Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Intake Camshaft Actuator Solenoid Circuit – Bank 1	P0010	Detects a VVT system error by monitoring the circuit for electrical integrity	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		System supply voltage is within limits Output driver is commanded on, Ignition switch is in crank or run position	> 11 Volts, and < 32 Volts	20 failures out of 25 samples 250 ms /sample, continuous	Trips 2 B Type
Intake Camshaft System Performance – Bank 1	P0011	Detects a VVT system error by comparing the desired and actual cam positions when VVT is activated	Camshaft position error [absolute value of (desired position - actual position)] is compared to thresholds to determine if excessive	(Intake cam Bank 1)Cam Position Error > KtPHSD_phi_CamPos ErrorLimIc1 Deg (see Supporting Table)	DTC's are NOT active: P0010 IntkCMP B1 Circuit IntakeCamSensorTFTKO CrankSensorTFTKO CrankIntakeCamCorrelationFA Engine is running VVT is enabled Desired camshaft position > 0 Power Take Off (PTO) not active	System Voltage > 11 Volts, and System Voltage < 32 Volts Both Desired & Measured cam positions cannot be < KtPHSD_phi_CamPosErrorLimIc1 or > than (26.0 - KtPHSD_phi_CamPosErrorLimIc1). Desired cam position cannot vary more than 5.0 Cam Deg for at least KtPHSD_t_StablePositionTimeIc1 seconds (see Supporting Tables) 100 ms /sample	300 failures out of 400 samples	Trips 2 B Type
Exhaust Camshaft Actuator Solenoid Circuit – Bank 1	P0013	Detects a VVT system error by monitoring the circuit for electrical integrity	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		System supply voltage is within limits Output driver is commanded on, Ignition switch is in crank or run position	> 11 Volts, and < 32 Volts	20 failures out of 25 samples 250 ms /sample, continuous	Trips 2 B Type

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Exhaust Camshaft System Performance – Bank 1	P0014	Detects a VVT system error by comparing the desired and actual cam positions when VVT is activated	Camshaft position error [absolute value of (desired position - actual position)] is compared to thresholds to determine if excessive	(Exhaust cam Bank 1)Cam Position Error > KtPHSD_phi_CamPos ErrorLimEc1 Deg (see Supporting Table)	DTC's are NOT active: P0013 IntkCMP B1 Circuit ExhaustCamSensorTFT KO CrankSensorTFTKO CrankExhaustCamCorr elationFA Engine is running VVT is enabled Desired camshaft position > 0 Power Take Off (PTO) not active	System Voltage > 11 Volts, and System Voltage < 32 Volts Both Desired & Measured cam positions cannot be < KtPHSD_phi_CamPosErrorLim Ec1 or > than (Exh26.0 - KtPHSD_phi_CamPosErrorLim Ec1). Desired cam position cannot vary more than 5.0 Cam Deg for at least KtPHSD_t_StablePositionTime Ec1 seconds (see Supporting Tables)	300 failures out of 400 samples 100 ms /sample	Trips 2 B Type
Crankshaft Position (CKP)-Camshaft Position (CMP) Correlation Bank 1 Sensor A	P0016	Detects cam to crank misalignment by monitoring if cam sensor pulse for bank 1 sensor A occurs during the incorrect crank position	4 cam sensor pulses more than -10 crank degrees before or 10 crank degrees after nominal position in one cam revolution.		Crankshaft and camshaft position signals are synchronized Engine is Spinning Cam phaser is in "parked" position		2 failures out of 3 tests. A failed test is 4 failures out of 5 samples. There is a delay after the first failed test to allow the camshaft position to return to the park position. This time is defined by the table "Cam Correlation Oil Temperature Threshold".	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					No Active DTCs: Time since last execution of diagnostic	P0335, P0336 P0340, P0341 5VoltReferenceA_FA 5VoltReferenceB_FA < 1.0 seconds	One sample per cam rotation	
Crankshaft Position (CKP)-Camshaft Position (CMP) Correlation Bank 1 Sensor B	P0017	Detects cam to crank misalignment by monitoring if cam sensor pulse for bank 1 sensor B occurs during the incorrect crank position	4 cam sensor pulses more than -10 crank degrees before or 10 crank degrees after nominal position in one cam revolution.		Crankshaft and camshaft position signals are synchronized Engine is Spinning Cam phaser is in "parked" position No Active DTCs: Time since last execution of diagnostic	 P0335, P0336 P0365, P0366 5VoltReferenceA_FA 5VoltReferenceB_FA < 1.0 seconds	2 failures out of 3 tests. A failed test is 4 failures out of 5 samples. There is a delay after the first failed test to allow the camshaft position to return to the park position. This time is defined by the table "Cam Correlation Oil Temperature Threshold". One sample per	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
							cam rotation	
O2S Heater Control Circuit Bank 1 Sensor 1	P0030	Diagnoses the Heater Output low side driver circuit for circuit faults.	Voltage low during driver off state (indicates open circuit)	Open Circuit: ≥ 200 KΩ impedance between signal and controller ground.	Ignition Ignition Voltage Engine Speed	= Crank or Run > 11.0 Volts > 400 RPM	20 failures out of 25 samples 250 ms / sample Continuous	2 trips Type B
O2S Heater Control Circuit Low Voltage Bank 1 Sensor 1	P0031	Diagnoses the Heater Output low side driver circuit for circuit faults.	Voltage low during driver off state (indicates shortto-ground).	Short to ground: ≤ 0.5Ω impedance between signal and controller ground.	Ignition Ignition Voltage Engine Speed	= Crank or Run > 11.0 Volts > 400 RPM	20 failures out of 25 samples 250 ms / sample Continuous	2 trips Type B
O2S Heater Control Circuit High Voltage Bank 1 Sensor 1	P0032	Diagnoses the Heater Output low side driver circuit for circuit faults.	Voltage high during driver on state (indicates short to power).	Short to power: ≤ 0.5Ω impedance between signal and controller ground.	Ignition Ignition Voltage Engine Speed	= Crank or Run > 11.0 Volts > 400 RPM	20 failures out of 25 samples 250 ms / sample Continuous	2 trips Type B
O2S Heater Control Circuit Bank 1 Sensor 2	P0036	Diagnoses the Heater Output low side driver circuit for circuit faults.	Voltage low during driver off state (indicates open circuit).	Open Circuit: ≥ 200 KΩ impedance between signal and controller ground.	Ignition Ignition Voltage Engine Speed	= Crank or Run > 11.0 Volts > 400 RPM	20 failures out of 25 samples 250 ms / sample Continuous	2 trips Type B
O2S Heater Control Circuit Low Voltage Bank 1 Sensor 2	P0037	Diagnoses the Heater Output low side driver circuit for circuit faults.	Voltage low during driver off state (indicates shortto-ground).	Short to ground: ≤ 0.5Ω impedance between signal and controller ground.	Ignition Ignition Voltage Engine Speed	= Crank or Run > 11.0 Volts > 400 RPM	20 failures out of 25 samples 250 ms / sample Continuous	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
O2S Heater Control Circuit High Voltage Bank 1 Sensor 2	P0038	Diagnoses the Heater Output low side driver circuit for circuit faults.	Voltage high during driver on state (indicates short to power).	Short to power: ≤ 0.5Ω impedance between signal and controller ground.	Ignition Ignition Voltage Engine Speed	= Crank or Run > 11.0 Volts > 400 RPM	20 failures out of 25 samples 250 ms / sample Continuous	2 trips Type B
HO2S Heater Resistance Bank 1 Sensor 1	P0053	Detects an oxygen sensor heater having an incorrect or out of range resistance value.	Heater Resistance	3.1 < Ω < 9.1	No Active DTC's Coolant – IAT Engine Soak Time Coolant Temp Ignition Voltage Engine Run time	ECT_Sensor_FA P2610 IAT_SensorFA < 8.0 ºC > 28800 seconds -30.0 < ºC < 45.0 < 32.0 volts < 0.00 seconds	Once per valid cold start	2 trips Type B
HO2S Heater Resistance Bank 1 Sensor 2	P0054	Detects an oxygen sensor heater having an incorrect or out of range resistance value.	Heater Resistance	3.1 < Ω < 9.1	No Active DTC's Coolant – IAT Engine Soak Time Coolant Temp Ignition Voltage Engine Run time	ECT_Sensor_FA P2610 IAT_SensorFA < 8.0 ºC > 28800 seconds -30.0 < ºC < 45.0 < 32.0 volts < 0.00 seconds	Once per valid cold start	2 trips Type B
MAP / MAF / Throttle Position Correlation	P0068	Detect when MAP and MAF do not match estimated engine airflow as established by the TPS	Difference between MAP and estimated MAP exceeds threshold (kPa), or P0651 (5 Volt Ref), or P0107 (MAP circuit low), or P0108 (MAP circuit high) have failed this key cycle, then MAP portion of diagnostic fails	Table, f(TPS). See supporting tables : Delta MAP Threshold f(TPS)	Engine Speed	> 800 RPM Run/Crank voltage or Powertrain relay voltage > 6.41 and reduced power is false, else the failure will be reported for all conditions	Continuously fail MAP and MAF portions of diagnostic for 0.1875 s Continuous in MAIN processor	Trips: 1 Type: A MIL: YES

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			Absolute difference between MAF and estimated MAF exceed threshold (grams/sec), or P0102 (MAF circuit low), or P0103 (MAF circuit hi) have failed this key cycle, or maximum MAF versus RPM (Table) is greater than or equal to maximum MAF versus battery voltage, then MAF portion of diagnostic fails	Table, f(TPS). See supporting tables : Delta MAF Threshold f(TPS) Table, f(RPM). See supporting tables : Maximum MAF f(RPM) Table, f(Volts). See supporting tables : Maximum MAF f(Volts)				
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	> 10.0 seconds ≤ 70.3 °C	5 failures out of 10 samples 1 sec/ sample Continuous	2 trips Type B
Radiator Coolant Temp Sensor Circuit High	P00B4	Circuit Continuity This DTC detects a short to high or open in	RCT Resistance (@ -60ºC)	> 148600 Ohms	Engine run time Or IAT min	> 60.0 seconds ≥ -7.0 °C	5 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.
Voltage		the RCT signal circuit or the RCT sensor.					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). 2) Absolute difference between ECT at power up & RCT at power up is > by 20.0 C and a block heater has not been detected. 3) ECT at power up > IAT at power up by 20.0 C and the time spent cranking the engine without starting is greater than 10.0 seconds with the LowFuelConditionDiag	See "P00B6: Fail if power up ECT exceeds RCT by these values" in the Supporting tables section = False	No Active DTC's Engine Off Soak Time Non-volatile memory initization Test complete this trip Test aborted this trip IAT LowFuel Condition Diag **Block Heater detection is enabled when either of the following occurs:** 1) ECT at power up > IAT at power up by 2) Cranking time **Block Heater is detected and diagnostic is aborted when 1) or 2) occurs. Diagnostic is aborted when 3) or 4) occurs:** 1a) Vehicle drive time 1b) Vehicle speed	VehicleSpeedSensor_FA IAT_SensorCircuitFA THMR_RCT_Sensor_Ckt_FA THMR_ECT_Sensor_Ckt_FA IgnitionOffTimeValid TimeSinceEngineRunningValid > 28800 seconds = Not occurred = False = False ≥ -7 ºC = False > 20.0 ºC < 10.0 Seconds > 400 Seconds with > 14.9 MPH and	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.
					1c) Additional Vehicle drive time is provided to 1a when Vehicle speed is below 1b as follows: 1d) IAT drops from power up IAT	 0.50 times the seconds with vehicle speed below 1b ≥ 5.3 ºC		
					2a) ECT drops from power up ECT 2b) Engine run time	> 5 ºC Within > 60 Seconds		
					3) Engine run time with vehicle speed below 1b 4) Minimum IAT during test	> 1800 Seconds ≤ -7.0 ºC		
Engine Coolant Flow Insufficient	P00B7	This DTC detects a Insufficient Flow Condition (i.e.. Stuck Closed Thermostat)	Engine Coolant Temp (ECT) is greater than 117 Deg C and Difference between ECT and RCT is greater than 45 Deg C. When above is present for more than 5 seconds, fail counts start.		No Active DTC's	THMR_RCT_Sensor_Ckt_FA THMR_ECT_Sensor_Ckt_FA	30 failures out of 600 samples	2 trips Type B
					Engine run time OR Engine Coolant Temp	 > 300 seconds > 105.5 Deg C	1 sec/ sample Continuous	
Mass Air Flow System Performance	P0101	Determines if the MAF sensor is stuck within the normal operating range	Filtered Throttle Model Error AND ABS(Measured Flow – Modeled Air Flow) Filtered AND	<= 250 kPa*(g/s) > 16 grams/sec	Engine Speed Engine Speed Coolant Temp Coolant Temp Intake Air Temp Intake Air Temp Minimum total weight	>= 400 RPM <= 6500 RPM >= -7 Deg C <= 125 Deg C >= -20 Deg C <= 100 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.
			ABS(Measured MAP – MAP Model 2) Filtered	> 20.0 kPa	factor (all factors multiplied together) No Active DTCs:	>= 0.50 Filtered Throttle Model Error multiplied by TPS Residual Weight Factor based on RPM Modeled Air Flow Error multiplied by MAF Residual Weight Factor based on RPM and MAF Residual Weight Factor Based on MAF Est MAP Model 2 Error multiplied by MAP2 Residual Weight Factor based on RPM See table "IFRD Residual Weighting Factors". MAP_SensorCircuitFA EGRValve_FP EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA ECT_Sensor_Ckt_FP IAT_SensorFA IAT_SensorCircuitFP		
Mass Air Flow Sensor Circuit Low Frequency	P0102	Detects a continuous short to low or a open in either the signal circuit or the MAF sensor	MAF Output	<= 900 Hertz (~ 0.093 gm/sec) (KtMAFI_dm_EngAirFlow)	Engine Run Time Engine Speed Ignition Voltage Above criteria present for a period of time	> 1.0 seconds >= 300 RPM >= 10.0 Volts >= 1.0 seconds	200 failures out of 250 samples 1 sample every cylinder firing event	Type B 2 trips
Mass Air Flow Sensor Circuit High Frequency	P0103	Detects a high frequency output from the MAF sensor	MAF Output	>= 14500 Hertz (~ 126.7 gm/sec) (KtMAFI_dm_EngAirFl	Engine Run Time Engine Speed Ignition Voltage	> 1.0 seconds >= 300 RPM >= 10.0 Volts	200 failures out of 250 samples	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
				ow)	Above criteria present for a period of time	>= 1.0 seconds	1 sample every cylinder firing event	
Manifold Absolute Pressure Sensor Performance	P0106	Determines if the MAP sensor is stuck within the normal operating range	Filtered Throttle Model Error AND ABS(Measured MAP – MAP Model 1) Filtered AND ABS(Measured MAP – MAP Model 2) Filtered	<= 250 kPa*(g/s) > 20.0 kPa > 20.0 kPa	Engine Speed Engine Speed Coolant Temp Coolant Temp Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together) No Active DTCs:	>= 400 RPM <= 6500 RPM >= -7 Deg C <= 125 Deg C >= -20 Deg C <= 100 Deg C >= 0.50 Filtered Throttle Model Error multiplied by TPS Residual Weight Factor based on RPM MAP Model 1 Error multiplied by MAP1 Residual Weight Factor based on RPM MAP Model 2 Error multiplied by MAP2 Residual Weight Factor based on RPM See table "IFRD Residual Weighting Factors". MAP_SensorCircuitFA EGRValve_FP EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA ECT_Sensor_Ckt_FP IAT_SensorFA IAT_SensorCircuitFP	Continuous Calculations are performed every 12.5 msec	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			Engine Not Rotating Case: Manifold Pressure OR Manifold Pressure	 < 50.0 kPa > 115.0 kPa	 Time between current ignition cycle and the last time the engine was running Engine is not rotating No Active DTCs: No Pending DTCs:	 > 10.0 seconds EngModeNotRunTmErr MAP_SensorFA AAP_SnsrFA MAP_SensorCircuitFP AAP_SnsrCktFP	 999 failures out of 0 samples 1 sample every 12.5 msec	
Manifold Absolute Pressure Sensor Circuit Low	P0107	Detects a continuous short to low or open in either the signal circuit or the MAP sensor.	MAP Voltage	< 3.0 % of 5 Volt Range (0.2 Volts = 3.5 kPa)	Continuous		320 failures out of 400 samples 1 sample every 12.5 msec	Type B 2 trips
Manifold Absolute Pressure Sensor Circuit High	P0108	Detects an open sensor ground or continuous short to high in either the signal circuit or the MAP sensor.	MAP Voltage	> 90.0 % of 5 Volt Range (4.5 Volts = 115.0 kPa)	Continuous		320 failures out of 400 samples 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 engine coolant temperature at startup	ABS(Power Up IAT - Power Up ECT)	> 50 deg C	Time between current ignition cycle and the last time the engine was running Power Up ECT No Active DTCs:	 > 28800 seconds < 60 deg C ECT_Sensor_Ckt_FA IAT_SensorCircuitFA	Executes once at the beginning of each ignition cycle if enable conditions are met	Type B 2 trips
Intake Air Temperature	P0112	Detects a continuous short to ground in the	Raw IAT Input	< 58 Ohms (~150 deg C)	Engine Run Time	> 0.0 seconds	40 failures out of 50 samples	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Sensor Circuit Low (High Temperature)		IAT signal circuit or the IAT sensor					1 sample every 100 msec	
Intake Air Temperature Sensor Circuit High (Low Temperature)	P0113	Detects a continuous open circuit in the IAT signal circuit or the IAT sensor	Raw IAT Input	> 142438 Ohms (~-60 deg C)	Engine Run Time	> 0.0 seconds	40 failures out of 50 samples 1 sample every 100 msec	Type B 2 trips
Intake Air Temperature Sensor Intermittent In-Range	P0114	Detects a noisy or erratic IAT signal circuit or IAT sensor	Change in IAT reading between consecutive 100 millisecond samples Change in IAT is multiplied by IAT Intermittent Weight Factor based on Filtered IAT. Filtered IAT = 0.10 * Current IAT + 0.90 * Filtered IAT from 100 milliseconds before	> 10 DegC	Continuous		20 failures out of 200 samples 1 sample every 100 msec	Type B 2 trips
Engine Coolant Temperature (ECT) Sensor Performance	P0116	This DTC detects ECT temp sensor stuck in mid range.	A failure will be reported if any of the following occur: 1) ECT at power up > IAT at power up by an IAT based table lookup value after a minimum 28800 second soak (fast fail). 2) ECT at power up > IAT at power up by 20.0 C after a minimum 28800 second soak and a block heater has not been detected.	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 Test complete this trip Test aborted this trip IAT LowFuelCondition Diag **Block Heater detection is enabled when either of the following occurs:** 1) ECT at power up >	VehicleSpeedSensor_FA IAT_SensorFA ECT_Sensor_Ckt_FA IgnitionOffTimeValid TimeSinceEngineRunningValid = Not occurred = False = False ≥ -7 ºC = False	1 failure 500 msec/ sample Once per valid cold start	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			3) ECT at power up > IAT at power up by 20.0 C after a minimum 28800 seconds soak and the time spent cranking the engine without starting is greater than 10.0 seconds with the LowFuelConditionDiag	= False	IAT at power up by	> 20.0 ºC		
					2) Cranking time	< 10.0 Seconds		
					Block Heater is detected and diagnostic is aborted when 1) or 2) occurs. Diagnostic is aborted when 3) or 4) occurs:			
					1a) Vehicle drive time	> 400 Seconds with		
					1b) Vehicle speed	> 14.9 MPH		
					1c) Additional Vehicle drive time is provided to 1a when Vehicle speed is below 1b as follows:	0.50 times the seconds with vehicle speed below 1b		
					1d) IAT drops from power up IAT	≥ 5.3 ºC		
					2a) ECT drops from power up ECT	> 5 ºC Within		
					2b) Engine run time	> 60 Seconds		
					3) Engine run time with vehicle speed below 1b	> 1800 Seconds		
					4) Minimum IAT during test	≤ -7 ºC		
Engine Coolant Temp Sensor Circuit Low	P0117	Circuit Continuity This DTC detects a short to ground in the ECT signal circuit or the ECT sensor.	ECT Resistance (@ 150ºC)	< 55 Ohms			5 failures out of 6 samples 1 sec/ sample Continuous	2 trips Type B
Engine Coolant	P0118	Circuit Continuity	ECT Resistance (@ -60ºC)	> 148600 Ohms	Engine run time	> 10.0 seconds	5 failures out of 6	2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Temp Sensor Circuit High		This DTC detects a short to high or open in the ECT signal circuit or the ECT sensor.			Or IAT min	 ≥ 0.0 °C	samples 1 sec/ sample Continuous	Type B
Engine Coolant Temperature (ECT) Sensor Circuit Intermittent	P0119	Circuit Continuity This DTC detects large step changes in the ECT signal circuit or the ECT sensor. Allowable high and low limits are calculated for the next sample based on the previous sample.	ECT temperature step change: 1) postive step change is greater than high limit OR 2) negitive step change is lower than low limit.		No Active DTC's	P0117 P0118	3 failures out of 4 samples 1 sec/ sample Continuous	2 trips Type B
Throttle Position Sensor Performance	P0121	Determines if the Throttle Position Sensor input is stuck within the normal operating range	Filtered Throttle Model Error AND ABS(Measured Flow – Modeled Air Flow) Filtered AND ABS(Measured MAP – MAP Model 2) Filtered	> 250 kPa*(g/s) > 16 grams/sec <= 20.0 kPa	Engine Speed Engine Speed Coolant Temp Coolant Temp Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together)	>= 400 RPM <= 6500 RPM > -7 Deg C < 125 Deg C > -20 Deg C < 100 Deg C >= 0.50 Filtered Throttle Model Error multiplied by TPS Residual Weight Factor based on RPM Modeled Air Flow Error multiplied by MAF Residual Weight Factor based on RPM and MAF Residual Weight Factor Based on MAF Est	Continuous Calculation are performed every 12.5 msec	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					No Active DTCs:	See table "IFRD Residual Weighting Factors". MAP_SensorCircuitFA EGRValve_FP EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA ECT_Sensor_Ckt_FP IAT_SensorFA IAT_SensorCircuitFP		
TPS1 Circuit Low	P0122	Detects a continuous or intermittent short or open in TPS1 circuit	TPS1 Voltage <	0.325		Run/Crank voltage or Powertrain relay voltage > 6.41 and reduced power is false, else the failure will be reported for all conditions No 5V reference error or fault for # 4 5V reference circuit (P06A3)	79/159 counts; 57 counts continuous; 3.125 ms /count in the ECM main processor	Trips: 1 Type: A MIL: YES
TPS1 Circuit High	P0123	Detects a continuous or intermittent short or open in TPS1 circuit	TPS1 Voltage >	4.75		Run/Crank voltage or Powertrain relay voltage > 6.41 and reduced power is false, else the failure will be reported for all conditions No 5V reference error or fault for # 4 5V reference circuit (P06A3)	79/159 counts; 57 counts continuous; 3.125 ms /count in the ECM main processor	Trips: 1 Type: A MIL: YES
Engine Coolant Temperature Below Stat Regulating Temperature	P0128	This DTC detects if the engine coolant temperature rises too slowly due to an ECT or Cooling system fault	Engine run time is accumulated when airflow is ≥ 11 grams per sec during Range #1 or #2: Range #1 (Primary)	See “P0128: Maximum Accumulated Time for IAT and Start-up ECT conditions“ in the Supporting tables section	No Active DTC's	MAF_SensorFA IAT_SensorFA THMR_RCT_Sensor_Ckt_FA THMR_ECT_Sensor_Ckt_FA	1 failure to set DTC 1 sec/ sample	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			ECT reaches Commanded temperature minus 11.0 °C when IAT min is < 65.0°C and ≥ 10.0°C.		Engine not run time Engine run time Fuel Condition	≥ 3600 seconds 20 ≤ Eng Run Tme ≤ 1500 seconds Ethanol ≤ 100%	Once per ignition key cycle	
					Range #1 (Primary) Test ECT at start run Average Airflow T-Stat Heater duty commanded cycle	 -20.0 ≤ ECT ≤ 74.5 °C ≥ 11.0 gps ≤ 100 %		
			Range #2 (Alternate) ECT reaches Commanded temperature minus 31.0 °C when IAT min is < 10.0°C and ≥ -7.0°C.		**Range #2 (Alternate) Test** ECT at start run Average Airflow T-Stat Heater duty commanded cycle	 -20.0 ≤ ECT ≤ 54.5 °C ≥ 11.0 gps ≤ 100 %		
O2S Circuit Low Voltage Bank 1 Sensor 1	P0131	This DTC determines if the O2 sensor circuit is shorted to low.	Oxygen Sensor Signal	< 40 mVolts	No Active DTC's	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	380 failures out of 475 samples Frequency: Continuous in 100 milli - second loop	2 trips Type B
					AIR intrusive test Fuel intrusive test Idle intrusive test EGR intrusive test System Voltage EGR Device Control Idle Device Control Fuel Device Control	= Not active = Not active = Not active = Not active 10.0 < Volts < 31.9 = 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.
					AIR Device Control	= Not active		
					Diag	= False		
					Equivalence Ratio	0.9912 < ratio < 1.0137		
					Air Per Cylinder	50 < mgram < 500		
					Fuel Control State	= Closed Loop		
					Closed Loop Active	= TRUE		
					All Fuel Injectors for active Cylinders	Enabled (On)		
					Fuel Condition	Ethanol ≤ 88%		
					Fuel State	DFCO not active		
					All of the above met for	> 5.0 seconds		
O2S Circuit High Voltage Bank 1 Sensor 1	P0132	This DTC determines if the O2 sensor circuit is shorted to high.	Oxygen Sensor Signal	> 1050 mvolts	**Open Test Criteria**		100 failures out of 125 samples	2 trips Type B
					No Active DTC's	TPS_ThrottleAuthorityDefaulted MAF_SensorFA EthanolCompositionSensor_FA	Frequency: Continuous in 100 milli - second loop	
					System Voltage	10.0 < Volts < 31.9		
					AFM Status	= All Cylinders active		
					Heater Warm-up delay	= Complete		
					Engine Run Time	> 5 seconds		
					Engine Run Accum	> 150 seconds		
					Fuel Condition	≤ 88 % Ethanol		
					No Active DTC's	MAP_SensorFA		
						EvapPurgeSolenoidCircuit_FA		
						EvapFlowDuringNonPurge_FA		
						EvapVentSolenoidCircuit_FA		
						EvapSmallLeak_FA		
						EvapEmissionSystem_FA		
						FuelTankPressureSnsrCkt_FA		
						FuelInjectorCircuit_FA		
						AIR System FA		
					Diag	= False		
					Fuel Condition	≤ 88 % Ethanol		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Initial delay after Open Test Criteria met (cold start condition)	> 40.0 seconds when engine soak time > 28800 seconds		
					Initial delay after Open Test Criteria met (not cold start condition)	> 40.0 seconds when engine soak time ≤ 28800 seconds		
					Equivalence Ratio	0.9912 ≤ ratio ≤ 1.0137		
					Air Per Cylinder	50.0 ≤ mgram ≤ 500.0		
					Fuel Control State	not = Power Enrichment		
					All of the above met for	> 5.0 seconds		
O2S Slow Response Bank 1 Sensor 1	P0133	This DTC determines if the O2 sensor response time is degraded.	The average response time is caluclated over the test time, and compared to the threshold. Refer to **"P0133 - O2S Slow Response Bank 1 Sensor 1"** Pass/Fail Threshold table in the Supporting Tables tab.		No Active DTC's	TPS_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 A EngineMisfireDetected_FA P0131 P0132 P0134	Sample time is 60 seconds Frequency: Once per trip	2 trips Type B
					System Voltage	10.0 < Volts < 31.9		
					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 **Green Sensor Delay Criteria (B1S1)** in Supporting Tables tab.		
					Green O2S Condition			
					O2 Heater on for	≥ 40 seconds		
					Learned Htr resistance	= Valid		
					Engine Coolant	> 60 ºC		
					IAT	> -40 ºC		
					Engine run Accum	> 155 seconds		
					Time since any AFM status change	> 2.0 seconds		
					Time since Purge On to Off change	> 1.0 seconds		
					Time since Purge Off to On change	> 2.0 seconds		
					Purge duty cycle	≥ 0 % duty cycle		
					Engine airflow	12 ≤ grams per second ≤ 30		
					Engine speed	1300 <= RPM <= 3500		
					Fuel	< 88 % Ethanol		
					Baro	> 70 kpa		
					Air Per Cylinder	≥ 130 mGrams		
					Low Fuel Condition Diag	= False		
					Fuel Control State	= Closed Loop		
					Closed Loop Active	= TRUE		
					LTM fuel cell	= Enabled		
					Transient Fuel Mass	≤ 100.0 mgrams		
					Baro	= Not Defaulted		
					Fuel Control State	not = Power Enrichment		
					Fuel State Commanded	DFCO not active		
					Proportional Gain	≥ 0.0 %		
					All of the above met for	> 2.0 seconds		
O2S Circuit Insufficient Activity Bank 1 Sensor 1	P0134	This DTC determines if the O2 sensor circuit is open.	Oxygen Sensor Signal	> 1700 mvolts	No Active DTC's	TPS_ThrottleAuthorityDefaulted MAF_SensorFA	200 failures out of 250 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	Frequency: Continuous	
					System Voltage	10.0 < Volts < 31.9		
					AFM Status	= All Cylinders active	100msec loop	
					Heater Warm-up delay	= Complete		
					Engine Run Time	> 5 seconds		
					Engine Run Accum	> 150 seconds		
					Fuel	≤ 88 % Ethanol		
O2S Heater Performance Bank 1 Sensor 1	P0135	This DTC determines if the O2 sensor heater is functioning properly by monitoring the current through the heater circuit.	Heater Current	0.5 < Amps < 3.5	No Active DTC's	ECT_Sensor_FA	8 failures out of 10 samples	2 trips Type B
					System Voltage	10.0 < Volts < 31.9	Frequency: 2 tests per trip	
					Heater Warm-up delay	= Complete		
					O2S Heater device control	= Not active		
					B1S1 O2S Heater Duty Cycle	> zero	30 seconds delay between tests and 1 second execution rate	
					All of the above met for	> 120 seconds		
O2S Circuit Low Voltage Bank 1 Sensor 2	P0137	This DTC determines if the O2 sensor circuit is shorted to low.	Oxygen Sensor Signal	< 40 mvolts	No Active DTC's	TPS_ThrottleAuthorityDefaulted	430 failures out of 540 samples	2 trips Type B
						MAP_SensorFA		
						AIR System FA		
						Ethanol Composition Sensor FA	Frequency: Continuous in 100 milli - second loop	
						EvapPurgeSolenoidCircuit_FA		
						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		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					EGR intrusive test	= Not active		
					System Voltage	10.0 < Volts < 31.9		
					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	0.9912 ≤ ratio ≤ 1.0137		
					Air Per Cylinder	50 ≤ mgrams ≤ 500		
					Fuel Control State	= Closed Loop		
					Closed Loop Active	= TRUE		
					All Fuel Injectors for active Cylinders	Enabled (On)		
					Fuel Condition	Ethanol <= 88%		
					Fuel State	DFCO not active		
					All of the above met for	> 5.0 seconds		
O2S Circuit High Voltage Bank 1 Sensor 2	P0138	This DTC determines if the O2 sensor circuit is shorted to high.	Oxygen Sensor Signal	> 1050 mvolts	**Open Test Criteria**		100 failures out of 125 samples Frequency: Continuous in 100 milli - second loop	2 trips Type B
					No Active DTC's	TPS_ThrottleAuthorityDefaulted MAF_SensorFA EthanolCompositionSensor_FA		
					System Voltage	10.0 < Volts < 31.9		
					AFM Status	= All Cylinders active		
					Heater Warm-up delay	= Complete		
					Engine Run Time	> 5 seconds		
					Fuel Condition	≤ 88 % Ethanol		
					No Active DTC's	MAP_SensorFA		
						EvapPurgeSolenoidCircuit_FA		
						EvapFlowDuringNonPurge_FA		
						EvapVentSolenoidCircuit_FA		
						EvapSmallLeak_FA		
						EvapEmissionSystem_FA		
						FuelTankPressureSnsrCkt_FA		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						FuelInjectorCircuit_FA AIR System FA		
					Low Fuel Condition Diag	= False		
					Fuel Condition	≤ 88 % Ethanol		
					Initial delay after Open Test Criteria met (cold start condition)	> 40.0 seconds when engine soak time > 28800 seconds		
					Initial delay after Open Test Criteria met (not cold start condition)	> 40.0 seconds when engine soak time ≤ 28800 seconds		
					Equivalence Ratio	0.9912 ≤ ratio ≤ 1.0137		
					Air Per Cylinder	50 ≤ mgrams ≤ 500		
					Fuel Control State	not = Power Enrichment		
					All of the above met for	> 5.0 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	> 8.5 units	No Active DTC's	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc= FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed.	1 trips Type A EWMA
			OR					
			The Accumulated mass air flow monitored during the Slow Response Test (between the upper and lower voltage thresholds)	> 21 grams (upper threshold is 450 mvolts and lower threshold is 150 mvolts)	B1S2 Failed this key cycle	P013B, P013E, P013F, P2270 or P2271		
					System Voltage	10.0 < Volts < 31.9		
					Learned heater resistance	= Valid		
					ICAT MAT Burnoff delay	= Not Valid		
					Green O2S Condition	= Not Valid, See definition of **Green Sensor Delay Criteria (B1S2)** in Supporting Tables tab.		
					Low Fuel Condition Diag	= False		
					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	P2270 (and P2272 if applicable)		
					DTC's Passed	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 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	> 8.5 units	No Active DTC's	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc= FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed.	1 trips Type A EWMA
			OR		B1S2 Failed this key cycle	P013A, P013E, P013F, P2270 or P2271		
			The Accumulated mass air flow monitored during the Slow Response Test (between the upper and lower voltage thresholds)	> 179 grams (lower threshold is 300 mvolts and upper threshold is 600 mvolts)	System Voltage	10.0 < Volts < 31.9		
					Learned heater resistance	= Valid		
					ICAT MAT Burnoff delay	= Not Valid		
					Green O2S Condition	= Not Valid, See definition of **Green Sensor Delay Criteria (B1S2)** in Supporting Tables tab.		
					Low Fuel Condition Diag	= False		
					Post fuel cell	= enabled		
					DTC's Passed	P2270 (and P2272 if applicable) P013E (and P014A if applicable) P013A (and P013C if applicable) P2271 (and P2273 if		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						applicable) P013F (and P014B if applicable)		
					After above conditions are met: Fuel Enrich mode continued.			
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 DFCO mode to achieve the required response.	Post O2 sensor voltage AND The Accumulated mass air flow monitored during the Delayed Response Test	> 450 mvolts > 23 grams	No Active DTC's B1S2 Failed this key cycle System Voltage Learned heater resistance ICAT MAT Burnoff delay Green O2S Condition Low Fuel Condition Diag Post fuel cell DTC's Passed	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA P013A, P013B, P013F, P2270 or P2271 10.0 < Volts < 31.9 = Valid = Not Valid = Not Valid, See definition of **Green Sensor Delay Criteria (B1S2)** in Supporting Tables tab. = False = enabled P2270 (and P2272 if applicable)	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
					After above conditions are met: DFCO mode entered (wo driver initiated pedal input).			
O2 Sensor Delayed Response	P013F	This DTC determines if the post catalyst O2	Post O2 sensor voltage	< 300 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.
Lean to Rich Bank 1 Sensor 2		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.	AND The Accumulated mass air flow monitored during the Delayed Response Test	> 245 grams		ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA	Note: if NaPOPD_b_ResetFastRespFunc= FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed	
					B1S2 Failed this key cycle	P013A, P013B, P013E, P2270 or P2271		
					System Voltage	10.0 < Volts < 31.9		
					Learned heater resistance	= Valid		
					ICAT MAT Burnoff delay	= Not Valid		
					Green O2S Condition	= Not Valid, See definition of **Green Sensor Delay Criteria (B1S2)** in Supporting Tables tab.		
					Low Fuel Condition Diag	= False		
					Post fuel cell	= enabled		
					DTC's Passed	P2270 (and P2272 if applicable) P013E (and P014A if applicable) P013A (and P013C if applicable) P2271 (and P2273 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: Fuel Enrich mode entered.			
O2S Circuit Insufficient Activity Bank 1 Sensor 2	P0140	This DTC determines if the O2 sensor circuit is open.	Oxygen Sensor Signal	> 1700 mvolts	No Active DTC's System Voltage AFM Status Heater Warm-up delay Engine Run Time Engine Run Accum Fuel	TPS_ThrottleAuthorityDefaulted MAF_SensorFA EthanolCompositionSensor_FA 10.0 <Volts < 31.9 = All Cylinders active = Complete > 5 seconds > 150 seconds ≤ 88 % Ethanol	200 failures out of 250 samples. Frequency: Continuous 100msec loop	2 trips Type B
O2S Heater Performance Bank 1 Sensor 2	P0141	This DTC determines if the O2 sensor heater is functioning properly by monitoring the current through the heater circuit.	Heater Current	0.5 > amps > 3.5	No Active DTC's System Voltage Heater Warm-up delay O2S Heater device control B1S1 O2S Heater Duty Cycle **All of the above met for** Time	ECT_Sensor_FA 10.0 < Volts < 31.9 = Complete = Not active > zero > 120 seconds	8 failures out of 10 samples Frequency: 2 tests per trip 30 seconds delay between tests and 1 second execution rate.	2 trips Type B
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	> 1.35 EWMA (sec) ≥ 2.00 Seconds	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	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	2 trips Type B EWMA

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			Pre O2 sensor voltage is above]	> 550 mvolts		FuelInjectorCircuit_FA AIR System FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EthanolCompositionSensor_FA EngineMisfireDetected_FA P0131 P0132 P0134	trip are allowed	
					System Voltage	10.0 < Volts < 31.9		
					EGR Device Control	= Not active		
					Idle Device Control	= Not active		
					Fuel Device Control	= Not active		
					AIR Device Control	= Not active		
					Low Fuel Condition Diag	= False		
					Green O2S Condition	= Not Valid, See definition of **Green Sensor Delay Criteria (B1S1)** in Supporting Tables tab.		
					O2 Heater on for	≥ 40 seconds		
					Learned Htr resistance	= Valid		
					Engine Coolant	> 60 ºC		
					IAT	> -40 ºC		
					Engine run Accum	> 155 seconds		
					Engine Speed to initially enable test	1100 ≤ RPM ≤ 3500		
					Engine Speed range to keep test enabled (after initially enabled)	1050 ≤ RPM ≤ 3650		
					Engine Airflow	2 ≤ gps ≤ 12		
					Vehicle Speed to initially enable test	43.5 ≤ MPH ≤ 80.8		
					Vehicle Speed range to keep test enabled (after initially enabled)	34.2 ≤ MPH ≤ 83.3 mph		
					Closed loop integral	0.90 ≤ C/L Int ≤ 1.08		
					Closed Loop Active	= TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Evap	not in control of purge		
					Ethanol	not in estimate mode		
					Post fuel cell	= enabled		
					EGR Intrusive diagnostic	= not active		
					All post sensor heater delays	= not active		
					O2S Heater on Time	≥ 180.0 sec		
					Predicted Catalyst temp	650 ≤ ºC ≤ 900		
					Fuel State	= DFCO possible		
					All of the above met for at least 3.0 seconds, and then the Force Cat Rich intrusive stage is requested.			
					Pre O2S voltage B1S1 at end of Cat Rich stage	≥ 690 mvolts		
					Fuel State	= DFCO active		
					Number of fueled cylinders	≤ 5 cylinders		
					After above conditions are met: DFCO Mode 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 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	> 1.35 EWMA (sec) ≥ 1.86 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 FuelTrimSystemB1_FA FuelTrimSystemB2_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	2 trips Type B EWMA

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			OR			EthanolCompositionSensor_FA		
			At end of Cat Rich stage the Pre O2 sensor output is	< 690 mvolts		EngineMisfireDetected_FA P0131 P0132 P0134		
					System Voltage	10.0 < Volts < 31.9		
					EGR Device Control	= Not active		
					Idle Device Control	= Not active		
					Fuel Device Control	= Not active		
					AIR Device Control	= Not active		
					Low Fuel Condition Diag	= False		
					Green O2S Condition	= Not Valid, See definition of **Green Sensor Delay Criteria (B1S1)** in Supporting Tables tab.		
					O2 Heater on for	≥ 40 seconds		
					Learned Htr resistance	= Valid		
					Engine Coolant	> 60 ºC		
					IAT	> -40 ºC		
					Engine run Accum	> 155 seconds		
					Engine Speed to initially enable test	1100 ≤ RPM ≤ 3500		
					Engine Speed range to keep test enabled (after initially enabled)	1050 ≤ RPM ≤ 3650		
					Engine Airflow	2 ≤ gps ≤ 12		
					Vehicle Speed to initially enable test	43.5 ≤ MPH ≤ 80.8		
					Vehicle Speed range to keep test enabled (after initially enabled)	34.2 ≤ MPH ≤ 83.3 mph		
					Closed loop integral	0.90 ≤ 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 on Time	≥ 180.0 sec		
					Predicted Catalyst temp	650 ≤ ºC ≤ 900		
					Fuel State	= DFCO inhibit		
					Number of fueled cylinders	≥ 1 cylinders		
					When above conditions are met: Fuel Enrich mode entered.			
Fuel System Too Lean Bank 1	P0171	Determines if the fuel control system is in a lean condition, based on the filtered long-term fuel trim.	The filtered long-term fuel trim metric	>= 1.290	Engine speed BARO Coolant Temp MAP Inlet Air Temp MAF Fuel Level	400 <rpm< 6100 > 70 kPa -38 <°C< 130 15 <kPa< 255 -20 <°C< 150 1.0 <g/s< 512.0 > 10 % or if fuel sender is faulty	Frequency: 100 ms Continuous Loop	2 Trip(s) Type B
					Long Term Fuel Trim data accumulation:	> 35.0 seconds of data must accumulate on each trip, with at least 15.0 seconds of data in the current fuel trim cell before a pass or fail decision can be made.		
					Long-Term Fuel Trim Cell Usage			
					Sometimes, certain Long-Term Fuel Trim Cells are not utilized for control or diagnosis. **Please see "Supporting Tables" Tab for a list of cells utilized for diagnosis.**			
					Fuel Control Status			
					Closed Loop Long Term FT	Enabled Enabled **Please see "Closed Loop**		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						Enable Criteria" and "Long Term FT Enable Criteria" in Supporting Tables.		
					Fuel Consumed	> 0.0 liters of fuel consumed after a fuel fill event ("Virtual Flex Fuel Sensor applications only)		
					EGR Flow Diag. Intrusive Test Not Active Catalyst Monitor Intrusive Test Not Active Post O2 Diag. Intrusive Test Not Active Device Control Not Active EVAP Diag. “tank pull down” Not Active			
					No active DTCs: IAC_SystemRPM_FA MAP_SensorFA MAF_SensorFA MAF_SensorTFTKO AIR System FA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSensorCircuit_FA Ethanol Composition Sensor FA FuelInjectorCircuit_FA EngineMisfireDetected_FA EGRValvePerformance_FA EGRValveCircuit_FA MAP_EngineVacuumStatus AmbientAirDefault O2S_Bank_1_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 1	P0172	Determines if the fuel control system is in a rich condition, based on the filtered long-term fuel trim metric. There are two methods to determine a Rich fault. They are Passive and Intrusive. The Intrusive test is described below:	**Passive Test:**			Secondary Parameters and Enable Conditions are identical to those for P0171, with the exception that fuel level is not considered.	Frequency: 100 ms Continuous Loop	2 Trip(s) Type B
			The filtered Non-Purge Long Term Fuel Trim metric	<= 0.705 (a Passive Test decision cannot be made when Purge is enabled)				
			Intrusive Test:					
			The filtered Purge Long Term Fuel Trim metric	<= 0.720				
			AND					
			The filtered Non-Purge Long Term Fuel Trim metric	<= 0.705 for 2 out of 3 intrusive segments				
		Intrusive Test: When the filtered Purge Long Term Fuel Trim metric is <= 0.720, purge is ramped off to determine if excess purge vapor is the cause of the rich condition. If the filtered Purge Long Term Fuel Trim metric > 0.720, the test passes without checking the filtered Non-Purge Long Term Fuel Trim metric.	Segment Def'n: Segments can last up to 35 seconds and are separated by the lesser of 30 seconds of purge-on time or enough time to purge 18 grams of vapor. A maximum of 3 completed segments or 25 attempts are allowed for each intrusive test. After an intrusive test report is completed, another intrusive test cannot occur for 300					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		Performing intrusive tests too frequently may also affect EVAP and EPAIII emissions, and the execution frequency of other diagnostics.	seconds to allow sufficient time to purge excess vapors from the canister. During this period, fuel trim will pass if the filtered Purge-on Long Term fuel trim > Purge Rich Limit Table for at least 150 seconds, indicating that the canister has been purged.					
Injector 1	P0201	This DTC Diagnoses Injector 1 low side driver circuit for circuit faults.	Voltage low during driver off state indicates short-to-ground or open circuit	Open circuit: ≥ 200 K Ω impedance between signal and controller ground	Powertrain Relay Voltage within range and stable according to Enable Conditions Engine Run Time	11 volts ≤ Voltage for greater than 1 seconds ≥ 0 Sec	10 failures out of 20 samples 100 ms /sample Continuous	2 trips Type B
Injector 2	P0202	This DTC Diagnoses Injector 2 low side driver circuit for circuit faults.	Voltage low during driver off state indicates short-to-ground or open circuit	Open circuit: ≥ 200 K Ω impedance between signal and controller ground	Powertrain Relay Voltage within range and stable according to Enable Conditions Engine Run Time	11 volts ≤ Voltage for greater than 1 seconds ≥ 0 Sec	10 failures out of 20 samples 100 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 3	P0203	This DTC Diagnoses Injector 3 low side driver circuit for circuit faults.	Voltage low during driver off state indicates short-to-ground or open circuit	Open circuit: ≥ 200 K Ω impedance between signal and controller ground	Powertrain Relay Voltage within range and stable according to Enable Conditions Engine Run Time	11 volts ≤ Voltage for greater than 1 seconds ≥ 0 Sec	10 failures out of 20 samples 100 ms /sample Continuous	2 trips Type B
Injector 4	P0204	This DTC Diagnoses Injector 4 low side driver circuit for circuit faults.	Voltage low during driver off state indicates short-to-ground or open circuit	Open circuit: ≥ 200 K Ω impedance between signal and controller ground	Powertrain Relay Voltage within range and stable according to Enable Conditions Engine Run Time	11 volts ≤ Voltage for greater than 1 seconds ≥ 0 Sec	10 failures out of 20 samples 100 ms /sample Continuous	2 trips Type B
TPS2 Circuit Low	P0222	Detects a continuous or intermittent short or open in TPS2 circuit	TPS2 Voltage <	0.25		Run/Crank voltage or Powertrain relay voltage > 6.41 and reduced power is false, else the failure will be reported for all conditions No 5V reference error or fault for # 4 5V reference circuit (P06A3)	79/159 counts; 57 counts continuous; 3.125 ms /count in the ECM main processor	Trips: 1 Type: A MIL: YES
TPS2 Circuit High	P0223	Detects a continuous or intermittent short or open in TPS2 circuit	TPS2 Voltage >	4.59		Run/Crank voltage or Powertrain relay voltage > 6.41 and reduced power is false, else the failure will be reported for all conditions No 5V reference error or fault for # 4 5V reference circuit (P06A3)	79/159 counts; 57 counts continuous; 3.125 ms /count in the ECM main processor	Trips: 1 Type: A MIL: YES

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Injector 1 Low side circuit shorted to ground	P0261	This DTC Diagnoses Injector 1 low side driver circuit for circuit faults.	Voltage low during driver off state indicates short-to-ground or open circuit	Short to ground: ≤ 0.5 Ω impedance between signal and controller ground	Powertrain Relay Voltage within range and stable according to Enable Conditions Engine Run Time	11 volts ≤ Voltage for greater than 1 seconds ≥ 0 Sec	10 failures out of 20 samples 100 ms /sample Continuous	2 trips Type B
Injector 1 Low side circuit shorted to power	P0262	This DTC Diagnoses Injector 1 low side driver circuit for circuit faults.	Voltage high during driver on state indicates short to power	Short to power: ≤ 0.5 Ω impedance between signal and controller power	Powertrain Relay Voltage within range and stable according to Enable Conditions Engine Run Time	11 volts ≤ Voltage for greater than 1 seconds ≥ 0 Sec	10 failures out of 20 samples 100 ms /sample Continuous	2 trips Type B
Injector 2 Low side circuit shorted to ground	P0264	This DTC Diagnoses Injector 2 low side driver circuit for circuit faults.	Voltage low during driver off state indicates short-to-ground or open circuit	Short to ground: ≤ 0.5 Ω impedance between signal and controller ground	Powertrain Relay Voltage within range and stable according to Enable Conditions Engine Run Time	11 volts ≤ Voltage for greater than 1 seconds ≥ 0 Sec	10 failures out of 20 samples 100 ms /sample Continuous	2 trips Type B
Injector 2 Low side circuit shorted to power	P0265	This DTC Diagnoses Injector 3 low side driver circuit for circuit faults.	Voltage high during driver on state indicates short to power	Short to power: ≤ 0.5 Ω impedance between signal and controller power	Powertrain Relay Voltage within range and stable according to Enable Conditions Engine Run Time	11 volts ≤ Voltage for greater than 1 seconds ≥ 0 Sec	10 failures out of 20 samples 100 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 3 Low side circuit shorted to ground	P0267	This DTC Diagnoses Injector 3 low side driver circuit for circuit faults.	Voltage low during driver off state indicates short-to-ground or open circuit	Short to ground: ≤ 0.5 Ω impedance between signal and controller ground	Powertrain Relay Voltage within range and stable according to Enable Conditions Engine Run Time	11 volts ≤ Voltage for greater than 1 seconds ≥ 0 Sec	10 failures out of 20 samples 100 ms /sample Continuous	2 trips Type B
Injector 3 Low side circuit shorted to power	P0268	This DTC checks the circuit for electrical integrity during operation.	Voltage high during driver on state indicates short to power	Short to power: ≤ 0.5 Ω impedance between signal and controller power	Powertrain Relay Voltage within range and stable according to Enable Conditions Engine Run Time	11 volts ≤ Voltage for greater than 1 seconds ≥ 0 Sec	10 failures out of 20 samples 100 ms /sample Continuous	2 trips Type B
Injector 4 Low side circuit shorted to ground	P0270	This DTC Diagnoses Injector 4 low side driver circuit for circuit faults.	Voltage low during driver off state indicates short-to-ground or open circuit	Short to ground: ≤ 0.5 Ω impedance between signal and controller ground	Powertrain Relay Voltage within range and stable according to Enable Conditions Engine Run Time	11 volts ≤ Voltage for greater than 1 seconds ≥ 0 Sec	10 failures out of 20 samples 100 ms /sample Continuous	2 trips Type B
Injector 4 Low side circuit shorted to power	P0271	This DTC Diagnoses Injector 4 low side driver circuit for circuit faults.	Voltage high during driver on state indicates short to power	Short to power: ≤ 0.5 Ω impedance between signal and controller power	Powertrain Relay Voltage within range and stable according to Enable Conditions Engine Run Time	11 volts ≤ Voltage for greater than 1 seconds ≥ 0 Sec	10 failures out of 20 samples 100 ms /sample Continuous	2 trips Type B
Random Misfire Detected	P0300	These DTC's will determine if a random	Deceleration index vs. Engine Speed Vs	(>Idle SCD AND > Idle SCD ddt Tables)	Engine Run Time ECT	> 2 crankshaft revolutions -7ºC < ECT < 125ºC	Emission Exceedence =	2 Trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Cylinder 1 Misfire Detected Cylinder 2 Misfire Detected Cylinder 3 Misfire Detected Cylinder 4 Misfire Detected	P0301 P0302 P0303 P0304	or a cylinder specific misfire is occurring by monitoring crankshaft velocity	Engine load Deceleration index calculation is tailored to specific veh. Tables used are 1st tables encountered that are not max of range. Undetectable region at a given speed/load point is where all tables are max of range point. see Algorithm Description Document for additional details.	**OR** (>SCD Delta AND > SCD Delta ddt Tables) **OR** (>Idle Cyl Mode AND > Idle Cyl Mode ddt Tables) **OR** (>Cyl Mode AND > Cyl Mode ddt Tables) **OR** (>Rev Mode Table) **OR** (> AFM Table in Cyl Deact mode)	If ECT at startup then ECT System Voltage + Throttle delta - Throttle delta	< -7ºC 21ºC < ECT < 125ºC 9.00 < volts < 32.00 < 95.00% per 25 ms < 95.00% per 25 ms	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	(Mil Flashes with Catalyst Damaging Misfire)
					Early Termination option	NotEnabled	OR when Early Termination Reporting = Enabled and engine rev > 1000 and < 3200 at end of trip Initial Emission Exceedence = fails when MF% > Emission Failure Threshold	
			Misfire Percent Emission Failure Threshold	≥ 1.63% P0300				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			Misfire Percent Catalyst Damage	> "Catalyst Damaging Misfire Percentage" Table whenever secondary conditions are met.	Engine Speed Engine Load Misfire counts (at low speed/loads, one cylinder may not cause cat damage)	> 1500 rpm AND > 20 % load AND < 180 counts on one cylinder	any Catalyst Exceedence = (1) 200 rev block as data supports for catalyst damage. Failure reported with (1 or 3) Exceedences in FTP, or (1) Exceedence outside FTP.	
			When engine speed and load are less than the FTP cals (3) catalyst damage exceedences are allowed.	≤ 0 FTP rpm AND ≤ 0 FTP % load			Continuous	
					Engine Speed	500 < rpm < (Engine Speed Limit) - 400 Engine speed limit is a function of inputs like Gear and temperature Engine Speed Limit = 6850 rpm (Rev, Gears 1-5) Engine Speed Limit = 4000 rpm (P,N)	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"		
						Transmission Output Shaft Angular Velocity Validity (Auto Trans only) Clutch Sensor FA (Manual Trans only)		
						TransEngagedState_FA (Auto Trans only)		
					P0315 & engine speed Fuel Level Low	> 1000 rpm LowFuelConditionDiagnostic	500 cycle delay	
					Cam and Crank Sensors	in sync with each other	4 cycle delay	
					Misfire requests TCC unlock	Not honored because Transmission in hot mode or POPD intrusive diagnostic running	4 cycle delay	
							4 cycle delay	
					Fuel System Status Active Fuel Management	≠ Fuel Cut Transition in progress	0 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 Veh Speed	 ≤ 1% > 318 mph	4 cycle delay	
					EGR Intrusive test	Active	0 cycle delay	
					Manual Trans Throttle Position AND Automatic transmission shift	Clutch shift > 98.00%	0 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:			
						> "Ring Filter" in Supporting Tables tab engine cycles after misfire		
					Stop filter early:			
						> "Number of Normals" in Supporting Tables tab engine cycles after misfire		
					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	> 3 %		
					Engine Speed	> 1000 rpm		
					Veh Speed	> 3 mph		
					SCD	> SCD Mode		
					Cyl Mode	> Cylinder Mode		
					Rev Mode	> Rev Mode		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Misfire Pattern Recognition Enabled: Validates misfire vs. false detection	1 (1 = Enabled)		
					Engine Speed	500 < RPM < 4000		
					Veh Speed	> 5 kph		
					Final fail conditions within:	> "min multiplier" or < "max multiplier" in Supporting Tables tab of misfire threshold for a given engine speed and load		
					Monitor Rough Road	0 (1=Yes)		
					Rough Road Source	TOSS		
					IF Rough Road is			
Crankshaft Position System Variation Not Learned	P0315	Monitor for valid crankshaft error compensation factors	Sum of Compensation factors. Each Cylinder pair shares one compensation factor. A perfect factor would be 1.0000. Unlearned factors are defaulted out of range so the sum of factors would be out of range.	≥ 2.0040 OR ≤ 1.9960	OBD Manufacturer Enable Counter	=0	0.50 seconds Frequency Continuous 100 msec	1 Trips Type A
Knock Sensor (KS) Performance Per Cylinder	P0324	This diagnostic checks for knock sensor performance out of the normal expected range due to: 1) Excessive knock **and** 2) Abnormal engine noise on a per cylinder basis	Common Enable Criteria		Diagnostic Enabled?	Disabled	First Order Lag Filter with Weight Coefficient	Type: B MIL: YES Trips: 2
					Engine Speed	≤ 8500 RPM		
					Engine Air Flow	≥ 40 mg/cylinder and ≤ 2000 mg/cylinder		
					ECT	≥ -40 deg's C		
					IAT	≥ -40 deg's C		
			Specific Enable Criteria and Thresholds					
			1. Filtered Knock Intensity (for Excessive Knock)	> 2.0000	Engine Speed Engine running	≥ 570 RPM ≥ 1.3 seconds	Weight Coefficient =	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			VaKNKD_k_PerfCylKnockIntFilt				0.0400 Updated each engine event	
			2. Filtered FFT Intensity: (for Abnormal Noise) VaKNKD_k_PerfCylAbnFiltIntnsity	< Abnormal Noise Threshold (see supporting tables)	Engine Speed Engine running	≥ 4000 RPM ≥ 0.9 seconds	Weight Coefficient = 0.0080 Updated each engine event	
Knock Sensor (KS) Circuit Bank 1	P0325	This diagnostic checks for an open in the knock sensor circuit	Filtered FFT Output (VaKNKD_k_OpenFiltIntensity[0])	> OpenCktThrshMin **and** < OpenCktThrshMax See Supporting Tables for OpenCktThrshMin & Max	Diagnostic Enabled?	Enabled	First Order Lag Filter with Weight Coefficient	Type: B MIL: YES Trips: 2
					Engine Speed	≥ 570 RPM and ≤ 8500 RPM		
					Engine Air Flow	≥ 40 mg/cylinder and ≤ 2000 mg/cylinder		
					ECT	≥ -40 deg's C	Weight Coefficient = 0.0100 Updated each engine event	
					IAT	≥ -40 deg's C		
					Engine running	≥ 5.3 seconds		
Knock Sensor (KS) Performance Bank 1	P0326	This diagnostic checks for knock sensor performance out of the normal expected range due to 1. Excessive knock **or** 2. Abnormal engine noise on a per bank/sensor basis	Common Enable Criteria		Diagnostic Enabled?	Enabled	First Order Lag Filter with Weight Coefficient	Type: B MIL: YES Trips: 2
					Engine Speed	≤ 8500 RPM		
					Engine Air Flow	≥ 40 mg/cylinder and ≤ 2000 mg/cylinder		
					ECT	≥ -40 deg's C		
					IAT	≥ -40 deg's C		
			1. Filtered Knock Intensity (for Excessive Knock) VaKNKD_k_PerfKnockIntFilt	> 2.0000	Engine Speed Engine running	≥ 570 RPM ≥ 5.3 seconds	Weight Coefficient = 0.0100	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
							Updated each engine event	
			2. Filtered FFT Intensity: (for Abnormal Noise) VaKNKD_k_PerfAbnFiltIntnsity	< Abnormal Noise Threshold (see supporting tables)	Engine Speed Engine running	≥ 4000 RPM ≥ 3.0 seconds	Weight Coefficient = 0.0025 Updated each engine event	
Knock Sensor (KS) Circuit Low Bank 1	P0327	This diagnostic checks for an out of range low knock sensor signal	Sensor Input Signal Line	< 0.57 Volts	Diagnostic Enabled?	Enabled	50 Failures out of 63 Samples	Type: B MIL: YES Trips: 2
					Engine Speed	> 0 RPM and < 8500 RPM	100 msec rate	
			or					
			Sensor Return Signal Line	< 0.40 Volts				
Knock Sensor (KS) Circuit High Bank 1	P0328	This diagnostic checks for an out of range high knock sensor signal	Sensor Input Signal Line	> 2.76 Volts	Diagnostic Enabled?	Enabled	50 Failures out of 63 Samples	Type: B MIL: YES Trips: 2
					Engine Speed	> 0 RPM and < 8500 RPM	100 msec rate	
			or					
			Sensor Return Signal Line	> 1.95 Volts				
Crankshaft Position (CKP) Sensor A Circuit	P0335	Determines if a fault exists with the crank position sensor signal	<u>Engine-Cranking Crankshaft Test:</u> Time since last crankshaft position sensor pulse received	>= 4.0 seconds	<u>Engine-Cranking Crankshaft Test:</u> Starter engaged AND (cam pulses being received OR (DTC P0101 AND DTC P0102 AND DTC P0103 AND	= FALSE = FALSE = FALSE	<u>Engine-Cranking Crankshaft Test:</u> 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 Crankshaft Test:		Time-Based Crankshaft Test:		Time-Based Crankshaft Test:	
			No crankshaft pulses received	>= 1.0 seconds	Engine is Running Starter is not engaged		Continuous every 12.5 msec	
					No DTC Active:	5VoltReferenceB_FA		
			Event-Based Crankshaft Test:		Event-Based Crankshaft Test:		Event-Based Crankshaft Test:	
			No crankshaft pulses received		Engine is Running OR Starter is engaged		2 failures out of 10 samples	
					No DTC Active:	5VoltReferenceA_FA 5VoltReferenceB_FA P0365 P0366	One sample per engine revolution	
Crankshaft Position (CKP) Sensor A Performance	P0336	Determines if a performance fault exists with the crank position sensor signal	Crank Re-synchronization Test:		Crank Re-synchronization Test:		Crank Re-synchronization Test:	Type B 2 trips
			Time in which 10 or more crank re-synchronizations occur	< 10.0 seconds	Engine Air Flow Cam-based engine speed No DTC Active:	>= 3.0 grams/second > 450 RPM 5VoltReferenceB_FA P0335	Continuous every 250 msec	
			Time-Based Crankshaft Test:		Time-Based Crankshaft Test:		Time-Based Crankshaft Test:	
			No crankshaft synchronization gap found	>= 0.4 seconds	Engine is Running Starter is not engaged		Continuous every 12.5 msec	
					No DTC Active:	5VoltReferenceB_FA		
			Engine Start Test during Crank:		Engine Start Test during Crank:		Engine Start Test during Crank:	
			Time since starter		Starter engaged		Continuous every	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			engaged without detecting crankshaft synchronization gap	>= 1.5 seconds	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))	100 msec	
			Event-Based Crankshaft Test: Crank Pulses received in one engine revolution OR Crank Pulses received in one engine revolution	< 51 > 65	Event-Based Crankshaft Test: Engine is Running OR Starter is engaged No DTC Active:	5VoltReferenceA_FA 5VoltReferenceB_FA P0365 P0366	Event-Based Crankshaft Test: 8 failures out of 10 samples One sample per engine revolution	
Camshaft Position (CMP) Sensor Circuit Bank 1 Sensor A	P0340	Determines if a fault exists with the cam position bank 1 sensor A signal	Engine Cranking Camshaft Test: Time since last camshaft position sensor pulse received OR Time that starter has been engaged without a camshaft sensor pulse Time-Based Camshaft	>= 5.5 seconds >= 4.0 seconds	Engine Cranking Camshaft Test: Starter engaged AND (cam pulses being received OR (DTC P0101 AND DTC P0102 AND DTC P0103 AND Engine Air Flow Time-Based Camshaft	= FALSE = FALSE = FALSE > 3.0 grams/second))	Engine Cranking Camshaft Test: Continuous every 100 msec Time-Based	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			Test: Fewer than 4 camshaft pulses received in a time	> 3.0 seconds	Test: Engine is Running Starter is not engaged No DTC Active:	5VoltReferenceA_FA	Camshaft Test: Continuous every 100 msec	
			Fast Event-Based Camshaft Test: No camshaft pulses received during first 12 MEDRES events (There are 12 MEDRES events per engine cycle)		Fast Event-Based Camshaft Test: Crankshaft is synchronized Starter must be engaged to enable the diagnostic, but the diagnostic will not disable when the starter is disengaged No DTC Active:	5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensor_FA	Fast Event-Based Camshaft Test: Continuous every MEDRES event	
			Slow Event-Based Camshaft Test: The number of camshaft pulses received during 100 engine cycles	= 0	Slow Event-Based Camshaft Test: Crankshaft is synchronized No DTC Active:	5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensor_FA	Slow Event-Based Camshaft Test: 8 failures out of 10 samples Continuous every engine cycle	
Camshaft Position (CMP) Sensor Performance Bank 1 Sensor A	P0341	Determines if a performance fault exists with the cam position bank 1 sensor A signal	Fast Event-Based Camshaft Test: The number of camshaft pulses received during first 12 MEDRES events is less than 4 or greater than 10		Fast Event-Based Camshaft Test: Crankshaft is synchronized Starter must be engaged to enable the		Fast Event-Based Camshaft Test: Continuous every MEDRES event	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			(There are 12 MEDRES events per engine cycle)		diagnostic, but the diagnostic 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 OR	< 398 > 402	Slow Event-Based Camshaft Test: Crankshaft is synchronized No DTC Active:	5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensor_FA	Slow Event-Based Camshaft Test: 8 failures out of 10 samples Continuous every engine cycle	
IGNITION CONTROL #1 CIRCUIT	P0351	This diagnostic checks the circuit for electrical integrity during operation. Monitors EST for Cylinder 1	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine running Ignition Voltage	 > 6.00 Volts	50 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2
IGNITION CONTROL #2 CIRCUIT	P0352	This diagnostic checks the circuit for electrical integrity during operation. Monitors EST for Cylinder 2	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine running Ignition Voltage	 > 6.00 Volts	50 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
IGNITION CONTROL #3 CIRCUIT	P0353	This diagnostic checks the circuit for electrical integrity during operation. Monitors EST for Cylinder 3	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine running Ignition Voltage	 **> 6.00 Volts**	50 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2
IGNITION CONTROL #4 CIRCUIT	P0354	This diagnostic checks the circuit for electrical integrity during operation. Monitors EST for Cylinder 4	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine running Ignition Voltage	 **> 6.00 Volts**	50 Failures out of 63Samples 100 msec rate	Type: B MIL: YES Trips: 2
Camshaft Position (CMP) Sensor Circuit Bank 1 Sensor B	P0365	Determines if a fault exists with the cam position bank 1 sensor B signal	<u>Engine Cranking Camshaft Test:</u> Time since last camshaft position sensor pulse received OR Time that starter has been engaged without a camshaft sensor pulse <u>Time-Based Camshaft Test:</u> Fewer than 4 camshaft pulses received in a time	 >= 5.5 seconds >= 4.0 seconds > 3.0 seconds	<u>Engine Cranking Camshaft Test:</u> Starter engaged AND (cam pulses being received OR (DTC P0101 AND DTC P0102 AND DTC P0103 AND Engine Air Flow <u>Time-Based Camshaft Test:</u> Engine is Running Starter is not engaged	 = FALSE = FALSE = FALSE > 3.0 grams/second))	<u>Engine Cranking Camshaft Test:</u> Continuous every 100 msec <u>Time-Based Camshaft Test:</u> 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.
					No DTC Active:	5VoltReferenceA_FA		
			Fast Event-Based Camshaft Test:		Fast Event-Based Camshaft Test:		Fast Event-Based Camshaft Test:	
			No camshaft pulses received during first 12 MEDRES events (There are 12 MEDRES events per engine cycle)		Crankshaft is synchronized Starter must be engaged to enable the diagnostic, but the diagnostic will not disable when the starter is disengaged		Continuous every MEDRES event	
					No DTC Active:	5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensor_FA		
			Slow Event-Based Camshaft Test:		Slow Event-Based Camshaft Test:		Slow Event-Based Camshaft Test:	
			The number of camshaft pulses received during 100 engine cycles	= 0	Crankshaft is synchronized No DTC Active:	5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensor_FA	8 failures out of 10 samples Continuous every engine cycle	
Camshaft Position (CMP) Sensor Performance Bank 1 Sensor B	P0366	Determines if a performance fault exists with the cam position bank 1 sensor B signal	Fast Event-Based Camshaft Test: The number of camshaft pulses received during first 12 MEDRES events is less than 4 or greater than 10 (There are 12 MEDRES events per engine cycle)		Fast Event-Based Camshaft Test: Crankshaft is synchronized Starter must be engaged to enable the diagnostic, but the diagnostic will not disable when the starter is disengaged		Fast Event-Based Camshaft Test: Continuous every MEDRES event	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					No DTC Active:	5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensor_FA		
			<u>Slow Event-Based Camshaft Test:</u> The number of camshaft pulses received during 100 engine cycles OR	< 398 > 402	<u>Slow Event-Based Camshaft Test:</u> Crankshaft is synchronized No DTC Active:	5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensor_FA	<u>Slow Event-Based Camshaft Test:</u> 8 failures out of 10 samples Continuous every engine cycle	
Catalyst System Low Efficiency Bank 1	P0420	Oxygen Storage The catalyst washcoat contains Cerium Oxide. Cerium Oxide reacts with NO and O2 during lean A/F excursions to store the excess oxygen (I.e. Cerium Oxidation). During rich A/F excursions, Cerium Oxide reacts with CO and H2 to release this stored oxygen (I.e. Cerium Reduction). This is referred to as the Oxygen Storage Capacity, or OSC. CatMon's strategy is to "measure" the OSC of the catalyst through forced Lean and Rich A/F excursions Normalized Ratio OSC Value Calculation Information and Definitions = 1. Raw OSC Calculation = (post cat O2 Resp time - pre cat O2 Resp time) 2. BestFailing OSC value from a calibration table (based on temp and exhaust gas flow) 3. WorstPassing OSC value (based on temp and exhaust gas flow) Normalized Ratio Calculation = (1-2) / (3-2) A Normalized Ratio of 1 essentially represents a good part and a ratio of 0 essentially represents a very bad part.	Normalized Ratio OSC Value (EWMA filtered)	< 0.320	***<u>Valid Idle Period Criteria</u>*** Driver must be off the accel pedal. This checks that the final accel pedal position (comprehending deadband and hysteresis) is essentially zero. Vehicle Speed: *< 1.24 MPH* Engine speed: > 1000 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 Temperature, please see Supporting Tables** 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*	1 test attempted per valid idle period Minimum of 1 test per trip Maximum of 8 tests per trip Frequency: Fueling Related : 12.5 ms OSC Measurements: 100 ms Temp Prediction: 1000ms	Type A 1 Trip(s)

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Intrusive test(s): Fueltrim Post O2 EVAP EGR	Not Active		
		The Catalyst Monitoring Test is done during idle. Several conditions must be meet in order to execute this test. These conditions and their related values are listed in the secondary parameters area of this document.			Other vehicle functions: Power Take Off	Not Active		
					RunCrank Voltage	> 10.90 Volts		
					Ethanol Estimation	NOT in Progress		
					ECT	*40 < ° C < 140*		
					Barometric Pressure	> 70 KPA		
					Idle Time before going intrusive is	< 50 Seconds		
					Idle time is incremented if Vehicle speed	< 1.24 MPH and the drivers foot is off accel pedal and the idle speed control system is active as identified in the Valid Idle Period Criteria section.		
					Short Term Fuel Trim	*0.80 < ST FT < 1.25*		
					Predicted catalyst temp > 500 degC AND Engine Airflow > MinAirflowToWarmCatalyst table (g/s) (refer to "Supporting Tables" tab) (Based on engine coolant at the time the WarmedUpEvents counter resets to 0.) for at least 15 seconds with a closed throttle time < 60 seconds consecutively (closed throttle consideration involves having the driver off the accel pedal as stated in the Valid Idle Period Criteria Section) . Also, in order to increment the WarmedUpEvents counter (counter must exceed 15 cal value), either the vehicle speed must exceed the vehicle speed cal or the driver must NOT be off the accel pedal as stated in the Valid Idle Period Criteria section above.			
					Closed loop fueling Enabled			

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	*1.50 < g/s < 10.00*		
					Predicted catalyst temperature	< 900 degC		
					Engine Fueling Criteria at Beginning of Idle Period			
					The following fueling related must also be met from between 4 and 7 seconds after the Catalyst Idle Conditions Met Criteria has been met for at least 4 seconds prior to allowing intrusive control			
					Number of pre-O2 switches	>= 2		
					Short Term Fuel Trim Avg	*0.960 < ST FT Avg < 1.040*		
					Rapid Step Response (RSR) feature will initiate multiple tests:			
					If the difference between current EWMA value and the current OSC Normalized Ratio value is > 0.440 and the current OSC Normalized Ratio value is < 0.100			
					Maximum of 24 RSR tests to detect failure when RSR is enabled.			
					Green Converter Delay Criteria			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					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			
					MAF_SensorTFTKO			
					AmbPresDfltdStatus			
					IAT_SensorCircuitFA			
					IAT_SensorCircuitTFTKO			
					ECT_Sensor_FA			
					O2S_Bank_1_Sensor_1_FA			
					O2S_Bank_1_Sensor_2_FA			
					O2S_Bank_2_Sensor_1_FA			
					O2S_Bank_2_Sensor_2_FA			
					FuelTrimSystemB1_FA			
					FuelTrimSystemB1_TFTKO			
					FuelTrimSystemB2_FA			
					FuelTrimSystemB2_TFTKO			
					EngineMisfireDetected_FA			
					EvapPurgeSolenoidCircuit_FA			
					IAC_SystemRPM_FA			
					EGRValvePerformance_FA			
					EGRValveCircuit_FA			
					CamSensorAnyLocationFA			
					CrankSensor_FA			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					TPS_Performance_FA EnginePowerLimited VehicleSpeedSensor_FA			
Evaporative Emission (EVAP) System Small Leak Detected	P0442	This DTC will detect a small leak (≥ 0.020") in the EVAP system between the fuel fill cap and the purge solenoid. The engine off natural vacuum method (EONV) is used. EONV is an evaporative system leak detection diagnostic that runs when the vehicle is shut off when enable conditions are met. Prior to sealing the system and performing the diagnostic, the fuel volatility is analyzed. In an open system (Canister Vent Solenoid [CVS] open) high volatility fuel creates enough flow to generate a measurable pressure differential relative to atmospheric.	The total delta from peak pressure to peak vacuum during the test is normalized against a calibration pressure threshold table that is based upon fuel level and ambient temperature. (See P0442: EONV Pressure Threshold Table on Supporting Tables Tab). The normalized value is calculated by the following equation: 1 - (peak pressure - peak vacuum) / pressure threshold. The normalized value is entered into EWMA (with 0= perfect pass and 1= perfect fail).		Fuel Level Drive Time Drive length ECT Baro Odometer Engine not run time before key off must be Time since last complete test if normalized result and EWMA is passing OR Time since last complete test if normalized result or EWMA is failing Estimated ambient temperature at end of drive Estimate of Ambient Air Temperature Valid	10 % ≤ Percent ≤ 90 % ≥ 600 seconds ≥ 3.1 miles ≥ 63 °C ≥ 70 kPa ≥ 10.0 miles ≤ refer to "P0442: Engine Off Time Before Vehicle Off Maximum as a Function of Estimated Ambient Temperature table" in Supporting Tables. ≥ 17 hours ≥ 10 hours 0 °C ≤ Temperature ≤ 34 °C	Once per trip, during hot soak (up to 2400 sec.). No more than 2 unsuccessful attempts between completed tests.	1 trip Type A EWMA Average run length is 8 to 12 trips under normal conditions. Run length is 3 to 6 trips after code clear or nonvolatile reset.
			When EWMA is , the DTC light is illuminated.	> 0.65 (EWMA Fail Threshold)	**Conditions for Estimate of Ambient Air Temperature to be valid:**			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		After the volatility check, the vent solenoid will close. After the vent is closed, typically a build up of pressure from the hot soak begins (phase-1). The pressure typically will peak and then begin to decrease as the fuel cools. When the pressure drops (-62.27) Pa from peak pressure, the vent is then opened for 60 seconds to normalize the system pressure. The vent is again closed to begin the vacuum portion of the test (phase-2). As the fuel temperature continues to fall, a vacuum will begin forming. The vacuum will continue until it reaches a vacuum peak. When the pressure rises 62.27 Pa from vacuum peak, the test then completes. If the key is turned on while the diagnostic test is in progress, the test will abort.	The DTC light can be turned off if the EWMA is and stays below the EWMA fail threshold for 2 additional consecutive trips.	≤ 0.35 (EWMA Re-Pass Threshold)	**1. Cold Start** Startup delta deg C (ECT-IAT) OR **2. Short Soak and Previous EAT Valid** Previous time since engine off OR **3. Less than a short soak and Previous EAT Not Valid** Previous time since engine off AND Must expire Estimate of Ambient Temperature Valid Conditioning Time. **"P0442: Estimate of Ambient Temperature Valid Conditioning Time" in Supporting Tables Tab.** OR **4. Not a Cold Start and greater than a Short Soak** Previous time since engine off	≤ 8 °C ≤ 7200 seconds ≤ 7200 seconds Vehicle Speed ≥ 19.9 mph AND Mass Air Flow ≥ 7 g/sec > 7200 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					AND Must expire maximum value in Estimate of Ambient Temperature Valid Conditioning Time. **Please see "P0442: Estimate of Ambient Temperature Valid Conditioning Time" in Supporting Tables Tab.**	Vehicle Speed ≥ 19.9 mph AND Mass Air Flow ≥ 7 g/sec		
				Abort Conditions:	**1. High Fuel Volatility** During the volatility phase, pressure in the fuel tank is integrated vs. time. If the integrated pressure is then test aborts and unsuccessful attempts is incremented. OR **2. Vacuum Refueling Detected** See P0454 Fault Code for information on vacuum refueling	< -5		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					algorithm. OR **3. Fuel Level Refueling Detected** See P0464 Fault Code for information on fuel level refueling. OR **4. Vacuum Out of Range and No Refueling** See P0451 Fault Code for information on vacuum sensor out of range and P0464 Fault Code for information on fuel level refueling. OR **5. Vacuum Out of Range and Refueling Detected** See P0451 Fault Code for information on vacuum sensor out of range and P0464 Fault Code for information on fuel level refueling.			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					OR **6. Vent Valve Override Failed** Device control using an off-board tool to control the vent solenoid, cannot exceed during the EONV test OR **7. Key up during EONV test** No active DTCs:	0.50 seconds FuelLevelDataFault MAF_SensorFA ECT_Sensor_FA IAT_SensorFA VehicleSpeedSensor_FA IgnitionOffTimeValid AmbientAirDefault P0443 P0446 P0449 P0452 P0453 P0455 P0496		
Evaporative Emission (EVAP) Canister Purge Solenoid Valve Circuit (ODM)	P0443	Diagnoses the canister purge solenoid low side driver circuit for circuit faults	Voltage low during driver off state (indicates open circuit)	Open Circuit: ≥ 200 KΩ impedance between signal and controller ground.	PT Relay Voltage	11 volts ≤ Voltage	20 failures out of 25 samples 250 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.
							Continuous with solenoid operation	
Evaporative Emission (EVAP) Vent System Performance	P0446	This DTC will determine if a restriction is present in the vent solenoid, vent filler, vent hose or EVAP canister. This test runs with normal purge and vent valve is open.	Vent Restriction Prep Test: Vented Vacuum OR Vented Vacuum for 60 seconds Vent Restriction Test: Tank Vacuum for 5 seconds BEFORE Purge Volume After setting the DTC for the first time, 2 liters of fuel must be consumed before setting the DTC for the second time.	< -623 Pa > 1245 Pa > 2989 Pa ≥ 10 liters	Fuel Level System Voltage Startup IAT Startup ECT BARO No active DTCs:	10% ≤ Percent ≤ 90% 11 volts ≤ Voltage ≤ 32 volts 4 °C ≤ Temperature ≤ 30 °C ≤ 35 °C ≥ 70 kPa MAP_SensorFA TPS_FA VehicleSpeedSensor_FA IAT_SensorCircuitFA ECT_Sensor_FA AmbientAirDefault EnginePowerLimited P0443 P0449 P0452 P0453 P0454	Once per Cold Start Time is dependent on driving conditions Maximum time before test abort is 1000 seconds	2 trips Type B
Evaporative Emission (EVAP) Vent Solenoid Control Circuit (ODM)	P0449	Diagnoses the vent solenoid low side driver circuit for circuit faults.	Voltage low during driver off state (indicates open circuit)	Open Circuit: ≥ 200 KΩ impedance between signal and controller ground.	Run/Crank Voltage	11 volts ≤ Voltage	20 failures out of 25 samples 250 ms / sample Continuous with solenoid operation	2 trips Type B
Fuel Tank Pressure (FTP)	P0451	The DTC will be set if the fuel tank vacuum	The tank vacuum sensor voltage is compared to a		This test will execute whenever the engine-		This test is executed during	1 trip Type A

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Sensor Circuit Performance		sensor is out of range when it tries to re-zero prior to the phase-1 or phase-2 portions of the engine-off natural vacuum small leak test.	window about the nominal sensor voltage offset (~1.5 volts) Upper voltage threshold (voltage addition above the nominal voltage) Lower voltage threshold (voltage subtraction below the nominal voltage) The difference between tank vacuum sensor voltage and the nominal offset voltage is then normalized against the appropriate threshold listed above to produce a ratio between 0.0 and 1.0. This normalized re-zero ratio is then filtered with a EWMA (with 0= perfect pass and 1=perfect fail). When EWMA is , the DTC light is illuminated. The DTC light can be turned off if the EWMA is and stays below the EWMA fail threshold for 2 additional consecutive trips.	0.2 volts 0.2 volts > 0.73 (EWMA Fail Threshold) ≤ 0.40 (EWMA Re-Pass Threshold)	off natural vacuum small leak test (P0442) executes		an engine-off natural vacuum small leak test. The number of times that it executes can range from zero to two per engine-off period. The length of the test is determined by the refueling rationality test, which can take up to 600 seconds to complete.	EWMA Average run length: 6 Run length is 3 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.
Fuel Tank Pressure (FTP) Sensor Circuit Low Voltage	P0452	This DTC will detect a fuel tank pressure sensor signal that is too low out of range.	Fuel tank pressure sensor signal The normal operating range of the fuel tank pressure sensor is 0.5 volts (~1245 Pa) to 4.5 volts (~ -3736 Pa).	< 0.15 volts (3 % of Vref or ~ 1681 Pa)	Time delay after sensor power up for sensor warm-up ECM State ≠ crank Stops 6.0 seconds after key-off	is 0.10 seconds	640 failures out of 800 samples 100 ms / sample Continuous	2 trips Type B
Fuel Tank Pressure (FTP) Sensor Circuit High Voltage	P0453	This DTC will detect a fuel tank pressure sensor signal that is too high out of range.	Fuel tank pressure sensor signal The normal operating range of the fuel tank pressure sensor is 0.5 volts (~1245 Pa) to 4.5 volts (~ -3736 Pa).	> 4.85 volts (97% of Vref or ~ -4172 Pa)	Time delay after sensor power up for sensor warm-up ECM State ≠ crank Stops 6.0 seconds after key-off	is 0.10 seconds	640 failures out of 800 samples 100 ms / sample Continuous	2 trips Type B
Fuel Tank Pressure (FTP) Sensor Circuit Intermittent	P0454	This DTC will detect intermittent tank vacuum sensor signals that would have caused the engine-off natural vacuum small leak test to abort due to an apparent re-fueling event.	If an abrupt change in tank vacuum is detected the engine-off natural vacuum test is aborted due to an apparent refueling event. Subsequent to the abort, a refueling rationality test is executed to confirm that a refueling event occurred. If a refueling is confirmed, then the test sample is considered passing. Otherwise, the sample is considered failing indicating an intermittent signal problem.		This test will execute whenever the engine-off natural vacuum small leak test (P0442) executes		This test is executed during an engine-off natural vacuum small leak test. The test can only execute up to once per engine-off period. The length of the test is determined by the refueling rationality test, which can take up to 600 seconds to complete	1 trips 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 10 %			The test will report a failure if 2 out of 3 samples are failures. 12.5 ms / sample Continuous when vent solenoid is closed.	
Evaporative Emission (EVAP) System Large Leak Detected	P0455	This DTC will detect a weak vacuum condition (large leak or purge blockage) in the EVAP system. Purge valve is controlled (to allow purge flow) and vent valve is commanded closed.	Purge volume while Tank vacuum After setting the DTC for the first time, 2 liters of fuel must be consumed before setting the DTC for the second time. <u>Weak Vacuum Follow-up Test</u> (fuel cap replacement test) Weak Vacuum Test failed. Passes if tank vacuum Note: Weak Vacuum Follow-up Test can only report a pass.	> 10 liters ≤ 2740 Pa ≥ 2740 Pa	Fuel Level System Voltage BARO Purge Flow No active DTCs: <u>Cold Start Test</u>	10% ≤ Percent ≤ 90% 11 volts ≤ Voltage ≤ 32 volts ≥ 70 kPa ≥ 2.00 % MAP_SensorFA TPS_FA VehicleSpeedSensor_FA IAT_SensorCircuitFA ECT_Sensor_FA AmbientAirDefault EnginePowerLimited P0443 P0449 P0452 P0453 P0454	Once per cold start Time is dependent on driving conditions Maximum time before test abort is 1000 seconds <u>Weak Vacuum Follow-up Test</u> With large leak detected, the	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					If ECT > IAT, Startup temperature delta (ECT-IAT): Cold Test Timer Startup IAT Startup ECT <u>Weak Vacuum Follow-up Test</u> This test can run following a weak vacuum failure or on a hot restart.	 ≤ 8 °C ≤ 1000 seconds 4 °C ≤ Temperature ≤ 30 °C ≤ 35 °C	follow-up test is limited to 1300 seconds. Once the MIL is on, the follow-up test runs indefinitely.	
Evaporative Emission System Purge Control Valve Circuit Low	P0458	Diagnoses the canister purge solenoid low side driver circuit for circuit faults	Voltage low during driver off state (indicates short to ground)	Short to ground: ≤ 0.5Ω impedance between signal and controller ground.	PT Relay Voltage	11 volts ≤ Voltage	20 failures out of 25 samples 250 ms / sample Continuous with solenoid operation	2 trips Type B
Evaporative Emission System Purge Control Valve Circuit High	P0459	Diagnoses the canister purge solenoid low side driver circuit for circuit faults	Voltage high during driver on state (indicates short to power)	Short to power: ≤ 0.5Ω impedance between signal and controller power.	PT Relay Voltage	11 volts ≤ Voltage	20 failures out of 25 samples 250 ms / sample Continuous with solenoid operation	2 trips Type B
Fuel Level Sensor 1 Performance	P0461	This DTC will detect a fuel sender stuck in range in the primary fuel tank.	Delta Fuel Volume change over an accumulated 186 miles.	< 3 liters	Engine Running No active DTCs:	 VehicleSpeedSensor_FA	250 ms / sample Continuous	2 trips Type B
Fuel Level Sensor 1 Circuit Low Voltage	P0462	This DTC will detect a fuel sender stuck out of range low in the primary	Fuel level Sender % of 5V range	< 10 %	Run/Crank Voltage	11 volts ≤ Voltage ≤ 32 volts	100 failures out of 125 samples	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		fuel tank.			Run/Crank voltage goes to 0 volts at key off		100 ms / sample Continuous	
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 Sensor 1 Circuit Intermittent	P0464	This DTC will detect intermittent fuel level sensor signals that would have caused the engine-off natural vacuum small leak test to abort due to an apparent re-fueling event.	If a change in fuel level is detected, the engine-off natural vacuum test is aborted due to an apparent refueling event. Subsequent to the abort, a refueling rationality test is executed to confirm that an actual refueling event occurred. If a refueling event is confirmed, then the test sample is considered passing. Otherwise, the sample is considered failing indicating an intermittent signal problem. An intermintant change in fuel level is defined as: The fuel level changes and does not remain	by 10 %	This test will execute whenever the engine-off natural vacuum small leak test (P0442) executes		This test is executed during an engine-off natural vacuum small leak test. The test can only execute up to once per engine-off period. The length of the test is determined by the refueling rationality test, which can take up to 600 seconds to complete. The test will report a failure if 2 out of 3 samples are failures.	1 trips Type A

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			for 30 seconds during a 600 second refueling rationality test.	> 10 %			100 ms / sample	
Cooling Fan 1 Relay Control Circuit (ODM)	P0480	Diagnoses the cooling fan 1 relay control low side driver circuit for circuit faults	Voltage low during driver off state (indicates open circuit) Voltage low during driver off state (indicates short to ground) Voltage high during driver on state (indicates short to power)	Open Circuit: >= 200K Ohms impedance between signal and controller ground Short to Ground: <= 0.5 Ohms impedance between signal and controller ground Short to Power: <= 0.5 Ohms impedance between signal and controller power	Powertrain relay voltage Engine Speed	11 volts ≤ Voltage ≤ 32 volts ≥ 400 RPM	50 failures out of 63 samples 100 ms / sample Continuous with fan operation	2 trips Type B
Cooling Fan 2 Relay Control Circuit (ODM)	P0481	Diagnoses the cooling fan 2 relay control low side driver circuit for circuit faults	Voltage low during driver off state (indicates open circuit) Voltage low during driver off state (indicates short to ground) Voltage high during driver on state (indicates short to power)	Open Circuit: >= 200K Ohms impedance between signal and controller ground Short to Ground: <= 0.5 Ohms impedance between signal and controller ground Short to Power: <= 0.5 Ohms impedance between signal and controller power	Powertrain relay voltage Engine Speed	11 volts ≤ Voltage ≤ 32 volts ≥ 400 RPM	50 failures out of 63 samples 100 ms / sample Continuous with fan operation	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Evaporative Emission (EVAP) System Flow During Non-Purge	P0496	This DTC will determine if the purge solenoid is leaking to engine manifold vacuum. This test will run with the purge valve closed and the vent valve closed.	Tank Vacuum for 5 seconds BEFORE Test time	> 2491 Pa ≥ refer to "P0496: Purge Valve Leak Test Engine Vacuum Test Time (Cold Start) as a Function of Fuel Level table" in Supporting Tables Tab.	Fuel Level System Voltage BARO Startup IAT Startup ECT Engine Off Time No active DTCs:	10% ≤ Percent ≤ 90% 11 volts ≤ Voltage ≤ 32 volts ≥ 70 kPa 4 °C ≤ Temperature ≤ 30 °C ≤ 35 °C ≥ 28800.0 seconds MAP_SensorFA TPS_FA VehicleSpeedSensor_FA IAT_SensorCircuitFA ECT_Sensor_FA AmbientAirDefault EnginePowerLimited P0443 P0449 P0452 P0453 P0454	Once per cold start Cold start: max time is 1000 seconds	2 trips Type B
Evaporative Emission System Vent Solenoid Control Circuit Low	P0498	Diagnoses the vent solenoid low side driver circuit for circuit faults.	Voltage low during driver off state (indicates short to ground)	Short to ground: ≤ 0.5Ω impedance between signal and controller ground.	Run/Crank Voltage	11 volts ≤ Voltage	20 failures out of 25 samples 250 ms / sample Continuous with solenoid operation	2 trips Type B
Evaporative	P0499	Diagnoses the vent	VVoltage low during driver	Short to ground:	Run/Crank Voltage	11 volts ≤ Voltage	20 failures out of	2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Emission System Vent Solenoid Control Circuit High		solenoid low side driver circuit for circuit faults. If the P0449 is active, an intrusive test is performed with the vent solenoid commanded closed for 15 seconds.	on state (indicates short to power)	≤ 0.5Ω impedance between signal and controller power.			25 samples 250 ms / sample Continuous with solenoid operation	Type B
Transmission Output Speed Sensor (TOSS)	P0502	No activity in the TOSS circuit	TOSS Raw Speed	≤ 60 RPM	Engine Torque Minimum Throttle opening Engine Speed Ignition voltage PTO	90.0 ≤ N-M ≤ 8191.8 ≥ 8.0 % 1500 ≤ RPM ≤ 6500 11.0 ≤ Volts ≤ 32.0 not active	≥ 4.5 sec	Type X 0 trips
					EngineTorqueEstInaccurate OR If KeETQC_b_MinTransRemedial = 1 (KeETQC_b_MinTransRemedial = 0)	FALSE Not MAF_SensorTFTKO Not MAP_SensorTFTKO Not EngineMisfireDetected_FA		
					P0503	Not failed this key cycle		
Transmission Output Speed Sensor (TOSS)	P0503	TOSS Signal Intermittent	Loop-to-Loop change in TOSS	≥ 350 RPM	Raw Output Speed Output Speed change Time since transfer case range change Ignition voltage Engine Speed Vehicle Speed PTO	> 200 RPM for ≥ 2.0 sec ≤ 150 RPM for ≥ 2.0 sec ≥ 6.0 sec 11.0 ≤ Volts ≤ 32.0 200 ≤ RPM ≤ 7500 for ≥ 5.0 seconds ≤ 124 MPH for ≥ 5.0 sec not active	≥ 3.3 sec	Type X 0 trips
Low Engine Speed Idle System	P0506	This DTC will determine if a low idle exists	Filtered Engine Speed Error	> 91.00 rpm	Baro	> 70 kPa	Diagnostic runs in every 12.5 ms loop	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			filter coefficient	0.003	Coolant Temp	> 60 °C and < 120 °C Must verify KfECTI_T_EngCoolHotLoThresh is less than KfECTI_T_EngCoolHotHiThresh	Diagnostic reports pass or fail in 10 seconds once all enable conditions are met	
					Engine run time	≥ 60 sec		
					Ignition voltage	32 ≥ volts ≥ 11		
					Time since gear change	≥ 3 sec		
					Time since a TCC mode change	> 3 sec		
					IAT	> -20 °C		
					Vehicle speed	≤ 2 mph		
					Commanded RPM delta	≤ 25 rpm		
					Idle time	> 10 sec		
					For manual transmissions: Clutch Pedal Position or Clutch Pedal Position	> 88.00 pct < 25.00 pct		
						PTO not active		
						Transfer Case not in 4WD LowState		
						Off-vehicle device control (service bay control) must not be active.		
						following conditions not TRUE: (VeTESR_e_EngSpdReqIntvType = CeTESR_e_EngSpdMinLimit AND VeTESR_e_EngSpdReqRespType = CeTESR_e_NoSuggestion)		
						Clutch is not depressed		
					No active DTCs	TC_BoostPresSnsrFA		
						ECT_Sensor_FA		
						EnginePowerLimited		
						EGRValveCircuit_FA		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						EGRValvePerformance_FA		
						IAT_SensorCircuitFA		
						EvapFlowDuringNonPurge_FA		
						FuelTrimSystemB1_FA		
						FuelTrimSystemB2_FA		
						FuelInjectorCircuit_FA		
						MAF_SensorFA		
						EngineMisfireDetected_FA		
						IgnitionOutputDriver_FA		
						TPS_FA		
						TPS_Performance_FA		
						VehicleSpeedSensor_FA		
						FuelLevelDataFault		
						LowFuelConditionDiagnostic		
						Clutch Sensor FA		
						AmbPresDfltdStatus		
						P2771		
					All of the above met for Idle time	> 10 sec		
High Engine Speed Idle System	P0507	This DTC will determine if a high idle exists	Filtered Engine Speed Error	< -182.00 rpm	Baro	> 70 kPa	Diagnostic runs in every 12.5 ms loop	2 trips Type B
			filter coefficient	0.003	Coolant Temp	> 60 °C and < 120 °C Must verify KfECTI_T_EngCoolHotLoThresh is less than KfECTI_T_EngCoolHotHiThresh	Diagnostic reports pass or fail in 10 seconds once all enable conditions are met	
					Engine run time	≥ 60 sec		
					Ignition voltage	32 ≥ volts ≥ 11		
					Time since gear change	≥ 3 sec		
					Time since a TCC mode change	> 3 sec		
					IAT	> -20 °C		
					Vehicle speed	≤ 2 mph		
					Commanded RPM delta	≤ 25 rpm		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					For manual transmissions: Clutch Pedal Position or Clutch Pedal Position	> 88.00 pct < 25.00 pct		
						PTO not active		
						Transfer Case not in 4WD LowState		
						Off-vehicle device control (service bay control) must not be active.		
						following conditions not TRUE: (VeTESR_e_EngSpdReqIntvType = CeTESR_e_EngSpdMinLimit AND VeTESR_e_EngSpdReqRespType = CeTESR_e_NoSuggestion)		
						Clutch is not depressed		
					No active DTCs	TC_BoostPresSnsrFA		
						ECT_Sensor_FA		
						EnginePowerLimited		
						EGRValveCircuit_FA		
						EGRValvePerformance_FA		
						IAT_SensorCircuitFA		
						EvapFlowDuringNonPurge_FA		
						FuelTrimSystemB1_FA		
						FuelTrimSystemB2_FA		
						FuelInjectorCircuit_FA		
						MAF_SensorFA		
						EngineMisfireDetected_FA		
						IgnitionOutputDriver_FA		
						TPS_FA		
						TPS_Performance_FA		
						VehicleSpeedSensor_FA		
						FuelLevelDataFault		
						LowFuelConditionDiagnostic		
						Clutch Sensor FA		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						AmbPresDfltdStatus		
						P2771		
					All of the above met for Idle time	> 10 sec		
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	Enabled	fail continuously for greater than 0.500 seconds	Type: C MIL: NO Trips: 1
Cruise Control On Switch Circuit	P0565		Cruise Control On 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	Enabled	fail continuously for greater than 20.000 seconds	Type: C MIL: NO Trips: 1
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	Enabled	fail continuously for greater than 90.0 seconds	Type: C MIL: NO Trips: 1
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	Enabled	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 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	Enabled	10/16 counts	Type: C 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			Brake Pedal Position Range Diagnostic Enable Ignition voltage	Enabled > 10 volts		Type: A
			Calculated EWMA value must be greater than calibratable theshold after calibratable number of tests have completed to report a "test passed" for P057B	EWMA value looked up in supporting table P057B KtBRKI_K_FastTestPointWeight as a function of calculated brake pedal position delta	calculated brake pedal position delta sample counter > 50 for fast test OR calculated brake pedal position delta sample	calculated brake pedal position delta > 8.00 OR (for slow test) shift lever has been in park once this key cycle	total number of EWMA tests > 20	MIL: YES Trips: 1
			Calculated EWMA Value must be less than calibratable threshold after calibratable number of tests have completed to report a "test failed" for P057B. This test runs once per key cycle	EWMA value looked up in supporting table P057B KtBRKI_K_CmpltTestPointWeight as a function of calculated brake pedal position delta EWMA value is > 0.40	no DTC's active (P057C, P057D)	shift lever has been in park once this key cycle vehicle speed >= 5.00 accelerator pedal position < 5.00	total number of EWMA tests > 2	
Brake Pedal Position Sensor Circuit Low	P057C	detects short to ground for brake pedal position sensor	If x of y samples are observed below failure threshold, default brake pedal position to zero percent.	5	Brake Pedal Position Diagnostic Enable	Enabled	20 / 32 counts	Type: B MIL: YES Trips: 2
Brake Pedal Position Sensor Circuit High	P057D	detects open circuit for brake pedal position sensor	If x of y samples are observed above failure threshold, default brake pedal position to zero percent and set DTC	95	Brake Pedal Position Diagnostic Enable	Enabled	20 / 32 counts	Type: B MIL: YES Trips: 2
Cruise Control Multifunction Circuit Low Voltage	P0580	detects short to ground failure for cruise multifunction switch circuit	Cruise Control analog circuit voltage must be in an "Open Short To Ground" for reater than a calibratable period of time		CAN cruise switch diagnostic enable in ECM	Enabled	fail continuously for greater than 2.00 seconds	Type: C MIL:

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			for cruise switch states that are received over serial data					NO Trips: 1
Cruise Control Multifunction Circuit High Voltage	P0581	detects short to power failure for cruise multifunction switch circuit	Cruise Control analog circuit voltage must be in an "Short To Power" 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	Enabled	fail continuously for greater than 2.00 seconds	Type: C MIL: NO Trips: 1
Thermostat Heater Control Open Circuit	P0597	This DTC checks the T-stat Heater Driver Output circuit for electrical integrity.	Voltage low during driver open state (indicates short-to-ground or open circuit). Fault present state for Open circuit is determined from output driver status byte.		Run Crank Ignition in Range Engine not cranking Run Crank active Above is true and Last Open Circuit Test	= True = True = True = not Indeterminate	15 failures out of 30 samples 1 sec/ sample Continuous	2 trips Type B
Thermostat Heater Control Circuit Low	P0598	This DTC checks the T-stat Heater Driver Output circuit for electrical integrity.	Voltage low during driver open state (indicates short-to-ground or open circuit). Fault present state for Ground Short circuit is determined from output driver status byte.		Run Crank Ignition in Range Engine not cranking Run Crank active Above is true and Last Ground Short Circuit Test	= True = True = True = not Indeterminate	15 failures out of 30 samples 1 sec/ sample Continuous	2 trips Type B
Thermostat Heater Control Circuit High	P0599	This DTC checks the T-stat Heater Driver Output circuit for electrical integrity.	Voltage high during driver closed state (indicates short-to-power). Fault present state for Power Short circuit is determined from output driver status byte.		Run Crank Ignition in Range Engine not cranking Run Crank active Above is true and Last Power Short	= True = True = True	15 failures out of 30 samples 1 sec/ sample	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Circuit Test	= not Indeterminate	Continuous	
Control Module Read Only Memory (ROM)	P0601	This DTC will be stored if the calibration check sum is incorrect or the flash memory detects an uncorrectable error via the Error Correcting Code.	The Primary Processor's calculated checksum does not match the stored checksum value. Covers all software and calibrations.	1 failure if the fault is detected during the first pass. 5 failures if the fault occurs after the first pass is complete.			Diagnostic runs continuously in the background	Trips: 1 Type: A MIL: YES
			The Primary Processor's Error Correcting Code hardware in the flash memory detects an error. Covers all software and calibrations.	254 failures detected via Error Correcting Code			Diagnostic runs continuously via the flash hardware	
			The Primary Processor's calculated checksum does not match the stored checksum value for a selected subset of the calibrations.	2 consecutive failures detected or 5 total failures detected.			Diagnostic runs continuously. Will report a detected fault within 200 ms.	
			The Secondary Processor's calculated checksum does not match the stored checksum value. Covers all software and calibrations.	1 failure if the fault is detected during the first pass. 5 failures if the fault occurs after the first pass is complete.			Diagnostic runs continuously in the background	
				In all cases, the failure count is cleared when controller shuts down				
Control Module Not Programmed	P0602	This DTC will be stored if the PCM is a service PCM that has not been	Output state invalid		PCM State	= crank or run PCM is identified through calibration as a Service PCM	Diagnostic runs at powerup and once per second	Type A 1 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		programmed.					continuously after that	
Control Module Long Term Memory Reset	P0603	Non-volatile memory checksum error at controller power-up	Checksum at power-up does not match checksum at power-down				Diagnostic runs at powerup Diagnostic reports a fault if 1 failure occurs	Type A 1 trips
ECM RAM Failure	P0604	Indicates that the ECM has detected a RAM fault:						Trips: 1 Type: A
		Primary Processor System RAM Fault	Indicates that the primary processor is unable to correctly read data from or write data to system RAM. Detects data read does not match data written >=	254 counts			Will finish first memory scan within 30 seconds at all engine conditions - diagnostic runs continuously (background loop)	MIL: YES
		Primary Processor Cache RAM Fault	Indicates that the primary processor is unable to correctly read data from or write data to cached RAM. Detects data read does not match data written >=	254 counts			Will finish first memory scan within 30 seconds at all engine conditions - diagnostic runs continuously (background loop)	
		Primary Processor TPU RAM Fault	Indicates that the primary processor is unable to correctly read data from or write data to TPU RAM.				Will finish first memory scan within 30 seconds at all engine conditions - diagnostic runs continuously (background loop)	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			Detects data read does not match data written >=	5 counts			loop)	
		Primary Processor Update Dual Store RAM Fault	Indicates that the primary processor detects a mismatch between the data and dual data is found during RAM updates. Detects a mismatch in data and dual data updates >	0.45522 seconds			When dual store updates occur.	
		Primary Processor Write Protected RAM Fault	Indicates that the primary processor detects an illegal write attempt to protected RAM. Number of illegal writes are >	65534 counts			Diagnostic runs continuously (background loop)	
		Secondary Processor RAM Fault	Indicates that the secondary processor is unable to correctly read data from or write data to system RAM. Detects data read does not match data written >=	5 counts			Will finish first memory scan within 30 seconds at all engine conditions, diagnostic runs continuously (background loop)	
Internal ECM Processor Integrity Fault	P0606	Indicates that the ECM has detected an internal processor integrity fault:						Trips: 1 Type: A MIL: YES
		Primary Processor SPI Fault Detected	Loss or invalid message of SPI communication from the Secondary Processor at initialization detected by the Primary Processor or loss or invalid message of SPI communication from the Secondary Processor after a valid message was recieved by the Primary	Loss or invalid message at initialization detected or loss or invalid message after a valid message was recieved		Run/Crank voltage >= 6.41 or Run/Crank voltage >= 11.00, else the failure will be reported for all conditions	In the primary processor, 159/399 counts intermittent or 39 counts continuous; 39 counts continuous @ initialization. 12.5 ms /count in	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			recieved by the Primary Processor				12.5 ms /count in the ECM main processor	
		Secondary Processor SPI Fault Detected	Loss or invalid message of SPI communication from the Primary Processor at initialization detected by the Secondary Processor or loss or invalid message of SPI communication from the Primary Processor after a valid message was recieved by the Secondary Processor	Loss or invalid message at initialization detected or loss or invalid message after a valid message was recieved			In the secondary processor, 20/200 counts intermittent or 0 counts continuous; 0 counts continuous @ initialization. 12.5 ms /count in the ECM main processor	
		Secondary Processor Stack Fault	Checks for stack over or underflow in secondary processorby looking for corruption of known pattern at stack boundaries. Checks number of stack over/under flow since last powerup reset >=	5		KeMEMD_b_StackLimitTestEnbl == 1 Value of KeMEMD_b_StackLimitTestEnbl is: 1. (If 0, this test is disabled)	variable, depends on length of time to corrupt stack	
		Secondary processor received incorrect Keys	MAIN processor is verified by responding to a seed sent from the secondary with a key response to secondary. Checks number of incorrect keys received > or Secondary processor has not received a new within time limit	2 incorrect seeds within 8 messages, 0.200 seconds		Ignition in Run or Crank	150 ms for one seed continually failing	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			a new within time limit					
		MAIN processor did not receive seed within time limit	Time new seed not received exceeded			always running	0.450 seconds	
		MAIN processor test for seeds to arrive in a known sequence	MAIN processor receives seed in wrong order			always running	3 / 17 counts intermittent. 50 ms/count in the ECM main	
		Secondary processor ALU check	2 fails in a row in the Secondary processor's ALU check			KePISD_b_ALU_TestEnbld == 1 Value of KePISD_b_ALU_TestEnbld is: 1. (If 0, this test is disabled)	25 ms	
		Secondary processor register configuration check	2 fails in a row in the Secondary processor's configuration register masks versus known good data			KePISD_b_ConfigRegTestEnbld == 1 Value of KePISD_b_ConfigRegTestEnbld is: 1. (If 0, this test is disabled)	12.5 to 25 ms	
		MAIN processor discrete fault:	Secondary processor detects an error in the toggling of a hardware discrete line controlled by the MAIN processor: number of discrete changes >= or <= over time window(50ms)	7 17		KePISD_b_MainCPU_SOH_FltEnbld == 1 time from initialization >= 0.488 seconds Value of KePISD_b_ConfigRegTestEnbld is: 1. (If 0, this test is disabled)	50 ms	
		MAIN detected corruption in throttle or pedal critical RAM data	memory and complement memory do not agree				0.19 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		MAIN Processor Performance Check	1. Software tasks loops > schedule tasks loop 2. 12.5ms task loop sequence does not complete >=	See supporting tables 0.19 seconds		KePISD_b_SeedUpdKeyStorFltEnbl== 1 Value of KePISD_b_SeedUpdKeyStorFltEnbl is: 1. (If 0, this test is disabled) KePISD_b_12p5msSeqTestEnbld== 1 Value of KePISD_b_12p5msSeqTestEnbld is: 1. (If 0, this test is disabled)	Error > 5 times of loop time; loop times are 6.25, 12.5, 25 ms in the main processor	
		MAIN Processor Performance Check	Software background task first pass time to complete exceeds		Powertrain relay	> 6.41 V	360.000 seconds	
		MAIN processor ALU check	2 fails in a row in the MAIN processor's ALU check			KePISD_b_ALU_TestEnbld == 1 Value of KePISD_b_ALU_TestEnbld is: 1. (If 0, this test is disabled)	25 ms	
		MAIN processor configuration register check	2 fails in a row in the MAIN processor's configuration register masks versus known good data			KePISD_b_ConfigRegTestEnbld == 1 Value of KePISD_b_ConfigRegTestEnbld is: 1. (If 0, this test is disabled)	12.5 to 25 ms	
		MAIN Stack Fault	Checks number of stack over/under flow since last powerup reset >=	5		KeMEMD_b_StackLimitTestEnbl == 1 Value of KeMEMD_b_StackLimitTestEnbl is: 1. (If 0, this test is disabled)	variable, depends on length of time to corrupt stack	
		MAIN processor ADC test	Voltage deviation >	0.495		KePISD_b_A2D_CnvrtrTestEnbld == 1 Value of KePISD_b_A2D_CnvrtrTestEnbld is: 1. (If 0, this test is disabled)	5 / 10 counts or 0.150 seconds continuous; 50 ms/count in main processor	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		Flash ECC Fault	Checks for ECC (error correcting code) circuit test errors reported by the hardware for flash memory. Increments counter during controller initialization if ECC error occured since last controller initialization. Counter >=	3 (results in MIL), 5(results in MIL and remedial action)		KeMEMD_b_FlashECC_CktTestEnbl == 1 Value of KeMEMD_b_FlashECC_CktTestEnbl is: 1. (If 0, this test is disabled)	variable, depends on length of time to access flash with corrupted memory	
		RAM ECC Fault	Checks for ECC (error correcting code) circuit test errors reported by the hardware for RAM memory circuit. Increments counter during controller initialization if ECC error occured since last controller initialization. Counter >=	3 (results in MIL), 5 (results in MIL and remedial action)		KeMEMD_b_RAM_ECC_CktTestEnbl == 1 Value of KeMEMD_b_RAM_ECC_CktTestEnbl is: 1. (If 0, this test is disabled)	variable, depends on length of time to access flash with corrupted memory	
		MAIN DMA transfer check	MAIN processor DMA transfer from Flask to RAM has 1 failure			KePISD_b_DMA_XferTestEnbld == 1 Value of KePISD_b_DMA_XferTestEnbld is: 0. (If 0, this test is disabled)	variable, depends on length of time to write flash to RAM	
Fuel Pump Relay Control Circuit Low Voltage	P0628	Diagnoses the fuel pump relay control high side driver circuit for circuit faults	Voltage low during driver on state (indicates short to ground)	Short to Ground: <= 0.5 Ohms impedance between signal and controller ground	Run/Crank Voltage Engine Speed	11 volts ≤ Voltage ≤ 32 volts ≥ 0 RPM	8 failures out of 10 samples 250 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.
							Continuous with device on	
Control Module EEPROM Error	P062F	Indicates that the NVM Error flag has not been cleared	The next write to NVM will not succeed or the assembly calibration integrity check failed.		Ignition State	= unlock/accesory, run, or crank	1 test failure Diagnostic runs once at powerup	Type A 1 trips
VIN Not Programmed or Mismatched - Engine Control Module (ECM)	P0630	This DTC checks VIN is correctly written	At least one of programed VIN's digit	= 00 or FF	OBD Manufacturer Enable Counter	= 0	250 ms / test Continuous	Type A 1 trips
5 Volt Reference #1 Circuit	P0641	Detects a continuous or intermittent short on th 5 volt reference circuit #1	ECM Vref1 < or ECM Vref1 > or the difference between ECM filtered Vref1 and Vref1 >	4.875 5.125 0.05		Run/Crank voltage or Powertrain relay voltage > 6.41 and reduced power is false, else the failure will be reported for all conditions	19/39 counts or 0.1875 sec continuous; 12.5 ms/count in main processor	Trips: 1 Type: A MIL: YES
Malfunction Indicator Lamp (MIL) Control Circuit (ODM) Open	P0650	Diagnoses the malfunction indicator lamp control low side driver circuit for circuit faults	Voltage low during driver off state (indicates open circuit)	Open Circuit: >= 200K Ohms impedance between signal and controller ground	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 Note: In certain controll ers P263A may also set (MIL control circuit

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
								circuit short to ground)
5 Volt Reference #2 Circuit	P0651	Detects a continuous or intermittent short on th 5 volt reference circuit #2	ECM Vref2 < or ECM Vref2 > or the difference between ECM filtered Vref2 and Vref2 >	4.875 5.125 0.05		Run/Crank voltage or Powertrain relay voltage > 6.41 and reduced power is false, else the failure will be reported for all conditions	19/39 counts or 0.1875 sec continuous; 12.5 ms/count in main processor	Trips: 1 Type: A MIL: YES
Powertrain Relay Control High (ODM)	P0687	Diagnoses the powertrain relay control low side driver circuit for circuit faults	Voltage high during driver on state (indicates short to power)	Short to Power: <= 0.5 Ohms impedance between signal and controller power	Run/Crank Voltage	11 volts ≤ Voltage ≤ 32 volts	8 failures out of 10 samples 250 ms / sample Continuous	2 trips Type B
Powertrain Relay Feedback Circuit High	P0690	This DTC is a check to determine if the Powertrain relay is functioning properly.	Powertrain Relay Voltage	> 2 volts	Powertrain Relay commanded "OFF" No active DTCs:	≥ 4 seconds, PowertrainRelayStateOn_FA	50 failures out of 63 samples 100 ms/ sample	2 trips Type B
5 Volt Reference #3 Circuit	P0697	Detects a continuous or intermittent short on th 5 volt reference circuit #1	ECM Vref3 < or ECM Vref3 > or the difference between ECM filtered Vref3 and Vref3 >	4.875 5.125 0.05		Run/Crank voltage or Powertrain relay voltage > 6.41 and reduced power is false, else the failure will be reported for all conditions	19/39 counts or 0.1875 sec continuous; 12.5 ms/count in main processor	Trips: 1 Type: A MIL: YES
5 Volt Reference #4 Circuit	P06A3	Detects a continuous or intermittent short on th 5 volt reference circuit #2	ECM Vref4 < or ECM Vref4 > or the difference between ECM filtered Vref3 and Vref3 >	4.875 5.125 0.05		Run/Crank voltage or Powertrain relay voltage > 6.41 and reduced power is false, else the failure will be reported for all conditions	19/39 counts or 0.1875 sec continuous; 12.5 ms/count in main processor	Trips: 1 Type: A MIL: YES
Internal Control	P06B6	This diagnostic checks	Gated FFT Diagnostic	> OpenTestThreshLo	Diagnostic Enabled?	Enabled	First Order Lag	Type: B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Module Knock Sensor Processor 1 Performance		for a fault with the internal test circuit used only for the '20 kHz' method of the Open Circuit Diagnostic	Output (VaKNKD_k_OpenTestCktIntFilter[0])	**and** < OpenTestThreshHi See Supporting Tables	 Engine Speed Engine Air Flow Engine running	 > 570 RPM and < 6250 RPM ≥ 40 mg/cylinder and ≤ 2000 mg/cylinder ≥ 5.3 seconds	Filter with Weight Coefficient Weight Coefficient = 0.0100 Updated each engine event	MIL: YES Trips: 2
Transmission Control Module (TCM) Requested MIL Illumination	P0700	Monitors the TCM MIL request line to determine when the TCM has detected a MIL illuminating fault.	Transmission Emissions-Related DTC set			Time since power-up > 3 seconds	Continuous	Type A 1 trips MIL: NO
Clutch Pedal Position Sensor Circuit Range / Performance	P0806	Detects if Clutch Pedal Position Sensor is Stuck in a range indicative of a vehicle NOT in gear, when the vehicle is determined to be in gear. Gear determination is made by verifying that engine RPM/ Trans Output Speed (N/TOS) ratio represents a valid gear.	Filtered Clutch Pedal Position Error when the vehicle is determined to be in gear	> 5 %	N/TOS Ratio Transfer Case vehicle speed Engine Torque Clutch Pedal Position **OR** Clutch Pedal Position **No Active DTCs:** ClutchPositionSensorCktLo FA ClutchPositionSensorCkitHi FA CrankSensorFA Trans Output Shaft Angular Velocity Validity VehicleSpeedSensor_FA	Must match actual gear (i.e. vehicle in gear) Not in 4WD Low range > 5 MPH > **EngTorqueThreshold** Table < **ResidualErrEnableLow** Table > ***ResidualErrEnableHigh*** *Table*	25 ms loop Continuous	1 Trip(s) Type A
Clutch Pedal Position Sensor Circuit Low	P0807	Detects Continuous Circuit Short to Low or Open	Clutch Position Sensor Circuit for	< 4 % of Vref 200 counts out of 250 samples	Engine Not Cranking System Voltage No active DTCs:	> 9.0 Volts 5VoltReferenceB_FA	25 ms loop Continuous	1 Trip(s) Type A
Clutch Pedal	P0808	Detects Continuous	Clutch Position Sensor		Engine Not Cranking		25 ms loop	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Position Sensor Circuit High		Circuit Short to High	Circuit	> 96 % of Vref	System Voltage	> 9.0 Volts	Continuous	1 Trip(s) Type A
			for	200 counts out of 250 samples	No active DTCs:	5VoltReferenceB_FA		
Clutch Pedal Position Not Learned	P080A	Monitor for Valid Clutch Pedal Fully Applied Learn Position values	Fully Applied Learn Position	< 7.0 %	OBD Manufacturer Enable Counter	= 0	250 ms loop Continuous	1 Trip(s) Type C
			OR					
			Fully Applied Learn Position	> 33.0 %				
Traction Control Torque Request Circuit	P0856	Determines if torque request from the EBTCM is valid	Serial Communication 2's complement message - ($140 for PPEI2 or $1C9 for PPEI3, $1CA for Hybrid))	Message <> 2's complement of message	Serial communication to EBTCM (U0108) Power Mode Engine Running	No loss of communication = Run = True	**All except Class2 PWM:** Count of 2's complement values not equal >= 10 Performed every 12.5 msec	
			OR					
			Serial Communication message ($140 for PPEI2 or $1C9 for PPEI3, $1CA for Hybrid)) rolling count value	Message rolling count value <> previous message rolling count value plus one	Status of traction in GMLAN message ($4E9)	= Traction Present	6 rolling count failures out of 10 samples Performed every 12.5 msec	
			OR					
			Too many minimum limit torque request transitions occur from TRUE to FALSE to TRUE within a time period	Requested torque intervention type toggles from not increasing request to increasing request			>= 3 multi-transitions out of 5 samples. Performed every 200 ms	1 trip(s) Special Type C
			Torque request greater than torque request diagnostic maximum threshold	> 250 Nm for engine based traction torque system, > 4000 Nm for axle based traction torque system			>= 4 out of 10 samples Performed every 12.5 msec	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Inlet Airflow System Performance	P1101	Determines if there are multiple air induction problems affecting airflow and/or manifold pressure.	Filtered Throttle Model Error AND (ABS(Measured Flow – Modeled Air Flow) Filtered OR ABS(Measured MAP – MAP Model 1) Filtered AND ABS(Measured MAP – MAP Model 2) Filtered	<= 250 kPa*(g/s) > 16 grams/sec > 20.0 kPa) > 20.0 kPa	Engine Speed Engine Speed Coolant Temp Coolant Temp Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together) No Active DTCs:	>= 400 RPM <= 6500 RPM > -7 Deg C < 125 Deg C > -20 Deg C < 100 Deg C >= 0.50 Filtered Throttle Model Error multiplied by TPS Residual Weight Factor based on RPM Modeled Air Flow Error multiplied by MAF Residual Weight Factor based on RPM and MAF Residual Weight Factor Based on MAF Est MAP Model 1 Error multiplied by MAP1 Residual Weight Factor based on RPM MAP Model 2 Error multiplied by MAP2 Residual Weight Factor based on RPM See table "IFRD Residual Weighting Factors". MAP_SensorCircuitFA	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.
						EGRValve_FP EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA ECT_Sensor_Ckt_FP IAT_SensorFA IAT_SensorCircuitFP		
Cold Start Emissions Reduction System Fault	P1400	Model based test computes power from exhaust flow and thermal energy resulting from elevated idle speed and retarded spark advance. Detects if the cold start emission reduction system has failed resulting in the delivered power being out of range.	Average desired accumulated exhaust power - Average estimated accumulated exhaust power OR Average desired accumulated exhaust power - Average estimated accumulated exhaust power (EWMA filtered)	< -32.00 KJ/s (high RPM failure mode) > 4.40 KJ/s (low RPM failure mode)	**To enable the diagnostic, the Cold Start Emission Reduction Strategy must be Active per the following:**		Runs once per trip when the cold start emission reduction strategy is active Frequency: 100ms Loop Test completes after 14 seconds of accumulated qualified data.	Type A 1 Trip(s)
					Catalyst Temperature	< 350.00 degC		
					AND			
					Engine Coolant	> 18.00 degC		
					The Cold Start Emission Reduction strategy must not be exiting. The strategy will exit per the following:			
					Catalyst Temperature	>= 420.00 degC		
					AND			
					Engine Run Time	>= 30.00 seconds		
					OR			
					Engine Run Time	> 30.00 seconds		
					OR			
					Engine Coolant	>= 50.00 degC		
					Other Enable Criteria			
					Vehicle Speed	< 1.24 MPH		
					Driver must be off the accel pedal. This checks that the final accel pedal position (comprehending deadband and hysteresis) is essentially zero.			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					A change in throttle position (tip-in/tip-out) will initiate a delay in the calculation of the average qualified residual value. When the			
					OBD Manufacturer Enable Counter	0		
					Pedal Close Delay Timer	> 5.00 seconds		
					the diagnostic will continue the calculation.			
					Clutch Pedal Top of Travel Achieved and Clutch Pedal Bottom of Travel Achieved. **Refer to the "Clutch Pedal Top of Travel Achieved criteria"** and **"Clutch Pedal Bottom of Travel Achieved criteria"** section of the "Supporting Tables" tab criteria			
					Idle Speed Control System	Active		
					General Enable			
					DTC's Not Set			
					AcceleratorPedalFailure			
					ECT_Sensor_FA			
					IAT_SensorCircuitFA			
					IAT2_SensorCircuitFA			
					CrankSensorFaultActive			
					FuelInjectorCircuit_FA			
					MAF_SensorFA			
					MAP_SensorFA			
					EngineMisfireDetected_FA			
					Clutch Sensor FA			
					IAC_SystemRPM_FA			
					IgnitionOutputDriver_FA			
					P050A (ColdStrt_IAC_SysPerf)			
					P050B (ColdStrtIgnTmngPerf)			
					TPS_FA			
					VehicleSpeedSensor_FA			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					5VoltReferenceMAP_OOR_Flt TransmissionEngagedState_FA EngineTorqueInaccurate			
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		
					# 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		
Steady State Actuation Fault	P1516	Detect an inablity to maintain a steady state throttle position	Throttle is considered to be steady state when: Change in throttle position over 12.5 msec is < 4.00 seconds	0.25 percent		Run/crank voltage or Powertrain relay voltage > 6.41 and reduced power is false, else the failure will be reported for all conditions	0.49 ms	Trips: 1 Type: A MIL: YES
Remote Vehicle Speed Limiting Signal Circuit	P162B	Determines if the speed request from OnStar is valid	**Password Protect error** - Serial Communication message - ($3ED) **OR** **Rolling count error** - Serial Communication message ($3ED) rolling count value	Message <> two's complement of message Message <> previous message rolling count value + one	Vehicle Requested Speed Limit	< 318 mph	>= 10 Password Protect errors out of 10 samples >= 10 Rolling count errors out of 10 samples	1 trip(s) Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
							Performed every 25 msec	
Ignition Voltage Correlation	P1682	Detect a continuous or intermittent out of correlation between the Run/Crank Ignition Voltage & the Powertrain Relay Ignition Voltage	|Run/Crank – ETC Run/Crank| >	3.00 Volts	Powertrain commanded on and Run/crank voltage > or ETC Run/crank voltage > and Run/crank voltage >	Table, f(IAT). See supporting tables 5.5 5.5	240/480 counts or 0.1750sec continuous; 12.5 ms/count in main processor	Trips: 1 Type: A MIL: YES
Internal Control Module Redundant Memory Performance	P16F3	Detect Processor Calculation faults due to RAM corruptions, ALU failures and ROM failures						Trips: 1 Type: A MIL: YES
			Desired engine torque request greater than redundant calculation plus threshold	42.33 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Difference between Cruise Axle Torque Arbitrated Request and Cruise Axle Torque Request exceeds threshold	73.47 Nm		Cruise has been engaged for more than 4.00 seconds	Up/down timer 2048 ms continuous, 0.5 down time multipier	Not used Series 11
			Engine min capacity above threshold	43.33 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 122 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			No fast unmanaged retarded spark above the applied spark plus the threshold	Table, f(Erpm). See supporting tables		Engine speed greater than 0rpm	Up/down timer 143 ms continuous, 0.5 down time multipier	
			Absolute difference of adjustment factor based on temperature and its dual store above threshold	2.76 m/s		Ignition in unlock/accessory, run or crank	Up/down timer 167 ms continuous, 0.5 down time multipier	
			1) Absolute difference of redundant calculated engine speed above threshold 2)Time between lores events and its dual store do not match	KeEPSD_n_LoresSecurBndry 968 RPM		Engine speed greater than 0 RPM	Up/down timer 143 ms continuous, 0.5 down time multipier	
			After throttle blade pressure and its dual store do not match	N/A		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Speed Control's Preditcted Torque Request and its dual store do not match	N/A		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Engine oil temperature and its dual store do not match	N/A		Ignition in unlock/accessory, run or crank	Up/down timer 391 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			Desired throttle position greater than redundant calculation plus threshold	10.00 percent		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Absolute difference of the rate limited pre-throttle pressure and its redundant calculation greater than threshold	0.06 kpa		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Throttle desired torque above desired torque plus threshold	43.33 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Desired filtered throttle torque exceeds the threshold plus the higher of desired throttle torque or modeled throttle torque	43.33 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Torque feedback proportional term is out of allowable range or its dual store copy does not match	High Threshold 21.67 Nm Low Threshold -21.67 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Torque feedback integral term magnitude or rate of change is out of allowable range or its dual store copy do not match	High Threshold 40.62 Nm Low Threshold -43.33 Nm Rate of change threshold 2.71 Nm/loop		Ignition in unlock/accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Difference of Final Torque feedback proportional plus	High Threshold 43.33 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 475 ms	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			integral term and its redundant calculation is out of bounds given by threshold range	Low Threshold -43.33 Nm			continuous, 0.5 down time multipier	
			Difference of torque desired throttle area and its redundant calculation is out of bounds given by threshold range	High Threshold 0.50% Low Threshold -0.50%		Ignition in unlock/accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Difference of torque model coefficients and its redundant calculation is out of bounds given by threshold range	High Threshold 0.0003200 Low Threshold -0.0003200		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Difference of base friction torque and its redundant calculation is out of bounds given by threshold range	High Threshold 43.33Nm Low Threshold -43.33Nm		Ignition in unlock/accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Accessory drive friction torque is out of bounds given by threshold range	High Threshold 43.33 Nm Low Threshold 0.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			AC friction torque is greater than commanded by AC control software or less than threshold limit	High Threshold 40.00 Nm Low Threshold 0.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Difference of Oil temperature delta friction torque and its redundant calculation is out of bounds given by threshold range	High Threshold 43.33 Nm Low Threshold -43.33 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 2048 ms continuous, 0.5 down time multipier	Not used Series 11

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			Generator friction torque is out of bounds given by threshold range	High Threshold 43.33 Nm Low Threshold 0.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Supercharger friction torque is out of bounds given by threshold range	High Threshold 43.33 Nm Low Threshold 0.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Filtered Torque error magnitude or its increase rate of change is out of allowable range or its dual store copy do not match	High Threshold 43.33 Nm Low Threshold -43.33 Nm Rate of change threshold 2.71 Nm/loop		Engine speed >0rpm MAF, MAP and Baro DTCs are false	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Torque error compensation is out of bounds given by threshold range	High Threshold 43.33 Nm Low Threshold 0.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Delta Torque Baro compensation is out of bounds given by threshold range	High Threshold 2.43 Nm Low Threshold -2.30 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			1) Difference of reserve torque value and its redundant calculation exceed threshold 2) Reserve request does not agree with operating conditions or Difference of final predicted torque and its	1) 42.33 Nm 2) NA 3) 42.33 Nm 4) 42.33 Nm		1&2) Torque reserve (condition when spark control greater than optimum to allow fast transitions for torque disturbances) > 43.33 Nm 3&4) Ignition in unlock/accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			predicted torque and its redundant calculation exeed threshold 3) Rate of change of reserve torque exceeds threshold, increasing direction only 4) Reserve engine torque above allowable capacity threshold					
			AC friction torque is greater than commanded by AC control software	40.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 2048 ms continuous, 0.5 down time multipier	Not used Series 11
			Absolute difference of the calculated spark offset for equivalence ratio and its redundant calculation greater than threshold	16.50 degrees		Engine speed >0rpm	Up/down timer 143 ms continuous, 0.5 down time multipier	
			Engine Vacuum and its dual store do not match	N/A		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Absolute difference of the calculated Intake Manifold Pressure during engine event versus during time event is greater than threshold	Table, f(Engine Torque). See supporting tables		Engine speed >0rpm	Up/down timer 143 ms continuous, 0.5 down time multipier	
			Min. Axle Torque Capacity is greater than threshold	0.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
							down time multipier	
			Predicted torque for zero pedal determination is greater than calc'ed limit.	Table, f(Engine, Oil Temp). See supporting tables + 43.33 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Commanded Predicted Axle Torque and its dual store do not match	1 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Steady State Estimated Engine Torque and its dual store are not equal	N/A		AFM not changing from Active to Inactive and preload torque not changing and one loop after React command Engine speed >0rpm	Up/down timer 1988 ms continuous, 0.5 down time multipier	
			Difference of Weighting factor for number of cylinders fueled and its redundant calculation is above threshold	0.26		Engine run flag = TRUE > 10.00s	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Difference of minimum spark advance limit and its redundant calculation is out of bounds given by threshold range	16.50 degrees		Ignition in unlock/accessory, run or crank	Up/down timer 143 ms continuous, 0.5 down time multipier	
			Difference of commanded spark advance and adjusted delivered is out of bounds given by threshold range	16.50 degrees		Engine speed >0rpm	Up/down timer 143 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			Estimated Engine Torque and its dual store do not match	43.33 Nm		Engine speed >0rpm	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Estimated Engine Torque without reductions due to torque control and its dual store are not match	43.33 Nm		Engine speed >0rpm	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Difference of desired spark advance for managed torque and its redundant calculation is out of bounds given by threshold range	16.50 degrees		Torque reserve (condition when spark control greater than optimum to allow fast transitions for torque disturbances) > 43.33 Nm	Up/down timer 443 ms continuous, 0.5 down time multipier	
			Absolute difference of Engine Capacity Minimum Running Immediate Brake Torque Excluding Cylinder Sensitivity and its redundant calculation is out of bounds given by threshold range	43.33 Nm		Engine speed >0rpm	Up/down timer 175 ms continuous, 0.5 down time multipier	
			One step ahead calculation of air-per-cylinder greater than two step ahead calculation by threshold for time	Threshold: Dynamically calculated based on current engine conditions Fault Pending Threshold: 100 ms		Engine speed > 670rpm	Up/down timer 443 ms continuous, 0.5 down time multipier	
			Rate limited cruise axle torque request and its dual store do not match	73.47 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 163 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			1) Absolute difference of Calculated accelerator pedal position compensated for carpet learn and error conditions and its redundant calculation is out of bounds given by threshold range 2) Absolute difference of Calculated accelerator pedal position compensated for carpet learn and error conditions and its dual store do not equal 3) Absolute difference of Calculated accelerator pedal position and its dual store do not equal	1) 5.00 % 2) NA 3) NA		Ignition in unlock/accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Commanded axle torque is greater than its redundant calculation by threshold	587.77 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Commanded axle torque is less than its redundant calculation by threshold	-65535.00 Nm		Ignition in unlock/accessory, run or crank Redundant commanded axle torque < --65535.00 Nm	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Commanded engine torque due to fast actuators and its dual store do not equal	NA		Ignition in unlock/accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Commanded engine torque due to slow	NA		Ignition in unlock/accessory, run or crank	Up/down timer 475 ms	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			actuators and its dual store do not equal				continuous, 0.5 down time multipier	
			Arbitrated Air-Per-Cylinder filter coefficient is out of bounds given by threshold range	High Threshold 1.000 Low Threshold 0.074		Ignition in unlock/accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Launch spark is active but the launch spark redundant path indicates it should not be active	NA		Engine speed < 7000.00 or 7200.00 rpm (hysteresis pair)	Up/down timer 143 ms continuous, 0.5 down time multipier	
			Rate limited vehicle speed and its dual store do not equal	NA		Time since first CAN message with vehicle speed >= 0.500sec	10/20 counts; 25.0msec/count	
			Throttle progression mode and its dual store do not equal	NA		Ignition in unlock/accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			TOS to wheel speed conversion factor is out of bounds given by threshold range	High Threshold 1.10 T/C Range Hi 0.10 T/C Range Lo Low Threshold 1.10 T/C Range Hi 0.10 T/C Range Lo		Ignition in unlock/accessory, run or crank	255/6 counts; 25.0msec/count	
			TOS to wheel speed conversion factor and its dual store do not equal	NA		Ignition in unlock/accessory, run or crank	255/6 counts; 25.0msec/count	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			Cylinders active greater than commanded	3 cylinders		Engine run flag = TRUE > 2.00s Number of cylinder events since engine run > 24 No fuel injector faults active	Up/down timer 143 ms continuous, 0.5 down time multipier	
			Absolute difference of Friction torque and its redundant calculation is out of bounds given by threshold range	43.33 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Absolute difference of Accessory torque and its redundant calculation is out of bounds given by threshold range	43.33 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Absolute difference of Filtered Air-per-cylinder and its redundant calculation is out of bounds given by threshold range	78.37 mg		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Absolute difference between the previous Final Advance and the current Final Advance not Adjusted for Equivalence Ratio is out of bounds given by threshold range	16.50 degrees		Engine speed >0rpm	Up/down timer 143 ms continuous, 0.5 down time multipier	
			Desired Throttle Area calculated does not equal its redundant calculation	N/A		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			Equivance Ratio torque compensation exceeds threshold	-43.33 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Absolute difference between Equivance Ratio torque compensation and its dual store out of bounds given bt threshold	43.33 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Commanded Predicted Engine Torque and its dual store do not match	N/A		Ignition in unlock/accessory, run or crank	Up/down timer 2048 ms continuous, 0.5 down time multipier	Not used Series 11
			Zero pedal axle torque is out of bounds given by threshold range	High Threshold 587.77 Nm Low Threshold -65535.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Creep Coast Axle Torque is out of bounds given by threshold range	High Threshold 587.77 Nm Low Threshold -65535.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 2048 ms continuous, 0.5 down time multipier	Not used Series 11
			Torque Learn offset is out of bounds given by threshold range	High Threshold 0.00 Nm Low Threshold 0.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			One step ahead calculation of air-per-cylinder and two step ahead is greater than	80.00 mg		Engine speed >670rpm	Up/down timer 443 ms continuous, 0.5 down time	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			threshold				multipier	
			Difference between Unmanaged Spark and PACS Spark is greater than threshold	16.49 degrees		Ignition in unlock/accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Predicted torque for uncorrected zero pedal determination is greater than calc'ed limit.	Table, f(Engine, Oil Temp). See supporting tables + 43.33 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Idle speed control calculated predicted minimum torque request exceeds calculated torque limit	Table, f(Engine, Oil Temp). See supporting tables + 43.33 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Idle speed control calculated predicted minimum torque without reserves exceeds calculated torque limit	Table, f(Engine, Oil Temp). See supporting tables + 43.33 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Difference between Driver Requested Immediate Torque primary path and its secondary exceeds threshold	587.77 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 2048 ms continuous, 0.5 down time multipier	Not used Series 11
			Engine Speed Lores Intake Firing (event based) calculation does not equal its redundant calculation	N/A		Engine speed greater than 0rpm	Up/down timer 143 ms continuous, 0.5 down time multipier	
			Engine Speed Lores Intake	N/A		Engine speed greater than	Up/down timer	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			Firing timing (event based) calculation does not equal its redundant calculation			0rpm	143 ms continuous, 0.5 down time multipier	
			Engine Speed Lores Intake Firing (12.5ms based) calculation does not equal its redundant calculation	N/A		Engine speed greater than 0rpm	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Cold Delta Friction Torque and its dual store do not match	N/A		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			1. Driver Predicted Request is greater than its redundant calculation plus threshold 2. Driver Predicted Request is less than its redundant calculation minus threshold	587.77 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Driver Immediate Request is less than its redundant calculation minus threshold	587.77 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			1. Commanded Immediate Request is greater than its redundant calculation plus threshold 2. Commanded Immediate Request is less than its	587.77 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 2048 ms continuous, 0.5 down time multipier	Not used Series 11

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			redundant calculation minus threshold					
			Commanded Immediate Response Type is set to Inactive	N/A		Ignition in unlock/accessory, run or crank	Up/down timer 2048 ms continuous, 0.5 down time multipier	Not used Series 11
			Commanded Immediate Engine Request is greater than its redundant calculation plus threshold	43.33 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 2048 ms continuous, 0.5 down time multipier	Not used Series 11
			Commanded Predicted Engine Request is greater than its redundant calculation plus threshold	43.33 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Commanded Hybrid Predicted Crankshaft Request is greater than its redundant calculation plus threshold	4096.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 2048 ms continuous, 0.5 down time multipier	Not used Series 11

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			Commanded Hybrid Immediate Crankshaft Request is less than its redundant calculation minus threshold	4096.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 2048 ms continuous, 0.5 down time multipier	Not used Series 11
			Engine Predicted Request Without Motor is greater than its redundant calculation plus threshold	42.33 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Engine Immediate Request Without Motor is greater than its redundant calculation plus threshold	42.33 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			1. Positive Torque Offset is greater than its redundant calculation plus threshold 2. Positive Torque Offset is less than its redundant calculation minus threshold	43.33 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			[illegible]					
			Engine Capacity Minimum Immediate Without Motor is greater than its dual store plus threshold	43.33 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Engine Capacity Minimum Engine Off is greater than threshold	0 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Engine Capacity Minimum Engine Immediate Without Motor is greater than threshold	0 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 2048 ms continuous, 0.5 down time multipier	Not used Series 11
			Cylinder Spark Delta Correction exceeds the absolute difference as compared to Unadjusted Cylinder Spark Delta	16.49 degrees		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			1. Cylinder Torque Offset exceeds step size threshold 2. Sum of Cylinder Torque Offset exceeds sum threshold	1. 20.00 Nm 2. 10.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
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 for too long.	Bank 1 Rich Fail Timer: Note: These timers will reset to 0 when the sample period of 67.5 seconds is reached. Evaluation will then start again.	> 50.0 seconds during a 67.5 second sample period.	The following must be true for:	> 5.0 seconds	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		
	Additional notes, strategy and enable requirements:							
		Note: If the post catalyst O2 voltage is too rich, the post catalyst O2 integral offset voltage is decreased. The offset is applied to the front O2 sensor rich/lean switchpoint in attempt to adjust the bulk average exhaust air/fuel ratio. With a functional system, decreasing the switchpoint results in leaner gas. The adjusted offset value is	**Bank 1 Sample Timer will increment if:**					
			The current post O2 airflow mode is a selected cell			See supporting tables: **Selected Cells**		
			Accumulated Cell Time is greater than			See supporting tables: **Cell Accum Time Min**		
			Bank 1 Rich Fail Timer will increment if sample timer increments AND:					
			Filtered post O2 voltage is continuously greater than: (filtered with first order lag filter coefficient: 0.0500)			See supporting tables: **O2RichThrsh**	See supporting tables: **Out of Window Timer**	
			Post catalyst O2 integral offset is less than			See supporting tables: **Integral Offset Min**		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		adjusted offset value is retained between trips.						
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 to a lean exhaust gas condition for too long.	Bank 1 Lean Fail Timer: Note: These timers will reset to 0 when the sample period of 67.5 seconds is reached. Evaluation will then start again.	> 50.0 seconds during a 67.5 second sample period.	The following must be true for:	> 5.0 seconds	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		
	Additional notes, strategy and enable requirements:							
		Note: If the post catalyst O2 voltage is too lean, the post catalyst O2 integral offset voltage is increased. The offset is applied to the front O2 sensor rich/lean switchpoint in attempt to adjust the bulk average exhaust air/fuel ratio. With a functional system, increasing the switchpoint results in richer gas. The adjusted offset value is retained between trips.	**Bank 1 Sample Timer will increment if:**					
			The current post O2 airflow mode is a selected cell			See supporting tables: **Selected Cells**		
			Accumulated Cell Time is greater than			See supporting tables: **Cell Accum Time Min**		
			Bank 1 Lean Fail Timer will increment if sample timer increments AND:					
			Filtered post O2 voltage is continuously less than: (filtered with first order lag filter coefficient: 0.0500)			See supporting tables: **O2LeanThrsh**	See supporting tables: **Out of Window Timer**	
			Post catalyst O2 integral offset is greater than			See supporting tables: **Integral Offset Max**		
Control Module	P2101	1) Detect a throttle	Difference between		TPS minimum learn is	Run/crank voltage or	1. 15 counts; 12.5	Trips:

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Throttle Actuator Position Performance		positioning error	measured throttle position and modeled throttle position >	10.00 percent	not active and Throttle is being Controlled and (Engine Running or Ignition Voltage > or Ignition Voltage >)	Powertrain relay voltage > 6.41 and reduced power is false, else the failure will be reported for all conditions	ms/count in the primary processor	1 Type: A MIL: YES
			Difference between modeled throttle position and measured throttle position >	10.00 percent	Ignition voltage failure is false (P1682)	11 5.5		
		2) Detect throttle control is driving the throttle in the incorrect direction or exceed the reduced power limit	Throttle Position >	39.52 percent	TPS minimum learn is active		2. 11 counts; 12.5 ms/count in the primary processor	
			Throttle Position >	38.52 percent	Reduced Power is True			
					Powertrain relay voltage	> 6.41 Volts		
Throttle return to default	P2119	Throttle unable to return to default throttle position after de-energizing ETC motor.	TPS1 Voltage > AND TPS2 Voltage >	1.788 1.788	Throttle de-energized No TPS circuit faults	Run/Crank voltage or Powertrain relay voltage > 6.41 and reduced power is false, else the failure will be reported for all conditions No 5V reference error or fault for # 4 5V reference circuit (P06A3)	0.4969 sec	Trips: 1 Type: C MIL: NO
					PT Relay Voltage >	5.5		
Accelerator Pedal Position (APP) Sensor 1 Lo	P2122	Detect a continuous or intermittent short or open in the APP sensor #1 on Main processor	APP1 Voltage <	0.463		Run/Crank voltage or Powertrain relay voltage > 6.41 and reduced power is false, else the failure will be reported for all conditions No 5V reference error or fault for # 4 5V reference circuit (P06A3)	19/39 counts or 14 counts continuous; 12.5 ms/count in the main processor	Trips: 1 Type: A MIL: YES
Accelerator Pedal Position (APP) Sensor 1 Hi	P2123	Detect a continuous or intermittent short or open in the APP sensor	APP1 Voltage >	4.75		Run/Crank voltage or Powertrain relay voltage > 6.41 and reduced power is false,	19/39 counts or 14 counts continuous; 12.5	Trips: 1 Type:

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		#1 on Main processor				else the failure will be reported for all conditions No 5V reference error or fault for # 4 5V reference circuit (P06A3)	ms/count in the main processor	A MIL: YES
Accelerator Pedal Position (APP) Sensor 2 Lo	P2127	Detect a continuous or intermittent short or open in the APP sensor #2 on Main processor	APP2 Voltage <	0.325		Run/Crank voltage or Powertrain relay voltage > 6.41 and reduced power is false, else the failure will be reported for all conditions No 5V reference error or fault for # 4 5V reference circuit (P0697)	19/39 counts or 14 counts continuous; 12.5 ms/count in the main processor	Trips: 1 Type: A MIL: YES
Accelerator Pedal Position (APP) Sensor 2 Hi	P2128	Detect a continuous or intermittent short or open in the APP sensor #2 on Main processor	APP2 Voltage >	2.6		Run/Crank voltage or Powertrain relay voltage > 6.41 and reduced power is false, else the failure will be reported for all conditions No 5V reference error or fault for # 4 5V reference circuit (P0697)	19/39 counts or 14 counts continuous; 12.5 ms/count in the main processor	Trips: 1 Type: A MIL: YES
Throttle Position (TP) Sensor 1-2 Correlation	P2135	1. Detects a continuous or intermittent correlation fault between TPS sensors #1 and #2 on Main processor	1. Difference between TPS1 displaced and TPS2 displaced > 2. Difference between (normalized min TPS1) and (normalized min TPS2) >	1. 6.775% offset at min. throttle position with a linear threshold to 9.575% at max. throttle position 2. 5.000 % Vref		Run/Crank voltage or Powertrain relay voltage > 6.41 and reduced power is false, else the failure will be reported for all conditions No TPS sensor faults (P0122, P0123, P0222, P0223) No 5V reference error or fault for # 4 5V reference circuit (P06A3)	1 & 2: 79/159 counts or 58 counts continuous; 3.125 ms/count in the main processor	Trips: 1 Type: A MIL: YES

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Accelerator Pedal Position (APP) Sensor 1-2 Correlation	P2138	Detects a continuous or intermittent correlation fault between APP sensors #1 and #2 on Main processor	1. Difference between APP1 displaced and APP2 displaced >	1. 5.000% offset at min. pedal position with a linear threshold to 10.000% at max. pedal position		Run/Crank voltage or Powertrain relay voltage > 6.41 and reduced power is false, else the failure will be reported for all conditions	1 & 2: 19/39 counts intermittent or 15 counts continuous, 12.5 ms/count in the main processor	Trips: 1 Type: A MIL: YES
			2. Difference between (normalized min APP1) and (normalized min APP2) >	2. 5.000% Vref		No APP sensor faults (P2122, P2123,P2127, P2128) No 5V reference errors or faulst for # 3 & # 4 5V reference circuits (P06A3, P0697)		
Minimum Throttle Position Not Learned	P2176	TP sensors were not in the minmum learn window after multiple attempts to learn the minimum.	During TPS min learn on the Main processor, TPS Voltage >	0.717		Run/crank voltage or Powertrain relay voltage > 6.41 and reduced power is false, else the failure will be reported for all conditions	2.0 secs	Trips: 1 Type: A MIL: YES
			Number of learn attempts >	10 counts				
Cooling System Performance	P2181	This DTC detects thermostat malfunction (i.e. stuck open)	Engine Coolant Temp (ECT) is ≤ commanded temperature minus 11 Deg C and normalized ratio is ≤ than 2. When above is present for more than 5 seconds, fail counts start.		No Active DTC's Engine not run time Engine run time Fuel Condition ECT at Power Up IAT min	MAF_SensorFA IAT_SensorFA THMR_RCT_Sensor_Ckt_FA THMR_ECT_Sensor_Ckt_FA ≥ 7200 seconds 70 ≤ Time ≤ 1200 seconds Ethanol ≤ 100% -40.0 ≤ ECT ≤ 45.0 °C -7°C ≤ IAT ≤ 60°C.	320 failures out of 400 samples 1 sec/ sample Once per ignition key cycle	2 trips Type B
			Engine total airgrams is accumulated when 11 ≤ AirFlow ≤ 100 grams per second.		T-Stat Heater duty cycle commanded Airflow	≤ 100 % 11.0 ≤ Airflow ≤ 100.0 GPS		
			Ratio Definition:					
			Current temp difference between ECT and RCT minus PwrUp difference					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			divided by total airgrams. Note: Minimum total airgrams is 800.0 grams.					
O2 Sensor Signal Stuck Lean Bank 1 Sensor 2	P2270	This DTC determines if the post catalyst O2 sensor is stuck in a normal lean voltage range and thereby can no longer be used for post oxygen sensor fuel control or for catalyst monitoring. The diagnostic is an intrusive test (during coast) which increases the delivered fuel to achieve the required rich threshold.	Post O2 sensor signal AND The Accumulated mass air flow monitored during the Stuck Lean Voltage Test	< 775 mvolts > 55 grams	No Active DTC's B1S2 Failed this key cycle System Voltage ICAT MAT Burnoff delay Green O2S Condition Low Fuel Condition Diag Engine Speed to initially enable test Engine Speed range to keep test enabled (after initially enabled) Engine Airflow Vehicle Speed to initially enable test Vehicle Speed range to keep test enabled (after initially enabled) Closed loop integral	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA P013A, P013B, P013E, P013F, P2270 or P2271 10.0 < Volts < 31.9 = Not Valid = Not Valid, See definition of **Green Sensor Delay Criteria (B1S2)** in Supporting Tables tab. = False 1100 ≤ RPM ≤ 3500 1050 ≤ RPM ≤ 3650 2 ≤ gps ≤ 12 43.5 ≤ MPH ≤ 80.8 34.2 ≤ MPH ≤ 83.3 mph 0.90 ≤ C/L Int ≤ 1.08	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.
					Closed Loop Active Evap Ethanol Post fuel cell EGR Intrusive diagnostic All post sensor heater delays O2S Heater on Time Predicted Catalyst temp Fuel State	= TRUE not in control of purge not in estimate mode = enabled = not active = not active ≥ 180.0 sec 650 ≤ ºC ≤ 900 = DFCO possible		
					All of the above met for at least 3.0 seconds, and then the Force Cat Rich intrusive stage is requested.			
O2 Sensor Signal Stuck Rich Bank 1 Sensor 2	P2271	This DTC determines if the post catalyst O2 sensor is stuck in a normal rich voltage range and thereby can no longer be used for post oxygen sensor fuel control or for catalyst monitoring. The diagnostic is an intrusive test which requests the DFCO mode to achieve the required lean threshold.	Post O2 sensor signal AND The Accumulated mass air flow monitored during the Stuck Rich Voltage Test	> 100 mvolts > 59 grams	No Active DTC's B1S2 Failed this key cycle System Voltage ICAT MAT Burnoff delay Green O2S Condition	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA P013A, P013B, P013E, P013F or P2270 10.0 < Volts < 31.9 = Not Valid = Not Valid, See definition of **Green Sensor Delay Criteria (B1S2)** in Supporting Tables tab.	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.
					Low Fuel Condition Diag	= False		
					Engine Speed	1100 ≤ RPM ≤ 3500		
					Engine Airflow	2 ≤ gps ≤ 12		
					Vehicle Speed	43.5 ≤ MPH ≤ 80.8		
					Closed loop integral	0.90 ≤ 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	≥ 180.0 sec		
					Predicted Catalyst temp	650 ≤ ºC ≤ 900		
					Fuel State	= DFCO possible		
					DTC's Passed	= P2270 (and P2272 if applicable)		
					DTC's Passed	= P013E (and P014A if applicable)		
					DTC's Passed	= P013A (and P013C if applicable)		
					After above conditions are met: DFCO mode is continued (wo driver initiated pedal input).			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Transmission Control Torque Request Circuit	P2544	Determines if the torque request from the TCM is valid	**Protect error** - Serial Communication message - ($199 - PTEI3)	Message <> two's complement of message	Diagnostic enabled/ disabled	Enabled	>= 16 Protect errors during key cycle. Performed every 12.5 msec	2 trip(s)
			OR					
			Rolling count error - Serial Communication message ($199 - PPEI3) rolling count value	Message <> previous message rolling count value + one	Power Mode	= Run	>= 6 Rolling count errors out of ten samples. Performed every 12.5 msec	Type B
			OR					
			RAM error - Serial Communication message ($199 - PPEI3)	Transmission torque request value or request type dual store not equal	Engine Running Run/Crank Active	= True > 0.50 Sec	>= 16 RAM errors out of 32 samples. Performed every 12.5 msec	
			OR					
			Range Error - Serial Communication message - ($199 - PTEI3) TCM Requested Torque Increase	> 350 Nm			>= 6 out of 10 samples. Performed every 12.5 msec	
			OR					
			Multi-transition error - Trans torque intervention type request change	Requested torque intervention type toggles from not increasing request to increasing request			>= 3 multi-transitions out of 5 samples. Performed every 200 msec	
ECM/PCM Internal Engine Off Timer Performance	P2610	This DTC determines if the engine mode not running timer does not initialize or count properly. There are two tests to ensure proper	**Count Up Test:** Time difference between the current read and the previous read of the Timer		IAT Temperature No active DTCs:	-256 °C ≤ Temperature ≤ 256 °C IAT_SensorFA	**Count Up Test:** 4 failures out of 20 samples	2 trips Type B DTC

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		functioning of the timer: Count Up Test (CUT) and Range Test (RaTe). Count Up Test (CUT): Verifies that the HWIO timer is counting up with the proper increment. Range Test (RaTe): Runs a mirror timer to the HWIO timer. The mirror timer is started when the Engine Mode Not Run Timer is started. When the engine starts or when a controller shutdown is requested, the HWIO timer and mirror timer are compared.	**Range Test:** The variation of the HWIO timer and mirror timer is at controller shutdown.	> 1.50 seconds > 25 %	**Count Up Test:** Ignition key off OR Engine off **Range Test:** ECM is powering down		1 sec / sample Continuous from key off or engine off until controller shutdown. **Range Test:** One time when the controller is powered down.	sets on next key cycle if failure detected.
Malfunction Indicator Lamp (MIL) Control Circuit (ODM) Low Voltage	P263A	Diagnoses the malfunction indicator lamp control low side driver circuit for circuit faults	Voltage low during driver off state (indicates short to ground)	Short to Ground: <= 0.5 Ohms impedance between signal and controller ground	Run/Crank Voltage Remote Vehicle Start is	11 volts ≤ Voltage ≤ 32 volts	20 failures out of 25 samples 250 ms / sample	2 trip Type B NO MIL

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					not active		Continuous	Note: In certain controllers P0650 may also set (MIL control circuit Open)
O2Sensor Circuit Range/ Performance Bank 1 Sensor 1	P2A00	This DTC determines if the O2 sensor voltage is not meeting the voltage criteria to enable closed loop fueling.	Closed Loop O2S ready flag	= False	No Active DTC's	TPS_ThrottleAuthorityDefaulted MAP_SensorFA ECT_Sensor_FA FuelInjectorCircuit_FA P0131, P0151 P0132, P0152	200 failures out of 250 samples. Frequency: Continuous 100msec loop	2 trips Type B
			A) O2S signal must be To set Closed Loop ready flag	< 1100 mvolts = True	System Voltage	10.0 < Volts < 32.0		
			Closed Loop O2S ready flag	= True	Engine Speed	1000 ≤ RPM ≤ 3400		
			B) Once set to ready O2S cannot be for Then set Closed Loop ready flag	> 1100 mvolts > 5.0 seconds = False	Engine Airflow	4.0 ≤ gps ≤ 30.0		
					Engine Coolant	≥ 65.0 ºC		
					Engine Metal Overtemp Active	= False		
					Converter Overtemp Active	= False		
					Fuel State	DFCO not active		
					AFM Status	= All Cylinders active		
					Predicted Exhaust Temp (B1S1)	≥ 0.0 ºC		
					Engine run time	> 100 seconds		
					Fuel Enrichment	= Not Active		
					All of the above met for	> 5 seconds		
Control Module Communication Bus A Off	U0073	This DTC monitors for a BUS A off condition	Bus off failures	≥ 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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Lost Communication With TCM	U0101	This DTC monitors for a loss of communication with the transmission control module	Message is not received from controller for this amount of time.	Type B time = 10s Type C time = 12s Torque Security Ucode = varied and possibly much shorter time.	Run/Crank Voltage	11 volts ≤ Voltage ≤ 32 volts	The fail diagnostic runs in the 6.25 ms loop with pass conditions reported to the DFIR in the 1000ms loop.	2 Trip(s)
					Power mode is RUN			Type B
					Communication bus is not OFF			
					or is typed as a C code			
					Normal Communication is enabled			
					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 amount of time.	Type B time = 10s Type C time = 12s Torque Security Ucode = varied and possibly much shorter time.	Run/Crank Voltage	11 volts ≤ Voltage ≤ 32 volts	The fail diagnostic runs in the 6.25 ms loop with pass conditions reported to the DFIR in the 1000ms loop.	1 Trip(s)
					Power mode is RUN			Special Type C
					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		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					A message has been selected to monitor.			
Lost Communication With Body Control Module	U0140	This DTC monitors for a loss of communication with the Body Control Module.	Message is not received from controller for this amount of time.	Type B time = 10s Type C time = 12s Torque Security Ucode = varied and possibly much shorter time.	Run/Crank Voltage	11 volts ≤ Voltage ≤ 32 volts	The fail diagnostic runs in the 6.25 ms loop with pass conditions reported to the DFIR in the 1000ms loop.	1 Trip(s)
					Power mode is RUN			Special Type C
					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.			

Supporting Tables

P0401

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
0.6797	0.7188	0.7578	0.7969	0.8359	0.8750	0.9141	0.9531	1.0000

KtEGRD_Cnt_StepSamplesPerTrip

X axis is Kpa BARO

65	70	75	80	85	90	95	100	105
7.0000	7.0000	7.0000	5.0000	3.0000	3.0000	3.0000	3.0000	3.0000

KtEGRD_Cnt_SamplesAfterStep

X axis is Kpa BARO

65	70	75	80	85	90	95	100	105
20.0000	20.0000	20.0000	15.0000	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
20.0000	20.0000	20.0000	15.0000	10.0000	10.0000	10.0000	10.0000	10.0000

P0011

KtPHSD_phi_CamPosErrorLimIc1

X axis is Deg C
Y axis is RPM

	-40.0000	-28.0000	-16.0000	-4.0000	8.0000	20.0000	32.0000	44.0000	56.0000	68.0000	80.0000	92.0000	104.0000	116.0000	128.0000	140.0000	152.0000
400	6.0000	6.0000	4.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000
800	6.0000	6.0000	4.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000
1200	6.0000	6.0000	4.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000
1600	6.0000	6.0000	4.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000
2000	6.0000	6.0000	4.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000
2400	6.0000	6.0000	4.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000
2800	6.0000	6.0000	4.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000
3200	6.0000	6.0000	4.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000
3600	6.0000	6.0000	4.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000
4000	6.0000	6.0000	4.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000
4400	6.0000	6.0000	4.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000
4800	6.0000	6.0000	4.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000
5200	6.0000	6.0000	4.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000
5600	6.0000	6.0000	4.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000
6000	6.0000	6.0000	4.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000
6400	6.0000	6.0000	4.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000
6800	6.0000	6.0000	4.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000

Supporting Tables

P0014
KtPHSD_phi_CamPosErrorLimEc1

X axis is Deg C
Y axis is RPM

	-40.0000	-28.0000	-16.0000	-4.0000	8.0000	20.0000	32.0000	44.0000	56.0000	68.0000	80.0000	92.0000	104.0000	116.0000	128.0000	140.0000	152.0000
400	12.0000	12.0000	9.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000
800	12.0000	12.0000	9.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000
1200	12.0000	12.0000	9.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000
1600	12.0000	12.0000	9.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000
2000	12.0000	12.0000	9.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000
2400	12.0000	12.0000	9.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000
2800	12.0000	12.0000	9.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000
3200	12.0000	12.0000	9.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000
3600	12.0000	12.0000	9.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000
4000	12.0000	12.0000	9.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000
4400	12.0000	12.0000	9.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000
4800	12.0000	12.0000	9.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000
5200	12.0000	12.0000	9.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000
5600	12.0000	12.0000	9.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000
6000	12.0000	12.0000	9.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000
6400	12.0000	12.0000	9.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000
6800	12.0000	12.0000	9.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000

P0021
KtPHSD_phi_CamPosErrorLimIc2

X axis is Deg C
Y axis is RPM

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

P0024
KtPHSD_phi_CamPosErrorLimEc2

X axis is Deg C
Y axis is RPM

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

Supporting Tables

P0011
KtPHSD_t_StablePositionTimeIc1

X axis is Deg C
Y axis is RPM

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

P0014
KtPHSD_t_StablePositionTimeEc1

X axis is Deg C
Y axis is RPM

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

P0021
KtPHSD_t_StablePositionTimeIc2

X axis is Deg C
Y axis is RPM

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

Supporting Tables

P0024
KtPHSD_t_StablePositionTimeEc2

X axis is Deg C
Y axis is RPM

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

P0420, P0430

MinimumEngineRunTime

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

MinAirflowToWarmCatalyst

Engine Coolant	0	45	90
MinAirFlowToWrmCat	12	8	4

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

Load	400	500	600	700	800	900	1000	1100	1200	1400	1600	1800	2000
8	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
9	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
11	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
12	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
13	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
15	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
17	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
19	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
22	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
25	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
29	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
33	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
38	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
42	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
48	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
54	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
61	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767

Supporting Tables

P0300-P0308: Idle SCD ddt

Load	400	500	600	700	800	900	1000	1100	1200	1400	1600	1800	2000
8	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
9	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
11	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
12	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
13	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
15	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
17	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
19	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
22	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
25	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
29	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
33	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
38	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
42	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
48	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
54	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
61	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767

P0300-P0308: Off Idle SCD dt **OR** (decel index >Off Idle SCD dt **AND** > Off Idle SCD ddt Tables))

Load	400	500	600	700	800	900	1000	1100	1200	1400	1600	1800	2000
8	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
9	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
11	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
12	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
13	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
15	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
17	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
19	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
22	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
25	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
29	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
33	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
38	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
42	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
48	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
54	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
61	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767

P0300-P0308: SCD Delta ddt

Load	400	500	600	700	800	900	1000	1100	1200	1400	1600	1800	2000
8	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
9	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
11	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
12	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
13	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
15	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
17	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
19	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
22	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
25	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
29	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
33	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
38	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
42	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
48	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
54	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
61	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767

Supporting Tables

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

Load	400	500	600	700	800	900	1000	1100	1200	1400	1600	1800	2000
8	4200	3500	2800	2700	1600	1300	1260	790	493	393	296	163	100
9	3500	3000	2500	2400	1600	1300	1248	766	493	408	296	149	106
11	3200	2800	2400	2300	1600	800	738	700	399	411	299	139	97
12	3400	2800	2200	2100	1600	800	586	715	427	350	290	145	105
13	3200	2800	2400	2300	1600	800	600	711	430	342	296	155	114
15	3600	3200	2800	2700	1600	800	656	735	480	292	260	165	118
17	4000	3400	2800	2750	1600	800	800	713	361	336	253	170	118
19	4400	3700	3000	2900	1600	800	800	750	330	300	252	190	130
22	4550	4000	3450	3300	1600	800	800	506	405	264	196	123	101
25	5500	4500	3500	3400	1600	800	800	580	402	270	172	127	89
29	6000	5000	4000	3900	1600	800	800	580	431	270	196	133	101
33	6500	5500	4500	4450	1650	800	800	590	449	336	194	168	120
38	7000	6000	5000	4800	1700	1075	800	783	620	399	232	173	140
42	7500	6500	5500	5250	1750	1264	1022	808	646	399	249	230	166
48	8000	7000	6000	5300	1800	1530	1507	1000	765	464	287	231	188
54	8500	7500	6500	5400	1900	1850	1804	1196	805	483	396	282	208
61	9000	8000	7000	5500	2000	1950	1900	1200	816	618	395	321	237

P0300-P0308: Idle Cyl Mode ddt

Load	400	500	600	700	800	900	1000	1100	1200	1400	1600	1800	2000
8	4878	4471	4065	759	3311	183	461	996	613	511	480	130	102
9	4858	4453	4048	756	3298	182	459	1000	613	495	490	151	119
11	4839	4436	4032	753	3285	355	500	963	704	506	500	139	113
12	4819	4418	4016	3400	3400	371	508	960	704	550	500	126	98
13	4800	4400	4000	3410	3650	708	508	904	705	550	496	137	123
15	5400	4950	4500	3419	3800	964	600	860	708	550	400	150	128
17	6000	5500	5000	3868	3968	1894	950	928	745	550	350	220	135
19	7200	6600	6000	4149	3667	1618	1200	1000	780	587	343	240	179
22	8000	8000	8000	4737	3600	1753	1210	1045	790	600	343	274	190
25	8000	8000	8000	6550	3700	2007	1238	1119	820	610	388	276	200
29	9000	9000	9000	8000	3800	1703	1300	1300	974	620	399	291	231
33	10000	10000	10000	8500	4207	1747	1627	1437	1050	670	486	352	245
38	11000	11000	11000	9000	4570	2358	1700	1700	1384	780	500	406	299
42	12000	12000	12000	9500	5100	2865	2588	1810	1521	869	645	484	354
48	13000	13000	13000	10000	5500	2993	3196	2150	1648	932	734	533	391
54	14000	14000	14000	10500	6110	4207	3811	2308	1721	1100	900	620	433
61	14500	14500	14500	11000	6200	4207	4000	2516	1784	1227	934	664	477

Supporting Tables

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

Load

	400	500	600	700	800	900	1000	1100	1200	1400	1600	1800	2000	2200	2400	2600
8	4200	3500	2800	2700	1600	1300	1260	790	493	393	296	163	100	94	52	59
9	3500	3000	2500	2400	1600	1300	1248	766	493	408	296	149	106	90	53	60
11	3200	2800	2400	2300	1600	800	738	700	399	411	299	139	97	90	54	60
12	3400	2800	2200	2100	1600	800	586	715	427	350	290	145	105	92	53	60
13	3200	2800	2400	2300	1600	800	600	711	430	342	296	155	114	93	50	60
15	3600	3200	2800	2700	1600	800	656	735	480	292	260	165	118	94	52	60
17	4000	3400	2800	2750	1600	800	800	713	361	336	253	170	118	97	58	60
19	4400	3700	3000	2900	1600	800	800	750	330	300	252	190	130	110	62	65
22	4550	4000	3450	3300	1600	800	800	506	405	264	196	123	101	76	54	44
25	5500	4500	3500	3400	1600	800	800	580	402	270	172	127	89	70	48	36
29	6000	5000	4000	3900	1600	800	800	580	431	270	196	133	101	82	55	41
33	6500	5500	4500	4450	1650	800	800	590	449	336	194	168	120	93	67	50
38	7000	6000	5000	4800	1700	1075	800	783	620	399	232	173	140	107	68	57
42	7500	6500	5500	5250	1750	1264	1022	808	646	399	249	230	166	136	93	73
48	8000	7000	6000	5300	1800	1530	1507	1000	765	464	287	231	188	146	104	79
54	8500	7500	6500	5400	1900	1850	1804	1196	805	483	396	282	208	159	105	97
61	9000	8000	7000	5500	2000	1950	1900	1200	816	618	395	321	237	172	133	109

	2800	3000	3500	4000	4500	5000	5500	6000	6500	7000
8	45	38	21	17	15	14	11	9	9	9
9	45	38	21	17	15	14	11	9	9	9
11	45	38	21	17	15	14	11	9	9	9
12	45	39	21	17	15	14	11	9	9	9
13	49	40	21	17	15	14	11	9	9	9
15	47	40	21	17	15	14	11	9	9	9
17	49	40	21	17	15	14	11	9	9	9
19	55	42	21	17	15	14	11	9	9	9
22	60	50	21	17	15	14	11	9	9	9
25	44	33	21	17	15	14	11	9	9	9
29	31	34	25	17	15	14	11	9	9	9
33	42	35	25	19	16	14	11	9	9	9
38	46	40	29	22	17	14	11	9	9	9
42	59	40	35	26	18	15	12	9	9	9
48	72	59	40	27	20	16	13	10	10	10
54	82	70	47	33	25	20	16	11	11	11
61	92	81	55	40	31	26	17	13	13	13

Supporting Tables

P0300-P0308: Cyl Mode ddt

Load

	400	500	600	700	800	900	1000	1100	1200	1400	1600	1800	2000	2200	2400	2600
8	4878	4471	4065	759	3311	183	461	996	613	511	480	130	102	100	77	61
9	4858	4453	4048	756	3298	182	459	1000	613	495	490	151	119	103	76	59
11	4839	4436	4032	753	3285	355	500	963	704	506	500	139	113	101	73	58
12	4819	4418	4016	3400	3400	371	508	960	704	550	500	126	98	95	73	64
13	4800	4400	4000	3410	3650	708	508	904	705	550	496	137	123	105	73	62
15	5400	4950	4500	3419	3800	964	600	860	708	550	400	150	128	109	75	62
17	6000	5500	5000	3868	3968	1894	950	928	745	550	350	220	135	119	76	65
19	7200	6600	6000	4149	3667	1618	1200	1000	780	587	343	240	179	153	95	80
22	8000	8000	8000	4737	3600	1753	1210	1045	790	600	343	274	190	155	100	81
25	8000	8000	8000	6550	3700	2007	1238	1119	820	610	388	276	200	160	100	83
29	9000	9000	9000	8000	3800	1703	1300	1300	974	620	399	291	231	168	105	85
33	10000	10000	10000	8500	4207	1747	1627	1437	1050	670	486	352	245	194	130	110
38	11000	11000	11000	9000	4570	2358	1700	1700	1384	780	500	406	299	222	140	127
42	12000	12000	12000	9500	5100	2865	2588	1810	1521	869	645	484	354	247	192	153
48	13000	13000	13000	10000	5500	2993	3196	2150	1648	932	734	533	391	292	216	177
54	14000	14000	14000	10500	6110	4207	3811	2308	1721	1100	900	620	433	331	230	209
61	14500	14500	14500	11000	6200	4207	4000	2516	1784	1227	934	664	477	361	293	226

	2800	3000	3500	4000	4500	5000	5500	6000	6500	7000
8	45	37	36	27	23	18	14	14	14	14
9	43	37	36	27	23	18	14	14	14	14
11	44	37	36	27	23	18	14	14	14	14
12	47	37	36	27	23	18	14	14	14	14
13	59	37	36	27	23	18	14	14	14	14
15	64	39	36	27	23	18	14	14	14	14
17	69	39	36	27	23	18	14	14	14	14
19	71	48	36	27	23	18	14	14	14	14
22	83	56	36	27	23	18	14	14	14	14
25	83	57	36	27	23	21	14	14	14	14
29	83	61	44	27	23	21	19	14	14	14
33	93	64	50	31	23	21	19	14	14	14
38	103	74	56	35	27	22	19	14	14	14
42	123	89	61	39	30	24	19	14	14	14
48	140	107	73	45	35	27	21	17	17	17
54	174	122	81	51	38	30	24	17	17	17
61	206	142	101	58	45	39	28	21	21	21

Supporting Tables

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

Load

	1100	1200	1400	1600	1800	2000	2200	2400	2600	2800	3000	3500	4000	4500	5000	5500
8	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
9	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
11	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
12	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
13	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
15	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
17	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
19	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
22	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
25	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
29	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
33	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
38	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
42	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
48	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
54	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
61	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767

	6000	6500	7000
8	32767	32767	32767
9	32767	32767	32767
11	32767	32767	32767
12	32767	32767	32767
13	32767	32767	32767
15	32767	32767	32767
17	32767	32767	32767
19	32767	32767	32767
22	32767	32767	32767
25	32767	32767	32767
29	32767	32767	32767
33	32767	32767	32767
38	32767	32767	32767
42	32767	32767	32767
48	32767	32767	32767
54	32767	32767	32767
61	32767	32767	32767

Supporting Tables

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

Load	400	500	600	700	800	900	1000	1100	1200	1400	1600	1800	2000	2200	2400	2600
0	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
6	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
13	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
19	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
25	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
31	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
38	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
44	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
50	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
56	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
63	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
69	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
75	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
81	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
88	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
94	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
100	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767

	2800	3000	3500
0	32767	32767	32767
6	32767	32767	32767
13	32767	32767	32767
19	32767	32767	32767
25	32767	32767	32767
31	32767	32767	32767
38	32767	32767	32767
44	32767	32767	32767
50	32767	32767	32767
56	32767	32767	32767
63	32767	32767	32767
69	32767	32767	32767
75	32767	32767	32767
81	32767	32767	32767
88	32767	32767	32767
94	32767	32767	32767
100	32767	32767	32767

P0300-P0308: Zero torque engine load

Zero Torque: All Cylinders active

RPM	Pct load
400	14.48
500	14.48
600	13.60
700	10.00
800	10.32
900	10.32
1000	10.90
1100	10.90
1200	10.90
1400	10.90
1600	10.90
1800	10.90
2000	10.90
2200	10.90
2400	10.90
2600	10.90
2800	10.90
3000	10.90
3500	13.28
4000	15.15
4500	17.03
5000	18.91
5500	20.78
6000	22.66
6500	24.54
7000	26.41

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

Zero Torque: Active Fuel Management (AFM)

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

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

Supporting Tables

Catalyst Damaging Misfire Percentage

Load	0	1000	2000	3000	4000	5000	6000	7000
0	22.6	22.6	22.6	12.1	8.0	4.8	4.8	4.8
10	22.6	22.6	22.6	12.1	8.0	4.8	4.8	4.8
20	22.6	22.6	22.6	12.1	8.0	4.8	4.8	4.8
30	17.6	17.6	17.6	8.0	5.9	4.8	4.8	4.8
40	12.1	12.1	12.1	5.9	5.0	4.8	4.8	4.8
50	8.0	8.0	5.9	5.0	4.8	4.8	4.8	4.8
60	5.9	5.9	5.0	4.8	4.8	4.8	4.8	4.8
70	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8
80	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8
90	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8
100	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8

RoughRoadSource = CeRRDR_e_TOSS
Rough Road Threshold
Engine Speed

Trans Speed	600	800	1000	1200	1400	1600	1800	2000	2200	2400	2600	2800	3000	3500	4000	4500
100	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
200	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
300	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
400	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
500	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
600	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
700	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
800	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
900	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
1000	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
1100	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
1200	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
1300	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
1400	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0

	5000	5500	6000
100	1.0	1.0	1.0
200	1.0	1.0	1.0
300	1.0	1.0	1.0
400	1.0	1.0	1.0
500	1.0	1.0	1.0
600	1.0	1.0	1.0
700	1.0	1.0	1.0
800	1.0	1.0	1.0
900	1.0	1.0	1.0
1000	1.0	1.0	1.0
1100	1.0	1.0	1.0
1200	1.0	1.0	1.0
1300	1.0	1.0	1.0
1400	1.0	1.0	1.0

RoughRoadSource = CeRRDR_e_WheelSpeedInECM or CeRRDR_e_SerialDataFromABS
Rough Road Threshold

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

Kph	144	158	170	181	194
Accel	0.25	0.25	0.25	0.25	0.25

Supporting Tables

P0300-P0308: Abnormal Engine Speed

Cylinder Mode Abnormal Speed

RPM	0	1000	2000	3000	4000	5000	6000	7000	8000
Multiplier	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00

SCD Mode Abnormal Speed

RPM	0	1000	2000	3000	4000	5000	6000	7000	8000
Multiplier	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00

Rev Mode Abnormal Speed

RPM	0	1000	2000	3000	4000	5000	6000	7000	8000
Multiplier	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00

P0300-P0308: Pattern Recognition Min and Max Multipliers

Min Multiplier

RPM	0	1000	2000	3000	4000	5000	6000	7000	8000
Multiplier	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75

Max Multiplier

RPM	0	1000	2000	3000	4000	5000	6000	7000	8000
Multiplier	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50

P0300-P0308: Driveline Ring Filter

Ring Filter

RPM	0	1000	2000	3000	4000	5000	6000	7000	8000
Multiplier	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00

Number of Normals

RPM	0	1000	2000	3000	4000	5000	6000	7000	8000
Multiplier	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00

P0114: IAT Intermittent Weight Factor

X axis is Filtered Intake Air Temperature in Deg C

Temp	-40	0	40	80	120	160	200
	1.00	1.00	1.00	1.00	1.00	1.00	1.00

P0101, P0106, P0121, P012B, P0236, P1101: IFRD Residual Weighting Factors

TPS Residual Weight Factor based on RPM

RPM	0	400	800	1200	1600	2000	2400	2800	3200	3600	4000	4400	4800	5200	5600	6000	6500
	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

MAF Residual Weight Factor based on RPM

RPM	0	400	800	1200	1600	2000	2400	2800	3200	3600	4000	4400	4800	5200	5600	6000	6500
	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	0.960	0.709

MAF Residual Weight Factor Based on MAF Estimate

gm/sec	0.0	50.0	70.0	73.0	76.0	79.0	82.0	85.0	89.0	95.0	100.0	110.0	120.0	150.0	200.0	280.0	350.0
	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

MAP1 Residual Weight Factor based on RPM

RPM	0	400	800	1200	1600	2000	2400	2800	3200	3600	4000	4400	4800	5200	5600	6000	6500
	0.850	0.850	0.850	0.900	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950

MAP2 Residual Weight Factor based on RPM

RPM	0	400	800	1200	1600	2000	2400	2800	3200	3600	4000	4400	4800	5200	5600	6000	6500
	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

MAP3 Residual Weight Factor based on RPM

RPM	0	250	750	1250	1750	2250	2750	3250	3750	4250	4750	5250	5750	6250	6750	7250	9000
	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

TIAP1 Residual Weight Factor based on RPM

RPM	0	1500	2200	2500	2700	3100	3200	3300	3500	3700	4000	4200	4500	5000	5250	5500	8000
	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

SCIAP1 Residual Weight Factor based on RPM

RPM	0	1500	2200	2500	2800	3100	3200	3300	3500	3700	4000	4200	4500	5000	5500	6500	8000
	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

SCIAP2 Residual Weight Factor based on RPM

Supporting Tables

RPM	0	1500	2200	2500	2800	3100	3200	3300	3500	3700	4000	4200	4500	5000	5500	6500	8000
	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Boost Residual Weight Factor based on % of Boost

% Boost	0.00	0.06	0.13	0.19	0.25	0.31	0.38	0.44	0.50	0.56	0.63	0.69	0.75	0.81	0.88	0.94	1.00
	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

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

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

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

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

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

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

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

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

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

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

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

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

Supercharger Intake Flow Rationality Diagnostic Failure Matrix

TPS Model Failure	MAF Model Failure	MAP 1 Model Failure	MAP 2 Model Failure	SCIAP 1 Model Failure	SCIAP 2 Model Failure	DTC Set
F	F	F	F	F	F	No DTC
F	F	F	F	F	T	No DTC
F	F	F	F	T	F	No DTC
F	F	F	F	T	T	P012B
F	F	F	T	F	F	No DTC
F	F	F	T	F	T	P1101
F	F	F	T	T	F	P1101
F	F	F	T	T	T	P1101
F	F	T	F	F	F	No DTC
F	F	T	F	F	T	P1101
F	F	T	F	T	F	P1101
F	F	T	F	T	T	P1101
F	F	T	T	F	F	P0106
F	F	T	T	F	T	P1101
F	F	T	T	T	F	P1101
F	F	T	T	T	T	P1101
F	T	F	F	F	F	No DTC
F	T	F	F	F	T	P0101
F	T	F	F	T	F	No DTC
F	T	F	F	T	T	P0101, P012B
F	T	F	T	F	F	P1101
F	T	F	T	F	T	P0101
F	T	F	T	T	F	P1101
F	T	F	T	T	T	P0101, P012B
F	T	T	F	F	F	P1101
F	T	T	F	F	T	P1101
F	T	T	F	T	F	P1101
F	T	T	F	T	T	P1101
F	T	T	T	F	F	P1101
F	T	T	T	F	T	P1101
F	T	T	T	T	F	P1101
F	T	T	T	T	T	P1101
T	F	F	F	F	F	P0121

Supporting Tables

Supercharger Intake Flow Rationality Diagnostic Failure Matrix (Cont'd)						
TPS Model Failure	MAF Model Failure	MAP 1 Model Failure	MAP 2 Model Failure	SCIAP 1 Model Failure	SCIAP 2 Model Failure	DTC Set
T	F	F	F	F	T	No DTC
T	F	F	F	T	F	P0121
T	F	F	F	T	T	P1101
T	F	F	T	F	F	P1101
T	F	F	T	F	T	P1101
T	F	F	T	T	F	P1101
T	F	F	T	T	T	P1101
T	F	T	F	F	F	P0121
T	F	T	F	F	T	P1101
T	F	T	F	T	F	P0121
T	F	T	F	T	T	P1101
T	F	T	T	F	F	P1101
T	F	T	T	F	T	P1101
T	F	T	T	T	F	P1101
T	F	T	T	T	T	P1101
T	T	F	F	F	F	P0121
T	T	F	F	F	T	P1101
T	T	F	F	T	F	P0121
T	T	F	F	T	T	P1101
T	T	F	T	F	F	P1101
T	T	F	T	F	T	P1101
T	T	F	T	T	F	P1101
T	T	F	T	T	T	P1101
T	T	T	F	F	F	P0121
T	T	T	F	F	T	P1101
T	T	T	F	T	F	P0121
T	T	T	F	T	T	P1101
T	T	T	T	F	F	P1101
T	T	T	T	F	T	P1101
T	T	T	T	T	F	P1101
T	T	T	T	T	T	P1101

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

Supporting Tables

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

Supporting Tables

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

Supporting Tables

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

Supporting Tables

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

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

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

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

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

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

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

Supporting Tables

P0128: Maximum Total Energy transferred to Cooling System for IAT and Start-up ECT conditions

Z axis is the cooling system energy failure threshold (grams)
X axis is ECT Temperature at Power up (° C)
Y axis is IAT min during test (° C)

Remove for applications with dual coolant sensor	IAT Range		-40	-28	-16	-4	8	20	32	44	56	68	80
	Low	Hi											
Primary	10.0 ° C	52.0 ° C	10000	9000	8000	7000	6000	5000	4000	3000	2000	1000	500
Alternate	-7.0 ° C	52.0 ° C	10000	9000	8000	7000	6000	5000	4000	3000	2000	1000	500

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

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

Remove for applications with single coolant sensor	IAT Range		-40	-28	-16	-4	8	20	32	44	56	68	80
	Low	Hi											
Primary	10.0 ° C	65.0 ° C	1002	1002	1002	1002	1002	938	898	836	757	639	436
Alternate	-7.0 ° C	10.0 ° C	716	716	716	658	599	543	491	440	304	54	0

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

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

	0.000	0.020	0.040	0.060	0.080	0.100	0.120	0.140	0.160	0.180	0.200	0.220	0.240	0.260	0.280	0.300	1.000
0.000	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0
0.020	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0
0.040	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0
0.060	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0
0.080	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0
0.100	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0
0.120	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0
0.140	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0
0.160	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0
0.180	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0
0.200	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0
0.220	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0
0.240	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0
0.260	0	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0	0
0.280	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0
0.300	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1.000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Supporting Tables

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	0.020	0.040	0.060	0.080	0.100	0.120	0.140	0.160	0.180	0.200	0.220	0.240	0.260	0.280	0.300	1.000
0.000	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0
0.020	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
0.040	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0
0.060	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0
0.080	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0
0.100	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0
0.120	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0
0.140	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0
0.160	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0
0.180	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0
0.200	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0
0.220	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0
0.240	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0
0.260	0	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0	0
0.280	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0
0.300	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1.000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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

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

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

Supporting Tables

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

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

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

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

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

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

Supporting Tables

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

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

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

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 7 gps for 120000 grams of accumulated flow non-continuously.
* B1S2 Airflow greater than 7 gps for 360000 grams of accumulated flow non-continuously.
* B2S1 Airflow greater than 7 gps for 120000 grams of accumulated flow non-continuously.
* B2S2 Airflow greater than 7 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

P00C6 **KtFHPD_p_HPS_PressFallLoThrsh**

Coolant Axis

Eth %	**-40**	**-32**	**-24**	**-16**	**-8**	**0**	**8**	**16**	**20**	**24**	**32**	**40**	**48**	**64**	**80**	**96**	**112**
0.0000	2.0	2.0	2.0	2.0	2.0	1.1	0.6	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
12.5000	**2.0**	2.0	2.0	2.0	2.0	1.1	0.6	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
25.0000	**2.0**	2.0	2.0	2.0	2.0	1.6	1.6	1.3	1.1	1.1	0.8	0.6	0.3	0.3	0.3	0.3	0.3
37.5000	**2.0**	2.0	2.0	2.0	2.0	1.6	1.6	1.3	1.1	1.1	0.8	0.6	0.3	0.3	0.3	0.3	0.3
50.0000	**2.0**	2.0	2.0	2.0	2.0	1.6	1.6	1.3	1.1	1.1	0.8	0.6	0.3	0.3	0.3	0.3	0.3
62.5000	**2.0**	2.0	2.0	2.0	2.0	1.6	1.6	1.3	1.1	1.1	0.8	0.6	0.3	0.3	0.3	0.3	0.3
75.0000	**2.0**	2.0	2.0	2.0	2.0	1.6	1.6	1.3	1.1	1.1	0.8	0.6	0.3	0.3	0.3	0.3	0.3
87.5000	**2.0**	2.0	2.0	2.0	2.0	1.6	1.6	1.3	1.1	1.1	0.8	0.6	0.3	0.3	0.3	0.3	0.3
100.0000	**2.0**	2.0	2.0	2.0	2.0	1.6	1.6	1.3	1.1	1.1	0.8	0.6	0.3	0.3	0.3	0.3	0.3

P00C6 **KtFHPD_Cnt_HPS_PressFallLoThrsh**

Coolant Axis

Eth %	**-40**	**-32**	**-24**	**-16**	**-8**	**0**	**8**	**16**	**20**	**24**	**32**	**40**	**48**	**64**	**80**	**96**	**112**
0.0000	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
12.5000	**10.0**	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
25.0000	**10.0**	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
37.5000	**10.0**	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
50.0000	**10.0**	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
62.5000	**10.0**	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
75.0000	**10.0**	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
87.5000	**10.0**	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
100.0000	**10.0**	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0

Supporting Tables

P00C6 **KtFHPC_p_HighPressStart**

Coolant Axis

Eth %	**-40**	**-32**	-24	-16	-8	0	8	16	20	24	32	40	48	64	80	96	112
0.0000	5.0	5.0	4.0	3.0	2.5	1.4	1.1	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.4	0.4	0.4
12.5000	**5.0**	5.0	4.0	3.0	2.5	1.4	1.1	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.4	0.4	0.4
25.0000	**6.8**	6.8	5.3	4.0	3.0	1.9	1.5	1.2	1.1	1.0	1.0	1.0	1.0	0.7	0.4	0.4	0.4
37.5000	**8.5**	8.5	6.5	5.0	3.5	2.5	1.9	1.6	1.4	1.3	1.1	1.1	1.1	0.7	0.4	0.4	0.4
50.0000	**8.5**	8.5	6.5	5.0	3.5	2.5	1.9	1.6	1.4	1.3	1.1	1.1	1.1	0.7	0.4	0.4	0.4
62.5000	**8.5**	8.5	6.5	5.0	3.5	2.5	1.9	1.6	1.4	1.3	1.1	1.1	1.1	0.7	0.4	0.4	0.4
75.0000	**8.5**	8.5	6.5	5.0	3.5	2.5	1.9	1.6	1.4	1.3	1.1	1.1	1.1	0.7	0.4	0.4	0.4
87.5000	**8.5**	8.5	6.5	6.5	4.5	2.5	1.9	1.6	1.4	1.3	1.1	1.1	1.1	0.7	0.4	0.4	0.4
100.0000	**8.5**	8.5	6.5	6.5	4.5	3.8	3.2	2.8	2.4	2.3	2.2	1.1	1.1	0.7	0.4	0.4	0.4

P00C6 **KtFHPC_t_HighPressStartTmout**

Coolant Axis

-40	**-32**	-24	-16	-8	0	8	16	20	24	32	40	48	64	80	96	112
11.0	11.0	10.0	9.0	8.0	7.0	5.0	4.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	5.0

P0089
P163A
P228C
P228D
P0191 **KtFHPD_t_PumpCntrlEngRunThrsh**

-30	-20	-10	0	10	20	80	100	110
60.0	60.0	40.0	10.0	10.0	10.0	20.0	40.0	60.0

P0191 **KtFHPD_t_SnsPrfStuckCrankTmout**

-30	-20	-10	0	10	20	80	100	110
10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0

P0191 **KtFHPD_Cnt_SnsPrfIdlePumpOffDly(12.5 ms loop rate)**

Baro

Eth %	**65**	**70**	**75**	**80**	**85**	**90**	**95**	**100**	**105**
0.0000	240.0	240.0	240.0	240.0	240.0	240.0	240.0	240.0	240.0
12.5000	240.0	240.0	240.0	240.0	240.0	240.0	240.0	240.0	240.0
25.0000	230.0	230.0	230.0	230.0	230.0	230.0	230.0	230.0	230.0
37.5000	220.0	220.0	220.0	220.0	220.0	220.0	220.0	220.0	220.0
50.0000	210.0	210.0	210.0	210.0	210.0	210.0	210.0	210.0	210.0
62.5000	200.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0
75.0000	190.0	190.0	190.0	190.0	190.0	190.0	190.0	190.0	190.0
87.5000	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0
100.0000	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0

P0234, P0299

KtBSTD_p_CntrlDevNegLim [kPa]

X axis pressure [kPa]
Y axis is Engine Speed [rpm]

	5.0000	50.0000	100.0000	150.0000	200.0000	250.0000	300.0000	350.0000	400.0000	450.0000
1000.0000	-30.0000	-30.0000	-30.0000	-30.0000	-30.0000	-30.0000	-30.0000	-30.0000	-20.0000	-20.0000
1500.0000	-20.0000	-20.0000	-20.0000	-20.0000	-20.0000	-20.0000	-20.0000	-20.0000	-10.0000	-10.0000
2000.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000
2500.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000
3000.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000
3500.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000
4000.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000
4500.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000
5000.0000	-20.0000	-20.0000	-20.0000	-20.0000	-20.0000	-20.0000	-20.0000	-20.0000	-30.0000	-40.0000
6000.0000	-30.0000	-30.0000	-20.0000	-20.0000	-20.0000	-20.0000	-30.0000	-40.0000	-50.0000	-50.0000

Supporting Tables

KtBSTD_p_CntrlDevPosLim [kPa]

X axis is pressure [kPa]
Y axis is Engine Speed [rpm]

	5.0000	50.0000	100.0000	150.0000	200.0000	250.0000	300.0000	350.0000	400.0000	450.0000
1000.0000	30.0000	30.0000	30.0000	30.0000	30.0000	30.0000	30.0000	30.0000	20.0000	20.0000
1500.0000	20.0000	20.0000	20.0000	20.0000	20.0000	20.0000	20.0000	20.0000	10.0000	10.0000
2000.0000	10.0000	10.0000	10.0000	10.0000	10.0000	10.0000	10.0000	10.0000	10.0000	10.0000
2500.0000	10.0000	10.0000	10.0000	10.0000	10.0000	10.0000	10.0000	10.0000	10.0000	10.0000
3000.0000	10.0000	10.0000	10.0000	10.0000	10.0000	10.0000	10.0000	10.0000	10.0000	10.0000
3500.0000	10.0000	10.0000	10.0000	10.0000	10.0000	10.0000	10.0000	10.0000	10.0000	10.0000
4000.0000	10.0000	10.0000	10.0000	10.0000	10.0000	10.0000	10.0000	10.0000	10.0000	10.0000
4500.0000	10.0000	10.0000	10.0000	10.0000	10.0000	10.0000	10.0000	10.0000	10.0000	10.0000
5000.0000	20.0000	20.0000	20.0000	20.0000	20.0000	20.0000	20.0000	20.0000	30.0000	40.0000
6000.0000	30.0000	30.0000	20.0000	20.0000	20.0000	20.0000	30.0000	40.0000	50.0000	50.0000

KtBSTD_p_CntrlDevAmbAirCorr [kPa]

X axis is pressure [kPa]
Y axis is Ambient Pressure [kPa]

	60.0000	70.0000	80.0000	90.0000	100.0000	110.0000
1000.0000	20.0000	15.0000	10.0000	5.0000	0.0000	0.0000
2000.0000	15.0000	10.0000	5.0000	0.0000	0.0000	0.0000
3000.0000	10.0000	5.0000	0.0000	0.0000	0.0000	0.0000
4000.0000	10.0000	5.0000	0.0000	0.0000	0.0000	0.0000
5000.0000	15.0000	10.0000	5.0000	0.0000	0.0000	0.0000
6000.0000	20.0000	15.0000	10.0000	5.0000	0.0000	0.0000

P00C4, P2261

KtBSTD_r_SurgeLim [-]

Axis is Corrected Air Mass Flow [g/s]

5.0000	1.0000
10.0000	1.1000
25.0000	1.2500
50.0000	2.6000
150.0000	2.9000
200.0000	3.0000

P226B

KtBSTD_r_ExcsvBstPresLim [-]

Axis is Corrected Air Mass Flow [g/s]

0.0000	2.5000
0.0250	2.5000
0.0500	2.5000
0.0750	2.5000
0.1000	2.5000
0.1250	2.0000
0.1500	1.8000
0.1750	1.4000

Supporting Tables

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

Y-axis: Engine Speed (RPM) \ X-axis: Engine Air Flow (mg per cylinder)	100	300	700	1200
500	0.0515	0.0515	0.0515	0.0515
1000	0.0559	0.0559	0.0559	0.0559
1500	0.0536	0.0536	0.0536	0.0536
2000	0.0598	0.0598	0.0598	0.0598
2500	0.0589	0.0589	0.0589	0.0589
3000	0.0887	0.0887	0.0887	0.0887
3500	0.0770	0.0770	0.0770	0.0770
4000	0.0979	0.0979	0.0979	0.0979
4500	0.1021	0.1021	0.1021	0.1021
5000	0.1342	0.1342	0.1342	0.1342
5500	0.1475	0.1475	0.1475	0.1475
6000	0.1436	0.1436	0.1436	0.1436
6500	0.1522	0.1522	0.1522	0.1522
7000	0.1522	0.1522	0.1522	0.1522
7500	0.1522	0.1522	0.1522	0.1522
8000	0.1522	0.1522	0.1522	0.1522
8500	0.1522	0.1522	0.1522	0.1522

P0325/P0330

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

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

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

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

Open Circuit Thresholds:

1. 20 kHz Method:

Engine Speed (RPM):	500	1000	1500	2000	2500	3000	3500	4000	4500
OpenCktThrshMin:	2.8262	2.7363	2.6895	2.6738	2.6738	2.6777	2.6738	2.6484	2.5879
Engine Speed (RPM):	5000	5500	6000	6500	7000	7500	8000	8500	
OpenCktThrshMin:	2.4805	2.3145	2.0742	1.7500	1.3262	0.7930	0.1367	0.0000	

Engine Speed (RPM):	500	1000	1500	2000	2500	3000	3500	4000	4500
OpenCktThrshMax:	5.8809	5.7207	5.6426	5.6191	5.6270	5.6367	5.6191	5.5527	5.4063
Engine Speed (RPM):	5000	5500	6000	6500	7000	7500	8000	8500	
OpenCktThrshMax:	5.1543	4.7695	4.2246	3.4941	2.5508	1.3652	0.0000	0.0000	

Supporting Tables

2. Normal Noise Method:

Engine Speed (RPM):	500	1000	1500	2000	2500	3000	3500	4000	4500
OpenCktThrshMin:	0.1387	0.1387	0.1387	0.1387	0.0977	0.0781	0.0762	0.0879	0.1016

Engine Speed (RPM):	5000	5500	6000	6500	7000	7500	8000	8500
OpenCktThrshMin:	0.1152	0.1230	0.1172	0.0918	0.0430	0.0000	0.0000	0.0000

Engine Speed (RPM):	500	1000	1500	2000	2500	3000	3500	4000	4500
OpenCktThrshMax:	0.3223	0.3223	0.3223	0.3223	0.1563	0.0840	0.0801	0.1230	0.1934

5000	5500	6000	6500	7000	7500	8000	8500
0.2637	0.3164	0.3262	0.2734	0.1328	0.0000	0.0000	0.0000

P06B6/P06B7

Engine Speed (RPM):	500	1000	1500	2000	2500	3000	3500	4000	4500
OpenTestThreshLo	0.0742	0.0742	0.0957	0.0938	0.0898	0.0879	0.0879	0.0938	0.1094

5000	5500	6000	6500	7000	7500	8000	8500
0.1367	0.1797	0.2402	0.3223	0.4277	0.5586	0.7207	0.9141

Engine Speed (RPM):	500	1000	1500	2000	2500	3000	3500	4000	4500
OpenTestThreshHi	0.1797	0.1797	0.2051	0.1992	0.1934	0.1953	0.2051	0.2324	0.2773

5000	5500	6000	6500	7000	7500	8000	8500
0.3496	0.4512	0.5859	0.7598	0.9785	1.2461	1.5664	1.9473

P0068: MAP / MAF / TPS Correleation

X-axis is TPS (%)
Delta MAP Threshold f(TPS)

X-axis	10.00	15.00	20.00	25.00	30.00	35.00	40.00	45.00	100.00
Data	36.73	45.02	42.28	35.51	32.73	255.00	255.00	255.00	255.00

X axis is TPS (%)
Delta MAF Threshold f(TPS)

X-axis	10.00	15.00	20.00	25.00	30.00	35.00	40.00	45.00	100.00
Data	5.25	10.01	12.76	16.22	20.24	255.00	255.00	255.00	255.00

X axis is Engine Speed (RPM)
Maximum MAF f(RPM)

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

X axis is Battery Voltage (V)
Maximum MAF f(Volts)

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

P1682: Ignition Voltage Correleation

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

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

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

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

X-axis	CePISR_e_6p25msSeq	CePISR_e_12p5msSeq	CePISR_e_25msSeq	CePISR_e_LORES_C
Data	0.200	0.200	0.200	409.594

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

X-axis	CePISR_e_6p25msSeq	CePISR_e_12p5msSeq	CePISR_e_25msSeq	CePISR_e_LORES_C
Data	1	1	0	0

Supporting Tables

P16F3: No fast unmanaged retarded spark above the applied spark

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

KtSPRK_phi_DeltTorqueScrtyAdv

APC/Erpm	500.00	980.74	1461.48	1942.23	2422.97	2903.71	3384.45	3865.20	4345.94	4826.68	5307.42	5788.16	6268.91	6749.65	7230.39	7711.13	8191.88
80.00	125.00	30.72	33.23	33.52	28.98	30.06	29.61	28.42	27.59	26.19	24.13	25.00	26.34	26.34	26.34	26.34	26.34
160.00	125.00	28.72	29.81	31.02	27.41	28.81	27.92	26.17	25.77	24.97	23.75	23.73	23.97	23.97	23.97	23.97	23.97
240.00	125.00	26.95	27.03	28.88	25.14	25.00	24.70	23.86	23.63	22.95	21.80	21.75	21.94	21.94	21.94	21.94	21.94
320.00	125.00	25.42	24.73	26.50	21.89	21.61	21.52	20.77	20.52	19.86	18.77	18.48	18.41	18.41	18.41	18.41	18.41
400.00	125.00	24.53	23.48	25.02	20.05	19.92	19.83	19.08	18.91	18.31	17.25	16.78	16.50	16.50	16.50	16.50	16.50
480.00	125.00	24.53	23.48	25.02	20.05	19.92	19.83	19.08	18.91	18.31	17.25	16.78	16.50	16.50	16.50	16.50	16.50
560.00	125.00	24.53	23.48	25.02	20.05	19.92	19.83	19.08	18.91	18.31	17.25	16.78	16.50	16.50	16.50	16.50	16.50
640.00	125.00	24.53	23.48	25.02	20.05	19.92	19.83	19.08	18.91	18.31	17.25	16.78	16.50	16.50	16.50	16.50	16.50
720.00	125.00	24.53	23.48	25.02	20.05	19.92	19.83	19.08	18.91	18.31	17.25	16.78	16.50	16.50	16.50	16.50	16.50
800.00	125.00	24.53	23.48	25.02	20.05	19.92	19.83	19.08	18.91	18.31	17.25	16.78	16.50	16.50	16.50	16.50	16.50
880.00	125.00	24.53	23.48	25.02	20.05	19.92	19.83	19.08	18.91	18.31	17.25	16.78	16.50	16.50	16.50	16.50	16.50
960.00	125.00	24.53	23.48	25.02	20.05	19.92	19.83	19.08	18.91	18.31	17.25	16.78	16.50	16.50	16.50	16.50	16.50
1040.00	125.00	24.53	23.48	25.02	20.05	19.92	19.83	19.08	18.91	18.31	17.25	16.78	16.50	16.50	16.50	16.50	16.50
1120.00	125.00	24.53	23.48	25.02	20.05	19.92	19.83	19.08	18.91	18.31	17.25	16.78	16.50	16.50	16.50	16.50	16.50
1200.00	125.00	24.53	23.48	25.02	20.05	19.92	19.83	19.08	18.91	18.31	17.25	16.78	16.50	16.50	16.50	16.50	16.50
1280.00	125.00	24.53	23.48	25.02	20.05	19.92	19.83	19.08	18.91	18.31	17.25	16.78	16.50	16.50	16.50	16.50	16.50
1360.00	125.00	24.53	23.48	25.02	20.05	19.92	19.83	19.08	18.91	18.31	17.25	16.78	16.50	16.50	16.50	16.50	16.50

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

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

X-axis	0.00	50.00	100.00	150.00	200.00	300.00
Data	32.73	32.73	32.73	32.73	32.73	32.73

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

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

	-40.00	-20.00	-10.00	0.00	50.00	90.00
200.00	110.75	110.75	110.75	110.75	110.75	110.75
500.00	110.75	110.75	110.75	110.75	94.30	76.52
670.00	110.75	110.75	104.96	94.96	74.33	37.57
850.00	105.92	95.92	88.92	80.79	36.28	26.75
900.00	102.01	92.52	86.36	79.16	33.45	24.98
1000.00	94.75	85.89	80.24	73.27	28.36	22.15
1100.00	87.95	79.81	74.24	67.10	24.27	19.77
1200.00	60.74	53.31	47.91	40.76	21.48	17.91
1350.00	44.57	38.41	33.51	26.68	18.50	15.85
1500.00	34.06	29.64	25.79	20.11	16.10	14.04
2000.00	20.36	18.16	16.25	13.37	13.08	11.53
2500.00	19.28	16.25	14.13	11.69	12.59	11.09
3000.00	21.58	18.01	15.50	12.63	13.61	12.01
3500.00	23.84	19.88	17.10	13.91	15.17	13.50
4500.00	30.46	25.98	22.84	19.23	18.50	16.92
5500.00	36.76	31.95	28.57	24.70	23.77	21.12
6500.00	38.76	33.71	30.18	26.12	24.79	21.94

Supporting Tables

P0442: EONV Pressure Threshold Table (in Pascals)

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

	0.0000	6.2499	12.4998	18.7497	24.9996	31.2495	37.4994	43.7493	49.9992	56.2491	62.4990	68.7490	74.9989	81.2488	87.4987	93.7486	99.9985
-10.0000	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025
-4.3750	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025
1.2500	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025
6.8750	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025
12.5000	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025
18.1250	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025
23.7500	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025
29.3750	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025
35.0000	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025
40.6250	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025
46.2500	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025
51.8750	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025
57.5000	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025
63.1250	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025
68.7500	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025
74.3750	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025
80.0000	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025	-423.5025

P0442: Estimate of Ambient Temperature Valid Conditioning Time

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

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

Supporting Tables

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

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

Axis	-10	-4	1	7	13	18	24	29	35	41	46	52	58	63	69	74	80
Curve	30	30	30	45	60	60	60	75	220	380	380	380	380	380	380	380	380

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

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

Axis	Curve
0	40
6	40
12	40
19	40
25	40
31	40
37	40
44	40
50	40
56	39
62	38
69	36
75	35
81	34
87	33
94	31
100	30

P0461, P2066, P2636: Transfer Pump Enable

TransferPumpOnTimeLimit (in seconds)
Axis is Fuel Level in %

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

Supporting Tables

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	80.0	80.0	80.0	60.0	60.0	40.0	40.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0

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

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

P0521

EngSpeedWeightFactorTable — AXIS is Engine RPM, Curve is Weight Factor

Axis	0	500	900	1000	1500	1750	2000	3500	4000
Curve	0.00	0.00	0.00	0.45	0.45	0.45	0.46	0.44	0.00

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

Axis	-40	40	60	80	90	100	120	130	140
Curve	0.58	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.00

EngLoadStabilityWeightFactorTable — AXIS is Engine RPM, Curve is Weight Factor

Axis	0	5	10	20	30	50	100	200	399
Curve	1.00	1.00	0.50	0.30	0.10	0.00	0.00	0.00	0.00

EngOilPredictionWeightFacotrTable — AXIS is Engine RPM, Curve is Engine Oil Prediction Weight Factor

Axis	0	170	250	275	360	375	400	500	600
Curve	0.00	0.00	0.10	1.00	1.00	1.00	1.00	0.86	0.00

Tables supporting AIR Diagnostics

P0411

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

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

P0411

Include this table only if dual valve system
SL Threshold Bank 2 Table (dual valve systems only) — axis is average engine airflow during test in gm/sec

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

P0411

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

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

P0411

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

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

P0411

Phase 1 System Volt Test Weight Factor — axis is system volts

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

P0411

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

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

P2431

P2436 Include P2436 only if dual valve system
Baro Skewed Sensor Weight Factor — axis is distance traveled from last Baro update in Km

Axis	0.0	2.0	4.0	6.0	8.0	10.0	12.0	14.0	16.0	18.0	20.0	22.0	24.0	26.0	28.0	30.0	32.0
Curve	1.0	0.8	0.5	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Supporting Tables

P2440

Bank 1 Valve Pressure Error — **axis is weighted time in seconds**

Axis	0	1	2	3	4	5	6	7	8
Curve	0.0	0.0	-1.0	-2.0	-3.0	-3.0	-3.0	-3.0	-3.0

P2440

Include this table only if dual valve system

Bank 2 Valve Pressure Error — **axis is weighted time in seconds**

Axis	0	1	2	3	4	5	6	7	8
Curve	0.0	0.0	-1.0	-2.0	-3.0	-3.0	-3.0	-3.0	-3.0

P2440

Phase 2 Baro Test Weight Factor — **axis is Baro in Kpa**

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

P2440

Phase 2 MAF Test Weight Factor — **axis is engine airflow in gm/sec**

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

P2440

Phase 2 System Volt Test Weight Factor — **axis is system volts**

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

P2440

Phase 2 Amb Temp Test Weight Factor — **axis is Deg C**

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

P2444

Bank 1 Pump Pressure Error — **axis is weighted time in seconds**

Axis	0	1	2	3	4	5	6	7	8
Curve	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5

P2444

Include this table only if dual valve system

Bank 2 Pump Pressure Error — **axis is weighted time in seconds**

Axis	0	1	2	3	4	5	6	7	8
Curve	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5

Tables supporting Clutch Diagnostics

P0806

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

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

P0806

ResidualErrorEnableLow Table — **axis is Gear**

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

P0806

ResidualErrorEnableHigh Table — **axis is Gear**

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

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

Clutch Pedal Top of Travel Achieved criteria

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

Clutch Pedal Position	<= 88 %	
for	> 2 counts	each count is equal to 12.5ms

Clutch Disengaged criteria

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

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

Supporting Tables

Clutch Pedal Bottom of Travel Achieved criteria

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

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

FASD Section
P0171, P0172, P0174, P0175

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

Long-Term Fuel Trim Cell Usage

Cell I.D.	CeFADR_e_Cell00_PurgOnAirMode5CeFADD_e_SelectedPur	CeFADR_e_Cell01_PurgOnAirMode4CeFADD_e_SelectedPur	CeFADR_e_Cell02_PurgOnAirMode3CeFADD_e_SelectedPur	CeFADR_e_Cell03_PurgOnAirMode2CeFADD_e_SelectedPur	CeFADR_e_Cell04_PurgOnAirMode1CeFADD_e_SelectedPur	CeFADR_e_Cell05_PurgOnAirMode0CeFADD_e_SelectedPur	CeFADR_e_Cell06_PurgOnIdleCeFADD_e_SelectedPur	CeFADR_e_Cell07_PurgOnDecelCeFADD_e_NonSelected	CeFADR_e_Cell08_PurgOffAirMode5CeFADD_e_SelectedNon	CeFADR_e_Cell09_PurgOffAirMode4CeFADD_e_SelectedNon	CeFADR_e_Cell10_PurgOffAirMode3CeFADD_e_SelectedNon	CeFADR_e_Cell11_PurgOffAirMode2CeFADD_e_SelectedNon	CeFADR_e_Cell12_PurgOffAirMode1CeFADD_e_SelectedNon	CeFADR_e_Cell13_PurgOffAirMode0CeFADD_e_SelectedNon	CeFADR_e_Cell14_PurgOffIdleCeFADD_e_SelectedNon	CeFADR_e_Cell15_PurgOffDecelCeFADD_e_NonSelected
FASD Cell Usage	geCell	geCell	geCell	geCell	geCell	geCell	geCell	Cell	PurgeCell	PurgeCell	PurgeCell	PurgeCell	PurgeCell	PurgeCell	PurgeCell	Cell
FASD Enabled In Cell?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	NO	Yes	Yes	Yes	Yes	Yes	Yes	Yes	NO

P2096, P2097, P2098, P2099
Cell Accum Time 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	600	600	600	600	600	600	600	600	600	600
Cell Accum Min Time [seconds] (time = counts / 10)	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0

Integral Offset Max

Post O2 Air Flow Mode	Decel	Idle	Cruise	Light Accel	Heavy Accel
Post O2 Integral Offset Max [mV]	#REF!	#REF!	#REF!	#REF!	#REF!

Integral Offset Min

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

O2 Lean Thresh

Post O2 Airflow Mode Cell	Bank1 Decel	Bank2 Decel	Bank1 Idle	Bank2 Idle	Bank1 Cruise	Bank2 Cruise	Bank1 Light Accel	Bank2 Light Accel	Bank1 Heavy Accel	Bank2 Heavy Accel
O2 Lean Threshold [mV]	550	550	550	550	550	550	550	550	550	550

O2 Rich Thresh

Post O2 Airflow Mode Cell	Bank1 Decel	Bank2 Decel	Bank1 Idle	Bank2 Idle	Bank1 Cruise	Bank2 Cruise	Bank1 Light Accel	Bank2 Light Accel	Bank1 Heavy Accel	Bank2 Heavy Accel
O2 Rich Threshold [mV]	760	760	760	760	760	760	760	760	760	760

Out Of Window Timer

Post O2 Airflow Mode Cell	Decel	Idle	Cruise	Light Accel	Heavy Accel
Out of Window Counts	50	50	50	50	50
Out of Window Time [seconds] (time = counts / 10)	0.0	0.0	0.0	0.0	0.0

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

Supporting Tables

Closed Loop Enable Criteria

Engine run time greater than
KtFSTA_t_ClosedLoopAu (HYBRID ONLY)

AutoStart Coolant	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
Close Loop Enable Time	200.0	135.0	80.0	57.0	25.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0

and
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	200.0	135.0	80.0	57.0	25.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0

and pre converter 02 sensor voltage less than
KfFULC_U_O2_SensorReadyThrshLo

	< 1100
Voltage	*milliVolts*

for
KcFULC_O2_SensorReadyEvents

(events * 12.5 milliseconds)	*> 20 events*

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

Long Term FT Enable Criteria

Closed Loop Enable and
Coolant greater than
KfFCLL_T_AdaptiveLoCoolant

	> 40 Celcius
Coolant	

or less than
KfFCLL_T_AdaptiveHiCoolant

	< 120
Coolant	*Celcius*

and
KtFCLL_p_AdaptiveLowMAP_Limit

Barometric Pressure	65	70	75	80	85	90	95	100	105
Manifold Air Pressure	17.0	17.0	17.0	17.0	17.5	18.0	18.5	19.0	19.0

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

Secondary Fuel Trim Enable Criteria

Closed Loop Enable and
KfFCLP_U_O2ReadyThrshLo

	< 1100
Voltage	*milliVolts*

for
KcFCLP_Cnt_O2RdyCyclesThrsh

(events * 12.5 milliseconds)	*> 80 events*

Supporting Tables

Long Term Secondary Fuel Trim Enable Criteria

KtFCLP_t_PostIntglDisableTime									X10 Y10	X11 Y11	X12 Y12	X13 Y13	X14 Y14	X15 Y15	X16 Y16	X17 Y17	
Start-Up Coolant	-40	-29	-18	-6	5	16	28	39	50	61	73	84	95	106	118	129	140
Post Integral Enable Time	100.0	100.0	100.0	100.0	100.0	100.0	75.0	50.0	50.0	50.0	50.0	40.0	40.0	25.0	25.0	25.0	25.0
Plus									X10	X11	X12	X13	X14	X15	X16	X17	
KtFCLP_t_PostIntglRampInTime									Y10	Y11	Y12	Y13	Y14	Y15	Y16	Y17	
Start-Up Coolant	-40	-29	-18	-6	5	16	28	39	50	61	73	84	95	106	118	129	140
Post Integral Ramp In Time	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0

and
KeFCLP_T_IntegrationCatalystMax
Modeled Catalyst Temperature *< 900 Celcius*
and
KeFCLP_T_IntegrationCatalystMin
Modeled Catalyst Temperature *> 350 Celcius*
and
PO2S_Bank_1_Snsr_2_FA and PO2S_Bank_2_Snsr_2_FA = False

Tables supporting Brake Pedal Position Sensor Diagnostic

P057B

KtBRKI_K_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

KtBRKI_K_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

PDT	Ring	Fault Bundles Produced	Cert Doc Bundle Name	Pcodes											
Dilution PDT	PHSR	GetPHSR_b_PhaserBndlFlagFA	AnyCamPhaser_FA	P0010	P0011	P0013	P0014	P0020	P0021	P0023	P0024				
Dilution PDT	PHSR	GetPHSR_b_PhaserBndlFlagTFTKO	AnyCamPhaser_TFTKO	P0010	P0011	P0013	P0014	P0020	P0021	P0023	P0024				
Dilution PDT	PHSR	GetPHSR_b_IcPhaserBndlFlagFA	IntkCamPhaser_FA	P0010	P0011	P0020	P0021								
Dilution PDT	EGRR	GetEGRR_b_EGR_ValvePerf_FA	EGRValvePerformance_FA	P0401	P042E										
Dilution PDT	EGRR	GetEGRR_b_EGR_ValveCkt_FA	EGRValveCircuit_FA	P0403	P0404	P0405	P0406								
Dilution PDT	EGRR	GetEGRR_b_EGR_ValveFP	EGRValve_FP	P0405	P0406	P042E									
Dilution PDT	EGRR	GetEGRR_b_EGR_ValveCktTFTKO	EGRValveCircuit_TFTKO	P0403	P0404	P0405	P0406								
Dilution PDT	EGRR	GetEGRR_b_EGR_ValvePerfTFTKO	EGRValvePerformance_TFTKO	P0401	P042E										
	CATR	GetCATR_b_CatSysEffLoB1_FA	CatalystSysEfficiencyLoB1_FA	P0420											
		GetCATD_b_CatSysEffLoB2_FA	CatalystSysEfficiencyLoB2_FA	P0430											
Misfire PDT	MSFR	GetMSFR_b_EngMisfDtctd_TFTKO	EngineMisfireDetected_TFTKO	P0300	P0301	P0302	P0303	P0304	P0305	P0306	P0307	P0308			
		GetMSFR_b_EngMisfDtctd_FA	EngineMisfireDetected_FA	P0300	P0301	P0302	P0303	P0304	P0305	P0306	P0307	P0308			
Air Measurement	AAPR	GetAAPR_b_AAP_SnsrFA	AAP_SnsrFA	naturally aspirated:	P2227	P2228	P2229	P2230							
				turbocharged:	P0237	P0238									
		GetAAPR_b_AAP_SnsrCktFP	AAP_SnsrCktFP	naturally aspirated:	P2228	P2229									
				turbocharged:	P0237	P0238									
		GetAAPR_b_AAP_SnsrTFTKO	AAP_SnsrTFTKO	naturally aspirated:	P2227	P2228	P2229	P2230							
				turbocharged:	P0237	P0238									
		GetAAPR_b_AAP2_SnsrFA	AAP2_SnsrFA	P2227	P2228	P2229	P2230								
		GetAAPR_b_AAP2_SnsrCktFP	AAP2_SnsrCktFP	P2228	P2229										
		GetAAPR_b_AAP2_SnsrTFTKO	AAP2_SnsrTFTKO	P2227	P2228	P2229	P2230								
		GetAAPR_b_TC_BoostPresSnsrCktFA	TC_BoostPresSnsrCktFA	P0237	P0238										
		GetAAPR_b_TC_BoostPresSnsrFA	TC_BoostPresSnsrFA	P0236	P0237	P0238									
		GetAAPR_b_AmbPresSnsrCktFA	AmbPresSnsrCktFA	P2228	P2229										
		GetAAPR_b_AmbPresSnsrCktFP	AmbPresSnsrCktFP	P2228	P2229										

PDT	Ring	Fault Bundles Produced	Cert Doc Bundle Name	Pcodes											
		GetAAPR_b_AmbientAirPresDfltd	AmbientAirDefault	baro or TIAP sensor:	P2227	P2228	P2229	P2230							
				no baro or TIAP sensor:	P0101	P0102	P0103	P0106	P0107	P0108	P0111	P0112	P0113	P0114	
					P0121	P0122	P0123	P012B	P012C	P012D	P0222	P0223	P1221		
		GetAAPR_e_AmbPresDfltdStatus	AmbPresDfltdStatus	baro or TIAP sensor:	P2227	P2228	P2229	P2230							
				no baro or TIAP sensor:	P0101	P0102	P0103	P0106	P0107	P0108	P0111	P0112	P0113	P0114	
					P0121	P0122	P0123	P012B	P012C	P012D	P0222	P0223	P1221		
Air Measurement	EITR	GetEITR_b_IAT_SnsrCktTFTKO	IAT_SensorCircuitTFTKO	P0112	P0113										
		GetEITR_b_IAT_SnsrCktFA	IAT_SensorCircuitFA	P0112	P0113										
		GetEITR_b_IAT_SnsrCktFP	IAT_SensorCircuitFP	P0112	P0113										
		GetEITR_b_IAT_SnsrTFTKO	IAT_SensorTFTKO	P0111	P0112	P0113									
		GetEITR_b_IAT_SnsrFA	IAT_SensorFA	P0111	P0112	P0113									
		GetEITR_b_IAT_2_SnsrCktTFTKO	IAT2_SensorCktTFTKO	IAT2 Present	P0097	P0098									
				IAT2 Not Present	P0112	P0113									
		GetEITR_b_IAT_2_SnsrCktFA	IAT2_SensorCircuitFA	IAT2 Present	P0097	P0098									
				IAT2 Not Present	P0112	P0113									
		GetEITR_b_IAT_2_SnsrCktFP	IAT2_SensorcircuitFP	IAT2 Present	P0097	P0098									
				IAT2 Not Present	P0112	P0113									
		GetEITR_b_IAT_2_SnsrTFTKO	IAT2_SensorTFTKO	IAT2 Present	P0096	P0097	P0098								
				IAT2 Not Present	P0111	P0112	P0113								
		GetEITR_b_IAT_2_SnsrFA	IAT2_SensorFA	IAT2 Present	P0096	P0097	P0098								
				IAT2 Not Present	P0111	P0112	P0113								
		GetEITR_b_ThrotTempSnsrTFTKO	ThrotTempSensorTFTKO	IAT2 Present	P0096	P0097	P0098								
				IAT2 Not Present	P0111	P0112	P0113								
		GetEITR_b_ThrotTempSnsrFA	ThrotTempSensorFA	IAT2 Present	P0096	P0097	P0098								
				IAT2 Not Present	P0111	P0112	P0113								
Air Measurement	IFRR	GetIFRR_b_ChgrBypVlvFault	SuperchargerBypassValveFA	P2261											
		GetIFRR_b_CylDeacSys_TFTKO	CylDeacSystemTFTKO	P3400											
		GetIFRR_b_MAF_SnsrPerfFault	MAF_SensorPerfFA	P0101											
		GetIFRR_b_MAF_SnsrPerf_TFTKO	MAF_SensorPerfTFTKO	P0101											
		GetIFRR_b_MAP_SnsrPerfFault	MAP_SensorPerfFA	P0106											

PDT	Ring	Fault Bundles Produced	Cert Doc Bundle Name	Pcodes										
		GetIFRR_b_MAP_SnsrPerf_TFTKO	MAP_SensorPerfTFTKO	P0106										
		GetIFRR_b_SCIAP_SnsrPerfFault	SCIAP_SensorPerfFA	P012B										
		GetIFRR_b_SCIAP_SnsrPerf_TFTKO	SCIAP_SensorPerfTFTKO	P012B										
		GetIFRR_b_TP_SnsrPerfFault	ThrottlePositionSnsrPerfFA	P0121										
		GetIFRR_b_TP_SnsrPerf_TFTKO	ThrottlePositionSnsrPerfTFTKO	P0121										
		GetIFRR_b_TIAP_SnsrPerfFault	TIAP_SensorPerfFA	P0236										
Air Measurement	MAFR	GetMAFR_b_MAF_SnsrFA	MAF_SensorFA	P0101	P0102	P0103								
		GetMAFR_b_MAF_SnsrTFTKO	MAF_SensorTFTKO	P0101	P0102	P0103								
		GetMAFR_b_MAF_SnsrFP	MAF_SensorFP	P0102	P0103									
		GetMAFR_b_MAF_SnsrCktFA	MAF_SensorCircuitFA	P0102	P0103									
		GetMAFR_b_MAF_SnsrCktTFTKO	MAF_SensorCircuitTFTKO	P0102	P0103									
Air Measurement	MAPR	GetMAPR_b_MAP_SnsrTFTKO	MAP_SensorTFTKO	P0106	P0107	P0108								
		GetMAPR_b_MAP_SnsrFA	MAP_SensorFA	P0106	P0107	P0108								
		GetMAPR_b_MAP_SnsrCktFP	MAP_SensorCircuitFP	P0107	P0108									
		GetMAPR_b_SCIAP_SnsrFA	SCIAP_SensorFA	P012B	P012C	P012D								
		GetMAPR_b_SCIAP_SnsrTFTKO	SCIAP_SensorTFTKO	P012B	P012C	P012D								
		GetMAPR_b_SCIAP_SnsrCktFP	SCIAP_SensorCircuitFP	P012C	P012D									
		GetMAPR_b_AfterThrotBlade_FA	AfterThrottlePressureFA	naturally aspirated, turbocharged	P0106	P0107	P0108							
				supercharged	P012B	P012C	P012D							
		GetMAPR_b_AftThrotVacSnsr_TFTKO	AfterThrottleVacuumTFTKO	naturally aspirated, turbocharged	P0106	P0107	P0108							
				supercharged	P012B	P012C	P012D							
		GetMAPR_b_SCIAP_SnsrCktFA	SCIAP_SensorCircuitFA	P012C	P012D									
		GetMAPR_b_AftThrotPresSnsrTFTKO	AfterThrottlePressTFTKO	naturally aspirated, turbocharged	P0106	P0107	P0108							
				supercharged	P012B	P012C	P012D							
		GetMAPR_b_MAP_SnsrCktFA	MAP_SensorCircuitFA	P0107	P0108									
		GetMAPR_e_EngVacStatus() == CeMAPR_e_Defaulted	MAP_EngineVacuumStatus	MAP_SensorFA OR P0107, P0108 Pending										

PDT	Ring	Fault Bundles Produced	Cert Doc Bundle Name	Pcodes											
Engine Positioning	EPSR	GetEPSR_b_CkpToCamCorr_TFTKO	CrankCamCorrelationTFTKO	P0016	P0017	P0018	P0019								
		GetEPSR_b_CrankSnsr_FA	CrankSensorFA	P0335	P0336										
		GetEPSR_b_CrankSnsr_TFTKO	CrankSensorTFTKO	P0335	P0336										
		GetEPSR_b_CamSnsr_FA	CamSensorFA	P0016	P0017	P0018	P0019	P0340	P0341	P0345	P0346	P0365	P0366	P0390	P0391
		GetEPSR_b_CamSnsr_TFTKO	CamSensorTFTKO	P0016	P0017	P0018	P0019	P0340	P0341	P0345	P0346	P0365	P0366	P0390	P0391
		GetEPSR_b_CkpToCamCorrInt_FA	CrankIntakeCamCorrelationFA	P0016	P0018										
		GetEPSR_b_CkpToCamCorrExh_FA	CrankExhaustCamCorrelationFA	P0017	P0019										
		GetEPSR_b_CamSnsrIntake_TFTKO	IntakeCamSensorTFTKO	P0016	P0018	P0340	P0341	P0345	P0346						
		GetEPSR_b_CamSnsrIntake_FA	IntakeCamSensorFA	P0016	P0018	P0340	P0341	P0345	P0346						
		GetEPSR_b_CamSnsrExhaust_TFTKO	ExhaustCamSensorTFTKO	P0017	P0019	P0365	P0366	P0390	P0391						
		GetEPSR_b_CamSnsrExhaust_FA	ExhaustCamSensorFA	P0017	P0019	P0365	P0366	P0390	P0391						
		GetEPSR_b_IntakeSnsrFaultActive	IntakeCamSensor_FA	P0016	P0018	P0340	P0341	P0345	P0346						
		GetEPSR_b_IntakeSnsrTestFailTKO	IntakeCamSensor_TFTKO	P0016	P0018	P0340	P0341	P0345	P0346						
		GetEPSR_b_ExhSnsrFaultActive	ExhaustCamSensor_FA	P0017	P0019	P0365	P0366	P0390	P0391						
		GetEPSR_b_ExhSnsrTestFailTKO	ExhaustCamSensor_TFTKO	P0017	P0019	P0365	P0366	P0390	P0391						
		GetEPSR_b_CkpToCamCorrInt	CrankIntakeCamCorrFA	P0016	P0018										
		GetEPSR_b_CkpToCamCorrExh	CrankExhaustCamCorrFA	P0017	P0019										
		GetEPSR_b_CrankSnsrFaultActive	CrankSensorFaultActive	P0335	P0336										
		GetEPSR_b_CrkSnsrFA	CrankSensor_FA	P0335	P0336										
		GetEPSR_b_CrankSnsrTestFailTKO	CrankSensorTestFailedTKO	P0335	P0336										
		GetEPSR_b_CrkSnsrTFTKO	CrankSensor_TFTKO	P0335	P0336										
		GetEPSR_b_CamSnsrFaultActive	CamSensor_FA	P0016	P0017	P0018	P0019	P0340	P0341	P0345	P0346	P0365	P0366	P0390	P0391
		GetEPSR_b_CamSnsrLctnAnyFA	CamSensorAnyLocationFA	P0016	P0017	P0018	P0019	P0340	P0341	P0345	P0346	P0365	P0366	P0390	P0391
		GetEPSR_b_CamSnsrTestFailTKO	CamSensor_TFTKO	P0016	P0017	P0018	P0019	P0340	P0341	P0345	P0346	P0365	P0366	P0390	P0391
Engine Moding	EMDR	GetEMDR_b_EngModeNotRunTmErr	EngModeNotRunTmErr	P2610											
Cooling System PDT	ECTI	NeECTI_b_ECT_SnsrCktFA	ECT_Sensor_Ckt_FA	P0117	P0118										

PDT	Ring	Fault Bundles Produced	Cert Doc Bundle Name	Pcodes											
		NeECTI_b_ECT_SnsrCktTPTKO	ECT_Sensor_Ckt_TPTKO	P0117	P0118										
		NeECTI_b_ECT_SnsrCktTFTKO	ECT_Sensor_Ckt_TFTKO	P0117	P0118										
		NeECTI_b_DfltECT_CondDtctd	ECT_Sensor_DefaultDetected	P0117	P0118	P0116	P0119								
		NeECTI_b_ECT_SnsrFA	ECT_Sensor_FA	P0117	P0118	P0116	P0119	P0128							
		NeECTI_b_ECT_SnsrTFTKO	ECT_Sensor_TFTKO	P0117	P0118	P0116	P0119								
		NeECTI_b_ECT_SnsrPerfFA	ECT_Sensor_Perf_FA	P0116											
		VeECTI_b_ECT_SnsrCktFP	ECT_Sensor_Ckt_FP	P0117	P0118										
		GetECTI_b_ECT_SnsrCktHiFP	ECT_Sensor_Ckt_High_FP	P0118											
		GetETCI_b_ECT_SnsrCktLoFP	ECT_Sensor_Ckt_Low_FP	P0117											
	THMD	NeTHMD_b_InsuffClntFlwFA	THMR_Insuff_Flow_FA	P00B7											
		NeTHMD_b_ThstCntrlFA	THMR_Therm_Control_FA	P0597	P0598	P0599									
		NeTHMD_b_ERTSnsrCktFA	THMR_RCT_Sensor_Ckt_FA	P00B3	P00B4										
		NeTHMD_b_ECTSnsrCktFA	THMR_ECT_Sensor_Ckt_FA	P0117	P0118	P0116	P00B6								
O2 PDT	OXYR	VaOXYI_O2_TestFailedThisKeyOn[CiFADR_FuelBank1]	O2S_Bank_ 1_TFTKO	P0131	P0132	P0134	P2A00								
		VaOXYI_O2_TestFailedThisKeyOn[CiFADR_FuelBank2]	O2S_Bank_ 2_TFTKO	P0151	P0152	P0154	P2A03								
		NeOXYI_b_Bank1Snsr1_FA	O2S_Bank_1_Sensor_1_FA	P2A00	P0131	P0132	P0133	P0134	P0135	P0053	P1133	P015A	P015B	P0030	
		NeOXYI_b_Bank1Snsr2_FA	O2S_Bank_1_Sensor_2_FA	P013A	P013B	P013E	P013F	P2270	P2271	P0137	P0138	P0140	P0141	P0054	P0036
		NeOXYI_b_Bank2Snsr1_FA	O2S_Bank_2_Sensor_1_FA	P2A03	P0151	P0152	P0153	P0154	P0155	P0059	P1153	P015C	P015D	P0050	
		NeOXYI_b_Bank2Snsr2_FA	O2S_Bank_2_Sensor_2_FA	P013C	P013D	P014A	P014B	P2272	P2273	P0157	P0158	P0160	P0161	P0060	P0056
		NeOXYI_b_PO2_CntrlBank1Snsr2_FA	PO2S_Bank_1_Snsr_2_FA	P0137	P0138	P0140	P0036	P0054	P0141	P2270	P2271				
		NeOXYI_b_PO2_CntrlBank2Snsr2_FA	PO2S_Bank_2_Snsr_2_FA	P0157	P0158	P0160	P0056	P0060	P0161	P2272	P2273				
	FULR	GetFULR_b_FuelInjCkt_FA	FuelInjectorCircuit_FA	P0201	P0202	P0203	P0204	P0205	P0206	P0207	P0208				
				P0261	P0264	P0267	P0270	P0273	P0276	P0279	P0282				
				P0262	P0265	P0268	P0271	P0274	P0277	P0280	P0283				
				P2147	P2150	P2153	P2156	P216B	P216E	P217B	P217E				
				P2148	P2151	P2154	P2157	P216C	P216F	P217C	P217F				
				P1248	P1249	P124A	P124B	P124C	P124D	P124E	P124F				
	FULR	GetFULR_b_FuelInjCkt_TFTKO	FuelInjectorCircuit_TFTKO	P0201	P0202	P0203	P0204	P0205	P0206	P0207	P0208				
				P0261	P0264	P0267	P0270	P0273	P0276	P0279	P0282				
				P0262	P0265	P0268	P0271	P0274	P0277	P0280	P0283				
				P2147	P2150	P2153	P2156	P216B	P216E	P217B	P217E				
				P2148	P2151	P2154	P2157	P216C	P216F	P217C	P217F				

PDT	Ring	Fault Bundles Produced	Cert Doc Bundle Name	Pcodes											
				P1248	P1249	P124A	P124B	P124C	P124D	P124E	P124F				
	FHPR	GetFHPR_b_PumpCkt_FA	FHPR_b_PumpCkt_FA	P0090	P0091	P0092	P00C8	P00C9	P00CA						
	FHPR	GetFHPR_b_PumpCkt_TFTKO	FHPR_b_PumpCkt_TFTKO	P0090	P0091	P0092	P00C8	P00C9	P00CA						
	FHPR	GetFHPR_b_FRP_SnsrCkt_FA	FHPR_b_FRP_SnsrCkt_FA	P0192	P0193										
	FHPR	GetFHPR_b_FRP_SnsrCkt_TFTKO	FHPR_b_FRP_SnsrCkt_TFTKO	P0192	P0193										
	EMOR	GetEMOC_b_EngMetalOvertempActv true for calibrated time	EngineMetalOvertempActive	P1258											
Charging Controls PDT	BSTR	GetBSTR_b_PCA_CktFA	BSTR_b_PCA_CktFA	P0033	P0034	P0035	P0045	P0047	P0048	P0243	P0245	P0246	P0247	P0249	P0250
		GetBSTR_b_PCA_CktTFTKO	BSTR_b_PCA_CktTFTKO	P0033	P0034	P0035	P0045	P0047	P0048	P0243	P0245	P0246	P0247	P0249	P0250
		GetBSTR_b_PCA_CktLoTFTKO	BSTR_b_PCA_CktLoTFTKO	P0034	P0047	P0245	P0249								
		GetBSTR_b_PstnCntrlFA	BSTR_b_PstnCntrlFA	P166D	P166E										
		GetBSTR_b_PstnCntrlTooLoTFTKO	BSTR_b_PstnCntrlTooLoTFTKO	P166D	P166E										
		GetBSTR_b_PstnCntrlTooHiTFTKO	BSTR_b_PstnCntrlTooHiTFTKO	P166D	P166E										
		GetBSTR_b_PCA_PstnSnsrFA	BSTR_b_PCA_PstnSnsrFA	P003A	P2564	P2565									
		GetBSTR_b_PCA_PstnSnsrTFTKO	BSTR_b_PCA_PstnSnsrTFTKO	P003A	P2564	P2565									
		GetBSTR_b_TurboBypassCktFA	BSTR_b_TurboBypassCktFA	P0033	P0034	P0035	P00C0	P00C1	P00C2						
		GetBSTR_b_TurboBypassCktTFTKO	BSTR_b_TurboBypassCktTFTKO	P0033	P0034	P0035	P00C0	P00C1	P00C2						
		GetBSTR_b_IC_PmpCktFA	BSTR_b_IC_PmpCktFA	P023A	P023C										
		GetBSTR_b_PCA_FA	BSTR_b_PCA_FA	P0234	P0299	P0033	P0034	P0035	P0045	P0047	P0048	P0243	P0245	P0246	P2261
					P0247	P0249	P0250								
		GetBSTR_b_PCA_TFTKO	BSTR_b_PCA_TFTKO	P0234	P0299	P0033	P0034	P0035	P0045	P0047	P0048	P0243	P0245	P0246	P2261
					P0247	P0249	P0250								
		GetBSTR_b_ExcsvBstFA	BSTR_b_ExcsvBstFA	P226B											
		GetBSTR_b_ExcsvBstTFTKO	BSTR_b_ExcsvBstTFTKO	P226B											
		GetBSTR_b_PresCntrlTooLoTFTKO	BSTR_b_PresCntrlTooLoTFTKO	P0299											
		GetBSTR_b_PresCntrlTooHiTFTKO	BSTR_b_PresCntrlTooHiTFTKO	P0234											
		GetBSTR_b_TurboBypB_CktFA	BSTR_b_TurboBypB_CktFA	P00C0	P00C1	P00C2									
		GetBSTR_b_TurboBypB_CktTFTKO	BSTR_b_TurboBypB_CktTFTKO	P00C0	P00C1	P00C2									
Spark/ESC	KNKR	VeKNKR_b_KS_CktPerfB1B2_FA	KS_Ckt_Perf_B1B2_FA	P0324	P0325	P0326	P0327	P0328	P0330	P0332	P0333	P06B6	P06B7		

PDT	Ring	Fault Bundles Produced	Cert Doc Bundle Name	Pcodes											
Spark/ESC	SPKR	VeSPKR_b_EST_DriverFltActive	IgnitionOutputDriver_FA	P0351	P0352	P0353	P0354	P0355	P0356	P0357	P0358				
Speed Control PDT	SPDR	GetSPDR_b_IAC_SysRPM_FA	IAC_SystemRPM_FA	P0506	P0507										
Speed Control PDT	TESR_MSC	GetDFIR_e_TCM_EngSpdReqCkt	TCM_EngSpdReqCkt	P150C											
ETC	APSR	GetAPSR_PPS_1_OOR_Flt_Composite()	PPS1_OutOfRange_Composite	P2122	P2123	P06A3									
		GetAPSR_PPS_2_OOR_Flt_Composite()	PPS2_OutOfRange_Composite	P2127	P2128	P0697									
		GetAPSR_b_PPS_1_OOR_Flt_Cmposite()	PPS1_OutOfRange_Composite	P2122	P2123	P06A3									
		GetAPSR_b_PPS_2_OOR_Flt_Cmposite()	PPS2_OutOfRange_Composite	P2127	P2128	P0697									
		GetAPSR_b_PPS_1_OutofRangeFlt()	PPS1_OutOfRange	P2122	P2123										
		GetAPSR_b_PPS_2_OutofRangeFlt()	PPS2_OutOfRange	P2127	P2128										
		GetAPSR_PPS_1_OutofRangeFlt()	PPS1_OutOfRange	P2122	P2123										
		GetAPSR_PPS_2_OutofRangeFlt()	PPS2_OutOfRange	P2127	P2128										
		GetAPSR_b_PedalFailure	AcceleratorPedalFailure	P2122	P2123	P2127	P2128	P2138	P0697	P06A3					
	MEMR	GetMEMR_b_CM_RAM_ErrFA()	ControllerRAM_Error_FA	P0604											
	PISR	GetPISR_b_ECU_ProcPerf_FA()	ControllerProcessorPerf_FA	P0606											
	TPSR	GetTPSR_b_TPS1_OOR_FltComposite()	TPS1_OutOfRange_Composite	P0122	P0123	P06A3									
		GetTPSR_b_TPS2_OOR_FltComposite()	TPS2_OutOfRange_Composite	P0222	P0223	P06A3									
		GetTPSR_b_FaultActive_TPS()	TPS_FA	P0122	P0123	P0222	P0223	P2135							
		GetTPSR_b_TFTKO_TPS()	TPS_TFTKO	P0122	P0123	P0222	P0223	P2135							
		GetTPSR_b_PerfFaultActive_TPS()	TPS_Performance_FA	P0068	P0121	P1104	P2100	P2101	P2102	P2103					
		GetTPSR_b_PerfTFTKO_TPS()	TPS_Performance_TFTKO	P0068	P0121	P1104	P2100	P2101	P2102	P2103					
		GetTPSR_FaultPending_TPS()	TPS_FaultPending	P0122	P0123	P0222	P0223	P2135							
		GetTPSR_b_FaultPending_TPS()	TPS_FaultPending	P0122	P0123	P0222	P0223	P2135							
		GetTPSR_ThrotAuthDefault()	TPS_ThrottleAuthorityDefaulted	P0068	P0122	P0123	P0222	P0223	P16F3	P1104	P2100	P2101	P2102	P2103	P2135
	SRAR	GetSRAR_b_EnginePowerLimited()	EnginePowerLimited	P0068	P0122	P0123	P0222	P0223	P0606	P16F3	P1104	P2100	P2101	P2102	P2103
				P160E	P160D	P0191	P0192	P0193	P00C8	P00C9	P00CA	P0090	P0091	P0092	P228C
				P2135	P2138	P2122	P2123	P2127	P2128	P228D	P06A3	P0697			
	VLTR	GetVLTR_b_V5A_FA()	5VoltReferenceA_FA	P0641											

PDT	Ring	Fault Bundles Produced	Cert Doc Bundle Name	Pcodes											
		GetVLTR_b_V5B_FA()	5VoltReferenceB_FA	P0651											
		GetVLTR_b_MAP_OOR_Flt()	5VoltReferenceMAP_OOR_Flt	P0697											
Evap	EVPR	GetEVPR_b_Purg1SlndCkt_FA	EvapPurgeSolenoidCircuit_FA	P0443											
		GetEVPR_b_FlowDurNonPurg_FA	EvapFlowDuringNonPurge_FA	P0496											
		GetEVPR_b_VentSlndCkt_FA	EvapVentSolenoidCircuit_FA	P0449											
		GetEVPR_b_SmallLeak_FA	EvapSmallLeak_FA	P0442											
		GetEVPR_b_EmissionSys_FA	EvapEmissionSystem_FA	P0455	P0446										
		GetEVPR_b_FTP_Circuit_FA	FuelTankPressureSnsrCkt_FA	P0452	P0453										
Evap	FLVR	GetFLVR_b_FuelLvlDataFlt	FuelLevelDataFault	P0461	P0462	P0463	P2066	P2067	P2068						
Eng Interface	FANR	GetFANR_b_FanSpeedTooHiFA	CoolingFanSpeedTooHigh_FA	P0495											
		GetFANR_b_OutputDriver_FA	FanOutputDriver_FA	P0480	P0481	P0482									
Engine Interface	PMDR	GetPMDR_b_PT_RelayFlt	PowertrainRelayFault	P1682											
		GetPMDC_b_PT_RelayStOnFA	PowertrainRelayStateOn_FA	P0685	P0686	P0687									
		GetPMDC_b_PT_RelayStOnError	PowertrainRelayStateOn_Error	P0685	P0686	P0687									
		GetPMDR_b_IgnOffTmFA	IgnitionOffTimer_FA	P2610											
		GetPMDR_b_IgnOffTmeVld	IgnitionOffTimeValid	P2610											
		GetEMDR_b_EngModeNotRunTmErr	EngineModeNotRunTimerError	P2610											
		GetEMDR_b_EngModeNotRunTmFA	EngineModeNotRunTimer_FA	P2610											
Vehicle Infrastructure PMT	VSPR	GetVSPR_b_VehicleSpeedFA	VehicleSpeedSensor_FA	P0502	P0503	P0722	P0723								
		GetVSPR_b_VehicleSpeedError	VehicleSpeedSensorError	P0502	P0503	P0722	P0723								
Trans	TGRR	GetTGRR_TransGrDfltd	TransmissionGearDefaulted	MYD/MYC/MYB:	P182E	P1915									
				M30/M32/M70:	P1915	P182A	P182C	P182D	P182E	P182F					
	TRGR	GetTRGR_b_TransEngdStEmisFlt	TransmissionEngagedState_FA	MYD/MYC/MYB:	P182E	P1915									
				M30/M32/M70:	P1915	P182A	P182C	P182D	P182E	P182F					
		GetTOSR_b_TOS_FA	Transmission Output Shaft Angular Velocity Validity	MYD/MYC/MYB:	P0722	P0723	P077D	P077C							
				M30/M32/M70:	P0722	P0723									

PDT	Ring	Fault Bundles Produced	Cert Doc Bundle Name	Pcodes											
		GetSHPR_b_ShfSIndFlt	no validity name is assigned to this fault bundle		P0751	P0752	P0756	P0757	P0973	P0974	P0976	P0977			
		GetTOSR_b_OutRotRollgCntValid	Trans Output Rotations Rolling Count Validity		P0722	P0723	P077C	P077D							
		GetTGRR_TransGrDfltd	Transmission Actual Gear Validity		P0716	P0717	P0722	P0723	P077C	P077D	P07BF	P07C0	P182E	P1915	
		GetTRGR_b_TransEngdStEmisFlt	Transmission Engaged State Validity		P182E	P1915									
		GetTGRR_TransGrDfltd	Transmission Estimated Gear Validity		P182E	P1915									
		GetTRTR_GearRatioValidity	Transmission Gear Ratio Validity		P0716	P0717	P0722	P0723	P077C	P077D	P07BF	P07C0			
		GetTRGR_PRNDL_StateDfltd	Transmission Gear Selector Position Validity		P182E	P1915									
		GetTFTR_b_TransOilVld	Transmission Oil Temperature Validity		P0667	P0668	P0669	P0711	P0712	P0713					
		GetTRTR_b_TransOverallRatioVld	Transmission Overall Actual Torque Ratio Validity		P0716	P0717	P0722	P0723	P077C	P077D	P07BF	P07C0	P182E	P1915	
		GetTRTR_b_TransOverallRatioVld	Transmission Overall Estimated Torque Ratio Validity		P0716	P0717	P0722	P0723	P077C	P077D	P07BF	P07C0	P182E	P1915	
		GetTRGR_PRNDL_StateDfltd	Transmission Shift Lever Position Validity		P182E	P1915									
		GetTBNR_TurbineSpdValid	Transmission Turbine Angular Velocity Validity		P0716	P0717	P07BF	P07C0							
Oil Attributes PDT	EOTR														
If sensor application		GetEOTI_b_EngOilTempSnsrCktFA()	EngOilTempSensorCircuitFA	P0197	P0198										
	if modeled	GetEOTI_b_EngOilModelValid	EngOilModeledTempValid	ECT_Sensor_FA	IAT_SensorCircuitFA										
Oil Attributes PDT	EOPR	GetEOPR_b_ValidEngOil	EngOilPressureSensorCktFA	P0522	P0523										
		GetEOPR_b_EOP_SnsrFA	EngOilPressureSensorFA	P0521	P0522	P0523									
AFM PDT	CDAR	GetCDAR_b_AllDeacDriver_TFTKO	CylnderDeacDriverTFTKO	P3401	P3409	P3417	P3425	P3433	P3441	P3449					
AFM PDT	BTRR	GetBBVR_b_BrakeBoostVacFA	BrakeBoosterSensorFA	P0556	P0557	P0558									
If sensor application		GetBBVR_b_BrkBoostVacVld	BrakeBoosterVacuumValid	P0556	P0557	P0558									

PDT	Ring	Fault Bundles Produced	Cert Doc Bundle Name	Pcodes										
	if modeled	GetBBVR_b_BrkBoostVacVld	BrakeBoosterVacuumValid	VehicleSpeedSensor_FA	MAP_SensorFA									
AFM PDT	CDAR	GetCDAR_b_AllDeacDriver_TFTKO	CylnderDeacDriverTFTKO	P3401	P3409	P3417	P3425	P3433	P3441	P3449				
Engine Torque PDT	ETQR	GetETQR_EngineTorqueInaccurate	EngineTorqueEstInaccurate	EngineMisfireDetected_FA	FuelInjectorCircuit_FA	FuelInjectorCircuit_TFTKO	FuelTrimSystemB1_FA	FuelTrimSystemB2_FA	MAF_SensorTFTKO	MAP_SensorTFTKO	EGRValuePerformnce_FA			
FASD	FADR	GetFADR_b_FuelTrimSysB1_FA	FuelTrimSystemB1_FA	P0171	P0172									
		GetFADR_b_FuelTrimSysB2_FA	FuelTrimSystemB2_FA	P0174	P0175									
		GetFADR_b_FuelTrimSysB1_TFTKO	FuelTrimSystemB1_TFTKO	P0171	P0172									
		GetFADR_b_FuelTrimSysB2_TFTKO	FuelTrimSystemB2_TFTKO	P0174	P0175									
AFIM	OXYR	GetDFIR_FaultActive(CeDFIR_e_FuelTrimCylBalB1)	A/F Imbalance Bank1	P219A										
		GetDFIR_FaultActive(CeDFIR_e_FuelTrimCylBalB2)	A/F Imbalance Bank2	P219B										
Secondary Air	AIRR	GetAIRR_b_AIR_PresSensorFault	AIRSystemPressureSensorFA	P2430	P2431	P2432	P2433	P2435	P2436	P2437	P2438			
		GetAIRR_b_AIR_Sys_FA	AIR System FA	P0411	P2440	P2444								
		GetDFIR_FaultActive(CeDFIR_e_AIR_SlndCktB1)	AIRValveControlCircuit FA	P0412										
		GetDFIR_FaultActive(CeDFIR_e_AIR_PmpCktB1)	AIRPumpControlCircuit FA	P0418										
Clutch	MTCR	GetMTCR_b_ClchPstnEmisFA	Clutch Sensor FA	P0806	P0807	P0808								
		GetDFIR_FaultActive(CeDFIR_e_ClchPstnSnsrCktLo)	ClutchPositionSensorCircuit Lo FA	P0807										
		GetDFIR_FaultActive(CeDFIR_e_ClchPstnSnsrCktHi)	ClutchPositionSensorCircuit Hi FA	P0808										
Closed Loop Fuel	E85R	GetE85R_b_FFS_CompFA	Ethanol Composition Sensor FA	P0178	P0179	P2269								

Other Definitions

Evap	FLVD	GetFLVR_b_LowFuelCondition Diag	LowFuelConditionDiagnostic	Flag set to TRUE if the fuel level < 10 % AND No Active DTCs: FuelLevelDataFault, P0462, P0463 for at least 30 seconds.
	FLVD	GetFLVC_b_FuelPump2_StOn	Transfer Pump is Commanded On	Fuel Volume in Primary Fuel Tank < 0.0 liters AND Fuel Volume in Secondary Fuel Tank ≥ 0.0 liters AND Transfer Pump on Time < **TransferPumpOnTimeLimit** Table AND Transfer Pump had been Off for at least 0.0 seconds AND Evap Diagnostic (Purge Valve Leak Test, Large Leak Test, and Waiting for Purge) is not running AND Engine Running

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