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	60 failures out of 70 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_CamPosErrorLimIc 1 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_CamPos ErrorLimIc1 or > than (30.0 - KtPHSD_phi_CamPos ErrorLimIc1). Desired cam position cannot vary more than 4.0 Cam Deg for at least KtPHSD_t_StablePositi onTimeIc1 seconds (see Supporting Tables)	120 failures out of 150 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	60 failures out of 70 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_CamPosErrorLimEc 1 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_CamPos ErrorLimEc1 or > than (Exh30.0 - KtPHSD_phi_CamPos ErrorLimEc1). Desired cam position cannot vary more than 4.0 Cam Deg for at least KtPHSD_t_StablePositi	120 failures out of 150 samples 100 ms /sample	Trips 2 B Type
Crankshaft Position (CKP)-Camshaft Position (CMP) Correlation Bank 1 Sensor A	P0016	Detects cam to crank misalignment by monitoring if cam sensor pulse for bank 1 sensor A occurs during the incorrect crank position	4 cam sensor pulses more than -12 crank degrees before or 12 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:	 P0335, P0336 P0340, P0341 5VoltReferenceA_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.
						5VoltReferenceB_FA		
					Time since last execution of 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	4 cam sensor pulses more than -12 crank degrees before or 12 crank degrees after nominal position in one cam revolution.		Crankshaft and camshaft position signals are synchronized		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
					Engine is Spinning			
					Cam phaser is in "parked" position			
					No Active DTCs:	P0335, P0336 P0365, P0366 5VoltReferenceA_FA 5VoltReferenceB_FA		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Time since last execution of diagnostic	< 1.0 seconds	One sample per cam rotation	
O2S Heater Control Circuit Bank 1 Sensor 1	P0030	This DTC checks the Heater Output Driver circuit for electrical integrity.	Voltage low during driver open state (indicates short-to-ground or open circuit) or voltage high during driver closed state (indicates short to 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/Super Charger Bypass Valve Control Circuit	P0033	Detect Turbochharger 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 Powertrain relay Voltage Ignition run crank voltage Ignition run crank voltage Engine is not cranking	Enabled >= 11.00 Volts <= 32.00 Volts >= 2.00 Volts <= 6.00 Volts	10 failures out of 20 samples 1 sample every 100ms	Type B 2 trips
Turbo/Super Charger Bypass Valve Control Circuit Low	P0034	Detect Turbochharger 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 Powertrain relay Voltage	Enabled >= 11.00 Volts <= 32.00 Volts	10 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.
					Ignition run crank voltage Ignition run crank voltage Engine is not cranking	>= 2.00 Volts <= 6.00 Volts		
Turbo/Super Charger Bypass Valve Control Circuit High	P0035	Detect Turbochharger 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 Powertrain relay Voltage Ignition run crank voltage Ignition run crank voltage Engine is not cranking	Enabled >= 11.00 Volts <= 32.00 Volts >= 2.00 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
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	ECT_Sensor_FA P2610 IAT_SensorFA	Once per valid cold start	2 trips Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Sensor 2					Coolant – IAT Engine Soak Time Coolant Temp Ignition Voltage Engine Run time	< 8.0 ºC > 28820 seconds -30.0 < ºC < 45.0 < 31.9 volts < 0.00 seconds		
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
			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				

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
				Table, f(Volts). See supporting tables				
Intake Air Temperature Sensor 2 Circuit Performance	P0096	Detects an IAT2 sensor that has stuck in range by comparing to IAT and engine coolant temperature at startup	ABS(Power Up IAT - Power Up IAT2) AND ABS(Power Up ECT – Power Up IAT2) >= ABS(Power Up ECT – Power Up IAT)	> 20 deg C	Time between current ignition cycle and the last time the engine was running No Active DTCs:	> 28800 seconds ECT_Sensor_Ckt_FA IAT_SensorCircuitFA IAT2_SensorCircuitFA	Executes once at the beginning of each ignition cycle if enable conditions are met	Type B 2 trips
Intake Air Temperature Sensor Circuit 2 Low (High Temperature)	P0097	Detects a continuous short to ground in the IAT 2 signal circuit or the IAT 2 sensor	Raw IAT 2 Input	< 49 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
Intake Air Temperature Sensor Circuit 2 High (Low Temperature)	P0098	Detects a continuous open circuit in the IAT 2 signal circuit or the IAT 2 sensor	Raw IAT 2 Input	> 169523 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

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
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
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	See "P00B6: Fail if power up ECT exceeds RCT by these values" in	No Active DTC's	VehicleSpeedSensor_FA IAT_SensorCircuitFA THMR_RCT_Sensor_Ckt_FA THMR_ECT_Sensor_Ckt_FA IgnitionOffTimeValid	1 failure 500 msec/ sample	2 trips Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			ECT at power up & RCT at power up is ≥ an IAT based threshold table lookup value(fast fail).	exceeds RCT by these values" in the Supporting tables section		TimeSinceEngineRunningValid	Once per valid cold start	
					Engine Off Soak Time	> 28800 seconds		
					Non-volatile memory initization	= Not occurred		
					Test complete this trip	= False		
			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.		Test aborted this trip	= False		
					IAT	≥ -7 ºC		
					LowFuel Condition Diag	= False		
					Block Heater detection is enabled when either of the following occurs:			
			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		1) ECT at power up > IAT at power up by	> 20.0 ºC		
					2) Cranking time	< 10.0 Seconds		
				= False	**Block Heater is detected and diagnostic is aborted when 1) or 2) occurs. Diagnostic is aborted when 3) or 4) occurs:**			
					1a) Vehicle drive time	> 400 Seconds with		
					1b) Vehicle speed	> 14.9 MPH and		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					1c) Additional Vehicle drive time is provided to 1a when Vehicle speed is below 1b as follows: 1d) IAT drops from power up IAT	0.50 times the seconds with vehicle speed below 1b ≥ 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 4) Minimum IAT during test	> 1800 Seconds ≤ -7.0 ºC		
Engine Coolant Flow Insufficient	P00B7	This DTC detects a Insufficient Flow Condition (i.e.. Stuck Closed Thermostat)	Engine Coolant Temp (ECT) is greater than 117 Deg C and Difference between ECT and RCT is greater than 30 Deg C. When above is present for more than 5 seconds, fail counts start.		No Active DTC's	THMR_RCT_Sensor_Ckt_FA THMR_ECT_Sensor_Ckt_FA	30 failures out of 600 samples	2 trips Type B
					Engine run time OR Engine Coolant Temp	> 30 seconds > 150.0 Deg C	1 sec/ sample Continuous	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Intake Air Pressure Measurement System - Multiple Sensor Correlation	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) OR 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 <= 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 Manifold Pressure Baro Pressure Baro Pressure Turbocharger Boost Pressure Turbocharger Boost Pressure No Active DTCs:	> 10.0 seconds >= 50.0 kPa <= 115.0 kPa >= 50.0 kPa <= 115.0 kPa >= 50.0 kPa <= 115.0 kPa EngModeNotRunTmErr MAP_SensorFA AAP_SnsrFA AAP2_SnsrFA	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) AND ABS(Turbocharger Boost Pressure - Manifold Pressure) AND ABS(Turbocharger Boost Pressure - Baro Pressure) OR 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 > 10.0 kPa > 10.0 kPa > 10.0 kPa	No Pending DTCs:	MAP_SensorCircuitFP AAP_SnsrCktFP AAP2_SnsrCktFP		
Mass Air Flow System Performance	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	>= 400 RPM <= 6000 RPM > -7 Deg C < 125 Deg C	Continuous Calculation are performed every 12.5 msec	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Intake Air Temp	> -20 Deg C		
					Intake Air Temp	< 100 Deg C		
					Minimum total weight factor (all factors multiplied together)			
			MAF model fails when			>= 0.00		
			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					

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			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 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	> 25.0 kPa				

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			See table "TIAP-Baro Correlation Offset"					
			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				
			AND					
			Manifold Pressure	See table "TIAP-MAP Correlation Min Air Flow"				
				> 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-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					

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			Mass Air Flow - Filtered Mass Air Flow	< 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	<= 1400 Hertz (~0 g/sec) (KtMAFI_dm_EngAirFlow)	Engine Run Time Engine Speed Ignition Voltage Above criteria present for a period of time	> 1.0 seconds >= 300 RPM >= 8.0 Volts >= 1.0 seconds	200 failures out of 250 samples 1 sample every cylinder firing event	Type B 2 trips
Mass Air Flow Sensor Circuit High Frequency	P0103	Detects a high frequency output from the MAF sensor	MAF Output	>= 14500 Hertz (~ 269 g/sec) (KtMAFI_dm_EngAirFlow)	Engine Run Time Engine Speed Ignition Voltage Above criteria present for a period of time	> 1.0 seconds >= 300 RPM >= 8.0 Volts >= 1.0 seconds	200 failures out of 250 samples 1 sample every cylinder firing event	Type B 2 trips
Manifold Absolute Pressure Sensor Performance	P0106	Determines if the MAP sensor is stuck within the normal operating range	See table "Turbocharger Intake Flow Rationality Diagnostic Failure Matrix" for combinations of model failures that can set this DTC. MAF model fails when ABS(Measured Flow – Modeled Air Flow) Filtered		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 >= 0.00 Modeled Air Flow Error multiplied by MAF Residual Weight Factor	Continuous Calculation are performed every 12.5 msec	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
				> 16 grams/sec		based on RPM and MAF Residual Weight Factor Based on MAF Est		
			MAP1 model fails when					
			ABS(Measured MAP – MAP Model 1) Filtered			MAP Model 1 Error multiplied by MAP1 Residual Weight Factor based on RPM		
				> 20.0 kPa				
			MAP2 model fails when					
			ABS(Measured MAP – MAP Model 2) Filtered			MAP Model 2 Error multiplied by MAP2 Residual Weight Factor based on RPM		
				> 25.0 kPa				
			MAP3 model fails when					
			ABS(Measured MAP – MAP Model 3) Filtered			MAP Model 3 Error multiplied by MAP Residual Weight Factor based on RPM		
				> 25.0 kPa				
			TIAP1 model fails when					
			ABS(Measured TIAP – TIAP Model 1) Filtered			TIAP Model 1 Error multiplied by TIAP Residual Weight Factor based on RPM		
				> 25.0 kPa				
			TPS model fails when					
			Filtered Throttle Model Error			Filtered Throttle Model Error multiplied by TPS Residual Weight Factor based on RPM		
				> 250 kPa*(g/s)				

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			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" TIAP Correlation is valid when High Engine Air Flow has been TRUE for a period of time OR	> 25.0 kPa > 25.0 kPa > 2.0 seconds	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		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			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"				
			AND					
			Filtered Mass Air Flow - Mass Air Flow	< 2.0 gm/sec				
			Low Engine Air Flow is TRUE when					

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			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				
			<u>Engine Not Rotating Case:</u>					
			Manifold Pressure OR	< 50.0 kPa	Time between current ignition cycle and the last time the engine was running		4 failures out of 5 samples	
			Manifold Pressure	> 115.0 kPa			1 sample every 12.5 msec	
						> 10.0 seconds		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Engine is not rotating No Active DTCs: No Pending DTCs:	EngModeNotRunTmErr MAP_SensorFA TC_BoostPresSnsrCktFA AAP2_SnsrFA MAP_SensorCircuitFP AAP_SnsrCktFP AAP2_SnsrCktFP		
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 = -1.9 kPa)	Continuous		80 failures out of 100 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	> 97.0 % of 5 Volt Range (4.9 Volts = 291.9 kPa)	Continuous		80 failures out of 100 samples 1 sample every 12.5 msec	Type B 2 trips
Intake Air Temperature Sensor Circuit Performance	P0111	Detects an IAT sensor that has stuck in range by comparing to IAT2 and engine coolant temperature at startup	ABS(Power Up IAT - Power Up IAT2) AND ABS(Power Up ECT – Power Up IAT) > ABS(Power Up ECT – Power Up IAT2)	> 20 deg C	Time between current ignition cycle and the last time the engine was running No Active DTCs:	> 28800 seconds ECT_Sensor_Ckt_FA	Executes once at the beginning of each ignition cycle if enable conditions are met	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						IAT_SensorCircuitFA IAT2_SensorCircuitFA		
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	< 62 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
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	> 126840 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

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	No Active DTC's Non-volatile memory initization Test complete this trip Test aborted this trip IAT LowFuelCondition Diag **Block Heater detection is enabled when either of the following occurs:** 1) ECT at power up > IAT at power up by 2) Cranking time **Block Heater is detected and diagnostic is aborted when 1) or 2) occurs. Diagnostic is aborted when 3) or 4) occurs:** 1a) Vehicle drive time 1b) Vehicle speed	VehicleSpeedSensor_FA IAT_SensorFA ECT_Sensor_Ckt_FA IgnitionOffTimeValid TimeSinceEngineRunningValid = Not occurred = False = False ≥ -7 ºC = False > 20.0 ºC < 10.0 Seconds > 400 Seconds with > 14.9 MPH	1 failure 500 msec/ sample Once per valid cold start	2 trips Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
				= False	1c) Additional Vehicle drive time is provided to 1a when Vehicle speed is below 1b as follows: 1d) IAT drops from power up IAT	0.50 times the seconds with vehicle speed below 1b ≥ 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 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

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
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	> 10.0 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
Throttle Position Sensor Performance	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	>= 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

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Minimum total weight factor (all factors multiplied together)			
			MAF model fails when			>= 0.00		
			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			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.
				> 25.0 kPa		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		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		
			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				

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				

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 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					

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
				< 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
Engine Coolant Temperature Below Stat Regulating Temperature	P0128	This DTC detects if the engine coolant temperature rises too slowly due to an ECT or Cooling system fault	Engine run time is accumulated when airflow is ≥ 11 grams per sec during Range #1 or #2: Range #1 (Primary) ECT reaches Commanded temperature minus 26.0 °C when IAT min is < 65.0°C and ≥ 10.0°C.	See "P0128: Maximum Accumulated Time for IAT and Start-up ECT conditions" in the Supporting tables section	No Active DTC's Engine not run time	MAF_SensorFA IAT_SensorFA THMR_RCT_Sensor_Ckt_FA THMR_ECT_Sensor_Ckt_FA ≥ 1800 seconds	1 failure to set DTC 1 sec/ sample Once per ignition key cycle	2 trips Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Engine run time	22 ≤ Eng Run Tme ≤ 1400 seconds		
					Fuel Condition	Ethanol ≤ 100%		
					Range #1 (Primary) Test			
					ECT at start run	-20.0 ≤ ECT ≤ 73.0 °C		
					Average Airflow	≥ 11.0 gps		
					T-Stat Heater duty commanded cycle	≤ 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	-20.0 ≤ ECT ≤ 53.0 °C		
					Average Airflow	≥ 11.0 gps		
					T-Stat Heater duty commanded cycle	≤ 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	TPS_ThrottleAuthority Defaulted MAP_SensorFA AIR System FA Ethanol Composition Sensor FA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA	380 failures out of 475 samples Frequency: Continuous in 100 milli - second loop	2 trips Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						FuelInjectorCircuit_FA		
					AIR intrusive test	= Not active		
					Fuel intrusive test	= Not active		
					Idle intrusive test	= Not active		
					EGR intrusive test	= Not active		
					System Voltage	10.0 < Volts < 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	0.9805 < ratio < 1.0254		
					Air Per Cylinder	50 < mgram < 500		
					Fuel Control State	= Closed Loop		
					Closed Loop Active	= TRUE		
					All Fuel Injectors for active Cylinders	Enabled (On)		
					Fuel Condition	Ethanol ≤ 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_ThrottleAuthority Defaulted		
						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		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					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		
					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	0.9805 ≤ ratio ≤ 1.0254		
					Air Per Cylinder	50.0 ≤ 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_ThrottleAuthority Defaulted MAP_SensorFA IAT_SensorFA ECT_Sensor_FA AmbientAirDefault	Sample time is 60 seconds Frequency: Once per trip	2 trips Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						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		
					System Voltage	10.0 < Volts < 32.0		
					EGR Device Control	= Not active		
					Idle Device Control	= Not active		
					Fuel Device Control	= Not active		
					AIR Device Control	= Not active		
					Low Fuel Condition Diag	= False		
					Green O2S Condition	= Not Valid, See definition of **Green Sensor Delay Criteria (B1S1)** in Supporting Tables tab.		
					O2 Heater on for	≥ 40 seconds		
					Learned Htr resistance	= Valid		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Engine Coolant	> 65 ºC		
					IAT	> -40 ºC		
					Engine run Accum	> 100 seconds		
					Time since any AFM status change	> 0.0 seconds		
					Time since Purge On to Off change	> 1.0 seconds		
					Time since Purge Off to On change	> 1.0 seconds		
					Purge duty cycle	≥ 0 % duty cycle		
					Engine airflow	10 ≤ grams per second ≤ 35		
					Engine speed	1300 <= RPM <= 3500		
					Fuel	< 87 % Ethanol		
					Baro	> 70 kpa		
					Air Per Cylinder	≥ 120 mGrams		
					Low Fuel Condition Diag	= False		
					Fuel Control State	= Closed Loop		
					Closed Loop Active	= TRUE		
					LTM fuel cell	= Enabled		
					Transient Fuel Mass	≤ 50.0 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		
O2S Circuit Insufficient Activity Bank 1 Sensor 1	P0134	This DTC determines if the O2 sensor circuit is open.	Oxygen Sensor Signal	> 1700 mvolts	No Active DTC's	TPS_ThrottleAuthority Defaulted MAF_SensorFA EthanolCompositionSensor_FA	100 failures out of 125 samples. Frequency: Continuous	2 trips Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					System Voltage AFM Status Heater Warm-up delay Engine Run Time Engine Run Accum Fuel	10.0 < Volts < 32.0 = All Cylinders active = Complete > 5 seconds > 50 seconds ≤ 87 % Ethanol	100msec loop	
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	< 30 mvolts	No Active DTC's	TPS_ThrottleAuthority Defaulted MAP_SensorFA AIR System FA Ethanol Composition Sensor FA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA	380 failures out of 475 samples Frequency: Continuous in 100 milli - second loop	2 trips Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						EvapEmissionSystem_FA		
						FuelTankPressureSnsrCkt_FA		
						FuelInjectorCircuit_FA		
					AIR intrusive test	= Not active		
					Fuel intrusive test	= Not active		
					Idle intrusive test	= Not active		
					EGR intrusive test	= Not active		
					System Voltage	10.0 < Volts < 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	0.9805 ≤ ratio ≤ 1.0254		
					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	2 trips Type B
					No Active DTC's	TPS_ThrottleAuthority Defaulted		
						MAF_SensorFA		
						EthanolCompositionSensor_FA	Frequency: Continuous in 100 milli - second loop	
					System Voltage	10.0 < Volts < 32.0		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					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		
					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	0.9805 ≤ ratio ≤ 1.0254		
					Air Per Cylinder	100 ≤ mgrams ≤ 500		
					Fuel Control State	not = Power Enrichment		
					All of the above met for	> 3.0 seconds		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
O2 Sensor Slow Response Rich to Lean Bank 1 Sensor 2	P013A	This DTC determines if the post catalyst O2 sensor has Slow Response in a predefined Rich to Lean voltages range during Rich to Lean transition. The diagnostic is an intrusive test which runs in a DFCO mode to achieve the required response.	The 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)	> 9.0 units > 6 grams (upper threshold is 450 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 DTC's Passed	TPS_ThrottleAuthority Defaulted 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) P013E (and P014A 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: 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)	> 9.0 units > 25 grams (lower threshold is 350 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	TPS_ThrottleAuthority Defaulted 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.	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.
					Low Fuel Condition Diag Post fuel cell DTC's Passed	= 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)		
					After above conditions are met: Fuel Enrich mode continued.			
O2 Sensor Delayed Response Rich to Lean Bank 1 Sensor 2	P013E	This DTC determines if the post catalyst O2 sensor has an initial delayed response to an A/F change from Rich to Lean. The diagnostic is an intrusive test which runs in a DFCO mode to achieve the required response.	Post O2 sensor voltage AND The Accumulated mass air flow monitored during the Delayed Response Test	> 450 mvolts > 20 grams	No Active DTC's B1S2 Failed this key cycle	TPS_ThrottleAuthority Defaulted 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	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.
						P2270 or P2271		
					System Voltage	10.0 < Volts < 32.0		
					Learned heater resistance	= Valid		
					ICAT MAT Burnoff delay	= Not Valid		
					Green O2S Condition	= Not Valid, See definition of **Green Sensor Delay Criteria (B1S2)** in Supporting Tables tab.		
					Low Fuel Condition Diag	= False		
					Post fuel cell DTC's Passed	= enabled P2270 (and P2272 if applicable)		
					After above conditions are met: DFCO mode entered (wo driver initiated pedal input).			
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	< 350 mvolts > 70 grams	No Active DTC's	TPS_ThrottleAuthority Defaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA	Frequency: Once per trip Note: if NaPOPD_b_Reset FastRespFunc= FALSE for the given Fuel Bank OR NaPOPD_b_Rapid ResponseActive = 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.
						EthanolCompositionSensor_FA		
					B1S2 Failed this key cycle	P013A, P013B, P013E, P2270 or P2271		
					System Voltage	10.0 < Volts < 32.0		
					Learned heater resistance	= Valid		
					ICAT MAT Burnoff delay	= Not Valid		
					Green O2S Condition	= Not Valid, See definition of **Green Sensor Delay Criteria (B1S2)** in Supporting Tables tab.		
					Low Fuel Condition Diag	= False		
					Post fuel cell	= enabled		
					DTC's Passed	P2270 (and P2272 if applicable)		
						P013E (and P014A if applicable)		
						P013A (and P013C if applicable)		
						P2271 (and P2273 if applicable)		
					After above conditions are met: Fuel Enrich mode entered.			
O2S Circuit Insufficient Activity Bank 1 Sensor 2	P0140	This DTC determines if the O2 sensor circuit is open.	Oxygen Sensor Signal	> 1700 mvolts	No Active DTC's	TPS_ThrottleAuthority Defaulted MAF_SensorFA	100 failures out of 125 samples.	2 trips Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						EthanolCompositionSensor_FA	Frequency: Continuous	
					System Voltage	10.0 <Volts < 32.0		
					AFM Status	= All Cylinders active	100msec loop	
					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	ECT_Sensor_FA	8 failures out of 10 samples	2 trips Type B
					System Voltage	10.0 < Volts < 32.0	Frequency: 2 tests per trip	
					Heater Warm-up delay	= Complete		
					O2S Heater device control	= Not active	10 seconds delay between tests and 1 second execution rate.	
					B1S1 O2S Heater Duty Cycle	> zero		
					All of the above met for			
					Time	> 30 seconds		
O2 Sensor Delayed Response Rich to Lean Bank 1 Sensor 1	P015A	This DTC determines if the pre catalyst O2 sensor has an initial delayed response to an A/F change from Rich to Lean. The diagnostic is an intrusive test which runs in a DFCO mode to achieve the required response.	The EWMA of the Pre O2 sensor normalized R2L time delay value OR [The Accumulated time monitored during the R2L Delayed Response Test (Gross failure). AND	> 0.35 EWMA (sec) > 2.00 Seconds	No Active DTC's	TPS_ThrottleAuthority Defaulted MAP_SensorFA IAT_SensorFA ECT_Sensor_FA AmbientAirDefault MAF_SensorFA	Frequency: Once per trip Note: if NaESPD_b_FastInitRespIsActive = TRUE for the given Fuel Bank OR NaESPD_b_RapidResponseIsActive = TRUE, multiple	1 trips Type A EWMA

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			Pre O2 sensor voltage is above]	≥ 2.00 Seconds > 550 mvolts		EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA AIR System FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EthanolCompositionSensor_FA EngineMisfireDetected_FA P0131 P0132 P0134 System Voltage: 10.0 < Volts < 32.0 EGR Device Control: = Not active Idle Device Control: = Not active Fuel Device Control: = Not active AIR Device Control: = Not active Low Fuel Condition Diag: = False Green O2S Condition: = Not Valid, See definition of **Green Sensor Delay Criteria (B1S1)** in Supporting Tables tab. O2 Heater on for: ≥ 40 seconds Learned Htr resistance: = Valid	= TRUE, multiple tests per trip are allowed	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					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	≥ 120.0 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	≥ 700 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	> 0.35 EWMA (sec)	No Active DTC's	TPS_ThrottleAuthority Defaulted 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	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).					
			AND	≥ 2.00 Seconds				
			Pre O2 sensor voltage is below]					
			OR					
			At end of Cat Rich stage the Pre O2 sensor output is	< 350 mvolts				
				< 700 mvolts				

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						FuelTrimSystemB2_FA		
						EthanolCompositionSensor_FA		
						EngineMisfireDetected_FA		
						P0131		
						P0132		
						P0134		
					System Voltage	10.0 < Volts < 32.0		
					EGR Device Control	= Not active		
					Idle Device Control	= Not active		
					Fuel Device Control	= Not active		
					AIR Device Control	= Not active		
					Low Fuel Condition Diag	= False		
					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)			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					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	≥ 120.0 sec		
					Predicted Catalyst temp	550 ≤ ºC ≤ 900		
					Fuel State	= DFCO inhibit		
					Number of fueled cylinders	≥ 1 cylinders		
					When above conditions are met: Fuel Enrich mode entered.			
Fuel System Too Lean Bank 1	P0171	Determines if the fuel control system is in a lean condition, based on the filtered long-term fuel trim.	The filtered long-term fuel trim metric	>= 1.300	Engine speed	400 <rpm< 6100	Frequency: 100 ms Continuous Loop Development data indicates that the Fuel Adjustment System Diagnostic (FASD) is typically enabled during 44 % of the EPAIII drive cycle. This is also typical of real-world driving, however values	2 Trip(s) Type B
					BARO	> 70 kPa		
					Coolant Temp	-20 <°C< 130		
					MAP	18 <kPa< 253		
					Inlet Air Temp	-20 <°C< 150		
					MAF	1.5 <g/s< 505.0		
					Fuel Level	> 10 % or if fuel sender is faulty		
					Long Term Fuel Trim data accumulation:	> 55.0 seconds of data must accumulate on		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					accumulation.	must accumulate on each trip, with at least 40.0 seconds of data in the current fuel trim cell before a pass or fail decision can be made.	will vary (higher or lower) based on the actual conditions present during the drive cycle.	
					fuel trim diagnosed during decels? Yes			
					Long-Term Fuel Trim Cell Usage			
					Sometimes, certain Long-Term Fuel Trim Cells are not utilized for control or diagnosis. **Please see "Supporting Tables" Tab for a list of cells utilized for diagnosis.**			
					Fuel Control Status			
					Closed Loop Long Term FT	Enabled Enabled **Please see "Closed Loop Enable Criteria" and "Long Term FT Enable Criteria" in Supporting Tables.**		
					Fuel Consumed	> 0.0 liters of fuel consumed after a fuel fill event ("Virtual Flex Fuel Sensor applications only)		
					EGR Flow Diag. Intrusive Test Not Active Catalyst Monitor Intrusive Test Not Active Post O2 Diag. Intrusive Test Not Active			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Device Control Not Active EVAP Diag. “tank pull down” Not Active **No active DTCs:** IAC_SystemRPM_FA MAP_SensorFA MAF_SensorFA MAF_SensorTFTKO AIR System FA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSensorCircuit_FA Ethanol Composition Sensor FA FuelInjectorCircuit_FA EngineMisfireDetected_FA EGRValvePerformance_FA EGRValveCircuit_FA MAP_EngineVacuumStatus AmbientAirDefault O2S_Bank_1_Sensor_1_FA			
Fuel System Too Rich Bank 1	P0172	Determines if the fuel control system is in a rich condition, based on the filtered long-term fuel trim metric. There are two methods to determine a Rich fault. They are Passive and Intrusive. The Intrusive test is described below:	**Passive Test:** The filtered Non-Purge Long Term Fuel Trim metric **Intrusive Test:**	<= 0.715 (a Passive Test decision cannot be made when Purge is enabled)		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 44% of the EPAIII drive cycle. This is also typical of real-world driving, however values	2 Trip(s) Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			The filtered Purge Long Term Fuel Trim metric	<= 0.720			however values will vary (higher or lower) based on the actual conditions present during the drive cycle.	
			AND					
			The filtered Non-Purge Long Term Fuel Trim metric	<= 0.715 for 3 out of 5 intrusive segments				
		Intrusive Test: When the filtered Purge Long Term Fuel Trim metric is <= 0.720, purge is ramped off to determine if excess purge vapor is the cause of the rich condition. If the filtered Purge Long Term Fuel Trim metric > 0.720, the test passes without checking the filtered Non-Purge Long Term Fuel Trim metric. 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 25 seconds and are separated by the lesser of 30 seconds of purge-on time or enough time to purge 50 grams of vapor. A maximum of 5 completed segments or 15 attempts are allowed for each intrusive test. After an intrusive test report is completed, another intrusive test cannot occur for 300 seconds to allow sufficient time to purge excess vapors from the canister. During this period, fuel trim will pass if the filtered Purge-on Long Term fuel trim > Purge Rich Limit Table for at least 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	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.
						No 5V reference error or fault for # 4 5V reference circuit (P06A3)		
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/Super Charger Engine Overboost	P0234	Detect Negative Boost Pressure Control Deviation	Desired Boost Pressure - Actual Boost Pressure	< (KtBSTD_p_CntrlDevNegLim - 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	Enabled > 2400 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	10 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.
					Wait for steady state:	0.8 seconds Desired Boost Pressure > Basic Pressure		
					No Active DTCs:	AmbientAirDefault BSTR_b_PCA_CktFA BSTR_b_TurboBypass CktFA ECT_Sensor_FA IAT_SensorFA BSTR_b_ExcsvBstTFT KO BSTR_b_PCA_CktTFT KO TC_BoostPresSnsrFA AnyCamPhaser_FA BSTR_b_PresCntrlToo LoTFTKO BSTR_b_PresCntrlToo HiTFTKO EnginePowerLimited		
					Not in Device Control for:	Wastegate Control Bypass control		
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

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			MAF model fails when			>= 0.00		
			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 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		
			TIAP Correlation is valid when					

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			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"				
			AND					

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			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				
			AND					
			Manifold Pressure	See table "TIAP-Baro Correlation Max Air Flow"				
			AND					
			Mass Air Flow - Filtered Mass Air Flow	< a threshold in kPa as a function of engine speed				
			AND					
			Engine Not Rotating Case:	See table "TIAP-Baro Correlation Max MAP"				
			Filtered Mass Air Flow - 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.
			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 (1.0 Volts = 52.5 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 (4.7 Volts = 250.0 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 / Supercharger 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 Powertrain relay Voltage Ignition run crank voltage Ignition run crank voltage Engine is not cranking	Enabled >= 11.00 Volts <= 32.00 Volts >= 2.00 Volts <= 6.00 Volts	10 failures out of 20 samples 1 sample every 100ms	Type B 2 trips
Turbocharger Wastegate / Supercharger 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 Powertrain relay Voltage Ignition run crank voltage Ignition run crank voltage Engine is not cranking	Enabled >= 11.00 Volts <= 32.00 Volts >= 2.00 Volts <= 6.00 Volts	10 failures out of 20 samples 1 sample every 100ms	Type B 2 trips
Turbocharger Wastegate / Supercharger 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 Powertrain relay Voltage Ignition run crank voltage Ignition run crank voltage Engine is not cranking	Enabled >= 11.00 Volts <= 32.00 Volts >= 2.00 Volts <= 6.00 Volts	10 failures out of 20 samples 1 sample every 100ms	Type B 2 trips
Turbo/Super Charger Engine Underboost	P0299	Detect Positive Boost Pressure Control Deviation	Desired Boost Pressure - Actual	> (KtBSTD_p_CntrlDevPosLim + KtBSTD_p_CntrlDevAmbAirCorr)	Diagnosis Enabled Engine Speed	Enabled > 2400 rpm	15 failures out of 30 samples	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			Desired Boost Pressure - Actual Boost Pressure	See Tables in Supporting Tables Sheet	Engine Speed	< 6000 rpm	1 sample every 100ms	
					Desired Boost Pressure	> 135.0 kPa		
					Desired Boost Pressure	< 220.0 kPa		
					Desired Boost Pressure Derivative	> -70.0 kPa/s		
					Desired Boost Pressure Derivative	< 55.0 kPa/s		
					Ambient Pressure	> 60.0 kPa		
					Ambient Pressure	< 120.0 kPa		
					Coolant Temp	> -40.0 Deg C		
					Coolant Temp	< 120.0 Deg C		
					Intake Air Temp	> -40.0 Deg C		
					Intake Air Temp	< 80.0 Deg C		
					Wait for steady state:	0.8 seconds		
						Desired Boost Pressure > Basic Pressure		
					No Active DTCs:	AmbientAirDefault		
						BSTR_b_PCA_CktFA		
						BSTR_b_TurboBypass CktFA		
						ECT_Sensor_FA		
						IAT_SensorFA		
						BSTR_b_ExcsvBstTFT KO		
						BSTR_b_PCA_CktTFT KO		
						TC_BoostPresSnsrFA		
						AnyCamPhaser_FA		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						BSTR_b_PresCntrlTooLoTFTKO BSTR_b_PresCntrlTooHiTFTKO EnginePowerLimited		
					Not in Device Control for:	Wastegate Control Bypass Control		
Random Misfire Detected Cylinder 1 Misfire Detected Cylinder 2 Misfire Detected Cylinder 3 Misfire Detected Cylinder 4 Misfire Detected	P0300	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** (> AFM Table in Cyl Deact mode)	Engine Run Time ECT If ECT at startup ECT System Voltage + Throttle delta - Throttle delta	> 2 crankshaft revolutions -7ºC < ECT < 130ºC < -7ºC 21ºC < ECT < 130ºC 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. 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.	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.
			Misfire Percent Emission Failure Threshold	≥ 4.00% P0300 ≥ 4.00% 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)	> 2000 rpm AND > 30 % load AND < 180 counts on one cylinder		
			When engine speed and load are less than the FTP cals (3) catalyst damage exceedences are allowed.	≤ 0 FTP rpm AND ≤ 0 FTP % load			Continuous	
					Engine Speed	530 < rpm < 6500 - 400 Engine speed limit is a function of inputs like Gear and temperature typical Engine Speed Limit = 6500 rpm	4 cycle delay	
				disable conditions:	No active DTCs:	TPS_FA EnginePowerLimited MAF_SensorTFTKO MAP_SensorTFTKO IAT_SensorTFTKO ECT_Sensor_Ckt_TFTKO 5VoltReferenceB_FA CrankSensorTestFailedTKO CrankSensorFaultActive CrankIntakeCamCorrelationFA	4 cycle delay	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						CrankExhaustCamCorrelationFA		
						CrankCamCorrelationTFTKO		
						AnyCamPhaser_FA		
						AnyCamPhaser_TFTKO		
						If Monitor Rough Road=1 and RoughRoadSource="TOSS"		
						Transmission Output Shaft Angular Velocity Validity (Auto Trans only)		
						Clutch Sensor FA (Manual Trans only)		
						TransEngagedState_FA (Auto Trans only)		
					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	4 cycle delay	
					Fuel System Status	≠ Fuel Cut	4 cycle delay	
					Active Fuel Management	Transition in progress	0 cycle delay	
					Undetectable engine speed and engine load region	invalid speed load range in **decel index** tables	4 cycle delay	
					Abusive Engine Over Speed	> 8191 rpm	0 cycle delay	
					Below zero torque (except CARB approved 3000 rpm to redline triangle.)	<" Zero torque engine load" in Supporting Tables tab	4 cycle delay	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Below zero torque: TPS Veh Speed	 ≤ 1% > 30 mph	4 cycle delay	
					EGR Intrusive test	Active	0 cycle delay	
					Manual Trans Throttle Position AND Automatic transmission shift	Clutch shift > 95.00%	4 cycle delay 7 cycle delay	
					Driveline Ring Filter active After a low level misfire, another misfire may not be detectable until driveline ringing ceases. If no ringing seen, stop filter early.			
					Filter Driveline ring: Stop filter early:	 4 engine cycles after misfire 3 Engine cycles after misfire		
					Abnormal engine speed oscillations: (Rough road etc) Off Idle, number of consecutive decelerating cylinders after accelerating,: (Number of decels can vary with misfire detection equation) TPS Engine Speed Veh Speed SCD Cyl Mode Rev Mode	 > 3 % > 950 rpm > 3 mph		

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	0 (1 = Enabled)		
					Engine Speed Veh Speed	Between > 700 RPM and < 3000 RPM		
					Final fail conditions within:	> 1 kph > 0.8 < 2.0 of misfire threshold for a given		
					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 Rough Road Source = "WheelSpeedInECM" ABS/TCS system RoughRoad VSES	active detected		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Rough Road Source = "FromABS" ABS/TCS system RoughRoad VSES	 active detected		
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
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? Engine Speed Engine Air Flow ECT IAT	Disabled ≤ 8500 RPM ≥ 0 mg/cylinder and ≤ 2000 mg/cylinder ≥ -40 deg's C ≥ -40 deg's C	First Order Lag Filter with Weight Coefficient	Type: B MIL: YES Trips: 2
			Specific Enable Criteria and Thresholds					
			1. Filtered Knock Intensity (for Excessive Knock) VaKNKD_k_PerfCylKnockIntFilt	> 0.6108	Engine Speed Engine running	≥ 580 RPM ≥ 1.3 seconds	Weight Coefficient = 0.0400 Updated each engine event	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			2. Filtered FFT Intensity: (for Abnormal Noise) VaKNKD_k_PerfCylAbnFiltIntnsity	< Abnormal Noise Threshold (see supporting tables)	Engine Speed Engine running	≥ 2000 RPM ≥ 0.4 seconds	Weight Coefficient = 0.0400 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	≥ 580 RPM and ≤ 8500 RPM		
					Engine Air Flow	≥ 0 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	≥ 5.2 seconds		
Knock Sensor (KS) Performance Bank 1	P0326	This diagnostic checks for knock sensor performance out of the normal expected range due to 1. Excessive knock **or** 2. Abnormal engine noise on a per bank/sensor basis	Common Enable Criteria		Diagnostic Enabled?	Enabled	First Order Lag Filter with Weight Coefficient	Type: B MIL: YES Trips: 2
					Engine Speed	≤ 8500 RPM		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Engine Air Flow	≥ 0 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	> 0.6108	Engine Speed Engine running	≥ 580 RPM ≥ 5.2 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	≥ 2000 RPM ≥ 1.5 seconds	Weight Coefficient = 0.0100 Updated each engine event	
Knock Sensor (KS) Circuit Low Bank 1	P0327	This diagnostic checks for an out of range low knock sensor signal	Sensor Input Signal Line	< 0.57 Volts	Diagnostic Enabled?	Enabled	50 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2
					Engine Speed	> 0 RPM and < 8500 RPM		
			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 100 msec rate	Type: B MIL: YES Trips: 2
					Engine Speed	> 0 RPM and < 8500 RPM		
			or					

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			Sensor Return Signal Line	> 1.95 Volts				
Crankshaft Position (CKP) Sensor A Circuit	P0335	Determines if a fault exists with the crank position sensor signal	Engine-Cranking Crankshaft Test: Time since last crankshaft position sensor pulse received Time-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:	= FALSE = FALSE = FALSE > 2.0 grams/second)) 5VoltReferenceB_FA	Engine-Cranking Crankshaft Test: Continuous every 100 msec Time-Based Crankshaft Test: Continuous every 12.5 msec	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			Event-Based Crankshaft Test: No crankshaft pulses received		Event-Based Crankshaft Test: Engine is Running OR Starter is engaged No DTC Active:	 5VoltReferenceA_FA 5VoltReferenceB_FA P0365 P0366	Event-Based Crankshaft Test: 2 failures out of 10 samples One sample per engine revolution	
Crankshaft Position (CKP) Sensor A Performance	P0336	Determines if a performance fault exists with the crank position sensor signal	Crank Re-synchronization Test: Time in which 10 or more crank re-synchronizations occur < 10.0 seconds Time-Based Crankshaft Test: No crankshaft synchronization gap found >= 0.4 seconds Engine Start Test during Crank:		Crank Re-synchronization Test: Engine Air Flow Cam-based engine speed No DTC Active: Time-Based Crankshaft Test: Engine is Running Starter is not engaged No DTC Active: Engine Start Test during Crank:	 >= 2.0 grams/second > 450 RPM 5VoltReferenceB_FA P0335 5VoltReferenceB_FA	Crank Re-synchronization Test: Continuous every 250 msec Time-Based Crankshaft Test: Continuous every 12.5 msec Engine Start Test during Crank:	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			Time since starter engaged without detecting crankshaft synchronization gap	>= 1.5 seconds	Starter engaged AND (cam pulses being received OR (DTC P0101 AND DTC P0102 AND DTC P0103 AND Engine Air Flow	= FALSE = FALSE = FALSE > 2.0 grams/second))	Continuous every 100 msec	
			Event-Based Crankshaft Test: Crank Pulses received in one engine revolution OR Crank Pulses received in one engine revolution	< 51 > 65	Event-Based Crankshaft Test: Engine is Running OR Starter is engaged No DTC Active:	5VoltReferenceA_FA 5VoltReferenceB_FA P0365 P0366	Event-Based Crankshaft Test: 8 failures out of 10 samples One sample per engine revolution	
Camshaft Position (CMP) Sensor Circuit Bank 1 Sensor A	P0340	Determines if a fault exists with the cam position bank 1 sensor A signal	Engine Cranking Camshaft Test:		Engine Cranking Camshaft Test:		Engine Cranking Camshaft Test:	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			Time since last camshaft position sensor pulse received		Starter engaged		Continuous every 100 msec	
					AND			
				>= 5.5 seconds	(cam pulses being received			
			OR					
			Time that starter has been engaged without a camshaft sensor pulse		OR			
					(DTC P0101	= FALSE		
					AND DTC P0102			
				>= 4.0 seconds		= FALSE		
					AND DTC P0103			
						= FALSE		
					AND			
					Engine Air Flow	> 2.0 grams/second))		
			Time-Based Camshaft Test:		Time-Based Camshaft Test:		Time-Based Camshaft Test:	
			Fewer than 4 camshaft pulses received in a time		Engine is Running		Continuous every 100 msec	
				> 3.0 seconds	Starter is not engaged			
					No DTC Active:	5VoltReferenceA_FA		
			Fast Event-Based Camshaft Test:		Fast Event-Based Camshaft Test:		Fast Event-Based Camshaft Test:	
			No camshaft pulses received during first 12 MEDRES events		Crankshaft is synchronized		Continuous every MEDRES event	
					Starter must be engaged to enable the diagnostic, but the diagnostic will not disable when			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			(There are 12 MEDRES events per engine cycle)		the starter is disengaged			
					No DTC Active:	5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensor_FA		
			Slow Event-Based Camshaft Test:		Slow Event-Based Camshaft Test:		Slow Event-Based Camshaft Test:	
			The number of camshaft pulses received during 100 engine cycles		Crankshaft is synchronized		8 failures out of 10 samples	
				= 0	No DTC Active:	5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensor_FA	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:		Fast Event-Based Camshaft Test:		Fast Event-Based Camshaft Test:	Type B 2 trips
			The number of camshaft pulses received during first 12 MEDRES events is less than 4 or greater than 6		Crankshaft is synchronized		Continuous every MEDRES event	
					Starter must be engaged to enable the diagnostic, but the diagnostic will not disable when the starter is disengaged			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			(There are 12 MEDRES events per engine cycle) Slow Event-Based Camshaft Test: The number of camshaft pulses received during 100 engine cycles OR	 < 398 > 402	No DTC Active: Slow Event-Based Camshaft Test: Crankshaft is synchronized No DTC Active:	5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensor_FA 5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensor_FA	 Slow Event-Based Camshaft Test: 8 failures out of 10 samples Continuous every engine cycle	
IGNITION CONTROL #1 CIRCUIT	P0351	This diagnostic checks the circuit for electrical integrity during operation. Monitors EST for Cylinder 1	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine running Ignition Voltage	 > 6.00 Volts	50 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2
IGNITION CONTROL #2 CIRCUIT	P0352	This diagnostic checks the circuit for electrical integrity during operation. Monitors EST for Cylinder 2	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine running Ignition Voltage	 > 6.00 Volts	50 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
IGNITION CONTROL #3 CIRCUIT	P0353	This diagnostic checks the circuit for electrical integrity during operation. Monitors EST for Cylinder 3	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine running Ignition Voltage	**> 6.00 Volts**	50 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2
IGNITION CONTROL #4 CIRCUIT	P0354	This diagnostic checks the circuit for electrical integrity during operation. Monitors EST for Cylinder 4	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine running Ignition Voltage	**> 6.00 Volts**	50 Failures out of 63Samples 100 msec rate	Type: B MIL: YES Trips: 2
Camshaft Position (CMP) Sensor Circuit Bank 1 Sensor B	P0365	Determines if a fault exists with the cam position bank 1 sensor B signal	Engine Cranking Camshaft Test: Time since last camshaft position sensor pulse received		Engine Cranking Camshaft Test: Starter engaged		Engine Cranking 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.
					AND			
				>= 5.5 seconds	(cam pulses being received			
			OR					
			Time that starter has been engaged without a camshaft sensor pulse		OR			
					(DTC P0101	= FALSE		
					AND DTC P0102			
				>= 4.0 seconds		= FALSE		
					AND DTC P0103			
						= FALSE		
					AND			
					Engine Air Flow	> 2.0 grams/second))		
			Time-Based Camshaft Test:		Time-Based Camshaft Test:		Time-Based Camshaft Test:	
			Fewer than 4 camshaft pulses received in a time		Engine is Running		Continuous every 100 msec	
				> 3.0 seconds	Starter is not engaged			
					No DTC Active:	5VoltReferenceA_FA		
			Fast Event-Based Camshaft Test:		Fast Event-Based Camshaft Test:		Fast Event-Based Camshaft Test:	
			No camshaft pulses received during first 12 MEDRES events		Crankshaft is synchronized		Continuous every MEDRES event	
					Starter must be engaged to enable the diagnostic, but the diagnostic will not disable when the starter is disengaged			
			(There are 12 MEDRES events per engine cycle)					

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:		Slow Event-Based Camshaft Test:		Slow Event-Based Camshaft Test:	
			The number of camshaft pulses received during 100 engine cycles		Crankshaft is synchronized		8 failures out of 10 samples	
					No DTC Active:	5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensor_FA	Continuous every engine cycle	
				= 0				
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:		Fast Event-Based Camshaft Test:		Fast Event-Based Camshaft Test:	Type B 2 trips
			The number of camshaft pulses received during first 12 MEDRES events is less than 4 or greater than 6		Crankshaft is synchronized		Continuous every MEDRES event	
					Starter must be engaged to enable the diagnostic, but the diagnostic will not disable when the starter is disengaged			
			(There are 12 MEDRES events per engine cycle)					

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:		Slow Event-Based Camshaft Test:		Slow Event-Based Camshaft Test:	
			The number of camshaft pulses received during 100 engine cycles		Crankshaft is synchronized		8 failures out of 10 samples	
					No DTC Active:	5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensor_FA	Continuous every engine cycle	
			OR	< 398 > 402				
Catalyst System Low Efficiency Bank 1	P0420	Oxygen Storage	Normalized Ratio OSC Value (EWMA filtered)	< 0.290	***Valid Idle Period Criteria***		1 test attempted per valid idle period Minimum of 1 test per trip Maximum of 6 tests per trip Frequency: Fueling Related : 12.5 ms OSC Measurements: 100 ms	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)			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: > 1200 RPM for a minimum of 2 seconds since end of last idle period.			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
		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.			Engine run time	≥ MinimumEngineRunTime, **This is a function of Coolant Temperature, please see Supporting Tables**	Temp Prediction: 1000ms	
					Tests attempted this trip	< 255		
					The catalyst diagnostic has not yet completed for the current trip.			
					Catalyst Idle Conditions Met Criteria			
					General Enable met and the Valid Idle Period Criteria met			
					Green Converter Delay	Not Active		
					Induction Air	*-20 < ° C < 250*		
					Intrusive test(s): Fueltrim Post O2 EVAP EGR	Not Active		
		The Catalyst Monitoring Test is done during idle. Several conditions must be meet in order to execute this test. These conditions and their related values are listed in the secondary parameters area of this document.			Other vehicle functions: Power Take Off	Not Active		
					RunCrank Voltage	> 10.90 Volts		
					Ethanol Estimation	NOT in Progress		
					ECT	*40 < ° C < 140*		
					Barometric Pressure	> 70 KPA		
					Idle Time before going intrusive is	< 50 Seconds		
					Idle time is incremented if Vehicle speed	< 1.24 MPH and the drivers foot is off accel pedal and the idle speed control system is active as identified in the Valid Idle Period Criteria section.		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Short Term Fuel Trim	*0.80 < ST FT < 1.20*		
					Predicted catalyst temp > 480 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 < 90 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.**			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					PRNDL is in Drive Range on an Auto Transmission vehicle.			
					Idle Stable Criteria :: Must hold true from after Catalyst Idle Conditions Met to the end of test			
					MAF	*2.50 < g/s < 7.00*		
					Predicted catalyst temperature	< 850 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 > 0.350 and the current OSC Normalized Ratio value is < 0.110			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Maximum of 18 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:			
					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			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					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			
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	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	Once per trip, during hot soak (up to 2400 sec.). No more than 2 unsuccessful attempts between completed tests.	1 trip Type A EWMA Average run length is 6 under normal conditions Run length is 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.
						Supporting Tables.		
					Time since last complete test if normalized result and EWMA is passing	≥ 17 hours		
					OR Time since last complete test if normalized result or EWMA is failing	≥ 10 hours		
					Estimated ambient temperature at end of drive Estimate of Ambient Air Temperature Valid	0 °C ≤ Temperature ≤ 34 °C		
			When EWMA is , the DTC light is illuminated.	> 0.53 (EWMA Fail Threshold)	**Conditions for Estimate of Ambient Air Temperature to be valid:**			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
		After the volatility check, the vent solenoid will close. After the vent is closed, typically a build up of pressure from the hot soak begins (phase-1). The pressure typically will peak and then begin to decrease as the fuel cools. When the pressure drops (-62.27) Pa from peak pressure, the vent is then opened for 60 seconds to normalize the system pressure. The vent is again closed to begin the vacuum portion of the test (phase-2). As the fuel temperature continues to fall, a vacuum will begin forming. The vacuum will continue until it reaches a vacuum peak. When the pressure rises 62.27 Pa from vacuum peak, the test then completes. If the key is turned on while the diagnostic test is in progress, the test will abort.	The DTC light can be turned off if the EWMA is and stays below the EWMA fail threshold for 2 additional consecutive trips.	≤ 0.35 (EWMA Re-Pass Threshold)	**1. Cold Start** Startup delta deg C (ECT-IAT) OR **2. Short Soak and Previous EAT Valid** Previous time since engine off OR **3. Less than a short soak and Previous EAT Not Valid** Previous time since engine off AND Must expire Estimate of Ambient Temperature Valid Conditioning Time. **"P0442: Estimate of Ambient Temperature Valid Conditioning Time" in Supporting Tables Tab.**	≤ 8 °C ≤ 7200 seconds ≤ 7200 seconds Vehicle Speed ≥ 15.5 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.
					OR **4. Not a Cold Start and greater than a Short Soak**			
					Previous time since engine off	> 7200 seconds		
					AND			
					Must expire maximum value in Estimate of Ambient Temperature Valid Conditioning Time. **Please see "P0442: Estimate of Ambient Temperature Valid Conditioning Time" in Supporting Tables Tab.**	Vehicle Speed ≥ 15.5 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	< -5		
					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**			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					See P0464 Fault Code for information on fuel level refueling. OR **4. Vacuum Out of Range and No Refueling** See P0451 Fault Code for information on vacuum sensor out of range and P0464 Fault Code for information on fuel level refueling. OR **5. Vacuum Out of Range and Refueling Detected** See P0451 Fault Code for information on vacuum sensor out of range and P0464 Fault Code for information on fuel level refueling.			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					OR **6. Vent Valve Override Failed** Device control using an off-board tool to control the vent solenoid, cannot exceed during the EONV test	0.50 seconds		
					OR **7. Key up during EONV test** No active DTCs:	FuelLevelDataFault MAF_SensorFA ECT_Sensor_FA IAT_SensorFA VehicleSpeedSensor_FA IgnitionOffTimeValid AmbientAirDefault		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						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:	 < -623 Pa > 1245 Pa	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	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.
			Tank Vacuum for 5 seconds BEFORE Purge Volume After setting the DTC for the first time, 2 liters of fuel must be consumed before setting the DTC for the second time.	> 2989 Pa ≥ 8 liters		A IAT_SensorCircuitFA ECT_Sensor_FA AmbientAirDefault 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	P0451	The DTC will be set if the fuel tank vacuum sensor is out of range	The tank vacuum sensor voltage is compared to a window about		This test will execute whenever the engine-off natural vacuum		This test is executed during an	1 trip Type A EWMA

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
(FTP) Sensor Circuit Performance		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.	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) The difference between tank vacuum sensor voltage and the nominal offset voltage is then normalized against the appropriate threshold listed above to produce a ratio between 0.0 and 1.0. This normalized re-zero ratio is then filtered with a EWMA (with 0= perfect pass and 1=perfect fail).	0.2 volts 0.2 volts	the engine-off natural vacuum small leak test (P0442) executes		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. The length of the test is determined by the refueling rationality test, which can take up to 600 seconds to complete.	EWMA Average run length: 6 Run length is 2 trips after code clear or non-volatile reset

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			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)				
Fuel Tank Pressure (FTP) Sensor Circuit Low Voltage	P0452	This DTC will detect a fuel tank pressure sensor signal that is too low out of range.	Fuel tank pressure sensor signal The normal operating range of the fuel tank pressure sensor is 0.5 volts (~1245 Pa) to 4.5 volts (~ -3736 Pa).	< 0.15 volts (3 % of Vref or ~ 1681 Pa)	Time delay after sensor power up for sensor warm-up ECM State ≠ crank Stops 6.0 seconds after key-off	is 0.10 seconds	80 failures out of 100 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 Tank Pressure (FTP) Sensor Circuit High Voltage	P0453	This DTC will detect a fuel tank pressure sensor signal that is too high out of range.	Fuel tank pressure sensor signal The normal operating range of the fuel tank pressure sensor is 0.5 volts (~1245 Pa) to 4.5 volts (~ -3736 Pa).	> 4.85 volts (97% of Vref or ~ -4172 Pa)	Time delay after sensor power up for sensor warm-up ECM State ≠ crank Stops 6.0 seconds after key-off	is 0.10 seconds	80 failures out of 100 samples 100 ms / sample Continuous	2 trips Type B
Fuel Tank Pressure (FTP) Sensor Circuit Intermittent	P0454	This DTC will detect intermittent tank vacuum sensor signals that would have caused the engine-off natural vacuum small leak test to abort due to an apparent re-fueling event.	If an abrupt change in tank vacuum is detected the engine-off natural vacuum test is aborted due to an apparent refueling event. Subsequent to the abort, a refueling rationality test is executed to confirm that a refueling event occurred. If a refueling is confirmed, then the test sample is considered passing. Otherwise, the sample is considered failing indicating an intermittent signal problem.		This test will execute whenever the engine-off natural vacuum small leak test (P0442) executes		This test is executed during an engine-off natural vacuum small leak test. The test can only execute up to once per engine-off period. The length of the test is determined by the refueling rationality test, which can take up to 600 seconds to complete.	1 trips Type A

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			An abrupt change is defined as a change in vacuum: in the span of 1.0 seconds. But in 12.5 msec. A refueling event is confirmed if the fuel level has a persistent change for 30 seconds.	>112 Pa < 249 Pa of 10 %			The test will report a failure if 2 out of 3 samples are failures. 12.5 ms / sample Continuous when vent solenoid is closed.	
Evaporative Emission (EVAP) System Large Leak Detected	P0455	This DTC will detect a weak vacuum condition (large leak or purge blockage) in the EVAP system. Purge valve is controlled (to allow purge flow) and vent valve is commanded closed.	Purge volume while Tank vacuum After setting the DTC for the first time, 2 liters of fuel must be consumed before setting the DTC for the second time.	> 10 liters ≤ 1868 Pa	Fuel Level System Voltage BARO Purge Flow No active DTCs:	10% ≤ Percent ≤ 90% 11 volts ≤ Voltage ≤ 32 volts ≥ 70 kPa ≥ 4.80 % MAP_SensorFA TPS_FA VehicleSpeedSensor_FA	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.
						A IAT_SensorCircuitFA ECT_Sensor_FA AmbientAirDefault EnginePowerLimited P0443 P0449 P0452 P0453 P0454	Maximum time before test abort is 1000 seconds	
			<u>Weak Vacuum Follow-up Test</u> (fuel cap replacement test) Weak Vacuum Test failed. Passes if tank vacuum Note: Weak Vacuum Follow-up Test can only report a pass.	≥ 2117 Pa	<u>Cold Start Test</u> If ECT > IAT, Startup temperature delta (ECT-IAT): Cold Test Timer Startup IAT Startup ECT <u>Weak Vacuum Follow-up Test</u> This test can run following a weak vacuum failure or on a hot restart	 ≤ 8 °C ≤ 1000 seconds 4 °C ≤ Temperature ≤ 30 °C ≤ 35 °C	<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.	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					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 Performance	P0461	This DTC will detect a fuel sender stuck in range in the primary fuel tank.			Engine Running No active DTCs:	VehicleSpeedSensor_FA	250 ms / sample Continuous	2 trips Type B
			Fuel Level in Primary Tank Remains in an Unreadable Range too Long					
			If fuel volume in primary tank is AND Fuel volume in secondary tank and remains in this condition for OR	>= 1024.0 liters < 0.0 liters 99 miles.				
			After Refuel Event					

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			If the secondary fuel volume changes by 1024.0 liters from engine “off” to engine “on” the primary volume should change by 10.0 liters. OR		The shutdown primary tank volume + 10.0 liters must be	< 1024.0 liters		
			Distance Traveled without a Primary Fuel Level Change					
			Delta Fuel Volume change over an accumulated 149 miles.	< 10 liters				
Fuel Level Sensor 1 Circuit Low Voltage	P0462	This DTC will detect a fuel sender stuck out of range low in the primary fuel tank.	Fuel level Sender % of 5V range	< 10 %	Run/Crank Voltage Run/Crank voltage goes to 0 volts at key off	11 volts ≤ Voltage ≤ 32 volts	100 failures out of 125 samples 100 ms / sample Continuous	2 trips Type B
Fuel Level Sensor 1 Circuit High Voltage	P0463	This DTC will detect a fuel sender stuck out ofrange high in the primary fuel tank.	Fuel level Sender % of 5V range	> 60 %	Run/Crank Voltage Run/Crank voltage goes to 0 volts at key off	11 volts ≤ Voltage ≤ 32 volts	100 failures out of 125 samples 100 ms / sample	2 trips Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
							Continuous	
Fuel Level Sensor 1 Circuit Intermittent	P0464	This DTC will detect intermittent fuel level sensor signals that would have caused the engine-off natural vacuum small leak test to abort due to an apparent re-fueling event.	If a change in fuel level is detected, the engine-off natural vacuum test is aborted due to an apparent refueling event. Subsequent to the abort, a refueling rationality test is executed to confirm that an actual refueling event occurred. If a refueling event is confirmed, then the test sample is considered passing. Otherwise, the sample is considered failing indicating an intermittent signal problem. An intermintant change in fuel level is defined as:		This test will execute whenever the engine-off natural vacuum small leak test (P0442) executes		This test is executed during an engine-off natural vacuum small leak test. The test can only execute up to once per engine-off period. The length of the test is determined by the refueling rationality test, which can take up to 600 seconds to complete. The test will report a failure if 2 out of	1 trips Type A

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			level is defined as: The fuel level changes and does not remain for 30 seconds during a 600 second refueling rationality test.	 by 10 % > 10 %			a failure if 2 out of 3 samples are failures. 100 ms / sample	
Cooling Fan 1 Relay Control Circuit (ODM)	P0480	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Run/Crank Voltage Engine Speed	11 volts ≤ Voltage ≤ 32 volts ≥ 400 RPM	20 failures out of 25 samples 25 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	20 failures out of 25 samples 25 ms / sample Continuous with fan operation	2 trips Type B Not used on systems with Mechanical Fan)
Evaporative	P0496	This DTC will determine if the purge solenoid is leaking to	Tank Vacuum	> 2491 Pa	Fuel Level	10% ≤ Percent ≤ 90%	Once per cold start	2 trips Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Emission (EVAP) System Flow During Non-Purge		purge solenoid is leaking to engine manifold vacuum. This test will run with the purge valve closed and the vent valve closed.	for 5 seconds BEFORE Test time	≥ refer to "P0496: Purge Valve Leak Test Engine Vacuum Test Time (Cold Start) as a Function of Fuel Level table" in Supporting Tables Tab.	System Voltage BARO Startup IAT Startup ECT Engine Off Time No active DTCs:	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	Cold start: max time is 1000 seconds	
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

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					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_EngCoolHot LoThresh is less than KfECTI_T_EngCoolHot HiThresh	Diagnostic reports pass or fail in 10 seconds once all enable conditions are met	
					Engine run time	≥ 60 sec		
					Ignition voltage	32 ≥ volts ≥ 11		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					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	> 5 sec		
					For manual transmissions: Clutch Pedal Position or Clutch Pedal Position	> 90.00 pct < 12.00 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		

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	> 5 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_EngCoolHot LoThresh is less than KfECTI_T_EngCoolHot HiThresh	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		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					IAT	> -20 °C		
					Vehicle speed	≤ 2 mph		
					Commanded RPM delta	≤ 25 rpm		
					For manual transmissions: Clutch Pedal Position or Clutch Pedal Position	> 90.00 pct < 12.00 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		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						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	> 5 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 > 70 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			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Timer for time since engine last running validity OR Engine coolant at power up	> 3600 Seconds = True < (Power down engine coolant) minus 10 Deg C	250 msec loop Continuous	
					Diagnostic enabled/ disabled No active DTC's	Enabled Fault bundles: ECT_Sensor_Ckt_FA		
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"
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	1 trip Type C

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
							Continuous	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 0.794 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 Trips: 1
							fail continuously for greater than 90.000 seconds	
Cruise Control Brake Input Circuit 1 Low Voltage	P0572	Detects a failure of the Cruise Control Brake Input in the not applied state.	Cruise Control Brake input remains in the not applied state while a transition of the serial data signal Brake Pedal Initial Travel Achieved Status from not applied to applied is registered.		Cruise Control Brake Input Circuit Low Diagnostic Enable	Enabled	4 fails out of 5 samples	Type: C MIL: NO Trips: 1
					Engine Speed	> 400 rpm	1 sample every time brake is applied	
Cruise Control Brake Input Circuit 1 High Voltage	P0573	Detects a failure of the Cruise Control Brake Input in the applied state.	Cruise Control Brake input remains in the applied state while a transition of the serial data signal Brake Pedal Initial Travel Achieved Status from applied to not applied is registered.		Cruise Control Brake Input Circuit High Diagnostic Enable	Enabled	4 fails out of 5 samples	Type: C MIL: NO Trips: 1
					Engine Speed	> 400 rpm	1 sample every time brake is released	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Brake Pedal Position Sensor Circuit Low	P057C	Detects Continuous Circuit Short to Low or Open	Brake Pedal Position Sensor Circuit	< 5 % of Vref	Brake Brake Pedal Position Out of Range Low Diagnostic Enable	Enabled	10 fails out of 16 samples	Type: B MIL: YES Trips: 2
					Ignition Voltage	>10 V	25 ms loop Continuous	
Brake Pedal Position Sensor Circuit Low	P057D	Detects Continuous Circuit Short to High	Brake Pedal Position Sensor Circuit	> 88 % of Vref	Brake Brake Pedal Position Out of Range High Diagnostic Enable	Enabled	10 fails out of 16 samples	Type: B MIL: YES Trips: 2
					Ignition Voltage	>10 V	25 ms loop Continuous	
Cruise Control Input Circuit	P0575	Detects rolling count or protection value errors in Cruise Control Switch Status serial data signal	If x of y rolling count / protection value faults occur, disable cruise for duration of fault		Cruise Control Switch Serial Data Error Diagnostic Enable	Enabled	10/16 counts	Type: C MIL: NO Trips: 1
Thermostat Heater Control Open Circuit	P0597	This DTC checks the T-stat Heater Driver Output circuit for electrical integrity.	Voltage low during driver open state (indicates short-to-ground or open circuit). Fault present state for Open circuit is determined from output driver status byte.		Run Crank Ignition in Range Engine not cranking Run Crank active Above is true and	= True = True = True	15 failures out of 30 samples 1 sec/ sample	2 trips Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Last Open Circuit Test	= not Indeterminate	Continuous	
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	= True = True = True	15 failures out of 30 samples 1 sec/ sample	2 trips Type B
					Above is true and			
					Last Ground Short Circuit Test	= not Indeterminate	Continuous	
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	= True = True = True	15 failures out of 30 samples 1 sec/ sample	2 trips Type B
					Above is true and			
					Last Power Short Circuit Test	= not Indeterminate	Continuous	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Control Module Read Only Memory (ROM)	P0601	This DTC will be stored if the calibration check sum is incorrect or the flash memory detects an uncorrectable error via the Error Correcting Code.	The Primary Processor's calculated checksum does not match the stored checksum value. Covers all software and calibrations.	1 failure if the fault is detected during the first pass. 5 failures if the fault occurs after the first pass is complete.			Diagnostic runs continuously in the background	Trips: 1 Type: A MIL: YES
			The Primary Processor's Error Correcting Code hardware in the flash memory detects an error. Covers all software and calibrations.	254 failures detected via Error Correcting Code			Diagnostic runs continuously via the flash hardware	
			The Primary Processor's calculated checksum does not match the stored checksum value for a selected subset of the calibrations.	2 consecutive failures detected or 5 total failures detected.			Diagnostic runs continuously. Will report a detected fault within 200 ms.	
			The Secondary Processor's calculated checksum does not match the stored checksum value. Covers all software and calibrations.	1 failure if the fault is detected during the first pass. 5 failures if the fault occurs after the first pass is complete.			Diagnostic runs continuously in the background	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
				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 PCM is identified through calibration as a Service PCM	Diagnostic runs at powerup and once per second continuously after that	Type A 1 trips
Control Module Long Term Memory Reset	P0603	Non-volatile memory checksum error at controller power-up	Checksum at power-up does not match checksum at power-down				Diagnostic runs at powerup Diagnostic reports a fault if 1 failure occurs	Type A 1 trips
ECM RAM Failure	P0604	Indicates that the ECM has detected a RAM fault: Primary Processor System RAM Fault					Will finish first memory scan within 30 seconds at all engine conditions - diagnostic runs continuously (background loop)	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.
			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				
		Primary Processor Cache RAM Fault	Indicates that the primary processor is unable to correctly read data from or write data to cached RAM. Detects data read does not match data written >=	254 counts			Will finish first memory scan within 30 seconds at all engine conditions - diagnostic runs continuously (background loop)	
		Primary Processor TPU RAM Fault	Indicates that the primary processor is unable to correctly read data from or write data to TPU RAM. 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 >				When dual store updates occur.	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
				0.44000 seconds				
		Primary Processor Write Protected RAM Fault	Indicates that the primary processor detects an illegal write attempt to protected RAM. Number of illegal writes are >	65534 counts			Diagnostic runs continuously (background loop)	
		Secondary Processor RAM Fault	Indicates that the secondary processor is unable to correctly read data from or write data to system RAM. Detects data read does not match data written >=	5 counts			Will finish first memory scan within 30 seconds at all engine conditions, diagnostic runs continuously (background loop)	
Internal ECM Processor Integrity Fault	P0606	Indicates that the ECM has detected an internal processor integrity fault:						Trips: 1 Type: A MIL: YES
		Primary Processor SPI Fault Detected	Loss or invalid message of SPI communication from the	Loss or invalid message at initialization detected or loss or		Run/Crank voltage >= 6.41 or Run/Crank	In the primary processor	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
		Detected	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	initialization detected or loss of invalid message after a valid message was recieved		0.41 or Run/Crank voltage >= 11.00, else the failure will be reported for all conditions	processor; 159/399 counts intermittent or 39 counts continuous; 39 counts continuous @ initialization. 12.5 ms /count in the ECM main processor	
		Secondary Processor SPI Fault Detected	Loss or invalid message of SPI communication from the Primary Processor at initialization detected by the Secondary Processor or loss or invalid message of SPI communication from the Primary Processor after a valid message was recieved by the Secondary Processor	Loss or invalid message at initialization detected or loss or invalid message after a valid message was recieved			In the secondary processor, 20/200 counts intermittent or 0 counts continuous; 0 counts continuous @ initialization. 12.5 ms /count in the ECM main processor	
		Secondary Processor Stack Fault	Checks for stack over or underflow in secondary			KeMEMD_b_StackLimitTestEnbl == 1	variable, depends on length of time	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			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		tTestEnbl == 1 Value of KeMEMD_b_StackLimitTestEnbl is: 1.	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	
		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	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
		arrive in a known sequence	wrong order				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. '	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.	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.	50 ms	
		MAIN detected corruption in throttle or pedal critical RAM data	memory and complement memory do not agree				0.19 seconds	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
		MAIN Processor Performance Check	1. Software tasks loops > schedule tasks loop 2. 12.5ms task loop sequence does not complete >=	See supporting tables 0.19 seconds		KePISD_b_SeedUpdKeyStorFltEnbl== 1 Value of KePISD_b_SeedUpdKeyStorFltEnbl is: 1. KePISD_b_12p5msSeqTestEnbld== 1 Value of KePISD_b_12p5msSeqTestEnbld is: 1.	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.	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_ConfigReg TestEnbld == 1 Value of KePISD_b_ConfigReg TestEnbld is: 1.	12.5 to 25 ms	
		MAIN Stack Fault	Checks number of stack over/under flow since last powerup reset >=	5		KeMEMD_b_StackLimi tTestEnbl == 1 Value of KeMEMD_b_StackLimi tTestEnbl is: 1.	variable, depends on length of time to corrupt stack	
		MAIN processor ADC test	Voltage deviation >	0.495		KePISD_b_A2D_Cnvrtr TestEnbld == 1 Value of KePISD_b_A2D_Cnvrtr TestEnbld is: 1.	3 / 8 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 >=			KeMEMD_b_FlashECC _CktTestEnbl == 1 Value of KeMEMD_b_FlashECC _CktTestEnbl is: 1.	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.
				3 (results in MIL), 5(results in MIL and remedial action)				
		RAM ECC Fault	Checks for ECC (error correcting code) circuit test errors reported by the hardware for RAM memory circuit. Increments counter during controller initialization if ECC error occured since last controller initialization. Counter >=	3 (results in MIL), 5 (results in MIL and remedial action)		KeMEMD_b_RAM_ECC_CktTestEnbl == 1 Value of KeMEMD_b_RAM_ECC_CktTestEnbl is: 1.	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. G3458(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	11 volts ≤ Voltage ≤ 32 volts	8 failures out of 10 samples	1 trip Type C

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Engine Speed	≥ 0 RPM	250 ms / sample Continuous	Not "Special Type C"
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	< 3000		
					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	10 failures out of 20 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	10 failures out of 20 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	10 failures out of 20 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 X 0 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

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
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 <= 18.00 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	2 trips Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
							Continuous	
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.	PT Relay feedback voltage is Stuck Test: PT Relay feedback voltage is when commanded ‘OFF’	≥ 18 volts > 2 volts	Powertrain relay commanded “ON” No active DTCs:	PowertrainRelayStateOn_FA	5 failures out of 6 samples 1 second / sample Stuck Test: 100 ms/ sample Continous failures ≥ 4 seconds	2 trips Type B
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		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:

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
				0.05				YES
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 MIL: NO
5 Volt Reference #4 Circuit	P06A3	Detects a continuous or intermittent short on th 5 volt reference circuit #2	ECM Vref4 < or ECM Vref4 > or the difference between ECM filtered Vref3 and Vref3 >	4.875 5.125 0.05		Run/Crank voltage or Powertrain relay voltage > 6.41 and reduced power is false, else the failure will be reported for all conditions	19/39 counts or 0.1875 sec continuous; 12.5 ms/count in main processor	Trips: 1 Type: A MIL: YES
Internal Control 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? Engine Speed Engine Air Flow Engine running	Enabled > 580 RPM and < 3000 RPM ≥ 0 mg/cylinder and ≤ 2000 mg/cylinder ≥ 5.2 seconds	First Order Lag Filter with Weight Coefficient Weight Coefficient = 0.0070 Updated each engine event	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.
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
Torque Converter/Brake Switch B Circuit	P0703	Detects rolling count or protection value errors in Brake Pedal Initial Travel Achieved Status serial data signal	If x of y rolling count / protection value faults occur, the DTC is set		Brake Serial Data Error Diagnostic enabled	Enabled	10/16 counts 25 ms loop Continuous	Type: C MIL: NO Trips: 1
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	> 4 %	N/TOS Ratio	Must match actual gear (i.e. vehicle in gear)	25 ms loop	1 Trip(s)
					Transfer Case	Not in 4WD Low range	Continuous	Type A
					vehicle speed	> 2 MPH		
					Engine Torque	> **EngTorqueThreshold** Table		
					Clutch Pedal Position	< **ResidualErrEnableLow** Table		
					OR			
					Clutch Pedal Position	> ***ResidualErrEnableHigh*** *Table*		
					No Active DTCs:			
					ClutchPositionSensorCktLo FA ClutchPositionSensorCkitHi FA CrankSensorFA			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Trans Output Shaft Angular Velocity Validity VehicleSpeedSensor_FA			
Clutch Pedal Position Sensor Circuit Low	P0807	Detects Continuous Circuit Short to Low or Open	Clutch Position Sensor Circuit	< 4 % of Vref for 200 counts out of 250 samples	Engine Not Cranking System Voltage No active DTCs:	> 10.0 Volts 5VoltReferenceB_FA	25 ms loop Continuous	1 Trip(s) Type A
Clutch Pedal Position Sensor Circuit High	P0808	Detects Continuous Circuit Short to High	Clutch Position Sensor Circuit	> 96 % of Vref for 200 counts out of 250 samples	Engine Not Cranking System Voltage No active DTCs:	> 10.0 Volts 5VoltReferenceB_FA	25 ms loop Continuous	1 Trip(s) Type A
Clutch Pedal Position Not Learned	P080A	Monitor for Valid Clutch Pedal Fully Applied Learn Position values	Fully Applied Learn Position **OR** Fully Applied Learn Position	< 7.0 % > 33.0 %	OBD Manufacturer Enable Counter	= 0	250 ms loop Continuous	1 Trip(s) Type A
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)) **OR**	Message <> 2's complement of message	Serial communication to EBTCM (U0108) Power Mode Engine Running	No loss of communication = Run = True	**All except Class2 PWM:** Count of 2's complement values not equal >= 10 Performed every 12.5 msec	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			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	10 rolling count failures out of 10 samples Performed every 12.5 msec	
			OR					
			Too many minimum limit torque request transitions occur from TRUE to FALSE to TRUE within a time period	Requested torque intervention type toggles from not increasing request to increasing request			>= 5 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	> 8192 Nm for engine based traction torque system, > 999999 Nm for axle based traction torque system			>= 10 out of 10 samples Performed every 12.5 msec	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Inlet Airflow System Performance	P1101	Determines if there are multiple air induction problems affecting airflow and/or manifold pressure.	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			>= 0.00		
			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			MAP Model 3 Error multiplied by MAP 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.
				> 25.0 kPa				
			TIAP1 model fails when			TIAP Model 1 Error multiplied by TIAP Residual Weight Factor based on RPM		
			ABS(Measured TIAP – TIAP Model 1) Filtered					
				> 25.0 kPa				
			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					
			Measured TIAP - measured MAP offset as a function of engine speed		No Active DTCs:	MAP_SensorCircuitFA EGRValve_FP EGRValvePerformance_FA		
				> 25.0 kPa		MAF_SensorCircuitFA		
			See table "TIAP-MAP Correlation Offset"			CrankSensor_FA ECT_Sensor_FA ECT_Sensor_Ckt_FP		
			OR			IAT_SensorFA		
			Low Engine Air Flow is TRUE AND			IAT_SensorCircuitFP IAT2_SensorFA		
			Measured TIAP - measured Baro offset as a function of engine speed			IAT2_SensorCircuitFP TC_BoostPresSnsrCktFA		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						AmbientAirDefault		
			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				
			High Engine Air Flow is TRUE when					
			Mass Air Flow	> a threshold in gm/sec as a function of engine speed				
			AND Manifold Pressure	See table "TIAP-MAP Correlation Min Air Flow"				

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
				> 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				
O2S Insufficient Switching Bank 1 Sensor 1	P1133	This DTC determines if the O2 sensor is no longer sufficiently switching.	Fault condition present if Half Cycle L/R or R/L Switches are below the threshold. OR Slope Time L/R Switches OR Slope Time R/L Switches	H/C L/R switches < Threshold, or H/C R/L switches < Threshold, (refer to table named "P1133 - O2S HC L to R Switches Limit Bank 1 Sensor 1" Pass/Fail Threshold table & "P1133 - O2S HC R to L Switches Limit Bank 1 Sensor 1" Pass/Fail Threshold table in Supporting tables tab) < 5 < 5	No Active DTC's Bank 1 Sensor 1 DTC's not active System Voltage EGR Device Control	TPS_ThrottleAuthority Defaulted 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 or P0134 10.0 < Volts < 32.0 = Not active	Sample time is 60 seconds Frequency: Once per trip	2 trips Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					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	> 65 ºC		
					IAT	> -40 ºC		
					Engine run Accum	> 100 seconds		
					Time since any AFM status change	> 0.0 seconds		
					Time since Purge On to Off change	> 1.0 seconds		
					Time since Purge Off to On change	> 1.0 seconds		
					Purge duty cycle	≥ 0 % duty cycle		
					Engine airflow	10 ≤ gps ≤ 35		
					Engine speed	1300 ≤ RPM ≤ 3500		
					Fuel	< 87 % Ethanol		
					Baro	> 70 kpa		
					Air Per Cylinder	≥ 120 mgrams		
					Low Fuel Condition Diag	= False		
					Fuel Control State	= Closed Loop		
					Closed Loop Active	= TRUE		
					LTM fuel cell	= Enabled		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Transient Fuel Mass	≤ 50.0 mgrams		
					Baro	= Not Defaulted		
					Fuel Control State	not = Power Enrichment		
					Fuel State	DFCO not active		
					Commanded Proportional Gain	≥ 0.0 %		
					All of the above met for Time	> 1.0 seconds		
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) > 3.19 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	< 650.00 degC		
					AND			
					Engine Coolant	> -20.00 degC		
					The Cold Start Emission Reduction strategy must not be exiting. The strategy will exit per the following:			
					Catalyst Temperature	>= 1000.00 degC		
					AND			
					Engine Run Time	>= 60.00 seconds		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					OR			
					Engine Run Time	> 65.00 seconds		
					OR			
					Engine Coolant	>= 66.00 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			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					DTC's Not Set			
					AcceleratorPedalFailure			
					ECT_Sensor_FA			
					IAT_SensorCircuitFA			
					IAT2_SensorCircuitFA			
					CrankSensorFaultActive			
					FuelInjectorCircuit_FA			
					MAF_SensorFA			
					MAP_SensorFA			
					EngineMisfireDetected_FA			
					Clutch Sensor FA			
					IAC_SystemRPM_FA			
					IgnitionOutputDriver_FA			
					P050A (ColdStrt_IAC_SysPerf)			
					P050B (ColdStrtIgnTmngPerf)			
					TPS_FA			
					VehicleSpeedSensor_FA			
					5VoltReferenceMAP_OOR_Flt			
					TransmissionEngagedState_FA			
					EngineTorqueInaccurate			
Transmission Engine Speed Request Circuit	P150C	Determines if engine speed request from the TCM is valid	Serial Communication rolling count value	+ 1 from previous $19D message (PTEI3)	Diagnostic enable bit	1	Diagnostic runs in 12.5 ms loop	2 trips Type B
			Transmission engine speed protection	not equal to 2's complement of transmission engine speed request + Transmission alive rolling count	Engine run time	0.50 sec		
					# of Protect Errors	10 protect errors out of 10 samples		
					# of Alive Rolling Errors	6 rolling count errors out of 10 samples		
					No idle diagnostic 506/507 code	IAC_SystemRPM_FA		
					No Serial communication loss to TCM	(U0101)		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					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 <	0.25 percent 4.00 seconds		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
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

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
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	46.20 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 3000rpm	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	187.38 Nm		Cruise has been engaged for more than 4.00 seconds	Up/down timer 2048 ms continuous, 0.5 down time multipier	Not used Series 11
			Engine min capacity above threshold	47.20 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 138 ms continuous, 0.5 down time multipier	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			No fast unmanaged retarded spark above the applied spark plus the threshold	Table, f(Erpm). See supporting tables		Engine speed greater than 0rpm	Up/down timer 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 454 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	10.00 percent		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Absolute difference of the rate limited pre-throttle pressure and its redundant calculation greater than threshold	1.29 kpa		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.
			Throttle desired torque above desired torque plus threshold	47.20 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	47.20 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Torque feedback proportional term is out of allowable range or its dual store copy does not match	High Threshold 23.60 Nm Low Threshold -23.60 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 44.25 Nm Low Threshold -47.20 Nm Rate of change threshold 2.95 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 47.20 Nm Low Threshold -47.20 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.
			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 0.0000963 Low Threshold -0.0000963		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 47.20Nm Low Threshold -47.20Nm		Ignition in unlock/accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Accessory drive friction torque is out of bounds given by threshold range	High Threshold 47.20 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 45.00 Nm Low Threshold 0.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			Difference of Oil temperature delta friction torque and its redundant calculation is out of bounds given by threshold range	High Threshold 47.20 Nm Low Threshold -47.20 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 47.20 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 47.20 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 47.20 Nm Low Threshold -47.20 Nm Rate of change threshold 2.95 Nm/loop		Engine speed >0rpm MAF, MAP and Baro DTCs are false	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Torque error compensation is out of bounds given by threshold range	High Threshold 47.20 Nm Low Threshold 0.00 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.
			Delta Torque Baro compensation is out of bounds given by threshold range	High Threshold 8.82 Nm Low Threshold -1.93 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) 46.20 Nm 2) NA 3) 46.20 Nm 4) 46.20 Nm		1&2) Torque reserve (condition when spark control greater than optimum to allow fast transitions for torque disturbances) > 47.20 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	45.00 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	13.03 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 + 47.20 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	13.03 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	13.03 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	47.20 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.
			Estimated Engine Torque without reductions due to torque control and its dual store are not match	47.20 Nm		Engine speed >0rpm	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Difference of desired spark advance for managed torque and its redundant calculation is out of bounds given by threshold range	13.03 degrees		Torque reserve (condition when spark control greater than optimum to allow fast transitions for torque disturbances) > 47.20 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	47.20 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	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			Rate limited cruise axle torque request and its dual store do not match	187.38 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 163 ms continuous, 0.5 down time multipier	
			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	1499.01 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	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			Preload Throttle Area is greater than its redundant calculation by threshold AFM apps only Does not apply to E83	10.00%		Engine speed >0rpm	Up/down timer 2048 ms continuous, 0.5 down time multipier	Not used Series 11
			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	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			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	
			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	14/16 counts; 25.0msec/count	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			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	
			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	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			Absolute difference of Friction torque and its redundant calculation is out of bounds given by threshold range	47.20 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	47.20 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	111.85 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	13.03 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	-47.20 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	47.20 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 1499.01 Nm Low Threshold -65535.00 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.
			Creep Coast Axle Torque is out of bounds given by threshold range	High Threshold 1499.01 Nm Low Threshold -65535.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 2048 ms continuous, 0.5 down time multipier	Not used Series 11
			Torque Learn offset is out of bounds given by threshold range	High Threshold 0.00 Nm Low Threshold 0.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			One step ahead calculation of air-per-cylinder and two step ahead is greater than 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	13.03 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 + 47.20 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.
			Idle speed control calculated predicted minimum torque request exceeds calculated torque limit	Table, f(Engine, Oil Temp). See supporting tables + 47.20 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 + 47.20 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Difference between Driver Requested Immediate Torque primary path and its secondary exceeds threshold	1499.01 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	5.90 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	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			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	
			1. Driver Predicted Request is greater than its redundant calculation plus threshold 2. Driver Predicted Request is less than its redundant calculation minus threshold	1499.01 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.
			Driver Immediate Request is less than its redundant calculation minus threshold	1499.01 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	1499.01 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	47.20 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	47.20 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	46.20 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	46.20 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	47.20 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	47.20 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	13.03 degrees		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			1. Cylinder Torque Offset exceeds step size threshold 2. Sum of Cylinder Torque Offset exceeds sum threshold	1. 47.20 Nm 2. 47.20 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
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	>= 5.0% <= 35.0% >= 5.0 seconds >= 5.0%	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

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			AND Valve Position for a time period greater than for	 <= 35.0% >= 0.5 seconds >= 10 times in one ignition cycle				
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
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 100.0 seconds is reached. Evaluation will then start again.	> 70.0 seconds during a 100.0 second sample period.	The following must be true for: PTO: Intrusive diagnostic fuel control: Long Term Secondary Fuel Trim Enabled	> 2.0 seconds NOT active FALSE (i.e. catalyst monitor diagnostic) Please see "**Long Term Secondary Fuel Trim Enable Criteria**" in Supporting Tables	Frequency: Continuous Monitoring in 100ms loop	2 Trip(s) Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
		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: 0.1000)			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**		
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 100.0 seconds is reached. Evaluation will then start again.	> 70.0 seconds during a 100.0 second sample period.	The following must be true for: PTO: Intrusive diagnostic fuel control:	> 2.0 seconds NOT active FALSE (i.e. catalyst monitor diagnostic)	Frequency: Continuous Monitoring in 100ms loop	2 Trip(s) Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					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: 0.1000)			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 >	10.00 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
			Difference between modeled throttle position and measured throttle position >	10.00 percent	Ignition voltage failure is false (P1682)	11 5.5		
		2) Detect throttle control is driving the throttle in the incorrect direction or exceed the reduced power limit	Throttle Position >	37.60 percent	TPS minimum learn is active		2. 11 counts; 12.5 ms/count in the primary processor	
			Throttle Position >	50.00 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 >	1.617 1.727	Throttle de-energized No TPS circuit faults	Run/Crank voltage or Powertrain relay voltage > 6.41 and reduced power is false, else the failure will be reported for all conditions	0.4969 sec	Trips: 1 Type: C MIL: NO

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						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 # 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	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 # 4 5V reference circuit (P06A3)		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
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. 14.999% offset at min. pedal position with a linear threshold to 14.999% 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 >					

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
				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. Engine total airgrams is accumulated when 11 ≤ AirFlow ≤ 100 grams per second. **Ratio Definition:** Current temp difference between ECT and RCT minus PwrUp difference divided by total airgrams. Note: Minimum total airgrams is 500.0 grams.		No Active DTC's Engine not run time Engine run time Fuel Condition ECT at Power Up IAT min T-Stat Heater duty cycle commanded Airflow	MAF_SensorFA IAT_SensorFA THMR_RCT_Sensor_Ckt_FA THMR_ECT_Sensor_Ckt_FA ≥ 7200 seconds 120 ≤ Time ≤ 1400 seconds Ethanol ≤ 100% -20.0 ≤ ECT ≤ 45.0 °C -7°C ≤ IAT ≤ 60°C. ≤ XXX % 11.0 ≤ Airflow ≤ 100.0 GPS	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.
Barometric Pressure (BARO) Sensor Performance	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 <u>Engine Not Rotating Case:</u> Barometric Pressure OR Barometric Pressure	> 15.0 kPa <= 0.06 miles > 20.0 kPa > 0.06 miles < 50.0 kPa > 115.0 kPa	No Active DTCs: Engine Run Time Time between current ignition cycle and the last time the engine was running	AmbientAirPressCktFA ECT_Sensor_Ckt_FA IAT_SensorFA MAF_SensorFA AfterThrottlePressureFA TPS_FA TPS_Performance_FA VehicleSpeedSensor_FA > 0.00 seconds > 10.0 seconds	320 failures out of 400 samples 1 sample every 12.5 msec 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.
					Engine is not rotating No Active DTCs: No Pending DTCs:	EngModeNotRunTmErr MAP_SensorFA AAP_SnsrFA SCIAP_SensorFA AAP2_SnsrFA MAP_SensorCircuitFP AAP_SnsrCktFP SCIAP_SensorCircuitFP AAP2_SnsrCktFP		
Barometric Pressure (BARO) Sensor Circuit Low	P2228	Detects a continuous short to low or open in either the signal circuit or the BARO sensor.	BARO Voltage	< 40.0 % of 5 Volt Range (2.0 Volts = 50.9 kPa)	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	P2229	Detects an open sensor ground or continuous short to high in either the signal circuit or the BARO sensor.	BARO Voltage	> 90.0 % of 5 Volt Range (4.5 Volts = 115.0 kPa)	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 Intermittent	P2230	Detects a noisy or erratic barometric pressure input	Difference between the current Baro sensor reading and the previous Baro sensor reading		Vehicle Speed No Active DTCs:	< 512 KPH AmbientAirPressCktFA ECT_Sensor_FA IAT_SensorFA	320 failures out of 400 samples	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
				> 10.0 kPa		MAF_SensorFA AfterThrottlePressure_NA TPS_FA TPS_Performance_FA VehicleSpeedSensorError	1 sample every 12.5 msec	
Turbo/Super Charger Bypass Valve - Mechanical	P2261	Detect Stuck Closed Bypass Valve	Between start and end time is high pass filtered accumulated Air mass Flow or Boost Pressure larger then Thresholds	0.25 Second < Accmulation time < 0.85 Second	Diagnosis Enabled Engine Speed Pressure ratio over the compressor	Enabled >= 1800 rpm > KtBSTD_r_ExcsvBstPresLim Enable condition kept true for 1.5 seconds extra	3 Failed tests out of 3 Tests 1 sample every 25ms	Type B 2 trips
			Filter Frequancy	12.00 Hz		See Tables in Supporting Tables Sheet		
			Filtered Air Mass Flow Filtered Boost Pressure	> 50.000 g/s > 40.00 kPa	Relative Boost Pressure (Boost - Ambient) and Negative Transient in Manifold Air Pressure	IF (RelativeBoost < 3.0 kPa OR DerivativeMAP > 50.00 kPa/s) [FALSE] Else (RelativeBoost >= 40.0 kPa AND DerivativeMAP <= -150.00 kPa) [TRUE]		
					Bypass Valve Commanded Opened	> 6.0 percent Enable condition kept true for 0.70 seconds extra		
					No Active DTCs:	TC_BoostPresSnsrFA MAF_SensorFA BSTR_b_TurboBypassCktFA		

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	< 775 mvolts > 38 grams	No Active DTC's	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA 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
					B1S2 Failed this key cycle	P013A, P013B, P013E, P013F, P2270 or P2271		
					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 to initially enable test	1100 ≤ RPM ≤ 3500		
					Engine Speed range to keep test enabled (after initially enabled)	1000 ≤ RPM ≤ 3650		
					Engine Airflow	1 ≤ gps ≤ 30		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Vehicle Speed to initially enable test Vehicle Speed range to keep test enabled (after initially enabled)	31.1 ≤ MPH ≤ 80.8 28.0 ≤ MPH ≤ 83.9 mph		
					Closed loop integral	0.92 ≤ C/L Int ≤ 1.07		
					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	≥ 60.0 sec		
					Predicted Catalyst temp	550 ≤ ºC ≤ 900		
					Fuel State	= DFCO possible		
					All of the above met for at least 1.0 seconds, and then the Force Cat Rich intrusive stage is requested.			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
O2 Sensor Signal Stuck Rich Bank 1 Sensor 2	P2271	This DTC determines if the post catalyst O2 sensor is stuck in a normal rich voltage range and thereby can no longer be used for post oxygen sensor fuel control or for catalyst monitoring. The diagnostic is an intrusive test which requests the DFCO mode to achieve the required lean threshold.	Post O2 sensor signal AND The Accumulated mass air flow monitored during the Stuck Rich Voltage Test	> 100 mvolts > 25 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 Engine Airflow Vehicle Speed Closed loop integral Closed Loop Active Evap	TPS_ThrottleAuthority Defaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA P013A, P013B, P013E, P013F or P2270 10.0 < Volts < 32.0 = Not Valid = Not Valid, See definition of **Green Sensor Delay Criteria (B1S2)** in Supporting Tables tab. = False 1100 ≤ RPM ≤ 3500 1 ≤ gps ≤ 30 31.1 ≤ MPH ≤ 80.8 0.92 ≤ C/L Int ≤ 1.07 = TRUE not in control of purge	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.
					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	≥ 60.0 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).			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Transmission Control Torque Request Circuit	P2544	Determines if the torque request from the TCM is valid	**Protect error** - Serial Communication message - ($199 - PTEI3)	Message <> two's complement of message	Diagnostic enabled/ disabled	Enabled	>= 10 Protect errors during key cycle. Performed every 12.5 msec	2 trip(s)
			OR					
			Rolling count error - Serial Communication message ($199 - PPEI3) rolling count value	Message <> previous message rolling count value + one	Power Mode	= Run	>= 6 Rolling count errors out of ten samples. Performed every 12.5 msec	Type B
			OR					
			RAM error - Serial Communication message ($199 - PPEI3)	Transmission torque request value or request type dual store not equal	Engine Running Run/Crank Active	= True > 0.50 Sec	>= 16 RAM errors out of 32 samples. Performed every 12.5 msec	
			OR					
			Range Error - Serial Communication message - ($199 - PTEI3) TCM Requested Torque Increase	> 450 Nm			>= 6 out of 10 samples. Performed every 12.5 msec	
			OR					

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			Multi-transition error - Trans torque intervention type request change	Requested torque intervention type toggles from not increasing request to increasing request			>= 3 multi-transitions out of 5 samples. Performed every 200 msec	
ECM/PCM Internal Engine Off Timer Performance	P2610	This DTC determines if the engine mode not running timer does not initialize or count properly. There are two tests to ensure proper functioning of the timer: Count Up Test (CUT) and Range Test (RaTe). Count Up Test (CUT): Verifies that the HWIO timer is counting up with the proper increment.	**Count Up Test:** Time difference between the current read and the previous read of the Timer **Range Test:** The variation of the HWIO timer and mirror timer is at controller shutdown.	> 1.50 seconds > 25 %	IAT Temperature No active DTCs: **Count Up Test:** Ignition key off OR Engine off **Range Test:** ECM is powering down	-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. **Range Test:** One time when the controller is powered down.	2 trips Type B DTC sets on next key cycle if failure detected.

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
		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.						
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	> 0.5000 seconds	Diagnostic runs in 12.5 ms loop	2 Trip(s)
			out of these samples	≥ 5 counts	Diagnostic enable timer	> 3.0000 seconds		Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Lost Communication With TCM	U0101	This DTC monitors for a loss of communication with the transmission control module	Message is not received from controller for this amount of time.	Type B time = 10s Type C time = 12s Torque Security Ucode = varied and possibly much shorter time.	Run/Crank Voltage	11 volts ≤ Voltage ≤ 32 volts	The fail diagnostic runs in the 6.25 ms loop with pass conditions reported to the DFIR in the 1000ms loop.	2 Trip(s)
					Power mode is RUN			Type B
					Communication bus is not OFF			
					or is typed as a C code			
					Normal Communication is enabled			
					Normal Transmit capability is TRUE			
					The diagnostic system is not disabled			
					The bus has been on for	> 3.0000 seconds		
					A message has been selected to monitor.			
Lost Communication With 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			
					Normal Communication is enabled			
					Normal Transmit capability is TRUE			
					The diagnostic system is not disabled			
					The bus has been on for	> 3.0000 seconds		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					A message has been selected to monitor.			
Lost Communication With 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.			
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			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					The diagnostic system is not disabled			
					The bus has been on for	> 3.0000 seconds		
					A message has been selected to monitor.			

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	20.0000	20.0000	20.0000	10.0000	10.0000	10.0000	10.0000	10.0000	10.0000	10.0000	10.0000	10.0000	10.0000	10.0000	10.0000	10.0000	10.0000
800	20.0000	20.0000	20.0000	10.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000
1200	20.0000	20.0000	20.0000	10.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000
1600	20.0000	20.0000	20.0000	10.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000
2000	20.0000	20.0000	20.0000	10.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000
2400	20.0000	20.0000	20.0000	10.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000
2800	20.0000	20.0000	20.0000	10.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000
3200	20.0000	20.0000	20.0000	10.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000
3600	20.0000	20.0000	20.0000	10.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000
4000	20.0000	20.0000	20.0000	10.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000
4400	20.0000	20.0000	20.0000	10.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000
4800	20.0000	20.0000	20.0000	10.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000
5200	20.0000	20.0000	20.0000	10.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000
5600	20.0000	20.0000	20.0000	10.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000
6000	20.0000	20.0000	20.0000	10.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000
6400	20.0000	20.0000	20.0000	10.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000
6800	20.0000	20.0000	20.0000	10.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000

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	20.0000	20.0000	20.0000	10.0000	10.0000	10.0000	10.0000	10.0000	10.0000	10.0000	10.0000	10.0000	10.0000	10.0000	10.0000	10.0000	10.0000
800	20.0000	20.0000	20.0000	10.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000
1200	20.0000	20.0000	20.0000	10.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000
1600	20.0000	20.0000	20.0000	10.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000
2000	20.0000	20.0000	20.0000	10.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000
2400	20.0000	20.0000	20.0000	10.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000
2800	20.0000	20.0000	20.0000	10.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000
3200	20.0000	20.0000	20.0000	10.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000
3600	20.0000	20.0000	20.0000	10.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000
4000	20.0000	20.0000	20.0000	10.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000
4400	20.0000	20.0000	20.0000	10.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000
4800	20.0000	20.0000	20.0000	10.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000
5200	20.0000	20.0000	20.0000	10.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000
5600	20.0000	20.0000	20.0000	10.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000
6000	20.0000	20.0000	20.0000	10.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000
6400	20.0000	20.0000	20.0000	10.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000
6800	20.0000	20.0000	20.0000	10.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000

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	10.000	3.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	5.000	10.000
800	100.000	80.000	20.000	10.000	3.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	5.000	10.000
1200	100.000	80.000	20.000	10.000	3.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	5.000	10.000
1600	100.000	80.000	20.000	10.000	3.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	5.000	10.000
2000	100.000	80.000	20.000	10.000	3.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	5.000	10.000
2400	100.000	80.000	20.000	10.000	3.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	5.000	10.000
2800	100.000	80.000	20.000	10.000	3.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	5.000	10.000
3200	100.000	80.000	20.000	10.000	3.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	5.000	10.000
3600	100.000	80.000	20.000	10.000	3.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	5.000	10.000
4000	100.000	80.000	20.000	10.000	3.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	5.000	10.000
4400	100.000	80.000	20.000	10.000	3.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	5.000	10.000
4800	100.000	80.000	20.000	10.000	3.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	5.000	10.000
5200	100.000	80.000	20.000	10.000	3.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	5.000	10.000
5600	100.000	80.000	20.000	10.000	3.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	5.000	10.000
6000	100.000	80.000	20.000	10.000	3.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	5.000	10.000
6400	100.000	80.000	20.000	10.000	3.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	5.000	10.000
6800	100.000	80.000	20.000	10.000	3.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	5.000	10.000

P0014
KtPHSD_t_StablePositionTimeEc1

X axis is Deg C
Y axis is RPM

	-40.0000	-28.0000	-16.0000	-4.0000	8.0000	20.0000	32.0000	44.0000	56.0000	68.0000	80.0000	92.0000	104.0000	116.0000	128.0000	140.0000	152.0000
400	100.000	80.000	20.000	10.000	3.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	5.000	10.000
800	100.000	80.000	20.000	10.000	3.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	5.000	10.000
1200	100.000	80.000	20.000	10.000	3.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	5.000	10.000
1600	100.000	80.000	20.000	10.000	3.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	5.000	10.000
2000	100.000	80.000	20.000	10.000	3.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	5.000	10.000
2400	100.000	80.000	20.000	10.000	3.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	5.000	10.000
2800	100.000	80.000	20.000	10.000	3.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	5.000	10.000
3200	100.000	80.000	20.000	10.000	3.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	5.000	10.000
3600	100.000	80.000	20.000	10.000	3.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	5.000	10.000
4000	100.000	80.000	20.000	10.000	3.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	5.000	10.000
4400	100.000	80.000	20.000	10.000	3.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	5.000	10.000
4800	100.000	80.000	20.000	10.000	3.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	5.000	10.000
5200	100.000	80.000	20.000	10.000	3.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	5.000	10.000
5600	100.000	80.000	20.000	10.000	3.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	5.000	10.000
6000	100.000	80.000	20.000	10.000	3.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	5.000	10.000
6400	100.000	80.000	20.000	10.000	3.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	5.000	10.000
6800	100.000	80.000	20.000	10.000	3.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	5.000	10.000

P0420, P0430

MinimumEngineRunTime

Coolant Temp	40	50	60	70	80
Engine Run Time	230	100	100	100	100

Supporting Tables

MinAirflowToWarmCatalyst

Engine Coolant	0	45	90
MinAirFlowToWrmCat	12	8	4

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

load	400	500	600	700	800	900	1000	1100	1200	1400	1600	1800	2000
8	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
Load **9**	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
11	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
12	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
13	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
14	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
15	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
16	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
17	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
18	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
19	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
21	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
22	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
25	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
25	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
27	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
29	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767

P0300-P0308: Idle SCD ddt

load	400	500	600	700	800	900	1000	1100	1200	1400	1600	1800	2000
8	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
9	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
11	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
12	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
13	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
14	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
15	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
16	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
17	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
18	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
19	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
21	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
22	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
25	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
25	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
27	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
29	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767

P0300-P0308: SCD Delta **OR** (decel index >SCD Delta **AND** > SCD Delta ddt Tables))

load	400	500	600	700	800	900	1000	1100	1200	1400	1600	1800	2000
10	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
Load **12**	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
15	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
18	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
22	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
26	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
31	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
38	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
45	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
54	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
65	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
77	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
91	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
107	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
125	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
145	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
155	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767

P0300-P0308: SCD Delta ddt

load	400	500	600	700	800	900	1000	1100	1200	1400	1600	1800	2000
10	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
12	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
15	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
18	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
22	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
26	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
31	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
38	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
45	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
54	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
65	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
77	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
91	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
107	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
125	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
145	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
155	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767

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

load	400	500	600	700	800	900	1000	1100	1200	1400	1600	1800	2000
8	4350	3000	2000	1310	890	605	445	320	265	178	116	84	64
Load **9**	4550	3150	2050	1340	910	620	455	330	270	182	118	86	66

Supporting Tables

P0300-P0308: Idle Cyl Mode (Con't) **OR** (decel index (>Idle Cyl Mode **AND** > Idle Cyl Mode ddt Tables))

11	4750	3300	2100	1370	930	635	465	340	275	186	122	88	68
12	4950	3350	2150	1400	950	650	475	350	280	190	125	90	70
13	5250	3520	2220	1440	975	670	490	360	290	194	128	93	72
14	5600	3680	2300	1470	995	690	505	370	295	200	132	95	75
15	5900	3850	2370	1510	1020	710	520	385	305	204	134	98	77
16	6250	4010	2450	1540	1040	725	535	395	310	208	138	101	79
17	6550	4180	2520	1580	1065	745	550	405	320	214	140	103	82
18	6850	4340	2600	1610	1090	765	565	415	325	218	144	106	84
19	7200	4510	2670	1650	1110	785	575	430	335	222	146	109	86
21	7500	4670	2750	1680	1135	805	590	440	340	226	150	112	88
22	7800	4840	2820	1720	1160	825	605	450	350	232	152	114	91
25	8150	5000	2900	1750	1180	840	620	460	355	236	156	117	93
25	8450	5170	2970	1790	1205	860	635	475	365	240	158	120	95
27	8800	5330	3050	1820	1225	880	650	485	370	246	162	122	98
29	9100	5500	3120	1860	1250	900	665	495	380	250	165	125	100

P0300-P0308: Idle Cyl Mode ddt

load	**400**	**500**	**600**	**700**	**800**	**900**	**1000**	**1100**	**1200**	**1400**	**1600**	**1800**	**2000**
8	4280	3550	2850	2150	1500	1120	880	680	525	270	175	125	100
9	4350	3630	2930	2190	1550	1150	890	695	535	275	180	130	105
11	4460	3700	3010	2235	1600	1190	905	710	545	280	185	135	110
12	4600	3820	3080	2295	1650	1240	930	725	555	285	190	140	115
13	4780	3940	3160	2365	1730	1300	970	745	565	290	195	145	120
14	4990	4090	3270	2455	1800	1360	1010	765	575	295	200	150	125
15	5280	4290	3400	2565	1900	1420	1050	785	585	300	205	155	130
16	5540	4490	3560	2680	1960	1440	1065	795	590	310	215	160	135
17	5810	4670	3700	2790	2020	1470	1080	805	600	320	220	170	145
18	6070	4870	3870	2900	2080	1490	1095	815	605	330	230	175	150
19	6340	5070	4020	3010	2140	1510	1110	825	615	340	235	185	160
21	6600	5270	4170	3120	2200	1540	1125	835	620	350	245	190	165
22	6860	5460	4320	3230	2260	1560	1140	840	625	360	250	195	170
25	7130	5660	4480	3350	2320	1580	1155	850	635	370	260	205	180
25	7390	5850	4630	3460	2380	1610	1170	860	640	380	265	210	185
27	7660	6040	4790	3570	2440	1630	1185	870	650	390	275	215	195
29	7920	6230	4940	3680	2500	1655	1200	880	655	400	280	224	200

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

load Load	**400**	**500**	**600**	**700**	**800**	**900**	**1000**	**1100**	**1200**	**1400**	**1600**	**1800**	**2000**	**2200**	**2400**	**2600**	**2800**	**3000**	**3500**	**4000**	**4500**	**5000**	**5500**	**6000**	**6500**	**7000**
10	700	550	450	380	320	270	230	190	160	105	80	68	50	40	34	28	23	20	15	12	10	9	7	5	5	5
12	755	590	485	410	345	290	245	205	170	115	85	72	55	40	36	24	21	20	16	12	10	9	7	5	5	5
15	795	640	525	435	365	305	260	220	180	125	90	75	60	42	38	32	21	20	16	12	10	9	7	5	5	5
18	840	685	565	475	395	335	285	240	200	135	100	80	65	52	40	30	25	20	17	13	10	9	7	5	5	5
22	930	765	645	540	460	390	325	270	230	155	115	90	74	60	47	37	30	25	15	13	10	9	7	5	5	5
26	1050	875	745	630	530	450	380	320	270	185	135	105	85	69	55	45	37	30	16	14	11	10	7	6	5	5
31	1160	980	840	720	610	520	445	380	325	235	175	140	110	90	72	58	48	38	24	15	12	10	7	6	6	5
38	1270	1085	935	805	695	595	510	440	380	280	215	170	135	110	88	72	58	47	28	18	13	10	8	7	6	5
45	1380	1195	1035	895	775	680	575	500	435	330	260	205	165	130	105	85	69	55	34	21	15	11	9	7	8	7
54	1490	1300	1130	980	850	740	640	560	490	380	300	235	190	150	120	98	79	63	40	23	17	12	11	10	9	8
65	1660	1440	1250	1090	950	830	720	630	545	425	340	270	215	175	140	110	90	72	47	27	21	15	14	13	12	11
77	1840	1600	1390	1210	1050	910	790	690	600	475	380	300	240	195	155	123	100	80	53	31	24	18	15	14	13	12
91	2000	1740	1510	1310	1140	990	860	750	655	525	420	330	265	215	170	135	110	88	60	36	28	21	18	15	14	13
107	2170	1890	1640	1430	1240	1080	940	820	710	575	460	360	290	235	185	148	120	96	66	42	33	25	23	19	17	15
125	2320	2020	1760	1530	1330	1160	1010	880	770	625	500	390	315	255	200	160	130	104	72	48	38	29	27	23	21	19
145	2500	2170	1890	1640	1430	1240	1080	940	830	675	540	420	340	275	215	173	140	112	79	54	43	32	32	27	23	21
155	2670	2320	2020	1760	1530	1330	1160	1010	890	725	580	450	365	295	230	185	150	120	85	60	48	36	38	31	27	24

P0300-P0308: Cyl Mode ddt

load	**400**	**500**	**600**	**700**	**800**	**900**	**1000**	**1100**	**1200**	**1400**	**1600**	**1800**	**2000**	**2200**	**2400**	**2600**	**2800**	**3000**	**3500**	**4000**	**4500**	**5000**	**5500**	**6000**	**6500**	**7000**
10	1330	1110	920	770	640	530	440	365	300	220	150	105	78	68	48	39	33	33	26	22	17	16	14	13	13	12
12	1390	1160	960	810	680	560	470	390	325	240	165	105	85	65	52	42	35	33	29	22	17	16	14	13	13	12
15	1570	1310	1090	910	750	620	520	430	360	260	180	125	91	72	56	43	39	33	31	22	17	16	14	13	13	12
18	1890	1570	1310	1090	910	750	620	520	435	305	210	145	105	78	65	46	42	35	33	23	17	16	14	13	13	12
22	2280	1900	1590	1330	1110	920	770	640	530	360	245	175	125	92	74	62	52	39	29	25	18	16	14	13	13	12
26	2650	2210	1850	1530	1270	1070	880	740	620	415	285	200	145	105	87	74	62	52	33	25	20	17	14	13	13	12
31	3410	2830	2370	1980	1650	1380	1140	950	780	510	330	235	170	130	105	90	77	65	35	26	22	20	17	16	13	12
38	4080	3410	2830	2370	1980	1650	1380	1140	950	600	385	275	195	150	125	105	91	78	39	29	23	21	18	17	14	13
45	4850	4040	3370	2810	2340	1950	1630	1350	1120	710	440	320	230	175	145	125	105	91	44	31	25	22	20	17	16	14
54	5540	4620	3850	3210	2680	2240	1860	1550	1290	830	510	370	265	210	170	145	125	105	51	35	27	23	21	17	16	14
65	6250	5210	4340	3610	3020	2510	2090	1740	1460	950	590	430	310	245	200	170	145	125	59	40	31	26	23	21	18	17
77	6990	5820	4850	4040	3370	2810	2340	1950	1630	1070	660	495	365	295	240	200	170	145	68	46	35	29	26	23	21	18
91	7740	6450	5370	4470	3730	3110	2590	2160	1790	1200	750	560	425	340	280	235	195	170	78	52	39	33	30	27	23	21
107	8450	7050	5880	4900	4080	3410	2830	2370	1980	1320	850	620	480	390	325	275	230	195	91	60	46	39	36	33	27	25
125	9330	7770	6470	5400	4500	3740	3120	2600	2170	1440	950	700	540	440	370	310	260	220	104	69	56	48	44	39	34	30
145	10300	8580	7150	5950	4970	4130	3450	2870	2390	1560	1050	770	600	495	415	350	295	245	117	78	70	59	52	46	40	36
155	11260	9390	7830	6530	5430	4520	3770	3150	2630	1730	1140	850	660	550	460	390	325	275	130	88	83	68	59	52	46	42

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**
10	32767	32767	32767	32767	32767	32768	32768	32768	32768	32768	32768	32768	32768	32768	25	18	14	12	10
12	32767	32767	32767	32767	32767	32768	32768	32768	32768	32768	32768	32768	32768	32768	25	18	14	12	10
15	32767	32767	32767	32767	32767	32768	32768	32768	32768	32768	32768	32768	32768	32768	25	18	14	12	10
18	32767	32767	32767	32767	32767	32768	32768	32768	32768	32768	32768	32768	32768	32768	25	18	14	12	10
22	32767	32767	32767	32767	32767	32768	32768	32768	32768	32768	32768	32768	32768	32768	29	22	14	12	10
26	32767	32767	32767	32767	32767	32768	32768	32768	32768	32768	32768	32768	32768	32768	33	26	18	12	10
31	32767	32767	32767	32767	32767	32768	32768	32768	32768	32768	32768	32768	32768	32768	38	29	22	14	10
38	32767	32767	32767	32767	32767	32768	32768	32768	32768	32768	32768	32768	32768	32768	43	33	25	16	11
45	32767	32767	32767	32767	32767	32768	32768	32768	32768	32768	32768	32768	32768	32768	48	38	29	20	14
54	32767	32767	32767	32767	32767	32768	32768	32768	32768	32768	32768	32768	32768	32768	54	45	35	27	21
65	32767	32767	32767	32767	32767	32768	32768	32768	32768	32768	32768	32768	32768	32768	63	52	43	34	29
77	32767	32767	32767	32767	32767	32768	32768	32768	32768	32768	32768	32768	32768	32768	72	62	52	45	39
91	32767	32767	32767	32767	32767	32768	32768	32768	32768	32768	32768	32768	32768	32768	82	70	61	51	46
107	32767	32767	32767	32767	32767	32768	32768	32768	32768	32768	32768	32768	32768	32768	90	79	69	60	53
125	32767	32767	32767	32767	32767	32768	32768	32768	32768	32768	32768	32768	32768	32768	100	87	78	68	61
145	32767	32767	32767	32767	32767	32768	32768	32768	32768	32768	32768	32768	32768	32768	109	96	86	77	68
155	32767	32767	32767	32767	32767	32768	32768	32768	32768	32768	32768	32768	32768	32768	120	105	95	86	76

Supporting Tables

P0300-P0308: AFM Mode Table

OR (decel index > AFM Table if active fuel management)

load / Load	400	500	600	700	800	900	1000	1100	1200	1400	1600	1800	2000	2200	2400	2600	2800	3000	3500
0	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
6	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
13	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
19	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
25	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
31	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
38	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
44	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
50	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
56	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
63	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
69	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
75	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
81	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
88	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
94	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
100	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767

P0300-P0308: Zero torque engine load

Zero Torque: All Cylinders active

RPM	Pct load
400	15.20
500	14.30
600	13.70
700	13.10
800	12.90
900	12.70
1000	11.80
1100	11.40
1200	11.30
1400	11.00
1600	10.80
1800	10.80
2000	10.70
2200	10.70
2400	10.80
2600	10.80
2800	10.90
3000	11.00
3500	14.00
4000	16.50
4500	19.50
5000	22.50
5500	25.50
6000	28.50
6500	32.00
7000	35.00

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	15.20
500	14.30
600	13.70
700	13.10
800	12.90
900	12.70
1000	11.80
1100	11.40
1200	11.30
1400	11.00
1600	10.80
1800	10.80
2000	10.70
2200	10.70
2400	10.80
2600	10.80
2800	10.90
3000	11.00
3500	14.00
4000	16.50
4500	19.50
5000	22.50
5500	25.50
6000	28.50
6500	32.00
7000	35.00

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)

Catalyst Damaging Misfire Percentage

load / Load	0	1000	2000	3000	4000	5000	6000	7000
0	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
10	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
20	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
30	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
40	22.5	22.5	22.5	22.5	22.5	22.5	22.0	21.0
50	22.5	22.5	22.5	22.5	21.5	20.5	17.5	16.5
60	22.5	22.5	22.5	20.5	17.5	16.5	15.5	15.0
70	22.5	21.0	19.5	19.0	13.5	15.5	19.0	21.0
80	22.5	19.0	17.0	14.5	12.5	18.0	21.0	22.0
90	22.0	17.5	14.0	12.5	14.5	18.5	22.0	22.5
100	21.5	20.0	18.5	12.5	15.5	20.5	22.5	22.5

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
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
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
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
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
1500	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
1800	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
2100	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
2400	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
2700	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
3000	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
3300	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
3600	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
4200	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

Supporting Tables

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

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	700	1000	1400	1800	2200	2600	3000	3400	3800	4200	4600	5000	5400	5800	6200	6600
	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	700	1000	1400	1800	2200	2600	3000	3400	3800	4200	4600	5000	5400	5800	6200	6600
	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.913	1.000	1.000	1.000	1.000	1.000

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	700	1000	1400	1800	2200	2600	3000	3400	3800	4200	4600	5000	5400	5800	6200	6600
	1.000	1.000	1.000	1.000	0.794	0.866	1.000	0.923	0.987	1.000	1.000	1.000	1.000	0.864	1.000	1.000	1.000

MAP2 Residual Weight Factor based on RPM

RPM	0	700	1000	1400	1800	2200	2600	3000	3400	3800	4200	4600	5000	5400	5800	6200	6600
	1.000	1.000	1.000	1.000	1.000	0.797	1.000	1.000	0.937	0.775	0.643	0.561	0.923	0.743	1.000	1.000	1.000

MAP3 Residual Weight Factor based on RPM

RPM	0	700	1000	1400	1800	2200	2600	3000	3400	3800	4200	4600	5000	5400	5800	6200	6600
	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.924	1.000	1.000	1.000	1.000	1.000

TIAP1 Residual Weight Factor based on RPM

RPM	0	700	1000	1400	1800	2200	2600	3000	3400	3800	4200	4600	5000	5400	5800	6200	6600
	1.000	0.510	1.000	0.914	0.882	0.844	0.887	0.822	1.000	1.000	1.000	0.909	0.839	0.811	0.833	1.000	1.000

SCIAP1 Residual Weight Factor based on RPM

RPM	0	700	1000	1400	1800	2200	2600	3000	3400	3800	4200	4600	5000	5400	5800	6200	6600
	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	700	1000	1400	1800	2200	2600	3000	3400	3800	4200	4600	5000	5400	5800	6200	6600
	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	36.0	47.0	57.0	70.0	74.0	76.0	76.0

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

Supercharger Intake Flow Rationality Diagnostic Failure Matrix

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

Supporting Tables

Supercharger Intake Flow Rationality Diagnostic Failure Matrix (Cont'd)

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

Turbocharger Intake Flow Rationality Diagnostic Failure Matrix

MAF Model Failure	MAP 1 Model Failure	MAP 2 Model Failure	MAP 3 Model Failure	TIAP 1 Model Failure	TPS Model Failure	TIAP Correlation Failure	TIAP Correlation Valid	DTC Set
F	F	F	F	F	F	F	F	No DTC
F	F	F	F	F	F	F	T	No DTC
F	F	F	F	F	F	T	F	No DTC
F	F	F	F	F	F	T	T	No DTC
F	F	F	F	F	T	F	F	No DTC
F	F	F	F	F	T	F	T	No DTC
F	F	F	F	F	T	T	F	No DTC
F	F	F	F	F	T	T	T	No DTC
F	F	F	F	T	F	F	F	No DTC
F	F	F	F	T	F	F	T	No DTC
F	F	F	F	T	F	T	F	No DTC
F	F	F	F	T	F	T	T	No DTC
F	F	F	F	T	T	F	F	P1101
F	F	F	F	T	T	F	T	P0121
F	F	F	F	T	T	T	F	P1101
F	F	F	T	F	F	F	F	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

Supporting Tables

Turbocharger Intake Flow Rationality Diagnostic Failure Matrix (Cont'd)

MAF Model Failure	MAP 1 Model Failure	MAP 2 Model Failure	MAP 3 Model Failure	TIAP 1 Model Failure	TPS Model Failure	TIAP Correlation Failure	TIAP Correlation Valid	DTC Set
F	F	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	T	F	F	F	F	F	F	P1101
F	T	F	F	F	F	F	T	P1101
F	T	F	F	F	F	T	F	P1101
F	T	F	F	F	F	T	T	P0236
F	T	F	F	F	T	F	F	P1101
F	T	F	F	F	T	F	T	P0121
F	T	F	F	F	T	T	F	P1101
F	T	F	F	F	T	T	T	P0236
F	T	F	F	T	F	F	F	P1101
F	T	F	F	T	F	F	T	P1101
F	T	F	F	T	F	T	F	P1101
F	T	F	F	T	F	T	T	P0236
F	T	F	F	T	T	F	F	P1101
F	T	F	F	T	T	F	T	P0121
F	T	F	F	T	T	T	F	P1101
F	T	F	F	T	T	T	T	P0236
F	T	F	T	F	F	F	F	P1101
F	T	F	T	F	F	F	T	P1101
F	T	F	T	F	F	T	F	P1101
F	T	F	T	F	F	T	T	P1101
F	T	F	T	F	T	F	F	P1101
F	T	F	T	F	T	F	T	P1101
F	T	F	T	F	T	T	F	P1101
F	T	F	T	F	T	T	T	P1101
F	T	F	T	T	F	F	F	P1101
F	T	F	T	T	F	F	T	P1101
F	T	F	T	T	F	T	F	P1101
F	T	F	T	T	F	T	T	P1101
F	T	F	T	T	T	F	F	P1101
F	T	F	T	T	T	F	T	P1101
F	T	F	T	T	T	T	F	P1101
F	T	F	T	T	T	T	T	P1101
F	T	T	F	F	F	F	F	P1101
F	T	T	F	F	F	F	T	P1101
F	T	T	F	F	F	T	F	P1101
F	T	T	F	F	F	T	T	P1101
F	T	T	F	F	T	F	F	P1101
F	T	T	F	F	T	F	T	P1101
F	T	T	F	F	T	T	F	P1101
F	T	T	F	F	T	T	T	P1101
F	T	T	F	T	F	F	F	P1101
F	T	T	F	T	F	F	T	P1101
F	T	T	F	T	F	T	F	P1101
F	T	T	F	T	F	T	T	P1101
F	T	T	F	T	T	F	F	P1101
F	T	T	F	T	T	F	T	P1101
F	T	T	F	T	T	T	F	P1101
F	T	T	F	T	T	T	T	P1101
F	T	T	T	F	F	F	F	P0106
F	T	T	T	F	F	F	T	P0106
F	T	T	T	F	F	T	F	P0106
F	T	T	T	F	F	T	T	P0106
F	T	T	T	F	T	F	F	P1101
F	T	T	T	F	T	F	T	P1101
F	T	T	T	F	T	T	F	P1101
F	T	T	T	F	T	T	T	P1101
F	T	T	T	T	F	F	F	P1101
F	T	T	T	T	F	F	T	P1101
F	T	T	T	T	F	T	F	P1101
F	T	T	T	T	F	T	T	P1101
F	T	T	T	T	T	F	F	P1101
F	T	T	T	T	T	F	T	P1101
F	T	T	T	T	T	T	F	P1101
F	T	T	T	T	T	T	T	P1101
T	F	F	F	F	F	F	F	P1101
T	F	F	F	F	F	F	T	P1101
T	F	F	F	F	F	T	F	P1101
T	F	F	F	F	F	T	T	P0236

Supporting Tables

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

Supporting Tables

Turbocharger Intake Flow Rationality Diagnostic Failure Matrix (Cont'd)

MAF Model Failure	MAP 1 Model Failure	MAP 2 Model Failure	MAP 3 Model Failure	TIAP 1 Model Failure	TPS Model Failure	TIAP Correlation Failure	TIAP Correlation Valid	DTC Set
T	T	F	T	T	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
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)

	IAT Range												
	Low	Hi	-40	-28	-16	-4	8	20	32	44	56	68	80
Primary	10.0 ° C	65.0 ° C	1000	850	800	650	600	500	475	450	400	325	300
Alternate	-7.0 ° C	10.0 ° C	1100	1000	700	550	500	400	350	300	250	225	175

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	0.030	0.045	0.060	0.075	0.090	0.105	0.120	0.135	0.150	0.165	0.180	0.195	0.210	0.225	0.240	1.000
0.000	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0
0.030	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0
0.045	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0
0.060	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0
0.075	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0
0.090	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
0.105	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
0.120	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
0.135	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
0.150	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0
0.165	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0
0.180	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0
0.195	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	0
0.210	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0
0.225	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0
0.240	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1.000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Supporting Tables

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

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

	0.0	10.0	20.0	50.0	80.0
0.0	20	25	25	25	25
6.3	23	25	25	25	25
12.5	23	25	25	25	25
18.8	24	25	25	25	25
25.0	25	25	25	25	25
31.3	26	25	25	25	25
37.5	27	25	25	25	25
43.8	30	25	25	25	25
50.0	30	25	25	25	25
56.3	30	25	25	25	25
62.5	30	25	25	25	25
68.8	30	25	25	25	25
75.0	30	25	25	25	25
81.3	30	25	25	25	25
87.5	30	25	25	25	25
93.8	30	25	25	25	25
100.0	30	25	25	25	25

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

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

	0.0	10.0	20.0	50.0	80.0
0.0	20	25	25	25	25
6.3	23	25	25	25	25
12.5	23	25	25	25	25
18.8	24	25	25	25	25
25.0	25	25	25	25	25
31.3	26	25	25	25	25
37.5	27	25	25	25	25
43.8	30	25	25	25	25
50.0	30	25	25	25	25
56.3	30	25	25	25	25
62.5	30	25	25	25	25
68.8	30	25	25	25	25
75.0	30	25	25	25	25
81.3	30	25	25	25	25
87.5	30	25	25	25	25
93.8	30	25	25	25	25
100.0	30	25	25	25	25

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 15 gps for 100000 grams of accumulated flow non-continuously.
* B1S2 Airflow greater than 15 gps for 100000 grams of accumulated flow non-continuously.
* B2S1 Airflow greater than 15 gps for 100000 grams of accumulated flow non-continuously.
* B2S2 Airflow greater than 15 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

P0089
P163A
P228C
P228D
P0191

KtFHPD_t_PumpCntrlEngRunThrsh

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

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	-20.0000	-25.0000	-23.0000	-22.0000	-20.0000	-20.0000	-20.0000	-22.0000	-22.0000	-22.0000
1500.0000	-40.0000	-30.0000	-23.0000	-22.0000	-20.0000	-20.0000	-20.0000	-22.0000	-22.0000	-22.0000
2000.0000	-60.0000	-40.0000	-22.0000	-21.0000	-20.0000	-20.0000	-20.0000	-20.0000	-20.0000	-22.0000
2500.0000	-60.0000	-40.0000	-20.0000	-17.0000	-16.1500	-17.1000	-18.0500	-19.0000	-19.0000	-20.9000
3000.0000	-60.0000	-40.0000	-20.0000	-16.0000	-16.1500	-17.1000	-18.0500	-19.0000	-19.0000	-20.9000
3500.0000	-60.0000	-40.0000	-16.0000	-16.0000	-16.1500	-17.1000	-18.0500	-19.0000	-19.0000	-20.9000
4000.0000	-60.0000	-40.0000	-16.0000	-16.0000	-16.1500	-17.1000	-18.0500	-19.0000	-19.0000	-20.9000
4500.0000	-60.0000	-40.0000	-16.0000	-16.0000	-16.1500	-17.1000	-18.0500	-19.0000	-19.0000	-20.9000
5000.0000	-60.0000	-40.0000	-16.0000	-16.0000	-16.1500	-17.1000	-18.0500	-19.0000	-19.0000	-20.9000
6000.0000	-60.0000	-40.0000	-16.0000	-16.0000	-16.1500	-17.1000	-18.0500	-19.0000	-19.0000	-20.9000

Supporting Tables

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	90.0000	80.0000	60.0000	10.0000	0.0000	0.0000
2500.0000	80.0000	45.0000	20.0000	5.0000	0.0000	0.0000
3000.0000	75.0000	40.0000	10.0000	0.0000	0.0000	0.0000
4000.0000	10.0000	0.0000	0.0000	0.0000	0.0000	0.0000
5000.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
6000.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

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

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

	X-axis: Engine Air Flow (mg per cylinder)			
Y-axis: Engine Speed (RPM)	100	300	700	1200
500	0.0300	0.0300	0.0300	0.0300
1000	0.0300	0.0300	0.0300	0.0300
1500	0.0310	0.0310	0.0310	0.0310
2000	0.0310	0.0310	0.0310	0.0310
2500	0.0330	0.0330	0.0330	0.0330
3000	0.0340	0.0340	0.0340	0.0340
3500	0.0340	0.0340	0.0340	0.0340
4000	0.0370	0.0370	0.0370	0.0370
4500	0.0450	0.0450	0.0450	0.0450
5000	0.0410	0.0410	0.0410	0.0410
5500	0.0440	0.0440	0.0440	0.0440
6000	0.0400	0.0400	0.0400	0.0400
6500	0.0530	0.0530	0.0530	0.0530
7000	0.0530	0.0530	0.0530	0.0530
7500	0.0530	0.0530	0.0530	0.0530
8000	0.0530	0.0530	0.0530	0.0530
8500	0.0530	0.0530	0.0530	0.0530

Supporting Tables

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). This is the primary open circuit diag method and is used at all engine RPM when possible. In some engines the primary method is not robust at high engine rpm. In these cases a second method (Normal Noise) is used at high RPM.

2) Normal Noise: The amplitude of the FFT (background noise 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

LUJ

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

LUW

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

Open Circuit Thresholds: (shaded cells mean threshold is not applicable due to KtKNKD_e_OpenMethod used)

1. 20 kHz Method:

Engine Speed (RPM):	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500
OpenCktThrshMin (LUJ):	0.7949	0.7930	0.7676	0.7227	0.6660	0.5996	0.5313	0.4668	0.4082	0.3652	0.3398	0.3379	0.3652	0.4297	0.5313	0.6797	0.8789
OpenCktThrshMin (LUW):	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):	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500
OpenCktThrshMax (LUJ):	2.0586	2.0801	2.0234	1.9082	1.7480	1.5605	1.3652	1.1758	1.0078	0.8828	0.8125	0.8164	0.9082	1.1094	1.4316	1.8945	2.5156
OpenCktThrshMax (LUW):	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):	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500
OpenCktThrshMin (LUJ):	0.0000	0.0000	0.0078	0.0117	0.0156	0.0176	0.0195	0.0215	0.0215	0.0215	0.0215	0.0215	0.0234	0.0254	0.0293	0.0352	0.0430
OpenCktThrshMin (LUW):	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
OpenCktThrshMax (LUJ):	0.0000	0.0000	0.0000	0.0000	0.0078	0.0469	0.0684	0.0781	0.0801	0.0820	0.0840	0.1035	0.1328	0.1836	0.2578	0.3633	0.5059
OpenCktThrshMax (LUW):	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	0.0078	0.0059	0.0117	0.0215	0.0352	0.0391	0.0508	0.0840	0.0938	0.0996	0.0977	0.0859	0.0625	0.0254	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	0.0254	0.0313	0.0371	0.0645	0.0898	0.1348	0.1836	0.2344	0.2793	0.3203	0.3496	0.3672	0.3652	0.3457	0.2988	0.2266	0.1230

P0068: MAP / MAF / TPS Correleation

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

X-axis	1.00	6.00	12.00	15.00	20.00	25.00	30.00	40.00	60.00
Data	36.00	37.00	32.00	42.00	41.50	46.00	47.00	69.00	150.00

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

X-axis	1.00	6.00	12.00	15.00	20.00	25.00	30.00	40.00	60.00
Data	5.50	7.00	9.60	11.70	14.84	19.13	27.27	56.00	150.00

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	17.90	39.19	63.43	80.91	112.92	138.31	168.70	174.20	176.70

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	1.48	1.95	13.74	42.67	102.67	205.24	300.70	300.70	300.70

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

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	1.250	1.250	1.250	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	0	0	0	0

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	83.16	63.69	47.58	38.33	34.67	32.22	34.61	35.66	37.36	40.56	45.11	48.94	51.97	52.80	52.80	52.80	52.80
160.00	85.31	56.72	41.06	33.77	30.13	28.08	30.05	30.55	31.63	33.70	36.06	38.59	41.23	41.95	41.95	41.95	41.95
240.00	86.22	50.11	34.38	28.98	26.63	24.80	26.16	26.63	27.42	28.56	29.27	31.13	33.97	34.73	34.73	34.73	34.73
320.00	87.14	44.94	29.13	24.69	23.45	22.22	23.16	23.61	24.00	23.98	24.22	26.09	28.89	29.64	29.64	29.64	29.64
400.00	88.08	40.75	25.28	21.11	20.45	20.11	20.77	20.78	20.64	20.42	20.66	22.45	25.13	25.86	25.86	25.86	25.86
480.00	89.03	37.23	22.33	18.45	18.09	18.20	18.42	18.13	17.97	17.78	18.02	19.72	22.23	22.92	22.92	22.92	22.92
560.00	88.05	34.02	20.00	16.38	16.14	16.34	16.33	16.03	15.92	15.73	15.97	17.58	19.94	20.59	20.59	20.59	20.59
640.00	86.61	31.31	18.11	14.73	14.50	14.69	14.66	14.36	14.28	14.13	14.33	15.86	18.08	18.69	18.69	18.69	18.69
720.00	85.55	29.56	16.91	13.69	13.47	13.66	13.61	13.33	13.27	13.11	13.31	14.77	16.89	17.47	17.47	17.47	17.47
800.00	85.55	29.56	16.91	13.69	13.47	13.66	13.61	13.33	13.27	13.11	13.31	14.77	16.89	17.47	17.47	17.47	17.47
880.00	85.55	29.56	16.91	13.69	13.47	13.66	13.61	13.33	13.27	13.11	13.31	14.77	16.89	17.47	17.47	17.47	17.47
960.00	85.55	29.56	16.91	13.69	13.47	13.66	13.61	13.33	13.27	13.11	13.31	14.77	16.89	17.47	17.47	17.47	17.47
1040.00	85.55	29.56	16.91	13.69	13.47	13.66	13.61	13.33	13.27	13.11	13.31	14.77	16.89	17.47	17.47	17.47	17.47
1120.00	85.55	29.56	16.91	13.69	13.47	13.66	13.61	13.33	13.27	13.11	13.31	14.77	16.89	17.47	17.47	17.47	17.47
1200.00	85.55	29.56	16.91	13.69	13.47	13.66	13.61	13.33	13.27	13.11	13.31	14.77	16.89	17.47	17.47	17.47	17.47
1280.00	85.55	29.56	16.91	13.69	13.47	13.66	13.61	13.33	13.27	13.11	13.31	14.77	16.89	17.47	17.47	17.47	17.47
1360.00	85.55	29.56	16.91	13.69	13.47	13.66	13.61	13.33	13.27	13.11	13.31	14.77	16.89	17.47	17.47	17.47	17.47

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

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

X-axis	0.00	50.00	100.00	150.00	200.00	300.00
Data	32.00	32.00	32.00	32.00	32.00	32.00

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
300.00	4096.00	4096.00	4096.00	4096.00	4096.00	4096.00
500.00	4096.00	4096.00	4096.00	4096.00	4096.00	4096.00
600.00	80.00	70.00	70.00	70.00	70.00	70.00
700.00	80.00	70.00	60.00	55.00	55.00	35.00
800.00	80.00	70.00	60.00	55.00	55.00	35.00
900.00	80.00	70.00	60.00	55.00	55.00	35.00
1000.00	80.00	70.00	60.00	55.00	55.00	35.00
1100.00	80.00	70.00	60.00	55.00	55.00	35.00
1300.00	80.00	70.00	60.00	55.00	55.00	35.00
1500.00	80.00	70.00	60.00	55.00	55.00	35.00
1700.00	80.00	70.00	60.00	55.00	55.00	35.00
2000.00	60.00	50.00	29.70	28.00	25.30	25.00
2500.00	45.30	40.80	37.90	35.80	32.90	32.90
3000.00	45.30	40.80	37.90	35.80	32.90	32.90
4000.00	45.30	40.80	37.90	35.80	32.90	32.90
5000.00	45.30	40.80	37.90	35.80	32.90	32.90
6000.00	45.30	40.80	37.90	35.80	32.90	32.90

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	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-273.9023	-273.9023	-273.9023	-273.9023	-273.9023	-273.9023	-273.9023	-273.9023	-273.9023	-273.9023	-273.9023	-273.9023
-4.3750	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-273.9023	-273.9023	-273.9023	-273.9023	-273.9023	-273.9023	-273.9023	-273.9023	-273.9023	-273.9023	-273.9023	-273.9023
1.2500	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-273.9023	-273.9023	-273.9023	-273.9023	-273.9023	-273.9023	-273.9023	-273.9023	-273.9023	-273.9023	-273.9023	-273.9023
6.8750	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-273.9023	-273.9023	-273.9023	-273.9023	-273.9023	-273.9023	-273.9023	-273.9023	-273.9023	-273.9023	-273.9023	-273.9023
12.5000	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-273.9023	-273.9023	-273.9023	-273.9023	-273.9023	-273.9023	-273.9023	-273.9023	-273.9023	-273.9023	-273.9023	-273.9023
18.1250	-473.3693	-473.3693	-473.3693	-473.3693	-473.3693	-348.8240	-323.7690	-323.7690	-298.9573	-298.9573	-298.9573	-298.9573	-298.9573	-298.9573	-298.9573	-298.9573	-298.9573
23.7500	-473.3693	-473.3693	-473.3693	-473.3693	-473.3693	-448.3143	-373.6358	-373.6358	-348.8240	-298.9573	-298.9573	-298.9573	-298.9573	-298.9573	-298.9573	-298.9573	-298.9573
29.3750	-597.9146	-597.9146	-597.9146	-597.9146	-597.9146	-522.9928	-473.3693	-473.3693	-398.4475	-348.8240	-298.9573	-298.9573	-298.9573	-298.9573	-298.9573	-298.9573	-298.9573
35.0000	-672.5931	-672.5931	-672.5931	-672.5931	-672.5931	-597.9146	-548.0478	-548.0478	-473.3693	-423.5025	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358
40.6250	-672.5931	-672.5931	-672.5931	-672.5931	-672.5931	-597.9146	-548.0478	-548.0478	-473.3693	-423.5025	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358
46.2500	-672.5931	-672.5931	-672.5931	-672.5931	-672.5931	-597.9146	-548.0478	-548.0478	-473.3693	-423.5025	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358
51.8750	-672.5931	-672.5931	-672.5931	-672.5931	-672.5931	-597.9146	-548.0478	-548.0478	-473.3693	-423.5025	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358
57.5000	-672.5931	-672.5931	-672.5931	-672.5931	-672.5931	-597.9146	-548.0478	-548.0478	-473.3693	-423.5025	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358
63.1250	-672.5931	-672.5931	-672.5931	-672.5931	-672.5931	-597.9146	-548.0478	-548.0478	-473.3693	-423.5025	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358
68.7500	-672.5931	-672.5931	-672.5931	-672.5931	-672.5931	-597.9146	-548.0478	-548.0478	-473.3693	-423.5025	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358
74.3750	-672.5931	-672.5931	-672.5931	-672.5931	-672.5931	-597.9146	-548.0478	-548.0478	-473.3693	-423.5025	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358
80.0000	-672.5931	-672.5931	-672.5931	-672.5931	-672.5931	-597.9146	-548.0478	-548.0478	-473.3693	-423.5025	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358

Supporting Tables

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

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

Supporting Tables

P0461, P2066, P2636: Transfer Pump Enable

TransferPumpOnTimeLimit (in seconds)
Axis is Fuel Level in %

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

Tables supporting Engine Oil Temperature Sensor

P0196

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

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

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

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

P0521

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

Axis	700	1000	1500	1700	1800	2000	2500	3000	3500
Curve	0.00	0.00	0.00	0.43	0.43	0.43	0.44	0.42	0.00

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

Axis	-40	-10	20	45	60	75	95	105	120
Curve	0.55	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.00

EngLoadStabilityWeightFactorTable — **AXIS is Engine RPM, Curve is Weight Factor**

Axis	0	5	10	20	30	50	100	200	350
Curve	0.95	0.95	0.48	0.29	0.10	0.00	0.00	0.00	0.00

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

Axis	0	20	35	40	45	55	65	85	110
Curve	0.00	0.00	0.10	1.00	1.00	1.00	1.00	0.86	0.00

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	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

P0806

ResidualErrorEnableLow 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

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

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	<= 40 %	
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	< 12 %	
for	> 3 counts	each count is equal to 12.5ms

FASD Section
P0171, P0172, P0174, P0175

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

Long-Term Fuel Trim Cell Usage

Cell I.D.	CeFADR_e_Cell00_PurgOnAirMode5	CeFADR_e_Cell01_PurgOnAirMode4	CeFADR_e_Cell02_PurgOnAirMode3	CeFADR_e_Cell03_PurgOnAirMode2	CeFADR_e_Cell04_PurgOnAirMode1	CeFADR_e_Cell05_PurgOnAirMode0	CeFADR_e_Cell06_PurgOnIdle	CeFADR_e_Cell07_PurgOnDecel	CeFADR_e_Cell08_PurgOffAirMode5	CeFADR_e_Cell09_PurgOffAirMode4	CeFADR_e_Cell10_PurgOffAirMode3	CeFADR_e_Cell11_PurgOffAirMode2	CeFADR_e_Cell12_PurgOffAirMode1	CeFADR_e_Cell13_PurgOffAirMode0	CeFADR_e_Cell14_PurgOffIdle	CeFADR_e_Cell15_PurgOffDecel
FASD Cell Usage	CeFADD_e_SelectedPurgeCell	CeFADD_e_SelectedPurgeCell	CeFADD_e_SelectedPurgeCell	CeFADD_e_SelectedPurgeCell	CeFADD_e_SelectedPurgeCell	CeFADD_e_SelectedPurgeCell	CeFADD_e_SelectedPurgeCell	CeFADD_e_SelectedPurgeCell	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_SelectedNonPurgeCell
FASD Enabled In Cell?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

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

Integral Offset Max

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

Integral Offset Min

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

O2 Lean Thresh

Post O2 Airflow Mode Cell	Bank1 Decel	Bank2 Decel	Bank1 Idle	Bank2 Idle	Bank1 Cruise	Bank2 Cruise	Bank1 Light Accel	Bank2 Light Accel	Bank1 Heavy Accel	Bank2 Heavy Accel
O2 Lean Threshold [mV]	630	630	630	630	630	630	630	630	630	630

O2 Rich Thresh

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

Out Of Window Timer

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

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

Closed Loop Enable Criteria

Engine run time greater than
KtFSTA_t_ClosedLoopTime

Start-Up Coolant	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
Close Loop Enable Time	90.0	75.0	60.0	44.0	30.0	21.0	21.0	21.0	15.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0

and pre converter 02 sensor voltage less than
KfFULC_U_O2_SensorReadyThrshLo

	< 1100
Voltage *milliVolts*	

for
KcFULC_O2_SensorReadyEvents

(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

Supporting Tables

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

	> 38 Celcius
Coolant	

or less than
KfFCLL_T_AdaptiveHiCoolant

	< 120
Coolant	*Celcius*

and
KtFCLL_p_AdaptiveLowMAP_Limit

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

Secondary Fuel Trim Enable Criteria

Closed Loop Enable and
KfFCLP_U_O2ReadyThrshLo

	< 950
Voltage	*milliVolts*

for
KcFCLP_Cnt_O2RdyCyclesThrsh
(events * 12.5 milliseconds) *> 80 events*

Long Term Secondary Fuel Trim Enable Criteria

KtFCLP_t_PostIntglDisableTime

	X10	X11	X12	X13	X14	X15	X16	X17
	Y10	Y11	Y12	Y13	Y14	Y15	Y16	Y17
Start-Up Coolant	-40	-29	-18	-6	5	16	28	39	50	61	73	84	95	106	118	129	140
Post Integral Enable Time	320.0	300.0	280.0	260.0	240.0	220.0	200.0	176.0	151.0	127.0	103.0	79.0	54.0	30.0	30.0	30.0	30.0

Plus
KtFCLP_t_PostIntglRampInTime

	X10	X11	X12	X13	X14	X15	X16	X17
	Y10	Y11	Y12	Y13	Y14	Y15	Y16	Y17
Start-Up Coolant	-40	-29	-18	-6	5	16	28	39	50	61	73	84	95	106	118	129	140
Post Integral Ramp In Time	120.0	110.0	100.0	90.0	80.0	70.0	60.0	54.3	48.6	42.9	37.1	31.4	25.7	20.0	15.0	10.0	10.0

and
KeFCLP_T_IntegrationCatalystMax

	< 1000
Modeled Catalyst Temper	*Celcius*

and
KeFCLP_T_IntegrationCatalystMin

	> 300
Modeled Catalyst Temper	*Celcius*

and
PO2S_Bank_1_Snsr_2_FA and PO2S_Bank_2_Snsr_2_FA = False

Fault Bundle Definitions

York	Dilution PDT	EGRR	GetEGRR_b_EGR_ValvePerf_FA	EGRValvePerformance_FA	P0401 P042E
York	Dilution PDT	EGRR	GetEGRR_b_EGR_ValveCkt_FA	EGRValveCircuit_FA	P0403 P0404 P0405 P0406
York	Dilution PDT	EGRR	GetEGRR_b_EGR_ValveFP	EGRValve_FP	P0405 P0406 P042E
York	Dilution PDT	EGRR	GetEGRR_b_EGR_ValveCktTFTKO	EGRValveCircuit_TFTKO	P0403 P0404 P0405 P0406
York	Dilution PDT	EGRR	GetEGRR_b_EGR_ValvePerfTFTKO	EGRValvePerformance_TFTKO	P0401 P042E
Genslak		CATR	GetCATR_b_CatSysEffLoB1_FA	CatalystSysEfficiencyLoB1_FA	P0420
			GetCATD_b_CatSysEffLoB2_FA	CatalystSysEfficiencyLoB2_FA	P0430
Mathews	Misfire PDT	MSFR	GetMSFR_b_EngMisfDtctd_TFTKO	EngineMisfireDetected_TFTKO	P0300 P0301 P0302 P0303 P0304 P0305 P0306 P0307 P0308
			GetMSFR_b_EngMisfDtctd_FA	EngineMisfireDetected_FA	P0300 P0301 P0302 P0303 P0304 P0305 P0306 P0307 P0308
Wiggins	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
Wiggins	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
Wiggins	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
Wiggins	Air Measurement	MAFR	GetMAFR_b_MAF_SnsrFA	MAF_SensorFA	P0101 P0102 P0103
			GetMAFR_b_MAF_SnsrTFTKO	MAF_SensorTFTKO	P0101 P0102 P0103
			GetMAFR_b_MAF_SnsrFP	MAF_SensorFP	P0102 P0103
			GetMAFR_b_MAF_SnsrCktFA	MAF_SensorCircuitFA	P0102 P0103
			GetMAFR_b_MAF_SnsrCktTFTKO	MAF_SensorCircuitTFTKO	P0102 P0103
Wiggins	Air Measurement	MAPR	GetMAPR_b_MAP_SnsrTFTKO	MAP_SensorTFTKO	P0106 P0107 P0108
			GetMAPR_b_MAP_SnsrFA	MAP_SensorFA	P0106 P0107 P0108
			GetMAPR_b_MAP_SnsrCktFP	MAP_SensorCircuitFP	P0107 P0108

Fault Bundle Definitions

			GetMAPR_b_SCIAP_SnsrFA	SCIAP_SensorFA	P012B P012C P012D
			GetMAPR_b_SCIAP_SnsrTFTKO	SCIAP_SensorTFTKO	P012B P012C P012D
			GetMAPR_b_SCIAP_SnsrCktFP	SCIAP_SensorCircuitFP	P012C P012D
			GetMAPR_b_AfterThrotBlade_FA	AfterThrottlePressureFA	naturally aspirated, turbocharged P0106 P0107 P0108 supercharged P012B P012C P012D
			GetMAPR_b_AftThrotVacSnsr_TFTKO	AfterThrottleVacuumTFTKO	naturally aspirated, turbocharged P0106 P0107 P0108 supercharged P012B P012C P012D
			GetMAPR_b_SCIAP_SnsrCktFA	SCIAP_SensorCircuitFA	P012C P012D
			GetMAPR_b_AftThrotPresSnsrTFTKO	AfterThrottlePressTFTKO	naturally aspirated, turbocharged P0106 P0107 P0108 supercharged P012B P012C P012D
			GetMAPR_b_MAP_SnsrCktFA	MAP_SensorCircuitFA	P0107 P0108
			GetMAPR_e_EngVacStatus() == CeMAPR_e_Defaulted	MAP_EngineVacuumStatus	MAP_SensorFA OR P0107, P0108 Pending
Wiggins	Engine Positioning	EPSR	GetEPSR_b_CkpToCamCorr_TFTKO	CrankCamCorrelationTFTKO	P0016 P0017 P0018 P0019
			GetEPSR_b_CrankSnsr_FA	CrankSensorFA	P0335 P0336
			GetEPSR_b_CrankSnsr_TFTKO	CrankSensorTFTKO	P0335 P0336
			GetEPSR_b_CamSnsr_FA	CamSensorFA	P0016 P0017 P0018 P0019 P0340 P0341 P0345 P0346 P0365 P0366 P0390 P0391
			GetEPSR_b_CamSnsr_TFTKO	CamSensorTFTKO	P0016 P0017 P0018 P0019 P0340 P0341 P0345 P0346 P0365 P0366 P0390 P0391
			GetEPSR_b_CkpToCamCorrInt_FA	CrankIntakeCamCorrelationFA	P0016 P0018
			GetEPSR_b_CkpToCamCorrExh_FA	CrankExhaustCamCorrelationFA	P0017 P0019
			GetEPSR_b_CamSnsrIntake_TFTKO	IntakeCamSensorTFTKO	P0016 P0018 P0340 P0341 P0345 P0346
			GetEPSR_b_CamSnsrIntake_FA	IntakeCamSensorFA	P0016 P0018 P0340 P0341 P0345 P0346
			GetEPSR_b_CamSnsrExhaust_TFTKO	ExhaustCamSensorTFTKO	P0017 P0019 P0365 P0366 P0390 P0391
			GetEPSR_b_CamSnsrExhaust_FA	ExhaustCamSensorFA	P0017 P0019 P0365 P0366 P0390 P0391
			GetEPSR_b_IntakeSnsrFaultActive	IntakeCamSensor_FA	P0016 P0018 P0340 P0341 P0345 P0346
			GetEPSR_b_IntakeSnsrTestFailTKO	IntakeCamSensor_TFTKO	P0016 P0018 P0340 P0341 P0345 P0346
			GetEPSR_b_ExhSnsrFaultActive	ExhaustCamSensor_FA	P0017 P0019 P0365 P0366 P0390 P0391
			GetEPSR_b_ExhSnsrTestFailTKO	ExhaustCamSensor_TFTKO	P0017 P0019 P0365 P0366 P0390 P0391
			GetEPSR_b_CkpToCamCorrInt	CrankIntakeCamCorrFA	P0016 P0018
			GetEPSR_b_CkpToCamCorrExh	CrankExhaustCamCorrFA	P0017 P0019
			GetEPSR_b_CrankSnsrFaultActive	CrankSensorFaultActive	P0335 P0336
			GetEPSR_b_CrkSnsrFA	CrankSensor_FA	P0335 P0336
			GetEPSR_b_CrankSnsrTestFailTKO	CrankSensorTestFailedTKO	P0335 P0336
			GetEPSR_b_CrkSnsrTFTKO	CrankSensor_TFTKO	P0335 P0336
			GetEPSR_b_CamSnsrFaultActive	CamSensor_FA	P0016 P0017 P0018 P0019 P0340 P0341 P0345 P0346 P0365 P0366 P0390 P0391
			GetEPSR_b_CamSnsrLctnAnyFA	CamSensorAnyLocationFA	P0016 P0017 P0018 P0019 P0340 P0341 P0345 P0346 P0365 P0366 P0390 P0391
			GetEPSR_b_CamSnsrTestFailTKO	CamSensor_TFTKO	P0016 P0017 P0018 P0019 P0340 P0341 P0345 P0346 P0365 P0366 P0390 P0391
Wiggins	Engine Moding	EMDR	GetEMDR_b_EngModeNotRunTmErr	EngModeNotRunTmErr	P2610
Siekkinen	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
			NeECTI_b_DfltECT_CondDtctd	ECT_Sensor_DefaultDetected	P0117 P0118 P0116 P0119
			NeECTI_b_ECT_SnsrFA	ECT_Sensor_FA	P0117 P0118 P0116 P0119 P0128
			NeECTI_b_ECT_SnsrTFTKO	ECT_Sensor_TFTKO	P0117 P0118 P0116 P0119
			NeECTI_b_ECT_SnsrPerfFA	ECT_Sensor_Perf_FA	P0116
			VeECTI_b_ECT_SnsrCktFP	ECT_Sensor_Ckt_FP	P0117 P0118
			GetECTI_b_ECT_SnsrCktHiFP	ECT_Sensor_Ckt_High_FP	P0118
			GetETCI_b_ECT_SnsrCktLoFP	ECT_Sensor_Ckt_Low_FP	P0117
		THMD	NeTHMD_b_InsuffCIntFlwFA	THMR_Insuff_Flow_FA	P00B7
			NeTHMD_b_ThstCntrlFA	THMR_Therm_Control_FA	P0597 P0598 P0599
			NeTHMD_b_ERTSnsrCktFA	THMR_RCT_Sensor_Ckt_FA	P00B3 P00B4
			NeTHMD_b_ECTSnsrCktFA	THMR_ECT_Sensor_Ckt_FA	P0117 P0118 P0116 P00B6
Siekkinen	O2 PDT	OXYR	VaOXYI_O2_TestFailedThisKeyOn[CiFADR_FuelBank1]	O2S_Bank_ 1_TFTKO	P0131 P0132 P0134 P2A00
			VaOXYI_O2_TestFailedThisKeyOn[CiFADR_FuelBank2]	O2S_Bank_ 2_TFTKO	P0151 P0152 P0154 P2A03
			NeOXYI_b_Bank1Snsr1_FA	O2S_Bank_1_Sensor_1_FA	P2A00 P0131 P0132 P0133 P0134 P0135 P0053 P1133 P015A P015B P0030
			NeOXYI_b_Bank1Snsr2_FA	O2S_Bank_1_Sensor_2_FA	P013A P013B P013E P013F P2270 P2271 P0137 P0138 P0140 P0141 P0054 P0036
			NeOXYI_b_Bank2Snsr1_FA	O2S_Bank_2_Sensor_1_FA	P2A03 P0151 P0152 P0153 P0154 P0155 P0059 P1153 P015C P015D P0050
			NeOXYI_b_Bank2Snsr2_FA	O2S_Bank_2_Sensor_2_FA	P013C P013D P014A P014B P2272 P2273 P0157 P0158 P0160 P0161 P0060 P0056
			NeOXYI_b_PO2_CntrlBank1Snsr2_FA	PO2S_Bank_1_Snsr_2_FA	P0137 P0138 P0140 P0036 P0054 P0141 P2270 P2271
			NeOXYI_b_PO2_CntrlBank2Snsr2_FA	PO2S_Bank_2_Snsr_2_FA	P0157 P0158 P0160 P0056 P0060 P0161 P2272 P2273
Miller		FULR	GetFULR_b_FuelInjCkt_FA	FuelInjectorCircuit_FA	P0201 P0202 P0203 P0204 P0205 P0206 P0207 P0208 P0261 P0264 P0267 P0270 P0273 P0276 P0279 P0282 P0262 P0265 P0268 P0271 P0274 P0277 P0280 P0283 P2147 P2150 P2153 P2156 P216B P216E P217B P217E P2148 P2151 P2154 P2157 P216C P216F P217C P217F P1248 P1249 P124A P124B P124C P124D P124E P124F
		FULR	GetFULR_b_FuelInjCkt_TFTKO	FuelInjectorCircuit_TFTKO	P0201 P0202 P0203 P0204 P0205 P0206 P0207 P0208 P0261 P0264 P0267 P0270 P0273 P0276 P0279 P0282 P0262 P0265 P0268 P0271 P0274 P0277 P0280 P0283 P2147 P2150 P2153 P2156 P216B P216E P217B P217E P2148 P2151 P2154 P2157 P216C P216F P217C P217F P1248 P1249 P124A P124B P124C P124D P124E P124F

Fault Bundle Definitions

		FHPR	GetFHPR_b_PumpCkt_FA	FHPR_b_PumpCkt_FA	P0090 P0091 P0092 P00C8 P00C9 P00CA
		FHPR	GetFHPR_b_PumpCkt_TFTKO	FHPR_b_PumpCkt_TFTKO	P0090 P0091 P0092 P00C8 P00C9 P00CA
		FHPR	GetFHPR_b_FRP_SnsrCkt_FA	FHPR_b_FRP_SnsrCkt_FA	P0192 P0193
		FHPR	GetFHPR_b_FRP_SnsrCkt_TFTKO	FHPR_b_FRP_SnsrCkt_TFTKO	P0192 P0193
		EMOR	GetEMOC_b_EngMetalOvertempActv true for calibrated time	EngineMetalOvertempActive	P1258
Andersson	Charging Controls PDT	BSTR	GetBSTR_b_PCA_CktFA	BSTR_b_PCA_CktFA	P0033 P0034 P0035 P0045 P0047 P0048 P0243 P0245 P0246 P0247 P0249 P0250
			GetBSTR_b_PCA_CktTFTKO	BSTR_b_PCA_CktTFTKO	P0033 P0034 P0035 P0045 P0047 P0048 P0243 P0245 P0246 P0247 P0249 P0250
			GetBSTR_b_PCA_CktLoTFTKO	BSTR_b_PCA_CktLoTFTKO	P0034 P0047 P0245 P0249
			GetBSTR_b_PstnCntrlFA	BSTR_b_PstnCntrlFA	P166D P166E
			GetBSTR_b_PstnCntrlTooLoTFTKO	BSTR_b_PstnCntrlTooLoTFTKO	P166D P166E
			GetBSTR_b_PstnCntrlTooHiTFTKO	BSTR_b_PstnCntrlTooHiTFTKO	P166D P166E
			GetBSTR_b_PCA_PstnSnsrFA	BSTR_b_PCA_PstnSnsrFA	P003A P2564 P2565
			GetBSTR_b_PCA_PstnSnsrTFTKO	BSTR_b_PCA_PstnSnsrTFTKO	P003A P2564 P2565
			GetBSTR_b_TurboBypassCktFA	BSTR_b_TurboBypassCktFA	P0033 P0034 P0035 P00C0 P00C1 P00C2
			GetBSTR_b_TurboBypassCktTFTKO	BSTR_b_TurboBypassCktTFTKO	P0033 P0034 P0035 P00C0 P00C1 P00C2
			GetBSTR_b_IC_PmpCktFA	BSTR_b_IC_PmpCktFA	P023A P023C
			GetBSTR_b_PCA_FA	BSTR_b_PCA_FA	P0234 P0299 P0033 P0034 P0035 P0045 P0047 P0048 P0243 P0245 P0246 P2261 P0247 P0249 P0250
			GetBSTR_b_PCA_TFTKO	BSTR_b_PCA_TFTKO	P0234 P0299 P0033 P0034 P0035 P0045 P0047 P0048 P0243 P0245 P0246 P2261 P0247 P0249 P0250
			GetBSTR_b_ExcsvBstFA	BSTR_b_ExcsvBstFA	P226B
			GetBSTR_b_ExcsvBstTFTKO	BSTR_b_ExcsvBstTFTKO	P226B
			GetBSTR_b_PresCntrlTooLoTFTKO	BSTR_b_PresCntrlTooLoTFTKO	P0299
			GetBSTR_b_PresCntrlTooHiTFTKO	BSTR_b_PresCntrlTooHiTFTKO	P0234
			GetBSTR_b_TurboBypB_CktFA	BSTR_b_TurboBypB_CktFA	P00C0 P00C1 P00C2
			GetBSTR_b_TurboBypB_CktTFTKO	BSTR_b_TurboBypB_CktTFTKO	P00C0 P00C1 P00C2
Sawdon	Spark/ESC	KNKR	VeKNKR_b_KS_CktPerfB1B2_FA	KS_Ckt_Perf_B1B2_FA	P0324 P0325 P0326 P0327 P0328 P0330 P0332 P0333 P06B6 P06B7
Sawdon	Spark/ESC	SPKR	VeSPKR_b_EST_DriverFltActive	IgnitionOutputDriver_FA	P0351 P0352 P0353 P0354 P0355 P0356 P0357 P0358
Kar	Speed Control PDT	SPDR	GetSPDR_b_IAC_SysRPM_FA	IAC_SystemRPM_FA	P0506 P0507
Kar	Speed Control PDT	TESR_MSG	GetDFIR_e_TCM_EngSpdReqCkt	TCM_EngSpdReqCkt	P150C
Worthing	ETC	APSR	GetAPSR_PPS_1_OOR_Flt_Composite()	PPS1_OutOfRange_Composite	P2122 P2123 P06A3
			GetAPSR_PPS_2_OOR_Flt_Composite()	PPS2_OutOfRange_Composite	P2127 P2128 P0697
			GetAPSR_b_PPS_1_OOR_Flt_Cmposite()	PPS1_OutOfRange_Composite	P2122 P2123 P06A3
			GetAPSR_b_PPS_2_OOR_Flt_Cmposite()	PPS2_OutOfRange_Composite	P2127 P2128 P0697
			GetAPSR_b_PPS_1_OutofRangeFlt()	PPS1_OutOfRange	P2122 P2123
			GetAPSR_b_PPS_2_OutofRangeFlt()	PPS2_OutOfRange	P2127 P2128
			GetAPSR_PPS_1_OutofRangeFlt()	PPS1_OutOfRange	P2122 P2123
			GetAPSR_PPS_2_OutofRangeFlt()	PPS2_OutOfRange	P2127 P2128
			GetAPSR_b_PedalFailure	AcceleratorPedalFailure	P2122 P2123 P2127 P2128 P2138 P0697 P06A3
		MEMR	GetMEMR_b_CM_RAM_ErrFA()	ControllerRAM_Error_FA	P0604
		PISR	GetPISR_b_ECU_ProcPerf_FA()	ControllerProcessorPerf_FA	P0606
		TPSR	GetTPSR_b_TPS1_OOR_FltComposite()	TPS1_OutOfRange_Composite	P0122 P0123 P06A3
			GetTPSR_b_TPS2_OOR_FltComposite()	TPS2_OutOfRange_Composite	P0222 P0223 P06A3
			GetTPSR_b_FaultActive_TPS()	TPS_FA	P0122 P0123 P0222 P0223 P2135
			GetTPSR_b_TFTKO_TPS()	TPS_TFTKO	P0122 P0123 P0222 P0223 P2135
			GetTPSR_b_PerfFaultActive_TPS()	TPS_Performance_FA	P0068 P0121 P1104 P2100 P2101 P2102 P2103
			GetTPSR_b_PerfTFTKO_TPS()	TPS_Performance_TFTKO	P0068 P0121 P1104 P2100 P2101 P2102 P2103
			GetTPSR_FaultPending_TPS()	TPS_FaultPending	P0122 P0123 P0222 P0223 P2135
			GetTPSR_b_FaultPending_TPS()	TPS_FaultPending	P0122 P0123 P0222 P0223 P2135
			GetTPSR_ThrotAuthDefault()	TPS_ThrottleAuthorityDefaulted	P0068 P0122 P0123 P0222 P0223 P16F3 P1104 P2100 P2101 P2102 P2103 P2135
		SRAR	GetSRAR_b_EnginePowerLimited()	EnginePowerLimited	P0068 P0122 P0123 P0222 P0223 P0606 P16F3 P1104 P2100 P2101 P2102 P2103
					P160E P160D P0191 P0192 P0193 P00C8 P00C9 P00CA P0090 P0091 P0092 P228C
					P2135 P2138 P2122 P2123 P2127 P2128 P228D P06A3 P0697
		VLTR	GetVLTR_b_V5A_FA()	5VoltReferenceA_FA	P0641
			GetVLTR_b_V5B_FA()	5VoltReferenceB_FA	P0651
			GetVLTR_b_MAP_OOR_Flt()	5VoltReferenceMAP_OOR_Flt	P0697
Jackson	Evap	EVPR	GetEVPR_b_Purg1SlndCkt_FA	EvapPurgeSolenoidCircuit_FA	P0443
			GetEVPR_b_FlowDurNonPurg_FA	EvapFlowDuringNonPurge_FA	P0496
			GetEVPR_b_VentSlndCkt_FA	EvapVentSolenoidCircuit_FA	P0449
			GetEVPR_b_SmallLeak_FA	EvapSmallLeak_FA	P0442
			GetEVPR_b_EmissionSys_FA	EvapEmissionSystem_FA	P0455 P0446
			GetEVPR_b_FTP_Circuit_FA	FuelTankPressureSnsrCkt_FA	P0452 P0453
Jackson	Eng Interface	FANR	GetFANR_b_FanSpeedTooHiFA	CoolingFanSpeedTooHigh_FA	P0495
			GetFANR_b_OutputDriver_FA	FanOutputDriver_FA	P0480 P0481 P0482
Jackson	Evap	FLVR	GetFLVR_b_FuelLvlDataFlt	FuelLevelDataFault	P0461 P0462 P0463 P2066 P2067 P2068
Jackson	Engine Interface	PMDR	GetPMDR_b_PT_RelayFlt	PowertrainRelayFault	P1682
			GetPMDC_b_PT_RelayStOnFA	PowertrainRelayStateOn_FA	P0685
			GetPMDC_b_PT_RelayStOnError	PowertrainRelayStateOn_Error	P0685
			GetPMDR_b_IgnOffTmFA	IgnitionOffTimer_FA	P2610
			GetPMDR_b_IgnOffTmeVld	IgnitionOffTimeValid	P2610
			GetEMDR_b_EngModeNotRunTmErr	EngineModeNotRunTimerError	P2610
			GetEMDR_b_EngModeNotRunTmFA	EngineModeNotRunTimer_FA	P2610

Fault Bundle Definitions

Jackson	Vehicle Infrastructure PMT	VSPR	GetVSPR_b_VehicleSpeedFA	VehicleSpeedSensor_FA	P0502 P0503 P0722 P0723
			GetVSPR_b_VehicleSpeedError	VehicleSpeedSensorError	P0502 P0503 P0722 P0723
Pellerito	Trans	TGRR	GetTGRR_TransGrDfltd	TransmissionGearDefaulted	MYD/M\ P182E P1915 M30/M3 P1915 P182A P182C P182D P182E P182F
		TRGR	GetTRGR_b_TransEngdStEmisFlt	TransmissionEngagedState_FA	MYD/M\ P182E P1915 M30/M3 P1915 P182A P182C P182D P182E P182F
			GetTOSR_b_TOS_FA	Transmission Output Shaft Angular Velocity Validity	MYD/M\ P0722 P0723 P077D P077C M30/M3 P0722 P0723
			GetSHPR_b_ShfSlndFlt	**no validity name is assigned to this fault bundle**	**P0751 P0752 P0756 P0757 P0973 P0974 P0976 P0977**
			GetTOSR_b_OutRotRollgCntValid	**Trans Output Rotations Rolling Count Validity**	**P0722 P0723 P077C P077D**
			GetTGRR_TransGrDfltd	**Transmission Actual Gear Validity**	**P0716 P0717 P0722 P0723 P077C P077D P07BF P07C0 P182E P1915**
			GetTRGR_b_TransEngdStEmisFlt	**Transmission Engaged State Validity**	**P182E P1915**
			GetTGRR_TransGrDfltd	**Transmission Estimated Gear Validity**	**P182E P1915**
			GetTRTR_GearRatioValidity	**Transmission Gear Ratio Validity**	**P0716 P0717 P0722 P0723 P077C P077D P07BF P07C0**
			GetTRGR_PRNDL_StateDfltd	**Transmission Gear Selector Position Validity**	**P182E P1915**
			GetTFTR_b_TransOilVld	**Transmission Oil Temperature Validity**	**P0667 P0668 P0669 P0711 P0712 P0713**
			GetTRTR_b_TransOverallRatioVld	**Transmission Overall Actual Torque Ratio Validity**	**P0716 P0717 P0722 P0723 P077C P077D P07BF P07C0 P182E P1915**
			GetTRTR_b_TransOverallRatioVld	**Transmission Overall Estimated Torque Ratio Validity**	**P0716 P0717 P0722 P0723 P077C P077D P07BF P07C0 P182E P1915**
			GetTRGR_PRNDL_StateDfltd	**Transmission Shift Lever Position Validity**	**P182E P1915**
			GetTBNR_TurbineSpdValid	**Transmission Turbine Angular Velocity Validity**	**P0716 P0717 P07BF P07C0**
Jess	Oil Attributes PDT	EOTR			
		If sensor application	GetEOTI_b_EngOilTempSnsrCktFA()	EngOilTempSensorCircuitFA	P0197 P0198
		if modeled	GetEOTI_b_EngOilModelValid	EngOilModeledTempValid	ECT_Se IAT_SensorCircuitFA
Jess	Oil Attributes PDT	EOPR	GetEOPR_b_ValidEngOil	EngOilPressureSensorCktFA	P0522 P0523
			GetEOPR_b_EOP_SnsrFA	EngOilPressureSensorFA	P0521 P0522 P0523
Kaiser	AFM PDT	CDAR	GetCDAR_b_AllDeacDriver_TFTKO	CylnderDeacDriverTFTKO	P3401 P3409 P3417 P3425 P3433 P3441 P3449
Kaiser	AFM PDT	BTRR	GetBBVR_b_BrakeBoostVacFA	BrakeBoosterSensorFA	P0556 P0557 P0558
		If sensor application	GetBBVR_b_BrkBoostVacVld	BrakeBoosterVacuumValid	P0556 P0557 P0558
		if modeled	GetBBVR_b_BrkBoostVacVld	BrakeBoosterVacuumValid	VehicleS MAP_SensorFA
Kaiser	AFM PDT	CDAR	GetCDAR_b_AllDeacDriver_TFTKO	CylnderDeacDriverTFTKO	P3401 P3409 P3417 P3425 P3433 P3441 P3449
Kaiser	Engine Torque PDT	ETQR	GetETQR_EngineTorqueInaccurate	EngineTorqueEstInaccurate	EngineV FuelInje FuelInje FuelTrim FuelTrim MAF_Se MAP_Se EGRValuePerforamnce_FA
MacEwen	FASD	FADR	GetFADR_b_FuelTrimSysB1_FA	FuelTrimSystemB1_FA	P0171 P0172
			GetFADR_b_FuelTrimSysB2_FA	FuelTrimSystemB2_FA	P0174 P0175
			GetFADR_b_FuelTrimSysB1_TFTKO	FuelTrimSystemB1_TFTKO	P0171 P0172
			GetFADR_b_FuelTrimSysB2_TFTKO	FuelTrimSystemB2_TFTKO	P0174 P0175
MacEwen	AFIM	OXYR	GetDFIR_FaultActive(CeDFIR_e_FuelTrimCylBalB1)	A/F Imbalance Bank1	P219A
			GetDFIR_FaultActive(CeDFIR_e_FuelTrimCylBalB2)	A/F Imbalance Bank2	P219B
MacEwen	Secondary Air	AIRR	GetAIRR_b_AIR_PresSensorFault	AIRSystemPressureSensor FA	P2430 P2431 P2432 P2433 P2435 P2436 P2437 P2438
			GetAIRR_b_AIR_Sys_FA	AIR System FA	P0411 P2440 P2444
			GetDFIR_FaultActive(CeDFIR_e_AIR_SlndCktB1)	AIRValveControlCircuit FA	P0412
			GetDFIR_FaultActive(CeDFIR_e_AIR_PmpCktB1)	AIRPumpControlCircuit FA	P0418
MacEwen	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
MacEwen	Closed Loop Fuel	E85R	GetE85R_b_FFS_CompFA	Ethanol Composition Sensor FA	P0178 P0179 P2269

Other Definitions

Jackson	Evap	FLVD	GetFLVR_b_LowFuelConditionDiag	LowFuelConditionDiagnostic	Flag set to TRUE if the fuel level < AND No Active DTCs: FuelLevelDataFault P0462 P0463 for at least 30 seconds.
		FLVD	GetFLVC_b_FuelPump2_StOn	Transfer Pump is Commanded On	Fuel Volume in Primary Fuel Tank < 0.0 liters AND Fuel Volume in Secondary Fuel Tank ≥ 0.0 liters AND Transfer Pump on Time < **TransferPumpOnTimeLimit** Table AND Transfer Pump had been Off for at least 0.0 seconds AND Evap Diagnostic (Purge Valve Leak Test,

Fault Bundle Definitions

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

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
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 DTC (P0232)	Not active		
					5. FuelPump Circuit Open DTC (P023F)	Not active	Intrusive test is run when fuel flow is below Max allowed fuel flow rate (Typical values in the range of 11 to 50 g/s)	
					6. Reference Voltage DTC (P0641)	Not active		
					7. Fuel Pump Control Module Driver Over-temperature DTC (P064A)	Not active		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					8. Control Module Internal Performance DTC (P0606) 9. Engine run time 10. Emissions fuel level (PPEI $3FB) 11. Fuel pump control 12. Fuel pump control state 13. Engine fuel flow 14. ECM fuel control system failure (PPEI $1ED)	Not active >=5 seconds 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	Run or Crank enabled enabled	72 test failures in 80 test samples if Fuel Pump Current <100A 1 sample/12.5 ms	DTC Type A 1 trip

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					AND Ignition Run/Crank Voltage	 9V < voltage < 32V		
Fuel Pump Control Circuit High Voltage	P0232	This DTC detects if the fuel pump control circuit is shorted to high	Voltage measured at fuel pump circuit	> 3.86 V	Commanded fuel pump output Fuel pump control enable Time that above conditions are met	0% duty cycle (off) False >=4.0 seconds	36 test failures in 40 test samples; 1 sample/12.5ms Pass/Fail determination made only once per trip	DTC Type A 1 trip
Fuel Pump Control Circuit (Open)	P023F	This DTC detects if the fuel pump control circuit is open	Fuel Pump Current AND Fuel Pump Duty Cycle	<=0.5A □ >20%	 Ignition OR HS Comm OR Fuel Pump Control AND Ignition Run/Crank Voltage	 Run or Crank enabled enabled 9V < voltage < 32V	72 test failures in 80 test samples; 1 sample/12.5ms	DTC Type A 1 trip
Fuel System Control Module Enable Control Circuit	P025A	This DTC detects if there is a fault in the fuel pump control enable circuit	PPEI (PPEI (Powertrain Platform Electrical Interface) Fuel System Request ($1ED)	≠ Fuel Pump Control Module Enable Control Circuit	 Ignition AND PPEI Fuel System Request ($1ED)	 Run or Crank valid	72 failures out of 80 samples 1 sample/12.5 ms	DTC Type A 1 trip
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 ILLUM.
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
Control Module Internal Performance 1. Main Processor Configuration Register Test 2. Processor clock test	P0606	This DTC indicates the FSCM has detected an internal processor fault or external watchdog fault (PID 2032 discriminates the source of the fault)	1. For all I/O configuration register faults: •Register contents 2. For Processor Clock Fault: •EE latch flag in EEPROM. OR	Incorrect value. 0x5A5A	Ignition OR HS Comm OR Fuel Pump Control 1. For all I/O configuration register faults: •KeMEMD_b_ProcFltCfgRegEnbl	Run or Crank enabled enabled TRUE	Tests 1 and 2 1 failure Frequency: Continuously (12.5ms) Test 3 3 failures out of 15 samples 1 sample/12.5 ms	DTC Type A 1 trip

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
3. External watchdog test			• RAM latch flag. 3. For External Watchdog Fault: • Software control of fuel pump driver	0x5A Control Lost	2. For Processor Clock Fault: •KeMEMD_b_ProcFltCLKDiagEnbl 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 TRUE not active not active		
Control Module Long Term Memory (EEPROM) Performance	P062F	Indicates that the NVM Error flag has not been cleared	Last EEPROM write	Did not complete	Ignition OR HS Comm OR Fuel Pump Control	Run or Crank enabled enabled	1 test failure Once on controller power-up	DTC Type A 1 trip
5Volt Reference Circuit (Short High/Low/Out of Range)	P0641	Detects continuous short or out of range on the #1 5V sensor reference circuit	Reference voltage AND Output OR Reference voltage AND Output OR Reference voltage AND Output	>= 0.5V inactive >= 5.5V active <= 4.5V active	Ignition	Run or Crank	15 failures out of 20 samples 1 sample/12.5 ms	DTC Type A 1 trip
			OR Reference voltage □	> 102.5% nominal (i.e., 5.125V) OR <97.5% nominal (i.e., 4.875V)				
Fuel Pump Control Module - Driver Over-temperature 1	P064A	This DTC detects if an internal fuel pump driver overtemperature condition exists under normal operating conditions	Pump Driver Temp	> 150C	Ignition OR HS Comm	Run or Crank 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 ILLUM.
					OR Fuel Pump Control KeFRPD_b_FPOverTempDiagEnbl Ignition Run/Crank	Enabled 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	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		
					7. Reference Voltage DTC (P0641)	Not active		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					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)		
					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

Supporting Tables LUJ

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	10.86719	10.86719	10.86719	10.86719	10.86719	10.86719	10.86719	8.4375	6.015625
6	10.86719	10.86719	10.86719	10.86719	10.86719	10.86719	10.86719	8.4375	6.015625
7.5	10.86719	10.86719	10.86719	10.86719	10.86719	10.86719	10.86719	8.4375	6.015625
9	10.86719	10.86719	10.86719	10.86719	10.86719	10.86719	10.86719	8.4375	6.015625
10.5	10.86719	10.86719	10.86719	10.86719	10.86719	10.86719	10.86719	8.4375	6.015625
12	10.86719	10.86719	10.86719	10.86719	10.86719	10.86719	10.86719	10.86719	10.86719
13.5	10.86719	10.86719	10.86719	10.86719	10.86719	10.86719	10.86719	10.86719	10.86719
15	10.86719	10.86719	10.86719	10.86719	10.86719	10.86719	10.86719	10.86719	10.86719
16.5	10.86719	10.86719	10.86719	10.86719	10.86719	10.86719	10.86719	10.86719	10.86719
18	10.86719	10.86719	10.86719	10.86719	10.86719	10.86719	10.86719	10.86719	10.86719
19.5	10.86719	10.86719	10.86719	10.86719	10.86719	10.86719	10.86719	10.86719	10.86719
21	10.86719	10.86719	10.86719	10.86719	10.86719	10.86719	10.86719	10.86719	10.86719
22.5	10.86719	10.86719	10.86719	10.86719	10.86719	10.86719	10.86719	10.86719	10.86719
24	10.86719	10.86719	10.86719	10.86719	10.86719	10.86719	10.86719	10.86719	10.86719
25.5	10.86719	10.86719	10.86719	10.86719	10.86719	10.86719	10.86719	10.86719	10.86719
27	10.86719	10.86719	10.86719	10.86719	10.86719	10.86719	10.86719	10.86719	10.86719
28.5	10.86719	10.86719	10.86719	10.86719	10.86719	10.86719	10.86719	10.86719	10.86719

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	448
3.162842	3.254883	3.34668	3.438721	3.530518	3.622314	3.714355	3.806152	3.898193	3.98999	4.081787	4.173828	4.265625	4.357666	4.44946	4.541504	4.633301

468	488	508	528	548	568	588	608	628	648	668	688	708	728	748	768
4.725098	4.817139	4.908936	5.000977	5.092773	5.184814	5.276611	5.368408	5.460449	5.552246	5.644287	5.736084	5.827881	5.919922	6.01172	6.10376

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

Supporting Tables LUJ

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

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	11.70313	11.70313	11.70313	11.70313	11.70313	11.66406	8.757813	6.078125	3.601563
6	11.70313	11.70313	11.70313	11.70313	11.70313	11.66406	8.757813	6.078125	3.601563
7.5	11.70313	11.70313	11.70313	11.70313	11.70313	11.66406	8.757813	6.078125	3.601563
9	11.70313	11.70313	11.70313	11.70313	11.70313	11.66406	8.757813	6.078125	3.601563
10.5	11.70313	11.70313	11.70313	11.70313	11.70313	11.66406	8.757813	6.078125	3.601563
12	11.70313	11.70313	11.70313	11.70313	11.70313	11.70313	11.70313	11.70313	9.0625
13.5	11.70313	11.70313	11.70313	11.70313	11.70313	11.70313	11.70313	11.70313	11.70313
15	11.70313	11.70313	11.70313	11.70313	11.70313	11.70313	11.70313	11.70313	11.70313
16.5	11.70313	11.70313	11.70313	11.70313	11.70313	11.70313	11.70313	11.70313	11.70313
18	11.70313	11.70313	11.70313	11.70313	11.70313	11.70313	11.70313	11.70313	11.70313
19.5	11.70313	11.70313	11.70313	11.70313	11.70313	11.70313	11.70313	11.70313	11.70313
21	11.70313	11.70313	11.70313	11.70313	11.70313	11.70313	11.70313	11.70313	11.70313
22.5	11.70313	11.70313	11.70313	11.70313	11.70313	11.70313	11.70313	11.70313	11.70313
24	11.70313	11.70313	11.70313	11.70313	11.70313	11.70313	11.70313	11.70313	11.70313
25.5	11.70313	11.70313	11.70313	11.70313	11.70313	11.70313	11.70313	11.70313	11.70313
27	11.70313	11.70313	11.70313	11.70313	11.70313	11.70313	11.70313	11.70313	11.70313
28.5	11.70313	11.70313	11.70313	11.70313	11.70313	11.70313	11.70313	11.70313	11.70313

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	448
2.087402	2.201416	2.315674	2.429688	2.543945	2.657959	2.772217	2.88623	3.000488	3.114502	3.22876	3.343018	3.457031	3.571289	3.636963	3.71875	3.802002

468	488	508	528	548	568	588	608	628	648	668	688	708	728	748	768
3.852295	3.952881	4.08667	4.188965	4.291016	4.393066	4.495117	4.597168	4.699219	4.80127	4.90332	5.005615	5.107666	5.209717	5.311768	5.413818

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
0.796875	0.796875	0.796875	0.796875	0.796875	0.796875	0.796875	0.796875	0.796875	0.796875	0.796875	0.796875	0.796875	0.796875	0.796875	0.796875	0.796875