC detects if an internal fuel pump driver overtemperature condition exists under normal operating conditions	Pump Driver Temp	> 150C	Ignition OR HS Comm OR Fuel Pump Control KeFRPD_b_FPOverTempDiagEnbl Ignition Run/Crank	Run or Crank enabled enabled TRUE 9V<voltage<32V	3 failures out of 15 samples 1 sample/12.5 ms	DTC Type B 2 trips
Ignition 1 Switch Circuit Low Voltage	P2534	This DTC detects if the Ignition1 Switch circuit is shorted to low or open	Ignition 1 voltage	<= 6 V	Engine	Running	180 failures out of 200 samples 1 sample/25.0 ms	DTC Type A 1 trip

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Fuel Pump Flow Performance (rationality)	P2635	This DTC detects degradation in the performance of the SIDI electronic return-less fuel system	Filtered fuel rail pressure error	<= Low Threshold (function of desired fuel rail pressure and fuel flow rate. 15% of resultant Target Pressure) OR >= High Threshold (function of desired fuel rail pressure and fuel flow rate. 15% of resultant Target Pressure) **(See Supporting Tables tab)**	1. FRP Circuit Low DTC (P018C)	not active	Filtered fuel rail pressure error Time Constant = 12.5 seconds Frequency: Continuous 12.5 ms loop	DTC Type B 2 trips
					2. FRP Circuit High DTC (P018D)	not active .		
					3. Fuel Rail Pressure Sensor Performance DTC (P018B)	not active		
					4. FuelPump Circuit Low DTC (P0231)	not active		
					5. FuelPump Circuit High DTC (P0232)	not active		
					6. FuelPump Circuit Open DTC (P023F)	not active		
					7. Reference Voltage DTC (P0641)	not active		
					8. Fuel Pump Control Module Driver Over-temperature DTC's (P064A)	not active		
					9. Control Module Internal Performance DTC (P0606)	not active		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
					10. An ECM fuel control system failure (PPEI $1ED)	has not occurred		
					11. The Barometric pressure (PPEI $4C1) signal	valid (for absolute fuel pressure sensor)		
					12. Engine run time	>= 30 seconds		
					13. Emissions fuel level (PPEI $3FB)	not low		
					14. Fuel pump control	enabled		
					15. Fuel pump control state	normal		
					16. Battery Voltage	11V<=voltage=<32V		
					17. Fuel flow rate **(See Supporting Tables tab)**	> 0.047 g/s **AND** <= Max allowed fuel flow rate as a function of desired rail pressure & Vbatt (Typical values in the range of 11 to 50 g/s)		
					18. Fuel Pressure Control System	Is not responding to an over-pressurization due to pressure build during DFCO or a decreasing desired pressure command.		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Control Module Communication Bus “A” Off	U0073	Detects that a CAN serial data bus shorted condition has occurred to force the CAN device driver to enter a bus-off state	Bus Status	Off	Power mode	Run/Crank	5 failures out of 5 samples (5 seconds)	DTC Type B 2 trips
Lost Communication With ECM/PCM “A”	U0100	Detects that CAN serial data communication has been lost with the ECM	Message $0C9	Undetected	1. Power mode 2. Ignition Run/Crank Voltage 3. U0073	Run/Crank 11V<voltage<32V not active	12 failures out of 12 samples (12 seconds)	DTC Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Fuel Rail Pressure (FRP) Sensor Performance (Rationality)	P0191	This DTC detects if the fuel pressure sensor is stuck within the normal operating range	Absolute value of change in fuel pressure as sensed during intrusive test.	<= 30 kPa	1. FRP Circuit Low DTC (P0192) 2. FRP Circuit High DTC (P0193) 3. Fuel Pump Driver Ignition Circuit DTC (P129D) 4. Fuel Pump Circuit Frequency Out of Range (P129F) 5. Fuel Pump Circuit DC Low DTC (P12A0) 6. Fuel Pump Circuit DC High DTC (P12A1) 7. Fuel Pump Circuit Rationality DTC (P12A2) 8. Fuel Pump Enable Circuit Low DTC (P12A4) 9. Fuel Pump Enable Circuit High DTC (P12A5)	not active not active not active not active not active not active not active not active not active	<u>Frequency:</u> Continuous; 12.5 ms loop. 60 seconds between intrusive tests that pass Intrusive test requested if fuel system is clamped for >= 5 seconds or fuel pressure error variance <= typically (0.3 to 0.6) (calculated over a 2.5sec period); otherwise report pass Duration of intrusive test is fueling related (5 to 12 seconds). Intrusive test is run when fuel flow is < 21.445 g/s	DTC Type A 1 trip

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
					10. Fuel Pump Enable Circuit Rationality DTC (P12A6) 11. Fuel Pump Output Circuit DTC (P12A7) 12. Reference Voltage DTC (P0641) 13. Reference Voltage DTC (P06A6) 14. Fuel Pump Control Module Driver Over-temperature DTC's (P1255) 15. Control Module Internal Performance DTC (P0606) 16. Engine run time 17. Emissions fuel level (PPEI $3FB) 18. Fuel pump control 19. Fuel pump control state 20. Engine fuel flow 21. ECM fuel control system failure (PPEI $1ED)	not active not active not active not active not active not active >=5 seconds not low enabled normal or FRP Rationality control > 0.047 g/s failure has not occurred		
Fuel Rail Pressure (FRP) Sensor Circuit Low Voltage	P0192	This DTC detects if the fuel pressure sensor circuit is shorted to low	FRP sensor voltage	< 0.1 V	Ignition	Run or Crank	72 failures out of 80 samples 1 sample/12.5 ms	DTC Type A 1 trip
Fuel Rail Pressure (FRP) Sensor Circuit High Voltage	P0193	This DTC detects if the fuel pressure sensor circuit is shorted to high	FRP sensor voltage	> 4.9 V	Ignition	Run or Crank	72 failures out of 80 samples 1 sample/12.5 ms	DTC Type A 1 trip

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Fuel System Control Module Enable Control Circuit	P025A	This DTC detects if there is a fault in the fuel pump control enable circuit	PPEI (PPEI (Powertrain Platform Electrical Interface) Fuel System Request ($1ED)	≠ Fuel Pump Control Module Enable Control Circuit	Ignition AND PPEI Fuel System Request ($1ED)	Run or Crank valid	72 failures out of 80 samples 1 sample/12.5 ms	DTC Type A 1 trip
Control Module Read Only Memory (ROM)	P0601	This DTC will be stored if any software or calibration check sum is incorrect	Calculated Checksum (CRC16)	≠ stored checksum for any of the parts (boot, software, application calibration, system calibration)	Ignition OR HS Comm OR Fuel Pump Control	Run or Crank enabled enabled	1 failure if it occurs during the first ROM test of the ignition cycle, otherwise 5 failures Frequency: Runs continuously in the background	DTC Type A 1 trip
Control Module Not Programmed	P0602	Indicates that the FSCM needs to be programmed	This DTC is set via calibration, when KeMEMD_b_NoStartCal	TRUE	Ignition OR HS Comm OR Fuel Pump Control	Run or Crank enabled enabled	Runs once at power up	DTC Type A 1 trip
Control Module Long Term Memory Reset	P0603	Non-volatile memory checksum error at controller power-up	Checksum at power-up	≠ checksum at power-down	Ignition OR HS Comm OR Fuel Pump Control	Run or Crank enabled enabled	1 failure Frequency: Once at power-up	DTC Type A 1 trip

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Control Module Random Access Memory (RAM)	P0604	Indicates that control module is unable to correctly write and read data to and from RAM	Data read	≠ Data written	Ignition OR HS Comm OR Fuel Pump Control	Run or Crank enabled enabled	1 failure if it occurs during the first RAM test of the ignition cycle, otherwise 5 failures Frequency: Runs continuously in the background.	DTC Type A 1 trip
Control Module Internal Performance 1. Main Processor Configuration Register Test 2. Processor clock test	P0606	This DTC indicates the FSCM has detected an internal processor fault or external watchdog fault (PID 2032 can tell what causes the fault.)	1. For all I/O configuration register faults: •Register contents 2. For Processor Clock Fault: •EE latch flag in EEPROM. OR • RAM latch flag.	Incorrect value. 0x5A5A 0x5A	Ignition OR HS Comm OR Fuel Pump Control 1. For all I/O configuration register faults: •KeMEMD_b_ProcFltCfgRegEnbl 2. For Processor Clock Fault: •KeMEMD_b_ProcFltCLKDiagEnbl	Run or Crank enabled enabled TRUE TRUE	Tests 1 and 2 1 failure Frequency: Continuously (12.5ms) Test 3 3 failures out of 15 samples 1 sample/12.5 ms	DTC Type A 1 trip

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
3. External watchdog test			3. For External Watchdog Fault: • Software control of fuel pump driver	Control Lost	3. For External Watchdog Fault: •KeFRPD_b_FPExtWDogDiagEnbl 3. For External Watchdog Fault: •Control Module ROM(P0601) 3. For External Watchdog Fault: •Control Module RAM(P0604)	TRUE not active not active		
Control Module Long Term Memory (EEPROM) Performance	P062F	Indicates that the NVM Error flag has not been cleared	Last EEPROM write	Did not complete	Ignition OR HS Comm OR Fuel Pump Control	Run or Crank enabled enabled	1 test failure Once on controller power-up	DTC Type A 1 trip
5 Volt Reference Circuit (Short High/Low)	P0641	Detects a continuous short on the #1 5V sensor reference circuit	Reference voltage AND Output OR Reference voltage AND Output OR Reference voltage AND Output	>= 0.5V . inactive >= 5.5V active <= 4.5V active	Ignition	Run or Crank	15 failures out of 20 samples 1 sample/12.5 ms	DTC Type A 1 trip
5 Volt Reference Circuit (Out of Range)	P06A6	Detects that the #1 5 V sensor reference circuit is out of range	Reference voltage	> 102.5% nominal (i.e. 5.125V) OR	Ignition	Run or Crank	72 failures out of 80 samples 1 sample/12.5 ms	DTC Type A 1 trip

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
				< 97.5% nominal (i.e. 4.875V)				
Fuel Pump Control Module - Driver Over-temperature 2	P1255	This DTC detects if an fuel pump driver overtemperature condition exists under extreme operating conditions	Module Range of Operation **AND** Driver Temp	Outside normal range (FSCM is NOT in normal operating range for module voltage versus PWM duty cycle.) > 130C	Ignition OR HS Comm OR Fuel Pump Control KeFRPD_b_FPOverTempDiagEnbl Ignition Run/Crank	Run or Crank enabled enabled TRUE 9V<voltage<18V	3 failures out of 15 samples 1 sample/12.5 ms	DTC Type B 2 trips
Fuel Pump Driver Control Module Ignition 1 Switch Circuit Low Voltage	P129D	This DTC detects if the Ignition1 Switch circuit is shorted to low or open	Ignition 1 voltage	<= 6 V	Engine	Running	72 failures out of 80 samples 1 sample/12.5 ms	DTC Type A 1 trip
Fuel Pump Driver Control Module PWM Control Circuit Frequency	P129F	This DTC detects if there is a fault in the fuel pump control PWM circuit frequency	PWM Frequency	<384 Hz or >416Hz	Ignition	Run or Crank	72 failures out of 80 samples 1 sample/12.5 ms	DTC Type A 1 trip
Fuel Pump Driver Control Module PWM Control Circuit Duty Cycle Low	P12A0	This DTC detects if there is a Low Duty Cycle fault in the fuel pump control PWM circuit	PWM Duty Cycle	< 5%	Ignition	Run or Crank	72 failures out of 80 samples 1 sample/12.5 ms	DTC Type A 1 trip

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Fuel Pump Driver Control Module PWM Control Circuit Duty Cycle High	P12A1	This DTC detects if there is a High Duty Cycle fault in the fuel pump control PWM circuit	PWM Duty Cycle	>95%	Ignition	Run or Crank	72 failures out of 80 samples 1 sample/12.5 ms	DTC Type A 1 trip
Fuel Pump Driver Control Module PWM Control Circuit Rationality	P12A2	This DTC detects if there is a rationality fault in the fuel pump control PWM circuit	Absolute Value of (Duty Cycle Feedback - Duty Cycle Commanded) Absolute Value of (Frequency Feedback - Frequency Commanded)	> 5% > 20 Hz	Ignition	Run or Crank	180 failures out of 200 samples; 1 sample/12.5ms	DTC Type B 2 trips
Fuel Pump Driver Control Module Enable Control Circuit	P12A4	This DTC detects if there is a Low fault in the fuel pump control enable circuit	Enable Circuit Voltage	< 2.0 Volts	Ignition	Run or Crank	72 failures out of 80 samples 1 sample/12.5 ms	DTC Type A 1 trip
Fuel Pump Driver Control Module Enable Control Circuit	P12A5	This DTC detects if there is a high fault in the fuel pump control enable circuit	Enable Circuit Voltage	> 2.0 Volts	Ignition	Run or Crank	72 failures out of 80 samples 1 sample/12.5 ms	DTC Type A 1 trip
Fuel Pump Driver Control Module Enable Control Circuit	P12A6	This DTC detects if there is a rationality fault in the fuel pump control enable circuit	Enable Circuit Feedback	Enable Feedback <> Enable Command	Ignition	Run or Crank	180 failures out of 200 samples; 1 sample/12.5ms	DTC Type A 1 trip

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Fuel Pump Pump Driver Phase U-V-W Circuit	P12A7	This DTC detects if there is a fault in the fuel pump Output Phase Circuit	Phase 1, 2, or 3 Output	Transition through 1 to 4 volt region	Ignition	Run or Crank	Diagnostic runs continuously in the background	DTC Type A 1 trip
Fuel Pump Driver Control Module Read Only Memory (ROM)	P164B	This DTC will be stored if any software or calibration check sum is incorrect	Calculated Checksum	≠ stored checksum for firmware	Ignition	Run or Crank	Diagnostic runs continuously in the background Diagnostic reports a fault if 1 failure occurs on the first pass.	DTC Type A 1 trip
Fuel Pump Driver Control Module Random Access Memory (RAM)	P164C	Indicates that control module is unable to correctly write and read data to and from RAM	Data read	≠ Data written	Ignition	Run or Crank	Diagnostic runs continuously in the background Diagnostic reports a fault if 1 failure occurs on the first pass.	DTC Type A 1 trip
Ignition 1 Switch Circuit Low Voltage	P2534	This DTC detects if the Ignition1 Switch circuit is shorted to low or open	Ignition 1 voltage	<= 6 V	Engine	Running	144 failures out of 160 samples 1 sample/12.5 ms	DTC Type A 1 trip

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Fuel Pump Flow Performance	P2635	This DTC detects degradation in the performance of the PFI electronic return-less fuel system	Filtered fuel rail pressure error	<= Low Threshold (function of desired fuel rail pressure and fuel flow rate. 15% of resultant Target Pressure in the range of -10.4 to -167.7 kPa.) . **OR** <= High Threshold (function of desired fuel rail pressure and fuel flow rate. 15% of resultant Target Pressure in the range of +11.7 to +144.3 kPa.) .	1. FRP Circuit Low DTC (P0192) 2. FRP Circuit High DTC (P0193) 3. Fuel Rail Pressure Sensor Performance DTC (P0191) 4. Fuel Pump Driver Ignition Circuit DTC (P129D) 5. Fuel Pump Circuit Frequency Out of Range (P129F) 6. Fuel Pump Circuit DC Low DTC (P12A0) 7. Fuel Pump Circuit DC High DTC (P12A1) 8. Fuel Pump Circuit Rationality DTC (P12A2) 9. Fuel Pump Enable Circuit Low DTC (P12A4) 10. Fuel Pump Enable Circuit High DTC (P12A5) 11. Fuel Pump Enable Circuit Rationality DTC (P12A6) 12. Fuel Pump Output Circuit DTC (P12A7) 13. Reference Voltage DTC (P0641)	not active not active not active not active not active not active not active not active not active not active not active not active not active	Filtered fuel rail pressure error Time Constant = 12.5 seconds Frequency: Continuous 100 ms loop	DTC Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
					14. Reference Voltage DTC (P06A6)	not active		
					15. Fuel Pump Control Module Driver Over-temperature DTC's (P1255)	not active		
					16. Control Module Internal Performance DTC (P0606)	not active		
					17. An ECM fuel control system failure (PPEI $1ED)	has not occurred		
					18. The Barometric pressure (PPEI $4C1) signal	valid (for absolute fuel pressure sensor)		
					19. Engine run time	>= 30 seconds		
					20. Emissions fuel level (PPEI $3FB)	not low		
					21. Fuel pump control	enabled		
					22. Fuel pump control state	normal		
					23. Battery Voltage	11V<=voltage=<18V		
					24. Fuel flow rate	> 0.047 g/s **AND** <= Max allowed fuel flow rate as a function of desired rail pressure & Vbatt (Typical values in the range of 51 to 58 g/s)		
					25. Fuel Pressure Control System	Is not responding to an over-pressurization due to pressure build during DFCO or a decreasing desired pressure command.		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Control Module Communication Bus "A" Off	U0073	Detects that a CAN serial data bus shorted condition has occurred to force the CAN device driver to enter a bus-off state	Bus Status	Off	1. Power mode	Run/Crank	5 failures out of 5 samples (5 seconds)	DTC Type B 2 trips
Lost Communication With ECM/PCM "A"	U0100	Detects that CAN serial data communication has been lost with the ECM	Message $0C9	Undetected	1. Power mode 2. Ignition Run/Crank Voltage 3. U0073	Run/Crank (11 – 18 V) not active	12 failures out of 12 samples (12 seconds)	DTC Type B 2 trips
Control Module Communication Bus "A" Off	U1802	Detects that a CAN serial data bus shorted condition has occurred to force the CAN device driver to enter a bus-off state	Bus Status	Off	1. Power mode	Run/Crank	5 test failures in 5 samples (5 seconds)	DTC Type B 2 trips

P2635 Fuel Pump Performance Maximum Fuel Flow map (grams / second)

X-axis= Desired Fuel Pressure (kiloPascals)
Y-axis= Battery voltage (volts)

	200	250	300	350	400	450	500	550	600
4.5	42.70313	42.70313	42.70313	42.70313	42.70313	41.52344	37.66406	33.89063	30.19531
6	42.70313	42.70313	42.70313	42.70313	42.70313	41.52344	37.66406	33.89063	30.19531
7.5	42.70313	42.70313	42.70313	42.70313	42.70313	41.52344	37.66406	33.89063	30.19531
9	42.70313	42.70313	42.70313	42.70313	42.70313	41.52344	37.66406	33.89063	30.19531
10.5	42.70313	42.70313	42.70313	42.70313	42.70313	41.52344	37.66406	33.89063	30.19531
12	42.70313	42.70313	42.70313	42.70313	42.70313	42.70313	42.70313	42.70313	42.26563
13.5	42.70313	42.70313	42.70313	42.70313	42.70313	42.70313	42.70313	42.70313	42.70313
15	42.70313	42.70313	42.70313	42.70313	42.70313	42.70313	42.70313	42.70313	42.70313
16.5	42.70313	42.70313	42.70313	42.70313	42.70313	42.70313	42.70313	42.70313	42.70313
18	42.70313	42.70313	42.70313	42.70313	42.70313	42.70313	42.70313	42.70313	42.70313
19.5	42.70313	42.70313	42.70313	42.70313	42.70313	42.70313	42.70313	42.70313	42.70313
21	42.70313	42.70313	42.70313	42.70313	42.70313	42.70313	42.70313	42.70313	42.70313
22.5	42.70313	42.70313	42.70313	42.70313	42.70313	42.70313	42.70313	42.70313	42.70313
24	42.70313	42.70313	42.70313	42.70313	42.70313	42.70313	42.70313	42.70313	42.70313
25.5	42.70313	42.70313	42.70313	42.70313	42.70313	42.70313	42.70313	42.70313	42.70313
27	42.70313	42.70313	42.70313	42.70313	42.70313	42.70313	42.70313	42.70313	42.70313
28.5	42.70313	42.70313	42.70313	42.70313	42.70313	42.70313	42.70313	42.70313	42.70313

P2635 Fuel Injector curve (grams / second)

X-axis= Fuel Pressure (kiloPascals)

128	148	168	188	208	228	248	268	288	308	328	348	368
3.550049	3.784668	4.019043	4.253662	4.488281	4.7229	4.939941	5.130859	5.321533	5.512695	5.693604	5.860352	6.026855

388	408	428	448	468	488	508	528	548	568	588	608	628
6.193848	6.355957	6.51001	6.660645	6.807373	6.944824	7.070801	7.197266	7.323242	7.449219	7.575439	7.70166	7.827637

648	668	688	708	728	748	768
7.953857	7.999878	7.999878	7.999878	7.999878	7.999878	7.999878

P2635 **Maximum Engine Intake Boost curve (kiloPascals)**

X-axis= barometric pressure (kiloPascals)

40	50	60	70	80	90	100	110	120
0	0	0	0	0	0	0	0	0

P2635 **Minimum Fuel Injector Pulse Width curve (seconds)**

X-axis= engine speed (revolutions / minute)

0	512	1024	1536	2048	2560	3072	3584	4096	4608	5120	5632	6144
0.632813	0.632813	0.632813	0.632813	0.632813	0.632813	0.632813	0.632813	0.632813	0.632813	0.632813	0.632813	0.632813

6656	7168	6656	7168	7680	8192
0.632813	0.632813	0.632813	0.632813	0.632813	0.632813

P2635 Fuel Pump Performance Maximum Fuel Flow map (grams / s)

X-axis= Desired Fuel Pressure (kiloPascals)
Y-axis= Battery voltage (volts)

	200	250	300	350	400	450	500	550	600
4.5	42.70313	42.70313	42.70313	42.15625	39.57813	37.07813	34.65625	32.29688	30.01563
6	42.70313	42.70313	42.70313	42.15625	39.57813	37.07813	34.65625	32.29688	30.01563
7.5	42.70313	42.70313	42.70313	42.15625	39.57813	37.07813	34.65625	32.29688	30.01563
9	42.70313	42.70313	42.70313	42.15625	39.57813	37.07813	34.65625	32.29688	30.01563
10.5	42.70313	42.70313	42.70313	42.15625	39.57813	37.07813	34.65625	32.29688	30.01563
12	42.70313	42.70313	42.70313	42.70313	42.70313	42.70313	42.70313	41.45313	39.03906
13.5	42.70313	42.70313	42.70313	42.70313	42.70313	42.70313	42.70313	42.70313	42.70313
15	42.70313	42.70313	42.70313	42.70313	42.70313	42.70313	42.70313	42.70313	42.70313
16.5	42.70313	42.70313	42.70313	42.70313	42.70313	42.70313	42.70313	42.70313	42.70313
18	42.70313	42.70313	42.70313	42.70313	42.70313	42.70313	42.70313	42.70313	42.70313
19.5	42.70313	42.70313	42.70313	42.70313	42.70313	42.70313	42.70313	42.70313	42.70313
21	42.70313	42.70313	42.70313	42.70313	42.70313	42.70313	42.70313	42.70313	42.70313
22.5	42.70313	42.70313	42.70313	42.70313	42.70313	42.70313	42.70313	42.70313	42.70313
24	42.70313	42.70313	42.70313	42.70313	42.70313	42.70313	42.70313	42.70313	42.70313
25.5	42.70313	42.70313	42.70313	42.70313	42.70313	42.70313	42.70313	42.70313	42.70313
27	42.70313	42.70313	42.70313	42.70313	42.70313	42.70313	42.70313	42.70313	42.70313
28.5	42.70313	42.70313	42.70313	42.70313	42.70313	42.70313	42.70313	42.70313	42.70313

P2635 Fuel Pump Performance Filtered Pressure Error Fault Threshold High map (kiloPascals)

X-axis= Target Fuel Pressure (kiloPascals)
Y-axis= Fuel Flow (grams / s)

	200	250	300	350	400	450	500	550	600
0	55.5	69.375	83.25	97.125	111	124.875	138.75	152.625	166.5
1.5	55.5	69.375	83.25	97.125	111	124.875	138.75	152.625	166.5

3	55.5	69.375	83.25	97.125	111	124.875	138.75	152.625	166.5
4.5	55.5	69.375	83.25	97.125	111	124.875	138.75	152.625	166.5
6	55.5	69.375	83.25	97.125	111	124.875	138.75	152.625	166.5
7.5	55.5	69.375	83.25	97.125	111	124.875	138.75	152.625	166.5
9	55.5	69.375	83.25	97.125	111	124.875	138.75	152.625	166.5
10.5	55.5	69.375	83.25	97.125	111	124.875	138.75	152.625	166.5
12	55.5	69.375	83.25	97.125	111	124.875	138.75	152.625	166.5
13.5	55.5	69.375	83.25	97.125	111	124.875	138.75	152.625	166.5
15	55.5	69.375	83.25	97.125	111	124.875	138.75	152.625	166.5
16.5	55.5	69.375	83.25	97.125	111	124.875	138.75	152.625	166.5
18	55.5	69.375	83.25	97.125	111	124.875	138.75	152.625	166.5
19.5	55.5	69.375	83.25	97.125	111	124.875	138.75	152.625	166.5
21	55.5	69.375	83.25	97.125	111	124.875	138.75	152.625	166.5
22.5	55.5	69.375	83.25	97.125	111	124.875	138.75	152.625	166.5
24	55.5	69.375	83.25	97.125	111	124.875	138.75	152.625	166.5
25.5	55.5	69.375	83.25	97.125	111	124.875	138.75	152.625	166.5
27	55.5	69.375	83.25	97.125	111	124.875	138.75	152.625	166.5
28.5	43.9375	69.375	83.25	97.125	111	124.875	138.75	152.625	166.5
30	31.9375	69.375	83.25	97.125	111	124.875	138.75	152.625	166.5
31.5	19.5	54.92188	83.25	97.125	111	124.875	138.75	152.625	166.5
33	19.5	39.92188	83.25	97.125	111	124.875	138.75	152.625	166.5
34.5	19.5	24.375	65.90625	97.125	111	124.875	138.75	152.625	166.5
36	19.5	24.375	47.89063	97.125	111	124.875	138.75	152.625	166.5
37.5	19.5	24.375	29.25	76.90625	111	124.875	138.75	152.625	166.5
39	19.5	24.375	29.25	55.875	75.45313	111.1875	149.3281	175.3125	191.25
40.5	19.5	24.375	29.25	34.125	39.89063	97.5	159.8906	198	216
42	19.5	24.375	29.25	34.125	39.89063	97.5	159.8906	198	216
43.5	19.5	24.375	29.25	34.125	39.89063	97.5	159.8906	198	216
45	19.5	24.375	29.25	34.125	39.89063	97.5	159.8906	198	216
46.5	19.5	24.375	29.25	34.125	39.89063	97.5	159.8906	198	216
48	19.5	24.375	29.25	34.125	39.89063	97.5	159.8906	198	216

P2635 Fuel Pump Performance Filtered Pressure Error Fault RePass Threshold High map (kiloPascals)

X-axis= Target Fuel Pressure (kiloPascals)
Y-axis= Fuel Flow (grams / s)

	200	250	300	350	400	450	500	550	600
0	47.57813	59.46875	71.375	83.26563	95.15625	107.0625	118.9531	130.8438	142.7344
1.5	47.57813	59.46875	71.375	83.26563	95.15625	107.0625	118.9531	130.8438	142.7344
3	47.57813	59.46875	71.375	83.26563	95.15625	107.0625	118.9531	130.8438	142.7344
4.5	47.57813	59.46875	71.375	83.26563	95.15625	107.0625	118.9531	130.8438	142.7344
6	47.57813	59.46875	71.375	83.26563	95.15625	107.0625	118.9531	130.8438	142.7344
7.5	47.57813	59.46875	71.375	83.26563	95.15625	107.0625	118.9531	130.8438	142.7344
9	47.57813	59.46875	71.375	83.26563	95.15625	107.0625	118.9531	130.8438	142.7344
10.5	47.57813	59.46875	71.375	83.26563	95.15625	107.0625	118.9531	130.8438	142.7344
12	47.57813	59.46875	71.375	83.26563	95.15625	107.0625	118.9531	130.8438	142.7344
13.5	47.57813	59.46875	71.375	83.26563	95.15625	107.0625	118.9531	130.8438	142.7344
15	47.57813	59.46875	71.375	83.26563	95.15625	107.0625	118.9531	130.8438	142.7344
16.5	47.57813	59.46875	71.375	83.26563	95.15625	107.0625	118.9531	130.8438	142.7344
18	47.57813	59.46875	71.375	83.26563	95.15625	107.0625	118.9531	130.8438	142.7344
19.5	47.57813	59.46875	71.375	83.26563	95.15625	107.0625	118.9531	130.8438	142.7344
21	47.57813	59.46875	71.375	83.26563	95.15625	107.0625	118.9531	130.8438	142.7344
22.5	47.57813	59.46875	71.375	83.26563	95.15625	107.0625	118.9531	130.8438	142.7344
24	47.57813	59.46875	71.375	83.26563	95.15625	107.0625	118.9531	130.8438	142.7344
25.5	47.57813	59.46875	71.375	83.26563	95.15625	107.0625	118.9531	130.8438	142.7344
27	47.57813	59.46875	71.375	83.26563	95.15625	107.0625	118.9531	130.8438	142.7344
28.5	36.01563	59.46875	71.375	83.26563	95.15625	107.0625	118.9531	130.8438	142.7344
30	24.01563	59.46875	71.375	83.26563	95.15625	107.0625	118.9531	130.8438	142.7344
31.5	11.57813	45.03125	71.375	83.26563	95.15625	107.0625	118.9531	130.8438	142.7344
33	11.57813	30.01563	71.375	83.26563	95.15625	107.0625	118.9531	130.8438	142.7344
34.5	11.57813	14.46875	54.03125	83.26563	95.15625	107.0625	118.9531	130.8438	142.7344
36	11.57813	14.46875	36.01563	83.26563	95.15625	107.0625	118.9531	130.8438	142.7344
37.5	11.57813	14.46875	17.375	63.03125	95.15625	107.0625	118.9531	130.8438	142.7344
39	11.57813	14.46875	17.375	42.01563	59.60938	93.375	129.5156	153.5313	167.4844
40.5	11.57813	14.46875	17.375	20.26563	24.04688	79.6875	140.0938	176.2188	192.2344
42	11.57813	14.46875	17.375	20.26563	24.04688	79.6875	140.0938	176.2188	192.2344

43.5	11.57813	14.46875	17.375	20.26563	24.04688	79.6875	140.0938	176.2188	192.2344
45	11.57813	14.46875	17.375	20.26563	24.04688	79.6875	140.0938	176.2188	192.2344
46.5	11.57813	14.46875	17.375	20.26563	24.04688	79.6875	140.0938	176.2188	192.2344
48	11.57813	14.46875	17.375	20.26563	24.04688	79.6875	140.0938	176.2188	192.2344

P2635 Fuel Pump Performance Filtered Pressure Error Fault Threshold Low map (kiloPascals)

X-axis= Target Fuel Pressure (kiloPascals)
Y-axis= Fuel Flow (grams / s)

	200	250	300	350	400	450	500	550	600
0	-34.5625	-34.5625	-34.5625	-31.4688	-28.4063	-28.4063	-28.4063	-28.4063	-28.4063
1.5	-63	-63	-63	-73.5	-84	-84	-84	-84	-84
3	-64.5	-80.625	-96.75	-112.875	-129	-145.125	-161.25	-177.375	-193.5
4.5	-64.5	-80.625	-96.75	-112.875	-129	-145.125	-161.25	-177.375	-193.5
6	-64.5	-80.625	-96.75	-112.875	-129	-145.125	-161.25	-177.375	-193.5
7.5	-64.5	-80.625	-96.75	-112.875	-129	-145.125	-161.25	-177.375	-193.5
9	-64.5	-80.625	-96.75	-112.875	-129	-145.125	-161.25	-177.375	-193.5
10.5	-64.5	-80.625	-96.75	-112.875	-129	-145.125	-161.25	-177.375	-193.5
12	-64.5	-80.625	-96.75	-112.875	-129	-145.125	-161.25	-177.375	-193.5
13.5	-64.5	-80.625	-96.75	-112.875	-129	-145.125	-161.25	-177.375	-193.5
15	-64.5	-80.625	-96.75	-112.875	-129	-145.125	-161.25	-177.375	-193.5
16.5	-64.5	-80.625	-96.75	-112.875	-129	-145.125	-161.25	-177.375	-193.5
18	-64.5	-80.625	-96.75	-112.875	-129	-145.125	-161.25	-177.375	-193.5
19.5	-64.5	-80.625	-96.75	-112.875	-129	-145.125	-161.25	-177.375	-193.5
21	-64.5	-80.625	-96.75	-112.875	-129	-145.125	-161.25	-177.375	-193.5
22.5	-64.5	-80.625	-96.75	-112.875	-129	-145.125	-161.25	-177.375	-193.5
24	-64.5	-80.625	-96.75	-112.875	-129	-145.125	-161.25	-177.375	-193.5
25.5	-64.5	-80.625	-96.75	-112.875	-129	-145.125	-161.25	-177.375	-193.5
27	-64.5	-80.625	-96.75	-112.875	-129	-145.125	-161.25	-177.375	-193.5
28.5	-64.5	-80.625	-96.75	-112.875	-129	-145.125	-161.25	-177.375	-193.5
30	-64.5	-80.625	-96.75	-112.875	-129	-145.125	-161.25	-177.375	-193.5
31.5	-64.5	-80.625	-96.75	-112.875	-129	-145.125	-161.25	-177.375	-193.5
33	-64.5	-80.625	-96.75	-112.875	-129	-145.125	-161.25	-177.375	-193.5
34.5	-64.5	-80.625	-96.75	-112.875	-129	-145.125	-161.25	-177.375	-193.5

36	-64.5	-80.625	-96.75	-112.875	-129	-145.125	-161.25	-177.375	-193.5
37.5	-64.5	-80.625	-96.75	-112.875	-129	-145.125	-161.25	-177.375	-193.5
39	-64.5	-80.625	-96.75	-112.875	-129	-145.125	-161.25	-177.375	-193.5
40.5	-64.5	-80.625	-96.75	-112.875	-129	-145.125	-161.25	-177.375	-193.5
42	-64.5	-80.625	-96.75	-112.875	-129	-145.125	-161.25	-177.375	-193.5
43.5	-64.5	-80.625	-96.75	-112.875	-129	-145.125	-161.25	-177.375	-193.5
45	-64.5	-80.625	-96.75	-112.875	-129	-145.125	-161.25	-177.375	-193.5
46.5	-64.5	-80.625	-96.75	-112.875	-129	-145.125	-161.25	-177.375	-193.5
48	-64.5	-80.625	-96.75	-112.875	-129	-145.125	-161.25	-177.375	-193.5

P2635 Fuel Pump Performance Filtered Pressure Error Fault RePass Threshold Low map (kiloPascals)

X-axis= Target Fuel Pressure (kiloPascals)
Y-axis= Fuel Flow (grams / s)

	200	250	300	350	400	450	500	550	600
0	-16.875	-16.875	-16.875	-14.4375	-12	-12	-12	-12	-12
1.5	-49.9063	-49.9063	-49.9063	-58.25	-66.5625	-66.5625	-66.5625	-66.5625	-66.5625
3	-55.375	-69.2188	-83.0625	-96.9063	-110.75	-124.594	-138.438	-152.281	-166.125
4.5	-55.375	-69.2188	-83.0625	-96.9063	-110.75	-124.594	-138.438	-152.281	-166.125
6	-55.375	-69.2188	-83.0625	-96.9063	-110.75	-124.594	-138.438	-152.281	-166.125
7.5	-55.375	-69.2188	-83.0625	-96.9063	-110.75	-124.594	-138.438	-152.281	-166.125
9	-55.375	-69.2188	-83.0625	-96.9063	-110.75	-124.594	-138.438	-152.281	-166.125
10.5	-55.375	-69.2188	-83.0625	-96.9063	-110.75	-124.594	-138.438	-152.281	-166.125
12	-55.375	-69.2188	-83.0625	-96.9063	-110.75	-124.594	-138.438	-152.281	-166.125
13.5	-55.375	-69.2188	-83.0625	-96.9063	-110.75	-124.594	-138.438	-152.281	-166.125
15	-55.375	-69.2188	-83.0625	-96.9063	-110.75	-124.594	-138.438	-152.281	-166.125
16.5	-55.375	-69.2188	-83.0625	-96.9063	-110.75	-124.594	-138.438	-152.281	-166.125
18	-55.375	-69.2188	-83.0625	-96.9063	-110.75	-124.594	-138.438	-152.281	-166.125
19.5	-55.375	-69.2188	-83.0625	-96.9063	-110.75	-124.594	-138.438	-152.281	-166.125
21	-55.375	-69.2188	-83.0625	-96.9063	-110.75	-124.594	-138.438	-152.281	-166.125
22.5	-55.375	-69.2188	-83.0625	-96.9063	-110.75	-124.594	-138.438	-152.281	-166.125
24	-55.375	-69.2188	-83.0625	-96.9063	-110.75	-124.594	-138.438	-152.281	-166.125
25.5	-55.375	-69.2188	-83.0625	-96.9063	-110.75	-124.594	-138.438	-152.281	-166.125
27	-55.375	-69.2188	-83.0625	-96.9063	-110.75	-124.594	-138.438	-152.281	-166.125

28.5	-55.375	-69.2188	-83.0625	-96.9063	-110.75	-124.594	-138.438	-152.281	-166.125
30	-55.375	-69.2188	-83.0625	-96.9063	-110.75	-124.594	-138.438	-152.281	-166.125
31.5	-55.375	-69.2188	-83.0625	-96.9063	-110.75	-124.594	-138.438	-152.281	-166.125
33	-55.375	-69.2188	-83.0625	-96.9063	-110.75	-124.594	-138.438	-152.281	-166.125
34.5	-55.375	-69.2188	-83.0625	-96.9063	-110.75	-124.594	-138.438	-152.281	-166.125
36	-55.375	-69.2188	-83.0625	-96.9063	-110.75	-124.594	-138.438	-152.281	-166.125
37.5	-55.375	-69.2188	-83.0625	-96.9063	-110.75	-124.594	-138.438	-152.281	-166.125
39	-55.375	-69.2188	-83.0625	-96.9063	-110.75	-124.594	-138.438	-152.281	-166.125
40.5	-55.375	-69.2188	-83.0625	-96.9063	-110.75	-124.594	-138.438	-152.281	-166.125
42	-55.375	-69.2188	-83.0625	-96.9063	-110.75	-124.594	-138.438	-152.281	-166.125
43.5	-55.375	-69.2188	-83.0625	-96.9063	-110.75	-124.594	-138.438	-152.281	-166.125
45	-55.375	-69.2188	-83.0625	-96.9063	-110.75	-124.594	-138.438	-152.281	-166.125
46.5	-55.375	-69.2188	-83.0625	-96.9063	-110.75	-124.594	-138.438	-152.281	-166.125
48	-55.375	-69.2188	-83.0625	-96.9063	-110.75	-124.594	-138.438	-152.281	-166.125

P2635 Fuel Pump Performance Maximum Fuel Flow map (grams / second)

X-axis= Desired Fuel Pressure (kiloPascals)
Y-axis= Battery voltage (volts)

	200	250	300	350	400	450	500	550	600
4.5	31.21875	31.21875	31.21875	30.10156	25.42188	21.23438	17.47656	14.07031	10.97656
6	31.21875	31.21875	31.21875	30.10156	25.42188	21.23438	17.47656	14.07031	10.97656
7.5	31.21875	31.21875	31.21875	30.10156	25.42188	21.23438	17.47656	14.07031	10.97656
9	31.21875	31.21875	31.21875	30.10156	25.42188	21.23438	17.47656	14.07031	10.97656
10.5	31.21875	31.21875	31.21875	30.10156	25.42188	21.23438	17.47656	14.07031	10.97656
12	31.21875	31.21875	31.21875	31.21875	31.21875	29.36719	25.19531	21.42188	17.99219
13.5	31.21875	31.21875	31.21875	31.21875	31.21875	31.21875	31.21875	28.78906	25.02344
15	31.21875	31.21875	31.21875	31.21875	31.21875	31.21875	31.21875	31.21875	31.21875
16.5	31.21875	31.21875	31.21875	31.21875	31.21875	31.21875	31.21875	31.21875	31.21875
18	31.21875	31.21875	31.21875	31.21875	31.21875	31.21875	31.21875	31.21875	31.21875
19.5	31.21875	31.21875	31.21875	31.21875	31.21875	31.21875	31.21875	31.21875	31.21875
21	31.21875	31.21875	31.21875	31.21875	31.21875	31.21875	31.21875	31.21875	31.21875
22.5	31.21875	31.21875	31.21875	31.21875	31.21875	31.21875	31.21875	31.21875	31.21875
24	31.21875	31.21875	31.21875	31.21875	31.21875	31.21875	31.21875	31.21875	31.21875
25.5	31.21875	31.21875	31.21875	31.21875	31.21875	31.21875	31.21875	31.21875	31.21875
27	31.21875	31.21875	31.21875	31.21875	31.21875	31.21875	31.21875	31.21875	31.21875
28.5	31.21875	31.21875	31.21875	31.21875	31.21875	31.21875	31.21875	31.21875	31.21875

P2635 Fuel Injector curve (grams / second)

X-axis= Fuel Pressure (kiloPascals)

128	148	168	188	208	228	248	268	288	308	328	348	368
2.974365	3.154785	3.325439	3.487793	3.642822	3.791626	3.934692	4.072876	4.206421	4.335815	4.461548	4.583862	4.702881

388	408	428	448	468	488	508	528	548	568	588	608	628
4.819092	4.932495	5.043335	5.151733	5.258057	5.362183	5.464233	5.564575	5.663086	5.759888	5.855103	5.94873	6.041016

648	668	688	708	728	748	768
6.131836	6.221313	6.30957	6.396606	6.482544	6.567261	6.650879

P2635 Maximum Engine Intake Boost curve (kiloPascals)

X-axis= barometric pressure (kiloPascals)

40	50	60	70	80	90	100	110	120
0	0	0	0	0	0	0	0	0

P2635 Minimum Fuel Injector Pulse Width curve (seconds)

X-axis= engine speed (revolutions / minute)

0	512	1024	1536	2048	2560	3072	3584	4096	4608	5120	5632	6144
0	0.796875	0.796875	0.796875	0.796875	0.796875	0.796875	0.796875	0.796875	0.796875	0.796875	0.796875	0.796875

6656	7168	7680	8192
0.796875	0.796875	0.796875	0.796875

P2635 Fuel Pump Performance Maximum Fuel Flow map (grams / second)

X-axis= Desired Fuel Pressure (kiloPascals)
Y-axis= Battery voltage (volts)

	200	250	300	350	400	450	500	550	600
4.5	58	58	58	58	58	58	58	57.24219	51.14844
6	58	58	58	58	58	58	58	57.24219	51.14844
7.5	58	58	58	58	58	58	58	57.24219	51.14844
9	58	58	58	58	58	58	58	57.24219	51.14844
10.5	58	58	58	58	58	58	58	57.24219	51.14844
12	58	58	58	58	58	58	58	58	58
13.5	58	58	58	58	58	58	58	58	58
15	58	58	58	58	58	58	58	58	58
16.5	58	58	58	58	58	58	58	58	58
18	58	58	58	58	58	58	58	58	58
19.5	58	58	58	58	58	58	58	58	58
21	58	58	58	58	58	58	58	58	58
22.5	58	58	58	58	58	58	58	58	58
24	58	58	58	58	58	58	58	58	58
25.5	58	58	58	58	58	58	58	58	58
27	58	58	58	58	58	58	58	58	58
28.5	58	58	58	58	58	58	58	58	58

P2635 Fuel Injector curve (grams / second)

X-axis= Fuel Pressure (kiloPascals)

128	148	168	188	208	228	248	268	288	308	328	348	368
3.7948	4.014771	4.222412	4.419434	4.6073	4.787109	4.959961	5.126343	5.287109	5.442749	5.593628	5.740234	5.882935

388	408	428	448	468	488	508	528	548	568	588	608	628
6.021851	6.157349	6.289795	6.419189	6.545776	6.6698	6.79126	6.910522	7.027588	7.142456	7.255371	7.366455	7.475708

648	668	688	708	728	748	768
7.583252	7.689209	7.793579	7.896362	7.997803	7.999878	7.999878

P2635 Maximum Engine Intake Boost curve (kiloPascals)

X-axis= barometric pressure (kiloPascals)

40	50	60	70	80	90	100	110	120
61.01563	64.58984	68.09375	71.39063	74.35547	76.84766	78.73438	80	80

P2635 Minimum Fuel Injector Pulse Width curve (seconds)

X-axis= engine speed (revolutions / minute)

0	512	1024	1536	2048	2560	3072	3584	4096	4608	5120	5632	6144
0.875	0.875	0.875	0.96875	1.085938	1.234375	1.304688	1.351563	1.351563	1.351563	1.351563	1.351563	1.351563

6656	7168	7680	8192
1.351563	1.351563	1.351563	1.351563

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Brake Pedal	C0161.71	BLS GMLAN signal monitoring	BLS CAN monitoring	BLS GMLAN signal is invalid “Brake Pedal Initial Travel Achieved Validity” = 1	-	Continuous	500ms.	Special Type C NO MIL
Brake Pedal	C0161.00	Signal monitoring	1. Brake light switch permanently high	1. If the BLS-signals is high for 60 s, while the gas pedal is stepped, with vehicle speed > 3 m/s, offset-compensated pVor < 5 bar and no control is active, a fault is set.	-	1. Vehicle speed > 3 m/s and offset-compensated < 5 bar	1. 60 s	Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			2. Bls vs. Pressure sensor plausibility	2. If the Pre-pressure has climbed to pPre > 10 bar after braking and Brake light switch signal is set in software without the actual Brake light switch signal being set and the Pump motor being actuated. A fault is set if the Fault detection time is exceeded. OR If the Pre-pressure pPre > 80 bar and no Brake light switch signal is set. A fault is set if the Fault detection time is exceeded.		2. No Rfp is running no active pressure increase For pPre > 80bar continuous	2. 1 s	NO MIL
LF, RF, LR, RR Wheel Speed Sensor Circuit	C0035.00 C0040.00 C0045.00	Startup WSS test (Wheel speed sensor test) for active WSS	Failure criteria's: • Open circuit in the WSS line • Short circuit to UZ in the WSS line	Wheel speed sensor test starts immediate after power. Especially shorts between WSS lines and shorts to UZ can	-	Once after power up	1 s	Special Type C NO MIL

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
	C0050.00		• Short circuit to GND in the WSS line • Short circuit between WSSlines • Loose contact in WSS connector • Input amplifier in ECU faulty	be detected by switching single WSS channels in sequence. After end of test only the channels with no fault are switched on.				
LF, RF, LR, RR Wheel Speed Sensor Circuit	C0035.00	WSS line monitoring	Failure criteria's:	The sensor circuitry has two current levels I = 7mA and I= 14mA. These current levels are monitored by the input amplifier located on the ECU. If the sensor line is broken, shorted to ground or shorted to supply voltage a faulty current level will be detected.	-	WSS line faults are detected, if the fault condition exists uninterrupted for t >= 200ms.	> 200 ms	Special Type C
	C0040.00		• Open circuit in the WSS line	Mutual shorts between sensor lines are detected after power up in a self test which turns on single channels in sequence.				NO MIL

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
	C0045.00 C0050.00		• Short circuit to UZ in the WSS line • Short circuit to GND in the WSS line • Loose contact in WSS connector • Input amplifier in ECU faulty	Defective sensor channels are turned of to prevent damage due to overheat. Single and multiple faults are detected and the fault locations are given.				
LF, RF, LR, RR Wheel Speed Sensor Circuit	C0035.00 C0040.00	WSS Status monitoring	Failure criteria: • Input amplifier in ECU faulty	Power supply of the wheel speed sensor input amplifier is continuous monitored. WSS low voltage is also continuous monitored (only necessary for active sensors) In case of WSS low voltage WSS line monitoring is not active.	-	Continuous	200 ms	Special Type C NO MIL

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
	C0045.00 C0050.00			Backward current that flows in the WSS input amplifier is also continuous monitored. Filter time is 200 ms. The pulse width (t(high) > 2 ms) of DF11s WSS sensors is continuous monitored but only if vehicle speed is > 0km/h and < 20 km/h. This ensures that the correct active sensor is mounted (DF11i switched with DF11s) and that the sensor is not corrupted. Filter time is 3.5 s.				
LF, RF, LR, RR wheel speed sensor,	C0035.5A	Lambda monitoring	Failure Criteria's:	There are two monitors for static wheel slip:	-	Testing is activated when monitoring conditions are met and no under voltage is detected	main monitor (λ5):	Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
plausibility	C0040.5A		• Permanently bad signal	The main monitor (λ5) needs additional information of the ESP-sensors and is active for a velocity > 20 km/h and no under voltage is detected. The backup monitor (λ6) manages with the wheel speeds alone. If the following fault conditions are fulfilled, the fault counter tLam is increased. After 5s, a suspicious flag is set, so that the corresponding wheel is not longer used for the reference speed calculation and no control			20s for 1 defective WSS	NO MIL

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
	C0045.5A		• Tooth wheel missing, WSS not installed, too great airgap	is active anymore. After that, a fault is detected, if the fault counter exceeds its limit, which depends on the current system state and the driving situation.			40s for 2 defective WSS	
	C0050.5A		• Worn or missing teeth	Main Monitor (λ5):				
			• Noise	If the maximum difference of wheel speeds related to maximum wheel speed exceeds 5% (free rolling wheel speeds transformed to the center of			backup monitor (λ6):	
			• Open circuit, Short circuit to Uconst	rear axle) a wheel specific wheel speed sensor fault is set, if the faulty wheel is always the same, otherwise a generic wheel speed sensor fault is set.			normally 20s	
			• Interference between lines	detection filter time			With a spinning wheel 80s	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
				- the above conditions apply for 20s for 1 defective WSS. - the above conditions apply for 40s for 2 defective WSS. Backup Monitor (λ6): If the velocity is higher than 50 km/h, the deviation between the fastest and the slowest wheel must exceeds 6% related to the fastest wheel. If the velocity is below 50 km/h, the deviation must exceed an absolute value of 3km/h. In case of a detected curve, the threshold is increased with an additional value of 4 km/h. detection filter time : normally 20s With a spinning wheel 80s				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
LF, RF, LR, RR wheel speed sensor, plausibility	C0035.5A C0040.5A C0045.5A C0050.5A	Startup monitoring	Failure Criteria's: • Permanently bad signal • Tooth wheel missing, WSS not installed, too great airgap	Fast monitoring: A test is performed at the time the vehicle is accelerated to 12km/h. a) once after energizing the system b) if the vehicle was stationary for approx. 2s. The test detects a failure if one (or two) wheel are at vmin and the other wheels are above 12 km/h for longer than 1s. The monitoring could detect double faults, but only at the driven axle. A fault could also be set during driving. If one wheel speed gets to vmin at a vehicle velocity vFzRef = v1, a fault is detected if the vehicle has	-	Testing is activated any time the conditions above are met and no under voltage is detected	Usually 20 s	Special Type C NO MIL

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
				accelerated to a velocity of v1+18 km/h and the wheel speed at the faulty wheel remains at vMin. This monitoring could only detect singular faults. Slow monitoring: The slow start-up monitoring does not depend on the driving situation or on the vehicle velocity. Therefore it is always performed. However, failures are detected much slowly. The failure detection time is usually about 20 seconds.				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
				The monitoring function detects a failure if both non driven wheels are under 3 km/h and the driven wheels have a velocity above 12 km/h over a period of time longer than the defined failure detection time. For 2WD systems, in case of double failure at the non driven wheels, this fault will not be set. This monitoring function can detect double failures. -				
LF, RF, LR, RR wheel speed sensor, plausibility	C0035.5A	Missing Teeth Detection	Failure Criteria:	Every time, if a gap in the wheel speed sensor signal occurs cyclically with one wheel rotation, a fault counter is increased by one. If the fault	--	The monitoring is active from 10 km/h to 80km/h and if no ABS-control is active at a front wheel AND a rear wheel.	10 wheel rotations	Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
	C0040.5A C0045.5A C0050.5A		• Worn or missing teeth	counter exceeds its limit of 6, a wheel specific fault is stored in the EEPROM.		-		NO MI
LF, RF, LR, RR wheel speed sensor, plausibility	C0035.5A C0040.5A C0045.5A C0050.5A	LF, RF, LR, RR WSS - Dynamic Monitoring	Failure Criteria's: • Open circuit, Short circuit to Uconst • Loose contact in WSS connector	A monitoring is provided for wss signal dropout. If there is a loss of wss signal and the vehicle speed is greater than 43 kph, a fault counter becomes active.	-	Vehicle speed is greater than 43 kph	60 ms	E Special Type C NO MIL
LF, RF, LR, RR wheel speed sensor, plausibility	C0035.5A C0040.5A C0045.5A C0050.5A	WSS Long-term Signal Disturbance Monitoring	Failure Criteria's: • Permanently bad signal • Worn or missing teeth • Noise • Loose contact in WSS connector	Interference and signal disturbance like: • non-plausible high frequency received, • non-plausible high wheel acceleration, • non-plausible high wheel jerk and • non-plausible deltaT and Edges at low speed.	-	Continuous	10s	Special Type C NO MIL

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			• Interference between lines	In case of Active WSS set of failure is done after 10s. During this time an Einst-bit is set. It monitors up to four faults				
Generic Wheel speed sensor, slipping or wrong toothed	C0245.00	Mismatch speed between wheels	1. ABS continuous control monitoring	1. The monitoring reports a failure if the ABS target slip is exceeded for a time period >= 10 s at one or more wheels. If the driver brakes or the velocity is lower than 50 km/h the detection time is enlarged to 60s.	-	1. Continuous	1. 10 s If the driver brakes or the velocity is lower than 50 km/h the detection time is enlarged to 60s.	Special Type C
			2. Wss suspected failure monitoring	2. A suspected Wss (wheel speed sensor) failure is detected using the following information: • Wss electromagnetic noise detection		2. Continuous	2. 0.5 s in control. 2s or 5 s outside control	NO MIL

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
				• 50/60Hz interference (passive Wss only) • suspected dynamic failure • suspected flat tire • suspected absent signal • suspected permanent slip				
LF Outlet valve LF Inlet valve RF Outlet RF Inlet valve LR Outlet valve LR Inlet valve	C0550.00	Valve monitor	Fault criteria's • Interruption of valve • Short to GND • Short to UBVR • VR (Valve Relay) defect • Fly back diode	The electrical feedback signal does not match the actuation signal for the corresponding valve: Actuation Signal != Feedback Signal Fault filter time is t = 30ms (for current controlled valves and under voltage conditions: t =80ms)	-	Continuous	30 ms	Special Type C NO MIL

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
RR Outlet valve RR Inlet valve Shutoff Valve 1 (HSV1/ASV1) Switching Valve 1 (USV1) Shutoff Valve 2 (HSV2/ASV2) Switching Valve 2 (USV2)			• Short/ Interruption in Actuation/ Feedback lines					
LF Outlet valve LF Inlet valve RF Outlet	C0550.00	Cyclic Valve and Relay Test (CVRT)	Fault criteria's • Interruption of valve • Short to GND	Malfunctions of electrical valve actuation and valve relay are detected. First the valve relay (VR) is switched off. Then the voltage value of UVR (voltage at the valve relay) is measured. A Fault is found if UVR is not within 0.1*UZ < UVR < 0.8*UZ. After that all valves are switched on sequential, UVR and valve feedback is measured.	-	CVRT is executed immediately after power on and then periodic every t = 20s. The Test is canceled if any control/valve actuation takes place or if the Vehicle is in motion and the BLS is on.	Up to 20 s	Special Type C NO MIL

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
RF Inlet valve LR Outlet valve LR Inlet valve RR Outlet valve RR Inlet valve Shutoff Valve 1 (HSV1/ASV1) Switching Valve 1 (USV1) Shutoff Valve 2 (HSV2/ASV2) Switching Valve 2 (USV2)			• Short to UBVR • VR (Valve Relay) defect • Short/ Interruption in Actuation/ Feedback lines	A Fault is found if UVR is not 0.2*UZ < UVR < 0.8*UZ and the Valve Feedback is not act. Valve == FALSE and not act. Valve == TRUE. At least VR is switched on again.				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
LF Outlet valve	C0550.00	Valve and pump motor test (VPMT)	Fault criteria's	The valve and pump motor test detects electrical actuation malfunction of ABS valves. The test actuates all valves in series (to detect short cuts or shunts between the valve lines). Faults are detected by monitoring the valve response signals.	-	The Valve and Pump motor Test is performed once after ignition on if vehicle speed is >= 15 km/h.	Immediately	Special Type C
LF Inlet valve			• Interruption of valve	At the same time the pump motor is actuated. The monitor functions for the pump motor are described separately.				NO MIL
RF Outlet			• Short to GND					
RF Inlet valve			• Short to UBVR					
LR Outlet valve			• Short between valves					
LR Inlet valve			• VR (Valve Relay) defect					
RR Outlet valve			• Fly back diode					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
RR Inlet valve Shutoff Valve 1 (HSV1/ASV1) Switching Valve 1 (USV1) Shutoff Valve 2 (HSV2/ASV2) Switching Valve 2 (USV2)			• Short/ Interruption in Actuation/ Feedback lines					
LF Outlet valve LF Inlet valve RF Outlet RF Inlet valve LR Outlet valve LR Inlet valve RR Outlet valve RR Inlet valve Shutoff Valve 1 (HSV1/ASV1) Switching Valve 1 (USV1) Shutoff Valve 2 (HSV2/ASV2)	C0550.00	ASV/USV Valve Test	Fault criteria's • Interruption of valve • Short to GND • Short to UBVR • Short between valves • VR (Valve Relay) defect • Fly back diode • Short/ Interruption in Actuation/ Feedback lines	The valve and pump motor test detects electrical actuation malfunction of USV and ASV/HSV valves. The test actuates all valves in series (to detect shorts or shunts between the valve lines). Faults are detected by monitoring the valve response signals.	-	The ASVUSV Test is performed once after ignition on at standstill if the BLS is off and at vehicle speed is v >= 15 km/h if the BLS is on.	Immediately	Special Type C NO MIL

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Switching Valve 2 (USV2)								
LF Outlet valve LF Inlet valve RF Outlet RF Inlet valve LR Outlet valve LR Inlet valve RR Outlet valve RR Inlet valve Shutoff Valve 1 (HSV1/ASV1) Switching Valve 1 (USV1) Shutoff Valve 2 (HSV2/ASV2) Switching Valve 2 (USV2)	C0550.00	Valve Drift Test (current controlled valves)	Fault criteria's • Interruption of valve • Short to GND • Short to UBVR • VR (Valve Relay) defect • Fly back diode • Current control	The drift test is executed only once during an ignition Cycle. It detects partly shorted valve coils, almost defective coils or malfunction of the valve driver. The test requires identical temperature of the tested valves. At first the power stages are set in test mode. Then a test pattern with different current is applied to current controlled valves. After that the test mode is also checked with a different test pattern. Then the power stages are reset to normal mode. The valve feedback is evaluated. In case	-	The drift test executes only once during an ignition Cycle The test is triggered if the following conditions are fulfilled: t = 10min after power up or end of control, no BLS is applied, brake pressure is < 10bar, vehicle speed >15km/h, vehicle acceleration > 0.5m/s2 and supply voltage > 11 volts.	10min	Special Type C NO MIL

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Device Power	C0899.00	Supply voltage monitoring	Supply voltage too low	Low-voltage during operation. The monitored supply voltage is filtered and limited to a rise time of 4 volts per second. UZ is monitored for a level of: filtered UZ < 9.3V outside control, or a level of: filtered UZ < 9.2V during control. If the Voltage is lower than this threshold, the DTC will be detected.	-	Continuous Power mode != Crank	20 ms	Special Type C NO MIL
Device Power	C0900.00	Supply voltage monitoring	Supply voltage too high	High-voltage during operation. The monitored supply voltage is filtered and limited to a rise time of 4 volts per second. High voltage problem will be monitored if filtered UZ is > 16.8V.	-	Continuous Power mode != Crank	20 ms	Special Type C NO MIL

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
				If the Voltage is higher than this threshold, a DTC Supply voltage too high will be detected.				
Pump motor	C0110.00	Pump stop monitor	Fault criteria's • Open circuit in UM line • Short circuit to UZ in UM line • Motor relay faulty - sticks • Motor faulty (Open circuit) • Faulty input stage in control unit • Faulty output stage in control unit	Stop monitor detects short to Ubatt, GND loss and FET continuous on. A failure is detected if the voltage UM > 2.0V for a time t >= 1s	-	Stop monitor is active if the pump is off i.e. not actuation and no slowdown.	> 1 s	Special Type C NO MIL
Pump motor	C0110.00	Pump run monitor	Fault criteria's • Open circuit in UBMR line • Short circuit to GND in UM line • Motor relay faulty fails to energize • Faulty input stage in control unit • Faulty output stage in control unit	The monitor detects pump supply faults, FET continuous off, UBMR interruptions (fuse blown) and high resistance of FET and supply line. A failure is detected if the voltage UM < (UZ - 4.0V) for a time t >= 100ms.	-	The monitor is active if the pump is switched on (FET on) Remark: the run monitor is idle during pump PWM actuation (i.e. pump control) in the off-phase	> 100 ms	Special Type C NO MIL

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Pump motor	C0110.00	Pump slowdown monitor	Fault criteria's	After the end of the actuation of the motor relay has, the pump motor is still in motion and is generating a Voltage during it's slowdown. The generated UM is monitored for a certain time on high level. The time depends on the supply voltage and is in the range of t = 30ms to t = 125ms.	-	Monitor is always active in the transition	Normally > 4 s	Special Type C
			• Short circuit to GND in UM line	If the slow down condition isn't met, the pump is activated again (see actuation times below) and the slowdown time is measured again. This is repeated for maximum n = 3 times. If, after the last pump activation, the pump motor slowdown time is still to short, a failure is detected.		"pump on -> pump off".		NO MIL

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			• Mechanical pump fault • Motor faulty (Short circuit or Open circuit) • Faulty output stage in control unit	Actuation times: 1st actuation: 200 ms 2nd actuation: 1000 ms 3rd actuation: 3000 ms				
Valve relay	C0121.00	FSA Test (Fail Save Circuit Test)	Fault criteria's • Open circuit in VR line • Short circuit to UZ in VR line • Short circuit to GND in VR line • Open circuit in UBVR line • Short circuit to UZ in UVR line • Short circuit to GND in UVR line	Watchdog and VR function is tested during startup. FSA test detects if the VR/Enable remains in off position when it is turned on and vice versa. Reason could be short to GND or UZ, interrupted lines or a defective output stage etc.	-	Once during startup.	Immediately	Special Type C NO MIL

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			• Valve relay faulty (Fails to energize; Drops out; Sticks) • Faulty output stage in control unit (Short or open circuit)					
Valve relay	C0121.00	UVR Monitor	Fault criteria's • Open circuit in VR line • Open circuit in UBVR line • Valve relay faulty (Fails to energize; Drops out) • Faulty output stage in control unit (Open circuit)	A Fault is detected if UVR < 0.8 * UZ for a time t > 500ms.	-	Continuous	500 ms	Special Type C NO MIL
Valve relay	C0121.00	CVRT (Cyclic Valve and Relay Test) for VR monitoring	Fault criteria's • Short circuit to UZ in VR line • Short circuit to GND in VR line • Short circuit to UZ in UVR line • Short circuit to GND in UVR line • Valve relay faulty (Sticks)	This test evaluates the function of the VR (vale relay) periodically. The VR is switched off and back on. VR malfunction and UVR short to UZ or UBVR and medium or high ohmic short of UVR (or a valve) to UZ,	-	Continuous	Immediately	Special Type C NO MIL

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			• Faulty output stage in control unit (Short or open circuit)	UBVR or GND are detected.				
Pressure Sensor failure, circuit	C0131.00	Pressure sensor Supply monitoring	Failure criteria: • Sensor supply out of range	OR Sensor Supply Voltage < 4.5V	-	Continuous	60ms	Special Type C NO MIL
Pressure Sensor failure, circuit	C0131.00	Pressure signal line monitoring	Failure criteria:	Pressure Signal Voltage > 3.29V	-	Continuous	100ms	Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			• Pressure signal out of range	OR Pressure Signal Voltage < 0.129V				NO MIL
Pressure Sensor failure, circuit	C0131.00	Pressure signal offset monitoring	Failure criteria: • Pressure sensor offset exceeds range.	The DS-offset value must be in the range of ±15 bar.	-	After DS-initialization, no under voltage, no pumps are running and no BLS-signal is set	0	Special Type C NO MIL
Lateral Accelerometer Circuit	C0186.00	Sensor signal failure	1. Lateral acceleration out of range. 2. Lateral acceleration value during standstill is too large.	1. The AY-signal is limited to an electrical stop of 1.8g. If |Ay| > 1.5g for more than 500ms fault is detected. 2. At standstill the plausible range of |Ay| < 0.7g. If the filtered value of Ay > 0.7g than fault is set.	-	1. Continuous after initialization. 2. Monitoring during standstill	1. > 500 ms 2. > 400 ms	Special Type C NO MIL

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			3. AYS offset out of range.	3. Under normal driving conditions the long time filtered driving direction is straight ahead. The long time filtered Ay-value is called Offset. If the Offset value is higher than 2.25 m/s2 an Ay-fault is determined. Failure detection time depends on the driving distance, vehicle speed and on the amount of failed Ay-signal.		3. Monitoring during straight driving	3. Immediately when offset exceeds limit	
			4. AY gradient monitoring.	4. A signal gradient higher 55g/sec sets a fault. The AY-signal is filtered by a peak-filter.		4. After init and no ABS active	4. Depends on driving condition.	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Lateral Accelerometer Circuit	C0186.5A	Sensor plausibility failure	Lateral acceleration plausibility fault during model validity.	If during stabile vehicle behavior an Ay-Failure larger then 2.5 m/s2 is occurring, the VDC controller will disregard the Ay sensor information so that a false VDC intervention is prevented. Failure is detectable if this condition applies for t > 2s and stable driving conditions are given.	-	After initialization, no under voltage, sensor offsets calculated, VDC not temporary passive, FZREF > 5 m/s recognized forward driving direction and no banking curve	> 2 s	Special Type C NO MIL
Yaw Rate Circuit	C0196.00	Monitoring of Yaw rate status reported in CAN message.	If the CAN received signals indicate internal DRS sensor failure the fault will be set after predefined filtering.	-	-	Continuous.	Typical 100ms	Special Type C NO MIL

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Yaw Rate Circuit	C0196.00	Yaw Rate signal monitoring	1. Yaw rate sensor offset exceeds limit.	1. If offset value is outside the plausible range ± 5.25 °/s at start of driving a DRS-Offset fault is set.	-	1. After initialization, no under voltage, no control active, reference yaw rate less than 55 °/s and no internal LWS-failure.	1. Imediately.	Special Type C
			2. Yaw rate sensitivity monitoring.	2. DRS-sensitivity is estimated by comparison of the reference yaw rate (build by model based sensor monitoring) and measured yaw rate during cornering. The fault criteria is approx. 25% sensitivity failure		2. After initialization, no undervoltage, DRS-Offset calibration finished, no control active, DRS-reference yaw rate less than 55°/s and higher than 5°/s, |Ay| < 7 m/s2 , slip at driven axle less than 3%, recognized forward driving direction, no LWS-failure and no banking curve	2. Depends on driving situation.	NO MIL

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			3. Yaw rate sensor gradient fault.	3. If the yaw rate is greater than 10 – 23 degrees/s / 40ms (depending on driving conditions) a suspected fault is detected after t > 280ms and fault detection occurs after t > 10s.		3. Continuous after initialization. No undervoltage.	3. 800 ms and forward driving is recognized	
Yaw Rate Circuit	C0196.5A	Yaw Rate plausibility monitoring	A failure is set if the offset corrected DRS signal deviates sufficiently from the reference yaw rate and from the yaw rate calculated via a model based upon LWS signal and vehicle speed.	The comparisons include static and dynamic thresholds which vary dependent upon current vehicle maneuver and circumstances.	-	Continuous and no undervoltage.	Depends on driving situation.	Special Type C NO MIL

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Yaw rate sensor	U2142	Lost communication with yaw rate sensor.	1. If a DRS CAN message is not received by EBCM fault is set. The receive CAN message from YAW sensor are: 0x130, 0x131 and 0x140.	1. –	-	1. Continuous.	1. 300ms	Special Type C
			2. If transmitted message was not transmitted a fault is set.	2. –		2. Continuous	2. 600ms	NO MIL
			3. Monitoring includes line short to ground, line short to supply voltage and mutual line short. Line interruptions are detected by CAN message monitor. After detecting a BUSOFF failure the transmission is reinitialized. A BUSOFF fault is established if re-initialization is tried for 15 times in sequence without success.	3. – 15 re-init tries.		4. Continuous	3. 300ms	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			4. Monitoring whether the initialization software has write access to the configuration registers of the CAN-controller module. Faults are detected immediate	4. -		4. During sensor CAN controller initialization.	4. Imediately.	
Steering Position Signal	C0710.00	Steering angle sensor circuit	1. SAS-A and/or SAS-B not changing	1. If one or both of the SAS A and SAS-B signals is not changing (due to short to ground, etc.) while the SAS is being turned, a fault will be set once the SAS-Analog signal has changed by at least 30degrees	-	1. Continuous during driving. However, this fault can only be detected when the SAS-Analog signal is changing – that is when the angle is between +/- 225 degrees.	1. 40ms	Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			2. SAS-A and SAS-B Shorted together	2. If the SAS-A and SAS-B signals are shorted together, they will change state at exactly the same time. Every time this happens a count will be incremented by 1. Every 20ms, this count will be decremented by 1. If the count ever reaches 2, this fault will be set.		2. Continuous while driving	2. 2 counts	NO MIL

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			3. SAS-Index Signal Not Changing	3. If the SAS-Index stays high and the SAS-A and SAS-B signals change by more than 25 degrees, or the SAS-Index stays low and the SAS-A and SAS-B signals change by more than 345 degrees.		3. Continuous while driving	3. 40ms	
			4. SAS-Index Signal Coming Too often monitoring	4. If there are two different SAS-Indexes and the SAS-Analog angle changes by less than 5 degrees, a fault will be set.		4. Continuous while driving	4. 40ms	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			5. SAS-Analog Signal Changing Too Fast monitoring	5. If the SAS-Analog signal rises from its lowest value to its highest value (or vice versa) in less than 250 degrees in one direction (based on the SAS-A and SAS-B signals), a fault will be set.		5. Continuous while driving	5. 40ms	
			6. SAS-A and SAS-B Swapped monitoring	6. If the steering angle based on the SAS-A and SAS-B signals changes in the opposite direction of the analog angle, a fault will be set once the SASAnalog signal has changed by at least 30 degrees if it lasts 40ms.		6. Continuous during driving. However, this fault can only be detected whenthe SAS-Analog signal is changing that is when the angle is between +/- 225 degrees.	6. 40ms	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			7. SAS Turning Too Fast monitoring	7. If the SAS-A and SAS-B signals change significantly faster than the specified maximum turning rate of the Steering Angle Sensor, a fault will be set. This is done to protect the operating system from crashing due to excessive interrupt handling. The number of SAS-A and SAS-B edges each 20ms is counted. If this count exceeds the limit at the end of the 20ms, the fault will be set.		7. Continuous.	7. 50 counts	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Steering Position Signal	C0710.00	Steering angle sensor circuit	8. SAS-Analog Not Changing monitoring	8 If the angle changes by more than 530 degrees based on the SAS-A and SAS-B signals, and the SAS-Analog angle changes by less than 5 degrees, a fault will be set if it lasts 40ms.	-	8. Continuous while driving	8. 40ms	Special Type C
		(Cont.)	9. SAS- 5 Volt supply fault	9 If the SAS 5V supply is greater than 5.3V or less than 4.5V for more than 60ms, the fault will be set.		9. Continuous.	9. 60ms	NO MIL

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Steering Position Signal	C0710.00	Steering angle sensor signal monitoring.	1. SAS Offset monitoring	1. If the SAS offset value exceeds a threshold of approximately 15 deg a SAS-fault is determined. Failure detection time depends on the driving distance, vehicle speed and on the amount of failed SAS-signal. Within 30 km of symmetrical driving the calculated offset corresponds to the sensor offset.		1. Continuous during driving. The maximum admissible range for SAS offset compensation is when |steering angle|<30 deg or straight ahead driving can be detected from WSS.	1. Immediately.	Special Type C
			2. SAS Gradient monitoring	2. Rapid changes of the SAS-Signal cannot occur under normal conditions. A SAS-gradient-failure is set, if :			2. Immediately	NO MIL

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			3. SAS range monitoring	- signal gradient (steering angle velocity) from one 20 ms-cycle to another is higher than 40° or		2. After SAS-initialization and FZREF > 1.4 m/s; no under voltage and at least one SAS-message was sent in the current 20ms-cycle	3. 600ms	
			4. SAS constant signal	- change of this gradient (steering angle acceleration) is higher than 15			4. Depends on driving conditions.	
			5. SAS Wrong Sign Monitoring	and no signal peak is recognized by a peak-filter 3. Range of SAS-Signal is limited by mechanical stop of steering mechanism. If value is higher than possible range for more than 300ms a fault is determined.		3. After initialization and no under voltage detected	5. Depends on driving conditions.	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
				4. At a minimum change of e.g. 5° in the signal, the monitoring is reset. If there is no change in the signal, but a right AND left cornering has been recognized which would have required a change in SAS signal larger than 5 deg (lateral acceleration > 2 m/s² in combination with a yaw rate > 6 °/s in both directions), a fault is determined.		4. Initialization once in every ignition cycle. The monitoring is active until a reset by a change in the SAS signal or until a right and left cornering can be recognized		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
				5. This monitoring detects a wrong built in steering angle sensor. The model yaw rates, calculated from the WSS and SAS are compared. During driving these signals must have the same sign. If the signal signs are different, a fault is determined.		5. Once in every ignition cycle. Stable driving with a minimum yaw rate of 3 deg/s is necessary.		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Steering Position Signal	C0710.5A	Steering angle sensor plausibility monitoring.	The steering angle is compared to a steering angle calculated from yaw based on a vehicle model a reference. The difference between measured SAS-signal and SAS signal calculated from YRS-signal is evaluated for fault detection.	Threshold depends on driving conditions.		Continuous during driving when the stability criteria of the monitoring is met.	Depends on driving conditions.	Special Type C NO MIL
Steering Position Signal	C0455.00	Steering angle sensor circuit monitoring.	SAS. Steering Angle Sensor Analog signal	If the SAS-Analog signal is outside of its working range compared to the 5volt supply voltage – less than 9% or greater than 90 of 5V supply - a fault will be set.		Continuous during driving.	120ms	Special Type C NO MIL

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Vacuum sensor	C1100.00	Vacuum sensor circuit monitoring	1. Vacuum Sensor Supply monitoring	1. Sensor supply voltage is continuously monitored (except power on). A sensor supply failure is detected if Sensor Supply Voltage > 5.25V OR Sensor Supply Voltage < 4.75V for t >= 200ms		1. Continuous	1. 200ms	Special Type C
			2. Vacuum Sensor line monitoring	2. Vacuum sensor line is continuous monitored (except power on). Line faults like open, short to GND or short to UZ are detected. A Fault is set if the vacuum sensor signal is U VAC > 3.15V OR U VAC < 0.3V for a time t >= 200ms		2. Continuous	2. 200ms	NO MIL

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Vacuum sensor	C1100.00	Vacuum sensor signal monitoring	Vacuum Sensor Plausibility	Vacuum signal remains constant during a brake apply greater than 20 bar/sec starting from 0 bar.		Continuous	1s	Special Type C NO MIL
Brake Fluid	C0267.00	Brake Fluid low	When the brake fluid signal in GMLAN message 0x12A (LS_Device_Information) from BCM indicates the low brake fluid is true, the fault is set.	-	-	Continuous	Immediately	Special Type C NO MIL
Stability System Active Too Long	C0252.00	Implausible Control	1. Implausible FZR-interventions or wrong signal.	1. The monitoring reports a failure if continuous ESC control occurs for a time period >= 10 s. A continuous ESC control for longer than 10s is not possible under normal conditions	-	1. Continuous at vehicle reference speed greater than 6m/s, no detectedunder voltage and a fault is not already detected	1. 10s	Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			2. Implausible controller intervention.	2. A fault is set if all 4 wheel inlet valves are continuously maintaining pressure or releasing pressure during the ABS control.		2. Ignition on. Then 'Power on self-test (POS)'. Continuous monitoring. Active ABS control.	2. 2s	NO MIL
Electronic Control Unit Hardware	C0550.00	Monitoring of internal ECU hardware.	Internal control unit failures of the µC's and peripheral integrated circuits will be continuous monitored for proper function.	-	-	Continuous.	Immediately.	Special Type C NO MIL

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Electronic Control Unit Software	C0569.00	Calibration not programmed.	If the re-program flag in EEPROM indicates the ECU is not reprogrammed, the fault is set. The re-program flag is set to not reprogrammed when the ECU is built with default calibration block. The reprogram flag will be reset to reprogrammed once the ECU is reprogrammed successfully.	-	-	Wrong configuration can be realized and detected after ignition on.	Immediately	Special Type C NO MIL
CAN System fail	U2100.00	CAN system monitoring	Failure criteria: • CAN controller fails to initialize.	-	-	Monitored whenever CAN chip initializes.	Immediately	Special Type C NO MIL
Lost Comms with ECM	U0100.00	ECM Lost Communication	Following messages are missing from the bus:	N/A	-	Continuous	2.5*period or	Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			0x1C3/0x1C1 PPEI_Engine_Torque_Status2 0x0C9 PPEI_Engine_General_Status1 0x2C3/0x2C5 PPEI_Engine_Torque_Status_3				250 ms (whichever is greater)	NO MIL
Lost Comms with TCM	U0101.00	TCM Lost Communication	Following messages are missing from the bus: 0x1F5 PPEI_Trans_General_Status_2 0x0F9 PPEI_Trans_General_Status_1 0x2D1 (NR3) PPEI_Transfer_Case_Status	N/A	-	Continuous	2.5*period or 250 ms (whichever is greater)	Special Type C NO MIL
Lost Comms With BCM	U0140.00	BCM Lost Communication	Following messages are missing from the bus: 0x0F1PPEI_Brake_Apply_Status 0x1F1 PPEI_Platform_General_Status 0x12A LS_Device_Information	N/A	-	Continuous	2.5*period or 250 ms (whichever is greater)	Special Type C NO MIL

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Lost Comms With TCCM (NQH/NQG variants)	U0102.00	BCM Lost Communication	Following messages are missing from the bus: 0x2D1 PPEI_Transfer_Case_Status 0x1CB PPEI_TC_Coupling_Status	N/A	-	Continuous	2.5*period or 250 ms (whichever is greater)	Special Type C NO MIL
Invalid GMLAN data	C0561.71 C0561.72 C0561.74	GMLAN signals validity monitoring.	Failure criteria: • GMLAN signal is invalid	-	-	Continuous after 5 sec from power up.	500ms	Special Type C NO MIL

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Engine torque	C0242.00	Torque signal monitor.	Engine Torque Inhibit	When the GMLAN signal EngTrqRdFlrSt in 0x1C1/0x1C3 from ECM is not “Torque Reduction OK” or “Torque Reduction Limited”, the fault is set after 500ms. The fault is reset after the signal EngTrqRdFlrSt is “Torque Reduction OK” or Torque Reduction Limited” for 500ms.	-	Continuous.	500ms	Special Type C NO MIL