Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Intake Camshaft Actuator Solenoid Circuit – Bank 1	P0010	Detects a VVT system error by monitoring the circuit for electrical integrity	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		System supply voltage is within limits Output driver is commanded on, Ignition switch is in crank or run position	> 11 Volts, and < 32 Volts	20 failures out of 25 samples 250 ms /sample, continuous	Trips 2 B Type
Intake Camshaft System Performance – Bank 1	P0011	Detects a VVT system error by comparing the desired and actual cam positions when VVT is activated	Camshaft position error [absolute value of (desired position - actual position)] is compared to thresholds to determine if excessive	(Intake cam Bank 1)Cam Position Error > KtPHSD_phi_CamPosErrorLimIc1 Deg (see Supporting Table)	DTC's are NOT active: P0010 IntkCMP B1 Circuit IntakeCamSensorTFTKO CrankSensorTFTKO CrankIntakeCamCorrelationFA Engine is running VVT is enabled Desired camshaft position > 0 Power Take Off (PTO) not active	System Voltage > 11 Volts, and System Voltage < 32 Volts Both Desired & Measured cam positions cannot be < KtPHSD_phi_CamPosErrorLimIc1 or > than (30.0 - KtPHSD_phi_CamPosErrorLimIc1). Desired cam position cannot vary more than 3.0 Cam Deg for at least KtPHSD_t_StablePositionTimeIc1 seconds (see Supporting Tables)	100 failures out of 125 samples 100 ms /sample	Trips 2 B Type
Exhaust Camshaft Actuator Solenoid Circuit – Bank 1	P0013	Detects a VVT system error by monitoring the circuit for electrical integrity	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		System supply voltage is within limits Output driver is commanded on, Ignition switch is in crank or run position	> 11 Volts, and < 32 Volts	20 failures out of 25 samples 250 ms /sample, continuous	Trips 2 B Type

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_CamPosErrorLimEc1 Deg (see Supporting Table)	DTC's are NOT active: P0013 IntkCMP B1 Circuit ExhaustCamSensorTFTKO CrankSensorTFTKO CrankExhaustCamCorrelationFA 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_CamPosErrorLimEc1 or > than (Exh22.5 - KtPHSD_phi_CamPosErrorLimEc1). Desired cam position cannot vary more than 3.0 Cam Deg for at least KtPHSD_t_StablePositionTimeEc1 seconds (see Supporting Tables)	100 failures out of 125 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	3 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	 P0335, P0336 P0340, P0341 5VoltReferenceA_FA 5VoltReferenceB_FA	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.
					diagnostic	< 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	3 cam sensor pulses more than -10 crank degrees before or 10 crank degrees after nominal position in one cam revolution.		Crankshaft and camshaft position signals are synchronized Engine is Spinning Cam phaser is in "parked" position No Active DTCs: Time since last execution of diagnostic	 P0335, P0336 P0365, P0366 5VoltReferenceA_FA 5VoltReferenceB_FA < 1.0 seconds	2 failures out of 3 tests. A failed test is 4 failures out of 5 samples. There is a delay after the first failed test to allow the camshaft position to return to the park position. This time is defined by the table "Cam Correlation Oil Temperature Threshold". One sample per cam rotation	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
O2S Heater Control Circuit Bank 1 Sensor 1	P0030	This DTC checks the Heater Output Driver circuit for electrical integrity.	Voltage low during driver open state (indicates short-to-ground or open circuit) or voltage high during driver closed state (indicates short to voltage).		Ignition Ignition Voltage Engine Speed	= Crank or Run 11.0 < Volts < 32.0 > 400 RPM	20 failures out of 25 samples 250 ms / sample Continuous	2 trips Type B
Turbo Charger Bypass Valve Control Circuit	P0033	Detect Turbocharger Bypass Valve - Open Circuit	ECM detects that commanded and actual states of output driver do not match because the output is open circuit		Diagnosis Enabled Powertrain relay Voltage Ignition run crank voltage Engine is not cranking	Disabled >= 11.00 Volts >= 6.00 Volts	10 failures out of 20 samples 1 sample every 100ms	Type B 2 trips
Turbo Charger Bypass Valve Control Circuit Low	P0034	Detect Turbocharger Bypass Valve - Shorted to Ground	ECM detects that commanded and actual states of output driver do not match because the output is shorted to ground		Diagnosis Enabled Powertrain relay Voltage Ignition run crank voltage Engine is not cranking	Disabled >= 11.00 Volts >= 6.00 Volts	10 failures out of 20 samples 1 sample every 100ms	Type B 2 trips
Turbo Charger Bypass Valve Control Circuit High	P0035	Detect Turbocharger Bypass Valve - Shorted to Power	ECM detects that commanded and actual states of output driver do not match because the output is shorted to power		Diagnosis Enabled Powertrain relay Voltage Ignition run crank voltage Engine is not cranking	Disabled >= 11.00 Volts >= 6.00 Volts	10 failures out of 20 samples 1 sample every 100ms	Type B 2 trips
O2S Heater Control Circuit Bank 1 Sensor 2	P0036	This DTC checks the Heater Output Driver circuit for electrical integrity.	Voltage low during driver open state (indicates short-to-ground or open circuit) or voltage high during driver closed state (indicates short to voltage).		Ignition Ignition Voltage Engine Speed	= Crank or Run 11.0 < Volts < 32.0 > 400 RPM	20 failures out of 25 samples 250 ms / sample Continuous	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
HO2S Heater Resistance Bank 1 Sensor 1	P0053	Detects an oxygen sensor heater having an incorrect or out of range resistance value.	Heater Resistance	7.5 < Ω < 13.0	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 > 28820 seconds -30.0 < ºC < 45.0 < 31.9 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	7.5 < Ω < 13.0	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 > 28820 seconds -30.0 < ºC < 45.0 < 31.9 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	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 Table, f(RPM). See supporting tables Table, f(Volts). See supporting tables				
Intake Air Temperature Sensor 2 Circuit Performance (applications with humidity sensor and manifold temperature sensor)	P0096	Detects an IAT2 sensor that has stuck in range by comparing to IAT and IAT3 at startup	ABS(Power Up IAT - Power Up IAT2) AND ABS(Power Up IAT - Power Up IAT3) AND ABS(Power Up IAT2 - Power Up IAT3)	> 25 deg C <= 25 deg C > 25 deg C	Time between current ignition cycle and the last time the engine was running Powertrain Relay Voltage for a time No Active DTCs:	> 28,800 seconds >= 11.00 Volts >= 0.9seconds PowertrainRelayFault ECT_Sensor_Ckt_FA IAT_SensorCircuitFA MnfdTempSensorCktFA HumTempSnsrCktFA	Executes once at the beginning of each ignition cycle if enable conditions are met	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			Power Up IAT is between Power Up IAT2 and Power Up IAT3 AND ABS(Power Up IAT2 - Power Up IAT3) AND ABS(Power Up IAT - Power Up IAT2) > ABS(Power Up IAT - Power Up IAT3)	> 25 deg C	Time between current ignition cycle and the last time the engine was running Powertrain Relay Voltage for a time No Active DTCs:	> 28,800 seconds >= 11.00 Volts >= 0.9 seconds PowertrainRelayFault ECT_Sensor_Ckt_FA IAT_SensorCircuitFA MnfdTempSensorCktFA HumTempSnsrCktFA	Executes once at the beginning of each ignition cycle if enable conditions are met	
			Power Up IAT3 is between Power Up IAT and Power Up IAT2 AND ABS(Power Up IAT - Power Up IAT2) AND ABS(Power Up IAT3 - Power Up IAT2) > ABS(Power Up IAT3 - Power Up IAT)	> 25 deg C	Time between current ignition cycle and the last time the engine was running Powertrain Relay Voltage for a time No Active DTCs:	> 28,800 seconds >= 11.00 Volts >= 0.9 seconds PowertrainRelayFault ECT_Sensor_Ckt_FA IAT_SensorCircuitFA MnfdTempSensorCktFA HumTempSnsrCktFA	Executes once at the beginning of each ignition cycle if enable conditions are met	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Intake Air Temperature Sensor Circuit 2 Low (applications with humidity)	P0097	Detects a continuous short to ground or open in the IAT 2 signal circuit	Raw IAT 2 Input	< 10 Hertz (~-60 deg C)	Powertrain Relay Voltage for a time No Active DTCs:	 >= 11.00 Volts >= 0.9 seconds PowertrainRelayFault	40 failures out of 50 samples 1 sample every 100 msec	Type B 2 trips
IIntake Air Temperature Sensor Circuit 2 High (applications with humidity)	P0098	Detects a continuous high frequency in the IAT 2 signal circuit	Raw IAT 2 Input	> 390 Hertz (~150 deg C)	Powertrain Relay Voltage for a time No Active DTCs:	 >= 11.00 Volts >= 0.9 seconds PowertrainRelayFault	40 failures out of 50 samples 1 sample every 100 msec	Type B 2 trips
Radiator Coolant Temp Sensor Circuit Low Voltage	P00B3	This DTC detects a short to ground in the RCT signal circuit or the RCT sensor.	RCT Resistance (@ 150ºC)	< 34 Ohms	Engine run time Or IAT min	> 10.0 seconds ≤ 70.3 °C	5 failures out of 10 samples 1 sec/ sample Continuous	2 trips Type B
Radiator Coolant Temp Sensor Circuit High Voltage	P00B4	Circuit Continuity This DTC detects a short to high or open in the RCT signal circuit or the RCT sensor.	RCT Resistance (@ -60ºC)	> 260000 Ohms	Engine run time Or IAT min	> 60.0 seconds ≥ -7.0 °C	5 failures out of 10 samples 1 sec/ sample Continuous	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
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	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	1 failure 500 msec/ sample Once per valid cold start	2 trips Type B
					Block Heater detection is enabled when either of the following occurs: 1) ECT at power up > IAT at power up by 2) Cranking time	 > 20.0 ºC < 10.0 Seconds		
					Block Heater is detected and diagnostic is aborted when 1) or 2) occurs. Diagnostic is aborted when 3) or 4) occurs: 1a) Vehicle drive time 1b) Vehicle speed 1c) Additional Vehicle drive time is provided to 1a when Vehicle speed is below 1b as follows:	 > 400 Seconds with > 14.9 MPH and 0.50 times the seconds with vehicle speed below 1b		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					1d) IAT drops from power up IAT	≥ 3.3 ºC		
					2a) ECT drops from power up ECT 2b) Engine run time	> 2 ºC Within > 60 Seconds		
					3) Engine run time with vehicle speed below 1b	> 1800 Seconds		
					4) Minimum IAT during test	≤ -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 120 Deg C and Difference between ECT and RCT is greater than 40 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 300 samples	2 trips Type B
					Engine run time OR Engine Coolant Temp	> 30 seconds > 150.0 Deg C	1 sec/ sample Continuous	
Intake Air Pressure Measurement System - Multiple Sensor Correlation (turbocharged)	P00C7	Detects an inconsistency between pressure sensors in the induction system in which a particular sensor cannot be identified as the failed sensor	ABS(Manifold Pressure - Baro Pressure) AND ABS(Turbocharger Boost Pressure - Manifold Pressure) AND ABS(Turbocharger Boost Pressure - Baro Pressure)	> 10.0 kPa <= 10.0 kPa <= 10.0 kPa	Time between current ignition cycle and the last time the engine was running Engine is not rotating Manifold Pressure	> 10.0 seconds >= 50.0 kPa	4 failures out of 5 samples 1 sample every 12.5 msec	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			OR					
			ABS(Manifold Pressure - Baro Pressure)	<= 10.0 kPa	Manifold Pressure Baro Pressure Baro Pressure Turbocharger Boost Pressure Turbocharger Boost Pressure	<= 115.0 kPa >= 50.0 kPa >= 50.0 kPa <= 115.0 kPa		
			AND ABS(Turbocharger Boost Pressure - Manifold Pressure)	> 10.0 kPa				
			AND ABS(Turbocharger Boost Pressure - Baro Pressure)	<= 10.0 kPa	No Active DTCs:	EngModeNotRunTmErr MAP_SensorFA AAP_SnsrFA AAP2_SnsrFA		
			OR		No Pending DTCs:	MAP_SensorCircuitFP AAP_SnsrCktFP AAP2_SnsrCktFP		
			ABS(Manifold Pressure - Baro Pressure)	<= 10.0 kPa				
			AND ABS(Turbocharger Boost Pressure - Manifold Pressure)	<= 10.0 kPa				
			AND ABS(Turbocharger Boost Pressure - Baro Pressure)	> 10.0 kPa				
			OR					
			ABS(Manifold Pressure - Baro Pressure)	> 10.0 kPa				
			AND ABS(Turbocharger Boost Pressure - Manifold Pressure)	> 10.0 kPa				
			AND ABS(Turbocharger Boost Pressure - Baro Pressure)	> 10.0 kPa				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Mass Air Flow System Performance (naturally aspirated)	P0101	Determines if the MAF sensor is stuck within the normal operating range	Filtered Throttle Model Error AND ABS(Measured Flow – Modeled Air Flow) Filtered AND ABS(Measured MAP – MAP Model 2) Filtered	<= 500 kPa*(g/s) > 15 grams/sec > 25.0 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 <= 7000 RPM >= -7 Deg C <= 125 Deg C >= -20 Deg C <= 125 Deg C >= 0.25 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	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.
Mass Air Flow System Performance (turbocharged)	P0101	Determines if the MAF sensor is stuck within the normal operating range	See table "Turbocharger Intake Flow Rationality Diagnostic Failure Matrix" for combinations of model failures that can set this DTC.		Engine Speed Engine Speed Coolant Temp Coolant Temp Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together)	>= 400 RPM <= 6000 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
			MAF model fails when			>= 0.50		
			ABS(Measured Flow – Modeled Air Flow) Filtered	> 16 grams/sec		Modeled Air Flow Error multiplied by MAF Residual Weight Factor based on RPM and MAF Residual Weight Factor Based on MAF Est		
			MAP1 model fails when					
			ABS(Measured MAP – MAP Model 1) Filtered	> 20.0 kPa		MAP Model 1 Error multiplied by MAP1 Residual Weight Factor based on RPM		
			MAP2 model fails when					
			ABS(Measured MAP – MAP Model 2) Filtered	> 25.0 kPa		MAP Model 2 Error multiplied by MAP2 Residual Weight Factor based on RPM		
			MAP3 model fails when					
			ABS(Measured MAP – MAP Model 3) Filtered	> 25.0 kPa		MAP Model 3 Error multiplied by MAP Residual Weight Factor based on RPM		
			TIAP1 model fails when					
			ABS(Measured TIAP – TIAP Model 1) Filtered	> 25.0 kPa		TIAP Model 1 Error multiplied by TIAP Residual Weight Factor based on RPM		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			TPS model fails when			Filtered Throttle Model Error multiplied by TPS Residual Weight Factor based on RPM		
			Filtered Throttle Model Error	> 250 kPa*(g/s)				
			TIAP Correlation model fails when			See table "IFRD Residual Weighting Factors".		
			High Engine Air Flow is TRUE AND		No Active DTCs:	MAP_SensorCircuitFA EGRValve_FP EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA ECT_Sensor_Ckt_FP IAT_SensorFA IAT_SensorCircuitFP IAT2_SensorFA IAT2_SensorCircuitFP TC_BoostPresSnsrCktFA AmbientAirDefault		
			Measured TIAP - measured MAP - offset as a function of engine speed See table "TIAP-MAP Correlation Offset"	> 25.0 kPa				
			OR Low Engine Air Flow is TRUE AND					
			Measured TIAP - measured Baro - offset as a function of engine speed See table "TIAP-Baro Correlation Offset"	> 25.0 kPa				
			TIAP Correlation is valid when					
			High Engine Air Flow has been TRUE for a period of time	> 2.0 seconds				
			OR High Engine Air Flow has been TRUE for a period of time	> 2.0 seconds				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			High Engine Air Flow is TRUE when					
			Mass Air Flow	> a threshold in gm/sec as a function of engine speed See table "TIAP-MAP Correlation Min Air Flow"				
			AND Manifold Pressure	> a threshold in kPa as a function of engine speed See table "TIAP-MAP Correlation Min MAP"				
			AND Filtered Mass Air Flow - Mass Air Flow	< 2.0 gm/sec				
			Low Engine Air Flow is TRUE when					
			Mass Air Flow	< a threshold in gm/sec as a function of engine speed See table "TIAP-Baro Correlation Max Air Flow"				
			AND Manifold Pressure	< a threshold in kPa as a function of engine speed				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			AND Mass Air Flow - Filtered Mass Air Flow	See table "TIAP-Baro Correlation Max MAP" < 2.0 gm/sec				
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	<= 1837 Hertz (~ 0.39 gm/sec) (KtMAFI_dm_EngAir Flow)	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	>= 13200 Hertz (~ 810.00 gm/sec) (KtMAFI_dm_EngAir Flow)	Engine Run Time Engine Speed Ignition Voltage Above criteria present for a period of time	> 1.0 seconds >= 300 RPM >= 10.0 Volts >= 1.0 seconds	200 failures out of 250 samples 1 sample every cylinder firing event	Type B 2 trips
Manifold Absolute Pressure Sensor Performance (naturally aspirated)	P0106	Determines if the MAP sensor is stuck within the normal operating range	Filtered Throttle Model Error AND ABS(Measured MAP – MAP Model 1) Filtered AND ABS(Measured MAP – MAP Model 2) Filtered	<= 500 kPa*(g/s) > 25.0 kPa > 25.0 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 <= 7000 RPM >= -7 Deg C <= 125 Deg C >= -20 Deg C <= 125 Deg C >= 0.25 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	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.
						MAP Model 2 Error multiplied by MAP2 Residual Weight Factor based on RPM See table "IFRD Residual Weighting Factors".		
					No Active DTCs:	MAP_SensorCircuitFA EGRValve_FP EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA ECT_Sensor_Ckt_FP IAT_SensorFA IAT_SensorCircuitFP		
			Engine Not Rotating Case: Manifold Pressure OR Manifold Pressure	< 50.0 kPa > 115.0 kPa	Time between current ignition cycle and the last time the engine was running		4 failures out of 5 samples 1 sample every 12.5 msec	
						> 6.0 seconds		
					Engine is not rotating			
					No Active DTCs:	EngModeNotRunTmErr MAP_SensorFA AAP_SnsrFA		
					No Pending DTCs:	MAP_SensorCircuitFP AAP_SnsrCktFP		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Manifold Absolute Pressure Sensor Performance (turbocharged)	P0106	Determines if the MAP sensor is stuck within the normal operating range	See table "Turbocharger Intake Flow Rationality Diagnostic Failure Matrix" for combinations of model failures that can set this DTC.		Engine Speed Engine Speed Coolant Temp Coolant Temp Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together)	>= 400 RPM <= 6000 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
			MAF model fails when			>= 0.50		
			ABS(Measured Flow – Modeled Air Flow) Filtered	> 16 grams/sec		Modeled Air Flow Error multiplied by MAF Residual Weight Factor based on RPM and MAF Residual Weight Factor Based on MAF Est		
			MAP1 model fails when					
			ABS(Measured MAP – MAP Model 1) Filtered	> 20.0 kPa		MAP Model 1 Error multiplied by MAP1 Residual Weight Factor based on RPM		
			MAP2 model fails when					
			ABS(Measured MAP – MAP Model 2) Filtered	> 25.0 kPa		MAP Model 2 Error multiplied by MAP2 Residual Weight Factor based on RPM		
			MAP3 model fails when					
			ABS(Measured MAP – MAP Model 3) Filtered	> 25.0 kPa		MAP Model 3 Error multiplied by MAP Residual Weight Factor based on RPM		
			TIAP1 model fails when					
			ABS(Measured TIAP – TIAP Model 1) Filtered	> 25.0 kPa		TIAP Model 1 Error multiplied by TIAP Residual Weight Factor based on RPM		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			TPS model fails when Filtered Throttle Model Error	> 250 kPa*(g/s)		Filtered Throttle Model Error multiplied by TPS Residual Weight Factor based on RPM		
			TIAP Correlation model fails when High Engine Air Flow is TRUE AND Measured TIAP - measured MAP - offset as a function of engine speed See table "TIAP-MAP Correlation Offset"	> 25.0 kPa	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 IAT2_SensorFA IAT2_SensorCircuitFP TC_BoostPresSnsrCktFA AmbientAirDefault		
			OR Low Engine Air Flow is TRUE AND Measured TIAP - measured Baro - offset as a function of engine speed See table "TIAP-Baro Correlation Offset"	> 25.0 kPa				
			TIAP Correlation is valid when High Engine Air Flow has been TRUE for a period of time	> 2.0 seconds				
			OR High Engine Air Flow has been TRUE for a period of time	> 2.0 seconds				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			High Engine Air Flow is TRUE when					
			Mass Air Flow	> a threshold in gm/sec as a function of engine speed See table "TIAP-MAP Correlation Min Air Flow"				
			AND Manifold Pressure	> a threshold in kPa as a function of engine speed See table "TIAP-MAP Correlation Min MAP"				
			AND Filtered Mass Air Flow - Mass Air Flow	< 2.0 gm/sec				
			Low Engine Air Flow is TRUE when					
			Mass Air Flow	< a threshold in gm/sec as a function of engine speed See table "TIAP-Baro Correlation Max Air Flow"				
			AND Manifold Pressure	< a threshold in kPa as a function of engine speed				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
				See table "TIAP-Baro Correlation Max MAP"				
			AND Mass Air Flow - Filtered Mass Air Flow	< 2.0 gm/sec				
			Engine Not Rotating Case: Manifold Pressure	< 50.0 kPa	Time between current ignition cycle and the last time the engine was running		4 failures out of 5 samples 1 sample every 12.5 msec	
			OR Manifold Pressure	> 115.0 kPa		> 10.0 seconds		
			OR ABS(Manifold Pressure - Baro Pressure)	> 10.0 kPa	Engine is not rotating			
			AND ABS(Turbocharger Boost Pressure - Manifold Pressure)	> 10.0 kPa	No Active DTCs:	EngModeNotRunTmErr MAP_SensorFA TC_BoostPresSnsrCktFA AAP2_SnsrFA		
			AND ABS(Turbocharger Boost Pressure - Baro Pressure)	<= 10.0 kPa	No Pending DTCs:	MAP_SensorCircuitFP AAP_SnsrCktFP AAP2_SnsrCktFP		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
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 (no humidity or manifold temperature sensors)	P0111	Detects an IAT sensor that has stuck in range by comparing to engine coolant temperature at startup	ABS(Power Up IAT - Power Up ECT)	> 40 deg C	Time between current ignition cycle and the last time the engine was running Power Up ECT No Active DTCs:	> 28800 seconds < 60 deg C ECT_Sensor_Ckt_FA IAT_SensorCircuitFA	Executes once at the beginning of each ignition cycle if enable conditions are met	Type B 2 trips
Intake Air Temperature Sensor Circuit Performance (applications with humidity sensor and manifold temperature sensor)	P0111	Detects an IAT sensor that has stuck in range by comparing to IAT2 and IAT3 at startup	ABS(Power Up IAT - Power Up IAT2) AND ABS(Power Up IAT - Power Up IAT3) AND ABS(Power Up IAT2 - Power Up IAT3)	> 25 deg C > 25 deg C <= 25 deg C	Time between current ignition cycle and the last time the engine was running Powertrain Relay Voltage for a time No Active DTCs:	> 28800 seconds >= 11.00 Volts >= 0.9 seconds PowertrainRelayFault ECT_Sensor_Ckt_FA IAT_SensorCircuitFA MnfdTempSensorCktFA HumTempSnsrCktFA	Executes once at the beginning of each ignition cycle if enable conditions are met	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			Power Up IAT2 is between Power Up IAT and Power Up IAT3 AND ABS(Power Up IAT - Power Up IAT3) AND ABS(Power Up IAT2 - Power Up IAT) > ABS(Power Up IAT2 - Power Up IAT3)	> 25 deg C	Time between current ignition cycle and the last time the engine was running Powertrain Relay Voltage for a time No Active DTCs:	> 28800 seconds >= 11.00 Volts >= 0.9 seconds PowertrainRelayFault ECT_Sensor_Ckt_FA IAT_SensorCircuitFA MnfdTempSensorCktFA HumTempSnsrCktFA	Executes once at the beginning of each ignition cycle if enable conditions are met	
			Power Up IAT3 is between Power Up IAT and Power Up IAT2 AND ABS(Power Up IAT - Power Up IAT2) AND ABS(Power Up IAT3 - Power Up IAT) > ABS(Power Up IAT3 - Power Up IAT2)	> 25 deg C	Time between current ignition cycle and the last time the engine was running Powertrain Relay Voltage for a time No Active DTCs:	> 28800 seconds >= 11.00 Volts >= 0.9 seconds PowertrainRelayFault ECT_Sensor_Ckt_FA IAT_SensorCircuitFA MnfdTempSensorCktFA HumTempSnsrCktFA	Executes once at the beginning of each ignition cycle if enable conditions are met	
Intake Air Temperature Sensor Circuit Low (High Temperature)	P0112	Detects a continuous short to ground in the IAT signal circuit or the IAT sensor	Raw IAT Input	< 94 Ohms (~150 deg C)	Engine Run Time	> 0.0 seconds	40 failures out of 50 samples 1 sample every 100 msec	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
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	> 63000 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
Intake Air Temperature Sensor Intermittent In-Range	P0114	Detects a noisy or erratic IAT signal circuit or IAT sensor	String Length Where: "String Length" = sum of "Diff" calculated over And where: "Diff" = ABS(current IAT reading - IAT reading from 100 milliseconds previous)	> 99,999,997,952.00 DegC 10 consecutive IAT samples			4 failures out of 5 samples	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
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. 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	See "P0116: Fail if power up ECT exceeds IAT by these values" in the Supporting tables section = False	No Active DTC's Non-volatile memory initization Test complete this trip Test aborted this trip IAT LowFuelCondition Diag	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
					Block Heater detection is enabled when either of the following occurs:			
					1) ECT at power up > IAT at power up by	> 20.0 ºC		
					2) Cranking time	< 10.0 Seconds		
					Block Heater is detected and diagnostic is aborted when 1) or 2) occurs. Diagnostic is aborted when 3) or 4) occurs:			
					1a) Vehicle drive time 1b) Vehicle speed 1c) Additional Vehicle drive time is provided to 1a when Vehicle speed is below 1b as follows: 1d) IAT drops from power up IAT	> 400 Seconds with > 14.9 MPH 0.50 times the seconds with vehicle speed below 1b ≥ 3.3 ºC		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					2a) ECT drops from power up ECT 2b) Engine run time	> 2 ºC Within > 60 Seconds		
					3) Engine run time with vehicle speed below 1b 4) Minimum IAT during test	> 1800 Seconds ≤ -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)	< 34 Ohms			5 failures out of 6 samples 1 sec/ sample Continuous	2 trips Type B
Engine Coolant Temp Sensor Circuit High	P0118	Circuit Continuity This DTC detects a short to high or open in the ECT signal circuit or the ECT sensor.	ECT Resistance (@ -60ºC)	> 260000 Ohms	Engine run time Or IAT min	> 15.0 seconds ≥ -7.0 °C	5 failures out of 6 samples 1 sec/ sample Continuous	2 trips 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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Throttle Position Sensor Performance (naturally aspirated)	P0121	Determines if the Throttle Position Sensor input is stuck within the normal operating range	Filtered Throttle Model Error AND ABS(Measured Flow – Modeled Air Flow) Filtered AND ABS(Measured MAP – MAP Model 2) Filtered	> 500 kPa*(g/s) > 15 grams/sec <= 25.0 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 <= 7000 RPM > -7 Deg C < 125 Deg C > -20 Deg C < 125 Deg C >= 0.25 Filtered Throttle Model Error multiplied by TPS Residual Weight Factor based on RPM Modeled Air Flow Error multiplied by MAF Residual Weight Factor based on RPM and MAF Residual Weight Factor Based on MAF Est See table "IFRD 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 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.
Throttle Position Sensor Performance (turbocharged)	P0121	Determines if the Throttle Position Sensor input is stuck within the normal operating range	See table "Turbocharger Intake Flow Rationality Diagnostic Failure Matrix" for combinations of model failures that can set this DTC.		Engine Speed Engine Speed Coolant Temp Coolant Temp Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together)	>= 400 RPM <= 6000 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
			MAF model fails when			>= 0.50		
			ABS(Measured Flow – Modeled Air Flow) Filtered	> 16 grams/sec		Modeled Air Flow Error multiplied by MAF Residual Weight Factor based on RPM and MAF Residual Weight Factor Based on MAF Est		
			MAP1 model fails when					
			ABS(Measured MAP – MAP Model 1) Filtered	> 20.0 kPa		MAP Model 1 Error multiplied by MAP1 Residual Weight Factor based on RPM		
			MAP2 model fails when					
			ABS(Measured MAP – MAP Model 2) Filtered	> 25.0 kPa		MAP Model 2 Error multiplied by MAP2 Residual Weight Factor based on RPM		
			MAP3 model fails when					
			ABS(Measured MAP – MAP Model 3) Filtered	> 25.0 kPa		MAP Model 3 Error multiplied by MAP Residual Weight Factor based on RPM		
			TIAP1 model fails when					
			ABS(Measured TIAP – TIAP Model 1) Filtered	> 25.0 kPa		TIAP Model 1 Error multiplied by TIAP Residual Weight Factor based on RPM		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						Filtered Throttle Model Error multiplied by TPS Residual Weight Factor based on RPM		
			TPS model fails when					
			Filtered Throttle Model Error	> 250 kPa*(g/s)		See table "IFRD Residual Weighting Factors".		
			TIAP Correlation model fails when High Engine Air Flow is TRUE AND Measured TIAP - measured MAP - offset as a function of engine speed See table "TIAP-MAP Correlation Offset"	> 25.0 kPa	No Active DTCs:	MAP_SensorCircuitFA EGRValve_FP EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA ECT_Sensor_Ckt_FP IAT_SensorFA IAT_SensorCircuitFP IAT2_SensorFA IAT2_SensorCircuitFP TC_BoostPresSnsrCktFA AmbientAirDefault		
			OR Low Engine Air Flow is TRUE AND Measured TIAP - measured Baro - offset as a function of engine speed See table "TIAP-Baro Correlation Offset"	> 25.0 kPa				
			TIAP Correlation is valid when High Engine Air Flow has been TRUE for a period of time	> 2.0 seconds				
			OR High Engine Air Flow has been TRUE for a period of time	> 2.0 seconds				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			High Engine Air Flow is TRUE when					
			Mass Air Flow	> a threshold in gm/sec as a function of engine speed See table "TIAP-MAP Correlation Min Air Flow"				
			AND Manifold Pressure	> a threshold in kPa as a function of engine speed See table "TIAP-MAP Correlation Min MAP"				
			AND Filtered Mass Air Flow - Mass Air Flow	< 2.0 gm/sec				
			Low Engine Air Flow is TRUE when					
			Mass Air Flow	< a threshold in gm/sec as a function of engine speed See table "TIAP-Baro Correlation Max Air Flow"				
			AND Manifold Pressure	< a threshold in kPa as a function of engine speed See table "TIAP-Baro Correlation Max MAP"				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			AND Mass Air Flow - Filtered Mass Air Flow	< 2.0 gm/sec				
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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
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:	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	2 trips Type B
			Range #1 (Primary) ECT reaches Commanded temperature minus 26.0 °C when IAT min is < 65.0°C and ≥ 10.0°C.		Engine not run time Engine run time Fuel Condition	1 sec/ sample ≥ 1800 seconds 22 ≤ Eng Run Tme ≤ 1800 seconds Ethanol ≤ 100%	Once per ignition key cycle	
					Range #1 (Primary) Test ECT at start run Average Airflow T-Stat Heater duty commanded cycle	 ≤ ECT ≤ °C ≥ 11.0 gps ≤ 10 %		
			Range #2 (Alternate) ECT reaches Commanded temperature minus 46.0 °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	 ≤ ECT ≤ °C ≥ 11.0 gps ≤ 10 %		
O2S Circuit Low Voltage Bank 1 Sensor 1	P0131	This DTC determines if the O2 sensor circuit is shorted to low.	Oxygen Sensor Signal	< 20 mVolts	No Active DTC's AIR intrusive test Fuel intrusive test Idle intrusive test	TPS_ThrottleAuthorityDefaulted MAP_SensorFA AIR System FA Ethanol Composition Sensor FA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA = Not active = Not active = Not active	380 failures out of 475 samples Frequency: Continuous in 100 milli - second loop	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					EGR intrusive test	= Not active		
					System Voltage	10.0 < Volts < 32.0		
					EGR Device Control	= Not active		
					Idle Device Control	= Not active		
					Fuel Device Control	= Not active		
					AIR Device Control	= Not active		
					Low Fuel Condition Diag	= False		
					Equivalence Ratio	0.9912 < ratio < 1.0137		
					Air Per Cylinder	60 < mgram < 500		
					Fuel Control State	= Closed Loop		
					Closed Loop Active	= TRUE		
					All Fuel Injectors for active Cylinders	Enabled (On)		
					Fuel Condition	Ethanol ≤ 87%		
					Fuel State	DFCO not active		
					All of the above met for	> 3.0 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 < 32.0		
					AFM Status	= All Cylinders active		
					Heater Warm-up delay	= Complete		
					Engine Run Time	> 5 seconds		
					Engine Run Accum	> 50 seconds		
					Fuel Condition	≤ 87 % Ethanol		
					No Active DTC's	MAP_SensorFA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA AIR System FA		
					Low Fuel Condition Diag	= False		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Fuel Condition	≤ 87 % Ethanol		
					Initial delay after Open Test Criteria met (cold start condition)	> 10.0 seconds when engine soak time > 28820 seconds		
					Initial delay after Open Test Criteria met (not cold start condition)	> 10.0 seconds when engine soak time ≤ 28820 seconds		
					Equivalence Ratio	0.9912 ≤ ratio ≤ 1.0137		
					Air Per Cylinder	60.0 ≤ mgram ≤ 500.0		
					Fuel Control State	not = Power Enrichment		
					All of the above met for	> 3.0 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 EthanolCompositionSensor_FA EngineMisfireDetected_FA P0131 P0132 P0134	Sample time is 60 seconds Frequency: Once per trip	2 trips Type B
					System Voltage	10.0 < Volts < 32.0		
					EGR Device Control	= Not active		
					Idle Device Control	= Not active		
					Fuel Device Control	= Not active		
					AIR Device Control	= Not active		
					Low Fuel Condition Diag	= False		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						= Not Valid, See definition of **Green Sensor Delay Criteria**
					Green O2S Condition	**(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	> 150 seconds
					Time since any AFM status change	> 2.0 seconds
					Time since Purge On to Off change	> 2.0 seconds
					Time since Purge Off to On change	> 2.0 seconds
					Purge duty cycle	≥ 0 % duty cycle
					Engine airflow	8 ≤ grams per second ≤ 30
					Engine speed	1200 <= RPM <= 3500
					Fuel	< 87 % Ethanol
					Baro	> 70 kpa
					Air Per Cylinder	≥ 100 mGrams
					Low Fuel Condition Diag	= False
					Fuel Control State	= Closed Loop
					Closed Loop Active	= TRUE
					LTM fuel cell	= Enabled
					Transient Fuel Mass	≤ 100.0 mgrams
					Baro	= Not Defaulted
					Fuel Control State	not = Power Enrichment
					Fuel State	DFCO not active
					Commanded Proportional Gain	≥ 0.0 %
					All of the above met for	> 1.0 seconds

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
O2S Circuit Insufficient Activity Bank 1 Sensor 1	P0134	This DTC determines if the O2 sensor circuit is open.	Oxygen Sensor Signal	> 1700 mvolts	No Active DTC's System Voltage AFM Status Heater Warm-up delay Engine Run Time Engine Run Accum Fuel	 TPS_ThrottleAuthorityDefaulted MAF_SensorFA EthanolCompositionSensor_FA 10.0 < Volts < 32.0 = All Cylinders active = Complete > 5 seconds > 50 seconds ≤ 87 % Ethanol	100 failures out of 125 samples. Frequency: Continuous 100msec loop	2 trips Type B
O2S Heater Performance Bank 1 Sensor 1	P0135	This DTC determines if the O2 sensor heater is functioning properly by monitoring the current through the heater circuit.	Heater Current	0.3 < Amps < 2.5	No Active DTC's System Voltage Heater Warm-up delay O2S Heater device control B1S1 O2S Heater Duty Cycle **All of the above met for**	 ECT_Sensor_FA 10.0 < Volts < 32.0 = Complete = Not active > zero > 30 seconds	8 failures out of 10 samples Frequency: 2 tests per trip 10 seconds delay between tests and 1 second execution rate	2 trips Type B
O2S Circuit Low Voltage Bank 1 Sensor 2	P0137	This DTC determines if the O2 sensor circuit is shorted to low.	Oxygen Sensor Signal	< 20 mvolts	No Active DTC's AIR intrusive test Fuel intrusive test	TPS_ThrottleAuthorityDefaulted MAP_SensorFA AIR System FA Ethanol Composition Sensor FA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA = Not active = Not active	380 failures out of 475 samples Frequency: Continuous in 100 milli - second loop	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Idle intrusive test	= Not active		
					EGR intrusive test	= Not active		
					System Voltage	10.0 < Volts < 32.0		
					EGR Device Control	= Not active		
					Idle Device Control	= Not active		
					Fuel Device Control	= Not active		
					AIR Device Control	= Not active		
					Low Fuel Condition			
					Diag	= False		
					Equivalence Ratio	0.9912 ≤ ratio ≤ 1.0137		
					Air Per Cylinder	100 ≤ mgrams ≤ 500		
					Fuel Control State	= Closed Loop		
					Closed Loop Active	= TRUE		
					All Fuel Injectors for active Cylinders	Enabled (On)		
					Fuel Condition	Ethanol <= 87%		
					Fuel State	DFCO not active		
					All of the above met for	> 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 < 32.0		
					AFM Status	= All Cylinders active		
					Heater Warm-up delay	= Complete		
					Engine Run Time	> 5 seconds		
					Fuel Condition	≤ 87 % Ethanol		
					No Active DTC's	MAP_SensorFA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA AIR System FA		
					Low Fuel Condition			
					Diag	= False		
					Fuel Condition	≤ 87 % 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)	> 10.0 seconds when engine soak time > 28820 seconds		
					Initial delay after Open Test Criteria met (not cold start condition)	> 10.0 seconds when engine soak time ≤ 28820 seconds		
					Equivalence Ratio	0.9912 ≤ ratio ≤ 1.0137		
					Air Per Cylinder	100 ≤ mgrams ≤ 500		
					Fuel Control State	not = Power Enrichment		
					All of the above met for	> 3.0 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 OR The Accumulated mass air flow monitored during the Slow Response Test (between the upper and lower voltage thresholds)	> 9.5 units > 10 grams (upper threshold is mvolts and lower threshold is 150 mvolts)	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 P013B, P013E, P013F, P2270 or P2271 10.0 < Volts < 32.0 = 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.	1 trips Type A EWMA

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					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 OR The Accumulated mass air flow monitored during the Slow Response Test (between the upper and lower voltage thresholds)	> 9.5 units > 140 grams (lower threshold is mvolts and upper threshold is 650 mvolts)	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, P013E, P013F, P2270 or P2271 10.0 < Volts < 32.0 = Valid = Not Valid = Not Valid, See definition of **Green Sensor Delay Criteria (B1S2)** in Supporting Tables tab. = False = enabled P2270 (and P2272 if applicable) P013E (and P014A if applicable) P013A (and P013C if applicable) P2271 (and P2273 if applicable) P013F (and P014B if applicable)	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc= FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed.	1 trips Type A EWMA

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					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	> mvolts > 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 < 32.0 = 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).			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
O2 Sensor Delayed Response Lean to Rich Bank 1 Sensor 2	P013F	This DTC determines if the post catalyst O2 sensor has an initial delayed response to an A/F change from Lean to Rich. The diagnostic is an intrusive test which increases the delivered A/F ratio to achieve the required rich threshold.	Post O2 sensor voltage AND The Accumulated mass air flow monitored during the Delayed Response Test	< mvolts > 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 After above conditions are met: Fuel Enrich mode entered.	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, P2270 or P2271 10.0 < Volts < 32.0 = Valid = Not Valid = Not Valid, See definition of **Green Sensor Delay Criteria (B1S2)** in Supporting Tables tab. = False = enabled P2270 (and P2272 if applicable) P013E (and P014A if applicable) P013A (and P013C if applicable) P2271 (and P2273 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
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	TPS_ThrottleAuthorityDefaulted MAF_SensorFA EthanolCompositionSensor_FA 10.0 <Volts < 32.0 = All Cylinders active	100 failures out of 125 samples. Frequency: Continuous 100msec loop	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Heater Warm-up delay	= Complete		
					Engine Run Time	> 5 seconds		
					Engine Run Accum	> 50 seconds		
					Fuel	≤ 87 % Ethanol		
O2S Heater Performance Bank 1 Sensor 2	P0141	This DTC determines if the O2 sensor heater is functioning properly by monitoring the current through the heater circuit.	Heater Current	0.3 > amps > 2.5	No Active DTC's 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 < 32.0 = Complete = Not active > zero > 30 seconds	8 failures out of 10 samples Frequency: 2 tests per trip 10 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 Pre O2 sensor voltage is above]	> 0.40 EWMA (sec) ≥ 2.00 Seconds > 550 mvolts	No Active DTC's System Voltage EGR Device Control	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 EthanolCompositionSensor_FA EngineMisfireDetected_FA P0131 P0132 P0134 10.0 < Volts < 32.0 = Not active	Frequency: Once per trip Note: if NaESPD_b_FastInitRespIsActive = TRUE for the given Fuel Bank OR NaESPD_b_RapidResponseIsActive = TRUE, multiple tests per trip are allowed	1 trips Type A EWMA

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					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	> 150 seconds		
					Engine Speed to initially enable test	1400 ≤ RPM ≤ 3500		
					Engine Speed range to keep test enabled (after initially enabled)	1350 ≤ RPM ≤ 3650		
					Engine Airflow	2 ≤ gps ≤ 20		
					Vehicle Speed to initially enable test	28.0 ≤ MPH ≤ 77.7		
					Vehicle Speed range to keep test enabled (after initially enabled)	24.9 ≤ MPH ≤ 80.8 mph		
					Closed loop integral	0.92 ≤ C/L Int ≤ 1.08		
					Closed Loop Active	= TRUE		
					Evap	not in control of purge		
					Ethanol	not in estimate mode		
					Post fuel cell	= enabled		
					EGR Intrusive diagnostic	= not active		
					All post sensor heater delays	= not active		
					O2S Heater on Time	≥ 40.0 sec		
					Predicted Catalyst temp	550 ≤ ºC ≤ 900		
					Fuel State	= DFCO possible		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					All of the above met for at least 1.5 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	≤ 3 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	> 0.40 EWMA (sec)	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 EthanolCompositionSensor_FA EngineMisfireDetected_FA P0131 P0132 P0134	Frequency: Once per trip Note: if NaESPD_b_FastInitRespIsActive = TRUE for the given Fuel Bank OR NaESPD_b_RapidResponseIsActive = TRUE, multiple tests per trip are allowed	1 trips Type A EWMA
			OR					
			[The Accumulated time monitored during the L2R Delayed Response Test (Gross failure).	≥ 2.00 Seconds				
			AND					
			Pre O2 sensor voltage is below]	< 350 mvolts				
			OR					
			At end of Cat Rich stage the Pre O2 sensor output is	< 690 mvolts				
					System Voltage	10.0 < Volts < 32.0		
					EGR Device Control	= Not active		
					Idle Device Control	= Not active		
					Fuel Device Control	= Not active		
					AIR Device Control	= Not active		
					Low Fuel Condition Diag	= False		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Green O2S Condition	= Not Valid, See definition of **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	> 150 seconds		
					Engine Speed to initially enable test	1400 ≤ RPM ≤ 3500		
					Engine Speed range to keep test enabled (after initially enabled)	1350 ≤ RPM ≤ 3650		
					Engine Airflow	2 ≤ gps ≤ 20		
					Vehicle Speed to initially enable test	28.0 ≤ MPH ≤ 77.7		
					Vehicle Speed range to keep test enabled (after initially enabled)	24.9 ≤ MPH ≤ 80.8 mph		
					Closed loop integral	0.92 ≤ C/L Int ≤ 1.08		
					Closed Loop Active	= TRUE		
					Evap	not in control of purge		
					Ethanol	not in estimate mode		
					Post fuel cell	= enabled		
					EGR Intrusive diagnostic	= not active		
					All post sensor heater delays	= not active		
					O2S Heater on Time	≥ 40.0 sec		
					Predicted Catalyst temp	550 ≤ ºC ≤ 900		
					Fuel State cylinders	= DFCO inhibit ≥ 1 cylinders		
					When above conditions are met: Fuel Enrich mode entered.			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Fuel System Too Lean Bank 1	P0171	Determines if the fuel control system is in a lean condition, based on the filtered long-term and short-term fuel trim.	The filtered long-term fuel trim metric	>= 1.250	Engine speed BARO Coolant Temp MAP Inlet Air Temp MAF Fuel Level	400 <rpm< 7000 > 70 kPa -20 <°C< 150 10 <kPa< 255 -20 <°C< 150 1.0 <g/s< 512.0 > 10 % or if fuel sender is faulty	Frequency: 100 ms Continuous Loop Development data indicates that the Fuel Adjustment System Diagnostic (FASD) is typically enabled during **90** % of the EPAIII drive cycle. This is also typical of real-world driving, however values will vary (higher or lower) based on the actual conditions present during the drive cycle.	2 Trip(s) Type B
			AND					
			The filtered short-term fuel trim metric (cal < 0.95 indicates cal-out)	>= 0.100	Long Term Fuel Trim data accumulation:	> 20.1 seconds of data must accumulate on each trip, with at least 0.1 seconds of data in the current fuel trim cell before a pass or fail decision can be made.		
					Sometimes, certain Long-Term Fuel Trim Cells are not utilized for control and/or diagnosis	**Please see "Supporting Tables" Tab for a list of cells utilized for diagnosis**		
					Closed Loop Long Term FT	Enabled Enabled **Please see "Closed Loop Enable Criteria" and "Long Term FT Enable Criteria" in Supporting Tables.**		
					EGR Diag. Catalyst Diag. Post O2 Diag. Device Control EVAP Diag.	Intrusive Test Not Active Intrusive Test Not Active Intrusive Test Not Active Not Active “tank pull down” Not Active		
					No active DTCs:			
					IAC_SystemRPM_FA MAP_SensorFA			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					MAF_SensorFA MAF_SensorTFTKO AIR System FA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSensorCircuit_FA Ethanol Comp Snsr FA FuelInjectorCkt_FA EngMisfireDetected_FA EGRValvePerf_FA EGRValveCkt_FA MAP_EngVacuumStatus AmbPresDfltdStatus TC_BoostPresSnsrFA O2Snsr_B1_Snsr_1_FA			
Fuel System Too Rich Bank 1	P0172	Determines if the fuel control system is in a rich condition, based on the filtered long-term fuel trim metric. There are two methods to determine a Rich fault. They are Passive and Intrusive. A Passive Test decision cannot be made when Purge is enabled. The Intrusive test is described below:	Passive Test: The filtered Non-Purge Long Term Fuel Trim metric AND The filtered Short Term Fuel Trim metric (cal > 1.05 indicates cal-out)	<= 0.750 <= 2.000		Secondary Parameters and Enable Conditions are identical to those for P0171, with the exception that fuel level is not considered.	Frequency: 100 ms Continuous Loop Development data indicates that the Fuel Adjustment System Diagnostic (FASD) is typically enabled during **90** % of the EPAIII drive cycle. This is also typical of real-world driving, however values will vary (higher or lower) based on the actual	2 Trip(s) Type B
			Intrusive Test: The filtered Purge Long Term Fuel Trim metric AND The filtered Non-Purge Long Term Fuel Trim metric AND The filtered Short Term	<= 0.755 <= 0.750 <= 2.000 for				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			Fuel Trim metric (cal > 1.05 indicates cal-out)	2 out of 3 intrusive segments			conditions present during the drive cycle.	
		Intrusive Test: When the filtered Purge Long Term Fuel Trim metric is <= 0.755, 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 > 0.755, the test passes without checking the filtered Non-Purge Long Term Fuel Trim metric. Performing intrusive tests too frequently may also affect EVAP and EPAIII emissions, and the execution frequency of other diagnostics.	Segment Def'n: Segments can last up to 60 seconds and are separated by the lesser of 20 seconds of purge-on time or enough time to purge 36 grams of vapor. A maximum of 3 completed segments or 20 attempts are allowed for each intrusive test. After an intrusive test report is completed, another intrusive test cannot occur for 100 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.					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Injector 1	P0201	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control ciruit do not match		Powertrain Relay Voltage within range and stable according to Enable Conditions Engine Running	11 volts ≤ Voltage ≤ 32 volts greater than 1 seconds	20 failures out of 25 samples 250 ms /sample Continuous	2 trips Type B
Injector 2	P0202	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control ciruit do not match		Powertrain Relay Voltage within range and stable according to Enable Conditions Engine Running	11 volts ≤ Voltage ≤ 32 volts greater than 1 seconds	20 failures out of 25 samples 250 ms /sample Continuous	2 trips Type B
Injector 3	P0203	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control ciruit do not match		Powertrain Relay Voltage within range and stable according to Enable Conditions Engine Running	11 volts ≤ Voltage ≤ 32 volts greater than 1 seconds	20 failures out of 25 samples 250 ms /sample Continuous	2 trips Type B
Injector 4	P0204	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control ciruit do not match		Powertrain Relay Voltage within range and stable according to Enable Conditions Engine Running	11 volts ≤ Voltage ≤ 32 volts greater than 1 seconds	20 failures out of 25 samples 250 ms /sample Continuous	2 trips Type B
TPS2 Circuit Low	P0222	Detects a continuous or intermittent short or open in TPS2 circuit	TPS2 Voltage <	0.25		Run/Crank voltage or Powertrain relay voltage > 6.41 and reduced power is false, else the failure will be reported for all conditions No 5V reference error or fault for # 4 5V reference circuit (P06A3)	79/159 counts; 57 counts continuous; 3.125 ms /count in the ECM main processor	Trips: 1 Type: A MIL: YES

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
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
Turbo Charger Engine Overboost	P0234	Detect Negative Boost Pressure Control Deviation	Desired Boost Pressure - Actual Boost Pressure	< (KtBSTD_p_CntrlDev NegLim - KtBSTD_p_CntrlDev AmbAirCorr) See Tables in Supporting Tables Sheet	Diagnosis Enabled Engine Speed Engine Speed Desired Boost Pressure Desired Boost Pressure Desired Boost Pressure Derivative Desired Boost Pressure Derivative Ambient Pressure Ambient Pressure Coolant Temp Coolant Temp Intake Air Temp Intake Air Temp Wait for steady state: No Active DTCs:	Disabled > 2450 rpm < 6000 rpm > 135.0 kPa < 220.0 kPa > -70.0 kPa/s < 55.0 kPa/s > 60.0 kPa < 120.0 kPa > -40.0 Deg C < 120.0 Deg C > -40.0 Deg C < 80.0 Deg C required stabilization time as a function of engine speed, see KtBSTD_t_CntrlDevEnblDelay in Supporting Tables Sheet Desired Boost Pressure > Basic Pressure AmbientAirDefault_Snsr BSTR_b_PCA_CktFA BSTR_b_TurboBypassCktFA ECT_Sensor_FA IAT_SensorFA	20 failures out of 20 samples 1 sample every 100ms	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						BSTR_b_ExcsvBstTFTKO BSTR_b_PCA_CktTFTKO TC_BoostPresSnsrFA AnyCamPhaser_FA BSTR_b_PresCntrlTooLoTFTKO BSTR_b_PresCntrlTooHiTFTKO EnginePowerLimited		
					No Active DVCs:	BSTR_b_DVC_PCA_DC_Actv BSTR_b_DVC_PCA_PstnActv BSTR_b_DVC_TurboComprBypActv		
Turbocharger Boost Pressure (TIAP) Sensor Performance	P0236	Determines if the Turbocharger Boost (TIAP) Pressure Sensor input is stuck within the normal operating range	See table "Turbocharger Intake Flow Rationality Diagnostic Failure Matrix" for combinations of model failures that can set this DTC.		Engine Speed Engine Speed Coolant Temp Coolant Temp Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together)	>= 400 RPM <= 6000 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
			MAF model fails when			>= 0.50		
			ABS(Measured Flow – Modeled Air Flow) Filtered	> 16 grams/sec		Modeled Air Flow Error multiplied by MAF Residual Weight Factor based on RPM and MAF Residual Weight Factor Based on MAF Est		
			MAP1 model fails when					
			ABS(Measured MAP – MAP Model 1) Filtered	> 20.0 kPa		MAP Model 1 Error multiplied by MAP1 Residual Weight Factor based on RPM		
			MAP2 model fails when					
			ABS(Measured MAP – MAP Model 2) Filtered	> 25.0 kPa		MAP Model 2 Error multiplied by MAP2 Residual Weight Factor based on RPM		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			MAP3 model fails when ABS(Measured MAP – MAP Model 3) Filtered	 > 25.0 kPa		MAP Model 3 Error multiplied by MAP Residual Weight Factor based on RPM		
			TIAP1 model fails when ABS(Measured TIAP – TIAP Model 1) Filtered	 > 25.0 kPa		TIAP Model 1 Error multiplied by TIAP Residual Weight Factor based on RPM		
			TPS model fails when Filtered Throttle Model Error	 > 250 kPa*(g/s)		Filtered Throttle Model Error multiplied by TPS Residual Weight Factor based on RPM See table "IFRD Residual Weighting Factors".		
			TIAP Correlation model fails when High Engine Air Flow is TRUE AND Measured TIAP - measured MAP - offset as a function of engine speed See table "TIAP-MAP Correlation Offset" OR Low Engine Air Flow is TRUE AND Measured TIAP - measured Baro - offset as a function of engine speed See table "TIAP-Baro Correlation Offset"	 > 25.0 kPa > 25.0 kPa	No Active DTCs:	MAP_SensorCircuitFA EGRValve_FP EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA ECT_Sensor_Ckt_FP IAT_SensorFA IAT_SensorCircuitFP IAT2_SensorFA IAT2_SensorCircuitFP TC_BoostPresSnsrCktFA AmbientAirDefault		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			TIAP Correlation is valid when					
			High Engine Air Flow has been TRUE for a period of time	> 2.0 seconds				
			OR					
			High Engine Air Flow has been TRUE for a period of time	> 2.0 seconds				
			High Engine Air Flow is TRUE when					
			Mass Air Flow	> a threshold in gm/sec as a function of engine speed				
				See table "TIAP-MAP Correlation Min Air Flow"				
			AND					
			Manifold Pressure	> a threshold in kPa as a function of engine speed				
				See table "TIAP-MAP Correlation Min MAP"				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			AND Filtered Mass Air Flow - Mass Air Flow	< 2.0 gm/sec				
			Low Engine Air Flow is TRUE when Mass Air Flow	< a threshold in gm/sec as a function of engine speed				
				See table "TIAP-Baro Correlation Max Air Flow"				
			AND Manifold Pressure	< a threshold in kPa as a function of engine speed				
				See table "TIAP-Baro Correlation Max MAP"				
			AND Mass Air Flow - Filtered Mass Air Flow	< 2.0 gm/sec				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			Engine Not Rotating Case: Turbocharger Boost Pressure OR Turbocharger Bosst 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 TC_BoostPresSnsrCktFA AAP2_SnsrFA MAP_SensorCircuitFP AAP_SnsrCktFP AAP2_SnsrCktFP	4 failures out of 5 samples 1 sample every 12.5 msec	
Turbocharger Boost Pressure Sensor Circuit Low	P0237	Detects a continuous short to low or open in either the signal circuit or the turbocharger boost pressure sensor.	Turbocharger Boost Pressure Voltage	< 20.0 % of 5 Volt Range (This is equal to 1.00 Volts, or 328.1 kPa)	Engine Run Time	> 0.00 seconds	80 failures out of 100 samples 1 sample every 12.5 msec	Type B 2 trips
Turbocharger Boost Pressure Sensor Circuit High	P0238	Detects an open sensor ground or continuous short to high in either the signal circuit or the turbocharger boost pressure sensor.	Turbocharger Boost Pressure Voltage	> 93.0 % of 5 Volt Range (This is equal to 4.65 Volts, or 323.5 kPa)	Engine Run Time	> 0.00 seconds	80 failures out of 100 samples 1 sample every 12.5 msec	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Turbocharger Wastegate Boost Solenoid A Control Circuit	P0243	Detect Turbocharger Boost Solenoid - Open Circuit	ECM detects that commanded and actual states of output driver do not match because the output is open circuit		Diagnosis Enabled Powertrain relay Voltage Ignition run crank voltage Engine is not cranking	Disabled >= 11.00 Volts >= 6.00 Volts	10 failures out of 20 samples 1 sample every 100ms	Type B 2 trips
Turbocharger Wastegate Boost Solenoid A Control Circuit Low	P0245	Detect Turbocharger Boost Solenoid - Shorted to ground	ECM detects that commanded and actual states of output driver do not match because the output is shorted to ground		Diagnosis Enabled Powertrain relay Voltage Ignition run crank voltage Engine is not cranking	Disabled >= 11.00 Volts >= 6.00 Volts	10 failures out of 20 samples 1 sample every 100ms	Type B 2 trips
Turbocharger Wastegate Boost Solenoid A Control Circuit High	P0246	Detect Turbocharger Boost Solenoid - Shorted to Power	ECM detects that commanded and actual states of output driver do not match because the output is shorted to power		Diagnosis Enabled Powertrain relay Voltage Ignition run crank voltage Engine is not cranking	Disabled >= 11.00 Volts >= 6.00 Volts	10 failures out of 20 samples 1 sample every 100ms	Type B 2 trips
Turbo Charger Engine Underboost	P0299	Detect Positive Boost Pressure Control Deviation	Desired Boost Pressure - Actual Boost Pressure	> (KtBSTD_p_CntrlDevPosLim + KtBSTD_p_CntrlDevAmbAirCorr) See Tables in Supporting Tables Sheet	Diagnosis Enabled Engine Speed Engine Speed Desired Boost Pressure Desired Boost Pressure Desired Boost Pressure Derivative Desired Boost Pressure Derivative Ambient Pressure Ambient Pressure Coolant Temp Coolant Temp Intake Air Temp Intake Air Temp	Disabled > 2450 rpm < 6000 rpm > 135.0 kPa < 220.0 kPa > -70.0 kPa/s < 55.0 kPa/s > 60.0 kPa < 120.0 kPa > -40.0 Deg C < 120.0 Deg C > -40.0 Deg C < 80.0 Deg C	25 failures out of 25 samples 1 sample every 100ms	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Wait for steady state:	required stabilization time as a function of engine speed, see KtBSTD_t_CntrlDevEnblDelay in Supporting Tables Sheet		
						Desired Boost Pressure > Basic Pressure		
					No Active DTCs:	AmbientAirDefault_Snsr BSTR_b_PCA_CktFA BSTR_b_TurboBypassCktFA ECT_Sensor_FA IAT_SensorFA BSTR_b_ExcsvBstTFTKO BSTR_b_PCA_CktTFTKO TC_BoostPresSnsrFA AnyCamPhaser_FA BSTR_b_PresCntrlTooLoTFTKO BSTR_b_PresCntrlTooHiTFTKO EnginePowerLimited		
					No Active DVCs:	BSTR_b_DVC_PCA_DC_Actv BSTR_b_DVC_PCA_PstnActv BSTR_b_DVC_TurboComprBypActv		
Random Misfire Detected Cylinder 1 Misfire Detected Cylinder 2 Misfire Detected Cylinder 3 Misfire Detected Cylinder 4 Misfire Detected	P0300 P0301 P0302 P0303 P0304	These DTC's will determine if a random or a cylinder specific misfire is occurring by monitoring crankshaft velocity	Deceleration index vs. Engine Speed Vs Engine load Deceleration index calculation is tailored to specific veh. Tables used are 1st tables encountered that are not max of range. Undetectable region at a given speed/load point is where all tables are max of range point. see Algorithm Description Document for additional details.	**(>**Idle SCD AND > Idle SCD ddt Tables) **OR** (>SCD Delta AND > SCD Delta ddt Tables) **OR** (>Idle Cyl Mode AND > Idle Cyl Mode ddt Tables) **OR** (>Cyl Mode AND > Cyl Mode ddt Tables) **OR** (>Rev Mode Table) **OR**	Engine Run Time ECT If ECT at startup then ECT System Voltage + Throttle delta - Throttle delta	> 2 crankshaft revolutions -7ºC < ECT < 125ºC < -7ºC 21ºC < ECT < 125ºC 9.00 < volts < 32.00 < 95.00% per 25 ms < 95.00% per 25 ms	Emission Exceedence = any (5) failed 200 rev blocks out of (16) 200 rev block tests Failure reported for (1) Exceedence in 1st (16) 200 rev block tests, or (4) Exceedences thereafter.	2 Trips Type B (Mil Flashes with Catalyst Damaging Misfire)

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
				(> AFM Table in Cyl Deact mode)				
			Misfire Percent Emission Failure Threshold	≥ 3.00% P0300 ≥ 3.00% emission				
			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)	> 1000 rpm AND > 25 % 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	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Engine Speed	500 < rpm < 6500 - 400 Engine speed limit is a function of inputs like Gear and temperature Engine Speed Limit = 6500 rpm (Rev, Gears 1-6) 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 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)	4 cycle delay	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					P0315 & engine speed	> 1000 rpm		
					Fuel Level Low	LowFuelConditionDiagnostic	500 cycle delay	
					Cam and Crank Sensors	in sync with each other	4 cycle delay	
					Misfire requests TCC unlock	Not honored because Transmission in hot mode or POPD intrusive diagnostic running	4 cycle delay	
					Fuel System Status	≠ Fuel Cut	4 cycle delay	
					Active Fuel Management	Transition in progress	7 cycle delay	
					Undetectable engine speed and engine load region	invalid speed load range in **decel index** tables	4 cycle delay	
					Abusive Engine Over Speed	> 8192 rpm	0 cycle delay	
					Below zero torque (except CARB approved 3000 rpm to redline triangle.)	< "Zero torque engine load" in Supporting Tables tab	4 cycle delay	
					Below zero torque: TPS Veh Speed	 ≤ 1% > 30 mph	4 cycle delay	
					EGR Intrusive test	Active	12 cycle delay	
					Manual Trans	Clutch shift	4 cycle delay	
					Throttle Position AND Automatic transmission shift	> 95.00%	7 cycle delay	
					Driveline Ring Filter active			
					After a low level misfire, another misfire may not be detectable until driveline ringing ceases. If no ringing seen, stop filter early.			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Filter Driveline ring:			
					Stop filter early:	> "Ring Filter" in Supporting Tables tab engine cycles after misfire > "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 Engine Speed Veh Speed SCD Cyl Mode Rev Mode	 > 1 % > 1000 rpm > 3 mph > SCD Mode > Cylinder Mode > Rev Mode in Supporting Tables tab		

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			
					Veh Speed	Between > 630 RPM and < 6100 RPM		
					Final crank oscillations within:	> 5 kph > "min multiplier" or < "max multiplier" in Supporting Tables tab of misfire threshold for a given engine speed and load		
					Rough Road Section: Monitor Rough Road	0 (1=Yes)		
					RoughRoadSource	TOSS		
					IF Rough Road is monitored, then ONE of the following Rough Road Sources will be used:			
					Rough Road Source = "TOSS"			
					Rough Road	detected		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Rough Road Source = "WheelSpeedInECM" ABS/TCS system RoughRoad VSES Rough Road Source = "FromABS" ABS/TCS system RoughRoad VSES	active detected active active detected active		
Crankshaft Position System Variation Not Learned	P0315	Monitor for valid crankshaft error compensation factors	Sum of Compensation factors	≥ 2.0040 OR ≤ 1.9960	OBD Manufacturer Enable Counter	0	0.50 seconds Frequency Continuous 100 msec	1 Trips Type A

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
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) VaKNKD_k_PerfCylKnockIntFilt	> 0.6150	Engine Speed Engine running	≥ 1000 RPM ≥ 0.8 seconds	Weight Coefficient = 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	≥ 8500 RPM ≥ 0.4 seconds	Weight Coefficient = 0.0100 Updated each engine event	
Knock Sensor (KS) Circuit Bank 1	P0325	This diagnostic checks for an open in the knock sensor circuit	Filtered FFT Output (VaKNKD_k_OpenFiltIntensity[0])	> OpenCktThrshMin **and** < OpenCktThrshMax See Supporting Tables for OpenCktThrshMin & Max	Diagnostic Enabled?	Enabled	First Order Lag Filter with Weight Coefficient	Type: B MIL: YES Trips: 2
					Engine Speed	≥ 600 RPM and ≤ 8500 RPM		
					Engine Air Flow	≥ 40 mg/cylinder and ≤ 2000 mg/cylinder		
					ECT	≥ -40 deg's C	Weight Coefficient = 0.0100 Updated each engine event	
					IAT	≥ -40 deg's C		
					Engine running	≥ 5.0 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Knock Sensor (KS) Performance Bank 1	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	> 0.6150	Engine Speed Engine running	≥ 1000 RPM ≥ 3.0 seconds	Weight Coefficient = 0.0100 Updated each engine event	
			2. Filtered FFT Intensity: (for Abnormal Noise) VaKNKD_k_PerfAbnFiltIntnsity	< Abnormal Noise Threshold (see supporting tables)	Engine Speed Engine running	≥ 3500 RPM ≥ 0.9 seconds	Weight Coefficient = 0.0100 Updated each	
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				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Crankshaft Position (CKP) Sensor A Circuit	P0335	Determines if a fault exists with the crank position sensor signal	Engine-Cranking Crankshaft Test: Time since last crankshaft position sensor pulse received Time-Based Crankshaft Test: No crankshaft pulses received Event-Based Crankshaft Test: No crankshaft pulses received	 >= 4.0 seconds >= 0.1 seconds	Engine-Cranking Crankshaft Test: Starter engaged AND (cam pulses being received OR (DTC P0101 AND DTC P0102 AND DTC P0103 AND Engine Air Flow Time-Based Crankshaft Test: Engine is Running Starter is not engaged No DTC Active: Event-Based Crankshaft Test: Engine is Running OR Starter is engaged No DTC Active:	 = FALSE = FALSE = FALSE > 3.0 grams/second)) 5VoltReferenceB_FA 5VoltReferenceA_FA 5VoltReferenceB_FA P0365 P0366	Engine-Cranking Crankshaft Test: Continuous every 100 msec Time-Based Crankshaft Test: Continuous every 12.5 msec Event-Based Crankshaft Test: 2 failures out of 10 samples One sample per engine revolution	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Crankshaft Position (CKP) Sensor A Performance	P0336	Determines if a performance fault exists with the crank position sensor signal	Crank Re-synchronization Test: Time in which 10 or more crank re-synchronizations occur	< 10.0 seconds	Crank Re-synchronization Test: Engine Air Flow Cam-based engine speed No DTC Active:	>= 3.0 grams/second > 450 RPM 5VoltReferenceB_FA P0335	Crank Re-synchronization Test: Continuous every 250 msec	Type B 2 trips
			Time-Based Crankshaft Test: No crankshaft synchronization gap found	>= 0.4 seconds	Time-Based Crankshaft Test: Engine is Running Starter is not engaged No DTC Active:	5VoltReferenceB_FA	Time-Based Crankshaft Test: Continuous every 12.5 msec	
			Engine Start Test during Crank: Time since starter engaged without detecting crankshaft synchronization gap	>= 1.5 seconds	Engine Start Test during Crank: Starter engaged AND (cam pulses being received OR (DTC P0101 AND DTC P0102 AND DTC P0103 AND Engine Air Flow	= FALSE = FALSE = FALSE > 3.0 grams/second))	Engine Start Test during Crank: Continuous every 100 msec	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			Event-Based Crankshaft Test: Crank Pulses received in one engine revolution OR Crank Pulses received in one engine revolution	< 51 > 65	Event-Based Crankshaft Test: Engine is Running OR Starter is engaged No DTC Active:	5VoltReferenceA_FA 5VoltReferenceB_FA P0365 P0366	Event-Based Crankshaft Test: 8 failures out of 10 samples One sample per engine revolution	
Camshaft Position (CMP) Sensor Circuit Bank 1 Sensor A	P0340	Determines if a fault exists with the cam position bank 1 sensor A signal	Engine Cranking Camshaft Test: Time since last camshaft position sensor pulse received OR Time that starter has been engaged without a camshaft sensor pulse Time-Based Camshaft Test: Fewer than 4 camshaft pulses received in a time	>= 5.5 seconds >= 4.0 seconds > 3.0 seconds	Engine Cranking Camshaft Test: Starter engaged AND (cam pulses being received OR (DTC P0101 AND DTC P0102 AND DTC P0103 AND Engine Air Flow Time-Based Camshaft Test: Engine is Running Starter is not engaged No DTC Active:	= FALSE = FALSE = FALSE > 3.0 grams/second)) 5VoltReferenceA_FA	Engine Cranking Camshaft Test: Continuous every 100 msec Time-Based Camshaft Test: Continuous every 100 msec	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			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		Fast Event-Based Camshaft Test: Continuous every MEDRES event	
					No DTC Active:	5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensor_FA		
			Slow Event-Based Camshaft Test: The number of camshaft pulses received during 100 engine cycles	= 0	Slow Event-Based Camshaft Test: Crankshaft is synchronized No DTC Active:	5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensor_FA	Slow Event-Based Camshaft Test: 8 failures out of 10 samples Continuous every engine cycle	
Camshaft Position (CMP) Sensor Performance Bank 1 Sensor A	P0341	Determines if a performance fault exists with the cam position bank 1 sensor A signal	Fast Event-Based Camshaft Test: The number of camshaft pulses received during first 12 MEDRES events is less than 4 or greater than 6 (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		
			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	 > 5.00 Volts	20 Failures out of 25 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	 > 5.00 Volts	20 Failures out of 25 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	**> 5.00 Volts**	20 Failures out of 25 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	**> 5.00 Volts**	20 Failures out of 25Samples 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>	 >= 5.5 seconds >= 4.0 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>	 = FALSE = FALSE = FALSE > 3.0 grams/second))	<u>Engine Cranking Camshaft Test:</u> Continuous every 100 msec <u>Time-Based Camshaft Test:</u>	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			Fewer than 4 camshaft pulses received in a time	> 3.0 seconds	Engine is Running Starter is not engaged No DTC Active:	5VoltReferenceA_FA	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	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
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 6 (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
					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	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Catalyst System Low Efficiency Bank 1	P0420	Oxygen Storage	Normalized Ratio OSC Value (EWMA filtered)	< 0.100	***Valid Idle Period Criteria***		1 test attempted per valid idle period Minimum of 1 test per trip Maximum of 8 tests per trip Frequency: Fueling Related : 12.5 ms OSC Measurements: 100 ms Temp Prediction: 1000ms	Type A 1 Trip(s)
		The catalyst washcoat contains Cerium Oxide. Cerium Oxide reacts with NO and O2 during lean A/F excursions to store the excess oxygen (I.e. Cerium Oxidation). During rich A/F excursions, Cerium Oxide reacts with CO and H2 to release this stored oxygen (I.e. Cerium Reduction). This is referred to as the Oxygen Storage Capacity, or OSC. CatMon's strategy is to "measure" the OSC of the catalyst through forced Lean and Rich A/F excursions Normalized Ratio OSC Value Calculation Information and Definitions = 1. Raw OSC Calculation = (post cat O2 Resp time - pre cat O2 Resp time) 2. BestFailing OSC value from a calibration table (based on temp and exhaust gas flow) 3. WorstPassing OSC value (based on temp and exhaust gas flow) Normalized Ratio Calculation = (1-2) / (3-2) A Normalized Ratio of 1 essentially represents a good part and a ratio of 0 essentially represents a very bad part.			Driver must be off the accel pedal. This checks that the final accel pedal position (comprehending deadband and hysteresis) is essentially zero.			
					Vehicle Speed	*< 1.24 MPH*		
					Engine speed	> 1100 RPM for a minimum of 5 seconds since end of last idle period.		
					Engine run time	≥ 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*		
					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*		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Barometric Pressure	> 70 KPA		
					Idle Time before going intrusive is	< 50 Seconds		
					Idle time is incremented if Vehicle speed	< 1.24 MPH and the drivers foot is off accel pedal and the idle speed control system is active as identified in the Valid Idle Period Criteria section.		
					Short Term Fuel Trim	*0.80 < ST FT < 1.30*		
					Predicted catalyst temp > 550 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 **Please see "Closed Loop Enable Criteria" section of the "Supporting Tables" tab for details.**			
					PRNDL is in Drive Range on an Auto Transmission vehicle.			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Idle Stable Criteria :: Must hold true from after Catalyst Idle Conditions Met to the end of test			
					MAF	*1.50 < g/s < 7.00*		
					Predicted catalyst temperature	< 950 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 > 0.490 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			
					This is part of the check for the Catalyst Idle Conditions Met Criteria section			
					The diagnostic will not be enabled until the following has been met:			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Predicted catalyst temperature > 0 ° C for 0 seconds non-continuously. Note: this feature is only enabled when the vehicle is new and cannot be enabled in service			
					PTO Not Active			
					General Enable			
					DTC's Not Set			
					MAF_SensorFA			
					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			
					TPS_Performance_FA			
					EnginePowerLimited			
					VehicleSpeedSensor_FA			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
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	10 % ≤ Percent ≤ 90 % ≥ 600 seconds ≥ 5.0 miles ≥ 70 °C ≥ 70 kPa ≥ 10.0 miles ≤ refer to "P0442: Engine Off Time Before Vehicle Off Maximum as a Function of Estimated Ambient Temperature table" in Supporting Tables. ≥ 17 hours ≥ 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 6 under normal condition s Run length is 3 to 6 trips after code clear or non-volatile reset

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Estimate of Ambient Air Temperature Valid			
			When EWMA is , the DTC light is illuminated.	> 0.54 (EWMA Fail Threshold)	**Conditions for Estimate of Ambient Air Temperature to be valid:**			
		After the volatility check, the vent solenoid will close. After the vent is closed, typically a build up of pressure from the hot soak begins (phase-1). The pressure typically will peak 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	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	≤ 8 °C ≤ 7200 seconds ≤ 7200 seconds Vehicle Speed ≥ 18.6 mph AND Mass Air Flow ≥ 7 g/sec		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		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.			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 AND Must expire maximum value in Estimate of Ambient Temperature Valid Conditioning Time. **Please see "P0442: Estimate of Ambient Temperature Valid Conditioning Time" in Supporting Tables Tab.**	 > 7200 seconds Vehicle Speed ≥ 18.6 mph AND Mass Air Flow ≥ 7 g/sec		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
				Abort Conditions:	**1. High Fuel Volatility** During the volatility phase, pressure in the fuel tank is integrated vs. time. If the integrated pressure is then test aborts and unsuccessful attempts is incremented. OR **2. Vacuum Refueling Detected** See P0454 Fault Code for information on vacuum refueling algorithm. OR **3. Fuel Level Refueling Detected** See P0464 Fault Code for information on fuel level refueling. OR **4. Vacuum Out of Range and No Refueling**	< -5		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					See P0451 Fault Code for information on vacuum sensor out of range and P0464 Fault Code for information on fuel level refueling.			
					OR **5. Vacuum Out of Range and Refueling Detected**			
					See P0451 Fault Code for information on vacuum sensor out of range and P0464 Fault Code for information on fuel level refueling.			
					OR **6. Vent Valve Override Failed**			
					Device control using an off-board tool to control the vent solenoid, cannot exceed during the EONV test	0.50 seconds		
					OR **7. Key up during EONV test**			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					No active DTCs:	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	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		PT Relay Voltage	11 volts ≤ Voltage ≤ 32 volts	20 failures out of 25 samples 250 ms / sample Continuous with solenoid operation	2 trips Type B
Evaporative Emission (EVAP) Vent System Performance	P0446	This DTC will determine if a restriction is present in the vent solenoid, vent filler, vent hose or EVAP canister. This test runs with normal purge and vent valve is open.	Vent Restriction Prep Test: Vented Vacuum OR Vented Vacuum for 60 seconds Vent Restriction Test: Tank Vacuum for 5 seconds BEFORE Purge Volume	 < -623 Pa > 1245 Pa > 2989 Pa ≥ 8 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	Once per Cold Start Time is dependent on driving conditions	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			After setting the DTC for the first time, 2 liters of fuel must be consumed before setting the DTC for the second time.			EnginePowerLimited P0443 P0449 P0452 P0453 P0454	Maximum time before test abort is 1000 seconds	
Evaporative Emission (EVAP) Vent Solenoid Control Circuit (ODM)	P0449	This DTC checks the circuit for electrical integrity during operation. If the P0449 is active, an intrusive test is performed with the vent solenoid commanded closed for 15 seconds.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Run/Crank Voltage Run/Crank voltage goes to 0 volts at key off	11 volts ≤ Voltage ≤ 32 volts	20 failures out of 25 samples 250 ms / sample Continuous with solenoid operation	2 trips Type B
Fuel Tank Pressure (FTP) Sensor Circuit Performance	P0451	The DTC will be set if the fuel tank vacuum sensor is out of range when it tries to re-zero prior to the phase-1 or phase-2 portions of the engine-off natural vacuum small leak test.	The tank vacuum sensor voltage is compared to a window about the nominal sensor voltage offset (~1.5 volts) Upper voltage threshold (voltage addition above the nominal voltage) Lower voltage threshold (voltage subtraction below the nominal voltage)	0.2 volts 0.2 volts	This test will execute whenever the engine-off natural vacuum small leak test (P0442) executes		This test is executed during an engine-off natural vacuum small leak test. The number of times that it executes can range from zero to two per engine-off period.	1 trip Type A EWMA Average run length: 6 Run length is 2 trips after code clear or

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			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.	 > 0.73 (EWMA Fail Threshold) ≤ 0.40 (EWMA Re-Pass Threshold)			The length of the test is determined by the refueling rationality test, which can take up to 600 seconds to complete.	non-volatile reset
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	 is 0.10 seconds	640 failures out of 800 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.
					Stops 6.0 seconds after key-off			
Fuel Tank Pressure (FTP) Sensor Circuit High Voltage	P0453	This DTC will detect a fuel tank pressure sensor signal that is too high out of range.	Fuel tank pressure sensor signal The normal operating range of the fuel 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,	1 trips Type A

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
							which can take up to 600 seconds to 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.	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
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 Passes if tank vacuum Note: Weak Vacuum Follow-up Test can only report a pass.	> 15 liters ≤ 2740 Pa ≥ 2740 Pa	Fuel Level System Voltage BARO Purge Flow No active DTCs: <u>Cold Start Test</u> If ECT > IAT, Startup temperature delta (ECT-IAT): Cold Test Timer Startup IAT Startup ECT <u>Weak Vacuum Follow-up Test</u>	10% ≤ Percent ≤ 90% 11 volts ≤ Voltage ≤ 32 volts ≥ 70 kPa ≥ 2.80 % MAP_SensorFA TPS_FA VehicleSpeedSensor_FA IAT_SensorCircuitFA ECT_Sensor_FA AmbientAirDefault EnginePowerLimited P0443 P0449 P0452 P0453 P0454 ≤ 8 °C ≤ 1000 seconds 4 °C ≤ Temperature ≤ 30 °C ≤ 35 °C	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 follow-up test is limited to 1300 seconds. Once the MIL is on, the follow-up test runs indefinitely.	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					This test can run following a weak vacuum failure or on a hot restart.			
Fuel Level Sensor 1 Performance	P0461	This DTC will detect a fuel sender stuck in range in the primary fuel tank.	Delta Fuel Volume change over an accumulated 149 miles.	< 10 liters	Engine Running No active DTCs:	 VehicleSpeedSensor_FA	250 ms / sample Continuous	2 trips Type B
Fuel Level Sensor 1 Circuit Low Voltage	P0462	This DTC will detect a fuel sender stuck out of range low in the primary fuel tank.	Fuel level Sender % of 5V range	< 10 %	Run/Crank Voltage Run/Crank voltage goes to 0 volts at key off	11 volts ≤ Voltage ≤ 32 volts	100 failures out of 125 samples 100 ms / sample Continuous	2 trips Type B
Fuel Level Sensor 1 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

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

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.				100 ms / sample	
Cooling Fan 1 Relay Control Circuit (ODM)	P0480	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Run/Crank Voltage Engine Speed	11 volts ≤ Voltage ≤ 32 volts ≥ 400 RPM	50 failures out of 63 samples 100 ms / sample Continuous with fan operation	2 trips Type B Not used on systems with Mechanical Fan)
Cooling Fan 2 Relay Control Circuit (ODM)	P0481	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Run/Crank Voltage Engine Speed	11 volts ≤ Voltage ≤ 32 volts ≥ 400 RPM	50 failures out of 63 samples 100 ms / sample Continuous with fan operation	2 trips Type B Not used on systems with Mechanical Fan)

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
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 ≥ 15.0 % 1500 ≤ RPM ≤ 6500 11.0 ≤ Volts ≤ 32.0 not active	≥ 4.5 sec	Type B 2 trips
					EngineTorqueEstInaccurate OR If KeETQC_b_MinTransRemedial = 1 (KeETQC_b_MinTransRemedial = 0)	FALSE Not MAF_SensorTFTKO Not MAP_SensorTFTKO Not EngineMisfireDetected_FA		
					P0503	Not failed this key cycle		
Transmission Output Speed Sensor (TOSS)	P0503	TOSS Signal Intermittent	Loop-to-Loop change in TOSS	≥ 350 RPM	Raw Output Speed Output Speed change Time since transfer case range change Ignition voltage Engine Speed Vehicle Speed PTO	> 200 RPM for ≥ 2.0 sec ≤ 150 RPM for ≥ 2.0 sec ≥ 3.0 sec 11.0 ≤ Volts ≤ 32.0 200 ≤ RPM ≤ 7500 for ≥ 5.0 seconds ≤ 155 MPH for ≥ 5.0 sec not active	≥ 3.3 sec	Type B 2 trips
Low Engine Speed Idle System	P0506	This DTC will determine if a low idle exists	Filtered Engine Speed Error	> 91.00 rpm	Baro	> 70 kPa	Diagnostic runs in every 12.5 ms loop	2 trips Type B
			filter coefficient	0.003	Coolant Temp	> 60 °C and < 120 °C Must verify KfECTI_T_EngCoolHotLoThresh is less than KfECTI_T_EngCoolHotHiThresh	Diagnostic reports pass or fail in 10 seconds once all enable conditions are met	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					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	> 90.00 pct < 15.00 pct		
						PTO not active		
						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		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						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	> 90.00 pct < 15.00 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		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						FuelLevelDataFault		
						LowFuelConditionDiagnostic		
						Clutch Sensor FA		
						AmbPresDfltdStatus		
						P2771		
					All of the above met for Idle time	> 10 sec		
Engine Oil Pressure (EOP) Switch	P0520	When criteria are met that assure no oil pressure should be present, read state of oil pressure switch circuit	State of Engine Oil Pressure (EOP) switch circuit	Detecting.a.ground.will.set.a.fault	Run/Crank powermode active Engine movement detected Key in crank position Power down engine coolant Powertrain relay voltage Run/Crank Ignition voltage	= True = False = False > 80 Deg C >= 11 and <= 32 Volts >= 11 and <= 32 Volts	Fail detected for >= 5.0 Sec.	1 trip(s) Type C
					AND			
					Time since engine last running Timer for time since engine last running validity	> 3600 Seconds = True	250 msec loop Continuous	
					OR			
					Engine coolant at power up	< (Power down engine coolant) minus 10 Deg C		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Diagnostic enabled/ disabled No active DTC's	Enabled Fault bundles: ECT_Sensor_Ckt_FA		
Air Conditioning Refrigerant Pressure Sensor Circuit Low Voltage	P0532	Determines if the Air Conditioning Refrigerant Pressure circuit voltage is too low	(AC Pressure Sensor Voltage) / 5 Volts	< 2.0 percent	AC Pressure Sensor diagnostic enabled	Enabled	120 failures	1 Trip(s) Type C Not "Special Type C"
					AC pressure sensor present	Present	Performed every 25 msec	
Air Conditioning Refrigerant Pressure Sensor Circuit High Voltage	P0533	Determines if the Air Conditioning Refrigerant Pressure circuit voltage is too high	(AC Pressure Sensor Voltage) / 5 Volts	> 98.0 percent	AC Pressure Sensor diagnostic enabled	Enabled	120 failures	1 Trip(s) Type C Not "Special Type C"
					AC pressure sensor present	Present	Performed every 25 msec	
System Voltage Low	P0562	This DTC determines if the current system voltage is below the minimum required voltage for proper ECM operation.	System voltage	≤ 9 volts	Ignition is “ON” Engine Speed	 ≥ 400 RPM	5 failures out of 6 samples 1 second / sample Continuous	1 trip Type C Not "Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
System Voltage High	P0563	This DTC determines if the current system voltage is above the maximum allowed voltage for proper ECM operation.	System voltage	≥ 18 volts	Ignition is “ON”		5 failures out of 6 samples 1 second / sample Continuous	1 trip Type C Not "Special Type C"
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 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 90.000 seconds	Type: C MIL: NO Trips: 1

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Cruise Control Set Circuit	P0568	Detects a failure of the cruise set switch in a continously applied state	Cruise Control Set switch remains applied for greater than a calibratable period of time for architecture where cruise switch states are received over serial data		CAN cruise switch diagnostic enable in ECM	Enabled	fail continuously for greater than 90.000 seconds	Type: C MIL: NO
							fail continuously for greater than 90.000 seconds	Trips: 1
Cruise Control Input Circuit	P0575	Detects rolling count or protection value errors in Cruise Control Switch Status serial data signal	If x of y rolling count / protection value faults occur, disable cruise for duration of fault		Cruise Control Switch Serial Data Error Diagnostic Enable	Enabled	5/10 counts	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	= True = True = True	15 failures out of 30 samples 1 sec/ sample	2 trips Type B
					Above is true and			
					Last Open Circuit Test	= not Indeterminate	Continuous	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
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 Circuit Test	= True = True = True = not Indeterminate	15 failures out of 30 samples 1 sec/ sample Continuous	2 trips Type B
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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			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 programmed.	Output state invalid		PCM State	= crank or run	Diagnostic runs at powerup and once per second continuously after that	Type A 1 trips
						PCM is identified through calibration as a Service PCM		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Control Module Long Term Memory Reset	P0603	Non-volatile memory checksum error at controller power-up	Checksum at power-up does not match checksum at power-down				Diagnostic runs at powerup Diagnostic reports a fault if 1 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)	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		Primary Processor TPU RAM Fault	Indicates that the primary processor is unable to correctly read data from or write data to TPU RAM. Detects data read does not match data written >=	5 counts			Will finish first memory scan within 30 seconds at all engine conditions - diagnostic runs continuously (background loop)	
		Primary Processor Update Dual Store RAM Fault	Indicates that the primary processor detects a mismatch between the data and dual data is found during RAM updates. Detects a mismatch in data and dual data updates >	0.44000 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)	

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		MAIN detected corruption in throttle or pedal critical RAM data	memory and complement memory do not agree				0.19 seconds	
		MAIN Processor Performance Check	1. Software tasks loops > schedule tasks loop 2. 12.5ms task loop sequence does not complete >=	See supporting tables 0.19 seconds		KePISD_b_SeedUpdKeyStorFltEnbl== 1 Value of KePISD_b_SeedUpdKeyStorFltEnbl is: 1. (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	

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		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_CktTest Enbl == 1 Value of KeMEMD_b_RAM_ECC_CktTest Enbl 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	
Starter Relay Control Circuit	P0615	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Run/Crank Voltage Engine Speed	11 volts ≤ Voltage ≤ 32 volts ≥ 0 RPM	8 failures out of 10 samples 250 ms / sample Continuous	1 trip Type C Not "Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Generator 1 L-Terminal Circuit	P0621	Determines if the L-Terminal is shorted to ground (Key_On Test) or shorted to ground or power (Engine_Run Test)	Key-On Test:		Key-On diagnostic enabled	Enabled	>=1 seconds	1 Trip(s)
			L-Terminal shorted to ground for:	>=1 seconds	Engine starter in not active		Performed every 250 msec	Type C
					No CrankSensorFA			Not "Special Type C"
					Power mode is Run/Crank			
					No engine movement is detected (no RPM)			
					No CamSensorFA			
					The previous key cycle was a complete shutdown OR Run/Crank has been active for	>=2 seconds		
			Engine-Run Test:		Engine-Run diagnostic enabled	Enabled	>=15 seconds	
					L-Terminal is enabled			
					No CrankSensorFA			
			L-Terminal shorted to ground or to power for:	> = 15 seconds	Power mode is Run/Crank			
					No CamSensorFA			
					Engine off time			
Generator 1 F-Terminal Circuit	P0622	Determines if the F-Terminal is faulted either during key-on or with engine running	Key-On Test:		Key-On diagnostic enabled	Enabled	>=5 seconds	1 Trip(s)
			Filtered F-Terminal Duty Cycle is	>=65 %	F-Terminal is present	Present	Performed every 50 msec	Type C
			for	>=5 seconds	No crank sensor Fault Active			Not "Special Type C"
					Engine starter in not active			
					No CrankSensorFA			
					Power mode is Run/Crank			
					Regulated Voltage Control is not present	Present		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					No engine movement is detected (no RPM)			
					No CamSensorFA			
			Engine-Run Test:		Engine-Run diagnostic enabled	Enabled	>=30 seconds	
			Filtered F-Terminal Duty Cycle is	<=5 %	F-Terminal is present	Present		
			for	>=30 seconds	L-Terminal is enabled			
					No CrankSensorFA			
					Power mode is Run/Crank			
					No CamSensorFA			
					Engine RPM is	< 1000		
					L-Terminal fault is not active			
Fuel Pump Relay Control Circuit Open	P0627	This DTC checks for an open and shorted high circuit while the device is commanded off.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Run/Crank Voltage Engine Speed	11 volts ≤ Voltage ≤ 32 volts ≥ 0 RPM	8 failures out of 10 samples 250 ms / sample Continuous with device off	2 trips Type B
Fuel Pump Relay Control Circuit Low Voltage	P0628	This DTC checks for a shorted low circuit while the device is commanded on.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Run/Crank Voltage Engine Speed	11 volts ≤ Voltage ≤ 32 volts ≥ 0 RPM	8 failures out of 10 samples 250 ms / sample Continuous with device on	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Fuel Pump Relay Control Circuit High Voltage	P0629	This DTC checks for an open and shorted high circuit while the device is commanded off.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Run/Crank Voltage Engine Speed	11 volts ≤ Voltage ≤ 32 volts ≥ 0 RPM	8 failures out of 10 samples 250 ms / sample Continuous with device off	2 trips Type B
Control Module EEPROM Error	P062F	Indicates that the NVM Error flag has not been cleared	The next write to NVM will not succeed or the assembly calibration integrity check failed.		Ignition State	= unlock/accesory, run, or crank	1 test failure Diagnostic runs once at powerup	Type A 1 trips
VIN Not Programmed 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
Air Conditioning Clutch Relay Control Circuit	P0645	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Run/Crank Voltage Engine Speed	11 volts ≤ Voltage ≤ 32 volts ≥ 400 RPM	20 failures out of 25 samples 250 ms / sample	0 trip Type X Not "Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
							Continuous	
Malfunction Indicator Lamp (MIL) Control Circuit (ODM)	P0650	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Run/Crank Voltage Remote Vehicle Start is not active	11 volts ≤ Voltage ≤ 32 volts	20 failures out of 25 samples 250 ms / sample Continuous	2 trip Type B NO MIL
5 Volt Reference #2 Circuit	P0651	Detects a continuous or intermittent short on th 5 volt reference circuit #2	ECM Vref2 < or ECM Vref2 > 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
Intake Manifold Tuning (IMT) Valve Solenoid Control Circuit Bank 1	P0660	Electrical Integrity of Intake Manifold Tuning (IMT) Valve Control Circuitry	ECM detects that commanded and actual states of output driver do not match		Powertrain Relay Voltage Powertrain Relay Voltage Engine Speed	>= 11.00 Volts <= 32.00 Volts >= 400 RPM	320 failures out of 400 samples 1 sample every 12.5 msec	Type B 2 trips
Powertrain Relay Control (ODM)	P0685	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Run/Crank Voltage	11 volts ≤ Voltage ≤ 32 volts	8 failures out of 10 samples 250 ms / sample Continuous	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Powertrain Relay Feedback Circuit Low	P0689	This DTC is a check to determine if the Powertrain relay is functioning properly.	PT Relay feedback voltage is	≤ 5 volts	Run/Crank Voltage Powertrain relay commanded On No active DTCs:	≥ 11 volts PowertrainRelayStateOn_FA	5 failures out of 6 samples 1 second / sample	1 trips Type C Not "Special Type C"
Powertrain Relay Feedback Circuit High	P0690	This DTC is a check to determine if the Powertrain relay is functioning properly.	High Voltage test When PT relay is commanded On, PT Relay feedback voltage is	Disabled ≥ 18 volts	No active DTCs:	PowertrainRelayStateOn_FA	5 failures out of 6 samples 1 second / sample	2 trips Type B
			Voltage Stuck High test After PT Relay is commanded Off for PT Relay feedback voltage is	Enabled ≥ 2 seconds, > 4 volts	No active DTCs:	PowertrainRelayStateOn_FA	100 ms/ sample Continuous	
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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Fuel Pump Control Module (FPCM) Requested MIL Illumination	P069E	Monitors the FPCM MIL request line to determine when the FPCM has detected a MIL illuminating fault.	Fuel Pump Control Module Emissions-Related DTC set			Time since power-up > 3 seconds	Continuous	Type A 1 trips
5 Volt Reference #4 Circuit	P06A3	Detects a continuous or intermittent short on th 5 volt reference circuit #2	or ECM Vref4 >	5.125		Run/Crank voltage or Powertrain relay voltage > 6.41 and reduced power is false, else the failure will be reported for all conditions	19/39 counts or 0.1875 sec continuous; 12.5 ms/count in main processor	1
			or the difference between ECM filtered Vref3 and Vref3 >	0.05				Type: A MIL: YES
Internal Control Module Knock Sensor Processor 1 Performance	P06B6	This diagnostic checks for a fault with the internal test circuit used only for the '20 kHz' method of the Open Circuit Diagnostic	Gated FFT Diagnostic Output (VaKNKD_k_OpenTestCktIntFilter[0])	> OpenTestThreshLo **and** < OpenTestThreshHi See Supporting Tables	Diagnostic Enabled?	Enabled	First Order Lag Filter with Weight Coefficient	Type: B MIL: YES Trips: 2
					Engine Speed	> 600 RPM and < 4250 RPM		
					Engine Air Flow	≥ 40 mg/cylinder and ≤ 2000 mg/cylinder	Weight Coefficient = 0.0100 Updated each engine event	
					Engine running	≥ 5.0 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
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	> 2 %	N/TOS Ratio	Must match actual gear (i.e. vehicle in gear)	25 ms loop Continuous	1 Trip(s) Type A
					Transfer Case	Not in 4WD Low range		
					vehicle speed	> 1.2 MPH		
					Engine Torque	> **EngTorqueThreshold** Table		
					Clutch Pedal Position	< **ResidualErrEnableLow** Table		
					OR			
					Clutch Pedal Position	> ***ResidualErrEnableHigh*** *Table*		
					No Active DTCs:			
					ClutchPositionSensorCktLo FA ClutchPositionSensorCktHi FA CrankSensorFA Trans Output Shaft Angular Velocity Validity VehicleSpeedSensor_FA			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Clutch Pedal Position Sensor Circuit Low	P0807	Detects Continuous Circuit Out-of-Range Low or Open	Clutch Position Sensor Circuit	< 4 % of Vref	Engine Not Cranking System Voltage	> 9.0 Volts	25 ms loop Continuous	1 Trip(s)
			for	200 counts out of 250 samples				Type A
					No active DTCs:	5VoltReferenceB_FA		
Clutch Pedal Position Sensor Circuit High	P0808	Detects Continuous Circuit Out-of-Range High	Clutch Position Sensor Circuit	> 96 % of Vref	Engine Not Cranking System Voltage	> 9.0 Volts	25 ms loop Continuous	1 Trip(s)
			for	200 counts out of 250 samples				Type A
					No active DTCs:	5VoltReferenceB_FA		
Clutch Pedal Position Not Learned	P080A	Detects Invalid Clutch Pedal Fully Applied Learn Position values	Fully Applied Learn Position	< 9.0 %	OBD Manufacturer Enable Counter	= 0	250 ms loop Continuous	1 Trip(s)
			OR					Type A
			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)	No loss of communication	**All except Class2 PWM:** Count of 2's complement values not equal >= 16 Performed every 12.5 msec	
					Power Mode Engine Running	= Run = True		
			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	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			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, > 1000000 Nm for axle based traction torque system			>= 6 out of 10 samples Performed every 12.5 msec	
Inlet Airflow System Performance (naturally aspirated)	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	<= 500 kPa*(g/s) > 15 grams/sec > 25.0 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 <= 7000 RPM > -7 Deg C < 125 Deg C > -20 Deg C < 125 Deg C >= 0.25 Filtered Throttle Model Error multiplied by TPS Residual Weight Factor based on RPM	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	> 25.0 kPa		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".		
					No Active DTCs:	MAP_SensorCircuitFA EGRValve_FP EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA ECT_Sensor_Ckt_FP IAT_SensorFA IAT_SensorCircuitFP		
Inlet Airflow System Performance (turbocharged)	P1101	Determines if there are multiple air induction problems affecting airflow and/or manifold pressure.	See table "Turbocharger Intake Flow Rationality Diagnostic Failure Matrix" for combinations of model failures that can set this DTC.		Engine Speed Engine Speed Coolant Temp Coolant Temp Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together)	>= 400 RPM <= 6000 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
			MAF model fails when			>= 0.50		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			ABS(Measured Flow – Modeled Air Flow) Filtered	> 16 grams/sec		Modeled Air Flow Error multiplied by MAF Residual Weight Factor based on RPM and MAF Residual Weight Factor Based on MAF Est		
			MAP1 model fails when					
			ABS(Measured MAP – MAP Model 1) Filtered	> 20.0 kPa		MAP Model 1 Error multiplied by MAP1 Residual Weight Factor based on RPM		
			MAP2 model fails when					
			ABS(Measured MAP – MAP Model 2) Filtered	> 25.0 kPa		MAP Model 2 Error multiplied by MAP2 Residual Weight Factor based on RPM		
			MAP3 model fails when					
			ABS(Measured MAP – MAP Model 3) Filtered	> 25.0 kPa		MAP Model 3 Error multiplied by MAP Residual Weight Factor based on RPM		
			TIAP1 model fails when					
			ABS(Measured TIAP – TIAP Model 1) Filtered	> 25.0 kPa		TIAP Model 1 Error multiplied by TIAP Residual Weight Factor based on RPM		
			TPS model fails when					
			Filtered Throttle Model Error	> 250 kPa*(g/s)		Filtered Throttle Model Error multiplied by TPS Residual Weight Factor based on RPM		
			TIAP Correlation model fails when			See table "IFRD Residual Weighting Factors".		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			High Engine Air Flow is TRUE AND Measured TIAP - measured MAP - offset as a function of engine speed See table "TIAP-MAP Correlation Offset" OR Low Engine Air Flow is TRUE AND Measured TIAP - measured Baro - offset as a function of engine speed See table "TIAP-Baro Correlation Offset" TIAP Correlation is valid when High Engine Air Flow has been TRUE for a period of time OR High Engine Air Flow has been TRUE for a period of time High Engine Air Flow is TRUE when Mass Air Flow	> 25.0 kPa > 25.0 kPa > 2.0 seconds > 2.0 seconds > a threshold in gm/sec as a function of engine speed	No Active DTCs:	MAP_SensorCircuitFA EGRValve_FP EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA ECT_Sensor_Ckt_FP IAT_SensorFA IAT_SensorCircuitFP IAT2_SensorFA IAT2_SensorCircuitFP TC_BoostPresSnsrCktFA AmbientAirDefault		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
				See table "TIAP-MAP Correlation Min Air Flow"				
			AND Manifold Pressure	> a threshold in kPa as a function of engine speed				
				See table "TIAP-MAP Correlation Min MAP"				
			AND Filtered Mass Air Flow - Mass Air Flow	< 2.0 gm/sec				
			Low Engine Air Flow is TRUE when Mass Air Flow	< a threshold in gm/sec as a function of engine speed				
				See table "TIAP-Baro Correlation Max Air Flow"				
			AND Manifold Pressure	< a threshold in kPa as a function of engine speed				
				See table "TIAP-Baro Correlation Max MAP"				
			AND Mass Air Flow - Filtered Mass Air Flow	< 2.0 gm/sec				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Intake Air Temperature Sensor 3 Circuit Performance (applications with humidity sensor and manifold temperature sensor)	P112B	Detects an IAT3 sensor that has stuck in range by comparing to IAT and IAT2 at startup	ABS(Power Up IAT - Power Up IAT2) AND ABS(Power Up IAT - Power Up IAT3) AND ABS(Power Up IAT2 - Power Up IAT3)	<= 25 deg C > 25 deg C > 25 deg C	Time between current ignition cycle and the last time the engine was running Powertrain Relay Voltage for a time No Active DTCs:	> 28,800 seconds >= 11.00 Volts >= 0.9 seconds PowertrainRelayFault ECT_Sensor_Ckt_FA IAT_SensorCircuitFA MnfdTempSensorCktFA HumTempSnsrCktFA	Executes once at the beginning of each ignition cycle if enable conditions are met	Type B 2 trips
			Power Up IAT is between Power Up IAT2 and Power Up IAT3 AND ABS(Power Up IAT2 - Power Up IAT3) AND ABS(Power Up IAT - Power Up IAT3) > ABS(Power Up IAT - Power Up IAT2)	> 25Deg C	Time between current ignition cycle and the last time the engine was running Powertrain Relay Voltage for a time No Active DTCs:	> 28,800 seconds >= 11.00 Volts >= 0.9 seconds PowertrainRelayFault ECT_Sensor_Ckt_FA IAT_SensorCircuitFA MnfdTempSensorCktFA HumTempSnsrCktFA	Executes once at the beginning of each ignition cycle if enable conditions are met	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			Power Up IAT2 is between Power Up IAT and Power Up IAT3 AND ABS(Power Up IAT - Power Up IAT3) AND ABS(Power Up IAT2 - Power Up IAT3) > ABS(Power Up IAT2 - Power Up IAT)	 > 25Deg C	Time between current ignition cycle and the last time the engine was running Powertrain Relay Voltage for a time No Active DTCs:	 > 28,800 seconds >= 11.00 Volts >= 0.9 seconds PowertrainRelayFault ECT_Sensor_Ckt_FA IAT_SensorCircuitFA MnfdTempSensorCktFA HumTempSnsrCktFA	Executes once at the beginning of each ignition cycle if enable conditions are met	
Intake Air Temperature Sensor Circuit 3 Low (applications with manifold temperature and humidity)	P112C	Detects a continuous short to ground in the IAT 3 signal circuit or the IAT 3 sensor	Raw IAT 3 Input	< 49 Ohms (~150 deg C)	Engine Run Time	> 0.00 seconds	40 failures out of 50 samples 1 sample every 100 msec	Type B 2 trips
Intake Air Temperature Sensor Circuit 3 High (applications with manifold temperature and humidity)	P112D	Detects a continuous open circuit in the IAT 3 signal circuit or the IAT 3 sensor	Raw IAT 3 Input	> 169,523 Ohms (~-60 deg C)	Engine Run Time	> 0.00 seconds	40 failures out of 50 samples 1 sample every 100 msec	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Humidity Sensor Circuit Low	P11C2	Detects a continuous short to power in the Humidity Sensor circuit	Humidity Duty Cycle	<= 5.0%	Powertrain Relay Voltage for a time No Active DTCs:	 >= 11.00 Volts >= 0.9 seconds PowertrainRelayFault	40 failures out of 50 samples 1 sample every 100 msec	Type B 2 trips
Humidity Sensor Circuit High	P11C3	Detects a continuous open or short to low in the Humidity Sensor circuit	Humidity Duty Cycle	>= 95.0%	Powertrain Relay Voltage for a time No Active DTCs:	 >= 11.00 Volts >= 0.9 seconds PowertrainRelayFault	40 failures out of 50 samples 1 sample every 100 msec	Type B 2 trips
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) > 6.50 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 10 seconds of accumulated qualified data.	Type A 1 Trip(s)

Catalyst Temperature	< 300.00 degC
AND	
Engine Coolant	> -10.00 degC

The Cold Start Emission Reduction strategy must not be exiting. The strategy will exit per the following:

Catalyst Temperature	>= 700.00 degC
AND	
Engine Run Time	>= 30.00 seconds
OR	
Engine Run Time	> 80.00 seconds
OR	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Engine Coolant	>= 40.00 degC		
					Other Enable Criteria			
					Vehicle Speed	< 1.24 MPH		
					Driver must be off the accel pedal. This checks that the final accel pedal position (comprehending deadband and hysteresis) is essentially zero.			
					A change in throttle position (tip-in/tip-out) will initiate a delay in the calculation of the average qualified residual value. When the			
					OBD Manufacturer Enable Counter	0		
					Pedal Close Delay Timer	> 5.00 seconds		
					the diagnostic will continue the calculation.			
					Clutch Pedal Top of Travel Achieved and Clutch Pedal Bottom of Travel Achieved. **Refer to the "Clutch Pedal Top of Travel Achieved criteria"** and **"Clutch Pedal Bottom of Travel Achieved criteria"** section of the "Supporting Tables" tab criteria			
					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			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					IAC_SystemRPM_FA			
					IgnitionOutputDriver_FA			
					P050A (ColdStrt_IAC_SysPerf)			
					P050B (ColdStrtIgnTmngPerf)			
					TPS_FA			
					VehicleSpeedSensor_FA			
					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	16 protect errors out of 10 samples		
					# of Alive Rolling Errors	5 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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
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	59.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Cylinders active greater than commanded AFM apps only Does not apply to E83	1 cylinder		Engine speed greater than 0rpm and less than 3200rpm	Up/down timer 2048 ms continuous, 0.5 down time multipier	Not used Series 11
			Difference between Cruise Axle Torque Arbitrated Request and Cruise Axle Torque Request exceeds threshold	221.05 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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			Engine min capacity above threshold	60.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 138 ms continuous, 0.5 down time multipier	
			No fast unmanaged retarded spark above the applied spark plus the threshold	Table, f(Erpm). See supporting tables		Engine speed greater than 0rpm	Up/down timer 128 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 228 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 1052 RPM		Engine speed greater than 0 RPM	Up/down timer 128 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	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			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 438 ms continuous, 0.5 down time multipier	
			Desired throttle position greater than redundant calculation plus threshold	9.32 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	1.88 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	60.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Desired filtered throttle torque exceeds the threshold plus the higher of desired throttle torque or modeled throttle torque	60.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			Torque feedback proportional term is out of allowable range or its dual store copy does not match	High Threshold 30.00 Nm Low Threshold -30.00 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 56.25 Nm Low Threshold -60.00 Nm Rate of change threshold 3.75 Nm/loop		Ignition in unlock/accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Difference of Final Torque feedback proportional plus integral term and its redundant calculation is out of bounds given by threshold range	High Threshold 60.00 Nm Low Threshold -60.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Difference of torque desired throttle area and its redundant calculation is out of bounds given by threshold range	High Threshold 0.50% Low Threshold -0.50%		Ignition in unlock/accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Difference of torque model coefficients and its redundant calculation is out of bounds given by threshold range	High Threshold 0.0002110 Low Threshold -0.0002110		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 60.00Nm Low Threshold -60.00Nm		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.
			Accessory drive friction torque is out of bounds given by threshold range	High Threshold 60.00 Nm Low Threshold 0.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			AC friction torque is greater than commanded by AC control software or less than threshold limit	High Threshold 40.00 Nm Low Threshold 0.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Difference of Oil temperature delta friction torque and its redundant calculation is out of bounds given by threshold range	High Threshold 60.00 Nm Low Threshold -60.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 2048 ms continuous, 0.5 down time multipier	Not used Series 11
			Generator friction torque is out of bounds given by threshold range	High Threshold 60.00 Nm Low Threshold 0.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Supercharger friction torque is out of bounds given by threshold range	High Threshold 60.00 Nm Low Threshold 0.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			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 60.00 Nm Low Threshold -60.00 Nm Rate of change threshold 3.75 Nm/loop		Engine speed >0rpm MAF, MAP and Baro DTCs are false	Up/down timer 475 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			Torque error compensation is out of bounds given by threshold range	High Threshold 60.00 Nm Low Threshold 0.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Delta Torque Baro compensation is out of bounds given by threshold range	High Threshold 5.30 Nm Low Threshold -2.19 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 redundant calculation exeed threshold 3) Rate of change of reserve torque exceeds threshold, increasing direction only 4) Reserve engine torque above allowable capacity threshold	1) 59.00 Nm 2) NA 3) 59.00 Nm 4) 59.00 Nm		1&2) Torque reserve (condition when spark control greater than optimum to allow fast transitions for torque disturbances) > 60.00 Nm 3&4) 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	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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			Absolute difference of the calculated spark offset for equivalence ratio and its redundant calculation greater than threshold	13.38 degrees		Engine speed >0rpm	Up/down timer 128 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 128 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 down time multipier	
			Predicted torque for zero pedal determination is greater than calc'ed limit.	Table, f(Engine, Oil Temp). See supporting tables + 60.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Commanded Predicted Axle Torque and its dual store do not match	1 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			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	13.38 degrees		Ignition in unlock/accessory, run or crank	Up/down timer 128 ms continuous, 0.5 down time multipier	
			Difference of commanded spark advance and adjusted delivered is out of bounds given by threshold range	13.38 degrees		Engine speed >0rpm	Up/down timer 128 ms continuous, 0.5 down time multipier	
			Estimated Engine Torque and its dual store do not match	60.00 Nm		Engine speed >0rpm	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Estimated Engine Torque without reductions due to torque control and its dual store are not match	60.00 Nm		Engine speed >0rpm	Up/down timer 475 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			Difference of desired spark advance for managed torque and its redundant calculation is out of bounds given by threshold range	13.38 degrees		Torque reserve (condition when spark control greater than optimum to allow fast transitions for torque disturbances) > 60.00 Nm	Up/down timer 428 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	60.00 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 > 500rpm	Up/down timer 428 ms continuous, 0.5 down time multipier	
			Rate limited cruise axle torque request and its dual store do not match	221.05 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	1768.40 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	
			Preload Throttle Area is greater than its redundant calculation by threshold AFM apps only	10.00%		Engine speed >0rpm	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.
			Does not apply to E83					
			Preload timer and its redundant calculation do not equal AFM apps only Does not apply to E83	NA		Ignition in unlock/accessory, run or crank	Up/down timer 2048 ms continuous, 0.5 down time multipier	Not used Series 11
			Preload Throttle Area and its dual store do not equal AFM apps only Does not apply to E83	NA		Ignition in unlock/accessory, run or crank	Up/down timer 2048 ms continuous, 0.5 down time multipier	Not used Series 11
			Commanded engine torque due to fast actuators and its dual store do not equal	NA		Ignition in unlock/accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Commanded engine torque due to slow actuators and its dual store do not equal	NA		Ignition in unlock/accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Arbitrated Air-Per-Cylinder filter coefficient is out of bounds given by threshold range	High Threshold 1.000 Low Threshold 0.074		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.
			Launch spark is active but the launch spark redundant path indicates it should not be active	NA		Engine speed < 7800.00 or 7900.00 rpm (hysteresis pair)	Up/down timer 128 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	
			transfer case neutral request from four wheel drive logic does not match with operating conditions FWD Apps only	NA		Ignition in unlock/accessory, run or crank Transfer case range valid and not over-ridden	32/6 counts; 25.0msec/count	
			transfer case neutral and its dual store do not equal FWD Apps only	NA		Ignition in unlock/accessory, run or crank	255/6 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	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			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	
			Cylinders active greater than commanded	2 cylinders		Engine run flag = TRUE > 2.00s Number of cylinder events since engine run > 24 No fuel injector faults active	Up/down timer 128 ms continuous, 0.5 down time multipier	
			Absolute difference of Friction torque and its redundant calculation is out of bounds given by threshold range	60.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Absolute difference of Accessory torque and its redundant calculation is out of bounds given by threshold range	60.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Absolute difference of Filtered Air-per-cylinder and its redundant calculation is out of bounds given by threshold range	112.54 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	13.38 degrees		Engine speed >0rpm	Up/down timer 128 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 Area calculated does not equal its redundant calculation	N/A		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Equivance Ratio torque compensation exceeds threshold	-60.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Absolute difference between Equivance Ratio torque compensation and its dual store out of bounds given bt threshold	60.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Commanded Predicted Engine Torque and its dual store do not match	N/A		Ignition in unlock/accessory, run or crank	Up/down timer 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 1768.40 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 1768.40 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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			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 threshold	80.00 mg		Engine speed >500rpm	Up/down timer 428 ms continuous, 0.5 down time multipier	
			Difference between Unmanaged Spark and PACS Spark is greater than threshold	13.38 degrees		Ignition in unlock/accessory, run or crank	Up/down timer 2048 ms continuous, 0.5 down time multipier	Not used Series 11
			Predicted torque for uncorrected zero pedal determination is greater than calc'ed limit.	Table, f(Engine, Oil Temp). See supporting tables + 60.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Idle speed control calculated predicted minimum torque request exceeds calculated torque limit	Table, f(Engine, Oil Temp). See supporting tables + 60.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Idle speed control calculated predicted minimum torque without reserves exceeds calculated torque limit	Table, f(Engine, Oil Temp). See supporting tables + 60.00 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.
			Difference between Driver Requested Immediate Torque primary path and its secondary exceeds threshold	1768.40 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 2048 ms continuous, 0.5 down time multipier	Not used Series 11
			PTO Torque Request exceeds allowed rate limited PRO Torque Request Does not apply to E83	500.00 Nm/25ms		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 128 ms continuous, 0.5 down time multipier	
			Engine Speed Lores Intake Firing timing (event based) calculation does not equal its redundant calculation	N/A		Engine speed greater than 0rpm	Up/down timer 128 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	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			1. Driver Predicted Request is greater than its redundant calculation plus threshold 2. Driver Predicted Request is less than its redundant calculation minus threshold	1768.40 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	1768.40 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 redundant calculation minus threshold	1768.40 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 2048 ms continuous, 0.5 down time multipier	Not used Series 11
			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	60.00 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 Predicted Engine Request is greater than its redundant calculation plus threshold	60.00 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
			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	59.00 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.
			Engine Immediate Request Without Motor is greater than its redundant calculation plus threshold	59.00 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	60.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Engine Capacity Minimum Immediate Without Motor is greater than its dual store plus threshold	60.00 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	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			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
			Regeneration Brake Assist is not within a specified range Does not apply to E83	Brake Regen Assist < 0 Nm or Brake Regen Assist > 1000.00 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	13.38 degrees		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			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	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Intake Manifold Tuning (IMT) Valve Stuck Open	P2070	Detects an Intake Manifold Tuning Valve that is stuck in the open position	Time after the close command without the Intake Manifold Tuning Valve reaching the closed position	>= 5.00 seconds	Intake Manifold Tuning Valve is commanded closed No Active DTCs:	 P0660 P2077 P2078	320 failures out of 400 samples 1 sample every 12.5 msec	Type B 2 trips
Intake Manifold Tuning (IMT) Valve Stuck Closed	P2071	Detects an Intake Manifold Tuning Valve that is stuck in the closed position	Time after the open command without the Intake Manifold Tuning Valve reaching the open position	>= 5.00 seconds	Intake Manifold Tuning Valve is commanded closed No Active DTCs:	 P0660 P2077 P2078	320 failures out of 400 samples 1 sample every 12.5 msec	Type B 2 trips
Intake Manifold Tuning (IMT) Valve Position Sensor/ Switch Circuit Range/ Performance	P2076	Detects an Intake Manifold Tuning Valve Actuator that has initiated its learn sequence for too long a period of time, or too many times per ignition cycle	Valve Position AND Valve Position for a time period greater than OR Valve Position AND Valve Position for a time period greater than for	>= 5.0% <= 35.0% >= 5.0 seconds >= 5.0% <= 35.0% >= 0.2 seconds >= 10 times in one ignition cycle	Powertrain Relay Voltage Powertrain Relay Voltage Engine Run Time	>= 11.00 Volts <= 999.00 Volts >= 1.0 seconds	Executes every 12.5 msec	Type B 2 trips
Intake Manifold Tuning (IMT) Valve Position Sensor/ Switch Circuit Low	P2077	Detects a continuous open or short to low in the Intake Manifold Tuning Valve Position Sensor circuit	Valve Position	>= 95.0%	Continuous		320 failures out of 400 samples 1 sample every 12.5 msec	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Intake Manifold Tuning (IMT) Valve Position Sensor/ Switch Circuit High	P2078	Detects a continuous short to high in the Intake Manifold Tuning Valve Position Sensor circuit	Valve Position	<= 5.0%	Continuous		320 failures out of 400 samples 1 sample every 12.5 msec	Type B 2 trips
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 50.0 seconds is reached. Evaluation will then start again.	> 35.0 seconds during a 50.0 second sample period.	The following must be true for:	> 1.0 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 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 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.
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 50.0 seconds is reached. Evaluation will then start again.	> 35.0 seconds during a 50.0 second sample period.	The following must be true for:	> 1.0 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**		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Control Module Throttle Actuator Position Performance	P2101	1) Detect a throttle positioning error	Difference between measured throttle position and modeled throttle position >	9.32 percent	TPS minimum learn is not active and Throttle is being Controlled and (Engine Running or Ignition Voltage > or Ignition Voltage >)	Run/crank voltage or Powertrain relay voltage > 6.41 and reduced power is false, else the failure will be reported for all conditions	1. 15 counts; 12.5 ms/count in the primary processor	Trips: 1 Type: A MIL: YES
					11			
			Difference between modeled throttle position and measured throttle position >	9.32 percent	Ignition voltage failure is false (P1682)	5.5		
		2) Detect throttle control is driving the throttle in the incorrect direction or exceed the reduced power limit	Throttle Position >	38.37 percent	TPS minimum learn is active		2. 11 counts; 12.5 ms/count in the primary processor	
			Throttle Position >	37.37 percent	Reduced Power is True			
					Powertrain relay voltage	> 6.41 Volts		
Throttle return to default	P2119	Throttle unable to return to default throttle position after de-energizing ETC motor.	TPS1 Voltage > AND TPS2 Voltage >	1.647 1.757	Throttle de-energized	Run/Crank voltage or Powertrain relay voltage > 6.41 and reduced power is false, else the failure will be reported for all conditions	0.4969 sec	Trips: 1 Type: C MIL: NO
					No TPS circuit faults			
						No 5V reference error or fault for # 4 5V reference circuit (P06A3)		
					PT Relay Voltage >	5.5		
Accelerator Pedal Position (APP) Sensor 1 Lo	P2122	Detect a continuous or intermittent short or open in the APP sensor #1 on Main processor	APP1 Voltage <	0.463		Run/Crank voltage or Powertrain relay voltage > 6.41 and reduced power is false, else the failure will be reported for all conditions	19/39 counts or 14 counts continuous; 12.5 ms/count in the main processor	Trips: 1 Type: A MIL: YES
						No 5V reference error or fault for		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						# 4 5V reference circuit (P06A3)		
Accelerator Pedal Position (APP) Sensor 1 Hi	P2123	Detect a continuous or intermittent short or open in the APP sensor #1 on Main processor	APP1 Voltage >	4.75		Run/Crank voltage or Powertrain relay voltage > 6.41 and reduced power is false, else the failure will be reported for all conditions No 5V reference error or fault for # 4 5V reference circuit (P06A3)	19/39 counts or 14 counts continuous; 12.5 ms/count in the main processor	Trips: 1 Type: A MIL: YES
Accelerator Pedal Position (APP) Sensor 2 Lo	P2127	Detect a continuous or intermittent short or open in the APP sensor #2 on Main processor	APP2 Voltage <	0.325		Run/Crank voltage or Powertrain relay voltage > 6.41 and reduced power is false, else the failure will be reported for all conditions No 5V reference error or fault for # 4 5V reference circuit (P0697)	19/39 counts or 14 counts continuous; 12.5 ms/count in the main processor	Trips: 1 Type: A MIL: YES
Accelerator Pedal Position (APP) Sensor 2 Hi	P2128	Detect a continuous or intermittent short or open in the APP sensor #2 on Main processor	APP2 Voltage >	2.6		Run/Crank voltage or Powertrain relay voltage > 6.41 and reduced power is false, else the failure will be reported for all conditions No 5V reference error or fault for # 4 5V reference circuit (P0697)	19/39 counts or 14 counts continuous; 12.5 ms/count in the main processor	Trips: 1 Type: A MIL: YES
Throttle Position (TP) Sensor 1-2 Correlation	P2135	1. Detects a continuous or intermittent correlation fault between TPS sensors #1 and #2 on Main processor	1. Difference between TPS1 displaced and TPS2 displaced >	1. 7.022% offset at min. throttle position with a linear threshold to 9.622% at max. throttle position		Run/Crank voltage or Powertrain relay voltage > 6.41 and reduced power is false, else the failure will be reported for all conditions	1 & 2: 79/159 counts or 58 counts continuous; 3.125 ms/count in the main processor	Trips: 1 Type: A MIL: YES

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			2. Difference between (normalized min TPS1) and (normalized min TPS2) >	2. 5.000 % Vref		No TPS sensor faults (P0122, P0123, P0222, P0223) No 5V reference error or fault for # 4 5V reference circuit (P06A3)		
Accelerator Pedal Position (APP) Sensor 1-2 Correlation	P2138	Detects a continuous or intermittent correlation fault between APP sensors #1 and #2 on Main processor	1. Difference between APP1 displaced and APP2 displaced >	1. 10.001% offset at min. pedal position with a linear threshold to 10.001% at max. pedal position		Run/Crank voltage or Powertrain relay voltage > 6.41 and reduced power is false, else the failure will be reported for all conditions	1 & 2: 19/39 counts intermittent or 15 counts continuous, 12.5 ms/count in the main processor	Trips: 1 Type: A MIL: YES
			2. Difference between (normalized min APP1) and (normalized min APP2) >	2. 5.000% Vref		No APP sensor faults (P2122, P2123,P2127, P2128) No 5V reference errors or faulst for # 3 & # 4 5V reference circuits (P06A3, P0697)		
Minimum Throttle Position Not Learned	P2176	TP sensors were not in the minmum learn window after multiple attempts to learn the minimum.	During TPS min learn on the Main processor, TPS Voltage >	0.955		Run/crank voltage or Powertrain relay voltage > 6.41 and reduced power is false, else the failure will be reported for all conditions	2.0 secs	Trips: 1 Type: A MIL: YES
			Number of learn attempts >	10 counts				
Cooling System Performance	P2181	This DTC detects thermostat malfunction (i.e. stuck open)	Engine Coolant Temp (ECT) is ≤ commanded temperature minus 11 Deg C and normalized ratio is ≤ than 1. When above is present for more than 0 seconds, fail counts start.		No Active DTC's Engine not run time Engine run time	MAF_SensorFA IAT_SensorFA THMR_RCT_Sensor_Ckt_FA THMR_ECT_Sensor_Ckt_FA ≥ 7200 seconds 120 ≤ Time ≤ 1400 seconds	225 failures out of 280 samples 1 sec/ sample Once per ignition key cycle	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			Engine total airgrams is accumulated when 11 ≤ AirFlow ≤ 100 grams per second.		Fuel Condition ECT at Power Up IAT min T-Stat Heater duty cycle commanded Airflow	Ethanol ≤ 100% -20.0 ≤ ECT ≤ 45.0 °C -7°C ≤ IAT ≤ 60°C. ≤ 10 % 11.0 ≤ Airflow ≤ 100.0 GPS		
			Ratio Definition: Current temp difference between ECT and RCT minus PwrUp difference divided by total airgrams. Note: Minimum total airgrams is 500.0 grams.					
Barometric Pressure (BARO) Sensor Performance (turbocharged)	P2227	Compares baro sensor to the calculated baro estimate (part throttle calculation or unthrottled MAP)	Difference between baro sensor reading and estimated baro when distance since last estimated baro update OR Difference between baro sensor reading and estimated baro when distance since last estimated baro update Engine Not Rotating	> 15.0 kPa <= 0.06 miles > 20.0 kPa > 0.06 miles	No Active DTCs: Engine Run Time	AmbientAirPressCktFA ECT_Sensor_Ckt_FA IAT_SensorFA MAF_SensorFA AfterThrottlePressureFA TPS_FA TPS_Performance_FA VehicleSpeedSensor_FA > 0.00 seconds	320 failures out of 400 samples 1 sample every 12.5 msec	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			Case: Barometric Pressure OR Barometric 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 SCIAP_SensorFA AAP2_SnsrFA MAP_SensorCircuitFP AAP_SnsrCktFP SCIAP_SensorCircuitFP AAP2_SnsrCktFP	4 failures out of 5 samples 1 sample every 12.5 msec	
Barometric Pressure (BARO) Sensor Circuit Low	P2228	Detects a continuous short to low or open in either the signal circuit or the BARO sensor.	BARO Voltage	< 40.0 % of 5 Volt Range (2.0 Volts = 42.6 kPa)	Engine Run Time	> 0.00 seconds	80 failures out of 100 samples 1 sample every 12.5 msec	Type B 2 trips
Barometric Pressure (BARO) Sensor Circuit High (boosted applications)	P2229	Detects an open sensor ground or continuous short to high in either the signal circuit or the BARO sensor.	BARO Voltage	> 90.0 % of 5 Volt Range (3.0 Volts = 61.4 kPa)	Engine Run Time	> 0.00 seconds	80 failures out of 100 samples 1 sample every 12.5 msec	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Barometric Pressure (BARO) Sensor Circuit Intermittent (boosted applications)	P2230	Detects a noisy or erratic barometric pressure input	String Length Where: "String Length" = sum of "Diff" calculated over And where: "Diff" = ABS(current BARO reading - BARO reading from 12.5 milliseconds previous)	> 99,999,936 kPa 5 consecutive BARO samples	No Active DTCs:	AmbientAirPressCktFA ECT_Sensor_FA IAT_SensorFA MAF_SensorFA AfterThrottlePressure_NA TPS_FA TPS_Performance_FA VehicleSpeedSensorError	10 failures out of 20 samples	Type B 2 trips
Turbo/Super Charger Bypass Valve - Mechanical Turbocharger with wastegate. Not supercharger with mechanical compressor	P2261	Detect Stuck Closed Bypass Valve	Accumulation time is high pass filtered. Accumulated air mass flow or boost pressure larger then thresholds Filter Frequency Filtered Air Mass Flow Filtered Boost Pressure	0.25 Second < Accumulation time < 0.85 Second 12.00 Hz > 50.000 g/s > 40.00 kPa	Diagnosis Enabled Engine Speed Pressure ratio over the compressor Relative Boost Pressure (Boost - Ambient) and Negative Transient in Manifold Air Pressure Bypass Valve Commanded Opened No Active DTCs:	Disabled >= 1800 rpm > KtBSTD_r_ExcsvBstPresLim Enable condition kept true for 1.5 seconds extra See Tables in Supporting Tables Sheet IF (RelativeBoost < 3.0 kPa OR DerivativeMAP > 50.00 kPa/s) [FALSE] Else (RelativeBoost >= 40.0 kPa AND DerivativeMAP <= -150.00 kPa) [TRUE] > 6.0 percent Enable condition kept true for 0.70 seconds extra TC_BoostPresSnsrFA MAF_SensorFA BSTR_b_TurboBypassCktFA	5 Failed tests out of 5 Tests 1 sample every 25ms	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
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	< 260 mvolts > 60 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 Closed Loop Active Evap Ethanol Post fuel cell EGR Intrusive diagnostic	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 < 32.0 = Not Valid = Not Valid, See definition of **Green Sensor Delay Criteria (B1S2)** in Supporting Tables tab. = False 1400 ≤ RPM ≤ 3500 1350 ≤ RPM ≤ 3650 2 ≤ gps ≤ 20 28.0 ≤ MPH ≤ 77.7 24.9 ≤ MPH ≤ 80.8 mph 0.92 ≤ C/L Int ≤ 1.08 = TRUE not in control of purge not in estimate mode = enabled = not active	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.
					All post sensor heater delays	= not active		
					O2S Heater on Time	≥ 40.0 sec		
					Predicted Catalyst temp	550 ≤ ºC ≤ 900		
					Fuel State	= DFCO possible		
					All of the above met for at least 1.5 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	> 100 mvolts	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.	2 trips Type B
			AND		B1S2 Failed this key cycle	P013A, P013B, P013E, P013F or P2270		
			The Accumulated mass air flow monitored during the Stuck Rich Voltage Test	> 30 grams	System Voltage	10.0 < Volts < 32.0		
					ICAT MAT Burnoff delay	= Not Valid		
					Green O2S Condition	= Not Valid, See definition of **Green Sensor Delay Criteria (B1S2)** in Supporting Tables tab.		
					Low Fuel Condition Diag	= False		
					Engine Speed	1400 ≤ RPM ≤ 3500		
					Engine Airflow	2 ≤ gps ≤ 20		
					Vehicle Speed	28.0 ≤ MPH ≤ 77.7		
					Closed loop integral	0.92 ≤ 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		
					Power Take Off	= not active		
					EGR Intrusive diagnostic	= not active		
					All post sensor heater delays	= not active		
					O2S Heater on Time	≥ 40.0 sec		
					Predicted Catalyst temp	550 ≤ 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).			
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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			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	> 450 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			>= 4 multi-transitions out of 5 samples. Performed every 200 msec	
ECM/PCM Internal Engine Off Timer Performance	P2610	This DTC determines if the engine mode not running timer does not initialize or count properly. There are two tests to ensure proper functioning of the timer: Count Up Test (CUT) and Range Test (RaTe).	**Count Up Test:** Time difference between the current read and the previous read of the Timer	> 1.50 seconds	IAT Temperature No active DTCs: **Count Up Test:** Ignition key off OR Engine off	-256 °C ≤ Temperature ≤ 256 °C IAT_SensorFA	**Count Up Test:** 4 failures out of 20 samples 1 sec / sample Continuous from key off or engine off until controller shutdown.	2 trips Type B DTC sets on next key cycle if failure detected.
			Range Test: The variation of the HWIO timer and mirror timer is at controller shutdown.	> 25 %	**Range Test:** ECM is powering down			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		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:** One time when the controller is powered down.	
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.	1 Trip(s)
					Power mode is RUN			Type A
					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 Fuel Pump Control Module	U0109	This DTC monitors for a loss of communication with the fuel pump control module	Message is not received from controller for this 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			

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

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

12 OBDG02 Engine Diagnostics

ECM Supporting Tables

	-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	10.0000	10.0000	10.0000	8.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
800	10.0000	10.0000	10.0000	8.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
1200	10.0000	10.0000	10.0000	8.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
1600	10.0000	10.0000	10.0000	8.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
2000	10.0000	10.0000	10.0000	8.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
2400	10.0000	10.0000	10.0000	8.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
2800	10.0000	10.0000	10.0000	8.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
3200	10.0000	10.0000	10.0000	8.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
3600	10.0000	10.0000	10.0000	8.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
4000	10.0000	10.0000	10.0000	8.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
4400	10.0000	10.0000	10.0000	8.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
4800	10.0000	10.0000	10.0000	8.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
5200	10.0000	10.0000	10.0000	8.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
5600	10.0000	10.0000	10.0000	8.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
6000	10.0000	10.0000	10.0000	8.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
6400	10.0000	10.0000	10.0000	8.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
6800	10.0000	10.0000	10.0000	8.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000

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	10.0000	10.0000	10.0000	8.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
800	10.0000	10.0000	10.0000	8.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
1200	10.0000	10.0000	10.0000	8.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
1600	10.0000	10.0000	10.0000	8.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
2000	10.0000	10.0000	10.0000	8.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
2400	10.0000	10.0000	10.0000	8.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
2800	10.0000	10.0000	10.0000	8.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
3200	10.0000	10.0000	10.0000	8.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
3600	10.0000	10.0000	10.0000	8.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
4000	10.0000	10.0000	10.0000	8.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
4400	10.0000	10.0000	10.0000	8.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
4800	10.0000	10.0000	10.0000	8.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
5200	10.0000	10.0000	10.0000	8.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
5600	10.0000	10.0000	10.0000	8.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
6000	10.0000	10.0000	10.0000	8.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
6400	10.0000	10.0000	10.0000	8.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
6800	10.0000	10.0000	10.0000	8.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000

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	12.000	9.000	6.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	5.000	5.000	8.000
800	100.000	80.000	20.000	12.000	9.000	6.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	5.000	5.000	8.000
1200	100.000	80.000	20.000	12.000	9.000	6.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	5.000	5.000	8.000
1600	100.000	80.000	20.000	12.000	9.000	6.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	5.000	5.000	8.000
2000	100.000	80.000	20.000	12.000	9.000	6.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	5.000	5.000	8.000
2400	100.000	80.000	20.000	12.000	9.000	6.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	5.000	5.000	8.000
2800	100.000	80.000	20.000	12.000	9.000	6.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	5.000	5.000	8.000
3200	100.000	80.000	20.000	12.000	9.000	6.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	5.000	5.000	8.000
3600	100.000	80.000	20.000	12.000	9.000	6.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	5.000	5.000	8.000
4000	100.000	80.000	20.000	12.000	9.000	6.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	5.000	5.000	8.000
4400	100.000	80.000	20.000	12.000	9.000	6.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	5.000	5.000	8.000
4800	100.000	80.000	20.000	12.000	9.000	6.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	5.000	5.000	8.000
5200	100.000	80.000	20.000	12.000	9.000	6.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	5.000	5.000	8.000
5600	100.000	80.000	20.000	12.000	9.000	6.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	5.000	5.000	8.000
6000	100.000	80.000	20.000	12.000	9.000	6.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	5.000	5.000	8.000
6400	100.000	80.000	20.000	12.000	9.000	6.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	5.000	5.000	8.000
6800	100.000	80.000	20.000	12.000	9.000	6.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	5.000	5.000	8.000

12 OBDG02 Engine Diagnostics

ECM Supporting Tables

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	12.000	9.000	6.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	5.000	5.000	8.000
800	100.000	80.000	20.000	12.000	9.000	6.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	5.000	5.000	8.000
1200	100.000	80.000	20.000	12.000	9.000	6.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	5.000	5.000	8.000
1600	100.000	80.000	20.000	12.000	9.000	6.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	5.000	5.000	8.000
2000	100.000	80.000	20.000	12.000	9.000	6.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	5.000	5.000	8.000
2400	100.000	80.000	20.000	12.000	9.000	6.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	5.000	5.000	8.000
2800	100.000	80.000	20.000	12.000	9.000	6.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	5.000	5.000	8.000
3200	100.000	80.000	20.000	12.000	9.000	6.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	5.000	5.000	8.000
3600	100.000	80.000	20.000	12.000	9.000	6.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	5.000	5.000	8.000
4000	100.000	80.000	20.000	12.000	9.000	6.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	5.000	5.000	8.000
4400	100.000	80.000	20.000	12.000	9.000	6.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	5.000	5.000	8.000
4800	100.000	80.000	20.000	12.000	9.000	6.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	5.000	5.000	8.000
5200	100.000	80.000	20.000	12.000	9.000	6.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	5.000	5.000	8.000
5600	100.000	80.000	20.000	12.000	9.000	6.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	5.000	5.000	8.000
6000	100.000	80.000	20.000	12.000	9.000	6.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	5.000	5.000	8.000
6400	100.000	80.000	20.000	12.000	9.000	6.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	5.000	5.000	8.000
6800	100.000	80.000	20.000	12.000	9.000	6.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	5.000	5.000	8.000

P0420, P0430

MinimumEngineRunTime

Coolant Temp	40	50	60	70	80
Engine Run Time	120	120	120	120	120

MinAirflowToWarmCatalyst

Engine Coolant	0	45	90
MinAirFlowToWrmCat	6	4	2

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	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768
9	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768
11	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768
12	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768
13	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768
14	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768
15	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768
16	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768
17	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768
18	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768
19	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768
21	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768
22	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768
24	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768
25	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768
27	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768
30	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768

P0300-P0308: Idle SCD ddt

Load	400	500	600	700	800	900	1000	1100	1200	1400	1600	1800	2000
8	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768
9	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768
11	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768
12	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768
13	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768
14	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768
15	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768
16	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768
17	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768
18	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768
19	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768
21	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768
22	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768
24	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768
25	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768
27	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768
30	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768

12 OBDG02 Engine Diagnostics

ECM Supporting Tables

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	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768
9	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768
11	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768
12	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768
13	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768
15	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768
17	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768
19	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768
22	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768
25	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768
29	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768
33	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768
38	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768
42	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768
48	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768
54	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768
61	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768

P0300-P0308: Off Idle SCD ddt

Load	400	500	600	700	800	900	1000	1100	1200	1400	1600	1800	2000
8	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768
9	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768
11	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768
12	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768
13	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768
15	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768
17	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768
19	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768
22	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768
25	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768
29	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768
33	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768
38	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768
42	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768
48	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768
54	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768
61	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768

P0300-P0308: Idle Cyl Mode dt

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

Load	500	600	700	800	900	1000	1100	1200	1300	1400	1600	1800	2000
8	3000	2500	1700	1450	800	650	600	500	400	400	400	400	400
9	3000	2500	1700	1450	800	650	600	500	400	400	400	400	400
11	3000	2800	1700	1450	800	700	600	500	400	400	400	400	400
12	3100	3000	1700	1450	900	750	600	500	400	400	400	400	400
13	3500	3000	1700	1500	1000	750	600	500	400	400	400	400	400
14	3500	3000	1700	1500	1000	750	700	500	400	400	400	400	400
15	4000	3000	1800	1500	1000	800	700	500	400	400	400	400	400
16	4500	3000	1800	1600	1200	800	800	500	400	400	400	400	400
17	5000	3400	2100	1600	1200	950	800	550	500	500	500	500	500
18	5000	3400	2100	1600	1250	950	800	550	500	500	500	500	500
19	5600	3400	2300	1600	1250	950	800	550	500	500	500	500	500
21	5600	3500	2300	1800	1250	1000	800	550	500	500	500	500	500
22	5600	3600	2300	1850	1300	1050	800	550	500	500	500	500	500
24	5600	3600	2400	1900	1300	1100	800	550	500	500	500	500	500
25	7000	4000	2400	1900	1300	1100	800	550	500	500	500	500	500
27	7500	4000	2500	1900	1600	1400	900	600	550	550	550	550	550
30	8000	4000	2500	2200	1600	1400	900	600	600	600	600	600	600

P0300-P0308: Idle Cyl Mode ddt

Load	500	600	700	800	900	1000	1100	1200	1300	1400	1600	1800	2000
8	4000	2800	1900	1400	950	750	550	500	400	400	400	400	400
9	4000	2800	1900	1400	1000	750	550	500	400	400	400	400	400
11	4000	3000	1900	1500	1000	750	550	500	400	400	400	400	400
12	4000	3000	1900	1500	1050	800	550	500	400	400	400	400	400
13	4000	3000	2000	1500	1100	800	600	500	400	400	400	400	400
14	4000	3000	2200	1500	1150	800	600	600	400	400	400	400	400
15	4500	3000	2300	1600	1200	900	600	600	400	400	400	400	400
16	4500	3000	2400	1900	1500	900	700	600	450	450	450	450	450
17	5000	3500	2800	2000	1550	1100	800	650	500	500	500	500	500
18	5000	3500	3000	2000	1600	1100	800	650	500	500	500	500	500
19	7000	3500	3000	2100	1600	1100	800	700	500	500	500	500	500
21	7000	3500	3000	2200	1600	1200	850	700	500	500	500	500	500
22	7000	4000	3000	2200	1600	1400	1000	750	550	550	550	550	550
24	7000	4000	3000	2200	1800	1400	1100	750	600	600	600	600	600
25	7000	4500	3000	2200	2000	1550	1100	800	600	600	600	600	600
27	7500	4500	3000	2400	2200	1800	1100	850	625	625	625	625	625
30	8000	5000	3000	2400	2200	1800	1100	850	625	625	625	625	625

12 OBDG02 Engine Diagnostics

ECM 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	2800	3000
8	2000	2000	1800	1200	850	575	450	260	250	180	130	70	70	45	35	30	29	20
9	2000	2000	1800	1200	850	575	450	260	250	180	130	70	70	45	35	30	29	20
11	2000	2000	1800	1200	850	575	450	260	250	180	130	70	70	45	35	30	29	20
12	2000	2000	1800	1200	850	575	450	260	250	180	140	70	70	45	35	31	29	20
13	2000	2000	1800	1250	850	620	500	300	250	180	140	70	75	50	35	33	29	20
15	2000	2000	1800	1300	850	750	700	500	350	190	150	75	75	55	42	35	30	23
17	2200	2200	1900	1400	1100	1000	800	650	458	200	200	115	100	60	44	39	40	27
19	2250	2250	2000	1650	1400	1100	900	750	479	250	210	140	100	74	51	44	40	33
22	2500	2500	2400	2100	1600	1300	1000	800	502	340	232	170	140	80	60	60	50	45
25	2800	2800	2600	2200	1750	1500	1100	925	600	360	276	190	150	105	90	70	60	45
29	3100	3100	2900	2350	1900	1600	1200	1050	700	400	320	200	160	112	100	80	60	50
33	3200	3200	3000	2600	2000	1750	1375	1100	800	450	354	250	180	120	100	90	70	59
38	3500	3500	3200	2700	2300	2000	1486	1157	850	550	407	280	200	140	120	100	90	64
42	3800	3800	3300	2800	2450	2200	1650	1250	900	600	525	310	250	152	140	110	100	78
48	4000	4000	3450	3000	2550	2250	1800	1550	950	700	550	400	280	180	160	120	110	82
54	4200	4200	3700	3200	2800	2550	2000	1800	1100	750	600	450	300	200	180	150	120	100
61	4400	4400	4000	3450	3050	2800	2250	1900	1300	850	650	500	350	250	200	170	150	120

	3500	4000	4500	5000	5500	6000	6500	7000
8	12	9	8	7	5	4	4	4
9	12	9	8	7	5	4	4	4
11	12	9	8	7	5	4	4	4
12	12	9	8	7	5	4	4	4
13	13	9	8	7	5	4	4	4
15	16	10	8	7	5	4	4	4
17	16	11	8	7	5	4	4	4
19	18	12	9	8	5	4	4	4
22	20	16	10	8	6	5	5	5
25	26	19	14	11	8	6	6	6
29	30	20	16	13	10	7	7	7
33	32	22	18	15	10	9	9	9
38	38	25	20	18	12	10	10	10
42	45	28	24	18	13	11	11	11
48	52	35	25	20	15	12	12	12
54	60	40	30	23	16	13	13	13
61	75	48	32	26	20	16	16	16

P0300-P0308: Cyl Mode ddt

Load

	400	500	600	700	800	900	1000	1100	1200	1400	1600	1800	2000	2200	2400	2600	2800	3000
8	2100	2100	1800	1200	1100	975	700	400	375	250	180	130	100	70	55	55	45	40
9	2100	2100	1800	1200	1100	975	700	400	375	250	180	130	100	70	55	55	45	40
11	2100	2100	1800	1200	1100	975	700	400	375	250	180	130	100	70	55	55	45	40
12	2100	2100	1800	1200	1100	1000	700	400	375	280	230	130	120	70	65	55	45	40
13	2100	2100	1800	1250	1150	1050	700	600	419	325	260	160	150	80	70	55	45	40
15	2500	2500	2000	1550	1225	1100	1000	689	522	380	300	220	180	130	100	75	60	40
17	2800	2800	2400	1700	1400	1350	1100	796	547	450	350	250	200	150	120	75	62	45
19	3000	3000	2600	2000	1621	1450	1200	1050	800	500	400	300	200	150	120	80	62	55
22	3000	3000	2900	2500	1989	1900	1500	1300	950	600	440	320	300	200	150	120	80	65
25	3300	3300	3000	3000	2500	2100	1800	1350	1050	694	469	350	300	200	170	150	100	74
29	3800	3800	3300	3200	2700	2700	2000	1800	1400	708	535	480	300	250	200	150	100	88
33	4000	4000	3700	3500	3000	2800	2100	2000	1500	850	704	500	350	280	200	180	120	95
38	4250	4250	3900	3800	3300	2900	2400	2030	1650	1110	790	550	420	300	220	210	150	109
42	4500	4500	4250	4000	3550	3500	2650	2150	1700	1200	863	600	500	350	300	230	150	121
48	4800	4800	4500	4250	3775	3500	2900	2200	1750	1300	925	750	550	400	300	240	200	141
54	5100	5100	4800	4500	4000	3800	3100	2400	1800	1400	1111	780	680	500	350	300	220	162
61	5500	5500	5100	4800	4500	4250	3400	2600	2150	1450	1233	900	700	550	400	310	250	197

	3500	4000	4500	5000	5500	6000	6500	7000
8	19	14	11	10	9	8	8	8
9	19	14	11	10	9	8	8	8
11	19	14	11	10	9	8	8	8
12	19	14	11	10	9	8	8	8
13	20	15	11	10	9	8	8	8
15	26	20	12	10	9	8	8	8
17	30	21	13	12	9	8	8	8
19	33	22	17	14	9	8	8	8
22	35	30	20	16	11	10	10	10
25	40	36	21	20	15	10	10	10
29	50	38	22	23	17	13	13	13
33	60	42	30	25	19	14	14	14
38	65	45	32	30	21	14	14	14
42	78	55	34	32	23	14	14	14
48	90	65	38	34	25	15	15	15
54	100	68	40	39	30	16	16	16
61	130	80	45	42	38	22	22	22

12 OBDG02 Engine Diagnostics

ECM 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	6000	6500	7000
8	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768
9	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768
11	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768
12	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768
13	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768
15	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768
17	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768
19	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768
22	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768
25	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768
29	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768
33	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768
38	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768
42	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768
48	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768
54	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768
61	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768

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	2800	3000	3500
0	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768
6	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768
13	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768
19	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768
25	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768
31	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768
38	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768
44	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768
50	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768
56	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768
63	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768
69	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768
75	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768
81	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768
88	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768
94	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768
100	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768

P0300-P0308: Zero torque engine load

Zero Torque: All Cylinders active

RPM	Pct load
400	12.52
500	12.52
600	12.52
700	12.14
800	11.76
900	11.52
1000	11.01
1100	10.93
1200	10.86
1400	10.76
1600	10.62
1800	10.64
2000	10.36
2200	10.41
2400	10.29
2600	10.25
2800	10.22
3000	9.72
3500	11.33
4000	12.94
4500	14.55
5000	16.17
5500	17.78
6000	19.38
6500	21.00
7000	22.61

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	25.00
500	24.00
600	24.00
700	23.00
800	23.00
900	22.00
1000	22.00
1100	21.00
1200	21.00
1400	21.00
1600	21.00
1800	21.00
2000	20.00
2200	20.00
2400	20.00
2600	21.00
2800	22.00
3000	23.00
3500	25.00
4000	30.00
4500	35.00
5000	40.00
5500	45.00
6000	50.00
6500	55.00
7000	60.00

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)

12 OBDG02 Engine Diagnostics

ECM Supporting Tables

Catalyst Damaging Misfire Percentage

Load	0	1000	2000	3000	4000	5000	6000	7000
0	22.5	22.5	22.5	22.5	22.5	12.5	12.5	12.5
10	22.5	22.5	22.5	22.5	22.5	12.5	12.5	8.0
20	22.5	22.5	22.5	12.5	12.5	12.5	8.0	6.3
30	22.5	22.5	22.5	12.5	12.5	8.0	6.3	6.3
40	22.5	22.5	12.5	12.5	12.5	8.0	5.0	5.0
50	22.5	22.5	12.5	12.5	8.0	6.3	5.0	5.0
60	22.5	12.5	12.5	12.5	6.3	5.0	5.0	5.0
70	12.5	12.5	12.5	8.0	6.3	5.0	5.0	5.0
80	12.5	12.5	8.0	6.3	6.3	5.0	5.0	5.0
90	12.5	12.5	8.0	6.3	6.3	5.0	5.0	5.0
100	12.5	12.5	8.0	6.3	6.3	5.0	5.0	5.0

RoughRoadSource = CeRRDR_e_TOSS
Rough Road Threshold

Trans Speed \ Engine Speed	600	800	1000	1200	1400	1600	1800	2000	2200	2400	2600	2800	3000	3500	4000	4500	5000	5500	6000
100	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	20.0	20.0
200	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	20.0	20.0
300	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	20.0	20.0
400	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	20.0	20.0
500	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	20.0	20.0
600	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	20.0	20.0
700	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	20.0	20.0
800	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	20.0	20.0
900	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	20.0	20.0
1000	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	20.0	20.0
1100	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	20.0	20.0
1200	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	20.0	20.0
1300	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	20.0	20.0
1400	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	20.0	20.0

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	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05

P0300-P0308: Abnormal Engine Speed

Cylinder Mode

RPM	0	1000	2000	3000	4000	5000	6000	7000	8000
Multiplier	2.00	2.00	2.00	4.00	4.00	4.00	4.00	4.00	4.00

SCD Mode

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

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

P0300-P0308: Pattern Recognition Min and Max Multipliers

Min Multiplier

RPM	0	1000	2000	2500	3000	3500	4000	5000	6500
Multiplier	1.10	1.10	0.75	0.85	0.85	0.60	0.70	0.80	0.80

Max Multiplier

RPM	0	1000	2000	2500	3000	3500	4000	5000	6500
Multiplier	1.30	1.30	1.20	0.80	0.80	1.00	1.20	1.40	1.40

P0300-P0308: Driveline Ring Filter

Ring Filter

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

Number of Normals

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

12 OBDG02 Engine Diagnostics

ECM Supporting Tables

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	1500	2200	2500	2700	3100	3200	3300	3500	3700	4000	4200	4500	5000	5250	5625	7000
	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	800	1500	2500	2800	3100	3200	3300	3500	3700	4000	4200	4500	5000	5500	6500	7000
	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.900	0.950	0.950	1.000	0.950	0.950

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	800	1500	2500	2800	3100	3200	3300	3500	3700	4000	4200	4500	5000	5500	6500	7000
	0.900	0.900	0.900	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

MAP2 Residual Weight Factor based on RPM

RPM	0	800	1500	2500	2800	3100	3200	3300	3500	3700	4000	4200	4500	5000	5500	6500	7000
	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	1500	2200	2500	2700	3100	3200	3300	3500	3700	4000	4200	4500	5000	5250	5625	7000
	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	5625	7000
	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	7000
	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

SCIAP2 Residual Weight Factor based on RPM

RPM	0	1500	2200	2500	2800	3100	3200	3300	3500	3700	4000	4200	4500	5000	5500	6500	7000
	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
	1.0	1.0	1.0	1.0	2.0	2.0	2.0	3.0	3.0

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

RPM	1000	1750	2500	3250	4000	4750	5500	6250	7000
	15.0	27.0	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
	124.0	126.0	127.0	128.0	129.0	128.0	127.0	127.0	127.0

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

RPM	1000	1750	2500	3250	4000	4750	5500	6250	7000
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

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

RPM	1000	1750	2500	3250	4000	4750	5500	6250	7000
	2.6	3.3	4.5	5.4	7.0	8.8	11.0	12.4	12.4

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

RPM	1000	1750	2500	3250	4000	4750	5500	6250	7000
	34.1	27.3	26.1	25.4	25.7	24.1	29.5	29.4	29.4

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

ECM Supporting Tables

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

ECM Supporting Tables

Turbocharger Intake Flow Rationality Diagnostic Failure Matrix, Con't

MAF Model Failure	MAP 1 Model Failure	MAP 2 Model Failure	MAP 3 Model Failure	TIAP 1 Model Failure	TPS Model Failure	TIAP Correlation Failure	TIAP Correlation Valid	DTC Set
F	T	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
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	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	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
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	P1101
T	F	F	F	T	T	F	F	P1101
T	F	F	F	T	T	F	T	P0121
T	F	F	F	T	T	T	F	P1101
T	F	F	F	T	T	T	T	P0236
T	F	F	T	F	F	F	F	P1101
T	F	F	T	F	F	F	T	P1101
T	F	F	T	F	F	T	F	P1101
T	F	F	T	F	F	T	T	P1101
T	F	F	T	F	T	F	F	P1101
T	F	F	T	F	T	F	T	P1101
T	F	F	T	F	T	T	F	P1101
T	F	F	T	F	T	T	T	P1101
T	F	F	T	T	F	F	F	P1101
T	F	F	T	T	F	F	T	P1101
T	F	F	T	T	F	T	F	P1101
T	F	F	T	T	F	T	T	P1101
T	F	F	T	T	T	F	F	P1101
T	F	F	T	T	T	F	T	P1101
T	F	F	T	T	T	T	F	P1101
T	F	F	T	T	T	T	T	P1101

ECM Supporting Tables

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

ECM Supporting Tables

Turbocharger Intake Flow Rationality Diagnostic Failure Matrix, Con't								
MAF Model Failure	MAP 1 Model Failure	MAP 2 Model Failure	MAP 3 Model Failure	TIAP 1 Model Failure	TPS Model Failure	TIAP Correlation Failure	TIAP Correlation Valid	DTC Set
T	T	T	F	T	F	T	F	P1101
T	T	T	F	T	F	T	T	P1101
T	T	T	F	T	T	F	F	P1101
T	T	T	F	T	T	F	T	P1101
T	T	T	F	T	T	T	F	P1101
T	T	T	F	T	T	T	T	P1101
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
106	94	82	70	60	46	40	30	30	30	30	30	30	30	37	49	61

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

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

Remove for applications with single coolant sensor	IAT Range												
	Low	Hi	-40	-28	-16	-4	8	20	32	44	56	68	80
Primary	10.0 ° C	65.0 ° C	1100	1100	1000	990	870	750	700	640	565	500	410
Alternate	-7.0 ° C	10.0 ° C	1100	1000	850	645	547	500	410	350	350	300	200

12 OBDG02 Engine Diagnostics

ECM Supporting Tables

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	0.035	0.050	0.060	0.080	0.090	0.100	0.110	0.120	0.130	0.140	0.160	0.180	0.199	0.225	0.250	0.300
0.000	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
0.035	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
0.050	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
0.060	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
0.080	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
0.090	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	0	0	0	0	0	0	0
0.110	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0
0.120	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0
0.130	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0
0.140	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0
0.160	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.180	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.199	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.225	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.250	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.300	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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

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

	0.000	0.050	0.100	0.149	0.159	0.170	0.180	0.189	0.199	0.210	0.220	0.229	0.239	0.250	0.300	0.350	0.399
0.000	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
0.050	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
0.100	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
0.149	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
0.159	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
0.170	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
0.180	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
0.189	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
0.199	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
0.210	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
0.220	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
0.229	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
0.239	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
0.250	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
0.300	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
0.350	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
0.399	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

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 20 gps for 100000 grams of accumulated flow non-continuously.
* B1S2 Airflow greater than 20 gps for 100000 grams of accumulated flow non-continuously.
* B2S1 Airflow greater than 20 gps for 100000 grams of accumulated flow non-continuously.
* B2S2 Airflow greater than 20 gps for 100000 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

12 OBDG02 Engine Diagnostics

ECM Supporting Tables

P0234, P0299

KtBSTD_p_CntrlDevNegLim [kPa]

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

	100.0000	120.0000	140.0000	160.0000	170.0000	180.0000	190.0000	200.0000	210.0000	220.0000
1000.0000	-24.3600	-30.4500	-28.0140	-26.7960	-24.3600	-24.3600	-24.3600	-26.7960	-26.7960	-28.0018
1500.0000	-48.7200	-36.5400	-28.0140	-26.7960	-24.3600	-24.3600	-24.3600	-26.7960	-26.7960	-28.0018
2000.0000	-73.0800	-48.7200	-26.7960	-25.5780	-24.3600	-24.3600	-24.3600	-25.4562	-25.4562	-28.0018
2500.0000	-80.3880	-53.5920	-26.7960	-22.7766	-21.6378	-22.9106	-24.1834	-25.4562	-25.4562	-28.0018
3000.0000	-73.0800	-48.7200	-24.3600	-19.4880	-19.6707	-20.8278	-21.9849	-23.1420	-23.1420	-25.4562
3500.0000	-73.0800	-48.7200	-19.4880	-19.4880	-19.6707	-20.8278	-21.9849	-23.1420	-23.1420	-25.4562
4000.0000	-73.0800	-48.7200	-19.4880	-19.4880	-19.6707	-20.8278	-21.9849	-23.1420	-23.1420	-25.4562
4500.0000	-73.0800	-48.7200	-19.4880	-19.4880	-19.6707	-20.8278	-21.9849	-23.1420	-23.1420	-25.4562
5000.0000	-73.0800	-48.7200	-19.4880	-19.4880	-19.6707	-20.8278	-21.9849	-23.1420	-23.1420	-25.4562
6000.0000	-73.0800	-48.7200	-19.4880	-19.4880	-19.6707	-20.8278	-21.9849	-23.1420	-23.1420	-25.4562

KtBSTD_p_CntrlDevPosLim [kPa]

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

	100.0000	120.0000	140.0000	160.0000	170.0000	180.0000	190.0000	200.0000	210.0000	220.0000
1000.0000	40.0000	35.0000	45.0000	67.0000	85.0000	107.0000	125.0000	137.0000	169.0000	189.0000
1500.0000	30.0000	25.0000	27.0000	42.0000	52.0000	60.0000	79.0000	82.0000	102.0000	135.0000
2000.0000	30.0000	27.6000	26.4000	25.2000	24.0000	30.0000	36.0000	42.0000	48.0000	48.0000
2500.0000	30.0000	27.6000	24.0000	20.4000	20.4000	21.6000	22.8000	24.0000	25.2000	26.4000
3000.0000	30.0000	27.6000	21.6000	19.2000	20.4000	21.6000	22.8000	24.0000	25.2000	26.4000
3500.0000	30.0000	27.6000	20.4000	19.2000	20.4000	21.6000	22.8000	24.0000	25.2000	26.4000
4000.0000	30.0000	27.6000	20.4000	19.2000	20.4000	21.6000	22.8000	24.0000	25.2000	26.4000
4500.0000	30.0000	27.6000	20.4000	19.2000	20.4000	21.6000	22.8000	24.0000	25.2000	26.4000
5000.0000	30.0000	27.6000	20.4000	19.2000	20.4000	21.6000	22.8000	24.0000	25.2000	26.4000
6000.0000	30.0000	27.6000	20.4000	19.2000	20.4000	21.6000	22.8000	24.0000	25.2000	26.4000

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
2000.0000	100.0000	100.0000	80.0000	30.0000	15.0000	0.0000
2500.0000	100.0000	100.0000	50.0000	15.0000	0.0000	0.0000
3000.0000	100.0000	50.0000	20.0000	10.0000	0.0000	0.0000
4000.0000	100.0000	20.0000	10.0000	5.0000	0.0000	0.0000
5000.0000	100.0000	10.0000	5.0000	0.0000	0.0000	0.0000
6000.0000	100.0000	5.0000	5.0000	0.0000	0.0000	0.0000

KtBSTD_t_CntrlDevEnblDelay [s]

Engine Speed (RPM):	1000	1500	2000	2500	3000	3500	4000	4500	5000	6000
KtBSTD_t_CntrlDevEnblDelay	1.7500	1.5000	1.3750	1.1250	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

P00C4, P2261

KtBSTD_r_SurgeLim [-]

Axis is Corrected Air Mass Flow [g/s]

16.0000	1.1200
18.0000	1.2300
36.0000	1.6000
41.0000	1.8500
77.0000	2.4600
103.0000	3.2000

P226B

KtBSTD_r_ExcsvBstPresLim [-]

Axis is Corrected Air Mass Flow [g/s]

103.0000	3.2040
111.0000	3.2220
119.0000	3.1860
128.0000	3.1050
135.0000	2.9790
143.0000	2.7810
149.0000	2.5110
149.0000	2.5110

12 OBDG02 Engine Diagnostics

ECM 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	0.0450	0.0450	0.0450	0.0450
1000	0.0450	0.0450	0.0450	0.0450
1500	0.0450	0.0450	0.0450	0.0450
2000	0.0450	0.0450	0.0450	0.0450
2500	0.0450	0.0450	0.0450	0.0450
3000	0.0450	0.0450	0.0450	0.0450
3500	0.0450	0.0450	0.0450	0.0450
4000	0.0450	0.0450	0.0450	0.0450
4500	0.0450	0.0450	0.0450	0.0450
5000	0.0450	0.0450	0.0450	0.0450
5500	0.0450	0.0450	0.0450	0.0450
6000	0.0450	0.0450	0.0450	0.0450
6500	0.0450	0.0450	0.0450	0.0450
7000	0.0450	0.0450	0.0450	0.0450
7500	0.0450	0.0450	0.0450	0.0450
8000	0.0450	0.0450	0.0450	0.0450
8500	0.0450	0.0450	0.0450	0.0450

P0325/P0330

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

1) 20 kHz Method: 20 kHz signal is internally injected on one sensor line (Signal) and the output of the differential op-amp is checked to verify the 20 kHz travels through the sensor and back to the second sensor input line (Return).
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	0	0	0	0
5000	2	2	2	2
5500	2	2	2	2
6000	2	2	2	2
6500	2	2	2	2
7000	2	2	2	2
7500	2	2	2	2
8000	2	2	2	2
8500	2	2	2	2

12 OBDG02 Engine Diagnostics

ECM Supporting Tables

Open Circuit Thresholds:

1. 20 kHz Method:

Engine Speed (RPM):	700	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500
OpenCktThrshMin:	1.1289	1.1250	0.9512	0.8828	0.7051	0.5820	0.4395	0.3438	0.3926	0.4160	0.4258	0.4434	0.4609	0.4609	0.4609	0.4609	0.4609

Engine Speed (RPM):	700	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500
OpenCktThrshMax:	2.6035	2.5938	2.1992	2.0371	1.6348	1.3516	1.0137	0.7891	0.8984	0.9492	0.9883	1.0293	1.0703	1.0703	1.0703	1.0703	1.0703

2. Normal Noise Method:

Engine Speed (RPM):	700	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500
OpenCktThrshMin:	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

Engine Speed (RPM):	700	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500
OpenCktThrshMax:	0.0410	0.0410	0.0449	0.0508	0.0508	0.0527	0.0586	0.0625	0.0723	0.0879	0.0996	0.1406	0.1895	0.1895	0.1895	0.1895	0.1895

P06B6/P06B7

Engine Speed (RPM):	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500
OpenTestThreshLo	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

Engine Speed (RPM):	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500
OpenTestThreshHi	0.0898	0.0898	0.0898	0.0898	0.0898	0.1094	0.1094	0.1250	0.1504	0.1992	0.2500	0.3008	0.3496	0.3496	0.3496	0.3496	0.3496

P0068: MAP / MAF / TPS Correleation

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

X-axis	0.69	5.00	10.00	15.00	20.00	25.00	30.00	40.00	55.00
Data	42.00	41.00	39.92	31.00	28.60	28.32	29.14	70.00	110.00

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

X-axis	0.69	5.00	10.00	15.00	20.00	25.00	30.00	40.00	55.00
Data	10.00	11.43	13.38	14.33	16.32	22.16	28.16	70.00	120.00

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

X-axis	600.00	1400.00	2200.00	3000.00	3800.00	4600.00	5400.00	6200.00	7000.00
Data	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00

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

X-axis	6.00	7.00	8.00	9.00	10.00	11.00	12.00	13.00	14.00
Data	511.99	511.99	511.99	511.99	511.99	511.99	511.99	511.99	511.99

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

ECM Supporting Tables

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	1

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	66.53	65.61	74.64	74.84	68.17	66.78	64.83	62.25	59.05	55.95	53.86	52.88	52.27	52.09	52.09	52.09	52.09
160.00	60.66	56.70	63.02	57.88	51.11	48.41	47.02	45.31	42.17	39.30	36.95	35.59	34.72	34.48	34.48	34.48	34.48
240.00	49.52	46.05	52.03	44.97	40.02	36.55	35.25	34.22	32.47	30.28	28.13	26.81	26.00	25.77	25.77	25.77	25.77
320.00	41.56	37.98	43.95	36.77	32.09	28.98	28.06	27.38	25.78	24.36	22.70	21.52	20.78	20.58	20.58	20.58	20.58
400.00	35.80	32.31	37.69	31.05	26.80	24.02	23.31	22.80	21.33	20.11	18.89	17.97	17.30	17.13	17.13	17.13	17.13
480.00	31.44	28.13	32.97	26.88	23.00	20.50	19.94	19.53	18.19	17.09	16.08	15.34	14.81	14.66	14.66	14.66	14.66
560.00	29.08	25.89	30.44	24.67	21.02	18.67	18.17	17.81	16.55	15.55	14.63	13.97	13.50	13.38	13.38	13.38	13.38
640.00	29.08	25.89	30.44	24.67	21.02	18.67	18.17	17.81	16.55	15.55	14.63	13.97	13.50	13.38	13.38	13.38	13.38
720.00	29.08	25.89	30.44	24.67	21.02	18.67	18.17	17.81	16.55	15.55	14.63	13.97	13.50	13.38	13.38	13.38	13.38
800.00	29.08	25.89	30.44	24.67	21.02	18.67	18.17	17.81	16.55	15.55	14.63	13.97	13.50	13.38	13.38	13.38	13.38
880.00	29.08	25.89	30.44	24.67	21.02	18.67	18.17	17.81	16.55	15.55	14.63	13.97	13.50	13.38	13.38	13.38	13.38
960.00	29.08	25.89	30.44	24.67	21.02	18.67	18.17	17.81	16.55	15.55	14.63	13.97	13.50	13.38	13.38	13.38	13.38
1040.00	29.08	25.89	30.44	24.67	21.02	18.67	18.17	17.81	16.55	15.55	14.63	13.97	13.50	13.38	13.38	13.38	13.38
1120.00	29.08	25.89	30.44	24.67	21.02	18.67	18.17	17.81	16.55	15.55	14.63	13.97	13.50	13.38	13.38	13.38	13.38
1200.00	29.08	25.89	30.44	24.67	21.02	18.67	18.17	17.81	16.55	15.55	14.63	13.97	13.50	13.38	13.38	13.38	13.38
1280.00	29.08	25.89	30.44	24.67	21.02	18.67	18.17	17.81	16.55	15.55	14.63	13.97	13.50	13.38	13.38	13.38	13.38
1360.00	29.08	25.89	30.44	24.67	21.02	18.67	18.17	17.81	16.55	15.55	14.63	13.97	13.50	13.38	13.38	13.38	13.38

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	10.00	25.00	50.00	100.00	150.00	200.00
Data	29.69	29.69	29.69	29.69	29.69	29.69

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

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

	-40.00	-20.00	-10.00	0.00	50.00	90.00
200.00	4096.00	4096.00	4096.00	4096.00	4096.00	4096.00
400.00	1412.00	1412.00	1412.00	1412.00	1412.00	1412.00
600.00	150.00	150.00	150.00	150.00	150.00	150.00
700.00	150.00	150.00	150.00	150.00	150.00	150.00
1000.00	150.00	150.00	150.00	150.00	150.00	150.00
1200.00	150.00	150.00	150.00	150.00	150.00	150.00
1600.00	150.00	150.00	150.00	150.00	150.00	150.00
2000.00	150.00	150.00	150.00	150.00	150.00	150.00
2500.00	150.00	150.00	150.00	150.00	150.00	150.00
3000.00	150.00	150.00	150.00	150.00	150.00	150.00
3500.00	150.00	150.00	150.00	150.00	150.00	150.00
4000.00	150.00	150.00	150.00	150.00	150.00	150.00
4500.00	150.00	150.00	150.00	150.00	150.00	150.00
5000.00	150.00	150.00	150.00	150.00	150.00	150.00
6000.00	150.00	150.00	150.00	150.00	150.00	150.00
7000.00	150.00	150.00	150.00	150.00	150.00	150.00
8000.00	150.00	150.00	150.00	150.00	150.00	150.00

12 OBDG02 Engine Diagnostics

ECM 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	-448.3143	-448.3143	-448.3143	-423.5025	-398.4475	-373.6358	-348.8240	-323.7690	-298.9573	-273.9023	-249.0905	-224.2788	-224.2788	-224.2788	-224.2788	-224.2788	-224.2788
-4.3750	-448.3143	-448.3143	-448.3143	-423.5025	-398.4475	-373.6358	-348.8240	-323.7690	-298.9573	-273.9023	-249.0905	-224.2788	-224.2788	-224.2788	-224.2788	-224.2788	-224.2788
1.2500	-448.3143	-448.3143	-448.3143	-423.5025	-398.4475	-373.6358	-348.8240	-323.7690	-298.9573	-273.9023	-249.0905	-224.2788	-224.2788	-224.2788	-224.2788	-224.2788	-224.2788
6.8750	-448.3143	-448.3143	-448.3143	-423.5025	-398.4475	-373.6358	-348.8240	-323.7690	-298.9573	-273.9023	-249.0905	-224.2788	-224.2788	-224.2788	-224.2788	-224.2788	-224.2788
12.5000	-448.3143	-448.3143	-448.3143	-423.5025	-398.4475	-373.6358	-348.8240	-323.7690	-298.9573	-273.9023	-249.0905	-224.2788	-224.2788	-224.2788	-224.2788	-224.2788	-224.2788
18.1250	-448.3143	-448.3143	-448.3143	-423.5025	-398.4475	-373.6358	-348.8240	-323.7690	-298.9573	-273.9023	-249.0905	-224.2788	-224.2788	-224.2788	-224.2788	-224.2788	-224.2788
23.7500	-448.3143	-448.3143	-448.3143	-423.5025	-398.4475	-373.6358	-348.8240	-323.7690	-298.9573	-273.9023	-249.0905	-224.2788	-224.2788	-224.2788	-224.2788	-224.2788	-224.2788
29.3750	-448.3143	-448.3143	-448.3143	-423.5025	-398.4475	-373.6358	-348.8240	-323.7690	-298.9573	-273.9023	-249.0905	-224.2788	-224.2788	-224.2788	-224.2788	-224.2788	-224.2788
35.0000	-448.3143	-448.3143	-448.3143	-423.5025	-398.4475	-373.6358	-348.8240	-323.7690	-298.9573	-273.9023	-249.0905	-224.2788	-224.2788	-224.2788	-224.2788	-224.2788	-224.2788
40.6250	-448.3143	-448.3143	-448.3143	-423.5025	-398.4475	-373.6358	-348.8240	-323.7690	-298.9573	-273.9023	-249.0905	-224.2788	-224.2788	-224.2788	-224.2788	-224.2788	-224.2788
46.2500	-448.3143	-448.3143	-448.3143	-423.5025	-398.4475	-373.6358	-348.8240	-323.7690	-298.9573	-273.9023	-249.0905	-224.2788	-224.2788	-224.2788	-224.2788	-224.2788	-224.2788
51.8750	-448.3143	-448.3143	-448.3143	-423.5025	-398.4475	-373.6358	-348.8240	-323.7690	-298.9573	-273.9023	-249.0905	-224.2788	-224.2788	-224.2788	-224.2788	-224.2788	-224.2788
57.5000	-448.3143	-448.3143	-448.3143	-423.5025	-398.4475	-373.6358	-348.8240	-323.7690	-298.9573	-273.9023	-249.0905	-224.2788	-224.2788	-224.2788	-224.2788	-224.2788	-224.2788
63.1250	-448.3143	-448.3143	-448.3143	-423.5025	-398.4475	-373.6358	-348.8240	-323.7690	-298.9573	-273.9023	-249.0905	-224.2788	-224.2788	-224.2788	-224.2788	-224.2788	-224.2788
68.7500	-448.3143	-448.3143	-448.3143	-423.5025	-398.4475	-373.6358	-348.8240	-323.7690	-298.9573	-273.9023	-249.0905	-224.2788	-224.2788	-224.2788	-224.2788	-224.2788	-224.2788
74.3750	-448.3143	-448.3143	-448.3143	-423.5025	-398.4475	-373.6358	-348.8240	-323.7690	-298.9573	-273.9023	-249.0905	-224.2788	-224.2788	-224.2788	-224.2788	-224.2788	-224.2788
80.0000	-448.3143	-448.3143	-448.3143	-423.5025	-398.4475	-373.6358	-348.8240	-323.7690	-298.9573	-273.9023	-249.0905	-224.2788	-224.2788	-224.2788	-224.2788	-224.2788	-224.2788

P0442: Estimate of Ambient Temperature Valid Conditioning Time

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

Axis	Curve
0	178
600	345
1200	345
1800	345
2400	345
3000	345
3600	285
4200	283
4800	281
5400	279
6000	276
6600	274
7200	272
7800	270
8400	268
9000	266
9600	263
10200	261
10800	259
11700	256
12600	253
13500	249
14400	246
15300	244
16200	243
17100	241
18000	240
19200	237
20400	235
21600	233
22800	229
24000	224
25200	220

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	44	44	44	44	68	82	105	153	320	480	480	480	480	480	480	480	480

12 OBDG02 Engine Diagnostics

ECM Supporting Tables

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	100
6	100
12	80
19	75
25	70
31	65
37	60
44	60
50	60
56	60
62	60
69	55
75	50
81	45
87	40
94	30
100	30

P0461, P2066, P2636: Transfer Pump Enable

TransferPumpOnTimeLimit (in seconds)
Axis is Fuel Level in %

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

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	10.0	10.0	15.0	25.0	30.0	50.0	50.0	60.0	70.0	75.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

P0806

ResidualErrorEnableLow Table — **axis is Gear**

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

P0806

ResidualErrorEnableHigh Table — **axis is Gear**

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

12 OBDG02 Engine Diagnostics

ECM Supporting Tables

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	<= 90 %	
for	> 3 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	<= 58 %	
for	> 3 counts	each count is equal to 12.5ms

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

Clutch Pedal Position	< 15 %	
for	> 3 counts	each count is equal to 12.5ms

FASD Section
P0171, P0172, P0174, P0175
zed for FASD diagnosis (cells identified with a "Yes" are enabled, and with a "NO" are disabled)

Long-Term Fuel Trim Cell Usage

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

FAPD Section_Ian MacEwen
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	300	300	300	300	100	100	100	100	300	300
Cell Accum Min Time [seconds] (time = counts / 10)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Integral Offset Max

Post O2 Air Flow Mode	Decel	Idle	Cruise	Light Accel	Heavy Accel
Post O2 Integral Offset Max [mV]	0.0	0.0	0.0	0.0	0.0

Integral Offset Min

Post O2 Air Flow Mode	Decel	Idle	Cruise	Light Accel	Heavy Accel
Post O2 Integral Offset Min [mV]	0.0	0.0	0.0	0.0	0.0

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]	650	650	650	650	650	650	650	650	650	650

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]	770	770	770	770	770	770	770	770	770	770

Out Of Window Timer

Post O2 Airflow Mode Cell	Decel	Idle	Cruise	Light Accel	Heavy Accel
Out of Window Counts	100	100	100	100	100
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	1	1	1	1	1

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	300	300	300	300	100	100	100	100	300	300
Cell Accum Min Time [seconds] (time = counts / 10)	30.0	30.0	30.0	30.0	10.0	10.0	10.0	10.0	30.0	30.0

12 OBDG02 Engine Diagnostics

ECM Supporting Tables

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]	650	650	650	650	650	650	650	650	650	650

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]	770	770	770	770	770	770	770	770	770	770

Out Of Window Timer

Post O2 Airflow Mode Cell	Decel	Idle	Cruise	Light Accel	Heavy Accel
Out of Window Counts	100	100	100	100	100
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	1	1	1	1	1

Closed Loop Enable Criteria

Engine run time greater than
KtFSTA_t_ClosedLoopAutostart (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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

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	180.0	120.0	60.0	40.0	15.0	15.0	13.0	12.0	6.0	4.0	2.0	1.0	1.0	1.0	1.0	1.0	1.0

and pre converter 02 sensor voltage less than
KfFULC_U_O2_SensorReadyThrshLo

	< 950
Voltage	*milliVolts*

for
KcFULC_O2_SensorReadyEvents

Time (events * 12.5 milliseconds)	*> 40 events*

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

Long Term FT Enable Criteria

Closed Loop Enable and
Coolant greater than
KfFCLL_T_AdaptiveLoCoolant

Coolant	*> 40 Celcius*

or less than
KfFCLL_T_AdaptiveHiCoolant

	< 120 Celcius
Coolant	

and
KtFCLL_p_AdaptiveLowMAP_Limit

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

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

12 OBDG02 Engine Diagnostics

ECM Supporting Tables

Secondary Fuel Trim Enable Criteria

Closed Loop Enable and
KfFCLP_U_O2ReadyThrshLo

Voltage	*< 1000 milliVolts*

for
KcFCLP_Cnt_O2RdyCyclesThrsh

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

Long Term Secondary Fuel Trim Enable Criteria

KtFCLP_t_PostIntglDisableTime

	X10 Y10	X11 Y11	X12 Y12	X13 Y13	X14 Y14	X15 Y15	X16 Y16	X17 Y17	
Start-Up Coolant	-40	-29	-18	-6	5	16	28	39	50	61	73	84	95	106	118	129	140
Post Integral Enable Time	170.0	170.0	170.0	170.0	170.0	170.0	170.0	170.0	170.0	170.0	170.0	170.0	170.0	170.0	170.0	170.0	170.0

Plus
KtFCLP_t_PostIntglRamplnTime

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

and
KeFCLP_T_IntegrationCatalystMax

Modeled Catalyst Temperature	*< 830 Celcius*

and
KeFCLP_T_IntegrationCatalystMin

Modeled Catalyst Temperature	*> 450 Celcius*

and
PO2S_Bank_1_Snsr_2_FA and PO2S_Bank_2_Snsr_2_FA = False

		Fault Bundles Produced (Fault Bundles Consumed - from line 364)	Cert Doc Bundle Name	Pcodes																			
		GetPHSR_b_PhaserBndlFlagFA	AnyCamPhaser_FA	P0010	P0011	P0013	P0014	P0020	P0021	P0023	P0024												
		GetPHSR_b_PhaserBndlFlagTFTKO	AnyCamPhaser_TFTKO	P0010	P0011	P0013	P0014	P0020	P0021	P0023	P0024												
		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_TFTKC	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																		
		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	HUMR	GetHUMR_b_HumidityFA	HumidityFA	P0097																			
Air Measurement	IFRR	GetIFRR_b_ChgrBypVlvFault	SuperchargerBypassValveFA	P2261																			
		GetIFRR_b_CylDeacSys_TFTKO	CylDeacSystemTFTKO	P3400																			
		GetIFRR_b_MAF_SnsrPerfFault	MAF_SensorPerfFA	P0101																			
		GetIFRR_b_MAF_SnsrPerf_TFTKO	MAF_SensorPerfTFTKO	P0101																			
		GetIFRR_b_MAP_SnsrPerfFault	MAP_SensorPerfFA	P0106																			
		GetIFRR_b_MAP_SnsrPerf_TFTKO	MAP_SensorPerfTFTKO	P0106																			
		GetIFRR_b_SCIAP_SnsrPerfFault	SCIAP_SensorPerfFA	P012B																			
		GetIFRR_b_SCIAP_SnsrPerf_TFTKO	SCIAP_SensorPerfTFTKO	P012B																			
		GetIFRR_b_TP_SnsrPerfFault	ThrottlePositionSnsrPerfFA	P0121																			
		GetIFRR_b_TP_SnsrPerf_TFTKO	ThrottlePositionSnsrPerfTFTKO	P0121																			
		GetIFRR_b_TIAP_SnsrPerfFault	TIAP_SensorPerfFA	P0236																			
					P0102	P0103																	

		Fault Bundles Produced (Fault Bundles Consumed - from line 364)	Cert Doc Bundle Name	Pcodes
Air Measurement	MAFR	GetMAFR_b_MAF_SnsrFA	MAF_SensorFA	P0101 P0102 P0103
		GetMAFR_b_MAF_SnsrTFTKO	MAF_SensorTFTKO	P0101 P0103
		GetMAFR_b_MAF_SnsrFP	MAF_SensorFP	P0102 P0103
		GetMAFR_b_MAF_SnsrCktFA	MAF_SensorCircuitFA	P0102 P0103
		GetMAFR_b_MAF_SnsrCktTFTKO	MAF_SensorCircuitTFTKO	P0102 P0107 P0108
Air Measurement	MAPR	GetMAPR_b_MAP_SnsrTFTKO	MAP_SensorTFTKO	P0106 P0107 P0108
		GetMAPR_b_MAP_SnsrFA	MAP_SensorFA	P0106 P0108
		GetMAPR_b_MAP_SnsrCktFP	MAP_SensorCircuitFP	P0107 P012C P012D
		GetMAPR_b_SCIAP_SnsrFA	SCIAP_SensorFA	P012B P012C P012D
		GetMAPR_b_SCIAP_SnsrTFTKO	SCIAP_SensorTFTKO	P012B P012D
		GetMAPR_b_SCIAP_SnsrCktFP	SCIAP_SensorCircuitFP	P012C P0106 P0107 P0108
		GetMAPR_b_AfterThrotBlade_FA	AfterThrottlePressureFA	naturally aspirated, turbocharged supercharged P012B P012C P012D
		GetMAPR_b_AftThrotVacSnsr_TFTKO	AfterThrottleVacuumTFTKO	P0106 P0107 P0108 naturally aspirated, turbocharged supercharged P012B P012C P012D
		GetMAPR_b_SCIAP_SnsrCktFA	SCIAP_SensorCircuitFA	P012D P012C P0106 P0107 P0108
		GetMAPR_b_AftThrotPresSnsrTFTKO	AfterThrottlePressTFTKO	naturally aspirated, turbocharged supercharged P012B P012C P012D P0108
		GetMAPR_b_MAP_SnsrCktFA	MAP_SensorCircuitFA	P0107
		GetMAPR_e_EngVacStatus() == CeMAPR_e_Defaulted	MAP_EngineVacuumStatus	MAP_SensorFA OR P0107, P0108 Pending P0017 P0018 P0019
Engine Positioning	EPSR	GetEPSR_b_CkpToCamCorr_TFTKO	CrankCamCorrelationTFTKO	P0016 P0336
		GetEPSR_b_CrankSnsr_FA	CrankSensorFA	P0335 P0336
		GetEPSR_b_CrankSnsr_TFTKO	CrankSensorTFTKO	P0335 P0017 P0018 P0019 P0340 P0341 P0345 P0346 P0365 P0366 P0390 P0391
		GetEPSR_b_CamSnsr_FA	CamSensorFA	P0016 P0017 P0018 P0019 P0340 P0341 P0345 P0346 P0365 P0366 P0390 P0391
		GetEPSR_b_CamSnsr_TFTKO	CamSensorTFTKO	P0016 P0018
		GetEPSR_b_CkpToCamCorrInt_FA	CrankIntakeCamCorrelationFA	P0016 P0019
		GetEPSR_b_CkpToCamCorrExh_FA	CrankExhaustCamCorrelationFA	P0017 P0018 P0340 P0341 P0345 P0346
		GetEPSR_b_CamSnsrIntake_TFTKO	IntakeCamSensorTFTKO	P0016 P0018 P0340 P0341 P0345 P0346
		GetEPSR_b_CamSnsrIntake_FA	IntakeCamSensorFA	P0016 P0019 P0365 P0366 P0390 P0391
		GetEPSR_b_CamSnsrExhaust_TFTKO	ExhaustCamSensorTFTKO	P0017 P0019 P0365 P0366 P0390 P0391
		GetEPSR_b_CamSnsrExhaust_FA	ExhaustCamSensorFA	P0017 P0018 P0340 P0341 P0345 P0346
		GetEPSR_b_IntakeSnsrFaultActive	IntakeCamSensor_FA	P0016 P0018 P0340 P0341 P0345 P0346
		GetEPSR_b_IntakeSnsrTestFailTKO	IntakeCamSensor_TFTKO	P0016 P0019 P0365 P0366 P0390 P0391
		GetEPSR_b_ExhSnsrFaultActive	ExhaustCamSensor_FA	P0017 P0019 P0365 P0366 P0390 P0391
		GetEPSR_b_ExhSnsrTestFailTKO	ExhaustCamSensor_TFTKO	P0017 P0018
		GetEPSR_b_CkpToCamCorrInt	CrankIntakeCamCorrFA	P0016 P0019
		GetEPSR_b_CkpToCamCorrExh	CrankExhaustCamCorrFA	P0017 P0336
		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 P0017 P0018 P0019 P0340 P0341 P0345 P0346 P0365 P0366 P0390 P0391
		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
Engine Moding	EMDR	GetEMDR_b_EngModeNotRunTmErr	EngModeNotRunTmErr	P2610 P0118
Cooling System PDT	ECTI	NeECTI_b_ECT_SnsrCktFA	ECT_Sensor_Ckt_FA	P0117 P0118
		NeECTI_b_ECT_SnsrCktTPTKO	ECT_Sensor_Ckt_TPTKO	P0117 P0118
		NeECTI_b_ECT_SnsrCktTFTKO	ECT_Sensor_Ckt_TFTKO	P0117 P0118 P0116 P0119
		NeECTI_b_DfltECT_CondDtctd	ECT_Sensor_DefaultDetected	P0117 P0118 P0116 P0119 P0128
		NeECTI_b_ECT_SnsrFA	ECT_Sensor_FA	P0117 P0118 P0116 P0119
		NeECTI_b_ECT_SnsrTFTKO	ECT_Sensor_TFTKO	P0117
		NeECTI_b_ECT_SnsrPerfFA	ECT_Sensor_Perf_FA	P0116 P0118
		VeECTI_b_ECT_SnsrCktFP	ECT_Sensor_Ckt_FP	P0117
		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 P0598 P0599
		NeTHMD_b_ThstCntrlFA	THMR_Therm_Control_FA	P0597 P00B4
		NeTHMD_b_ERTSnsrCktFA	THMR_RCT_Sensor_Ckt_FA	P00B3 P0118 P0116 P00B6
		NeTHMD_b_ECTSnsrCktFA	THMR_ECT_Sensor_Ckt_FA	P0117 P0132 P0134 P2A00
O2 PDT	OXYR	VaOXYI_O2_TestFailedThisKeyOn[CiFADR_FuelBank1	O2S_Bank_ 1_TFTKO	P0131 P0152 P0154 P2A03
		VaOXYI_O2_TestFailedThisKeyOn[CiFADR_FuelBank2]	O2S_Bank_ 2_TFTKO	P0151 P0131 P0132 P0133 P0134 P0135 P0053 P1133 P015A P015B P0030
		NeOXYI_b_Bank1Snsr1_FA	O2S_Bank_1_Sensor_1_FA	P2A00 P013B P013E P013F P2270 P2271 P0137 P0138 P0140 P0141 P0054 P0036
		NeOXYI_b_Bank1Snsr2_FA	O2S_Bank_1_Sensor_2_FA	P013A P0151 P0152 P0153 P0154 P0155 P0059 P1153 P015C P015D P0050
		NeOXYI_b_Bank2Snsr1_FA	O2S_Bank_2_Sensor_1_FA	P2A03 P013D P014A P014B P2272 P2273 P0157 P0158 P0160 P0161 P0060 P0056

		Fault Bundles Produced (Fault Bundles Consumed - from line 364)	Cert Doc Bundle Name	Pcodes													
		NeOXYI_b_Bank2Snsr2_FA	O2S_Bank_2_Sensor_2_FA	P013C	P0138	P0140	P0036	P0054	P0141	P2270	P2271						
		NeOXYI_b_PO2_CntrlBank1Snsr2_FA	PO2S_Bank_1_Snsr_2_FA	P0137	P0158	P0160	P0056	P0060	P0161	P2272	P2273						
		NeOXYI_b_PO2_CntrlBank2Snsr2_FA	PO2S_Bank_2_Snsr_2_FA	P0157													
					P0202	P0203	P0204	P0205	P0206	P0207	P0208						
	FULR	GetFULR_b_FuelInjCkt_FA	FuelInjectorCircuit_FA	P0201	P0264	P0267	P0270	P0273	P0276	P0279	P0282						
				P0261	P0265	P0268	P0271	P0274	P0277	P0280	P0283						
				P0262	P2150	P2153	P2156	P216B	P216E	P217B	P217E						
				P2147	P2151	P2154	P2157	P216C	P216F	P217C	P217F						
				P2148	P1249	P124A	P124B	P124C	P124D	P124E	P124F						
				P1248													
					P0202	P0203	P0204	P0205	P0206	P0207	P0208						
	FULR	GetFULR_b_FuelInjCkt_TFTKO	FuelInjectorCircuit_TFTKO	P0201	P0264	P0267	P0270	P0273	P0276	P0279	P0282						
				P0261	P0265	P0268	P0271	P0274	P0277	P0280	P0283						
				P0262	P2150	P2153	P2156	P216B	P216E	P217B	P217E						
				P2147	P2151	P2154	P2157	P216C	P216F	P217C	P217F						
				P2148	P1249	P124A	P124B	P124C	P124D	P124E	P124F						
				P1248													
					P0091	P0092	P00C8	P00C9	P00CA								
	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													
					P0193												
	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													
	EMOR	GetEMOC_b_EngMetalOvertempActv true for calibrated time	EngineMetalOvertempActive	P1258													
					P0034	P0035	P0045	P0047	P0048	P0243	P0245	P0246	P0247	P0249	P0250		
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	P0047	P0245	P0249										
		GetBSTR_b_PCA_CktLoTFTKO	BSTR_b_PCA_CktLoTFTKO	P0034	P0047	P0245	P0249										
		GetBSTR_b_PCA_CktLoFA	BSTR_b_PCA_CktLoFA	P0034	P166E												
		GetBSTR_b_PstnCntrlFA	BSTR_b_PstnCntrlFA	P166D													
		GetBSTR_b_PstnCntrlTooLoFA	BSTR_b_PstnCntrlTooLoFA	P166D													
		GetBSTR_b_PstnCntrlTooHiFA	BSTR_b_PstnCntrlTooHiFA	P166E													
		GetBSTR_b_PstnCntrlTooLoTFTKO	BSTR_b_PstnCntrlTooLoTFTKO	P166D													
		GetBSTR_b_PstnCntrlTooHiTFTKO	BSTR_b_PstnCntrlTooHiTFTKO	P166E	P2564	P2565											
		GetBSTR_b_PCA_PstnSnsrFA	BSTR_b_PCA_PstnSnsrFA	P003A	P2564	P2565											
		GetBSTR_b_PCA_PstnSnsrTFTKO	BSTR_b_PCA_PstnSnsrTFTKO	P003A	P0034	P0035	P00C0	P00C1	P00C2								
		GetBSTR_b_TurboBypassCktFA	BSTR_b_TurboBypassCktFA	P0033	P0034	P0035	P00C0	P00C1	P00C2								
		GetBSTR_b_TurboBypassCktTFTKO	BSTR_b_TurboBypassCktTFTKO	P0033	P023C												
		GetBSTR_b_IC_PmpCktFA	BSTR_b_IC_PmpCktFA	P023A	P0299	P0033	P0034	P0035	P0045	P0047	P0048	P0243	P0245	P0246	P2261	P0247	P0249	P0250
		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													
		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_PresCntrlTooLoFA	BSTR_b_PresCntrlTooLoFA	P0299													
		GetBSTR_b_PresCntrlTooHiFA	BSTR_b_PresCntrlTooHiFA	P0234	P00C1	P00C2											
		GetBSTR_b_TurboBypB_CktFA	BSTR_b_TurboBypB_CktFA	P00C0	P00C1	P00C2											
		GetBSTR_b_TurboBypB_CktTFTKO	BSTR_b_TurboBypB_CktTFTKO	P00C0													
					P0325	P0326	P0327	P0328	P0330	P0332	P0333	P06B6	P06B7				
Spark/ESC	KNKR	VeKNKR_b_KS_CktPerfB1B2_FA	KS_Ckt_Perf_B1B2_FA	P0324													
					P0352	P0353	P0354	P0355	P0356	P0357	P0358						
Spark/ESC	SPKR	VeSPKR_b_EST_DriverFltActive	IgnitionOutputDriver_FA	P0351													
					P0507												
Speed Control	SPDR	GetSPDR_b_IAC_SysRPM_FA	IAC_SystemRPM_FA	P0506													
Speed Control	TESR_M	GetDFIR_e_TCM_EngSpdReqCkt	TCM_EngSpdReqCkt	P150C													
					P2123	P06A3											
ETC	APSR	GetAPSR_PPS_1_OOR_Flt_Composite()	PPS1_OutOfRange_Composite	P2122	P2128	P0697											
		GetAPSR_PPS_2_OOR_Flt_Composite()	PPS2_OutOfRange_Composite	P2127	P2123	P06A3											
		GetAPSR_b_PPS_1_OOR_Flt_Cmposite()	PPS1_OutOfRange_Composite	P2122	P2128	P0697											
		GetAPSR_b_PPS_2_OOR_Flt_Cmposite()	PPS2_OutOfRange_Composite	P2127	P2123												
		GetAPSR_b_PPS_1_OutofRangeFlt()	PPS1_OutOfRange	P2122	P2128												
		GetAPSR_b_PPS_2_OutofRangeFlt()	PPS2_OutOfRange	P2127	P2123												
		GetAPSR_PPS_1_OutofRangeFlt()	PPS1_OutOfRange	P2122	P2128												
		GetAPSR_PPS_2_OutofRangeFlt()	PPS2_OutOfRange	P2127	P2123	P2127	P2128	P2138	P0697	P06A3							
		GetAPSR_b_PedalFailure	AcceleratorPedalFailure	P2122													
	MEMR	GetMEMR_b_CM_RAM_ErrFA()	ControllerRAM_Error_FA	P0604													
	PISR	GetPISR_b_ECU_ProcPerf_FA()	ControllerProcessorPerf_FA	P0606	P0123	P06A3											
	TPSR	GetTPSR_b_TPS1_OOR_FltComposite()	TPS1_OutOfRange_Composite	P0122	P0223	P06A3											
		GetTPSR_b_TPS2_OOR_FltComposite()	TPS2_OutOfRange_Composite	P0222	P0123	P0222	P0223	P2135									
		GetTPSR_b_FaultActive_TPS()	TPS_FA	P0122	P0123	P0222	P0223	P2135									
		GetTPSR_b_TFTKO_TPS()	TPS_TFTKO	P0122	P0121	P1104	P2100	P2101	P2102	P2103							
		GetTPSR_b_PerfFaultActive_TPS()	TPS_Performance_FA	P0068	P0121	P1104	P2100	P2101	P2102	P2103							
		GetTPSR_b_PerfTFTKO_TPS()	TPS_Performance_TFTKO	P0068	P0123	P0222	P0223	P2135									
		GetTPSR_FaultPending_TPS()	TPS_FaultPending	P0122	P0123	P0222	P0223	P2135									
		GetTPSR_b_FaultPending_TPS()	TPS_FaultPending	P0122	P0122	P0123	P0222	P0223	P16F3	P1104	P2100	P2101	P2102	P2103	P2135		
		GetTPSR_ThrotAuthDefault()	TPS_ThrottleAuthorityDefaulted	P0068	P0122	P0123	P0222	P0223	P0606	P16F3	P1104	P2100	P2101	P2102	P2103		
	SRAR	GetSRAR_b_EnginePowerLimited()	EnginePowerLimited	P0068	P160D	P0191	P0192	P0193	P00C8	P00C9	P00CA	P0090	P0091	P0092	P228C		
				P160E	P2138	P2122	P2123	P2127	P2128	P228D	P06A3	P0697					
				P2135													

12 OBDG02 Engine Diagnostics

		Fault Bundles Produced (Fault Bundles Consumed - from line 364)	Cert Doc Bundle Name	Pcodes
	VLTR	GetVLTR_b_V5A_FA()	5VoltReferenceA_FA	P0641
		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 P0446
		GetEVPR_b_EmissionSys_FA	EvapEmissionSystem_FA	P0455 P0453
		GetEVPR_b_FTP_Circuit_FA	FuelTankPressureSnsrCkt_FA	P0452
Eng Interface	FANR	GetFANR_b_FanSpeedTooHiFA	CoolingFanSpeedTooHigh_FA	P0495 P0481 P0482
		GetFANR_b_OutputDriver_FA	FanOutputDriver_FA	P0480 P0462 P0463 P2066 P2067 P2068 **P0977**
Evap	FLVR	GetFLVR_b_FuelLvlDataFlt	FuelLevelDataFault	P0461 **P07C0 P182E P1915**
Engine	PMDR	GetPMDR_b_PT_RelayFlt	PowertrainRelayFault	P1682
		GetPMDC_b_PT_RelayStOnFA	PowertrainRelayStateOn_FA	P0685
		GetPMDC_b_PT_RelayStOnError	PowertrainRelayStateOn_Error	P0685 **P07C0**
		GetPMDR_b_IgnOffTmFA	IgnitionOffTimer_FA	P2610
		GetPMDR_b_IgnOffTmeVld	IgnitionOffTimeValid	P2610
		GetEMDR_b_EngModeNotRunTmErr	EngineModeNotRunTimerError	P2610 **P07C0 P182E P1915**
		GetEMDR_b_EngModeNotRunTmFA	EngineModeNotRunTimer_FA	P2610 **P07C0 P182E P1915**
Vehicle Infrastructure PMT	VSPR	GetVSPR_b_VehicleSpeedFA	VehicleSpeedSensor_FA	P0502 P0503 P0722 P0723
		GetVSPR_b_VehicleSpeedError	VehicleSpeedSensorError	P0502 P182E P1915
Trans	TGRR	GetTGRR_TransGrDfltd	TransmissionGearDefaultec	MYD/MYC/MYB: P1915 P182A P182C P182D P182E P182F M30/M32/M70: P182E P1915
	TRGR	GetTRGR_b_TransEngdStEmisFlt	TransmissionEngagedState_FA	MYD/MYC/MYB: P1915 P182A P182C P182D P182E P182F M30/M32/M70: P0722 P0723 P077D P077C
		GetTOSR_b_TOS_FA	Transmission Output Shaft Angular Velocity Validity	MYD/MYC/MYB: P0722 P0723 M30/M32/M70: **P0751 P0752 P0756 P0757 P0973 P0974 P0976**
		GetSHPR_b_ShfSlndFlt	**no validity name is assigned to this fault bundle**	**P0722 P0723 P077C P077D**
		GetTOSR_b_OutRotRollgCntValid	**Trans Output Rotations Rolling Count Validity**	**P0716 P0717 P0722 P0723 P077C P077D P07BF**
		GetTGRR_TransGrDfltd	**Transmission Actual Gear Validity**	**P182E P1915**
		GetTRGR_b_TransEngdStEmisFlt	**Transmission Engaged State Validity**	**P182E P1915**
		GetTGRR_TransGrDfltd	**Transmission Estimated Gear Validity**	**P0716 P0717 P0722 P0723 P077C P077D P07BF**
		GetTRTR_GearRatioValidity	**Transmission Gear Ratio Validity**	**P182E P1915**
		GetTRGR_PRNDL_StateDfltd	**Transmission Gear Selector Position Validity**	**P0667 P0668 P0669 P0711 P0712 P0713**
		GetTFTR_b_TransOilVld	**Transmission Oil Temperature Validity**	**P0716 P0717 P0722 P0723 P077C P077D P07BF**
		GetTRTR_b_TransOverallRatioVld	**Transmission Overall Actual Torque Ratio Validity**	**P0716 P0717 P0722 P0723 P077C P077D P07BF**
		GetTRTR_b_TransOverallRatioVld	**Transmission Overall Estimated Torque Ratio Validity**	**P182E P1915**
		GetTRGR_PRNDL_StateDfltd	**Transmission Shift Lever Position Validity**	**P0716 P0717 P07BF P07C0**
		GetTBNR_TurbineSpdValid	**Transmission Turbine Angular Velocity Validity**	
Oil Attributes PDT	EOTR			P0198
If sensor application		GetEOTI_b_EngOilTempSnsrCktFA()	EngOilTempSensorCircuitFA	P0197 IAT_SensorCircuitFA
if modeled		GetEOTI_b_EngOilModelValid	EngOilModeledTempValid	ECT_Sensor_FA
Oil Attributes PDT	EOPR	GetEOPR_b_ValidEngOil	EngOilPressureSensorCktFA	P0522 P0522 P0523
		GetEOPR_b_EOP_SnsrFA	EngOilPressureSensorFA	P0521 P3409 P3417 P3425 P3433 P3441 P3449
AFM PDT	CDAR	GetCDAR_b_AllDeacDriver_TFTKO	CylnderDeacDriverTFTKO	P3401 P0557 P0558
AFM PDT	BTRR	GetBBVR_b_BrakeBoostVacFA	BrakeBoosterSensorFA	P0556 P0557 P0558
If sensor application		GetBBVR_b_BrkBoostVacVld	BrakeBoosterVacuumValid	P0556 MAP_SensorFA
if modeled		GetBBVR_b_BrkBoostVacVld	BrakeBoosterVacuumValid	VehicleSpeedSensor_FA P3409 P3417 P3425 P3433 P3441 P3449
AFM PDT	CDAR	GetCDAR_b_AllDeacDriver_TFTKO	CylnderDeacDriverTFTKO	P3401 FuelInjec FuelInjec FuelTrim FuelTrim MAF_Se MAP_Se EGRValuePerforamnce_FA
Engine Torque PDT	ETQR	GetETQR_EngineTorqueInaccurate	EngineTorqueEstInaccurate	EngineMisfireDetected_FA P0172
FASD	FADR	GetFADR_b_FuelTrimSysB1_FA	FuelTrimSystemB1_FA	P0171 P0175
		GetFADR_b_FuelTrimSysB2_FA	FuelTrimSystemB2_FA	P0174 P0172
		GetFADR_b_FuelTrimSysB1_TFTKO	FuelTrimSystemB1_TFTKO	P0171 P0175
		GetFADR_b_FuelTrimSysB2_TFTKO	FuelTrimSystemB2_TFTKO	P0174

12 OBDG02 Engine Diagnostics

		Fault Bundles Produced (Fault Bundles Consumed - from line 364)	Cert Doc Bundle Name	Pcodes
Closed Loop Fuel System Diagnostics	FADR	None (no diagnaostics disable based on secondary fuel trim faults)	N/A	N/A
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_PresSensorFaul	AIRSystemPressureSensor FA	P2430 P2431 P2432 P2433 P2435 P2436 P2437 P2438 P2440 P2444
		GetAIRR_b_AIR_Sys_FA	AIR System FA	P0411
		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)	ClutchPositionSensorCircuitLo FA	P0807
		GetDFIR_FaultActive(CeDFIR_e_ClchPstnSnsrCktHi)	ClutchPositionSensorCircuitHi FA	P0808
		GetDFIR_FaultActive(CeDFIR_e_ClchPstnNotLrnd)	ClutchPositionSensorNotLearned	P080A
Closed Loop Flex Fue	E85R	GetE85R_b_FFS_CompFA	Ethanol Composition Sensor FA	P0178 P0179 P2269

Other Definitions

Evap	FLVD	GetFLVR_b_LowFuelConditionDiag	LowFuelConditionDiagnostic	Flag set to TRUE if the fuel level <10 % AND FuelLevelDataFault No Active DTCs: 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 least0.0 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

FASD	FADR	GetSPDR_b_IAC_SysRPM_FA GetMAPR_b_MAP_SnsrFA GetMAFR_b_MAF_SnsrFA GetMAFR_b_MAF_SnsrTFTKO GetAIRR_b_AIR_Sys_FA GetEVPR_b_Purg1SlndCkt_FA GetEVPR_b_FlowDurNonPurg_FA GetEVPR_b_VentSlndCkt_FA GetEVPR_b_SmallLeak_FA GetEVPR_b_EmissionSys_FA GetEVPR_b_FTP_Circuit_FA GetE85R_b_FFS_CompFA GetFULR_b_FuelInjCkt_FA GetMSFR_b_EngMisfDtctd_FA GetEGRR_b_EGR_ValvePerf_FA GetEGRR_b_EGR_ValveCkt_FA

		Fault Bundles Produced (Fault Bundles Consumed - from line 364)	Cert Doc Bundle Name	Pcodes
		GetMAPR_e_EngVacStatus GetAAPR_e_AmbPresDfltdStatus GetAAPR_b_TC_BoostPresSnsrFA GetOXYR_b_Bank1Snsr1_FA GetOXYR_b_Bank2Snsr1_FA		
Closed Loop Fuel System Diagnostics	FADR	None (secondary fuel trim diagnostic does not disable for any faults)	N/A	N/A
Clutch	MTCR	GetEPSR_b_CrankSnsr_FA GetVSPR_b_VehicleSpeedFA GetTOSR_b_TOS_FA GetDFIR_FaultActive(CeDFIR_e_ClchPstnSnsrCktLo) GetDFIR_FaultActive(CeDFIR_e_ClchPstnSnsrCktHi) GetVLTR_b_V5B_FA()	CrankSensorFA VehicleSpeedSensor_FA Transmission Output Shaft Angular Velocity Validity ClutchPositionSensorCktLo FA ClutchPositionSensorCktHi FA 5VoltReferenceB_FA	
Secondary Air	AIRR	GetAIRD_b_AIR_PresSensorFaul GetDFIR_FaultActive(CeDFIR_e_AIR_SlndCktB1) GetDFIR_FaultActive(CeDFIR_e_AIR_PmpCktB1) GetMAFR_b_MAF_SnsrFA GetAAPR_e_AAP_DfltdStatus GetEITR_b_IAT_SnsrFA GetECTR_b_ECT_SnsrFA GetMSFR_b_EngMisfDtctd_FA GetCATR_b_CatSysEffLoB1_FA GetCATR_b_CatSysEffLoB2_FA GetMEMR_b_ECM_PCM_ProcPerf_FA GetVLTR_b_V5A_FA GetVLTR_b_V5B_FA GetSPKR_b_EST_DriverFltActive GetFULR_b_FuelInjCkt_FA		
Closed Loop Flex Fue	E85R	None		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Fuel Rail Pressure (FRP) Sensor Performance (rationality)	P018B	This DTC detects a fuel pressure sensor response stuck within the normal operating range	Absolute value of fuel pressure change as sensed during intrusive test.	<= 30 kPa			Frequency: Continuous; 12.5 ms loop. 60 seconds between intrusive tests that pass Intrusive test requested if fuel system is clamped for >= 5 seconds or fuel pressure error variance <= typically (0.3 to 0.6) (calculated over a 2.5sec period); otherwise report pass	DTC Type A 1 trip
					1. FRP Circuit Low DTC (P018C)	Not active		
					2. FRP Circuit High DTC (P018D)	Not active		
					3. FuelPump Circuit Low DTC (P0231)	Not active	Duration of intrusive test is fueling related (5 to 12 seconds).	
					4. FuelPump Circuit High	Not active		
					5. FuelPump Circuit Open DTC (P023F)	Not active	Intrusive test is run when fuel flow is below Max allowed fuel flow rate (Typical values in the range of 11 to 50 g/s)	
					6. Reference Voltage DTC (P0641)	Not active		
					7. Fuel Pump Control Module Driver Over-temperature DTC (P064A)	Not active		
					8. Control Module Internal Performance DTC (P0606)	Not active		
					9. Engine run time	>=5 seconds		
					10. Emissions fuel level (PPEI $3FB)	Not low		
					11. Fuel pump control	Enabled		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
					12. Fuel pump control state 13. Engine fuel flow 14. ECM fuel control system failure (PPEI $1ED)	Normal or FRP rationality control > 0.047 g/s Not failed		
Fuel Rail Pressure (FRP) Sensor Circuit Low Voltage	P018C	This DTC detects if the fuel pressure sensor circuit is shorted low	FRP sensor voltage	< 0.14 V	 Ignition	 Run or Crank	72 failures out of 80 samples 1 sample/12.5 ms	DTC Type A 1 trip
Fuel Rail Pressure (FRP) Sensor Circuit High Voltage	P018D	This DTC detects if the fuel pressure sensor circuit is shorted high	FRP sensor voltage	> 4.86 V	 Ignition	 Run or Crank	72 failures out of 80 samples 1 sample/12.5 ms	DTC Type A 1 trip
Fuel Pump Control Circuit Low Voltage	P0231	This DTC detects if the fuel pump control circuit is shorted to low	Fuel Pump Current	> 14.48A	 Ignition OR HS Comm OR Fuel Pump Control AND Ignition Run/Crank Voltage	 Run or Crank enabled enabled 9V < voltage < 32V	72 test failures in 80 test samples if Fuel Pump Current <100A 1 sample/12.5 ms	DTC Type A 1 trip
Fuel Pump Control Circuit High Voltage	P0232	This DTC detects if the fuel pump control circuit is shorted to high	Voltage measured at fuel pump circuit	> 3.86 V	Commanded fuel pump output	0% duty cycle (off)	36 test failures in 40 test samples; 1 sample/12.5ms	DTC Type A 1 trip

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Control Module Not Programmed	P0602	Indicates that the FSCM needs to be programmed	This DTC is set via calibration, when KeMEMD_b_NoStart Cal	= TRUE	Ignition OR HS Comm OR Fuel Pump Control	Run or Crank enabled enabled	Runs once at power up	DTC Type A 1 trip
Control Module Long Term Memory Reset	P0603	Non-volatile memory checksum error at controller power-up	Checksum at power-up	≠ checksum at power-down	Ignition OR HS Comm OR Fuel Pump Control	Run or Crank enabled enabled	1 failure Frequency: Once at power-up	DTC Type A 1 trip
Control Module Random Access Memory (RAM)	P0604	Indicates that control module is unable to correctly write and read data to and from RAM	Data read	≠ Data written	Ignition OR HS Comm OR Fuel Pump Control	Run or Crank enabled enabled	1 failure if it occurs during the first RAM test of the ignition cycle, otherwise 5 failures Frequency: Runs continuously in the background.	DTC Type A 1 trip
Control Module Internal Performance 1. Main Processor Configuration Register Test	P0606	This DTC indicates the FSCM has detected an internal processor fault or external watchdog fault (PID 2032 discriminates the source of the fault)	1. For all I/O configuration register faults: •Register contents	Incorrect value.	Ignition	Run or Crank	Tests 1 and 2 1 failure Frequency: Continuously (12.5ms)	DTC Type A 1 trip

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
					OR HS Comm OR Fuel Pump Control	 enabled enabled		
2. Processor clock test			2. For Processor Clock Fault: •EE latch flag in EEPROM. OR • RAM latch flag.	0x5A5A 0x5A	1. For all I/O configuration register faults: •KeMEMD_b_ProcFltCfgRegEnbl 2. For Processor Clock Fault: •KeMEMD_b_ProcFltCLKDiagEnbl	 TRUE TRUE	Test 3 3 failures out of 15 samples 1 sample/12.5 ms	
3. External watchdog test			3. For External Watchdog Fault: • Software control of fuel pump driver	Control Lost	3. For External Watchdog Fault: •KeFRPD_b_FPExtWDogDiagEnbl 3. For External Watchdog Fault: •Control Module ROM(P0601) 3. For External Watchdog Fault: •Control Module RAM(P0604)	 TRUE not active not active		
Control Module Long Term Memory (EEPROM) Performance	P062F	Indicates that the NVM Error flag has not been cleared	Last EEPROM write	Did not complete	Ignition OR HS Comm OR Fuel Pump Control	Run or Crank enabled enabled	1 test failure Once on controller power-up	DTC Type A 1 trip

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
5Volt Reference Circuit (Short High/Low/Out of Range)	P0641	Detects continuous short or out of range on the #1 5V sensor reference circuit	Reference voltage AND Output OR Reference voltage AND Output OR Reference voltage AND Output	>= 0.5V inactive >= 5.5V active <= 4.5V active	Ignition	Run or Crank	15 failures out of 20 samples 1 sample/12.5 ms	DTC Type A 1 trip
			OR Reference voltage	> 105% nominal (i.e., 5.25V) OR <95% nominal (i.e., 4.75V)				
Fuel Pump Control Module - Driver Over-	P064A	This DTC detects if an internal fuel pump driver overtemperature condition exists under normal operating conditions	Pump Driver Temp	> 150C	Ignition OR HS Comm OR Fuel Pump Control KeFRPD_b_FPOverTemp DiagEnbl Ignition Run/Crank	Run or Crank Enabled Enabled TRUE 9V<voltage<32V	3 failures out of 15 samples 1 sample/12.5 ms	DTC Type B 2 trips
Ignition 1 Switch Circuit Low Voltage	P2534	This DTC detects if the Ignition1 Switch circuit is shorted to low or open	Ignition 1 voltage	<= 6 V	Engine	Running	180 failures out of 200 samples 1 sample/25.0 ms	DTC Type A 1 trip

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
					6. FuelPump Circuit Open DTC (P023F)	Not active		
					7. Reference Voltage DTC (P0641)	Not active		
					8. Fuel Pump Control Module Driver Over-temperature DTC's (P064A)	Not active		
					9. Control Module Internal Performance DTC (P0606)	Not active		
					10. An ECM fuel control system failure (PPEI $1ED)	Not occurred		
					11. The Barometric pressure (PPEI $4C1) signal	Valid (for absolute fuel pressure sensor)		
					12. Engine run time	>= 30 seconds		
					13. Emissions fuel level (PPEI $3FB)	Not low		
					14. Fuel pump control	Enabled		
					15. Fuel pump control state	Normal		
					16. Battery Voltage	11V<=voltage=<32V		
					17. Fuel flow rate **(See Supporting Tables tab)**	> 0.047 g/s **AND** <= Max allowed fuel flow rate as a function of desired rail pressure & Vbatt (Typical values in the range of 11 to 50 g/s)		

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Fuel Rail Pressure (FRP) Sensor Performance (rationality)	P018B	This DTC detects a fuel pressure sensor response stuck within the normal operating range	Absolute value of fuel pressure change as sensed during intrusive test.	<= 30 kPa			Frequency: Continuous; 12.5 ms loop. 60 seconds between intrusive tests that pass Intrusive test requested if fuel system is clamped for >= 5 seconds or fuel pressure error variance <= typically (0.3 to 0.6) (calculated over a 2.5sec period); otherwise report pass	DTC Type A 1 trip
					1. FRP Circuit Low DTC (P018C)	Not active		
					2. FRP Circuit High DTC (P018D)	Not active		
					3. FuelPump Circuit Low DTC (P0231)	Not active	Duration of intrusive test is fueling related (5 to 12 seconds).	
					4. FuelPump Circuit High	Not active		
					5. FuelPump Circuit Open DTC (P023F)	Not active	Intrusive test is run when fuel flow is below Max allowed fuel flow rate (Typical values in the range of 11 to 50 g/s)	
					6. Reference Voltage DTC (P0641)	Not active		
					7. Fuel Pump Control Module Driver Over-temperature DTC (P064A)	Not active		
					8. Control Module Internal Performance DTC (P0606)	Not active		
					9. Engine run time	>=5 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
					10. Emissions fuel level (PPEI $3FB) 11. Fuel pump control 12. Fuel pump control state 13. Engine fuel flow 14. ECM fuel control system	Not low Enabled Normal or FRP rationality control > 0.047 g/s Not failed		
Fuel Rail Pressure (FRP) Sensor Circuit Low Voltage	P018C	This DTC detects if the fuel pressure sensor circuit is shorted low	FRP sensor voltage	< 0.14 V	Ignition	Run or Crank	72 failures out of 80 samples 1 sample/12.5 ms	DTC Type A 1 trip
Fuel Rail Pressure (FRP) Sensor Circuit High Voltage	P018D	This DTC detects if the fuel pressure sensor circuit is shorted high	FRP sensor voltage	> 4.86 V	Ignition	Run or Crank	72 failures out of 80 samples 1 sample/12.5 ms	DTC Type A 1 trip
Fuel Pump Control Circuit Low Voltage	P0231	This DTC detects if the fuel pump control circuit is shorted to low	Fuel Pump Current	> 14.48A	Ignition OR HS Comm OR Fuel Pump Control AND Ignition Run/Crank Voltage	Run or Crank enabled enabled 9V < voltage < 32V	72 test failures in 80 test samples if Fuel Pump Current <100A 1 sample/12.5 ms	DTC Type A 1 trip

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Mechanical Actuator Performance (Functionality)	P059F	Compare commanded shutter position to sensed position	Failure to achieve commanded position	Two (2) consecutive intrusive tests fail to achieve commanded position. Intrusive tests are triggered immediately following any failure to achieve a commanded position.	1. Power mode 2. Shutter Control 3. Ignition Run/Crank Voltage	Run/Crank Enabled 11V < voltage < 32V	Frequency: 1 sample after every shutter movement. Intrusive test requested if shutter movement is commanded and position feedback differs after 19.5 seconds; otherwise report pass. Duration of intrusive test is shutter movement related (40 to 80 seconds).	DTC Type B 2 trips
Control Module Read Only Memory (ROM)	P0601	This DTC will be stored if any software or calibration check sum is incorrect	Calculated Checksum (CRC16)	≠ stored checksum for any of the parts (boot, software, application calibration, system calibration)	Ignition OR HS Comm OR Fuel Pump Control	Run or Crank enabled enabled	1 failure if it occurs during the first ROM test of the ignition cycle, otherwise 5 failures Frequency: Runs continuously in the background	DTC Type A 1 trip

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Control Module Long Term Memory (EEPROM) Performance	P062F	Indicates that the NVM Error flag has not been cleared	Last EEPROM write	Did not complete	Ignition OR HS Comm OR Fuel Pump Control	Run or Crank enabled enabled	1 test failure Once on controller power-up	DTC Type A 1 trip
5Volt Reference Circuit (Short High/Low/Out of Range)	P0641	Detects continuous short or out of range on the #1 5V sensor reference circuit	Reference voltage AND Output OR Reference voltage AND Output OR Reference voltage AND Output	>= 0.5V inactive >= 5.5V active <= 4.5V active	Ignition	Run or Crank	15 failures out of 20 samples 1 sample/12.5 ms	DTC Type A 1 trip
			OR Reference voltage	> 105% nominal (i.e., 5.25V) OR <95% nominal (i.e., 4.75V)				
Fuel Pump Control Module -	P064A	This DTC detects if an internal fuel pump driver overtemperature condition exists under normal operating conditions	Pump Driver Temp	> 150C	Ignition OR HS Comm OR Fuel Pump Control	Run or Crank Enabled Enabled	3 failures out of 15 samples 1 sample/12.5 ms	DTC Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
					KeFRPD_b_FPOverTempDia Ignition Run/Crank	TRUE 9V<voltage<32V		
Ignition 1 Switch Circuit Low Voltage	P2534	This DTC detects if the Ignition1 Switch circuit is shorted to low or open	Ignition 1 voltage	<= 6 V	Engine	Running	180 failures out of 200 samples 1 sample/25.0 ms	DTC Type A 1 trip
Fuel Pump Flow Performance (rationality)	P2635	This DTC detects degradation in the performance of the SIDI electronic return-less fuel system	Filtered fuel rail pressure error	<= Low Threshold (function of desired fuel rail pressure and fuel flow rate. 15% of resultant Target Pressure) OR >= High Threshold (function of desired fuel rail pressure and fuel flow rate. 15% of resultant Target Pressure) **(See Supporting Tables tab)**	1. FRP Circuit Low DTC (P018C)	Not active	Filtered fuel rail pressure error Time Constant = 12.5 seconds Frequency: Continuous 12.5 ms loop	DTC Type B 2 trips
					2. FRP Circuit High DTC (P018D)	Not active .		
					3. Fuel Rail Pressure Sensor Performance DTC (P018B)	Not active		
					4. FuelPump Circuit Low DTC (P0231)	Not active		
					5. FuelPump Circuit High DTC (P0232)	Not active		
					6. FuelPump Circuit Open DTC (P023F)	Not active		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
					7. Reference Voltage DTC (P0641)	Not active		
					8. Fuel Pump Control Module Driver Over-temperature DTC's (P064A)	Not active		
					9. Control Module Internal Performance DTC (P0606)	Not active		
					10. An ECM fuel control system failure (PPEI $1ED)	Not occurred		
					11. The Barometric pressure (PPEI $4C1) signal	Valid (for absolute fuel pressure sensor)		
					12. Engine run time	>= 30 seconds		
					13. Emissions fuel level (PPEI $3FB)	Not low		
					14. Fuel pump control	Enabled		
					15. Fuel pump control state	Normal		
					16. Battery Voltage	11V<=voltage=<32V		
					17. Fuel flow rate **(See Supporting Tables tab)**	> 0.047 g/s **AND** <= Max allowed fuel flow rate as a function of desired rail pressure & Vbatt (Typical values in the range of 11 to 50 g/s)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
					18. Fuel Pressure Control System	Is not responding to an over-pressurization due to pressure build during DFCO or a decreasing desired pressure command.		
Control Module Communication Bus “A” Off	U0073	Detects that a CAN serial data bus shorted condition has occurred to force the CAN device driver to enter a bus-off state	Bus Status	Off	Power mode	Run/Crank	5 failures out of 5 samples (5 seconds)	DTC Type B 2 trips
Lost Communication With ECM/PCM “A”	U0100	Detects that CAN serial data communication has been lost with the ECM	Message $0C9	Undetected	1. Power mode 2. Ignition Run/Crank Voltage 3. U0073	Run/Crank 11V<voltage<32V not active	12 failures out of 12 samples (12 seconds)	DTC Type B 2 trips
Lost Communication With "Actuator"	U0284	Detects loss of communication condition has occurred between ECU and device Active Grill Air Shutter "A" actuator	PWM Message	Undetected	1. Power mode 2. Ignition Run/Crank Voltage	Run/Crank 11V < voltage < 32V	Frequency: 100ms 150 failures out of 167 samples	DTC Type B 2 trips

FSCM Supporting Tables LUJ, LUV

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

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

	200	250	300	350	400	450	500	550	600
4.5	10.87	10.87	10.87	10.87	10.87	10.87	10.87	8.438	6.016
6	10.87	10.87	10.87	10.87	10.87	10.87	10.87	8.438	6.016
7.5	10.87	10.87	10.87	10.87	10.87	10.87	10.87	8.438	6.016
9	10.87	10.87	10.87	10.87	10.87	10.87	10.87	8.438	6.016
10.5	10.87	10.87	10.87	10.87	10.87	10.87	10.87	8.438	6.016
12	10.87	10.87	10.87	10.87	10.87	10.87	10.87	10.87	10.87
13.5	10.87	10.87	10.87	10.87	10.87	10.87	10.87	10.87	10.87
15	10.87	10.87	10.87	10.87	10.87	10.87	10.87	10.87	10.87
16.5	10.87	10.87	10.87	10.87	10.87	10.87	10.87	10.87	10.87
18	10.87	10.87	10.87	10.87	10.87	10.87	10.87	10.87	10.87
19.5	10.87	10.87	10.87	10.87	10.87	10.87	10.87	10.87	10.87
21	10.87	10.87	10.87	10.87	10.87	10.87	10.87	10.87	10.87
22.5	10.87	10.87	10.87	10.87	10.87	10.87	10.87	10.87	10.87
24	10.87	10.87	10.87	10.87	10.87	10.87	10.87	10.87	10.87
25.5	10.87	10.87	10.87	10.87	10.87	10.87	10.87	10.87	10.87
27	10.87	10.87	10.87	10.87	10.87	10.87	10.87	10.87	10.87
28.5	10.87	10.87	10.87	10.87	10.87	10.87	10.87	10.87	10.87

P2635 Fuel Injector curve (grams / second)

X-axis= Fuel Pressure (kiloPascals)

128	148	168	188	208	228	248	268	288	308	328	348	368	388	408	428
3.163	3.255	3.347	3.439	3.531	3.622	3.714	3.806	3.898	3.99	4.082	4.174	4.266	4.358	4.449	4.542

448	468	488	508	528	548	568	588	608	628	648	668	688	708	728	748	768
4.633	4.725	4.817	4.909	5.001	5.093	5.185	5.277	5.368	5.46	5.552	5.644	5.736	5.828	5.92	6.012	6.104

FSCM Supporting Tables LUJ, LUV

P2635 Maximum Engine Intake Boost curve (kiloPascals)

X-axis= barometric pressure (kiloPascals)

40	50	60	70	80	90	100	110	120
125	155	185	205	215	215	215	215	215

P2635 Minimum Fuel Injector Pulse Width curve (seconds)

X-axis= engine speed (revolutions / minute)

0	512	1024	1536	2048	2560	3072	3584	4096	4608	5120	5632	6144	6656	7168	7680	8192
0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25

FSCM Supporting Tables LUW

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

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

	200	250	300	350	400	450	500	550	600
4.5	11.7	11.7	11.7	11.7	11.7	11.66	8.758	6.078	3.602
6	11.7	11.7	11.7	11.7	11.7	11.66	8.758	6.078	3.602
7.5	11.7	11.7	11.7	11.7	11.7	11.66	8.758	6.078	3.602
9	11.7	11.7	11.7	11.7	11.7	11.66	8.758	6.078	3.602
10.5	11.7	11.7	11.7	11.7	11.7	11.66	8.758	6.078	3.602
12	11.7	11.7	11.7	11.7	11.7	11.7	11.7	11.7	9.063
13.5	11.7	11.7	11.7	11.7	11.7	11.7	11.7	11.7	11.7
15	11.7	11.7	11.7	11.7	11.7	11.7	11.7	11.7	11.7
16.5	11.7	11.7	11.7	11.7	11.7	11.7	11.7	11.7	11.7
18	11.7	11.7	11.7	11.7	11.7	11.7	11.7	11.7	11.7
19.5	11.7	11.7	11.7	11.7	11.7	11.7	11.7	11.7	11.7
21	11.7	11.7	11.7	11.7	11.7	11.7	11.7	11.7	11.7
22.5	11.7	11.7	11.7	11.7	11.7	11.7	11.7	11.7	11.7
24	11.7	11.7	11.7	11.7	11.7	11.7	11.7	11.7	11.7
25.5	11.7	11.7	11.7	11.7	11.7	11.7	11.7	11.7	11.7
27	11.7	11.7	11.7	11.7	11.7	11.7	11.7	11.7	11.7
28.5	11.7	11.7	11.7	11.7	11.7	11.7	11.7	11.7	11.7

FSCM Supporting Tables LUW

P2635 Fuel Injector Flow curve (grams / second)

X-axis= Fuel Pressure (kiloPascals)

128	148	168	188	208	228	248	268	288	308	328	348	368	388	408	428
2.087	2.201	2.316	2.43	2.544	2.658	2.772	2.886	3	3.115	3.229	3.343	3.457	3.571	3.637	3.719

448	468	488	508	528	548	568	588	608	628	648	668	688	708	728	748	768
3.802	3.852	3.953	4.087	4.189	4.291	4.393	4.495	4.597	4.699	4.801	4.903	5.006	5.108	5.21	5.312	5.414

P2635 Minimum Fuel Injector Pulse Width curve (seconds)

X-axis= engine speed (revolutions / minute)

0	512	1024	1536	2048	2560	3072	3584	4096	4608	5120	5632	6144	6656	7168	7680	8192
0.797	0.797	0.797	0.797	0.797	0.797	0.797	0.797	0.797	0.797	0.797	0.797	0.797	0.797	0.797	0.797	0.797