16 OBDG01 ECM Summary Tables (Initial DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Camshaft Actuator Solenoid Circuit Open – Bank 1	P0010	Diagnoses the VVT system high side driver circuit for circuit faults.	The ECM detects that voltage is high during driver off state (indicates short to power or open circuit)	Short to power: ≤ 0.5 Ω impedance between signal and controller power Open Circuit: ≥ 200 K Ω impedance between signal and controller ground	System supply voltage Output driver is commanded on Ignition switch is in crank or run position	> 11.00 Volts	20 failures out of 25 samples 250 ms /sample, continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Camshaft System Performance – Bank 1	P0011	Detects a VVT system error by comparing the desired and actual cam positions when VVT is activated	Camshaft position error [absolute value of (desired position - actual position)] is compared to thresholds to determine if excessive	(Intake cam Bank 1) Cam Position Error > (**P0011_CamPosErrorLimIc1**) deg	**Intake Cam Phsr Enable** System Voltage Engine Running Power Take Off (PTO) active Desired cam position Desired AND Measured cam position Desired cam position variation No Active DTCs	= TRUE > 11.00 Volts = TRUE = FALSE > 0 deg > (**P0011_CamPosErrorLimIc1**) deg AND < (**CalculatedPerfMaxIc1**) deg < 5.00 deg for (**P0011_P05CC_StablePositionTimeIc1**) seconds P0010 P2088 P2089	300.00 failures out of 400.00 samples 100 ms /sample	Type B, 2 Trips

16 OBDG01 ECM Summary Tables (Initial DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Camshaft Actuator Solenoid Circuit Open – Bank 1	P0013	Diagnoses the VVT system high side driver circuit for circuit faults.	The ECM detects that voltage is high during driver off state (indicates short to power or open circuit)	Short to power: ≤ 0.5 Ω impedance between signal and controller power Open Circuit: ≤ 200 K Ω impedance between signal and controller ground	System supply voltage Output driver is commanded on Ignition switch is in crank or run position	> 11.00 Volts	20 failures out of 25 samples 250 ms /sample, continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor 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 > (**P0014_CamPosErrorLimEc1**) deg	**Exhaust Cam Phsr Enable** System Voltage Engine Running Power Take Off (PTO) active Desired cam position Desired AND Measured cam position Desired cam position variation No Active DTCs	= TRUE > 11.00 Volts = TRUE = FALSE > 0 deg > (**P0014_CamPosErrorLimEc1**) deg AND < (**CalculatedPerfMaxEc1**) deg < 5.00 deg for (**P0014_P05CE_StablePositionTimeEc1**) seconds P0013 P2090 P2091	300.00 failures out of 400.00 samples 100 ms /sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Crankshaft Position (CKP)- Camshaft Position (CMP) Correlation Bank 1 Sensor A (end-park phaser)	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 less than or greater than nominal position in one cam revolution.	-7.1 Crank Degrees 8.3 Crank Degrees	Crankshaft and camshaft position signals are synchronized Engine is Spinning Cam phaser is in "parked" position No Active DTCs: Time since last execution of diagnostic	 CrankSensor_FA P0340, P0341 < 1.0 seconds	2 failures out of 3 tests. A failed test is 4 failures out of 5 samples. There is a delay after the first failed test to allow the camshaft position to return to the park position. This time is defined by the table **P0016, P0017, P0018, P0019: Cam Correlation Oil Temperature Threshold** . One sample per cam rotation	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Crankshaft Position (CKP)- Camshaft Position (CMP) Correlation Bank 1 Sensor B (end-park phaser)	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 less than or greater than nominal position in one cam revolution..	-8.4 Crank Degrees 9.2 Crank Degrees	Crankshaft and camshaft position signals are synchronized Engine is Spinning Cam phaser is in "parked" position No Active DTCs: Time since last execution of diagnostic	 CrankSensor_FA P0365, P0366 < 1.0 seconds	2 failures out of 3 tests. A failed test is 4 failures out of 5 samples. There is a delay after the first failed test to allow the camshaft position to return to the park position. This time is defined by the table **P0016, P0017, P0018, P0019: Cam Correlation Oil Temperature Threshold** . One sample per cam rotation	Type B, 2 Trips

16 OBDG01 ECM Summary Tables (Initial DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Heater Control Circuit Bank 1 Sensor 1	P0030	Diagnoses the Heater Output low side driver circuit for circuit faults.	Voltage low during driver off state (indicates open circuit)	Open Circuit: >= 200 K ohms impedance between signal and controller ground.	Ignition Voltage Engine Speed	= Crank or Run > 11.0 volts > 400 RPM	20 failures out of 25 samples 250 ms / sample Continuous	Type B, 2 Trips Note: In certain controllers P0031 may also set

16 OBDG01 ECM Summary Tables (Initial DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Heater Control Circuit Bank1 Sensor1	P0031	Diagnoses the Heater Output low side driver circuit for circuit faults.	Voltage low during driver off state (indicates short-to-ground).	Short to ground: <= 0.5 ohms impedance between signal and controller ground.	Ignition Voltage Engine Speed	= Crank or Run > 11.0 volts > 400 RPM	20 failures out of 25 samples 250 ms / sample Continuous	Type B, 2 Trips Note: In certain controllers P0030 may also set

16 OBDG01 ECM Summary Tables (Initial DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Heater Control Circuit Bank1 Sensor1	P0032	Diagnoses the Heater Output low side driver circuit for circuit faults.	Voltage high during driver on state (indicates short to power).	Short to power: <= 0.5 ohms impedance between signal and controller power.	Ignition Voltage Engine Speed	= Crank or Run > 11.0 volts > 400 RPM	20 failures out of 25 samples 250 ms / sample Continuous	Type B, 2 Trips

16 OBDG01 ECM Summary Tables (Initial DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Heater Control Circuit Bank 1 Sensor 2	P0036	Diagnoses the Heater Output low side driver circuit for circuit faults.	Voltage low during driver off state (indicates open circuit).	Open Circuit: >= 200 K ohms impedance between signal and controller ground.	Ignition Voltage Engine Speed	= Crank or Run > 11.0 volts > 400 RPM	20 failures out of 25 samples 250 ms / sample Continuous	Type B, 2 Trips Note: In certain controllers P0037 may also set

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Heater Control Circuit Bank1 Sensor2	P0037	Diagnoses the Heater Output low side driver circuit for circuit faults.	Voltage low during driver off state (indicates short-to-ground).	Short to ground: <= 0.5 ohms impedance between signal and controller ground.	Ignition Voltage Engine Speed	= Crank or Run > 11.0 volts > 400 RPM	20 failures out of 25 samples 250 ms / sample Continuous	Type B, 2 Trips Note: In certain controllers P0036 may also set

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Heater Control Circuit Bank1 Sensor2	P0038	Diagnoses the Heater Output low side driver circuit for circuit faults.	Voltage high during driver on state (indicates short to power).	Short to power: <= 0.5 ohms impedance between signal and controller power.	Ignition Voltage Engine Speed	= Crank or Run > 11.0 volts > 400 RPM	20 failures out of 25 samples 250 ms / sample Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
HO2S Heater Resistance Bank 1 Sensor 1	P0053	Detects an oxygen sensor heater having an incorrect or out of range resistance value.	Heater Resistance outside of the expected range of	7.1 < ohms < 14.4	No Active DTC's Coolant – IAT Engine Soak Time Coolant Temp Ignition Voltage Engine Run time	ECT_Sensor_FA P262B IAT_SensorFA < 8.0 ºC > 28,800 seconds -30.0 < ºC < 255.0 < 32.0 volts < 0.06 seconds	Once per valid cold start	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
HO2S Heater Resistance Bank 1 Sensor 2) (For Single Bank Exhaust Only	P0054	Detects an oxygen sensor heater having an incorrect or out of range resistance value.	Heater Resistance outside of the expected range of	6.7 < ohms < 14.0	No Active DTC's Coolant – IAT Engine Soak Time Coolant Temp Ignition Voltage Engine Run time	ECT_Sensor_FA P262B IAT_SensorFA < 8.0 ºC > 28,800 seconds -30.0 < ºC < 255.0 < 32.0 volts < 0.06 seconds	Once per valid cold start	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Internal Control Module SIDI High Pressure Pump min/ max authority	P0089	This DTC Diagnoses pump control windup to its max or min authority	High Pressure Fuel Pump Delivery Angle High Pressure Fuel Pump Delivery Angle	>= 92 ° Or <= 0 °	High Pressure Pump Performance Diagnostic Enable Battery Voltage Low Side Fuel Pressure Engine Run Time Barometric Pressure Inlet Air Temp Fuel Temp Additional Enable Conditions: All must be true (High Pressure Pump is enabled and High Fuel pressure sensor ckt is Not (FA,FP or TFTKO) and High Pressure fuel pump ckt is Not (FA,FP or TFTKO) andCam or Crank Sensor Not FA and	True >= 11 Volts > 0.300 MPa >= **P0089 - P163A - P228C - P228D - P0191 - KtFHPD_t_PumpCntrlEngRunThrsh** (see supporting tables) Enabled when a code clear is not active or not exiting device control Engine is not cranking >= 70.0 KPA >= -10.0 degC -10 <= Temp degC <= 132	Windup High - 750 failures out of 938 samples Windup Low - 750 failures out of 938 Samples 4 samples per engine rotaion	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					IAT,IAT2,ECT Not FA and Low side Fuel Pump Relay ckt Not FA and Estimate fuel rail pressure is valid and Green Engine (In assembly plant) is not enabled and Not if low fuel condition and Low side Fuel Pump is on and Injector Flow Test is not active and Device control commanded pressure is false and Device control pump ckt enabled on is false and Engine movement detected is true andManufacturers enable counter is 0) Flex Fuel Sensor Not FA Ignition voltage out of correlation error(P1682) not active			

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
High Pressure Pump Control Solenoid Enable Low Side Open Circuit	P0090	This DTC Determines if there is low Voltage during driver off state indicates open circuit on the High Pressure Pump Control Solenoid Enable Low Side Circuit . Open Circuit is determine by the impedance between signal and controller ground.	Voltage low during driver off state indicates open circuit	Open Circuit: ≥ 200 K Ω impedance between signal and controller ground	Engine Speed Battery Voltage	>= 50 RPM >= 11 Volts Not in pump device control Enabled when a code clear is not active or not exiting device control	20 failures out of 40 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
High Pressure Pump Control Solenoid Enable Low Side Short to Ground	P0091	This DTC Determines if there is low Voltage during driver off state indicates circuit short to ground on the High Pressure Pump Control Solenoid Enable Low Side Circuit . Short Circuit to ground is determine by the current between signal and controller ground.	Voltage low during driver off state indicates short-to-ground	Short to ground: ≤ 0.1 Amps between signal and controller ground	Engine Speed Battery Voltage	>= 50 RPM >= 11 Volts Not in pump device control Enabled when a code clear is not active or not exiting device control	20 failures out of 40 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
High Pressure Pump Cntrl Solenoid Enable Low Side Short to Power	P0092	This DTC Determines if there is high Voltage during driver off state indicates short to power circuit on the High Pressure Pump Control Solenoid Enable Low Side Circuit . Short Circuit to power is determine by the current between signal and controller power.	Voltage high during driver off state indicates short to power	Short to power: ≤ 1.1 or 15 Amps selectable thershold based on High pressure Pump .	Engine Speed Battery Voltage	>= 50 RPM >= 11 Volts Not in pump device control Enabled when a code clear is not active or not exiting device control	20 failures out of 40 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Air Temperature Sensor 2 Circuit Performance (applications with humidity sensor, but no manifold temperature sensor)	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)	> 25 deg C	Time between current ignition cycle and the last time the engine was running Powertrain Relay Voltage for a time No Active DTCs:	> 28,800 seconds >= 11.0 Volts >= 0.9 seconds PowertrainRelayFault ECT_Sensor_Ckt_FA IAT_SensorCircuitFA HumTempSnsrCktFA	Executes once at the beginning of each ignition cycle if enable conditions are met	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Air Temperature Sensor Circuit 2 Low (applications with humidity)	P0097	Detects a continuous short to ground or open in the IAT 2 signal circuit	Raw IAT 2 Input	< 10 Hertz (~-60 deg C)	Powertrain Relay Voltage for a time No Active DTCs:	>= 11.0 Volts >= 0.9 seconds PowertrainRelayFault	40 failures out of 50 samples 1 sample every 100 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Air Temperature Sensor Circuit 2 High (applications with humidity)	P0098	Detects a continuous high frequency in the IAT 2 signal circuit	Raw IAT 2 Input	> 390 Hertz (~150 deg C)	Powertrain Relay Voltage for a time No Active DTCs:	>= 11.0 Volts >= 0.9 seconds PowertrainRelayFault	40 failures out of 50 samples 1 sample every 100 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Air Temperature Sensor 2 Intermittent In-Range	P0099	Detects a noisy or erratic IAT 2 signal circuit or IAT 2 sensor	String Length Where: "String Length" = sum of "Diff" calculated over And where: "Diff" = ABS(current IAT 2 reading - IAT 2 reading from 100 milliseconds previous)	> 100.00 deg C 10 consecutive IAT 2 samples	Powertrain Relay Voltage for a time No Active DTCs:	>= 11.0 Volts >= 0.9 seconds PowertrainRelayFault	4 failures out of 5 samples Each sample takes 1.0 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor 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)	< 56 Ohms	Engine run time OR IAT min	> 10.0 seconds ≤ 70.3 °C	5 failures out of 6 samples 1 sec/ sample Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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)	> 134,000 Ohms	Engine run time OR IAT min	> 60.0 seconds ≥ -7.0 °C	5 failures out of 6 samples 1 sec/ sample Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Coolant Flow Insufficient	P00B7	This DTC detects a Insufficient Flow Condition (i.e.. Stuck Closed Thermostat)	Engine Coolant Temp (ECT) is AND Difference between ECT and RCT (Radiator Coolant Temp) is When above is present for fail counts start.	> 116.8 Deg C > 40.0 Deg C > 5 seconds	No Active DTC's Engine run time AND Engine Coolant Temp	THMR_RCT_Sensor_Ckt _FA THMR_ECT_Sensor_Ckt _FA > 30 seconds > 90.0 Deg C	30 failures out of 60 samples 1 sec/ sample Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
High Pressure Start Diagnostic	P00C6	The DTC Diagnoses the high side fuel pressure during engine cranking.	The ECM detects that the fuel pressure is not rising or has fallen beyond acceptable limits during engine cranking Pressure Rise Test: High Side Fuel Pressure Pressure Fall Test: High Side Fuel Rail Pressure	< **P00C6 - KtFHPC_p_HighPressStart** (see Supporting Table) <= **P00C6 - KtFHPD_p_HPS_PressFallLoThrsh** (see Supporting Table)	High Pressure Rise Diagnostic During Start High Pressure Fail Diagnostic During Start Low side feed fuel pressure Engine Run Time Run/Crank Voltage Engine Coolant For each engine start, only 1 diagnostic is performed. The pressure rise test will run if HIgh side fuel pressure is less than KtFHPC_p_HighPressStart, otherwise, the pressure fall diagnostic will run The pressure fall runs when the engine is cranking.	True False >= 0 KPA < = 0 sec > 8 Volts -42 <= °C <= 130 All must be true (High Pressure Pump is enabled and High Fuel pressure sensor ckt is Not (FA,FP or TFTKO) and High Pressure fuel pump ckt is Not (FA,FP or TFTKO) and Cam or Crank Sensor Not FA and IAT, IAT2 and ECT Not FA and Low side Fuel Pump Relay ckt Not FA and Estimate fuel rail pressure is valid and Green Engine (In assembly plant) is not enabled and Not if low fuel condition and Low side Fuel Pump is on and Injector Flow Test is not active and Device control commanded pressure is	Pressure Rise Test: Time >= **P00C6 - KtFHPC_t_HighPressStartTmout** (see Supporting Table) 6.25 ms per sample Pressure Fall Test: Injected cylinder events >= **P00C6 - KtFHPD_Cnt_HPS_PressFallLoThrsh** (see Supporting Table) 4 samples per engine rotation	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						false and Device control pump ckt enabled on is false and Engine movement detected is true and Manufacturers enable counter is 0) Flex Fuel Sensor Not FA Ignition voltage out of correlation error(P1682) not active Barometric Pressure >= 70.0 KPA Inlet Air Temp >= -10.0 DegC		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Air Pressure Measurement System - Multiple Sensor Correlation (naturally aspirated with TIAP/ Baro sensor)	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)	> 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 No Active DTCs: No Pending DTCs:	 > 10.0 seconds >= 50.0 kPa <= 115.0 kPa >= 50.0 kPa <= 115.0 kPa EngineModeNotRunTimer Error MAP_SensorFA AAP_SnsrFA MAP_SensorCircuitFP AAP_SnsrCktFP	4 failures out of 5 samples 1 sample every 12.5 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Press Regulator Solenoid Supply Voltage Control High Side Circuit Open	P00C8	This DTC Determines if there is high Voltage during driver off state indicates open circuit on the High Pressure Pump Control Solenoid high Side Circuit . Open Circuit is determine by the impedance between signal and controller ground.	Voltage High during driver off state indicates open circuit	Open circuit: ≥ 200 K Ω impedance between signal and controller ground	Engine Speed Battery Voltage	>= 50 RPM >= 11 Volts Not in pump device control Enabled when a code clear is not active or not exiting device control	20 failures out of 40 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Press Regulator Solenoid Supply Voltage Control High Side Circuit Short to ground	P00C9	This DTC Determines if there is low Voltage during driver on state indicates short to ground circuit on the High Pressure Pump Control Solenoid high Side Circuit . short to gorund Circuit is determine by the current between signal and controller ground.	Voltage low during driver on state indicates short to ground	Short to ground: ≤ 1.1 or 15 Amps selectable thershold based on High pressure Pump.	Engine Speed Battery Voltage	>= 50 RPM >= 11 Volts Not in pump device control Enabled when a code clear is not active or not exiting device control	20 failures out of 40 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Press Regulator Solenoid Supply Voltage Control High Side Circuit Short to power	P00CA	This DTC Determines if there is high Voltage during driver off state indicates short to power circuit on the High Pressure Pump Control Solenoid high Side Circuit . short to power Circuit is determine by the current between signal and controller ground.	Voltage high during driver off state indicates short to power	Short to Power: ≤ 0.1 Amps between signal and controller power	Engine Speed Battery Voltage	>= 50 RPM >= 11 Volts Not in pump device control Enabled when a code clear is not active or not exiting device control	20 failures out of 40 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Humidity Sensor Circuit Low	P00F4	Detects a continuous short to power in the Humidity Sensor circuit	Humidity Duty Cycle	<= 5.0 %	Powertrain Relay Voltage for a time No Active DTCs:	>= 11.0 Volts >= 0.9 seconds PowertrainRelayFault	40 failures out of 50 samples 1 sample every 100 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Humidity Sensor Circuit High	P00F5	Detects a continuous open or short to low in the Humidity Sensor circuit	Humidity Duty Cycle	>= 95.0 %	Powertrain Relay Voltage for a time No Active DTCs:	>= 11.0 Volts >= 0.9 seconds PowertrainRelayFault	40 failures out of 50 samples 1 sample every 100 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Humidity Sensor Circuit Intermittent	P00F6	Detects a noisy or erratic humidity sensor input	String Length Where: "String Length" = sum of "Diff" calculated over And where: "Diff" = ABS(current Humidity reading - Humidity reading from 100 milliseconds previous)	> 80 % 10 consecutive Humidity samples	Powertrain Relay Voltage for a time No Active DTCs:	>= 11.0 Volts >= 0.9 seconds PowertrainRelayFault	4 failures out of 5 samples Each sample takes 1.0 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Mass Air Flow System Performance (naturally aspirated)	P0101	Determines if the MAF sensor is stuck within the normal operating range	Filtered Throttle Model Error AND ABS(Measured Flow – Modeled Air Flow) Filtered AND ABS(Measured MAP – MAP Model 2) Filtered	<= 125 kPa*(g/s) > 15.0 grams/sec > 22.0 kPa	Engine Speed Engine Speed (Coolant Temp OR OBD Coolant Enable Criteria Coolant Temp Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together) See Residual Weight Factor tables. -	>= 0 RPM <= 5,400 RPM >= -7 Deg C = TRUE) <= 125 Deg C >= -20 Deg C <= 125 Deg C >= 0.50 Filtered Throttle Model Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: TPS Residual Weight Factor based on RPM** Modeled Air Flow Error multiplied by **P0101, P0106, P010B, P0121, P012B, P0236, P1101: MAF1 Residual Weight Factor based on RPM** and **P0101, P0106, P010B, P0121, P012B, P0236, P1101: MAF1 Residual Weight Factor based on MAF Est** MAP Model 2 Error multiplied by	Continuous Calculation are performed every 12.5 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						P0101, P0106, P0121, P012B, P0236, P1101: MAP2 Residual Weight Factor based on RPM		
					No Active DTCs: No Pending DTCs:	MAP_SensorCircuitFA EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA IAT_SensorFA EGRValve_FP ECT_Sensor_Ckt_FP IAT_SensorCircuitFP		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Mass Air Flow Sensor Circuit Low Frequency	P0102	Detects a continuous short to low or a open in either the signal circuit or the MAF sensor	MAF Output	<= 1,825 Hertz (~ 1.46 gm/sec)	Engine Run Time Engine Speed Ignition Voltage Above criteria present for a period of time	> 1.0 seconds >= 300 RPM >= 10.0 Volts >= 1.0 seconds	200 failures out of 250 samples 1 sample every cylinder firing event	Type B, 2 Trips

16 OBDG01 ECM Summary Tables (Initial DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Mass Air Flow Sensor Circuit High Frequency	P0103	Detects a high frequency output from the MAF sensor	MAF Output	>= 12,801 Hertz (~ 256.7 gm/sec)	Engine Run Time Engine Speed Ignition Voltage Above criteria present for a period of time	> 1.0 seconds >= 300 RPM >= 10.0 Volts >= 1.0 seconds	200 failures out of 250 samples 1 sample every cylinder firing event	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Manifold Absolute Pressure Sensor Performance (naturally aspirated)	P0106	Determines if the MAP sensor is stuck within the normal operating range	Filtered Throttle Model Error AND ABS(Measured MAP – MAP Model 1) Filtered AND ABS(Measured MAP – MAP Model 2) Filtered	<= 125 kPa*(g/s) > 22.0 kPa > 22.0 kPa	Engine Speed Engine Speed (Coolant Temp OR OBD Coolant Enable Criteria Coolant Temp Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together) See Residual Weight Factor tables. No Active DTCs:	>= 0 RPM <= 5,400 RPM >= -7 Deg C = TRUE) <= 125 Deg C >= -20 Deg C <= 125 Deg C >= 0.50 Filtered Throttle Model Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: TPS Residual Weight Factor based on RPM** MAP Model 1 Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: MAP1 Residual Weight Factor based on RPM** MAP Model 2 Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: MAP2 Residual Weight Factor based on RPM** MAP_SensorCircuitFA EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensor_FA	Continuous Calculations are performed every 12.5 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						ECT_Sensor_FA IAT_SensorFA		
					No Pending DTCs:	EGRValve_FP ECT_Sensor_Ckt_FP IAT_SensorCircuitFP		
			Manifold Pressure OR Manifold Pressure	< 50.0 kPa > 115.0 kPa	Time between current ignition cycle and the last time the engine was running Engine is not rotating	> 10.0 seconds	4 failures out of 5 samples 1 sample every 12.5 msec	
					No Active DTCs:	EngineModeNotRunTimer Error MAP_SensorCircuitFA AAP_SnsrCktFA		
					No Pending DTCs:	MAP_SensorCircuitFP AAP_SnsrCktFP		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Manifold Absolute Pressure Sensor Circuit Low (Gen III)	P0107	Detects a continuous short to low in either the signal circuit or the MAP sensor.	MAP Voltage	< 3.0 % of 5 Volt Range (This is equal to 0.15 Volts or 3.5 kPa)	Continuous		320 failures out of 400 samples 1 sample every 12.5 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Manifold Absolute Pressure Sensor Circuit High (Gen III)	P0108	Detects an open sensor ground, continuous short to high, or open in either the signal circuit or the MAP sensor.	MAP Voltage	> 90.0 % of 5 Volt Range (This is equal to 4.50 Volts, or 115.0 kPa)	Continuous		320 failures out of 400 samples 1 sample every 12.5 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Air Temperature Sensor Circuit Performance (applications with humidity sensor, but no manifold temperature sensor)	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)	> 25 deg C	Time between current ignition cycle and the last time the engine was running Powertrain Relay Voltage for a time No Active DTCs:	> 28,800 seconds >= 11.0 Volts >= 0.9 seconds PowertrainRelayFault ECT_Sensor_Ckt_FA IAT_SensorCircuitFA HumTempSnsrCktFA	Executes once at the beginning of each ignition cycle if enable conditions are met	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Air Temperature Sensor Circuit Low	P0112	Detects a continuous short to ground in the IAT signal circuit or the IAT sensor	Raw IAT Input	< 58 Ohms (~150 deg C)	Engine Run Time	> 0.00 seconds	40 failures out of 50 samples 1 sample every 100 msec	Type B, 2 Trips

16 OBDG01 ECM Summary Tables (Initial DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Air Temperature Sensor Circuit High	P0113	Detects a continuous open circuit in the IAT signal circuit or the IAT sensor	Raw IAT Input	> 142,438 Ohms (~-60 deg C)	Engine Run Time	> 0.00 seconds	40 failures out of 50 samples 1 sample every 100 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Air Temperature Sensor Intermittent In-Range	P0114	Detects a noisy or erratic IAT signal circuit or IAT sensor	String Length Where: "String Length" = sum of "Diff" calculated over And where: "Diff" = ABS(current IAT reading - IAT reading from 100 milliseconds previous)	> 80.00 deg C 10 consecutive IAT samples	Continuous		4 failures out of 5 samples Each sample takes 1.0 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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)	< 56 Ohms			5 failures out of 6 samples 1 sec/ sample Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor 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)	> 134,000 Ohms	Engine run time OR IAT min	> 10.0 seconds ≥ -7.0 °C	5 failures out of 6 samples 1 sec/ sample Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 calculated high limit OR 2) negitive step change is lower than calculated low limit. The calculated high and low limits for the next reading use the following calibrations: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit *****Generic Example***** If the last ECT reading was 90 Deg C, the Time constant was calibrated at 10 seconds, the low limit was calibrated to -80 Deg C and the high limit was calibrated to 200 Deg C the caluculated limits are 101 Deg C and 73 Deg C. The next reading (after the 90 Deg C reading) must be between 73 Deg C and 101 Deg C to be valid.	 15.0 seconds -60.0 Deg C 150.0 Deg C	No Active DTC's	ECT_Sensor_Ckt_FP	3 failures out of 4 samples 1 sec/ sample Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Throttle Position Sensor Performance (naturally aspirated)	P0121	Determines if the Throttle Position Sensor input is stuck within the normal operating range	Filtered Throttle Model Error AND ABS(Measured MAP – MAP Model 2) Filtered	> 125 kPa*(g/s) <= 22.0 kPa	Engine Speed Engine Speed (Coolant Temp OR OBD Coolant Enable Criteria Coolant Temp Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together) See Residual Weight Factor tables. No Active DTCs: No Pending DTCs:	>= 0 RPM <= 5,400 RPM >= -7 Deg C = TRUE) <= 125 Deg C >= -20 Deg C <= 125 Deg C >= 0.50 Filtered Throttle Model Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: TPS Residual Weight Factor based on RPM** MAP Model 2 Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: MAP2 Residual Weight Factor based on RPM** MAP_SensorCircuitFA EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA IAT_SensorFA EGRValve_FP ECT_Sensor_Ckt_FP IAT_SensorCircuitFP	Continuous Calculation are performed every 12.5 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
TPS1 Circuit Low	P0122	Detects a continuous or intermittent short low or open in TPS1 circuit by monitoring the TPS 1 sensor voltage and failing the diagnostic when the TPS voltage is too low. This diagnostic only runs when battery voltage is high enough.	TPS1 Voltage <	0.3250		Run/Crank voltage > 6.41 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	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
TPS1 Circuit High	P0123	Detects a continuous or intermittent short high in TPS1 circuit by monitoring the TPS 1 sensor voltage and failing the diagnostic when the TPS voltage is too high. This diagnostic only runs when battery voltage is high enough.	TPS1 Voltage >	4.750		Run/Crank voltage > 6.41 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	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Coolant Temperature Below Stat Regulating Temperature) (energy based "Deluxe" method	P0128	This DTC detects if the engine coolant temperature rises too slowly due to an ECT or Cooling system fault	Energy is accumulated after the first conbustion event using Range #1 or #2 below: Thermostat type is divided into normal (non-heated) and electrically heated. For this application the "type" cal (KeTHMG_b_TMS_ElecThstEquipped) = 1 If the type cal is equal to one, the application has an electrically heated t-stat, if equal to zero the the application has an non heated t-stat. See appropiate section below. ********** Type cal above = 1 (Electrically heated t-stat) == == == == Range #1 (Primary) ECT reaches Commanded temperature minus 11 °C when Ambient min is ≤ 52 °C and > 10 °C. Note: Warm up target for range #1 will be at least 74 °C == == == == Range #2 (Alternate) ECT reaches Commanded temperature minus 37 °C when Ambient min is ≤ 10 °C and > -7 °C. Note: Warm up target for range #2 will be at least	See the two tables named: **P0128_Maximum Accumulated Energy for Start-up ECT conditions - Primary** and **P0128_Maximum Accumulated Energy for Start-up ECT conditions - Alternate** in the Supporting tables section. This diagnostic models the net energy into and out of the cooling	No Active DTC's Engine not run time (soaking time before current trip) Engine run time Fuel Condition Distance traveled ********** If Engine RPM is continuously greater than for this time period The diagnostic test for this key cycle will abort ********** ********** If T-Stat Heater commanded duty cycle for this time period	ECT_Sensor_Ckt_FA ECT_Sensor_Perf_FA VehicleSpeedSensor_FA OAT_PtEstFiltFA IAT_SensorCircuitFA MAF_SensorFA THMR_AWP_AuxPumpFA THMR_AHV_FA THMR_SWP_Control_FA THMR_SWP_NoFlow_FA THMR_SWP_FlowStuckOn_FA EngineTorqueEstInaccurate ≥ 1,800 seconds 30 ≤ Eng Run Tme ≤ 1,400 seconds Ethanol ≤ 87 % ≥ 0.00 miles ********** 9,999 rpm 5.0 seconds ********** ********** > 50.0 % duty cycle > 5.0 seconds	1 failure to set DTC 1 sec/ sample Once per ignition key cycle	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			55 °C ********** Type cal above = 0 (non - heated t-stat) == == == == Range #1 (Primary) ECT reaches 81 °C when Ambient min is ≤ 52 °C and > 10 °C. == == == == Range #2 (Alternate) ECT reaches 55 °C when Ambient min is ≤ 10 °C and > -7 °C. **********	system during the warm-up process. The five energy terms are: heat from combustion (with AFM correction), heat from after-run, heat loss to enviroment, heat loss to cabin and heat loss to DFCO.	The diagnostic test for this key cycle will abort ********** ECT at start run	********** -60 ≤ ECT ≤ 69 °C		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Circuit Low Voltage Bank 1 Sensor 1	P0131	This DTC determines if the O2 sensor circuit is shorted to low.	Oxygen Sensor Signal	< 40.0 mVolts	No Active DTC's	TPS_ThrottleAuthorityDefaulted MAP_SensorFA AIR System FA Ethanol Composition Sensor FA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA	320 failures out of 400 samples Frequency: Continuous in 100 milli - second loop	Type B, 2 Trips
					AIR intrusive test Fuel intrusive test Idle intrusive test EGR intrusive test System Voltage EGR Device Control Idle Device Control Fuel Device Control AIR Device Control	= Not active = Not active = Not active = Not active 10.0 < Volts = Not active = Not active = Not active = Not active		
					Low Fuel Condition Only when FuelLevelDataFault	= False = False		
					Equivalence Ratio Air Per Cylinder Fuel Control State Closed Loop Active	0.9912 < ratio < 1.0137 60 < mgram < 500 = Closed Loop = TRUE (Please see “**Closed Loop Enable Clarification**” in Supporting Tables).		
					All Fuel Injectors for			

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					active Cylinders Fuel Condition Fuel State All of the above met for	Enabled (On) Ethanol <= 87 % DFCO not active > 5.0 seconds		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Circuit High Voltage Bank 1 Sensor 1	P0132	This DTC determines if the O2 sensor circuit is shorted to high.	Oxygen Sensor Signal	> 1,050 mvolts	No Active DTC's System Voltage AFM Status Heater Warm-up delay Engine Run Time Engine Run Accum Low Fuel Condition Diag Only when FuelLevelDataFault Initial delay after Open Test Criteria met (cold start condition) Initial delay after Open Test Criteria met (not cold start condition) Equivalence Ratio All of the above met for	TPS_ThrottleAuthorityDefaulted MAF_SensorFA MAP_SensorFA EvapExcessPurgePsbl_FA FuelInjectorCircuit_FA Ethanol Composition Sensor FA AIR System FA 10.0 < Volts = All Cylinders active = Complete > 5.0 seconds > 30.0 seconds = False = False > 235.0 seconds when engine soak time > 28,800 seconds > 235.0 seconds when engine soak time <= 28,800 seconds 0.9912 <=ratio<= 1.0137 > 3.0 seconds	100 failures out of 125 samples Frequency: Continuous in 100 milli - second loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Slow Response Bank 1 Sensor 1) (For use with ESPD and w/o WRAF	P0133	This DTC determines if the O2 sensor response time is degraded.	Fault condition present when the average response time is caluclated over the test time, and compared to the threshold. OR Slope Time L/R Switches OR Slope Time R/L Switches	Refer to **P0133_O2S Slow Response Bank 1 Sensor 1 "Pass/Fail Threshold table"** in the Supporting Tables tab < 5 < 5 The test averages the signal response time over 60.0 seconds when the signal is transitioning between 400 mvolts and 600 mvolts. An average rich to lean time and lean to rich time are each calculated separately.	No Active DTC's Bank 1 Sensor 1 DTC's not active System Voltage EGR Device Control Idle Device Control Fuel Device Control AIR Device Control Low Fuel Condition Only when FuelLevelDataFault Green O2S Condition	TPS_ThrottleAuthorityDefaulted MAP_SensorFA IAT_SensorFA ECT_Sensor_FA AmbientAirDefault MAF_SensorFA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA AIR System FA Ethanol Composition Sensor FA EngineMisfireDetected_FA P0131, P0132, P0134 > 10.0 Volts = Not active = Not active = Not active = Not active = False = False = Not Valid, See definition of **Multiple DTC Use_Green Sensor Delay Criteria - Airflow**	Sample time is 60 seconds Frequency: Once per trip	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						and **Multiple DTC Use_Green Sensor Delay Criteria - Limit** for the following locations: B1S1, B2S1 (if applicable) in Supporting Tables tab.		
					O2 Heater on for Learned Htr resistance	>= 50 seconds = Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's")		
					(Engine Coolant Or OBD Coolant Enable Criteria IAT Engine run Accum	> 60 ºC = TRUE) > -40 ºC > 30 seconds		
					Time since any AFM status change Time since Purge On to Off change Time since Purge Off to On change	> 1.5 seconds > 0.0 seconds > 1.5 seconds		
					Engine airflow Engine speed Fuel Condition Baro Air Per Cylinder	12 <=grams/second<= 60 1,000 <= RPM <= 3,500 < 87 % Ethanol > 70 kpa >= 100 mGrams		
					Fuel Control State Closed Loop Active	= Closed Loop = TRUE (Please see "**Closed Loop Enable Clarification**" in Supporting Tables).		
					LTM (Block Learn) fuel	= Enabled, refer to		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					cell Transient Fuel Mass Baro Fuel Control State Fuel State Commanded Proportional Gain ========== All of the above met for	**Multiple DTC Use - Response Cell Enable Table** for additional info. <= 100.0 mgrams = Not Defaulted not = Power Enrichment DFCO not active >= 0.0 % ========== > 4.0 seconds		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 outside of the expected range of	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 = Complete = Not active > zero > 120 seconds	8 failures out of 10 samples Frequency: 2 tests per trip 10 seconds delay between tests and 1 second execution rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Circuit Low Voltage Bank 1 Sensor 2) (For Single Bank Exhaust Only	P0137	This DTC determines if the O2 sensor circuit is shorted to low.	Oxygen Sensor Signal	< 40 mvolts	No Active DTC's	TPS_ThrottleAuthorityDefaulted MAP_SensorFA AIR System FA Ethanol Composition Sensor FA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA	320 failures out of 400 samples Frequency: Continuous in 100 milli - second loop	Type B, 2 Trips
					AIR intrusive test Fuel intrusive test Idle intrusive test EGR intrusive test System Voltage EGR Device Control Idle Device Control Fuel Device Control AIR Device Control	= Not active = Not active = Not active = Not active 10.0 < Volts = Not active = Not active = Not active = Not active		
					Low Fuel Condition Only when FuelLevelDataFault	= False = False		
					Equivalence Ratio Air Per Cylinder Fuel Control State Closed Loop Active	0.9912 <= ratio <= 1.0137 60 <= mgrams <= 500 = Closed Loop = TRUE (Please see “**Closed Loop Enable Clarification**” in Supporting Tables).		
					All Fuel Injectors for			

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					active Cylinders Fuel Condition Fuel State All of the above met for	Enabled (On) Ethanol <= 87 %DFCO not active > 5.0 seconds		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Circuit High Voltage Bank 1 Sensor 2) (For Single Bank Exhaust Only	P0138	This DTC determines if the O2 sensor circuit is shorted to high.	Oxygen Sensor Signal	> 1,050 mvolts	No Active DTC's System Voltage AFM Status Heater Warm-up delay Engine Run Time Engine Run Accum Low Fuel Condition Only when FuelLevelDataFault Initial delay after Open Test Criteria met (cold start condition) Initial delay after Open Test Criteria met (not cold start condition) Equivalence Ratio Fuel Control State All of the above met for	TPS_ThrottleAuthorityDefaulted MAF_SensorFA MAP_SensorFA EvapExcessPurgePsbl_FA FuelInjectorCircuit_FA Ethanol Composition Sensor FA AIR System FA 10.0 < Volts = All Cylinders active = Complete > 5.0 seconds > 30.0 seconds = False = False > 280.0 seconds when engine soak time > 28,800 seconds > 280.0 seconds when engine soak time <= 28,800 seconds 0.9912 <= ratio <= 1.0137 not = Power Enrichment > 3.0 seconds	100 failures out of 125 samples Frequency: Continuous in 100 milli - second loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor 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 indicates that the secondary oxygen sensor for Bank 1 has deteriorated slow response when the exhaust gas transitions from rich to lean condition. Testing is performed when basic conditions are met, and vehicle is decelerating and engine fuel cut off is commanded. If the measured air flow amount during rich to lean condition transition exceeds a calibrated threshold, code is set. This testing is performed once per trip if opportunity matures.	The EWMA of the Post O2 sensor normalized integral value. The EWMA caluclation uses a 0.28 coefficient. OR The Accumulated mass air flow monitored during the Slow Response Test (between the upper and lower voltage thresholds)	> 8.0 units > 60.0 grams (upper voltage threshold is 450 mvolts and lower voltage threshold is 150 mvolts)	No Active DTC's B1S2 DTC's Not Active this key cycle System Voltage Learned heater resistance ICAT MAT Burnoff delay Green O2S Condition Low Fuel Condition Only when	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA Ethanol Composition Sensor FA P013B, P013E, P013F, P2270 or P2271 > 10.0 Volts = Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's") = Not Valid = Not Valid, See definition of **Multiple DTC Use_Green Sensor Delay Criteria - Airflow** and **Multiple DTC Use_Green Sensor Delay Criteria - Limit** for the following locations: B1S2, B2S2 (if applicable) in Supporting Tables tab. = False	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.	Type A, 1 Trips EWMA

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					FuelLevelDataFault Post fuel cell Crankshaft Torque DTC's Passed ========== After above conditions are met: DFCO mode is continued (wo driver initiated pedal input).	= False = Enabled, refer to **Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests** for additional info. < 125.0 Nm P2270 (and P2272 if applicable) P013E (and P014A if applicable) ==========		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2 Sensor Slow Response Lean to Rich Bank 1 Sensor 2	P013B	This DTC indicates that the secondary oxygen sensor for Bank 1 has deteriorated slow response when the exhaust gas transitions from lean to rich condition. Testing starts after P013A diagnostic completes, then engine fuel-on is commanded specific for this testing. If the measured air flow amount during lean to rich condition transition exceeds a calibrated threshold, code is set. This testing is performed once per trip if opportunity matures.	The EWMA of the Post O2 sensor normalized integral value. The EWMA caluclation uses a 0.28 coefficient. OR The Accumulated mass air flow monitored during the Slow Response Test (between the upper and lower voltage thresholds)	> 8.0 units > 805 grams (lower voltage threshold is 350 mvolts and upper voltage threshold is 650 mvolts)	No Active DTC's B1S2 DTC's Not Active this key cycle System Voltage Learned heater resistance ICAT MAT Burnoff delay Green O2S Condition Green Cat System	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA Ethanol Composition Sensor FA P013A, P013E, P013F, P2270 or P2271 > 10.0 Volts = Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's") = Not Valid = Not Valid, See definition of **Multiple DTC Use_Green Sensor Delay Criteria - Airflow** and **Multiple DTC Use_Green Sensor Delay Criteria - Limit** for the following locations: B1S2, B2S2 (if applicable) 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.	Type A, 1 Trips EWMA

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Condition	= Not Valid, System is not valid until accumulated airflow is greater than 360,000 grams. Airflow accumulation is only enabled when estimated Cat temperature is above 600 Deg C and **Multiple DTC Use_Green Sensor Delay Criteria - Airflow** (Note: This feature is only enabled when the vehicle is new and cannot be enabled in service).		
					Low Fuel Condition Only when FuelLevelDataFault	= False = False		
					Post fuel cell	= Enabled, refer to **Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests** for additional info.		
					DTC's Passed	P2270 P013E P013A P2271 P013F		
					========== After above conditions are met: Fuel Enrich mode continued. ========== During this test the following must stay TRUE or the test will abort: 0.96	==========		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<= Fuel EQR <= 1.08			

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 under DFCO DFCO begins after: 1) Catalyst has been rich for a minimum of AND 2) Catalyst Rich Accumulation Air Flow is greater or equal to	> 450 mvolts > 85 grams > 1 secs > 6 grams	No Active DTC's B1S2 DTC's Not Active this key cycle System Voltage Learned heater resistance ICAT MAT Burnoff delay Green O2S Condition	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA Ethanol Composition Sensor FA P013A, P013B, P013F, P2270 or P2271 > 10.0 Volts = Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's") = Not Valid = Not Valid, See definition of **Multiple DTC Use_Green Sensor Delay Criteria - Airflow** and **Multiple DTC Use_Green Sensor Delay Criteria - Limit** for the following locations: B1S2, B2S2 (if applicable) 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.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Low Fuel Condition Only when FuelLevelDataFault Post fuel cell Crankshaft Torque DTC's Passed Number of fueled cylinders ========== After above conditions are met: DFCO mode entered (wo driver initiated pedal input).	= False = False = Enabled, refer to **Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests** for additional info. < 125.0 Nm P2270 <= 3 cylinders ==========		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2 Sensor Delayed Response Lean to Rich Bank 1 Sensor 2	P013F	This DTC determines if the post catalyst O2 sensor has an initial delayed response to an A/F change from Lean to Rich. The diagnostic is an intrusive test which increases the delivered A/F ratio to achieve the required rich threshold.	Post O2 sensor voltage AND The Accumulated mass air flow monitored during the Delayed Response Test	< 350 mvolts > 1,000 grams	No Active DTC's B1S2 DTC's Not Active this key cycle System Voltage Learned heater resistance ICAT MAT Burnoff delay Green O2S Condition Green Cat System	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA Ethanol Composition Sensor FA P013A, P013B, P013E, P2270 or P2271 > 10.0 Volts = Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's") = Not Valid = Not Valid, See definition of **Multiple DTC Use_Green Sensor Delay Criteria - Airflow** and **Multiple DTC Use_Green Sensor Delay Criteria - Limit** for the following locations: B1S2, B2S2 (if applicable) 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	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Condition	= Not Valid, System is not valid until accumulated airflow is greater than 360,000 grams. Airflow accumulation is only enabled when estimated Cat temperature is above 600 Deg C and **Multiple DTC Use_Green Sensor Delay Criteria - Airflow** (Note: This feature is only enabled when the vehicle is new and cannot be enabled in service).		
					Low Fuel Condition	= False		
					Only when FuelLevelDataFault	= False		
					Post fuel cell	= Enabled, refer to **Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests** for additional info.		
					DTC's Passed	P2270 P013E P013A P2271		
					Number of fueled cylinders	>= 1 cylinders		
					========== After above conditions are met: Fuel Enrich mode entered. ========== During this test the following must stay TRUE or the test will abort: 0.96 <= Fuel EQR <= 1.08	==========		

16 OBDG01 ECM Summary Tables (Initial DTCs)

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

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Heater Performance Bank 1 Sensor 2) (For Single Bank Exhaust Only	P0141	This DTC determines if the O2 sensor heater is functioning properly by monitoring the current through the heater circuit.	Heater Current outside of the expected range of	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 = Complete = Not active > zero > 120 seconds	8 failures out of 10 samples Frequency: 2 tests per trip 10 seconds delay between tests and 1 second execution rate.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2 Sensor Delayed Response Rich to Lean Bank 1 Sensor 1) (For use w/o WRAF	P015A	This DTC indicates that the primary oxygen sensor for Bank 1 has deteriorated delayed response when the exhaust gas transitions from rich to lean condition. Testing is performed along with P013A diagnostic, i.e. basic conditions are met, and vehicle is decelerating and engine fuel cut off is commanded. If the filtered delayed response time exceeds a calibrated threshold, code is set. This testing is performed once per trip if opportunity matures.	The EWMA of the Pre O2 sensor normalized R2L time delay value. The EWMA caluclation uses a 0.25 coefficient. OR [The Accumulated time monitored during the R2L Delayed Response Test (Gross failure). AND Pre O2 sensor voltage is	> 0.7 EWMA (sec) >= 2.0 Seconds > 550 mvolts	No Active DTC's System Voltage EGR Device Control Idle Device Control Fuel Device Control AIR Device Control Low Fuel Condition Only when FuelLevelDataFault Green O2S Condition	TPS_ThrottleAuthorityDefaulted MAP_SensorFA IAT_SensorFA ECT_Sensor_FA AmbientAirDefault MAF_SensorFA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA AIR System FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EthanolCompositionSensor_FA EngineMisfireDetected_FA P0131, P0132, P013A, P013B, P013E, P013F, P2270, P2271 > 10.0 Volts = Not active = Not active = Not active = Not active = False = False = Not Valid, See definition of	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	Type A, 1 Trips EWMA

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						Multiple DTC Use_Green Sensor Delay Criteria - Airflow and **Multiple DTC Use_Green Sensor Delay Criteria - Limit** for the following locations: B1S1, B2S1 (if applicable) in Supporting Tables tab.		
					O2 Heater (pre sensor) on for Learned Htr resistance	>= 50 seconds = Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's")		
					(Engine Coolant Or OBD Coolant Enable Criteria IAT Engine run Accum	> 60 ºC = TRUE) > -40 ºC > 30 seconds		
					Engine Speed to initially enable test Engine Speed range to keep test enabled (after initially enabled)	1,100 <= RPM <= 3,500 1,000 <= RPM <= 3,650		
					Engine Airflow Vehicle Speed to initially enable test Vehicle Speed range to keep test enabled (after initially enabled)	2 <= gps <= 50 31.1 <= MPH <= 77.7 24.9 <= MPH <= 80.8		
					Closed loop integral Closed Loop Active	0.92 <= C/L Int <= 1.08 = TRUE (Please see “**Closed**		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						Loop Enable Clarification" in Supporting Tables).		
					Evap Ethanol Baro Post fuel cell	not in control of purge not in estimate mode > 70 kpa = enabled		
					EGR Intrusive diagnostic All post sensor heater delays O2S Heater (post sensor) on Time Predicted Catalyst temp Fuel State	= not active = not active >= 60.0 sec 550 <= ºC <= 910 = DFCO possible		
					========== All of the above met for at least 2.0 seconds, and then the Force Cat Rich intrusive stage is requested. ==========	========== ==========		
					Pre O2S voltage B1S1 at end of Cat Rich stage Fuel State Number of fueled cylinders	>= 680 mvolts = DFCO active <= 3 cylinders		
					========== After above conditions are met: DFCO Mode is entered (wo driver initiated pedal input).	==========		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2 Sensor Delayed Response Lean to Rich Bank 1 Sensor 1) (For use w/o WRAF	P015B	This DTC indicates that the primary oxygen sensor for Bank 1 has deteriorated delayed response when the exhaust gas transitions from lean to rich condition. Testing starts after P015A diagnostic completes, and engine fuel-on is commanded per P013B diagnostic. If the filtered delayed response time exceeds a calibrated threshold, code is set. This testing is performed once per trip if opportunity matures.	The EWMA of the Pre O2 sensor normalized L2R time delay value. The EWMA caluclation uses a 0.25 coefficient. OR [The Accumulated time monitored during the L2R Delayed Response Test (Gross failure). AND Pre O2 sensor voltage is OR At end of Cat Rich stage the Pre O2 sensor output is	> 0.6 EWMA (sec) >= 2.0 Seconds < 350 mvolts < 680 mvolts	No Active DTC's P015A test is complete and System Voltage EGR Device Control Idle Device Control Fuel Device Control AIR Device Control Low Fuel Condition Only when FuelLevelDataFault	TPS_ThrottleAuthorityDefaulted MAP_SensorFA IAT_SensorFA ECT_Sensor_FA AmbientAirDefault MAF_SensorFA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA AIR System FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EthanolCompositionSensor_FA EngineMisfireDetected_FA P0131, P0132, P013A, P013B, P013E, P013F, P015A, P2270, P2271 = Passed > 10.0 Volts = Not active = Not active = Not active = Not active = False = False	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	Type A, 1 Trips EWMA

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Green O2S Condition	= Not Valid, See definition of **Multiple DTC Use_Green Sensor Delay Criteria - Airflow** and **Multiple DTC Use_Green Sensor Delay Criteria - Limit** for the following locations: B1S1, B2S1 (if applicable) in Supporting Tables tab.		
					O2 Heater (pre sensor) on for	>= 50 seconds		
					Learned Htr resistance	= Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's")		
					(Engine Coolant	> 60 ºC		
					Or			
					OBD Coolant Enable Criteria	= TRUE)		
					IAT	> -40 ºC		
					Engine run Accum	> 30 seconds		
					Engine Speed to initially enable test	1,100 <= RPM <= 3,500		
					Engine Speed range to keep test enabled (after initially enabled)	1,000 <= RPM <= 3,650		
					Engine Airflow	2 <= gps <= 50		
					Vehicle Speed to initially enable test	31.1 <= MPH <= 77.7		
					Vehicle Speed range to keep test enabled (after initially enabled)	24.9 <= MPH <= 80.8		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Closed loop integral Closed Loop Active Evap Ethanol Baro Post fuel cell EGR Intrusive diagnostic All post sensor heater delays O2S Heater (post sensor) on Time Predicted Catalyst temp Fuel State Number of fueled cylinders ========== When above conditions are met: Fuel Enrich mode is entered. ========== During this test: Engine Airflow must stay between: and the delta Engine Airflow over 12.5msec must be :	0.92 <= C/L Int <= 1.08 = TRUE (Please see "**Closed Loop Enable Clarification**" in Supporting Tables). not in control of purge not in estimate mode > 70 kpa = enabled = not active = not active >= 60.0 sec 550 <= ºC <= 910 = DFCO inhibit >= 1 cylinders ========== ========== 0 <= gps <= 20 <= 20.0 gps		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel System Too Lean Bank 1	P0171	Determines if the fuel control system is in a lean condition, based on the filtered long-term and short-term fuel trim.	The filtered long-term fuel trim metric AND The filtered short-term fuel trim metric (Note: any value below 0.95 effectively nullifies the short-term fuel trim criteria)	>= 1.360 >= 0.102	Engine speed BARO Coolant Temp Coolant Temp MAP Inlet Air Temp MAF Fuel Level Long Term Fuel Trim data accumulation: Sometimes, certain Long-Term Fuel Trim Cells are not utilized for control and/or diagnosis Closed Loop Long Term FT	400 <rpm< 6,100 > 70 kPa > -20 °C (or OBD Coolant Enable Criteria = TRUE) < 150 °C 5 <kPa< 255 -20 <°C< 150 0.5 <g/s< 510.0 > 10 % or if fuel sender is faulty the diagnostic will bypass the fuel level criteria. > 47.0 seconds of data must accumulate on each trip, with at least 35.0 seconds of data in the current fuel trim cell before a pass or fail decision can be made. (Please see **P0171_P0172_P0174_P0175 Long-Term Fuel Trim Cell Usage** in Supporting Tables for a list of cells utilized for diagnosis) Enabled Enabled (Please see "**Closed Loop Enable Clarification**" and "**Long Term FT Enable Criteria**" in Supporting Tables.)	Frequency: 100 ms Continuous Loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					EGR Diag. Catalyst Diag. Post O2 Diag. Device Control EVAP Diag. No active DTC:	Intrusive Test Not Active Intrusive Test Not Active Intrusive Test Not Active Not Active “tank pull down” Not Active IAC_SystemRPM_FA MAP_SensorFA MAF_SensorFA MAF_SensorTFTKO AIR System FA EvapExcessPurgePsbl_FA Ethanol Composition Sensor FA FuelInjectorCircuit_FA EngineMisfireDetected_FA EGRValvePerformance_FA EGRValveCircuit_FA MAP_EngineVacuumStatus AmbPresDfltdStatuss TC_BoostPresSnsrFA O2S_Bank_1_Sensor_1_FA		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel System Too Rich Bank 1	P0172	Determines if the fuel control system is in a rich condition, based on the filtered long-term fuel trim metric. There are two methods to determine a Rich fault. They are Passive and Intrusive. A Passive Test decision can be made up until the time that purge is first enabled. From that point forward, rich faults can only be detected by turning purge off intrusively. Intrusive Test: If the filtered Purge Long Term Fuel Trim metric > 0.705 , the test passes without intrusively checking the filtered Non-Purge Long Term Fuel Trim metric. However if the filtered Purge Long Term Fuel Trim metric is <= 0.705 , purge is ramped off to determine if excess purge vapor is the cause of the rich condition. Performing intrusive tests too frequently may also affect EVAP and EPAIII emissions,	Passive Test: The filtered Non-Purge Long Term Fuel Trim metric AND The filtered Short Term Fuel Trim metric (Note: any value above 1.05 effectively nullifies the short-term fuel trim criteria) Intrusive Test: For 3 out of 5 intrusive segments, the filtered Purge Long Term Fuel Trim metric AND The filtered Non-Purge Long Term Fuel Trim metric AND The filtered Short Term Fuel Trim metric (Note: any value above 1.05 effectively nullifies the short-term fuel trim criteria) Segment Def'n: Segments can last up to 45 seconds and are separated by the lesser of 12.0 seconds of purge-on time or enough time to	<= 0.700 <= 1.996 <= 0.705 <= 0.700 <= 1.996		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	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		and the execution frequency of other diagnostics.	purge 11 grams of vapor. A maximum of 5 completed segments or 20 attempts are allowed for each intrusive test. After an intrusive test report is completed, another intrusive test cannot occur for 300 seconds to allow sufficient time to purge excess vapors from the canister. During this period, fuel trim will pass if the filtered Purge Long Term Fuel Trim metric > 0.705 for at least 200.0 seconds, indicating that the canister has been purged.					

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
SENT Fuel Rail Temperature Sensor 1 Circuit Low Fault	P0182	This DTC diagnose SENT fuel rail temperature sensor 1 out of range low	Fuel Temperature Sensor 1 SENT digital read value	< 145	Fuel Temperature Out of Range Diagnoistic Enabled No Fault Active on No Fault Pending on	True Enabled when a code clear is not active or not exiting device control SENT Communication Fault Active (P16E4, P16E5) SENT Intenal Error Fault Active (P126E) Fuel Temperature Sensor SENT Message Error Fault Active (P128C) SENT Intenal Error Fault Pending (P126E) Fuel Temperature Sensor SENT Message Error Fault Pending (P128C)	50.00 failures out of 62.00 samples 100 ms per Sample Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
SENT Fuel Rail Temperature Sensor 1 Circuit High Fault	P0183	This DTC diagnose SENT fuel rail temperature sensor 1 out of range high	Fuel Temperature Sensor 1 SENT digital read value	> 1,865	Fuel Temperature Out of Range Diagnoistic Enabled	True	50.00 failures out of 62.00 samples 100 ms per Sample Continuous	Type B, 2 Trips
						Enabled when a code clear is not active or not exiting device control		
					No Fault Active on	SENT Communication Fault Active (P16E4, P16E5)		
						SENT Intenal Error Fault Active (P126E)		
						Fuel Temperature Sensor SENT Message Error Fault Active (P128C)		
					No Fault Pending	SENT Intenal Error Fault Pending (P126E)		
						Fuel Temperature Sensor SENT Message Error Fault Pending (P128C)		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
SENT Fuel Rail Temperature Sensor 2 Circuit Low Fault	P0187	This DTC diagnose SENT fuel rail temperature sensor 2 out of range low	Fuel Temperature Sensor 1 SENT digital read value	< 145.00	Fuel Temperature Out of Range Diagnoistic Enabled No Fault Active on No Fault Pending	True Enabled when a code clear is not active or not exiting device control SENT Communication Fault Active (P16E4, P16E5) SENT Intenal Error Fault Active (P126F) Fuel Temperature Sensor SENT Message Error Fault Active (P128D) SENT Intenal Error Fault Pending (P126F) Fuel Temperature Sensor SENT Message Error Fault Pending (P128D)	50.00 failures out of 62.00 samples 100 ms per Sample Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
SENT Fuel Rail Temperature Sensor 2 Circuit High Fault	P0188	This DTC diagnose SENT fuel rail temperature sensor 2 out of range low	Fuel Temperature Sensor 1 SENT digital read value	> 1,865.00	Fuel Temperature Out of Range Diagnoistic Enabled No Fault Active on No Fault Pending	True Enabled when a code clear is not active or not exiting device control SENT Communication Fault Active (P16E4, P16E5) SENT Intenal Error Fault Active (P126F) Fuel Temperature Sensor SENT Message Error Fault Active (P128D) SENT Intenal Error Fault Pending (P126F) Fuel Temperature Sensor SENT Message Error Fault Pending (P128D)	50.00 failures out of 62.00 samples 100 ms per Sample Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pressure Sensor "B" Circuit Range/ Performance	P018B	This DTC detects a fuel pressure sensor response stuck within the normal operating range using an intrusive test (as follows) a] Intrusive Test Trigger: 1] Fuel Pump Duty Cycle Clamped Time (min or max duty cycle) >= 5 sec Or 2] Fuel Pres Err Variance <= calibration value KeFRPD_cmp_FPSS_ MinPres Variance (typically 0.3 to 0.6); Otherwise, Report status as Pass b] Intrusive test freq limit: 60 sec between intrusive tests that pass, c] Intrusive test Fuel Flow limit: Fuel Flow Actual < Max allowed Fuel Flow rate	Absolute value of fuel pressure change (as sensed during intrusive test)	<= 30 kPa	a] Diagnostic KeFRPD_b _FPSS_DiagEnbld b] Engine Run Time c] Engine Fuel Flow d] Fuel Pump Control Enabled e] Fuel Pump Control State f] Emissions Fuel Level Low g] Validity status VeFRPD_b_FPSS_ DataIntegrityOK IF [1] FRP Circuit Low Fault Active (DTC P018C) [2] FRP Circuit High Fault Active (DTC P018D) [3] Fuel Pump Circuit Low Fault Active (DTC P0231) [4] Fuel Pump Circuit High Fault Active (DTC P0232) [5] Fuel Pump Circuit Open Fault Active (DTC P023F) [6] Reference Voltage Fault Status (DTC P0641) [7] Fuel Pump Control Module Driver Over-	a] == TRUE b] >= 5 sec c] > 0.05 d] == TRUE e] Normal OR Fuel Pres Snsr Stuck Ctrl (rationality) f] <> TRUE g] == TRUE IF [1] <> TRUE [2] <> TRUE [3] <> TRUE [4] <> TRUE [5] <> TRUE [6] <> Active This Key [7] <> TRUE [8] <> TRUE	1 sample / 12.5 millisec Intrusive Test Duration: Fuel Flow - related (5 to 12 sec)	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					temperature Fault Active (DTC P1255) [8] Fuel Pump Driver Mod Ign Sw RunStart Pstn Ckt Low Fault Active (DTC P129D) [9] Fuel Pump Driver Control Mod Enable Ckt Perf Fault Active(DTC P12A6)	[9] <> TRUE		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pressure Sensor "B" Circuit Low	P018C	This DTC detects if the fuel pressure sensor circuit is shorted low	Fuel Pressure Sensor Voltage Percent, 5.0V Nominal ((Abs(5.0V - SensorV_actual) /5.0V) *100)	< 4.00	Ignition circuit input state	High (Run or Crank)	64 failures / 80 samples 1 sample/12.5 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pressure Sensor "B" Circuit High	P018D	This DTC detects if the fuel pressure sensor circuit is shorted high	Fuel Pressure Sensor Voltage Percent, 5.0V Nominal ((Abs(5.0V - SensorV_actual) /5.0V) *100)	> 96.00	Ignition circuit input state	High (Run or Crank)	64 failures / 80 samples 1 sample/12.5 millisec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
SIDI High Pressure Sensor Performance - Dual Sensor	P0191	The DTC determines if there is a skewed control fuel rail sensor (Sensor1) via a comparison to diagnostic sensor (sensor2) continuously when the engine is running and the commanded pressure is steady.	Primary sensor (P1) vs. Secondary sensor (P2) performance rationality **(**(Low Limit fail Filtered Fuel Control Error) OR (High Limit Fail: Filtered Fuel Control Error)**)** AND (FIltered Absolute delta between sensor1 and sensor2	 <= **P0191 - KtFHPD_cmp_DPS_FailLoThrsh (Dual sensors)** (See supporting table) >= **P0191 - KtFHPD_cmp_DPS_FailHiThrsh (Dual Sensors)** (see Supporting table) >= 1.00 mpa Note: fuel control error is calcuated based on the squreroot of senor1 divided by sensor2, this value is filter to ensure proper failure detection. Absolute delta between sensor1 and sensor2 value is filter to ensure proper failure detection.	Dual Sensor Equiped SIDI High Pressure Sensor Performance Diagnostic Enabled Commanded Pressure rate of change (increasing or dercresing) for a period of time Fuel pump temperature Desired pressure	True True < 0.70 mpa >= 1.25 seconds <= 1,000 degC >= -1.00 mpa Enabled when a code clear is not active or not exiting device control	 Filter Fuel Control Error term and Absolute delta between sensor1 and sensor2 exceed Low or High Fail limit for a duration >= 1.50 seconds This is diagnostic runs Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 1 Open Circuit - (SIDI)	P0201	This DTC Determines if there Low current through the low side driver during operation indicates open circuit on Injector 1 enable low side driver circuit. Open Circuit is determine by the impedance between signal and controller ground.	Low current through the low side driver during operation indicates open circuit	Open circuit: ≥ 200 K Ω impedance between signal and controller ground	Battery Voltage Engine Running	>= 11 Volts >= 2 Seconds P062B not FA or TFTK	10 failures out of 20 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 2 Open Circuit - (SIDI)	P0202	This DTC Determines if there Low current through the low side driver during operation indicates open circuit on Injector 2 enable low side driver circuit. Open Circuit is determine by the impedance between signal and controller ground.	Low current through the low side driver during operation indicates open circuit	Open circuit: ≥ 200 K Ω impedance between signal and controller ground	Battery Voltage Engine Run Time	>= 11 Volts >= 2 Seconds P062B not FA or TFTK	10 failures out of 20 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 3 Open Circuit - (SIDI)	P0203	This DTC Determines if there Low current through the low side driver during operation indicates open circuit on Injector 3 enable low side driver circuit. Open Circuit is determine by the impedance between signal and controller ground.	Low current through the low side driver during operation indicates open circuit	Open circuit: ≥ 200 K Ω impedance between signal and controller ground	Battery Voltage Engine Running	>= 11 Volts >= 2 Seconds P062B not FA or TFTK	10 failures out of 20 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 4 Open Circuit - (SIDI)	P0204	This DTC Determines if there Low current through the low side driver during operation indicates open circuit on Injector 4 enable low side driver circuit. Open Circuit is determine by the impedance between signal and controller ground.This DTC Diagnoses Injector 4 enable low side driver circuit for circuit faults.	Low current through the low side driver during operation indicates open circuit	Open circuit: ≥ 200 K Ω impedance between signal and controller ground	Battery Voltage Engine Run Time	>= 11 Volts >= 2 Seconds P062B not FA or TFTK	10 failures out of 20 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
TPS2 Circuit Low	P0222	Detects a continuous or intermittent short low or open in TPS2 circuit by monitoring the TPS 2 sensor voltage and failing the diagnostic when the TPS voltage is too low. This diagnostic only runs when battery voltage is high enough.	TPS2 Voltage <	0.250		Run/Crank voltage > 6.41 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	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
TPS2 Circuit High	P0223	Detects a continuous or intermittent short high in TPS2 circuit by monitoring the TPS 2 sensor voltage and failing the diagnostic when the TPS voltage is too high. This diagnostic only runs when battery voltage is high enough.	TPS2 Voltage >	4.590		Run/Crank voltage > 6.41 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	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Secondary Circuit Low	P0231	This DTC detects if the fuel pump control circuit is shorted to low. Per "smart device" design guidelines, Fuel Pump Power device reports a Faulted state enumeration if current >= 18A [25A for high performance variants. FPPM reports Not Faulted enumeration if current < 18A FPPM reports Indeterminate state enumeration if the circuit is not being evaluated during current decision loop due to other conditions.	Power driver output current (Fuel Pump Power Module Driver Circuit Ground Short enumeration)	Current >= 18.0 A	a) FPPM configuration KeFRPR_e_ChassisFuelPresSysType b) Diagnostic KeFRPR_b_FPPM_DrvrGshtDiagEnbld c) Fuel Pump Control Enable command d) Fuel Pump Control Enable time e) System Voltage f] FPPM Driver Status Alive Rolling Count Sample Faulted g] Diagnostic feedback received h] Fuel Pump Power Module output current	a) == CeFRPR_e_ECM_FPPM_Sys b) == TRUE c) == TRUE d) >= 40.00 e) 9v < System V > 32v f] <> TRUE g] == TRUE h] < 75A	64 failures / 80 samples 1 sample/12.5 millisec	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Secondary Circuit High	P0232	This DTC detects if the fuel pump control circuit is shorted to high voltage Per "smart device" design guidelines, Fuel Pump Power device reports a Faulted state enumeration if circuit voltage >= 4V. FPPM reports Not Faulted enumeration if circuit voltage < 4V. FPPM reports Indeterminate state enumeration if the circuit is not being evaluated during current decision loop due to other conditions.	Voltage offset relative to low state level of duty cycle pulse measured at fuel pump circuit	> 4.0 V	a) FPPM configuration KeFRPR_e_ChassisFuel PresSysType b) Diagnostic KeFRPR_b_FPPM_ DrvrPshtDiagEnbld c) Fuel Pump Control Enabled d] FPPM Arbitrated Fu Pmp Duty Cycle Rate of Change e] System voltage f] FPPM Driver Status Alive Rolling Count Sample Faulted g] Diagnostic feedback Received	a) == CeFRPR_e_ECM_ FPPM_Sys b) == TRUE c) == TRUE d] >= -100.00 e] 9v < System V > 32v f] <> TRUE g] == TRUE	64 failures / 80 samples 1 sample / 12.5 millisec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Secondary Circuit Open	P023F	This DTC detects if the fuel pump control circuit is open Per "smart device" design guidelines, Fuel Pump Power device reports a Faulted state enumeration if current <= 1A . FPPM reports Not Faulted enumeration if current > 1A. FPPM reports Indeterminate state enumeration if the circuit is not being evaluated during current decision loop due to other conditions.	Output driver current (Fuel Pump Power Module Driver Circuit Open enumeration)	Current <= 1.0 A	a) FPPM configuration KeFRPR_e_ChassisFuel PresSysType b) Diagnostic KeFRPR_b_FPPM_ OpenCktDiagEnbld c) Arbitrated Fuel Pump Duty Cycle (%) d] Fuel Pump Control Enable Faulted e] FPPM Fuel Pmp Driver Over-temperature Faulted f] FPPM Driver Status Alive Rolling Count Sample Faulted g] Diagnostic feedback received h] System Voltage	a) == CeFRPR_e_ECM_ FPPM_Sys b) == TRUE c) > 63.03 d] <> TRUE e] <> TRUE f] <> TRUE g] == TRUE h] 9v < System V > 32v	40 test failures / 80 test samples; 1 sample/12.5ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 1 Low side circuit shorted to ground (SIDI)	P0261	This DTC Determines if low voltage across low side drive during off state indicates short-to-ground circuit on Injector 1 enable low side driver circuit. short to ground circuit is determine by the low between signal and controller ground.	Voltage low across low side drive during off state indicates short-to-ground	Short to ground: ≤ 1 volt between signal and controller ground	Battery Voltage Engine Run Time	>= 11 Volts >= 2 Seconds P062B not FA or TFTK	10 failures out of 20 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 1 Low side circuit shorted to power (SIDI)	P0262	This DTC Determines if high voltage across low side drive during on state indicates short-to-power circuit on Injector 2 enable low side driver circuit. short to power circuit is determine by the high current through low side driver.	Voltage High across low side driver during On state indicates short to power	Short to power: 25 amp >= through low side driver	Battery Voltage Engine Run Time	>= 11 Volts >= 2 Seconds P062B not FA or TFTK	10 failures out of 20 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 2 Low side circuit shorted to ground (SIDI)	P0264	This DTC Determines if low voltage across low side drive during off state indicates short-to-ground circuit on Injector 2 enable low side driver circuit. short to ground circuit is determine by the low between signal and controller ground.	Voltage low across low side drive during off state indicates short-to-ground	Short to ground: ≤ 1 volt between signal and controller ground	Battery Voltage Engine Run Time	>= 11 Volts >= 2 Seconds P062B not FA or TFTK	10 failures out of 20 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 2 Low side circuit shorted to power (SIDI)	P0265	This DTC Determines if high voltage across low side drive during on state indicates short-to-power circuit on Injector 2 enable low side driver circuit. short to power circuit is determine by the high current through low side driver.	Voltage High across low side driver during On state indicates short to power	Short to power: 25 amp >= through low side driver	Battery Voltage Engine Run Time	>= 11 Volts >= 2 Seconds P062B not FA or TFTK	10 failures out of 20 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 3 Low side circuit shorted to ground (SIDI)	P0267	This DTC Determines if low voltage across low side drive during off state indicates short-to-ground circuit on Injector 2 enable low side driver circuit. short to ground circuit is determine by the low between signal and controller ground.	Voltage low across low side drive during off state indicates short-to-ground	Short to ground: ≤ 1 volt between signal and controller ground	Battery Voltage Engine Run Time	>= 11 Volts >= 2 Seconds P062B not FA or TFTK	10 failures out of 20 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 3 Low side circuit shorted to power (SIDI)	P0268	This DTC Determines if high voltage across low side drive during on state indicates short-to-power circuit on Injector 2 enable low side driver circuit. short to power circuit is determine by the high current through low side driver.	Voltage High across low side driver during On state indicates short to power	Short to power: 25 amp >= through low side driver	Battery Voltage Engine Run Time	>= 11 Volts >= 2 Seconds P062B not FA or TFTK	10 failures out of 20 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 4 Low side circuit shorted to ground (SIDI)	P0270	This DTC Determines if low voltage across low side drive during off state indicates short-to-ground circuit on Injector 2 enable low side driver circuit. short to ground circuit is determine by the low between signal and controller ground.	Voltage low across low side drive during off state indicates short-to-ground	Short to ground: ≤ 1 volt between signal and controller ground	Battery Voltage Engine Run Time	>= 11 Volts >= 2 Seconds P062B not FA or TFTK	10 failures out of 20 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 4 Low side circuit shorted to power (SIDI)	P0271	This DTC Determines if high voltage across low side drive during on state indicates short-to-power circuit on Injector 2 enable low side driver circuit. short to power circuit is determine by the high current through low side driver.	Voltage High across low side driver during On state indicates short to power	Short to power: 25 amp >= through low side driver	Battery Voltage Engine Run Time	>= 11 Volts >= 2 Seconds P062B not FA or TFTK	10 failures out of 20 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Random Misfire Detected Cylinder 1 Misfire Detected Cylinder 2 Misfire Detected Cylinder 3 Misfire Detected Cylinder 4 Misfire Detected	P0300 P0301 P0302 P0303 P0304	These DTC's will determine if a random or a cylinder specific misfire is occurring by monitoring various terms derived from crankshaft velocity. The rate of misfire over an interval is compared to both emissions and catalyst damaging thresholds. The pattern of crankshaft acceleration after the misfire is checked to differentiate between real misfire and other sources of crank shaft noise.	Crankshaft Deceleration Value(s) vs. Engine Speed and Engine load The equation used to calculate deceleration value is tailored to specific vehicle operating conditions. The selection of the equation used is based on the 1st single cylinder continuous misfire threshold tables encountered that are not max of range. If all tables are max of range at a given speed/load, that speed load region is an ***Undetectable region*** see Algorithm Description Document for additional details. SINGLE CYLINDER CONTINUOUS MISFIRE((Medres_Decel Medres_Jerk OR (Medres_Decel Medres_Jerk OR (Lores_Decel Lores_Jerk OR (Lores_Decel Lores_Jerk OR RevBalanceTime)	 - see details of thresholds on Supporting Tables Tab > **IdleSCD_Decel** AND > **IdleSCD_Jerk)** > **SCD_Decel** AND > **SCD_Jerk)** > **IdleCyl_Decel** AND > **IdleCyl_Jerk)** > **CylModeDecel** AND > **CylModeJerk)** >**RevMode_Decel**	Engine Run Time Engine Coolant Temp Or If ECT at startup Then ECT System Voltage + Throttle delta - Throttle delta Early Termination option: (used on plug ins that may not have enough engine run time at end of trip for normal interval to complete.)	> 2 crankshaft revolution -7 ºC < ECT < 125 ºC < -7 ºC 21 ºC < ECT < 125 ºC 9.00 < volts < 32.00 < 100.00 % per 25 ms < 100.00 % per 25 ms Not Enabled	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. OR when Early Termination Reporting = Enabled and engine rev > 1,000 revs and < 3,200 revs at end of trip any Catalyst Exceedence = (1) 200 rev block as data supports for catalyst damage.	Type A, 1 Trips (Mil Flashes with Catalyst damage level of Misfire)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			********** *Feature not used on Gasoline engines Combustion Modes that force selection of Idle Tables ********** Other patterns of misfire use adjustments to the single cylinder continuous misfire threshold tables: RANDOM MISFIRE Use random misfire thresholds If no misfire for (Medres_Decel AND Medres_Jerk) OR (Medres_Decel AND Medres_Jerk) OR (Lores_Decel AND Lores_Jerk) OR (Lores_Decel	********** *Feature not used on Gasoline engines **CombustModeIdleTbl** in Supporting Tables ********** > 3 Engine Cycles > **IdleSCD_Decel** * **Random_SCD_Decel** > **IdleSCD_Jerk** * **Random_SCD_Jerk** > **SCD_Decel** * **Random_SCD_Decel** > **SCD_Jerk** * **Random_SCD_Jerk** > **IdleCyl_Decel** * **RandomCylModDecel** > **IdleCyl_Jerk** * **RandomCylModJerk** > **CylModeDecel** *			Catalyst Failure reported with (1 or 3) Exceedences in FTP, or (1) Exceedence outside FTP. Continuous	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
				RandomCylModDecel				
			AND Lores_Jerk)	> **CylModeJerk** * **RandomCylModJerk**				
			OR RevBalanceTime	> **RevMode_Decel** * **RandomRevModDecl**				
			PAIRED CYLINDER MISFIRE If a cylinder & it's pair are above PAIR thresholds (Medres_Decel	> **IdleSCD_Decel** * **Pair_SCD_Decel**				
			AND Medres_Jerk)	> **IdleSCD_Jerk** * **Pair_SCD_Jerk**				
			OR (Medres_Decel	> **SCD_Decel** * **Pair_SCD_Decel**				
			AND Medres_Jerk)	> **SCD_Jerk** * **Pair_SCD_Jerk**				
			OR (Lores_Decel	> **IdleCyl_Decel** * **PairCylModeDecel**				
			AND Lores_Jerk)	> **IdleCyl_Jerk** * **PairCylModeJerk**				
			OR (Lores_Decel	> **CylModeDecel** * **PairCylModeDecel**				
			AND Lores_Jerk)	> **CylModeJerk** * **PairCylModeJerk**				
			OR (Revmode Active AND					

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			(within one engine cycle: 2nd largest Lores_Decel) AND Above TRUE for))	> **CylModeDecel * PairCylModeDecel** > 80 engine cycles out of 100 engine cycles				
			BANK MISFIRE Cylinders above Bank Thresholds (Medres_Decel AND Medres_Jerk)	>= 3 cylinders > **IdleSCD_Decel** * **Bank_SCD_Decel** > **IdleSCD_Jerk** * **Bank_SCD_Jerk**				
			OR (Medres_Decel AND Medres_Jerk)	> **SCD_Decel** * **Bank_SCD_Decel** > **SCD_Jerk** * **Bank_SCD_Jerk**				
			OR (Lores_Decel AND Lores_Jerk)	> **IdleCyl_Decel** * **BankCylModeDecel** >**IdleCyl_Jerk** * **BankCylModeJerk**				
			OR (Lores_Decel AND Lores_Jerk)	> **CylModeDecel** * **BankCylModeDecel** > **CylModeJerk** * **BankCylModeJerk**				

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			CONSECUTIVE CYLINDER MISFIRE 1st cylinder uses single cyl continuous misfire thresholds; 2nd Cylinder uses: (Medres_Decel	> **IdleSCD_Decel** * **ConsecSCD_Decel** AND > **IdleSCD_Jerk** * **ConsecSCD_Jerk**				
			OR (Medres_Decel	> **SCD_Decel** * **ConsecSCD_Decel** AND > **SCD_Jerk** * **ConsecSCD_Jerk**				
			OR (Lores_Decel	> **IdleCyl_Decel** * **ConsecCylModDecel** AND > **IdleSCD_Jerk** * **ConsecCylModeJerk**				
			OR (Lores_Decel	> **CylModeDecel** * **ConsecCylModDecel** AND > **CylModeJerk** * **ConsecCylModeJerk**				
			CYLINDER DEACTIVATION MODE (Active Fuel Managment) AFM: SINGLE CYLINDER					

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			CONTINUOUS MISFIRE (CylAfterDeacCyl_Decel AND CylAfterDeacCyl_Jerk) OR (CylBeforeDeacCylDecel AND CylBeforeDeacCyl_Jerk) AFM: RANDOM MISFIRE Use random misfire thresholds If no misfire for (CylAfterDeacCyl_Decel AND CylAfterDeacCyl_Jerk) (CylBeforeDeacCylDecel AND CylBeforeDeacCyl_Jerk)	> **CylModeDecel** * **ClyAfterAFM_Decel** > **CylModeJerk** * **CylAfterAFM_Jerk** > **CylModeDecel** * **CylBeforeAFM_Decel** > **CylModeJerk** * **ClyBeforeAFM_Jerk** > 3 Engine Cycles > **CylModeDecel** * **ClyAfterAFM_Decel** * **RandomAFM_Decl** > **CylModeJerk** * **CylAfterAFM_Jerk** * **RandomAFM_Jerk** > **CylModeDecel** * **CylBeforeAFM_Decel** * **RandomAFM_Decl** > **CylModeJerk** * **ClyBeforeAFM_Jerk** * **RandomAFM_Jerk** - see details on Supporting Tables Tab				

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Misfire Percent Emission Failure Threshold	≥ 2.75 % P0300				
			Misfire Percent Catalyst Damage	> **Catalyst_Damage_Misfire_Percentage** in Supporting Tables whenever secondary conditions are met.	(at low speed/loads, one cylinder may not cause cat damage) Engine Speed Engine Load Misfire counts	> 0 rpm AND > 0 % load AND < 37 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				
				disable conditions:	Engine Speed	1,000 < rpm < ((Engine Over Speed Limit) - 50) OR 8,191) Engine speed limit is a function of inputs like Gear and temperature see **EngineOverSpeedLimit** in supporting tables	4 cycle delay	
					No active DTCs:	TPS_FA EnginePowerLimited	4 cycle delay	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						MAF_SensorTFTKO MAP_SensorTFTKO IAT_SensorTFTKO ECT_Sensor_Ckt_TFTKO 5VoltReferenceB_FA CrankSensor_TFTKO CrankSensor_FA CamLctnIntFA CamLctnExhFA CamSensorAnyLctnTFTKO AnyCamPhaser_FA AnyCamPhaser_TFTKO AmbPresDfltdStatus		
					P0315 & engine speed	> 1,000 rpm	4 cycle delay	
					Fuel Level Low	LowFuelConditionDiagnostic	500 cycle delay	
					Cam and Crank Sensors	in sync with each other	4 cycle delay	
					Misfire requests TCC unlock	Not honored because Transmission in hot mode or POPD intrusive diagnostic running	4 cycle delay	
					Fuel System Status	≠ Fuel Cut	4 cycle delay	
					Active FuelManagement	Transition in progress	0 cycle delay	
					Undetectable engine speed and engine load region	***Undetectable region*** from Malfunction Criteria	4 cycle delay	
					Abusive Engine Over Speed	> 8,192 rpm	0 cycle delay	
					Below zero torque (except CARB approved 3000 rpm to redline triangle.)	< **ZeroTorqueEngLoad** or <**ZeroTorqueAFM** if AFM is active	4 cycle delay	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						in Supporting Tables		
					Below zero torque: TPS Vehicle Speed	≤ 2.0 % (≤ 2.0 % in AFM) > 318 mph (> 19 mph AFM)	4 cycle delay	
					NEGATIVE TORQ AFM If deactivated cylinders appear to make power, torque is negative: DeactivatedCyl_Decel AND DeactivatedCyl_Jerk AND # of Deact Cyls Inverted	 <**DeacCylInversionDecel** <**DeacCylInversionJerk** > 0 cylinders	0 cycle delay	
					EGR Intrusive test	Active	12 cycle delay	
					Manual Trans	Clutch shift	0 cycle delay	
					Accel Pedal Position AND Automatic transmission shift	> 100.00 %	0 cycle delay	
					After Fuel resumes on Automatic shift containing Fuel Cut		2 Cylinder delay	
					Delay if PTO engaged	Enabled	4 cycle delay	
					**********	**********	**********	
					*Feature not used on Gasoline engines			
					Combustion Mode		0 cycle delay	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						= **InfrequentRegen** value in Supporting Tables		
					Driver cranks before Wait to Start lamp extinguishes	IF TRUE	**WaitToStart** cycle delay	
					Brake Torque **********	> 199.99 % Max Torque **********	0 cycle delay **********	
					DRIVELINE RING FILTER After a low level misfire, another misfire may not be detectable until driveline ringing ceases. If no ringing seen, stop filter early. Filter Driveline ring:	> "**Ring Filter**" # of engine cycles after misfire in Supporting Tables		
					Stop filter early:	> "**Number of Normals**" # of engine cycles after misfire in Supporting Tables tab		
					ABNORMAL ENGINE SPEED OSCILLATION: (checks each "misfire" candidate in 100 engine Cycle test to see if it looks like some disturbance like rough road (abnormal).) Used Off Idle, and while not shifting, TPS Engine Speed Veh Speed Auto Transmission	> 1 % > 1,000 rpm > 0 mph not shifting		
					indivdual candidate deemed abnormal if			

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					number of consecutive decelerating cylinders after "misfire": (Number of decels can vary with misfire detection equation) Consecutive decels while in SCD Mode Cyl Mode Rev Mode At the end of 100 engine cycle test, the ratio of abnormal/candidate is checked to confirm if real misfire is present within the 100 engine cycles. abnormal candidates/ total candidates MISFIRE CRANKSHAFT PATTERN RECOGNITION checks each "misfire" candidate in 100 engine Cycle test to see if overall crankshaft pattern looks like real misfire (recognized), or some disturbance like rough road (unrecognized). At the end of 100 engine cycle test, the ratio of unrecog/recognized is checked to confirm if real	> **Abnormal SCD Mode** > **Abnormal Cyl Mode** > **Abnormal Rev Mode** in Supporting Tables > 0.50 ratio	discard 100 engine cycle test	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					misfire is present within the 100 engine cycles. Typically used for checking a single misfire per engine cycle but can support some other patterns on some packages Pattern Recog Enabled: Pattern Recog Enabled during Cylinder Deac Pattern Recog Enabled consecutive cyl pattrn Engine Speed Veh Speed The 1st check for "recognized" is the 1st fired cylinder after the misfire candidate should both accelerate and jerk an amount based acceleration and jerk of Single Cylinder Misfire thresholds in effect at that speed and load. (CylAfter_Accel AND CylAfter_Jerk)	Disabled Not Enabled Disabled 700 < rpm < 3,000 > 0.6 mph > Misfire_ decel * **1st_FireAftrMisfr_Acel** > Misfire_Jerk * **1st_FireAftrMisfr_Jerk** Or if AFM mode is active: > Misfire_ decel * **1stFireAftrMisAcelAFM** > Misfire_Jerk * **1stFireAfterMisJerkAFM**		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Addtionally, the crankhaft is checked again a small calibratible number of cylinders later to see if the distrubance is still large like rough road, or has calmed down like real misfire. The size of disturbance is compared to a multiplier times the ddt_jerk value used to detect misfire at that speed and load. If there is repetitive misfire on consecutive engine cycles, the expected snap is adjusted due to the higher expected disturbance. Num of Cylinders after misfire to start check of crankshaft snap "misfire" recognized if: Crankshaft snap after: isolated "misfire" repetative "misfire" At the end of 100 engine cycle test, the ratio of unrecog/recognized is checked to confirm if real misfire is present. Ratio of Unrecog/Recog	2 Cylinders < Misfire_Jerk *** SnapDecayAfterMisfire** < Misfire_Jerk * **SnapDecayAfterMisfire * RepetSnapDecayAdjst** in Supporting Tables > 1.00	discard 100 engine cycle test	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					: NON-CRANKSHAFT BASED ROUGH ROAD: Rough Road Source IF Rough Road Source = WheelSpeedInECM ABS/TCS Wheel speed noise VSES IF Rough Road Source = "FromABS" ABS/TCS RoughRoad VSES IF Rough Road Source = "TOSS" TOSS dispersion AND No Active DTCs	Enabled Wheel Speed in ECM active > **WSSRoughRoadThres** active active detected active >**TOSSRoughRoadThres** in supporting tables Transmission Output Shaft Angular Velocity Validity TransmissionEngagedStat e_FA (Auto Trans only) ClutchPstnSnsr FA (Manual Trans only)	discard 100 engine cycle test discard 100 engine cycle test discard 100 engine cycle test 4 cycle delay

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Crankshaft Position System Variation Not Learned	P0315	This DTC determines if the crankshaft sensor learn values that are stored in memory are valid. The angle between each tooth of the reluctor wheel is learned, and the sum of all angles together should sum to 360° (one revolution of the reluctor wheel). Default values, or corrupted values will not sum to 360°.	Differance between 360 degrees and the sum of the reluctor wheel's teeth	> 0.001 degrees	OBD Manufacturer Enable Counter	MEC = 0	0.50 seconds Frequency Continuous100 msec	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Knock Sensor (KS) Performance Per Cylinder	P0324	This diagnostic checks for knock sensor performance out of the normal expected range on a per cylinder basis due to Excessive Knock (either real or false knock).	Common Enable Criteria		Diagnostic Enabled? Engine Run Time Engine Speed Engine Air Flow (Engine Coolant Temperature OR OBD Coolant Enable Criteria Inlet Air Temperature Cumlative Number of Engine Revs Above Min Eng Speed (per key cycle)	Yes ≥ 2.0 seconds ≥ 700 RPM AND ≤ 8,500 RPM ≥ 700 mg/cylinder AND ≤ 2,000 mg/cylinder ≥ -40 deg's C = TRUE) ≥ -40 deg's C ≥ 170 Revs	First Order Lag Filters with Weight Coefficient = 0.0201 Updated each engine event	Type B, 2 Trips
			Excessive Knock Diag: Filtered Knock Intensity (where 'Knock Intensity' = 0 with no knock; and > 0 & proportional to knock magnitude with knock)	**> P0324_PerCyl_ExcessiveKnock_Threshold** (no units)				

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Knock Sensor (KS) Circuit Bank 1	P0325	This diagnostic checks for an open in the knock sensor circuit. There are two possible methods used: 1. 20 kHz 2. Normal Noise See **Supporting Tables** for method definition: **P0325_P0330_OpenMethod** Typical implementations: A. Use 20 kHz method at all RPM (used when acceptable separation achieved at all RPM) or B. Use 20 kHz method at low/medium RPM and Normal Noise at high RPM	Open Circuit Method chosen (2 possible methods: 20 kHz or Normal Noise): Thresholds for OpenMethod = 20 kHZ Filtered FFT Output Thresholds for OpenMethod = NormalNoise: Filtered FFT Output	Supporting Table: **P0325_P0330_OpenMethod_2** (see Supporting Tables) **> P0325_P0330_OpenCktThrshMin (20 kHz) AND < P0325_P0330_OpenCktThrshMax (20 kHz)** **> P0325_P0330_OpenCktThrshMin (Normal Noise) AND < P0325_P0330_OpenCktThrshMax (Normal Noise)**	Diagnostic Enabled? Engine Run Time Engine Speed Cumulative Number of Engine Revs (per key cycle) within min/max Engine Speed enable (above) Engine Air Flow (Engine Coolant Temperature OR OBD Coolant Enable Criteria Inlet Air Temperature	Yes ≥ 2.0 seconds ≥ 1,000 RPM and ≤ 4,650 RPM ≥ 100 revs ≥ 40 mg/cylinder and ≤ 2,000 mg/cylinder ≥ -40 deg's C = TRUE) ≥ -40 deg's C	First Order Lag Filter with Weight Coefficient Weight Coefficient = 0.0100 Updated each engine event	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Knock Sensor (KS) Performance Bank 1	P0326	This diagnostic checks for knock sensor performance out of the normal expected range, on a per sensor basis, due to Abnormal (engine) Noise	Enable Criteria for Per Sensor Abnormal Noise Diag:		Diagnostic Enabled? Engine Run Time Engine Speed Engine Air Flow (Engine Coolant Temperature OR OBD Coolant Enable Criteria Inlet Air Temperature	Yes ≥ 2.0 seconds ≥ 2,500 RPM AND ≤ 8,500 RPM ≥ 50 mg/cylinder AND ≤ 2,000 mg/cylinder ≥ -40 deg's C = TRUE) ≥ -40 deg's C	First Order Lag Filters with Weight Coefficient = 0.0017 Updated each engine event	Type B, 2 Trips
			Filtered FFT Intensity: (where 'FFT Intensity' = Non-knocking, background engine noise)	< **P0324_P0326_P0331_AbnormalNoise_Threshold** (Supporting Table)	Individual Cylinders enabled for Abnormal Noise Cumlative Number of Engine Revs Above Min Eng Speed (per key cycle)	**P0324_P0326_P0331_AbnormalNoise_CylsEnabled** (Supporting Table) ≥ 100 Revs		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Knock Sensor (KS) Circuit Low Bank 1	P0327	This diagnostic checks for an out of range low knock sensor signal	Sensor Input or Return Signal Line	< 8.0 Percent (of 5 V reference)	Diagnostic Enabled? Engine Speed	Yes > 0 RPM and < 8,500 RPM	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Knock Sensor (KS) Circuit High Bank 1	P0328	This diagnostic checks for an out of range high knock sensor signal	Sensor Input or Return Signal Line	> 39.0 Percent (of 5 Volt Reference)	Diagnostic Enabled? Engine Speed	Yes > 0 RPM and < 8,500 RPM	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Crankshaft Position (CKP) Sensor A Circuit	P0335	Diagnostic will fail if a crank sensor pulse was not received during a period of time; if crank sensor pulses are received the diagnostic will pass.	Time since last crankshaft position sensor pulse received	>= 4.0 seconds	Starter engaged AND (cam pulses being received OR (MAF_SensorFA AND Engine Air Flow	 = FALSE > 2.0 grams/second))	Continuous every 100 msec	Type B, 2 Trips
			No crankshaft pulses received	>= 0.3 seconds	Engine is Running Starter is not engaged		Continuous every 12.5 msec	
			No crankshaft pulses received		Engine is Running OR Starter is engaged No DTC Active:	 P0365 P0366	2 failures out of 10 samples One sample per engine revolution	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Crankshaft Position (CKP) Sensor A Performance	P0336	1. Fail counts will occur if the engine goes out synchronization repeatedly over a period of time and will pass if the engine stays in synchronization. 2. Diagnostic will fail if synchronization gap is not found in a specified period of time and will pass if the synchronization gap is found. 3. Diagnostic will fail if the incorrect number of crank sensor teeth are detected in-between detecting the synchronization gap and will pass if the correct number of teeth are seen.	Time in which 10 or more crank re-synchronizations occur	< 10.0 seconds	Engine Air Flow Cam-based engine speed No DTC Active:	>= 2.0 grams/second > 450 RPM P0335	Continuous every 250 msec	Type B, 2 Trips
			No crankshaft synchronization gap found	>= 0.4 seconds	Engine is Running Starter is not engaged		Continuous every 12.5 msec	
			Time since starter engaged without detecting crankshaft synchronization gap	>= 1.5 seconds	Starter engaged AND (cam pulses being received OR (MAF_SensorFA AND Engine Air Flow	 = FALSE > 2.0 grams/second))	Continuous every 100 msec	
			Crank pulses received in one engine revolution OR Crank pulses received in one engine revolution	< 51 > 65	Engine is Running OR Starter is engaged No DTC Active:	 P0365 P0366	8 failures out of 10 samples One sample per engine revolution	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Camshaft Position (CMP) Sensor Circuit Bank 1 Sensor A	P0340	Diagnostic will fail if a cam sensor pulse was not received during a period of time; if cam sensor pulses are received the diagnostic will pass.	Time since last camshaft position sensor pulse received OR Time that starter has been engaged without a camshaft sensor pulse	>= 5.5 seconds >= 4.0 seconds	Starter engaged AND (crank pulses being received OR (MAF_SensorFA AND Engine Air Flow	 = FALSE > 2.0 grams/second))	Continuous every 100 msec	Type B, 2 Trips
			Fewer than 4 camshaft pulses received in a time	> 3.0 seconds	Engine is running Starter is not engaged		Continuous every 100 msec	
			No camshaft pulses received during first 12 MEDRES events (There are 12 MEDRES events per engine cycle		Crankshaft is synchronized Starter must be engaged to enable the diagnostic, but the diagnostic will not disable when the starter is disengaged No DTC Active:	 CrankSensor_FA	Continuous every MEDRES event	
			The number of camshaft pulses received during 100 engine cycles	= 0	Crankshaft is synchronized No DTC Active:	 CrankSensor_FA	8 failures out of 10 samples Continuous every engine cycle	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Camshaft Position (CMP) Sensor Performance Bank 1 Sensor A	P0341	Diagnostic will fail if an incorrect number of cam sensor pulses are detected over a number of engine cycles and will pass if the number of cam pulses is correct.	The number of camshaft pulses received during first 12 MEDRES events is OR (There are 12 MEDRES events per engine cycle)	< 4 > 6	Crankshaft is synchronized Starter must be engaged to enable the diagnostic, but the diagnostic will not disable when the starter is disengaged No DTC Active:	CrankSensor_FA	Continuous every MEDRES event	Type B, 2 Trips
			The number of camshaft pulses received during 100 engine cycles OR	< 398 > 402	Crankshaft is synchronized No DTC Active:	CrankSensor_FA	8 failures out of 10 samples Continuous every engine cycle	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #1 CIRCUIT	P0351	Diagnoses Cylinder #1 Ignition Control (EST) output driver circuit for an Open Circuit fault.	The ECM detects there is high impedance on the EST circuit.	≥ 30 kΩ impedance between signal and controller ground	Engine cranking or running Ignition Voltage	 > 5.00 Volts	50 Failures out of 63 Samples 250 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #2 CIRCUIT	P0352	Diagnoses Cylinder #2 Ignition Control (EST) output driver circuit for an Open Circuit fault.	High impedance during driver high state (indicates open circuit)	≥30 kΩ impedance between signal and controller ground	Engine running Ignition Voltage	 > 11.0 Volts	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #3 CIRCUIT	P0353	Diagnoses Cylinder #3 Ignition Control (EST) output driver circuit for an Open Circuit fault.	High impedance during driver high state (indicates open circuit)	$\geq$ 30 kΩ impedance between signal and controller ground	Engine running Ignition Voltage	 > 11.0 Volts	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #4 CIRCUIT	P0354	Diagnoses Cylinder #4 Ignition Control (EST) output driver circuit for an Open Circuit fault.	High impedance during driver high state (indicates open circuit)	$\geq$ 30 kΩ impedance between signal and controller ground	Engine running Ignition Voltage	 > 11.0 Volts	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Camshaft Position (CMP) Sensor Circuit Bank 1 Sensor B	P0365	Diagnostic will fail if a cam sensor pulse was not received during a period of time; if cam sensor pulses are received the diagnostic will pass.	Time since last camshaft position sensor pulse received OR Time that starter has been engaged without a camshaft sensor pulse	>= 5.5 seconds >= 4.0 seconds	Starter engaged AND (crank pulses being received OR (MAF_SensorFA AND Engine Air Flow	= FALSE > 2.0 grams/second))	Continuous every 100 msec	Type B, 2 Trips
			Fewer than 4 camshaft pulses received in a time	> 3.0 seconds	Engine is running Starter is not engaged		Continuous every 100 msec	
			No camshaft pulses received during first 12 MEDRES events (There are 12 MEDRES events per engine cycle		Crankshaft is synchronized Starter must be engaged to enable the diagnostic, but the diagnostic will not disable when the starter is disengaged No DTC Active:	CrankSensor_FA	Continuous every MEDRES event	
			The number of camshaft pulses received during 100 engine cycles	= 0	Crankshaft is synchronized No DTC Active:	CrankSensor_FA	8 failures out of 10 samples Continuous every engine cycle	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Camshaft Position (CMP) Sensor Performance Bank 1 Sensor B	P0366	Diagnostic will fail if an incorrect number of cam sensor pulses are detected over a number of engine cycles and will pass if the number of cam pulses is correct.	The number of camshaft pulses received during first 12 MEDRES events is OR (There are 12 MEDRES events per engine cycle)	< 4 > 6	Crankshaft is synchronized Starter must be engaged to enable the diagnostic, but the diagnostic will not disable when the starter is disengaged No DTC Active:	CrankSensor_FA	Continuous every MEDRES event	Type B, 2 Trips
			The number of camshaft pulses received during 100 engine cycles OR	< 398 > 402	Crankshaft is synchronized No DTC Active:	CrankSensor_FA	8 failures out of 10 samples Continuous every engine cycle	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Recirculation (EGR) Flow Insufficient	P0401	During a closed throttle decel condition, the EGR valve is normally closed. This diagnostic opens the valve to a pre-determined position, and the change in MAP is computed. This change in MAP correlates to the flow rate of the EGR system	With EGR valve open, the peak positive MAP change is monitored over a period of time. This value is compared with a threshold from an Engine Speed vs Baro table and the difference computed. The result is statistically filtered (EWMA) and compared to a decision limit.	DTC is set when the filtered pressure change (NeEGRD_p_EWMA) exceeds 2.40	STEP CHANGE DETECTION: IF the difference between the current EWMA and the current map diff > (**P0401_StepDelta**) AND current map diff > (**P0401_StepMAP_DIFF**). Run multiple tests (**P0401_StepSamplesPerTrip**) until (**P0401_SamplesAfterStep**) number of tests have been completed. CODE CLEAR / NONVOLITLE MEMORY RESET DETECTION: Upon code clear or a nonvolatile memory failure, Initiate multiple tests. Run multiple tests per trip until (**P0401_SamplesAfterReset**) # of tests have been completed. .	EGR is available, DTC's NOT active: FuelInjectorCircuit_FA CrankSensor_FA TPS_Performance_FA TPS_FAMAP_SensorFA VehicleSpeedSensor_FA 5VoltReferenceA_FA 5VoltReferenceB_FA IAT_SensorFA ECT_Sensor_Ckt_FA IAC_SystemRPM_FA EGRValveCircuit_FA EngineMetalOvertempActive Not in Power Take Off (PTO) Mode, Traction control is NOT active, Not in device control, Not in Catalyst protection mode DTC's NOT active: P0604 EngineMisfireDetected_FA MAF_SensorFA, , Ethanol Composition Sensor FA Difference between desired & actual Air Charge < 40.00 , BARO > 70.00 & NOT defaulted, -23.00 < IAT < 100.00 , , Trans gear stable timer >	Time to test (once enabled) = 0.40 sec. Completes once per trip (typically) 6.25 ms operating loop	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						2.00 sec, Decel fuel cut off state is unchanged for time > 0.25 , 166.00 > VehicleSpeed > 0.00 MPH, Arbitrated Torque < 50.0 , EGR Position < 1.20 , 1,100.00 < Engine Speed < 1,300.00 RPM, MAP change < 1.00 , 20.00 < Altitude-compensated MAP < 50.00 kPa Intrusive Mode Enablements: Pos. Delta RPM <= 150.00 , Neg. Delta RPM <= 150.00 Number of EGR On-time execution loops < 25.00 , Throttle Area fluctuations < 1.20 %		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
EGR Solenoid Circuit Open	P0403	This DTC checks the EGR circuit for electrical continuity	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.	Open Circuit: ≥ 4 K Ω impedance between signal and controller ground	System supply voltage Output driver is commanded on Ignition switch is in crank or run position	> 11.00 Volts	100.00 failures out of 120.00 samples 250 ms /sample, continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
EGR Valve - Open Position Performance	P0404	This diagnostic detects if the valve position error is too large	Vavle position error [absolute value of (desired position - actual position)] > error threshold	Position error > 10.00 %	Desired EGR position > 0%	The following DTC's NOT active: P0405 P0406 Engine is running Off-board device not active PTO not active P0401 not intrusive Ignition voltage >= 11.00 EGR control is enabled, Desired EGR position variation < 30.00 for 2.00 sec. Enable conditions met for 3.00 sec.	100.00 failures out of 120.00 samples 100ms loop Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
EGR Valve - Position Sensor - Circuit Low	P0405	This diagnostic detects if the valve position feedback circuit is open or shorted to ground by comparing the sensor feedback to normal operating ranges	Raw EGR feedback sensor signal is less than the expected low limit	Raw EGR feedback sensor signal < 8.00 %		The following DTC's NOT active: 5VoltReferenceA_FA 5VoltReferenceB_FA Engine is running Off-board device not active, PTO not active, P0401 not intrusive, Ignition voltage >= 11.00 , EGR diagnostic is enabled, Enable conditions met for 3.00 sec.	100.00 failures out of 120.00 samples 100 ms Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
EGR Valve - Position Sensor - Circuit High	P0406	This diagnostic detects if the vavle position feedback circuit is shorted to high voltage or the 5V return is open.	Raw EGR feedback sensor signal is greater than the expected high limit	Raw EGR feedback sensor signal > 89.00		The following DTC's NOT active: 5VoltReferenceA_FA 5VoltReferenceB_FA Engine is running Off-board device not active PTO not active P0401 not intrusive Ignition voltage >= 11.00 EGR diagnostic is enabled, Enable conditions met for 3.00 sec.	100.00 failures out of 120.00 samples 100 ms Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
EGR Temperature Sensor2 Ckt Range/ Performance	P040B	ECM determines that the EGR temperature Sensor 2 has not moved enought since start (Stuck)	ECM determines that after an allowed amount of amount of engine consumed following a long enough soak, the Down Stream Temperature sensor has not change enough.	ABS(Initial Down stream temperature - final down stream temperature)<= **Down Stream Stk Temp Vrtn**	System supply voltage Engine soak (not run) time No Active DTCs Engine is running	> 11.00 Volts >= 28,800.00 Sec P262B	cumulative airflow > 400.00 100 ms /sample, continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
EGR Temperature Sensor2 Ckt Low	P040C	Diagnose the EGR Down Stream Temperature sensor circuit low	The ECM detects that the measured resistance of the temperature sensor is out of range low.	Measured Resistance of the Temperature sensor < 100.00 Ω impedance	System supply voltage Output driver is commanded on Ignition switch is in crank or run position	> 11.00 Volts	50 failures out of 63 samples 100 ms /sample, continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
EGR Temperature Sensor2 Ckt High	P040D	Diagnose the EGR Down Stream Temperature sensor circuit high	The ECM detects that the measured resistance of the temperature sensor is out of range high.	Measured Resistance of the Temperature sensor > 1,400.00 Ω impedance	System supply voltage Output driver is commanded on Ignition switch is in crank or run position	> 11.00 Volts	50 failures out of 63 samples 100 ms /sample, continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
EGR Temperature Sensor2 Ckt Intermittent/ Erratic	P040E	Detects a temperature sensor that is showing erratic or intermittent temperature readings	The absoluted value of the loop to loop (100 ms / sample) resistance change of the temperature sensor is greater than the allowed rate of change.	Delta chage > 10.00 Ω impedance	System supply voltage Output driver is commanded on Ignition switch is in crank or run position	> 11.00 Volts	15 failures out of 30 samples 100 ms /sample, continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
EGR Temperature Sensor1 Ckt Range/ Performance	P041B	ECM determines that the EGR temperature Sensor 1 has not moved enought since start (Stuck)	ECM determines that after an allowed amount of engine consumed airflow following a long enough soak, the Up Stream Temperature sensor has not change enough.	ABS(Initial upstream temperature - final upstream temperature) <= **UP Stream Stk Temp Vrtn**	System supply voltage Engine soak (not run) time No Active DTCs Engine is running	> 11.00 Volts >= 28,800.00 Sec P262B	cumulative airflow > 400.00 100 ms /sample, continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
EGR Temperature Sensor1 Ckt Low	P041C	Diagnose the EGR Up Stream Temperature sensor circuit low	The ECM detects that the measured resistance of the temperature sensor is out of range low.	Measured Resistance of the Temperature sensor < 100.00 Ω impedance	System supply voltage Output driver is commanded on Ignition switch is in crank or run position	> 11.00 Volts	53 failures out of 60 samples 100 ms /sample, continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
EGR Temperature Sensor1 Ckt High	P041D	Diagnose the EGR Up Stream Temperature sensor circuit high	The ECM detects that the measured resistance of the temperature sensor is out of range high.	Measured Resistance of the Temperature sensor > 1,400.00 Ω impedance	System supply voltage Output driver is commanded on Ignition switch is in crank or run position	> 11.00 Volts	50 failures out of 63 samples 100 ms /sample, continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
EGR Temperature Sensor1 Ckt Intermittent/ Erratic	P041E	Detects a temperature sensor that is showing erratic or intermittent temperature readings	The absoluted value of the loop to loop (100 ms / sample) resistance change of the temperature sensor is greater than the allowed rate of change.	Delta chage > 10.00 Ω impedance	System supply voltage Output driver is commanded on Ignition switch is in crank or run position	> 11.00 Volts	15 failures out of 30 samples 100 ms /sample, continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Catalyst System Low Efficiency Bank 1	P0420	NOTE: The information below applies to applications that use the Decel Catalyst Monitor Algorithm Oxygen Storage. The catalyst washcoat contains Cerium Oxide. Cerium Oxide reacts with NO and O2 during lean A/F excursions to store the excess oxygen (I.e. Cerium Oxidation). During rich A/F excursions, Cerium Oxide reacts with CO and H2 to release this stored oxygen (I.e. Cerium Reduction). This is referred to as the Oxygen Storage Capacity, or OSC. CatMon's strategy is to "measure" the OSC of the catalyst through forced Rich (intrusive rich) and Lean (decel fuel cutoff) 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	Normalized Ratio OSC Value (EWMA filtered)	< 0.35	All enable criteria associated with P0420 can be found under P2270 - (O2 Sensor Signal Stuck Lean Bank 1 Sensor 2) Rapid Step Response (RSR) feature will initiate multiple tests: If the difference between current EWMA value and the current OSC Normalized Ratio value is and the current OSC Normalized Ratio value is Maximum number of RSR tests to detect failure when RSR is enabled. MAF Predicted catalyst temperature Front O2 Sensor or Front WRAF Rear O2 Sensor General Enable Criteria In addition to the p-codes listed under P2270, the following DTC's shall also	 > 0.46 < 0.10 8 > 2.00 g/s < 50.00 g/s < 910 ° C > 680.00 mV or > 1.25 EQR > 700.00 mV	1 test attempted per valid decel period Minimum of 1 test per trip Maximum of 3 tests per trip Frequency: Fueling Related : 12.5 ms OSC Measurements: 100 ms Temp Prediction: 12.5ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		table (based on temp and exhaust gas flow) 3. WorstPassing OSC value (based on temp and exhaust gas flow) Normalized Ratio Calculation = (1-2) / (3-2) A Normalized Ratio of 1 essentially represents a good part and a ratio of 0 essentially represents a very bad part. Refer to the **P0420_WorstPassingOSCTableB1** and **P0420_BestFailingOSCTableB1** in Supporting Tables tab for details The Catalyst Monitoring Test is completed during a decel fuel cutoff event. This fuel cutoff event occurs following a rich instrusive fueling event initiated by the O2 Sensor Signal Stuck Lean Bank 1 Sensor 2 test (P2270). Several conditions must be met in order to execute this test. Additional conditions and their related values			not be set: For switching O2 sensors: For WRAF O2 sensors:	 O2S_Bank_1_Sensor_1_FA O2S_Bank_1_Sensor_2_FA O2S_Bank_2_Sensor_1_FA O2S_Bank_2_Sensor_2_FA WRAF_Bank_1_FA WRAF_Bank_2_FA		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		are listed in the "Secondary Parameters" and "Enable Conditions" section of this document for P2270 (O2 Sensor Signal Stuck Lean Bank 1 Sensor 2)						

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
EGR Valve - Closed-Valve Position Performance	P042E	This diagnostic detects if the valve is stuck open when commanded closed.	Actual valve position is greater than an error threshold (% of reference voltage from learned closed position)	Raw EGR feedback sensor signal > 8.00		The following DTC's NOT active: P0405 P0406 Engine is running Off-board device not active PTO not active P0401 is not intrusive Ignition voltage >= 11.00 EGR diagnostic is enabled, Desired EGR position = 0, for at least 1.00 sec. Enable conditions met for 3.00 sec	80.00 failures out of 100.00 100 ms Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Evaporative Emission System Leak Detection Reference Orifice Low Flow (ELCP Sealed Fuel System)	P043E	A plugged ELCP reference orifice is detected.	If 1st 0.020" reference orifice vacuum averaged measurement is after then a plugged ELCP reference orifice is detected and the DTC fails. Or If 2nd 0.020" reference orifice vacuum averaged measurement is after then a plugged ELCP reference orifice is detected and the DTC fails.	3 second ≥ refer to **P043E First Reference Orifice Measurement Table** in Supporting Tables 360 seconds 3 second ≥ refer to **P043E Second Reference Orifice Measurement Table** in Supporting Tables 30 seconds	Propulsion system not active time Distance since assembly plant Drive distance Min baro Max baro Min fuel level Max fuel level ECT Min IAT Max IAT Time since last test when passing P0442/P0455 Time since last test when failing P0442/P0455 ********** ELCP hardware can be powered by battery or powertrain relay. For this application the ELCP hardware is powered by battery Voltage ********** Vehicle speed Vehicle not in assembly plant (value must = 0) Propulsion system not active time Previous propulsion system active time Abort Conditions: Min fuel level slosh Max fuel level slosh Key up during test Refueling request button	4.3 ≤ time ≤ 5.8 hours or 6.0 ≤ time ≤ 8.1 hours or 8.2 ≤ time ≤ 11.0 hours ≥ 9.9 miles ≥ 0.1 miles ≥ 70 kPa ≤ 110 kPa ≥ 10 % ≤ 90 % ≤ 40 °C ≥ 4 °C ≤ 45 °C ≥ 0 hours ≥ 0 hours ********** ≥ 10 volts ********** ≤ 3 MPH 0 ≥ 0 seconds ≥ 0 seconds ≥ 190 % ≤ 200 % 	Up to twice per trip, for each required wake-up event 100 msec loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					pressed Service bay test active Device control exceeds No Active DTC's No Active DTC's TFTKO	 0.5 seconds FuelLevelDataFault IAT_SensorFA ECT_Sensor_FA VehicleSpeedSensor_FA AmbientAirDefault VentCircuit_FA ELCPCircuit_FA FTP_SensorCircuit_FA ELCP_PumpCircuit_FA ELCP_SwitchCircuit_FA VICM_WakeupDiag_FA VICM_WakeupDiag_TFTKO LostCommBCM_FA LostCommBusB_VICM_FA CommBusAOff_VICM_FA CommBusBOff_VICM_FA AccCktLo_FA ModuleOffTime_FA P043F P0451 P145C P145D P145E P1462 P2421 P2422 P2450 P24B9		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Evaporative Emission System Leak Detection Reference Orifice High Flow (ELCP Sealed Fuel System)	P043F	A missing ELCP reference orifice is detected.	If 1st 0.020” reference orifice vacuum averaged measurement is after then a missing ELCP reference orifice is detected and the DTC fails. Or If 2nd 0.020” reference orifice vacuum averaged measurement is after then a missing ELCP reference orifice is detected and the DTC fails.	3 second ≤ refer to **P043F First Reference Orifice Measurements Table** in Supporting Tables 360 seconds 3 second ≤ refer to **P043F Second Reference Orifice Measurements Table** in Supporting Tables 30 seconds	Propulsion system not active time Distance since assembly plant Drive distance Min baro Max baro Min fuel level Max fuel level ECT Min IAT Max IAT Time since last test when passing P0442/P0455 Time since last test when failing P0442/P0455 ********** ELCP hardware can be powered by battery or powertrain relay. For this application the ELCP hardware is powered by battery Voltage ********** Vehicle speed Vehicle not in assembly plant (value must = 0) Propulsion system not active time Previous propulsion system active time Abort Conditions: Min fuel level slosh Max fuel level slosh Key up during test Refueling request button	4.3 ≤ time ≤ 5.8 hours or 6.0 ≤ time ≤ 8.1 hours or 8.2 ≤ time ≤ 11.0 hours ≥ 9.9 miles ≥ 0.1 miles ≥ 70 kPa ≤ 110 kPa ≥ 10 % ≤ 90 % ≤ 40 °C ≥ 4 °C ≤ 45 °C ≥ 0 hours ≥ 0 hours ********** ≥ 10 volts ********** ≤ 3 MPH 0 ≥ 0 seconds ≥ 0 seconds ≥ 190 % ≤ 200 %	Up to twice per trip, for each required wake-up event 100 msec loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					pressed Service bay test active Device control exceeds No Active DTC's No Active DTC's TFTKO	 0.5 seconds FuelLevelDataFault IAT_SensorFA ECT_Sensor_FA VehicleSpeedSensor_FA AmbientAirDefault VentCircuit_FA ELCPCircuit_FA FTP_SensorCircuit_FA ELCP_PumpCircuit_FA ELCP_SwitchCircuit_FA VICM_WakeupDiag_FA VICM_WakeupDiag_TFTKO LostCommBCM_FA LostCommBusB_VICM_FA CommBusAOff_VICM_FA CommBusBOff_VICM_FA AccCktLo_FA ModuleOffTime_FA P043E P0451 P145C P145D P145E P1462 P2421 P2422 P2450 P24B9		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
EVAP System Small Leak Detected (ELCP Sealed Fuel System)	P0442	A small leak (≥ 0.020") is detected in the EVAP system between the fuel cap, purge solenoid, and diurnal control valve (DCV).The ELCP vacuum pump creates a vacuum across a 0.020" reference orifice. This reference vacuum is then compared to the vacuum level created in the fuel tank to determine if a leak exists.The diagnostic has fast pass capability. If the Fuel Tank Pressure (FTP) sensor measures a fuel tank system pressure greater than 1,276 Pa or a fuel tank system vacuum greater than -1,278 Pa then both the small leak and large leak diagnostics pass without using the ELCP vacuum pump.The Fast Pass Full Test Sequence is conducted on the 0 th consecutive fast pass. All other times, the Fast Pass Reduced Test Sequence is conducted to conserve battery state of charge. The Fast Pass Reduced Test Sequence	If the ELCP pressure sensor (gauge) vacuum reading is less than the 2nd 0.020" reference orifice vacuum measurement for then the fuel tank system has a small leak and the DTC fails.	400 seconds	Propulsion system not active time Distance since assembly plant Drive distance Min baro Max baro Min fuel level Max fuel level ECT Min IAT Max IAT Time since last test when passing P0442/P0455 Time since last test when failing P0442/P0455 ********** ELCP hardware can be powered by battery or powertrain relay. For this application the ELCP hardware is powered by battery Voltage ********** Vehicle speed Vehicle not in assembly plant (value must = 0) Propulsion system not active time Previous propulsion system active time Abort Conditions: Min fuel level slosh Max fuel level slosh Key up during test Refueling request button	4.3 ≤ time ≤ 5.8 hours or 6.0 ≤ time ≤ 8.1 hours or 8.2 ≤ time ≤ 11.0 hours ≥ 9.9 miles ≥ 0.1 miles ≥ 70 kPa ≤ 110 kPa ≥ 10 % ≤ 90 % ≤ 40 °C ≥ 4 °C ≤ 45 °C ≥ 0 hours ≥ 0 hours ********** ≥ 10 volts ********** ≤ 3 MPH 0 ≥ 0 seconds ≥ 0 seconds ≥ 190 % ≤ 200 %	Once per trip, for each required wake-up event 100 msec loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		includes the following diagnostics: ELCP Pump Stuck On (P145D), ELCP Sensor Performance (P1458), FTP Sensor Performance (P0451), DCV Stuck Closed (P2422), DCV Stuck Open (P2421), Small Leak (P0442) and Large Leak (P0455) diagnostics.			pressed Service bay test active Device control exceeds No Active DTC's No Active DTC's TFTKO	 0.5 seconds FuelLevelDataFault IAT_SensorFA ECT_Sensor_FA VehicleSpeedSensor_FA AmbientAirDefault VentCircuit_FA ELCPCircuit_FA FTP_SensorCircuit_FA ELCP_PumpCircuit_FA ELCP_SwitchCircuit_FA VICM_WakeupDiag_FA VICM_WakeupDiag_TFTKO LostCommBCM_FA LostCommBusB_VICM_FA CommBusAOff_VICM_FA CommBusBOff_VICM_FA AccCktLo_FA ModuleOffTime_FA P043E P043F P0451 P145C P145D P145E P145F P1462 P2421 P2422 P2450 P24B9		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Evaporative Emission System Purge Control Valve Open Circuit (ELCP Sealed/ Vented Fuel System)	P0443	Diagnoses the canister purge solenoid low side driver circuit for circuit faults	Voltage low during driver off state (indicates open circuit)	Open circuit: ≥ 200 K Ω impedence between signal and controller ground	Powertrain relay voltage	Voltage ≥ 11.0 volts	20 failures out of 25 samples 250 ms / sample	Type B, 2 Trips Note: In certain controllers P0458 may also set (Canister Purge Solenoid Short to Ground)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Evaporative Emission (EVAP) Vent System Performance Diagnostic (ELCP Sealed Fuel System)	P0446	EVAP vent system restriction is detected	After an initial time delay of if the Fuel Tank Pressure (FTP) sensor indicates a vacuum level is then the fail counter is incremented.	10 seconds, < -3,238 Pa	Min baro Max baro Min OAT Max OAT OAT estimate is valid Engine RPM to enable Engine RPM to re-enable Engine vac to enable Engine vac to re-enable Engine airflow to enable Engine airflow to re-enable Fuel level Purge flow to enable Purge flow to re-enable Purge DC to enable Purge DC to re-enable Requested purge flow to enable Delivered purge flow to re-enable Delivered purge flow to enable Vehicle not in assembly plant (value must = 0) Engine Running Run/Crank Voltage Purge is enabled Abort Conditions: Refueling request button pressed Device control exceeds Passing DTC's No Active DTC's	≥ 70 Pa ≤ 110 kPa ≥ 4 °C ≤ 35 °C 1,400 ≤ RPM ≤ 3,400 1,500 ≤ RPM ≤ 3,300 15 kPa ≤ vac ≤ 56 kPa 16 kPa ≤ vac ≤ 54 kPa 5 gps ≤ airflow ≤ 29 gps 6 gps ≤ airflow ≤ 27 gps ≤ 90 % ≥ 0.17 gps ≥ 0.18 gps ≥ 14.5 % ≥ 15.5 % ≥ 2.94 % ≥ 2.89 % ≥ 2.06 % 0 ≥ 11.0 volts 0.5 seconds P0497 MAP_SensorFA EnginePowerLimited AmbientAirDefault	50 failures out of 63 samples Once per trip when Propulsion System Active and Engine On 100 msec loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						OAT_EstAmbTemp_FA FuelLevelDataFault		
					No Active DTC's TFTKO	P0442 P0443 P0449 P0451 P0452 P0453 P0455 P0458 P0459 P0497 P0498 P0499 P145D P145E P2400 P2401 P2402 P2418 P2419 P2420 P2422 P2450 P24B9 P24BA P24BB		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Evaporative Emission System Vent Solenoid Control Open Circuit (ELCP Sealed Fuel System)	P0449	Diagnoses the vent solenoid low side driver circuit for circuit faults.	Voltage low during driver off state (indicates open circuit)	Open circuit: ≥ 200 K Ω impedence between signal and controller ground			20 failures out of 25 samples 250 ms / sample	Type B, 2 Trips Note: In certain controllers P0498 may also set (Vent Solenoid Short to Ground)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Tank Pressure (FTP) Sensor Circuit Performance Diagnostic (ELCP Sealed Fuel System)	P0451	Fuel Tank Pressure (FTP) sensor correlation diagnostic.	Purge off time After a delay time of and a stabilization time of This section of the diagnostic can both pass and fail IF 1) the FTP sensor reading is and the FTP sensor is in a readable range. OR 2) the ELCP pressure sensor (gauge) reading is and the ELCP pressure sensor indicates that the FTP sensor is in a readable range. THEN If the average difference between the FTP sensor reading and ELCP pressure sensor (gauge) reading is after then a FTP sensor correlation failure has been detected and the DTC fails. This section of the diagnostic can only pass IF 1) the FTP sensor reading	> 5 seconds 2 seconds 3 seconds > -4,010 Pa < 3,587 Pa, > -3,736 Pa < 3,313 Pa, > 1,021 Pa 5 seconds	Propulsion System Not Active Propulsion system not active time Distance since assembly plant Drive distance Min baro Max baro Min fuel level Max fuel level ECT Min IAT Max IAT Time since last test when passing P0442/P0455 Time since last test when failing P0442/P0455 ********** ELCP hardware can be powered by battery or powertrain relay. For this application the ELCP hardware is powered by battery Voltage ********** Vehicle speed Vehicle not in assembly plant (value must = 0) Propulsion system not active time Previous propulsion system active time Abort Conditions: Min fuel level slosh	4.3 ≤ time ≤ 5.8 hours or 6.0 ≤ time ≤ 8.1 hours or 8.2 ≤ time ≤ 11.0 hours ≥ 9.9 miles ≥ 0.1 miles ≥ 70 kPa ≤ 110 kPa ≥ 10 % ≤ 90 % ≤ 40 °C ≥ 4 °C ≤ 45 °C ≥ 0 hours ≥ 0 hours ********** ≥ 10 volts ********** ≤ 3 MPH 0 ≥ 0 seconds ≥ 0 seconds ≥ 190 %	Once per trip with Propulsion System Not Active, for each required wake-up event Once per trip with Propulsion System Active and Engine On 100 msec loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			is	< -4,010 Pa	Max fuel level slosh	≤ 200 %		
			and	> 3,587 Pa,	Key up during test			
			the FTP sensor is outside its readable range.		Refueling request button pressed			
			AND		Service bay test active			
			2) the ELCP pressure		Device control exceeds	0.5 seconds		
			sensor (gauge) reading is	< -3,736 Pa				
			and	> 3,313 Pa,	No Active DTC's	FuelLevelDataFault IAT_SensorFA ECT_Sensor_FA VehicleSpeedSensor_FA AmbientAirDefault VentCircuit_FA ELCPCircuit_FA FTP_SensorCircuit_FA ELCP_PumpCircuit_FA ELCP_SwitchCircuit_FA VICM_WakeupDiag_FA VICM_WakeupDiag_TFTKO LostCommBCM_FA LostCommBusB_VICM_FA CommBusAOff_VICM_FA CommBusBOff_VICM_FA AccCktLo_FA ModuleOffTime_FA		
			the ELCP pressure sensor indicates that the FTP sensor is outside its readable range.					
			THEN					
			after	5 seconds				
			the correlation is confirmed and the DTC passes.					
					No Active DTC's TFTKO	P145D P24B9		
					Propulsion System Active and Engine On			
					Min baro	≥ 70 kPa		
					Max baro	≤ 110 kPa		
					Min OAT	≥ 4 °C		
					Max OAT	≤ 35 °C		
					OAT estimate is valid			
					Vehicle not in assembly plant (value must = 0)	0		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Engine Running Run/Crank Voltage	≥ 11.0 volts		
					Purge is not enabled			
					**********	**********		
					When FTP sensor is located in the fuel tank then additional conditions	Section does not apply		
					Fuel Level	≤ 90.0 %		
					No Active DTC's	FuelLevelDataFault		
					**********	**********		
					Abort Conditions: Refueling request button pressed			
					Device control exceeds	0.5 seconds		
					No Active DTC's	MAP_SensorFA EnginePowerLimited AmbientAirDefault OAT_EstAmbTemp_FA		
					No Active DTC's TFTKO	P0442 P0443 P0449 P0452 P0453 P0455 P0458 P0459 P0498 P0499 P145D P145E P2400 P2401 P2402		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						P2418 P2419 P2420 P2422 P2450 P24B9 P24BA P24BB		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Tank Pressure (FTP) Sensor Circuit Low Voltage (ELCP Sealed/ Vented Fuel System)	P0452	This DTC will detect a Fuel Tank Pressure (FTP) sensor signal that is too low out of range.	FTP sensor signal The normal operating range of the FTP sensor is 0.5 volts (~ -3757 Pa) to 4.5 volts (~ 3329 Pa).	< 0.15 volts (3.0 % of Vref or ~ -4,377 Pa)			640 failures out of 800 samples 12.5 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Tank Pressure (FTP) Sensor Circuit High Voltage (ELCP Sealed/ Vented Fuel System)	P0453	This DTC will detect a Fuel Tank Pressure (FTP) sensor signal that is too high out of range.	FTP sensor signal The normal operating range of the FTP sensor is 0.5 volts (~ -3757 Pa) to 4.5 volts (~ 3329 Pa).	> 4.85 volts (97.0 % of Vref or ~ 3,950 Pa)			640 failures out of 800 samples 12.5 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
EVAP System Large Leak Detected (ELCP Sealed Fuel System)	P0455	A large leak (>> 0.020") is detected in the EVAP system between the fuel cap, purge solenoid, and diurnal control valve (DCV) after a refueling event has been detected.The ELCP vacuum pump creates a vacuum across a 0.020" reference orifice. This reference vacuum is then compared to the vacuum level created in the fuel tank to determine if a leak exists.The diagnostic has fast pass capability. If the Fuel Tank Pressure (FTP) sensor measures a fuel tank system pressure greater than 1,276 Pa or a fuel tank system vacuum greater than -1,278 Pa then both the small leak and large leak diagnostics pass without using the ELCP vacuum pump.The Fast Pass Full Test Sequence is conducted on the 0 th consecutive fast pass. All other times, the Fast Pass Reduced Test Sequence is conducted to conserve battery state of charge. The Fast Pass Reduced	After a refueling event has been detected and the small/large leak diagnostics have not passed. A refueling event is detected when there is a fuel level increase ≥ 10 % for ≥ 5 seconds. If the ELCP pressure sensor (gauge) vacuum reading is less than the 2nd 0.020" reference orifice vacuum measurement times a for then the fuel tank system has a large leak and the DTC fails.	0.20 multiplier 400 seconds	Propulsion system not active time Distance since assembly plant Drive distance Min baro Max baro Min fuel level Max fuel level ECT Min IAT Max IAT Time since last test when passing P0442/P0455 Time since last test when failing P0442/P0455 ********** ELCP hardware can be powered by battery or powertrain relay. For this application the ELCP hardware is powered by battery Voltage ********** Vehicle speed Vehicle not in assembly plant (value must = 0) Propulsion system not active time Previous propulsion system active time Refueling request active true Abort Conditions: Min fuel level slosh	4.3 ≤ time ≤ 5.8 hours or 6.0 ≤ time ≤ 8.1 hours or 8.2 ≤ time ≤ 11.0 hours ≥ 9.9 miles ≥ 0.1 miles ≥ 70 kPa ≤ 110 kPa ≥ 10 % ≤ 90 % ≤ 40 °C ≥ 4 °C ≤ 45 °C ≥ 0 hours ≥ 0 hours ********** ≥ 10 volts ********** ≤ 3 MPH 0 ≥ 0 seconds ≥ 0 seconds ≥ 190 %	Once per trip after a refueling event has been detected, for each required wake-up event 100 msec loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		Test Sequence includes the following diagnostics: ELCP Pump Stuck On (P145D), ELCP Sensor Performance (P1458), FTP Sensor Performance (P0451), DCV Stuck Closed (P2422), DCV Stuck Open (P2421), Small Leak (P0442) and Large Leak (P0455) diagnostics.			Max fuel level slosh Key up during test Refueling request button pressed Service bay test active Device control exceeds No Active DTC's No Active DTC's TFTKO	≤ 200 % 0.5 seconds FuelLevelDataFault IAT_SensorFA ECT_Sensor_FA VehicleSpeedSensor_FA AmbientAirDefault VentCircuit_FA ELCPCircuit_FA FTP_SensorCircuit_FA ELCP_PumpCircuit_FA ELCP_SwitchCircuit_FA VICM_WakeupDiag_FA VICM_WakeupDiag_TFTKO LostCommBCM_FA LostCommBusB_VICM_FA CommBusAOff_VICM_FA CommBusBOff_VICM_FA AccCktLo_FA ModuleOffTime_FA P043E P043F P0451 P145C P145D P145E P145F P1462 P2421 P2422 P2450 P24B9		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Evaporative Emission System Purge Control Valve Circuit Low (ELCP Sealed/ Vented Fuel System)	P0458	Diagnoses the canister purge solenoid low side driver circuit for circuit faults	Voltage low during driver off state (indicates short to ground)	Short to ground: ≤ 0.5 Ω impedence between signal and controller ground	Powertrain relay voltage	Voltage ≥ 11.0 volts	20 failures out of 25 samples 250 ms / sample	Type B, 2 Trips Note: In certain controllers P0443 may also set (Canister Purge Solenoid Open Circuit)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Evaporative Emission System Purge Control Valve Circuit High (ELCP Sealed/ Vented Fuel System)	P0459	This DTC checks for short to high voltage circuit failures during operation.	Voltage high during driver on state (indicates short to power)	Short to power: ≤ 0.5 Ω impedence between signal and controller power	Powertrain relay voltage	Voltage ≥ 11.0 volts	20 failures out of 25 samples 250 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Level Sensor 1 Performance (For use on vehicles with a single fuel tank)	P0461	This DTC will detect a fuel sender stuck in range in the primary fuel tank.	Delta fuel volume change over 15.7 liters of fuel consumed by the engine.	< 3 liters	Engine Running No active DTCs:	VehicleSpeedSensor_FA	250 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 %			100 failures out of 125 samples 100 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Level Sensor 1 Circuit High Voltage	P0463	This DTC will detect a fuel sender stuck out of range high in the primary fuel tank.	Fuel level Sender % of 5V range	> 60 %			100 failures out of 125 samples 100 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
EGR Solenoid Circuit Low	P0489	This DTC checks the EGR circuit for electrical shorts to ground	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.	< 0.15 volts (3.0 % of Vref (5V)	System supply voltage Output driver is commanded on Ignition switch is in crank or run position	> 11.00 Volts	100.00 failures out of 120.00 samples250 ms / sample, continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
EGR Solenoid Circuit High	P0490	This DTC checks the EGR circuit for electrical shorts to high voltage	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.	> 4.85 volts (97.0% of Vref (5 V)	System supply voltage Output driver is commanded on Ignition switch is in crank or run position	> 11.00 Volts	100.00 failures out of 120.00 samples 250 ms /sample, continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Evaporative Emission System Low Purge Flow Diagnostic (ELCP Sealed Fuel System)	P0497	Low purge flow is detected	After an initial time delay of when the Fuel Tank Pressure (FTP) sensor reading is or after an initial time delay of when the FTP sensor reading is plus an ELCP switching valve delay time of if the ELCP pressure sensor (gauge) indicates a vacuum change for then a low purge flow failure has been detected and the DTC fails.	3 seconds ≥ 299 Pa 3 seconds < 299 Pa 0.2 seconds, < 2,000 Pa 20 seconds	Min baro Max baro Min OAT Max OAT OAT estimate is valid Engine RPM to enable Engine RPM to re-enable Engine vac to enable Engine vac to re-enable Engine airflow to enable Engine airflow to re-enable Fuel level Purge flow to enable Purge flow to re-enable Purge DC to enable Purge DC to re-enable Requested purge flow to enable Delivered purge flow to re-enable Delivered purge flow to enable Vehicle not in assembly plant (value must = 0) Engine Running Run/Crank Voltage Purge is enabled Abort Conditions: Refueling request button pressed Device control exceeds No Active DTC's	≥ 70 kPa ≤ 110 kPa ≥ 4 °C ≤ 35 °C 1,400 ≤ RPM ≤ 3,400 1,500 ≤ RPM ≤ 3,300 15 kPa ≤ vac ≤ 56 kPa 16 kPa ≤ vac ≤ 54 kPa 5 gps ≤ airflow ≤ 29 gps 6 gps ≤ airflow ≤ 27 gps ≤ 90 % ≥ 0.17 gps ≥ 0.18 gps ≥ 14.5 % ≥ 15.5 % ≥ 2.94 % ≥ 2.89 % ≥ 2.06 % 0 ≥ 11.0 volts 0.5 seconds MAP_SensorFA EnginePowerLimited AmbientAirDefault OAT_EstAmbTemp_FA	Once per trip with Propulsion System Active and Engine On 100 msec loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					No Active DTC's TFTKO	FuelLevelDataFault P0442 P0443 P0449 P0451 P0452 P0453 P0455 P0458 P0459 P0498 P0499 P145D P145E P2400 P2401 P2402 P2418 P2419 P2420 P2422 P2450 P24B9 P24BA P24BB		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Evaporative Emission System Vent Solenoid Control Circuit Low (ELCP Sealed Fuel System)	P0498	Diagnoses the vent solenoid low side driver circuit for circuit faults.	Voltage low during driver off state (indicates short to ground)	Short to ground: ≤ 0.5 Ω impedence between signal and controller ground			20 failures out of 25 samples 250 ms / sample	Type B, 2 Trips Note: In certain controllers P0449 may also set (Vent Solenoid Open Circuit)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Evaporative Emission System Vent Solenoid Control Circuit High (ELCP Sealed Fuel System)	P0499	Diagnoses the vent solenoid low side driver circuit for circuit faults. If the P0499 is active, an intrusive test is performed with the vent solenoid commanded closed for 15 seconds.	Voltage high during driver on state (indicates short to power)	Short to power: ≤ 0.5 Ω impedence between signal and controller power			20 failures out of 25 samples 250 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cold Start Rough Idle	P050D	Monitors the combustion performance when the cold start emission reduction strategy is active by accumulating and determining the percentage of engine cycles that have less than complete combustion relative to the total number of engine cycles in which Dual Pulse is active.	Deceleration index vs. Engine Speed Vs Engine load Deceleration index calculation is tailored to specific vehicle. 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. Incomplete combustion identified by P0300 threshold tables:	(>Idle SCD AND >Idle SCD ddt Tables) OR (>Idle Cyl Mode AND > Idle Cyl Mode ddt Tables)	Misfire Algorithm Enabled (Refer to P0300 for Enablement Requirements) OBD Manufacturer Enable Counter To enable the diagnostic, the Cold Start Emission Reduction Strategy Must Be Active per the following: Catalyst Temperature AND Engine Coolant AND Engine Coolant AND Barometric Pressure In addition, Dual Pulse Strategy Is Enabled and Active Per the following: Engine Speed Accel Position Engine Run Time For the engine speeds and loads in which Dual Pulse is active:	= 0 < 350.00 degC > -15.00 degC <= 56.00 degC >= 76.00 KPa >= 450.00 RPM <= 2,200.00 RPM <= 110.00 Pct < 30 seconds	Runs once per trip when the cold start emission reduction strategy is active and Dual Pulse is enabled and active. Frequency: 100ms Test completes after Dual Pulse is no longer active OR The first 500 engine cycles have been reached	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Dual Pulse Error induced misfires percentage	>= catalyst damaging misfire		
					Dual Pulse Error induced misfires percentage	< 90% of the maximum achieveable catalyst damaging misfire.		
					Engine Cycles	>= 50 < 501		
					The Cold Start Emission Reduction strategy must not be exiting. The strategy will exit per the following:			
					Catalyst Temperature AND Engine Run Time	>= 900.00 degC >= 30.00 seconds		
					OR Engine Run Time	 > **P050D_P1400_CatalystLightOffExtendedEngineRunTimeExit** This Extended Engine run time exit table is a function of percent ethanol and Catmons NormRatioEWMA. Refer to "Supporting Tables" for details.		
					OR Barometric Pressure	 < 76.00 KPa		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Dual Pulse Strategy will exit per the following:			
					Engine Speed OR Accel Position	> 2,400.00 RPM > 110.00 Pct		
					Engine Run Time	>= 30 seconds		
					Dual Pulse Strategy will also exit if the any of the "Additional Dual Pulse Enabling Criteria" is not satisfied:			
					"Additional Dual Pulse Enabling Criteria":			
					Green Engine Enrichment	Not Enabled		
					Misfire Converter Protection strategy	Not being requested		
					Engine Metal Overtemp strategy	Not being requested		
					Fuel control state	Open Loop		
					Output State Control	Not being requested for fuel		
					DOD Or DFCO	Not Active		
					Power Enrichment	Not Active		
					Dynamic Power Enrichment	Not Active		
					Piston Protection	Not Active		
					Hot Coolant Enrichment	Not Active		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Injector Flow Test General Enable DTC's Not Set:	Not Active AcceleratorPedalFailure ECT_Sensor_FA IAT_SensorCircuitFA MnfdTempSensorCktFA CrankSensor_FA FuelInjectorCircuit_FA MAF_SensorFA MAP_SensorFA AnyCamPhaser_TFTKO ClutchPstnSnsr FA IAC_SystemRPM_FA IgnitionOutputDriver_FA TPS_FA VehicleSpeedSensor_FA FuelInjectorCircuit_TFTKO FHPR_b_FRP_SnsrCkt_FA FHPR_b_FRP_SnsrCkt_TFTKO FHPR_b_PumpCkt_FA FHPR_b_PumpCkt_TFTKO TransmissionEngagedState_FA EngineTorqueEstInaccurate FuelPumpRlyCktFA		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Oil Pressure (EOP) Sensor Performance - Two Stage Oil Pump	P0521	Determines if the Engine Oil Pressure (EOP) Sensor is stuck or biased in range. The engine oil pressure is compared against thresholds when engine is running and when engine is off.	**Two Stage Oil Pump EOP Sensor Test with Engine Running** If enabled: <u>To Fail when previously passing with the engine running:</u> Filtered Engine Oil Pressure below expected threshold OR Filtered Engine Oil Pressure above expected threshold <u>To pass when previously failing:</u> Filtered Engine Oil Pressure above low threshold plus an offset OR	 Filtered Oil Pressure < **P0521_LowMinOilPresFail - Two Stage Oil Pump** OR Filtered Oil Pressure > (**P0521_P06DD_P06DE_OP_HiStatePressure** * 1.25 + 75.0 kPa) Filtered Oil Pressure > (10.0 kPa+ **P0521_LowMinOilPresFail - Two Stage Oil Pump**) OR	Two Stage Oil Pump is Present = TRUE Engine Running Diagnostic Status Engine Off Rationality Test Diagnostic Reporting Status Oil Pressure Sensor In Use Engine Running Ambient Air Pressure Oil Aeration (= TRUE if engine speed > 10,000 RPM for longer than 30.0 seconds) Filtered Engine Speed within range Modelled Oil Temperature within range No active DTC's	TRUE Enabled Test not report a fail state Yes ≥ 10.0 seconds ≥ 70.0 kPa FALSE 1,000 RPM ≤ Filtered Engine Speed ≤ 4,500 RPM 40.0 deg C ≤ Oil Temp ≤ 120.0 deg C Fault bundles: MAF_SensorFA ECT_Sensor_FA IAT_SensorFA EngOilPressureSensorCktFA AmbientAirDefault EngOilTempFA CrankSensor_FA	 ≥ 40 errors out of 50 samples. Performed every 100 msec ≥ 10 passes out of 50 samples. Performed every 100 msec	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Filtered Engine Oil Pressure below high threshold minus an offset	Filtered Oil Pressure < (**P0521_P06DD_P06DE_OP_HiStatePressure** * 1.25 + 75.0 kPa) - 10.0 kPa (Details on Supporting Tables Tab: **P0521_LowMinOilPresFail - Two Stage Oil Pump P0521_P06DD_P06DE_OP_HiStatePressure**)				
			Two Stage Oil Pump EOP Sensor Test with Engine Off If enabled: <u>To Fail when previously passing with the engine off:</u> Filtered Engine Oil Pressure greater than threshold	 Filtered Oil Pressure ≥ 40.0 kPa	Two Stage Oil Pump is Present = TRUE Engine Off Rationality Test Diagnostic Status Engine Running Rationality Test Diagnostic Status Modelled Oil Temperature No Engine Movement No active DTC's	TRUE Enabled Test not report a fail state ≥ 70.0 deg C > 10.0 seconds EngineModeNotRunTimer_FA EngOilTempFA EngOilPressureSensorCktFA CrankSensor_FA	≥ 20 errors out of 40 samples. Run once per trip	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Oil Pressure (EOP) Sensor Circuit Low Voltage	P0522	Determines if the Engine Oil Pressure (EOP) Sensor circuit voltage is too low	(Engine Oil Pressure Sensor Circuit Voltage) ÷ 5 Volts) *100	< 5.00 percent	Engine Speed Enable Engine Speed Disable Oil Pressure Sensor In Use Diagnostic Status	> 400 rpm < 350 rpm Yes Enabled	800 failures out of 1,000 samples Performed every 6.25 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Oil Pressure (EOP) Sensor Circuit High Voltage	P0523	Determines if the Engine Oil Pressure (EOP) Sensor circuit voltage is too high	(Engine Oil Pressure Sensor Circuit Voltage) ÷ 5 Volts) *100	> 95.00 percent	Oil Pressure Sensor In Use Diagnostic Status	Yes Enabled	800 failures out of 1,000 samples Performed every 6.25 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Air Conditioning High Side Pressure Sensor (HSPS) Circuit Low Voltage	P0532	Determines if the Air Conditioning High Side Pressure Sensor circuit voltage is too low	(AC High Side Pressure Sensor Circuit Voltage) ÷ 5 Volts) *100	< 3 percent	AC HSP Sensor Present Diagnostic Status	Yes Enabled	80 failures out of 100 samples Performed every 25 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Air Conditioning High Side Pressure Sensor (HSPS) Circuit High Voltage	P0533	Determines if the Air Conditioning High Side Pressure Sensor circuit voltage is too high	(AC High Side Pressure Sensor Circuit Voltage) ÷ 5 Volts) *100	> 94 percent	AC HSP Sensor Present Diagnostic Status	Yes Enabled	80 failures out of 100 samples Performed every 25 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
System Voltage Performance	P0561	Diagnoses the 12V battery system performance	Run Crank voltage low and high	ABS(Battery voltage - Run Crank voltage) > 3.00	Battery voltage B+ line present = TRUE Battery voltage low and high diag enable = TRUE Run Crank voltage	1.00 1.00 Voltage ≥ 5.00 volts	50 failures out of 63 samples 100 ms / sample	Type C, No SVS

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
System Voltage Low	P0562	Diagnoses the 12V battery system low	System voltage low	Battery voltage <= 9.00	System voltage low diag enable = TRUE Run Crank voltage Engine speed >=	1.00 Voltage ≥ 5.00 volts 400.00	400 failures out of 500 samples 12.5 ms / sample	Type C, No SVS

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
System Voltage High	P0563	Diagnoses the 12V battery system high	System voltage high	Battery voltage >= 18.00	System voltage high diag enable = TRUE Run Crank voltage	1.00 Voltage ≥ 5.00 volts	400 failures out of 500 samples 12.5 ms / sample	Type C, No SVS

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cruise Control Mutil-Functon Switch Circuit	P0564	Detect when cruise control multi-function switch circuit (analog) voltage is in an invalid range	Cruise Control analog circuit voltage must be "between ranges" for greater than a calibratable period of time.	The cruise control analog voltage A/D count ratio is considerred to be "between ranges" when the ratio is measured in the following ranges: 0.28 -0.31, 0.415-0.445, 0.585 - 0.615 0.78 - 0.81, 1.005 - 1.035	CAN cruise switch diagnostic enable in ECM	1.00	fail continuously for greater than 0.500 seconds	Type C, No SVS , special type C

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cruise Control On Switch Circuit	P0565	Detects a failure of the cruise on/off switch in a continously applied state	Cruise Control On switch remains applied for greater than a calibratable period of time.	fail continuously in the applied state for greater than 20.00 seconds	CAN cruise switch diagnostic enable in ECM	1.00	fail continuously for greater than 20.00 seconds	Type C, No SVS , special type C

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cruise Control Resume Circuit	P0567	Detects a failure of the cruise resume switch in a continously applied state	Cruise Control Resume switch remains applied for greater than a calibratable period of time.	fail continuously in the applied state for greater than 89.000 seconds	CAN cruise switch diagnostic enable in ECM	1.00	fail continuously for greater than 89.000 seconds	Type C, No SVS , special type C

Component/ System	Fault Code	Monitor 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.	fail continuously in the applied state for greater than 89.000 seconds	CAN cruise switch diagnostic enable in ECM	1.00	fail continuously for greater than 89.000 seconds	Type C, No SVS , special type C

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cruise Control Cancel Switch Circuit	P056C		Cruise Control Cancel switch remains applied for greater than a calibratable period of time.	fail continously in the applied state for greater than 20.00 seconds	CAN cruise switch diagnostic enable in ECM	1.00	fail continuously for greater than 20.00 seconds	Type C, No SVS , special type C

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cruise Control Input Circuit	P0575	Determines if cruise switch state received from the BCM is valid.	If x of y rolling count / protection value faults occur, disable cruise for duration of fault	Message <> 2's complement of message Message rollling count<>previous message rolling count value plus one	Cruise Control Switch Serial Data Error Diagnostic Enable Serial communication to BCM Power Mode Engine Running	1.00 No loss of communication = RUN = TRUE	10 failures out of / 16 samples Performed on every received message 10 rolling count failures out of / 16 samples Performed on every received messagw	Type C, No SVS , special type C

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Brake Pedal Position Sensor Circuit Range/ Performance	P057B	This diagnostic monitors the Brake Pedal Position Sensor for a stuck in range failure	.		Brake Pedal Position Sensor Circuit Range / Performance Diagnostic Enable	1.00 ignition voltage > 10.00		MIL: Type A, 1 Trips
			Calculated EWMA value must be greater than calibratable theshold after calibratable number of tests have completed to report a "test passed" for P057B	EWMA value looked up in supporting table **P057B KtBRKI_K_FastTestPointWeight** P057B as a function of calculated brake pedal position delta EWMA value is > 0.80	calculated brake pedal position delta sample counter > 50.00 for fast test OR calculated brake pedal position delta sample counter > 1,000.00 for slow test	calculated brake pedal position delta > 5.00 OR (for slow test) shift lever has been in park once this key cycle vehicle speed >= 5.00 accelerator pedal position < 5.00	total number of EWMA tests > 20.00	
			Calculated EWMA Value must be less than calibratable threshold after calibratable number of tests have completed to report a "test failed" for P057B. This test runs once per key cycle	EWMA value looked up in supporting table **P057B KtBRKI_K_CmpltTestPointWeight** P057B as a function of calculated brake pedal position delta EWMA value is less thatn 0.40	no DTC's active (P057C, P057D)	shift lever has been in park once this key cycle vehicle speed >= 5.00 accelerator pedal position < 5.00	total number of EWMA tests > 2.00	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Brake Pedal Position Sensor Circuit Low	P057C	detects short to ground for brake pedal position sensor	If x of y samples are observed below failure threshold, default brake pedal position to zero percent.	5.00	Brake Pedal Position Sensore Low Voltage Diagnostic Enable	1.00	20 / 32.00 counts	MIL: Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Brake Pedal Position Sensor Circuit High	P057D	detects open circuit for brake pedal position sensor	If x of y samples are observed above failure threshold, default brake pedal position to zero percent and set DTC	95.00	Brake Pedal Position Sensore High Voltage Diagnostic Enable	1.00	20.00 / 32.00 counts	MIL: Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Brake Pedal Position Sensor Circuit Intermittent/ Erratic	P057E	detects noisy / erratic ouput for brake pedal position sensor	If x of y samples are observed above failure threshold, default brake pedal position to zero percent and set DTC	5.00	Brake Pedal Position Sensor Circuit Intermittent / Erratic Diagnostic Enable	1.00	10.00 / 16.00 counts	MIL: Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cruise Control Multi-function Circuit Low Voltage	P0580	detects short to ground failure for cruise multi-function switch circuit	Cruise Control analog circuit voltage must be in an "Open Short To Ground" range for greater than a calibratable period of time.	The cruise control analog voltage A/D count ratio is considerred to be "open short to ground when the ratio is measured in the following rangs: 0 - 0.185	CAN cruise switch diagnostic enable in ECM	1.00	fail continuously for greater than 2.00 seconds	Type C, No SVS , special type C

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cruise Control Multi-function Circuit High Voltage	P0581		Cruise Control analog circuit voltage must be in "Short To Power" range for greater than a calibratable period of time.	The cruise control analog voltage A/D count ratio is considered to be "short to power" when the ratio is measured in the following range: 1.005 - 1.035	CAN cruise switch diagnostic enable in ECM	1.00	fail continuously for greater than 2.00 seconds	Type C, No SVS , special type C

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Thermostat Heater Control Open Circuit	P0597	Diagnoses the T-stat Heater low side driver circuit for circuit faults.	Voltage low during driver off state (indicates open circuit)	Open Circuit: ≥ 200 K Ω impedance between signal and controller ground.	Run Crank Ignition in Range Engine not cranking Run Crank active == Above is true and == Last Open Circuit Test	 = True = True = True ========== = not Indeterminate	5 failures out of 6 samples 1 sec/ sample Continuous	Type B, 2 Trips Note: In certian controllers P0598 may also set

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Thermostat Heater Control Circuit Low	P0598	Diagnoses the T-stat Heater low side driver circuit for circuit faults.	Voltage low during driver off state (indicates short-to-ground)	Short to ground: ≤ 0.5 Ω impedance between signal and controller ground	Run Crank Ignition in Range Engine not cranking Run Crank active == Above is true and == Last Ground Short Circuit Test	 = True = True = True ========== = not Indeterminate	5 failures out of 6 samples 1 sec/ sample Continuous	Type B, 2 Trips Note: In certian controllers P0597 may also set

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Thermostat Heater Control Circuit High	P0599	Diagnoses the T-stat Heater low side driver circuit for circuit faults.	Voltage high during driver on state (indicates short to power)	Short to power: ≤ 0.5 Ω impedance between signal and controller power.	Run Crank Ignition in Range Engine not cranking Run Crank active == Above is true and == Last Power Short Circuit Test	 = True = True = True ========== = not Indeterminate	5 failures out of 6 samples 1 sec/ sample Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Active Grill Air Shutter A Performance /Stuck OFF	P059F	Compare commanded shutter A position to sensed position	Consecutive failed intrusive position performance test count	>= 5.00	1. Ignition Run_Crack Active, 2. Ignition Run_Crank AND Ignition Accessory AND ECU Awake, 3. Command Shutter1 Enable	1. = TRUE, 2. = FALSE AND = FALSE AND = TRUE, 3. = TRUE	1 sample / 100 millisec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Not Programmed	P0602	Checks a calibration value to determine if the ECU needs to be programmed because it is a service part.	Service (reflash) controller calibration present	= 1		none	Diagnostic runs at powerup and once per second continuously after that	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
ECM Long Term Memory Reset	P0603	This DTC detects an invalid NVM.	Static NVM region error detected during initialization				Diagnostic runs at controller power up.	Type A, 1 Trips
			Perserved NVM region error detected during initialization				Diagnostic runs at controller power up.	
			ECC ROM fault detected in NVM Flash region ECC ROM Error Count >	 3			Diagnostic runs at controller power up.	
			Perserved NVM region error detected during shut down.				Diagnostic runs at controller power down.	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Relay Control Circuit Open	P0627	Diagnoses the fuel pump relay control high side driver circuit for circuit faults	Voltage high during driver off state (indicates open circuit)	Open circuit: ≥ 200 K Ω impedance between signal and controller ground	Run/Crank Voltage Engine Speed	Voltage ≥ 11.00 volts ≥ 0 RPM	8 failures out of 10 samples 250 ms / sample	Type B, 2 Trips Note: In certain controllers P0629 may also set (Fuel Pump Relay Control Short to Power)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Relay Control Circuit Low Voltage	P0628	Diagnoses the fuel pump relay control high side driver circuit for circuit faults	Voltage low during driver on state (indicates short to ground)	Short to ground: ≤ 0.5 Ω impedance between signal and controller ground	Run/Crank Voltage Engine Speed	Voltage ≥ 11.00 volts ≥ 0 RPM	8 failures out of 10 samples 250 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Relay Control Circuit High Voltage	P0629	Diagnoses the fuel pump relay control high side driver circuit for circuit faults	Voltage high during driver off state (indicates short to power)	Short to power: ≤ 0.5 Ω impedance between signal and controller power	Run/Crank Voltage Engine Speed	Voltage ≥ 11.00 volts ≥ 0 RPM	8 failures out of 10 samples 250 ms / sample	Type B, 2 Trips Note: In certain controllers P0627 may also set (Fuel Pump Relay Control Open Circuit)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Internal Control Module Fuel Injector Control Performance	P062B	This DTC determines the internal fuel injctor control module circuit is faulted. The faulted status is set on any failure that could potentially damage the drivers or injectors, or could result in uncontrolled fueling. The following general classes of failures shall be covered: Communication error with control circuit Internal corruption of control circuit values, Invalid interface values (from control circuit)	Internal ECU Boost Voltage OR Internal ECU Boost Voltage OR Driver Status OR Driver Status	>= 90 Volts <= 40 Volts = Not Ready = Uninitialized	Battery Voltage	>= 8 or >= 11 Enabled when a code clear is not active or not exiting device control Engine is not cranking Powertrain Relay Voltage within range	High Voltage - 160 failures out of 200 samples Low Voltage - 160 failures out of 200 samples Driver Status Not Ready- 160 failures out of 200 samples Driver Status Uninitialized - Uninitialized state for >= 100 counts All at 12.5ms per sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Powertrain Internal Control Module EEPROM Error	P062F	This DTC detects a NVM long term performance.	HWIO reports that writing to NVM (at shutdown) will not succeed				Diagnostic runs at controller power up.	Type B, 2 Trips
			HWIO reports the assembly calibration integrity check has failed				Diagnostic runs at controller power up.	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
VIN Not Programmed or Mismatched - Engine Control Module (ECM)	P0630	Determine whether the vehicle VIN has been written to long term memory.	At least one of the programmed VIN digits	= 00 or FF	OBD Manufacturer Enable Counter	= 0	250 ms / test Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Malfunction Indicator Lamp (MIL) Control Circuit (ODM) Open	P0650	Diagnoses the malfunction indicator lamp control low side driver circuit for circuit faults.	Voltage low during driver off state (indicates open circuit)	Open circuit: ≥ 200 K Ω impedance between signal and controller ground	Run/Crank Voltage Remote Vehicle Start is not active	Voltage ≥ 11.00 volts	1 failures out of 1 samples 50 ms / sample	Type B, No MIL NO MIL Note: In certain controllers P263A may also set (MIL Control Short to Ground)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Powertrain Relay Control (ODM) Open	P0685	Diagnoses the powertrain relay control low side driver circuit for circuit faults	Voltage low during driver off state (indicates open circuit)	Open Circuit: ≥ 200 K Ω ohms impedance between signal and controller ground	Run/Crank Voltage	Voltage ≥ 11.00 volts	8 failures out of 10 samples 250 ms / sample	Type B, 2 Trips Note: In certain controllers P0686 may also set (Powertrain Relay Control Short to Ground).

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Powertrain Relay Control (ODM) Low	P0686	Diagnoses the powertrain relay control low side driver circuit for circuit faults	Voltage low during driver off state (indicates short-to-ground)	Short to ground: ≤ 0.5 Ω impedance between signal and controller ground	Run/Crank Voltage	Voltage ≥ 11.00 volts	8 failures out of 10 samples 250 ms / sample	Type B, 2 Trips Note: In certain controllers P0685 may also set (Powertrain Relay Control Open Circuit).

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Powertrain Relay Control (ODM) High	P0687	Diagnoses the powertrain relay control low side driver circuit for circuit faults	Voltage high during driver on state (indicates short to power)	Short to power: ≤ 0.5 Ω impedance between signal and controller power	Run/Crank Voltage	Voltage ≥ 11.00 volts	8 failures out of 10 samples 250 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Power Relay Feedback Circuit Low Voltage	P0689	Diagnoses control module relay feedback circuit low voltage	Control module relay feedback circuit low voltage	Powertrain relay voltage <= 5.00	Powertrain relay short low diagnostic enable Run Crank voltage Powertrain relay state	= 1.00 > 9.00 = ON	5 failures out of 6 samples 1000 ms / sample	Type C, No SVS

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Powertrain Relay Feedback Circuit High	P0690	This DTC is a check to determine if the Powertrain relay is functioning properly.	Powertrain Relay Voltage	>= 4.00 volts will increment the fail counter	Powertrain relay commanded “OFF” No active DTCs:	>= 2.00 seconds PowertrainRelayStateOn_FA	50 failures out of 63 samples 100ms / Sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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	FFT Diagnostic Output	**> P06B6_P06B7_OpenTestCktThrshMin** **AND** **< P06B6_P06B7_OpenTestCktThrshMax** **See Supporting Tables**	Diagnostic Enabled? Engine Run Time Engine Speed Cumlative Number of Engine Revs (per key cycle) within min/max Engine Speed enable (above) Engine Air Flow	Yes ≥ 2.0 seconds > 1,000 RPM and < 4,650 RPM ≥ 200 Revs ≥ 40 mg/cylinder and ≤ 2,000 mg/cylinder	First Order Lag Filter with Weight Coefficient Weight Coefficient = 0.0100 Updated each engine event	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
5 Volt Reference #5 Circuit	P06D2	Detects a continuous or intermittent short on the 5 volt reference circuit #5 by monitoring the reference voltage and failing the diagnostic when the voltage is too low or too high or if the delta between the filtered voltage and non-filtered voltage is too large. This diagnostic only runs when battery voltage is high enough.	ECM Vref5 < or ECM Vref5 > or the difference between ECM filtered Vref5 and Vref5 >	4.875 5.125 0.0495		Run/Crank voltage > 6.41	19 / 39 counts or 0.1875 sec continuous; 12.5 ms/count in main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Two Stage Oil Pump Control Circuit Open	P06DA	Diagnoses the two stage oil pump low side driver for open circuit fault	Voltage low during driver off state (indicates an open circuit)	Open Circuit ≥ 200 k Ω impedance between signal and controller ground	Diagnostic Status Powertrain Relay Voltage Run/Crank Active Cranking State	Enabled ≥ 11.00 = True = False	>= 40 errors out of 50 samples. Performed every 100 msec	Type B, 2 Trips Note: In certain controllers P06DB may also set (Two Stage Oil Pump Control Circuit Short To Ground)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Two Stage Oil Pump Control Circuit Short To Ground	P06DB	Diagnoses the two stage oil pump low side driver for Short to Ground circuit fault. This is standard GM Short to Ground diagnostic. If the circuit is short to ground, the error counter increments. Once the error counter reaches the calibrated threshold, the fault condition is met.	Voltage low during driver off state (indicates an short circuit to Ground)	Short to Ground Circuit ≤ 0.5 Ω impedance between signal and controller ground	Diagnostic Status Powertrain Relay Voltage Run/Crank Active Cranking State	Enabled ≥ 11.00 = True = False	>= 40 errors out of 50 samples. Performed every 100 msec	Type A, 1 Trips Note: In certain controllers P06DA may also set (Two Stage Oil Pump Control Circuit Open)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Two Stage Oil Pump Control Circuit Short To Power	P06DC	Diagnoses the two stage oil pump low side driver for Short to Power circuit fault	Voltage low during driver on state (indicates an short to power)	Short to Power ≤ 0.5 Ω impedance between signal and controller power	Diagnostic Status Powertrain Relay Voltage Run/Crank Active Cranking State	Enabled ≥ 11.00 = True = False	>= 40 errors out of 50 samples. Performed every 100 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Two Stage Oil Pump Control Circuit Performance - Two Sided	P06DD	Diagnoses the two stage oil pump is stuck in the high pressure state	Fail from passing state: Oil Pressure delta is less than a minimum delta pressure on a state change and the measured filtered oil pressure is above a threshold	Oil Pressure delta = ABS [Filtered Oil Pressure at beginning of state change - filtered oil pressure after 1.0 seconds] Oil Pressure delta < **P06DD_P06DE_OP_StateChangeMin** AND Filtered Oil Pressure ≥ (**P0521_P06DD_P06DE_OP_HiStatePressure** + **P06DD_P06DE_OP_LoStatePressure**) ÷ 2 (see P06DD details on Supporting Tables Tab **P06DD_P06DE_OP_StateChangeMin** **P0521_P06DD_P06DE_OP_HiStatePressure** **P06DD_P06DE_OP_LoStatePressure**)	Common Criteria: Two Stage Oil Pump is Present Engine Running Ambient Air Pressure Oil Aeration (= TRUE if engine speed > 10,000 RPM for longer than 30.0 seconds) No active DTC's for diagnsotic enable: Check oil pump TFTKO as a diagnostic enable when Enabled. No active DTC's for control enable: Active Criteria: One Sided Performance Test = Disabled	TRUE ≥ 10.0 seconds ≥ 70.0 kPa FALSE Fault bundles: MAF_SensorFA ECT_Sensor_FA IAT_SensorFA CrankSensor_FA EngOilPressureSensorCktFA AmbientAirDefault EngOilTempFA OilPmpTFTKO Enabled : OilPmpTFTKO Enabled Fault bundles for control disable : OilPmpTFTKO EngineTorqueEstInaccurate EngOilPressureSensorFA PowertrainRelayFault CrankSensor_FA EngOilTempFA Disabled	≥ 12 errors out of 15 samples. Run once per trip or activiated by the Passive Test	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Oil Pump in Low State	> 1.0 seconds		
					Modelled Oil Temperature within range	50.0 deg C ≤ Oil Temp ≤ 110.0 deg C		
					Filtered Engine Speed within range	1,150 RPM ≤ Filtered Engine Speed ≤ 3,500 RPM		
					Delta Filtered Engine Speed within a range	ABS [Filtered RPM at beginning of State change - Filtered RPM after 1.0 seconds] ≤ 50 RPM		
					Engine Torque within range	**P06DD_P06DE_MinEnableTorque_OP** ≤ Indicated Requested Engine Torque ≤ **P06DD_P06DE_MaxEnableTorque_OP** (see P06DD details on Supporting Tables Tab **P06DD_P06DE_MinEnableTorque_OP** **P06DD_P06DE_MaxEnableTorque_OP**)		
					Filtered Oil Pressure within range	Filtered Engine Oil Pressure > **P06DD_P06DE_MinOilPressThresh** (see P06DD details on Supporting Tables Tab **P06DD_P06DE_MinOilPressThresh**)		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Expected Oil Pressure Delta within range	125.0 kPa < ABS [**P0521_P06DD_P06DE_OP_HiStatePressure** - **P06DD_P06DE_OP_LoStatePressure**] < 325.0 kPa		
					<u>Passive Criteria:</u>			
					Active Test Passed	TRUE		
					Filtered Engine Speed within range	1,000 RPM ≤ Filtered Engine Speed ≤ 4,500 RPM		
					Modelled Oil Temperature within range	40.0 deg C ≤ Oil Temp ≤ 120.0 deg C		
					Delta Filtered Engine Speed within a range	ABS [Filtered RPM at beginning of State change - Filtered RPM after 1.00 seconds] ≤ 1,000 RPM		
					Oil Pressure Delta within a range	Oil Pressure Delta < **P06DD_P06DE_OP_StateChangeMin** (see P06DD details on Supporting Tables Tab **P06DD_P06DE_OP_StateChangeMin**)		
			<u>Fast Pass Condition</u> Oil Pressure delta is less than a minimum delta pressure on a state change and the measured filtered oil pressure is	Oil Pressure delta = ABS [Filtered Oil Pressure at beginning of state change -	<u>Common Criteria:</u> Two Stage Oil Pump is Present Engine Running	 TRUE ≥ 10.0 seconds	0 errors out of 5 samples. Run once per trip or activiated by the Passive Test	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			above a threshold	filtered oil pressure after 1.0 seconds] Oil Pressure delta < **P06DD_P06DE_OP_StateChangeMin** AND Filtered Oil Pressure ≥ (**P0521_P06DD_P06DE_OP_HiStatePressure** - **P06DD_P06DE_OP_LoStatePressure**) ÷ 2 (see P06DD details on Supporting Tables Tab **P06DD_P06DE_OP_StateChangeMin** **P0521_P06DD_P06DE_OP_HiStatePressure** **P06DD_P06DE_OP_LoStatePressure**)	Ambient Air Pressure Oil Aeration (= TRUE if engine speed > 10,000 RPM for longer than 30.0 seconds) No active DTC's for diagnsotic enable: Check oil pump TFTKO as a diagnostic enable when Enabled. No active DTC's for control enable: <u>Active Criteria:</u> One Sided Performance Test = Disabled Oil Pump in Low State Modelled Oil Temperature within range Filtered Engine Speed within range	≥ 70.0 kPa FALSE Fault bundles: MAF_SensorFA ECT_Sensor_FA IAT_SensorFA EngOilPressureSensorCktFA AmbientAirDefault EngOilTempFA OilPmpTFTKO CrankSensor_FA Enabled : OilPmpTFTKO Enabled Fault bundles for control disable : OilPmpTFTKO EngineTorqueEstInaccurate EngOilPressureSensorFA PowertrainRelayFault CrankSensor_FA EngOilTempFA Disabled > 1.0 seconds 50.0 deg C ≤ Oil Temp ≤ 110.0 deg C 1,150 RPM ≤ Filtered Engine Speed ≤ 3,500		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						RPM		
					Engine Torque within range	**P06DD_P06DE_MinEnableTorque_OP** ≤ Indicated Requested Engine Torque ≤ **P06DD_P06DE_MaxEnableTorque_OP** (see P06DD details on Supporting Tables Tab **P06DD_P06DE_MinEnableTorque_OP** **P06DD_P06DE_MaxEnableTorque_OP**)		
					Delta Filtered Engine Speed within a range	ABS [Filtered RPM at beginning of State change - Filtered RPM after 1.0 seconds] ≤ 50 RPM		
					Filtered Oil Pressure within range	Filtered Engine Oil Pressure > **P06DD_P06DE_MinOilPressThresh** (see P06DD details on Supporting Tables Tab **P06DD_P06DE_MinOilPressThresh**)		
					Expected Oil Pressure Delta within range	125.0 kPa < ABS [**P0521_P06DD_P06DE_OP_HiStatePressure** - **P06DD_P06DE_OP_LoStatePressure**] < 325.0 kPa		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Two Stage Oil Pump Control Circuit StuckOn - Two Sided	P06DE	Diagnoses the two stage oil pump is stuck in the low pressure state. This diagnostic consists of the intrusive test and the passive test and the details are provided in the ADD flowcharts.	Fail from a passing state: Oil Pressure delta is less than a minimum delta pressure on a state change and the measured filtered oil pressure is below a threshold	Oil Pressure delta = ABS [Filtered Oil Pressure at beginning of state change - filtered oil pressure after 1.0 seconds] Oil Pressure delta < **P06DD_P06DE_OP_StateChangeMin** (see P06DE details on Supporting Tables Tab) Filtered Oil Pressure ≤ **P0521_P06DD_P06DE_OP_HiStatePressure** (**re** - **P06DD_P06DE_OP_LoStatePressure**) **÷ 2** (see P06DE details on Supporting Tables Tab)	Common Criteria: Two Stage Oil Pump is Present Engine Running Ambient Air Pressure Oil Aeration (= TRUE if engine speed > 10,000 RPM for longer than 30.0 seconds) No active DTC's for diagnsotic enable: Check oil pump TFTKO as a diagnostic enable when Enabled. No active DTC's for control enable: Active Criteria: One Sided Performance	TRUE ≥ 10.0 seconds ≥ 70.0 kPa FALSE Fault bundles: MAF_SensorFA ECT_Sensor_FA IAT_SensorFA CrankSensor_FA EngOilPressureSensorCktFA AmbientAirDefault EngOilTempFA Enabled : OilPmpTFTKO Enabled Fault bundles for control disable : OilPmpTFTKO EngineTorqueEstInaccurate EngOilPressureSensorFA PowertrainRelayFault CrankSensor_FA EngOilTempFA Disabled	≥ 12 errors out of 15 samples. Run once per trip or activiated by the Passive Test	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Test = Disabled			
					Oil Pump in Low State	> 1.0 seconds		
					Modelled Oil Temperature within range	50.0 deg C ≤ Oil Temp ≤ 110.0 deg C		
					Filtered Engine Speed within range	1,150 RPM ≤ Filtered Engine Speed ≤ 3,500 RPM		
					Engine Torque within range	**P06DD_P06DE_MinEnableTorque_OP** ≤ Indicated Requested Engine Torque ≤ **P06DD_P06DE_MaxEnableTorque_OP** (see P06DE details on Supporting Tables Tab)		
					Delta Filtered Engine Speed within a range	ABS [Filtered RPM at beginning of State change - Filtered RPM after 1.0 seconds] ≤ 50 RPM		
					Filtered Oil Pressure within range	Filtered Engine Oil Pressure > **P06DD_P06DE_MinOilPressThresh** (see P06DD details on Supporting Tables Tab)		
					Expected Oil Pressure Delta within range	125.0 kPa < ABS [**P0521_P06DD_P06DE_OP_HiStatePressure** - **P06DD_P06DE_OP_LoStatePressure**] < 325.0 kPa		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Passive Criteria: Active Test Passed Filtered Engine Speed within range Modelled Oil Temperature within range Delta Filtered Engine Speed within a range Oil Pressure Delta < **P06DD_P06DE_OP_StateChangeMin** (see P06DE details on Supporting Tables Tab)	 TRUE 1,000 RPM ≤ Filtered Engine Speed ≤ 4,500 RPM 40.0 deg C ≤ Oil Temp ≤ 120.0 deg C ABS [Filtered RPM at beginning of State change - Filtered RPM after 1.00 seconds] ≤ 1,000 RPM TRUE		
			Fast Pass Condition Oil Pressure delta is less than a minimum delta pressure on a state change and the measured filtered oil pressure is below a threshold	Oil Pressure delta = ABS [Filtered Oil Pressure at beginning of state change - filtered oil pressure after 1.0 seconds] Oil Pressure delta <	Common Criteria: Two Stage Oil Pump is Present Engine Running Ambient Air Pressure Oil Aeration (= TRUE if engine speed	 TRUE ≥ 10.0 seconds ≥ 70.0 kPa FALSE	0 errors out of 5 samples. Run once per trip or activiated by the Passive Test	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
				P06DD_P06DE_OP_StateChangeMin (P06DD Performance Test Details on Supporting Tables Tab) Filtered Oil Pressure ≤ **P0521_P06DD_P06DE_OP_HiStatePressu** (**re** - **P06DD_P06DE_OP_LoStatePressure**) / 2 (P06DD Performance Test Details on Supporting Tables Tab)	> 10,000 RPM for longer than 30.0 seconds) No active DTC's for diagnsotic enable: Check oil pump TFTKO as a diagnostic enable when Enabled. No active DTC's for control : <u>Active Criteria:</u> One Sided Performance Test = Disabled Oil Pump in Low State Modelled Oil Temperature within range Filtered Engine Speed within range Engine Torque within range	Fault bundles: MAF_SensorFA ECT_Sensor_FA IAT_SensorFA CrankSensor_FA EngOilPressureSensorCktFA AmbientAirDefault EngOilTempFA Enabled : OilPmpTFTKO Enabled Fault bundles for control disable : OilPmpTFTKO EngineTorqueEstInaccurate EngOilPressureSensorFA PowertrainRelayFault CrankSensor_FA EngOilTempFA Disabled > 1.0 seconds 50.0 deg C ≤ Oil Temp ≤ 110.0 deg C 1,150 RPM ≤ Filtered Engine Speed ≤ 3,500 RPM **P06DD_P06DE_MinEnableTorque_OP** ≤		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						Indicated Requested Engine Torque ≤ **P06DD_P06DE_MaxEnableTorque_OP** (P06DD Performance Test Details on Supporting Tables Tab)		
					Delta Filtered Engine Speed within a range	ABS [Filtered RPM at beginning of State change - Filtered RPM after 1.0 seconds] ≤ 50 RPM		
					Filtered Oil Pressure within range	Filtered Engine Oil Pressure > **P06DD_P06DE_MinOilPressThresh** (see P06DD details on Supporting Tables Tab)		
					Expected Oil Pressure Delta within range	125.0 kPa < ABS [**P0521_P06DD_P06DE_OP_HiStatePressure** - **P06DD_P06DE_OP_LoStatePressure**] < 325.0 kPa		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Wake-up Circuit Performance Diagnostic (ELCP Sealed/ Vented Fuel System)	P06E4	VICM Wake-up events were not received	Whenever the propulsion system goes active, the diagnostic reads its internal timer and evaluates the results from the wake-up events that could have occurred. For each wake-up event the status can be: Pass – the wake-up event occurred within a window Indeterminate – the ECM was already awake at the time the wake-up event could have occurred Fail – the wake-up event occurred outside a window or did not occur at all If the 5.0 hour wake-up event did not occur from to then a failure has occurred. If the 7.0 hour wake-up event did not occur from to then a failure has occurred. If the 9.5 hour wake-up event did not occur from to then a failure has occurred. At Propulsion System Active, if any of the wake-up events indicate a	4.3 hours 5.8 hours 6.0 hours 8.1 hours 8.2 hours 11.0 hours	Distance since assembly plant Drive distance Time since last test when passing P0442/P0455 Time since last test when failing P0442/P0455 No Active DTC's	≥ 9.9 miles ≥ 0.1 miles ≥ 0 hours ≥ 0 hours VehicleSpeedSensor_FA ModuleOffTime_FA LostCommBusB_VICM_FA CommBusAOff_VICM_FA CommBusBOff_VICM_FA AccCktLo_FA	Once per each wake-up event when Propulsion System is not active Final decision is made when Propulsion System is Active 100 msec loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			failure then the DTC fails.					

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Traction Control Torque Request Circuit	P0856	Determines if torque request from the EBTCM is valid	Serial Communication 2's complement message - ($1C7/$1C9 for engine torque, $1CA/$1C6 for axle torque)	Message <> 2's complement of message	Serial communication to EBTCM (U0108) Power Mode Engine Running Status of traction in GMLAN message ($4E9)	No loss of communication = Run = True = Traction Present	>= 6 failures out of 10 Performed on every received message	Type C, No SVS Safety Special Type C
			OR Serial Communication message ($1C7/$1C9 for engine torque, $1CA/ $1C6 for axle torque) rolling count index value	Message rolling count value <> previous message rolling count value plus one			6 rolling count failures out of 10 samples Performed on every received message	
			OR Too many minimum limit torque request transitions occur from TRUE to FALSE to TRUE within a time period	Requested torque intervention type toggles from not increasing request to increasing request			>= 3 multi-transitions out of 5 samples. Performed every 200 ms	
			Torque request greater than torque request diagnostic maximum threshold	> 175 Nm for engine torque based traction torque system, OR > 1,020 Nm for axle torque based traction torque system			>= 4 out of 10 samples Performed on every received message	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Powertrain Control Module (HPC) Requested MIL Illumination	P0AC4	Monitors the HPC MIL request message to determine when the HPC has detected a MIL illuminating fault.	HPC Emissions-Related DTC set			Time since power-up ≥ 3 seconds	Continuous	Type A, No MIL

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Inlet Airflow System Performance (naturally aspirated)	P1101	Determines if there are multiple air induction problems affecting airflow and/or manifold pressure.	Filtered Throttle Model Error AND ABS(Measured Flow – Modeled Air Flow) Filtered OR ABS(Measured MAP – MAP Model 1) Filtered AND ABS(Measured MAP – MAP Model 2) Filtered	> 125 kPa*(g/s) > 15.0 grams/sec > 22.0 kPa) > 22.0 kPa	Engine Speed Engine Speed (Coolant Temp OR OBD Coolant Enable Criteria Coolant Temp Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together) See Residual Weight Factor tables. -	>= 0 RPM <= 5,400 RPM >= -7 Deg C = TRUE) <= 125 Deg C >= -20 Deg C <= 125 Deg C >= 0.50 Filtered Throttle Model Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: TPS Residual Weight Factor based on RPM** Modeled Air Flow Error multiplied by **P0101, P0106, P010B, P0121, P012B, P0236, P1101: MAF1 Residual Weight Factor based on RPM** and **P0101, P0106, P010B, P0121, P012B, P0236, P1101: MAF1 Residual Weight Factor based on MAF Est** MAP Model 1 Error multiplied by	Continuous Calculation are performed every 12.5 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						P0101, P0106, P0121, P012B, P0236, P1101: MAP1 Residual Weight Factor based on RPM MAP Model 2 Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: MAP2 Residual Weight Factor based on RPM** MAP_SensorCircuitFA EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA IAT_SensorFA EGRValve_FP ECT_Sensor_Ckt_FP IAT_SensorCircuitFP		
					No Active DTCs: No Pending DTCs:			

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Coolant Temperature Sensor Not Plausible) (TSRD	P111E	This DTC detects a difference between ECT and two other temp sensors after a soak condition.	**Sensor usage definitions:** **Sensor1 =** CeECTR_e_ECT_Snsr (Sensor1 is the temp sensor most impacted by the block heater (if equipped)) **Sensor2 =** CeECTR_e_RCT_Snsr **Sensor3 =** CeECTR_e_OAT_Snsr ================== A failure will be reported if any of the following occur: 1) Sensor1 power up absolute temp difference to Sensor2 and Sensor3 is (Sensor1 fast fail) . 2) Sensor1 power up temp is greater than Sensor2 and Sensor3 in this range: (and a block heater has not been detected) 3) Sensor1 power up temp is lower than Sensor2 and Sensor3 by this amount: 4) Sensor1 power up temp is ≥ Sensor2 and	≥ 25.0 ºC ≥ 15.0 and < 25.0 ºC ≤ 15.0 Deg ºC	No Active DTC's Engine Off Soak Time Propulsion Off Soak Time Non-volatile memory initization Test complete this trip Test aborted this trip Test disabled this trip Ambient LowFuelCondition Diag ================== Block Heater detection is **enabled** when either of the following occurs: 1) Sensor1 power up temp is greater than Sensor2 and Sensor3 in this range: 2) Cranking time ================== Block Heater is **detected**	VehicleSpeedSensor_FA IAT_SensorCircuitFA THMR_RCT_Sensor_Ckt_FA ECT_Sensor_Ckt_FA EngineModeNotRunTimerError EngineModeNotRunTimer_FA OAT_PtEstFiltFA OAT_PtEstRawFA PSAR_PropSysInactveCrs_FA DRER_DiagSystemDsbl > 28,800 seconds > 28,800 seconds = Not occurred = False = False = False ≥ -7 ºC = False ================== ≥ 15.0 ºC and < 25.0 ºC < 14.0 Seconds ==================	1 failure to set DTC 1 sec/ sample Once per valid cold start	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Sensor3 by 15.0 ºC and the time spent cranking the engine without starting is ≥ 14.0 seconds with the LowFuelConditionDiag	= False	and diagnostic is aborted when 1) or 2) occurs. 1a) IAT monitoring is enabled after the following Vehicle drive constraints 1b) Drive time 1c) Vehicle speed 1d) Additional Vehicle drive time is provided to 1b when Vehicle speed is below 1c as follows: 1e) IAT drops from power up IAT 2a) ECT monitoring is enabled after engine start in the following engine run time window 2b) Sensor1 temp derivative during the test is: 2c) Consectutive samples of 2b) being true are: ========== Diagnostic is **aborted** when 3) or 4) occurs: 3) Engine run time with vehicle speed below 1b 4) Engine off time (i.e. auto stop) during Block heater detection	 > 400 Seconds with > 12.4 MPH and 0.00 times the seconds with vehicle speed below 1b ≥ 8.0 ºC 10.0 <= seconds <= 15.0 < -0.50 ºC/sec ≥ 10 samples ========== ≥ 1,370 Seconds ≥ 300.0 Seconds		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
SIDI High Pressure Rail Temperature Sensor Performance	P111F	This DTC Diagnoses Fuel Temperature sensors rationality by comparing Primary sensor (T1) vs. Secondary sensor (T2)	Fuel Temperature Error (Absolute delta between sensor1 and sensor2)	> 20.00 degC	SENT Fuel Temperature Sensor Equiped Fuel Temperature Rationality Diagnostic Enabled No Fault Active on No Fault Pending on	True True Enabled when a code clear is not active or not exiting device control Temperature sensors 1 out of range Low or High Fault Active (P0182, P0182) Temperature sensors 2 out of range Low or High (P0187, P0188) SENT Communication Fault Active (P16E4, P16E5) SENT Intenal Error Fault Active (P126E, P126F) Fuel Temperature Sensor SENT Message Error Fault Active (P128C, P128D) SENT Communication Fault Pending (P16E4, P16E5) Fuel Temperature Sensor SENT Message Error Fault Pending (P128C, P128D)	100.00 failures out of 125.00 samples 100 ms per Sample Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Radiator Coolant Temperature Sensor Not Plausible) (TSRD	P112F	This DTC detects a difference between RCT and two other temp sensors after a soak condition.	**Sensor usage definitions:** **Sensor1 =** CeECTR_e_ECT_Snsr (Sensor1 is the temp sensor most impacted by the block heater (if equipped)) **Sensor2 =** CeECTR_e_RCT_Snsr **Sensor3 =** CeECTR_e_OAT_Snsr ================== A failure will be reported if (based on the above calibrations): 1) Sensor2 (if RCT is Sensor2)power up absolute temp difference to Sensor1 and Sensor3 is: OR (based on usage) 2) Sensor3 (if RCT is Sensor3) power up absolute temp difference to Sensor1 and Sensor2 is:	≥ 15.0 ºC ≥ 15.0 ºC	No Active DTC's Engine Off Soak Time Propulsion Off Soak Time Non-volatile memory initization Test complete this trip Test aborted this trip Test disabled this trip Ambient LowFuelCondition Diag	VehicleSpeedSensor_FA IAT_SensorCircuitFA THMR_RCT_Sensor_Ckt_FA ECT_Sensor_Ckt_FA EngineModeNotRunTimerError EngineModeNotRunTimer_FA OAT_PtEstFiltFA OAT_PtEstRawFA PSAR_PropSysInactveCrs_FA DRER_DiagSystemDsbl > 28,800 seconds > 28,800 seconds = Not occurred = False = False = False ≥ -7 ºC = False	1 failure to set DTC 1 sec/ sample Once per valid cold start	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 1 low side circuit shorted to high side circuit	P1248	This DTC Determines if high Voltage across low side and High side drivers during on state indicates low side shorted to high side on Injector 1 circuit. short low side and High side circuit is determine by the high current through low side driver.	Voltage high across low side and High side drivers during on state indicates low side shorted to high side	Low side shorted to High Side: 25 amp >= through low side driver	Battery Voltage Engine Run Time	>= 11 Volts >= 2 Seconds P062B not FA or TFTK	10 failures out of 20 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 2 low side circuit shorted to high side circuit	P1249	This DTC Determines if high Voltage across low side and High side drivers during on state indicates low side shorted to high side on Injector 2 circuit. short low side and High side circuit is determine by the high current through low side driver.	Voltage high across low side and High side drivers during on state indicates low side shorted to high side	Low side shorted to High Side: 25 amp >= through low side driver	Battery Voltage Engine Run Time	>= 11 Volts >= 2 Seconds P062B not FA or TFTK	10 failures out of 20 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 3 low side circuit shorted to high side circuit	P124A	This DTC Determines if high Voltage across low side and High side drivers during on state indicates low side shorted to high side on Injector 3 circuit. short low side and High side circuit is determine by the high current through low side driver.	Voltage high across low side and High side drivers during on state indicates low side shorted to high side	Low side shorted to High Side: 25 amp >= through low side driver	Battery Voltage Engine Run Time	>= 11 Volts >= 2 Seconds P062B not FA or TFTK	10 failures out of 20 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 4 low side circuit shorted to high side circuit	P124B	This DTC Determines if high Voltage across low side and High side drivers during on state indicates low side shorted to high side on Injector 3 circuit. short low side and High side circuit is determine by the high current through low side driver.	Voltage high across low side and High side drivers during on state indicates low side shorted to high side	Low side shorted to High Side: 25 amp >= through low side driver	Battery Voltage Engine Run Time	>= 11 Volts >= 2 Seconds P062B not FA or TFTK	10 failures out of 20 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Driver Over Temperature	P1255	To detect if an internal fuel pump driver over-temperature condition exists under normal operating conditions	Fuel Pump Driver Circuit Board temperature (Fuel Pump Driver Overtemperature enumeration)	T>= 160 degC (Fuel Pump Power Module smart device reports Faulted, Not Faulted or Indeterminate)	a) FPPM configuration KeFRPR_e_ChassisFuel PresSysType b) Diagnostic KeFRPR_b_FPPM_ OvertempDiagEnbld c] FPPM Driver Status Alive Rolling Count Sample Faulted d] Diagnostic feedback received e] System Voltage	a) == CeFRPR_e_ECM _FPPM_Sys b) == TRUE c] <> TRUE d] == TRUE e] 9V < System V < 32V	3 failures / 15 samples 1 sample / 12.5 millisec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
SENT Fuel Rail Temperature Sensor 1 Internal Fault - Error Code	P126E	This DTC Diagnoses the SENT Fuel Temperature Sensor 1 internal failure	Fuel Temperature Sensor 1 SENT digital read value	>= 4,089.00	SENT Fuel Temperature Sensor Equiped No Fault Active on No Fault Pending on	True True Enabled when a code clear is not active or not exiting device control SENT Communication Fault Active (P16E4, P16E5) Fuel Temperature Sensor SENT Message Error Fault Active (P128C) Fuel Temperature Sensor SENT Message Error Fault Pending (P128C)	50.00 failures out of 62.00 samples 100 ms per Sample Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
SENT Fuel Rail Temperature Sensor 2 Internal Fault - Error Code	P126F	This DTC Diagnoses the SENT Fuel Temperature Sensor 2 internal failure	Fuel Temperature Sensor 2 SENT digital read value	>= 4,089.00	SENT Fuel Temperature Sensor Equiped No Fault Active on No Fault Pending on	True True Enabled when a code clear is not active or not exiting device control SENT Communication Fault Active (P16E4, P16E5) Fuel Temperature Sensor SENT Message Error (P128D) Fuel Temperature Sensor SENT Message Error Fault Pending (P128D)	50.00 failures out of 62.00 samples 100 ms per Sample Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
SENT Fuel Rail Pressure Sensor 1 Internal Performance	P128A	This DTC determines if there is internal error within the SENT pressure sensor 1 (i.e. Broken wire bond internal to the SENT Sensor). Once the internal error is detected a fixed faulted digital values is communicated to the ECU.	Digital pressure sesnor 1 value	>= 4,089	SENT Fuel Rail Pressure Sensor Internal Performance Enable SENT High Pressure Sesnor Equiped Not Fault Pending	Enabled when a code clear is not active or not exiting device control True True P16E4 P16E5 P128F	Time Based Mode 400 failures out of 500 samples 6.25 ms per Sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
SENT Fuel Rail Pressure Sensor 2 Internal Performance	P128B	This DTC determines if there is internal error within the SENT pressure sensor 2 (i.e. Broken wire bond internal to the SENT Sensor). Once the internal error is detected a fixed faulted digital values is communicated to the ECU.	Digital pressure sesnor 2 value	>= 4,089	SENT Fuel Rail Pressure Sensor Internal Performance Enable SENT High Pressure Sesnor Equiped Not Fault Pending	Enabled when a code clear is not active or not exiting device control True True P16E4 P16E5 P128F	Time Based Mode 400 failures out of 500 samples 6.25 ms per Sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
SENT Fuel Rail Pressure &Temperature Sensor Temperature 1 Message Incorrect	P128C	This DTC diagnoses the the communication errors on the temperature 1 serial data channel	Serial Message 1 Age	>= 0.03 ms	SENT High Pressure Sesnor Equiped SENT signal Serial waveform diagnostics enable SENT power up delay No Fault Active	True True >= 0.00 seconds P16E4 P16E5	134 failures out of 167 samples 6.5 ms per sample Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
SENT Fuel Rail Pressure & Temperature Sensor Temperature 2 Message Incorrect	P128D	This DTC diagnoses the the communication errors on the temperature 2 serial data channel	Serial Message 2 Age	>= 0.03 ms	SENT High Pressure Sesnor Equiped SENT signal Serial waveform diagnostics enable SENT power up delay No Fault Active	True True >= 0.00 seconds P16E4 P16E5	134 failures out of 167 samples 6.5 ms per sample Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
SENT Fuel Rail Pressure & Temperature Sensor Pressure Message Incorrect	P128F	This DTC determines if there is any SENT signal waveform for discrepancies (i.e. too many pulse, too few pulse, clock shift). The SENT HWIO Determines message waveform fault (i.e.too many pulse, too few pulse, clock shift) and if the message age is too long.	SENT HWIO Determines message fault (i.e.too many pulse, too few pulse, clock shift) Message Age	= true > 1.69 ms	SENT High Pressure Sensor Equiped SENT signal Serial waveform diagnostics enable SENT power up delay No Fault Active on	True True >= 0.00 seconds Enabled when a code clear is not active or not exiting device control P16E4 P16E5	400 failures out of 500 samples 6.5 ms per sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Driver Module- Ignition Switch Run/ Start Position Circuit Low	P129D	To detect if the Run/ Start position circuit voltage is short to low / open	FPPM Run_Crank Active status	<> ECM Run_Crank Active status	a) FPPM configuration KeFRPR_e_ChassisFuel PresSysType b) Diagnostic KeFRPR_b_FPPM_RunC rnkRatlEnbld c) FPPM Control Status Alive Rolling Count result d) Diagnostic feedback received e) System Voltage	a) == CeFRPR_e_ECM_FPPM _Sys b) == TRUE c) == Valid d) == TRUE e) >= 0.0 v	64 failures / 80 samples 1 sample / 12.5 millisec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Driver Control Module Signal Message Counter Incorrect	P129E	To detect if the command message received as serial data from the engine control module is valid The "rolling count check" value is created by adding an appended hexadecimal calculation to the pump duty cycle command value. In order to achieve a desired fuel pressure, a hexadecimal equivalent value representing the necessary fuel pump current pulse "On" time (duty cycle as a percent value) is transmitted to the FPPM. The corresponding "check" value is transmitted as well. At the FPPM, the received duty cycle command value is used to create an expected "rolling count" value using the same calculation method as the ECM. The expected "rolling count" value calculated at the receiving power module (smart device) is compared to the transmitted "rolling count" value. If these do not match, a fault condition is reported	FPPM Received Duty Cycle Rolling Count	<> Transmitted Duty Cycle Rolling Count (ECM) (Fu Pmp Pwr Mod smart device reports Faulted, Not Faulted or Indeterminate test state)	a) FPPM configuration KeFRPR_e_ChassisFuel PresSysType b) Fault state determination enabled c) FPPM Received Duty Cycle Count result d) FPPM Diagnostic feedback received e) CAN communication f) System Voltage	a) == CeFRPR_e_ECM_FPPM _Sys b) == TRUE c) == Valid d) == TRUE e) == Valid f) 9v < Sys Voltage > 32v	64 failures / 80 samples 1 sample / 12.5 millisec	Type B, 2 Trips
			FPPM Received Duty Cycle Protection Value	<> Transmitted Duty Cycle Protection Value (ECM) (Fu Pmp Pwr Mod smart device reports Faulted, Not Faulted or Indeterminate test state)	a) FPPM configuration KeFRPR_e_ChassisFuel PresSysType b) Fault state determination enabled c) FPPM Received Duty Cycle Protection Value result d) FPPM Diagnostic feedback received e) CAN communication f) System Voltage	a) == CeFRPR_e_ECM_FPPM _Sys b) == TRUE c) == Valid d) == TRUE e) == Valid f) 9v < Sys Voltage > 32v	64 failures / 80 samples 1 sample / 12.5 millisec	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		forward to the ECM where X/Y diagnostic counting is performed.						

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Driver Control Module Enable Circuit Performance	P12A6	The purpose of the Fuel Pump Driver Control Module Enable Circuit Performance Diagnostic is to detect if the state of the fuel control enable circuit is valid. This is accomplished by comparing the Fuel Pump Driver Control Module reported fuel control enable state (high or low) to that of the expected state of the circuit in the ECM (in software). When the reported state does not match the expected state, the fail counter increments.To detect a driver control circuit signal stuck in normal operating range	FPPM Fuel Control Enable Active boolean	<> Fuel Control Enable variable (ECM)	a) FPPM configuration KeFRPR_e_ChassisFuelPresSysType b) Diagnostic KeFRPR_b_FPPM_FuelCntrlEnblEnbld c) FPPM Control Data Rolling Count result d) Diagnostic feedback received e) System Voltage	a) == CeFRPR_e_ECM_FPPM_Sys b) == TRUE c) == Valid d) == TRUE e) >= 9.0 v	40 failures / 80 samples 1 sample / 12.5 millisec	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Control Status Signal Message Counter Incorrect	P12A8	To detect if the control status message transmitted as serial data from the driver control module is valid. The "rolling count check" value is created by adding an appended hexadecimal calculation to each control command value. The corresponding "check" value is transmitted to the FPPM as well as the actual command. At the FPPM, the received command value is used to create an expected "rolling count" value using the same calculation method as the ECM. The expected "rolling count" value calculated at the receiving power module (smart device) is compared to the transmitted "rolling count" value. If these do not match, a fault condition is reported forward to the ECM where X/Y diagnostic counting is performed.	FPPM Control Status Alive Rolling Count	<> ECM Control Status Alive Rolling Count (Fu Pmp Pwr Mod smart device reports Faulted, Not Faulted or Indeterminate test state)	a) FPPM configuration KeFRPR_e_ChassisFuelPresSysType b) Fault state determination enabled c) FPPM Diagnostic feedback received	a) == CeFRPR_e_ECM_FPPM_Sys b) == TRUE c) == TRUE	64 failures / 80 samples 1 sample / 12.5 millisec	Type B, 2 Trips
			FPPM Power Consumption Alive Rolling Count	<> ECM Power Consumption Alive Rolling Count (Fu Pmp Pwr Mod smart device reports Faulted, Not Faulted or Indeterminate test state)	a) FPPM configuration KeFRPR_e_ChassisFuelPresSysType b) Fault state determination enabled c) FPPM Diagnostic feedback received	a) == CeFRPR_e_ECM_FPPM_Sys b) == TRUE c) == TRUE	64 failures / 80 samples 1 sample / 12.5 millisec	
			FPPM Driver Status Alive Rolling Count	<> ECM Driver Status Alive Rolling Count (Fu Pmp Pwr Mod smart device reports Faulted, Not Faulted or Indeterminate test state)	a) FPPM configuration KeFRPR_e_ChassisFuelPresSysType b) Fault state determination enabled c) FPPM Diagnostic feedback received	a) == CeFRPR_e_ECM_FPPM_Sys b) == TRUE c) == TRUE	64 failures / 80 samples 1 sample / 12.5 millisec	
			FPPM Hardware Status Alive Rolling Count	<> ECM Hardware Status Alive Rolling Count (Fu Pmp Pwr Mod smart device reports Faulted, Not Faulted or Indeterminate test state)	a) FPPM configuration KeFRPR_e_ChassisFuelPresSysType b) Fault state determination enabled c) FPPM Diagnostic feedback received	a) == CeFRPR_e_ECM_FPPM_Sys b) == TRUE c) == TRUE	64 failures / 80 samples 1 sample / 12.5 millisec	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Ignition Coil Positive Voltage Circuit Group 1 * * SIDI ONLY * *	P135A	This diagnostic checks for voltage supply to the Ignition Coils (applicable only for SIDI applications)	Ignition Module Supply Voltage.	< 2.5 Volts	Diagnostic Enabled? Three possible Ignition Coil Power Sources (only 1 used): Ignition Coil Power Source = <u>Case 1: Battery</u> Delay starting at Key-On <u>Case 2: Ignition Run/ Crank</u> Ignition Run/Crank Voltage <u>Case 3: PT Relay</u> PT Relay Voltage	Yes PT Relay 5 Engine Revs > 5.0 volts > 11.0 volts	24 Failures out of 30 Samples 6.25 msec rate	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cold Start Emissions Reduction System Fault	P1400	Model based test computes power from exhaust flow and thermal energy resulting from elevated idle speed and retarded spark advance. Detects if the cold start emission reduction system has failed resulting in the delivered power being out of range.	Average desired accumulated exhaust power - Average actual accumulated exhaust power (too much energy delivered to catalyst) Average desired accumulated exhaust power - Average actual accumulated exhaust power (too little energy delivered to catalyst) (EWMA filtered) Average Power = output of **P1400_EngineSpeedResidual_Table** * output of **P1400_SparkResidual_Table** NOTE: Desired accumulated power would use the desired catalyst light off spark and desired engine speed and the actual accumuated power would use the final commanded spark and actual engine speed. Refer to the Supporting Tables for details	< -3.85 KJ/s (high RPM failure mode) > 5.30 KJ/s (low RPM failure mode)	To enable the diagnostic, the Cold Start Emission Reduction Strategy must be Active per the following: Catalyst Temperature AND Engine Coolant AND Engine Coolant AND Barometric Pressure The Cold Start Emission Reduction strategy must not be exiting. The strategy will exit per the following: Catalyst Temperature AND Engine Run Time OR Engine Run Time OR Barometric Pressure	< 350.00 degC > -15.00 degC <= 56.00 degC >= 76.00 KPa >= 900.00 degC >= 30.00 seconds > **P050D_P1400_CatalystLightOffExtendedEngineRunTimeExit** This Extended Engine run time exit is a function of percent ethanol and Catmons NormRatioEWMA. Refer to "Supporting Tables" for details. < 76.00 KPa	Runs once per trip when the cold start emission reduction strategy is active Frequency: 100ms Loop Test completes after 15 seconds of accumulated qualified data.	EWMA Based - Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Other Enable Criteria: OBD Manufacturer Enable Counter Vehicle Speed Allow diagnostic to calculate residual in an off-idle state. If the value of the OffIdleEnable is equal to 1 then the "DriverOffAccelPedal" will not be checked. However, if the value of OffIdleEnable is 0 then driver must be off the accel pedal A change in throttle position (tip-in/tip-out) will initiate a delay in the calculation of the average qualified residual value. Therefore when the: Pedal Close Delay Timer the diagnostic will continue the calculation. A change in gear will initiate a delay in the calculation of the average qualified residual value to	0 < 81.40 MPH 1 (A value of 1 allows diagnostic to run and calculate the residual while off idle. A value of 0 requires calculation of the residual at idle) > 2.00 seconds		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					allow time for the actual engine speed and actual final commanded spark to achieve their desired values. Therefore, when the:			
					Gear Shift Delay Timer	> 2.00 seconds		
					the diagnostic will continue the calculation			
					For Manual Transmission vehicles:			
					Clutch Pedal Position	> 12.00 %		
					Clutch Pedal Position	< 75.00 %		
					The diagnostic will delay calculation of the residual value and potentially weight the residual calculation differently based on engine run time. This is to ensure the diagnostic is operating in idle speed control as well as during the peak catalyst light off period.			
					The time weighting factor must be :	> 0 These are scalar values that are a function of engine run time. Refer to		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					General Enable: DTC's Not Set:	**P1400_ColdStartDiagnosticDelayBasedOnEngineRunTime** and the cal axis, **P1400_ColdStartDiagnosticDelayBasedOnEngineRunTimeCalAxis** in the "Supporting Tables" for details. AcceleratorPedalFailure ECT_Sensor_FA IAT_SensorCircuitFA MnfdTempSensorCktFP CrankSensor_FA FuelInjectorCircuit_FA MAF_SensorFA MAP_SensorFA EngineMisfireDetected_FA ClutchPstnSnsr FA IAC_SystemRPM_FA IgnitionOutputDriver_FA TPS_FA VehicleSpeedSensor_FA 5VoltReferenceMAP_OOR_Flt TransmissionEngagedState_FA EngineTorqueEstInaccurate		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Recirculation (EGR) Internal Error	P1426	An internal error exists in the Smart EGR Vavle	The smart EGR valve has determined that an internal error exists (internal to the EGR vavle). The EGR valve has boradcast the specific duty cycle to indicate internal error conditions exist.	12.00 % > Duty Cycle Revcived from EGR Valve > 8.00 %	Engine RPM Engine RPM Output driver is commanded on Ignition switch is in crank or run position	>= 700 RPM <= 5,900 RPM	> 20 failures 12.50 ms / sample, continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
EGR Temperature Sensor1 vs IAT Not Plausible	P1427	The power up temperatue varies too much from reference sensor after long soak	if the power up initial value of the temp sensor varies more than allowed from the reference temp sensor	Temperature Delta from IAT. at powerup > 15 C	Engine soak (not run) time No P codes Ignition switch is in crank or run position	>= 28,800.00 Sec P262B P0111 P0114 P010B P00E9 P117D P017C P017D P017B P117B P117F P117E P117C P0116 P0117 P0118 P111E P0128 P0119	NA	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
EGR Temperature Sensor2 vs IAT Not Plausible	P1429	The power up temperatue varies too much from reference sensor after long soak	if the power up initial value of the temp sensor varies more than allowed from the reference temp sensor	Temperature Delta from IAT. at powerup > 15 C	Engine soak (not run) time No P codes Ignition switch is in crank or run position	>= 28,800.00 Sec P262B P0111 P0114 P010B P00E9 P117D P017C P017D P017B P117B P117F P117E P117C P0116 P0117 P0118 P111E P0128 P0119	NA	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
EGR Temperature Sensor "B" Not Plausible	P1437	The Smart EGR vavle is requesting a thermal shutdown when conditions do not exist. MORE DETAILED DESCRIPTION: The EGR Valve on this application is a “Smart EGR Valve”. Desired Position, Position Feedback as well as other state communication between the ECM and the Valve are done using an Encoded PWM message. The EGR valve has internal temperature determination that can determine the valve is operating at a temperature that is beyond its range and damage to the valve could occur. GM’s standard is that Smart Components cannot make this determination on their own and the request to shut down decision must be made and rationalized by the ECM. When the EGR believes it is in an	The smart EGR valve has determined that a thermal condition exists where the vavle should be shut down for protection but ECM has determined that condition is not plausable. ECM Recieved duty Cycle of 14% (request from valve to be shutdown due to thermal conditions) but none of the other engine "hot conditions" exist.	16.00 % > Duty Cycle Revcived from EGR Valve > 12.00 % and NONE of the following conditions exist: Engine Metal Overtemp: Engine Metal Temperature > 131 C for > 2 Sec. Ambient Temperature>= 140 C Catalyst temperature > 950 Piston Protection: RPM > 8,192 RPM and Airflow > **Piston Protection Airflow** and engine coolant > 63 C for >= 7 Sec Hot Coolant Enrichment: Engine coolant >= 120.00 C and Percent throttle area >= 5.00 % and	Engine RPM Engine RPM Output driver is commanded on Ignition switch is in crank or run position	>= 700 RPM <= 5,900 RPM	>= 800 samples 12.50 ms / sample, continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		elevated temperature conditions where it desires to shut down for protection, it must request it from ECM. This is done by sending a 14% DC message as the Feedback position. The range 12% □ 16% of Feedback Position is held for the Valve request for shutdown. The ECM rationalizes this request with several available known temperatures (calibratable). The request can be rationalized versus: Engine Metal Overtemp active flag, Ambient Temperature, Catalyst Temperature, Piston Protection Active, High coolant with elevated RPM and Airflow, Hot coolant enrichment active, Turbo Charger Temperature, Engine Metal temperature, Coolant Temperature, Oil temperature. (Calibratable conditions). If the Valve is requesting temperature shutdown and the ECM determines conditions are such that the valve		Intake Manifold Pressure >= 50.00 kPa and vehicle speed >= 15.00 KPH for >= 2.00 sec Turbo Charger Temperature > 930.00 - **GearDownShftOffset** Engine Metal Temperature > 131.00 for > 2.00 Sec. Engine Coolant Temperatue >= 124.00 Engine Oil Temperature >= 1,000.00				

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		can be hot and should be requesting temperature protection the request is honored and the ECM sends the message to the Valve via the encoded PWM desired position message that Valve shutdown is commanded. If the Valve is requesting temperature shutdown and the ECM determines conditions are NOT such that the valve can be hot and that is should NOT be requesting temperature protection the request is Not honored. The ECM continues to send the desired position command to the Valve via the encoded PWM desired position message. Debouncing of the P1437 EGR Temperature Sensor "B" Not Plausible fault starts. If the request message continues while not rationalized for long enough, the P1437 code is set.						

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Evaporative Emission System Leak Detection Pump Performance /Stuck Off (ELCP Sealed Fuel System)	P145C	This DTC will detects an ELCP vacuum pump that is stuck off.	When the ELCP vacuum pump is commanded on during the 1st 0.020" reference orifice vacuum measurement, if the stabilized ELCP pressure sensor (gauge) vacuum reading is after then the ELCP vacuum pump is stuck off and the DTC fails. When the ELCP vacuum pump is commanded on during the 2nd 0.020" reference orifice vacuum measurement, if the stabilized ELCP pressure sensor (gauge) vacuum reading is after then the ELCP vacuum pump is stuck off and the DTC fails.	< 100 Pa 360 seconds < 100 Pa 30 seconds	Propulsion system not active time Distance since assembly plant Drive distance Min baro Max baro Min fuel level Max fuel level ECT Min IAT Max IAT Time since last test when passing P0442/P0455 Time since last test when failing P0442/P0455 ****************************** ELCP hardware can be powered by battery or powertrain relay. For this application the ELCP hardware is powered by battery Voltage ****************************** Vehicle speed Vehicle not in assembly plant (value must = 0) Propulsion system not active time Previous propulsion system active time Abort Conditions: Min fuel level slosh Max fuel level slosh Key up during test	4.3 ≤ time ≤ 5.8 hours or 6.0 ≤ time ≤ 8.1 hours or 8.2 ≤ time ≤ 11.0 hours ≥ 9.9 miles ≥ 0.1 miles ≥ 70 kPa ≤ 110 kPa ≥ 10 % ≤ 90 % ≤ 40 °C ≥ 4 °C ≤ 45 °C ≥ 0 hours ≥ 0 hours ****************************** ≥ 10 volts ****************************** ≤ 3 MPH 0 ≥ 0 seconds ≥ 0 seconds ≥ 190 % ≤ 200 %	Up to twice per trip, for each required wake-up event 100 msec loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Refueling request button pressed			
					Service bay test active Device control exceeds	0.5 seconds		
					No Active DTC's	FuelLevelDataFault IAT_SensorFA ECT_Sensor_FA VehicleSpeedSensor_FA AmbientAirDefault VentCircuit_FA ELCPCircuit_FA FTP_SensorCircuit_FA ELCP_PumpCircuit_FA ELCP_SwitchCircuit_FA VICM_WakeupDiag_FA VICM_WakeupDiag_TFTKO LostCommBCM_FA LostCommBusB_VICM_FA CommBusAOff_VICM_FA CommBusBOff_VICM_FA AccCktLo_FA ModuleOffTime_FA		
					No Active DTC's TFTKO	P043E P043F P0451 P145D P145E P1462 P2421 P2422 P2450 P24B9		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Evaporative Emission System Leak Detection Pump Stuck On (ELCP Sealed Fuel System)	P145D	This DTC detects an ELCP vacuum pump that is stuck on.	The 1st time in the test sequence when the ELCP vacuum pump is commanded off, after the ELCP switching valve transitions from vent to pump position, if the difference between an initial ELCP pressure sensor (absolute) reading and a second ELCP pressure sensor (absolute) reading is after then the ELCP vacuum pump is stuck on and the DTC fails. The 2nd time in the test sequence when the ELCP vacuum pump is commanded off, if the ELCP pressure sensor (gauge) vacuum reading is after then the ELCP vacuum pump is stuck on and the DTC fails.	> 1,000 Pa 8 seconds > 1,180 Pa 14 seconds	Propulsion system not active time Distance since assembly plant Drive distance Min baro Max baro Min fuel level Max fuel level ECT Min IAT Max IAT Time since last test when passing P0442/P0455 Time since last test when failing P0442/P0455 ********** ELCP hardware can be powered by battery or powertrain relay. For this application the ELCP hardware is powered by battery Voltage ********** Vehicle speed Vehicle not in assembly plant (value must = 0) Propulsion system not active time Previous propulsion system active time Abort Conditions: Min fuel level slosh Max fuel level slosh Key up during test	4.3 ≤ time ≤ 5.8 hours or 6.0 ≤ time ≤ 8.1 hours or 8.2 ≤ time ≤ 11.0 hours ≥ 9.9 miles ≥ 0.1 miles ≥ 70 kPa ≤ 110 kPa ≥ 10 % ≤ 90 % ≤ 40 °C ≥ 4 °C ≤ 45 °C ≥ 0 hours ≥ 0 hours ********** ≥ 10 volts ********** ≤ 3 MPH 0 ≥ 0 seconds ≥ 0 seconds ≥ 190 % ≤ 200 %	Once or twice per trip, for each required wake-up event 100 msec loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Refueling request button pressed Service bay test active Device control exceeds No Active DTC's No Active DTC's TFTK	 0.5 seconds FuelLevelDataFault IAT_SensorFA ECT_Sensor_FA VehicleSpeedSensor_FA AmbientAirDefault VentCircuit_FA ELCPCircuit_FA FTP_SensorCircuit_FA ELCP_PumpCircuit_FA ELCP_SwitchCircuit_FA VICM_WakeupDiag_FA VICM_WakeupDiag_TFTKO LostCommBCM_FA LostCommBusB_VICM_FA CommBusAOff_VICM_FA CommBusBOff_VICM_FA AccCktLo_FA ModuleOffTime_FA P043E P043F P0451 P145C P145E P145F P1462 P2421 P2422 P2450 P24B9		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
EVAP System Leak Between Vent Control Valve and Leak Detection Pump (ELCP Sealed Fuel System)	P145E	A small leak (≥0.020") is detected in the EVAP system between the Diurnal Control Valve (DCV) and the ELCP vacuum pump. This includes a leak through the DCV.The ELCP vacuum pump creates a vacuum across a 0.020" reference orifice. This reference vacuum is then compared to the vacuum level created between the Diurnal Control Valve (DCV) and the ELCP leak detection pump to determine if a leak exists.	If the ELCP pressure sensor (gauge) vacuum reading is less than the 1st 0.020" reference orifce vacuum measurement times a plus a offset for then a small leak is detected between the DCV and ELCP vacuum pump and the DTC fails.	 1.00 multiplier 0 Pa 30 seconds	Propulsion system not active time Distance since assembly plant Drive distance Min baro Max baro Min fuel level Max fuel level ECT Min IAT Max IAT Time since last test when passing P0442/P0455 Time since last test when failing P0442/P0455 ********** ELCP hardware can be powered by battery or powertrain relay. For this application the ELCP hardware is powered by battery Voltage ********** Vehicle speed Vehicle not in assembly plant (value must = 0) Propulsion system not active time Previous propulsion system active time Abort Conditions: Min fuel level slosh Max fuel level slosh Key up during test	4.3 ≤ time ≤ 5.8 hours or 6.0 ≤ time ≤ 8.1 hours or 8.2 ≤ time ≤ 11.0 hours ≥ 9.9 miles ≥ 0.1 miles ≥ 70 kPa ≤ 110 kPa ≥ 10 % ≤ 90 % ≤ 40 °C ≥ 4 °C ≤ 45 °C ≥ 0 hours ≥ 0 hours ********** ≥ 10 volts ********** ≤ 3 MPH 0 ≥ 0 seconds ≥ 0 seconds ≥ 190 % ≤ 200 %	Up to once per trip, for each required wake-up event 100 msec loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Refueling request button pressed Service bay test active Device control exceeds No Active DTC's No Active DTC's TFTKO	 0.5 seconds FuelLevelDataFault IAT_SensorFA ECT_Sensor_FA VehicleSpeedSensor_FA AmbientAirDefault VentCircuit_FA ELCPCircuit_FA FTP_SensorCircuit_FA ELCP_PumpCircuit_FA ELCP_SwitchCircuit_FA VICM_WakeupDiag_FA VICM_WakeupDiag_TFTKO LostCommBCM_FA LostCommBusB_VICM_FA CommBusAOff_VICM_FA CommBusBOff_VICM_FA AccCktLo_FA ModuleOffTime_FA P043E P043F P0451 P145C P145D P1462 P2450 P24B9		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Evaporative Emission System Leak Detection Reference Orifice Performance (ELCP Sealed Fuel System)	P145F	1st and 2nd 0.020" reference orifice vacuum measurements do not correlate.	If the difference between the 1st 0.020" reference orifice vacuum measurement and the 2nd 0.020" reference orifice vacuum measurement is after then the 1st and 2nd reference orifice vacuum measurements do not correlate and the DTC fails.	> 550 Pa 30 seconds	Propulsion system not active time Distance since assembly plant Drive distance Min baro Max baro Min fuel level Max fuel level ECT Min IAT Max IAT Time since last test when passing P0442/P0455 Time since last test when failing P0442/P0455 ********** ELCP hardware can be powered by battery or powertrain relay. For this application the ELCP hardware is powered by battery Voltage ********** Vehicle speed Vehicle not in assembly plant (value must = 0) Propulsion system not active time Previous propulsion system active time Abort Conditions: Min fuel level slosh Max fuel level slosh Key up during test	4.3 ≤ time ≤ 5.8 hours or 6.0 ≤ time ≤ 8.1 hours or 8.2 ≤ time ≤ 11.0 hours ≥ 9.9 miles ≥ 0.1 miles ≥ 70 kPa ≤ 110 kPa ≥ 10 % ≤ 90 % ≤ 40 °C ≥ 4 °C ≤ 45 °C ≥ 0 hours ≥ 0 hours ********** ≥ 10 volts ********** ≤ 3 MPH 0 ≥ 0 seconds ≥ 0 seconds ≥ 190 % ≤ 200 %	Up to once per trip, for each required wake-up event 100 msec loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Refueling request button pressed			
					Service bay test active			
					Device control exceeds	0.5 seconds		
					No Active DTC's	FuelLevelDataFault IAT_SensorFA ECT_Sensor_FA VehicleSpeedSensor_FA AmbientAirDefault VentCircuit_FA ELCPCircuit_FA FTP_SensorCircuit_FA ELCP_PumpCircuit_FA ELCP_SwitchCircuit_FA VICM_WakeupDiag_FA VICM_WakeupDiag_TFTKO LostCommBCM_FA LostCommBusB_VICM_FA CommBusAOff_VICM_FA CommBusBOff_VICM_FA AccCktLo_FA ModuleOffTime_FA		
					No Active DTC's TFTKO	P043E P043F P0451 P145C P145D P145E P1462 P2421 P2422 P2450 P24B9		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Evaporative System Leak Detection Reference Orifice Flow Erratic (ELCP Sealed Fuel System)	P1462	0.020" reference orifice vacuum measurement is eratic.	While performing 1st 0.020" reference orifice vacuum measurement for or 2nd 0.020" reference orifice vacuum measurement for If the absolute value of the difference between the averaged ELCP pressure sensor (absolute) reading starting before the end of the reference measurement and the final averaged ELCP pressure sensor (absolute) reading is then a stabilized 0.020" reference orifice vacuum measurement could not be obtained and the DTC fails.	360 seconds 30 seconds 3 second 10 seconds 3 second > 220 Pa	Propulsion system not active time Distance since assembly plant Drive distance Min baro Max baro Min fuel level Max fuel level ECT Min IAT Max IAT Time since last test when passing P0442/P0455 Time since last test when failing P0442/P0455 ********** ELCP hardware can be powered by battery or powertrain relay. For this application the ELCP hardware is powered by battery Voltage ********** Vehicle speed Vehicle not in assembly plant (value must = 0) Propulsion system not active time Previous propulsion system active time Abort Conditions: Min fuel level slosh Max fuel level slosh Key up during test	4.3 ≤ time ≤ 5.8 hours or 6.0 ≤ time ≤ 8.1 hours or 8.2 ≤ time ≤ 11.0 hours ≥ 9.9 miles ≥ 0.1 miles ≥ 70 kPa ≤ 110 kPa ≥ 10 % ≤ 90 % ≤ 40 °C ≥ 4 °C ≤ 45 °C ≥ 0 hours ≥ 0 hours ********** ≥ 10 volts ********** ≤ 3 MPH 0 ≥ 0 seconds ≥ 0 seconds ≥ 190 % ≤ 200 %	Up to twice per trip, for each required wake-up event 100 msec loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Refueling request button pressed Service bay test active Device control exceeds No Active DTC's No Active DTC's TFTKO	 0.5 seconds IAT_SensorFA FuelLevelDataFault ECT_Sensor_FA VehicleSpeedSensor_FA AmbientAirDefault VentCircuit_FA ELCPCircuit_FA FTP_SensorCircuit_FA ELCP_PumpCircuit_FA ELCP_SwitchCircuit_FA VICM_WakeupDiag_FA VICM_WakeupDiag_TFTKO LostCommBCM_FA LostCommBusB_VICM_FA CommBusAOff_VICM_FA CommBusBOff_VICM_FA AccCktLo_FA ModuleOffTime_FA P043E P043F P0451 P145C P145D P145E P2421 P2422 P2450 P24B9		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cooling Fan 1 Output Circuit (ODM) (EREV/ PHEV only) Open	P1485	Diagnoses the cooling fan 1 output low side driver circuit for circuit faults	Voltage low during driver off state (indicates open circuit)	Open circuit: ≥ 200 K Ω impedance between signal and controller ground	Battery voltage to enable Battery voltage to remain enabled Accessory line is high for No Active DTC's	≥ 11.00 volts ≥ 10.00 volts > 5.00 seconds P2537	50 failures out of 63 samples 100 ms / sample	Type B, 2 Trips Note: In certain controllers P1486 may also set (Cooling Fan 1 Output Circuit Short to Ground).

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cooling Fan 1 Output Circuit Low Voltage (ODM) (EREV/ PHEV only)	P1486	Diagnoses the cooling fan 1 output low side driver circuit for circuit faults	Voltage low during driver off state (indicates short-to-ground)	Short to ground: ≤ 0.5 Ω impedance between signal and controller ground	Battery voltage to enable Battery voltage to remain enabled Accessory line is high for No Active DTC's	≥ 11.00 volts ≥ 10.00 volts > 5.00 seconds P2537	50 failures out of 63 samples 100 ms / sample	Type B, 2 Trips Note: In certain controllers P1485 may also set (Cooling Fan 1 Output Circuit Open Circuit).

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cooling Fan 1 Output Circuit High Voltage (ODM) (EREV/ PHEV only)	P1487	Diagnoses the cooling fan 1 output low side driver circuit for circuit faults	Voltage high during driver on state (indicates short to power).	Short to power: ≤ 0.5 Ω impedance between signal and controller power	Battery voltage to enable Battery voltage to remain enabled Accessory line is high for No Active DTC's	≥ 11.00 volts ≥ 10.00 volts > 5.00 seconds P2537	50 failures out of 63 samples 100 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Steady State Actuation Fault	P1516	Detect an inablity to maintain a steady state throttle position	The absolute difference between desired and indicated throttle position is >	2.00 percent		Run/Crank voltage > 6.41 Ignition voltage failure is false (P1682) TPS minimum learn is not active and Throttle is being Controlled Throttle is considered in a steadystate condition when the desired throttle position over a 12.5 ms period is < 0.25 percent for a settling time period > 4.00 s	0.49 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Communication Error with Active Grill Air Shutter Module “A”	P151E	This DTC monitors for an internal error or error in communication with the Active Grill Air Shutter Module A	Communication of the Alive Rolling Count from the Shutter Module over LIN bus is incorrect or the Shutter Module signals it has an internal error for out of total samples	 >= 10.00 counts >= 10.00 counts	All the following conditions are met for Power Mode Powertrain Relay Voltage Run/Crank Ignition Voltage	>= 3.00 seconds = Run >= 11.00 Volts >= 11.00 Volts	LIN bus communication executes in 500ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cruise Control Switch State Undetermined	P155A	Detects when cruise switch state cannot be determined, such as low voltage conditions	cruise switch state is received as "undetermined" for greater than a calibratable time	fail continuously for greater than 0.5 seconds			fail continuously for greater than 0.5 seconds	Type C, No SVS, special type C

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Air Conditioning (A/C) Refrigerant Pressure Too High When A/C Off	P156A	Determines if the Air Conditioning High Side Pressure Sensor circuit voltage is stuck or biased in range	**Off Test:** The pressure sensor has to be greater than a threshold value when AC is off (a function of ambient temp) (P156A Off Test Details on Supporting Tables:)	Off Test Pressure > **P0531_Off_Test_Threshold** (function of ambient temperature)	Diagnostic Status Off Test Status AC Off Time No active DTC's	Disabled Enabled Delay Time > **P156A_Off_Test_Delay** Sec. Fault bundles: ACHighSidePressSnsrCktFA ACFailedOnSD ACThrmlRefrigSpdVld ACCMLostComm	80 failures out of 100 samples Performed every 100 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Air Conditioning (A/C) Refrigerant Pressure Too Low When A/C On	P156B	Determines if the Air Conditioning High Side Pressure Sensor circuit voltage is stuck or biased in range	**On Test:** The pressure sensor has to be less than a threshold value when engaged (a function of ambient temp)	On Test Pressure < **P0531_On_Test_Threshold** (function of ambient temperature) (P156B On Test Details on Supporting Tables:)	Diagnostic Status On Test Status AC On Time No active DTC's	Disabled Enabled Delay Time > 10 Sec. Fault bundles: ACHighSidePressSnsrCktFA ACFailedOnSD ACThrmlRefrigSpdVld ACCMLostComm	80 failures out of 100 samples Performed every 100 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Control Torque Request Circuit	P15F2	Determines if torque request from the HCP is valid. This is done using a rolling count / protection fault for commanded engine torque.	1. Serial Communication 2's complement not equal for message $181 for Strong Hybrid or Mild Hybrid Applications OR 2. Serial Communication rolling count value shall be + 1 from previous $181 message for Strong Hybrid or Mild Hybrid Applications	Message <> 2's complement of Engine Torque Signal and if Mild Hybrid: Message <> 2's complement of Motor Torque Signal OR Message rolling count value <> previous message rolling count value plus one	Secondary High Speed Bus is Present and No Serial communication loss to HCP (U1817) Run Crank Active Ingintion Voltage > Threshold No Serial communication loss to HCP (U1817) Hybrid Type = Mild, SS or Strong	No loss of communication >= 0.50 Sec > 6.41 = Strong	1. >= 10 Protect errors out of 16 samples OR 2. >= 10 Rolling count errors out of 16 samples Pass diagnostic if samples >= 16 Performed every received message	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Front Object Detection Control Module Torque Request Signal Message Counter Incorrect	P15F6	Detects rolling count or protection value errors in Collision Preparation System Axle Torque Command serial data signal	If x of y rolling count / protection value faults occur, disable collision preparation system for duration of fault		Front Object Detection Module Torque Request Serial Data Error Diagnostic Enable	1.00	4 / 10 counts	Type C, No SVS , special type C

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Automatic Braking Engine Torque Request Signal Message Incorrect	P15F8	Detects rolling count or protection value errors Rear Virtual Bumper Axle Torque Command serial data signal	If x of y rolling count / protection value faults occur, disable rear virtual bumper or collision preparation system for duration of fault		Automatic Braking Engine Torque Request Serial Data Error Diagnostic Enable	1.00	4 / 10 counts	Type C, No SVS , special type C

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Control Speed Request Circuit	P15F9	Determines if torque request from the HCP is valid	1. Serial Communication 2's complement not equal for message $281 OR 2. Serial Communication rolling count value shall be + 1 from previous $281 message	Message <> 2's complement of message Message rolling count value <> previous message rolling count value plus one	Secondary High Speed Bus is Present No Serial communication loss to HCP (U1817) Run Crank Active	>= 0.50 Sec	>= 10.00 Password Protect errors out of 16.00 samples OR >= 10.00 Rolling count errors out of 16.00 samples Pass diagnostic if samples >= 16.00 Performed every 12.5 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
EVAP System Alarm Clock Signal Not Received (ELCP Sealed/ Vented Fuel System)	P162D	ECM did not receive VICM alarm clock feedback signal	Whenever the propulsion system goes active, the diagnostic reads its internal timer and evaluates the results from the wake-up events that could have occurred. If the ECM did not receive feedback from the VICM that the alarm clock was set, the 5.0 hour wake-up event did not occur, and the ECM did not wake up for any reason from to then a failure has occurred. If the ECM did not receive feedback from the VICM that the alarm clock was set, the 7.0 hour wake-up event did not occur, and the ECM did not wake up for any reason from to then a failure has occurred. If the ECM did not receive feedback from the VICM that the alarm clock was set, the 9.5 hour wake-up event did not occur, and the ECM did not wake up for any reason from to then a failure has occurred.	 4.3 hours 5.8 hours 6.0 hours 8.1 hours 8.2 hours 11.0 hours	Distance since assembly plant Drive distance Time since last test when passing P0442/P0455 Time since last test when failing P0442/P0455 No Active DTC's Abort Conditions: Service bay test active	≥ 9.9 miles ≥ 0.1 miles ≥ 0 hours ≥ 0 hours VehicleSpeedSensor_FA ModuleOffTime_FA LostCommBCM_FA LostCommBusB_VICM_FA CommBusAOff_VICM_FA CommBusBOff_VICM_FA AccCktLo_FA	Once per each wake-up event when Propulsion System is not active Final decision is made when Propulsion System is Active 100 msec loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			At Propulsion System Active, if any of the wake-up events indicate a failure then the DTC fails.					

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Internal Control Module SIDI High Pressure Pump current monitor	P163A	This DTC Diagnoses the current from the control area and compares it with calibrated thresholds to set current high and low flags	SIDI fuel pump High Current Test Current SIDI fuel pump Low Current Test Current	 >= 11.00 Amps <= 0.10 Amps	Battery Voltage Low Side Fuel Pressure Engine Run Time Additional Enable Conditions: All must be true (High Pressure Pump is enabled and High Fuel pressure sensor ckt is Not (FA,FP or TFTKO) and High Pressure fuel pump ckt is Not (FA,FP or TFTKO) and Cam or Crank Sensor Not FA and IAT,IAT2,ECT Not FA and Low side Fuel Pump Relay ckt Not FA and Estimate fuel rail pressure is valid and Green Engine (In assembly plant) is not enabled and Not if low fuel condition and Low side Fuel Pump is on and Injector Flow Test is not active and Device control commanded pressure is false and Device control pump ckt enabled on is false andEngine movement	>= 11 Volts > 0.300 MPa >= **P0089 - P163A - P228C - P228D - P0191 - KtFHPD_t_PumpCntrlEngRunThrsh** (see supporting tables) Enabled when a code clear is not active or not exiting device control Engine is not cranking	Current High - 750 failures out of 938 samples Current Low - 750 failures out of 938 Samples 4 samples per engine rotaion	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					detected is true and Manufacturers enable counter is 0) Flex Fuel Sensor Not FA Ignition voltage out of correlation error(P1682) not active and Barometric Pressure Inlet Air Temp Fuel Temp	 >= 70.0 KPA >= -10.0 degC -10 <= Temp degC <= 132		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Ignition Voltage Correlation	P1682	Detect a continuous or intermittent out of correlation between the Run/Crank Ignition Voltage and the Powertrain Relay Ignition Voltage. The diagnostic monitors the difference in voltage between Run/Crank Voltage and the Powertrain Relay Ignition Voltage and fails the diagnostic when the voltage difference is too high. This diagnostic only runs when the powertrain is commanded on and the Run/Crank Voltage is greater than a threshold based on IAT or the powertrain ignition voltage is high enough the Run/Crank voltage is high enough.	|Run/Crank – PT Relay Ignition| >	3.00 Volts		Powertrain commanded on AND (Run/Crank voltage > Table, f(IAT). See supporting tables: **P1682_PT Relay Pull-in Run/Crank Voltage f(IAT)** OR PT Relay Ignition voltage > 5.50) AND Run/Crank voltage > 5.50 .	240 / 480 counts or 0.175 sec continuous; 12.5 ms/count in main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
TPS SENT Comm Circuit Low (Gasoline applications ONLY)	P16A0	Detects a continuous or intermittent short low or open fault in the TPS SENT Communication Circuit by monitoring the voltage and failing the diagnostic when the voltage for the wave pulse is below state threshold as defined by SAE J2716 SENT Protocol. This diagnostic only runs when battery voltage is high enough.	Voltage for wave pulse is below state threshold as defined by SAE J2716 SENT Protocol	0.5 V		Run/Crank voltage > 6.41	79 / 159 counts; 57 counts continuous; 3.125 ms /count in the ECM main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
TPS SENT Comm Circuit High (Gasoline applications ONLY)	P16A1	Detects a continuous or intermittent short high fault in the TPS SENT Communication Circuit by monitoring the voltage and failing the diagnostic when the voltage for the wave pulse is above state threshold as defined by SAE J2716 SENT Protocol. This diagnostic only runs when battery voltage is high enough. Detects a High Circuit Fault in the TPS SENT Communication Circuit	Voltage for wave pulse is above state threshold as defined by SAE J2716 SENT Protocol	4.1 V		Run/Crank voltage > 6.41	79 / 159 counts; 57 counts continuous; 3.125 ms /count in the ECM main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
TPS SENT Comm Circuit Performance (Gasoline applications ONLY)	P16A2	Detects a message fault in the TPS SENT Communication Circuit by monitoring the message pulse time and failing the diagnostic when the time for the pulse is above a low time threshold or above a high time threshold or if the message age limit is greater than a time threshold. This diagnostic only runs when battery voltage is high enough. Detects a Message Fault in the TPS SENT Communication Circuit	Message Pulse < Message Pulse > or Message Age Limit >= or Signal CRC fails	0.125977 ms 0.209991 ms 3.125 ms		Run/Crank voltage > 6.41	79 / 159 counts; 57 counts continuous; 3.125 ms /count in the ECM main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Ignition Voltage Correlation #2	P16A7	Detect a continuous or intermittent out of correlation between the Run/Crank Ignition Voltage and the Powertrain Relay Ignition Voltage #2. The diagnostic monitors the difference in voltage between Run/Crank Voltage and the Powertrain Relay Ignition Voltage and fails the diagnostic when the voltage difference is too high. This diagnostic only runs when the powertrain is commanded on and the Run/Crank Voltage is greater than a threshold based on IAT or the powertrain ignition voltage is high enough the Run/Crank voltage is high enough. Detect a continuous or intermittent out of correlation between the Run/Crank Ignition Voltage & the Powertrain Relay Ignition Voltage #2.	|Run/Crank – PT Relay Ignition| >	3.00 Volts		Powertrain commanded on AND (Run/Crank voltage > Table, f(IAT). See supporting tables: **P1682_PT Relay Pull-in Run/Crank Voltage f(IAT)** OR PT Relay Ignition voltage > 5.50) AND Run/Crank voltage > 5.50 .	240 / 480 counts or 0.175 sec continuous; 12.5 ms/count in main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Controls Ignition Relay Feedback Circuit 2 Low Voltage - (GEN III Controllers ONLY)	P16AF	Diagnoses ignition feedback circuit 2 low voltage	Engine controls ignition relay feedback circuit 2 low voltage	Relay voltage <= 5.00	Powertrain relay low diag enable Powertrain relay voltage Run Crank voltage Powertrain relay state	= 1.00 >= 11.00 > 9.00 = ON	5 failures out of 6 samples 1000 ms / sample	Type C, No SVS

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Controls Ignition Relay Feedback Circuit 2 High Voltage - (GEN III Controllers ONLY)	P16B3	Diagnoses ignition feedback circuit 2 high voltage	Engine controls ignition relay feedback circuit 2 high voltage	Relay voltage >= 4.00	Powertrain relay high diag enable Powertrain relay state	= 1.00 = INACTIVE	50 failures out of 63 samples 100 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
SENT Fuel Rail Pressure & Temperature Sensor Communication Circuit 3 Low Voltage	P16E4	This DTC determines if the SENT signal shorted low, this is determined by monitoring the number pulses on the SENT signal line received at the ECU and the SENT Signal Line State always indicating low.	The number pulses on the SENT signal line SENT Signal Line State	<= 40 = Low	SENT High Pressure Sensor Equiped SENT Sensor Communication Circuit Diagnostic Enabled SENT power up delay	True True >= 0.00 seconds Enabled when a code clear is not active or not exiting device control	400 failures out of 500 samples 6.5 ms per sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
SENT Fuel Rail Pressure & Temperature Sensor Communication Circuit 3 High Voltage	P16E5	This DTC determines if the SENT signal shorted low, this is determined by monitoring the number pulses on the SENT signal line received at the ECU and the SENT Signal Line State always indicating high.	The number pulses on the SENT signal line SENT Signal Line State	<= 40 = High	SENT High Pressure Sensor Equiped SENT Sensor Communication Circuit Diagnostic Enabled SENT power up delay	True True >= 0.00 seconds Enabled when a code clear is not active or not exiting device control	400 failures out of 500 samples 6.5 ms per sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Serial Peripheral Interface Bus 1	P16F0	This DTC detects intermitent and continuous invalid SPI messages.	This function detects a serial communications fault based upon the detection of missing or invalid (receive) message within the main processor before receiving a valid message.			Run/Crank voltage > 6.41	39 / 399 counts continuous; 12.5 ms /count in the ECM main processor	Type A, 1 Trips
			This function detects a serial communications fault based upon the detection of missing or invalid (receive) message within the main processor after receiving a valid message.			Run/Crank voltage > 6.41	159 / 399 counts continuous; 12.5 ms /count in the ECM main processor	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Internal Control Module Redundant Memory Performance (Gasoline applications ONLY)	P16F3	Detect Processor Calculation faults due to RAM corruptions, ALU failures and ROM failures For all of the following cases: If the individual diagnostic threshold is equal to 2048 ms, this individual case is not applicable. If any of the following cases are X out of Y diagnostics and the fail (x) is greater than the sample (Y), this individual case is also not applicable.	Equivance Ratio torque compensation exceeds threshold	-132.90 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	Type A, 1 Trips
			Absolute difference between Equivance Ratio torque compensation and its dual store out of bounds given by threshold	132.90 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Absolute difference of Accessory torque and its redundant calculation is out of bounds given by threshold range	132.90 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Absolute difference of Filtered Air-per-cylinder and its redundant calculation is out of bounds given by threshold range	140.87 mg	Ignition State	Accessory, run or crank	Up/down timer 2,048 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	34.58 degrees		Engine speed >0rpm	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Torque Learn offset is out of bounds given by threshold range	High Threshold 0.00 Nm Low Threshold 0.00	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
				Nm				
			One step ahead calculation of air-per-cylinder and two step ahead is greater than threshold	80.00 mg		Engine speed > 1,400 rpm	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Difference between Unmanaged Spark and PACS Spark is greater than threshold	34.58 degrees	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Commanded Predicted Engine Torque and its dual store do not match	N/A	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Zero pedal axle torque is out of bounds given by threshold range	High Threshold 998.00 Nm Low Threshold -1,497.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Creep Coast Axle Torque is out of bounds given by threshold range	High Threshold 998.00 Nm Low Threshold -1,497.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Absolute difference of Friction torque and its redundant calculation is out of bounds given by threshold range	132.90 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Arbitrated Air-Per-Cylinder filter coefficient is out of bounds given by threshold range	High Threshold 1.000 Low Threshold 0.074	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Launch spark is active but the launch spark redundant path indicates it should not be active	N/A		Engine speed < 7,800.00 or 7,900.00 rpm (hysteresis pair)	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Rate limited vehicle speed and its dual store do not equal	N/A		Time since first CAN message with vehicle speed >= 0.500 sec	10 / 20 counts; 25.0msec/count	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Commanded engine torque due to fast actuators and its dual store do not equal	N/A	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Commanded engine torque due to slow actuators and its dual store do not equal	N/A	Ignition State	Accessory, run or crank	Up/down timer 2,048 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 State	Accessory, run or crank	255 / 6 counts; 25.0msec/count	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Cylinders active greater than commanded	5 cylinders		Engine run flag = TRUE > 2.00 s Number of cylinder events since engine run > 24 No fuel injector faults active	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Transfer case neutral request from four wheel drive logic does not match with operating conditions	N/A	Ignition State	Accessory, run or crank Transfer case range valid and not over-ridden FWD Apps only	32 / 400 counts; 25.0msec/count	
			Driver progression mode and its dual store do not equal	N/A	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
							multipier	
			Predicted torque for uncorrected zero pedal determination is greater than calculated limit.	Table, f(Engine, Oil Temp). **P16F3_Speed Control External Load f(Oil Temp, RPM)** + 132.90 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Engine Predicted Request Without Motor is greater than its redundant calculation plus threshold	131.90 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Engine Immediate Request Without Motor is greater than its redundant calculation plus threshold	131.90 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
							down time multipier	
			Positive Torque Offset is greater than its redundant calculation plus threshold OR Positive Torque Offset is less than its redundant calculation minus threshold	132.90 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Commanded Predicted Engine Request is greater than its redundant calculation plus threshold	132.90 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, down time	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
							multipier 0.5	
			Commanded Hybrid Predicted Crankshaft Request is greater than its redundant calculation plus threshold	4,096.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Commanded Hybrid Immediate Crankshaft Request is less than its redundant calculation minus threshold	131.90 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Regeneration Brake Assist is not within a specified range	Brake Regen Assist < 0 Nm or Brake Regen Assist > 0.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Cylinder Spark Delta Correction exceeds the absolute difference as compared to Unadjusted Cylinder Spark Delta	34.58 degrees	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			1. Cylinder Torque Offset exceeds step size threshold OR	1. 132.90 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			2. Sum of Cylinder Torque Offset exceeds sum threshold	2. 132.90 Nm				
			Engine Capacity Minimum Immediate Without Motor is greater than its dual store plus threshold	132.90 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Engine Capacity Minimum Engine Off is greater than threshold	0 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor 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 State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Commanded Immediate Engine Request is greater than its redundant calculation plus threshold	132.90 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Engine Speed Lores Intake Firing (event based) calculation does not equal its redundant calculation	N/A		Engine speed greater than 0rpm	Up/down timer 2,048 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor 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 2,048 ms continuous, 0.5 down time multipier	
			Idle speed control calculated predicted minimum torque request exceeds calculated torque limit	Table, f(Oil Temp, RPM). See supporting tables: **P16F3_Speed Control External Load f(Oil Temp, RPM)** + 132.90 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Idle speed control calculated predicted minimum torque without reserves exceeds calculated torque limit	Table, f(Oil Temp, RPM). See supporting tables: **P16F3_Speed Control External Load f(Oil Temp, RPM)** +	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
				132.90 Nm				
			Difference between Driver Requested Immediate Torque primary path and its secondary exceeds threshold	998.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Driver Immediate Request is less than its redundant calculation minus threshold	998.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Commanded Immediate Request is greater than its redundant calculation plus threshold	998.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			OR Commanded Immediate Request is less than its redundant calculation minus threshold				multipier	
			Commanded Immediate Response Type is set to Inactive	N/A	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Difference between Cruise Axle Torque Arbitrated Request and Cruise Axle Torque Request exceeds threshold	124.75 Nm		Cruise has been engaged for more than 4.00 seconds	Up/down timer 2,048 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Desired engine torque request greater than redundant calculation plus threshold	131.90 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Engine min capacity above threshold	132.90 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			No fast unmanaged retarded spark above the applied spark plus the threshold	Table, f(RPM,APC). See supporting tables: **P16F3_Delta Spark Threshold f (RPM,APC)**		Engine speed greater than 0rpm	Up/down timer 2,048 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 State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
							multipier	
			1. Absolute difference of redundant calculated engine speed above threshold	500 RPM		Engine speed greater than 0 RPM	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			After throttle blade pressure and its dual store do not match	N/A	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Speed Control's Preditcted Torque Request and its dual store do not match	N/A	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Engine oil temperature and its dual store do not match	N/A	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Desired throttle position greater than redundant calculation plus threshold	10.00 percent	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Absolute difference of the rate limited pre-throttle pressure and its redundant calculation greater than threshold	0.06 kpa	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Throttle desired torque above desired torque plus threshold	132.90 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Desired filtered throttle torque exceeds the threshold plus the higher of desired throttle torque or modeled throttle torque	132.90 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 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 66.45 Nm Low Threshold -66.45 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Torque feedback integral term magnitude or rate of	High Threshold	Ignition State	Accessory, run or crank	Up/down timer 2,048	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			change is out of allowable range or its dual store copy do not match	124.59 Nm Low Threshold -132.90 Nm Rate of change threshold 8.31 Nm/loop			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 132.90 Nm Low Threshold - 132.90 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor 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 State	Accessory, run or crank	Up/down timer 2,048 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 0.0006730 Low Threshold - 0.0006730	Ignition State	Accessory, run or crank	Up/down timer 2,048 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 132.90 Nm Low Threshold - 132.90 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Accessory drive friction torque is out of bounds given by threshold range	High Threshold 132.90 Nm Low Threshold 0.00 Nm	Ignition State	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 0.00 Nm Low Threshold 0.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Difference of Oil temperature delta friction torque and its redundant	High Threshold 132.90	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous,	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			calculation is out of bounds given by threshold range	Nm Low Threshold - 132.90 Nm			0.5 down time multipier	
			Generator friction torque is out of bounds given by threshold range	High Threshold 132.90 Nm Low Threshold 0.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Absolute difference between the Supercharger friction torque and its redundant calculation greater than threshold	132.90 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			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 132.90 Nm Low Threshold -132.90 Nm Rate of change threshold 8.31 Nm/loop		Engine speed >0rpm MAF, MAP and Baro DTCs are false	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Torque error compensation is out of bounds given by threshold range	High Threshold 132.90 Nm Low Threshold 0.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor 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 1.32 Nm Low Threshold -1.27 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			1. Difference of reserve torque value and its redundant calculation exceed threshold OR 2. Reserve request does not agree with operating conditions or Difference of final predicted torque and its redundant calculation exeed threshold OR 3. Rate of change of reserve torque exceeds threshold, increasing direction only OR 4. Reserve engine torque	1. 131.90 Nm 2. N/A 3. 131.90 Nm 4. 131.90 Nm	3. & 4.: Ignition State	1. & 2.: Torque reserve (condition when spark control greater than optimum to allow fast transitions for torque disturbances) > 132.90 Nm 3. & 4.: Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			above allowable capacity threshold					
			Engine Vacuum and its dual store do not match	N/A	Ignition State	Accessory, run or crank	Up/down timer 2,048 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(Desired Engine Torque). See supporting tables: **P16F3_Delta MAP Threshold f(Desired Engine Torque)**		Engine speed >0rpm	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Min. Axle Torque Capacity is greater than threshold	-3,250.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Driver Predicted Request is greater than its redundant calculation plus threshold	998.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			OR Driver Predicted Request is less than its redundant calculation minus threshold				down time multipier	
			Cold Delta Friction Torque and its dual store do not match	N/A	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Predicted torque for zero pedal determination is greater than calculated limit.	Table, f(Oil Temp, RPM). See supporting tables: **Speed Control External Load f(Oil Temp, RPM)** + 132.90 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Commanded Predicted Axle Torque and its dual store do not match	1 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Steady State Estimated Engine Torque and its dual store are not equal	N/A		AFM not changing from Active to Inactive and preload torque not changing and one loop after React command Engine speed >0rpm	Up/down timer 2,048 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 > 0.20 s	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Difference of minimum spark advance limit and	34.58 degrees	Ignition State	Accessory, run or crank	Up/down timer 2,048	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			its redundant calculation is out of bounds given by threshold range				ms continuous, 0.5 down time multipier	
			Difference of commanded spark advance and adjusted delivered is out of bounds given by threshold range	34.58 degrees		Engine speed >0rpm	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Absolute difference between Estimated Engine Torque and its dual store are above a threshold	132.90 Nm		Engine speed >0rpm	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Absolute difference between Estimated Engine Torque without reductions due to torque control and its dual store are above a threshold	132.90 Nm		Engine speed >0rpm	Up/down timer 2,048 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Difference of desired spark advance for managed torque and its redundant calculation is out of bounds given by threshold range	34.58 degrees		Torque reserve (condition when spark control greater than optimum to allow fast transitions for torque disturbances) > 132.90 Nm	Up/down timer 2,048 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	133 Nm		Engine speed >0rpm	Up/down timer 2,048 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		Engine speed > 1,400 rpm	Up/down timer 2,048 ms continuous, 0.5 down time	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
				Threshold: 100 ms			multipier	
			Rate limited cruise axle torque request and its dual store do not match within a threshold	124.75 Nm	Ignition State	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 OR 2. Absolute difference of Calculated accelerator pedal position compensated for carpet learn and error conditions and its dual store do not equal	1. 5.00 % 2. N/A 3. N/A	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			OR 3. Absolute difference of Calculated accelerator pedal position and its dual store do not equal					
			Commanded axle torque is greater than its redundant calculation by threshold	998.00 Nm	Ignition State	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	1,497.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Preload timer and its redundant calculation do not equal	N/A	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						AFM apps only	down time multipier	
			AC friction torque is greater than commanded by AC control software	0.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Engine Speed Lores Intake Firing (time based) calculation does not equal its redundant calculation	N/A		Engine speed >0rpm	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Absolute difference of the calculated spark offset for equivalence ratio and its redundant cacluation is greater than a threshold	34.58 degrees		Engine speed >0rpm	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Transmission Torque Request cacluations do not equal their dual stores	N/A		Run or Crank = TRUE > 0.50 s	16 / 32 counts; 25.0msec/count	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Absolute difference of the predicted motor torque ACS and its redundant cacluation is greater than a threshold	0.01 Nm			Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Absolute difference of maximum throttle area and its redundant cacluation is greater than a threshold	15 mm2			Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Absolute difference of Desired TIAP and its redundant cacluation is greater than a threshold	5.00 kPa			Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Pedal learns and their redundant calculation do not equal		Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Throttle learns and their redundant calculation do not equal		Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Desired Throttle Position and its redundant calculation do not equal		Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Driver Intended Brake Torque Fault	P1B12	Detect a rolling count or protection value error in Driver Intended Brake Torque serial data	X of Y failure, or continuous criteria have been met for rolling count or protection errors for Driver Intended Brake Torque.			Propulsion System is active KeBRKI_b_TrqSerialData FailEnbl == 1 Value of KeBRKI_b_TrqSerialData FailEnbl is: 1 . (If 0, this test is disabled) Manufacturer Enable Counter is 0	10 / 16 counts or 0.488 seconds continuous; 25 ms/count in main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Powertrain Control Module (HPC) 2 Requested MIL Illumination	P1E00	Monitors the HPC 2 MIL request message to determine when the HPC has detected a MIL illuminating fault.	HPC 2 Emissions-Related DTC set			Time since power-up ≥ 3 seconds	Continuous	Type A, No MIL

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Camshaft Actuator Solenoid Circuit Low– Bank 1	P2088	Diagnoses the VVT system high side driver circuit for circuit faults.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.	Short to ground: ≤ 0.5 Ω to a voltage source within the Vehicle Ground Voltage Range relative to PWRGND	System supply voltage Output driver is commanded on Ignition switch is in crank or run position	> 11.00 Volts	20 failures out of 25 samples 250 ms /sample, continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Camshaft Actuator Solenoid Circuit High – Bank 1	P2089	Diagnoses the VVT system high side driver circuit for circuit faults.	The ECM detects that voltage is high during driver off state (indicates short to power or open circuit)	Short to power: ≤ 0.5 Ω impedance between signal and controller power Open Circuit: ≥ 200 K Ω impedance between signal and controller ground	System supply Output driver is commanded on Ignition switch is in crank or run position	> 11.00 Volts	20 failures out of 25 samples 250 ms /sample, continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Camshaft Actuator Solenoid Circuit Low – Bank 1	P2090	Diagnoses the VVT system high side driver circuit for circuit faults.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.	Short to ground: ≤ 0.5 Ω to a voltage source within the Vehicle Ground Voltage Range relative to PWRGND	System supply voltage Output driver is commanded on Ignition switch is in crank or run position	> 11.00 Volts	20 failures out of 25 samples 250 ms /sample, continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Camshaft Actuator Solenoid Circuit High – Bank 1	P2091	Diagnoses the VVT system high side driver circuit for circuit faults.	The ECM detects that voltage is high during driver off state (indicates short to power or open circuit)	Short to power: ≤ 0.5 Ω impedance between signal and controller power Open Circuit: ≥ 200 K Ω impedance between signal and controller ground	System supply voltage Output driver is commanded on Ignition switch is in crank or run position	> 11.00 Volts	20 failures out of 25 samples 250 ms /sample, continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Post Catalyst Fuel Trim System Low Limit Bank 1 (Too Rich)	P2096	Determines if the post catalyst O2 sensor based fuel control system is indicating a rich exhaust gas condition. If the rich condition is such that the control system utilizes all or most of its available low limit authority (low limit = -100% authority), then P2096 will set. The monitor can be calibrated to fail based on the Average Integral Offset % Authority, or based on the Average Integral Offset % Authority AND Average Total Offset % Authority. The Average Total Offset metric consists of the average of the Integral Offset+ Proportional Offset. Note: When the post catalyst O2 voltage is too rich, the post catalyst O2 integral and proportional offset control is decreased (negative % authority). This applies a lean bias to fuel control in an attempt to counteract the rich condition. A perfectly balanced control system (no rich	The Average Integral Offset % Authority AND The Average Total Offset % Authority (Note: any value greater than or equal to +100% effectively nullifies the Average Total Offset % Authority criteria) High Vapor Feature: The diagnostic is at risk of reporting a false fail when excessively High Vapor (HV) conditions are present. This HV condition is indicated when the purge valve is open AND percent vapor is >= 18 % for >= 5.0 seconds AND the % Authority metric is approaching the failure threshold. Diagnosis resumes if the purge valve is closed OR the percent vapor is <= 14 % for >= 5.0 seconds. This was done to minimize disabling the diagnostic for longer than necessary.	<= -99.0 % <= -50.0 %	The diagnostic is enabled during: Deceleration Idle Cruise Light Acceleration Heavy Acceleration Ambient Air Pressure Engine AirFlow Intake Manifold Pressure Induction Air Temperature Start-up Coolant Temp. PTO Intrusive diag. fuel control Long Term Secondary Fuel Trim Enabled for (see "**Long Term Secondary Fuel Trim Enable Criteria**" in Supporting Tables) High Vapor Conditions No Fault Active for:	 Yes Yes Yes Yes Yes >= 70 kPa >= 0.0 g/s <= 10,000.0 >= 10 kPa <= 255 >= -20 deg. C <= 150 >= -20 deg. C (or OBD Coolant Enable Criteria = TRUE) Not Active Not Active >= 0.0 seconds Not Present AmbientAirDefault AIR System FA Ethanol Composition Sensor FA ECT_Sensor_FA EGRValveCircuit_FA EGRValvePerformance_FA IAT_SensorFA CamSensorAnyLocationFA EvapEmissionSystem_FA EvapFlowDuringNonPurge_FA	Frequency: Continuous Monitoring in 100ms loop. The Integral and Total Offset % Authority metrics are sampled every 100ms and an average is calculated every 100.0 seconds (1,000 samples) before comparing to their respective failure thresholds.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		or lean bias required) is represented by integral and proportional offset values of "0" (i.e. 0% authority) and a post catalyst O2 sensor that is within it's optimal operating range (neither rich nor lean).				FuelTankPressureSnsrCkt_FA EvapPurgeSolenoidCircuit_FA EvapSmallLeak_FA EvapVentSolenoidCircuit_FA FuelInjectorCircuit_FA MAF_SensorFA MAF_SensorTFTKO MAP_SensorFA MAP_EngineVacuumStatus EngineMisfireDetected_FA A/F Imbalance Bank1 O2S_Bank_1_Sensor_1_FA O2S_Bank_1_Sensor_2_FA		
					For the cells identified as enabled (i.e. those containing a "Yes" at the beginning of the Enable Conditions column), the minimum accumulated samples required before the fuel control metric is considered usable for that cell (1 sample = 100ms): Deceleration Idle Cruise Light Acceleration Heavy Acceleration (Note: A value in any of the above operating "cells" that is an order of magnitude (or more) higher than other cells is	 10,000,000,272,564,200 10,000,000,272,564,200 300 300 300		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					an indication that the diagnostic is not capable of diagnosing in that cell).			

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Post Catalyst Fuel Trim System High Limit Bank 1 (Too Lean)	P2097	Determines if the post catalyst O2 sensor based fuel control system is indicating a lean exhaust gas condition. If the lean condition is such that the control system utilizes all or most of its available high limit authority (high limit = 100% authority), then P2097 will set. The monitor can be calibrated to fail based on the Average Integral Offset % Authority, or based on the Average Integral Offset % Authority AND Average Total Offset % Authority. The Average Total Offset metric consists of the average of the Integral Offset+ Proportional Offset. Note: When the post catalyst O2 voltage is too lean, the post catalyst O2 integral and proportional offset control is increased (positive % authority). This applies a rich bias to fuel control in an attempt to counteract the lean condition. A perfectly balanced control system (no rich	The Average Integral Offset % Authority AND The Average Total Offset % Authority (Note: any value less than or equal to -100% effectively nullifies the Average Total Offset % Authority criteria) High Vapor Feature: The diagnostic is at risk of reporting a false fail when excessively High Vapor (HV) conditions are present. This HV condition is indicated when the purge valve is open AND percent vapor is >= 18 % for >= 5.0 seconds. Diagnosis resumes if the purge valve is closed OR the percent vapor is <= 14 % for >= 5.0 seconds. This was done to minimize disabling the diagnostic for longer than necessary.	>= 99.0 % >= 50.0 %	Same as P2096	Same as P2096	Frequency: Continuous Monitoring in 100ms loop. The Integral and Total Offset % Authority metrics are sampled every 100ms and an average is calculated every 100.0 seconds (1,000 samples) before comparing to their respective failure thresholds.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		or lean bias required) is represented by integral and proportional offset values of "0" (i.e. 0% authority) and a post catalyst O2 sensor that is within it's optimal operating range (neither rich nor lean).						

Component/ System	Fault Code	Monitor 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. This is determined if the difference between measured throttle position and modeled throttle position is greater than a threshold or less than a threshold. This diagnostic only runs when the engine is running and the ignition voltage is high enough and there is not an ignition votage failure and the throttle position minimum learn is not active and the throttle is being controlled 2) Throttle control is driving the throttle in the incorrect direction. This is determined if the throttle position is greater than a threshold percent and the powertrain relay voltage is high enough and the throttle position minimum learn is active 3) Throttle control exceeds the reduced power limit. This is determined if the throttle position is greater and a threshold and the powertrain relay voltage is high enough and reduced power is active.	Difference between measured throttle position and modeled throttle position > OR Difference between modeled throttle position and measured throttle position >	10.00 percent 10.00 percent	TPS minimum learn is not active and Throttle is being Controlled and (Engine Running or Ignition Voltage > or Ignition Voltage >) Ignition voltage failure is false (P1682)	Run/Crank voltage > 6.41 Ignition voltage failure is false (P1682) TPS minimum learn is not active and Throttle is being Controlled AND ((Engine Running AND Ignition Voltage > 5.50) OR Ignition Voltage > 8.41)	15 counts; 12.5 ms/count in the primary processor	Type A, 1 Trips
			Throttle Position >	36.00 percent		Powertrain Relay voltage > 6.41 TPS minimum learn is active	11 counts; 12.5 ms/count in the primary processor	
			Throttle Position >	35.00 percent		Powertrain Relay voltage > 6.41 Reduced Power is True	11 counts; 12.5 ms/count in the primary processor	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Throttle Return to Default Performance	P2119	Throttle unable to return to default throttle position after de-energizing ETC motor.	(Normalized TPS1 Voltage > AND Normailzed TPS2 Voltage > On the main processor) OR (Normalized TPS1 Voltage < AND Normailzed TPS2 Voltage < On the main processor)	1.7560 1.7590 1.4340 1.4310		Throttle de-energized for Actuator, Controller, or Ignition Faults (P21104, P2100, P2101, P2102, P2103, P1682, P0068, P16F3) No TPS circuit faults PT Relay Voltage > 5.500 No 5V reference error or fault for # 4 5V reference circuit (P06A3)	0.4969 s	Type C, No SVS
			(Normalized TPS1 Voltage > AND Normailzed TPS2 Voltage > On the main processor) OR (Normalized TPS1 Voltage < AND Normailzed TPS2 Voltage < On the main processor)	1.7560 1.7590 1.4340 1.4310		Throttle de-energized for Battery Saver Mode Engine not running No TPS circuit faults PT Relay Voltage > 5.500 No 5V reference error or fault for # 4 5V reference circuit (P06A3)	1.5000 s	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Accelerator Pedal Position (APP) Sensor 1 Lo	P2122	Detects a continuous or intermittent short low or open in the APP sensor #1 by monitoring the APP1 sensor voltage and failing the diagnostic when the APP1 voltage is too low. This diagnostic only runs when battery voltage is high enough. Detects a continuous or intermittent short low or open in the APP sensor #1 on the Main processor.	APP1 Voltage <	0.4625		Run/Crank voltage > 6.41 No 5V reference error or fault for # 4 5V reference circuit (P06A3)	19 / 39 counts or 14 counts continuous; 12.5 ms/count in the main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Accelerator Pedal Position (APP) Sensor 1 Hi	P2123	Detects a continuous or intermittent short high in the APP sensor #1 by monitoring the APP1 sensor voltage and failing the diagnostic when the APP1 voltage is too high. This diagnostic only runs when battery voltage is high enough. Detect a continuous or intermittent short high in the APP sensor #1 on the Main processor.	APP1 Voltage >	4.7500		Run/Crank voltage > 6.41 No 5V reference error or fault for # 4 5V reference circuit (P06A3)	19 / 39 counts or 14 counts continuous; 12.5 ms/count in the main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Accelerator Pedal Position (APP) Sensor 2 Lo	P2127	Detects a continuous or intermittent short low or open in the APP sensor #2 by monitoring the APP2 sensor voltage and failing the diagnostic when the APP2 voltage is too low. This diagnostic only runs when battery voltage is high enough. Detects a continuous or intermittent short low or open in the APP sensor #2 on the Main processor.	APP2 Voltage <	0.3250		Run/Crank voltage > 6.41 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	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Accelerator Pedal Position (APP) Sensor 2 Hi	P2128	Detects a continuous or intermittent short high in the APP sensor #2 by monitoring the APP2 sensor voltage and failing the diagnostic when the APP2 voltage is too high. This diagnostic only runs when battery voltage is high enough. Detect a continuous or intermittent short high in the APP sensor #2 on the Main processor.	APP2 Voltage >	2.6000		Run/Crank voltage > 6.41 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	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Throttle Position (TP) Sensor 1-2 Correlation	P2135	Detect a continuous or intermittent correlation fault between TPS sensors #1 and #2 on Main processor. 1.) The diagnostic monitors the difference in position between TPS1 and the TPS2 and fails the diagnostic when the difference is too high. This diagnostic only runs when the battery voltage is high enough. 2.) The diagnostic monitors the difference in reference voltage between normalized min TPS1 and the normalized min TPS2 and fails the diagnostic when the difference is too high. This diagnostic only runs when the battery voltage is high enough. Detects a continuous or intermittent correlation fault between TPS sensors #1 and #2 on Main processor	Difference between TPS1 displaced and TPS2 displaced >	6.797 % offset at min. throttle position with a linear threshold to 9.720 % at max. throttle position		Run/Crank voltage > 6.41 No TPS sensor faults (P0122, P0123, P0222, P0223) No 5V reference error or fault for # 4 5V reference circuit (P06A3)	79 / 159 counts or 58 counts continuous; 3.125 ms/count in the main processor	Type A, 1 Trips
			Difference between (normalized min TPS1) and (normalized min TPS2) >	5.000 % Vref		Run/Crank voltage > 6.41 No TPS sensor faults (P0122, P0123, P0222, P0223) No 5V reference error or fault for # 4 5V reference circuit (P06A3)	79 / 159 counts or 58 counts continuous; 3.125 ms/count in the main processor	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Accelerator Pedal Position (APP) Sensor 1-2 Correlation	P2138	Detect a continuous or intermittent correlation fault between APP sensors #1 and #2 on Main processor. 1.) The diagnostic monitors the difference in position between APP1 and the APP2 and fails the diagnostic when the difference is too high. This diagnostic only runs when the battery voltage is high enough. 2.) The diagnostic also monitors the difference in reference voltage between normalized min APP1 and the normalized min APP2 and fails the diagnostic when the difference is too high. This diagnostic only runs when the battery voltage is high enough. Detects a continuous or intermittent correlation fault between APP sensors #1 and #2 on Main processor	Difference between APP1 displaced and APP2 displaced >	5.000 % offset at min. pedal position with a linear threshold to 10.001 % at max. pedal position		Run/Crank voltage > 6.41 No APP sensor faults (P2122, P2123,P2127, P2128) No 5V reference errors or faulst for # 3 & # 4 5V reference circuits (P06A3, P0697)	19 / 39 counts intermittent or 15 counts continuous, 12.5 ms/count in the main processor	Type A, 1 Trips
			Difference between (normalized min APP1) and (normalized min APP2) >	5.000 % Vref		Run/Crank voltage > 6.41 No APP sensor faults (P2122, P2123,P2127, P2128) No 5V reference errors or faulst for # 3 & # 4 5V reference circuits (P06A3, P0697)	19 / 39 counts intermittent or 15 counts continuous, 12.5 ms/count in the main processor	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 1 high side circuit shorted to ground	P2147	This DTC Determines if high Voltage across High Side Driver during On state indicates short to ground on Injector 1 circuit. short to ground is determine by the high current through high side driver.	Voltage high across High Side Driver during On state indicates short to ground	Short to Ground: 25 amp >= through High Side Driver	Battery Voltage Engine Run Time	>= 11 Volts >= 2 Seconds P062B not FA or TFTK	10 failures out of 20 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 1 high side circuit shorted to power	P2148	This DTC Determines if low Voltage across High side drive during off state indicates short to power on Injector 1 circuit. short to power is determine by the low voltage between signal and controller power.	Voltage low across High side drive during off state indicates short to power.	Short to Power: ≤ 1 volt between signal and controller power	Battery Voltage Engine Run Time	>= 11 Volts >= 2 Seconds P062B not FA or TFTK	10 failures out of 20 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 2 high side circuit shorted to ground	P2150	This DTC Determines if high Voltage across High Side Driver during On state indicates short to ground on Injector 2 circuit. short to ground is determine by the high current through high side driver.	Voltage high across High Side Driver during On state indicates short to ground	Short to Ground: 25 amp >= through High Side Driver	Battery Voltage Engine Run Time	>= 11 Volts >= 2 Seconds P062B not FA or TFTK	10 failures out of 20 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 2 high side circuit shorted to power	P2151	This DTC Determines if low Voltage across High side drive during off state indicates short to power on Injector 2 circuit. short to power is determine by the low voltage between signal and controller power.	Voltage low across High side drive during off state indicates short to power.	Short to Power: ≤ 1 volt between signal and controller power	Battery Voltage Engine Run Time	>= 11 Volts >= 2 Seconds P062B not FA or TFTK	10 failures out of 20 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 3 high side circuit shorted to ground	P2153	This DTC Determines if high Voltage across High Side Driver during On state indicates short to ground on Injector 3 circuit. short to ground is determine by the high current through high side driver.	Voltage high across High Side Driver during On state indicates short to ground	Short to Ground: 25 amp >= through High Side Driver	Battery Voltage Engine Run Time	>= 11 Volts >= 2 Seconds P062B not FA or TFTK	10 failures out of 20 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 3 high side circuit shorted to power	P2154	This DTC Determines if low Voltage across High side drive during off state indicates short to power on Injector 3 circuit. short to power is determine by the low voltage between signal and controller power.	Voltage low across High side drive during off state indicates short to power.	Short to Power: ≤ 1 volt between signal and controller power	Battery Voltage Engine Run Time	>= 11 Volts >= 2 Seconds P062B not FA or TFTK	10 failures out of 20 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 4 high side circuit shorted to ground	P2156	This DTC Determines if high Voltage across High Side Driver during On state indicates short to ground on Injector 4 circuit. short to ground is determine by the high current through high side driver.	Voltage high across High Side Driver during On state indicates short to ground	Short to Ground: 25 amp >= through High Side Driver	Battery Voltage Engine Run Time	>= 11 Volts >= 2 Seconds P062B not FA or TFTK	10 failures out of 20 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 4 high side circuit shorted to power	P2157	This DTC Determines if low Voltage across High side drive during off state indicates short to power on Injector 4 circuit. short to power is determine by the low voltage between signal and controller power.	Voltage low across High side drive during off state indicates short to power.	Short to Power: ≤ 1 volt between signal and controller power	Battery Voltage Engine Run Time	>= 11 Volts >= 2 Seconds P062B not FA or TFTK	10 failures out of 20 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Vehicle Speed – Output Shaft Speed Correlation	P215B	Detect invalid vehicle speed source.	The absolute difference between wheel speed vehicle speed and TOS vehicle speed greater than > OR Secure vehicle speed source is unavailable	6.21 mph		Time since first CAN activity > 0.5000 s Secure vehicle speed source is TOS vehicle speed or wheel speed vehicle speed Trans engaged state is equal to engaged.	400 / 800 counts for wheel speed correlation or 400 / 800 counts for TOS correlation; 25ms/count	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Minimum Throttle Position Not Learned	P2176	Detect when the throttle position minimum learn on the main processor is not learned. This diagnostic detects this by monitoring if the throttle position is greater than a threshold and the number of learn attempts is greater than a threshold. This diagnostic only runs when the battery voltage is high enough and the throttle position minimum learn is active. Throttle position 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 > AND Number of learn attempts >	0.5740 10 counts		Run/Crank voltage > 6.41 TPS minimum learn is active No previous TPS min learn values stored in long term memory	2.0 secs	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cooling System Performance	P2181	This DTC detects thermostat malfunction (i.e. stuck open)	This diagnostic can be calibrated to fail in oneof two methods based on the following calibration. This application has been calibrated as a Type 1 . Type 0 - Airflow Method: Engine Coolant Temp (ECT) is ≤ commanded temperature minus 11 °C and normalized ratio is == Ratio Definition:=== Current temp difference between ECT and RCT minus PwrUp difference divided by total airgrams. Note: Minimum total airgrams is 500.0 grams. Type 1 - Energy Method: Engine Coolant Temp (ECT) is ≤ commanded temperature minus 11 °C and normalized ratio is == Ratio Definition:=== Current temp difference between ECT and RCT minus PwrUp difference divided by predicted energy.	 ≤ 2.00 ≤ 7.00	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 for Type 0: Airflow range to accumulate Type 1: Minumum energy to enable	MAF_SensorFA IAT_SensorFA THMR_RCT_Sensor_Ckt_FA THMR_ECT_Sensor_Ckt_FA THMR_AHV_FA ≥ 14,400 seconds 30 ≤ Time ≤ 1,370 seconds Ethanol ≤ 87 % -10.0 ≤ ECT ≤ 59.0 °C -7 °C ≤ IAT ≤ 60 °C. ≤ 50 % ≤ 5 seconds 12.5 ≤ Airflow ≤ 100.0 gps 250.0 kJ	70 failures out of 100 samples 1 sec/ sample Once per ignition key cycle	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Air Temperature Sensor 1 / 2 Correlation	P2199	Detects a difference between the IAT and IAT2 sensors	ABS (IAT - IAT2)	> 55.0 deg C	Powertrain Relay Voltage for a time No Active DTCs:	>= 11.0 Volts >= 0.9 seconds PowertrainRelayFault	40 failures out of 50 samples 1 sample every 100 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Bank 1 Air-Fuel Ratio Imbalance	P219A	This monitor determines if there is an Air Fuel Imbalance in the fueling system for a cylinder on a Bank 1. Detection is based on a the pre catalyst oxygen sensor voltage. The pre catalyst voltage is used to generate a variance metric that represents the statistical variation of the O2 sensor voltage over a given engine cycle. This metric is proportional to the air-fuel ratio imbalance (variance is higher with an imbalance than without). Multiple samples are collected in making a decision then normalized and calculated into a EWMA filtered ratio that is compared to the failure limit to set the fault.	Filtered Ratio > Note: The input to this metric is the pre catalyst oxygen sensor voltage. This voltage is used to generate a Variance metric that represents the statistical variation of the O2 sensor voltage over a given engine cycle. This metric is proportional to the air-fuel ratio imbalance (variance is higher with an imbalance than without). Multiple samples are collected in making a decision. The observed Variance is dependant on engine speed and load and so each result is normalized for speed and load by comparing it to a known "good system" result for that speed and load, and generating a Ratio metric. The Ratio metric is calculated by selecting the appropriate threshold calibration from a 17x17 table (see Supporting Table **P219A Variance Threshold Bank1 Table**) and subtracting it from the measured Variance. The result is then divided by a normalizer calibration	0.60 If the diagnostic has reported a failure on the prior trip, the Filtered Ratio must fall below 0.25 in order to report a pass. This feature prevents the diagnostic from toggling between failing and passing when the Filtered Ratio remains near the initial failure threshold of 0.60 .	System Voltage Fuel Level Engine Coolant Temperature Cumulative engine run time Diagnostic enabled at Idle (regardless of other operating conditions) Engine speed range Engine speed delta during a short term sample period Mass Airflow (MAF) range Cumulative delta MAF during a short term sample period Filtered MAF delta between samples Note: first order lag filter coefficient applied to MAF = 0.050 Air Per Cylinder (APC) APC delta during short term sample period	no lower than 9.0 Volts for more than 0.2 seconds > 10.0 percent AND no fuel level sensor fault > -20 deg. C (or OBD Coolant Enable Criteria = TRUE) > 0.0 seconds Yes 0 to 10,000 RPM < 1,000 RPM 0 to 10,000 g/s < 1,000 g/s < 1,000.00 g/s 0 to 10,000 mg/cylinder < 1,000 mg/cylinder	Minimum of 1 test per trip, up to 8 tests per trip during RSR or FIR. The front O2 sensor voltage is sampled once per cylinder event. Therefore, the time required to complete a single test (when all enable conditions are met) decreases as engine speed increases. For example, 41.40 seconds of data is required at 1000 rpm while double this time is required at 500 rpm and half this time is required at 2000 rpm. This data is collected only when enable conditions are met, and as such significantly more operating time is required than is indicated above. Generally, a report will be	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			from another 17 x 17 table (see Supporting Table **P219A Normalizer Bank1 Table**). This quotient is then multiplied by a quality factor calibration from a 17 x 17 table (see Supporting Table **P219A Quality Factor Bank1 Table**). This result is referred to as the Ratio. Note that the quality factor ranges between 0 and 1 and represents robustness to false diagnosis in the current operating region. Regions with low quality factors are not used. Finally, a EWMA filter is applied to the Ratio metric to generate the Filtered Ratio malfunction criteria metric. Generally, a normal system will result in a negative Filtered Ratio while a failing system will result in a positive Filtered Ratio. The range of the Filtered Ratio metric is application specific since both the emissions sensitivity and relationship between imbalance and the Variance metric are application specific. Some applications may		Filtered APC delta between samples Note: first order lag filter coefficient applied to APC = 1.000 Spark Advance Throttle Area (percent of max) Intake Cam Phaser Angle Exhaust Cam Phaser Angle Quality Factor (QF) QF calibrations are located in a 17x17 lookup table versus engine speed and load (see Supporting Table **P219A Quality Factor Bank1 Table**). QF values less than “1” indicate that we don’t have 4sigma/2sigma robustness in that region. The quality of the data is determined via statistical analysis of Variance data. Fuel Control Status Closed Loop and Long Term FT Enabled for:	< 100.00 percent 0 to 100 degrees 0 to 200 percent 0 to 100 degrees 0 to 100 degrees >= 0.89 >= 1.2 seconds (Please see "**Closed Loop Enable Clarification**" and "**Long Term FT Enable Criteria**" in Supporting Tables)	made within 5 minutes of operation. For RSR or FIR, 16 tests must complete before the diagnostic can report.	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			need to command a unique cam phaser value before performing the above calculations since cam phasing has been shown to have an impact on overall signal quality. This application Does Not Use this feature.		Device Control AIR pump CASE learn EGR EVAP Engine OverSpeed Protection Idle speed control PTO Injector base pulse width O2 learned htr resistance Rapid Step Response (RSR): RSR will trigger if the Ratio result from the last test is AND it exceeds the last Filtered ratio by Once triggered, the filtered ratio is reset to: Fast Initial Response (FIR): FIR will trigger when an NVM reset or code clear occurs. Once triggered, the filtered ratio is reset to: No Fault Active for:	Not active Not on Not active Not intrusive Not intrusive Not Active Normal Not Active Above min pulse limit = Valid (the O2 heater resistance has learned since NVM reset) >= 0.60 >= 0.30 0.00 0.00 EngineMisfireDetected_FA MAP_SensorFA MAF_SensorFA ECT_Sensor_FA		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						TPS_ThrottleAuthorityDefaulted FuelInjectorCircuit_FA AIR System FA EvapExcessPurgePsbl_FA CamSensorAnyLocationFA FuelTrimSystemB1_FA O2S_Bank_1_Sensor_1_FA O2S_Bank_1_Sensor_2_FA WRAF_Bank_1_FA		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Barometric Pressure (BARO) Sensor Performance (naturally aspirated)	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	> 15.0 kPa <= 1.06 miles > 20.0 kPa > 1.06 miles	No Active DTCs:	AmbPresSnsrCktFA IAT_SensorFA MAF_SensorFA AfterThrottlePressureFA TPS_FA TPS_Performance_FA VehicleSpeedSensor_FA	320 failures out of 400 samples 1 sample every 12.5 msec	Type B, 2 Trips
			Barometric Pressure OR Barometric Pressure	< 50.0 kPa > 115.0 kPa	Time between current ignition cycle and the last time the engine was running Engine is not rotating No Active DTCs: No Pending DTCs:	> 10.0 seconds EngineModeNotRunTimer Error MAP_SensorCircuitFA AAP_SnsrCktFA MAP_SensorCircuitFP AAP_SnsrCktFP	4 failures out of 5 samples 1 sample every 12.5 msec	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Barometric Pressure (BARO) Sensor Circuit Low (non-boosted applications, Gen III)	P2228	Detects a continuous short to low in either the signal circuit or the BARO sensor.	BARO Voltage	< 39.3 % of 5 Volt Range (2.0 Volts = 50.0 kPa)			320 failures out of 400 samples 1 sample every 12.5 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Barometric Pressure (BARO) Sensor Circuit High (non-boosted applications, Gen III)	P2229	Detects an open sensor ground, continuous short to high or open in either the signal circuit or the BARO sensor.	BARO Voltage	> 90.0 % of 5 Volt Range (4.5 Volts = 115.0 kPa)			320 failures out of 400 samples 1 sample every 12.5 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Barometric Pressure (BARO) Sensor Circuit Intermittent	P2230	Detects a noisy or erratic barometric pressure input	String Length Where: "String Length" = sum of "Diff" calculated over And where: "Diff" = ABS(current BARO reading - BARO reading from 12.5 milliseconds previous)	> 100 kPa 80 consecutive BARO samples			4 failures out of 5 samples Each sample takes 1.0 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor 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	< 760 mvolts > 60 grams	No Active DTC's B1S2 DTC's Not active this key cycle System Voltage Learned heater resistance ICAT MAT Burnoff delay Green O2S Condition	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA Ethanol Composition Sensor FA P013A, P013B, P013E, P013F, P2270 or P2271 > 10.0 Volts = Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's") = Not Valid = Not Valid, See definition of **Multiple DTC Use_Green Sensor Delay Criteria - Airflow** and **Multiple DTC Use_Green Sensor Delay Criteria - Limit** for the following locations: B1S2, B2S2 (if applicable) 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.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Low Fuel Condition Only when FuelLevelDataFault Pedal position Engine Airflow Closed loop integral Closed Loop Active Evap Ethanol Post fuel cell Crankshaft Torque EGR Intrusive diagnostic All post sensor heater delays O2S Heater (post sensor) on Time Predicted Catalyst temp Fuel State ========== All of the above met for at least 0.0 seconds, and then check the following Engine Speed to initially enable test	= False = False <= 100.0 % 2 <= gps <= 50 0.92 <= C/L Int <= 1.08 = TRUE (Please see "**Closed Loop Enable Clarification**" in Supporting Tables). not in control of purge not in estimate mode = Enabled, refer to **Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests** for additional info. < 125.0 Nm = not active = not active >= 60.0 sec 550 <= ºC <= 910 = DFCO possible ========== 1,100 <= RPM <= 3,500		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Engine Speed range to keep test enabled (after initially enabled) Vehicle Speed to initially enable test Vehicle Speed range to keep test enabled (after initially enabled) ========== All of the above met for at least 2.0 seconds, and then the Force Cat Rich intrusive stage is requested. ========== During Stuck Lean test the following must stay TRUE or the test will abort: Commanded Fuel Crankshaft Torque	1,000 <= RPM <= 3,650 31.1 <= MPH <= 77.7 24.9 <= MPH <= 80.8 0.96 <= EQR <= 1.08 < 110.0 Nm		

Component/ System	Fault Code	Monitor 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 > 6.0 grams	No Active DTC's B1S2 DTC's Not Active this key cycle System Voltage Learned heater resistance ICAT MAT Burnoff delay Green O2S Condition	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA Ethanol Composition Sensor FA P013A, P013B, P013E, P013F or P2270 > 10.0 Volts = Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's") = Not Valid = Not Valid, See definition of **Multiple DTC Use_Green Sensor Delay Criteria - Airflow** and **Multiple DTC Use_Green Sensor Delay Criteria - Limit** for the following locations: B1S2, B2S2 (if applicable) 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.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Low Fuel Condition Only when FuelLevelDataFault Fuel State DTC's Passed ========== After above conditions are met: DFCO mode is continued (wo driver initiated pedal input).	= False = False = DFCO possible = P2270 = P013E = P013A ==========		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
SIDI High Pressure Pump	P228C	This DTC determines if the high pressure pump is not able to maintain target pressure. The fault is set if the measured fuel rail pressure is lower than desired fuel pressure by a value that can impact emission and drivability.	Desired Pressure - Measure Pressure	>= 3.00 Mpa	High Pressure Pump Performance Diagnostic Enable Battery Voltage Low Side Fuel Pressure Engine Run Time Additional Enable Conditions: All must be true (High Pressure Pump is enabled and High Fuel pressure sensor ckt is Not (FA,FP or TFTKO) and High Pressure fuel pump ckt is Not (FA,FP or TFTKO) andCam or Crank Sensor Not FA and IAT,IAT2,ECT Not FA and Low side Fuel Pump Relay ckt Not FA and Estimate fuel rail pressure is valid and Green Engine (In assembly plant) is not enabled and Not if low fuel condition and Low side Fuel Pump is on and Injector Flow Test is not active and Device control commanded pressure is	True >= 11 Volts > 0.300 MPa >= **P0089 - P163A - P228C - P228D - P0191 - KtFHPD_t_PumpCntrlEngRunThrsh** (see supporting tables) Enabled when a code clear is not active or not exiting device control Engine is not cranking	Pressure Error - 750 0 failures out of 938 samples 4 samples per engine rotaion	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					false and Device control pump ckt enabled on is false and Engine movement detected is true and Manufacturers enable counter is 0) Flex Fuel Sensor Not FA Ignition voltage out of correlation error(P1682) not active Barometric Pressure Inlet Air Temp Fuel Temp	 >= 70.0 KPA >= -10.0 degC -10 <=Temp degC <= 132		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
SIDI High Pressure Pump	P228D	This DTC determines if the high pressure pump is delivering high pressure that desired pressure. The fault is set if the measured fuel rail pressure is higher than desired fuel pressure by a value that can impact emission and drivability.	Desired Pressure - Measure Pressure	<= -3.00 Mpa	High Pressure Pump Performance Diagnostic Enable Battery Voltage Low Side Fuel Pressure Engine Run Time Additional Enable Conditions: All must be true (High Pressure Pump is enabled and High Fuel pressure sensor ckt is Not (FA,FP or TFTKO) and High Pressure fuel pump ckt is Not (FA,FP or TFTKO) and Cam or Crank Sensor Not FA and IAT,IAT2,ECT Not FA and Low side Fuel Pump Relay ckt Not FA and Estimate fuel rail pressure is valid and Green Engine (In assembly plant) is not enabled and Not if low fuel condition and Low side Fuel Pump is on and Injector Flow Test is not active and Device control	True >= 11 Volts > 0.300 MPa >= **P0089 - P163A - P228C - P228D - P0191 - KtFHPD_t_PumpCntrlEngRunThrsh** (see supporting tables) Enabled when a code clear is not active or not exiting device control Engine is not cranking	Pressure Error - 750 failures out of 938 samples 4 samples per engine rotaion	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					commanded pressure is false and Device control pump ckt enabled on is false and Engine movement detected is true andManufacturers enable counter is 0) Flex Fuel Sensor Not FA Ignition voltage out of correlation error(P1682) not active Barometric Pressure Inlet Air Temp Fuel Temp	 >= 70.0 KPA >= -10.0 DegC -10 <= Temp degC <= 132		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #1 CIRCUIT LOW	P2300	Diagnoses Cylinder #1 Ignition Control (EST) output driver circuit for a Short to Ground fault	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match. Voltage low during driver high state (indicates short-to-ground)	 ≤ 100 Ω impedance between signal and controller ground	Engine running Ignition Voltage	 > 11.0	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #1 CIRCUIT High	P2301	Diagnoses Cylinder #1 Ignition Control (EST) output driver circuit for a Short to Power fault	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match. Voltage high during driver low state (indicates short-to-power)	 ≤ 100 Ω impedance between signal and controller power	Engine running Ignition Voltage	 > 11.0 Volts	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #2 CIRCUIT Low	P2303	Diagnoses Cylinder #2 Ignition Control (EST) output driver circuit for a Short to Ground fault	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match. Voltage low during driver high state (indicates short-to-ground)	 ≤ 100 Ω impedance between signal and controller ground	Engine running Ignition Voltage	 > 11.0 Volts	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #2 CIRCUIT High	P2304	Diagnoses Cylinder #2 Ignition Control (EST) output driver circuit for a Short to Power fault	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match. Voltage high during driver low state (indicates short-to-power)	 ≤ 100 Ω impedance between signal and controller power	Engine running Ignition Voltage	 > 11.0 Volts	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #3 CIRCUIT Low	P2306	Diagnoses Cylinder #3 Ignition Control (EST) output driver circuit for a Short to Ground fault	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match. Voltage low during driver high state (indicates short-to-ground)	 ≤ 100 Ω impedance between signal and controller ground	Engine running Ignition Voltage	 > 11.0 Volts	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #3 CIRCUIT High	P2307	Diagnoses Cylinder #3 Ignition Control (EST) output driver circuit for a Short to Power fault	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match. Voltage high during driver low state (indicates short-to-power)	 ≤ 100 Ω impedance between signal and controller power	Engine running Ignition Voltage	 > 11.0 Volts	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #4 CIRCUIT Low	P2309	Diagnoses Cylinder #4 Ignition Control (EST) output driver circuit for a Short to Ground fault	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match. Voltage low during driver high state (indicates short-to-ground)	 ≤ 100 Ω impedance between signal and controller ground	Engine running Ignition Voltage	 > 11.0 Volts	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #4 CIRCUIT High	P2310	Diagnoses Cylinder #4 Ignition Control (EST) output driver circuit for a Short to Power fault	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match. Voltage high during driver low state (indicates short-to-power)	 ≤ 100 Ω impedance between signal and controller power	Engine running Ignition Voltage	 > 11.0 Volts	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Evaporative Emission System Leak Detection Pump Control Open Circuit (ELCP Sealed Fuel System)	P2400	Diagnoses the leak detection pump low side driver circuit for circuit faults.	Voltage low during driver off state (indicates open circuit)	Open circuit: ≥ 200 K Ω impedence between signal and controller ground			20 failures out of 25 samples 250 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Evaporative Emission System Leak Detection Pump Control Circuit Low (ELCP Sealed Fuel System)	P2401	Diagnoses the leak detection pump low side driver circuit for circuit faults.	Voltage low during driver off state (indicates short to ground)	Short to ground: ≤ 0.5 Ω impedence between signal and controller ground			20 failures out of 25 samples 250 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Evaporative Emission System Leak Detection Pump Control Circuit High (ELCP Sealed Fuel System)	P2402	Diagnoses the leak detection pump low side driver circuit for circuit faults. If the P2402 is active, an intrusive test is performed with the pump commanded on for 15 seconds.	Voltage low during driver on state (indicates short to power)	Short to power: ≤ 0.5 Ω impedence between signal and controller power			20 failures out of 25 samples 250 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Evaporative Emission System Switching Valve Control Open Circuit (ELCP Sealed Fuel System)	P2418	Diagnoses the switching valve low side driver circuit for circuit faults.	Voltage low during driver off state (indicates open circuit)	Open circuit: ≥ 200 K Ω impedence between signal and controller ground			20 failures out of 25 samples 250 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Evaporative Emission System Switching Valve Control Circuit Low (ELCP Sealed Fuel System)	P2419	Diagnoses the switching valve low side driver circuit for circuit faults.	Voltage low during driver off state (indicates short to ground)	Short to ground: ≤ 0.5 Ω impedence between signal and controller ground			20 failures out of 25 samples 250 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Evaporative Emission System Switching Valve Control Circuit High (ELCP Sealed Fuel System)	P2420	Diagnoses the switching valve low side driver circuit for circuit faults. If the P2420 is active, an intrusive test is performed with the switching valve commanded on for 15 seconds.	Voltage low during driver on state (indicates short to power)	Short to power: ≤ 0.5 Ω impedence between signal and controller power			20 failures out of 25 samples 250 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
EVAP System Vent Valve Stuck Closed (ELCP Sealed Fuel System)	P2422	This DTC detects a Diurnal Control Valve (DCV) that is stuck closed.There are two ways to run this diagnostic depending on the amount of pressure or vacuum in the fuel tank system.	When sufficient pressure or vacuum exists in the fuel tank system When the Fuel Tank Pressure (FTP) sensor indicates a pressure or a vacuum With the DCV commanded opened, if the change in the FTP sensor reading is after then the DCV is stuck closed and the DTC fails. When no pressure or vacuum exists in the fuel tank system When the FTP sensor indicates a pressure or a vacuum With the DCV commanded opened, the ELCP switching valve in the pump position and the ELCP vacuum pump commanded on, if the leak between result minus the ELCP pressure sensor (gauge) vacuum reading is after then the DCV is stuck	 > 697 Pa < -697 Pa. < 249 Pa 10 seconds < 697 Pa > -697 Pa. < 300 Pa 5 seconds	Propulsion system not active time Distance since assembly plant Drive distance Min baro Max baro Min fuel level Max fuel level ECT Min IAT Max IAT Time since last test when passing P0442/P0455 Time since last test when failing P0442/P0455 ********** ELCP hardware can be powered by battery or powertrain relay. For this application the ELCP hardware is powered by battery Voltage ********** Vehicle speed Vehicle not in assembly plant (value must = 0) Propulsion system not active time Previous propulsion system active time Abort Conditions: Min fuel level slosh Max fuel level slosh Key up during test	4.3 ≤ time ≤ 5.8 hours or 6.0 ≤ time ≤ 8.1 hours or 8.2 ≤ time ≤ 11.0 hours ≥ 9.9 miles ≥ 0.1 miles ≥ 70 kPa ≤ 110 kPa ≥ 10 % ≤ 90 % ≤ 40 °C ≥ 4 °C ≤ 45 °C ≥ 0 hours ≥ 0 hours ********** ≥ 10 volts ********** ≤ 3 MPH 0 ≥ 0 seconds ≥ 0 seconds ≥ 190 % ≤ 200 %	Up to once per trip, for each required wake-up event 100 msec loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			closed and the DTC fails.		Refueling request button pressed Service bay test active Device control exceeds No Active DTC's No Active DTC's TFTKO	 0.5 seconds FuelLevelDataFault IAT_SensorFA ECT_Sensor_FA VehicleSpeedSensor_FA AmbientAirDefault VentCircuit_FA ELCPCircuit_FA FTP_SensorCircuit_FA ELCP_PumpCircuit_FA ELCP_SwitchCircuit_FA VICM_WakeupDiag_FA VICM_WakeupDiag_TFTKO LostCommBCM_FA LostCommBusB_VICM_FA CommBusAOff_VICM_FA CommBusBOff_VICM_FA AccCktLo_FA ModuleOffTime_FA P043E P043F P0451 P145C P145D P1462 P2421 P2450 P24B9		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
ELCP Switching Valve Control Performance (ELCP Sealed Fuel System)	P2450	This DTC detects a ELCP switching valve that is stuck.	When the ELCP vacuum pump is commanded on and the ELCP switching valve transitions from vent to pump position, if the difference between the 1st 0.020” orifice reference vacuum measurement and the ELCP pressure sensor (gauge) vacuum reading is after then the ELCP switching value is stuck and the DTC fails.	< 400 Pa 5 seconds	Propulsion system not active time Distance since assembly plant Drive distance Min baro Max baro Min fuel level Max fuel level ECT Min IAT Max IAT Time since last test when passing P0442/P0455 Time since last test when failing P0442/P0455 ********** ELCP hardware can be powered by battery or powertrain relay. For this application the ELCP hardware is powered by battery Voltage ********** Vehicle speed Vehicle not in assembly plant (value must = 0) Propulsion system not active time Previous propulsion system active time Abort Conditions:	4.3 ≤ time ≤ 5.8 hours or 6.0 ≤ time ≤ 8.1 hours or 8.2 ≤ time ≤ 11.0 hours ≥ 9.9 miles ≥ 0.1 miles ≥ 70 kPa ≤ 110 kPa ≥ 10 % ≤ 90 % ≤ 40 °C ≥ 4 °C ≤ 45 °C ≥ 0 hours ≥ 0 hours ********** ≥ 10 volts ********** ≤ 3 MPH 0 ≥ 0 seconds ≥ 0 seconds	Up to once per trip, for each required wake-up event 100 msec loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Min fuel level slosh Max fuel level slosh Key up during test Refueling request button pressed Service bay test active Device control exceeds No Active DTC's No Active DTC's TFTKO	≥ 190 % ≤ 200 % 0.5 seconds FuelLevelDataFault IAT_SensorFA ECT_Sensor_FA VehicleSpeedSensor_FA AmbientAirDefault VentCircuit_FA ELCPCircuit_FA FTP_SensorCircuit_FA ELCP_PumpCircuit_FA ELCP_SwitchCircuit_FA VICM_WakeupDiag_FA VICM_WakeupDiag_TFTKO LostCommBCM_FA LostCommBusB_VICM_FA CommBusAOff_VICM_FA CommBusBOff_VICM_FA AccCktLo_FA ModuleOffTime_FA P043E P043F P0451 P145C P145D P1462 P2422 P24B9		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
EGR Cooler Efficiency (Performanc e)	P2457	Diagnose EGR Cooler Heat Transfer Efficiency	The ECM monitors the heat transfer efficiency from the exhaust gas to the coolant. if the efficiency drops below a calibrated level, teh fault is set.	**Calculated instatnaneous efficiency:** {}{ ((Up Stream temp - Down Stream temp) / (Up Sream temp - Coolant temp)) % + **EGR Efficiency Flow Offset** } **SUM over** 800 **samples:** **Determine Average efficiency:** Summation efficiency / 800 samples **Fail Threshold:** < 80.00 % efficient	Ignition switch is in crank or run position System supply voltage Up stream exhaust gas temperature RPM BARO AMBIENT TEMPERATURE OBD coolant temp reached No Active DTCs	 > 11.00 Volts > 200 C < 370 C > 1,200 RPM < 4,000 RPM > 70 kPa > -7 C P041E, P041C, P041D, P041B, P040E, P040C P040D, P040B, P0070, P0071, P0072, P0073, P2229, P2228, P222C, P222D, P0116, P0117, P0118, P0119, P111E P0128, P0101, P0102, P0103, P010B, P010C, P010D, P0403, P0489, P0490, P0404, P0405, P0406, P042E, P1426, P1437, P0107, P0108, P00C7, P0106, P2228, P2229, P0237, P0238, P0016, P0017, P0018, P0019, P0335, P0336, P0261, P0262, P0264, P0265, P0266, P0267, P0270, P0271, P0273, P0274, P0276, P0277, P0279, P0280, P0282,	800 samples 100 ms /sample, continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						P0283, P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P2147, P2148, P2150, P2151, P2153, P2154, P2156, P2157, P216B, P216C, P216E, P216F, P217B, P217C, P217E, P217F, P012B, P012C, P012D, P0300, P0351, P0352, P0353, P0354, P0355, P0356, P0357, P0358, P2300, P2301, P2303, P2304, P2306, P2307, P2309, P2310, P2312, P2313, P2315, P2316, P2318, P2319, P2321, P2322		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Evaporative Emission System Leak Detection Pump Pressure Sensor Circuit Performance Diagnostic (ELCP Sealed Fuel System)	P24B9	ELCP Pressure Sensor Correlation Diagnostic	Propulsion System Not Active If the difference between the ELCP pressure sensor (absolute) reading and the barometric pressure value from the MAP sensor is then increment the fail counter. This diagnostic runs for	 > 3,000 Pa 14 seconds.	Propulsion System Not Active Propulsion system not active time Distance since assembly plant Drive distance Min baro Max baro Min fuel level Max fuel level ECT Min IAT Max IAT Time since last test when passing P0442/P0455 Time since last test when failing P0442/P0455 ********** ELCP hardware can be powered by battery or powertrain relay. For this application the ELCP hardware is powered by battery Voltage ********** Vehicle speed Vehicle not in assembly plant (value must = 0) Propulsion system not active time Previous propulsion system active time Abort Conditions:	 4.3 ≤ time ≤ 5.8 hours or 6.0 ≤ time ≤ 8.1 hours or 8.2 ≤ time ≤ 11.0 hours ≥ 9.9 miles ≥ 0.1 miles ≥ 70 kPa ≤ 110 kPa ≥ 10 % ≤ 90 % ≤ 40 °C ≥ 4 °C ≤ 45 °C ≥ 0 hours ≥ 0 hours ********** ≥ 10 volts ********** ≤ 3 MPH 0 ≥ 0 seconds ≥ 0 seconds	Once or twice per trip with Propulsion System Not Active, for each required wake-up event First time diagnostic runs, 50 failures out of 63 samples Second time diagnostic runs, 50 failures out of 63 samples 100 msec loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Min fuel level slosh Max fuel level slosh Key up during test Refueling request button pressed Service bay test active Device control exceeds No Active DTC's	≥ 190 % ≤ 200 % 0.5 seconds FuelLevelDataFault IAT_SensorFA ECT_Sensor_FA VehicleSpeedSensor_FA AmbientAirDefault VentCircuit_FA ELCPCircuit_FA FTP_SensorCircuit_FA ELCP_PumpCircuit_FA ELCP_SwitchCircuit_FA VICM_WakeupDiag_FA VICM_WakeupDiag_TFTKO LostCommBCM_FA LostCommBusB_VICM_FA CommBusAOff_VICM_FA CommBusBOff_VICM_FA AccCktLo_FA ModuleOffTime_FA		
			Propulsion System Active After a stabilization time		No Active DTC's TFTKO	P043E P043F P0451 P145C P145D P145E P145F P1462 P2421 P2422 P2450		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			of When a recent barometric pressure update has occurred within the last if the difference between the ELCP pressure sensor (absolute) reading and the barometric pressure value from the MAP sensor is then increment the fail counter. When a recent barometric pressure update has not occurred within the last if the difference between the ELCP pressure sensor (absolute) reading and the barometric pressure value from the MAP sensor is then increment the fail counter.	10 seconds. 0.1 miles, > 15,000 Pa 0.1 miles, > 20,000 Pa	Propulsion System Active Min baro Max baro Min OAT OAT estimate is valid Vehicle not in assembly plant (value must = 0) Run/Crank Voltage Purge is not enabled Abort Conditions: Refueling request button pressed Device control exceeds FTP correlation diagnostic (P0451) is running Purge Low Flow diagnostic (P0497) is running Vent Restriction diagnostic (P0446) is running No Active DTC's No Active DTC's TFTKO	≥ 70 kPa ≤ 110 kPa ≥ 4 °C 0 ≥ 11.0 volts 0.5 seconds MAP_SensorFA EnginePowerLimited AmbientAirDefault OAT_EstAmbTemp_FA P0443 P0458 P0459	When Propulsion System Active 50 failures out of 63 samples 100 msec loop	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						P145D P2400 P2401 P2402 P2418 P2419 P2420 P2450 P24BA P24BB		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Evaporative Emission System Leak Detection Pump Pressure Sensor Circuit Low Voltage (ELCP Sealed/ Vented Fuel System)	P24BA	This DTC will detect an ELCP pressure sensor signal that is too low out of range.	ELCP pressure sensor signal	< 0.70 volts (14.0 % of Vref or ~ 47 kPa)			640 failures out of 800 samples 12.5 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Evaporative Emission System Leak Detection Pump Pressure Sensor Circuit High Voltage (ELCP Sealed/ Vented Fuel System)	P24BB	This DTC will detect an ELCP pressure sensor signal that is too high out of range.	ELCP pressure sensor signal	> 4.85 volts (97.0 % of Vref or ~ 123 kPa)			640 failures out of 800 samples 12.5 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Ignition Switch Accessory Position Circuit Low (EREV/ PHEV only)	P2537	This DTC checks for short to low voltage circuit failures during operation.	The ECM detects that the state of the accessory line is low when it should be high. The diagnostic is evaluated when Propulsion System Active time is > 5.0 seconds. Diagnostic fails when pass counts are	< 8 counts.			12.5 ms / sample Once per trip	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Brake System Control Module Requested MIL Illumination	P25A2	Monitors the Brake System Control Module MIL request message to determine when the Brake System Control Module has detected a MIL illuminating fault.	Brake System Control Module Emissions-Related DTC set			Time since power-up ≥ 3 seconds	Continuous	Type A, No MIL

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Brake System Control Module B Requested MIL Illumination	P25C9	Monitors the Brake System Control Module B MIL request message to determine when the Brake System Control Module B has detected a MIL illuminating fault.	Brake System Control Module B Emissions-Related DTC set			Time since power-up ≥ 3 seconds	Continuous	Type A, No MIL

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Crankshaft Position Signal Output Circuit Low	P2618	Diagnoses the Crankshaft Position Signal Output low side driver circuit for circuit faults	Voltage low during driver off state (indicates short-to-ground or open circuit)	Short to ground: <= 0.5 Ohms impedance between signal and controller ground Open Circuit: >= 200 K Ohms impedance between signal and controller ground	Powertrain Relay Voltage Engine is not cranking Crankshaft Position Output is commanded high	>= 11.0 Volts	40 failures out of 50 samples 1 sample every 100 msec	Type B, 2 Trips Note: In certain controllers P2617 may also set (Crankshaft Position Signal Output Circuit / Open)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Power Off Timer Performance	P262B	This DTC determines if the hardware 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. Range Test (RaTe): When the run/crank is not active both the hardware and mirror timers are started. The timers are compared when module shutdown is initiated or run/crank becomes active.	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	> 1.50 seconds > 0.25 %.			Count Up Test: 4 failures out of 20 samples 1 sec / sample Continuous while run/crank is not active and until controller shutdown is initiated. Range Test: Once per trip when controller shutdown is initiated or run/crank becomes active.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump "A" Low Flow / Performance	P2635	This DTC detects degradation in the performance of the SIDI electronically regulated fuel system	Filtered fuel rail pressure error	<= Low Threshold (see Supporting Calibration tab) OR >= High Threshold (see Supporting Calibration tab) (tabulated result: function of desired fuel rail pressure and fuel flow rate)	a] Fu Rail Pres Snsr Circuit Low Fault Active (DTC P018C) b] Fu Rail Pres Snsr Circuit High Fault Active (DTC P018D) c] Fu Rail Pres Snsr Perf Fault Active (DTC P018B) d] Fu Pump Circuit Low Fault Active (DTC P0231) e] Fu Pump Circuit High Fault Active (DTC P0232) f] Fu Pump Circuit Open Fault Active (DTC P023F) g] Reference Voltage Fault Status (DTC P0641) h] Fu Pump Driver Control Module Overtemperature Fault Active (DTC P1255) j] Barometric Pressure Signal Valid (PPEI $4C1) k] Engine run time l] Emissions Fuel Level Low (PPEI $3FB) m] Fu Pump Control Enabled n] Fu Pump Control state	a] <> TRUE b] <> TRUE c] <> TRUE d] <> TRUE e] <> TRUE f] <> TRUE g] <> Active This Key h] <> TRUE j] == TRUE (for absolute fuel pressure sensor) k] >= 30 sec l] <> TRUE m] == TRUE	1 sample / 12.5 millisec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					p] System Voltage q] Fuel flow rate r] Fuel Pressure Control System	n] == Normal p] 11V< System V <32V q1] > 0.047 gram/sec AND q2] <= Max allowed fuel flow rate (function of desired pressure and system voltage) r1] Not responding to overperformance due to pressure buildup during Deceleration Fuel Cut Off OR r2] Not responding to a decreasing desired fuel pres commnad		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Malfunction Indicator Lamp (MIL) Control Circuit (ODM) Low	P263A	Diagnoses the malfunction indicator lamp control low side driver circuit for circuit faults.	Voltage low during driver off state (indicates short-to-ground)	Short to ground: ≤ 0.5 Ω impedance between signal and controller ground	Run/Crank Voltage Remote Vehicle Start is not active	Voltage ≥ 11.00 volts	1 failures out of 1 samples 50 ms / sample	Type B, No MIL NO MIL Note: In certain controllers P0650 may also set (MIL Control Open Circuit)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Malfunction Indicator Lamp (MIL) Control Circuit (ODM) High	P263B	Diagnoses the malfunction indicator lamp control low side driver circuit for circuit faults.	Voltage high during driver on state (indicates short to power)	Short to power: ≤ 0.5 Ω impedance between signal and controller power	Run/Crank Voltage Remote Vehicle Start is not active	Voltage ≥ 11.00 volts	4 failures out of 5 samples 50 ms / sample	Type B, No MIL NO MIL

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Communication Bus A Off	U0073	This DTC monitors for a BUS A off condition	Bus off failures exceeds before the sample time of is reached	5 counts (equivalent to 0.06 seconds) 0.56 seconds	General Enable Criteria: U0073 Normal CAN transmission on Bus A Device Control High Voltage Virtual Network Management Ignition Voltage Criteria: Run/Crank Ignition voltage Power Mode Off Cycle Enable Criteria: KeCAND_b_OffKeyCycle DiagEnbl Ignition Accessory Line and Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for > 3.0000 seconds CAN hardware is bus OFF for	 Not Active on Current Key Cycle Enabled Not Active Not Active > 6.41 Volts = run = 0 (1 indicates enabled) = Active > 11.00 Volts > 0.1125 seconds	Diagnostic runs in 12.5 ms loop	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Communication Bus B Off	U0074	This DTC monitors for a BUS B off condition	Bus off failures exceeds before the sample time of is reached	5 counts (equivalent to 0.06 seconds) 0.56 seconds	General Enable Criteria: U0074 Normal CAN transmission on Bus B Device Control High Voltage Virtual Network Management Ignition Voltage Criteria: Run/Crank Ignition voltage Power Mode Off Cycle Enable Criteria: KeCAND_b_OffKeyCycle DiagEnbl Ignition Accessory Line and Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for > 3.0000 seconds CAN hardware is bus OFF for	 Not Active on Current Key Cycle Enabled Not Active Not Active > 6.41 Volts = run = 0 (1 indicates enabled) = Active > 11.00 Volts > 0.1125 seconds	Diagnostic runs in 12.5 ms loop	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication With Brake System Control Module	U0129	This DTC monitors for a loss of communication with the Brake System Control Module (OBD Module ID 7E5).	Message is not received from controller for Message $0C1 Message $0C5 Message $0D1 Message $1C6 Message $1C7 Message $1E9 Message $2F1 Message $2F9	 ≥ 10.0 seconds ≥ 10.0 seconds ≥ 10.0 seconds ≥ 10.0 seconds ≥ 10.0 seconds ≥ 10.0 seconds ≥ 10.0 seconds	General Enable Criteria: U0073 Normal CAN transmission on Bus A Device Control High Voltage Virtual Network Management Ignition Voltage Criteria: Run/Crank Ignition voltage Power Mode Off Cycle Enable Criteria: KeCAND_b_OffKeyCycle DiagEnbl Ignition Accessory Line and Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for > 3.0000 seconds Power Mode is in accessory or run or crank and High Voltage Virtual Network Management is	 Not Active on Current Key Cycle Enabled Not Active Not Active > 6.41 Volts = run = 0 (1 indicates enabled) = Active > 11.00 Volts	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips "Special Type C"

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					not active for U0129 Brake System Control Module	> 0.4000 seconds Not Active on Current Key Cycle is present on the bus		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication With Body Control Module	U0140	This DTC monitors for a loss of communication with the Body Control Module.	Message is not received from controller for Message $0F1 Message $12A Message $1E1 Message $1F1 Message $1F3 Message $3C9 Message $3CB Message $3F1 Message $451 Message $4D7 Message $4E1 Message $4E9	 ≥ 10.0 seconds ≥ 10.0 seconds ≥ 10.0 seconds ≥ 10.0 seconds ≥ 10.0 seconds ≥ 10.0 seconds ≥ 10.0 seconds ≥ 10.0 seconds ≥ 10.0 seconds ≥ 10.0 seconds ≥ 10.0 seconds	General Enable Criteria: U0073 Normal CAN transmission on Bus A Device Control High Voltage Virtual Network Management Ignition Voltage Criteria: Run/Crank Ignition voltage Power Mode Off Cycle Enable Criteria: KeCAND_b_OffKeyCycle DiagEnbl Ignition Accessory Line and Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for > 3.0000 seconds Power Mode is in accessory or run or crank and High Voltage Virtual Network Management is not active for	 Not Active on Current Key Cycle Enabled Not Active Not Active > 6.41 Volts = run = 0 (1 indicates enabled) = Active > 11.00 Volts > 0.4000 seconds	Diagnostic runs in 12.5 ms loop	Type C, No SVS "Special Type C"

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					U0140 Body Control Module	Not Active on Current Key Cycle is present on the bus		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication With Hybrid Powertrain Control Module	U0293	This DTC monitors for a loss of communication with the Hybrid Powertrain Control Module.	Message is not received from controller for Message $0B4 Message $0D3 Message $186 Message $1DF Message $3C1	 ≥ 10.0 seconds ≥ 0.5 seconds ≥ 0.5 seconds ≥ 0.5 seconds ≥ 10.0 seconds	General Enable Criteria: U0073 Normal CAN transmission on Bus A Device Control High Voltage Virtual Network Management Ignition Voltage Criteria: Run/Crank Ignition voltage Power Mode Off Cycle Enable Criteria: KeCAND_b_OffKeyCycle DiagEnbl Ignition Accessory Line and Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for > 3.0000 seconds Power Mode is in accessory or run or crank and High Voltage Virtual Network Management is	 Not Active on Current Key Cycle Enabled Not Active Not Active > 6.41 Volts = run = 0 (1 indicates enabled) = Active > 11.00 Volts	Diagnostic runs in 12.5 ms loop	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					not active for U0293 Hybrid Powertrain Control Module	> 0.4000 seconds Not Active on Current Key Cycle is present on the bus		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Communication LIN Bus 1 Off	U1501	This DTC monitors for a LIN bus off condition	LIN bus off failures	>= 3.00 counts	The following criteria have been enabled for Power Mode Run/Crank Voltage	>= 0.38 milliseconds =Run >= 11.00 Volts	Dependent on bus loading.	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
LIN Bus 1 Lost Communication with Device 0 (Shutter 1)	U1510	This DTC monitors for a loss of communication on the LIN bus with Shutter 1	ECM has lost communication over the LIN bus with Device 0 / Shutter 1 for	>= 3.00 counts	The following criteria have been enabled for Power Mode Run/Crank Voltage	>= 0.38 milliseconds =Run >= 11.00 Volts	LIN bus communication executes in 500ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication With Hybrid Powertrain Control Module on Bus B	U1817	This DTC monitors for a loss of communication with the Hybrid Powertrain Control Module on Bus B	Message is not received from controller for Message $0A7 Message $1E3 Message $281	 ≥ 0.5 seconds ≥ 0.5 seconds ≥ 0.5 seconds	General Enable Criteria: U0074 Normal CAN transmission on Bus B Device Control High Voltage Virtual Network Management Ignition Voltage Criteria: Run/Crank Ignition voltage Power Mode Off Cycle Enable Criteria: KeCAND_b_OffKeyCycle DiagEnbl Ignition Accessory Line and Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for > 3.0000 seconds	 Not Active on Current Key Cycle Enabled Not Active Not Active > 6.41 Volts = run = 0 (1 indicates enabled) = Active > 11.00 Volts	Diagnostic runs in 12.5 ms loop	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Power Mode is in accessory or run or crank and High Voltage Virtual Network Management is not active for U1817 Hybrid Powertrain Control Module	> 0.4000 seconds Not Active on Current Key Cycle is present on the bus		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication With Hybrid Powertrain Control Module B on Bus B	U182D	This DTC monitors for a loss of communication with the Hybrid Powertrain Control Module B on Bus B	Message is not received from controller for Message $1D8 Message $3C5 Message $3DA Message $3FF Message $4C2	 ≥ 10.0 seconds ≥ 10.0 seconds ≥ 10.0 seconds ≥ 10.0 seconds ≥ 10.0 seconds	General Enable Criteria: U0074 Normal CAN transmission on Bus B Device Control High Voltage Virtual Network Management Ignition Voltage Criteria: Run/Crank Ignition voltage Power Mode Off Cycle Enable Criteria: KeCAND_b_OffKeyCycle DiagEnbl Ignition Accessory Line and Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for > 3.0000 seconds Power Mode is in accessory or run or crank and High Voltage Virtual Network Management is	 Not Active on Current Key Cycle Enabled Not Active Not Active > 6.41 Volts = run = 0 (1 indicates enabled) = Active > 11.00 Volts	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					not active for U182D Hybrid Powertrain Control Module B (VICM)	> 0.4000 seconds Not Active on Current Key Cycle is present on the bus		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication With Fuel Pump Driver Control Module	U18A2	This DTC monitors for a loss of communication with the Fuel Pump Driver Control Module on Bus B	Message is not received from controller for Message $0D5 Message $0D7	 ≥ 10.0 seconds ≥ 10.0 seconds	General Enable Criteria: U0074 Normal CAN transmission on Bus B Device Control High Voltage Virtual Network Management Ignition Voltage Criteria: Run/Crank Ignition voltage Power Mode Off Cycle Enable Criteria: KeCAND_b_OffKeyCycle DiagEnbl Ignition Accessory Line and Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for > 3.0000 seconds Power Mode is in accessory or run or crank and High Voltage Virtual Network Management is not active for	 Not Active on Current Key Cycle Enabled Not Active Not Active > 6.41 Volts = run = 0 (1 indicates enabled) =Active > 11.00 Volts > 0.4000 seconds	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					U18A2 Fuel Pump Driver Control Module	Not Active on Current Key Cycle is present on the bus		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Front Object Detection Control Module	U216A	This DTC monitors for a loss of communication with the Front Object Detection Control Module.	Messages are not received from controller for Message $2CB Message $2CD Message $2CF Message $370	 ≥ 10.0 seconds ≥ 10.0 seconds ≥ 10.0 seconds ≥ 10.0 seconds	General Enable Criteria: U0073 Normal CAN transmission on Bus A Device Control High Voltage Virtual Network Management Ignition Voltage Criteria: Run/Crank Ignition voltage Power Mode Off Cycle Enable Criteria: KeCAND_b_OffKeyCycle DiagEnbl Ignition Accessory Line and Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for > 3.0000 seconds Power Mode is in accessory or run or crank and High Voltage Virtual Network Management is not active for	 Not Active on Current Key Cycle Enabled Not Active Not Active > 6.41 Volts = run = 0 (1 indicates enabled) = Active > 11.00 Volts > 0.4000 seconds	Diagnostic runs in 12.5 ms loop	Type C, No SVS

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					U216A EOCM, FCM, or RDCM modules (Front Object Detection Modules)	Not Active on Current Key Cycle are present on the bus		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Driver Control Module Lost Communication with ECM/PCM	U2616	To detect lost serial data communication from the power driver controller to the ECM	Timer - Fuel System Control message CAN $0D9 not received (FPPM Received Serial Data Communication Status)	t > 10 s (Fu Pmp Pwr Mod smart device reports Faulted, Not Faulted or Indeterminate)	a) FPPM configuration KeFRPR_e_ChassisFuel PresSysType b) Fault state determination enabled c) Run_Crank status d) FPPM Control Status Alive Rolling Count result e) FPPM Diagnostic feedback received f) System Voltage	a) == CeFRPR_e_ECM_FPPM _Sys b) == TRUE c) == Active d) == Valid e) == TRUE f) 9v < Sys Voltage > 32v	64 failures / 80 samples 1 sample / 12.5 millisec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Radiator Coolant Temp - Engine Coolant Temp (ECT) Correlation (DCRD)	P00B6	This DTC detects a difference between ECT and RCT after a soak condition.	A failure will be reported if any of the following occur: 1) Absolute difference between ECT at power up & RCT at power up is ≥ an IAT based threshold table lookup value(fast fail). 2) Absolute difference between ECT at power up & RCT at power up is > by 20.0 ºC and a block heater has not been detected. 3) ECT at power up > RCT at power up by 20.0 ºC and the time spent cranking the engine without starting is greater than or equal to 0.0 seconds with the LowFuelConditionDiag	See the table named: **P00B6_Fail if power up ECT exceeds RCT by these values** in the Supporting tables section = False	No Active DTC's Engine Off Soak Time Propulsion Off Soak Time 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. 1a) Vehicle drive time 1b) Vehicle speed 1c) Additional Vehicle drive time is provided to 1a when Vehicle speed is	VehicleSpeedSensor_FA IAT_SensorCircuitFA THMR_RCT_Sensor_Ckt_FA THMR_ECT_Sensor_Ckt_FA IgnitionOffTimeValid TimeSinceEngineRunningValid > 28,800 seconds > 28,800 seconds = Not occurred = False = False ≥ -7 ºC = False ========== > 20.0 ºC < 0.0 Seconds ========== > 0 Seconds with > 0.0 MPH and 0.00 times the seconds with vehicle speed below	1 failure 500 msec/ sample Once per valid cold start	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					below 1b as follows: 1d) IAT drops from power up IAT 2a) ECT drops from power up ECT 2b) Engine run time ========== Diagnostic is aborted when 3) or 4) occurs: 3) Engine run time with vehicle speed below 1b 4) Minimum IAT during test	1b ≥ 255.0 ºC > 255 ºC Within < 65,535 Seconds ========== > 1800 Seconds ≤ -7.0 ºC		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Manifold Absolute Pressure Sensor Circuit Low	P0107	Detects a continuous short to low or open in either the signal circuit or the MAP sensor.	MAP Voltage	< 3.0 % of 5 Volt Range (This is equal to 0.15 Volts or 3.5 kPa)	Continuous		320 failures out of 400 samples 1 sample every 12.5 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Manifold Absolute Pressure Sensor Circuit High	P0108	Detects an open sensor ground or continuous short to high in either the signal circuit or the MAP sensor.	MAP Voltage	> 90.0 % of 5 Volt Range (This is equal to 4.50 Volts, or 115.0 kPa)	Continuous		320 failures out of 400 samples 1 sample every 12.5 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Air Temperature Sensor Circuit Performance (no humidity or manifold temperature sensors)	P0111	Detects an IAT sensor that has stuck in range by comparing to engine coolant temperature at startup	ABS(Power Up IAT - Power Up ECT)	> 40 deg C	Time between current ignition cycle and the last time the engine was running Power Up ECT No Active DTCs:	> 28,800 seconds < 60 deg C ECT_Sensor_Ckt_FA IAT_SensorCircuitFA	Executes once at the beginning of each ignition cycle if enable conditions are met	Type B, 2 Trips

Component/ System	Fault Code	Monitor 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 (1-3) occur after the following soak conditions, Engine off time > 28,800 seconds Propulsion system off time > 28,800 seconds 1) ECT at power up > IAT at power up by an IAT based table lookup value (fast fail). 2) ECT at power up > IAT at power up by 20.0 Deg C and a block heater has not been detected. 3) ECT at power up > IAT at power up by 20.0 Deg C and the time spent cranking the engine without starting is greater than 0.0 seconds with the LowFuelConditionDiag	See the table named: **P0116_Fail if power up ECT exceeds IAT by these values** in the Supporting tables section = False	No Active DTC's Non-volatile memory initization Test complete this trip Test aborted this trip IAT LowFuelCondition Diag ========== 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: 1a) Vehicle drive time 1b) Vehicle speed 1c) Additional Vehicle drive time is provided to 1a when Vehicle speed is below 1b as follows: 1d) IAT drops from power up IAT	VehicleSpeedSensor_FA IAT_SensorFA ECT_Sensor_Ckt_FA IgnitionOffTimeValid = Not occurred = False = False ≥ -7 ºC = False ========== > 20.0 ºC < 0.0 seconds ========== > 0 seconds > 0.0 MPH 0.00 times the seconds with vehicle speed below 1b ≥ 255.0 ºC	1 failure 500 msec/ sample Once per valid cold start	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					2a) ECT drops from power up ECT 2b) Engine run time ========== Diagnostic is aborted when 3) or 4) occurs: 3) Engine run time with vehicle speed below 1b 4) Minimum IAT during test	≥ 255 ºC Within ≤ 65,535 seconds ========== > 1800 seconds ≤ -7 ºC		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Circuit Insufficient Activity Bank 1 Sensor 1	P0134	This DTC determines if the O2 sensor circuit is open.	Oxygen Sensor Signal	> 1,700 mvolts	No Active DTC's System Voltage AFM Status Heater Warm-up delay Engine Run Time Engine Run Accum Fuel Condition	TPS_ThrottleAuthorityDefaulted MAF_SensorFA Ethanol Composition Sensor FA 10.0 < Volts < 32.0 = All Cylinders active = Complete > 5 seconds > 150 seconds ≤ 87 % Ethanol	200 failures out of 250 samples. Frequency: Continuous 100 msec loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Circuit Insufficient Activity Bank 1 Sensor 2) (For Single Bank Exhaust Only	P0140	This DTC determines if the O2 sensor circuit is open.	Oxygen Sensor Signal	> 1,700 mvolts	No Active DTC's System Voltage AFM Status Heater Warm-up delay Engine Run Time Engine Run Accum Fuel Condition	TPS_ThrottleAuthorityDefaulted MAF_SensorFA Ethanol Composition Sensor FA 10.0 < Volts < 32.0 = All Cylinders active = Complete > 5 seconds > 150 seconds ≤ 87 % Ethanol	200 failures out of 250 samples. Frequency: Continuous 100 msec loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 1 Open Circuit (PFI) - 3 DTC Implmentation	P0201	This DTC Diagnoses Injector 1 low side driver circuit for circuit faults.	Voltage low during driver off state indicates short-to-ground or open circuit	Open circuit: ≥ 200 KΩ impedance between signal and controller ground	Powertrain Relay Voltage within range for a duration Engine Running	>= 11 Volts >= 5 Seconds >= 0 Seconds	50 failures out of 63 samples 100 ms /sample Continuous	Type B, 2 Trips Note: In certain controllers P0261 may also set (Injector 1 Short to Ground)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 2 Open Circuit (PFI) - 3 DTC Implmentation	P0202	This DTC Diagnoses Injector 2 low side driver circuit for circuit faults.	Voltage low during driver off state indicates short-to-ground or open circuit	Open circuit: ≥ 200 KΩ impedance between signal and controller ground	Powertrain Relay Voltage within range for a duration Engine Running	>= 11 Volts >= 5 Seconds >= 0 Seconds	50 failures out of 63 samples 100 ms /sample Continuous	Type B, 2 Trips Note: In certain controllers P0264 may also set (Injector 2 Short to Ground)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 3 Open Circuit (PFI) - 3 DTC Implmentation	P0203	This DTC Diagnoses Injector 3 low side driver circuit for circuit faults.	Voltage low during driver off state indicates short-to-ground or open circuit	Open circuit: ≥ 200 KΩ impedance between signal and controller ground	Powertrain Relay Voltage within range for a duration Engine Running	>= 11 Volts >= 5 Seconds >= 0 Seconds	50 failures out of 63 samples 100 ms /sample Continuous	Type B, 2 Trips Note: In certain controllers P0267 may also set (Injector 3 Short to Ground)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 4 Open Circuit (PFI) - 3 DTC Implmentation	P0204	This DTC Diagnoses Injector 4 low side driver circuit for circuit faults.	Voltage low during driver off state indicates short-to-ground or open circuit	Open circuit: ≥ 200 KΩ impedance between signal and controller ground	Powertrain Relay Voltage within range for a duration Engine Running	>= 11 Volts >= 5 Seconds >= 0 Seconds	50 failures out of 63 samples 100 ms /sample Continuous	Type B, 2 Trips Note: In certain controllers P0270 may also set (Injector 4 Short to Ground)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Random Misfire Detected Cylinder 1 Misfire Detected Cylinder 2 Misfire Detected Cylinder 3 Misfire Detected Cylinder 4 Misfire Detected	P0300 P0301 P0302 P0303 P0304	These DTC's will determine if a random or a cylinder specific misfire is occurring by monitoring various terms derived from crankshaft velocity. The rate of misfire over an interval is compared to both emissions and catalyst damaging thresholds. The pattern of crankshaft acceleration after the misfire is checked to differentiate between real misfire and other sources of crank shaft noise.	Deceleration Value vs. Engine Speed and Engine load The equation used to calculate deceleration value is tailored to specific vehicle operating conditions. The selection of the equation used is based on the 1st tables encountered that are not max of range. If all tables are max of range at a given speed/load, that speed load region is an ***Undetectable region*** see Algorithm Description Document for additional details. Misfire Percent Emission Failure Threshold Misfire Percent Catalyst Damage	[(>**IdleSCD_Decel** AND > **IdleSCD_Jerk**) OR (> **SCD_Decel** AND > **SCD_Jerk**) OR (>**IdleCylModeDecel** AND > **IdleCylModeJerk)** OR (>**CylMode_Decel** AND > **CylMode_Jerk**) OR (>**RevMode_Decel**) OR WHILE in Cylinder Deactivation mode: (> **AFM_Decel**)] - see details on Supporting Tables Tab (P0300 Section) ≥ 0.63 % P0300 > **Catalyst_Damage_Misfire_Percentage**	Engine Run Time Engine Coolant Temp Or If ECT at startup Then ECT System Voltage + Throttle delta - Throttle delta Early Termination option: (used on plug ins that may not have enough engine run time at end of trip for normal interval to complete.) (at low speed/loads, one cylinder may not cause cat damage)	> 2 crankshaft revolution -7 ºC < ECT < 125 ºC < -7 ºC 21 ºC < ECT < 125 ºC 9.00 < volts < 32.00 < 100.00 % per 25 ms < 100.00 % per 25 ms Not Enabled	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. OR when Early Termination Reporting = Enabled and engine rev > 1,000 revs and < 3,200 revs at end of trip 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.	Type B, 2 Trips (Mil Flashes with Catalyst damage level of Misfire)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			When engine speed and load are less than the FTP cals (3) catalyst damage exceedences are allowed.	in Supporting Tables whenever secondary conditions are met. ≤ 0 FTP rpm AND ≤ 0 FTP % load	Engine Speed Engine Load Misfire counts	> 0 rpm AND > 0 % load AND < 180 counts on one cylinder	Continuous	
				disable conditions:	Engine Speed	1,250 < rpm < ((Engine Over Speed Limit) - 50 Engine speed limit is a function of inputs like Gear and temperature see **EngineOverSpeedLimit** in supporting tables	4 cycle delay	
					No active DTCs:	TPS_FA EnginePowerLimited MAF_SensorTFTKO MAP_SensorTFTKO IAT_SensorTFTKO ECT_Sensor_Ckt_TFTKO 5VoltReferenceB_FA CrankSensor_TFTKO CrankSensor_FA CamLctnIntFA CamLctnExhFA CamSensorAnyLctnTFTKO AnyCamPhaser_FA AnyCamPhaser_TFTKO AmbPresDfltdStatus	4 cycle delay	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					P0315 & engine speed	> 1,000 rpm	4 cycle delay	
					Fuel Level Low	LowFuelConditionDiagnostic	500 cycle delay	
					Cam and Crank Sensors	in sync with each other	4 cycle delay	
					Misfire requests TCC unlock	Not honored because Transmission in hot mode or POPD intrusive diagnostic running	4 cycle delay	
					Fuel System Status	≠ Fuel Cut	4 cycle delay	
					Active FuelManagement	Transition in progress	0 cycle delay	
					Undetectable engine speed and engine load region	***Undetectable region*** from Malfunction Criteria	4 cycle delay	
					Abusive Engine Over Speed	> 8,192 rpm	0 cycle delay	
					Below zero torque (except CARB approved 3000 rpm to redline triangle.)	< **ZeroTorqueEngLoad** * **ZeroTorqBaro** in Supporting Tables	4 cycle delay	
					Below zero torque: TPS Vehicle Speed	 ≤ 2 % > 318 mph	4 cycle delay	
					EGR Intrusive test	Active	12 cycle delay	
					Manual Trans	Clutch shift	0 cycle delay	
					Accel Pedal Position AND Automatic transmission shift	> 100.00 %	0 cycle delay	
					Driveline Ring Filter active			

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					After a low level misfire, another misfire may not be detectable until driveline ringing ceases. If no ringing seen, stop filter early. Filter Driveline ring: Stop filter early: Abnormal engine speed oscillations: (Rough road etc) Off Idle, number of consecutive decelerating cylinders after "misfire": (Number of decels can vary with misfire detection equation) TPS Engine Speed Veh Speed Consecutive decels while in SCD Mode Cyl Mode Rev Mode Misfire Crankshaft Pattern Recognition checks each "misfire" candidate in 100 engine Cycle test to see if it looks like real misfire, or some disturbance like rough road. The check is	> "**RingFilter**" # of engine cycles after misfire in Supporting Tables > "**Number of Normals**" # of engine cycles after misfire in Supporting Tables tab > 1 % > 1,000 rpm > 0 mph > **Abnormal SCD Mode** > **Abnormal Cyl Mode** > **Abnormal Rev Mode** in Supporting Tables		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					based on a multiplier times the ddt_jerk value used to detect misfire at that speed and load. At the end of 100 engine cycle test, the ratio of unrecog/recognized is checked to confirm if real misfire is present.			
					Pattern Recog Enabled:	Disabled		
					Engine Speed	700 < rpm < 3,000		
					Veh Speed	> 0.6 mph		
					"misfire" unrecognized if:			
					Crankshaft snap after:			
					isolated "misfire"	> **Min_PatternMultiplier**		
					repetative "misfire"	> **Max_PatternMultiplier** in Supporting Tables		
					Ratio of Unrecog/Recog	> 1.00	discard test	
					Rough Road:			
					Non-Crankshaft based:	Disabled		
					Rough Road Source	TOSS		
					IF Rough Road Source = WheelSpeedInECM			
					ABS/TCS	active	discard test	
					Wheel speed noise	> **WSSRoughRoadThres**		
					VSES	active		
					IF Rough Road Source = "FromABS"			
					ABS/TCS	active	discard test	
					RoughRoad	detected		
					VSES	active		
					IF Rough Road Source = "TOSS"			

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					TOSS dispersion AND No Active DTCs	>**TOSSRoughRoadThres** in supporting tables Transmission Output Shaft Angular Velocity Validity TransmissionEngagedState_FA (Auto Trans only) ClutchPstnSnsr FA (Manual Trans only)	discard test 4 cycle delay	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 AND Time since engine last running Timer for time since engine last running validity OR Engine coolant at power up Diagnostic status No active DTC's	= True = False = False > 60 Deg C >= 5.0 volts >= 11 volts > 3,600 Seconds = True < (Power down engine coolant) minus an additional 10 Deg C Disabled Fault bundles: ECT_Sensor_Ckt_FA	Fail detected for >= 5.00 Sec. 250 msec loop Continuous	Type C, No SVS

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Air Conditioning High Side Pressure Sensor (HSPS) Sensor Performance	P0531	Determines if the Air Conditioning High Side Pressure Sensor circuit voltage is stuck or biased in range	**Engaged Test** <u>Primary Enable Conditons:</u>		Compressor Type = Electric Driven Diagnostic status Engaged Test status Enable with Key Off No active DTC's	Electric Driven Enabled Enabled Enabled Fault bundles: ACHighSidePressSnsrCktFA ACFailedOnSD ACThrmlRefrigSpdVld ACCMLostComm		Type B, 2 Trips
			<u>To fail a currently passing Engaged test:</u> The filtered, weighted ratio between measured Delta and predicted delta (a function of ambient temp, coolant temp, vehicle speed, and fan speed.):	Measured Test Delta Pressure / Predicted Engaged Test Filtered Weighted Pressure) * first order filter coefficient < 0.1494 Predicted Engaged Test Filtered Weighted Pressure = (**P0531_Coolant_Weighting_Factor** * **P0531_FanSpeed_Weighting_Factor** * **P0531_Delta_Predicted_ Pressure** *	Use First Order Filter = TRUE Quality or weighting factor values less than “1” indicate that we don’t have 4sigma/2sigma robustness in that region. The quality of the data is determined via statistical analysis of Variance data. Regions where diagnosis is possible have a quality or weighting factor values:	Compressor Speed > 300 RPM **P0531_Delta_Predicted_Quality_Factor** > 0.1 and **P0531_Coolant_Weighting_Factor** > - 0.4 AND < 2.0 and **P0531_FanSpeed_Weighting_Factor** > - 0.4 AND < 2.0	Performed every 100 msec	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
				P0531_Delta_Predicted_Quality_Factor) with a first order filter coefficient = (P0531 Engage Test Details on Supporting Tables Tab)	0.60 Fast Initial Response (FIR): FIR will trigger when an NVM reset or code clear occurs. Once triggered, the filtered ratio is reset to Initial response test ratio: FIR Test Ratio = 1.00 with an initial response first order filter: FIR Test Filter = 0.60 Rapid Step Response (RSR): RSR will trigger if the ratio result from the last test is < 32.00 AND the delta from the last filtered ratio by > 32.00 Once triggered, the RSR filtered ratio is reset to: RSR Test Ratio = 1.00 with an rapid step response first order filter: RSR Test Filter = 0.60		2 FIR tests must complete before the diagnostic can report. 2 RSR tests must complete before the diagnostic can report.	
			<u>To pass a currently failing Engaged test:</u> The filtered, weighted	Measured Test Delta	Use First Order Filter = TRUE	Compressor Speed > 300 RPM	Performed every 100 msec # of Test	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			ratio between measured delta and predicted delta (a function of ambient temp, coolant temp, vehicle speed and fan speed.):	Pressure / Predicted Engaged Test: Filtered Weighted Pressure) * first order filter coefficient => 0.1494 Predicted Engaged Test Filtered Weighted Pressure = (**P0531_Coolant_Weighting_Factor** * **P0531_FanSpeed_Weighting_Factor** * **P0531_Delta_Predicted_ Pressure** * **P0531_Delta_Predicted_Quality_Factor**) with a first order filter coefficient = 0.60 (P0531 Engage Test Details on Supporting Tables Tab)	Quality or weighting factor values less than “1” indicate that we don’t have 4sigma/2sigma robustness in that region. The quality of the data is determined via statistical analysis of Variance data. Regions where diagnosis is possible have a quality or weighting factor values: Fast Initial Response (FIR): FIR will trigger when an NVM reset or code clear occurs. Once triggered, the filtered ratio is reset to Initial response test ratio: FIR Test Ratio = 1.00 with an initial response first order filter: FIR Test Filter = 0.60 Rapid Step Response (RSR):	**P0531_Delta_Predicted_Quality_Factor** > 0.1 and **P0531_Coolant_Weighting_Factor** > -0.4 AND < 2.0 and **P0531_FanSpeed_Weighting_Factor** > -0.4 AND < 2.0	Samples = 100 2 FIR tests must complete before the diagnostic can report. 2 RSR tests must complete	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					RSR will trigger if the ratio result from the last test is < 32.00 AND the delta from the last filtered ratio by > 32.00 Once triggered, the RSR filtered ratio is reset to: RSR Test Ratio = 1.00 with an rapid step response first order filter: RSR Test Filter = 0.60		before the diagnostic can report.	
			On Test: The pressure sensor has to be less than a threshold value when engaged (a function of ambient temp)	On Test Pressure < **P0531_On_Test_Threshold** (function of ambient temperature). (P0531 On Test Details on Supporting Tables:)	Diagnostic status On Test status AC On Time No active DTC's	Enabled Enabled Delay Time > 10 Sec. Fault bundles: ACHighSidePressSnsrCktFA ACFailedOnSD ACThrmlRefrigSpdVld ACCMLostComm	80 failures out of 100 samples Performed every 100 msec	
			Cold Test: The pressure sensor has to be greater than a threshold value when propulsion system is off for a ambient stabilization time	Cold Test Pressure > **P0531_Cold_Test_Threshold** (function of ambient temperature). (P0531 Cold Test Details on Supporting Tables)	Diagnostic status Cold Test status AC has been enabled this Trip Enable Timer AC Soak Timer	Enabled Disabled FALSE Enabled Time > 0.1 Sec. Minimum Soak Time =>	80 failures out of 100 samples Report Once per trip	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					the soak timer can be established (via calibration enable) to be minimum of the Engine Off Time, and/or the Propulsion System Off Time, and/or the Battery Thermal Conditioning Off Time	28,800 Sec. Use Engine Off Soak Time = TRUE Use Propulsion Off Soak Time= TRUE Use Battery Off Soak Time = TRUE		
					Difference between Coolant Temperature and Air Temperature	Temp Diff < 15.0 Deg C		
					No active DTC's	Fault bundles: ACHighSidePressSnsrCktFA ACFailedOnSD ACThrmlRefrigSpdVld ACCMLostComm ECT_Sensor_DefaultDetected		
			Off Test: The pressure sensor has to be greater than a threshold value when Ac is off (a function of ambient temp)	Off Test Pressure > Off_Test_Threshold **P0531_Off_Test_Threshold** (function of ambient temperature). (P0531 Off Test Details on Supporting Tables:)	Diagnostic status Off Test status AC Off Time No active DTC's	Enabled Enabled Delay Time > 20 Sec. Fault bundles: ACHighSidePressSnsrCktFA ACFailedOnSD ACThrmlRefrigSpdVld ACCMLostComm	80 failures out of 100 samples Performed every 100 msec	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cruise Control Multi-Function Input B Circuit	P0589	Detect when cruise control multi-function switch circuit B (analog) voltage is in an illegal range	Cruise Control analog circuit B voltage must be in an "illegal range" or "between ranges" 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	1.00	fail continuously for greater than 0.500 seconds	MIL: Type C, No SVS

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cruise Control Multi-Function Input B Circuit Low	P0592	detects short to ground failure for cruise multi-function switch circuit B	Cruise Control analog circuit B voltage must be in an "Open Short To Ground" 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	1.00	fail continuously for greater than 2.00 seconds	MIL: Type C, No SVS

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cruise Control Multi-Function Input B Circuit High	P0593		Cruise Control analog circuit B voltage must be in an "Short To Power" for greater than a calibratable period of time for cruise switch states that are received over serial data		CAN cruise switch diagnostic enable in ECM	1.00	fail continuously for greater than 2.00 seconds	MIL: Type C, No SVS

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Control Module (FPCM) Requested MIL Illumination	P069E	Monitors the FPCM MIL request line to determine when the FPCM has detected a MIL illuminating fault.	Fuel Pump Control Module Emissions-Related DTC set			Time since power-up ≥ 3 seconds	Continuous	Type A, No MIL

16 OBDG01 ECM Summary Tables (Initial DTCs)

Component/ System	Fault Code	Monitor 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, No MIL

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Mass Air Flow A Supply Voltage Control Circuit	P121A	Diagnoses the Mass Air Flow Power Supply Circuit low side driver circuit for circuit faults	Voltage low during driver off state (indicates open circuit)	Open Circuit: >= 200K Ohms impedance between signal and controller ground	Mass Air Flow Power is commanded on Powertrain Relay Voltage	 >= 11.00 Volts	40 failures out of 50 samples 1 sample every 100 msec	Type B, 2 Trips Note: In certain controllers P121B may also set (Mass Air Flow A Supply Voltage Control Circuit Low)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Mass Air Flow A Supply Voltage Control Circuit Low	P121B	Diagnoses the Mass Air Flow Power Supply Circuit low side driver circuit for circuit faults	Voltage low during driver off state (indicates short-to-ground or open circuit)	Short to ground: <= 0.5 Ohms impedance between signal and controller ground Open Circuit: >= 200K Ohms impedance between signal and controller ground	Mass Air Flow Power is commanded on Powertrain Relay Voltage	 >= 11.00 Volts	40 failures out of 50 samples 1 sample every 100 msec	Type B, 2 Trips Note: In certain controllers P121A may also set (Mass Air Flow A Supply Voltage Control Circuit)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Mass Air Flow A Supply Voltage Control Circuit High	P121C	Diagnoses the Mass Air Flow Power Supply Circuit low side driver circuit for circuit faults	Voltage low during driver on state (indicates short-to-power)	Short to power: <= 0.5 Ohms impedance between signal and controller power	Mass Air Flow Power is commanded off Powertrain Relay Voltage	 >= 11.00 Volts	40 failures out of 50 samples 1 sample every 100 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Adaptive Cruise Control Signal Circuit	P1553	Detects rolling count or protection value errors in Adaptive Cruise Control Axle Torque Command serial data signal	If x of y rolling count / protection value faults occur, disable adaptive cruise control for duration of fault		Adaptive Cruise Control Command Serial Data Error Diagnostic Enable	1.00	10 / 16 counts	MIL: Type C, No SVS

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cruise Control Set/ Coast Signal 2 Circuit	P155B	Detects a failure of the cruise set 2 switch in a continously applied state	Cruise Control Set 2 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	1.00	fail continuously for greater than 89.000 seconds	MIL: Type C, No SVS

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cruise Control Resume/ Acceleration Signal 2 Circuit	P155C	Detects a failure of the cruise resume 2 switch in a continously applied state	Cruise Control Resume 2 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	1.00	fail continuously for greater than 89.000 seconds	MIL: Type C, No SVS

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Brake Pedal Position Sensor Signal Message Counter Incorrect	P15FB	Detects rolling count or protection value errors in Chassis Brake Pedal Position Emissions Related serial data signal	If x of y rolling count / protection value faults occur, default brake pedal positiion to zero for duration of fault		Chassis Brake Pedal Position Emissions Related Serial Data Error Diagnostic Enable	1.00	10.00 / 16.00 counts	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Post Catalyst Fuel Trim System Low Limit Bank 1 (Too Rich)	P2096	Determines if the post catalyst O2 sensor based fuel control system has utilized all or most of it's low limit authority, indicating a rich exhaust gas condition. Note: If the post catalyst O2 voltage is too rich, the post catalyst O2 integral offset control is decreased. This results in lean bias fuel control in an attempt to correct the rich condition. A perfectly balanced control system (no rich or lean bias required) is represented by an integral offset value of “0” and a post catalyst O2 sensor that is within it's optimal operating range (neither rich nor lean). An integral offset value < 0 is indicative of the control system reacting to a rich post catalyst O2 sensor. If the failure is such that the control system utilizes all or most of its available authority, then P2096 will set.	Rich Fail counter High Vapor Feature: The diagnostic is at risk of reporting a false fail when excessively High Vapor (HV) conditions are present. This HV condition is indicated when the purge valve is open AND percent vapor is >= 18 % for >= 5.0 seconds. Diagnosis resumes if the purge valve is closed OR the percent vapor is <= 15 % for >= 10.0 seconds. This was done to minimize disabling the diagnostic for longer than necessary.	>= 700 counts per 875 sample counts Note: Counters increment at a rate of 10 per second when enable conditions are met. If the fail count threshold is reached, a fail is reported and the diagnostic will not report again until the next trip. If the sample count threshold is reached before a fail is reported, a pass is reported, the counters are reset to 0, and evaluation starts again.	The diagnostic is enabled during: Deceleration Idle Cruise Light Acceleration Heavy Acceleration Ambient Air Pressure Engine AirFlow Intake Manifold Pressure Induction Air Temperature Start-up Coolant Temp. PTO Intrusive diag. fuel control Long Term Secondary Fuel Trim Enabled (see "**Long Term Secondary Fuel Trim Enable Criteria**" in Supporting Tables) High Vapor Conditions No Fault Active for:	 No No Yes Yes Yes >= 70 kPa >= 12.0 g/s <= 10,000.0 >= 0 kPa <= 200 >= -20 deg. C <= 200 >= -20 deg. C Not Active Not Active Not Present AmbientAirDefault AIR System FA Ethanol Composition Sensor FA ECT_Sensor_FA EGRValveCircuit_FA EGRValvePerformance_FA IAT_SensorFA CamSensorAnyLocationFA EvapEmissionSystem_FA EvapFlowDuringNonPurge_FA FuelTankPressureSnsrCkt_FA	Frequency: Continuous Monitoring in 100ms loop. Counters increment when enable conditions are met. When sample count threshold is reached or fail threshold is reached, counters are reset to 0 and start over.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						EvapPurgeSolenoidCircuit_FA EvapSmallLeak_FA EvapVentSolenoidCircuit_FA FuelInjectorCircuit_FA MAF_SensorFA MAF_SensorTFTKO MAP_SensorFA MAP_EngineVacuumStatus EngineMisfireDetected_FA A/F Imbalance Bank1 O2S_Bank_1_Sensor_1_FA O2S_Bank_1_Sensor_2_FA		
					The above general enable conditions must be true for: Minimum accumulated counts in each cell required before counters will increment for that cell: Deceleration Idle Cruise Light Acceleration Heavy Acceleration (Note: A value in any of the above operating "cells" that is an order of magnitude (or more) higher than other cells is an indication that the diagnostic is not capable of diagnosing in that cell). For the cells identified as	> 0.0 seconds 300 300 260 260 260		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					enabled (i.e. those containing a "Yes" at the beginning of the Enable Conditions column), the fail counter will increment if the sample counter increments AND Post oxygen sensor control integral offset (in mV) is Deceleration Idle Cruise Light Acceleration Heavy Acceleration AND Post O2 Voltage is Deceleration Idle Cruise Light Acceleration Heavy Acceleration (Note: A value in any of the above operating "cells" that is greater than 900mV is an indication that the diagnostic is not capable of diagnosing in that cell).	<= -60 (control min.= -100) -60 (control min.= -100) -375 (control min.= -415) -375 (control min.= -415) -375 (control min.= -415) > 760 mV 760 mV 760 mV 760 mV 760 mV		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Post Catalyst Fuel Trim System High Limit Bank 1 (Too Lean)	P2097	Determines if the post catalyst O2 sensor based fuel control system has utilized all or most of it's high limit authority, indicating a lean exhaust gas condition. Note: If the post catalyst O2 voltage is too lean, the post catalyst O2 integral offset control is increased. This results in rich bias fuel control in an attempt to correct the lean condition. A perfectly balanced control system (no rich or lean bias required) is represented by an integral offset value of “0” and a post catalyst O2 sensor that is within it's optimal operating range (neither rich nor lean). An integral offset value > 0 is indicative of the control system reacting to a lean post catalyst O2 sensor. If the failure is such that the control system utilizes all or most of its available authority, then P2097 will set.	Lean Fail counter High Vapor Feature: The diagnostic is at risk of reporting a false fail when excessively High Vapor (HV) conditions are present. This HV condition is indicated when the purge valve is open AND percent vapor is >= 18 % for >= 5.0 seconds. Diagnosis resumes if the purge valve is closed OR the percent vapor is <= 15 % for >= 10.0 seconds. This was done to minimize disabling the diagnostic for longer than necessary.	>= 700 counts per 875 sample counts Note: Counters increment at a rate of 10 per second when enable conditions are met. If the fail count threshold is reached, a fail is reported and the diagnostic will not report again until the next trip. If the sample count threshold is reached before a fail is reported, a pass is reported, the counters are reset to 0, and evaluation starts again.	Same as P2096 except for the following: For the cells identified as enabled (i.e. those containing a "Yes" at the beginning of the Enable Conditions for P2096), the fail counter will increment if the sample counter increments AND Post oxygen sensor control integral offset (in mV) is Deceleration Idle Cruise Light Acceleration Heavy Acceleration AND Post O2 Voltage is Deceleration Idle Cruise Light Acceleration Heavy Acceleration (Note: A value in any of the above operating "cells" that is less than 100mV is an indication that the diagnostic is not capable of diagnosing in that cell).	>= 15 (control max.= 100) 15 (control max.= 100) 330 (control max.= 415) 330 (control max.= 415) 330 (control max.= 415) < 731 mV 731 mV 731 mV 731 mV 731 mV	Frequency: Continuous Monitoring in 100ms loop. Counters increment when enable conditions are met. When sample count threshold is reached or fail threshold is reached, counters are reset to 0 and start over.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Crankshaft Position Signal Output Circuit High	P2619	Diagnoses the Crankshaft Position Signal Output low side driver circuit for circuit faults	Voltage low during driver on state (indicates short-to-power)	Short to power: <= 0.5 Ohms impedance between signal and controller power	Powertrain Relay Voltage Engine is not cranking Crankshaft Position Output is commanded low	>= 11.00 Volts	40 failures out of 50 samples 1 sample every 100 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor 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 Message $0AB Message $0BD Message $0C7 Message $0F9 Message $189 Message $199 Message $19D Message $1AF Message $1BE Message $1BF Message $1F5 Message $4C9	 ≥ 10.0 seconds ≥ 0.5 seconds ≥ 0.5 seconds ≥ 0.5 seconds ≥ 10.0 seconds ≥ 10.0 seconds ≥ 10.0 seconds ≥ 10.0 seconds ≥ 10.0 seconds ≥ 10.0 seconds ≥ 0.5 seconds ≥ 10.0 seconds	General Enable Criteria: U0073 Normal CAN transmission on Bus A Device Control High Voltage Virtual Network Management Ignition Voltage Criteria: Run/Crank Ignition voltage Power Mode Off Cycle Enable Criteria: KeCAND_b_OffKeyCycle DiagEnbl Ignition Accessory Line and Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for > 3.0000 seconds Power Mode is in accessory or run or crank and High Voltage Virtual Network Management is	 Not Active on Current Key Cycle Enabled Not Active Not Active > 6.41 Volts = run = 0 (1 indicates enabled) = Active > 11.00 Volts	Diagnostic runs in 12.5 ms loop	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					not active for U0101 TCM	> 0.4000 seconds Not Active on Current Key Cycle is present on the bus		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication With Cruise Control Module	U0104	This DTC monitors for a loss of communication with the Cruise Control Module.	Message is not received from controller for Message $2CB Message $2CD	 ≥ 10.0 seconds ≥ 10.0 seconds	General Enable Criteria: U0073 Normal CAN transmission on Bus A Device Control High Voltage Virtual Network Management Ignition Voltage Criteria: Run/Crank Ignition voltage Power Mode Off Cycle Enable Criteria: KeCAND_b_OffKeyCycle DiagEnbl Ignition Accessory Line and Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for > 3.0000 seconds Power Mode is in accessory or run or crank and High Voltage Virtual	 Not Active on Current Key Cycle Enabled Not Active Not Active > 6.41 Volts = run = 0 (1 indicates enabled) = Active > 11.00 Volts	Diagnostic runs in 12.5 ms loop	Type C, No SVS

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Network Management is not active for U0104 Cruise Control Module	> 0.4000 seconds Not Active on Current Key Cycle is present on the bus		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication With Fuel Pump Control Module	U0109	This DTC monitors for a loss of communication with the fuel pump control module	Message is not received from controller for Message $1EB Message $4D9	 ≥ 10.0 seconds ≥ 10.0 seconds	General Enable Criteria: U0073 Normal CAN transmission on Bus A Device Control High Voltage Virtual Network Management Ignition Voltage Criteria: Run/Crank Ignition voltage Power Mode Off Cycle Enable Criteria: KeCAND_b_OffKeyCycle DiagEnbl Ignition Accessory Line and Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for > 3.0000 seconds Power Mode is in accessory or run or crank and High Voltage Virtual Network Management is	 Not Active on Current Key Cycle Enabled Not Active Not Active > 6.41 Volts = run = 0 (1 indicates enabled) = Active > 11.00 Volts	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					not active for U0109 Fuel Pump Control Module	> 0.4000 seconds Not Active on Current Key Cycle is present on the bus		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication With Electric A/C Compressor Control Module	U016B	This DTC monitors for a loss of communication with the Electric A/C Compressor Control Module.	Message is not received from controller for Message $222	≥ 10.00 seconds	General Enable Criteria: U0073 Normal CAN transmission on Bus B Device Control High Voltage Virtual Network Management Ignition Voltage Criteria: Run/Crank Ignition voltage Power Mode Off Cycle Enable Criteria: KeCAND_b_OffKeyCycle DiagEnbl Ignition Accessory Line and Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for > 3.0000 seconds Power Mode is in accessory or run or crank and High Voltage Virtual Network Management is not active for	 Not Active on Current Key Cycle Enabled Not Active Not Active > 6.41 Volts = run = 0 (1 indicates enabled) = Active > 11.00 Volts > 0.4000 seconds	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					U016B Electric A/C Compressor Control Module	Not Active on Current Key Cycle is present on the bus		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication With Hybrid Powertrain Control Module B	U179A	This DTC monitors for a loss of communication with the Hybrid Powertrain Control Module B	Message is not received from controller for	≥ 10.0 seconds	General Enable Criteria: U0073 Normal CAN transmission on Bus A Device Control High Voltage Virtual Network Management Ignition Voltage Criteria: Run/Crank Ignition voltage Power Mode Off Cycle Enable Criteria: KeCAND_b_OffKeyCycle DiagEnbl Ignition Accessory Line and Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for > 3.0000 seconds Power Mode is in accessory or run or crank and High Voltage Virtual Network Management is	 Not Active on Current Key Cycle Enabled Not Active Not Active > 6.41 Volts = run = 0 (1 indicates enabled) = Active > 11.00 Volts	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					not active for U179A Hybrid Powertrain Control Module B	> 0.4000 seconds Not Active on Current Key Cycle is present on the bus		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Radiator Coolant Temp - Engine Coolant Temp (ECT) Correlation (DCRD)	P00B6	This DTC detects a difference between ECT and RCT after a soak condition.	A failure will be reported if any of the following occur: 1) Absolute difference between ECT at power up & RCT at power up is ≥ an IAT based threshold table lookup value(fast fail). 2) Absolute difference between ECT at power up & RCT at power up is > by 20.0 ºC and a block heater has not been detected. 3) ECT at power up > RCT at power up by 20.0 ºC and the time spent cranking the engine without starting is greater than or equal to 0.0 seconds with the LowFuelConditionDiag	See the table named: **P00B6_Fail if power up ECT exceeds RCT by these values** in the Supporting tables section = False	No Active DTC's Engine Off Soak Time Propulsion Off Soak Time 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. 1a) Vehicle drive time 1b) Vehicle speed 1c) Additional Vehicle drive time is provided to 1a when Vehicle speed is	VehicleSpeedSensor_FA IAT_SensorCircuitFA THMR_RCT_Sensor_Ckt_FA THMR_ECT_Sensor_Ckt_FA IgnitionOffTimeValid TimeSinceEngineRunningValid > 28,800 seconds > 28,800 seconds = Not occurred = False = False ≥ -7 ºC = False ========== > 20.0 ºC < 0.0 Seconds ========== > 0 Seconds with > 0.0 MPH and 0.00 times the seconds with vehicle speed below	1 failure 500 msec/ sample Once per valid cold start	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					below 1b as follows: 1d) IAT drops from power up IAT 2a) ECT drops from power up ECT 2b) Engine run time ========== Diagnostic is aborted when 3) or 4) occurs: 3) Engine run time with vehicle speed below 1b 4) Minimum IAT during test	1b ≥ 255.0 ºC > 255 ºC Within < 65,535 Seconds ========== > 1800 Seconds ≤ -7.0 ºC		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Manifold Absolute Pressure Sensor Circuit Low	P0107	Detects a continuous short to low or open in either the signal circuit or the MAP sensor.	MAP Voltage	< 3.0 % of 5 Volt Range (This is equal to 0.15 Volts or 3.5 kPa)	Continuous		320 failures out of 400 samples 1 sample every 12.5 msec	Type B, 2 Trips

16 OBDG01 ECM Summary Tables (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Manifold Absolute Pressure Sensor Circuit High	P0108	Detects an open sensor ground or continuous short to high in either the signal circuit or the MAP sensor.	MAP Voltage	> 90.0 % of 5 Volt Range (This is equal to 4.50 Volts, or 115.0 kPa)	Continuous		320 failures out of 400 samples 1 sample every 12.5 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Air Temperature Sensor Circuit Performance (no humidity or manifold temperature sensors)	P0111	Detects an IAT sensor that has stuck in range by comparing to engine coolant temperature at startup	ABS(Power Up IAT - Power Up ECT)	> 40 deg C	Time between current ignition cycle and the last time the engine was running Power Up ECT No Active DTCs:	> 28,800 seconds < 60 deg C ECT_Sensor_Ckt_FA IAT_SensorCircuitFA	Executes once at the beginning of each ignition cycle if enable conditions are met	Type B, 2 Trips

Component/ System	Fault Code	Monitor 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 (1-3) occur after the following soak conditions, Engine off time > 28,800 seconds Propulsion system off time > 28,800 seconds 1) ECT at power up > IAT at power up by an IAT based table lookup value (fast fail). 2) ECT at power up > IAT at power up by 20.0 Deg C and a block heater has not been detected. 3) ECT at power up > IAT at power up by 20.0 Deg C and the time spent cranking the engine without starting is greater than 0.0 seconds with the LowFuelConditionDiag	See the table named: **P0116_Fail if power up ECT exceeds IAT by these values** in the Supporting tables section = False	No Active DTC's Non-volatile memory initization Test complete this trip Test aborted this trip IAT LowFuelCondition Diag ========== 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: 1a) Vehicle drive time 1b) Vehicle speed 1c) Additional Vehicle drive time is provided to 1a when Vehicle speed is below 1b as follows: 1d) IAT drops from power up IAT	VehicleSpeedSensor_FA IAT_SensorFA ECT_Sensor_Ckt_FA IgnitionOffTimeValid = Not occurred = False = False ≥ -7 ºC = False ========== > 20.0 ºC < 0.0 seconds ========== > 0 seconds > 0.0 MPH 0.00 times the seconds with vehicle speed below 1b ≥ 255.0 ºC	1 failure 500 msec/ sample Once per valid cold start	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					2a) ECT drops from power up ECT 2b) Engine run time ========== Diagnostic is aborted when 3) or 4) occurs: 3) Engine run time with vehicle speed below 1b 4) Minimum IAT during test	≥ 255 ºC Within ≤ 65,535 seconds ========== > 1800 seconds ≤ -7 ºC		

16 OBDG01 ECM Summary Tables (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Circuit Insufficient Activity Bank 1 Sensor 1	P0134	This DTC determines if the O2 sensor circuit is open.	Oxygen Sensor Signal	> 1,700 mvolts	No Active DTC's System Voltage AFM Status Heater Warm-up delay Engine Run Time Engine Run Accum Fuel Condition	TPS_ThrottleAuthorityDefaulted MAF_SensorFA Ethanol Composition Sensor FA 10.0 < Volts < 32.0 = All Cylinders active = Complete > 5 seconds > 150 seconds ≤ 87 % Ethanol	200 failures out of 250 samples. Frequency: Continuous 100 msec loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Circuit Insufficient Activity Bank 1 Sensor 2) (For Single Bank Exhaust Only	P0140	This DTC determines if the O2 sensor circuit is open.	Oxygen Sensor Signal	> 1,700 mvolts	No Active DTC's System Voltage AFM Status Heater Warm-up delay Engine Run Time Engine Run Accum Fuel Condition	TPS_ThrottleAuthorityDefaulted MAF_SensorFA Ethanol Composition Sensor FA 10.0 < Volts < 32.0 = All Cylinders active = Complete > 5 seconds > 150 seconds ≤ 87 % Ethanol	200 failures out of 250 samples. Frequency: Continuous 100 msec loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 1 Open Circuit (PFI) - 3 DTC Implmentation	P0201	This DTC Diagnoses Injector 1 low side driver circuit for circuit faults.	Voltage low during driver off state indicates short-to-ground or open circuit	Open circuit: ≥ 200 KΩ impedance between signal and controller ground	Powertrain Relay Voltage within range for a duration Engine Running	>= 11 Volts >= 5 Seconds >= 0 Seconds	50 failures out of 63 samples 100 ms /sample Continuous	Type B, 2 Trips Note: In certain controllers P0261 may also set (Injector 1 Short to Ground)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 2 Open Circuit (PFI) - 3 DTC Implmentation	P0202	This DTC Diagnoses Injector 2 low side driver circuit for circuit faults.	Voltage low during driver off state indicates short-to-ground or open circuit	Open circuit: ≥ 200 KΩ impedance between signal and controller ground	Powertrain Relay Voltage within range for a duration Engine Running	>= 11 Volts >= 5 Seconds >= 0 Seconds	50 failures out of 63 samples 100 ms /sample Continuous	Type B, 2 Trips Note: In certain controllers P0264 may also set (Injector 2 Short to Ground)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 3 Open Circuit (PFI) - 3 DTC Implmentation	P0203	This DTC Diagnoses Injector 3 low side driver circuit for circuit faults.	Voltage low during driver off state indicates short-to-ground or open circuit	Open circuit: ≥ 200 KΩ impedance between signal and controller ground	Powertrain Relay Voltage within range for a duration Engine Running	>= 11 Volts >= 5 Seconds >= 0 Seconds	50 failures out of 63 samples 100 ms /sample Continuous	Type B, 2 Trips Note: In certain controllers P0267 may also set (Injector 3 Short to Ground)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 4 Open Circuit (PFI) - 3 DTC Implmentation	P0204	This DTC Diagnoses Injector 4 low side driver circuit for circuit faults.	Voltage low during driver off state indicates short-to-ground or open circuit	Open circuit: ≥ 200 KΩ impedance between signal and controller ground	Powertrain Relay Voltage within range for a duration Engine Running	>= 11 Volts >= 5 Seconds >= 0 Seconds	50 failures out of 63 samples 100 ms /sample Continuous	Type B, 2 Trips Note: In certain controllers P0270 may also set (Injector 4 Short to Ground)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Random Misfire Detected Cylinder 1 Misfire Detected Cylinder 2 Misfire Detected Cylinder 3 Misfire Detected Cylinder 4 Misfire Detected	P0300 P0301 P0302 P0303 P0304	These DTC's will determine if a random or a cylinder specific misfire is occurring by monitoring various terms derived from crankshaft velocity. The rate of misfire over an interval is compared to both emissions and catalyst damaging thresholds. The pattern of crankshaft acceleration after the misfire is checked to differentiate between real misfire and other sources of crank shaft noise.	Deceleration Value vs. Engine Speed and Engine load The equation used to calculate deceleration value is tailored to specific vehicle operating conditions. The selection of the equation used is based on the 1st tables encountered that are not max of range. If all tables are max of range at a given speed/load, that speed load region is an ***Undetectable region*** see Algorithm Description Document for additional details. Misfire Percent Emission Failure Threshold Misfire Percent Catalyst Damage	[(>**IdleSCD_Decel** AND > **IdleSCD_Jerk**) OR (> **SCD_Decel** AND > **SCD_Jerk**) OR (>**IdleCylModeDecel** AND > **IdleCylModeJerk)** OR (>**CylMode_Decel** AND > **CylMode_Jerk**) OR (>**RevMode_Decel**) OR WHILE in Cylinder Deactivation mode: (> **AFM_Decel**)] - see details on Supporting Tables Tab (P0300 Section) ≥ 0.63 % P0300 > **Catalyst_Damage_Misfire_Percentage**	Engine Run Time Engine Coolant Temp Or If ECT at startup Then ECT System Voltage + Throttle delta - Throttle delta Early Termination option: (used on plug ins that may not have enough engine run time at end of trip for normal interval to complete.) (at low speed/loads, one cylinder may not cause cat damage)	> 2 crankshaft revolution -7 ºC < ECT < 125 ºC < -7 ºC 21 ºC < ECT < 125 ºC 9.00 < volts < 32.00 < 100.00 % per 25 ms < 100.00 % per 25 ms Not Enabled	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. OR when Early Termination Reporting = Enabled and engine rev > 1,000 revs and < 3,200 revs at end of trip 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.	Type B, 2 Trips (Mil Flashes with Catalyst damage level of Misfire)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
				in Supporting Tables whenever secondary conditions are met.	Engine Speed Engine Load Misfire counts	> 0 rpm AND > 0 % load AND < 180 counts on one cylinder	Continuous	
			When engine speed and load are less than the FTP cals (3) catalyst damage exceedences are allowed.	≤ 0 FTP rpm AND ≤ 0 FTP % load				
				disable conditions:	Engine Speed	1,250 < rpm < ((Engine Over Speed Limit) - 50 Engine speed limit is a function of inputs like Gear and temperature see **EngineOverSpeedLimit** in supporting tables	4 cycle delay	
					No active DTCs:	TPS_FA EnginePowerLimited MAF_SensorTFTKO MAP_SensorTFTKO IAT_SensorTFTKO ECT_Sensor_Ckt_TFTKO 5VoltReferenceB_FA CrankSensor_TFTKO CrankSensor_FA CamLctnIntFA CamLctnExhFA CamSensorAnyLctnTFTKO AnyCamPhaser_FA AnyCamPhaser_TFTKO AmbPresDfltdStatus	4 cycle delay	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					P0315 & engine speed	> 1,000 rpm	4 cycle delay	
					Fuel Level Low	LowFuelConditionDiagnostic	500 cycle delay	
					Cam and Crank Sensors	in sync with each other	4 cycle delay	
					Misfire requests TCC unlock	Not honored because Transmission in hot mode or POPD intrusive diagnostic running	4 cycle delay	
					Fuel System Status	≠ Fuel Cut	4 cycle delay	
					Active FuelManagement	Transition in progress	0 cycle delay	
					Undetectable engine speed and engine load region	***Undetectable region*** from Malfunction Criteria	4 cycle delay	
					Abusive Engine Over Speed	> 8,192 rpm	0 cycle delay	
					Below zero torque (except CARB approved 3000 rpm to redline triangle.)	< **ZeroTorqueEngLoad** * **ZeroTorqBaro** in Supporting Tables	4 cycle delay	
					Below zero torque: TPS Vehicle Speed	 ≤ 2 % > 318 mph	4 cycle delay	
					EGR Intrusive test	Active	12 cycle delay	
					Manual Trans	Clutch shift	0 cycle delay	
					Accel Pedal Position AND Automatic transmission shift	> 100.00 %	0 cycle delay	
					Driveline Ring Filter active			

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					After a low level misfire, another misfire may not be detectable until driveline ringing ceases. If no ringing seen, stop filter early. Filter Driveline ring: Stop filter early: Abnormal engine speed oscillations: (Rough road etc) Off Idle, number of consecutive decelerating cylinders after "misfire": (Number of decels can vary with misfire detection equation) TPS Engine Speed Veh Speed Consecutive decels while in SCD Mode Cyl Mode Rev Mode Misfire Crankshaft Pattern Recognition checks each "misfire" candidate in 100 engine Cycle test to see if it looks like real misfire, or some disturbance like rough road. The check is	> "**RingFilter**" # of engine cycles after misfire in Supporting Tables > "**Number of Normals**" # of engine cycles after misfire in Supporting Tables tab > 1 % > 1,000 rpm > 0 mph > **Abnormal SCD Mode** > **Abnormal Cyl Mode** > **Abnormal Rev Mode** in Supporting Tables		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					based on a multiplier times the ddt_jerk value used to detect misfire at that speed and load. At the end of 100 engine cycle test, the ratio of unrecog/recognized is checked to confirm if real misfire is present.			
					Pattern Recog Enabled:	Disabled		
					Engine Speed	700 < rpm < 3,000		
					Veh Speed	> 0.6 mph		
					"misfire" unrecognized if:			
					Crankshaft snap after:			
					isolated "misfire"	> **Min_PatternMultiplier**		
					repetative "misfire"	> **Max_PatternMultiplier** in Supporting Tables		
					Ratio of Unrecog/Recog	> 1.00	discard test	
					Rough Road:			
					Non-Crankshaft based:	Disabled		
					Rough Road Source	TOSS		
					IF Rough Road Source = WheelSpeedInECM			
					ABS/TCS	active	discard test	
					Wheel speed noise	> **WSSRoughRoadThres**		
					VSES	active		
					IF Rough Road Source = "FromABS"			
					ABS/TCS	active	discard test	
					RoughRoad	detected		
					VSES	active		
					IF Rough Road Source = "TOSS"			

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					TOSS dispersion AND No Active DTCs	>**TOSSRoughRoadThres** in supporting tables Transmission Output Shaft Angular Velocity Validity TransmissionEngagedState_FA (Auto Trans only) ClutchPstnSnsr FA (Manual Trans only)	discard test 4 cycle delay	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 AND Time since engine last running Timer for time since engine last running validity OR Engine coolant at power up Diagnostic status No active DTC's	= True = False = False > 60 Deg C >= 5.0 volts >= 11 volts > 3,600 Seconds = True < (Power down engine coolant) minus an additional 10 Deg C Disabled Fault bundles: ECT_Sensor_Ckt_FA	Fail detected for >= 5.00 Sec. 250 msec loop Continuous	Type C, No SVS

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Air Conditioning High Side Pressure Sensor (HSPS) Sensor Performance	P0531	Determines if the Air Conditioning High Side Pressure Sensor circuit voltage is stuck or biased in range	**Engaged Test** <u>Primary Enable Conditons:</u>		Compressor Type = Electric Driven Diagnostic status Engaged Test status Enable with Key Off No active DTC's	Electric Driven Enabled Enabled Enabled Fault bundles: ACHighSidePressSnsrCktFA ACFailedOnSD ACThrmlRefrigSpdVld ACCMLostComm		Type B, 2 Trips
			<u>To fail a currently passing Engaged test:</u> The filtered, weighted ratio between measured Delta and predicted delta (a function of ambient temp, coolant temp, vehicle speed, and fan speed.):	Measured Test Delta Pressure / Predicted Engaged Test Filtered Weighted Pressure) * first order filter coefficient < 0.1494 Predicted Engaged Test Filtered Weighted Pressure = (**P0531_Coolant_Weighting_Factor** * **P0531_FanSpeed_Weighting_Factor** * **P0531_Delta_Predicted_ Pressure** *	Use First Order Filter = TRUE Quality or weighting factor values less than “1” indicate that we don’t have 4sigma/2sigma robustness in that region. The quality of the data is determined via statistical analysis of Variance data. Regions where diagnosis is possible have a quality or weighting factor values:	Compressor Speed > 300 RPM **P0531_Delta_Predicted_Quality_Factor** > 0.1 and **P0531_Coolant_Weighting_Factor** > -0.4 AND < 2.0 and **P0531_FanSpeed_Weighting_Factor** > -0.4 AND < 2.0	Performed every 100 msec	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
				P0531_Delta_Predicted_Quality_Factor) with a first order filter coefficient = (P0531 Engage Test Details on Supporting Tables Tab)	0.60 Fast Initial Response (FIR): FIR will trigger when an NVM reset or code clear occurs. Once triggered, the filtered ratio is reset to Initial response test ratio: FIR Test Ratio = 1.00 with an initial response first order filter: FIR Test Filter = 0.60 Rapid Step Response (RSR): RSR will trigger if the ratio result from the last test is < 32.00 AND the delta from the last filtered ratio by > 32.00 Once triggered, the RSR filtered ratio is reset to: RSR Test Ratio = 1.00 with an rapid step response first order filter: RSR Test Filter = 0.60		2 FIR tests must complete before the diagnostic can report. 2 RSR tests must complete before the diagnostic can report.	
			<u>To pass a currently failing Engaged test:</u> The filtered, weighted	Measured Test Delta	Use First Order Filter = TRUE	Compressor Speed > 300 RPM	Performed every 100 msec # of Test	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			ratio between measured delta and predicted delta (a function of ambient temp, coolant temp, vehicle speed and fan speed.):	Pressure / Predicted Engaged Test: Filtered Weighted Pressure) * first order filter coefficient => 0.1494 Predicted Engaged Test Filtered Weighted Pressure = (**P0531_Coolant_Weighting_Factor** * **P0531_FanSpeed_Weighting_Factor** * **P0531_Delta_Predicted_ Pressure** * **P0531_Delta_Predicted_Quality_Factor**) with a first order filter coefficient = 0.60 (P0531 Engage Test Details on Supporting Tables Tab)	Quality or weighting factor values less than “1” indicate that we don’t have 4sigma/2sigma robustness in that region. The quality of the data is determined via statistical analysis of Variance data. Regions where diagnosis is possible have a quality or weighting factor values: Fast Initial Response (FIR): FIR will trigger when an NVM reset or code clear occurs. Once triggered, the filtered ratio is reset to Initial response test ratio: FIR Test Ratio = 1.00 with an initial response first order filter: FIR Test Filter = 0.60 Rapid Step Response (RSR):	**P0531_Delta_Predicted_Quality_Factor** > 0.1 and **P0531_Coolant_Weighting_Factor** > -0.4 AND < 2.0 and **P0531_FanSpeed_Weighting_Factor** > -0.4 AND < 2.0	Samples = 100 2 FIR tests must complete before the diagnostic can report. 2 RSR tests must complete	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					RSR will trigger if the ratio result from the last test is < 32.00 AND the delta from the last filtered ratio by > 32.00 Once triggered, the RSR filtered ratio is reset to: RSR Test Ratio = 1.00 with an rapid step response first order filter: RSR Test Filter = 0.60		before the diagnostic can report.	
			On Test: The pressure sensor has to be less than a threshold value when engaged (a function of ambient temp)	On Test Pressure < **P0531_On_Test_Threshold** (function of ambient temperature). (P0531 On Test Details on Supporting Tables:)	Diagnostic status On Test status AC On Time No active DTC's	Enabled Enabled Delay Time > 10 Sec. Fault bundles: ACHighSidePressSnsrCktFA ACFailedOnSD ACThrmlRefrigSpdVld ACCMLostComm	80 failures out of 100 samples Performed every 100 msec	
			Cold Test: The pressure sensor has to be greater than a threshold value when propulsion system is off for a ambient stabilization time	Cold Test Pressure > **P0531_Cold_Test_Threshold** (function of ambient temperature). (P0531 Cold Test Details on Supporting Tables)	Diagnostic status Cold Test status AC has been enabled this Trip Enable Timer ~~AC Soak Timer~~	Enabled Disabled FALSE Enabled Time > 0.1 Sec. ~~Minimum Soak Time =>~~	80 failures out of 100 samples Report Once per trip	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					the soak timer can be established (via calibration enable) to be minimum of the Engine Off Time, and/or the Propulsion System Off Time, and/or the Battery Thermal Conditioning Off Time Difference between Coolant Temperature and Air Temperature No active DTC's	28,800 Sec. Use Engine Off Soak Time = TRUE Use Propulsion Off Soak Time= TRUE Use Battery Off Soak Time = TRUE Temp Diff < 15.0 Deg C Fault bundles: ACHighSidePressSnsrCkt FA ACFailedOnSD ACThrmlRefrigSpdVld ACCMLostComm ECT_Sensor_DefaultDetected		
			Off Test: The pressure sensor has to be greater than a threshold value when Ac is off (a function of ambient temp)	Off Test Pressure > Off_Test_Threshold **P0531_Off_Test_Threshold** (function of ambient temperature). (P0531 Off Test Details on Supporting Tables:)	Diagnostic status Off Test status AC Off Time No active DTC's	Enabled Enabled Delay Time > 20 Sec. Fault bundles: ACHighSidePressSnsrCkt FA ACFailedOnSD ACThrmlRefrigSpdVld ACCMLostComm	80 failures out of 100 samples Performed every 100 msec	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cruise Control Multi-Function Input B Circuit	P0589	Detect when cruise control multi-function switch circuit B (analog) voltage is in an illegal range	Cruise Control analog circuit B voltage must be in an "illegal range" or "between ranges" 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	1.00	fail continuously for greater than 0.500 seconds	MIL: Type C, No SVS

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cruise Control Multi-Function Input B Circuit Low	P0592	detects short to ground failure for cruise multi-function switch circuit B	Cruise Control analog circuit B voltage must be in an "Open Short To Ground" 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	1.00	fail continuously for greater than 2.00 seconds	MIL: Type C, No SVS

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cruise Control Multi-Function Input B Circuit High	P0593		Cruise Control analog circuit B voltage must be in an "Short To Power" for greater than a calibratable period of time for cruise switch states that are received over serial data		CAN cruise switch diagnostic enable in ECM	1.00	fail continuously for greater than 2.00 seconds	MIL: Type C, No SVS

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Control Module (FPCM) Requested MIL Illumination	P069E	Monitors the FPCM MIL request line to determine when the FPCM has detected a MIL illuminating fault.	Fuel Pump Control Module Emissions-Related DTC set			Time since power-up ≥ 3 seconds	Continuous	Type A, No MIL

Component/ System	Fault Code	Monitor 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, No MIL

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Mass Air Flow A Supply Voltage Control Circuit	P121A	Diagnoses the Mass Air Flow Power Supply Circuit low side driver circuit for circuit faults	Voltage low during driver off state (indicates open circuit)	Open Circuit: >= 200K Ohms impedance between signal and controller ground	Mass Air Flow Power is commanded on Powertrain Relay Voltage	 >= 11.00 Volts	40 failures out of 50 samples 1 sample every 100 msec	Type B, 2 Trips Note: In certain controllers P121B may also set (Mass Air Flow A Supply Voltage Control Circuit Low)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Mass Air Flow A Supply Voltage Control Circuit Low	P121B	Diagnoses the Mass Air Flow Power Supply Circuit low side driver circuit for circuit faults	Voltage low during driver off state (indicates short-to-ground or open circuit)	Short to ground: <= 0.5 Ohms impedance between signal and controller ground Open Circuit: >= 200K Ohms impedance between signal and controller ground	Mass Air Flow Power is commanded on Powertrain Relay Voltage	 >= 11.00 Volts	40 failures out of 50 samples 1 sample every 100 msec	Type B, 2 Trips Note: In certain controllers P121A may also set (Mass Air Flow A Supply Voltage Control Circuit)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Mass Air Flow A Supply Voltage Control Circuit High	P121C	Diagnoses the Mass Air Flow Power Supply Circuit low side driver circuit for circuit faults	Voltage low during driver on state (indicates short-to-power)	Short to power: <= 0.5 Ohms impedance between signal and controller power	Mass Air Flow Power is commanded off Powertrain Relay Voltage	 >= 11.00 Volts	40 failures out of 50 samples 1 sample every 100 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Adaptive Cruise Control Signal Circuit	P1553	Detects rolling count or protection value errors in Adaptive Cruise Control Axle Torque Command serial data signal	If x of y rolling count / protection value faults occur, disable adaptive cruise control for duration of fault		Adaptive Cruise Control Command Serial Data Error Diagnostic Enable	1.00	10 / 16 counts	MIL: Type C, No SVS

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cruise Control Set/ Coast Signal 2 Circuit	P155B	Detects a failure of the cruise set 2 switch in a continously applied state	Cruise Control Set 2 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	1.00	fail continuously for greater than 89.000 seconds	MIL: Type C, No SVS

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cruise Control Resume/ Acceleration Signal 2 Circuit	P155C	Detects a failure of the cruise resume 2 switch in a continously applied state	Cruise Control Resume 2 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	1.00	fail continuously for greater than 89.000 seconds	MIL: Type C, No SVS

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Brake Pedal Position Sensor Signal Message Counter Incorrect	P15FB	Detects rolling count or protection value errors in Chassis Brake Pedal Position Emissions Related serial data signal	If x of y rolling count / protection value faults occur, default brake pedal positiion to zero for duration of fault		Chassis Brake Pedal Position Emissions Related Serial Data Error Diagnostic Enable	1.00	10.00 / 16.00 counts	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Post Catalyst Fuel Trim System Low Limit Bank 1 (Too Rich)	P2096	Determines if the post catalyst O2 sensor based fuel control system has utilized all or most of it's low limit authority, indicating a rich exhaust gas condition. Note: If the post catalyst O2 voltage is too rich, the post catalyst O2 integral offset control is decreased. This results in lean bias fuel control in an attempt to correct the rich condition. A perfectly balanced control system (no rich or lean bias required) is represented by an integral offset value of “0” and a post catalyst O2 sensor that is within it's optimal operating range (neither rich nor lean). An integral offset value < 0 is indicative of the control system reacting to a rich post catalyst O2 sensor. If the failure is such that the control system utilizes all or most of its available authority, then P2096 will set.	Rich Fail counter High Vapor Feature: The diagnostic is at risk of reporting a false fail when excessively High Vapor (HV) conditions are present. This HV condition is indicated when the purge valve is open AND percent vapor is >= 18 % for >= 5.0 seconds. Diagnosis resumes if the purge valve is closed OR the percent vapor is <= 15 % for >= 10.0 seconds. This was done to minimize disabling the diagnostic for longer than necessary.	>= 700 counts per 875 sample counts Note: Counters increment at a rate of 10 per second when enable conditions are met. If the fail count threshold is reached, a fail is reported and the diagnostic will not report again until the next trip. If the sample count threshold is reached before a fail is reported, a pass is reported, the counters are reset to 0, and evaluation starts again.	The diagnostic is enabled during: Deceleration Idle Cruise Light Acceleration Heavy Acceleration Ambient Air Pressure Engine AirFlow Intake Manifold Pressure Induction Air Temperature Start-up Coolant Temp. PTO Intrusive diag. fuel control Long Term Secondary Fuel Trim Enabled (see "**Long Term Secondary Fuel Trim Enable Criteria**" in Supporting Tables) High Vapor Conditions No Fault Active for:	 No No Yes Yes Yes >= 70 kPa >= 12.0 g/s <= 10,000.0 >= 0 kPa <= 200 >= -20 deg. C <= 200 >= -20 deg. C Not Active Not Active Not Present AmbientAirDefault AIR System FA Ethanol Composition Sensor FA ECT_Sensor_FA EGRValveCircuit_FA EGRValvePerformance_FA IAT_SensorFA CamSensorAnyLocationFA EvapEmissionSystem_FA EvapFlowDuringNonPurge_FA FuelTankPressureSnsrCkt_FA	Frequency: Continuous Monitoring in 100ms loop. Counters increment when enable conditions are met. When sample count threshold is reached or fail threshold is reached, counters are reset to 0 and start over.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						EvapPurgeSolenoidCircuit_FA EvapSmallLeak_FA EvapVentSolenoidCircuit_FA FuelInjectorCircuit_FA MAF_SensorFA MAF_SensorTFTKO MAP_SensorFA MAP_EngineVacuumStatus EngineMisfireDetected_FA A/F Imbalance Bank1 O2S_Bank_1_Sensor_1_FA O2S_Bank_1_Sensor_2_FA		
					The above general enable conditions must be true for: Minimum accumulated counts in each cell required before counters will increment for that cell: Deceleration Idle Cruise Light Acceleration Heavy Acceleration (Note: A value in any of the above operating "cells" that is an order of magnitude (or more) higher than other cells is an indication that the diagnostic is not capable of diagnosing in that cell). For the cells identified as	> 0.0 seconds 300 300 260 260 260		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					enabled (i.e. those containing a "Yes" at the beginning of the Enable Conditions column), the fail counter will increment if the sample counter increments AND Post oxygen sensor control integral offset (in mV) is Deceleration Idle Cruise Light Acceleration Heavy Acceleration AND Post O2 Voltage is Deceleration Idle Cruise Light Acceleration Heavy Acceleration (Note: A value in any of the above operating "cells" that is greater than 900mV is an indication that the diagnostic is not capable of diagnosing in that cell).	<= -60 (control min.= -100) -60 (control min.= -100) -375 (control min.= -415) -375 (control min.= -415) -375 (control min.= -415) > 760 mV 760 mV 760 mV 760 mV 760 mV		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Post Catalyst Fuel Trim System High Limit Bank 1 (Too Lean)	P2097	Determines if the post catalyst O2 sensor based fuel control system has utilized all or most of it's high limit authority, indicating a lean exhaust gas condition. Note: If the post catalyst O2 voltage is too lean, the post catalyst O2 integral offset control is increased. This results in rich bias fuel control in an attempt to correct the lean condition. A perfectly balanced control system (no rich or lean bias required) is represented by an integral offset value of “0” and a post catalyst O2 sensor that is within it's optimal operating range (neither rich nor lean). An integral offset value > 0 is indicative of the control system reacting to a lean post catalyst O2 sensor. If the failure is such that the control system utilizes all or most of its available authority, then P2097 will set.	Lean Fail counter High Vapor Feature: The diagnostic is at risk of reporting a false fail when excessively High Vapor (HV) conditions are present. This HV condition is indicated when the purge valve is open AND percent vapor is >= 18 % for >= 5.0 seconds. Diagnosis resumes if the purge valve is closed OR the percent vapor is <= 15 % for >= 10.0 seconds. This was done to minimize disabling the diagnostic for longer than necessary.	>= 700 counts per 875 sample counts Note: Counters increment at a rate of 10 per second when enable conditions are met. If the fail count threshold is reached, a fail is reported and the diagnostic will not report again until the next trip. If the sample count threshold is reached before a fail is reported, a pass is reported, the counters are reset to 0, and evaluation starts again.	Same as P2096 except for the following: For the cells identified as enabled (i.e. those containing a "Yes" at the beginning of the Enable Conditions for P2096), the fail counter will increment if the sample counter increments AND Post oxygen sensor control integral offset (in mV) is Deceleration Idle Cruise Light Acceleration Heavy Acceleration AND Post O2 Voltage is Deceleration Idle Cruise Light Acceleration Heavy Acceleration (Note: A value in any of the above operating "cells" that is less than 100mV is an indication that the diagnostic is not capable of diagnosing in that cell).	>= 15 (control max.= 100) 15 (control max.= 100) 330 (control max.= 415) 330 (control max.= 415) 330 (control max.= 415) < 731 mV 731 mV 731 mV 731 mV 731 mV	Frequency: Continuous Monitoring in 100ms loop. Counters increment when enable conditions are met. When sample count threshold is reached or fail threshold is reached, counters are reset to 0 and start over.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Crankshaft Position Signal Output Circuit High	P2619	Diagnoses the Crankshaft Position Signal Output low side driver circuit for circuit faults	Voltage low during driver on state (indicates short-to-power)	Short to power: <= 0.5 Ohms impedance between signal and controller power	Powertrain Relay Voltage Engine is not cranking Crankshaft Position Output is commanded low	>= 11.00 Volts	40 failures out of 50 samples 1 sample every 100 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor 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 Message $0AB Message $0BD Message $0C7 Message $0F9 Message $189 Message $199 Message $19D Message $1AF Message $1BE Message $1BF Message $1F5 Message $4C9	 ≥ 10.0 seconds ≥ 0.5 seconds ≥ 0.5 seconds ≥ 0.5 seconds ≥ 10.0 seconds ≥ 10.0 seconds ≥ 10.0 seconds ≥ 10.0 seconds ≥ 10.0 seconds ≥ 10.0 seconds ≥ 0.5 seconds ≥ 10.0 seconds	General Enable Criteria: U0073 Normal CAN transmission on Bus A Device Control High Voltage Virtual Network Management Ignition Voltage Criteria: Run/Crank Ignition voltage Power Mode Off Cycle Enable Criteria: KeCAND_b_OffKeyCycle DiagEnbl Ignition Accessory Line and Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for > 3.0000 seconds Power Mode is in accessory or run or crank and High Voltage Virtual Network Management is	 Not Active on Current Key Cycle Enabled Not Active Not Active > 6.41 Volts = run = 0 (1 indicates enabled) = Active > 11.00 Volts	Diagnostic runs in 12.5 ms loop	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					not active for U0101 TCM	> 0.4000 seconds Not Active on Current Key Cycle is present on the bus		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication With Cruise Control Module	U0104	This DTC monitors for a loss of communication with the Cruise Control Module.	Message is not received from controller for Message $2CB Message $2CD	 ≥ 10.0 seconds ≥ 10.0 seconds	General Enable Criteria: U0073 Normal CAN transmission on Bus A Device Control High Voltage Virtual Network Management Ignition Voltage Criteria: Run/Crank Ignition voltage Power Mode Off Cycle Enable Criteria: KeCAND_b_OffKeyCycle DiagEnbl Ignition Accessory Line and Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for > 3.0000 seconds Power Mode is in accessory or run or crank and High Voltage Virtual	 Not Active on Current Key Cycle Enabled Not Active Not Active > 6.41 Volts = run = 0 (1 indicates enabled) = Active > 11.00 Volts	Diagnostic runs in 12.5 ms loop	Type C, No SVS

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Network Management is not active for U0104 Cruise Control Module	> 0.4000 seconds Not Active on Current Key Cycle is present on the bus		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication With Fuel Pump Control Module	U0109	This DTC monitors for a loss of communication with the fuel pump control module	Message is not received from controller for Message $1EB Message $4D9	 ≥ 10.0 seconds ≥ 10.0 seconds	General Enable Criteria: U0073 Normal CAN transmission on Bus A Device Control High Voltage Virtual Network Management Ignition Voltage Criteria: Run/Crank Ignition voltage Power Mode Off Cycle Enable Criteria: KeCAND_b_OffKeyCycle DiagEnbl Ignition Accessory Line and Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for > 3.0000 seconds Power Mode is in accessory or run or crank and High Voltage Virtual Network Management is	 Not Active on Current Key Cycle Enabled Not Active Not Active > 6.41 Volts = run = 0 (1 indicates enabled) = Active > 11.00 Volts	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					not active for U0109 Fuel Pump Control Module	> 0.4000 seconds Not Active on Current Key Cycle is present on the bus		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication With Electric A/C Compressor Control Module	U016B	This DTC monitors for a loss of communication with the Electric A/C Compressor Control Module.	Message is not received from controller for Message $222	≥ 10.00 seconds	General Enable Criteria: U0073 Normal CAN transmission on Bus B Device Control High Voltage Virtual Network Management Ignition Voltage Criteria: Run/Crank Ignition voltage Power Mode Off Cycle Enable Criteria: KeCAND_b_OffKeyCycle DiagEnbl Ignition Accessory Line and Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for > 3.0000 seconds Power Mode is in accessory or run or crank and High Voltage Virtual Network Management is not active for	 Not Active on Current Key Cycle Enabled Not Active Not Active > 6.41 Volts = run = 0 (1 indicates enabled) = Active > 11.00 Volts > 0.4000 seconds	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					U016B Electric A/C Compressor Control Module	Not Active on Current Key Cycle is present on the bus		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication With Hybrid Powertrain Control Module B	U179A	This DTC monitors for a loss of communication with the Hybrid Powertrain Control Module B	Message is not received from controller for	≥ 10.0 seconds	General Enable Criteria: U0073 Normal CAN transmission on Bus A Device Control High Voltage Virtual Network Management Ignition Voltage Criteria: Run/Crank Ignition voltage Power Mode Off Cycle Enable Criteria: KeCAND_b_OffKeyCycle DiagEnbl Ignition Accessory Line and Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for > 3.0000 seconds Power Mode is in accessory or run or crank and High Voltage Virtual Network Management is	 Not Active on Current Key Cycle Enabled Not Active Not Active > 6.41 Volts = run = 0 (1 indicates enabled) = Active > 11.00 Volts	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					not active for U179A Hybrid Powertrain Control Module B	> 0.4000 seconds Not Active on Current Key Cycle is present on the bus		

Engine run time greater than
Closed Loop Enable Clarification - KtFSTA_t_ClosedLoopAutostart **(HYBRID ONLY)**
KtFSTA_t_ClosedLoopAutostart

AutoStart Coolant	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11
Close Loop Enable Time	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Y11

and
Closed Loop Enable Clarification - KtFSTA_t_ClosedLoopTime
KtFSTA_t_ClosedLoopTime

Start-Up Coolant	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11
Close Loop Enable Time	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Y11

and pre converter 02 sensor voltage less than
Closed Loop Enable Clarification - KfFCLP_U_O2ReadyThrshLo
KfFULC_U_O2_SensorReadyThrsh Lo (Switching Sensor)

Voltage < *XXXX* milliVolts

for
Closed Loop Enable Clarification - KcFULC_O2_SensorReadyEvents
KcFULC_O2_SensorReadyEvents (Switching Sensor)

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

or
Closed Loop Enable Clarification - KeWRSC_T_HtrCntrlCL
KeWRSC_T_HtrCntrlCL (WRAF Sensor)
and
Closed Loop Enable Clarification - KeWRSI_T_PumpCurrentEnable
KeWRSI_T_PumpCurrentEnable (WRAF Sensor)
and
COSC (Converter Oxygen Storage Control) not

enabled
and
Consumed AirFuel Ratio is stoichiometry i.e. not in component protection
and
POPD or Catalyst Diagnostic not intrusive
and
Turbo Scavenging Mode not enabled
and
All cylinders whose valves are active also have their injectors enabled
and
O2S_Bank_ 1_TFTKO
O2S_Bank_ 2_TFTKO
FuelInjectorCircuit_FA
CylDeacSystemTFTKO
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
Closed Loop Enable Clarification - KfFCLL_T_AdaptiveLoCoolant
KfFCLL_T_AdaptiveLoCoolant

Coolant	> *XXXX* Celcius

or less than
Closed Loop Enable Clarification - KfFCLL_T_AdaptiveHiCoolant
KfFCLL_T_AdaptiveHiCoolant

Coolant	< *XXXX* Celcius

and
Closed Loop Enable Clarification - KtFCLL_p_AdaptiveLowMAP_Limit
KtFCLL_p_AdaptiveLowMAP_Limit

Barometric Pressure	X1	X2	X3	X4	X5	X6	X7	X8	X9
Manifold Air Pressure	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9

and
TPS_ThrottleAuthorityDefaulted
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
Closed Loop Enable Clarification - KfFCLP_U_O2ReadyThrshLo
KfFCLP_U_O2ReadyThrshLo

Voltage	< *XXXX* milliVolts

for
Closed Loop Enable Clarification - KcFCLP_Cnt_O2RdyCyclesThrsh
KcFCLP_Cnt_O2RdyCyclesThrsh

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

Long Term Secondary Fuel Trim Enable Criteria

Closed Loop Enable Clarification - KtFCLP_t_PostIntglDisableTime
KtFCLP_t_PostIntglDisableTime

Start-Up Coolant	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11
Post Integral Enable Time	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Y11

Plus
Closed Loop Enable Clarification - KtFCLP_t_PostIntglRampInTime
KtFCLP_t_PostIntglRampInTime

Start-Up Coolant	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11
Post Integral Ramp In Time	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Y11

and

Closed Loop Enable Clarification - KeFCLP_T_IntegrationCatalystMax

KeFCLP_T_IntegrationCatalystMax

Modeled Catalyst Temperature < *XXXX*Celcius

and

Closed Loop Enable Clarification - KeFCLP_T_IntegrationCatalystMin

KeFCLP_T_IntegrationCatalystMin

Modeled Catalyst Temperature > *XXXX*Celcius

and

PO2S_Bank_1_Snsr_2_FA

PO2S_Bank_1_Snsr_2_FA and

PO2S_Bank_2_Snsr_2_FA

PO2S_Bank_2_Snsr_2_FA = False

and

Closed Loop Enable Clarification - KeFCLP_Pct_CatAccuSlphrPostDsbl

(KeFCLP_Pct_CatAccuSlphrPostDsbl

Modeled converter sulfur percent < XXXX Percent

and

Closed Loop Enable Clarification - KaFCLP_U_SlphrIntglOfst_Thrsh

Post Integral < KaFCLP_U_SlphrIntglOfst_Thrsh

X axis: Post O2 Sensor

Y axis: Post O2 Mode

Z: Post Integral threshold

and

Closed Loop Enable Clarification - KeFCLP_dm_IntegrationAirflowMax

Airflow < KeFCLP_dm_IntegrationAirflowMax

OBD Coolant enable
Starting in 11.15A software GM has created a coordinated signal within the ECM that serves as a master enable for diagnostics/controls that use coolant as an enable condition. Controls and diagnostics may choose to enable prior to this calculated signal, but calibrating beyond the OBD limit will not function because of this signal. This enable condition is also put on the CAN bus for other modules to consume as well.

KeTHMG_b_elecstatequipd = 1 for this application

For mechanical thermostat applications (KeTHMG_b_elecstatequipd = 0)
OBD Coolant Enable Temp = P0128 Primary target temp – Calibratable offset (0-32) – 1
OBD Coolant Enable Temp = 81 - 0.0 – 1
OBD Coolant Enable Temp = 80.0

For E-stat applications (KeTHMG_b_elecstatequipd = 1)

OBD Coolant Enable Temp = Max(Min(ECT Control Temp) – Primary Warm up delta, Min primary P0128 target) – Calibratable offset (0-32) – 1
OBD Coolant Enable Temp = Max(Min(KaTHMC_T_TMS_EngCoolReq) - KaECTR_T_CTR_WrmUpDeltaTemp[0], KaECTR_T_CTR_WrmUpTargetMin[0]) - KeECTR_T_CTR_GlblMinOffst – 1
OBD Coolant Enable Temp = Max(85.0 - 11 , 81) - 0.0 – 1
OBD Coolant Enable Temp = 75.0

****
****

Exhaust Cam Phsr Enable

Exhaust Cam Phsr Enable = TRUE if:

DTCs not set:
CrankSensor_TFTKO
CamSnsrExhTFTKO
CamLctnExhFA

AND

CamSensorAnyLocationFAdiagnostic has executed and passed

AND

Cam edge locations have been learned

AND

[**Intake Cam Phsr Enable** = TRUE
OR
Intake Park Position is Retarded (TRUE)]

AND

[Catalyst Warmup Enabled = TRUE
AND
Engine RPM > 900.00
AND
Engine Run Time > **P0011_P0021_P05CC_P05CD_P0014_P0024_P05CE_P05CF_ColdStartEngRunning** sec]

OR

[Engine is running and engine power is requested

AND
ExhEngineSpeed is Enabled (see below)
AND
ExhOilPressure is Enabled (see below)
AND
ExhEngineOilTemp is Enabled (see below)]

****

ExhEngineSpeed is Enabled when

P0014_P0024_P05CE_P05CF_LoRpmHiEnblEc < Engine RPM <**P0014_P0024_P05CE_P05CF_HiEngSpdLoEnblEc**

ExhEngineSpeed is Disabled when

Engine RPM < **P0014_P0024_P05CE_P05CF_LoRpmLoDsblEc**
OR
Engine RPM > **P0014_P0024_P05CE_P05CF_HiEngSpdHiDsblEc**

****

If an oil pressure sensor is present (TRUE) and is being used (FALSE) then

ExhOilPressureEnable is Enabled when
Oil Pressure > **P0014_P0024_P05CE_P05CF_LoPresHiEnblEc** kPa
for **P0014_P0024_P05CE_P05CF_EngOilPressEnblEc** seconds

ExhOilPressureEnable is Disabled when
Oil pressure < **P0014_P0024_P05CE_P05CF_LoPresLoDsblEc** kPa

If an oil pressure sensor is not present (FALSE) OR is not being used (TRUE) then

ExhOilPressureEnable is Enabled when
Engine RPM > **P0014_P0024_P05CE_P05CF_LoRpmHiEnblEc**
for **P0014_P0024_P05CE_P05CF_EngOilPressEnblEc** seconds

****

ExhEngineOilTemp is Enabled when

-40.00 < Engine Oil Temp < 155.00 deg C

ExhEngineOilTemp is Disabled when
Engine Oil Temp < -42.00 deg C
OR
Engine Oil Temp > 165.00 deg C

****
****

Intake Cam Phsr Enable

Intake Cam Phsr Enable = TRUE if:

DTCs not set:
CrankSensor_TFTKO
CamSnsrIntTFTKO
CamLctnIntFA

AND

CamSensorAnyLocationFA has executed and passed

AND

Cam edge locations have been learned

AND

[Catalyst Warmup Enabled = TRUE
AND
Engine RPM > 900.00
AND
Engine Run Time > **P0011_P0021_P05CC_P05CD_P0014_P0024_P05CE_P05CF_ColdStartEngRunning** sec]

OR

[Engine is running and engine power is requested
AND
IntEngineSpeed is Enabled
AND
IntOilPressure is Enabled
AND
IntEngineOilTemp is Enabled]

****

IntEngineSpeed is Enabled when
P0011_P0021_P05CC_P05CD_LoRpmHiEnblIc < Engine RPM < **P0011_P0021_P05CC_P05CD_HiEngSpdLoEnblIc**

IntEngineSpeed is Disabled when

Engine RPM < **P0011_P0021_P05CC_P05CD_LoRpmLoDsblIc**
OR
Engine RPM > **P0011_P0021_P05CC_P05CD_HiEngSpdHiDsblIc**

****

If an oil pressure sensor is present (TRUE) and is being used (FALSE) then

IntOilPressureEnable is Enabled when
Oil Pressure > **P0011_P0021_P05CC_P05CD_LoPresHiEnblIc** kPa
for **P0011_P0021_P05CC_P05CD_EngOilPressEnblIc** seconds

IntOilPressureEnable is Disabled when
Oil pressure < **P0011_P0021_P05CC_P05CD_LoPresLoDsblIc**

If an oil pressure sensor is not present (FALSE) or is not being used (TRUE) then

IntOilPressureEnable is Enabled when
Engine RPM > **P0011_P0021_P05CC_P05CD_LoRpmHiEnblIc**
for **P0011_P0021_P05CC_P05CD_EngOilPressEnblIc** seconds

****

IntEngineOilTemp is Enabled when

-40.00 < Engine Oil Temp < 155.00 deg C

IntEngineOilTemp is Disabled when
Engine Oil Temp < -42.00 deg C
OR
Engine Oil Temp > 165.00 deg C

****
****

ReducedEngineCapacityMode_Enable

REDUCED CAPACITY CONTROL ENABLE CONDITIONS:
Conditions below must be met for >= 1.5 seconds before cylinder deactivation will begin in regular mode

Neutral Idle Mode (NI) operational checks:
Allowed in NI (FALSE)
Time NI mode shall be active >= 1.0 seconds
Vehicle Speed for NI
< 4.3 mph to Enter
> 0.0 mph to Exit
PRNDL position in NI = False **VCE_PRNDL_NI_Disables** (For details see Supporting Tables)
Engine RPM lower limit for NI > 475 rpm
Transmission gear for NI = FALSE **VCE_TransGear_DisablesNI**(For details see Supporting Tables)
Torque based AFM entry conditions: NI Mode Active
Indicated Torque < **VCE_NormalMode_MaxTorque_Gr5** minus 10.0 Nm
(Function of Gear: VCE_NormalMode_MaxTorque_Gr1 - Gr8,for details see Supporting Tables)

Normal Mode operational checks:
Engine running (based on engine off time)
Maximum of 30.0 or > **VCE_StartUpDelayTime** seconds (For details see Supporting Tables)
Engine RPM
> **VCE_EngineRPM_LowerLmt** + 50 RPM AND
< **VCE_EngineRPM_UpperLmt** - 200 RPM (For details see Supporting Tables)
Vehicle Speed (in Gear) >= 11.8 mph
Vehicle Speed (P/N) <= 0.0 mph
Vehicle Speed based on PRNDL < **VCE_VehicleSpeed_PRNDL_Enable**

Engine RPM PRNDL Feature is FALSE (When TRUE, will enable AFM only if transmission is not in a defaulted state)
Engine coolant (deac) >= 210 and <= 121 deg C
Ignition voltage >= 11.0 volts
Engine Oil Temperature >= 25 and <= 125 deg C
Engine Oil Pressure >= 23 and <= 97 KPa
Oil pump intrusive test = FALSE (refer to P06DD and P06DE)
Oil aeration present: Aeration enabled by engine RPM > 5,000 for 15 second(s), disabled by engine RPM < 4,000 for 90 second(s)
Catalyst Warmup Enabled= FALSE
POPD: Not active
Deceleration Fuel Cut Off: Not active
Fuel shut off (FSO) delay: Not active >= 5 second(s)
Green Engine mode: Not active
Pedal Position < 45 pct
Brake booster vacuum >= 0 KPa
Transmission gear = FALSE **VCE_TransGear_Disables**(For details see Supporting Tables)
Gear Shift: not currently in progress
4WD State: not = 4 low range
Time since last AFM mode event >= 1 second(s)
After exiting AFM mode for max time, must be in all cylinder mode for >= 60 second(s)
Tip in Bump: Not active
AFM is disabled at high percent ethanol: Ethanol concentration > 95 % disables AFM. Once disabled, ethanol concentration must be < 85 % to re-enable
If feature is enabled, AFM is allowed only when percent ethanol learn is not in progress: Feature is FALSE
AFIM diagnostic status: Not active
A/C clutch transition: Not currently in progress
ETC power management mode: Not active
Heater performance: Not in heater perforamance mode

Torque based AFM entry conditions:
ECO Mode Active: Indicated Torque < **VCE_ECOMode_MaxTorque_Gr5** minus **VCE_ECOMode_EnableTorqueHyst**
(Function of Gear: VCE_ECOMode_MaxTorque_Gr1 - Gr8, For details see Supporting Tables)

Normal Mode: Indicated Torque < **VCE_NormalMode_MaxTorque_Gr5** minus **VCE_NormalMode_EnableTorqueHyst**
(Function of Gear: VCE_NormalMode_MaxTorque_Gr1 - Gr8, For details see Supporting Tables)

IF DEACTIVATED, ANY OF THE CONDITIONS BELOW WILL FORCE CYLINDER REACTIVATION:
If deactivation mode is active for >= 480 seconds

then reactivation will occur if: >= 600 seconds
Deac mode active or
Delta vacuum > 10 or < 10 kPa
Vehicle Speed for NI exit < 0 Kph
ETC Power management mode: Active
Converter overtemp protect: Active
Hot coolant mode: Active
Engine running = False
Engine overspeed protection: Active
Engine metal overtemp protect: Active
Cat. temp low: Active
Four Wheel Drive: In low range
Engine misfire: Detected
Heater performance: Active
POPD Intrusive tests: Active (see P2270-P2273, P013A-P014B)

Torque based AFM exit conditions:
ECO Mode Active: Indicated Torque < **VCE_ECOMode_MaxTorque_Gr5**
(Function of Gear: VCE_ECOMode_MaxTorque_Gr1 - Gr8, For details see Supporting Tables)

Normal Mode: Indicated Torque < **VCE_NormalMode_MaxTorque_Gr5**
(Function of Gear: VCE_NormalMode_MaxTorque_Gr1 - Gr8, For details see Supporting Tables)

Engine Vacuum: **VCE_MinVacReducedTorqMode** (For details see Supporting Tables)
Ignition voltage < 10 volts
Engine coolant < 200 or > 131 Deg C
Vehicle speed < 9.3 mph
Brake booster vacuum < 0 kPa
Engine oil temperature < 20 or > 130 Deg C
Pedal Position > 50 %
Piston Protection: Active

No active DTC's for control enable:
Fault Bundles:
Catalyst Warmup Enabled
EngOilPressureSensorFA
EnginePowerLimited
CrankSensor_TFTKO

EngineTorqueEstInaccurate
VehicleSpeedSensorError
ECT_Sensor_FA
BrakeBoosterVacuumValid
IAT_SensorFA
CylDeacDriverFault
CylDeacAllDriverFault
MAP_EngineVacuumStatus
PowertrainRelayFault
CamSensorAnyLctnTFTKO
OilPmpStuckHigh
VCER_TorqueSecurity
FourWheelDriveLowStateInvalid

DFCO Enable Conditions

COOLANT ENABLE CRITERIA

Coolant temperature < **DFCO_CoolEnblHi_Temp** °C See Supporting Table

RUN TIME ENEBALE CRIETRIA

Engine run time > **DFCO_DelayAfterStart_Time** seconds See Supporting Table

ENGINE SPEED ENABLE CRITERIA

TORQUE CONVERETR CLUTCH UNLOCK

POPD OFF:

i) enabled when engine speed > (1,400.0 + supporting table value **DFCO_EngSpdEnblOfst**)

ii) once enabled continue to be enabled until engine speed < (1,400.0 + supporting table value **DFCO_EngSpdEnblOfst**)

POPD ON:

i) enabled when engine speed > (1,400.0 + supporting table value **DFCO_EngSpdEnblOfst**)

ii) once enabled continue to be enabled until engine speed < (1,400.0 + supporting table value **DFCO_EngSpdEnblOfst**)

TORQUE CONVERETR CLUTCH LOCK

POPD OFF:

i) enabled when engine speed > (1,000.0 + supporting table value **DFCO_EngSpdEnblOfst**)

ii) once enabled continue to be enabled until engine speed < (900.0 + supporting table value **DFCO_EngSpdEnblOfst**)

POPD ON:

i) enabled when engine speed > (1,200.0 + supporting table value **DFCO_EngSpdEnblOfst**)

ii) once enabled continue to be enabled until engine speed < (1,100.0 + supporting table value **DFCO_EngSpdEnblOfst**)

VEHICLE SPEED CRITERIA:

i) enabled when vehicle speed >= (**DFCO_EnblHi_Vehicle_Speed**)

ii) once enabled continue to be enabled until vehicle speed < **DFCO_DsblLo_Vehicle_Speed**

TORQUE CRITERIA :

I) enabled when following AND conditions satisfied

(a) driver raw trq delta = raw toqrue - zero pedal torque <= 65,535.0

b) driver shaped trq delta1 = shaped immediate torque - zero pedal torque <= 1.0

c) driver shaped trq delta2 = shaped predicted torque - minimum combustion unmanaged torque = 65,535.0

d) driver shaped trq delta3 = shaped immediate torque - minimum combustion managed torque <= 65,535.0

ii) once enabled, disabled when following OR conditions are satisfied

a) driver raw trq delta1 = raw torque - zero pedal torque > 5.0

b) driver shaped trq delta2 = zero pedal torque - minimum combustion managed torque > 65,535.0

CATALYST TEMPERATURE

i) enabled based on following AND criteria

a) (CatTemp < 970.0 °C and vehicle speed < 50.0 kph)

b) CatTemp < 1,200.0 °C

c) CatTemp >= 50.0 °C

d) CatalystWarmupEnabled = FALSE
ii) once enabled, disabled when following OR conditions are met
OTHER CONDITIONS:
a) Transmission is not about to unlock
b) Engine not about to stall
c) Transmission is not shifting if already not in DFCO
d) POPD or EOSD
1) POPD requesting DFCO or neither requesting DFCO OFF nor inhibit DFCO
2) EOSD not active
e) EVAP does not inhibit DFCO
f) O2 response test is not inhibiting DFCO event
g) Throttle is not in default mode

Low Fuel Condition Diagnostic flag

Flag set to TRUE if the fuel level < 10.0 % AND

No Active DTCs: FuelLevelDataFault, P0462, P0463 for at least 30.0 seconds

Transfer Pump is Commanded On Flag

Fuel Volume in Primary Fuel Tank < 0.0 liters AND

Fuel Volume in Secondary Fuel Tank ≥ 0.0 liters AND

Transfer Pump on Time < P0461, P2066, P2636: Transfer Pump Enable (see supporting table for numeric value) AND

Transfer Pump had been Off for at least 0.0 seconds AND

Evap Diagnostic (Purge Valve Leak Test, Large Leak Test, and Waiting for Purge) is not running AND

Engine Running

16 OBDG01 Initial Supporting Table - Multiple DTC Use - Block Learn Cells To Enable Post oxygen sensor tests

Description: KaPOPD_PostCellEnbl - A table of adaptive (Block Learn) cells in which to enable the post oxygen sensor tests.

Notes: Note: When Table column headings match the calibration value below it, that individual cell is enabled.
The cell numbers in the table are defined as:
CeFADR_e_Cell00_PurgOnAirMode5 = 0,
CeFADR_e_Cell01_PurgOnAirMode4 = 1,
CeFADR_e_Cell02_PurgOnAirMode3 = 2,
CeFADR_e_Cell03_PurgOnAirMode2 = 3,
CeFADR_e_Cell04_PurgOnAirMode1 = 4,
CeFADR_e_Cell05_PurgOnAirMode0 = 5,
CeFADR_e_Cell06_PurgOnIdle = 6,
CeFADR_e_Cell07_PurgOnDecel = 7,
CeFADR_e_Cell08_PurgOffAirMode5 = 8,
CeFADR_e_Cell09_PurgOffAirMode4 = 9,
CeFADR_e_Cell10_PurgOffAirMode3 = 10,
CeFADR_e_Cell11_PurgOffAirMode2 = 11,
CeFADR_e_Cell12_PurgOffAirMode1 = 12,
CeFADR_e_Cell13_PurgOffAirMode0 = 13,
CeFADR_e_Cell14_PurgOffIdle = 14,
CeFADR_e_Cell15_PurgOffDecel = 15

y/x	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

16 OBDG01 Initial Supporting table - Multiple DTC Use - Response Cell Enable Table

Description: KaEOSD_RespCellEnbl - Block learn cells in which to enable the Oxygen Sensor Response test

Notes: Note: When Table column headings match the calibration value below it, that individual cell is enabled

Multiple DTC Use - Response Cell Enable Table - Part 1				
y/x	CeFADR_e_Cell00_PurgOnAirMode 5	CeFADR_e_Cell01_PurgOnAirMode 4	CeFADR_e_Cell02_PurgOnAirMode 3	CeFADR_e_Cell03_PurgOnAirMode 2
1	CeFADR_e_Cell00_PurgOnAirMode 5	CeFADR_e_Cell01_PurgOnAirMode 4	CeFADR_e_Cell02_PurgOnAirMode 3	CeFADR_e_Cell03_PurgOnAirMode 2
Multiple DTC Use - Response Cell Enable Table - Part 2				
y/x	CeFADR_e_Cell04_PurgOnAirMode 1	CeFADR_e_Cell05_PurgOnAirMode 0	CeFADR_e_Cell06_PurgOnIdle	CeFADR_e_Cell07_PurgOnDecel
1	CeFADR_e_Cell04_PurgOnAirMode 1	CeFADR_e_Cell05_PurgOnAirMode 0	CeFADR_e_Cell06_PurgOnIdle	CeFADR_e_Cell07_PurgOnDecel
Multiple DTC Use - Response Cell Enable Table - Part 3				
y/x	CeFADR_e_Cell08_PurgOffAirMode 5	CeFADR_e_Cell09_PurgOffAirMode 4	CeFADR_e_Cell10_PurgOffAirMode 3	CeFADR_e_Cell11_PurgOffAirMode 2
1	CeFADR_e_Cell08_PurgOffAirMode 5	CeFADR_e_Cell09_PurgOffAirMode 4	CeFADR_e_Cell10_PurgOffAirMode 3	CeFADR_e_Cell11_PurgOffAirMode 2
Multiple DTC Use - Response Cell Enable Table - Part 4				
y/x	CeFADR_e_Cell12_PurgOffAirMode 1	CeFADR_e_Cell13_PurgOffAirMode 0	CeFADR_e_Cell14_PurgOffIdle	CeFADR_e_Cell15_PurgOffDecel
1	CeFADR_e_Cell12_PurgOffAirMode 1	CeFADR_e_Cell13_PurgOffAirMode 0	CeFADR_e_Cell14_PurgOffIdle	CeFADR_e_Cell15_PurgOffDecel

16 OBDG01 Initial Supporting Table - Multiple DTC Use_Green Sensor Delay Criteria - Airflow

Description: This Calibration is the airflow (in gps) above which the green airflow is acculmulated to expire the condition.

Notes: Used for: P0133, P013A, P013B, P013C, P013D, P013E, P013F, P014A, P014B, P0153, P015A, P015B, P015C, P015D, P1133, P1153, P2270, P2271, P2272 and P2273. 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:

y/x	1
1	18

16 OBDG01 Initial Supporting Table - Multiple DTC Use_Green Sensor Delay Criteria - Limit

Description: This Calibration is the acculmulated airflow (in grams) limit above which the green condition is expired

Notes: Used for: P0133, P013A, P013B, P013C, P013D, P013E, P013F, P014A, P014B, P0153, P015A, P015B, P015C, P015D, P1133, P1153, P2270, P2271, P2272 and P2273. Note: This feature is only enabled when the vehicle is new and cannot be enabled in service

y/x	CiOXYR_O2_Bank1_Sensor1	CiOXYR_O2_Bank1_Sensor2	CiOXYR_O2_Bank2_Sensor1	CiOXYR_O2_Bank2_Sensor2
1	120,000	120,000	120,000	120,000

16 OBDG01 Initial Supporting Table - P0011_CamPosErrorLimIc1

Description: P0011 - Cam Position Error Limit for performance diagnostic

Notes: KtPHSD_phi_CamPosErrorLimIc1

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
400	6.0	6.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
800	6.0	6.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
1,200	6.0	6.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
1,600	6.0	6.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
2,000	6.0	6.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
2,400	6.0	6.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
2,800	6.0	6.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
3,200	6.0	6.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
3,600	6.0	6.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
4,000	6.0	6.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
4,400	6.0	6.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
4,800	6.0	6.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
5,200	6.0	6.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
5,600	6.0	6.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
6,000	6.0	6.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
6,400	6.0	6.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
6,800	6.0	6.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5

16 OBDG01 Initial Supporting table - P0011_P0021_P05CC_P05CD_EngOilPressEnblIc

Description: Delay time before the oil pressure enable flag is set assuming all the oil pressure enable criteria are met

Notes: KtPHSC_t_EngOilPressEnblIc

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	3	3	3	2	2	1	1	1	1	1	1	1	1	1	1	1	2

16 OBDG01 Initial Supporting Table - P0011_P0021_P05CC_P05CD_HiEngSpdHiDsbllc

Description: Intake cam is disabled when engine speed exceeds this value

Notes: KtPHSC_n_HiEngSpdHiDsbllc

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000

16 OBDG01 Initial Supporting Table - P0011_P0021_P05CC_P05CD_HiEngSpdLoEnblIc

Description: Intake cam is enabled when engine speed remains below this value

Notes: KtPHSC_n_HiEngSpdLoEnblIc

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800

16 OBDG01 Initial Supporting Table - P0011_P0021_P05CC_P05CD_LoPresHiEnblIc

Description: Intake cam is enabled when oil pressure exceeds this value

Notes: KtPHSC_p_LoPresHiEnblEc

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160

16 OBDG01 Initial Supporting Table - P0011_P0021_P05CC_P05CD_LoPresLoDsbllc

Description: Intake cam is disabled when oil pressure falls below this value

Notes: KtPHSC_p_LoPresLoDsbllc

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150

16 OBDG01 Initial Supporting Table - P0011_P0021_P05CC_P05CD_LoRpmHiEnblIc

Description: Intake cam is enabled when engine speed exceeds this value.

Notes: KtPHSC_n_LoRpmHiEnblIc

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130

16 OBDG01 Initial Supporting Table - P0011_P0021_P05CC_P05CD_LoRpmLoDsbllc

Description: Intake cam is disabled when engine speed is below this value.

Notes: KtPHSC_n_LoRpmLoDsbllc

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

16 OBDG01 Initial Supporting Table - P0011_P0021_P05CC_P05CD_P0014_P0024_P05CE_P05CF_ColdStartEngRunning

Description: Engine running time must be greater than this threshold during a cold start to enable cam phasing

Notes: KtPHSR_t_ColdStartEngRunning

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

16 OBDG01 Initial Supporting Table - P0011_P05CC_StablePositionTimeIc1

Description: P0011 - Delay after transient move

Notes: KtPHSD_t_StablePositionTimeIc1

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
400	100.0	80.0	20.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
800	100.0	80.0	20.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
1,200	100.0	80.0	20.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
1,600	100.0	80.0	20.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
2,000	100.0	80.0	20.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
2,400	100.0	80.0	20.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
2,800	100.0	80.0	20.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
3,200	100.0	80.0	11.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
3,600	100.0	80.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
4,000	100.0	80.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
4,400	100.0	80.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
4,800	100.0	80.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
5,200	100.0	80.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
5,600	100.0	80.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
6,000	100.0	80.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
6,400	100.0	80.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
6,800	100.0	80.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0

16 OBDG01 Initial Supporting Table - P0014_CamPosErrorLimEc1

Description: P0014 - Cam Position Error Limit for performance diagnostic

Notes: KtPHSD_phi_CamPosErrorLimEc1

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
400	6.0	6.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
800	6.0	6.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
1,200	6.0	6.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
1,600	6.0	6.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
2,000	6.0	6.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
2,400	6.0	6.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
2,800	6.0	6.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
3,200	6.0	6.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
3,600	6.0	6.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
4,000	6.0	6.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
4,400	6.0	6.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
4,800	6.0	6.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
5,200	6.0	6.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
5,600	6.0	6.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
6,000	6.0	6.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
6,400	6.0	6.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
6,800	6.0	6.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5

16 OBDG01 Initial Supporting Table - P0014_P0024_P05CE_P05CF_EngOilPressEnblEc

Description: Delay time before the oil pressure enable flag is set assuming all the oil pressure enable criteria are met

Notes: KtPHSC_t_EngOilPressEnblEc

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	3	3	3	2	2	1	1	1	1	1	1	1	1	1	1	1	2

16 OBDG01 Initial Supporting Table - P0014_P0024_P05CE_P05CF_HiEngSpdHiDsblEc

Description: Exhaust cam is disabled when engine speed exceeds this value

Notes: KtPHSC_n_HiEngSpdHiDsblEc

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000

16 OBDG01 Initial Supporting Table - P0014_P0024_P05CE_P05CF_HiEngSpdLoEnblEc

Description: Exhaust cam is enabled when engine speed remains below this value

Notes: KtPHSC_n_HiEngSpdLoEnblEc

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800

16 OBDG01 Initial Supporting table - P0014_P0024_P05CE_P05CF_LoPresHiEnblEc

Description: Exhaust cam is enabled when oil pressure exceeds this value

Notes: KtPHSC_p_LoPresHiEnblIc

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160

16 OBDG01 Initial Supporting table - P0014_P0024_P05CE_P05CF_LoPresLoDsblEc

Description: Exhaust cam is disabled when oil pressure falls below this value

Notes: KtPHSC_p_LoPresLoDsblEc

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150

16 OBDG01 Initial Supporting table - P0014_P0024_P05CE_P05CF_LoRpmHiEnblEc

Description: Exhaust cam is enabled when engine speed exceeds this value.

Notes: KtPHSC_n_LoRpmHiEnblEc

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130

16 OBDG01 Initial Supporting table - P0014_P0024_P05CE_P05CF_LoRpmLoDsblEc

Description: Exhaust cam is disabled when engine speed is below this value.

Notes: KtPHSC_n_LoRpmLoDsblEc

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

16 OBDG01 Initial Supporting table - P0014_P05CE_StablePositionTimeEc1

Description: P0014 - Delay after transient move

Notes: KtPHSD_t_StablePositionTimeEc1

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
400	100.0	80.0	20.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
800	100.0	80.0	20.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
1,200	100.0	80.0	20.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
1,600	100.0	80.0	20.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
2,000	100.0	80.0	20.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
2,400	100.0	80.0	20.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
2,800	100.0	80.0	20.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
3,200	100.0	80.0	11.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
3,600	100.0	80.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
4,000	100.0	80.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
4,400	100.0	80.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
4,800	100.0	80.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
5,200	100.0	80.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
5,600	100.0	80.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
6,000	100.0	80.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
6,400	100.0	80.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
6,800	100.0	80.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0

16 OBDG01 Initial Supporting table - P0016, P0017, P0018, P0019: Cam Correlation Oil Temperature Threshold

Description: P0016, P0017, P0018, P0019: Cam Correlation Oil Temperature Threshold

Notes: KtPHSC_t_RtnHomeDlyLmt

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	300	300	160	18	18	18	18	10	3	3	3	3	3	3	3	3	3

16 OBDG01 Initial Supporting table - P0101, P0106, P0121, P012B, P0236, P1101: MAP1 Residual Weight Factor based on RPM

Description: P0101_P0106_P0121_P012B_P0236_P1101 MAP2 Residual Weight Factor based on RPM

Notes:

y/x	0	400	800	1,200	1,600	2,000	2,400	2,800	3,200	3,600	4,000	4,400	4,800	5,200	5,600	6,000	8,000
1	1.000	1.000	1.000	0.906	1.000	0.760	0.802	0.890	0.661	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

16 OBDG01 Initial Supporting table - P0101, P0106, P0121, P012B, P0236, P1101: MAP2 Residual Weight Factor based on RPM

Description: P0101_P0106_P0121_P012B_P0236_P1101 MAP2 Residual Weight Factor based on RPM

Notes:

y/x	0	400	800	1,200	1,600	2,000	2,400	2,800	3,200	3,600	4,000	4,400	4,800	5,200	5,600	6,000	8,000
1	1.000	1.000	1.000	0.906	1.000	0.760	0.802	0.890	0.661	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

16 OBDG01 Initial Supporting table - P0101, P0106, P0121, P012B, P0236, P1101: TPS Residual Weight Factor based on RPM

Description: P0101_P0106_P0121_P012B_P0236_P1101 TPS Residual Weight Factor based on RPM

Notes:

y/x	0	400	800	1,200	1,600	2,000	2,400	2,800	3,200	3,600	4,000	4,400	4,800	5,200	5,600	6,000	8,000
1	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

16 OBDG01 Initial Supporting table - P0133_O2S Slow Response Bank 1 Sensor 1 "Pass/Fail Threshold table"

Description: KaEOSD_x_ST_ResponseLimRS1[x][y]

Notes: X axis is Lean to Rich response time (in sec), Please see the table below named "KnEOSD_t_ST_LRC_LimRS1" for the 17 X axis table breakpoints. Y axis is Rich to Lean response time (sec), Please see the cal table below named "KnEOSD_t_ST_RLC_LimRS1" for the 17 Y axis table breakpoints. Z axis is the pass/fail result, Note: If the cell contains a "0" then the fault is indicated, if it contains a "1" a fault is not indicated.

y/x	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
6	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
8	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
11	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
12	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

16 OBDG01 Initial Supporting table - P0401_SamplesAfterReset

Description:

Notes: KtEFDD_Cnt_SamplesAfterReset

y/x	65	70	75	80	85	90	95	100	105
1	20	20	20	15	10	10	10	10	10

16 OBDG01 Initial Supporting table - P0401_SamplesAfterStep

Description:

Notes: KtEFDD_Cnt_SamplesAfterStep

y/x	65	70	75	80	85	90	95	100	105
1	15	15	15	15	15	15	15	15	15

16 OBDG01 Initial Supporting table - P0401_StepDelta

Description:

Notes: KtEFDD_Cnt_SamplesAfterStep

y/x	65	70	75	80	85	90	95	100	105
1	15	15	15	15	15	15	15	15	15

16 OBDG01 Initial Supporting table - P0401_StepMAP_DIFF

Description:

Notes: KtEFDD_p_StepMAP_DIFF

y/x	65	70	75	80	85	90	95	100	105
1	2	2	2	2	2	2	2	2	2

16 OBDG01 Initial Supporting table - P0401_StepSamplesPerTrip

Description:

Notes: KtEFDD_Cnt_StepSamplesPerTrip

y/x	65	70	75	80	85	90	95	100	105
1	1	1	1	1	1	1	1	1	1

16 OBDG01 Initial Supporting table - VCE_ECOMode_EnableTorqueHyst

Description: Entry threshold for torque based VCE mode selection when eco mode is active. VCE will be enabled for torque if the torque request is less than the max VCE torque minus this calibration in Nm.

Notes: P3400: KaVCEC_M_EcoRedTrqEnterThrsh

VCE_ECOMode_EnableTorqueHyst - Part 1

y/x	CeTGRR_e_TransGr1	CeTGRR_e_TransGr2	CeTGRR_e_TransGr3	CeTGRR_e_TransGr4	CeTGRR_e_TransGr5	CeTGRR_e_TransGr6	CeTGRR_e_TransGrEVT1
1	10	10	10	10	10	10	10

VCE_ECOMode_EnableTorqueHyst - Part 2

y/x	CeTGRR_e_TransGrEVT2	CeTGRR_e_TransGrNeut	CeTGRR_e_TransGrRvrs	CeTGRR_e_TransGrPark	CeTGRR_e_TransGr7	CeTGRR_e_TransGr8	
1	10	10	10	10	10	10	

16 OBDG01 Initial Supporting table - VCE_ECOMode_MaxTorque_Gr5

Description: CeTGRR_e_TransGr5 maximum indicated torque (Nm) allowed in VCE mode when Eco Mode is active. Function of engine speed.

Notes: For P3400: KaVCEC_M_EcoRedTrqMaxIndThrsh

VCE_ECOMode_MaxTorque_Gr5 - Part 1

y/x	500	600	700	800	900	1,000	1,100	1,200	1,300	1,400	1,500	1,600	1,700
1	60	60	60	60	60	60	60	60	60	60	60	60	60

VCE_ECOMode_MaxTorque_Gr5 - Part 2

y/x	1,800	1,900	2,000	2,100	2,200	2,300	2,400	2,500	2,600	2,700	2,800	2,900	3,000
1	60	60	60	60	60	60	60	60	60	60	60	60	60

16 OBDG01 Initial Supporting table - VCE_EngineRPM_LowerLmt

Description: Engine speed lower limit for AFM

Notes: For P3400: KaVCEC_n_EngineSpeedLowerLimit with axis defined by gear state. In VCE mode, engine speed less than this will force an exit. In non-VCE mode, engine speed greater than this plus hysteresis enables VCE mode.

VCE_EngineRPM_LowerLmt - Part 1

y/x	CeTGRR_e_TransGr1	CeTGRR_e_TransGr2	CeTGRR_e_TransGr3	CeTGRR_e_TransGr4	CeTGRR_e_TransGr5	CeTGRR_e_TransGr6	CeTGRR_e_TransGrEVT1
1	425	425	425	425	425	425	425

VCE_EngineRPM_LowerLmt - Part 2

y/x	CeTGRR_e_TransGrEVT2	CeTGRR_e_TransGrNeut	CeTGRR_e_TransGrRvrs	CeTGRR_e_TransGrPark	CeTGRR_e_TransGr7	CeTGRR_e_TransGr8	
1	425	425	425	425	425	425	

16 OBDG01 Initial Supporting table - VCE_EngineRPM_UpperLmt

Description: Engine speed upper limit for AFM

Notes: For P3400: KaVCEC_n_EngineSpeedUpperLimit: with axis defined by gear state. In VCE mode,engine speed greater than this will force an exit. In non-VCE mode, engine speed less than this minus hysteresis enables VCE mode.

VCE_EngineRPM_UpperLmt - Part 1

y/x	CeTGRR_e_TransGr1	CeTGRR_e_TransGr2	CeTGRR_e_TransGr3	CeTGRR_e_TransGr4	CeTGRR_e_TransGr5	CeTGRR_e_TransGr6	CeTGRR_e_TransGrEVT1
1	2,800	2,800	2,800	2,800	2,800	2,800	2,800

VCE_EngineRPM_UpperLmt - Part 2

y/x	CeTGRR_e_TransGrEVT2	CeTGRR_e_TransGrNeut	CeTGRR_e_TransGrRvrs	CeTGRR_e_TransGrPark	CeTGRR_e_TransGr7	CeTGRR_e_TransGr8	
1	2,800	2,800	2,800	2,800	2,800	2,800	

16 OBDG01 Initial Supporting table - VCE_MinVacReducedTorqMode

Description: Minimum Vacuum allowed in VCE mode

Notes: For P3400: KtVCEC_p_MinVacReducedTrqMode

VCE_MinVacReducedTorqMode - Part 1									
y/x	500	600	700	800	900	1,000	1,100	1,200	1,300
1	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
VCE_MinVacReducedTorqMode - Part 2									
y/x	1,400	1,500	1,600	1,700	1,800	1,900	2,000	2,100	2,200
1	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
VCE_MinVacReducedTorqMode - Part 3									
y/x	2,300	2,400	2,500	2,600	2,700	2,800	2,900	3,000	
1	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	

16 OBDG01 Initial Supporting table - VCE_NormalMode_EnableTorqueHyst

Description: Entry threshold for torque based VCE mode selection when eco mode is NOT active. VCE will be enabled for torque if the torque request is less than the max VCE torque minus this calibration in Nm.

Notes: For P3400: KaVCEC_M_RedTrqEnterThrsh

VCE_NormalMode_EnableTorqueHyst - Part 1

y/x	CeTGRR_e_TransGr1	CeTGRR_e_TransGr2	CeTGRR_e_TransGr3	CeTGRR_e_TransGr4	CeTGRR_e_TransGr5	CeTGRR_e_TransGr6	CeTGRR_e_TransGrEVT1
1	10	10	10	10	10	10	10

VCE_NormalMode_EnableTorqueHyst - Part 2

y/x	CeTGRR_e_TransGrEVT2	CeTGRR_e_TransGrNeut	CeTGRR_e_TransGrRvrs	CeTGRR_e_TransGrPark	CeTGRR_e_TransGr7	CeTGRR_e_TransGr8	
1	10	10	10	10	10	10	

16 OBDG01 Initial Supporting table - VCE_NormalMode_MaxTorque_Gr5

Description: CeTGRR_e_TransGr5 maximum indicated torque (Nm) allowed in VCE mode when Eco Mode is NOT active. Function of engine speed.

Notes: For P3400: KaVCEC_M_RedTrqMaxIndThrsh

VCE_NormalMode_MaxTorque_Gr5 - Part 1

y/x	500	600	700	800	900	1,000	1,100	1,200	1,300	1,400	1,500	1,600	1,700
1	60	60	60	60	60	60	60	60	60	60	60	60	60

VCE_NormalMode_MaxTorque_Gr5 - Part 2

y/x	1,800	1,900	2,000	2,100	2,200	2,300	2,400	2,500	2,600	2,700	2,800	2,900	3,000
1	60	60	60	60	60	60	60	60	60	60	60	60	60

16 OBDG01 Initial Supporting table - VCE_PRNDL_NI_Disables

Description: Disables VCE mode in certain PRNDL positions when Neutral Idle Overrides (AFM at Idle) are active.

Notes: For P3400: KaVCEC_b_DisabledForPRNDL_NI

y/x	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE

16 OBDG01 Initial Supporting table - VCE_StartUpDelayTime

Description: Engine running enablement based on an engine off time

Notes: For P3400: KtVCEC_t_StartupDelayTime with axis a function of engine mode not running time (VeEMDC_t_EngModeNotRun)

y/x	0	20	40	60	80	100	120	140	160	180	240	300	360	420	480	540	600
1	2	4	6	8	10	12	14	16	18	20	20	20	20	20	20	20	20

16 OBDG01 Initial Supporting table - VCE_TransGear_Disables

Description: Disables VCE mode for specific transmission gear state.

Notes: For P3400: KaVCEC_b_DisableForTransGr See VCE_TransGear_Axis supporting table for axis definition

y/x	1	2	3	4	5	6	7	8	9	10	11	12	13
1	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE

16 OBDG01 Initial Supporting table - VCE_TransGear_DisablesNI

Description: Disables VCE mode for specific transmission gear state when in Neutral Idle

Notes: For P3400: KaVCEC_b_DisableForTransGrNI See VCE_TransGear_Axis supporting table for axis definition

y/x	1	2	3	4	5	6	7	8	9	10	11	12	13
1	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE

16 OBDG01 Initial Supporting table - VCE_VehicleSpeed_PRNDL_Enable

Description: This disables VCE mode in certain PRNDL positions when vehicle speed is equal to or above this cal.

Notes: For P3400: KaVCEC_v_DisabledForPRNDL See VCE_PRNDL_Axis supporting table for axis definition

y/x	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1	318	318	318	318	318	318	318	318	318	318	318	318	318	318	318	318	318	318	318	318

16 OBDG01 Initial Supporting table - P0101, P0106, P010B, P0121, P012B, P0236, P1101: MAF1 Residual Weight Factor based on MAF Est

Description: P0101_P0106_P010B_P0121_P012B_P0236_P1101 MAF1 Residual Weight Factor based on MAF Est

Notes:

y/x	0	50	70	73	76	79	82	85	89	95	100	110	150	170	200	230	250
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

16 OBDG01 Initial Supporting table - P0101, P0106, P010B, P0121, P012B, P0236, P1101: MAF1 Residual Weight Factor based on RPM

Description: P0101_P0106_P010B_P0121_P012B_P0236_P1101 MAF1 Residual Weight Factor based on RPM

Notes:

y/x	0	400	800	1,200	1,600	2,000	2,400	2,800	3,200	3,600	4,000	4,400	4,800	5,200	5,600	6,000	8,000
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

16 OBDG01 Initial Supporting table - P0128_Maximum Accumulated Energy for Start-up ECT conditions - Alternate

Description: KtECTR_E_CTR_WrmUpEnrgyLimTest1

Notes: Z axis is the cooling system energy failure threshold (kJ), X axis is ECT Temperature at Power up (° C), (Deluxe version)

y/x	-10	0	10	30	51	59	76
1	1,650	1,459	1,267	885	483	330	330

16 OBDG01 Initial Supporting table - P0128_Maximum Accumulated Energy for Start-up ECT conditions - Primary

Description: KtECTR_E_CTR_WrmUpEnrgyLimTest0

Notes: Z axis is the cooling system energy failure threshold (kJ), X axis is ECT Temperature at Power up (° C) , (Deluxe version)

y/x	-10	0	10	30	51	59	76
1	2,654	2,654	2,367	1,793	1,190	961	473

16 OBDG01 Initial Supporting table - P0606_Last Seed Timeout f(Loop Time)

Description: The max time for the Last Seed Timeout as a function of operating loop time sequence.

Notes: P0606, KaPISD_t_LastSeedTimeout[x]

y/x	CePISR_e_6p25msSeq	CePISR_e_12p5msSeq	CePISR_e_25msSeq	CePISR_e_LORES_C
1	0.175	0.175	0.175	409.594

16 OBDG01 Initial Supporting table - P0606_PSW Sequence Fail f(Loop Time)

Description: Fail threshold for PSW per operating loop.

Notes: P0606, KaPISD_Cnt_SequenceFail[x]

y/x	CePISR_e_6p25msSeq	CePISR_e_12p5msSeq	CePISR_e_25msSeq	CePISR_e_LORES_C
1	3	3	3	3

16 OBDG01 Initial Supporting table - P0606_PSW Sequence Sample f(Loop Time)

Description: Sample threshold for PSW per operating loop.

Notes: P0606, KaPISD_Cnt_SequenceSmpl[x]

y/x	CePISR_e_6p25msSeq	CePISR_e_12p5msSeq	CePISR_e_25msSeq	CePISR_e_LORES_C
1	4	4	4	4

16 OBDG01 Initial Supporting table - P1682_PT Relay Pull-in Run/Crank Voltage f(IAT)

Description: The Run/Crank voltages required to pull in the PT relay as a function of induction air temperature.

Notes: P1682, KtEROR_U_PT_RelayPullInEnbl

y/x	23.00	85.00	95.00	105.00	125.00
1.00	7.00	8.70	9.00	9.20	10.00

16 OBDG01 Initial Supporting table - P16F3_Delta MAP Threshold f(Desired Engine Torque)

Description: Engine Sync based and Time based delta pressure threshold above which Torque Security error is reported.

Notes: P16F3, KtMAPI_p_ES_TB_MAP_DeltaThresh

y/x	0.00	50.00	100.00	150.00	200.00	300.00
1.00	34.92	34.92	34.92	34.92	34.92	34.92

16 OBDG01 Initial Supporting table - P16F3_Delta Spark Threshold f(RPM,APC)

Description: Threshold for determining when the difference between commanded spark and applied spark exceeds the torque security requirement. It is a function of engine rpm and APC.

Notes: P16F3, KtSPRK_phi_DeltTorqueScrtyAdv

y/x	500.00	980.74	1,461.48	1,942.23	2,422.97	2,903.71	3,384.45	3,865.20	4,345.94	4,826.68	5,307.42	5,788.16	6,268.91	6,749.65	7,230.39	7,711.13	8,191.88
80.00	125.00	129.27	108.56	111.47	126.22	134.91	139.45	134.83	129.11	137.94	144.08	137.11	136.48	136.48	136.48	136.48	136.48
160.00	125.00	118.11	85.86	81.47	93.69	102.67	103.33	99.42	96.09	102.59	107.00	101.78	101.33	101.33	101.33	101.33	101.33
240.00	125.00	84.91	63.56	63.64	66.73	78.81	79.63	77.02	74.86	80.00	82.98	78.14	77.77	77.77	77.77	77.77	77.77
320.00	125.00	66.27	50.00	48.92	51.38	61.97	64.14	62.86	61.31	65.56	67.78	63.41	63.09	63.09	63.09	63.09	63.09
400.00	125.00	54.34	40.64	39.33	41.05	51.06	53.72	53.09	51.91	55.53	57.28	53.34	53.08	53.08	53.08	53.08	53.08
480.00	125.00	49.41	36.75	35.45	36.94	46.52	49.28	48.89	47.73	50.73	52.45	49.03	48.78	48.78	48.78	48.78	48.78
560.00	125.00	49.41	36.75	35.45	36.94	46.52	49.28	48.89	47.73	50.73	52.45	49.03	48.78	48.78	48.78	48.78	48.78
640.00	125.00	49.41	36.75	35.45	36.94	46.52	49.28	48.89	47.73	50.73	52.45	49.03	48.78	48.78	48.78	48.78	48.78
720.00	125.00	49.41	36.75	35.45	36.94	46.52	49.28	48.89	47.73	50.73	52.45	49.03	48.78	48.78	48.78	48.78	48.78
800.00	125.00	49.41	36.75	35.45	36.94	46.52	49.28	48.89	47.73	50.73	52.45	49.03	48.78	48.78	48.78	48.78	48.78
880.00	125.00	49.41	36.75	35.45	36.94	46.52	49.28	48.89	47.73	50.73	52.45	49.03	48.78	48.78	48.78	48.78	48.78
960.00	125.00	49.41	36.75	35.45	36.94	46.52	49.28	48.89	47.73	50.73	52.45	49.03	48.78	48.78	48.78	48.78	48.78
1,040.00	125.00	49.41	36.75	35.45	36.94	46.52	49.28	48.89	47.73	50.73	52.45	49.03	48.78	48.78	48.78	48.78	48.78
1,120.00	125.00	49.41	36.75	35.45	36.94	46.52	49.28	48.89	47.73	50.73	52.45	49.03	48.78	48.78	48.78	48.78	48.78
1,200.00	125.00	49.41	36.75	35.45	36.94	46.52	49.28	48.89	47.73	50.73	52.45	49.03	48.78	48.78	48.78	48.78	48.78
1,280.00	125.00	49.41	36.75	35.45	36.94	46.52	49.28	48.89	47.73	50.73	52.45	49.03	48.78	48.78	48.78	48.78	48.78
1,360.00	125.00	49.41	36.75	35.45	36.94	46.52	49.28	48.89	47.73	50.73	52.45	49.03	48.78	48.78	48.78	48.78	48.78

16 OBDG01 Initial Supporting table - P16F3_Speed Control External Load f(Oil Temp, RPM)

Description: Specifies the external load table for SPDR torque security as a function of engine oil temperature and engine RPM.

Notes: P16F3, KtSPDC_M_ExternalLoad

y/x	-40.00	-20.00	-10.00	0.00	50.00	90.00
700.00	4,096.00	4,096.00	4,096.00	4,096.00	4,096.00	4,096.00
900.00	4,096.00	4,096.00	4,096.00	4,096.00	4,096.00	4,096.00
1,100.00	70.00	70.00	70.00	70.00	60.00	50.00
1,400.00	45.00	42.00	38.00	35.00	35.00	35.00
1,600.00	32.89	29.44	27.18	25.55	18.09	15.26
1,800.00	34.82	31.10	28.67	26.92	19.35	16.51
2,000.00	37.64	32.56	30.68	29.85	21.71	18.36
2,200.00	40.80	35.20	33.13	32.22	23.24	19.84
2,500.00	43.58	39.76	37.58	36.01	26.21	23.06
2,700.00	42.72	38.90	36.72	35.15	25.34	22.19
3,000.00	40.65	36.83	34.65	33.08	23.27	20.13
3,300.00	36.87	33.05	30.87	29.30	19.49	16.35
3,500.00	13.41	9.58	7.41	5.84	-3.97	-7.12
3,700.00	7.50	3.67	1.50	-0.08	-9.88	-13.03
4,000.00	4.25	0.43	-1.75	-3.32	-13.13	-16.28
4,500.00	4.25	0.43	-1.75	-3.32	-13.13	-16.28
5,000.00	4.25	0.43	-1.75	-3.32	-13.13	-16.28

16 OBDG01 Initial Supporting table - 1st_FireAftrMisfr_Acel

Description: Multiplier for establishing the expected acceleration of the cylinder after the misfire

Notes: Used for P0300 - P0308, Cal Name: KtMSFD_K_dt_CylAftMsfr

y/x	500	600	700	800	900	1,000	1,100	1,200	1,400	1,800	2,200	2,600	3,000	4,000	5,000	6,000	7,000
8	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
12	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
16	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
20	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
24	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
30	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
40	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
100	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

16 OBDG01 Initial Supporting table - 1st_FireAftrMisfr_Jerk

Description: Multiplier for establishing the expected Jerk of the cylinder after the misfire

Notes: Used for P0300 - P0308, Cal Name: KtMSFD_K_ddt_CylAftMsfr

y/x	500	600	700	800	900	1,000	1,100	1,200	1,400	1,800	2,200	2,600	3,000	4,000	5,000	6,000	7,000
8	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
12	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
16	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
20	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
24	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
30	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
40	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
100	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

16 OBDG01 Initial Supporting table - 1stFireAfterMisJerkAFM

Description: Multiplier for establishing the expected jerk of the cylinder after the misfire if Active Fuel Management cylinder deact mode is active

Notes: Used for P0300 - P0308, Cal Name: KtMSFD_K_ddt_AFM_CylAftMsfr

y/x	800	1,000	1,200	1,600	2,000	2,400	2,600	3,000	3,500
8	1	1	1	1	1	1	1	1	1
12	1	1	1	1	1	1	1	1	1
16	1	1	1	1	1	1	1	1	1
20	1	1	1	1	1	1	1	1	1
24	1	1	1	1	1	1	1	1	1
30	1	1	1	1	1	1	1	1	1
40	1	1	1	1	1	1	1	1	1
60	1	1	1	1	1	1	1	1	1
100	1	1	1	1	1	1	1	1	1

16 OBDG01 Initial Supporting table - 1stFireAftrMisAcelAFM

Description: Multiplier for establishing the expected acceleration of the cylinder after the misfire if Active Fuel Management cylinder deact mode is active

Notes: Used for P0300 - P0308, Cal Name: KtMSFD_K_dt_AFM_CylAftMsfr

y/x	800	1,000	1,200	1,600	2,000	2,400	2,600	3,000	3,500
8	1	1	1	1	1	1	1	1	1
12	1	1	1	1	1	1	1	1	1
16	1	1	1	1	1	1	1	1	1
20	1	1	1	1	1	1	1	1	1
24	1	1	1	1	1	1	1	1	1
30	1	1	1	1	1	1	1	1	1
40	1	1	1	1	1	1	1	1	1
60	1	1	1	1	1	1	1	1	1
100	1	1	1	1	1	1	1	1	1

16 OBDG01 Initial Supporting table - Abnormal Cyl Mode (Volt)

Description: Number of consecutive number of decelerating cylinders after the misfire that would be considered abnormal. (Cylinder Mode Equation)

Notes: Used for P0300-P0308. Cal Name: KaMSFD_Cnt_CylAbnormal

y/x	0	1	2	3	4	5	6	7	8
1	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00

16 OBDG01 Initial Supporting table - Abnormal Rev Mode (Volt)

Description: Abnormal Rev Mode Number of consecutive number of decelerating cylinders after the misfire that would be considered abnormal. (Rev Mode Equation)

Notes: Used for P0300-P0308. Cal Name: KaMSFD_Cnt_RevAbnormal

y/x	0	1	2	3	4	5	6	7	8
1	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00

16 OBDG01 Initial Supporting table - Abnormal SCD Mode (Volt)

Description: Number of consecutive number of decelerating cylinders after the misfire that would be considered abnormal. (SCD Mode Equation)

Notes: Used for P0300-P0308. Cal Name: KaMSFD_Cnt_SCD_CylAbnormal

y/x	0	1	2	3	4	5	6	7	8
1	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00

16 OBDG01 Initial Supporting table - Bank_SCD_Decel (Volt)

Description: Mulitplier to SCD decel to account for different pattern of Paired cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

Notes: Used for P0300 - P0308, Cal Name: KtMSFD_K_dt_MEDRES_Bank

y/x	700	800	900	1,000	1,100	1,200	1,300	1,400	1,500
5	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
10	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
20	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
30	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
40	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
50	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
60	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
80	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
100	12.03	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00

16 OBDG01 Initial Supporting table - Bank_SCD_Jerk (Volt)

Description: Mulitplier to Medres SCD jerk to account for different pattern of Paired cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

Notes: Used for P0300 - P0308, Cal Name: KtMSFD_K_ddt_MEDRES_Bank

y/x	700	800	900	1,000	1,100	1,200	1,300	1,400	1,500
5	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
10	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
20	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
30	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
40	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
50	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
60	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
80	13.14	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
100	5.66	8.21	11.37	15.00	15.00	15.00	15.00	15.00	15.00

16 OBDG01 Initial Supporting table - BankCylModeDecel

Description: Mulitplier to Lores Decel to account for different pattern of Paired cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

Notes: Used for P0300 - P0308, Cal Name: KtMSFD_K_dt_LORES_Bank

y/x	1,100	1,200	1,300	1,400	1,501	1,600	1,700	1,800	2,200	2,600	3,000	3,500	4,000	4,500	5,000	5,500	6,000
5	10.71	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
10	10.71	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
20	9.38	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
30	4.92	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
40	3.19	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
50	2.63	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
60	2.63	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
80	6.25	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
100	3.95	15.00	15.00	15.00	8.35	10.33	11.94	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00

16 OBDG01 Initial Supporting table - BankCylModeJerk

Description: Mulitplier to Lores Jerk to account for different pattern of Paired cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

Notes: Used for P0300 - P0308, Cal Name: KtMSFD_K_ddt_LORES_Bank

y/x	1,100	1,200	1,300	1,400	1,501	1,600	1,700	1,800	2,200	2,600	3,000	3,500	4,000	4,500	5,000	5,500	6,000
5	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
10	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
20	6.50	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
30	4.45	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
40	3.75	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
50	3.12	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
60	3.12	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
80	6.22	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
100	3.25	8.54	11.81	11.81	11.81	11.81	11.81	13.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00

16 OBDG01 Initial Supporting table - Catalyst_Damage_Misfire_Percentage (Volt)

Description: Catalyst Damaging Misfire Percentage" Table whenever secondary conditions are met.

Notes: Used for P0300-P0308. Cal Name: KtMSFD_Pct_CatalystMisfire

y/x	0	1,000	2,000	3,000	4,000	5,000	6,000	7,000
0	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
10	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
20	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
30	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
40	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
50	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
60	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
70	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
80	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
90	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
100	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6

16 OBDG01 Initial Supporting table - ClyAfterAFM_Decel

Description: Mulitplier to Lores decel to account for different pattern of misfire after a deactivated cylider. Similar to the second cylinder of consecutive cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

Notes: Used for P0300 - P0308, Cal Name: KtMSFD_K_dt_LORES_PostDeac

y/x	800	1,000	1,200	1,600	2,000	2,400	2,600	3,000	3,500
5	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
10	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
20	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
30	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
40	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
50	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
80	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
100	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

16 OBDG01 Initial Supporting table - ClyBeforeAFM_Jerk

Description: Mulitplier to Lores decel to account for different pattern of misfire before a deactivated cylider, but after an active cylinder that follows an deactive cylinder on engine that supports cylinder deactivation in non even fire patterns.. Multipliers are a function of engine rpm and % engine Load.

Notes: KtMSFD_K_ddt_LORES_PreDeac KtMSFD_K_ddt_LORES_PreDeac

y/x	800	1,000	1,200	1,600	2,000	2,400	2,600	3,000	3,500
5	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
10	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
20	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
30	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
40	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
50	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
80	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
100	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

16 OBDG01 Initial Supporting table - CombustModeIdleTbl

Description: Combustion modes that will force use of Idle table. A value of CeCMBR_i_CombModesMax means not selected.

Notes: Used for P0300 - P0308, Cal Name: KaMSFD_e_IdleTblDieselCM_Only

CombustModeIdleTbl - Part 1						
y/x	0	1	2	3	4	5
1	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax
CombustModeIdleTbl - Part 2						
y/x	6	7	8	9	10	11
1	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax
CombustModeIdleTbl - Part 3						
y/x	12	13	14	15	16	
1	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	

16 OBDG01 Initial Supporting table - ConsecCylModDecel

Description: Mulitplier to Lores decel to account for different pattern of the second cylinder of consecutive misfire. Multipliers are a function of engine rpm and % engine Load.

Notes: Used for P0300 - P0308, Cal Name: KtMSFD_K_dt_LORES_Consec

y/x	1,100	1,200	1,300	1,400	1,501	1,600	1,700	1,800	2,200	2,600	3,000	3,500	4,000	4,500	5,000	5,500	6,000
2	0.82	0.82	0.82	0.82	0.82	1.01	0.66	1.02	0.64	0.64	1.02	1.73	1.65	1.60	1.33	1.30	1.30
8	0.82	0.82	0.82	0.82	0.82	1.01	0.66	1.02	0.64	0.64	1.02	1.73	1.65	1.60	1.33	1.30	1.30
12	0.82	0.82	0.82	0.82	0.82	1.01	0.66	1.02	0.64	0.64	1.02	1.73	1.65	1.60	1.33	1.30	1.30
16	1.22	1.22	1.22	1.22	1.22	1.23	1.47	1.17	1.07	1.07	1.40	1.73	1.65	1.60	1.33	1.30	1.30
20	1.32	1.32	1.32	1.32	1.32	1.58	1.53	1.53	1.48	1.29	1.28	1.27	1.50	1.78	1.77	1.70	1.70
24	1.32	1.32	1.32	1.32	1.32	1.58	1.55	1.56	1.46	1.50	1.28	1.27	1.34	1.33	2.00	2.17	2.17
26	1.23	1.23	1.23	1.23	1.23	1.76	1.46	1.44	1.42	1.42	1.38	1.68	1.49	1.19	1.33	2.33	2.33
30	0.83	0.83	0.83	0.83	0.83	0.90	-1.70	1.54	1.49	1.44	1.33	1.26	1.31	1.38	1.27	1.29	1.29
50	0.83	0.83	0.83	0.83	0.83	0.90	-0.87	2.06	1.98	1.78	1.73	1.64	1.64	1.62	1.57	1.45	1.45

16 OBDG01 Initial Supporting table - ConsecCylModeJerk

Description: Mulitplier to Lores Jerk to account for different pattern of the second cylinder of consecutive misfire. Multipliers are a function of engine rpm and % engine Load.

Notes: Used for P0300 - P0308, Cal Name: KtMSFD_K_ddt_LORES_Consec

y/x	1,100	1,200	1,300	1,400	1,501	1,600	1,700	1,800	2,200	2,600	3,000	3,500	4,000	4,500	5,000	5,500	6,000
2	0	0	0	0	0	0	-1	-1	-1	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	-1	-1	-1	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	-1	-1	-1	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	-1	-1	-1	-1	-1	-1	-5	0	0	0	0	0	0	0	0	0	0
50	-1	-1	-1	-1	-1	-1	-3	0	0	0	0	0	0	0	0	0	0

16 OBDG01 Initial Supporting table - ConsecSCD_Decel

Description: Mulitplier to medres decel to account for different pattern of the second cylinder of consecutive misfire. Multipliers are a function of engine rpm and % engine Load.

Notes: Used for P0300 - P0308, Cal Name: KtMSFD_K_dt_MEDRES_Consec

y/x	700	800	900	1,000	1,100	1,200	1,300	1,400	1,500
2	-0.23	-0.23	-0.23	-0.23	-0.23	-0.23	0.35	0.00	0.00
8	-0.23	-0.23	-0.23	-0.23	-0.23	-0.23	0.35	-0.35	0.00
12	0.01	0.01	0.01	0.01	0.01	0.01	0.35	-0.35	0.25
16	0.01	0.01	0.01	0.01	0.01	0.01	0.55	0.36	0.53
20	0.14	0.14	0.14	0.14	0.14	0.14	0.10	0.24	0.15
24	0.13	0.13	0.13	0.13	0.13	0.13	-0.47	0.01	0.15
26	0.11	0.11	0.11	0.11	0.11	0.11	-1.05	-0.35	0.48
30	0.11	0.11	0.11	0.11	0.11	0.11	-1.82	-1.14	-1.19
50	0.11	0.11	0.11	0.11	0.11	0.11	-1.82	-0.89	-1.19

16 OBDG01 Initial Supporting table - ConsecSCD_Jerk

Description: Mulitplier to medres Jerk to account for different pattern of the second cylinder of consecutive misfire. Multipliers are a function of engine rpm and % engine Load.

Notes: Used for P0300 - P0308, Cal Name: KtMSFD_K_ddt_MEDRES_Consec

y/x	700	800	900	1,000	1,100	1,200	1,300	1,400	1,500
2	-1.73	-1.73	-1.73	-1.73	-1.73	-1.73	-1.02	-2.10	-0.91
8	-2.00	-2.00	-2.00	-2.00	-2.00	-2.00	-1.09	-2.04	-1.02
12	-2.00	-2.00	-2.00	-2.00	-2.00	-2.00	-1.09	-2.04	-1.02
16	-1.86	-1.86	-1.86	-1.86	-1.86	-1.86	-1.00	-0.97	-0.78
20	-1.70	-1.70	-1.70	-1.70	-1.70	-1.70	-1.70	-2.25	-1.48
24	-1.76	-1.76	-1.76	-1.76	-1.76	-1.76	-1.76	-2.25	-1.48
26	-1.73	-1.73	-1.73	-1.73	-1.73	-1.73	-1.73	-2.46	-1.33
30	-3.65	-3.65	-3.65	-3.65	-3.65	-3.65	-3.65	-2.97	-3.12
50	-2.01	-2.01	-2.01	-2.01	-2.01	-2.01	-2.01	-2.10	-3.12

16 OBDG01 Initial Supporting table - CylAfterAFM_Jerk

Description: Mulitplier to Lores Jerkl to account for different pattern of misfire after a deactivated cylider. Similar to the second cylinder of consecutive cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

Notes: Used for P0300 - P0308, Cal Name: KtMSFD_K_ddt_LORES_PostDeac

y/x	800	1,000	1,200	1,600	2,000	2,400	2,600	3,000	3,500
5	1	1	1	1	1	1	1	1	1
10	1	1	1	1	1	1	1	1	1
20	1	1	1	1	1	1	1	1	1
30	1	1	1	1	1	1	1	1	1
40	1	1	1	1	1	1	1	1	1
50	1	1	1	1	1	1	1	1	1
60	1	1	1	1	1	1	1	1	1
80	1	1	1	1	1	1	1	1	1
100	1	1	1	1	1	1	1	1	1

16 OBDG01 Initial Supporting table - CylBeforeAFM_Decel

Description: Mulitplier to Lores decel to account for different pattern of misfire before a deactivated cylider, but after an active cylinder that follows an deactive cylinder on engine that supports cylinder deactivation in non even fire patterns.. Multipliers are a function of engine rpm and % engine Load.

Notes: Used for P0300 - P0308, Cal Name: KtMSFD_K_dt_LORES_PreDeac

y/x	800	1,000	1,200	1,600	2,000	2,400	2,600	3,000	3,500
5	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
10	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
20	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
30	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
40	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
50	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
80	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
100	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

16 OBDG01 Initial Supporting table - CylBeforeAFM_Decel

Description: Crankshaft decel threshold. Thresholds are a function of rpm and % engine Load.

Notes: Used for P0300-P0308. Cal Name: KtMISF_CylinderMode

CylModeDecel - Part 1

y/x	700	800	900	1,000	1,100	1,200	1,300	1,400	1,501	1,600	1,700	1,800	2,000
3	2,800	1,800	1,250	825	621	420	389	289	249	180	158	110	76
6	2,800	1,800	1,250	825	621	420	389	289	249	180	158	110	76
8	2,800	1,800	1,250	825	621	420	389	289	249	180	158	110	76
10	2,800	1,800	1,250	825	621	420	389	289	249	180	158	110	76
12	2,950	1,875	1,310	900	644	498	415	333	255	188	159	116	78
14	3,199	2,090	1,403	1,004	732	570	560	400	344	209	160	126	80
16	4,743	2,920	1,958	1,466	1,041	884	676	476	415	265	191	174	97
18	6,103	3,809	2,568	1,775	1,212	1,016	830	618	450	306	253	205	132
20	7,610	4,743	3,084	2,110	1,497	1,241	1,186	658	506	318	266	239	149
22	9,410	5,726	3,795	2,597	1,798	1,589	1,315	953	571	340	327	245	153
24	9,585	5,996	3,930	2,726	1,976	1,743	1,405	1,055	631	369	350	271	166
26	11,428	7,062	4,663	3,261	2,264	1,859	1,539	1,080	900	491	428	317	196
30	3,200	2,200	1,600	1,200	900	700	350	1,130	956	868	606	447	274
40	4,338	3,099	2,066	1,505	1,122	783	388	365	1,387	1,115	1,011	644	422
50	4,800	3,250	2,150	1,600	1,250	908	521	450	1,731	1,362	1,165	660	438
60	6,100	3,800	2,550	1,800	1,350	1,033	900	783	2,142	1,688	1,455	880	571
97	7,600	4,750	3,100	2,100	1,500	1,583	1,350	1,122	3,593	2,905	2,513	1,469	961

CylModeDecel - Part 2

y/x	2,200	2,400	2,600	2,800	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000
3	59	42	32	26	25	14	10	7	5	5	5	5	5
6	59	42	32	26	25	14	10	7	5	5	5	5	5
8	59	42	32	26	25	14	10	7	5	5	5	5	5
10	59	42	32	26	25	14	10	7	5	5	5	5	5
12	63	44	36	30	26	14	10	7	5	5	5	5	5
14	65	46	37	31	26	16	11	8	6	5	5	5	5
16	70	51	42	32	27	17	12	8	6	5	5	5	5
18	85	61	45	33	28	17	12	9	7	5	5	5	5
20	108	82	68	59	46	19	13	10	7	6	6	6	6
22	127	91	70	60	48	31	18	10	8	6	6	6	6
24	146	107	85	69	52	32	22	15	8	6	6	6	6
26	158	118	90	73	55	34	24	18	12	6	6	6	6
30	201	134	99	79	62	43	29	20	15	10	10	10	10

16 OBDG01 Initial Supporting table - CylBeforeAFM_Decel

40	311	210	147	120	100	56	36	26	20	16	16	16	16
50	318	261	178	142	116	70	46	31	26	19	19	19	19
60	420	316	220	176	142	73	48	36	28	20	20	20	20
97	704	535	364	292	235	132	85	62	50	36	36	36	36

16 OBDG01 Initial Supporting table - CylModeJerk

Description: Crankshaft jerk threshold. Thresholds are a function of rpm and % engine Load.

Notes: Used for P0300-P0308. Cal Name: KtMISF_ddt_CylinderMode

CylModeJerk - Part 1

y/x	700	800	900	1,000	1,100	1,200	1,300	1,400	1,501	1,600	1,700	1,800	2,000
3	1,991	1,393	1,012	772	579	419	374	316	259	238	189	155	109
6	1,991	1,393	1,012	772	579	419	374	316	259	238	189	155	109
8	1,991	1,393	1,012	772	579	419	374	316	259	238	189	155	109
10	1,991	1,393	1,012	772	579	419	374	316	259	238	189	155	109
12	2,570	1,754	1,264	956	726	500	481	382	318	269	250	186	145
14	4,615	3,135	2,199	1,633	1,197	902	722	542	460	379	316	253	214
16	6,422	4,271	2,954	2,166	1,606	1,115	932	749	633	516	440	363	250
18	6,738	4,535	3,146	2,331	1,709	1,268	1,043	818	687	557	464	371	286
20	7,041	4,750	3,328	2,442	1,823	1,398	1,114	830	732	634	538	443	303
22	8,004	5,387	3,756	2,788	2,049	1,477	1,241	1,004	840	676	583	489	328
24	8,674	5,824	4,060	3,035	2,215	1,610	1,337	1,065	892	719	620	521	373
26	9,603	6,485	4,506	3,322	2,458	1,790	1,494	1,199	977	756	676	595	420
30	2,871	2,163	1,639	1,272	970	700	700	1,000	1,000	841	728	615	495
40	3,307	2,608	2,096	1,584	1,180	800	800	1,200	1,200	966	879	792	652
50	4,826	3,604	2,803	2,234	1,749	1,327	1,327	1,327	1,327	1,327	1,190	1,050	812
60	5,770	4,243	3,467	2,743	2,148	1,583	1,583	1,583	1,583	1,583	1,429	1,264	994
97	9,219	6,944	5,547	4,430	3,512	2,541	2,541	2,541	2,541	2,541	2,309	2,071	1,630

CylModeJerk - Part 2

y/x	2,200	2,400	2,600	2,800	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000
3	81	62	54	43	35	25	20	13	9	7	7	7	7
6	81	62	54	43	35	25	20	13	9	7	7	7	7
8	81	62	54	43	35	25	20	13	9	7	7	7	7
10	81	62	54	43	35	25	20	13	9	7	7	7	7
12	108	84	63	56	44	31	24	15	10	9	9	9	9
14	172	129	100	71	62	37	24	19	12	9	9	9	9
16	200	134	119	99	68	49	26	22	15	11	11	11	11
18	207	173	132	109	85	50	38	26	15	13	13	13	13
20	230	184	140	114	95	57	40	29	20	15	15	15	15
22	256	202	149	121	104	58	42	32	23	15	15	15	15
24	266	219	167	136	109	64	45	32	24	17	17	17	17
26	318	242	193	147	112	72	50	34	28	19	19	19	19
30	371	261	208	162	148	91	60	45	33	22	22	22	22

16 OBDG01 Initial Supporting table - CylModeJerk

40	507	380	270	243	200	110	70	57	42	28	28	28	28
50	586	428	334	298	239	135	91	64	56	41	41	41	41
60	732	545	404	362	291	157	104	74	64	50	50	50	50
97	1,205	888	656	597	478	292	181	128	110	83	83	83	83

16 OBDG01 Initial Supporting table - DeacCylInversionDecel

Description: Negative Torque can cause crank readings to invert (active cylinders appear weak & deactivated cylinders appear "strong" If deactivated cylinders don't decelerate at least this amount then the crank signal is inverting. Function of speed and load.

Notes: Used for P0300 - P0308, Cal Name: KtMSFD_dt_AFM_Inversion

y/x	800	1,000	1,200	1,600	2,000	2,400	2,600	3,000	3,500
5	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384
10	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384
20	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384
30	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384
40	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384
50	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384
60	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384
80	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384
100	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384

16 OBDG01 Initial Supporting table - DeacCylInversionJerk

Description: Negative Torque can cause crank readings to invert (active cylinders appear weak & deactivated cylinders appear "strong" If deactivated cylinders don't jerk at least this amount then the crank signal is inverting. Function of speed and load.

Notes: Used for P0300 - P0308, Cal Name: KtMSFD_ddt_AFM_Inversion

y/x	800	1,000	1,200	1,600	2,000	2,400	2,600	3,000	3,500
5	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384
10	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384
20	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384
30	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384
40	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384
50	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384
60	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384
80	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384
100	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384

16 OBDG01 Initial Supporting table - Down Stream Stk Temp Vrtn

Description: KtCETR_T_DNSS_StkTempVrtn - Required temperature movement required to pass the stuck diagnostic.								
Notes: input is Downstream Temp sensor temp								
y/x	-40	0	20	40	60	80	100	120
1	3	4	5	5	5	4	3	2

16 OBDG01 Initial Supporting table - EGR Efficiency Flow Offset

Description:					
Notes:					
y/x	1	5	10	20	30
1	0	0	0	0	0

16 OBDG01 Initial Supporting table - EngineOverSpeedLimit (Volt)

Description: Engine OverSpeed Limit versus gear

Notes: Used for P0300-P0308. Cal Name: KaEOSC_n_EngOvrspdLimitGear

EngineOverSpeedLimit - Part 1

y/x	CeTGRR_e_TransGr1	CeTGRR_e_TransGr2	CeTGRR_e_TransGr3	CeTGRR_e_TransGr4	CeTGRR_e_TransGr5	CeTGRR_e_TransGr6	CeTGRR_e_TransGrEVT1
1	5,800	5,800	5,800	5,800	5,800	5,800	5,800

EngineOverSpeedLimit - Part 2

y/x	CeTGRR_e_TransGrEVT2	CeTGRR_e_TransGrNeut	CeTGRR_e_TransGrRvrs	CeTGRR_e_TransGrPark	CeTGRR_e_TransGr7	CeTGRR_e_TransGr8	
1	5,800	5,800	5,800	5,800	5,800	5,800	

16 OBDG01 Initial Supporting table - GearDownShftOffset

Description: KtCCTI_T_GearDwnShftOffset - corrrection to turbo temperature for recent downshifts that can elevate temp for short period of time - inputs are turbo temp and RPM					
Notes: time for correction post down shift is KtCCTI_T_GearDwnShftOffset					
y/x	700	800	850	900	1,000
2,250	50	50	50	50	50
2,750	50	50	50	50	50
3,250	50	50	50	50	50
4,250	50	50	50	50	50
5,250	50	50	50	50	50

16 OBDG01 Initial Supporting table - IdleCyl_Decel

Description: Crankshaft decel threshold. Thresholds are a function of rpm and % engine Load.

Notes: Used for P0300-P0308. Cal Name: KtMSFD_dt_IdleCylinderMode

y/x	1,250	1,300	1,350	1,375	1,400	1,425	1,450	1,500	1,600	1,700	1,800	1,900	2,000
3	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
6	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
8	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
10	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
12	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
14	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
16	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
18	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
20	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
22	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
24	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
26	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
30	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
40	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
50	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
60	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
97	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767

16 OBDG01 Initial Supporting table - IdleCyl_Jerk

Description: Crankshaft jerk threshold. Thresholds are a function of rpm and % engine Load.

Notes: Used for P0300-P0308. Cal Name: KtMSFD_ddt_IdleCylinderMode

y/x	1,250	1,300	1,350	1,375	1,400	1,425	1,450	1,500	1,600	1,700	1,800	1,900	2,000
3	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
6	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
8	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
10	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
12	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
14	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
16	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
18	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
20	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
22	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
24	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
26	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
30	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
40	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
50	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
60	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
97	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767

16 OBDG01 Initial Supporting table - IdleSCD_Decel (Volt)

Description: Crankshaft decel threshold while in SCD mode. SCD mode uses smaller windows near TDC. Thresholds are a function of rpm and % engine Load.

Notes: Used for P0300-P0308. Cal Name: KtMISF_dt_SCD_IdleMode
Note: Misfire's Load term is %, but not PID$04. PID $04 is not robust to temperature and alititude shifts. (especially decel and jerk thresholds since they track actual air trapped in cylinder)

y/x	700	800	900	1,000	1,100	1,150	1,200	1,250	1,300	1,350	1,400	1,450	1,500
3	353	249	179	128	84	77	69	62	55	46	38	37	36
6	353	249	179	128	84	77	69	62	55	46	38	37	36
8	353	249	179	128	84	77	69	62	55	46	38	37	36
10	418	287	206	153	117	100	84	76	68	59	51	50	50
12	592	374	267	194	140	115	90	92	94	79	65	64	62
14	678	467	315	227	170	154	138	136	134	112	90	83	76
16	808	543	379	270	197	157	116	137	157	133	108	99	89
18	980	678	443	318	231	185	138	126	113	121	129	120	111
20	1,007	702	462	345	250	207	164	143	122	132	142	133	125
22	1,212	824	567	404	295	248	201	189	177	166	156	145	133
24	1,209	815	562	411	308	266	224	216	208	186	164	135	106
26	1,302	887	639	458	347	301	255	239	222	200	178	168	158
30	1,448	971	680	491	367	333	299	232	165	152	138	163	188
40	800	594	459	374	292	266	240	184	128	232	335	247	160
50	1,054	782	609	485	380	347	313	240	167	286	405	305	205
60	1,307	970	747	602	466	425	384	291	197	335	472	361	250
97	2,245	1,654	1,272	1,022	799	733	667	502	336	546	756	589	423

16 OBDG01 Initial Supporting table - IdleSCD_Jerk (Volt)

Description: Crankshaft jerk threshold while in SCD mode. SCD mode uses smaller windows near TDC. Thresholds are a function of rpm and % engine Load.

Notes: Used for P0300-P0308. Cal Name: KtMISF_ddt_SCD_IdleMode

y/x	700	800	900	1,000	1,100	1,150	1,200	1,250	1,300	1,350	1,400	1,450	1,500
3	256	185	131	94	69	64	59	55	52	44	36	35	34
6	256	185	131	94	69	64	59	55	52	44	36	35	34
8	256	185	131	94	69	64	59	55	52	44	36	35	34
10	341	241	173	129	97	85	72	68	63	58	52	48	44
12	432	300	219	164	127	108	90	86	81	77	72	68	63
14	633	429	309	233	176	158	139	126	113	100	88	83	78
16	793	536	381	287	216	190	165	144	123	107	90	85	80
18	889	607	429	340	258	214	169	164	160	138	115	108	101
20	966	672	477	354	264	235	207	186	165	144	124	116	109
22	1,065	727	529	381	286	250	214	200	186	157	128	125	122
24	1,180	804	558	421	304	264	224	210	195	177	158	142	126
26	1,297	870	611	459	346	291	237	222	206	189	171	158	146
30	1,327	921	666	499	385	338	292	207	121	149	176	180	183
40	2,055	1,411	1,014	754	577	491	406	381	356	340	324	260	196
50	2,468	1,710	1,221	911	696	594	492	441	390	381	373	319	264
60	2,961	2,036	1,467	1,094	839	713	587	527	467	461	456	385	313
97	4,767	3,289	2,375	1,768	1,356	1,159	961	830	699	732	765	631	498

16 OBDG01 Initial Supporting table - InfrequentRegen

Description: Initiates a misfire delay when the current combustion mode matchs a selection in the table. Diesel only. A value of CeCMBR_i_CombModesMax means not selected.

Notes: Used for P0300-P0308. Cal Name: KaMSFD_e_InfrqntRegenDelayCM

InfrequentRegen - Part 1

y/x	0	1	2	3	4	5
1	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax

InfrequentRegen - Part 2

y/x	6	7	8	9	10	11
1	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax

InfrequentRegen - Part 3

y/x	12	13	14	15	16	
1	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	

16 OBDG01 Initial Supporting table - Number of Normals (Volt)

Description: Number of Normals for the Driveline Ring Filter
After a low level misfire, another misfire may not be detectable until driveline ringing ceases. If no ringing seen, stop filter early.

Notes: Used for P0300-P0308. Cal Name: KaMSFD_Cnt_NumOfNormalsFil

y/x	0	1	2	3	4	5	6	7	8
1	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00

16 OBDG01 Initial Supporting table - P0089 - P163A - P228C - P228D - P0191 - KtFHPD_t_PumpCntrlEngRunThrsh

Description: The High Pressure Control Performance Diagnostic and Pump Current Diagnostic will not run when the engine run time is below this timer following an engine start.

Notes:

y/x	-30	-20	-10	0	10	20	80	100	110
1	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0

16 OBDG01 Initial Supporting table - P00C6 - KtFHPC_p_HighPressStart

Description: This calibration is the minimum pressure in MPa that will exit High Pressure Start mode and allow fuel delivery

Notes:

y/x	-40	-32	-24	-16	-16	-8	0	8	16	20	24	32	40	48	64	80	96
0	18.0	18.0	18.0	15.0	15.0	10.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
13	18.0	18.0	18.0	15.0	15.0	10.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
25	18.0	18.0	18.0	15.0	15.0	10.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
38	18.0	18.0	18.0	15.0	15.0	10.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
50	18.0	18.0	18.0	15.0	15.0	10.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
63	18.0	18.0	18.0	15.0	15.0	10.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
75	18.0	18.0	18.0	15.0	15.0	10.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
88	18.0	18.0	18.0	15.0	15.0	10.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
100	18.0	18.0	18.0	15.0	15.0	10.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0

16 OBDG01 Initial Supporting table - P00C6 - KtFHPC_t_HighPressStartTmout

Description: High Pressure Pump Control Mode will exit (Fuel will be delivered) if this timeout in seconds is reached.

Notes:

y/x	-40	-32	-24	-16	-16	-8	0	8	16	20	24	32	40	48	64	80	96
1	12.0	12.0	11.5	9.0	9.0	7.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0

16 OBDG01 Initial Supporting table - P00C6 - KtFHPD_Cnt_HPS_PressFallLoThrsh

Description: The maximum acceptable counts of fuel rail pressure below KtFHPD_p_HPS_PressFallLoThrsh after High Pressure Start (HPS) is executed but before engine is in run mode.

Notes:

y/x	-40	-32	-24	-16	-16	-8	0	8	16	20	24	32	40	48	64	80	96
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	10.0
13	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
25	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
38	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
50	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
63	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
75	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
88	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
100	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

16 OBDG01 Initial Supporting table - P00C6 - KtFHPD_p_HPS_PressFallLoThrsh

Description: The minimum acceptable value of fuel rail pressure after High Pressure Start (HPS) is executed. This ensures the pressure does not fall off drastically after High Pressure Start (HPS) is executed, but before engine is in run mode.

Notes: Axes are

y/x	-40	-32	-24	-16	-16	-8	0	8	16	20	24	32	40	48	64	80	96
0	2.0	2.0	2.0	2.0	2.0	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
13	2.0	2.0	2.0	2.0	2.0	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
25	2.0	2.0	2.0	2.0	2.0	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
38	2.0	2.0	2.0	2.0	2.0	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
50	2.0	2.0	2.0	2.0	2.0	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
63	2.0	2.0	2.0	2.0	2.0	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
75	2.0	2.0	2.0	2.0	2.0	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
88	2.0	2.0	2.0	2.0	2.0	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
100	2.0	2.0	2.0	2.0	2.0	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6

16 OBDG01 Initial Supporting table - P0171_P0172_P0174_P0175 Long-Term Fuel Trim Cell Usage

Description: Identifies which Long Term Fuel Trim Cell I.D.s are used for diagnosis. Only cells identified as "CeFADD_e_NonSelectedCell" are not used for diagnosis.

Notes: DTCs: P0171, P0172, P0174, P0175; Calibration Name: KaFADD_e_SelectCellSet; Axis is Long Term Fuel Trim Cell I.D.

P0171_P0172_P0174_P0175 Long-Term Fuel Trim Cell Usage - Part 1				
y/x	CeFADR_e_Cell00_PurgOnAirMode5	CeFADR_e_Cell01_PurgOnAirMode4	CeFADR_e_Cell02_PurgOnAirMode3	CeFADR_e_Cell03_PurgOnAirMode2
1	CeFADD_e_SelectedPurgeCell	CeFADD_e_SelectedPurgeCell	CeFADD_e_SelectedPurgeCell	CeFADD_e_SelectedPurgeCell
P0171_P0172_P0174_P0175 Long-Term Fuel Trim Cell Usage - Part 2				
y/x	CeFADR_e_Cell04_PurgOnAirMode1	CeFADR_e_Cell05_PurgOnAirMode0	CeFADR_e_Cell06_PurgOnIdle	CeFADR_e_Cell07_PurgOnDecel
1	CeFADD_e_SelectedPurgeCell	CeFADD_e_SelectedPurgeCell	CeFADD_e_SelectedPurgeCell	CeFADD_e_NonSelectedCell
P0171_P0172_P0174_P0175 Long-Term Fuel Trim Cell Usage - Part 3				
y/x	CeFADR_e_Cell08_PurgOffAirMode5	CeFADR_e_Cell09_PurgOffAirMode4	CeFADR_e_Cell10_PurgOffAirMode3	CeFADR_e_Cell11_PurgOffAirMode2
1	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_SelectedNonPurgeCell
P0171_P0172_P0174_P0175 Long-Term Fuel Trim Cell Usage - Part 4				
y/x	CeFADR_e_Cell12_PurgOffAirMode1	CeFADR_e_Cell13_PurgOffAirMode0	CeFADR_e_Cell14_PurgOffIdle	CeFADR_e_Cell15_PurgOffDecel
1	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_NonSelectedCell

16 OBDG01 Initial Supporting table - P0191 - KtFHPD_cmp_DPS_FailHiThrsh (Dual Sensors)

Description: High fail limit of fuel control due to pressure sensor error as Function of desired pressure									
Notes:									
y/x	0.00	3.00	7.00	15.00	20.00	25.00	27.50	32.00	36.00
1.00	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.09	1.05

16 OBDG01 Initial Supporting table - P0191 - KtFHPD_cmp_DPS_FailLoThrsh (Dual sensors)

Description: Low fail limit of fuel control due to pressure sensor error as Function of desired pressure									
Notes:									
y/x	0.00	3.00	7.00	15.00	20.00	25.00	27.50	32.00	36.00
1.00	0.75	0.75	0.75	0.75	0.79	0.82	0.86	0.92	0.95

16 OBDG01 Initial Supporting table - P050D_P1400_CatalystLightOffExtendedEngineRunTimeExit

Description: Exit Catalyst Warm-up mode if Engine Run Time is greater than this value. This table is based on percent ethanol (x-axis) and catmon's NormRatio_EWMA value (y-axis). The NormRatio_EWMA value determines the state of the catalyst. Typically, NormRatio_EWMA values below 0.35 (0 is bad and 1 is good) represent catalysts that have degraded. The emission performance of these degraded catalysts can be improved by extending catalyst light off of GetE85R_Pct_FFS_CompAtEngFloat.

Notes: KtCSEC_t_ExtendedEngineExit. Used for both P050D and P1400.

y/x	0	25	50	75	100
0.000	30	30	30	30	30
0.125	30	30	30	30	30
0.250	30	30	30	30	30
0.375	30	30	30	30	30
0.500	30	30	30	30	30
0.625	30	30	30	30	30
0.750	30	30	30	30	30
0.875	30	30	30	30	30
1.000	30	30	30	30	30

16 OBDG01 Initial Supporting table - P1400_ColdStartDiagnosticDelayBasedOnEngineRunTime

Description: Quality weight-based on engine run time. This allows adjustment of the weighting factors at various engine run times in order to prevent the updating of the cumulative quality timer or to change the value of the average qualified residual energy calculation to prevent false Fails of the diagnostic under circumstances inappropriate to update the calculation of the average qualified residual value.

Notes: KtCSED_K_TimeWght - This is used for P1400.

y/x	0	4	8	10	12	16	20	24	30
1	0	0	1	1	1	1	1	1	1

16 OBDG01 Initial Supporting table - P1400_ColdStartDiagnosticDelayBasedOnEngineRunTimeCalAxis

Description: This is the x-axis for the KtCSED_K_TimeWght calibration table. Refer to the description for KtCSED_K_TimeWght for details.

Notes: KnCSED_t_TimeWght - This is used for P1400.

y/x	1	2	3	4	5	6	7	8	9
1	0	4	8	10	12	16	20	24	30

16 OBDG01 Initial Supporting table - P1400_EngineSpeedResidual_Table

Description: This 1x17 table of engine exhaust flow values is used to calculate both the desired and the actual engine exhaust flow based on desired and actual engine speed. The desired engine exhaust flow is gathered from the desired engine speed (VeSPDR_n_EngDsrd). The value used for the actual engine exhaust flow is based on the actual engine RPM value.

Notes: KtCSED_dm_Exh - This is used for P1400

y/x	100	300	500	700	800	850	880	925	980	1,025	1,050	1,100	1,300	1,500	1,800	2,000	2,200
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

16 OBD G01Initial Supporting table - P1400_SparkResidual_Table

Description: Predicted engine-out energy potential based on either the desired cold start spark advance value or the actual spark advance value. ExhEngyPerUnitMass calibration is used to calculate both desired exhaust energy and actual energy. The desired and actual exhaust energy per unit mass values are used in part to calculate the desired exhaust energy per unit time and actual exhaust energy per unit time. Both desired and actual go into the residual exhaust energy per unit time calculation.

Notes: KtCSED_E_ExhEngyPerUnitMass

y/x	-20	-17	-15	0	1	2	3	5	10
1	20.00	10.50	9.00	8.81	7.81	6.19	2.50	1.44	1.00

16 OBDG01 Initial Supporting table - P219A Normalizer Bank1 Table

Description: Bank 1 Normalizer table used in the calculation of the Ratio for the current sample period.

Notes: DTCs: P219A; Calibration Name: KtFABD_U_Normalizer1; Horizontal axis is RPM; Vertical Axis is Air Per Cylinder (APC) in mg/cylinder

y/x	235	471	706	941	1,176	1,412	1,647	1,882	2,118	2,353	2,588	2,823	3,059	3,294	3,529	3,765	4,000
21	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00
45	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00
69	9,999.00	9,999.00	9,999.00	9,999.00	50.00	50.00	50.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00
103	9,999.00	9,999.00	9,999.00	52.50	51.25	50.00	43.50	37.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00
137	9,999.00	9,999.00	9,999.00	52.50	52.50	47.75	37.00	37.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00
161	9,999.00	9,999.00	9,999.00	62.00	62.00	74.00	48.25	41.75	47.50	41.50	47.00	43.00	30.50	25.50	25.50	9,999.00	9,999.00
185	9,999.00	9,999.00	9,999.00	98.50	98.50	53.50	74.25	35.25	47.50	41.50	47.00	43.00	30.50	25.50	25.50	9,999.00	9,999.00
209	9,999.00	9,999.00	9,999.00	95.00	95.00	109.50	99.50	86.00	77.00	67.25	75.75	55.00	52.00	26.00	26.00	9,999.00	9,999.00
233	9,999.00	9,999.00	9,999.00	90.50	90.50	99.00	113.00	121.50	117.25	103.50	101.50	77.00	85.50	50.75	50.75	9,999.00	9,999.00
257	9,999.00	9,999.00	9,999.00	76.75	76.75	90.25	131.75	129.50	131.00	117.00	118.00	118.50	100.50	100.25	100.25	9,999.00	9,999.00
281	9,999.00	9,999.00	9,999.00	88.50	88.50	91.25	128.00	121.00	103.50	108.75	79.00	115.25	122.25	91.50	91.50	9,999.00	9,999.00
305	9,999.00	9,999.00	9,999.00	58.25	58.25	96.25	124.00	102.50	100.25	88.75	60.50	78.75	118.50	93.50	93.50	9,999.00	9,999.00
329	9,999.00	9,999.00	9,999.00	126.00	126.00	111.00	69.75	108.00	106.25	93.50	105.00	102.25	112.00	101.25	101.25	9,999.00	9,999.00
353	9,999.00	9,999.00	9,999.00	126.00	126.00	111.00	92.50	115.25	83.50	73.25	92.75	115.75	85.50	87.25	87.25	9,999.00	9,999.00
377	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	115.25	115.25	83.50	73.25	92.75	109.50	103.00	84.25	84.25	9,999.00	9,999.00
396	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	103.00	103.00	84.25	84.25	9,999.00	9,999.00
415	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00

16 OBDG01 Initial Supporting table - P219A Quality Factor Bank1 Table

Description: Bank 1 lookup table of Quality Factors used in the calculation of the Ratio for the current sample period

Notes: DTCs: P219A; Calibration Name: KtFABD_K_QualFactor1; Horizontal axis is RPM; Vertical Axis is Air Per Cylinder (APC) in mg/cylinder

y/x	235	471	706	941	1,176	1,412	1,647	1,882	2,118	2,353	2,588	2,823	3,059	3,294	3,529	3,765	4,000
21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
69	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
103	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
137	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
161	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
185	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00
209	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00
233	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00
257	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00
281	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00
305	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	1.00	0.95	1.00	1.00	1.00	0.00	0.00	0.00
329	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00
353	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00
377	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	0.00	0.00	0.00
396	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
415	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

16 OBDG01 Initial Supporting table - P219A Variance Threshold Bank1 Table

Description: Bank 1 lookup table of Variance metric used to calculate the Ratio for the current sample period

Notes: DTCs: P219A; Calibration Name: KtFABD_U_VarThresh1; Horizontal axis is RPM; Vertical Axis is Air Per Cylinder (APC) in mg/cylinder

y/x	235	471	706	941	1,176	1,412	1,647	1,882	2,118	2,353	2,588	2,823	3,059	3,294	3,529	3,765	4,000
21	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00
45	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00
69	9,999.00	9,999.00	9,999.00	9,999.00	34.00	34.00	34.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00
103	9,999.00	9,999.00	9,999.00	52.75	43.25	34.00	43.00	52.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00
137	9,999.00	9,999.00	9,999.00	52.75	52.75	58.50	52.00	52.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00
161	9,999.00	9,999.00	9,999.00	108.00	108.00	66.75	43.50	45.50	42.50	31.25	38.50	24.50	31.75	32.50	32.50	9,999.00	9,999.00
185	9,999.00	9,999.00	9,999.00	80.75	80.75	79.25	46.00	47.75	42.50	31.25	38.50	24.50	31.75	32.50	32.50	9,999.00	9,999.00
209	9,999.00	9,999.00	9,999.00	91.00	91.00	72.25	50.00	41.50	41.25	26.75	33.75	26.50	25.25	44.25	44.25	9,999.00	9,999.00
233	9,999.00	9,999.00	9,999.00	102.00	102.00	73.75	59.75	48.00	47.00	30.75	43.00	38.00	34.00	55.50	55.50	9,999.00	9,999.00
257	9,999.00	9,999.00	9,999.00	123.00	123.00	82.75	67.50	55.50	57.00	50.75	47.25	46.75	38.50	54.25	54.25	9,999.00	9,999.00
281	9,999.00	9,999.00	9,999.00	117.75	117.75	78.50	75.50	50.50	58.50	53.75	84.75	46.25	37.50	58.50	58.50	9,999.00	9,999.00
305	9,999.00	9,999.00	9,999.00	181.00	181.00	118.75	90.50	75.25	67.25	62.25	119.00	80.00	43.50	57.75	57.75	9,999.00	9,999.00
329	9,999.00	9,999.00	9,999.00	108.50	108.50	125.00	146.00	87.75	72.75	72.75	70.50	58.00	58.00	61.75	61.75	9,999.00	9,999.00
353	9,999.00	9,999.00	9,999.00	108.50	108.50	125.00	118.50	91.00	95.50	90.00	69.00	52.00	67.00	66.00	66.00	9,999.00	9,999.00
377	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	91.00	91.00	95.50	90.00	69.00	54.50	57.00	54.00	54.00	9,999.00	9,999.00
396	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	57.00	57.00	54.00	54.00	9,999.00	9,999.00
415	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00

16 OBDG01 Initial Supporting table - Pair_SCD_Decel

Description: Mulitplier to P0300_SCD_Decel to account for different pattern of Paired cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

Notes: Used for P0300 - P0308, Cal Name: KtMSFD_K_dt_MEDRES_Opp

y/x	700	800	900	1,000	1,100	1,200	1,300	1,400	1,500
2	0.61	0.61	0.61	0.61	0.61	0.61	0.67	0.72	0.72
8	0.61	0.61	0.61	0.61	0.61	0.61	0.67	0.72	0.72
12	0.61	0.61	0.61	0.61	0.61	0.61	0.67	0.72	0.72
16	0.61	0.61	0.61	0.61	0.61	0.61	0.65	0.69	0.69
20	0.91	0.91	0.91	0.91	0.91	0.91	0.80	0.69	0.69
24	0.91	0.91	0.91	0.91	0.91	0.91	0.82	0.73	0.73
26	0.84	0.84	0.84	0.84	0.84	0.84	0.81	0.77	0.77
30	0.84	0.84	0.84	0.84	0.84	0.84	0.61	0.39	0.39
50	0.84	0.84	0.84	0.84	0.84	0.84	0.62	0.39	0.39

16 OBDG01 Initial Supporting table - Pair_SCD_Jerk

Description: Mulitplier to P0300_SCD_Jerk to account for different pattern of Paired cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

Notes: Used for P0300 - P0308, Cal Name: KtMSFD_K_ddt_MEDRES_Opp

y/x	700	800	900	1,000	1,100	1,200	1,300	1,400	1,500
2	1.31	1.31	1.31	1.31	1.31	1.31	1.42	1.52	1.52
8	1.31	1.31	1.31	1.31	1.31	1.31	1.42	1.52	1.52
12	1.31	1.31	1.31	1.31	1.31	1.31	1.41	1.52	1.52
16	1.31	1.31	1.31	1.31	1.31	1.31	1.41	1.52	1.52
20	1.56	1.56	1.56	1.56	1.56	1.56	1.58	1.59	1.59
24	1.76	1.76	1.76	1.76	1.76	1.76	1.70	1.65	1.65
26	1.84	1.84	1.84	1.84	1.84	1.84	1.75	1.65	1.65
30	1.84	1.84	1.84	1.84	1.84	1.84	1.60	1.36	1.36
50	1.84	1.84	1.84	1.84	1.84	1.84	1.60	1.36	1.36

16 OBDG01 Initial Supporting table - PairCylModeDecel

Description: Mulitplier to Cyl Mode Deceleration to account for different pattern of Paired cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

Notes: Used for P0300 - P0308, Cal Name: KtMSFD_K_dt_LORES_Opp

y/x	1,100	1,200	1,300	1,400	1,501	1,600	1,700	1,800	2,200	2,600	3,000	3,500	4,000	4,500	5,000	5,500	6,000
2	0.42	0.42	0.48	0.54	0.50	0.46	0.49	0.53	0.55	0.42	0.62	0.74	0.86	1.00	1.08	0.90	0.90
8	0.42	0.42	0.48	0.54	0.50	0.46	0.49	0.53	0.55	0.42	0.62	0.74	0.86	1.00	1.08	0.90	0.90
12	0.42	0.42	0.48	0.54	0.50	0.46	0.49	0.53	0.55	0.42	0.62	0.74	0.86	1.00	1.08	0.90	0.90
16	0.50	0.50	0.51	0.52	0.53	0.53	0.53	0.53	0.55	0.69	0.62	0.74	0.86	1.00	1.08	0.90	0.90
20	0.41	0.41	0.41	0.42	0.61	0.80	0.75	0.70	0.67	0.71	0.71	0.87	0.81	1.11	1.00	1.00	1.00
24	0.41	0.41	0.41	0.42	0.61	0.81	0.81	0.81	0.67	0.74	0.81	0.87	0.81	0.97	1.00	1.08	1.08
26	0.41	0.41	0.44	0.47	0.59	0.71	0.73	0.76	0.75	0.79	0.85	0.90	0.96	0.94	0.92	1.33	1.33
30	0.65	0.65	0.50	0.35	0.34	0.33	0.42	0.51	0.61	0.61	0.79	0.88	0.86	0.86	0.79	0.81	0.81
50	0.65	0.65	0.50	0.35	0.34	0.33	0.42	0.51	0.61	0.61	0.79	0.88	0.86	0.86	0.79	0.81	0.81

16 OBDG01 Initial Supporting table - PairCylModeJerk

Description: Mulitplier to P0300_CylModeJerk to account for different pattern of Paired cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

Notes: Used for P0300 - P0308, Cal Name: KtMSFD_K_ddt_LORES_Opp

y/x	1,100	1,200	1,300	1,400	1,501	1,600	1,700	1,800	2,200	2,600	3,000	3,500	4,000	4,500	5,000	5,500	6,000
2	0.62	0.62	0.72	0.82	0.68	0.55	0.42	0.30	0.30	0.37	0.48	0.58	0.72	0.82	1.00	0.88	0.88
8	0.62	0.62	0.72	0.82	0.68	0.55	0.42	0.30	0.30	0.37	0.48	0.58	0.72	0.82	1.00	0.88	0.88
12	0.62	0.62	0.72	0.82	0.68	0.55	0.42	0.30	0.30	0.37	0.48	0.58	0.72	0.82	1.00	0.88	0.88
16	0.62	0.62	0.71	0.79	0.68	0.57	0.43	0.30	0.30	0.45	0.48	0.58	0.72	0.82	1.00	0.88	0.88
20	0.77	0.77	0.78	0.79	0.81	0.83	0.77	0.71	0.64	0.64	0.69	0.76	0.72	0.79	0.91	0.87	0.87
24	0.88	0.88	0.85	0.81	0.82	0.83	0.81	0.79	0.67	0.69	0.85	0.94	0.88	0.83	0.91	0.91	0.91
26	0.89	0.89	0.88	0.88	0.91	0.95	0.88	0.81	0.75	0.78	0.85	0.87	0.92	1.06	0.91	0.95	0.95
30	1.22	1.22	1.02	0.82	0.73	0.65	0.73	0.81	0.67	0.67	0.80	0.85	0.89	0.80	0.78	0.89	0.89
50	1.22	1.22	1.02	0.82	0.73	0.65	0.73	0.81	0.67	0.67	0.80	0.85	0.89	0.80	0.78	0.89	0.89

16 OBDG01 Initial Supporting table - Piston Protection Airflow

Description: VeFEQR_m_APC_PistonProtectHigh - minimum airflow to indicate conditions exist such that piston protectin should be enabled. Input is RPM									
Notes:									
y/x	1,600	2,400	3,200	4,000	4,800	5,600	6,400	7,200	8,000
1	560	560	560	400	400	400	400	400	400

16 OBDG01 Initial Supporting table - Random_SCD_Decel

Description: Mulitplier to SCD_Decel to account for different pattern of light level misfire. Multipliers are a function of engine rpm and % engine Load.

Notes: Used for P0300 - P0308, Cal Name: KtMSFD_K_dt_MEDRES_Emiss

y/x	700	800	900	1,000	1,100	1,200	1,300	1,400	1,500
2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.19	1.20
8	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.12	1.08
12	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.12	1.08
16	1.12	1.08	1.17	1.18	1.23	1.10	1.00	1.00	1.05
20	1.00	1.00	1.03	1.07	1.11	1.13	1.13	1.00	1.00
24	1.00	1.00	1.03	1.07	1.11	1.10	1.00	1.00	1.00
26	1.00	1.01	1.01	1.04	1.05	1.00	1.00	1.00	1.00
30	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
50	1.00	1.00	1.00	1.00	1.00	1.00	1.19	1.00	1.00

16 OBDG01 Initial Supporting table - Random_SCD_Jerk

Description: Mulitplier to Random_SCD_Jerk to account for different pattern of light level misfire. Multipliers are a function of engine rpm and % engine Load.

Notes: Used for P0300 - P0308, Cal Name: KtMSFD_K_ddt_MEDRES_Emiss

y/x	700	800	900	1,000	1,100	1,200	1,300	1,400	1,500
2	1.10	1.00	1.07	1.15	1.20	1.12	1.15	1.15	1.05
8	1.00	1.00	1.03	1.05	1.09	1.11	1.14	1.07	1.00
12	1.00	1.00	1.03	1.05	1.09	1.11	1.14	1.07	1.00
16	1.20	1.18	1.18	1.08	1.08	1.07	1.00	1.10	1.12
20	1.06	1.06	1.04	1.07	1.08	1.00	1.00	1.09	1.10
24	1.02	1.02	1.04	1.03	1.09	1.00	1.00	1.00	1.10
26	1.00	1.02	1.04	1.03	1.04	1.00	1.00	1.00	1.00
30	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
50	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

16 OBDG01 Initial Supporting table - RandomAFM_Decl

Description: Mulitplier to Cylinder_Decel while in Cylnder Deactivation mode to account for different pattern of light level misfire. Multipliers are a function of engine rpm and % engine Load.

Notes: Used for P0300 - P0308, Cal Name: KtMSFD_K_dt_LORES_AFM_Emiss

y/x	800	1,000	1,200	1,600	2,000	2,400	2,600	3,000	3,500
5	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
10	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
20	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
30	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
40	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
50	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
80	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
100	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

16 OBDG01 Initial Supporting table - RandomAFM_Jerk

Description: Mulitplier to Cylinder_Jerk while in Cylnder Deactivation mode to account for different pattern of light level misfire. Multipliers are a function of engine rpm and % engine Load.

Notes: Used for P0300 - P0308, Cal Name: KtMSFD_K_ddt_LORES_AFM_Emiss

y/x	800	1,000	1,200	1,600	2,000	2,400	2,600	3,000	3,500
5	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
10	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
20	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
30	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
40	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
50	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
80	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
100	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

16 OBDG01 Initial Supporting table - RandomCylModDecel

Description: Multiplier to P0300_CylMode_Decel. account for different pattern of light level misfire. Multipliers are a function of engine rpm and % engine Load.

Notes: Used for P0300 - P0308. Cal Name: KtMSFD_K_dt_LORES_Emiss

y/x	1,100	1,200	1,300	1,400	1,501	1,600	1,700	1,800	2,200	2,600	3,000	3,500	4,000	4,500	5,000	5,500	6,000
2	1.01	1.16	1.09	1.33	1.15	1.40	1.29	1.45	1.45	1.61	1.60	2.14	2.00	2.14	2.00	2.00	2.00
8	1.01	1.16	1.09	1.33	1.15	1.40	1.29	1.45	1.45	1.61	1.60	2.14	2.00	2.14	2.00	2.00	2.00
12	1.01	1.16	1.09	1.33	1.15	1.40	1.29	1.45	1.45	1.61	1.60	2.14	2.00	2.14	2.00	2.00	2.00
16	1.29	1.27	1.28	1.36	1.48	1.80	1.92	1.96	2.20	2.77	2.54	2.74	2.64	2.67	2.55	2.20	2.20
20	1.09	1.00	1.00	1.09	1.52	1.85	1.81	1.89	2.05	2.07	2.07	2.16	2.39	2.89	2.92	3.00	3.00
24	1.08	1.00	1.00	1.01	1.43	1.85	1.81	1.50	1.50	2.04	2.09	2.16	2.14	2.57	3.00	3.00	3.00
26	1.05	1.00	1.00	1.13	1.12	1.64	1.66	1.80	1.70	2.00	2.10	2.20	2.28	2.28	2.46	3.00	3.00
30	3.00	3.00	2.50	1.26	1.00	1.00	1.01	1.45	1.65	1.90	2.05	2.20	2.16	2.12	2.37	2.29	2.29
50	3.00	3.00	3.00	3.00	1.00	1.00	1.01	1.45	1.65	1.70	2.00	2.20	2.16	2.04	2.22	2.29	2.29

16 OBDG01 Initial Supporting table - RandomCylModJerk

Description: Multiplier to P0300_CylMode_Jerk to account for different pattern of light level misfire. Multipliers are a function of engine rpm and % engine Load.

Notes: Used for P0300 - P0308, Cal Name: KtMSFD_K_ddt_LORES_Emiss

y/x	1,100	1,200	1,300	1,400	1,501	1,600	1,700	1,800	2,200	2,600	3,000	3,500	4,000	4,500	5,000	5,500	6,000
2	1.03	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
8	1.03	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
12	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
16	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.08	1.08
20	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
24	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.07	1.07
26	1.01	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.13	1.00	1.08	1.08
30	2.00	2.00	2.00	1.23	1.02	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.05	1.05	1.05
50	2.00	2.00	1.94	1.23	1.02	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

16 OBDG01 Initial Supporting table - RandomRevModDecl

Description: Mulitplier to P0300_RevMode_Decel to account for different pattern of light level misfire. Multipliers are a function of engine rpm and % engine Load.

Notes: Used for P0300 - P0308, Cal Name: KtMSFD_K_RevModeEmiss

y/x	3,000	3,500	4,000	4,500	5,000	5,500	6,000	7,000	8,000
2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
8	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
12	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
16	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
20	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
24	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
26	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
30	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
50	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

16 OBDG01 Initial Supporting table - RepetSnapDecayAdjst

Description: If misfire is present in consecutive engine cycles, this multiplier is applied to the misfire jerk threshold and compared to a crankshaft snap value after the misfire has taken place.. Table lookup as a function of engine rpm.

Notes: Used for P0300 - P0308, Cal Name:KtMSFD_K_dddt_PostCylCnscMsfr

y/x	500	1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

16 OBDG01 Initial Supporting table - RevMode_Decel (Volt)

Description: Crankshaft decel threshold. Thresholds are a function of rpm and % engine Load.

Notes: Used for P0300-P0308. Cal Name: KtMISF_RevolutionMode

y/x	1,100	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000
3	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
6	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
8	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
10	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
12	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
14	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
16	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
18	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
20	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
22	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
24	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
26	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
30	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
40	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
50	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
60	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
97	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767

16 OBDG01 Initial Supporting table - Ring Filter

Description: Driveline Ring Filter
After a low level misfire, another misfire may not be detectable until driveline ringing ceases. If no ringing seen, stop filter early.

Notes: Used for P0300-P0308. Cal Name: KaMSFD_Cnt_RingFilter

y/x	0	1	2	3	4	5	6	7	8
1	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00

16 OBDG01 Initial Supporting table - SCD_Decel

Description: Crankshaft decel threshold. SCD mode uses smaller windows near TDC. Thresholds are a function of rpm and % engine Load.

Notes: Used for P0300-P0308. Cal Name: KtMISF_dt_SCD_OffIdleMode

y/x	700	800	900	1,000	1,100	1,150	1,200	1,250	1,300	1,350	1,400	1,450	1,500
3	392	276	199	142	94	85	77	69	61	52	42	41	40
6	392	276	199	142	94	85	77	69	61	52	42	41	40
8	392	276	199	142	94	85	77	69	61	52	42	41	40
10	464	319	229	170	130	111	93	84	75	66	57	56	55
12	657	415	296	216	155	128	100	102	104	88	72	71	69
14	753	519	350	252	189	172	154	151	149	125	100	93	85
16	897	604	421	300	219	174	129	152	174	147	120	110	99
18	1,089	754	492	354	257	205	154	140	125	134	143	134	124
20	1,119	780	513	384	278	230	182	159	135	146	157	148	139
22	1,346	916	630	449	328	276	224	210	196	185	173	161	148
24	1,343	906	624	456	342	296	249	240	231	207	182	150	117
26	1,447	985	710	509	385	334	283	265	247	222	197	186	175
30	1,609	1,079	755	545	408	370	332	258	184	169	153	181	209
40	889	660	510	415	324	295	266	204	142	257	372	275	177
50	1,171	869	677	539	422	385	348	267	185	318	450	339	228
60	1,452	1,077	830	669	518	473	427	323	219	372	524	401	277
97	2,494	1,838	1,413	1,136	888	815	741	557	373	607	840	655	470

16 OBDG01 Initial Supporting table - SCD_Jerk

Description: Crankshaft jerk threshold. SCD mode uses smaller windows near TDC. Thresholds are a function of rpm and % engine Load.

Notes: Used for P0300-P0308. Cal Name: KtMISF_ddt_SCD_OffIdleMode

y/x	700	800	900	1,000	1,100	1,150	1,200	1,250	1,300	1,350	1,400	1,450	1,500
3	284	206	146	104	77	71	65	62	58	49	40	39	38
6	284	206	146	104	77	71	65	62	58	49	40	39	38
8	284	206	146	104	77	71	65	62	58	49	40	39	38
10	379	268	192	144	108	94	80	75	70	64	58	54	49
12	480	334	243	182	141	121	100	95	90	85	80	75	70
14	703	476	343	259	196	175	154	140	125	111	97	92	86
16	881	596	423	319	240	212	183	160	137	119	100	95	89
18	987	674	476	378	287	237	188	183	177	153	128	120	112
20	1,073	747	530	393	293	262	230	207	183	160	137	129	121
22	1,184	808	588	423	318	278	237	222	207	175	142	139	135
24	1,311	893	620	468	338	294	249	233	217	196	176	158	140
26	1,441	966	679	510	384	324	263	246	229	210	190	176	162
30	1,475	1,023	740	555	427	376	324	230	135	165	195	200	204
40	2,283	1,568	1,126	838	641	546	451	423	396	378	360	289	218
50	2,742	1,900	1,357	1,012	773	660	547	490	433	424	414	354	294
60	3,290	2,262	1,630	1,216	932	792	652	585	519	513	506	427	348
97	5,297	3,655	2,639	1,965	1,507	1,287	1,068	922	777	813	850	702	553

16 OBDG01 Initial Supporting table - SnapDecayAfterMisfire

Description: multiplier times the ddt_jerk value used used to detect misfire at that speed and load to see if size of disturbance has died down as expected of real misfire. Table lookup as a function of engine rpm and trans gear ratio.

Notes: Used for P0300 - P0308, Cal Name: KtMSFD_K_dddt_PostCylAft

y/x	500	1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
3	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
5	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
5	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

16 OBDG01 Initial Supporting table - TOSSRoughRoadThres

Description: Only used if Rough Road source = TOSS: dispersion value on Transmission Output Speed Sensor above which rough road is indicated present

Notes: Used for P0300-P0308. Cal Name: KtRRDI_a_RoughRoadThresh

y/x	600	800	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,500	4,000	4,500	5,000	5,500	6,000
100	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
200	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
300	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
400	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
500	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
600	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
700	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
800	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
900	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
1,000	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
1,100	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
1,200	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
1,300	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
1,400	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0

16 OBDG01 Initial Supporting table - UP Stream Stk Temp Vrtn

Description: KtCETR_T_UPSS_StkTempVrtn - Required temperature movement required to pass the stuck diagnostic.

Notes: input is Upstream Temp sensor temp

y/x	-40	0	20	40	60	80	100	120
1	3	4	5	5	5	4	3	2

16 OBDG01 Initial Supporting table - WaitToStart

Description: Number of engine cycles to delay if diesel engine is cranked before wait to start lamp is extinguished. This lookup table determines the delay length by taking into account the coolant temperature.

Notes: Used for P0300-P0308. Cal Name: KtMSFD_Cnt_GlowLampWarmupDly

y/x	-20	-10	0	10	20	30	40	50	60
1	0	0	0	0	0	0	0	0	0

16 OBDG01 Initial Supporting table - WSSRoughRoadThres (Volt)

Description: Only used if Wheel speed from ABS is used. If difference between wheel speed readings is larger than this limit, rough road is present

Notes: Used for P0300-P0308. Cal Name: KtRRDI_a_WhlSpdRoughRoadLim

y/x	0	12	24	36	48	60	72	85	97	109	121	133	145	157	169	181	193
1	0.40	0.40	0.40	0.40	0.40	0.40	0.43	0.45	0.47	0.50	0.50	0.51	0.51	0.51	0.52	0.52	0.53

16 OBDG01 Initial Supporting table - ZeroTorqueAFM

Description: Zero torque engine load while in Active Fuel Management. %of Max Brake Torque along the Neutral rev line, as a function of RPM and Baro

Notes: Used for P0300-P0308. Cal Name: KtMSFD_ZeroTorqDoD

ZeroTorqueAFM - Part 1

y/x	700	800	900	1,000	1,100	1,200	1,300	1,400	1,501	1,600	1,700	1,800	2,000
65	4.50	4.30	4.10	3.90	3.70	3.50	4.10	4.70	4.75	4.80	4.80	4.80	4.80
75	4.50	4.30	4.10	3.90	3.70	3.50	4.10	4.70	4.75	4.80	4.80	4.80	4.80
85	4.50	4.30	4.10	3.90	3.70	3.50	4.10	4.70	4.75	4.80	4.80	4.80	4.80
95	4.50	4.30	4.10	3.90	3.70	3.50	4.10	4.70	4.75	4.80	4.80	4.80	4.80
105	4.50	4.30	4.10	3.90	3.70	3.50	4.10	4.70	4.75	4.80	4.80	4.80	4.80

ZeroTorqueAFM - Part 2

y/x	2,200	2,400	2,600	2,800	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000
65	4.70	4.50	4.40	4.25	4.25	4.50	4.75	5.00	5.25	5.50	5.75	6.00	6.25
75	4.70	4.50	4.40	4.25	4.25	4.50	4.75	5.00	5.25	5.50	5.75	6.00	6.25
85	4.70	4.50	4.40	4.25	4.25	4.50	4.75	5.00	5.25	5.50	5.75	6.00	6.25
95	4.70	4.50	4.40	4.25	4.25	4.50	4.75	5.00	5.25	5.50	5.75	6.00	6.25
105	4.70	4.50	4.40	4.25	4.25	4.50	4.75	5.00	5.25	5.50	5.75	6.00	6.25

16 OBDG01 Initial Supporting table - ZeroTorqueEngLoad (Volt)

Description: %of Max Brake Torque that represents Zero Brake torque along the Neutral rev line, as a function of RPM and Baro

Notes: Used for P0300-P0308. Cal Name: KtMISF_ZeroTorqSpd

ZeroTorqueEngLoad - Part 1

y/x	700	800	900	1,000	1,100	1,200	1,300	1,400	1,501	1,600	1,700	1,800	2,000
65	4.50	4.30	4.10	3.90	3.70	3.50	4.10	4.70	4.75	4.80	4.80	4.80	4.80
75	4.50	4.30	4.10	3.90	3.70	3.50	4.10	4.70	4.75	4.80	4.80	4.80	4.80
85	4.50	4.30	4.10	3.90	3.70	3.50	4.10	4.70	4.75	4.80	4.80	4.80	4.80
95	4.50	4.30	4.10	3.90	3.70	3.50	4.10	4.70	4.75	4.80	4.80	4.80	4.80
105	4.50	4.30	4.10	3.90	3.70	3.50	4.10	4.70	4.75	4.80	4.80	4.80	4.80

ZeroTorqueEngLoad - Part 2

y/x	2,200	2,400	2,600	2,800	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000
65	4.70	4.50	4.40	4.25	4.25	4.50	4.75	5.00	5.25	5.50	5.75	6.00	6.25
75	4.70	4.50	4.40	4.25	4.25	4.50	4.75	5.00	5.25	5.50	5.75	6.00	6.25
85	4.70	4.50	4.40	4.25	4.25	4.50	4.75	5.00	5.25	5.50	5.75	6.00	6.25
95	4.70	4.50	4.40	4.25	4.25	4.50	4.75	5.00	5.25	5.50	5.75	6.00	6.25
105	4.70	4.50	4.40	4.25	4.25	4.50	4.75	5.00	5.25	5.50	5.75	6.00	6.25

16 OBDG01 Initial Supporting table - Closed Loop Enable Clarification - KaFCLP_U_SlphrIntglOfst_Thrsh

Description: Integral Offset voltage thresholds (bank and cell specific cals) used with KeFCLP_Pct_CatAccuSlphrPostDsbl to check for sulphur poisoning.

Notes: millivolts

y/x	CiOXYR_O2_PostCat1	CiOXYR_O2_PostCat2
CiFCLP_Decel	2,048	2,048
CiFCLP_Idle	2,048	2,048
CiFCLP_Cruise	2,048	2,048
CiFCLP_LightAccel	2,048	2,048
CiFCLP_HeavyAccel	2,048	2,048

16 OBDG01 Initial Supporting table - Closed Loop Enable Clarification - KcFCLP_Cnt_O2RdyCyclesThrsh

Description: Number of post catalyst oxygen sensor samples which must be outside not ready window before post oxygen sensor is READY.	
Notes: Time (events * 12.5 milliseconds)	
y/x	1
1	80

16 OBDG01 Initial Supporting table - Closed Loop Enable Clarification - KcFULC_O2_SensorReadyEvents

Description: Number of times an oxygen sensor value must be in range before declaring it ready	
Notes: Time (events * 12.5 milliseconds)	
y/x	1
1	20

16 OBDG01 Initial Supporting table - Closed Loop Enable Clarification - KeFCLP_dm_IntegrationAirflowMax

Description: Maximum allowed estimated airflow for post O2 integral terms to be updated.	
Notes: Grams per Second	
y/x	1
1	512

16 OBDG01 Initial Supporting table - Closed Loop Enable Clarification - KeFCLP_Pct_CatAccuSlphrPostDsbl

Description: Sulphur percent threshold above which post integral learning is disabled if the threshold criteria KaFCLP_U_SlphrIntglOfst_Thrsh is also met.	
Notes: Percent	
y/x	1
1	255

16 OBDG01 Initial Supporting table - Closed Loop Enable Clarification - KeFCLP_T_IntegrationCatalystMax

Description: Maximum allowed estimated catalytic converter temperature for post O2 integral terms to be updated.	
Notes: Modeled catalyst Temperature in Celcius	
y/x	1
1	950

16 OBDG01 Initial Supporting table - Closed Loop Enable Clarification - KeFCLP_T_IntegrationCatalystMin

Description: Minimum allowed estimated catalytic converter temperature to begin using post O2 integration correction terms. Converter temperature must remain above this threshold to ramp-in the post O2 integration adjustments. Once the ramp-in has started, a converter temperature below this threshold will freeze the ramp-in multiplier. Post O2 integration will not be allowed below this converter temperature

Notes: Modeled catalyst Temperature in Celcius

y/x	1
1	350

16 OBDG01 Initial Supporting table - Closed Loop Enable Clarification - KeWRSC_T_HtrCntrlCL

Description: WRAF heater temperature enabling threshold for transition from Open Loop to Closed Loop	
Notes: Degrees Celcius	
y/x	1
1	628

16 OBDG01 Initial Supporting table - Closed Loop Enable Clarification - KeWRSI_T_PumpCurrentEnable

Description: WRAF heater temperature threshold for enabling the sensor pump current	
Notes: Degrees Celcius	
y/x	1
1	628

16 OBDG01 Initial Supporting table - Closed Loop Enable Clarification - KfFCLL_T_AdaptiveHiCoolant

Description: LTM learning is inhibited if the engine coolant temperature is above this calibration.	
Notes: Degrees Celcius	
y/x	1
1	255

16 OBDG01 Initial Supporting table - Closed Loop Enable Clarification - KfFCLL_T_AdaptiveLoCoolant

Description: LTM learning is inhibited if the engine coolant temperature is below this calibration.	
Notes: Degrees Celcius	
y/x	1
1	35

16 OBDG01 Initial Supporting table - Closed Loop Enable Clarification - KfFCLP_U_O2ReadyThrshLo

Description: Lower threshold defining not ready window for post oxygen sensor voltage.	
Notes: Voltage in millivolts	
y/x	1
1	1,100

16 OBDG01 Initial Supporting table - Closed Loop Enable Clarification - KtFCLL_p_AdaptiveLowMAP_Limit

Description: KtFCLL_p_AdaptiveLowMAP_Limit

Notes: MAP in KPa

y/x	65	70	75	80	85	90	95	100	105
1	17.0	17.0	17.0	17.0	17.5	18.0	18.5	19.0	19.0

16 OBDG01 Initial Supporting table - Closed Loop Enable Clarification - KtFCLP_t_PostIntglDisableTime

Description: Disable integral offset after engine start for this amount of time.

Notes: Time in seconds

y/x	-40	-29	-18	-6	5	16	28	39	50	61	73	84	95	106	118	129	140
1	60.0	60.0	60.0	60.0	47.0	33.0	20.0	20.0	20.0	20.0	20.0	15.0	15.0	15.0	12.0	12.0	12.0

16 OBDG01 Initial Supporting table - Closed Loop Enable Clarification - KtFCLP_t_PostIntglRampInTime

Description: Time required to ramp integral offset to desired value.

Notes: Time in seconds

y/x	-40	-29	-18	-6	5	16	28	39	50	61	73	84	95	106	118	129	140
1	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0

16 OBDG01 Initial Supporting table - Closed Loop Enable Clarification - KtFSTA_t_ClosedLoopAutostart

Description: Engine run time following an autostart, as a function of begin run coolant, which must be exceeded to enable CLOSED LOOP.

Notes: Time in seconds: Hybrid use Only

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.5	1.0	1.0	1.0	1.0	1.0	1.0

16 OBDG01 Initial Supporting table - Closed Loop Enable Clarification - KtFSTA_t_ClosedLoopTime

Description: Engine run time, as a function of startup coolant temperature, which must be exceeded to enable CLOSED LOOP.

Notes: Time in seconds

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	250.0	250.0	200.0	100.0	30.0	20.0	20.0	20.0	20.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0

16 OBDG01 Initial Supporting table - P043E First Reference Orifice Measurement Table

Description: Data is first reference orifice measurement maximum value in kPa, X axis (horizontal) is barometric pressure (kPa)					
Notes:					
y/x	70	80	90	100	110
1	3.7	3.8	3.9	4.0	4.0

16 OBDG01 Initial Supporting table - P043E Second Reference Orifice Measurement Table

Description: Data is second reference orifice measurement maximum value in kPa, X axis (horizontal) is barometric pressure (kPa)					
Notes:					
y/x	70	80	90	100	110
1	4.2	4.3	4.4	4.6	4.6

16 OBDG01 Initial Supporting table - P043F First Reference Orifice Measurements Table

Description: Data is first reference orifice measurement minimum value in kPa, X axis (horizontal) is barometric pressure (kPa)					
Notes:					
y/x	70	80	90	100	110
1	1.2	1.3	1.4	1.5	1.5

16 OBDG01 Initial Supporting table - P043F Second Reference Orifice Measurements Table

Description: Data is second reference orifice measurement minimum value in kPa, X axis (horizontal) is barometric pressure (kPa)					
Notes:					
y/x	70	80	90	100	110
1	1.2	1.3	1.4	1.5	1.5

16 OBDG01 Initial Supporting table - P057B KtBRKI_K_CmpltTestPointWeight

Description:									
Notes:									
y/x	0.000	0.020	0.040	0.100	0.150	0.250	0.500	0.750	1.000
1	0	0	1	1	1	1	1	1	1

16 OBDG01 Initial Supporting table - P057B KtBRKI_K_FastTestPointWeight

Description:									
Notes:									
y/x	0.000	0.020	0.040	0.100	0.150	0.250	0.500	0.750	1.000
1	0	0	1	1	1	1	1	1	1

16 OBDG01 Initial Supporting table - CalculatedPerfMaxEc1

Description:

Notes:

y/x	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	25.5	25.5	27.5	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0
2	25.5	25.5	27.5	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0
3	25.5	25.5	27.5	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0
4	25.5	25.5	27.5	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0
5	25.5	25.5	27.5	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0
6	25.5	25.5	27.5	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0
7	25.5	25.5	27.5	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0
8	25.5	25.5	27.5	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0
9	25.5	25.5	27.5	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0
10	25.5	25.5	27.5	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0
11	25.5	25.5	27.5	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0
12	25.5	25.5	27.5	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0
13	25.5	25.5	27.5	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0
14	25.5	25.5	27.5	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0
15	25.5	25.5	27.5	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0
16	25.5	25.5	27.5	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0
17	25.5	25.5	27.5	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0

16 OBDG01 Initial Supporting table - CalculatedPerfMaxIc1

Description:

Notes:

y/x	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	25.5	25.5	27.5	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0
2	25.5	25.5	27.5	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0
3	25.5	25.5	27.5	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0
4	25.5	25.5	27.5	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0
5	25.5	25.5	27.5	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0
6	25.5	25.5	27.5	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0
7	25.5	25.5	27.5	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0
8	25.5	25.5	27.5	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0
9	25.5	25.5	27.5	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0
10	25.5	25.5	27.5	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0
11	25.5	25.5	27.5	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0
12	25.5	25.5	27.5	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0
13	25.5	25.5	27.5	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0
14	25.5	25.5	27.5	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0
15	25.5	25.5	27.5	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0
16	25.5	25.5	27.5	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0
17	25.5	25.5	27.5	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0

16 OBDG01 Initial Supporting table - P0324_PerCyl_ExcessiveKnock_Threshold

Description: Fail threshold for the Knock Performance per-cylinder Excessive Knock Diagnostic

Notes: Used for P0324. Cal Name: KtKNKD_k_PerfCylFiltKnkIntThrsh. X-axis = Engine Speed (RPM), Diagnostic fails when VaKNKD_k_PerCylKnockIntFilt[cyl] > KtKNKD_k_PerfCylFiltKnkIntThrsh

y/x	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000	7,500	8,000	8,500
1	2.25	2.25	2.00	1.63	1.63	1.63	1.63	1.63	1.63	1.56	1.63	1.63	1.63	1.63	1.63	1.63	1.63

16 OBDG01 Initial Supporting table - P0325_P0330_OpenCktThrshMax (20 kHz)

Description: Knock Open Circuit Diagnostic Maximum Threshold when using the 20 kHz method (see "OpenMethod" description)

Notes: Used for P0325 and P0330. Cal name: KtKNKD_k_OpenMax20K. x-axis = Engine Speed (RPM).

Diagnostic fails when the filtered diagnostic output is between the OpenCktThrshMin and OpenCktThrshMax:
i.e.: KtKNKD_k_OpenMin20K < VaKNKD_k_OpenFiltIntensity < KtKNKD_k_OpenMax20K.

y/x	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	4,650	5,500	6,000	6,500	7,000	7,500	8,000	8,500
1	0.0000	2.0156	2.0000	2.0020	1.9648	1.9609	1.9648	1.9648	1.9629	1.9063	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

16 OBDG01 Initial Supporting table - P0325_P0330_OpenCktThrshMax (Normal Noise)

Description: Knock Open Circuit Diagnostic Minimum Threshold when using the Normal Noise method (see "OpenMethod" description): When using the Normal Noise method (see "OpenMethod" description).

Notes: Used for P0325 and P0330. Cal name: KtKNKD_k_OpenMaxNN. x-axis = Engine Speed (RPM)

Diagnostic fails when the filtered diagnostic output is between the OpenCktThrshMin and OpenCktThrshMax:
i.e.: KtKNKD_k_OpenMinNN < VaKNKD_k_OpenFiltIntensity < KtKNKD_k_OpenMaxNN.

y/x	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000	7,500	8,000	8,500
1	0.4668	0.4102	0.3672	0.3359	0.3145	0.2988	0.2930	0.2891	0.2891	0.2910	0.2930	0.2910	0.2891	0.2793	0.2656	0.2402	0.2070

16 OBDG01 Initial Supporting table - P0325_P0330_OpenCktThrshMin (20 kHz)

Description: Knock Open Circuit Diagnostic Minimum Threshold when using the 20 kHz method (see "OpenMethod" description)

Notes: Used for P0325 and P0330. Cal name: KtKNKD_k_OpenMin20K. x-axis = Engine Speed (RPM)

Diagnostic fails when the filtered diagnostic output is between the OpenCktThrshMin and OpenCktThrshMax:
i.e.: KtKNKD_k_OpenMin20K < VaKNKD_k_OpenFiltIntensity < KtKNKD_k_OpenMax20K.

y/x	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	4,650	5,500	6,000	6,500	7,000	7,500	8,000	8,500
1	0.0000	0.6133	0.6152	0.6074	0.5898	0.5879	0.5898	0.5918	0.5938	0.5781	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

16 OBDG01 Initial Supporting table - P0325_P0330_OpenCktThrshMin (Normal Noise)

Description: Knock Open Circuit Diagnostic Minimum Threshold when using the Normal Noise method (see "OpenMethod" description): When using the Normal Noise method (see "OpenMethod" description).

Notes: Used for P0325 and P0330. Cal name: KtKNKD_k_OpenMinNN. x-axis = Engine Speed (RPM)

Diagnostic fails when the filtered diagnostic output is between the OpenCktThrshMin and OpenCktThrshMax:
i.e.: KtKNKD_k_OpenMinNN < VaKNKD_k_OpenFiltIntensity < KtKNKD_k_OpenMaxNN.

y/x	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000	7,500	8,000	8,500
1	0.2422	0.1895	0.1523	0.1289	0.1191	0.1211	0.1387	0.1680	0.2090	0.2617	0.3281	0.4043	0.4941	0.5918	0.7012	0.8223	0.9531

16 OBDG01 Initial Supporting table - P0325_P0330_OpenMethod_2

Description: Defines which Knock Open Circuit Diagnostic method to use.

Notes: Used for P0325 and P0330. Cal name: KaKNKD_e_OpenMethod. x-axis = Engine Speed Index, 500 to 8500 (RPM) by 500 rpm increments.

Selects 1 of 3 available methods: "20kHz Method", "Normal Noise Method," or "None" (note: "None" = disabled at that rpm). The mode chosen dictates which set of threshold tables are used. Typically, either: A) the 20 kHz Method is used for all RPM or B) the 20 kHz Method is used for low/medium RPM and the Normal Noise Method is used for high RPM.

P0325_P0330_OpenMethod_2 - Part 1

y/x	0	1	2	3	4
1	CeKNKD_e_Open_20KHz	CeKNKD_e_Open_20KHz	CeKNKD_e_Open_20KHz	CeKNKD_e_Open_20KHz	CeKNKD_e_Open_20KHz

P0325_P0330_OpenMethod_2 - Part 2

y/x	5	6	7	8	9
1	CeKNKD_e_Open_20KHz	CeKNKD_e_Open_20KHz	CeKNKD_e_Open_20KHz	CeKNKD_e_Open_20KHz	CeKNKD_e_Open_20KHz

P0325_P0330_OpenMethod_2 - Part 3

y/x	10	11	12	13	14
1	CeKNKD_e_Open_20KHz	CeKNKD_e_Open_20KHz	CeKNKD_e_Open_20KHz	CeKNKD_e_Open_20KHz	CeKNKD_e_Open_20KHz

P0325_P0330_OpenMethod_2 - Part 4

y/x	15	16			
1	CeKNKD_e_Open_20KHz	CeKNKD_e_Open_20KHz			

16 OBDG01 Initial Supporting table - P0326_P0331_AbnormalNoise_CylsEnabled

Description: Specifies which cylinders will be used for the Abnormal Noise portion of the performance diagnostics (1 = cylinder used, 0 = cylinder not used)

Notes: Used for P0324, P0326 and P0331. Cal name: KaKNKD_b_PerfAbnIncludeCyl. x-axis = Cylinder number in firing order (i.e. Cyl 0 = first cylinder in firing order, Cyl 1 = second cylinder in firing order....)

A cal value = 1 specifies the cylinder is used for the Abnormal Noise diagnostic. A cal value = 0 specifies the cylinder is not used. Only the first four values in the table are relavent for a four-cylinder engine and only the first six values in the table are relavent for a six-cylinder engine.

Typically, all cylinders are used. Cylinders are only excluded if the signal from that cylinder is weak and there is no separation between normal and faulted conditions (can occur if the sensor location results in poor signal-to-noise ratio for a given cylinder).

y/x	0	1	2	3	4	5	6	7
1	1	1	1	1	0	0	0	0

16 OBDG01 Initial Supporting table - P0326_P0331_AbnormalNoise_Threshold

Description: Fail threshold for the Knock Performance Abnormal Noise Diagnostic

Notes: Used for P0324, P0326 and P0331. Cal Name: KtKNKD_k_PerfAbnLimitLo. X-axis = Engine Speed (RPM). Diagnostic fails when VaKNKD_k_PerfCylAbnFiltIntnsity < KtKNKD_k_PerfAbnLimitLo

y/x	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000	7,500	8,000	8,500
1	0.531	0.531	0.531	0.531	0.300	0.274	0.200	0.162	0.168	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180

16 OBDG01 Initial Supporting table - P0521_Eng_Load_Stability_Weighting_Factor - Single Stage Oil Pump

Description: Engine Load Stability Weighting Factor - Single Stage Oil Pump

Notes: KtEOPD_r_EngLoadStblWeight with axis as Engine Load Stability defined by KnEOPD_m_EngLoadStabilityBpt

y/x	0	5	10	20	30	50	100	200	399
1	1.00	1.00	0.50	0.30	0.10	0.00	0.00	0.00	0.00

16 OBDG01 Initial Supporting table - P0521_Eng_Oil_Pred_Weighting_Factor - Single Stage Oil Pump

Description: Oil Pressure Predicted Weighting Factor - Single Stage Oil Pump

Notes: KtEOPD_r_EOP_PredictWeight with axis as Predicted Oil Pressure defined by KnEOPD_p_EngOilPredictedBpt

y/x	0	170	250	275	360	375	400	500	600
1	0.00	0.00	0.10	1.00	1.00	1.00	1.00	0.86	0.00

16 OBDG01 Initial Supporting table - P0521_Oil_Temp_Weighting_Factor - Single Stage Oil Pump

Description: Oil Temperature Weighting Factor - Single Stage Oil Pump

Notes: KtEOPD_r_EOT_Weight with axis as Oil Temperature defined by KnEOPD_T_EngFilteredBpt

y/x	-40	40	60	80	90	100	120	130	140
1	0.58	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.00

16 OBDG01 Initial Supporting table - P0521_P06DD_P06DE_OP_HiStatePressure

Description: Two Stage Oil Pump Oil Pressure in High State

Notes: For P0521, P06DD and P06DE: KtLUBD_p_OP_OilPresHighState with X Axis is defined by KnLUBD_n_OP_OilPresRPMAxs and Y Axis is defined by KnLUBD_T_OP_OilPresTempAxs

y/x	0.0	20.0	40.0	60.0	80.0	90.0	100.0	110.0	120.0
1,000.0	482.3	472.8	452.4	421.9	378.7	359.6	313.6	274.1	234.6
1,500.0	495.6	485.9	465.4	436.7	392.9	378.4	360.3	310.0	259.7
2,000.0	512.3	502.3	488.3	476.6	457.5	444.5	432.1	398.3	364.4
2,500.0	523.2	512.9	499.3	488.1	472.6	464.3	452.8	417.8	382.8
3,000.0	527.7	517.3	515.0	504.4	488.5	481.3	472.4	455.3	438.1
3,500.0	545.4	534.6	536.1	522.2	506.6	499.4	490.0	484.9	479.8
4,000.0	559.3	548.3	546.5	536.9	521.3	515.4	500.7	491.9	483.0
4,500.0	573.1	561.9	556.9	551.6	535.9	531.4	511.4	498.8	486.3
5,000.0	587.1	575.6	567.4	566.4	550.6	547.4	522.1	505.8	489.4

16 OBDG01 Initial Supporting table - P0521_RPM_Weighting_Factor - Single Stage Oil Pump

Description: Engine RPM Weighting Factor - Single Stage Oil Pump

Notes: KtEOPD_r_EngSpdWeight with axis as Engine RPM defined by KnEOPD_n_EngSpdFilteredBpt

y/x	0	500	900	1,000	1,500	1,750	2,000	3,500	4,000
1	0.00	0.00	0.00	0.45	0.45	0.45	0.46	0.44	0.00

16 OBDG01 Initial Supporting table - P0606_Program Sequence Watch Enable f(Core, Loop Time)

Description: The enabling flags for the program sequence watch as a function of processor core and operating loop time sequence.

Notes: P0606, KaPISD_b_ProgSeqWatchEnbl

y/x	CeTSKR_e_CPU	CeTSKR_e_CPU2	CeTSKR_e_CPU3	CeTSKR_e_CPU4
CePISR_e_6p25msSeq	1	1	0	0
CePISR_e_12p5msSeq	1	1	0	0
CePISR_e_25msSeq	1	1	0	0
CePISR_e_LORES_C	1	1	0	0

16 OBDG01 Initial Supporting table - P06B6_P06B7_OpenTestCktThrshMax

Description: Knock Open Circuit Minimum Threshold for Internal Circuit Diagnostic. Used only when the 20 kHz method is being used (see "OpenMethod" description). The Open Test Circuit ensures that the internal circuit used to generate the 20 kHz signal for the Open Circuit diags (P0325, P0330) is within range.

Notes: Used for P0325 and P0330. Cal name: KtKNKD_k_OpenTestCktMax. x-axis = Engine Speed (RPM).

Diagnostic fails when the filtered diagnostic output is between the OpenTestCktThrshMin and OpenTestCktThrshMax:
i.e. KtKNKD_k_OpenTestCktMin < VaKNKD_k_OpenTestCktIntFilter < KtKNKD_k_OpenTestCktMax

y/x	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	4,650	5,500	6,000	6,500	7,000	7,500	8,000	8,500
1	0.000	0.043	0.043	0.047	0.047	0.049	0.051	0.053	0.059	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

16 OBDG01 Initial Supporting table - P06B6_P06B7_OpenTestCktThrshMin

Description: Knock Open Circuit Minimum Threshold for Internal Circuit Diagnostic. Used only when the 20 kHz method is being used (see "OpenMethod" description). The Open Test Circuit ensures that the internal circuit used to generate the 20 kHz signal for the Open Circuit diags (P0325, P0330) is within range.

Notes: Used for P0325 and P0330. Cal name: KtKNKD_k_OpenTestCktMin. x-axis = Engine Speed (RPM).

Diagnostic fails when the filtered diagnostic output is between the OpenTestCktThrshMin and OpenTestCktThrshMax:
i.e. KtKNKD_k_OpenTestCktMin < VaKNKD_k_OpenTestCktIntFilter < KtKNKD_k_OpenTestCktMax

y/x	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	4,650	5,500	6,000	6,500	7,000	7,500	8,000	8,500
1	0.000	0.020	0.020	0.021	0.021	0.023	0.023	0.025	0.029	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

16 OBDG01 Initial Supporting table - P06DD_P06DE_MaxEnableTorque_OP

Description: Two Stage Oil Pump Rationality Test Torque Max Enable Threshold

Notes: For P06DD and P06DE: KtLUBD_M_OP_InDiagEngTorqMax with X Axis is defined by KnLUBD_n_OP_InDiEngTorqMxRPMAxs

y/x	0.0	750.0	1,500.0	2,250.0	3,000.0	3,750.0	4,500.0	5,250.0	6,000.0
1.0	0.0	0.0	115.0	131.0	139.0	148.0	150.0	0.0	0.0

16 OBDG01 Initial Supporting table - P06DD_P06DE_MinEnableTorque_OP

Description: Two Stage Oil Pump Rationality Test Torque Min Enable Threshold									
Notes: For P06DD and P06DE: KtLUBD_M_OP_InDiagEngTorqMin with X Axis is defined by KnLUBD_n_OP_InDiEngTorqMnRPMAxs									
y/x	0.0	750.0	1,500.0	2,250.0	3,000.0	3,750.0	4,500.0	5,250.0	6,000.0
1.0	0.0	0.0	13.0	13.0	13.0	13.0	13.0	0.0	0.0

16 OBDG01 Initial Supporting table - P06DD_P06DE_MinOilPressThresh

Description: Intrusive diagnostic minimum pressure limit that is a function of Engine Speed and Oil Temperature

Notes: For P06DD and P06DE: KtLUBD_p_InDiagMinPresThresh with X Axis is defined by KnLUBD_n_OP_OilPresRPMAxs and Y Axis is defined by KnLUBD_T_OP_OilPresTempAxs

y/x	0	20	40	60	80	90	100	110	120
1,000	25	32	38	45	52	59	65	68	71
1,500	25	32	38	45	52	59	65	68	71
2,000	25	32	38	45	52	59	65	68	71
2,500	25	32	38	45	52	59	65	68	71
3,000	25	32	38	45	52	59	65	68	71
3,500	25	32	38	45	52	59	65	68	71
4,000	25	32	38	45	52	59	65	68	71
4,500	25	32	38	45	52	59	65	68	71
5,000	25	32	38	45	52	59	65	68	71

16 OBDG01 Initial Supporting table - P06DD_P06DE_OP_LoStatePressure

Description: Two Stage Oil Pump Oil Pressure in Low State

Notes: For P06DD and P06DE: KtLUBD_p_OP_OilPresLowState with X Axis is defined by KnLUBD_n_OP_OilPresRPMAxs and Y Axis is defined by KnLUBD_T_OP_OilPresTempAxs

y/x	0	20	40	60	80	90	100	110	120
1,000	265	260	242	236	225	218	210	205	199
1,500	268	262	245	239	230	225	217	212	207
2,000	274	269	251	250	244	240	235	229	222
2,500	283	277	256	254	249	246	241	237	233
3,000	287	281	266	260	255	252	247	244	240
3,500	295	289	277	266	260	256	251	249	246
4,000	304	298	289	269	263	259	255	253	251
4,500	312	306	295	271	266	262	258	257	256
5,000	320	314	303	274	269	264	262	262	262

16 OBDG01 Initial Supporting table - P06DD_P06DE_OP_StateChangeMin

Description: Minimum allowed pressure change on a Two Stage Oil Pump state change

Notes: For P06DD and P06DE: KtLUBD_p_OP_StateChangeMin with X Axis is defined by KnLUBD_n_OP_OilPresRPMAxs and Y Axis is defined by KnLUBD_T_OP_OilPresTempAxs

y/x	0.0	20.0	40.0	60.0	80.0	90.0	100.0	110.0	120.0
1,000.0	108.3	101.3	94.3	87.9	65.0	40.6	28.8	16.2	4.1
1,500.0	112.0	104.5	96.9	91.7	74.1	47.4	41.2	23.1	5.6
2,000.0	115.3	110.1	104.9	101.5	88.3	62.3	60.7	40.6	23.7
2,500.0	127.9	117.8	107.7	104.1	91.8	65.1	64.1	47.6	35.8
3,000.0	123.6	118.1	112.5	110.1	96.1	68.9	67.9	54.8	47.9
3,500.0	125.4	122.6	119.8	116.3	100.6	72.8	71.5	63.4	63.7
4,000.0	151.1	140.3	129.4	118.6	104.1	75.6	74.1	65.0	64.2
4,500.0	176.7	157.8	139.0	120.8	107.7	78.4	76.6	66.5	64.8
5,000.0	183.0	165.0	146.0	123.1	109.0	81.3	79.3	68.0	65.3

16 OBDG01 Initial Supporting table - P156A_Off_Test_Delay

Description: Delay time for AC High Side Pressure Rationality					
Notes: For P156A: KtACCD_t_HSP_RatOffTestDelay with X axis Ambient Temperature defined by KnACCD_T_HSP_RatOffTestPresMax					
y/x	-10.0	20.0	50.0	80.0	110.0
1.0	20.0	20.0	20.0	20.0	20.0

16 OBDG01 Initial Supporting table - P156A_Off_Test_Threshold

Description: AC High Side Pressure Sensor Rationality Off Test Threshold					
Notes: For P156A: KtACCD_p_HSPRat_OffTestPresMax with X Axis is defined by KnACCD_T_HSPRat_OffTestPresMax					
y/x	-10	20	50	80	110
1	1,000	1,400	1,800	2,000	2,300

16 OBDG01 Initial Supporting table - P156B_On_Test_Threshold

Description: AC High Side Pressure Sensor Rationality On Test Threshold					
Notes: For P156B: KtACCD_p_HSPRat_OnTestPresMin with X Axis is defined by KnACCD_T_HSPRat_OnTestPresMin					
y/x	-10	20	50	80	110
1	65.0	350.0	500.0	700.0	900.0

16 OBDG01 Initial Supporting table - DFCO_CoolEnblHi_Temp

Description:			
Notes:			
y/x	-40	0	25
1	20.0	20.0	20.0

16 OBDG01 Initial Supporting table - DFCO_DelayAfterStart_Time

Description:					
Notes:					
y/x	-30	-10	20	60	90
1	20.0	15.0	10.0	8.0	5.0

16 OBDG01 Initial Supporting table - DFCO_DsblLo_Vehicle_Speed

Description:		
Notes:		
y/x	CeTCOR_e_NonEcoMode	CeTCOR_e_EcoMode
CeTGRR_e_TransGr1	0	0
CeTGRR_e_TransGr2	0	0
CeTGRR_e_TransGr3	0	0
CeTGRR_e_TransGr4	0	0
CeTGRR_e_TransGr5	0	0
CeTGRR_e_TransGr6	0	0
CeTGRR_e_TransGrEVT1	0	0
CeTGRR_e_TransGrEVT2	0	0
CeTGRR_e_TransGrNeut	0	0
CeTGRR_e_TransGrRvrs	0	0
CeTGRR_e_TransGrPark	0	0
CeTGRR_e_TransGr7	0	0
CeTGRR_e_TransGr8	0	0

16 OBDG01 Initial Supporting table - DFCO_EnblHi_Vehicle_Speed

Description:		
Notes:		
y/x	CeTCOR_e_NonEcoMode	CeTCOR_e_EcoMode
CeTGRR_e_TransGr1	0.0	0.0
CeTGRR_e_TransGr2	0.0	0.0
CeTGRR_e_TransGr3	0.0	0.0
CeTGRR_e_TransGr4	0.0	0.0
CeTGRR_e_TransGr5	0.0	0.0
CeTGRR_e_TransGr6	0.0	0.0
CeTGRR_e_TransGrEVT1	0.0	0.0
CeTGRR_e_TransGrEVT2	0.0	0.0
CeTGRR_e_TransGrNeut	0.0	0.0
CeTGRR_e_TransGrRvrs	0.0	0.0
CeTGRR_e_TransGrPark	0.0	0.0
CeTGRR_e_TransGr7	0.0	0.0
CeTGRR_e_TransGr8	0.0	0.0

16 OBDG01 Initial Supporting table - DFCO_EngSpdEnblOfst

Description:									
Notes:									
y/x	-1,750	-1,500	-1,250	-1,000	-700	-500	-300	-100	0
1	500	500	500	50	0	0	0	0	0

16 OBDG01 Initial Supporting table - SCD_Decel (ELR)

Description: Crankshaft decel threshold. SCD mode uses smaller windows near TDC. Thresholds are a function of rpm and % engine Load.

Notes: Used for P0300-P0308. Cal Name: KtMISF_dt_SCD_OffIdleMode

y/x	400	500	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000
8	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
9	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
11	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
12	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
13	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
15	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
17	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
19	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
22	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
25	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
29	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
33	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
38	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
42	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
48	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
54	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
61	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767

16 OBDG01 Initial Supporting table - SCD_Jerk (ELR)

Description: Crankshaft jerk threshold. SCD mode uses smaller windows near TDC. Thresholds are a function of rpm and % engine Load.

Notes: Used for P0300-P0308. Cal Name: KtMISF_ddt_SCD_OffIdleMode

y/x	400	500	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000
8	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
9	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
11	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
12	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
13	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
15	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
17	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
19	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
22	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
25	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
29	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
33	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
38	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
42	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
48	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
54	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
61	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767

16 OBDG01 Initial Supporting table - WSSRoughRoadThres (ELR)

Description: Only used if Wheel speed from ABS is used. If difference between wheel speed readings is larger than this limit, rough road is present

Notes: Used for P0300-P0308. Cal Name: KtRRDI_a_WhlSpdRoughRoadLim

y/x	0	12	24	36	48	60	72	85	97	109	121	133	145	157	169	181	193
1	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04

16 OBDG01 Initial Supporting table - Abnormal Cyl Mode (ELR)

Description: Number of consecutive number of decelerating cylinders after the misfire that would be considered abnormal. (Cylinder Mode Equation)									
Notes: Used for P0300-P0308. Cal Name: KaMSFD_Cnt_CylAbnormal									
y/x	0	1	2	3	4	5	6	7	8
1	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00

16 OBDG01 Initial Supporting table - Abnormal Rev Mode (ELR)

Description: Abnormal Rev Mode Number of consecutive number of decelerating cylinders after the misfire that would be considered abnormal. (Rev Mode Equation)									
Notes: Used for P0300-P0308. Cal Name: KaMSFD_Cnt_RevAbnormal									
y/x	0	1	2	3	4	5	6	7	8
1	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00

16 OBDG01 Initial Supporting table - Abnormal SCD Mode (ELR)

Description: Number of consecutive number of decelerating cylinders after the misfire that would be considered abnormal. (SCD Mode Equation)

Notes: Used for P0300-P0308. Cal Name: KaMSFD_Cnt_SCD_CylAbnormal

y/x	0	1	2	3	4	5	6	7	8
1	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00

16 OBDG01 Initial Supporting table - AFM_Decel

Description: Crankshaft decel threshold. Thresholds are a function of rpm and % engine Load.

Notes: Used for P0300-P0308. Cal Name: KtMISF_DoDCylinderMode

y/x	400	500	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,500
0	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
6	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
13	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
19	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
25	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
31	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
38	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
44	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
50	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
56	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
63	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
69	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
75	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
81	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
88	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
94	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
100	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767

16 OBDG01 Initial Supporting table - Catalyst_Damage_Misfire_Percentage (ELR)

Description: Catalyst Damaging Misfire Percentage" Table whenever secondary conditions are met.

Notes: Used for P0300-P0308. Cal Name: KtMSFD_Pct_CatalystMisfire

y/x	0	1,000	2,000	3,000	4,000	5,000	6,000	7,000
0	24.6	24.6	24.6	24.6	12.1	7.9	7.9	7.9
10	24.6	24.6	24.6	24.6	12.1	7.9	7.9	7.9
20	24.6	24.6	24.6	12.1	12.1	7.9	7.9	7.9
30	12.1	12.1	12.1	12.1	7.9	5.9	5.9	5.9
40	12.1	12.1	12.1	12.1	5.9	4.6	4.6	4.6
50	12.1	12.1	12.1	7.9	4.6	4.6	4.6	4.6
60	12.1	12.1	12.1	4.6	4.6	4.6	4.6	4.6
70	12.1	12.1	12.1	4.6	4.6	4.6	4.6	4.6
80	12.1	12.1	12.1	4.6	4.6	4.6	4.6	4.6
90	12.1	12.1	12.1	4.6	4.6	4.6	4.6	4.6
100	12.1	12.1	12.1	4.6	4.6	4.6	4.6	4.6

16 OBDG01 Initial Supporting table - CylMode_Decel

Description: Crankshaft decel threshold. Thresholds are a function of rpm and % engine Load.

Notes: Used for P0300-P0308. Cal Name: KtMISF_CylinderMode

CylMode_Decel - Part 1

y/x	400	500	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000
8	5,000	5,000	4,000	2,500	2,500	2,000	800	800	800	550	380	300	145
9	5,000	5,000	4,000	2,500	2,500	2,000	750	750	750	475	310	285	138
11	5,000	5,000	4,000	2,500	2,500	2,000	700	700	700	475	250	245	127
12	5,000	5,000	4,000	2,500	2,500	2,000	750	750	750	475	260	255	130
13	5,000	5,000	4,000	2,500	2,500	2,000	800	800	800	533	285	280	135
15	5,000	5,000	4,000	2,500	2,500	2,000	850	850	850	535	290	285	150
17	5,000	5,000	4,000	2,500	2,500	2,000	1,100	1,100	1,100	575	388	310	160
19	5,000	5,000	4,000	2,500	2,500	2,000	1,200	1,200	1,200	650	390	315	210
22	5,000	5,000	4,000	2,500	2,500	2,000	1,400	1,400	1,400	825	400	325	235
25	5,000	5,000	4,000	2,500	2,500	2,000	1,450	1,450	1,450	850	450	390	240
29	5,000	5,000	4,000	2,500	2,500	2,000	1,500	1,500	1,500	950	550	390	310
33	5,000	5,000	4,000	2,500	2,500	2,000	1,600	1,600	1,600	1,000	600	390	315
38	5,000	5,000	4,000	2,500	2,500	2,000	1,800	1,800	1,800	1,050	650	390	315
42	5,000	5,000	4,000	2,500	2,500	2,000	1,900	1,900	1,900	1,400	800	500	320
48	5,000	5,000	4,000	2,500	2,500	2,000	2,000	2,000	2,000	1,425	900	525	320
54	5,000	5,000	4,000	2,500	2,500	2,000	2,000	2,000	2,000	1,450	1,000	525	360
61	5,000	5,000	4,000	2,500	2,500	2,000	2,000	2,000	2,000	1,800	1,300	855	450

CylMode_Decel - Part 2

y/x	2,200	2,400	2,600	2,800	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000
8	140	120	90	85	70	25	20	15	15	15	15	15	15
9	130	100	80	75	60	16	12	11	10	10	10	10	10
11	123	95	70	55	50	18	13	12	8	8	8	8	8
12	125	98	70	55	50	20	14	13	9	9	9	9	9
13	130	100	70	55	50	22	15	14	9	9	9	9	9
15	140	105	75	55	50	23	18	18	9	9	9	9	9
17	160	110	80	65	55	25	19	18	10	10	10	10	10
19	180	125	90	70	65	30	20	19	11	11	11	11	11
22	200	140	100	75	75	35	23	20	12	12	12	12	12
25	235	200	125	100	85	40	24	21	12	12	12	12	12
29	270	200	125	120	90	40	30	23	15	15	15	15	15
33	295	210	125	120	90	40	33	24	18	18	18	18	18
38	310	210	125	120	120	60	33	30	23	23	23	23	23

16 OBDG01 Initial Supporting table - CylMode_Decel

42	320	210	125	120	120	69	44	40	28	28	28	28	28
48	320	315	220	130	130	80	53	42	34	34	34	34	34
54	360	350	250	235	145	90	56	46	41	41	41	41	41
61	375	365	300	260	150	100	65	60	44	44	44	44	44

16 OBDG01Initial Supporting table - CylMode_Jerk

Description: Crankshaft jerk threshold. Thresholds are a function of rpm and % engine Load.

Notes: Used for P0300-P0308. Cal Name: KtMISF_ddt_CylinderMode

CylMode_Jerk - Part 1

y/x	400	500	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000
8	5,000	5,000	4,000	2,500	2,500	2,000	1,300	1,300	1,300	600	400	350	250
9	5,000	5,000	4,000	2,500	2,500	2,000	1,250	1,250	1,250	475	350	300	240
11	5,000	5,000	4,000	2,500	2,500	2,000	1,200	1,200	1,200	475	300	275	220
12	5,000	5,000	4,000	2,500	2,500	2,000	1,200	1,200	1,200	600	305	280	220
13	5,000	5,000	4,000	2,500	2,500	2,000	1,200	1,200	1,200	752	310	285	225
15	5,000	5,000	4,000	2,500	2,500	2,000	1,200	1,200	1,200	775	325	290	225
17	5,000	5,000	4,000	2,500	2,500	2,000	1,450	1,450	1,450	800	400	350	230
19	5,000	5,000	4,000	2,500	2,500	2,000	1,600	1,600	1,600	925	500	360	235
22	5,000	5,000	4,000	2,500	2,500	2,000	1,700	1,700	1,700	935	600	375	240
25	5,000	5,000	4,000	2,500	2,500	2,000	1,750	1,750	1,750	950	650	400	245
29	5,000	5,000	4,000	2,500	2,500	2,000	1,775	1,775	1,775	975	750	400	315
33	5,000	5,000	4,000	2,500	2,500	2,000	1,800	1,800	1,800	1,050	850	400	320
38	5,000	5,000	4,000	2,500	2,500	2,000	1,900	1,900	1,900	1,100	950	400	320
42	5,000	5,000	4,000	2,500	2,500	2,000	2,000	2,000	2,000	1,425	1,275	700	320
48	5,000	5,000	4,000	2,500	2,500	2,500	2,100	2,100	2,100	1,450	1,325	770	320
54	5,000	5,000	4,000	2,500	2,500	2,500	2,200	2,200	2,200	1,500	1,350	775	375
61	5,000	5,000	4,000	2,500	2,500	2,500	2,300	2,300	2,300	1,850	1,400	860	625

CylMode_Jerk - Part 2

y/x	2,200	2,400	2,600	2,800	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000
8	240	160	140	120	90	45	35	30	25	25	25	25	24
9	220	150	120	100	80	38	27	24	17	17	17	17	16
11	180	135	105	90	70	39	28	24	17	17	17	17	16
12	190	140	110	95	77	40	29	24	17	17	17	17	16
13	220	165	125	105	78	40	30	24	17	17	17	17	16
15	220	170	130	110	85	40	33	24	19	19	19	19	18
17	225	175	130	115	88	40	33	26	21	21	21	21	20
19	230	180	130	120	92	40	33	30	26	26	26	26	25
22	235	190	130	120	94	40	33	33	30	30	30	30	29
25	240	200	130	120	95	40	33	33	33	33	33	33	32
29	300	210	130	120	95	40	33	33	33	33	33	33	32
33	300	210	130	120	95	40	33	33	33	33	33	33	32
38	315	210	130	120	120	60	33	33	33	33	33	33	32

42	320	210	130	120	120	69	44	40	40	40	40	40	39
48	320	320	220	130	130	80	53	42	42	42	42	42	41
54	375	370	355	245	145	90	56	46	46	46	46	46	45
61	550	510	360	260	150	100	65	60	58	58	58	58	57

16 OBDG01 Initial Supporting table - EngineOverSpeedLimit (ELR)

Description: Engine OverSpeed Limit versus gear

Notes: Used for P0300-P0308. Cal Name: KaEOSC_n_EngOvrspdLimitGear

EngineOverSpeedLimit - Part 1

y/x	CeTGRR_e_TransGr1	CeTGRR_e_TransGr2	CeTGRR_e_TransGr3	CeTGRR_e_TransGr4	CeTGRR_e_TransGr5	CeTGRR_e_TransGr6
1	4,900	4,900	4,900	4,900	4,900	4,900

EngineOverSpeedLimit - Part 2

y/x	CeTGRR_e_TransGrEVT1	CeTGRR_e_TransGrEVT2	CeTGRR_e_TransGrNeut	CeTGRR_e_TransGrRvrs	CeTGRR_e_TransGrPark	
1	4,900	4,900	2,000	2,000	2,000	

16 OBDG01 Initial Supporting table - IdleCylModeDecel

Description: Crankshaft decel threshold. Thresholds are a function of rpm and % engine Load.

Notes: Used for P0300-P0308. Cal Name: KtMSFD_dt_IdleCylinderMode

y/x	1,250	1,300	1,350	1,375	1,400	1,425	1,450	1,500	1,600	1,700	1,800	1,900	2,000
8	600	550	550	550	550	550	550	380	380	300	300	145	145
9	800	500	500	500	500	500	500	310	310	285	285	138	138
11	750	500	500	500	500	500	500	250	250	245	245	127	127
12	700	500	500	500	500	500	500	260	260	255	255	130	130
13	750	500	500	500	500	500	500	285	285	280	280	135	135
15	800	500	500	500	500	500	500	290	290	285	285	150	150
17	850	500	500	500	500	500	500	388	388	310	310	160	160
19	1,100	250	250	250	250	250	250	390	390	315	315	210	210
22	1,200	400	400	400	400	400	400	400	400	325	325	235	235
25	1,400	480	480	480	480	480	480	450	450	390	390	240	240
29	1,700	495	495	495	495	495	495	550	550	390	390	310	310
33	2,300	650	650	650	650	650	650	600	600	390	390	315	315
38	2,800	750	750	750	750	750	750	650	650	390	390	315	315
42	3,000	825	825	825	825	825	825	800	800	500	500	320	320
48	3,400	850	850	850	850	850	850	900	900	525	525	320	320
54	3,700	875	875	875	875	875	875	1,000	1,000	525	525	360	360
60	3,800	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	855	855	450	450

16 OBDG01 Initial Supporting table - IdleCylModeJerk

Description: Crankshaft jerk threshold. Thresholds are a function of rpm and % engine Load.

Notes: Used for P0300-P0308. Cal Name: KtMSFD_ddt_IdleCylinderMode

y/x	1,250	1,300	1,350	1,375	1,400	1,425	1,450	1,500	1,600	1,700	1,800	1,900	2,000
8	1,300	550	550	550	550	550	550	400	400	350	350	250	250
9	1,250	500	500	500	500	500	500	350	350	300	300	240	240
11	1,200	500	500	500	500	500	500	300	300	275	275	220	220
12	1,300	500	500	500	500	500	500	305	305	280	280	220	220
13	1,400	500	500	500	500	500	500	310	310	285	285	225	225
15	1,500	500	500	500	500	500	500	325	325	290	290	225	225
17	1,600	500	500	500	500	500	500	400	400	350	350	230	230
19	1,800	500	500	500	500	500	500	500	500	360	360	235	235
22	2,000	525	500	500	500	500	500	600	600	375	375	240	240
25	2,500	600	600	600	600	600	600	650	650	400	400	245	245
29	3,500	610	610	610	610	610	610	750	750	400	400	315	315
33	4,500	675	675	675	675	675	675	850	850	400	400	320	320
38	5,000	800	800	800	800	800	800	950	950	400	400	320	320
42	5,500	825	825	825	825	825	825	1,275	1,275	700	700	320	320
48	5,600	850	850	850	850	850	850	1,325	1,325	770	770	320	320
54	5,750	875	875	875	875	875	875	1,350	1,350	775	775	375	375
60	4,000	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	860	860	625	625

16 OBDG01 Initial Supporting table - IdleSCD_Decel (ELR)

Description: Crankshaft decel threshold while in SCD mode. SCD mode uses smaller windows near TDC. Thresholds are a function of rpm and % engine Load.

Notes: Used for P0300-P0308. Cal Name: KtMISF_dt_SCD_IdleMode
Note: Misfire's Load term is %, but not PID$04. PID $04 is not robust to temperature and alititude shifts. (especially decel and jerk thresholds since they track actual air trapped in cylinder)

y/x	400	500	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000
8	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
9	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
11	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
12	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
13	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
15	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
17	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
19	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
22	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
25	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
29	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
33	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
38	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
42	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
48	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
54	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
60	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767

16 OBDG01 Initial Supporting table - IdleSCD_Jerk (ELR)

Description: Crankshaft jerk threshold while in SCD mode. SCD mode uses smaller windows near TDC. Thresholds are a function of rpm and % engine Load.

Notes: Used for P0300-P0308. Cal Name: KtMISF_ddt_SCD_IdleMode

y/x	400	500	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000
8	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
9	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
11	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
12	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
13	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
15	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
17	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
19	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
22	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
25	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
29	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
33	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
38	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
42	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
48	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
54	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
60	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767

16 OBDG01 Initial Supporting table - Max_PatternMultiplier

Description: Crankshaft should return to normal after the misfire. If crankshaft snap value after the misfire being evaulated is larger than the misfire's Jerk threshold times this multiplier, its not a real misfire. However, if random misfire occurs every engine cycle, more noise is allowed to be considered "normal" since the crankshaft does not have time to fully return to normal before the next misfire occurs.

Notes: Used for P0300-P0308. Cal Name: KtMSFD_K_SCD_MaxPttrnRecogMult

y/x	0	1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000
1	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00

16 OBDG01 Initial Supporting table - Min_PatternMultiplier

Description: Crankshaft should return to normal after the misfire. If crankshaft snap value after single isolated misfire being evaulated is larger than the misfire's Jerk threshold times this multiplier, its not a real misfire.

Notes: Used for P0300-P0308. Cal Name: KtMSFD_K_SCD_MinPttrnRecogMult

y/x	0	1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000
1	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85

16 OBDG01 Initial Supporting table - Number of Normals (ELR)

Description: Number of Normals for the Driveline Ring Filter
After a low level misfire, another misfire may not be detectable until driveline ringing ceases. If no ringing seen, stop filter early.

Notes: Used for P0300-P0308. Cal Name: KaMSFD_Cnt_NumOfNormalsFil

y/x	0	1	2	3	4	5	6	7	8
1	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00

16 OBDG01 Initial Supporting table - P00B6_Fail if power up ECT exceeds RCT by these values

Description: KtTHMD_T_DCRD_FastFailTempDiff

Notes: X axis is IAT Temperature at Power up (° C), Z axis is the Fast Failure temp difference (° C) The 17 X-axis breakpoints for the table below are (L to R) -40, -28, -16, -4, 8, 20, 32, 44, 56, 68, 80, 92, 104, 116, 128, 140 and 152. Note: Remove for applications with single coolant sensor

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20

16 OBDG01 Initial Supporting table - P0116_Fail if power up ECT exceeds IAT by these values

Description: KtECTD_T_HSC_FastFailTempDiff

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

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20

16 OBDG01 Initial Supporting table - P0531_Cold_Test_Threshold

Description: AC High Side Pressure Sensor Rationality Cold Test Threshold					
Notes: For P0531: KtACCD_p_HSPRat_ColdTestTarget with X Axis is defined by KnACCD_T_HSPRat_ColdTestTarget					
y/x	-20	0	20	60	100
1	150	250	600	1,300	1,500

16 OBDG01 Initial Supporting table - P0531_Coolant_Weighting_Factor

Description: Coolant Weighting Factor for Delta Predicted AC Pressure

Notes: For P0531: KtACCD_k_HSPRat_EngageCoolCoeff with X Axis is Engine Coolant defined by KnACCD_T_HSPRat_EngageTstCool to weight the Delta Predicted Pressure

y/x	-40	-20	0	20	40	60	80	100	120
1	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

16 OBDG01 Initial Supporting table - P0531_Delta_Predicted_ Pressure

Description: AC High Side Pressure Sensor Sensor Engage Test Predicted Delta Pressure

Notes: For P0531: KtACCD_p_HSPR_DeltaPredicted with X Axis is defined by KnACCD_T_HSPRat_EngageTstAmb and Y Axis is defined by KnACCD_v_HSPRat_EngageTstVehSpd

y/x	0	20	30	40	50	60	70	80	100
0	40.00	50.00	60.00	70.00	75.00	80.00	100.00	100.00	100.00
20	40.00	50.00	60.00	70.00	75.00	80.00	100.00	100.00	100.00
40	40.00	50.00	60.00	70.00	75.00	80.00	100.00	100.00	100.00
60	40.00	50.00	60.00	70.00	75.00	80.00	100.00	100.00	100.00
80	40.00	50.00	60.00	70.00	75.00	80.00	100.00	100.00	100.00
100	40.00	50.00	60.00	70.00	75.00	80.00	100.00	100.00	100.00
120	40.00	50.00	60.00	70.00	75.00	80.00	100.00	100.00	100.00
140	40.00	50.00	60.00	70.00	75.00	80.00	100.00	100.00	100.00
160	40.00	50.00	60.00	70.00	75.00	80.00	100.00	100.00	100.00

16 OBDG01 Initial Supporting table - P0531_Delta_Predicted_Quality_Factor

Description: Delta Predicted Qualtiy Factor for the Engage Test

Notes: For P0531: KtACCD_k_HSPR_QualFactor with X Axis is defined by KnACCD_T_HSPRat_EngageTstAmb and Y Axis is defined by KnACCD_v_HSPRat_EngageTstVehSpd

y/x	0	20	30	40	50	60	70	80	100
0	0.05000	0.25800	0.42999	0.46333	0.53000	0.63000	0.71666	0.83667	0.99001
20	0.05000	0.23500	0.38000	0.42667	0.49333	0.58000	0.67334	0.80667	0.99001
40	0.05000	0.16000	0.28000	0.31334	0.39000	0.50999	0.61667	0.75999	0.95000
60	0.05000	0.14999	0.25999	0.28999	0.34666	0.44000	0.53999	0.69333	0.92999
80	0.05000	0.13750	0.25000	0.28334	0.33667	0.41000	0.49001	0.63000	0.88000
100	0.05000	0.12250	0.23000	0.26334	0.31334	0.38000	0.46001	0.57666	0.78000
120	0.05000	0.09999	0.20000	0.25333	0.29666	0.33000	0.40334	0.52000	0.73000
140	0.05000	0.09000	0.18500	0.22000	0.24666	0.28000	0.34666	0.39667	0.48000
160	0.05000	0.08499	0.17999	0.19333	0.20999	0.23000	0.28333	0.32666	0.41000

16 OBDG01 Initial Supporting table - P0531_FanSpeed_Weighting_Factor

Description: FanSpeed Weighting Factor for Delta Predicted AC Pressure									
Notes: For P0531: KtACCD_k_HSPRat_EngageFanCoeff with X Axis is Fan Speed as desfined by KnACCD_Pct_HSPRat_EngageTestFan to weight the Delta Predicted Pressure									
y/x	10	20	30	40	50	60	70	80	95
1	1	1	1	1	1	1	1	1	0

16 OBDG01 Initial Supporting table - P0531_Off_Test_Threshold

Description: AC High Side Pressure Sensor Rationality Off Test Threshold

Notes: For P0531: KtACCD_p_HSPRat_OffTestPresMax with X Axis is defined by KnACCD_T_HSPRat_OffTestPresMax

y/x	0	20	40	60	100
1	1,000	1,400	1,800	2,000	2,300

16 OBDG01 Initial Supporting table - P0531_On_Test_Threshold

Description: AC High Side Pressure Sensor Rationality On Test Threshold					
Notes: For P0531: KtACCD_p_HSPRat_OnTestPresMin with X Axis is defined by KnACCD_T_HSPRat_OnTestPresMin					
y/x	0	20	40	60	100
1	65.0	195.0	260.0	325.0	455.0

16 OBDG01 Initial Supporting table - RevMode_Decel (ELR)

Description: Crankshaft decel threshold. Thresholds are a function of rpm and % engine Load.

Notes: Used for P0300-P0308. Cal Name: KtMISF_RevolutionMode

y/x	1,100	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000
8	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
9	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
11	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
12	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
13	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
15	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
17	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
19	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
22	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
25	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
29	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
33	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
38	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
42	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
48	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
54	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
61	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767

16 OBDG01 Initial Supporting table - ZeroTorqBaro

Description: adjusts zero torque for altitude

Notes: Used for P0300-P0308. Cal Name: KtMSFD_K_ZeroTorqBaro

y/x	65	70	75	80	85	90	95	100	105
1	0.85	0.87	0.89	0.91	0.94	0.96	0.98	1.00	1.02

16 OBDG01 Initial Supporting table - ZeroTorqueEngLoad (ELR)

Description: %air load that represents Zero Brake torque along the Neutral rev line. The Zero torque threshold is adjusted for Baro via P0300_ZeroTorqueBaro

Notes: Used for P0300-P0308. Cal Name: KtMISF_ZeroTorqSpd

ZeroTorqueEngLoad - Part 1									
y/x	400	500	600	700	800	900	1,000	1,100	1,200
1	5.79	5.79	5.79	5.79	5.79	5.73	5.58	5.28	5.63
ZeroTorqueEngLoad - Part 2									
y/x	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000
1	5.75	7.20	7.80	8.10	8.15	8.30	8.40	8.50	8.60
ZeroTorqueEngLoad - Part 3									
y/x	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000	
1	12.21	14.61	17.00	19.40	21.79	24.19	26.58	28.98	

16 OBDG01 Fault Bundle Definitions

Bundle Name: 5VoltReferenceA_FA
P0641
Bundle Name: 5VoltReferenceB_FA
P0651
Bundle Name: 5VoltReferenceMAP_OOR_Flt
P0697
Bundle Name: A/F Imbalance Bank1
P219A
Bundle Name: AAP_SnsrCktFA
Naturally aspirated: P2228, P2229. Turbocharged: P0237, P0238
Bundle Name: AAP_SnsrCktFP
Naturally aspirated: P2228, P2229. Turbocharged: P0237, P0238
Bundle Name: AAP_SnsrFA
Naturally Aspirated: P2227, P2228, P2229, P2230. Turbocharged: P0237, P0238.
Bundle Name: AccCktLo_FA
P2537
Bundle Name: AcceleratorPedalFailure
P2122, P2123, P2127, P2128, P2138, P0697, P06A3
Bundle Name: ACCMLostComm
U016B
Bundle Name: ACFailedOnSD
See ACCM Document
Bundle Name: ACHighSidePressSnsrCktFA
P0532, P0533
Bundle Name: ACThrmlRefrigSpdVld
See ACCM Document
Bundle Name: AfterThrottlePressureFA
Naturally Aspirated or Turbocharged: P0106, P0107, P0108. Supercharged: P012B, P012C, P012D.
Bundle Name: AIR System FA
P0411, P2440, P2444
Bundle Name: AmbientAirDefault
Baro Sensor Present: P2227, P2228, P2229, P2230. No Baro Sensor Present: P0101, P0102, P0103, P0106, P0107, P0108, P0111, P0112, P0113, P0114, P0121, P0122, P0123, P012B, P012C, P012D, P0222, P0223, P1221
Bundle Name: AmbPresDfltdStatus
Baro Sensor Present: P2227, P2228, P2229, P2230. No Baro Sensor Present: P0101, P0102, P0103, P0106, P0107, P0108, P0111, P0112, P0113, P0114, P0121, P0122, P0123, P012B, P012C, P012D, P0222, P0223, P1221
Bundle Name: AmbPresSnsrCktFA

P2228, P2229
Bundle Name: AnyCamPhaser_FA
P0010, P0011, P0013, P0014, P0020, P0021, P0023, P0024, P2088, P2089, P2090, P2091, P2092, P2093, P2094, P2095, P05CC, P05CD, P05CE, P05CF,
Bundle Name: AnyCamPhaser_TFTKO
P0010, P0011, P0013, P0014, P0020, P0021, P0023, P0024, P2088, P2089, P2090, P2091, P2092, P2093, P2094, P2095, P05CC, P05CD, P05CE, P05CF,
Bundle Name: BrakeBoosterVacuumValid
P0556, P0557, P0558
Bundle Name: CamLctnExhFA
P0017, P0019, P0365, P0366, P0390, P0391
Bundle Name: CamLctnIntFA
P0016, P0018, P0340, P0341, P0345, P0346
Bundle Name: CamSensorAnyLctnTFTKO
P0016, P0017, P0018, P0019, P0340, P0341, P0345, P0346, P0365, P0366, P0390, P0391
Bundle Name: CamSensorAnyLocationFA
P0016, P0017, P0018, P0019, P0340, P0341, P0345, P0346, P0365, P0366, P0390, P0391
Bundle Name: CamSnsrExhTFTKO
P0017, P0019, P0365, P0366, P0390, P0391
Bundle Name: CamSnsrIntTFTKO
P0016, P0018, P0340, P0341, P0345, P0346
Bundle Name: Catalyst Warmup Enabled
N/A
Catalyst Warmup Enabled - Other Definitions: To enable the Cold Start Emission Reduction Strategy: Catalyst Temperature < 350.00 degC AND Engine Coolant > -15.00 degC AND Engine Coolant <= 56.00 degC AND Barometric Pressure>= 76.00 KPa AND DTC's Not Set: ECT_Sensor_FA MAP_SensorFA The Cold Start Emission Reduction Strategy will remain active until: Engine Run Time > **P050D_P1400_CatalystLightOffExtendedEngineRunTimeExit** This Extended Engine run time exit is a function of percent ethanol and Catmons NormRatioEWMA.

Refer to "Supporting Tables" for details.

OR

Catalyst Temperature >= 900.00 degC
AND
Engine Run Time >= 30.00 seconds

OR

Barometric Pressure < 76.00 KPa

Bundle Name: ClutchPstnSnsr FA
P0806, P0807, P0808
Bundle Name: CommBusAOff_VICM_FA
U0073
Bundle Name: CommBusBOff_VICM_FA
U0074
Bundle Name: CrankSensor_FA
P0335, P0336
Bundle Name: CrankSensor_TFTKO
P0335, P0336
Bundle Name: CylDeacAllDriverFault
P3401, P03403, P03404, P3409, P03411, P03412, P3417, P3419, P3420, P3425, P3427, P3428, P3433, P3435, P3436, P3441, P3443, P3444, P3449, P3451, P3452, P3457, P3459, P3460
Bundle Name: CylDeacDriverFault
P3401, P03403, P03404, P3409, P03411, P03412, P3417, P3419, P3420, P3425, P3427, P3428, P3433, P3435, P3436, P3441, P3443, P3444, P3449, P3451, P3452, P3457, P3459, P3460
Bundle Name: ECT_Sensor_Ckt_FA
P0117, P0118
Bundle Name: ECT_Sensor_Ckt_FP
P0117, P0118
Bundle Name: ECT_Sensor_Ckt_TFTKO
P0117, P0118
Bundle Name: ECT_Sensor_FA
P0116, P0117, P0118, P0119, P0128, P111E
Bundle Name: ECT_Sensor_Perf_FA
P0116, P111E
Bundle Name: EGRValve_FP
P0405, P0406, P042E
Bundle Name: EGRValveCircuit_FA

P0403, P0404, P0405, P0406, P0489, P0490, P042E, P1426, P1437
Bundle Name: EGRValvePerformance_FA
P0404, P042E, P0401
Bundle Name: ELCP_PumpCircuit_FA
P2400, P2401, P2402
Bundle Name: ELCP_SwitchCircuit_FA
P2418, P2419, P2420
Bundle Name: ELCPCircuit_FA
P24BA, P24BB
Bundle Name: EngineMetalOvertempActive
P1258
Bundle Name: EngineMisfireDetected_FA
P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0307, P0308
Bundle Name: EngineModeNotRunTimer_FA
P2610
Bundle Name: EngineModeNotRunTimerError
P2610
Bundle Name: EnginePowerLimited
P0068, P00C8, P00C9, P00CA, P0090, P0091, P0092, P0122, P0123, P0191, P0192, P0193, P0222, P0223, P0601, P0604, P0606, P0697, P06A3, P06DB, P06D2, P06DE, P0A1D, P1104, P127A, P127C, P127D, P15F2, P160D, P160E, P1682, P16A0, P16A1, P16A2, P16A7, P16F3, P2100, P2101, P2102, P2103, P2122, P2123, P2127, P2128, P2135, P2138, P215B, P2176, P228C, P228D, U0073, U0074, U0293, U1817
Bundle Name: EngineTorqueEstInaccurate
EngineMisfireDetected_FA, FuelInjedtorCircuit_FA, FuelInjedtorCircuit_TFTKO, FuelTrimSystemB1_FA, FuelTrimSystemB2_FA, MAF_SensorTFTKO, MAP_SensorTFTKO, EGRValvePerformance_FA, P16F3
EngineTorqueEstInaccurate - Other Definitions: P16F3 with GetXOYR_b_SecurityFlt (CeXOYR_e_MAPR_AfterThrotPresFlt, CeXOYR_e_MAPR_EngineVacuumFlt, CeXOYR_e_MAPR_IntkMnfdPresFlt, CeXOYR_e_MAFR_Ahead1vs2FinalFlt)
Bundle Name: EngOilPressureSensorCktFA
P0522, P0523
Bundle Name: EngOilPressureSensorFA
P0521, P0522, P0523
Bundle Name: EngOilTempFA
EngOilTempSensorCircuitFA, EngOilModeledTempValid, P16F3
EngOilTempFA - Other Definitions: P16F3 with GetXOYR_b_SecurityFlt(CeXOYR_e_EOTR_SecurityFlt)
Bundle Name: Ethanol Composition Sensor FA
P0178, P0179, P2269
Bundle Name: EvapEmissionSystem_FA
P0455, P0446

Bundle Name: EvapExcessPurgePsbl_FA
ELCP sealed/vented fuel system, P0442, P0455, P0458 OR Conventional fuel system, P0442, P0455, P0458, P0496
Bundle Name: EvapFlowDuringNonPurge_FA
P0496
Bundle Name: EvapPurgeSolenoidCircuit_FA
P0443, P0458, P0459
Bundle Name: EvapSmallLeak_FA
P0442
Bundle Name: EvapVentSolenoidCircuit_FA
P0449, P0498, P0499
Bundle Name: FHPR_b_FRP_SnsrCkt_FA
P0192, P0193, P127C, P127D, P16E4, P16E5, P128A, P128B, 128F
Bundle Name: FHPR_b_FRP_SnsrCkt_TFTKO
P0192, P0193, , P127C, P127D, P16E4, P16E5, P128A, P128B, 128F
Bundle Name: FHPR_b_PumpCkt_FA
P0090, P0091, P0092, P00C8, P00C9, P00CA
Bundle Name: FHPR_b_PumpCkt_TFTKO
P0090, P0091, P0092, P00C8, P00C9, P00CA
Bundle Name: FourWheelDriveLowStateInvalid
P2771
Bundle Name: FTP_SensorCircuit_FA
P0452, P0453
Bundle Name: FuelInjectorCircuit_FA
PFI: P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0261, P0264, P0267, P0270, P0273, P0276, P0279, P0282, P0262, P0265, P0268, P0271, P0274, P0277, P0280, P0283 SIDI: 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
Bundle Name: FuelInjectorCircuit_TFTKO
PFI: P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0261, P0264, P0267, P0270, P0273, P0276, P0279, P0282, P0262, P0265, P0268, P0271, P0274, P0277, P0280, P0283 SIDI: 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
Bundle Name: FuelLevelDataFault
P0461, P0462, P0463, P2066, P2067, P2068
Bundle Name: FuelPumpRlyCktFA
P0627, P0628, P0629
Bundle Name: FuelTankPressureSnsrCkt_FA
P0452, P0453
Bundle Name: FuelTrimSystemB1_FA

P0171, P0172, P11E9 , P11EA
Bundle Name: FuelTrimSystemB2_FA
P0174, P0175, P11EB, P11EC
Bundle Name: HumTempSnsrCktFA
P0097, P0098
Bundle Name: IAC_SystemRPM_FA
P0506, P0507
Bundle Name: IAT_SensorCircuitFA
P0112, P0113
Bundle Name: IAT_SensorCircuitFP
P0112, P0113
Bundle Name: IAT_SensorFA
P0111, P0112, P0113, P0114
Bundle Name: IAT_SensorTFTKO
P0111, P0112, P0113, P0114
Bundle Name: IgnitionOutputDriver_FA
P0351, P0352, P0353, P0354, P0355, P0356, P0357, P0358, P2300, P2301, P2303, P2304, P2306, P2307, P2309, P2310, P2312, P2313, P2315, P2316, P2318, P2319, P2321, P2322
Bundle Name: LostCommBCM_FA
U0140
Bundle Name: LostCommBusB_VICM_FA
U182D
Bundle Name: MAF_SensorCircuitFA
P0102, P0103, P010C, P010D
Bundle Name: MAF_SensorFA
P0101, P0102, P0103, P010B, P010C, P010D
Bundle Name: MAF_SensorTFTKO
P0101, P0102, P0103, P010B, P010C, P010D
Bundle Name: MAP_EngineVacuumStatus
P0106, P0107, P0108 Fault Active OR P0107, P0108 Fault Pending
Bundle Name: MAP_SensorCircuitFA
P0107, P0108
Bundle Name: MAP_SensorCircuitFP
P0107, P0108
Bundle Name: MAP_SensorFA
P0106, P0107, P0108
Bundle Name: MAP_SensorTFTKO
P0106, P0107, P0108

Bundle Name: MnfdTempSensorCktFA
Turbocharged or Supercharged, with Humidity sensor: P00EA, P00EB. Turbocharged or Supercharged, without Humidity sensor: P0097, P0098. Naturally Aspirated: P0112, P0113.
Bundle Name: MnfdTempSensorCktFP
Turbocharged or Supercharged, with Humidity sensor: P00EA, P00EB. Turbocharged or Supercharged, without Humidity sensor: P0097, P0098. Naturally Aspirated: P0112, P0113.
Bundle Name: ModuleOffTime_FA
P262B
Bundle Name: O2S_Bank_1_Sensor_1_FA
P2A00, P0131, P0132, P0133, P0134, P0135, P0053, P1133, P015A, P015B, P0030
Bundle Name: O2S_Bank_1_Sensor_2_FA
P013A, P013B, P013E, P013F, P2270, P2271, P0137, P0138, P0140, P0141, P0054, P0036
Bundle Name: O2S_Bank_2_Sensor_1_FA
P2A03, P0151, P0152, P0153, P0154, P0155, P0059, P1153, P015C, P015D, P0050
Bundle Name: O2S_Bank_2_Sensor_2_FA
P013C, P013D, P014A, P014B, P2272, P2273, P0157, P0158, P0160, P0161, P0060, P0056
Bundle Name: OAT_EstAmbTemp_FA
ELCP sealed/vented fuel system, P0071, P0072, P0073, P0502, P0503, P0722, P0723 OR Conventional fuel system, P0071, P0072, P0073, P0074, P2610
Bundle Name: OAT_PtEstFiltFA
ECM OAT: P0071, P0072, P0073, P0074, EngModeNotRunTmErr, VehicleSpeedSensor_FA, IAT_SensorFA, ECT_Sensor_DefaultDetected, MAF_SensorFA. VIMC OAT: P0072, P0073, EngModeNotRunTmErr, VehicleSpeedSensor_FA, ECT_Sensor_DefaultDetected. IAT-Based OAT: VehicleSpeedSensor_FA, IAT_SensorFA, MAF_SensorFA. All other cases: EngModeNotRunTmErr, VehicleSpeedSensor_FA, IAT_SensorFA, ECT_Sensor_DefaultDetected.
Bundle Name: OAT_PtEstRawFA
ECM OAT: P0071, P0072, P0073, P0074. VIMC OAT: P0071, P0072, P0073, EngModeNotRunTmErr, VehicleSpeedSensor_FA, ECT_Sensor_DefaultDetected. IAT-Based OAT: IAT_SensorFA. All other cases: IAT_SensorFA, ECT_Sensor_DefaultDetected.
Bundle Name: OilPmpStuckHigh
P06DA, P06DB, P06DD
OilPmpStuckHigh - Other Definitions: TFTKO and FA
Bundle Name: OilPmpTFTKO
P06DA, P06DB, P06DC, P06DD, P06DE
OilPmpTFTKO - Other Definitions: TFTKO only for Output Driver and rationality
Bundle Name: PowertrainRelayFault
P1682, P16A7, P16BC
Bundle Name: PowertrainRelayStateOn_FA
P0685, P0686, P0687
Bundle Name: TC_BoostPresSnsrFA
P0236, P0237, P0238
Bundle Name: THMR_AHV_FA
P2681, P26A3, P26A6, P26A7, P26A9

THMR_AHV_FA - Other Definitions:
Bundle Name: THMR_AWP_AuxPumpFA
B269A, B269C, B269D
Bundle Name: THMR_ECT_Sensor_Ckt_FA
P0116, P0117, P0118, P0119, P111E
Bundle Name: THMR_RCT_Sensor_Ckt_FA
P00B3, P00B4
Bundle Name: THMR_SWP_Control_FA
P261A, P261D, P261C
Bundle Name: THMR_SWP_FlowStuckOn_FA
P261A, P261D, P261E
Bundle Name: THMR_SWP_NoFlow_FA
P261B, P261C
Bundle Name: TPS_FA
P0122, P0123, P0222, P0223, P16A0, P16A1, P16A2, P2135
Bundle Name: TPS_Performance_FA
P0068, P0121, P1104, P2100, P2101, P2102, P2103
Bundle Name: TPS_ThrottleAuthorityDefaulted
P0068, P0122, P0123, P0222, P0223, P16F3, P16A0, P16A1, P16A2, P1104, P2100, P2101, P2102, P2103, P2135
Bundle Name: Transmission Output Shaft Angular Velocity Validity
P0722, P0723, P077C, P077D
Bundle Name: TransmissionEngagedState_FA
P1824, P182A, P182B, P182C, P182D, P182E, P182F, P1838, P1839, P1840, P1841, P18B5, P18B6, P18B7, P18B8, P18B9, P18BA, P18BB, P18BC, P18BD, P18BE, P18BF, P18C0, P18C1, P18C2, P18C3, P1915
Bundle Name: VCER_TorqueSecurity
P16F3
VCER_TorqueSecurity - Other Definitions: P16F3 with GetXOYR_b_SecurityFlt(CeXOYR_e_AFM_PreloadAreaFlt, CeXOYR_e_AFM_PreloadTimerFlt, CeXOYR_e_AFM_DualPreloadAreaFlt, CeXOYR_e_CDAR_SecurityFlt)
Bundle Name: VehicleSpeedSensor_FA
P0502, P0503, P0722, P0723
Bundle Name: VehicleSpeedSensorError
P0502, P0503, P0722, P0723
Bundle Name: VentCircuit_FA
ELCP sealed/vented fuel system, P0449, P0498, P0499
Bundle Name: VICM_WakeupDiag_FA
P06E4
Bundle Name: VICM_WakeupDiag_TFTKO
P06E4

Bundle Name: WRAF_Bank_1_FA
P0131, P0132, P064D, P223C, P223E
Bundle Name: WRAF_Bank_2_FA
P0151, P0152, P064E, P223D, P223F

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Energy Control Module Internal Performance	P0A1F	VITM Software Watchdog	If Watchdog resets controller	1	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable VITM System Voltage	True True >= 9V	N/A Immediate	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Temperature Sensor Circuit Low	P0A9D	Sets when Temperature Sensor 1 falls below a threshold	Temperature Sensor 1	> 87.5C (ADC Count < 135)	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable	True True	1.4 seconds in a 2 second window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Temperature Sensor Circuit High	P0A9E	Sets when Temperature Sensor 1 falls above a threshold	Temperature Sensor 1	< -40C (ADC Count > 4008)	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable	True True	1.4 seconds in a 2 second window	Type B, 2 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Pack Voltage Sense Circuit Low	P0ABC	If Pack side Voltage is below Threshold	Pack Voltage	< 24V (ADC Count < 197)	Diagnostic Enable	True	175 ms in a 250 ms window	Type A, 1 Trips
					Run/Crank, Accessory/ Run or HVEM EB Comm Enable	True		
					VITM System Voltage	>= 9V		
			DTC Pass	Pack Voltage >= 24V (ADC Count >= 197)			250 ms	

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Pack Voltage Sense Circuit High	P0ABD	If Pack side Voltage is above Threshold	Pack Voltage	> 479V (ADC Count > 3925)	Diagnostic Enable	True	175 ms in a 250 ms window	Type A, 1 Trips
					Run/Crank, Accessory/ Run or HVEM EB Comm Enable	True		
					VITM System Voltage	>= 9V		
			DTC Pass	Pack Voltage <= 479V (ADC Count <=3925)			250 ms	

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Pack Current Sensor Circuit Low	P0AC1	If Coarse Current is below Threshold	Coarse Current	< -555A (ADC Count <163)	Diagnostic Enable	True	175 ms in a 250 ms window	Type A, 1 Trips
					Run/Crank, Accessory/ Run or HVEM EB Comm Enable	True		
					VITM System Voltage	>= 9V		
			DTC Pass	Coarse Current >= -555A (ADC Count >= 163)			250 ms	

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Pack Current Sensor Circuit High	P0AC2	If Coarse Current is above Threshold	Coarse Current	> 285A (ADC Count > 3934)	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable VITM System Voltage	True True >= 9V	175 ms in a 250 ms window	Type A, 1 Trips
			DTC Pass	Coarse Current <= 285A (ADC Count <= 3934)			250 ms	

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery 2 Temperature Sensor Circuit Low Voltage	P0AC7	Sets when Temperature Sensor 2 falls below a threshold	Temperature Sensor 2	> 87.5C (ADC Count < 135)	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable	True True	1.4 seconds in a 2 second window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery 2 Temperature Sensor Circuit High Voltage	P0AC8	Sets when Temperature Sensor 2 falls above a threshold	Temperature Sensor 2	< -40C (ADC Count > 4008)	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable	True True	1.4 seconds in a 2 second window	Type B, 2 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery 3 Temperature Sensor Circuit Low Voltage	P0ACC	Sets when Temperature Sensor 3 falls below a threshold	Temperature Sensor 3	> 87.5C (ADC Count < 135)	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable	True True	1.4 seconds in a 2 second window	Type B, 2 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery 3 Temperature Sensor Circuit High Voltage	P0ACD	Sets when Temperature Sensor 3 falls above a threshold	Temperature Sensor 3	< -40C (ADC Count > 4008)	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable	True True	1.4 seconds in a 2 second window	Type B, 2 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery 4 Temperature Sensor Circuit Low Voltage	P0AEA	Sets when Temperature Sensor 4 falls below a threshold	Temperature Sensor 4	> 87.5C (ADC Count < 135)	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable	True True	1.4 seconds in a 2 second window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery 4 Temperature Sensor Circuit High Voltage	P0AEB	Sets when Temperature Sensor 4 falls above a threshold	Temperature Sensor 4	< -40C (ADC Count > 4008)	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable	True True	1.4 seconds in a 2 second window	Type B, 2 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Pack Current Sensor B Circuit Low	P0B10	If Fine Current is below Threshold	Fine Current	< -23A (ADC Count < 163)	Diagnostic Enable	True	175 ms in a 250 ms window	Type A, 1 Trips
					Run/Crank, Accessory/ Run or HVEM EB Comm Enable	True		
					VITM System Voltage	>= 9V		
			DTC Pass	Fine Current >= -23A (ADC Count >= 163)			250 ms	

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Pack Current Sensor B Circuit High	P0B11	If Fine Current is above Threshold	Fine Current	> 23A (ADC Count > 3934)	Diagnostic Enable	True	175 ms in a 250 ms window	Type A, 1 Trips
					Run/Crank, Accessory/ Run or HVEM EB Comm Enable	True		
					VITM System Voltage	>= 9V		
			DTC Pass	Fine Current <= 23A (ADC Count <= 3934)			250 ms	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense A Circuit	P0B3B	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| or Cell V_gate on Case 1: Single Power Line - Positive side Affected Cell Voltage when Cell Balance Gate is on Case 2: General Sense Line |1st Cell V – 2nd Cell V| Case 3: Common Power Line |1st Cell V – 2nd Cell V| Case 4: Common Ground Line |1st Cell V – 2nd Cell V| Case 5: Single Ground Line Affected Cell Voltage when Cell Balance Gate is on Case 6: Splice Line Splice Cap Voltage Case 7: BusBar Splice Splice Cap Voltage	 Case 1: Cell V_On Gate < 36mV Case 2: |1st Cell V – 2nd Cell V| >= 1.3V Case 3 : |1st Cell V – 2nd Cell V| >= 1.3V Case 4 : |1st Cell V – 2nd Cell V| >= 1.3V Case 5 : Cell V_On Gate < 36mV Case 6: Splice Cap Voltage > 0.1V Case 7: Splice Cap Voltage > 0.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	0.6 seconds out of a 0.6 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense A Circuit Low	P0B3D	Sets when cell voltage is detected below threshold	Cell Voltage A	<= 0.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense A Circuit High	P0B3E	Sets when cell voltage is detected above threshold	Cell Voltage A	>= 4.8V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense B Circuit	P0B40	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| or Cell V_gate on Case 1: Single Power Line - Positive side Affected Cell Voltage when Cell Balance Gate is on Case 2: General Sense Line |1st Cell V – 2nd Cell V| Case 3: Common Power Line |1st Cell V – 2nd Cell V| Case 4: Common Ground Line |1st Cell V – 2nd Cell V| Case 5: Single Ground Line Affected Cell Voltage when Cell Balance Gate is on Case 6: Splice Line Splice Cap Voltage Case 7: BusBar Splice Splice Cap Voltage	 Case 1: Cell V_On Gate < 36mV Case 2: |1st Cell V – 2nd Cell V| >= 1.3V Case 3 : |1st Cell V – 2nd Cell V| >= 1.3V Case 4 : |1st Cell V – 2nd Cell V| >= 1.3V Case 5 : Cell V_On Gate < 36mV Case 6: Splice Cap Voltage > 0.1V Case 7: Splice Cap Voltage > 0.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	0.6 seconds out of a 0.6 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense B Circuit Low	P0B42	Sets when cell voltage is detected below threshold	Cell Voltage B	<= 0.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense B Circuit High	P0B43	Sets when cell voltage is detected above threshold	Cell Voltage B	>= 4.8V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense C Circuit	P0B45	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| or Cell V_gate on Case 1: Single Power Line - Positive side Affected Cell Voltage when Cell Balance Gate is on Case 2: General Sense Line |1st Cell V – 2nd Cell V| Case 3: Common Power Line |1st Cell V – 2nd Cell V| Case 4: Common Ground Line |1st Cell V – 2nd Cell V| Case 5: Single Ground Line Affected Cell Voltage when Cell Balance Gate is on Case 6: Splice Line Splice Cap Voltage Case 7: BusBar Splice Splice Cap Voltage	 Case 1: Cell V_On Gate < 36mV Case 2: |1st Cell V – 2nd Cell V| >= 1.3V Case 3 : |1st Cell V – 2nd Cell V| >= 1.3V Case 4 : |1st Cell V – 2nd Cell V| >= 1.3V Case 5 : Cell V_On Gate < 36mV Case 6: Splice Cap Voltage > 0.1V Case 7: Splice Cap Voltage > 0.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	0.6 seconds out of a 0.6 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense C Circuit Low	P0B47	Sets when cell voltage is detected below threshold	Cell Voltage C	<= 0.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense C Circuit High	P0B48	Sets when cell voltage is detected above threshold	Cell Voltage C	>= 4.8V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense D Circuit	P0B4A	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| or Cell V_gate on Case 1: Single Power Line - Positive side Affected Cell Voltage when Cell Balance Gate is on Case 2: General Sense Line |1st Cell V – 2nd Cell V| Case 3: Common Power Line |1st Cell V – 2nd Cell V| Case 4: Common Ground Line |1st Cell V – 2nd Cell V| Case 5: Single Ground Line Affected Cell Voltage when Cell Balance Gate is on Case 6: Splice Line Splice Cap Voltage Case 7: BusBar Splice Splice Cap Voltage	 Case 1: Cell V_On Gate < 36mV Case 2: |1st Cell V – 2nd Cell V| >= 1.3V Case 3 : |1st Cell V – 2nd Cell V| >= 1.3V Case 4 : |1st Cell V – 2nd Cell V| >= 1.3V Case 5 : Cell V_On Gate < 36mV Case 6: Splice Cap Voltage > 0.1V Case 7: Splice Cap Voltage > 0.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	0.6 seconds out of a 0.6 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense D Circuit Low	P0B4C	Sets when cell voltage is detected below threshold	Cell Voltage D	<= 0.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense D Circuit High	P0B4D	Sets when cell voltage is detected above threshold	Cell Voltage D	>= 4.8V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense E Circuit	P0B4F	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| or Cell V_gate on Case 1: Single Power Line - Positive side Affected Cell Voltage when Cell Balance Gate is on Case 2: General Sense Line |1st Cell V – 2nd Cell V| Case 3: Common Power Line |1st Cell V – 2nd Cell V| Case 4: Common Ground Line |1st Cell V – 2nd Cell V| Case 5: Single Ground Line Affected Cell Voltage when Cell Balance Gate is on Case 6: Splice Line Splice Cap Voltage Case 7: BusBar Splice Splice Cap Voltage	 Case 1: Cell V_On Gate < 36mV Case 2: |1st Cell V – 2nd Cell V| >= 1.3V Case 3 : |1st Cell V – 2nd Cell V| >= 1.3V Case 4 : |1st Cell V – 2nd Cell V| >= 1.3V Case 5 : Cell V_On Gate < 36mV Case 6: Splice Cap Voltage > 0.1V Case 7: Splice Cap Voltage > 0.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	0.6 seconds out of a 0.6 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense E Circuit Low	P0B51	Sets when cell voltage is detected below threshold	Cell Voltage E	<= 0.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense E Circuit High	P0B52	Sets when cell voltage is detected above threshold	Cell Voltage E	>= 4.8V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense F Circuit	P0B54	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| or Cell V_gate on Case 1: Single Power Line - Positive side Affected Cell Voltage when Cell Balance Gate is on Case 2: General Sense Line |1st Cell V – 2nd Cell V| Case 3: Common Power Line |1st Cell V – 2nd Cell V| Case 4: Common Ground Line |1st Cell V – 2nd Cell V| Case 5: Single Ground Line Affected Cell Voltage when Cell Balance Gate is on Case 6: Splice Line Splice Cap Voltage Case 7: BusBar Splice Splice Cap Voltage	 Case 1: Cell V_On Gate < 36mV Case 2: |1st Cell V – 2nd Cell V| >= 1.3V Case 3 : |1st Cell V – 2nd Cell V| >= 1.3V Case 4 : |1st Cell V – 2nd Cell V| >= 1.3V Case 5 : Cell V_On Gate < 36mV Case 6: Splice Cap Voltage > 0.1V Case 7: Splice Cap Voltage > 0.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	0.6 seconds out of a 0.6 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense F Circuit Low	P0B56	Sets when cell voltage is detected below threshold	Cell Voltage F	<= 0.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense F Circuit High	P0B57	Sets when cell voltage is detected above threshold	Cell Voltage F	>= 4.8V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense G Circuit	P0B59	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| or Cell V_gate on Case 1: Single Power Line - Positive side Affected Cell Voltage when Cell Balance Gate is on Case 2: General Sense Line |1st Cell V – 2nd Cell V| Case 3: Common Power Line |1st Cell V – 2nd Cell V| Case 4: Common Ground Line |1st Cell V – 2nd Cell V| Case 5: Single Ground Line Affected Cell Voltage when Cell Balance Gate is on Case 6: Splice Line Splice Cap Voltage Case 7: BusBar Splice Splice Cap Voltage	 Case 1: Cell V_On Gate < 36mV Case 2: |1st Cell V – 2nd Cell V| >= 1.3V Case 3 : |1st Cell V – 2nd Cell V| >= 1.3V Case 4 : |1st Cell V – 2nd Cell V| >= 1.3V Case 5 : Cell V_On Gate < 36mV Case 6: Splice Cap Voltage > 0.1V Case 7: Splice Cap Voltage > 0.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	0.6 seconds out of a 0.6 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense G Circuit Low	P0B5B	Sets when cell voltage is detected below threshold	Cell Voltage G	<= 0.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense G Circuit High	P0B5C	Sets when cell voltage is detected above threshold	Cell Voltage G	>= 4.8V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense H Circuit	P0B5E	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| or Cell V_gate on Case 1: Single Power Line - Positive side Affected Cell Voltage when Cell Balance Gate is on Case 2: General Sense Line |1st Cell V – 2nd Cell V| Case 3: Common Power Line |1st Cell V – 2nd Cell V| Case 4: Common Ground Line |1st Cell V – 2nd Cell V| Case 5: Single Ground Line Affected Cell Voltage when Cell Balance Gate is on Case 6: Splice Line Splice Cap Voltage Case 7: BusBar Splice Splice Cap Voltage	 Case 1: Cell V_On Gate < 36mV Case 2: |1st Cell V – 2nd Cell V| >= 1.3V Case 3 : |1st Cell V – 2nd Cell V| >= 1.3V Case 4 : |1st Cell V – 2nd Cell V| >= 1.3V Case 5 : Cell V_On Gate < 36mV Case 6: Splice Cap Voltage > 0.1V Case 7: Splice Cap Voltage > 0.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	0.6 seconds out of a 0.6 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense H Circuit Low	P0B60	Sets when cell voltage is detected below threshold	Cell Voltage H	<= 0.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense H Circuit High	P0B61	Sets when cell voltage is detected above threshold	Cell Voltage H	>= 4.8V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense I Circuit	P0B63	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| or Cell V_gate on Case 1: Single Power Line - Positive side Affected Cell Voltage when Cell Balance Gate is on Case 2: General Sense Line |1st Cell V – 2nd Cell V| Case 3: Common Power Line |1st Cell V – 2nd Cell V| Case 4: Common Ground Line |1st Cell V – 2nd Cell V| Case 5: Single Ground Line Affected Cell Voltage when Cell Balance Gate is on Case 6: Splice Line Splice Cap Voltage Case 7: BusBar Splice Splice Cap Voltage	 Case 1: Cell V_On Gate < 36mV Case 2: |1st Cell V – 2nd Cell V| >= 1.3V Case 3 : |1st Cell V – 2nd Cell V| >= 1.3V Case 4 : |1st Cell V – 2nd Cell V| >= 1.3V Case 5 : Cell V_On Gate < 36mV Case 6: Splice Cap Voltage > 0.1V Case 7: Splice Cap Voltage > 0.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	0.6 seconds out of a 0.6 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense I Circuit Low	P0B65	Sets when cell voltage is detected below threshold	Cell Voltage I	<= 0.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense I Circuit High	P0B66	Sets when cell voltage is detected above threshold	Cell Voltage I	>= 4.8V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense J Circuit	P0B68	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| or Cell V_gate on Case 1: Single Power Line - Positive side Affected Cell Voltage when Cell Balance Gate is on Case 2: General Sense Line |1st Cell V – 2nd Cell V| Case 3: Common Power Line |1st Cell V – 2nd Cell V| Case 4: Common Ground Line |1st Cell V – 2nd Cell V| Case 5: Single Ground Line Affected Cell Voltage when Cell Balance Gate is on Case 6: Splice Line Splice Cap Voltage Case 7: BusBar Splice Splice Cap Voltage	 Case 1: Cell V_On Gate < 36mV Case 2: |1st Cell V – 2nd Cell V| >= 1.3V Case 3 : |1st Cell V – 2nd Cell V| >= 1.3V Case 4 : |1st Cell V – 2nd Cell V| >= 1.3V Case 5 : Cell V_On Gate < 36mV Case 6: Splice Cap Voltage > 0.1V Case 7: Splice Cap Voltage > 0.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	0.6 seconds out of a 0.6 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense J Circuit Low	P0B6A	Sets when cell voltage is detected below threshold	Cell Voltage J	<= 0.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense J Circuit High	P0B6B	Sets when cell voltage is detected above threshold	Cell Voltage J	>= 4.8V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense K Circuit	P0B6D	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| or Cell V_gate on Case 1: Single Power Line - Positive side Affected Cell Voltage when Cell Balance Gate is on Case 2: General Sense Line |1st Cell V – 2nd Cell V| Case 3: Common Power Line |1st Cell V – 2nd Cell V| Case 4: Common Ground Line |1st Cell V – 2nd Cell V| Case 5: Single Ground Line Affected Cell Voltage when Cell Balance Gate is on Case 6: Splice Line Splice Cap Voltage Case 7: BusBar Splice Splice Cap Voltage	 Case 1: Cell V_On Gate < 36mV Case 2: |1st Cell V – 2nd Cell V| >= 1.3V Case 3 : |1st Cell V – 2nd Cell V| >= 1.3V Case 4 : |1st Cell V – 2nd Cell V| >= 1.3V Case 5 : Cell V_On Gate < 36mV Case 6: Splice Cap Voltage > 0.1V Case 7: Splice Cap Voltage > 0.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	0.6 seconds out of a 0.6 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense K Circuit Low	P0B6F	Sets when cell voltage is detected below threshold	Cell Voltage K	<= 0.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense K Circuit High	P0B70	Sets when cell voltage is detected above threshold	Cell Voltage K	>= 4.8V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense L Circuit	P0B72	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| or Cell V_gate on Case 1: Single Power Line - Positive side Affected Cell Voltage when Cell Balance Gate is on Case 2: General Sense Line |1st Cell V – 2nd Cell V| Case 3: Common Power Line |1st Cell V – 2nd Cell V| Case 4: Common Ground Line |1st Cell V – 2nd Cell V| Case 5: Single Ground Line Affected Cell Voltage when Cell Balance Gate is on Case 6: Splice Line Splice Cap Voltage Case 7: BusBar Splice Splice Cap Voltage	 Case 1: Cell V_On Gate < 36mV Case 2: |1st Cell V – 2nd Cell V| >= 1.3V Case 3 : |1st Cell V – 2nd Cell V| >= 1.3V Case 4 : |1st Cell V – 2nd Cell V| >= 1.3V Case 5 : Cell V_On Gate < 36mV Case 6: Splice Cap Voltage > 0.1V Case 7: Splice Cap Voltage > 0.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	0.6 seconds out of a 0.6 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense L Circuit Low	P0B74	Sets when cell voltage is detected below threshold	Cell Voltage L	<= 0.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense L Circuit High	P0B75	Sets when cell voltage is detected above threshold	Cell Voltage L	>= 4.8V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense M Circuit	P0B77	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| or Cell V_gate on Case 1: Single Power Line - Positive side Affected Cell Voltage when Cell Balance Gate is on Case 2: General Sense Line |1st Cell V – 2nd Cell V| Case 3: Common Power Line |1st Cell V – 2nd Cell V| Case 4: Common Ground Line |1st Cell V – 2nd Cell V| Case 5: Single Ground Line Affected Cell Voltage when Cell Balance Gate is on Case 6: Splice Line Splice Cap Voltage Case 7: BusBar Splice Splice Cap Voltage	 Case 1: Cell V_On Gate < 36mV Case 2: |1st Cell V – 2nd Cell V| >= 1.3V Case 3 : |1st Cell V – 2nd Cell V| >= 1.3V Case 4 : |1st Cell V – 2nd Cell V| >= 1.3V Case 5 : Cell V_On Gate < 36mV Case 6: Splice Cap Voltage > 0.1V Case 7: Splice Cap Voltage > 0.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	0.6 seconds out of a 0.6 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense M Circuit Low	P0B79	Sets when cell voltage is detected below threshold	Cell Voltage M	<= 0.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense M Circuit High	P0B7A	Sets when cell voltage is detected above threshold	Cell Voltage M	>= 4.8V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense N Circuit	P0B7C	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| or Cell V_gate on Case 1: Single Power Line - Positive side Affected Cell Voltage when Cell Balance Gate is on Case 2: General Sense Line |1st Cell V – 2nd Cell V| Case 3: Common Power Line |1st Cell V – 2nd Cell V| Case 4: Common Ground Line |1st Cell V – 2nd Cell V| Case 5: Single Ground Line Affected Cell Voltage when Cell Balance Gate is on Case 6: Splice Line Splice Cap Voltage Case 7: BusBar Splice Splice Cap Voltage	Case 1: Cell V_On Gate < 36mV Case 2: |1st Cell V – 2nd Cell V| >= 1.3V Case 3 : |1st Cell V – 2nd Cell V| >= 1.3V Case 4 : |1st Cell V – 2nd Cell V| >= 1.3V Case 5 : Cell V_On Gate < 36mV Case 6: Splice Cap Voltage > 0.1V Case 7: Splice Cap Voltage > 0.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	0.6 seconds out of a 0.6 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense N Circuit Low	P0B7E	Sets when cell voltage is detected below threshold	Cell Voltage N	<= 0.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense N Circuit High	P0B7F	Sets when cell voltage is detected above threshold	Cell Voltage N	>= 4.8V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense O Circuit	P0B81	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| or Cell V_gate on Case 1: Single Power Line - Positive side Affected Cell Voltage when Cell Balance Gate is on Case 2: General Sense Line |1st Cell V – 2nd Cell V| Case 3: Common Power Line |1st Cell V – 2nd Cell V| Case 4: Common Ground Line |1st Cell V – 2nd Cell V| Case 5: Single Ground Line Affected Cell Voltage when Cell Balance Gate is on Case 6: Splice Line Splice Cap Voltage Case 7: BusBar Splice Splice Cap Voltage	 Case 1: Cell V_On Gate < 36mV Case 2: |1st Cell V – 2nd Cell V| >= 1.3V Case 3 : |1st Cell V – 2nd Cell V| >= 1.3V Case 4 : |1st Cell V – 2nd Cell V| >= 1.3V Case 5 : Cell V_On Gate < 36mV Case 6: Splice Cap Voltage > 0.1V Case 7: Splice Cap Voltage > 0.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	0.6 seconds out of a 0.6 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense O Circuit Low	P0B83	Sets when cell voltage is detected below threshold	Cell Voltage O	<= 0.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense O Circuit High	P0B84	Sets when cell voltage is detected above threshold	Cell Voltage O	>= 4.8V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense P Circuit	P0B86	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| or Cell V_gate on Case 1: Single Power Line - Positive side Affected Cell Voltage when Cell Balance Gate is on Case 2: General Sense Line |1st Cell V – 2nd Cell V| Case 3: Common Power Line |1st Cell V – 2nd Cell V| Case 4: Common Ground Line |1st Cell V – 2nd Cell V| Case 5: Single Ground Line Affected Cell Voltage when Cell Balance Gate is on Case 6: Splice Line Splice Cap Voltage Case 7: BusBar Splice Splice Cap Voltage	 Case 1: Cell V_On Gate < 36mV Case 2: |1st Cell V – 2nd Cell V| >= 1.3V Case 3 : |1st Cell V – 2nd Cell V| >= 1.3V Case 4 : |1st Cell V – 2nd Cell V| >= 1.3V Case 5 : Cell V_On Gate < 36mV Case 6: Splice Cap Voltage > 0.1V Case 7: Splice Cap Voltage > 0.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	0.6 seconds out of a 0.6 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense P Circuit Low	P0B88	Sets when cell voltage is detected below threshold	Cell Voltage P	<= 0.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense P Circuit High	P0B89	Sets when cell voltage is detected above threshold	Cell Voltage P	>= 4.8V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense Q Circuit	P0B8B	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| or Cell V_gate on Case 1: Single Power Line - Positive side Affected Cell Voltage when Cell Balance Gate is on Case 2: General Sense Line |1st Cell V – 2nd Cell V| Case 3: Common Power Line |1st Cell V – 2nd Cell V| Case 4: Common Ground Line |1st Cell V – 2nd Cell V| Case 5: Single Ground Line Affected Cell Voltage when Cell Balance Gate is on Case 6: Splice Line Splice Cap Voltage Case 7: BusBar Splice Splice Cap Voltage	Case 1: Cell V_On Gate < 36mV Case 2: |1st Cell V – 2nd Cell V| >= 1.3V Case 3 : |1st Cell V – 2nd Cell V| >= 1.3V Case 4 : |1st Cell V – 2nd Cell V| >= 1.3V Case 5 : Cell V_On Gate < 36mV Case 6: Splice Cap Voltage > 0.1V Case 7: Splice Cap Voltage > 0.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	0.6 seconds out of a 0.6 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense Q Circuit Low	P0B8D	Sets when cell voltage is detected below threshold	Cell Voltage Q	<= 0.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense Q Circuit High	P0B8E	Sets when cell voltage is detected above threshold	Cell Voltage Q	>= 4.8V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense R Circuit	P0B90	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| or Cell V_gate on Case 1: Single Power Line - Positive side Affected Cell Voltage when Cell Balance Gate is on Case 2: General Sense Line |1st Cell V – 2nd Cell V| Case 3: Common Power Line |1st Cell V – 2nd Cell V| Case 4: Common Ground Line |1st Cell V – 2nd Cell V| Case 5: Single Ground Line Affected Cell Voltage when Cell Balance Gate is on Case 6: Splice Line Splice Cap Voltage Case 7: BusBar Splice Splice Cap Voltage	 Case 1: Cell V_On Gate < 36mV Case 2: |1st Cell V – 2nd Cell V| >= 1.3V Case 3 : |1st Cell V – 2nd Cell V| >= 1.3V Case 4 : |1st Cell V – 2nd Cell V| >= 1.3V Case 5 : Cell V_On Gate < 36mV Case 6: Splice Cap Voltage > 0.1V Case 7: Splice Cap Voltage > 0.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	0.6 seconds out of a 0.6 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense R Circuit Low	P0B92	Sets when cell voltage is detected below threshold	Cell Voltage R	<= 0.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense R Circuit High	P0B93	Sets when cell voltage is detected above threshold	Cell Voltage R	>= 4.8V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense S Circuit	P0B95	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| or Cell V_gate on Case 1: Single Power Line - Positive side Affected Cell Voltage when Cell Balance Gate is on Case 2: General Sense Line |1st Cell V – 2nd Cell V| Case 3: Common Power Line |1st Cell V – 2nd Cell V| Case 4: Common Ground Line |1st Cell V – 2nd Cell V| Case 5: Single Ground Line Affected Cell Voltage when Cell Balance Gate is on Case 6: Splice Line Splice Cap Voltage Case 7: BusBar Splice Splice Cap Voltage	 Case 1: Cell V_On Gate < 36mV Case 2: |1st Cell V – 2nd Cell V| >= 1.3V Case 3 : |1st Cell V – 2nd Cell V| >= 1.3V Case 4 : |1st Cell V – 2nd Cell V| >= 1.3V Case 5 : Cell V_On Gate < 36mV Case 6: Splice Cap Voltage > 0.1V Case 7: Splice Cap Voltage > 0.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	0.6 seconds out of a 0.6 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense S Circuit Low	P0B97	Sets when cell voltage is detected below threshold	Cell Voltage S	<= 0.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense S Circuit High	P0B98	Sets when cell voltage is detected above threshold	Cell Voltage S	>= 4.8V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense T Circuit	P0B9A	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| or Cell V_gate on Case 1: Single Power Line - Positive side Affected Cell Voltage when Cell Balance Gate is on Case 2: General Sense Line |1st Cell V – 2nd Cell V| Case 3: Common Power Line |1st Cell V – 2nd Cell V| Case 4: Common Ground Line |1st Cell V – 2nd Cell V| Case 5: Single Ground Line Affected Cell Voltage when Cell Balance Gate is on Case 6: Splice Line Splice Cap Voltage Case 7: BusBar Splice Splice Cap Voltage	 Case 1: Cell V_On Gate < 36mV Case 2: |1st Cell V – 2nd Cell V| >= 1.3V Case 3 : |1st Cell V – 2nd Cell V| >= 1.3V Case 4 : |1st Cell V – 2nd Cell V| >= 1.3V Case 5 : Cell V_On Gate < 36mV Case 6: Splice Cap Voltage > 0.1V Case 7: Splice Cap Voltage > 0.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	0.6 seconds out of a 0.6 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense T Circuit Low	P0B9C	Sets when cell voltage is detected below threshold	Cell Voltage T	<= 0.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense T Circuit High	P0B9D	Sets when cell voltage is detected above threshold	Cell Voltage T	>= 4.8V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense U Circuit	P0B9F	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| or Cell V_gate on Case 1: Single Power Line - Positive side Affected Cell Voltage when Cell Balance Gate is on Case 2: General Sense Line |1st Cell V – 2nd Cell V| Case 3: Common Power Line |1st Cell V – 2nd Cell V| Case 4: Common Ground Line |1st Cell V – 2nd Cell V| Case 5: Single Ground Line Affected Cell Voltage when Cell Balance Gate is on Case 6: Splice Line Splice Cap Voltage Case 7: BusBar Splice Splice Cap Voltage	 Case 1: Cell V_On Gate < 36mV Case 2: |1st Cell V – 2nd Cell V| >= 1.3V Case 3 : |1st Cell V – 2nd Cell V| >= 1.3V Case 4 : |1st Cell V – 2nd Cell V| >= 1.3V Case 5 : Cell V_On Gate < 36mV Case 6: Splice Cap Voltage > 0.1V Case 7: Splice Cap Voltage > 0.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	0.6 seconds out of a 0.6 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense U Circuit Low	P0BA1	Sets when cell voltage is detected below threshold	Cell Voltage U	<= 0.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense U Circuit High	P0BA2	Sets when cell voltage is detected above threshold	Cell Voltage U	>= 4.8V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense V Circuit	P0BA4	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| or Cell V_gate on Case 1: Single Power Line - Positive side Affected Cell Voltage when Cell Balance Gate is on Case 2: General Sense Line |1st Cell V – 2nd Cell V| Case 3: Common Power Line |1st Cell V – 2nd Cell V| Case 4: Common Ground Line |1st Cell V – 2nd Cell V| Case 5: Single Ground Line Affected Cell Voltage when Cell Balance Gate is on Case 6: Splice Line Splice Cap Voltage Case 7: BusBar Splice Splice Cap Voltage	 Case 1: Cell V_On Gate < 36mV Case 2: |1st Cell V – 2nd Cell V| >= 1.3V Case 3 : |1st Cell V – 2nd Cell V| >= 1.3V Case 4 : |1st Cell V – 2nd Cell V| >= 1.3V Case 5 : Cell V_On Gate < 36mV Case 6: Splice Cap Voltage > 0.1V Case 7: Splice Cap Voltage > 0.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	0.6 seconds out of a 0.6 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense V Circuit Low	P0BA6	Sets when cell voltage is detected below threshold	Cell Voltage V	<= 0.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense V Circuit High	P0BA7	Sets when cell voltage is detected above threshold	Cell Voltage V	>= 4.8V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense W Circuit	P0BA9	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| or Cell V_gate on Case 1: Single Power Line - Positive side Affected Cell Voltage when Cell Balance Gate is on Case 2: General Sense Line |1st Cell V – 2nd Cell V| Case 3: Common Power Line |1st Cell V – 2nd Cell V| Case 4: Common Ground Line |1st Cell V – 2nd Cell V| Case 5: Single Ground Line Affected Cell Voltage when Cell Balance Gate is on Case 6: Splice Line Splice Cap Voltage Case 7: BusBar Splice Splice Cap Voltage	 Case 1: Cell V_On Gate < 36mV Case 2: |1st Cell V – 2nd Cell V| >= 1.3V Case 3 : |1st Cell V – 2nd Cell V| >= 1.3V Case 4 : |1st Cell V – 2nd Cell V| >= 1.3V Case 5 : Cell V_On Gate < 36mV Case 6: Splice Cap Voltage > 0.1V Case 7: Splice Cap Voltage > 0.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	0.6 seconds out of a 0.6 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense W Circuit Low	P0BAB	Sets when cell voltage is detected below threshold	Cell Voltage W	<= 0.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense W Circuit High	P0BAC	Sets when cell voltage is detected above threshold	Cell Voltage W	>= 4.8V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense X Circuit	P0BAE	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| or Cell V_gate on Case 1: Single Power Line - Positive side Affected Cell Voltage when Cell Balance Gate is on Case 2: General Sense Line |1st Cell V – 2nd Cell V| Case 3: Common Power Line |1st Cell V – 2nd Cell V| Case 4: Common Ground Line |1st Cell V – 2nd Cell V| Case 5: Single Ground Line Affected Cell Voltage when Cell Balance Gate is on Case 6: Splice Line Splice Cap Voltage Case 7: BusBar Splice Splice Cap Voltage	 Case 1: Cell V_On Gate < 36mV Case 2: |1st Cell V – 2nd Cell V| >= 1.3V Case 3 : |1st Cell V – 2nd Cell V| >= 1.3V Case 4 : |1st Cell V – 2nd Cell V| >= 1.3V Case 5 : Cell V_On Gate < 36mV Case 6: Splice Cap Voltage > 0.1V Case 7: Splice Cap Voltage > 0.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	0.6 seconds out of a 0.6 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense X Circuit Low	P0BB0	Sets when cell voltage is detected below threshold	Cell Voltage X	<= 0.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense X Circuit High	P0BB1	Sets when cell voltage is detected above threshold	Cell Voltage X	>= 4.8V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense Y Circuit	P0BB3	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| or Cell V_gate on Case 1: Single Power Line - Positive side Affected Cell Voltage when Cell Balance Gate is on Case 2: General Sense Line |1st Cell V – 2nd Cell V| Case 3: Common Power Line |1st Cell V – 2nd Cell V| Case 4: Common Ground Line |1st Cell V – 2nd Cell V| Case 5: Single Ground Line Affected Cell Voltage when Cell Balance Gate is on Case 6: Splice Line Splice Cap Voltage Case 7: BusBar Splice Splice Cap Voltage	 Case 1: Cell V_On Gate < 36mV Case 2: |1st Cell V – 2nd Cell V| >= 1.3V Case 3 : |1st Cell V – 2nd Cell V| >= 1.3V Case 4 : |1st Cell V – 2nd Cell V| >= 1.3V Case 5 : Cell V_On Gate < 36mV Case 6: Splice Cap Voltage > 0.1V Case 7: Splice Cap Voltage > 0.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	0.6 seconds out of a 0.6 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense Y Circuit Low	P0BB5	Sets when cell voltage is detected below threshold	Cell Voltage Y	<= 0.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense Y Circuit High	P0BB6	Sets when cell voltage is detected above threshold	Cell Voltage Y	>= 4.8V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense Z Circuit	P0BB8	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| or Cell V_gate on Case 1: Single Power Line - Positive side Affected Cell Voltage when Cell Balance Gate is on Case 2: General Sense Line |1st Cell V – 2nd Cell V| Case 3: Common Power Line |1st Cell V – 2nd Cell V| Case 4: Common Ground Line |1st Cell V – 2nd Cell V| Case 5: Single Ground Line Affected Cell Voltage when Cell Balance Gate is on Case 6: Splice Line Splice Cap Voltage Case 7: BusBar Splice Splice Cap Voltage	 Case 1: Cell V_On Gate < 36mV Case 2: |1st Cell V – 2nd Cell V| >= 1.3V Case 3 : |1st Cell V – 2nd Cell V| >= 1.3V Case 4 : |1st Cell V – 2nd Cell V| >= 1.3V Case 5 : Cell V_On Gate < 36mV Case 6: Splice Cap Voltage > 0.1V Case 7: Splice Cap Voltage > 0.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	0.6 seconds out of a 0.6 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense Z Circuit Low	P0BBA	Sets when cell voltage is detected below threshold	Cell Voltage Z	<= 0.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense Z Circuit High	P0BBB	Sets when cell voltage is detected above threshold	Cell Voltage Z	>= 4.8V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Temperature Sensor E Circuit Low	P0BC4	Sets when Temperature Sensor 5 falls below a threshold	Temperature Sensor 5	> 87.5C (ADC Count < 135)	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable	True True	1.4 seconds in a 2 second window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Temperature Sensor E Circuit High	P0BC5	Sets when Temperature Sensor 5 falls above a threshold	Temperature Sensor 5	< -40C (ADC Count > 4008)	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable	True True	1.4 seconds in a 2 second window	Type B, 2 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Temperature Sensor F Circuit Low	P0C35	Sets when Temperature Sensor 6 falls below a threshold	Temperature Sensor 6	> 87.5C (ADC Count < 135)	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable	True True	1.4 seconds in a 2 second window	Type B, 2 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Temperature Sensor F Circuit High	P0C36	Sets when Temperature Sensor 6 falls above a threshold	Temperature Sensor 6	< -40C (ADC Count > 4008)	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable	True True	1.4 seconds in a 2 second window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Pack Coolant Temperature Sensor Circuit Low	P0C44	Sets when Inlet Coolant Temp Sensor falls below a Threshold	Inlet Temp	>= 87.9C (ADC Count <= 133)	Diagnostic Enable	True	1.75 seconds in a 2.5 seconds window	Type B, 2 Trips
					Run/Crank, Accessory/ Run or HVEM EB Comm Enable	True		
					VITM System Voltage	>= 9V		
			DTC Pass	Inlet Temp < 87.9C (ADC Count > 133)			2.5 Seconds	

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Pack Coolant Temperature Sensor Circuit High	P0C45	Sets when Inlet Coolant Temp Sensor goes above a Threshold	Inlet Temp DTC Pass	< -40C (ADC Count > 3890) Inlet Temp >= -40C (ADC Count <= 3890)	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable VITM System Voltage	True True >= 9V	1.75 seconds in a 2.5 seconds window 2.5 Seconds	Type B, 2 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Energy Control Module Long Term Memory Performance	P1A01	EEPROM Checksum Method	EEPROM Checksum Value Calculated is Different than Stored	1	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable VITM System Voltage	= True = True >= 9 Volts	At power down	Type C, No MIL

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Energy Control Module Random Accessoryes s Memory (RAM)	P1A05	RAM Read Write function Failed	RAM Read not Equal to RAM Written	1	Diagnostic Enable	True	At power up	Type A, 1 Trips
					Run/Crank, Accessory/ Run or HVEM EB Comm Enable	True		
					VITM Initalization Status Extended	Initializing		
					VITM System Voltage	>= 9V		
			DTC Pass	1			At power up	

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Energy Control Module Read Only Memory (ROM)	P1A06	Flash ROM Checksum method	Flash ROM Checksum Value Calculated is Different than Stored	1	Diagnostic Enable	True	At power up	Type A, 1 Trips
					Run/Crank, Accessory/ Run or HVEM EB Comm Enable	True		
					VITM Initalization Status Extended	Initializing		
					VITM System Voltage	>= 9V		
			DTC Pass	1			At power up	

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Energy Control Module 5 Volt Reference Circuit	P1A07	Sets when 5V VITM reference voltage is out of range	5V Reference Value (Circuit for Reference Diagnostic, Shunt Regulator) DTC Pass	5V Reference Value < 2.8V or 5V Reference Value > 3.2V 2.8V <= 5V Reference Value <= 3.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable VITM System Voltage	True True >= 9V	600 ms in a 1 second window 1 Second	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Energy Control Module System Voltage Low	P1A0C	If 12V System Voltage is below Threshold	12V System Voltage DTC Pass	< 9.0V 12V System Voltage >= 9.0V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable	True True	5 seconds in a 6 seconds window 6 Seconds	Type C, No MIL

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Energy Control Module System Voltage High	P1A0D	If 12V System Voltage is above Threshold	12V System Voltage DTC Pass	>18.5V 12V System Voltage >= 18.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable	True True	5 seconds in a 6 seconds window 6 Seconds	Type C, No MIL

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Energy Control Module Ignition Switch Run/ Start Position Circuit Low	P1A5E	If RunCrank input state is below Threshold and RunCrank Received Serial Data State = Active	RunCrank Hardwire Input and Serial Data signal DTC Pass	RunCrank Input < 5V RunCrank Input >= 5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable VITM System Voltage No Active DTC for Battery Energy Control Module Lost Communication with Hybrid Processor Control Module B on Bus H	True True >= 9V U185B	5 seconds in a 6 second window 6 seconds	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Energy Control Module Ignition Switch Run/ Start Position Circuit High	P1A5F	If RunCrank input state is above Threshold and RunCrank Received Serial Data State = Inactive	RunCrank Hardwire Input and Serial Data signal DTC Pass	RunCrank Input >= 5V RunCrank Input < 5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable VITM System Voltage No Active DTC for Battery Energy Control Module Lost Communication with Hybrid Processor Control Module B on Bus H	True True >= 9V U185B	5 seconds in a 6 second window 6 seconds	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Energy Control Module Ignition Switch Accessory Position Circuit Low	P1A60	If Acessory input state is below Threshold and received serial data Propulsion System Active state = True and Accessory Diagnostic Delay is Expired	Accessory Hardwire Input	Accessory Input < 5V	Diagnostic Enable	True	0.1 seconds (8 * 0.0125)	Type B, 2 Trips
					Run/Crank, Accessory/ Run or HVEM EB Comm Enable	True		
					No Active DTC for Battery Energy Control Module Lost Communication With with HCP (TPIM) on Bus A (HS GMLAN Bus)	U1885		
					VITM System Voltage	>= 9V		
					Propulsion System Active	True		
			DTC Pass	Accessory Input >= 5V			0.1 seconds (8 * 0.0125)	

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Energy Control Module Hybrid Battery Voltage Isolation Sensor Circuit	P1AE6	Sets when Isolation Ckt components detected open/short	Active Isolation Circuit	If K <= 0.985 or K >= 1.015	Diagnostic Enable	True	30s	Type A, 1 Trips
					Run/Crank, Accessory/ Run or HVEM EB Comm Enable	True		
					VICM Isolation Start Request	True		
					VITM System Voltage	> 9V		
					No Active DTC for Battery Energy Control Module Lost Communication with Hybrid Processor Control Module B on Bus H	U185B		
			DTC Pass	0.985 < K < 1.015 (diagnose open sw and/or open/short in circuit resistors) Or {}{abs(AD1 – AD2) < 30mV} or {abs(BD1 – BD2) < 30mV} (diagnose shorted sw)			30s	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AA Circuit Low	P1B17	Sets when cell voltage is detected below threshold	Cell Voltage AA	<= 0.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line	True True U2603, U2604, U2605, U2606, U2617, U2618, U2619, U2620, U2621, U2622, U2623, U2624 P0B3B, P0B40, P0B45, P0B4A, P0B4F, P0B54, P0B59, P0B5E, P0B63, P0B68, P0B6D, P0B72, P0B77, P0B7C, P0B81, P0B86, P0B8B, P0B90, P0B95, P0B9A, P0B9F, P0BA4, P0BA9, P0BAE, P0BB3, P0BB8, P1B28, P1B29, P1B2A, P1B2B, P1B2C, P1B2D, P1E4C, P1E4D, P1E4E, P1E4F, P1E50, P1E51, P1E52, P1E53, P1E54, P1E55, P1E56, P1E57, P1E58, P1E59, P1E5A, P1E5B, P1E5C, P1E5D, P1E5E, P1E5F, P1E60, P1E61, P1E62, P1E63, P1E64, P1E65, P1E66, P1E67, P1E68, P1E69, P1E6A, P1E6B, P1E6C, P1E6D P1E6E, P1E6F, P1E70, P1E71, P1E72, P1E73, P1E74, P1E75, P1E76, P1E77, P1E78, P1E79, P1E7A, P1E7B, P1E7C, P1E7D, P1E7E, P1E7F, P1E80, P1E81, P1E82, P1E83, P1E84, P1E86,	1.4 second in a 2 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						P1E87, P1E88, P1E89, P1E8A		
					2nd Protection Self Test Diagnostic	Not Running		
					No Active DTCs associated with Slave Cell Balancing Fault	P1E92, P1E98, P1E9E, P1EA4, P1FC9, P1FCA, P1FCB, P1FCC, P1FCD, P1FCE, P3036, P3041		
					No Active DTCs associated with Slave Internal Performance	P1E8E, P1E94, P1E9A, P1EA0, P1FBD, P1FBE, P1FBF, P1FC0, P1FC1, P1FC2, P3034, P303F		

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AA Circuit High	P1B18	Sets when cell voltage is detected above threshold	Cell Voltage AA	>= 4.8V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AB Circuit Low	P1B1A	Sets when cell voltage is detected below threshold	Cell Voltage AB	<= 0.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AB Circuit High	P1B1B	Sets when cell voltage is detected above threshold	Cell Voltage AB	>= 4.8V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AC Circuit Low	P1B1D	Sets when cell voltage is detected below threshold	Cell Voltage AC	<= 0.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AC Circuit High	P1B1E	Sets when cell voltage is detected above threshold	Cell Voltage AC	>= 4.8V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AD Circuit Low	P1B20	Sets when cell voltage is detected below threshold	Cell Voltage AD	<= 0.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AD Circuit High	P1B21	Sets when cell voltage is detected above threshold	Cell Voltage AD	>= 4.8V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AE Circuit Low	P1B23	Sets when cell voltage is detected below threshold	Cell Voltage AE	<= 0.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AE Circuit High	P1B24	Sets when cell voltage is detected above threshold	Cell Voltage AE	>= 4.8V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AF Circuit Low	P1B26	Sets when cell voltage is detected below threshold	Cell Voltage AF	<= 0.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AF Circuit High	P1B27	Sets when cell voltage is detected above threshold	Cell Voltage AF	>= 4.8V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AA Circuit	P1B28	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| or Cell V_gate on Case 1: Single Power Line - Positive side Affected Cell Voltage when Cell Balance Gate is on Case 2: General Sense Line |1st Cell V – 2nd Cell V| Case 3: Common Power Line |1st Cell V – 2nd Cell V| Case 4: Common Ground Line |1st Cell V – 2nd Cell V| Case 5: Single Ground Line Affected Cell Voltage when Cell Balance Gate is on Case 6: Splice Line Splice Cap Voltage Case 7: BusBar Splice Splice Cap Voltage	 Case 1: Cell V_On Gate < 36mV Case 2: |1st Cell V – 2nd Cell V| >= 1.3V Case 3 : |1st Cell V – 2nd Cell V| >= 1.3V Case 4 : |1st Cell V – 2nd Cell V| >= 1.3V Case 5 : Cell V_On Gate < 36mV Case 6: Splice Cap Voltage > 0.1V Case 7: Splice Cap Voltage > 0.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	0.6 seconds out of a 0.6 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AB Circuit	P1B29	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| or Cell V_gate on Case 1: Single Power Line - Positive side Affected Cell Voltage when Cell Balance Gate is on Case 2: General Sense Line |1st Cell V – 2nd Cell V| Case 3: Common Power Line |1st Cell V – 2nd Cell V| Case 4: Common Ground Line |1st Cell V – 2nd Cell V| Case 5: Single Ground Line Affected Cell Voltage when Cell Balance Gate is on Case 6: Splice Line Splice Cap Voltage Case 7: BusBar Splice Splice Cap Voltage	 Case 1: Cell V_On Gate < 36mV Case 2: |1st Cell V – 2nd Cell V| >= 1.3V Case 3 : |1st Cell V – 2nd Cell V| >= 1.3V Case 4 : |1st Cell V – 2nd Cell V| >= 1.3V Case 5 : Cell V_On Gate < 36mV Case 6: Splice Cap Voltage > 0.1V Case 7: Splice Cap Voltage > 0.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	0.6 seconds out of a 0.6 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AC Circuit	P1B2A	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| or Cell V_gate on Case 1: Single Power Line - Positive side Affected Cell Voltage when Cell Balance Gate is on Case 2: General Sense Line |1st Cell V – 2nd Cell V| Case 3: Common Power Line |1st Cell V – 2nd Cell V| Case 4: Common Ground Line |1st Cell V – 2nd Cell V| Case 5: Single Ground Line Affected Cell Voltage when Cell Balance Gate is on Case 6: Splice Line Splice Cap Voltage Case 7: BusBar Splice Splice Cap Voltage	 Case 1: Cell V_On Gate < 36mV Case 2: |1st Cell V – 2nd Cell V| >= 1.3V Case 3 : |1st Cell V – 2nd Cell V| >= 1.3V Case 4 : |1st Cell V – 2nd Cell V| >= 1.3V Case 5 : Cell V_On Gate < 36mV Case 6: Splice Cap Voltage > 0.1V Case 7: Splice Cap Voltage > 0.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	0.6 seconds out of a 0.6 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AD Circuit	P1B2B	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| or Cell V_gate on Case 1: Single Power Line - Positive side Affected Cell Voltage when Cell Balance Gate is on Case 2: General Sense Line |1st Cell V – 2nd Cell V| Case 3: Common Power Line |1st Cell V – 2nd Cell V| Case 4: Common Ground Line |1st Cell V – 2nd Cell V| Case 5: Single Ground Line Affected Cell Voltage when Cell Balance Gate is on Case 6: Splice Line Splice Cap Voltage Case 7: BusBar Splice Splice Cap Voltage	 Case 1: Cell V_On Gate < 36mV Case 2: |1st Cell V – 2nd Cell V| >= 1.3V Case 3 : |1st Cell V – 2nd Cell V| >= 1.3V Case 4 : |1st Cell V – 2nd Cell V| >= 1.3V Case 5 : Cell V_On Gate < 36mV Case 6: Splice Cap Voltage > 0.1V Case 7: Splice Cap Voltage > 0.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	0.6 seconds out of a 0.6 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AE Circuit	P1B2C	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| or Cell V_gate on Case 1: Single Power Line - Positive side Affected Cell Voltage when Cell Balance Gate is on Case 2: General Sense Line |1st Cell V – 2nd Cell V| Case 3: Common Power Line |1st Cell V – 2nd Cell V| Case 4: Common Ground Line |1st Cell V – 2nd Cell V| Case 5: Single Ground Line Affected Cell Voltage when Cell Balance Gate is on Case 6: Splice Line Splice Cap Voltage Case 7: BusBar Splice Splice Cap Voltage	 Case 1: Cell V_On Gate < 36mV Case 2: |1st Cell V – 2nd Cell V| >= 1.3V Case 3 : |1st Cell V – 2nd Cell V| >= 1.3V Case 4 : |1st Cell V – 2nd Cell V| >= 1.3V Case 5 : Cell V_On Gate < 36mV Case 6: Splice Cap Voltage > 0.1V Case 7: Splice Cap Voltage > 0.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	0.6 seconds out of a 0.6 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AF Circuit	P1B2D	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| or Cell V_gate on Case 1: Single Power Line - Positive side Affected Cell Voltage when Cell Balance Gate is on Case 2: General Sense Line |1st Cell V – 2nd Cell V| Case 3: Common Power Line |1st Cell V – 2nd Cell V| Case 4: Common Ground Line |1st Cell V – 2nd Cell V| Case 5: Single Ground Line Affected Cell Voltage when Cell Balance Gate is on Case 6: Splice Line Splice Cap Voltage Case 7: BusBar Splice Splice Cap Voltage	 Case 1: Cell V_On Gate < 36mV Case 2: |1st Cell V – 2nd Cell V| >= 1.3V Case 3 : |1st Cell V – 2nd Cell V| >= 1.3V Case 4 : |1st Cell V – 2nd Cell V| >= 1.3V Case 5 : Cell V_On Gate < 36mV Case 6: Splice Cap Voltage > 0.1V Case 7: Splice Cap Voltage > 0.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	0.6 seconds out of a 0.6 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AG Circuit Low	P1B46	Sets when cell voltage is detected below threshold	Cell Voltage AG	<= 0.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AG Circuit High	P1B47	Sets when cell voltage is detected above threshold	Cell Voltage AG	>= 4.8V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AH Circuit Low	P1B49	Sets when cell voltage is detected below threshold	Cell Voltage AH	<= 0.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AH Circuit High	P1B4A	Sets when cell voltage is detected above threshold	Cell Voltage AH	>= 4.8V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AI Circuit Low	P1B4C	Sets when cell voltage is detected below threshold	Cell Voltage AI	<= 0.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AI Circuit High	P1B4D	Sets when cell voltage is detected above threshold	Cell Voltage AI	>= 4.8V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AJ Circuit Low	P1B4F	Sets when cell voltage is detected below threshold	Cell Voltage AJ	<= 0.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AJ Circuit High	P1B50	Sets when cell voltage is detected above threshold	Cell Voltage AJ	>= 4.8V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AK Circuit Low	P1B52	Sets when cell voltage is detected below threshold	Cell Voltage AK	<= 0.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AK Circuit High	P1B53	Sets when cell voltage is detected above threshold	Cell Voltage AK	>= 4.8V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AL Circuit Low	P1B55	Sets when cell voltage is detected below threshold	Cell Voltage AL	<= 0.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AL Circuit High	P1B56	Sets when cell voltage is detected above threshold	Cell Voltage AL	>= 4.8V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AM Circuit Low	P1B58	Sets when cell voltage is detected below threshold	Cell Voltage AM	<= 0.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AM Circuit High	P1B59	Sets when cell voltage is detected above threshold	Cell Voltage AM	>= 4.8V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AN Circuit Low	P1B5B	Sets when cell voltage is detected below threshold	Cell Voltage AN	<= 0.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AN Circuit High	P1B5C	Sets when cell voltage is detected above threshold	Cell Voltage AN	>= 4.8V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AO Circuit Low	P1B5E	Sets when cell voltage is detected below threshold	Cell Voltage AO	<= 0.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AO Circuit High	P1B5F	Sets when cell voltage is detected above threshold	Cell Voltage AO	>= 4.8V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AP Circuit Low	P1B61	Sets when cell voltage is detected below threshold	Cell Voltage AP	<= 0.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AP Circuit High	P1B62	Sets when cell voltage is detected above threshold	Cell Voltage AP	>= 4.8V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AQ Circuit Low	P1B64	Sets when cell voltage is detected below threshold	Cell Voltage AQ	<= 0.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AQ Circuit High	P1B65	Sets when cell voltage is detected above threshold	Cell Voltage AQ	>= 4.8V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AR Circuit Low	P1B67	Sets when cell voltage is detected below threshold	Cell Voltage AR	<= 0.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AR Circuit High	P1B68	Sets when cell voltage is detected above threshold	Cell Voltage AR	>= 4.8V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AS Circuit Low	P1B6A	Sets when cell voltage is detected below threshold	Cell Voltage AS	<= 0.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AS Circuit High	P1B6B	Sets when cell voltage is detected above threshold	Cell Voltage AS	>= 4.8V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AT Circuit Low	P1B6D	Sets when cell voltage is detected below threshold	Cell Voltage AT	<= 0.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AT Circuit High	P1B6E	Sets when cell voltage is detected above threshold	Cell Voltage AT	>= 4.8V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AU Circuit Low	P1B70	Sets when cell voltage is detected below threshold	Cell Voltage AU	<= 0.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AU Circuit High	P1B71	Sets when cell voltage is detected above threshold	Cell Voltage AU	>= 4.8V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AV Circuit Low	P1B73	Sets when cell voltage is detected below threshold	Cell Voltage AV	<= 0.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AV Circuit High	P1B74	Sets when cell voltage is detected above threshold	Cell Voltage AV	>= 4.8V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AW Circuit Low	P1B76	Sets when cell voltage is detected below threshold	Cell Voltage AW	<= 0.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AW Circuit High	P1B77	Sets when cell voltage is detected above threshold	Cell Voltage AW	>= 4.8V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AX Circuit Low	P1B79	Sets when cell voltage is detected below threshold	Cell Voltage AX	<= 0.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AX Circuit High	P1B7A	Sets when cell voltage is detected above threshold	Cell Voltage AX	>= 4.8V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AY Circuit Low	P1B7C	Sets when cell voltage is detected below threshold	Cell Voltage AY	<= 0.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AY Circuit High	P1B7D	Sets when cell voltage is detected above threshold	Cell Voltage AY	>= 4.8V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AZ Circuit Low	P1B7F	Sets when cell voltage is detected below threshold	Cell Voltage AZ	<= 0.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AZ Circuit High	P1B80	Sets when cell voltage is detected above threshold	Cell Voltage AZ	>= 4.8V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BA Circuit Low	P1B82	Sets when cell voltage is detected below threshold	Cell Voltage BA	<= 0.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BA Circuit High	P1B83	Sets when cell voltage is detected above threshold	Cell Voltage BA	>= 4.8V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BB Circuit Low	P1B85	Sets when cell voltage is detected below threshold	Cell Voltage BB	<= 0.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BB Circuit High	P1B86	Sets when cell voltage is detected above threshold	Cell Voltage BB	>= 4.8V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BC Circuit Low	P1B88	Sets when cell voltage is detected below threshold	Cell Voltage BC	<= 0.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BC Circuit High	P1B89	Sets when cell voltage is detected above threshold	Cell Voltage BC	>= 4.8V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BD Circuit Low	P1B8B	Sets when cell voltage is detected below threshold	Cell Voltage BD	<= 0.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BD Circuit High	P1B8C	Sets when cell voltage is detected above threshold	Cell Voltage BD	>= 4.8V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BE Circuit Low	P1B8E	Sets when cell voltage is detected below threshold	Cell Voltage BE	<= 0.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BE Circuit High	P1B8F	Sets when cell voltage is detected above threshold	Cell Voltage BE	>= 4.8V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BF Circuit Low	P1B91	Sets when cell voltage is detected below threshold	Cell Voltage BF	<= 0.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BF Circuit High	P1B92	Sets when cell voltage is detected above threshold	Cell Voltage BF	>= 4.8V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BG Circuit Low	P1B94	Sets when cell voltage is detected below threshold	Cell Voltage BG	<= 0.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BG Circuit High	P1B95	Sets when cell voltage is detected above threshold	Cell Voltage BG	>= 4.8V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BH Circuit Low	P1B97	Sets when cell voltage is detected below threshold	Cell Voltage BH	<= 0.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BH Circuit High	P1B98	Sets when cell voltage is detected above threshold	Cell Voltage BH	>= 4.8V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BI Circuit Low	P1B9A	Sets when cell voltage is detected below threshold	Cell Voltage BI	<= 0.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BI Circuit High	P1B9B	Sets when cell voltage is detected above threshold	Cell Voltage BI	>= 4.8V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BJ Circuit Low	P1B9D	Sets when cell voltage is detected below threshold	Cell Voltage BJ	<= 0.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BJ Circuit High	P1B9E	Sets when cell voltage is detected above threshold	Cell Voltage BJ	>= 4.8V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BK Circuit Low	P1BA0	Sets when cell voltage is detected below threshold	Cell Voltage BK	<= 0.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BK Circuit High	P1BA1	Sets when cell voltage is detected above threshold	Cell Voltage BK	>= 4.8V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BL Circuit Low	P1BA3	Sets when cell voltage is detected below threshold	Cell Voltage BL	<= 0.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BL Circuit High	P1BA4	Sets when cell voltage is detected above threshold	Cell Voltage BL	>= 4.8V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BM Circuit Low	P1BA6	Sets when cell voltage is detected below threshold	Cell Voltage BM	<= 0.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BM Circuit High	P1BA7	Sets when cell voltage is detected above threshold	Cell Voltage BM	>= 4.8V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BN Circuit Low	P1BA9	Sets when cell voltage is detected below threshold	Cell Voltage BN	<= 0.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BN Circuit High	P1BAA	Sets when cell voltage is detected above threshold	Cell Voltage BN	>= 4.8V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BO Circuit Low	P1BAC	Sets when cell voltage is detected below threshold	Cell Voltage BO	<= 0.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BO Circuit High	P1BAD	Sets when cell voltage is detected above threshold	Cell Voltage BO	>= 4.8V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BP Circuit Low	P1BAF	Sets when cell voltage is detected below threshold	Cell Voltage BP	<= 0.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BP Circuit High	P1BB0	Sets when cell voltage is detected above threshold	Cell Voltage BP	>= 4.8V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BQ Circuit Low	P1BB2	Sets when cell voltage is detected below threshold	Cell Voltage BQ	<= 0.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BQ Circuit High	P1BB3	Sets when cell voltage is detected above threshold	Cell Voltage BQ	>= 4.8V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BR Circuit Low	P1BB5	Sets when cell voltage is detected below threshold	Cell Voltage BR	<= 0.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BR Circuit High	P1BB6	Sets when cell voltage is detected above threshold	Cell Voltage BR	>= 4.8V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BS Circuit Low	P1BB8	Sets when cell voltage is detected below threshold	Cell Voltage BS	<= 0.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BS Circuit High	P1BB9	Sets when cell voltage is detected above threshold	Cell Voltage BS	>= 4.8V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BT Circuit Low	P1BBB	Sets when cell voltage is detected below threshold	Cell Voltage BT	<= 0.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BT Circuit High	P1BBC	Sets when cell voltage is detected above threshold	Cell Voltage BT	>= 4.8V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BU Circuit Low	P1BBE	Sets when cell voltage is detected below threshold	Cell Voltage BU	<= 0.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BU Circuit High	P1BBF	Sets when cell voltage is detected above threshold	Cell Voltage BU	>= 4.8V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BV Circuit Low	P1BC1	Sets when cell voltage is detected below threshold	Cell Voltage BV	<= 0.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BV Circuit High	P1BC2	Sets when cell voltage is detected above threshold	Cell Voltage BV	>= 4.8V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BW Circuit Low	P1BC4	Sets when cell voltage is detected below threshold	Cell Voltage BW	<= 0.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BW Circuit High	P1BC5	Sets when cell voltage is detected above threshold	Cell Voltage BW	>= 4.8V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BX Circuit Low	P1BC7	Sets when cell voltage is detected below threshold	Cell Voltage BX	<= 0.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BX Circuit High	P1BC8	Sets when cell voltage is detected above threshold	Cell Voltage BX	>= 4.8V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BY Circuit Low	P1BCA	Sets when cell voltage is detected below threshold	Cell Voltage BY	<= 0.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BY Circuit High	P1BCB	Sets when cell voltage is detected above threshold	Cell Voltage BY	>= 4.8V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BZ Circuit Low	P1BCD	Sets when cell voltage is detected below threshold	Cell Voltage BZ	<= 0.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BZ Circuit High	P1BCE	Sets when cell voltage is detected above threshold	Cell Voltage BZ	>= 4.8V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense CA Circuit Low	P1BD0	Sets when cell voltage is detected below threshold	Cell Voltage CA	<= 0.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense CA Circuit High	P1BD1	Sets when cell voltage is detected above threshold	Cell Voltage CA	>= 4.8V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense CB Circuit Low	P1BD3	Sets when cell voltage is detected below threshold	Cell Voltage CB	<= 0.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense CB Circuit High	P1BD4	Sets when cell voltage is detected above threshold	Cell Voltage CB	>= 4.8V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense CC Circuit Low	P1BD6	Sets when cell voltage is detected below threshold	Cell Voltage CC	<= 0.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense CC Circuit High	P1BD7	Sets when cell voltage is detected above threshold	Cell Voltage CC	>= 4.8V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense CD Circuit Low	P1BD9	Sets when cell voltage is detected below threshold	Cell Voltage CD	<= 0.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense CD Circuit High	P1BDA	Sets when cell voltage is detected above threshold	Cell Voltage CD	>= 4.8V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense CE Circuit Low	P1BDC	Sets when cell voltage is detected below threshold	Cell Voltage CE	<= 0.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense CE Circuit High	P1BDD	Sets when cell voltage is detected above threshold	Cell Voltage CE	>= 4.8V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense CF Circuit Low	P1BDF	Sets when cell voltage is detected below threshold	Cell Voltage CF	<= 0.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense CF Circuit High	P1BE0	Sets when cell voltage is detected above threshold	Cell Voltage CF	>= 4.8V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense CG Circuit Low	P1BE2	Sets when cell voltage is detected below threshold	Cell Voltage CF	<= 0.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense CG Circuit High	P1BE3	Sets when cell voltage is detected above threshold	Cell Voltage CG	>= 4.8V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense CH Circuit Low	P1BE5	Sets when cell voltage is detected below threshold	Cell Voltage CH	<= 0.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense CH Circuit High	P1BE6	Sets when cell voltage is detected above threshold	Cell Voltage CH	>= 4.8V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense CI Circuit Low	P1BE8	Sets when cell voltage is detected below threshold	Cell Voltage CI	<= 0.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense CI Circuit High	P1BE9	Sets when cell voltage is detected above threshold	Cell Voltage CI	>= 4.8V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense CJ Circuit Low	P1BEB	Sets when cell voltage is detected below threshold	Cell Voltage CJ	<= 0.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense CJ Circuit High	P1BEC	Sets when cell voltage is detected above threshold	Cell Voltage CJ	>= 4.8V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense CK Circuit Low	P1BEE	Sets when cell voltage is detected below threshold	Cell Voltage CK	<= 0.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense CK Circuit High	P1BEF	Sets when cell voltage is detected above threshold	Cell Voltage CK	>= 4.8V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense CL Circuit Low	P1BF1	Sets when cell voltage is detected below threshold	Cell Voltage CL	<= 0.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense CL Circuit High	P1BF2	Sets when cell voltage is detected above threshold	Cell Voltage CL	>= 4.8V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense CM Circuit Low	P1BF4	Sets when cell voltage is detected below threshold	Cell Voltage CM	<= 0.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense CM Circuit High	P1BF5	Sets when cell voltage is detected above threshold	Cell Voltage CM	>= 4.8V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense CN Circuit Low	P1BF7	Sets when cell voltage is detected below threshold	Cell Voltage CN	<= 0.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense CN Circuit High	P1BF8	Sets when cell voltage is detected above threshold	Cell Voltage CN	>= 4.8V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense CO Circuit Low	P1BFA	Sets when cell voltage is detected below threshold	Cell Voltage CO	<= 0.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense CO Circuit High	P1BFB	Sets when cell voltage is detected above threshold	Cell Voltage CO	>= 4.8V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense CP Circuit Low	P1BFD	Sets when cell voltage is detected below threshold	Cell Voltage CP	<= 0.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense CP Circuit High	P1BFE	Sets when cell voltage is detected above threshold	Cell Voltage CP	>= 4.8V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense CQ Circuit Low	P1E02	Sets when cell voltage is detected below threshold	Cell Voltage CQ	<= 0.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense CQ Circuit High	P1E03	Sets when cell voltage is detected above threshold	Cell Voltage CQ	>= 4.8V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense CR Circuit Low	P1E05	Sets when cell voltage is detected below threshold	Cell Voltage CR	<= 0.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense CR Circuit High	P1E06	Sets when cell voltage is detected above threshold	Cell Voltage CR	>= 4.8V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AG Circuit	P1E4C	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| or Cell V_gate on Case 1: Single Power Line - Positive side Affected Cell Voltage when Cell Balance Gate is on Case 2: General Sense Line |1st Cell V – 2nd Cell V| Case 3: Common Power Line |1st Cell V – 2nd Cell V| Case 4: Common Ground Line |1st Cell V – 2nd Cell V| Case 5: Single Ground Line Affected Cell Voltage when Cell Balance Gate is on Case 6: Splice Line Splice Cap Voltage Case 7: BusBar Splice Splice Cap Voltage	Case 1: Cell V_On Gate < 36mV Case 2: |1st Cell V – 2nd Cell V| >= 1.3V Case 3 : |1st Cell V – 2nd Cell V| >= 1.3V Case 4 : |1st Cell V – 2nd Cell V| >= 1.3V Case 5 : Cell V_On Gate < 36mV Case 6: Splice Cap Voltage > 0.1V Case 7: Splice Cap Voltage > 0.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	0.6 seconds out of a 0.6 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AH Circuit	P1E4D	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| or Cell V_gate on Case 1: Single Power Line - Positive side Affected Cell Voltage when Cell Balance Gate is on Case 2: General Sense Line |1st Cell V – 2nd Cell V| Case 3: Common Power Line |1st Cell V – 2nd Cell V| Case 4: Common Ground Line |1st Cell V – 2nd Cell V| Case 5: Single Ground Line Affected Cell Voltage when Cell Balance Gate is on Case 6: Splice Line Splice Cap Voltage Case 7: BusBar Splice Splice Cap Voltage	 Case 1: Cell V_On Gate < 36mV Case 2: |1st Cell V – 2nd Cell V| >= 1.3V Case 3 : |1st Cell V – 2nd Cell V| >= 1.3V Case 4 : |1st Cell V – 2nd Cell V| >= 1.3V Case 5 : Cell V_On Gate < 36mV Case 6: Splice Cap Voltage > 0.1V Case 7: Splice Cap Voltage > 0.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	0.6 seconds out of a 0.6 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AI Circuit	P1E4E	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| or Cell V_gate on Case 1: Single Power Line - Positive side Affected Cell Voltage when Cell Balance Gate is on Case 2: General Sense Line |1st Cell V – 2nd Cell V| Case 3: Common Power Line |1st Cell V – 2nd Cell V| Case 4: Common Ground Line |1st Cell V – 2nd Cell V| Case 5: Single Ground Line Affected Cell Voltage when Cell Balance Gate is on Case 6: Splice Line Splice Cap Voltage Case 7: BusBar Splice Splice Cap Voltage	 Case 1: Cell V_On Gate < 36mV Case 2: |1st Cell V – 2nd Cell V| >= 1.3V Case 3 : |1st Cell V – 2nd Cell V| >= 1.3V Case 4 : |1st Cell V – 2nd Cell V| >= 1.3V Case 5 : Cell V_On Gate < 36mV Case 6: Splice Cap Voltage > 0.1V Case 7: Splice Cap Voltage > 0.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	0.6 seconds out of a 0.6 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AJ Circuit	P1E4F	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| or Cell V_gate on Case 1: Single Power Line - Positive side Affected Cell Voltage when Cell Balance Gate is on Case 2: General Sense Line |1st Cell V – 2nd Cell V| Case 3: Common Power Line |1st Cell V – 2nd Cell V| Case 4: Common Ground Line |1st Cell V – 2nd Cell V| Case 5: Single Ground Line Affected Cell Voltage when Cell Balance Gate is on Case 6: Splice Line Splice Cap Voltage Case 7: BusBar Splice Splice Cap Voltage	 Case 1: Cell V_On Gate < 36mV Case 2: |1st Cell V – 2nd Cell V| >= 1.3V Case 3 : |1st Cell V – 2nd Cell V| >= 1.3V Case 4 : |1st Cell V – 2nd Cell V| >= 1.3V Case 5 : Cell V_On Gate < 36mV Case 6: Splice Cap Voltage > 0.1V Case 7: Splice Cap Voltage > 0.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	0.6 seconds out of a 0.6 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AK Circuit	P1E50	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| or Cell V_gate on Case 1: Single Power Line - Positive side Affected Cell Voltage when Cell Balance Gate is on Case 2: General Sense Line |1st Cell V – 2nd Cell V| Case 3: Common Power Line |1st Cell V – 2nd Cell V| Case 4: Common Ground Line |1st Cell V – 2nd Cell V| Case 5: Single Ground Line Affected Cell Voltage when Cell Balance Gate is on Case 6: Splice Line Splice Cap Voltage Case 7: BusBar Splice Splice Cap Voltage	 Case 1: Cell V_On Gate < 36mV Case 2: |1st Cell V – 2nd Cell V| >= 1.3V Case 3 : |1st Cell V – 2nd Cell V| >= 1.3V Case 4 : |1st Cell V – 2nd Cell V| >= 1.3V Case 5 : Cell V_On Gate < 36mV Case 6: Splice Cap Voltage > 0.1V Case 7: Splice Cap Voltage > 0.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	0.6 seconds out of a 0.6 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AL Circuit	P1E51	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| or Cell V_gate on Case 1: Single Power Line - Positive side Affected Cell Voltage when Cell Balance Gate is on Case 2: General Sense Line |1st Cell V – 2nd Cell V| Case 3: Common Power Line |1st Cell V – 2nd Cell V| Case 4: Common Ground Line |1st Cell V – 2nd Cell V| Case 5: Single Ground Line Affected Cell Voltage when Cell Balance Gate is on Case 6: Splice Line Splice Cap Voltage Case 7: BusBar Splice Splice Cap Voltage	 Case 1: Cell V_On Gate < 36mV Case 2: |1st Cell V – 2nd Cell V| >= 1.3V Case 3 : |1st Cell V – 2nd Cell V| >= 1.3V Case 4 : |1st Cell V – 2nd Cell V| >= 1.3V Case 5 : Cell V_On Gate < 36mV Case 6: Splice Cap Voltage > 0.1V Case 7: Splice Cap Voltage > 0.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	0.6 seconds out of a 0.6 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AM Circuit	P1E52	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| or Cell V_gate on Case 1: Single Power Line - Positive side Affected Cell Voltage when Cell Balance Gate is on Case 2: General Sense Line |1st Cell V – 2nd Cell V| Case 3: Common Power Line |1st Cell V – 2nd Cell V| Case 4: Common Ground Line |1st Cell V – 2nd Cell V| Case 5: Single Ground Line Affected Cell Voltage when Cell Balance Gate is on Case 6: Splice Line Splice Cap Voltage Case 7: BusBar Splice Splice Cap Voltage	 Case 1: Cell V_On Gate < 36mV Case 2: |1st Cell V – 2nd Cell V| >= 1.3V Case 3 : |1st Cell V – 2nd Cell V| >= 1.3V Case 4 : |1st Cell V – 2nd Cell V| >= 1.3V Case 5 : Cell V_On Gate < 36mV Case 6: Splice Cap Voltage > 0.1V Case 7: Splice Cap Voltage > 0.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	0.6 seconds out of a 0.6 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AN Circuit	P1E53	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| or Cell V_gate on Case 1: Single Power Line - Positive side Affected Cell Voltage when Cell Balance Gate is on Case 2: General Sense Line |1st Cell V – 2nd Cell V| Case 3: Common Power Line |1st Cell V – 2nd Cell V| Case 4: Common Ground Line |1st Cell V – 2nd Cell V| Case 5: Single Ground Line Affected Cell Voltage when Cell Balance Gate is on Case 6: Splice Line Splice Cap Voltage Case 7: BusBar Splice Splice Cap Voltage	 Case 1: Cell V_On Gate < 36mV Case 2: |1st Cell V – 2nd Cell V| >= 1.3V Case 3 : |1st Cell V – 2nd Cell V| >= 1.3V Case 4 : |1st Cell V – 2nd Cell V| >= 1.3V Case 5 : Cell V_On Gate < 36mV Case 6: Splice Cap Voltage > 0.1V Case 7: Splice Cap Voltage > 0.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	0.6 seconds out of a 0.6 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AO Circuit	P1E54	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| or Cell V_gate on Case 1: Single Power Line - Positive side Affected Cell Voltage when Cell Balance Gate is on Case 2: General Sense Line |1st Cell V – 2nd Cell V| Case 3: Common Power Line |1st Cell V – 2nd Cell V| Case 4: Common Ground Line |1st Cell V – 2nd Cell V| Case 5: Single Ground Line Affected Cell Voltage when Cell Balance Gate is on Case 6: Splice Line Splice Cap Voltage Case 7: BusBar Splice Splice Cap Voltage	 Case 1: Cell V_On Gate < 36mV Case 2: |1st Cell V – 2nd Cell V| >= 1.3V Case 3 : |1st Cell V – 2nd Cell V| >= 1.3V Case 4 : |1st Cell V – 2nd Cell V| >= 1.3V Case 5 : Cell V_On Gate < 36mV Case 6: Splice Cap Voltage > 0.1V Case 7: Splice Cap Voltage > 0.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	0.6 seconds out of a 0.6 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AP Circuit	P1E55	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| or Cell V_gate on Case 1: Single Power Line - Positive side Affected Cell Voltage when Cell Balance Gate is on Case 2: General Sense Line |1st Cell V – 2nd Cell V| Case 3: Common Power Line |1st Cell V – 2nd Cell V| Case 4: Common Ground Line |1st Cell V – 2nd Cell V| Case 5: Single Ground Line Affected Cell Voltage when Cell Balance Gate is on Case 6: Splice Line Splice Cap Voltage Case 7: BusBar Splice Splice Cap Voltage	 Case 1: Cell V_On Gate < 36mV Case 2: |1st Cell V – 2nd Cell V| >= 1.3V Case 3 : |1st Cell V – 2nd Cell V| >= 1.3V Case 4 : |1st Cell V – 2nd Cell V| >= 1.3V Case 5 : Cell V_On Gate < 36mV Case 6: Splice Cap Voltage > 0.1V Case 7: Splice Cap Voltage > 0.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	0.6 seconds out of a 0.6 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AQ Circuit	P1E56	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| or Cell V_gate on Case 1: Single Power Line - Positive side Affected Cell Voltage when Cell Balance Gate is on Case 2: General Sense Line |1st Cell V – 2nd Cell V| Case 3: Common Power Line |1st Cell V – 2nd Cell V| Case 4: Common Ground Line |1st Cell V – 2nd Cell V| Case 5: Single Ground Line Affected Cell Voltage when Cell Balance Gate is on Case 6: Splice Line Splice Cap Voltage Case 7: BusBar Splice Splice Cap Voltage	 Case 1: Cell V_On Gate < 36mV Case 2: |1st Cell V – 2nd Cell V| >= 1.3V Case 3 : |1st Cell V – 2nd Cell V| >= 1.3V Case 4 : |1st Cell V – 2nd Cell V| >= 1.3V Case 5 : Cell V_On Gate < 36mV Case 6: Splice Cap Voltage > 0.1V Case 7: Splice Cap Voltage > 0.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	0.6 seconds out of a 0.6 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AR Circuit	P1E57	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| or Cell V_gate on Case 1: Single Power Line - Positive side Affected Cell Voltage when Cell Balance Gate is on Case 2: General Sense Line |1st Cell V – 2nd Cell V| Case 3: Common Power Line |1st Cell V – 2nd Cell V| Case 4: Common Ground Line |1st Cell V – 2nd Cell V| Case 5: Single Ground Line Affected Cell Voltage when Cell Balance Gate is on Case 6: Splice Line Splice Cap Voltage Case 7: BusBar Splice Splice Cap Voltage	 Case 1: Cell V_On Gate < 36mV Case 2: |1st Cell V – 2nd Cell V| >= 1.3V Case 3 : |1st Cell V – 2nd Cell V| >= 1.3V Case 4 : |1st Cell V – 2nd Cell V| >= 1.3V Case 5 : Cell V_On Gate < 36mV Case 6: Splice Cap Voltage > 0.1V Case 7: Splice Cap Voltage > 0.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	0.6 seconds out of a 0.6 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AS Circuit	P1E58	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| or Cell V_gate on Case 1: Single Power Line - Positive side Affected Cell Voltage when Cell Balance Gate is on Case 2: General Sense Line |1st Cell V – 2nd Cell V| Case 3: Common Power Line |1st Cell V – 2nd Cell V| Case 4: Common Ground Line |1st Cell V – 2nd Cell V| Case 5: Single Ground Line Affected Cell Voltage when Cell Balance Gate is on Case 6: Splice Line Splice Cap Voltage Case 7: BusBar Splice Splice Cap Voltage	 Case 1: Cell V_On Gate < 36mV Case 2: |1st Cell V – 2nd Cell V| >= 1.3V Case 3 : |1st Cell V – 2nd Cell V| >= 1.3V Case 4 : |1st Cell V – 2nd Cell V| >= 1.3V Case 5 : Cell V_On Gate < 36mV Case 6: Splice Cap Voltage > 0.1V Case 7: Splice Cap Voltage > 0.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	0.6 seconds out of a 0.6 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AT Circuit	P1E59	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| or Cell V_gate on Case 1: Single Power Line - Positive side Affected Cell Voltage when Cell Balance Gate is on Case 2: General Sense Line |1st Cell V – 2nd Cell V| Case 3: Common Power Line |1st Cell V – 2nd Cell V| Case 4: Common Ground Line |1st Cell V – 2nd Cell V| Case 5: Single Ground Line Affected Cell Voltage when Cell Balance Gate is on Case 6: Splice Line Splice Cap Voltage Case 7: BusBar Splice Splice Cap Voltage	 Case 1: Cell V_On Gate < 36mV Case 2: |1st Cell V – 2nd Cell V| >= 1.3V Case 3 : |1st Cell V – 2nd Cell V| >= 1.3V Case 4 : |1st Cell V – 2nd Cell V| >= 1.3V Case 5 : Cell V_On Gate < 36mV Case 6: Splice Cap Voltage > 0.1V Case 7: Splice Cap Voltage > 0.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	0.6 seconds out of a 0.6 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AU Circuit	P1E5A	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| or Cell V_gate on Case 1: Single Power Line - Positive side Affected Cell Voltage when Cell Balance Gate is on Case 2: General Sense Line |1st Cell V – 2nd Cell V| Case 3: Common Power Line |1st Cell V – 2nd Cell V| Case 4: Common Ground Line |1st Cell V – 2nd Cell V| Case 5: Single Ground Line Affected Cell Voltage when Cell Balance Gate is on Case 6: Splice Line Splice Cap Voltage Case 7: BusBar Splice Splice Cap Voltage	 Case 1: Cell V_On Gate < 36mV Case 2: |1st Cell V – 2nd Cell V| >= 1.3V Case 3 : |1st Cell V – 2nd Cell V| >= 1.3V Case 4 : |1st Cell V – 2nd Cell V| >= 1.3V Case 5 : Cell V_On Gate < 36mV Case 6: Splice Cap Voltage > 0.1V Case 7: Splice Cap Voltage > 0.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	0.6 seconds out of a 0.6 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AV Circuit	P1E5B	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| or Cell V_gate on Case 1: Single Power Line - Positive side Affected Cell Voltage when Cell Balance Gate is on Case 2: General Sense Line |1st Cell V – 2nd Cell V| Case 3: Common Power Line |1st Cell V – 2nd Cell V| Case 4: Common Ground Line |1st Cell V – 2nd Cell V| Case 5: Single Ground Line Affected Cell Voltage when Cell Balance Gate is on Case 6: Splice Line Splice Cap Voltage Case 7: BusBar Splice Splice Cap Voltage	 Case 1: Cell V_On Gate < 36mV Case 2: |1st Cell V – 2nd Cell V| >= 1.3V Case 3 : |1st Cell V – 2nd Cell V| >= 1.3V Case 4 : |1st Cell V – 2nd Cell V| >= 1.3V Case 5 : Cell V_On Gate < 36mV Case 6: Splice Cap Voltage > 0.1V Case 7: Splice Cap Voltage > 0.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	0.6 seconds out of a 0.6 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AW Circuit	P1E5C	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| or Cell V_gate on Case 1: Single Power Line - Positive side Affected Cell Voltage when Cell Balance Gate is on Case 2: General Sense Line |1st Cell V – 2nd Cell V| Case 3: Common Power Line |1st Cell V – 2nd Cell V| Case 4: Common Ground Line |1st Cell V – 2nd Cell V| Case 5: Single Ground Line Affected Cell Voltage when Cell Balance Gate is on Case 6: Splice Line Splice Cap Voltage Case 7: BusBar Splice Splice Cap Voltage	 Case 1: Cell V_On Gate < 36mV Case 2: |1st Cell V – 2nd Cell V| >= 1.3V Case 3 : |1st Cell V – 2nd Cell V| >= 1.3V Case 4 : |1st Cell V – 2nd Cell V| >= 1.3V Case 5 : Cell V_On Gate < 36mV Case 6: Splice Cap Voltage > 0.1V Case 7: Splice Cap Voltage > 0.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	0.6 seconds out of a 0.6 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AX Circuit	P1E5D	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| or Cell V_gate on Case 1: Single Power Line - Positive side Affected Cell Voltage when Cell Balance Gate is on Case 2: General Sense Line |1st Cell V – 2nd Cell V| Case 3: Common Power Line |1st Cell V – 2nd Cell V| Case 4: Common Ground Line |1st Cell V – 2nd Cell V| Case 5: Single Ground Line Affected Cell Voltage when Cell Balance Gate is on Case 6: Splice Line Splice Cap Voltage Case 7: BusBar Splice Splice Cap Voltage	 Case 1: Cell V_On Gate < 36mV Case 2: |1st Cell V – 2nd Cell V| >= 1.3V Case 3 : |1st Cell V – 2nd Cell V| >= 1.3V Case 4 : |1st Cell V – 2nd Cell V| >= 1.3V Case 5 : Cell V_On Gate < 36mV Case 6: Splice Cap Voltage > 0.1V Case 7: Splice Cap Voltage > 0.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	0.6 seconds out of a 0.6 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AY Circuit	P1E5E	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| or Cell V_gate on Case 1: Single Power Line - Positive side Affected Cell Voltage when Cell Balance Gate is on Case 2: General Sense Line |1st Cell V – 2nd Cell V| Case 3: Common Power Line |1st Cell V – 2nd Cell V| Case 4: Common Ground Line |1st Cell V – 2nd Cell V| Case 5: Single Ground Line Affected Cell Voltage when Cell Balance Gate is on Case 6: Splice Line Splice Cap Voltage Case 7: BusBar Splice Splice Cap Voltage	 Case 1: Cell V_On Gate < 36mV Case 2: |1st Cell V – 2nd Cell V| >= 1.3V Case 3 : |1st Cell V – 2nd Cell V| >= 1.3V Case 4 : |1st Cell V – 2nd Cell V| >= 1.3V Case 5 : Cell V_On Gate < 36mV Case 6: Splice Cap Voltage > 0.1V Case 7: Splice Cap Voltage > 0.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	0.6 seconds out of a 0.6 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AZ Circuit	P1E5F	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| or Cell V_gate on Case 1: Single Power Line - Positive side Affected Cell Voltage when Cell Balance Gate is on Case 2: General Sense Line |1st Cell V – 2nd Cell V| Case 3: Common Power Line |1st Cell V – 2nd Cell V| Case 4: Common Ground Line |1st Cell V – 2nd Cell V| Case 5: Single Ground Line Affected Cell Voltage when Cell Balance Gate is on Case 6: Splice Line Splice Cap Voltage Case 7: BusBar Splice Splice Cap Voltage	 Case 1: Cell V_On Gate < 36mV Case 2: |1st Cell V – 2nd Cell V| >= 1.3V Case 3 : |1st Cell V – 2nd Cell V| >= 1.3V Case 4 : |1st Cell V – 2nd Cell V| >= 1.3V Case 5 : Cell V_On Gate < 36mV Case 6: Splice Cap Voltage > 0.1V Case 7: Splice Cap Voltage > 0.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	0.6 seconds out of a 0.6 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BA Circuit	P1E60	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| or Cell V_gate on Case 1: Single Power Line - Positive side Affected Cell Voltage when Cell Balance Gate is on Case 2: General Sense Line |1st Cell V – 2nd Cell V| Case 3: Common Power Line |1st Cell V – 2nd Cell V| Case 4: Common Ground Line |1st Cell V – 2nd Cell V| Case 5: Single Ground Line Affected Cell Voltage when Cell Balance Gate is on Case 6: Splice Line Splice Cap Voltage Case 7: BusBar Splice Splice Cap Voltage	 Case 1: Cell V_On Gate < 36mV Case 2: |1st Cell V – 2nd Cell V| >= 1.3V Case 3 : |1st Cell V – 2nd Cell V| >= 1.3V Case 4 : |1st Cell V – 2nd Cell V| >= 1.3V Case 5 : Cell V_On Gate < 36mV Case 6: Splice Cap Voltage > 0.1V Case 7: Splice Cap Voltage > 0.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	0.6 seconds out of a 0.6 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BB Circuit	P1E61	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| or Cell V_gate on Case 1: Single Power Line - Positive side Affected Cell Voltage when Cell Balance Gate is on Case 2: General Sense Line |1st Cell V – 2nd Cell V| Case 3: Common Power Line |1st Cell V – 2nd Cell V| Case 4: Common Ground Line |1st Cell V – 2nd Cell V| Case 5: Single Ground Line Affected Cell Voltage when Cell Balance Gate is on Case 6: Splice Line Splice Cap Voltage Case 7: BusBar Splice Splice Cap Voltage	 Case 1: Cell V_On Gate < 36mV Case 2: |1st Cell V – 2nd Cell V| >= 1.3V Case 3 : |1st Cell V – 2nd Cell V| >= 1.3V Case 4 : |1st Cell V – 2nd Cell V| >= 1.3V Case 5 : Cell V_On Gate < 36mV Case 6: Splice Cap Voltage > 0.1V Case 7: Splice Cap Voltage > 0.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	0.6 seconds out of a 0.6 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BC Circuit	P1E62	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| or Cell V_gate on Case 1: Single Power Line - Positive side Affected Cell Voltage when Cell Balance Gate is on Case 2: General Sense Line |1st Cell V – 2nd Cell V| Case 3: Common Power Line |1st Cell V – 2nd Cell V| Case 4: Common Ground Line |1st Cell V – 2nd Cell V| Case 5: Single Ground Line Affected Cell Voltage when Cell Balance Gate is on Case 6: Splice Line Splice Cap Voltage Case 7: BusBar Splice Splice Cap Voltage	 Case 1: Cell V_On Gate < 36mV Case 2: |1st Cell V – 2nd Cell V| >= 1.3V Case 3 : |1st Cell V – 2nd Cell V| >= 1.3V Case 4 : |1st Cell V – 2nd Cell V| >= 1.3V Case 5 : Cell V_On Gate < 36mV Case 6: Splice Cap Voltage > 0.1V Case 7: Splice Cap Voltage > 0.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	0.6 seconds out of a 0.6 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BD Circuit	P1E63	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| or Cell V_gate on Case 1: Single Power Line - Positive side Affected Cell Voltage when Cell Balance Gate is on Case 2: General Sense Line |1st Cell V – 2nd Cell V| Case 3: Common Power Line |1st Cell V – 2nd Cell V| Case 4: Common Ground Line |1st Cell V – 2nd Cell V| Case 5: Single Ground Line Affected Cell Voltage when Cell Balance Gate is on Case 6: Splice Line Splice Cap Voltage Case 7: BusBar Splice Splice Cap Voltage	 Case 1: Cell V_On Gate < 36mV Case 2: |1st Cell V – 2nd Cell V| >= 1.3V Case 3 : |1st Cell V – 2nd Cell V| >= 1.3V Case 4 : |1st Cell V – 2nd Cell V| >= 1.3V Case 5 : Cell V_On Gate < 36mV Case 6: Splice Cap Voltage > 0.1V Case 7: Splice Cap Voltage > 0.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	0.6 seconds out of a 0.6 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BE Circuit	P1E64	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| or Cell V_gate on Case 1: Single Power Line - Positive side Affected Cell Voltage when Cell Balance Gate is on Case 2: General Sense Line |1st Cell V – 2nd Cell V| Case 3: Common Power Line |1st Cell V – 2nd Cell V| Case 4: Common Ground Line |1st Cell V – 2nd Cell V| Case 5: Single Ground Line Affected Cell Voltage when Cell Balance Gate is on Case 6: Splice Line Splice Cap Voltage Case 7: BusBar Splice Splice Cap Voltage	 Case 1: Cell V_On Gate < 36mV Case 2: |1st Cell V – 2nd Cell V| >= 1.3V Case 3 : |1st Cell V – 2nd Cell V| >= 1.3V Case 4 : |1st Cell V – 2nd Cell V| >= 1.3V Case 5 : Cell V_On Gate < 36mV Case 6: Splice Cap Voltage > 0.1V Case 7: Splice Cap Voltage > 0.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	0.6 seconds out of a 0.6 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BF Circuit	P1E65	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| or Cell V_gate on Case 1: Single Power Line - Positive side Affected Cell Voltage when Cell Balance Gate is on Case 2: General Sense Line |1st Cell V – 2nd Cell V| Case 3: Common Power Line |1st Cell V – 2nd Cell V| Case 4: Common Ground Line |1st Cell V – 2nd Cell V| Case 5: Single Ground Line Affected Cell Voltage when Cell Balance Gate is on Case 6: Splice Line Splice Cap Voltage Case 7: BusBar Splice Splice Cap Voltage	 Case 1: Cell V_On Gate < 36mV Case 2: |1st Cell V – 2nd Cell V| >= 1.3V Case 3 : |1st Cell V – 2nd Cell V| >= 1.3V Case 4 : |1st Cell V – 2nd Cell V| >= 1.3V Case 5 : Cell V_On Gate < 36mV Case 6: Splice Cap Voltage > 0.1V Case 7: Splice Cap Voltage > 0.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	0.6 seconds out of a 0.6 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BG Circuit	P1E66	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| or Cell V_gate on Case 1: Single Power Line - Positive side Affected Cell Voltage when Cell Balance Gate is on Case 2: General Sense Line |1st Cell V – 2nd Cell V| Case 3: Common Power Line |1st Cell V – 2nd Cell V| Case 4: Common Ground Line |1st Cell V – 2nd Cell V| Case 5: Single Ground Line Affected Cell Voltage when Cell Balance Gate is on Case 6: Splice Line Splice Cap Voltage Case 7: BusBar Splice Splice Cap Voltage	 Case 1: Cell V_On Gate < 36mV Case 2: |1st Cell V – 2nd Cell V| >= 1.3V Case 3 : |1st Cell V – 2nd Cell V| >= 1.3V Case 4 : |1st Cell V – 2nd Cell V| >= 1.3V Case 5 : Cell V_On Gate < 36mV Case 6: Splice Cap Voltage > 0.1V Case 7: Splice Cap Voltage > 0.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	0.6 seconds out of a 0.6 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BH Circuit	P1E67	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| or Cell V_gate on Case 1: Single Power Line - Positive side Affected Cell Voltage when Cell Balance Gate is on Case 2: General Sense Line |1st Cell V – 2nd Cell V| Case 3: Common Power Line |1st Cell V – 2nd Cell V| Case 4: Common Ground Line |1st Cell V – 2nd Cell V| Case 5: Single Ground Line Affected Cell Voltage when Cell Balance Gate is on Case 6: Splice Line Splice Cap Voltage Case 7: BusBar Splice Splice Cap Voltage	 Case 1: Cell V_On Gate < 36mV Case 2: |1st Cell V – 2nd Cell V| >= 1.3V Case 3 : |1st Cell V – 2nd Cell V| >= 1.3V Case 4 : |1st Cell V – 2nd Cell V| >= 1.3V Case 5 : Cell V_On Gate < 36mV Case 6: Splice Cap Voltage > 0.1V Case 7: Splice Cap Voltage > 0.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	0.6 seconds out of a 0.6 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BI Circuit	P1E68	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| or Cell V_gate on Case 1: Single Power Line - Positive side Affected Cell Voltage when Cell Balance Gate is on Case 2: General Sense Line |1st Cell V – 2nd Cell V| Case 3: Common Power Line |1st Cell V – 2nd Cell V| Case 4: Common Ground Line |1st Cell V – 2nd Cell V| Case 5: Single Ground Line Affected Cell Voltage when Cell Balance Gate is on Case 6: Splice Line Splice Cap Voltage Case 7: BusBar Splice Splice Cap Voltage	 Case 1: Cell V_On Gate < 36mV Case 2: |1st Cell V – 2nd Cell V| >= 1.3V Case 3 : |1st Cell V – 2nd Cell V| >= 1.3V Case 4 : |1st Cell V – 2nd Cell V| >= 1.3V Case 5 : Cell V_On Gate < 36mV Case 6: Splice Cap Voltage > 0.1V Case 7: Splice Cap Voltage > 0.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	0.6 seconds out of a 0.6 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BJ Circuit	P1E69	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| or Cell V_gate on Case 1: Single Power Line - Positive side Affected Cell Voltage when Cell Balance Gate is on Case 2: General Sense Line |1st Cell V – 2nd Cell V| Case 3: Common Power Line |1st Cell V – 2nd Cell V| Case 4: Common Ground Line |1st Cell V – 2nd Cell V| Case 5: Single Ground Line Affected Cell Voltage when Cell Balance Gate is on Case 6: Splice Line Splice Cap Voltage Case 7: BusBar Splice Splice Cap Voltage	 Case 1: Cell V_On Gate < 36mV Case 2: |1st Cell V – 2nd Cell V| >= 1.3V Case 3 : |1st Cell V – 2nd Cell V| >= 1.3V Case 4 : |1st Cell V – 2nd Cell V| >= 1.3V Case 5 : Cell V_On Gate < 36mV Case 6: Splice Cap Voltage > 0.1V Case 7: Splice Cap Voltage > 0.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	0.6 seconds out of a 0.6 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BK Circuit	P1E6A	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| or Cell V_gate on Case 1: Single Power Line - Positive side Affected Cell Voltage when Cell Balance Gate is on Case 2: General Sense Line |1st Cell V – 2nd Cell V| Case 3: Common Power Line |1st Cell V – 2nd Cell V| Case 4: Common Ground Line |1st Cell V – 2nd Cell V| Case 5: Single Ground Line Affected Cell Voltage when Cell Balance Gate is on Case 6: Splice Line Splice Cap Voltage Case 7: BusBar Splice Splice Cap Voltage	 Case 1: Cell V_On Gate < 36mV Case 2: |1st Cell V – 2nd Cell V| >= 1.3V Case 3 : |1st Cell V – 2nd Cell V| >= 1.3V Case 4 : |1st Cell V – 2nd Cell V| >= 1.3V Case 5 : Cell V_On Gate < 36mV Case 6: Splice Cap Voltage > 0.1V Case 7: Splice Cap Voltage > 0.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	0.6 seconds out of a 0.6 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BL Circuit	P1E6B	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| or Cell V_gate on Case 1: Single Power Line - Positive side Affected Cell Voltage when Cell Balance Gate is on Case 2: General Sense Line |1st Cell V – 2nd Cell V| Case 3: Common Power Line |1st Cell V – 2nd Cell V| Case 4: Common Ground Line |1st Cell V – 2nd Cell V| Case 5: Single Ground Line Affected Cell Voltage when Cell Balance Gate is on Case 6: Splice Line Splice Cap Voltage Case 7: BusBar Splice Splice Cap Voltage	 Case 1: Cell V_On Gate < 36mV Case 2: |1st Cell V – 2nd Cell V| >= 1.3V Case 3 : |1st Cell V – 2nd Cell V| >= 1.3V Case 4 : |1st Cell V – 2nd Cell V| >= 1.3V Case 5 : Cell V_On Gate < 36mV Case 6: Splice Cap Voltage > 0.1V Case 7: Splice Cap Voltage > 0.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	0.6 seconds out of a 0.6 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BM Circuit	P1E6C	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| or Cell V_gate on Case 1: Single Power Line - Positive side Affected Cell Voltage when Cell Balance Gate is on Case 2: General Sense Line |1st Cell V – 2nd Cell V| Case 3: Common Power Line |1st Cell V – 2nd Cell V| Case 4: Common Ground Line |1st Cell V – 2nd Cell V| Case 5: Single Ground Line Affected Cell Voltage when Cell Balance Gate is on Case 6: Splice Line Splice Cap Voltage Case 7: BusBar Splice Splice Cap Voltage	 Case 1: Cell V_On Gate < 36mV Case 2: |1st Cell V – 2nd Cell V| >= 1.3V Case 3 : |1st Cell V – 2nd Cell V| >= 1.3V Case 4 : |1st Cell V – 2nd Cell V| >= 1.3V Case 5 : Cell V_On Gate < 36mV Case 6: Splice Cap Voltage > 0.1V Case 7: Splice Cap Voltage > 0.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	0.6 seconds out of a 0.6 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BN Circuit	P1E6D	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| or Cell V_gate on Case 1: Single Power Line - Positive side Affected Cell Voltage when Cell Balance Gate is on Case 2: General Sense Line |1st Cell V – 2nd Cell V| Case 3: Common Power Line |1st Cell V – 2nd Cell V| Case 4: Common Ground Line |1st Cell V – 2nd Cell V| Case 5: Single Ground Line Affected Cell Voltage when Cell Balance Gate is on Case 6: Splice Line Splice Cap Voltage Case 7: BusBar Splice Splice Cap Voltage	 Case 1: Cell V_On Gate < 36mV Case 2: |1st Cell V – 2nd Cell V| >= 1.3V Case 3 : |1st Cell V – 2nd Cell V| >= 1.3V Case 4 : |1st Cell V – 2nd Cell V| >= 1.3V Case 5 : Cell V_On Gate < 36mV Case 6: Splice Cap Voltage > 0.1V Case 7: Splice Cap Voltage > 0.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	0.6 seconds out of a 0.6 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BO Circuit	P1E6E	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| or Cell V_gate on Case 1: Single Power Line - Positive side Affected Cell Voltage when Cell Balance Gate is on Case 2: General Sense Line |1st Cell V – 2nd Cell V| Case 3: Common Power Line |1st Cell V – 2nd Cell V| Case 4: Common Ground Line |1st Cell V – 2nd Cell V| Case 5: Single Ground Line Affected Cell Voltage when Cell Balance Gate is on Case 6: Splice Line Splice Cap Voltage Case 7: BusBar Splice Splice Cap Voltage	 Case 1: Cell V_On Gate < 36mV Case 2: |1st Cell V – 2nd Cell V| >= 1.3V Case 3 : |1st Cell V – 2nd Cell V| >= 1.3V Case 4 : |1st Cell V – 2nd Cell V| >= 1.3V Case 5 : Cell V_On Gate < 36mV Case 6: Splice Cap Voltage > 0.1V Case 7: Splice Cap Voltage > 0.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	0.6 seconds out of a 0.6 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BP Circuit	P1E6F	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| or Cell V_gate on Case 1: Single Power Line - Positive side Affected Cell Voltage when Cell Balance Gate is on Case 2: General Sense Line |1st Cell V – 2nd Cell V| Case 3: Common Power Line |1st Cell V – 2nd Cell V| Case 4: Common Ground Line |1st Cell V – 2nd Cell V| Case 5: Single Ground Line Affected Cell Voltage when Cell Balance Gate is on Case 6: Splice Line Splice Cap Voltage Case 7: BusBar Splice Splice Cap Voltage	 Case 1: Cell V_On Gate < 36mV Case 2: |1st Cell V – 2nd Cell V| >= 1.3V Case 3 : |1st Cell V – 2nd Cell V| >= 1.3V Case 4 : |1st Cell V – 2nd Cell V| >= 1.3V Case 5 : Cell V_On Gate < 36mV Case 6: Splice Cap Voltage > 0.1V Case 7: Splice Cap Voltage > 0.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	0.6 seconds out of a 0.6 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BQ Circuit	P1E70	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| or Cell V_gate on Case 1: Single Power Line - Positive side Affected Cell Voltage when Cell Balance Gate is on Case 2: General Sense Line |1st Cell V – 2nd Cell V| Case 3: Common Power Line |1st Cell V – 2nd Cell V| Case 4: Common Ground Line |1st Cell V – 2nd Cell V| Case 5: Single Ground Line Affected Cell Voltage when Cell Balance Gate is on Case 6: Splice Line Splice Cap Voltage Case 7: BusBar Splice Splice Cap Voltage	 Case 1: Cell V_On Gate < 36mV Case 2: |1st Cell V – 2nd Cell V| >= 1.3V Case 3 : |1st Cell V – 2nd Cell V| >= 1.3V Case 4 : |1st Cell V – 2nd Cell V| >= 1.3V Case 5 : Cell V_On Gate < 36mV Case 6: Splice Cap Voltage > 0.1V Case 7: Splice Cap Voltage > 0.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	0.6 seconds out of a 0.6 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BR Circuit	P1E71	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| or Cell V_gate on Case 1: Single Power Line - Positive side Affected Cell Voltage when Cell Balance Gate is on Case 2: General Sense Line |1st Cell V – 2nd Cell V| Case 3: Common Power Line |1st Cell V – 2nd Cell V| Case 4: Common Ground Line |1st Cell V – 2nd Cell V| Case 5: Single Ground Line Affected Cell Voltage when Cell Balance Gate is on Case 6: Splice Line Splice Cap Voltage Case 7: BusBar Splice Splice Cap Voltage	 Case 1: Cell V_On Gate < 36mV Case 2: |1st Cell V – 2nd Cell V| >= 1.3V Case 3 : |1st Cell V – 2nd Cell V| >= 1.3V Case 4 : |1st Cell V – 2nd Cell V| >= 1.3V Case 5 : Cell V_On Gate < 36mV Case 6: Splice Cap Voltage > 0.1V Case 7: Splice Cap Voltage > 0.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	0.6 seconds out of a 0.6 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BS Circuit	P1E72	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| or Cell V_gate on Case 1: Single Power Line - Positive side Affected Cell Voltage when Cell Balance Gate is on Case 2: General Sense Line |1st Cell V – 2nd Cell V| Case 3: Common Power Line |1st Cell V – 2nd Cell V| Case 4: Common Ground Line |1st Cell V – 2nd Cell V| Case 5: Single Ground Line Affected Cell Voltage when Cell Balance Gate is on Case 6: Splice Line Splice Cap Voltage Case 7: BusBar Splice Splice Cap Voltage	 Case 1: Cell V_On Gate < 36mV Case 2: |1st Cell V – 2nd Cell V| >= 1.3V Case 3 : |1st Cell V – 2nd Cell V| >= 1.3V Case 4 : |1st Cell V – 2nd Cell V| >= 1.3V Case 5 : Cell V_On Gate < 36mV Case 6: Splice Cap Voltage > 0.1V Case 7: Splice Cap Voltage > 0.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	0.6 seconds out of a 0.6 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BT Circuit	P1E73	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| or Cell V_gate on Case 1: Single Power Line - Positive side Affected Cell Voltage when Cell Balance Gate is on Case 2: General Sense Line |1st Cell V – 2nd Cell V| Case 3: Common Power Line |1st Cell V – 2nd Cell V| Case 4: Common Ground Line |1st Cell V – 2nd Cell V| Case 5: Single Ground Line Affected Cell Voltage when Cell Balance Gate is on Case 6: Splice Line Splice Cap Voltage Case 7: BusBar Splice Splice Cap Voltage	 Case 1: Cell V_On Gate < 36mV Case 2: |1st Cell V – 2nd Cell V| >= 1.3V Case 3 : |1st Cell V – 2nd Cell V| >= 1.3V Case 4 : |1st Cell V – 2nd Cell V| >= 1.3V Case 5 : Cell V_On Gate < 36mV Case 6: Splice Cap Voltage > 0.1V Case 7: Splice Cap Voltage > 0.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	0.6 seconds out of a 0.6 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BU Circuit	P1E74	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| or Cell V_gate on Case 1: Single Power Line - Positive side Affected Cell Voltage when Cell Balance Gate is on Case 2: General Sense Line |1st Cell V – 2nd Cell V| Case 3: Common Power Line |1st Cell V – 2nd Cell V| Case 4: Common Ground Line |1st Cell V – 2nd Cell V| Case 5: Single Ground Line Affected Cell Voltage when Cell Balance Gate is on Case 6: Splice Line Splice Cap Voltage Case 7: BusBar Splice Splice Cap Voltage	 Case 1: Cell V_On Gate < 36mV Case 2: |1st Cell V – 2nd Cell V| >= 1.3V Case 3 : |1st Cell V – 2nd Cell V| >= 1.3V Case 4 : |1st Cell V – 2nd Cell V| >= 1.3V Case 5 : Cell V_On Gate < 36mV Case 6: Splice Cap Voltage > 0.1V Case 7: Splice Cap Voltage > 0.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	0.6 seconds out of a 0.6 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BV Circuit	P1E75	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| or Cell V_gate on Case 1: Single Power Line - Positive side Affected Cell Voltage when Cell Balance Gate is on Case 2: General Sense Line |1st Cell V – 2nd Cell V| Case 3: Common Power Line |1st Cell V – 2nd Cell V| Case 4: Common Ground Line |1st Cell V – 2nd Cell V| Case 5: Single Ground Line Affected Cell Voltage when Cell Balance Gate is on Case 6: Splice Line Splice Cap Voltage Case 7: BusBar Splice Splice Cap Voltage	 Case 1: Cell V_On Gate < 36mV Case 2: |1st Cell V – 2nd Cell V| >= 1.3V Case 3 : |1st Cell V – 2nd Cell V| >= 1.3V Case 4 : |1st Cell V – 2nd Cell V| >= 1.3V Case 5 : Cell V_On Gate < 36mV Case 6: Splice Cap Voltage > 0.1V Case 7: Splice Cap Voltage > 0.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	0.6 seconds out of a 0.6 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BW Circuit	P1E76	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| or Cell V_gate on Case 1: Single Power Line - Positive side Affected Cell Voltage when Cell Balance Gate is on Case 2: General Sense Line |1st Cell V – 2nd Cell V| Case 3: Common Power Line |1st Cell V – 2nd Cell V| Case 4: Common Ground Line |1st Cell V – 2nd Cell V| Case 5: Single Ground Line Affected Cell Voltage when Cell Balance Gate is on Case 6: Splice Line Splice Cap Voltage Case 7: BusBar Splice Splice Cap Voltage	 Case 1: Cell V_On Gate < 36mV Case 2: |1st Cell V – 2nd Cell V| >= 1.3V Case 3 : |1st Cell V – 2nd Cell V| >= 1.3V Case 4 : |1st Cell V – 2nd Cell V| >= 1.3V Case 5 : Cell V_On Gate < 36mV Case 6: Splice Cap Voltage > 0.1V Case 7: Splice Cap Voltage > 0.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	0.6 seconds out of a 0.6 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BX Circuit	P1E77	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| or Cell V_gate on Case 1: Single Power Line - Positive side Affected Cell Voltage when Cell Balance Gate is on Case 2: General Sense Line |1st Cell V – 2nd Cell V| Case 3: Common Power Line |1st Cell V – 2nd Cell V| Case 4: Common Ground Line |1st Cell V – 2nd Cell V| Case 5: Single Ground Line Affected Cell Voltage when Cell Balance Gate is on Case 6: Splice Line Splice Cap Voltage Case 7: BusBar Splice Splice Cap Voltage	 Case 1: Cell V_On Gate < 36mV Case 2: |1st Cell V – 2nd Cell V| >= 1.3V Case 3 : |1st Cell V – 2nd Cell V| >= 1.3V Case 4 : |1st Cell V – 2nd Cell V| >= 1.3V Case 5 : Cell V_On Gate < 36mV Case 6: Splice Cap Voltage > 0.1V Case 7: Splice Cap Voltage > 0.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	0.6 seconds out of a 0.6 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BY Circuit	P1E78	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| or Cell V_gate on Case 1: Single Power Line - Positive side Affected Cell Voltage when Cell Balance Gate is on Case 2: General Sense Line |1st Cell V – 2nd Cell V| Case 3: Common Power Line |1st Cell V – 2nd Cell V| Case 4: Common Ground Line |1st Cell V – 2nd Cell V| Case 5: Single Ground Line Affected Cell Voltage when Cell Balance Gate is on Case 6: Splice Line Splice Cap Voltage Case 7: BusBar Splice Splice Cap Voltage	 Case 1: Cell V_On Gate < 36mV Case 2: |1st Cell V – 2nd Cell V| >= 1.3V Case 3 : |1st Cell V – 2nd Cell V| >= 1.3V Case 4 : |1st Cell V – 2nd Cell V| >= 1.3V Case 5 : Cell V_On Gate < 36mV Case 6: Splice Cap Voltage > 0.1V Case 7: Splice Cap Voltage > 0.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	0.6 seconds out of a 0.6 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BZ Circuit	P1E79	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| or Cell V_gate on Case 1: Single Power Line - Positive side Affected Cell Voltage when Cell Balance Gate is on Case 2: General Sense Line |1st Cell V – 2nd Cell V| Case 3: Common Power Line |1st Cell V – 2nd Cell V| Case 4: Common Ground Line |1st Cell V – 2nd Cell V| Case 5: Single Ground Line Affected Cell Voltage when Cell Balance Gate is on Case 6: Splice Line Splice Cap Voltage Case 7: BusBar Splice Splice Cap Voltage	 Case 1: Cell V_On Gate < 36mV Case 2: |1st Cell V – 2nd Cell V| >= 1.3V Case 3 : |1st Cell V – 2nd Cell V| >= 1.3V Case 4 : |1st Cell V – 2nd Cell V| >= 1.3V Case 5 : Cell V_On Gate < 36mV Case 6: Splice Cap Voltage > 0.1V Case 7: Splice Cap Voltage > 0.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	0.6 seconds out of a 0.6 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense CA Circuit	P1E7A	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| or Cell V_gate on Case 1: Single Power Line - Positive side Affected Cell Voltage when Cell Balance Gate is on Case 2: General Sense Line |1st Cell V – 2nd Cell V| Case 3: Common Power Line |1st Cell V – 2nd Cell V| Case 4: Common Ground Line |1st Cell V – 2nd Cell V| Case 5: Single Ground Line Affected Cell Voltage when Cell Balance Gate is on Case 6: Splice Line Splice Cap Voltage Case 7: BusBar Splice Splice Cap Voltage	 Case 1: Cell V_On Gate < 36mV Case 2: |1st Cell V – 2nd Cell V| >= 1.3V Case 3 : |1st Cell V – 2nd Cell V| >= 1.3V Case 4 : |1st Cell V – 2nd Cell V| >= 1.3V Case 5 : Cell V_On Gate < 36mV Case 6: Splice Cap Voltage > 0.1V Case 7: Splice Cap Voltage > 0.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	0.6 seconds out of a 0.6 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense CB Circuit	P1E7B	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| or Cell V_gate on Case 1: Single Power Line - Positive side Affected Cell Voltage when Cell Balance Gate is on Case 2: General Sense Line |1st Cell V – 2nd Cell V| Case 3: Common Power Line |1st Cell V – 2nd Cell V| Case 4: Common Ground Line |1st Cell V – 2nd Cell V| Case 5: Single Ground Line Affected Cell Voltage when Cell Balance Gate is on Case 6: Splice Line Splice Cap Voltage Case 7: BusBar Splice Splice Cap Voltage	 Case 1: Cell V_On Gate < 36mV Case 2: |1st Cell V – 2nd Cell V| >= 1.3V Case 3 : |1st Cell V – 2nd Cell V| >= 1.3V Case 4 : |1st Cell V – 2nd Cell V| >= 1.3V Case 5 : Cell V_On Gate < 36mV Case 6: Splice Cap Voltage > 0.1V Case 7: Splice Cap Voltage > 0.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	0.6 seconds out of a 0.6 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense CC Circuit	P1E7C	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| or Cell V_gate on Case 1: Single Power Line - Positive side Affected Cell Voltage when Cell Balance Gate is on Case 2: General Sense Line |1st Cell V – 2nd Cell V| Case 3: Common Power Line |1st Cell V – 2nd Cell V| Case 4: Common Ground Line |1st Cell V – 2nd Cell V| Case 5: Single Ground Line Affected Cell Voltage when Cell Balance Gate is on Case 6: Splice Line Splice Cap Voltage Case 7: BusBar Splice Splice Cap Voltage	 Case 1: Cell V_On Gate < 36mV Case 2: |1st Cell V – 2nd Cell V| >= 1.3V Case 3 : |1st Cell V – 2nd Cell V| >= 1.3V Case 4 : |1st Cell V – 2nd Cell V| >= 1.3V Case 5 : Cell V_On Gate < 36mV Case 6: Splice Cap Voltage > 0.1V Case 7: Splice Cap Voltage > 0.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	0.6 seconds out of a 0.6 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense CD Circuit	P1E7D	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| or Cell V_gate on Case 1: Single Power Line - Positive side Affected Cell Voltage when Cell Balance Gate is on Case 2: General Sense Line |1st Cell V – 2nd Cell V| Case 3: Common Power Line |1st Cell V – 2nd Cell V| Case 4: Common Ground Line |1st Cell V – 2nd Cell V| Case 5: Single Ground Line Affected Cell Voltage when Cell Balance Gate is on Case 6: Splice Line Splice Cap Voltage Case 7: BusBar Splice Splice Cap Voltage	 Case 1: Cell V_On Gate < 36mV Case 2: |1st Cell V – 2nd Cell V| >= 1.3V Case 3 : |1st Cell V – 2nd Cell V| >= 1.3V Case 4 : |1st Cell V – 2nd Cell V| >= 1.3V Case 5 : Cell V_On Gate < 36mV Case 6: Splice Cap Voltage > 0.1V Case 7: Splice Cap Voltage > 0.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	0.6 seconds out of a 0.6 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense CE Circuit	P1E7E	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| or Cell V_gate on Case 1: Single Power Line - Positive side Affected Cell Voltage when Cell Balance Gate is on Case 2: General Sense Line |1st Cell V – 2nd Cell V| Case 3: Common Power Line |1st Cell V – 2nd Cell V| Case 4: Common Ground Line |1st Cell V – 2nd Cell V| Case 5: Single Ground Line Affected Cell Voltage when Cell Balance Gate is on Case 6: Splice Line Splice Cap Voltage Case 7: BusBar Splice Splice Cap Voltage	Case 1: Cell V_On Gate < 36mV Case 2: |1st Cell V – 2nd Cell V| >= 1.3V Case 3 : |1st Cell V – 2nd Cell V| >= 1.3V Case 4 : |1st Cell V – 2nd Cell V| >= 1.3V Case 5 : Cell V_On Gate < 36mV Case 6: Splice Cap Voltage > 0.1V Case 7: Splice Cap Voltage > 0.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	0.6 seconds out of a 0.6 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense CF Circuit	P1E7F	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| or Cell V_gate on Case 1: Single Power Line - Positive side Affected Cell Voltage when Cell Balance Gate is on Case 2: General Sense Line |1st Cell V – 2nd Cell V| Case 3: Common Power Line |1st Cell V – 2nd Cell V| Case 4: Common Ground Line |1st Cell V – 2nd Cell V| Case 5: Single Ground Line Affected Cell Voltage when Cell Balance Gate is on Case 6: Splice Line Splice Cap Voltage Case 7: BusBar Splice Splice Cap Voltage	 Case 1: Cell V_On Gate < 36mV Case 2: |1st Cell V – 2nd Cell V| >= 1.3V Case 3 : |1st Cell V – 2nd Cell V| >= 1.3V Case 4 : |1st Cell V – 2nd Cell V| >= 1.3V Case 5 : Cell V_On Gate < 36mV Case 6: Splice Cap Voltage > 0.1V Case 7: Splice Cap Voltage > 0.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	0.6 seconds out of a 0.6 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense CG Circuit	P1E80	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| or Cell V_gate on Case 1: Single Power Line - Positive side Affected Cell Voltage when Cell Balance Gate is on Case 2: General Sense Line |1st Cell V – 2nd Cell V| Case 3: Common Power Line |1st Cell V – 2nd Cell V| Case 4: Common Ground Line |1st Cell V – 2nd Cell V| Case 5: Single Ground Line Affected Cell Voltage when Cell Balance Gate is on Case 6: Splice Line Splice Cap Voltage Case 7: BusBar Splice Splice Cap Voltage	 Case 1: Cell V_On Gate < 36mV Case 2: |1st Cell V – 2nd Cell V| >= 1.3V Case 3 : |1st Cell V – 2nd Cell V| >= 1.3V Case 4 : |1st Cell V – 2nd Cell V| >= 1.3V Case 5 : Cell V_On Gate < 36mV Case 6: Splice Cap Voltage > 0.1V Case 7: Splice Cap Voltage > 0.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	0.6 seconds out of a 0.6 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense CH Circuit	P1E81	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| or Cell V_gate on Case 1: Single Power Line - Positive side Affected Cell Voltage when Cell Balance Gate is on Case 2: General Sense Line |1st Cell V – 2nd Cell V| Case 3: Common Power Line |1st Cell V – 2nd Cell V| Case 4: Common Ground Line |1st Cell V – 2nd Cell V| Case 5: Single Ground Line Affected Cell Voltage when Cell Balance Gate is on Case 6: Splice Line Splice Cap Voltage Case 7: BusBar Splice Splice Cap Voltage	 Case 1: Cell V_On Gate < 36mV Case 2: |1st Cell V – 2nd Cell V| >= 1.3V Case 3 : |1st Cell V – 2nd Cell V| >= 1.3V Case 4 : |1st Cell V – 2nd Cell V| >= 1.3V Case 5 : Cell V_On Gate < 36mV Case 6: Splice Cap Voltage > 0.1V Case 7: Splice Cap Voltage > 0.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	0.6 seconds out of a 0.6 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense CI Circuit	P1E82	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| or Cell V_gate on Case 1: Single Power Line - Positive side Affected Cell Voltage when Cell Balance Gate is on Case 2: General Sense Line |1st Cell V – 2nd Cell V| Case 3: Common Power Line |1st Cell V – 2nd Cell V| Case 4: Common Ground Line |1st Cell V – 2nd Cell V| Case 5: Single Ground Line Affected Cell Voltage when Cell Balance Gate is on Case 6: Splice Line Splice Cap Voltage Case 7: BusBar Splice Splice Cap Voltage	 Case 1: Cell V_On Gate < 36mV Case 2: |1st Cell V – 2nd Cell V| >= 1.3V Case 3 : |1st Cell V – 2nd Cell V| >= 1.3V Case 4 : |1st Cell V – 2nd Cell V| >= 1.3V Case 5 : Cell V_On Gate < 36mV Case 6: Splice Cap Voltage > 0.1V Case 7: Splice Cap Voltage > 0.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	0.6 seconds out of a 0.6 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense CJ Circuit	P1E83	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| or Cell V_gate on Case 1: Single Power Line - Positive side Affected Cell Voltage when Cell Balance Gate is on Case 2: General Sense Line |1st Cell V – 2nd Cell V| Case 3: Common Power Line |1st Cell V – 2nd Cell V| Case 4: Common Ground Line |1st Cell V – 2nd Cell V| Case 5: Single Ground Line Affected Cell Voltage when Cell Balance Gate is on Case 6: Splice Line Splice Cap Voltage Case 7: BusBar Splice Splice Cap Voltage	 Case 1: Cell V_On Gate < 36mV Case 2: |1st Cell V – 2nd Cell V| >= 1.3V Case 3 : |1st Cell V – 2nd Cell V| >= 1.3V Case 4 : |1st Cell V – 2nd Cell V| >= 1.3V Case 5 : Cell V_On Gate < 36mV Case 6: Splice Cap Voltage > 0.1V Case 7: Splice Cap Voltage > 0.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	0.6 seconds out of a 0.6 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense CK Circuit	P1E84	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| or Cell V_gate on Case 1: Single Power Line - Positive side Affected Cell Voltage when Cell Balance Gate is on Case 2: General Sense Line |1st Cell V – 2nd Cell V| Case 3: Common Power Line |1st Cell V – 2nd Cell V| Case 4: Common Ground Line |1st Cell V – 2nd Cell V| Case 5: Single Ground Line Affected Cell Voltage when Cell Balance Gate is on Case 6: Splice Line Splice Cap Voltage Case 7: BusBar Splice Splice Cap Voltage	 Case 1: Cell V_On Gate < 36mV Case 2: |1st Cell V – 2nd Cell V| >= 1.3V Case 3 : |1st Cell V – 2nd Cell V| >= 1.3V Case 4 : |1st Cell V – 2nd Cell V| >= 1.3V Case 5 : Cell V_On Gate < 36mV Case 6: Splice Cap Voltage > 0.1V Case 7: Splice Cap Voltage > 0.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	0.6 seconds out of a 0.6 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense CL Circuit	P1E85	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| or Cell V_gate on Case 1: Single Power Line - Positive side Affected Cell Voltage when Cell Balance Gate is on Case 2: General Sense Line |1st Cell V – 2nd Cell V| Case 3: Common Power Line |1st Cell V – 2nd Cell V| Case 4: Common Ground Line |1st Cell V – 2nd Cell V| Case 5: Single Ground Line Affected Cell Voltage when Cell Balance Gate is on Case 6: Splice Line Splice Cap Voltage Case 7: BusBar Splice Splice Cap Voltage	 Case 1: Cell V_On Gate < 36mV Case 2: |1st Cell V – 2nd Cell V| >= 1.3V Case 3 : |1st Cell V – 2nd Cell V| >= 1.3V Case 4 : |1st Cell V – 2nd Cell V| >= 1.3V Case 5 : Cell V_On Gate < 36mV Case 6: Splice Cap Voltage > 0.1V Case 7: Splice Cap Voltage > 0.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	0.6 seconds out of a 0.6 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense CM Circuit	P1E86	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| or Cell V_gate on Case 1: Single Power Line - Positive side Affected Cell Voltage when Cell Balance Gate is on Case 2: General Sense Line |1st Cell V – 2nd Cell V| Case 3: Common Power Line |1st Cell V – 2nd Cell V| Case 4: Common Ground Line |1st Cell V – 2nd Cell V| Case 5: Single Ground Line Affected Cell Voltage when Cell Balance Gate is on Case 6: Splice Line Splice Cap Voltage Case 7: BusBar Splice Splice Cap Voltage	 Case 1: Cell V_On Gate < 36mV Case 2: |1st Cell V – 2nd Cell V| >= 1.3V Case 3 : |1st Cell V – 2nd Cell V| >= 1.3V Case 4 : |1st Cell V – 2nd Cell V| >= 1.3V Case 5 : Cell V_On Gate < 36mV Case 6: Splice Cap Voltage > 0.1V Case 7: Splice Cap Voltage > 0.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	0.6 seconds out of a 0.6 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense CN Circuit	P1E87	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| or Cell V_gate on Case 1: Single Power Line - Positive side Affected Cell Voltage when Cell Balance Gate is on Case 2: General Sense Line |1st Cell V – 2nd Cell V| Case 3: Common Power Line |1st Cell V – 2nd Cell V| Case 4: Common Ground Line |1st Cell V – 2nd Cell V| Case 5: Single Ground Line Affected Cell Voltage when Cell Balance Gate is on Case 6: Splice Line Splice Cap Voltage Case 7: BusBar Splice Splice Cap Voltage	 Case 1: Cell V_On Gate < 36mV Case 2: |1st Cell V – 2nd Cell V| >= 1.3V Case 3 : |1st Cell V – 2nd Cell V| >= 1.3V Case 4 : |1st Cell V – 2nd Cell V| >= 1.3V Case 5 : Cell V_On Gate < 36mV Case 6: Splice Cap Voltage > 0.1V Case 7: Splice Cap Voltage > 0.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	0.6 seconds out of a 0.6 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense CO Circuit	P1E88	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| or Cell V_gate on Case 1: Single Power Line - Positive side Affected Cell Voltage when Cell Balance Gate is on Case 2: General Sense Line |1st Cell V – 2nd Cell V| Case 3: Common Power Line |1st Cell V – 2nd Cell V| Case 4: Common Ground Line |1st Cell V – 2nd Cell V| Case 5: Single Ground Line Affected Cell Voltage when Cell Balance Gate is on Case 6: Splice Line Splice Cap Voltage Case 7: BusBar Splice Splice Cap Voltage	 Case 1: Cell V_On Gate < 36mV Case 2: |1st Cell V – 2nd Cell V| >= 1.3V Case 3 : |1st Cell V – 2nd Cell V| >= 1.3V Case 4 : |1st Cell V – 2nd Cell V| >= 1.3V Case 5 : Cell V_On Gate < 36mV Case 6: Splice Cap Voltage > 0.1V Case 7: Splice Cap Voltage > 0.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	0.6 seconds out of a 0.6 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense CP Circuit	P1E89	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| or Cell V_gate on Case 1: Single Power Line - Positive side Affected Cell Voltage when Cell Balance Gate is on Case 2: General Sense Line |1st Cell V – 2nd Cell V| Case 3: Common Power Line |1st Cell V – 2nd Cell V| Case 4: Common Ground Line |1st Cell V – 2nd Cell V| Case 5: Single Ground Line Affected Cell Voltage when Cell Balance Gate is on Case 6: Splice Line Splice Cap Voltage Case 7: BusBar Splice Splice Cap Voltage	 Case 1: Cell V_On Gate < 36mV Case 2: |1st Cell V – 2nd Cell V| >= 1.3V Case 3 : |1st Cell V – 2nd Cell V| >= 1.3V Case 4 : |1st Cell V – 2nd Cell V| >= 1.3V Case 5 : Cell V_On Gate < 36mV Case 6: Splice Cap Voltage > 0.1V Case 7: Splice Cap Voltage > 0.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	0.6 seconds out of a 0.6 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense CQ Circuit	P1E8A	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| or Cell V_gate on Case 1: Single Power Line - Positive side Affected Cell Voltage when Cell Balance Gate is on Case 2: General Sense Line |1st Cell V – 2nd Cell V| Case 3: Common Power Line |1st Cell V – 2nd Cell V| Case 4: Common Ground Line |1st Cell V – 2nd Cell V| Case 5: Single Ground Line Affected Cell Voltage when Cell Balance Gate is on Case 6: Splice Line Splice Cap Voltage Case 7: BusBar Splice Splice Cap Voltage	 Case 1: Cell V_On Gate < 36mV Case 2: |1st Cell V – 2nd Cell V| >= 1.3V Case 3 : |1st Cell V – 2nd Cell V| >= 1.3V Case 4 : |1st Cell V – 2nd Cell V| >= 1.3V Case 5 : Cell V_On Gate < 36mV Case 6: Splice Cap Voltage > 0.1V Case 7: Splice Cap Voltage > 0.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	0.6 seconds out of a 0.6 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense CR Circuit	P1E8B	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| or Cell V_gate on Case 1: Single Power Line - Positive side Affected Cell Voltage when Cell Balance Gate is on Case 2: General Sense Line |1st Cell V – 2nd Cell V| Case 3: Common Power Line |1st Cell V – 2nd Cell V| Case 4: Common Ground Line |1st Cell V – 2nd Cell V| Case 5: Single Ground Line Affected Cell Voltage when Cell Balance Gate is on Case 6: Splice Line Splice Cap Voltage Case 7: BusBar Splice Splice Cap Voltage	 Case 1: Cell V_On Gate < 36mV Case 2: |1st Cell V – 2nd Cell V| >= 1.3V Case 3 : |1st Cell V – 2nd Cell V| >= 1.3V Case 4 : |1st Cell V – 2nd Cell V| >= 1.3V Case 5 : Cell V_On Gate < 36mV Case 6: Splice Cap Voltage > 0.1V Case 7: Splice Cap Voltage > 0.5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Cell Balancing Fault No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Open Sense Line Fault Not Running Slave Cell Balancing Fault Slave Internal Performance Fault	0.6 seconds out of a 0.6 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Interface Control Module A Performance	P1E8E	Slave A fails for any of the following reasons: - Illegal Address Detect Reset - Illegal Opcode or Detect Reset - Watchdog Timer Reset - Loss of Clock Reset - Low Voltage Detect Reset - SPI Bus Malfunction (Read Value from Register Not Equal to Written Value)	If Watchdog resets controller OR Wrong value Read DTC Pass	1 All should pass	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable VITM System Voltage	True True >= 9V	Instantaneous - all reasons other than SPI bus 500us - SPI Bus 500 us in 200ms window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Interface Control Module A RAM	P1E8F	RAM Read Write function Failed	RAM Read not Equal to RAM Written DTC Pass	1 1	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm	True Transitions: TRUE to FALSE (During VTSM A Power down) U2603, U2604, U2605, U2606, U2617, U2618, U2619, U2620, U2621, U2622, U2623, U2624	At power up At power up	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Interface Control Module A ROM	P1E90	ROM Checksum Method	ROM Checksum Value Calculated is Different than Stored DTC Pass	1 1	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm	True Transitions: TRUE to FALSE (During VTSM A Power down) U2603, U2604, U2605, U2606, U2617, U2618, U2619, U2620, U2621, U2622, U2623, U2624	At power down At power down	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Interface Control Module A KAM	P1E91	Using Checksum method	EEPROM Checksum Value Calculated is Different than Stored DTC Pass	1 1	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm	True Transitions: TRUE to FALSE (During VTSM A Power down) U2603, U2604, U2605, U2606, U2617, U2618, U2619, U2620, U2621, U2622, U2623, U2624	At power down At power down	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Interface Control Module A Cell Balancing Circuit	P1E92	Cell Balance switch output	Cell Balance switch is below threshold DTC Pass	Slaves in VTSM: 4.0V < Cell Voltage < 5.0V Threshold = 66mV 3.5V < Cell Voltage < 4.0V Threshold = 41mV 3.0V < Cell Voltage < 3.5V Threshold = 22mV Slaves in VITM: 3.8V < Cell Voltage < 5.0V Threshold = 44mV 3.0V < Cell Voltage < 3.8V Threshold = 23mV Threshold is above values specified for Cell Voltage specified	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Internal Performance	True True U2603, U2604, U2605, U2606, U2617, U2618, U2619, U2620, U2621, U2622, U2623, U2624 Not Running P1E8E, P1E94, P1E9A, P1EA0, P1FBD, P1FBE, P1FBF, P1FC0, P1FC1, P1FC2, P3037, P3042	14 seconds in a 20 seconds window 20 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Interface Control Module A 5V Ref	P1E93	Sets when 5V Slave reference voltage is out of range	5V Reference Value (Circuit for Reference Diagnostic, Shunt Regulator)	5V Reference Value < 2.8V or 5V Reference Value > 3.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm 2nd Protection Self Test Diagnostic	True True U2603, U2604, U2605, U2606, U2617, U2618, U2619, U2620, U2621, U2622, U2623, U2624 Not Running	1.4 seconds in a 2.0 seconds window	Type A, 1 Trips
			DTC Pass	2.8V <= 5V Reference Value <= 3.2V			2.0 seconds	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Interface Control Module B Performance	P1E94	Slave B fails for any of the following reasons: - Illegal Address Detect Reset - Illegal Opcode or Detect Reset - Watchdog Timer Reset - Loss of Clock Reset - Low Voltage Detect Reset - SPI Bus Malfunction (Read Value from Register Not Equal to Written Value)	If Watchdog resets controller OR Wrong value Read DTC Pass	1 All should pass	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable VITM System Voltage	True True >= 9V	Instantaneous - all reasons other than SPI bus 500us - SPI Bus 500 us in 200ms window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Interface Control Module B RAM	P1E95	RAM Read Write function Failed	RAM Read not Equal to RAM Written DTC Pass	1 1	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm	True Transitions: TRUE to FALSE (During VTSM B Power down) U2603, U2604, U2605, U2606, U2617, U2618, U2619, U2620, U2621, U2622, U2623, U2624	At power up At power up	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Interface Control Module B ROM	P1E96	ROM Checksum Method	ROM Checksum Value Calculated is Different than Stored	1	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm	True Transitions: TRUE to FALSE (During VTSM B Power down) U2603, U2604, U2605, U2606, U2617, U2618, U2619, U2620, U2621, U2622, U2623, U2624	At power down	Type A, 1 Trips
			DTC Pass	1			At power down	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Interface Control Module B KAM	P1E97	Using Checksum method	EEPROM Checksum Value Calculated is Different than Stored DTC Pass	1 1	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm	True Transitions: TRUE to FALSE (During VTSM B Power down) U2603, U2604, U2605, U2606, U2617, U2618, U2619, U2620, U2621, U2622, U2623, U2624	At power down At power down	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Interface Control Module B Cell Balancing Circuit	P1E98	Cell Balance switch output	Cell Balance switch is below threshold DTC Pass	Slaves in VTSM: 4.0V < Cell Voltage < 5.0V Threshold = 66mV 3.5V < Cell Voltage < 4.0V Threshold = 41mV 3.0V < Cell Voltage < 3.5V Threshold = 22mV Slaves in VITM: 3.8V < Cell Voltage < 5.0V Threshold = 44mV 3.0V < Cell Voltage < 3.8V Threshold = 23mV Threshold is above values specified for Cell Voltage specified	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Internal Performance	True True U2603, U2604, U2605, U2606, U2617, U2618, U2619, U2620, U2621, U2622, U2623, U2624 Not Running P1E8E, P1E94, P1E9A, P1EA0, P1FBD, P1FBE, P1FBF, P1FC0, P1FC1, P1FC2, P3037, P3042	14 seconds in a 20 seconds window 20 seconds	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Interface Control Module B 5V Ref	P1E99	Sets when 5V Slave reference voltage is out of range	5V Reference Value (Circuit for Reference Diagnostic, Shunt Regulator) DTC Pass	5V Reference Value < 2.8V or 5V Reference Value > 3.2V 2.8V <= 5V Reference Value <= 3.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm 2nd Protection Self Test Diagnostic	True True U2603, U2604, U2605, U2606, U2617, U2618, U2619, U2620, U2621, U2622, U2623, U2624 Not Running	1.4 seconds in a 2.0 seconds window 2.0 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Interface Control Module C Performance	P1E9A	Slave C fails for any of the following reasons: - Illegal Address Detect Reset - Illegal Opcode or Detect Reset - Watchdog Timer Reset - Loss of Clock Reset - Low Voltage Detect Reset - SPI Bus Malfunction (Read Value from Register Not Equal to Written Value)	If Watchdog resets controller OR Wrong value Read DTC Pass	1 All should pass	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable VITM System Voltage	True True >= 9V	Instantaneous - all reasons other than SPI bus 500us - SPI Bus 500 us in 200ms window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Interface Control Module C RAM	P1E9B	RAM Read Write function Failed	RAM Read not Equal to RAM Written DTC Pass	1 1	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm	True Transitions: TRUE to FALSE (During VTSM C Power down) U2603, U2604, U2605, U2606, U2617, U2618, U2619, U2620, U2621, U2622, U2623, U2624	At power up At power up	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Interface Control Module C ROM	P1E9C	ROM Checksum Method	ROM Checksum Value Calculated is Different than Stored	1	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm	True Transitions: TRUE to FALSE (During VTSM C Power down) U2603, U2604, U2605, U2606, U2617, U2618, U2619, U2620, U2621, U2622, U2623, U2624	At power down	Type A, 1 Trips
			DTC Pass	1			At power down	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Interface Control Module C KAM	P1E9D	Using Checksum method	EEPROM Checksum Value Calculated is Different than Stored DTC Pass	1 1	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm	True Transitions: TRUE to FALSE (During VTSM C Power down) U2603, U2604, U2605, U2606, U2617, U2618, U2619, U2620, U2621, U2622, U2623, U2624	At power down At power down	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Interface Control Module C Cell Balancing Circuit	P1E9E	Cell Balance switch output	Cell Balance switch is below threshold DTC Pass	Slaves in VTSM: 4.0V < Cell Voltage < 5.0V Threshold = 66mV 3.5V < Cell Voltage < 4.0V Threshold = 41mV 3.0V < Cell Voltage < 3.5V Threshold = 22mV Slaves in VITM: 3.8V < Cell Voltage < 5.0V Threshold = 44mV 3.0V < Cell Voltage < 3.8V Threshold = 23mV Threshold is above values specified for Cell Voltage specified	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Internal Performance	True True U2603, U2604, U2605, U2606, U2617, U2618, U2619, U2620, U2621, U2622, U2623, U2624 Not Running P1E8E, P1E94, P1E9A, P1EA0, P1FBD, P1FBE, P1FBF, P1FC0, P1FC1, P1FC2, P3037, P3042	14 seconds in a 20 seconds window 20 seconds	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Interface Control Module C 5V Ref	P1E9F	Sets when 5V Slave reference voltage is out of range	5V Reference Value (Circuit for Reference Diagnostic, Shunt Regulator)	5V Reference Value < 2.8V or 5V Reference Value > 3.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm 2nd Protection Self Test Diagnostic	True True U2603, U2604, U2605, U2606, U2617, U2618, U2619, U2620, U2621, U2622, U2623, U2624 Not Running	1.4 seconds in a 2.0 seconds window	Type A, 1 Trips
			DTC Pass	2.8V <= 5V Reference Value <= 3.2V			2.0 seconds	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Interface Control Module D Performance	P1EA0	Slave D fails for any of the following reasons: - Illegal Address Detect Reset - Illegal Opcode or Detect Reset - Watchdog Timer Reset - Loss of Clock Reset - Low Voltage Detect Reset - SPI Bus Malfunction (Read Value from Register Not Equal to Written Value)	If Watchdog resets controller OR Wrong value Read DTC Pass	1 All should pass	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable VITM System Voltage	True True >= 9V	Instantaneous - all reasons other than SPI bus 500us - SPI Bus 500 us in 200ms window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Interface Control Module D RAM	P1EA1	RAM Read Write function Failed	RAM Read not Equal to RAM Written DTC Pass	1 1	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm	True Transitions: TRUE to FALSE (During VTSM D Power down) U2603, U2604, U2605, U2606, U2617, U2618, U2619, U2620, U2621, U2622, U2623, U2624	At power up At power up	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Interface Control Module D ROM	P1EA2	ROM Checksum Method	ROM Checksum Value Calculated is Different than Stored	1	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm	True Transitions: TRUE to FALSE (During VTSM D Power down) U2603, U2604, U2605, U2606, U2617, U2618, U2619, U2620, U2621, U2622, U2623, U2624	At power down	Type A, 1 Trips
			DTC Pass	1			At power down	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Interface Control Module D KAM	P1EA3	Using Checksum method	EEPROM Checksum Value Calculated is Different than Stored DTC Pass	1 1	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm	True Transitions: TRUE to FALSE (During VTSM D Power down) U2603, U2604, U2605, U2606, U2617, U2618, U2619, U2620, U2621, U2622, U2623, U2624	At power down At power down	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Interface Control Module D Cell Balancing Circuit	P1EA4	Cell Balance switch output	Cell Balance switch is below threshold DTC Pass	Slaves in VTSM: 4.0V < Cell Voltage < 5.0V Threshold = 66mV 3.5V < Cell Voltage < 4.0V Threshold = 41mV 3.0V < Cell Voltage < 3.5V Threshold = 22mV Slaves in VITM: 3.8V < Cell Voltage < 5.0V Threshold = 44mV 3.0V < Cell Voltage < 3.8V Threshold = 23mV Threshold is above values specified for Cell Voltage specified	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Internal Performance	True True U2603, U2604, U2605, U2606, U2617, U2618, U2619, U2620, U2621, U2622, U2623, U2624 Not Running P1E8E, P1E94, P1E9A, P1EA0, P1FBD, P1FBE, P1FBF, P1FC0, P1FC1, P1FC2, P3037, P3042	14 seconds in a 20 seconds window 20 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Interface Control Module D 5V Ref	P1EA5	Sets when 5V Slave reference voltage is out of range	5V Reference Value (Circuit for Reference Diagnostic, Shunt Regulator)	5V Reference Value < 2.8V or 5V Reference Value > 3.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm 2nd Protection Self Test Diagnostic	True True U2603, U2604, U2605, U2606, U2617, U2618, U2619, U2620, U2621, U2622, U2623, U2624 Not Running	1.4 seconds in a 2.0 seconds window	Type A, 1 Trips
			DTC Pass	2.8V <= 5V Reference Value <= 3.2V			2.0 seconds	

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid/EV Battery Interface Control Module Software Incompatible	P1EB1	VITM Software version and Software version of ALL Slave modules are compatible	If any software version incompatibility is detected	1	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable VITM System Voltage No Active DTCs associated with Slave Loss of Comm	True True >= 9V Slave Loss of Comm Fault	At power up - 0.200 seconds	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid/EV Battery Interface Control Module A Not Programmed	P1EB2	If Slave did not Program correctly	Wrong or No response from Slave indicating error in Programming	1	After Programming session Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable VITM System Voltage	 True True >= 9V	As soon as Programming session ends	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid/EV Battery Interface Control Module B Not Programmed	P1EB3	If Slave did not Program correctly	Wrong or No response from Slave indicating error in Programming	1	After Programming session Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable VITM System Voltage	 True True >= 9V	As soon as Programming session ends	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid/EV Battery Interface Control Module C Not Programmed	P1EB4	If Slave did not Program correctly	Wrong or No response from Slave indicating error in Programming	1	After Programming session Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable VITM System Voltage	 True True >= 9V	As soon as Programming session ends	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid/EV Battery Interface Control Module D Not Programmed	P1EB5	If Slave did not Program correctly	Wrong or No response from Slave indicating error in Programming	1	After Programming session Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable VITM System Voltage	 True True >= 9V	As soon as Programming session ends	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid/EV Battery Pack Current Sensor A Exceeded Learning Limit	P1EBA	If Pack Current Coarse Offset is out of range	|Pack Current Coarse Offset|	> 8A	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable High Voltage Contactor Status Charger Contactor Status VITM System Voltage VITM Initalization Status Extended No Active DTC for Battery Energy Control Module Lost Communication with Hybrid Processor Control Module B on Bus H	True True Open Open >= 9V Initializing U185B	At power up - 185 ms	Type A, 1 Trips
			DTC Pass	|Pack Current Coarse Offset| <= 8A			At power up - 185 ms	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid/EV Battery Pack Current Sensor B Exceeded Learning Limit	P1EBB	If Pack Current Fine Offset is out of range	Pack Current Fine Offset	|Pack Current Fine Offset| > 2.5A	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable High Voltage Contactor Status Charger Contactor Status VITM System Voltage VITM Initalization Status Extended No Active DTC for Battery Energy Control Module Lost Communication with Hybrid Processor Control Module B on Bus H	True True Open Open >= 9V Initializing U185B	At power up - 185 ms	Type A, 1 Trips
			DTC Pass	|Pack Current Fine Offset| <= 2.5A			At power up - 185 ms	

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Energy Control Module High Voltage Energy Management Communication Bus Enable Circuit Low	P1EC1	If High Voltage Energy Management (HVEM) Wakeup input state is below Threshold and HVEM Received Serial Data State = Active	HVEM Hardwire Input and Serial Data signal DTC Pass	HVEM Input < 5V HVEM Input >= 5V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable VITM System Voltage No Active DTC for Battery Energy Control Module System Voltage Low No Active DTC for Battery Energy Control Module Lost Communication with Hybrid Processor Control Module B on Bus A (HS)	True True >= 9V P1A0C U2602	7 seconds in a 10 second window 10 Seconds	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid/EV Battery Interface Control Module A Processor Performance	P1F06	Compare Slave Reported Value with Expected Value in VITM	Reported Key Value by Slave is not correct	5	Diagnostic Enable Seed and Key Algorithm Calibration Run/Crank, Accessory or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm 2nd Protection Self Test Diagnostic	True True True Slave Loss of Comm Fault Not Running	1 second in a 1.4 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid/EV Battery Interface Control Module B Processor Performance	P1F07	Compare Slave Reported Value with Expected Value in VITM	Reported Key Value by Slave is not correct	5	Diagnostic Enable Seed and Key Algorithm Calibration Run/Crank, Accessory or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm 2nd Protection Self Test Diagnostic	True True True Slave Loss of Comm Fault Not Running	1 second in a 1.4 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid/EV Battery Interface Control Module C Processor Performance	P1F08	Compare Slave Reported Value with Expected Value in VITM	Reported Key Value by Slave is not correct	5	Diagnostic Enable Seed and Key Algorithm Calibration Run/Crank, Accessory or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm 2nd Protection Self Test Diagnostic	True True True Slave Loss of Comm Fault Not Running	1 second in a 1.4 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid/EV Battery Interface Control Module D Processor Performance	P1F09	Compare Slave Reported Value with Expected Value in VITM	Reported Key Value by Slave is not correct	5	Diagnostic Enable Seed and Key Algorithm Calibration Run/Crank, Accessory or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm 2nd Protection Self Test Diagnostic	True True True Slave Loss of Comm Fault Not Running	1 second in a 1.4 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid/EV Battery Interface Control Module E Not Programmed	P1FA6	If Slave did not Program correctly	Wrong or No response from Slave indicating error in Programming	1	After Programming session Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable VITM System Voltage	 True True >= 9V	As soon as Programming session ends	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid/EV Battery Interface Control Module F Not Programmed	P1FA7	If Slave did not Program correctly	Wrong or No response from Slave indicating error in Programming	1	After Programming session Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable VITM System Voltage	 True True >= 9V	As soon as Programming session ends	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid/EV Battery Interface Control Module G Not Programmed	P1FA8	If Slave did not Program correctly	Wrong or No response from Slave indicating error in Programming	1	After Programming session Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable VITM System Voltage	 True True >= 9V	As soon as Programming session ends	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid/EV Battery Interface Control Module H Not Programmed	P1FA9	If Slave did not Program correctly	Wrong or No response from Slave indicating error in Programming	1	After Programming session Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable VITM System Voltage	 True True >= 9V	As soon as Programming session ends	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid/EV Battery Interface Control Module I Not Programmed	P1FAA	If Slave did not Program correctly	Wrong or No response from Slave indicating error in Programming	1	After Programming session Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable VITM System Voltage	 True True >= 9V	As soon as Programming session ends	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid/EV Battery Interface Control Module J Not Programmed	P1FAB	If Slave did not Program correctly	Wrong or No response from Slave indicating error in Programming	1	After Programming session Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable VITM System Voltage	 True True >= 9V	As soon as Programming session ends	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Interface Control Module E ROM	P1FAC	ROM Checksum Method	ROM Checksum Value Calculated is Different than Stored DTC Pass	1 1	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm	True Transitions: TRUE to FALSE (During VTSM E Power down) U2603, U2604, U2605, U2606, U2617, U2618, U2619, U2620, U2621, U2622, U2623, U2624	At power down At power down	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Interface Control Module G ROM	P1FAD	ROM Checksum Method	ROM Checksum Value Calculated is Different than Stored	1	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm	True Transitions: TRUE to FALSE (During VTSM G Power down) U2603, U2604, U2605, U2606, U2617, U2618, U2619, U2620, U2621, U2622, U2623, U2624	At power down	Type A, 1 Trips
			DTC Pass	1			At power down	

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Interface Control Module H ROM	P1FAE	ROM Checksum Method	ROM Checksum Value Calculated is Different than Stored	1	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm	True Transitions: TRUE to FALSE (During VTSM H Power down) U2603, U2604, U2605, U2606, U2617, U2618, U2619, U2620, U2621, U2622, U2623, U2624	At power down	Type A, 1 Trips
			DTC Pass	1			At power down	

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Interface Control Module I ROM	P1FAF	ROM Checksum Method	ROM Checksum Value Calculated is Different than Stored	1	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm	True Transitions: TRUE to FALSE (During VTSM I Power down) U2603, U2604, U2605, U2606, U2617, U2618, U2619, U2620, U2621, U2622, U2623, U2624	At power down	Type A, 1 Trips
			DTC Pass	1			At power down	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Interface Control Module J ROM	P1FB0	ROM Checksum Method	ROM Checksum Value Calculated is Different than Stored DTC Pass	1 1	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm	True Transitions: TRUE to FALSE (During VTSM J Power down) U2603, U2604, U2605, U2606, U2617, U2618, U2619, U2620, U2621, U2622, U2623, U2624	At power down At power down	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Interface Control Module E RAM	P1FB1	RAM Read Write function Failed	RAM Read not Equal to RAM Written DTC Pass	1 1	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm	True Transitions: TRUE to FALSE (During VTSM E Power down) U2603, U2604, U2605, U2606, U2617, U2618, U2619, U2620, U2621, U2622, U2623, U2624	At power up At power up	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Interface Control Module F RAM	P1FB2	RAM Read Write function Failed	RAM Read not Equal to RAM Written	1	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm	True Transitions: TRUE to FALSE (During VTSM F Power down) U2603, U2604, U2605, U2606, U2617, U2618, U2619, U2620, U2621, U2622, U2623, U2624	At power up	Type A, 1 Trips
			DTC Pass	1			At power up	

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Interface Control Module G RAM	P1FB3	RAM Read Write function Failed	RAM Read not Equal to RAM Written DTC Pass	1 1	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm	True Transitions: TRUE to FALSE (During VTSM G Power down) U2603, U2604, U2605, U2606, U2617, U2618, U2619, U2620, U2621, U2622, U2623, U2624	At power up At power up	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Interface Control Module H RAM	P1FB4	RAM Read Write function Failed	RAM Read not Equal to RAM Written DTC Pass	1 1	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm	True Transitions: TRUE to FALSE (During VTSM H Power down) U2603, U2604, U2605, U2606, U2617, U2618, U2619, U2620, U2621, U2622, U2623, U2624	At power up At power up	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Interface Control Module I RAM	P1FB5	RAM Read Write function Failed	RAM Read not Equal to RAM Written DTC Pass	1 1	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm	True Transitions: TRUE to FALSE (During VTSM I Power down) U2603, U2604, U2605, U2606, U2617, U2618, U2619, U2620, U2621, U2622, U2623, U2624	At power up At power up	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Interface Control Module J RAM	P1FB6	RAM Read Write function Failed	RAM Read not Equal to RAM Written DTC Pass	1 1	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm	True Transitions: TRUE to FALSE (During VTSM J Power down) U2603, U2604, U2605, U2606, U2617, U2618, U2619, U2620, U2621, U2622, U2623, U2624	At power up At power up	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Interface Control Module E KAM	P1FB7	Using Checksum method	EEPROM Checksum Value Calculated is Different than Stored DTC Pass	1 1	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm	True Transitions: TRUE to FALSE (During VTSM E Power down) U2603, U2604, U2605, U2606, U2617, U2618, U2619, U2620, U2621, U2622, U2623, U2624	At power down At power down	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Interface Control Module F KAM	P1FB8	Using Checksum method	EEPROM Checksum Value Calculated is Different than Stored DTC Pass	1 1	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm	True Transitions: TRUE to FALSE (During VTSM F Power down) U2603, U2604, U2605, U2606, U2617, U2618, U2619, U2620, U2621, U2622, U2623, U2624	At power down At power down	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Interface Control Module G KAM	P1FB9	Using Checksum method	EEPROM Checksum Value Calculated is Different than Stored DTC Pass	1 1	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm	True Transitions: TRUE to FALSE (During VTSM G Power down) U2603, U2604, U2605, U2606, U2617, U2618, U2619, U2620, U2621, U2622, U2623, U2624	At power down At power down	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Interface Control Module H KAM	P1FBA	Using Checksum method	EEPROM Checksum Value Calculated is Different than Stored DTC Pass	1 1	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm	True Transitions: TRUE to FALSE (During VTSM H Power down) U2603, U2604, U2605, U2606, U2617, U2618, U2619, U2620, U2621, U2622, U2623, U2624	At power down At power down	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Interface Control Module I KAM	P1FBB	Using Checksum method	EEPROM Checksum Value Calculated is Different than Stored DTC Pass	1 1	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm	True Transitions: TRUE to FALSE (During VTSM I Power down) U2603, U2604, U2605, U2606, U2617, U2618, U2619, U2620, U2621, U2622, U2623, U2624	At power down At power down	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Interface Control Module J KAM	P1FBC	Using Checksum method	EEPROM Checksum Value Calculated is Different than Stored DTC Pass	1 1	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm	True Transitions: TRUE to FALSE (During VTSM J Power down) U2603, U2604, U2605, U2606, U2617, U2618, U2619, U2620, U2621, U2622, U2623, U2624	At power down At power down	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Interface Control Module E Performance	P1FBD	Slave E fails for any of the following reasons: - Illegal Address Detect Reset - Illegal Opcode or Detect Reset - Watchdog Timer Reset - Loss of Clock Reset - Low Voltage Detect Reset - SPI Bus Malfunction (Read Value from Register Not Equal to Written Value)	If Watchdog resets controller OR Wrong value Read DTC Pass	1 All should pass	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable VITM System Voltage	True True >= 9V	Instantaneous - all reasons other than SPI bus 500us - SPI Bus 500 us in 200ms window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Interface Control Module F Performance	P1FBE	Slave F fails for any of the following reasons: - Illegal Address Detect Reset - Illegal Opcode or Detect Reset - Watchdog Timer Reset - Loss of Clock Reset - Low Voltage Detect Reset - SPI Bus Malfunction (Read Value from Register Not Equal to Written Value)	If Watchdog resets controller OR Wrong value Read DTC Pass	1 All should pass	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable VITM System Voltage	True True >= 9V	Instantaneous - all reasons other than SPI bus 500us - SPI Bus 500 us in 200ms window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Interface Control Module G Performance	P1FBF	Slave G fails for any of the following reasons: - Illegal Address Detect Reset - Illegal Opcode or Detect Reset - Watchdog Timer Reset - Loss of Clock Reset - Low Voltage Detect Reset - SPI Bus Malfunction (Read Value from Register Not Equal to Written Value)	If Watchdog resets controller OR Wrong value Read DTC Pass	1 All should pass	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable VITM System Voltage	True True >= 9V	Instantaneous - all reasons other than SPI bus 500us - SPI Bus 500 us in 200ms window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Interface Control Module H Performance	P1FC0	Slave H fails for any of the following reasons: - Illegal Address Detect Reset - Illegal Opcode or Detect Reset - Watchdog Timer Reset - Loss of Clock Reset - Low Voltage Detect Reset - SPI Bus Malfunction (Read Value from Register Not Equal to Written Value)	If Watchdog resets controller OR Wrong value Read DTC Pass	1 All should pass	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable VITM System Voltage	True True >= 9V	Instantaneous - all reasons other than SPI bus 500us - SPI Bus 500 us in 200ms window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Interface Control Module I Performance	P1FC1	Slave I fails for any of the following reasons: - Illegal Address Detect Reset - Illegal Opcode or Detect Reset - Watchdog Timer Reset - Loss of Clock Reset - Low Voltage Detect Reset - SPI Bus Malfunction (Read Value from Register Not Equal to Written Value)	If Watchdog resets controller OR Wrong value Read DTC Pass	1 All should pass	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable VITM System Voltage	True True >= 9V	Instantaneous - all reasons other than SPI bus 500us - SPI Bus 500 us in 200ms window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Interface Control Module J Performance	P1FC2	Slave J fails for any of the following reasons: - Illegal Address Detect Reset - Illegal Opcode or Detect Reset - Watchdog Timer Reset - Loss of Clock Reset - Low Voltage Detect Reset - SPI Bus Malfunction (Read Value from Register Not Equal to Written Value)	If Watchdog resets controller OR Wrong value Read DTC Pass	1 All should pass	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable VITM System Voltage	True True >= 9V	Instantaneous - all reasons other than SPI bus 500us - SPI Bus 500 us in 200ms window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Interface Control Module E 5V Ref	P1FC3	Sets when 5V Slave reference voltage is out of range	5V Reference Value (Circuit for Reference Diagnostic, Shunt Regulator) DTC Pass	5V Reference Value < 2.8V or 5V Reference Value > 3.2V 2.8V <= 5V Reference Value <= 3.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm 2nd Protection Self Test Diagnostic	True True U2603, U2604, U2605, U2606, U2617, U2618, U2619, U2620, U2621, U2622, U2623, U2624 Not Running	1.4 seconds in a 2.0 seconds window 2.0 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Interface Control Module F 5V Ref	P1FC4	Sets when 5V Slave reference voltage is out of range	5V Reference Value (Circuit for Reference Diagnostic, Shunt Regulator)	5V Reference Value < 2.8V or 5V Reference Value > 3.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm 2nd Protection Self Test Diagnostic	True True U2603, U2604, U2605, U2606, U2617, U2618, U2619, U2620, U2621, U2622, U2623, U2624 Not Running	1.4 seconds in a 2.0 seconds window	Type A, 1 Trips
			DTC Pass	2.8V <= 5V Reference Value <= 3.2V			2.0 seconds	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Interface Control Module G 5V Ref	P1FC5	Sets when 5V Slave reference voltage is out of range	5V Reference Value (Circuit for Reference Diagnostic, Shunt Regulator)	5V Reference Value < 2.8V or 5V Reference Value > 3.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm 2nd Protection Self Test Diagnostic	True True U2603, U2604, U2605, U2606, U2617, U2618, U2619, U2620, U2621, U2622, U2623, U2624 Not Running	1.4 seconds in a 2.0 seconds window	Type A, 1 Trips
			DTC Pass	2.8V <= 5V Reference Value <= 3.2V			2.0 seconds	

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Interface Control Module H 5V Ref	P1FC6	Sets when 5V Slave reference voltage is out of range	5V Reference Value (Circuit for Reference Diagnostic, Shunt Regulator)	5V Reference Value < 2.8V or 5V Reference Value > 3.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm 2nd Protection Self Test Diagnostic	True True U2603, U2604, U2605, U2606, U2617, U2618, U2619, U2620, U2621, U2622, U2623, U2624 Not Running	1.4 seconds in a 2.0 seconds window	Type A, 1 Trips
			DTC Pass	2.8V <= 5V Reference Value <= 3.2V			2.0 seconds	

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Interface Control Module I 5V Ref	P1FC7	Sets when 5V Slave reference voltage is out of range	5V Reference Value (Circuit for Reference Diagnostic, Shunt Regulator) DTC Pass	5V Reference Value < 2.8V or 5V Reference Value > 3.2V 2.8V <= 5V Reference Value <= 3.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm 2nd Protection Self Test Diagnostic	True True U2603, U2604, U2605, U2606, U2617, U2618, U2619, U2620, U2621, U2622, U2623, U2624 Not Running	1.4 seconds in a 2.0 seconds window 2.0 seconds	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Interface Control Module J 5V Ref	P1FC8	Sets when 5V Slave reference voltage is out of range	5V Reference Value (Circuit for Reference Diagnostic, Shunt Regulator) DTC Pass	5V Reference Value < 2.8V or 5V Reference Value > 3.2V 2.8V <= 5V Reference Value <= 3.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm 2nd Protection Self Test Diagnostic	True True U2603, U2604, U2605, U2606, U2617, U2618, U2619, U2620, U2621, U2622, U2623, U2624 Not Running	1.4 seconds in a 2.0 seconds window 2.0 seconds	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Interface Control Module E Cell Balancing Circuit	P1FC9	Cell Balance switch output	Cell Balance switch is below threshold DTC Pass	Slaves in VTSM: 4.0V < Cell Voltage < 5.0V Threshold = 66mV 3.5V < Cell Voltage < 4.0V Threshold = 41mV 3.0V < Cell Voltage < 3.5V Threshold = 22mV Slaves in VITM: 3.8V < Cell Voltage < 5.0V Threshold = 44mV 3.0V < Cell Voltage < 3.8V Threshold = 23mV Threshold is above values specified for Cell Voltage specified	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Internal Performance	True True U2603, U2604, U2605, U2606, U2617, U2618, U2619, U2620, U2621, U2622, U2623, U2624 Not Running P1E8E, P1E94, P1E9A, P1EA0, P1FBD, P1FBE, P1FBF, P1FC0, P1FC1, P1FC2, P3037, P3042	14 seconds in a 20 seconds window 20 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Interface Control Module F Cell Balancing Circuit	P1FCA	Cell Balance switch output	Cell Balance switch is below threshold DTC Pass	Slaves in VTSM: 4.0V < Cell Voltage < 5.0V Threshold = 66mV 3.5V < Cell Voltage < 4.0V Threshold = 41mV 3.0V < Cell Voltage < 3.5V Threshold = 22mV Slaves in VITM: 3.8V < Cell Voltage < 5.0V Threshold = 44mV 3.0V < Cell Voltage < 3.8V Threshold = 23mV Threshold is above values specified for Cell Voltage specified	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Internal Performance	True True U2603, U2604, U2605, U2606, U2617, U2618, U2619, U2620, U2621, U2622, U2623, U2624 Not Running P1E8E, P1E94, P1E9A, P1EA0, P1FBD, P1FBE, P1FBF, P1FC0, P1FC1, P1FC2, P3037, P3042	14 seconds in a 20 seconds window 20 seconds	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Interface Control Module G Cell Balancing Circuit	P1FCB	Cell Balance switch output	Cell Balance switch is below threshold DTC Pass	Slaves in VTSM: 4.0V < Cell Voltage < 5.0V Threshold = 66mV 3.5V < Cell Voltage < 4.0V Threshold = 41mV 3.0V < Cell Voltage < 3.5V Threshold = 22mV Slaves in VITM: 3.8V < Cell Voltage < 5.0V Threshold = 44mV 3.0V < Cell Voltage < 3.8V Threshold = 23mV Threshold is above values specified for Cell Voltage specified	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Internal Performance	True True U2603, U2604, U2605, U2606, U2617, U2618, U2619, U2620, U2621, U2622, U2623, U2624 Not Running P1E8E, P1E94, P1E9A, P1EA0, P1FBD, P1FBE, P1FBF, P1FC0, P1FC1, P1FC2, P3037, P3042	14 seconds in a 20 seconds window 20 seconds	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Interface Control Module H Cell Balancing Circuit	P1FCC	Cell Balance switch output	Cell Balance switch is below threshold DTC Pass	Slaves in VTSM: 4.0V < Cell Voltage < 5.0V Threshold = 66mV 3.5V < Cell Voltage < 4.0V Threshold = 41mV 3.0V < Cell Voltage < 3.5V Threshold = 22mV Slaves in VITM: 3.8V < Cell Voltage < 5.0V Threshold = 44mV 3.0V < Cell Voltage < 3.8V Threshold = 23mV Threshold is above values specified for Cell Voltage specified	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Internal Performance	True True U2603, U2604, U2605, U2606, U2617, U2618, U2619, U2620, U2621, U2622, U2623, U2624 Not Running P1E8E, P1E94, P1E9A, P1EA0, P1FBD, P1FBE, P1FBF, P1FC0, P1FC1, P1FC2, P3037, P3042	14 seconds in a 20 seconds window 20 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Interface Control Module I Cell Balancing Circuit	P1FCD	Cell Balance switch output	Cell Balance switch is below threshold DTC Pass	Slaves in VTSM: 4.0V < Cell Voltage < 5.0V Threshold = 66mV 3.5V < Cell Voltage < 4.0V Threshold = 41mV 3.0V < Cell Voltage < 3.5V Threshold = 22mV Slaves in VITM: 3.8V < Cell Voltage < 5.0V Threshold = 44mV 3.0V < Cell Voltage < 3.8V Threshold = 23mV Threshold is above values specified for Cell Voltage specified	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Internal Performance	True True U2603, U2604, U2605, U2606, U2617, U2618, U2619, U2620, U2621, U2622, U2623, U2624 Not Running P1E8E, P1E94, P1E9A, P1EA0, P1FBD, P1FBE, P1FBF, P1FC0, P1FC1, P1FC2, P3037, P3042	14 seconds in a 20 seconds window 20 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid/EV Battery Interface Control Module J Cell Balancing Circuit	P1FCE	Cell Balance switch output	Cell Balance switch is below threshold DTC Pass	Slaves in VTSM: 4.0V < Cell Voltage < 5.0V Threshold = 66mV 3.5V < Cell Voltage < 4.0V Threshold = 41mV 3.0V < Cell Voltage < 3.5V Threshold = 22mV Slaves in VITM: 3.8V < Cell Voltage < 5.0V Threshold = 44mV 3.0V < Cell Voltage < 3.8V Threshold = 23mV Threshold is above values specified for Cell Voltage specified	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Internal Performance	True True U2603, U2604, U2605, U2606, U2617, U2618, U2619, U2620, U2621, U2622, U2623, U2624 Not Running P1E8E, P1E94, P1E9A, P1EA0, P1FBD, P1FBE, P1FBF, P1FC0, P1FC1, P1FC2, P3037, P3042	14 seconds in a 20 seconds window 20 seconds	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid/EV Battery Interface Control Module E Processor Performance	P1FCF	Compare Slave Reported Value with Expected Value in VITM	Reported Key Value by Slave is not correct	5	Diagnostic Enable Seed and Key Algorithm Calibration Run/Crank, Accessory or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm 2nd Protection Self Test Diagnostic	True True True Slave Loss of Comm Fault Not Running	1 second in a 1.4 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid/EV Battery Interface Control Module F Processor Performance	P1FD0	Compare Slave Reported Value with Expected Value in VITM	Reported Key Value by Slave is not correct	5	Diagnostic Enable Seed and Key Algorithm Calibration Run/Crank, Accessory or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm 2nd Protection Self Test Diagnostic	True True True Slave Loss of Comm Fault Not Running	1 second in a 1.4 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid/EV Battery Interface Control Module G Processor Performance	P1FD1	Compare Slave Reported Value with Expected Value in VITM	Reported Key Value by Slave is not correct	5	Diagnostic Enable Seed and Key Algorithm Calibration Run/Crank, Accessory or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm 2nd Protection Self Test Diagnostic	True True True Slave Loss of Comm Fault Not Running	1 second in a 1.4 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid/EV Battery Interface Control Module H Processor Performance	P1FD2	Compare Slave Reported Value with Expected Value in VITM	Reported Key Value by Slave is not correct	5	Diagnostic Enable Seed and Key Algorithm Calibration Run/Crank, Accessory or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm 2nd Protection Self Test Diagnostic	True True True Slave Loss of Comm Fault Not Running	1 second in a 1.4 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid/EV Battery Interface Control Module I Processor Performance	P1FD3	Compare Slave Reported Value with Expected Value in VITM	Reported Key Value by Slave is not correct	5	Diagnostic Enable Seed and Key Algorithm Calibration Run/Crank, Accessory or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm 2nd Protection Self Test Diagnostic	True True True Slave Loss of Comm Fault Not Running	1 second in a 1.4 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid/EV Battery Interface Control Module J Processor Performance	P1FD4	Compare Slave Reported Value with Expected Value in VITM	Reported Key Value by Slave is not correct	5	Diagnostic Enable Seed and Key Algorithm Calibration Run/Crank, Accessory or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm 2nd Protection Self Test Diagnostic	True True True Slave Loss of Comm Fault Not Running	1 second in a 1.4 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid/EV Battery Interface Control Module A Voltage Sensor Circuit Low	P1FD5	Sets when Module Voltage Sensor falls below a Threshold	Module Voltage	< 1.5V (ADC Count < 123)	Diagnostic Enable Run/Crank, Accessory or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid/EV Battery Interface Control Module B Voltage Sensor Circuit Low	P1FD6	Sets when Module Voltage Sensor falls below a Threshold	Module Voltage	< 1.5V (ADC Count < 123)	Diagnostic Enable Run/Crank, Accessory or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid/EV Battery Interface Control Module C Voltage Sensor Circuit Low	P1FD7	Sets when Module Voltage Sensor falls below a Threshold	Module Voltage	< 1.5V (ADC Count < 123)	Diagnostic Enable Run/Crank, Accessory or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid/EV Battery Interface Control Module D Voltage Sensor Circuit Low	P1FD8	Sets when Module Voltage Sensor falls below a Threshold	Module Voltage	< 1.5V (ADC Count < 123)	Diagnostic Enable Run/Crank, Accessory or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid/EV Battery Interface Control Module E Voltage Sensor Circuit Low	P1FD9	Sets when Module Voltage Sensor falls below a Threshold	Module Voltage	< 1.5V (ADC Count < 123)	Diagnostic Enable Run/Crank, Accessory or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid/EV Battery Interface Control Module F Voltage Sensor Circuit Low	P1FDA	Sets when Module Voltage Sensor falls below a Threshold	Module Voltage	< 1.5V (ADC Count < 123)	Diagnostic Enable Run/Crank, Accessory or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid/EV Battery Interface Control Module G Voltage Sensor Circuit Low	P1FDB	Sets when Module Voltage Sensor falls below a Threshold	Module Voltage	< 1.5V (ADC Count < 123)	Diagnostic Enable Run/Crank, Accessory or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid/EV Battery Interface Control Module H Voltage Sensor Circuit Low	P1FDC	Sets when Module Voltage Sensor falls below a Threshold	Module Voltage	< 1.5V (ADC Count < 123)	Diagnostic Enable Run/Crank, Accessory or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid/EV Battery Interface Control Module I Voltage Sensor Circuit Low	P1FDD	Sets when Module Voltage Sensor falls below a Threshold	Module Voltage	< 1.5V (ADC Count < 123)	Diagnostic Enable Run/Crank, Accessory or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid/EV Battery Interface Control Module J Voltage Sensor Circuit Low	P1FDE	Sets when Module Voltage Sensor falls below a Threshold	Module Voltage	< 1.5V (ADC Count < 123)	Diagnostic Enable Run/Crank, Accessory or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid/EV Battery Interface Control Module A Voltage Sensor Circuit High	P1FDF	Sets when Module Voltage Sensor falls below a Threshold	Module Voltage	> 48.5V (ADC Count > 3972)	Diagnostic Enable Run/Crank, Accessory or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid/EV Battery Interface Control Module B Voltage Sensor Circuit High	P1FE0	Sets when Module Voltage Sensor falls below a Threshold	Module Voltage	> 48.5V (ADC Count > 3972)	Diagnostic Enable Run/Crank, Accessory or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid/EV Battery Interface Control Module C Voltage Sensor Circuit High	P1FE1	Sets when Module Voltage Sensor falls below a Threshold	Module Voltage	> 48.5V (ADC Count > 3972)	Diagnostic Enable Run/Crank, Accessory or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid/EV Battery Interface Control Module D Voltage Sensor Circuit High	P1FE2	Sets when Module Voltage Sensor falls below a Threshold	Module Voltage	> 48.5V (ADC Count > 3972)	Diagnostic Enable Run/Crank, Accessory or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid/EV Battery Interface Control Module E Voltage Sensor Circuit High	P1FE3	Sets when Module Voltage Sensor falls below a Threshold	Module Voltage	> 48.5V (ADC Count > 3972)	Diagnostic Enable Run/Crank, Accessory or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid/EV Battery Interface Control Module F Voltage Sensor Circuit High	P1FE4	Sets when Module Voltage Sensor falls below a Threshold	Module Voltage	> 48.5V (ADC Count > 3972)	Diagnostic Enable Run/Crank, Accessory or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid/EV Battery Interface Control Module G Voltage Sensor Circuit High	P1FE5	Sets when Module Voltage Sensor falls below a Threshold	Module Voltage	> 48.5V (ADC Count > 3972)	Diagnostic Enable Run/Crank, Accessory or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid/EV Battery Interface Control Module H Voltage Sensor Circuit High	P1FE6	Sets when Module Voltage Sensor falls below a Threshold	Module Voltage	> 48.5V (ADC Count > 3972)	Diagnostic Enable Run/Crank, Accessory or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid/EV Battery Interface Control Module I Voltage Sensor Circuit High	P1FE7	Sets when Module Voltage Sensor falls below a Threshold	Module Voltage	> 48.5V (ADC Count > 3972)	Diagnostic Enable Run/Crank, Accessory or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid/EV Battery Interface Control Module J Voltage Sensor Circuit High	P1FE8	Sets when Module Voltage Sensor falls below a Threshold	Module Voltage	> 48.5V (ADC Count > 3972)	Diagnostic Enable Run/Crank, Accessory or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid/EV Battery Interface Control Module A Voltage Sensor Circuit Range/ Performance	P1FE9	Compares Slave Module Voltage to sum of Cells measured by Slave	abs(Slave Module Voltage - Slave sum of Cell Voltages)	6-cell Slave Module: > 512mV (ADC Count > 422) 7-cell Slave Module: > 557mV (ADC Count > 445) 8-cell Slave Module: > 636mV (ADC Count > 521) 9-cell Slave Module: > 660mV (ADC Count > 540)	Diagnostic Enable No Active DTCs associated with Cell Voltage Ckt Low Run/Crank, Accessory or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line No Active DTCs associated with Cell Voltage Ckt High No Active DTCs associated with Slave Internal Performance	True Cell Voltage Ckt Low True Slave Loss of Comm Fault Open Sense Line Fault Cell Voltage Ckt High Slave Internal Performance Fault	3 seconds in a 4 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid/EV Battery Interface Control Module B Voltage Sensor Circuit Range/ Performance	P1FEA	Compares Slave Module Voltage to sum of Cells measured by Slave	abs(Slave Module Voltage - Slave sum of Cell Voltages)	6-cell Slave Module: > 512mV (ADC Count > 422) 7-cell Slave Module: > 557mV (ADC Count > 445) 8-cell Slave Module: > 636mV (ADC Count > 521) 9-cell Slave Module: > 660mV (ADC Count > 540)	Diagnostic Enable No Active DTCs associated with Cell Voltage Ckt Low Run/Crank, Accessory or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line No Active DTCs associated with Cell Voltage Ckt High No Active DTCs associated with Slave Internal Performance	True Cell Voltage Ckt Low True Slave Loss of Comm Fault Open Sense Line Fault Cell Voltage Ckt High Slave Internal Performance Fault	3 seconds in a 4 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid/EV Battery Interface Control Module C Voltage Sensor Circuit Range/ Performance	P1FEB	Compares Slave Module Voltage to sum of Cells measured by Slave	abs(Slave Module Voltage - Slave sum of Cell Voltages)	6-cell Slave Module: > 512mV (ADC Count > 422) 7-cell Slave Module: > 557mV (ADC Count > 445) 8-cell Slave Module: > 636mV (ADC Count > 521) 9-cell Slave Module: > 660mV (ADC Count > 540)	Diagnostic Enable No Active DTCs associated with Cell Voltage Ckt Low Run/Crank, Accessory or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line No Active DTCs associated with Cell Voltage Ckt High No Active DTCs associated with Slave Internal Performance	True Cell Voltage Ckt Low True Slave Loss of Comm Fault Open Sense Line Fault Cell Voltage Ckt High Slave Internal Performance Fault	3 seconds in a 4 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid/EV Battery Interface Control Module D Voltage Sensor Circuit Range/ Performance	P1FEC	Compares Slave Module Voltage to sum of Cells measured by Slave	abs(Slave Module Voltage - Slave sum of Cell Voltages)	6-cell Slave Module: > 512mV (ADC Count > 422) 7-cell Slave Module: > 557mV (ADC Count > 445) 8-cell Slave Module: > 636mV (ADC Count > 521) 9-cell Slave Module: > 660mV (ADC Count > 540)	Diagnostic Enable No Active DTCs associated with Cell Voltage Ckt Low Run/Crank, Accessory or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line No Active DTCs associated with Cell Voltage Ckt High No Active DTCs associated with Slave Internal Performance	True Cell Voltage Ckt Low True Slave Loss of Comm Fault Open Sense Line Fault Cell Voltage Ckt High Slave Internal Performance Fault	3 seconds in a 4 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid/EV Battery Interface Control Module E Voltage Sensor Circuit Range/ Performance	P1FED	Compares Slave Module Voltage to sum of Cells measured by Slave	abs(Slave Module Voltage - Slave sum of Cell Voltages)	6-cell Slave Module: > 512mV (ADC Count > 422) 7-cell Slave Module: > 557mV (ADC Count > 445) 8-cell Slave Module: > 636mV (ADC Count > 521) 9-cell Slave Module: > 660mV (ADC Count > 540)	Diagnostic Enable No Active DTCs associated with Cell Voltage Ckt Low Run/Crank, Accessory or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line No Active DTCs associated with Cell Voltage Ckt High No Active DTCs associated with Slave Internal Performance	True Cell Voltage Ckt Low True Slave Loss of Comm Fault Open Sense Line Fault Cell Voltage Ckt High Slave Internal Performance Fault	3 seconds in a 4 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid/EV Battery Interface Control Module F Voltage Sensor Circuit Range/ Performance	P1FEE	Compares Slave Module Voltage to sum of Cells measured by Slave	abs(Slave Module Voltage - Slave sum of Cell Voltages)	6-cell Slave Module: > 512mV (ADC Count > 422) 7-cell Slave Module: > 557mV (ADC Count > 445) 8-cell Slave Module: > 636mV (ADC Count > 521) 9-cell Slave Module: > 660mV (ADC Count > 540)	Diagnostic Enable No Active DTCs associated with Cell Voltage Ckt Low Run/Crank, Accessory or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line No Active DTCs associated with Cell Voltage Ckt High No Active DTCs associated with Slave Internal Performance	True Cell Voltage Ckt Low True Slave Loss of Comm Fault Open Sense Line Fault Cell Voltage Ckt High Slave Internal Performance Fault	3 seconds in a 4 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid/EV Battery Interface Control Module G Voltage Sensor Circuit Range/ Performance	P1FEF	Compares Slave Module Voltage to sum of Cells measured by Slave	abs(Slave Module Voltage - Slave sum of Cell Voltages)	6-cell Slave Module: > 512mV (ADC Count > 422) 7-cell Slave Module: > 557mV (ADC Count > 445) 8-cell Slave Module: > 636mV (ADC Count > 521) 9-cell Slave Module: > 660mV (ADC Count > 540)	Diagnostic Enable No Active DTCs associated with Cell Voltage Ckt Low Run/Crank, Accessory or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line No Active DTCs associated with Cell Voltage Ckt High No Active DTCs associated with Slave Internal Performance	True Cell Voltage Ckt Low True Slave Loss of Comm Fault Open Sense Line Fault Cell Voltage Ckt High Slave Internal Performance Fault	3 seconds in a 4 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid/EV Battery Interface Control Module H Voltage Sensor Circuit Range/ Performance	P1FF0	Compares Slave Module Voltage to sum of Cells measured by Slave	abs(Slave Module Voltage - Slave sum of Cell Voltages)	6-cell Slave Module: > 512mV (ADC Count > 422) 7-cell Slave Module: > 557mV (ADC Count > 445) 8-cell Slave Module: > 636mV (ADC Count > 521) 9-cell Slave Module: > 660mV (ADC Count > 540)	Diagnostic Enable No Active DTCs associated with Cell Voltage Ckt Low Run/Crank, Accessory or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line No Active DTCs associated with Cell Voltage Ckt High No Active DTCs associated with Slave Internal Performance	True Cell Voltage Ckt Low True Slave Loss of Comm Fault Open Sense Line Fault Cell Voltage Ckt High Slave Internal Performance Fault	3 seconds in a 4 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid/EV Battery Interface Control Module I Voltage Sensor Circuit Range/ Performance	P1FF1	Compares Slave Module Voltage to sum of Cells measured by Slave	abs(Slave Module Voltage - Slave sum of Cell Voltages)	6-cell Slave Module: > 512mV (ADC Count > 422) 7-cell Slave Module: > 557mV (ADC Count > 445) 8-cell Slave Module: > 636mV (ADC Count > 521) 9-cell Slave Module: > 660mV (ADC Count > 540)	Diagnostic Enable No Active DTCs associated with Cell Voltage Ckt Low Run/Crank, Accessory or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line No Active DTCs associated with Cell Voltage Ckt High No Active DTCs associated with Slave Internal Performance	True Cell Voltage Ckt Low True Slave Loss of Comm Fault Open Sense Line Fault Cell Voltage Ckt High Slave Internal Performance Fault	3 seconds in a 4 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid/EV Battery Interface Control Module J Voltage Sensor Circuit Range/ Performance	P1FF2	Compares Slave Module Voltage to sum of Cells measured by Slave	abs(Slave Module Voltage - Slave sum of Cell Voltages)	6-cell Slave Module: > 512mV (ADC Count > 422) 7-cell Slave Module: > 557mV (ADC Count > 445) 8-cell Slave Module: > 636mV (ADC Count > 521) 9-cell Slave Module: > 660mV (ADC Count > 540)	Diagnostic Enable No Active DTCs associated with Cell Voltage Ckt Low Run/Crank, Accessory or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line No Active DTCs associated with Cell Voltage Ckt High No Active DTCs associated with Slave Internal Performance	True Cell Voltage Ckt Low True Slave Loss of Comm Fault Open Sense Line Fault Cell Voltage Ckt High Slave Internal Performance Fault	3 seconds in a 4 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Interface Control Module F ROM	P1FF3	ROM Checksum Method	ROM Checksum Value Calculated is Different than Stored DTC Pass	1 1	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm	True Transitions: TRUE to FALSE (During VTSM F Power down) U2603, U2604, U2605, U2606, U2617, U2618, U2619, U2620, U2621, U2622, U2623, U2624	At power down At power down	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid/EV Battery Interface Control Module K Not Programmed	P3030	If Slave did not Program correctly	Wrong or No response from Slave indicating error in Programming	1	After Programming session Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable VITM System Voltage	 True True >= 9V	As soon as Programming session ends	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Interface Control Module K ROM	P3031	ROM Checksum Method	ROM Checksum Value Calculated is Different than Stored DTC Pass	1 1	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm	True Transitions: TRUE to FALSE (During VTSM K Power down) U2603, U2604, U2605, U2606, U2617, U2618, U2619, U2620, U2621, U2622, U2623, U2624	At power down At power down	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Interface Control Module K RAM	P3032	RAM Read Write function Failed	RAM Read not Equal to RAM Written DTC Pass	1 1	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm	True Transitions: TRUE to FALSE (During VTSM K Power down) U2603, U2604, U2605, U2606, U2617, U2618, U2619, U2620, U2621, U2622, U2623, U2624	At power up At power up	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Interface Control Module K KAM	P3033	Using Checksum method	EEPROM Checksum Value Calculated is Different than Stored DTC Pass	1 1	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm	True Transitions: TRUE to FALSE (During VTSM K Power down) U2603, U2604, U2605, U2606, U2617, U2618, U2619, U2620, U2621, U2622, U2623, U2624	At power down At power down	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Interface Control Module K Performance	P3034	Slave K fails for any of the following reasons: - Illegal Address Detect Reset - Illegal Opcode or Detect Reset - Watchdog Timer Reset - Loss of Clock Reset - Low Voltage Detect Reset - SPI Bus Malfunction (Read Value from Register Not Equal to Written Value)	If Watchdog resets controller OR Wrong value Read DTC Pass	1 All should pass	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable VITM System Voltage	True True >= 9V	Instantaneous - all reasons other than SPI bus 500us - SPI Bus 500 us in 200ms window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Interface Control Module K 5V Ref	P3035	Sets when 5V Slave reference voltage is out of range	5V Reference Value (Circuit for Reference Diagnostic, Shunt Regulator)	5V Reference Value < 2.8V or 5V Reference Value > 3.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm 2nd Protection Self Test Diagnostic	True True U2603, U2604, U2605, U2606, U2617, U2618, U2619, U2620, U2621, U2622, U2623, U2624 Not Running	1.4 seconds in a 2.0 seconds window	Type A, 1 Trips
			DTC Pass	2.8V <= 5V Reference Value <= 3.2V			2.0 seconds	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Interface Control Module K Cell Balancing Circuit	P3036	Cell Balance switch output	Cell Balance switch is below threshold DTC Pass	Slaves in VTSM: 4.0V < Cell Voltage < 5.0V Threshold = 66mV 3.5V < Cell Voltage < 4.0V Threshold = 41mV 3.0V < Cell Voltage < 3.5V Threshold = 22mV Slaves in VITM: 3.8V < Cell Voltage < 5.0V Threshold = 44mV 3.0V < Cell Voltage < 3.8V Threshold = 23mV Threshold is above values specified for Cell Voltage specified	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Internal Performance	True True U2603, U2604, U2605, U2606, U2617, U2618, U2619, U2620, U2621, U2622, U2623, U2624 Not Running P1E8E, P1E94, P1E9A, P1EA0, P1FBD, P1FBE, P1FBF, P1FC0, P1FC1, P1FC2, P3037, P3042	14 seconds in a 20 seconds window 20 seconds	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid/EV Battery Interface Control Module K Processor Performance	P3037	Compare Slave Reported Value with Expected Value in VITM	Reported Key Value by Slave is not correct	5	Diagnostic Enable Seed and Key Algorithm Calibration Run/Crank, Accessory or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm 2nd Protection Self Test Diagnostic	True True True Slave Loss of Comm Fault Not Running	1 second in a 1.4 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid/EV Battery Interface Control Module K Voltage Sensor Circuit Low	P3038	Sets when Module Voltage Sensor falls below a Threshold	Module Voltage	< 1.5V (ADC Count < 123)	Diagnostic Enable Run/Crank, Accessory or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid/EV Battery Interface Control Module K Voltage Sensor Circuit High	P3039	Sets when Module Voltage Sensor falls below a Threshold	Module Voltage	> 48.5V (ADC Count > 3972)	Diagnostic Enable Run/Crank, Accessory or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid/EV Battery Interface Control Module K Voltage Sensor Circuit Range/ Performance	P303A	Compares Slave Module Voltage to sum of Cells measured by Slave	abs(Slave Module Voltage - Slave sum of Cell Voltages)	6-cell Slave Module: > 512mV (ADC Count > 422) 7-cell Slave Module: > 557mV (ADC Count > 445) 8-cell Slave Module: > 636mV (ADC Count > 521) 9-cell Slave Module: > 660mV (ADC Count > 540)	Diagnostic Enable No Active DTCs associated with Cell Voltage Ckt Low Run/Crank, Accessory or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line No Active DTCs associated with Cell Voltage Ckt High No Active DTCs associated with Slave Internal Performance	True Cell Voltage Ckt Low True Slave Loss of Comm Fault Open Sense Line Fault Cell Voltage Ckt High Slave Internal Performance Fault	3 seconds in a 4 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid/EV Battery Interface Control Module L Not Programmed	P303B	If Slave did not Program correctly	Wrong or No response from Slave indicating error in Programming	1	After Programming session Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable VITM System Voltage	 True True >= 9V	As soon as Programming session ends	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Interface Control Module L ROM	P303C	ROM Checksum Method	ROM Checksum Value Calculated is Different than Stored	1	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm	True Transitions: TRUE to FALSE (During VTSM L Power down) U2603, U2604, U2605, U2606, U2617, U2618, U2619, U2620, U2621, U2622, U2623, U2624	At power down	Type A, 1 Trips
			DTC Pass	1			At power down	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Interface Control Module L RAM	P303D	RAM Read Write function Failed	RAM Read not Equal to RAM Written DTC Pass	1 1	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm	True Transitions: TRUE to FALSE (During VTSM L Power down) U2603, U2604, U2605, U2606, U2617, U2618, U2619, U2620, U2621, U2622, U2623, U2624	At power up At power up	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Interface Control Module L KAM	P303E	Using Checksum method	EEPROM Checksum Value Calculated is Different than Stored DTC Pass	1 1	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm	True Transitions: TRUE to FALSE (During VTSM L Power down) U2603, U2604, U2605, U2606, U2617, U2618, U2619, U2620, U2621, U2622, U2623, U2624	At power down At power down	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Interface Control Module L Performance	P303F	Slave L fails for any of the following reasons: - Illegal Address Detect Reset - Illegal Opcode or Detect Reset - Watchdog Timer Reset - Loss of Clock Reset - Low Voltage Detect Reset - SPI Bus Malfunction (Read Value from Register Not Equal to Written Value)	If Watchdog resets controller OR Wrong value Read DTC Pass	1 All should pass	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable VITM System Voltage	True True >= 9V	Instantaneous - all reasons other than SPI bus 500us - SPI Bus 500 us in 200ms window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Interface Control Module L 5V Ref	P3040	Sets when 5V Slave reference voltage is out of range	5V Reference Value (Circuit for Reference Diagnostic, Shunt Regulator) DTC Pass	5V Reference Value < 2.8V or 5V Reference Value > 3.2V 2.8V <= 5V Reference Value <= 3.2V	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm 2nd Protection Self Test Diagnostic	True True U2603, U2604, U2605, U2606, U2617, U2618, U2619, U2620, U2621, U2622, U2623, U2624 Not Running	1.4 seconds in a 2.0 seconds window 2.0 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Interface Control Module L Cell Balancing Circuit	P3041	Cell Balance switch output	Cell Balance switch is below threshold DTC Pass	Slaves in VTSM: 4.0V < Cell Voltage < 5.0V Threshold = 66mV 3.5V < Cell Voltage < 4.0V Threshold = 41mV 3.0V < Cell Voltage < 3.5V Threshold = 22mV Slaves in VITM: 3.8V < Cell Voltage < 5.0V Threshold = 44mV 3.0V < Cell Voltage < 3.8V Threshold = 23mV Threshold is above values specified for Cell Voltage specified	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm 2nd Protection Self Test Diagnostic No Active DTCs associated with Slave Internal Performance	True True U2603, U2604, U2605, U2606, U2617, U2618, U2619, U2620, U2621, U2622, U2623, U2624 Not Running P1E8E, P1E94, P1E9A, P1EA0, P1FBD, P1FBE, P1FBF, P1FC0, P1FC1, P1FC2, P3037, P3042	14 seconds in a 20 seconds window 20 seconds	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid/EV Battery Interface Control Module L Processor Performance	P3042	Compare Slave Reported Value with Expected Value in VITM	Reported Key Value by Slave is not correct	5	Diagnostic Enable Seed and Key Algorithm Calibration Run/Crank, Accessory or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm 2nd Protection Self Test Diagnostic	True True True Slave Loss of Comm Fault Not Running	1 second in a 1.4 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid/EV Battery Interface Control Module L Voltage Sensor Circuit Low	P3043	Sets when Module Voltage Sensor falls below a Threshold	Module Voltage	< 1.5V (ADC Count < 123)	Diagnostic Enable Run/Crank, Accessory or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid/EV Battery Interface Control Module L Voltage Sensor Circuit High	P3044	Sets when Module Voltage Sensor falls below a Threshold	Module Voltage	> 48.5V (ADC Count > 3972)	Diagnostic Enable Run/Crank, Accessory or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Slave Internal Performance	True True Slave Loss of Comm Fault Slave Internal Performance Fault	1.4 second in a 2 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid/EV Battery Interface Control Module L Voltage Sensor Circuit Range/ Performance	P3045	Compares Slave Module Voltage to sum of Cells measured by Slave	abs(Slave Module Voltage - Slave sum of Cell Voltages)	6-cell Slave Module: > 512mV (ADC Count > 422) 7-cell Slave Module: > 557mV (ADC Count > 445) 8-cell Slave Module: > 636mV (ADC Count > 521) 9-cell Slave Module: > 660mV (ADC Count > 540)	Diagnostic Enable No Active DTCs associated with Cell Voltage Ckt Low Run/Crank, Accessory or HVEM EB Comm Enable No Active DTCs associated with Slave Loss of Comm No Active DTCs associated with Open Sense Line No Active DTCs associated with Cell Voltage Ckt High No Active DTCs associated with Slave Internal Performance	True Cell Voltage Ckt Low True Slave Loss of Comm Fault Open Sense Line Fault Cell Voltage Ckt High Slave Internal Performance Fault	3 seconds in a 4 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Energy Control Module Communication Bus H Off	U1806	If Bus Off is Detected	Transmit Error Counter (TEC) DTC Pass	TEC > 255 TEC < 255	Diagnostic Enable Run/Crank or Accessory/ Run VITM System Voltage	True True >= 9V	1.4 seconds in a 2 seconds window 2 Seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Energy Control Module Communication Bus A Off	U180B	If Bus Off is Detected	Transmit Error Counter (TEC) DTC Pass	TEC > 255 TEC < 255	Diagnostic Enable Run/Crank or Accessory/ Run VITM System Voltage	True True >= 9V	1.4 seconds in a 2 seconds window 2 Seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Energy Control Module Lost Communication with Hybrid Powertrain Control Module B on Bus H	U185B	If message $20A OR $20E OR $304 are not Received by VITM	Loss of Supervision with VICM module on Charger CAN bus DTC Pass	# of consecutive $20A message not received > 5 OR # of consecutive $20E message not received > 4 OR # of consecutive $304 message not received >4 1	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable VITM System Voltage	True True >= 9V	700 ms in a 1 second window 1 Second	Type B, 2 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Energy Control Module Lost Communication With Hybrid Powertrain Control Module	U1885	If message $1DF is not Received by VITM	Loss of Supervision with HCP module on HS GMLAN bus DTC Pass	# of consecutive $1DF message not received > 10 1	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable VITM System Voltage Flashing Programming Session (Other Modules or itself) Mode $28 Executed on HS Bus	True True >= 9V Completed False	1.75 seconds in a 2 second window 2 Seconds	Type B, 2 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Energy Control Module Dedicated Bus 1 Off	U2401	If Bus Off is Detected	Transmit Error Counter (TEC) DTC Pass	TEC > 255 TEC < 255	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable VITM System Voltage	True True >= 9V	1.4 seconds in a 2 second window 2 Seconds	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Energy Control Module Lost Communication with Hybrid Processor Control Module B on HS	U2602	If message $236 is not Received by VITM	Loss of Supervision with VICM module on HS GMLAN bus DTC Pass	# of consecutive $236 message not received > 3 1	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable VITM System Voltage Flashing Programming Session (Other Modules or itself) Mode $28 Executed on HS Bus	True True >= 9V Completed False	2.8 seconds in a 4 second window 4 Seconds	Type B, 2 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Energy Control Module Lost Communication with Hybrid Batterry Interface Control Module A	U2603	If associated message from Slave is not received	Loss of Supervision with Slave A on Private CAN bus DTC Pass	# of consecutive serial data message from Slave A not received > 7 1	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable 2nd Protection Self Test Diagnostic VITM System Voltage	True True Not Running >= 9V	2.8 seconds in a 4 second window 4 Seconds	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Energy Control Module Lost Communication with Hybrid Batterry Interface Control Module B	U2604	If associated message from Slave is not received	Loss of Supervision with Slave B on Private CAN bus DTC Pass	# of consecutive serial data message from Slave B not received > 7 1	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable 2nd Protection Self Test Diagnostic VITM System Voltage	True True Not Running >= 9V	2.8 seconds in a 4 second window 4 Seconds	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Energy Control Module Lost Communication with Hybrid Batterry Interface Control Module C	U2605	If associated message from Slave is not received	Loss of Supervision with Slave C on Private CAN bus DTC Pass	# of consecutive serial data message from Slave C not received > 7 1	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable 2nd Protection Self Test Diagnostic VITM System Voltage	True True Not Running >= 9V	2.8 seconds in a 4 second window 4 Seconds	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Energy Control Module Lost Communication with Hybrid Batterry Interface Control Module D	U2606	If associated message from Slave is not received	Loss of Supervision with Slave D on Private CAN bus DTC Pass	# of consecutive serial data message from Slave D not received > 7 1	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable 2nd Protection Self Test Diagnostic VITM System Voltage	True True Not Running >= 9V	2.8 seconds in a 4 second window 4 Seconds	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Energy Control Module Lost Communication with Hybrid Batterry Interface Control Module E	U2617	If associated message from Slave is not received	Loss of Supervision with Slave E on Private CAN bus DTC Pass	# of consecutive serial data message from Slave E not received > 7 1	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable 2nd Protection Self Test Diagnostic VITM System Voltage	True True Not Running >= 9V	2.8 seconds in a 4 second window 4 Seconds	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Energy Control Module Lost Communication with Hybrid Batterry Interface Control Module F	U2618	If associated message from Slave is not received	Loss of Supervision with Slave F on Private CAN bus DTC Pass	# of consecutive serial data message from Slave F not received > 7 1	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable 2nd Protection Self Test Diagnostic VITM System Voltage	True True Not Running >= 9V	2.8 seconds in a 4 second window 4 Seconds	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Energy Control Module Lost Communication with Hybrid Batterry Interface Control Module G	U2619	If associated message from Slave is not received	Loss of Supervision with Slave G on Private CAN bus DTC Pass	# of consecutive serial data message from Slave G not received > 7 1	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable 2nd Protection Self Test Diagnostic VITM System Voltage	True True Not Running >= 9V	2.8 seconds in a 4 second window 4 Seconds	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Energy Control Module Lost Communication with Hybrid Batterry Interface Control Module H	U2620	If associated message from Slave is not received	Loss of Supervision with Slave H on Private CAN bus DTC Pass	# of consecutive serial data message from Slave H not received > 7 1	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable 2nd Protection Self Test Diagnostic VITM System Voltage	True True Not Running >= 9V	2.8 seconds in a 4 second window 4 Seconds	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Energy Control Module Lost Communication with Hybrid Batterry Interface Control Module I	U2621	If associated message from Slave is not received	Loss of Supervision with Slave I on Private CAN bus DTC Pass	# of consecutive serial data message from Slave I not received > 7 1	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable 2nd Protection Self Test Diagnostic VITM System Voltage	True True Not Running >= 9V	2.8 seconds in a 4 second window 4 Seconds	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Energy Control Module Lost Communication with Hybrid Batterry Interface Control Module J	U2622	If associated message from Slave is not received	Loss of Supervision with Slave J on Private CAN bus DTC Pass	# of consecutive serial data message from Slave J not received > 7 1	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable 2nd Protection Self Test Diagnostic VITM System Voltage	True True Not Running >= 9V	2.8 seconds in a 4 second window 4 Seconds	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Energy Control Module Lost Communication with Hybrid Batterry Interface Control Module K	U2623	If associated message from Slave is not received	Loss of Supervision with Slave J on Private CAN bus DTC Pass	# of consecutive serial data message from Slave J not received > 7 1	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable 2nd Protection Self Test Diagnostic VITM System Voltage	True True Not Running >= 9V	2.8 seconds in a 4 second window 4 Seconds	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - BECM and VITM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Energy Control Module Lost Communication with Hybrid Batterry Interface Control Module L	U2624	If associated message from Slave is not received	Loss of Supervision with Slave J on Private CAN bus DTC Pass	# of consecutive serial data message from Slave J not received > 7 1	Diagnostic Enable Run/Crank, Accessory/ Run or HVEM EB Comm Enable 2nd Protection Self Test Diagnostic VITM System Voltage	True True Not Running >= 9V	2.8 seconds in a 4 second window 4 Seconds	Type A, 1 Trips

16 OBDG01 Fault Bundle Definitions

Bundle Name: Battery Current Sensor
P0AC1, P0AC2, P1EBA, P1A07, P0B13, P0B10, P0B11, P1EBB, (U0111 and U185A)
Bundle Name: Battery Voltage Sensor
P0ABC, P0ABD, P1A07, P0AF8, P0ABB, (U0111 and U185A)
Bundle Name: Bus Voltage Sensor
P1AE8, P1AE9, P1AEA, P1AEB, P1AEC, P1AED, P1E20, P1E21, P1E28, U0293
Bundle Name: Cell Voltage Ckt High
P0B3E, P0B43, P0B48, P0B4D, P0B52, P0B57, P0B5C, P0B61, P0B66, P0B6B, P0B70, P0B75, P0B7A, P0B7F, P0B84, P0B89, P0B8E, P0B93, P0B98, P0B9D, P0BA2, P0BA7, P0BAC, P0BB1, P0BB6, P0BBB, P1B18, P1B1B, P1B1E, P1B21, P1B24, P1B27, P1B47, P1B4A, P1B4D, P1B50, P1B53, P1B56, P1B59, P1B5C, P1B5F, P1B62, P1B65, P1B68, P1B6B, P1B6E, P1B71, P1B74, P1B77, P1B7A, P1B7D, P1B80, P1B83, P1B86, P1B89, P1B8C, P1B8F, P1B92, P1B95, P1B98, P1B9B, P1B9E, P1BA1, P1BA4, P1BA7, P1BAA, P1BAD, P1BB0, P1BB3, P1BB6, P1BB9, P1BBC, P1BBF, P1BC2, P1BC5, P1BC8, P1BCB, P1BCE, P1BD1, P1BD4, P1BD7, P1BDA, P1BDD, P1BE0, P1BE3, P1BE6, P1BE9, P1BEC, P1BEF, P1BF2, P1BF5, P1BF8, P1BFB, P1BFE, P1E03, P1E06
Bundle Name: Cell Voltage Ckt Low
P0B3D, P0B42, P0B47, P0B4C, P0B51, P0B56, P0B5B, P0B60, P0B65, P0B6A, P0B6F, P0B74, P0B79, P0B7E, P0B83, P0B88, P0B8D, P0B92, P0B97, P0B9C, P0BA1, P0BA6, P0BAB, P0BB0, P0BB5, P0BBA, P1B17, P1B1A, P1B1D, P1B20, P1B23, P1B26, P1B46, P1B49, P1B4C, P1B4F, P1B52, P1B55, P1B58, P1B5B, P1B5E, P1B61, P1B64, P1B67, P1B6A, P1B6D, P1B70, P1B73, P1B76, P1B79, P1B7C, P1B7F, P1B82, P1B85, P1B88, P1B8B, P1B8E, P1B91, P1B94, P1B97, P1B9A, P1B9D, P1BA0, P1BA3, P1BA6, P1BA9, P1BAC, P1BAF, P1BB2, P1BB5, P1BB8, P1BBB, P1BBE, P1BC1, P1BC4, P1BC7, P1BCA, P1BCD, P1BD0, P1BD3, P1BD6, P1BD9, P1BDC, P1BDF, P1BE2, P1BE5, P1BE8, P1BEB, P1BEE, P1BF1, P1BF4, P1BF7, P1BFA, P1BFD, P1E02, P1E05
Bundle Name: CellVoltageRationalityFA
P0B3D, P0B42, P0B47, P0B4C, P0B51, P0B56, P0B5B, P0B60, P0B65, P0B6A, P0B6F, P0B74, P0B79, P0B7E, P0B83, P0B88, P0B8D, P0B92, P0B97, P0B9C, P0BA1, P0BA6, P0BAB, P0BB0, P0BB5, P0BBA, P1B17, P1B1A, P1B1D, P1B20, P1B23, P1B26, P1B46, P1B49, P1B4C, P1B4F, P1B52, P1B55, P1B58, P1B5B, P1B5E, P1B61, P1B64, P1B67, P1B6A, P1B6D, P1B70, P1B73, P1B76, P1B79, P1B7C, P1B7F, P1B82, P1B85, P1B88, P1B8B, P1B8E, P1B91, P1B94, P1B97, P1B9A, P1B9D, P1BA0, P1BA3, P1BA6, P1BA9, P1BAC, P1BAF, P1BB2, P1BB5, P1BB8, P1BBB, P1BBE, P1BC1, P1BC4, P1BC7, P1BCA, P1BCD, P1BD0, P1BD3, P1BD6, P1BD9, P1BDC, P1BDF, P1BE2, P1BE5, P1BE8, P1BEB, P1BEE, P1BF1, P1BF4, P1BF7, P1BFA, P1BFD, P1E02, P1E05, P0B3E, P0B43, P0B48, P0B4D, P0B52, P0B57, P0B5C, P0B61, P0B66, P0B6B, P0B70, P0B75, P0B7A, P0B7F, P0B84, P0B89, P0B8E, P0B93, P0B98, P0B9D, P0BA2, P0BA7, P0BAC, P0BB1, P0BB6, P0BBB, P1B18, P1B1B, P1B1E, P1B21, P1B24, P1B27, P1B47, P1B4A, P1B4D, P1B50, P1B53, P1B56, P1B59, P1B5C, P1B5F, P1B62, P1B65, P1B68, P1B6B, P1B6E, P1B71, P1B74, P1B77, P1B7A, P1B7D, P1B80, P1B83, P1B86, P1B89, P1B8C, P1B8F, P1B92, P1B95, P1B98, P1B9B, P1B9E, P1BA1, P1BA4, P1BA7, P1BAA, P1BAD, P1BB0, P1BB3, P1BB6, P1BB9, P1BBC, P1BBF, P1BC2, P1BC5, P1BC8, P1BCB, P1BCE, P1BD1, P1BD4, P1BD7, P1BDA, P1BDD, P1BE0, P1BE3, P1BE6, P1BE9, P1BEC, P1BEF, P1BF2, P1BF5, P1BF8, P1BFB, P1BFE, P1E03, P1E06, P0B3B, P0B40, P0B45, P0B4A, P0B4F, P0B54, P0B59, P0B5E, P0B63, P0B68, P0B6D, P0B77, P0B7C, P0B81, P0B86, P0B8B, P0B95, P0B9A, P0B9F, P0BA4, P0BA9, P0BAE, P0BB3, P0BB8, P1B28, P1B29, P1B2A, P1B2B, P1B2C, P1B2D, P1E4C, P1E4D, P1E4E, P1E4F, P1E50, P1E51, P1E52, P1E53, P1E54, P1E56, P1E57, P1E58, P1E59, P1E5A, P1E5B, P1E5C, P1E5D, P1E5E, P1E5F, P1E60, P1E61, P1E62, P1E63, P1E64, P1E65, P1E66, P1E67, P1E68, P1E69, P1E6A, P1E6B, P1E6C, P1E6E, P1E6F, P1E70, P1E71, P1E72, P1E73, P1E74, P1E75, P1E76, P1E77, P1E78, P1E79, P1E7A, P1E7B, P1E7C, P1E7D, P1E7E, P1E7F, P1E80, P1E81, P1E82, P1E83, P1E84, P1E86, P1E87, P1E88, P1E89, P1E8A, U2603, U2604, U2605, U2606, U2617, U2618, U2619, U2620, U2621, U2622, U2623, U2624, P1EB1, P1EB2, P1EB3, P1EB4, P1EB5, P1FA6, P1FA7, P1FA8, P1FA9, P1FAA, P1FAB, P3030, P303B
Bundle Name: Charger Current Sensor
P0D53, P0D54, U1838
Bundle Name: Open Sense Line Fault
P0B3B, P0B40, P0B45, P0B4A, P0B4F, P0B54, P0B59, P0B5E, P0B63, P0B68, P0B6D, P0B72, P0B77, P0B7C, P0B81, P0B86, P0B8B, P0B90, P0B95, P0B9A, P0B9F, P0BA4, P0BA9, P0BAE, P0BB3, P0BB8, P1B28, P1B29, P1B2A, P1B2B, P1B2C, P1B2D, P1E4C, P1E4D, P1E4E, P1E4F, P1E50, P1E51, P1E52, P1E53, P1E54, P1E55, P1E56, P1E57, P1E58, P1E59, P1E5A, P1E5B, P1E5C, P1E5D, P1E5E, P1E5F, P1E60, P1E61, P1E62, P1E63, P1E64, P1E65, P1E66, P1E67, P1E68, P1E69, P1E6A, P1E6B, P1E6C, P1E6D P1E6E, P1E6F, P1E70, P1E71, P1E72, P1E73, P1E74, P1E75, P1E76, P1E77, P1E78, P1E79, P1E7A, P1E7B, P1E7C, P1E7D, P1E7E, P1E7F, P1E80, P1E81, P1E82, P1E83, P1E84, P1E86, P1E87, P1E88, P1E89, P1E8A
Bundle Name: Slave Cell Balancing Fault

16 OBDG01 Fault Bundle Definitions

P1E92, P1E98, P1E9E, P1EA4, P1FC9, P1FCA, P1FCB, P1FCC, P1FCD, P1FCE, P3036, P3041
Bundle Name: Slave Internal Performance Fault
P1E8E, P1E94, P1E9A, P1EA0, P1FBD, P1FBE, P1FBF, P1FC0, P1FC1, P1FC2, P3034, P303F
Bundle Name: Slave Loss of Comm Fault
U2603, U2604, U2605, U2606, U2617, U2618, U2619, U2620, U2621, U2622, U2623, U2624
Bundle Name: TempRationalityFA
P0AC6, P0ACB, P0AE9, P0BC3, P0C34, P0A9E, P0AC8, P0ACD, P0AEB, P0BC5, P0C36, P0A9D, P0AC7, P0ACC, P0AEA, P0BC4, P0C35, P1EB1, P1EB2, P1EB3, P1EB4, P1EB5, P1FA6, P1FA7, P1FA8, P1FA9, P1FAA, P1FAB, P3030, P303B, U2401, U2603, U2604, U2605, U2606, U2617, U2618, U2619, U2620, U2621, U2622, U2623, U2624
Bundle Name: VICMVoltageFA
P0B3D, P0B42, P0B47, P0B4C, P0B51, P0B56, P0B5B, P0B60, P0B65, P0B6A, P0B6F, P0B74, P0B79, P0B7E, P0B83, P0B88, P0B8D, P0B92, P0B97, P0B9C, P0BA1, P0BA6, P0BAB, P0BB0, P0BB5, P0BBA, P1B17, P1B1A, P1B1D, P1B20, P1B23, P1B26, P1B46, P1B49, P1B4C, P1B4F, P1B52, P1B55, P1B58, P1B5B, P1B5E, P1B61, P1B64, P1B67, P1B6A, P1B6D, P1B70, P1B73, P1B76, P1B79, P1B7C, P1B7F, P1B82, P1B85, P1B88, P1B8B, P1B8E, P1B91, P1B94, P1B97, P1B9A, P1B9D, P1BA0, P1BA3, P1BA6, P1BA9, P1BAC, P1BAF, P1BB2, P1BB5, P1BB8, P1BBB, P1BBE, P1BC1, P1BC4, P1BC7, P1BCA, P1BCD, P1BD0, P1BD3, P1BD6, P1BD9, P1BDC, P1BDF, P1BE2, P1BE5, P1BE8, P1BEB, P1BEE, P1BF1, P1BF4, P1BF7, P1BFA, P1BFD, P1E02, P1E05, P0B3E, P0B43, P0B48, P0B4D, P0B52, P0B57, P0B5C, P0B61, P0B66, P0B6B, P0B70, P0B75, P0B7A, P0B7F, P0B84, P0B89, P0B8E, P0B93, P0B98, P0B9D, P0BA2, P0BA7, P0BAC, P0BB1, P0BB6, P0BBB, P1B18, P1B1B, P1B1E, P1B21, P1B24, P1B27, P1B47, P1B4A, P1B4D, P1B50, P1B53, P1B56, P1B59, P1B5C, P1B5F, P1B62, P1B65, P1B68, P1B6B, P1B6E, P1B71, P1B74, P1B77, P1B7A, P1B7D, P1B80, P1B83, P1B86, P1B89, P1B8C, P1B8F, P1B92, P1B95, P1B98, P1B9B, P1B9E, P1BA1, P1BA4, P1BA7, P1BAA, P1BAD, P1BB0, P1BB3, P1BB6, P1BB9, P1BBC, P1BBF, P1BC2, P1BC5, P1BC8, P1BCB, P1BCE, P1BD1, P1BD4, P1BD7, P1BDA, P1BDD, P1BE0, P1BE3, P1BE6, P1BE9, P1BEC, P1BEF, P1BF2, P1BF5, P1BF8, P1BFB, P1BFE, P1E03, P1E06, P0B3B, P0B40, P0B45, P0B4A, P0B4F, P0B54, P0B59, P0B5E, P0B63, P0B68, P0B6D, P0B77, P0B7C, P0B81, P0B86, P0B8B, P0B95, P0B9A, P0B9F, P0BA4, P0BA9, P0BAE, P0BB3, P0BB8, P1B28, P1B29, P1B2A, P1B2B, P1B2C, P1B2D, P1E4C, P1E4D, P1E4E, P1E4F, P1E50, P1E51, P1E52, P1E53, P1E54, P1E56, P1E57, P1E58, P1E59, P1E5A, P1E5B, P1E5C, P1E5D, P1E5E, P1E5F, P1E60, P1E61, P1E62, P1E63, P1E64, P1E65, P1E66, P1E67, P1E68, P1E69, P1E6A, P1E6B, P1E6C, P1E6E, P1E6F, P1E70, P1E71, P1E72, P1E73, P1E74, P1E75, P1E76, P1E77, P1E78, P1E79, P1E7A, P1E7B, P1E7C, P1E7D, P1E7E, P1E7F, P1E80, P1E81, P1E82, P1E83, P1E84, P1E86, P1E87, P1E88, P1E89, P1E8A, P0B3C, P0B41, P0B46, P0B4B, P0B50, P0B55, P0B5A, P0B5F, P0B64, P0B69, P0B6E, P0B73, P0B78, P0B7D, P0B82, P0B87, P0B8C, P0B91, P0B96, P0B9B, P0BA0, P0BA5, P0BAA, P0BAF, P0BB4, P0BB9, P1B16, P1B19, P1B1C, P1B1F, P1B22, P1B25, P1B45, P1B48, P1B4B, P1B4E, P1B51, P1B54, P1B57, P1B5A, P1B5D, P1B60, P1B63, P1B66, P1B69, P1B6C, P1B6F, P1B72, P1B75, P1B78, P1B7B, P1B7E, P1B81, P1B84, P1B87, P1B8A, P1B8D, P1B90, P1B93, P1B96, P1B99, P1B9C, P1B9F, P1BA2, P1BA5, P1BA8, P1BAB, P1BAE, P1BB1, P1BB4, P1BB7, P1BBA, P1BBD, P1BC0, P1BC3, P1BC6, P1BC9, P1BCC, P1BCF, P1BD2, P1BD5, P1BD8, P1BDB, P1BDE, P1BE1, P1BE4, P1BE7, P1BEA, P1BED, P1BF0, P1BF3, P1BF6, P1BF9, P1BFC, P1E01, P1E04, U2603, U2604, U2605, U2606, U2617, U2618, U2619, U2620, U2621, U2622, U2623, U2624, P1EB1, P1EB2, P1EB3, P1EB4, P1EB5, P1FA6, P1FA7, P1FA8, P1FA9, P1FAA, P1FAB, P3030, P303B, P0ABC, P0ABD

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Ambient Air Temperature Sensor Range/ Performance	P0071	Outside Air Temperature sensor is not performing as intended			System Voltage	> 10.20 V	32.00 fails / 40.00 samples at 250ms	Type B, 2 Trips
					Power mode	= Run for < 20.00 s		
					Test complete this trip	= FALSE		
					Compressor running	= FALSE		
					Propulsion Off Timer	> 21,600.00 s		
					Power Electronic Pump transition soak time	> 3,600.00 s		
					Compressor Off transition soak time	> 3,600.00 s		
					Charger Off transition soak time	> 3,600.00		
					No active power electronic pump DTC:	P0CE9, P1F44, P1F45		
					No active outside air temperature DTC:	P0072, P0073		
					No active run crank DTCs:	P2534, P2535		
					No active propulsion system off timer DTC:	P0606		
				If IAT_ECT selected CeOATD_e_Select_IAT_ECT				
			ABS (Outside Air Temperature - Inlet Air Temperature)	> 28.00	Difference between IAT and ECT	< 9,999.00		
			ABS (Outside Air Temperature - Engine	> 28.00	ECT compare	= TRUE		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Coolant Temperature)		No active inlet air temperature DTCs:	P0110, P0111, P0112, P0113		
					No active engine coolant temperature DTCs:	P0114, P0115, P0116, P0117, P0118, P0119		
				If IAT_ECT selected CeOATD_e_Select_IAT_ECT				
			ABS (Outside Air Temperature - High Side Refrigerant pressure converted to temperature)	> 9,999.00 °C	ACCM CPU Temperature	> -10.00 °C		
					No active high side refrigerant compressor DTCs:	P0532, P0533		
					No active compressor CPU temperature DTC:	P0D76, P0D77, P0D78		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Ambient Air Temperature Sensor Circuit Low Input	P0072	Outside Air Temperature sensor has an out of range low circuit fault	Sensor voltage	< 2.00 % (0.10 V) of reference voltage	System Voltage	> 10.20 V	16.00 fails / 20.00 samples at 250ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Ambient Air Temperature Sensor Circuit High Input	P0073	Outside Air Temperature sensor has an out of range high circuit fault	Sensor voltage	> 96.00 % (4.80 V) of reference voltage	System Voltage	> 10.20 V	16.00 fails / 20.00 samples at 250ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Ambient Air Temperature Sensor Circuit Intermittent/ Erratic	P0074	Outside Air Temperature sensor is intermittent or erratic	String Length Where: "String Length" = sum of "Diff" calculated over And where: "Diff" = ABS (current OAT reading - OAT reading from 250 milliseconds previous)	> 50.00 % 4 consecutive OAT samples	System Voltage	> 10.20 V	4.00 fails / 5.00 samples	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cooling Fan 1 Control Circuit	P0480	Engine Cooling Fan has a circuit fault	Engine Cooling Fan line is open, shorted to voltage or shorted to ground.	The controller board support package has detect a shorted fault condition.	System Voltage	> 10.20 V	16.00 fails / 20.00 samples at 250ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Fill Door Switch Stuck Closed	P04B6	Fuel Door Position Rationality	Fuel door opened AND refuel request AND refuel detected	False True True	Fuel Fill Door Switch Stuck Closed Diagnostic Enable Calibration	= TRUE	50ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Fill Door Position Sensor/ Switch Circuit	P04B8	Detects if sensor reading is invalid	Fuel Fill Door Position Sensor reading within an invalid range	65.88 %< Reported Position <= 81.56 %	Fuel Fill Door Position Sensor/Switch Circuit Diagnostic calibration	= TRUE	6 out of 8 samples @ 500ms per sample 3 seconds out of a 4 seconds window	Type B, 2 Trips

16 OBDG01 Diagnostic Summary Tables - VICM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Fill Door Position Sensor/ Switch Circuit Low	P04B9	Detects if the Circuit is Shorted to Ground	Fuel Fill Door Position Sensor reading below a threshold	Reported Position< 22.40 %	Fuel Fill Door Position Sensor/Switch Circuit Low Diagnostic Calibration	= TRUE	6.00 out of 8.00 samples @ 500ms per sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Fill Door Position Sensor/ Switch Circuit High	P04BA	Detects if the Circuit is Shorted to Battery	Fuel Fill Door Position Sensor reading above a threshold	Reported Position > 94.50 %	Fuel Fill Door Position Sensor/Switch Circuit High Diagnostic Enable Calibration	= TRUE	6.00 out of 8.00 samples @ 500ms per sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Fill Door Lock Control Circuit/Open	P04BB	Detects a fault in the Fuel Fill Door Lock/ Unlock Control Circuit	Hardware Reported Test Result for OPEN Circuit OR	Fault =TRUE	Fuel Fill Door Lock Control Circuit/Open Diagnostic Enable Calibration	= TRUE	80.00 % of total number samples @ 50ms per sample (<5sec)	Type A, 1 Trips
					The Hardware reported test result, for an open circuit or short to power condition	≠ INDETERMINATE	3.2 seconds out of a 4 seconds window	
			Hardware Reported Test Result for SHORT Circuit to Battery		The door lock driver circuit must be active to assert an Unlock OR The door lock driver circuit must be active to assert Lock state	=ASSERT UNLOCK =ASSERT LOCK		
			Hardware Reported Test Result for SHORT Circuit to Ground	Fault =TRUE	Fuel Fill Door Lock Control Circuit/Open Diagnostic Enable Calibration	= TRUE	64.00 out of 80.00 samples @ 50ms per sample	
					The door lock driver circuit is NOT be active	=ASSERT NONE		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Fill Door Open Request Sensor/ Switch Circuit	P04C8	Detects if the circuit resistance is incorrect	Switch sensor reading within invalid range	65.88 %< Reported Position <= 81.56 %	Fuel Fill Door Open Request Sensor/Switch Circuit Diagnostic Enable Calibration	= TRUE	6.00 out of 8.00 samples @ 500ms per sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Fill Door Open Request Sensor/ Switch Circuit Low	P04CA	Detects if the circuit is shorted to ground	Fuel Fill Door Lock Request Switch sensor reading less than threshold	Reported Position< 22.94 %	Fuel Fill Door Open Request Sensor/Switch Circuit Low Diagnostic Enable Calibration	= TRUE	6.00 out of 8.00 samples @ 500ms per sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Fill Door Open Request Sensor/ Switch Circuit High	P04CB	Detects if the Circuit is shorted to battery or open	Fuel Fill Door Request Switch sensor reading above threshold	Reported Position > 94.50 %	Fuel Fill Door Open Request Sensor/Switch Circuit High Diagnostic Enable Calibration	= TRUE	6.00 out of 8.00 samples @ 500ms per sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Air Conditioner (A/C) Refrigerant Charge Loss	P0534	Cooling performance not adequate/Low charge/Plugged refrigerant line.	CASE1: determine low refrigerant charge fail - compressor running Low Side Refrigerant Pressure based on Minimum of OAT Raw or OAT Filtered for Low Side Pressure Exceeded Threshold Time	P0534 Case 1 < (CompON) See Supporting Tables > 3.00 s	System Voltage No active pressure sensor or temperature sensor or clock DTCs: Diagnostic Complete Flag Compressor Running Flag OAT Raw Status OAT Filtered Status Compressor Status Continuous Compressor RPM check (Run Mode) OR Continuous Compressor RPM check (Charge Mode) Compressor Off Time (Propulsion System Active AND Run Crank Active) OR Charge Function Available	> 10.20 V P2517, P2518, P2516, P151C, P0606, P0071, P0072, P0073, P0074 = False = True = Valid or Uninitialized = Valid or Uninitialized = Normal Operation > 500.00 RPM to Enable < 250.00 RPM to Disable (Hysterisis) > 500.00 RPM to Enable < 250.00 RPM to Disable (Hysterisis) > 3,600.00 s = True = True = True	up to 60.00 s	Type B, 2 Trips
			CASE2a: determine low refrigerant charge fail - compressor off/soaked Low Side Refrigerant Pressure based on Minimum of OAT Raw or OAT Filtered for	P0534 Case 2 < (CompOFF_Fail) See Supporting Tables	System Voltage No active pressure sensor or temperature sensor or clock DTCs: OAT Raw Status OAT Filtered Status	> 10.20 V P2517, P2518, P2516, P151C, P0606, P0071, P0072, P0073, P0074 = Valid or Uninitialized = Valid or Uninitialized	up to 30.00 s	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Low Side Pressure Exceeded Threshold Time	> 30.00 s	Compressor Off Time Compressor Running Flag	> 3,600.00 s = False		
			CASE2b: determine low refrigerant charge pass - compressor off/soaked Low Side Refrigerant Pressure based on Minimum of OAT Raw or OAT Filtered for Low Side Pressure did not exceed threshold Time	P0534 Case 2 > (CompOFF_Pass) See Supporting Tables > 480.00 s	System Voltage No active pressure sensor or temperature sensor or clock DTCs: OAT Raw Status OAT Filtered Status Compressor Off Time Compressor Running Flag	> 10.20 V P2517, P2518, P2516, P151C, P0606, P0071, P0072, P0073, P0074 = Valid or Uninitialized = Valid or Uninitialized > 3,600.00 s = False	up to 480.00 s	

16 OBDG01 Diagnostic Summary Tables - VICM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
System Voltage Low	P0562	Detects if Battery input voltage is below a threshold	Battery voltage is below a threshold	≤ 10.20 volts		Continuous	1 failed sample for 500ms below Threshold value	Type C, No MIL

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Read Only Memory (Rom)	P0601	See Malfunction criteria for Case Description.	This DTC will be stored if any software or calibration checksum is incorrect - Case 1 - Calculated Checksum does not match stored checksum				Runs once per powerup	Type A, 1 Trips
			Flash ECC Circuit Test - Case 2 - Failed detection of invalid data written to ECC			Continuous	1s loop, 3 failures in powerup cycle	

16 OBDG01 Diagnostic Summary Tables - VICM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Not Programmed	P0602	Indicates that the Control Module needs to be programmed	'No Start' Calibration is set to true which is only available on a new un-programmed Module			Continuous	1s loop, 1 failure	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Long Term Memory Reset	P0603	Non-volatile memory checksum error	Checksum at power-up does not match checksum at power-down			Runs at battery connect OR after a controller reset OR When Battery Backed RAM failure detected OR next controller init when Failure counter increments to 1 OR Fault is active OR Test not passed since code clear OR Test failed this key on OR MIL Request is ON	2 consecutive failed samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Random Access Memory (RAM) Failure	P0604	RAM ECC Circuit Test	Failed validation of test data written to ECC			Continuous	1s loop, 3 failures in powerup cycle	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Internal Performance	P0606	See Malfunction criteria for Case Description.	ALU and Register Test - Case 1 - Control Module fails to execute a diagnostic test algorithm			Continuous	1s loop, 3 failures in powerup cycle	Type A, 1 Trips
			Program Sequence Counter - Case 2 - Incorrect sequence of frame executionProgram Sequence Counter	10 samples in incorrect sequence in consecutive order		Continuous	1s loop, 3 failures in powerup cycle	
			Configuration Registers Test - Case 3 - Comparison of current configuration register settings with predefined values fails			Continuous	1s loop, 3 failures in powerup cycle	
			MMU Test - Case 4 - Test of memory management related instructions fails	Fails MMU instruction		Continuous	1s loop, 3 failures in powerup cycle	
			MMU Configuration Fault - Case 5 - Verifies MMU TLB's are properly configured for the application	TLB set incorrectly		Continuous	1s loop, 3 failures in powerup cycle	
			Stack Limits Test - Case 6 - Verifies stack usage does not exceed maximum stack size	Stack usage exceeds 100%		Continuous	1s loop, 3 failures in powerup cycle	
			Clock Status - Case 7 - Checks for loss of lock/ clock, forces a reset if failed			Continuous	1s loop, 3 failures in powerup cycle	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Auxiliary ALU Test - Case 8 - Auxiliary microprocessor fails to run a defined diagnostic algorithm			Continuous	100ms loop, 3 failures in powerup cycle	
			Auxiliary RAM Test - Case 9 - Auxiliary microprocessor fails a write/read data diagnostic RAM test			Continuous	1s loop, 3 failures in powerup cycle	
			Auxiliary ROM Test - Case 10 - Auxiliary microprocessor ROM checksum error			Continuous	2.5s loop, 3 failures in powerup cycle	
			Auxiliary Register Configuration Test - Case 11 - Configuration register values do not match expected pre-configured values			Continuous	100ms loop, 3 failures in powerup cycle	
			Auxiliary Stack Test - Case 12 - Auxiliary microprocessor stack underflow or overflow			Continuous	100ms loop, 3 failures in powerup cycle	
			Seed and Key Test - Case 13 - Seed and key test failed - invalid order, timeout, incorrect seed, incorrect key			Continuous	100ms loop, 3 failures in powerup cycle	
			Main Detected Seed Incorrect Order - Case 14 - Seed and key test failed - main microprocessor received seed from the auxiliary icroprocessor out of order			Continuous	100ms loop, 3 failures in powerup cycle	
			Main Detected Unknown			Continuous	100ms loop, 3	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Seed - Case 15 - Seed and key test failed - main microprocessor received an unknown seed				failures in powerup cycle	
			Internal IO Diagnostic (BVREF) - Case 16 - 5V reference voltages out of range	10.46 % above or below		Continuous	1s loop, 3 failures in powerup cycle	
			Internal IO Diagnostic (Analog 25% reference line) - Case 17 - 25% reference line out of range	Reference less than 22% or greater than 28%		Continuous	1s loop, 3 failures in powerup cycle	
			Internal IO Diagnostic (Analog 75% reference line) - Case 18 - 75% reference line out of range	Reference less than 72% or greater than 78%		Continuous	1s loop, 3 failures in powerup cycle	
			SPI Fault Detection Test - Case 19 - SPI B, C, or D fault detected			Continuous	1s loop, 3 failures in powerup cycle	
			SPI B Fault Detection Test - Case 20 - Fault detected via echo test on SPI bus B			Continuous	1s loop, 3 failures in powerup cycle	
			SPI C Fault Detection Test - Case 21- Fault detected via echo test on SPI bus C			Continuous	1s loop, 3 failures in powerup cycle	
			SPI D Fault Detection Test - Case 22 - Fault detected via echo test on SPI bus D			Continuous	1s loop, 3 failures in powerup cycle	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Long Term Memory Performance	P062F	Update BINVDM operation	Battery independent non-volatile status update failed				Runs at controller shutdown and after new data is written to EEPROM (which is checked every 600 seconds) 2 consecutive failed samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Wake-up Circuit Performance	P06E4	Detects a fault in the Control Module Output Wake-Up Circuit	Case 1: Short to Ground		Diagnostic Enabled Control Module Output Wake-Up Circuit Enabled	=TRUE =TRUE	480.00 failed samples within 560.00 samples 1 sample every 12.5ms	Type B, 2 Trips
			Case 2:Short to Battery or Open circuit		Diagnostic Enabled Control Module Output Wake-Up Circuit Enabled	=TRUE =FALSE		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
High Voltage System Interlock Circuit Low	P0A0C	DTC monitors the sensed voltage when the commanded voltage is high to determine if the circuit is faulty	HVIL Sensed % of Reference Voltage	< 30.00 %	HVIL Source Status 12V Battery Voltage	Sourced (5V) > 10.2V DTC Pass	2 failures out of 2 samples 12.5 ms /sample 25 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
High Voltage System Interlock Circuit High	P0A0D	DTC monitors the sensed voltage when the commanded voltage is high and low to determine if the circuit is faulty.	HVIL Sensed % of Reference Voltage OR HVIL Sensed % of Reference Voltage	> 24.00 % > 44.00 %	HVIL Source Status 12V Battery Voltage HVIL Source Status 12V Battery Voltage	Unsourced (0V) > 10.2V Sourced (5V) > 10.2V DTC Pass	5 failures out of 8 samples 12.5 ms /sample 4 failures out of 6 samples 12.5 ms /sample 100 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Pack Over temperature	P0A7E	Battery temp. too high	Battery Temperature Above Threshold	> 73.50 °C	System Voltage No Active DTCs (Battery temperature status) Short Low Short High Comunication Performance	> 10.20 V P0A9D P0AC7 P0ACC P0AEA P0BC4 P0C35 P0A9E P0ACD P0AC8 P0AEB P0BC5 P0C36 U179C P0A9C P0AC6 P0ACB P0AE9 P0BC3 P0C34	50.00 fails / 60.00 samples at 100ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Pack Life (EV Range)	P0A7F	High Pack Power capability	Power limits	< KtBSED_P_BPD_D_EndOfLifePwrThrsh (kW) - see VICM Supporting Tables	Maximum battery temperature Minimum battery temperature Battery SOC RunCrank System Voltage Battery Voltage Sensor (see Fault Bundle Page) Battery Current Sensor (see Fault Bundle Page) TempRationalityFA (see Fault Bundle Page) Actual battery power exceedance of power limits in terms of % overshoot multiplied by seconds of duration	< 50.00 ºC > 20.00 ºC > 15.00 % < 100.00 % = TRUE >10.2 V = False = False = False > 80 %-Sec	5 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Temperature Sensor Range/ Performance	P0A9C	Rationality compares temperature with the other sensor values read	| Temperature input deviates from the average battery temperature of other Module_Groups |	> 20.00 ºC	TempRationalityFA (see Fault Bundle Page)	= FALSE	5 seconds out of a 6.7 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Positive Contactor Circuit Stuck Closed	P0AA1	This DTC detects when the Positive Contactor is Stuck Closed by checking for voltage on the Positive Rail Voltage sensor.	Positive Rail Bus Voltage	> 30 Volts	Bus Voltage Sensor Positive Main Rail Voltage Battery Voltage Sensor Main Bus Contactors Positive Contactor Charger Contactor	Not Failed Not Failed Not Failed Open Open for > 120 seconds Open for > 120 seconds DTC Pass	4 failures out of 6 samples 12.5 ms /sample Executed continuously when contactors are open and controler is awake 75 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Negative Contactor Circuit Stuck Closed	P0AA4	This DTC detects when the Negative Contactor is Stuck Closed by checking for voltage on the Negative Rail Voltage sensor.	Negative Rail Bus Voltage	> 30 V	Bus Voltage Sensor Negative Rail Voltage Battery Voltage Sensor Main Bus Contactors RESS Heating Mode Positive Main Contactor Charger Contactor	Not Failed Not Failed Not Failed Open Not Commanded On Open for > 120 seconds Open for > 120 seconds DTC Pass	4 failures out of 6 samples 12.5 ms /sample Executed continuously when contactors are open and controler is awakeExecuted Once Per Precharge Event 75 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage System Isolation Fault	P0AA6	This DTC will determine if the measured resistance between the high voltage bus and chassis ground Is too low which indicates that the internals of the battery are no longer adequately isolated from chassis ground	Active Isolation Resistance	< 300,000 Ohm	P0AA6 Positive Contactor Negative Contactor Charger Contactor RESS Heating Mode	DTC Not Active Open for 35 Seconds Open for 35 Seconds Open for 35 Seconds Open for 35 Seconds	Fail if last resistance measurement is below theshold AND any 5 measurements out of last 10 measurements are below resistance theshold. No more than one resistance measurement is taken per HPC2 Wakeup Cycle. Pass if any single resistance measurement exceeds resistance threshold	Type A, 1 Trips
			Active Isolation Resistance	< 350,000 Ohm	P0AA6 Positive Contactor Negative Contactor Charger Contactor RESS Heating Mode	DTC Active Open for 35 Seconds Open for 35 Seconds Open for 35 Seconds Open for 35 Seconds	Fail if last resistance measurement is below theshold AND any 5 measurements out of last 10 measurements are below resistance theshold. No more than one resistance measurement is taken per HPC2 Wakeup Cycle.	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
							Pass if any single resistance measurement exceeds resistance threshold	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Pack Voltage Sense Circuit Rationality	P0ABB	Rationality compares pack voltage sensor to average cell voltage * 96	|Average cell voltage * 96 - Battery Pack voltage|	> 12.00 V	VICMVoltageFA (see Fault Bundle Page) No active DTCs:	= FALSE U0111 U185A	2 seconds out of a 2.5 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery 2 Temperature Sensor Performance	P0AC6	Rationality compares temperature with the other sensor values read	| Temperature input deviates from the average battery temperature of other Module_Groups |	> 20.00 ºC	TempRationalityFA (see Fault Bundle Page)	= FALSE	5 seconds out of a 6.7 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery 3 Temperature Sensor Performance	P0ACB	Rationality compares temperature with the other sensor values read	| Temperature input deviates from the average battery temperature of other Module_Groups |	> 20.00 ºC	TempRationalityFA (see Fault Bundle Page)	= FALSE	5 seconds out of a 6.7 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Positive Contactor Control Circuit	P0AD9	This DTC checks the circuit for electrical integrity during operation.	The HPC2 detects that the commanded state of the driver and the actual state of the control circuit do not match. Exception: It cannot detect the Short to Ground Fault	Open Load detected while OFF and output voltage > 4V. Short to VBATT detected while OFF and output voltage is > (VPWR -0.4V) Open while ON detected when current sense feedback < 194 mA	12V Battery Voltage	> 10.2V	40 failures out of 50 samples 12.5 ms /sample Continuous 625 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Negative Contactor Control Circuit	P0ADD	This DTC checks the circuit for electrical integrity during operation.	The HPC2 detects that the commanded state of the driver and the actual state of the control circuit do not match. Exception: It cannot detect the Short to Ground Fault	Open Load detected while OFF and output voltage > 4V. Short to VBATT detected while OFF and output voltage is > (VPWR -0.4V) Open while ON detected when current sense feedback < 194 mA	12V Battery Voltage	> 10.2V	40 failures out of 50 samples 12.5 ms /sample Continuous 625 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Precharge Contactor Circuit Stuck Open	P0AE3	This DTC detects when the precharge contactor is stuck open by checking for little to no voltage on the negative rail.	Negative Rail Bus Voltage	< 5 V	Precharge Contactor Negative Main Contactor Negative Main Rail Voltage RESS Heating Mode	Commanded On For 0.090 Seconds Not Commanded On Not Failed Not Commanded On DTC Pass	8 failures out of 10 samples 12.5 ms/sample Executed once per HPC2 Wake up cycle during the precharge event 125 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Precharge Contactor Control Circuit	P0AE4	This DTC checks the circuit for electrical integrity during operation.	The HPC2 detects that the commanded state of the driver and the actual state of the control circuit do not match. Exception: It cannot detect the Open Ckt Fault and the Short to Ground Fault	Short to VBATT detected while OFF and output volage is > (VPWR -0.4V)	12V Battery Voltage	> 10.2V DTC Pass	40 failures out of 50 samples 12.5 ms /sample Continuous 625 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery 4 Temperature Sensor Performance	P0AE9	Rationality compares temperature with the other sensor values read	| Temperature input deviates from the average battery temperature of other Module_Groups |	> 20.00 ºC	TempRationalityFA (see Fault Bundle Page)	= FALSE	5 seconds out of a 6.7 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Pack Voltage Sense Circuit Correlation	P0AF8	Correlation compares pack voltage sensor to either TPIM Bus Voltage or Charger Bus Voltage	|Battery Pack voltage - TPIM Bus Voltage |	> 16.00 V	Battery Pack Connected to TPIM No active DTCs:	= TRUE P0ABC P0ABD P1A07 P0ABB P1AEC P1AED P1E28 P1AE9 P1AEB P1AE21 P1AE8 P1AEA P1AE20 U1817	10 seconds out of a 12.5 seconds window	Type A, 1 Trips
			OR					
			|Battery Pack voltage - Charger Bus Voltage |	> 16.00 V	Battery Pack Connected to Charger AND Battery Pack Connected to TPIM	= TRUE = FALSE	10 seconds out of a 12.5 seconds window	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					No active DTCs:	P0ABC P0ABD P1A07 P0ABB P0D4E P0D4F P1EEB P1EEC P0D5C P1ECE P16C5 U1838		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery System Voltage Low	P0AFA	Voltage too low	High Voltage Battery Pack Voltage	< KtBSED_U_BUV_Pack VoltThresh (V) (see VICM Supporting Tables)	No active DTCs:	P0ABC P0ABD P1A07 P0AF8 P0ABB U0111 U185A	8 seconds out of a 39.875 seconds window	Type A, 1 Trips
			OR		VICMVoltageFA (see Fault Bundle Page)	= FALSE		
			Any Cell Voltage	< KtBSED_U_BUV_Cell VoltThresh (V) (see VICM Supporting Tables)	No active DTCs:	U0111 U185A	1 seconds out of a 4.875 seconds window	
					Must Send CPID	0x7E4 07 AE 32 0C 0C 00 00 00		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery System Voltage High	P0AFB	Voltage too high	High Voltage Battery Pack Voltage	> KtBSED_U_BOV_PackVoltThresh (V) (see VICM Supporting Tables)	No active DTCs:	P0ABC P0ABD P1A07 P0AF8 P0ABB U0111 U185A	8 seconds out of a 39.875 seconds window	Type A, 1 Trips
			OR		VICMVoltageFA (see Fault Bundle Page)	= FALSE		
			Any Cell Voltage	> KtBSED_U_BOV_CellVoltThresh (V) (see VICM Supporting Tables)	No active DTCs: Must Send CPID	U0111 U185A 0x7E4 07 AE 32 0C 0C 00 00 00	1 seconds out of a 4.875 seconds window	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Pack Current Sensor A/B Correlation	P0B13	Checks for deviation between Fine and Coarse current sensors	| Fine Current - Coarse Current |	> 10.00 A	Fine Current measured OR Coarse Current measured No active DTCs: P0AC1 P0AC2 P1EBA P1A07 P0B13 P0B10 P0B11 P1EBB U0111 U185A	Between -20.00 A and 20.00 A Between -20.00 A and 20.00 A	10 seconds out of a 12.5 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense A Circuit Range/ Performance	P0B3C	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement OR < 0.005 V	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.022 V U185A	7 seconds out of a 8 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense B Circuit Range/ Performance	P0B41	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement OR < 0.005 V	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.022 V U185A	7 seconds out of a 8 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense C Circuit Range/ Performance	P0B46	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement OR < 0.005 V	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.022 V U185A	7 seconds out of a 8 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense D Circuit Range/ Performance	P0B4B	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement OR < 0.005 V	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.022 V U185A	7 seconds out of a 8 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense E Circuit Range/ Performance	P0B50	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement OR < 0.005 V	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.022 V U185A	7 seconds out of a 8 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense F Circuit Range/ Performance	P0B55	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement OR < 0.005 V	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.022 V U185A	7 seconds out of a 8 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense G Circuit Range/ Performance	P0B5A	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement OR < 0.005 V	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.022 V U185A	7 seconds out of a 8 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense H Circuit Range/ Performance	P0B5F	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement OR < 0.005 V	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.022 V U185A	7 seconds out of a 8 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense I Circuit Range/ Performance	P0B64	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement OR < 0.005 V	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.022 V U185A	7 seconds out of a 8 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense J Circuit Range/ Performance	P0B69	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement OR < 0.005 V	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.022 V U185A	7 seconds out of a 8 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense K Circuit Range/ Performance	P0B6E	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement OR < 0.005 V	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.022 V U185A	7 seconds out of a 8 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense L Circuit Range/ Performance	P0B73	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement OR < 0.005 V	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.022 V U185A	7 seconds out of a 8 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense M Circuit Range/ Performance	P0B78	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement OR < 0.005 V	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.022 V U185A	7 seconds out of a 8 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense N Circuit Range/ Performance	P0B7D	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement OR < 0.005 V	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.022 V U185A	7 seconds out of a 8 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense O Circuit Range/ Performance	P0B82	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement OR < 0.005 V	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.022 V U185A	7 seconds out of a 8 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense P Circuit Range/ Performance	P0B87	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement OR < 0.005 V	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.022 V U185A	7 seconds out of a 8 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense Q Circuit Range/ Performance	P0B8C	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement OR < 0.005 V	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.022 V U185A	7 seconds out of a 8 seconds window	Type A, 1 Trips

16 OBDG01 Diagnostic Summary Tables - VICM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense R Circuit Range/ Performance	P0B91	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement OR < 0.005 V	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.022 V U185A	7 seconds out of a 8 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense S Circuit Range/ Performance	P0B96	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement OR < 0.005 V	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.022 V U185A	7 seconds out of a 8 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense T Circuit Range/ Performance	P0B9B	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement OR < 0.005 V	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.022 V U185A	7 seconds out of a 8 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense U Circuit Range/ Performance	P0BA0	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement OR < 0.005 V	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.022 V U185A	7 seconds out of a 8 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense V Circuit Range/ Performance	P0BA5	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement OR < 0.005 V	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.022 V U185A	7 seconds out of a 8 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense W Circuit Range/ Performance	P0BAA	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement OR < 0.005 V	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.022 V U185A	7 seconds out of a 8 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense X Circuit Range/ Performance	P0BAF	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement OR < 0.005 V	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.022 V U185A	7 seconds out of a 8 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense Y Circuit Range/ Performance	P0BB4	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement OR < 0.005 V	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.022 V U185A	7 seconds out of a 8 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense Z Circuit Range/ Performance	P0BB9	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement OR < 0.005 V	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.022 V U185A	7 seconds out of a 8 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Temperature Sensor E Circuit Range/ Performance	P0BC3	Rationality compares temperature with the other sensor values read	| Temperature input deviates from the average battery temperature of other Module_Groups |	> 20.00 ºC	TempRationalityFA (see Fault Bundle Page)	= FALSE	5 seconds out of a 6.7 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Temperature Sensor F Circuit Range/ Performance	P0C34	Rationality compares temperature with the other sensor values read	| Temperature input deviates from the average battery temperature of other Module_Groups |	> 20.00 ºC	TempRationalityFA (see Fault Bundle Page)	= FALSE	5 seconds out of a 6.7 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Pack Coolant Temperature Sensor Circuit Range/ Performance	P0C43	Coolant Temp. Sensor 1 is not reading a rational value.	Absolut value of the difference of the Inlet Coolant Temperature to Battery Temperature greater than threshold AND Absolut value of the difference of the Inlet Coolant Temperature to Out Side Air Temperature greater than threshold	>= 23.00 °C >= 22.00 °C	System Voltage Power mode (Bus wake up) No Active DTCs (RESS Pump) No Active DTCs (Inlet Temperature) No Active DTCs (HV Battery Temperature) Outside Air Temperature Status No Active DTCs (Communications) Test complete this trip (TFTKO or TPTKO) Heater duty cycle All HV Battery contactors Open	> 10.20 V > 1.00 s AND < 20.00 s P1E8C, P1E8D, P0C47, P19FD, P19FE, P19FF P0C44, P0C45, P0C46 P0A9C, P0A9D, P0A9E = VALID U0111 = FALSE <= 100.00 % >= 14,400.00 seconds	32.00 fails / 40.00 samples at 250ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Pack Coolant Temperature Sensor A Circuit Intermittent/ Erratic	P0C46	Detects a noisy or erratic ESS Coolant Inlet Temperature signal circuit or sensor	String Length Where: "String Length" = sum of "Diff" calculated over And where: "Diff" = ABS(Current reading - reading from 250ms previous)	> 64.00 °C 10.00 consecutive samples	System Voltage No DTCs (Coolant Inlet Temperature sensor Status) OORL OORH Loss of Comms	> 10.20 V P0C44 P0C45 U185A	4.00 fails / 5.00 samples at 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Pack Coolant Pump Control Circuit/Open	P0C47	Coolant Pump Control line has a circuit fault	Coolant Pump Control line is open, shorted to voltage or shorted to ground	Board Support Package returns coolant pump control line fault = True	System Voltage HWIO Pump Control Circuit Status RESS Coolant Pump Enable RESS Pump Commanded PWM	> 10.20 V ≠ Indeterminate = TRUE 5.00 % < command < 95.00 %	40.00 fails / 50.00 samples at 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery System Precharge Time Too Long	P0C78	This DTC sets if the Bus Voltage does not get high enough in the allocated time	Bus Voltage / Battery Voltage	Has not reached 95.00 % in less than 0.700 seconds from the start of contactor precharge	Battery Voltage Sensor Bus Voltage Sensor Main Contactor Status RESS Heating Mode	Valid Valid Precharging Not Commanded On DTC Pass	0.700 seconds Executed Once Per Precharge Event 0.700 seconds or less	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid/EV Electronics Coolant Pump Control Circuit/Open	P0CE9	Coolant Pump Control line has a circuit fault	Coolant Pump Control line is open, shorted to voltage or shorted to ground	Board Support Package returns pump control line fault = TRUE	System Voltage HWIO Pump Control Coolant Pump Enable Coolant Pump Control PWM Range Between	> 10.20 V ≠ Indeterminate = True 5.00 < PWM < 95.00	16.00 fails / 20.00 samples at 250ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid/EV Electronics Coolant Temperature Sensor Circuit Range/ Performance	P0CEF	Power Electronics Coolant Temp Sensor is not functioning as intended	If OAT, TOT, and HSRP_T are selected to compare		System Voltage No active power electronic coolant temperature DTCs:	> 10.20 V P0CF1, P0CF0	32.00 fails / 40.00 samples at 250ms	Type B, 2 Trips
			ABS (Power Electronic Coolant Temperature - Outside Air Temperature) AND	> 27.00 °C	No active outside air temperature DTC:	P0071, P0072, P0073, P0074		
			ABS (Power Electronic Coolant Temperature - Transmission Oil Temperature) AND	> 27.00 °C	No active transmission fluid temperature DTC:	P0711, P0712, P0713		
			ABS (Power Electronic Coolant Temperature - High Side Refrigerant Pressure converted to Temperature)	> 28.00 °C	No active high side refrigerant pressure DTC: No active power electronic pump DTCs: No active propulsion system off timer DTC: Power mode Test complete this trip Compressor running Propulsion Off Timer Power Electronic Pump transition soak time	P0532, P0533 P1F44, P1F45, P0CE9 P0606 = Run for < 20.00 s = FALSE = FALSE > 18,000.00 s > 3,600.00 s		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Minimum PE pump commanded threshold	< 100.00 %		
					Compressor transition soak time	> 3,600.00 s		
					Charger transition soak time	> 3,600.00 s		
					Minimum OAT temperature	>= -9,999.00 °C		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid/EV Electronics Coolant Temperature Sensor Circuit Low	P0CF0	Power Electronics Coolant Temp Sensor has a out of range low circuit fault	Sensor voltage	< 4.00 % (0.20 V) of reference voltage	System Voltage	> 10.20 V	16.00 fails / 20.00 samples at 250ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid/EV Electronics Coolant Temperature Sensor Circuit High	P0CF1	Power Electronics Coolant Temp Sensor has a out of range high circuit fault	Sensor voltage	> 98.00 % (4.90 V) of reference voltage	System Voltage	> 10.20 V	16.00 fails / 20.00 samples at 250ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid/EV Electronics Coolant Temperature Sensor Circuit Intermittent/ Erratic	P0CF2	Detects a noisy or erratic Power Electronic Coolant Temperature signal circuit or sensor	String Length Where: "String Length" = sum of "Diff" calculated over And where: "Diff" = ABS (current PECL reading - PECL reading from 250 milliseconds previous)	> 90.00 °C 4 consecutive PECL samples	System Voltage Power Electronic Coolant Temperature Mask	> 10.20 V = True	4.00 fails / 5.00 samples	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Pilot Circuit Range/ Performance	P0CF4	This diagnostic tests the integrity of the Charge Control Pilot circuit. There are two tests to ensure proper functioning of the pilot. Part A: Sets when control pilot percent voltage is above a threshold OR aux micro logic state is in HIGH state OR main micro logic state is in LOW state Part B: Sets when control pilot percent voltage is above a high threshold OR control pilot percent voltage is below a low threshold OR aux micro logic state is in LOW state OR main micro logic state is in HIGH state. It requires both Part A and Part B to pass in order to pass the diagnostic.	**Part A:** Control Pilot Normalized Voltage OR Aux Micro Logic State OR Main Micro Logic State **Part B:** Control Pilot Normalized Voltage OR Aux Micro Logic State OR Main Micro Logic State Note: Control Pilot Normalized Voltage=Charging System Control Pilot Voltage / Battery Voltage	 > 0.03 High Low > 0.55 OR < 0.30 Low High	Global Diagnostic System Disable System Voltage Charge Cord State **Part A:** Control Pilot Diagnostic Switch State Vehicle Speed **Part B:** Control Pilot Diagnostic Switch State Control Pilot Charging Switch State Charging Ventilation Switch State Charge Cord State	FALSE >= 10.20 V Not Connected Not Asserted > = 8.00 kph Asserted Open Open Not Connected	30 failures out of 50 samples 100ms per sample 5 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Pilot Circuit Low	P0CF5	Monitors the control pilot signal for an out of range low condition.	Control Pilot Normalized Voltage Note: Control Pilot Normalized Voltage=Charging System Control Pilot Voltage / Battery Voltage	< 0.03	Global Diagnostic System Disable System Voltage Control Pilot Diag Switch Charge Cord State	FALSE >= 10.20 V Asserted Not Connected	30 failures out of 50 samples 100ms per sample 5 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Pilot Circuit High	P0CF6	Monitors the control pilot signal for an out of range high condition.	Control Pilot Normalized Voltage Note: Control Pilot Normalized Voltage=Charging System Control Pilot Voltage / Battery Voltage	> 0.55	Global Diagnostic System Disable System Voltage Charge Cord State Vehicle Speed	FALSE >= 10.20 V Not Connected >= 8.00 kph	30 failures out of 50 samples 100ms per sample 5 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Pilot Charging Switch Range/ Performance	P0CF9	Sets when the control pilot normalized voltage (percentage) is below a threshold or above a threshold	Control Pilot Normalized Voltage Note: Control Pilot Normalized Voltage=Charging System Control Pilot Voltage / Battery Voltage	< 0.14 OR > 0.28	Global Diagnostic System Disable System Voltage Control Pilot Diagnostic Switch Charge Cord State Control Pilot Circuit and Performance Diagnostics Control Pilot Charging Switch Range/ Performance Control Pilot Charging Ventilation Switch Range/ Performance	FALSE >= 10.20 V Closed Not Connected Completed this Key-Cycle Not Completed this Key-Cylcle Not Completed this Key-Cylcle	30 failures out of 50 samples 100ms per sample 5 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Pilot Charging Ventilation Switch Range/ Performance	P0D01	Sets when Control Pilot voltage is below a threshold or if it is above a threshold	Control Pilot Normalized Voltage Note: Control Pilot Normalized Voltage=Charging System Control Pilot Voltage / Battery Voltage	< 0.04 OR > 0.10	Global Diagnostic System Disable System Voltage Control Pilot Diagnostic Switch Charge Cord State Control Pilot Circuit and Performance Diagnostics Control Pilot Charging Switch Performance Control Pilot Charging Ventilation Switch Range/ Performance	FALSE >= 10.20 V Closed Not Connected Completed this Key-Cycle Completed this Key-Cycle Not Completed this Key-Cycle	30 failures out of 50 samples 100ms per sample 5 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Charging System Positive Contactor Stuck Open	P0D09	This DTC diagnoses a stuck open postive charging contactor during precharge	Processed OBCM Voltage	< 10 Volts	Charger Contactor Precharge Contactor Negative Main Contactor Processed Charger Voltage Negative Main Rail Voltage Negative Main Rail Voltage	Commanded On Commanded On Not Commanded On Not Faulted Not Faulted > 40 Volts DTC Pass	8 failures out of 9 samples 12.5ms / sample Executed once per charger precharge event 112.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Charging System Positive Contactor Control Circuit	P0D0A	This DTC checks the circuit for electrical integrity during operation.	The HPC2 detects that the commanded state of the driver and the actual state of the control circuit do not match. Exception: It cannot detect the Short to Ground Fault	Open Load detected while OFF and output voltage > 4V. Short to VBATT detected while OFF and output voltage is > (VPWR -0.4V) Open while ON detected when current sense feedback < 57 mA	12V Battery Voltage	> 10.2V DTC Pass	40 failures out of 50 samples 12.5 ms /sample Continuous 625 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Charger Hybrid/EV System Precharge Time Too Long	P0D26	This DTC sets if the Charger Bus Voltage does not get high enough in the allocated time	OBCM Voltage / Battery Voltage	has not reached 95.00 % in less than 0.700 seconds from the start of contactor precharge	Battery Voltage Sensor OBCM Voltage Sensor Charger Contactor Precharge Contactor Negative Main Contactor	Valid Valid Commanded On Commanded On Not Commanded On	0.700 seconds Executed Once Per Precharge Event	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Charger Input AC Voltage Sensor Rationality	P0D3E	Sets when the AC charger input voltage sensor signal is outside a duty cycle threshold window when above a vehicle speed threshold.	AC Charger Input Voltage Sensor Duty Cycle	>= 12.00 OR <= 8.00	Global Diagnostic System Disable System Voltage Charger Enable Mask AC Input Voltage Sensor OORH AC Input Voltage Sensor OORL Vehcile Speed Valid Vehicle Speed	FALSE >= 10.20 V TRUE Not Fault Active Not Fault Active TRUE >= 6.00 kph	60 failures out of 80 samples 25ms per sample 2 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Charger Input Voltage Sensor Circuit Low	P0D3F	Monitors the AC charger input voltage sensor for an out of range low condition	AC Charger Input Voltage Sensor Duty Cycle OR AC Charger Input Voltage Sensor Duty Cycle	<= 8.00 AND > 0.00 = 100.00	Global Diagnostic System Disable System Voltage Charger Enable Mask	FALSE >= 10.20 V TRUE	30 failures out of 40 samples 25ms per sample 1 second	Type B, 2 Trips

16 OBDG01 Diagnostic Summary Tables - VICM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Charger Input Voltage Sensor Circuit High	P0D40	Monitors the AC charger input voltage sensor signal for an out of range high condition	AC Charger Input Voltage Sensor Duty Cycle OR AC Charger Input Voltage Sensor Duty Cycle	>= 92.00 AND < 100.00 = 0.00	Global Diagnostic System Disable System Voltage Charger Enable Mask	FALSE >= 10.20 V TRUE	30 failures out of 40 samples 25ms per sample 1 second	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Charger DC Output Voltage Rationality	P0D4D	Sets when the difference between DC charger output voltage signal and battery DC input voltage signal is above a threshold.	abs[Charger DC Output Sensor Voltage - Battery DC Voltage]	> 30.00	Global Diagnostic System Disable System Voltage Charger Enable Mask Charger DC Output Voltage Sensor OORH Charger DC Output Voltage Sensor OORL Battery Voltage Sensor Charging Ready	FALSE >= 10.20 V TRUE Not Fault Active Not Fault Active Not Fault Active TRUE	60 failures out of 80 samples 25ms per sample 2 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Charger Hybrid/EV Battery Output Voltage Sensor Circuit Low	P0D4E	Monitors the charger output voltage sensor signal for an out of range low condition	DC Charger Output Voltage Sensor Duty Cycle OR DC Charger Output Voltage Sensor Duty Cycle	<= 8.00 AND > 0.00 = 100.00	Global Diagnostic System Disable System Voltage Charger Enable Mask	FALSE >= 10.20 V TRUE	30 failures out of 40 samples 25ms per sample 1 second	Type B, 2 Trips

16 OBDG01 Diagnostic Summary Tables - VICM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Charger Hybrid/EV Battery Output Voltage Sensor Circuit High	P0D4F	Monitors the charger output voltage sensor signal for an out of range high condition	DC Charger Output Voltage Sensor Duty Cycle OR DC Charger Output Voltage Sensor Duty Cycle	>= 92.00 AND < 100.00 = 0.00	Global Diagnostic System Disable System Voltage Charger Enable Mask	FALSE >= 10.20 V TRUE	30 failures out of 40 samples 25ms per sample 1 second	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Proximity Detection Circuit Low	P0D58	Sets when Proximity Detection Circuit Voltage is below a threshold	Proximity Detection Circuit Voltage	< 4.20 V	Global Diagnostic System Disable System Voltage Vehicle Speed Shift Lever Position Vehicle Speed Valid	FALSE >= 10.20 V > 20.00 kph Not in Park TRUE	240 failures out of 400 samples 12.5ms per sample 5 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Proximity Detection Circuit High	P0D59	Sets when Proximity Detection Circuit Voltage is above a threshold	Proximity Detection Circuit Voltage	> 4.80 V	Global Diagnostic System Disable System Voltage Vehicle Speed Shift Lever Position Vehicle Speed Valid	FALSE >= 10.20 V > 20.00 kph Not in Park TRUE	240 failures out of 400 samples 12.5ms per sample 5 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Charger Output Power Performance	P0D5C	Sets when the output power of the charger is below an efficiency threshold	AC Charger Efficiency	< Fail threshold (see supporting table) Charger efficiency is less than a threshold value, which is 67% times the nominal charger efficiency as a function of Power Electronics Coolant Loop temperature and AC input power.	Global Diagnostic System Disable System Voltage Charger Enable Mask Propulsion System Active Power Electronics Coolant Loop Temperature Power Electronics Coolant Loop Temperature DC Batterry Voltage Processed DC Charger Output Voltage Current Control Ready Maximum Current Control Ready Time Diagnostic Failed Since Reset Diagnostic Passed Since Reset Charge Power Level Battery Current Sensor Status Thermal Mode Status	FALSE >= 10.20 V TRUE FALSE < 65.00 C (re-enables below 60.00 C if this threshold is crossed) > -12.00 C (re-enables above -7.00 C if this threshold is crossed) Not Fault Active Not Fault Active TRUE <= 40.00 s FALSE FALSE = AC Level 1 or AC Level 2 VALID = Bypass Engage	320 failures out of 400 samples 25ms per sample 10 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Commanded Input Power Minimum Current Control Control Delay Time	>= 600.00 W >= 13.00 s		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Charger Hybrid/EV System Discharge Time Too Long	P0D5E	This DTC checks if the OBCM voltage is too high after a calibrated amount of time.	OBCM processed charger voltage	>= 60 V	Negative Contactor Charger Contator DTC Not Active 12V Battery Maintenance Mode OBCM Processed Charger Voltage All Contactors Command	Not commanded Not commanded P0D5E Not Commanded Not Faulted Transition From True to False DTC Pass	<= 4 seconds Executed Once Per Charger Discharge Event < 4 seconds	Type A, 1 Trips
			OBCM Processed charger voltage and negative main contactor	Faulted	Negative Contactor Charger Contator DTC Not Active 12V Battery Maintenance Mode OBCM Processed Charger Voltage All Contactors Command	Not commanded Not commanded P0D5E Not Commanded Not Faulted Transition From True to False DTC Fail	4 seconds	
			DTC Clear	Must Send CPID	0x7E4 07 AE 32 02 02			

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
A/C Compressor Motor Voltage Sensor Performance	P0D69	Compressor Motor Voltage Sensor is not performing as intended	ABS (High Voltage Battery Cell Voltage - Compressor Input Voltage)	> 30.00 V	No Active Run/Crank DTCs: No Active Loss of Communication DTCs: System Voltage (Accessory On Signal OR Run Crank Active Signal) for time No active Compressor Voltage Sensor DTCs: No active High Voltage Battery DTCs: No Active High Voltage Contactor DTCs: Compressor Sensor Data Alive Rolling Count Fault Present Signal High Voltage Positive, Negative and Charging Contactor for time	P2534, P2535 U016B > 10.20 V = True = True > 1.00 s P0D6A, P0D6B P0ABB, P0ABC, P0ABD, (U1111 AND U185A) P3061, P0C78, P0AD9, P0AA4, P0D5E, P1EC3 = False = Closed ≥ 1.00 s	32.00 fails / 40.00 samples at 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
A/C Compressor Motor Voltage Sensor Circuit High	P0D6A	Detect an out of range high condition on the compressor HV sensor circuit.	Compressor High Voltage Input Voltage Value	> 527.25 V	Compressor Sensor State Packet Alive Rolling Count Fault Present Signal System Voltage No Active Run/Crank DTCs: No Active Loss of Comm DTCs: (Accessory On Signal OR Run Crank Active Signal) for time	= False > 10.20 V P2534, P2535 U016B = True = True > 1.00 s	40.00 fails / 50.00 samples at 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
A/C Compressor Motor Voltage Sensor Circuit Low	P0D6B	Detect an out of range low condition on the compressor HV sensor circuit.	Compressor High Voltage Input Voltage Value	< 27.75 V	Compressor Sensor State Packet Alive Rolling Count Fault Present Signal High Voltage Positive, Negative and Charging Contactor for time System Voltage No Active Run/Crank DTCs: No Active Loss of Comm DTCs: No Active High Voltage Contactor DTCs: (Accessory On Signal OR Run Crank Active Signal) for time	= False = Closed > 1.00 sec > 10.20 V P2534, P2535 U016B P3061, P0C78, P0AD9, P0AA4, P0D5E, P1EC3 = True = True > 1.00 s	40.00 fails / 50.00 samples at 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Electric A/C Compressor Control Module Internal Temperature Sensor Performance	P0D71	Compressor CPU Temperature Sensor is not performing as intended.	IF ABS (Compressor CPU Temperature Sensor - Outside Air Temperature Sensor Raw) AND IF ABS (Compressor CPU Temperature Sensor - Compressor IGBT Sensor)	> 22.00 °C > 22.00 °C	No Active Run/Crank DTCs: No Active Loss of Communication DTCs: System Voltage (Accessory On Signal OR Run Crank Active Signal) for time No active Compressor Temp Sensor DTCs: No active Ambiet Air Temp Sensor DTCs: Ambient Air Temperature_Filtered Compressor Off Time Compressor Sensor Data Alive Rolling Count Fault Present Signal Compressor Speed Feedback	P2534, P2535 U016B > 10.20 V = True = True > 1.00 s P0D77, P0D78, P0072, P0073 P0071, P0072, P0073, P0074 > -7.00 °C > 7,200.00 s = False > 0.00 RPM	32.00 fails / 40.00 samples at 250ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Electric A/C Compressor Control Module Internal Temperature Sensor Circuit High	P0D72	Detect an out of range high condition on the compressor CPU temperature sensor circuit.	Compressor CPU Temperature Sensor Value	< -40 degC	Compressor Sensor State Packet Alive Rolling Count Fault Present Signal System Voltage No Active Run/Crank DTCs No Active Loss of Comm DTCs (Accessory On Signal OR Run Crank Active Signal) for time	= False > 10.20 V P2534, P2535 U016B = True = True > 1.00 s	40.00 fails / 50.00 samples at 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Electric A/C Compressor Control Module Internal Temperature Sensor Circuit Low	P0D73	Detect an out of range low condition on the compressor CPU temperature sensor circuit.	Compressor CPU Temperature Sensor Value	> 150 degC	Compressor Sensor State Packet Alive Rolling Count Fault Present Signal System Voltage No Active Run/Crank DTCs No Active Loss of Comm DTCs (Accessory On Signal OR Run Crank Active Signal) for time	= False > 10.20 V P2534, P2535 U016B = True = True > 1.00 s	40.00 fails / 50.00 samples at 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Electric A/C Compressor Control Module Output Driver Temperature Sensor Performance	P0D76	Compressor IGBT Temperature Sensor is not performing as intended	IF ABS (Compressor IGBT Temperature Sensor - Outside Air Temperature Sensor Raw) AND IF ABS (Compressor IGBT Temperature Sensor - Compressor CPU Temperature Sensor)	> 22.00 °C > 22.00 °C	No Active Run/Crank DTCs: No Active Loss of Communication DTCs: System Voltage (Accessory On Signal OR Run Crank Active Signal) for time No active Compressor Temp Sensor DTCs: No active Ambiet Air Temp Sensor DTCs: Ambient Air Temperature Filtered Compressor Off Time Compressor Sensor Data Alive Rolling Count Fault Present Signal Compressor Speed Feedback	P2534, P2535 U016B > 10.20 V = True = True > 1.00 s P0D77, P0D78, P0072, P0073 P0071, P0072, P0073, P0074 > -7.00 °C > 7,200.00 s = False > 0.00 RPM	32.00 fails / 40.00 samples at 250ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Electric A/C Compressor Control Module Output Driver Temperature Sensor Circuit High	P0D77	Detect an out of range high condition on the compressor IGBT Temperature sensor circuit.	Compressor IGBT Temperature Sensor Value	< -40 degC	Compressor Sensor State Packet Alive Rolling Count Fault Present Signal System Voltage No Active Run/Crank DTCs No Active Loss of Comm DTCs (Accessory On Signal OR Run Crank Active Signal) for time	= False > 10.20 V P2534, P2535 U016B = True = True > 1.00 s	40.00 fails / 50.00 samples at 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Electric A/C Compressor Control Module Output Driver Temperature Sensor Circuit Low	P0D78	Detect an out of range low condition on the compressor IGBT Temperature sensor circuit.	Compressor IGBT Temperature Sensor Value	> 150 degC	Compressor Sensor State Packet Alive Rolling Count Fault Present Signal System Voltage No Active Run/Crank DTCs No Active Loss of Comm DTCs (Accessory On Signal OR Run Crank Active Signal) for time	= False > 10.20 V P2534, P2535 U016B = True = True > 1.00 s	40.00 fails / 50.00 samples at 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Charger Enable Circuit	P0E61	Monitors the charger 12V enable circuit for a faulted condition	Enable Line Hardware I/O fault Flag	TRUE	Global Diagnostic System Disable System Voltage Enable Line Hardware I/O fault Flag	FALSE >= 10.20 V Not Indeterminate	30 failures out of 40 samples 25ms per sample 1 second	Type B, 2 Trips

16 OBDG01 Diagnostic Summary Tables - VICM (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Charger Control Circuit	P0E65	Monitors the charger control circuit for a faulted condition	Command Line Hardware I/O fault Flag	TRUE	Global Diagnostic System Disable System Voltage Charger Enable Mask Command Line Hardware I/O fault Flag	FALSE >= 10.20 V TRUE Not Indeterminate	30 failures out of 40 samples 25ms per sample 1 second	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Evaporative Emission (EVAP) System Pressure Incorrect During Fuel Fill Door Open Request	P1461	Detects incorrect EVAP System pressure during a Fuel Fill Door Open Request	The Fuel Tank Vapor Pressure does NOT fall within a pressure range	Fuel Tank Vapor Pressure >= 0.623 Kpa OR Fuel Tank Vapor Pressure < -0.623 Kpa	Evaporative Emission (EVAP) System Pressure Incorrect During Fuel Fill Door Open Request Diagnostic Enable Calibration A request to refuel the vehicle has been detected	= TRUE =TRUE	120.00 sec	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cooling Fan Signal Circuit Performance	P148A	Engine Cooling fan signal is not performing as intended	IF ABS (Hardware I/O Radiator fan period from ECM - 10.00) OR ABS (Hardware I/O Radiator fan duty cycle from ECM - Engine Cooling Fan Speed from CAN bus)	> 0.20000 s > 30.00 %	System Voltage Power mode No active DTCs: If ABS(Current Engine Cooling Fan Speed - Previous Engine Cooling Fan Speed) Then wait for AND Propulsion system active OR (Propulsion system active AND Energy storage system thermal condition request AND Engine Cooling fan operation enable)	> 10.20 V ≠ crank P148B, P148C, U0293 > 5.00 % 43.00 s before Enable = True for > 43.00 s = False = ActiveCool = True for > 43.00 s	32.00 fails / 40.00 samples at 250ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cooling Fan Signal Circuit Low	P148B	Engine Cooling fan signal has a out of range low circuit fault	HWIO duty cycle (from ECM)	< 3.00 %	System Voltage	> 10.20 V	16.00 fails / 20.00 samples at 250ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cooling Fan Signal Circuit High	P148C	Engine Cooling fan signal has a out of range high circuit fault	HWIO duty cycle (from ECM)	> 97.00 %	System Voltage Propulsion system active OR (Propulsion system active AND Energy storage system thermal condition request AND Engine Cooling fan operation enable)	> 10.20 V = True for > 43.00 s = False = ActiveCool = True for > 43.00 s	16.00 fails / 20.00 samples at 250ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
A/C Refrigerant Pressure Sensor B Rationality	P151C	Low Side Refrigerant Pressure Sensor is not functioning as intended	ABS (Low Side Refrigerant Pressure - High Side Refrigerant Pressure)	> 200.00 kpa	System Voltage No active pressure sensor DTCs: No active temperature sensor DTCs: No active clock DTC: No active engine coolant temperature sensor DTCs: Engine Present Engine Coolant Temperature Signal Status Power mode OAT Raw Status OAT Filtered Status Compressor Running Flag ABS (Engine Coolant Temperature - Outside Ambient Temperature Filtered) Outside Air Temp Raw High Side Refrigerant Pressure HSRP Status	> 10.20 V P2517, P2518, P0533, P0532 P0074, P0073, P0072, P0071 P0606 P0119, P0118, P0117, P0116 = True = Valid ≠ Crank = Valid = Valid = False < 15.00 C 0.00 C < OAT_raw < 25.00 C 0.00 Kpa < HSRP < 675.00 Kpa = Valid	32.00 fails / 40.00 samples at 250ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Compressor Off Time	> 3,600.00 s		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Electric A/C Compressor Motor Input Current - Positive Contactor State Not Plausible	P154F	Compressor HV input current sensor rationality check	**Case1** - HV Battery Contactors Open Compressor Electrical Current	 < -1.00 A OR > 1.00 A	No Active Run/Crank DTCs: No Active Loss of Communication DTCs: System Voltage (Accessory On Signal OR Run Crank Active Signal) for time No Active Compressor Sensor DTCs: No Active HSRP Sensor DTCs: No active High Voltage Battery DTCs: No Active High Voltage Contactor DTCs: Compressor Sensor Data ARC Fault Present Signal Time since High Voltage Contactors (Positive, Negative, Charging) Opened or Closed Input Current Rationality Instantaneous Status High Voltage Positive, Negative and Charge Contactors	P2534, P2535 U016B > 10.20 V = True = True > 1.00 s P1F0C, P1F0D, P0D69, P0D6A, P0D6B, P15CA, P1F0A P0532, P0533 P0ABB, P0ABC, P0ABD, (U1111 AND U185A) P3061, P0C78, P0AD9, P0AA4, P0D5E, P1EC3 = False > 1.00 s ≠ Indeterminate = Open	32.00 fails / 40.00 samples at 250ms	Type B, 2 Trips
			Case2 - HV Battery		No Active Run/Crank	P2534, P2535	32.00 fails /	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Contactors Closed and Compressor OFF (0 RPM Speed Requested)		DTCs:		40.00 samples at 250ms	
					No Active Loss of Communication DTCs:	U016B		
			Compressor Electrical Current	< -1.00 A OR > 1.00 A	System Voltage	> 10.20 V		
					(Accessory On Signal OR Run Crank Active Signal) for time)	= True = True > 1.00 s		
					No Active Compressor Sensor DTCs:	P1F0C, P1F0D, P0D69, P0D6A, P0D6B, P15CA, P1F0A		
					No Active HSRP Sensor DTCs:	P0532, P0533		
					No active High Voltage Battery DTCs:	P0ABB, P0ABC, P0ABD, (U1111 AND U185A)		
					No Active High Voltage Contactor DTCs:	P3061, P0C78, P0AD9, P0AA4, P0D5E, P1EC3		
					Compressor Sensor Data ARC Fault Present Signal	= False		
					Time since High Voltage Contactors (Positive, Negative, Charging) Opened or Closed	> 1.00 s		
					Input Current Rationality Status	≠ Indeterminate		
					(Compressor Speed Feedback OR Climate Control HV	< 60.00 RPM = True		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Device Shutdown Command) AND High Voltage Positive, Negative and Charge Contactors)	 = Closed		
			Case3 - HV Battery Contactors Closed and Compressor ON (Motor Running) Compressor Electrical Current	= True < 0.20 A OR > 27.00 A	No Active Run/Crank DTCs: No Active Loss of Communication DTCs: System Voltage (Accessory On Signal OR Run Crank Active Signal) for time No Active Compressor Sensor DTCs: No Active HSRP Sensor DTCs: No active High Voltage Battery DTCs: No Active High Voltage Contactor DTCs: Compressor Sensor Data ARC Fault Present Signal HV Climate Control Ready Transition delay Input Current Rationality	P2534, P2535 U016B > 10.20 V = True = True > 1.00 s P1F0C, P1F0D, P0D69, P0D6A, P0D6B, P15CA, P1F0A P0532, P0533 P0ABB, P0ABC, P0ABD, (U1111 AND U185A) P3061, P0C78, P0AD9, P0AA4, P0D5E, P1EC3 = False > 1.00 s ≠ Indeterminate	32.00 fails / 40.00 samples at 250ms	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Status High Side Refrigerant Pressure in range AND HV Battery Voltage in range AND Compressor Speed Feedback in range AND High Voltage Positive, Negative and Charge Contactors	 200.00 kPa < HSRP < 2,300.00 kPa 300.00 V < HVBattVolt < 410.00 V 1,000.00 RPM < CompSpeed < 8,600.00 RPM = Closed		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
A/C Compressor Control Module Ignition Switch Run/ Start Position Circuit Low	P15B9	Detect when the hard wired Run/Crank wakeup circuit to the Compressor is stuck Low.	Compressor Reported Run Crank Signal	= False	[No Active Run/Crank DTCs AND No Active Loss of Comm DTCs AND System Voltage AND Compressor Data Packet Alive Rolling Count Fault Present Signal AND Run Crank Active Signal] for time	P2534, P2535 U016B > 10.20 V = False = True > 2.00 sec	40.00 fails / 50.00 samples at 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
A/C Compressor Control Module Ignition Switch Run/ Start Position Circuit High	P15BA	Detect when the hard wired Run/Crank wakeup circuit to the Compressor is stuck High.	Compressor Reported Run Crank Signal	= True	[No Active Run/Crank DTCs AND No Active Loss of Comm DTCs AND System Voltage AND Compressor Data Packet Alive Rolling Count Fault Present Signal AND Run Crank Active Signal AND Accessory On Signal] for time	P2534, P2535 U016B > 10.20 V = False = False = True > 2.00 sec	40.00 fails / 50.00 samples at 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Coolant Bypass Valve A Position Sensor Circuit Range/ Performance - Unexpected Position Change Detected	P15C5	If valve feedback has drifted out of commanded position when the valve should not be moving.	Valve feedback position	> 3.00 % from valve commanded position	Propulstion System Active System Voltage No Active Valve DTCs Valve Control Command	= True > 10.20 V P2682, P2683, P26AD, P26AE, P26A6, P26A7, P26A9, P26A5 = Stop	80.00 fails / 100.00 samples at 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Electric A/C Compressor Speed Request Message Counter Incorrect	P15C6	Detect when the Compressor Speed Request Alive Rolling Count serial data received by the Compressor from the host controller is not being updated.	Current Compressor Speed Request Alive Rollling Count	≠ Previous Compressor Speed Request Alive Rolling Count +1	Compressor Data Packet Alive Rolling Count Fault Present Signal Compressor Loss of Communication Occurred Compressor Speed Request Alive Rolling Count State Common Diag Enable: System Voltage No Active Run/Crank DTCs No Active Loss of Comm DTCs (Accessory On Signal OR Run Crank Active Signal) for time	= False = False ≠ Indeterminate > 10.20 V P2534, P2535 U016B = True = True > 1.00 s	104.00 fails / 130.00 samples at 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Electric A/C Compressor Signal Message Counter Incorrect	P15C8	Detect when the Compressor Data Packet ARC serial data received by the host controller from the Compressor is not being updated.	Current Compressor Data Packet Alive Rollling Count	≠ Previous Compressor Data Packet Alive Rolling Count +1	System Voltage No Active Run/Crank DTCs No Active Loss of Comm DTCs (Accessory On Signal OR Run Crank Active Signal) for time	> 10.20 V P2534, P2535 U016B = True = True > 1.00 s	40.00 fails / 50.00 samples at 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Electric A/C Compressor Status Message Counter Incorrect	P15C9	Detect when the Device State Packet ARC serial data received by the host controller from the Compressor is not being updated.	Current Comprssor Device State Packet Alive Rollling Count	≠ Previous Comrpessor Device State Packet Alive Rolling Count +1	System Voltage No Active Run/Crank DTCs: No Active Loss of Comm DTCs: (Accessory On Signal OR Run Crank Active Signal) for time	> 10.20 V P2534, P2535 U016B = True = True > 1.00 s	40.00 fails / 50.00 samples at 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Electric A/C Compressor Sensor Signal Message Counter Incorrect	P15CA	Detect when the Sensor Data Packet ARC serial data received by the host controller from the Compressor is not being updated.	Current Compressor Sensor Data Packet Alive Rollling Count	≠ Previous Compressor Sensor Data Packet Alive Rolling Count +1	System Voltage No Active Run/Crank DTCs: No Active Loss of Comm DTCs: (Accessory On Signal OR Run Crank Active Signal) for time	> 10.20 V P2534, P2535, U016B U016B = True = True > 1.00 s	40.00 fails / 50.00 samples at 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Electric A/C Compressor Sensor Status Message Counter Incorrect	P15CB	Detect when the Sensor State Packet ARC serial data received by the host controller from the Compressor is not being updated.	Current Compressor Sensor State Alive Rollling Count	≠ Previous Compressor Sensor State Alive Rolling Count +1	System Voltage No Active DTCs: (Accessory On Signal OR Run Crank Active Signal) for time	> 10.20 V P2534, P2535, U016B = True = True > 1.00 s	40.00 fails / 50.00 samples at 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Fill Door Switch Wake-up Circuit Performance	P169D	Detects a circuit fault in the Fuel Fill Door Switch Wake-Up Circuit	Refuel Request Wake- up circuit state not equal to Refuel request Switch Postion State		Fuel Fill Door Switch Wake-up Circuit Performance Diagnostic Enable Calibration	= TRUE		Type B, 2 Trips
					No Active DTCs for the Open Request Sensor/ Switch Circuit	P04C8, P04CA, P04CB		
			Case 1: Fuel Fill Door Switch Wake-Up Circuit Active	=FALSE	Fuel Fill Door Open Switch Request	=TRUE	4.00 out of 4.00 samples @ 50ms per sample	
			Case 2: Fuel Fill Door Switch Wake-Up Circuit Active	=TRUE	Fuel Fill Door Open Switch Request	=FALSE	64.00 out of 80.00 samples @ 50ms per sample	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
A/C Compressor Control Module Wake-up Circuit Performance	P16B7	Monitors the instantaneous status reported by the Host Controller based on rationalizing the Compressor Wake up status to the Wakeup Terminal status of the host controller.	Compressor Wake Up Signal	= False	[No Active Loss of Comm DTCs AND Accessory On Signal AND System Voltage AND Compressor Data Packet Alive Rolling Count Fault Present Signal] for time	U016B = True > 10.20 V = False > 2.00 s	40.00 fails / 50.00 samples at 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
A/C Compressor Control Module Random Access Memory (RAM) Error	P16B8	Detect a Compressor RAM Memory Error. Monitors the instantaneous status reported by the Compressor.	RAM Read/Write Error State (This RAM self-check routine is performed by compressor microcontroller at bootup)	= Fault	No Active Run/Crank DTCs: No Active Loss of Communication DTCs: System Voltage (Accessory On Signal OR Run Crank Active Signal) for time Compressor Device State Packet Alive Rolling Count Fault Present Signal	P2534, P2535 U016B > 10.20 V = True = True > 1.00 s = False	At Start up	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
A/C Compressor Control Module Read Only Memory (ROM) Error	P16B9	Detect a Compressor ROM Memory Error. Monitors the instantaneous status reported by the Compressor.	ROM Checksum Error State (This ROM Checksum routine is executed by compressor microcontroller at bootup)	= Fault	No Active Run/Crank DTCs: No Active Loss of Communication DTCs: System Voltage (Accessory On Signal OR Run Crank Active Signal) for time Compressor Device State Packet Alive Rolling Count Fault Present Signal	P2534, P2535 U016B > 10.20 V = True = True > 1.00 s = False	At Startup	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
A/C Compressor Control Module Keep Alive Memory (KAM) Error	P16BA	Detect a Compressor EEPROM Memory Error. Monitors the instantaneous status reported by the Compressor.	EEPROM Checksum Error state (This EEPROM self-check routine is executed by compressor internal microcontroller at bootup)	= Fault	No Active Run/Crank DTCs: No Active Loss of Communication DTCs: System Voltage (Accessory On Signal OR Run Crank Active Signal) for time Compressor Device State Packet Alive Rolling Count Fault Present Signal	P2534, P2535 U016B > 10.20 V = True = True > 1.00 s = False	At Startup	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid/EV Electronics Coolant Pump Feedback Circuit High Voltage	P19FA	Coolant Pump Feedback signal has a out of range high circuit fault	Coolant Pump Feedback signal has a out of range high circuit fault	Pump feedback frequency 750.00 < Hz < 999,999,961,690,316,000,000,000,000,000,000,000.00	System Voltage Coolant Pump Enable Pump control commanded speed	> 10.20 V = True 11.00 < PWM < 90.00	16.00 fails / 20.00 samples at 250ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid/EV Electronics Coolant Pump Feedback Circuit Low Voltage	P19FB	Coolant Pump Feedback signal has a out of range low circuit fault	Coolant Pump Feedback signal has a out of range low circuit fault	Pump feedback frequency 0.00 < Hz < 8.60	System Voltage Coolant Pump Enable Pump control commanded speed	> 10.20 V = True 11.00 < PWM < 90.00	16.00 fails / 20.00 samples at 250ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid/EV Electronics Coolant Pump Feedback Circuit Performance	P19FC	Coolant Pump Feedback signal is not functioning as intended	Coolant pump feedback signal is not functioning as intended	Pump feedback performance fail in actuated state PCOD Pump Feedback Fault Low Threshold < Pump feedback filter speed error OR Pump feedback filter speed error > PCOD Pump Feedback Fault High Threshold	System Voltage Coolant Pump Enable No active power electronic coolant temperature DTCs: No active power electronic pump DTCs: Pump control commanded speed Diagnostics enable delay time Power electronic temperature	> 10.20 V = True P0CF0, P0CF1, P0CF2 P0CEF, P0CE9, P1F44, P1F45 11.00 < PWM < 90.00 > 5.00 s -20.00 < °C < 9,999.00	9 seconds < Time < 257 seconds	Type B, 2 Trips
			Coolant pump feedback signal is not functioning as intended	Pump feedback performance fail in non-actuated state Pump feedback speed > 250.00	System Voltage Coolant Pump Enable Coolant Pump Enable is False No active DTC from pump feedback in actuated state	> 10.20 V = False > 10.00 seconds P19FC	32.00 fails / 40.00 samples at 250ms	
			Coolant pump feedback signal is functioning as intended	If the pump feedback diagnostic fail in the actuated state, the requirement to pass the diagnostic in actuated state: PCOD Pump Feedback Repass Low Threshold > Pump feedback filter	System Voltage Coolant Pump Enable No active power electronic coolant temperature DTCs: No active power electronic pump DTCs:	> 10.20 V = True P0CF0, P0CF1, P0CF2 P0CEF P0CE9, P1F44, P1F45	53 seconds < Time < 311 seconds	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
				speed error OR Pump feedback filter speed error < PCOD Pump Feedback Repass High Threshold	Pump control commanded speed Diagnostics enable delay time Power electronic temperature	11.00 < PWM < 90.00 > 5.00 s -20.00 < °C < 9,999.00		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid/EV Battery Pack Coolant Pump Feedback Circuit High Voltage	P19FD	Coolant pump feedback signal has a out of range high circuit fault	Coolant Pump Feedback signal has a out of range high circuit fault	Pump feedback frequency >= 750.00	System VoltageSystem Voltage Coolant Pump Enable Pump control commanded speed Diagnostics enable delay time	> 10.20 V = TRUE 11.00 %< PWM < 90.00 % > 3.00 s	40.00 fails / 50.00 samples at 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid/EV Battery Pack Coolant Pump Feedback Circuit Low Voltage	P19FE	Coolant pump feedback signal has a out of range low circuit fault	Coolant Pump Feedback signal has a out of range low circuit fault	Pump feedback frequency 0.00 < HZ < 8.60	System VoltageSystem Voltage Coolant Pump Enable Pump control commanded speed Diagnostics enable delay time	> 10.20 V = TRUE 11.00 %< PWM < 90.00 % > 3.00 s	40.00 fails / 50.00 samples at 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid/EV Battery Pack Coolant Pump Feedback Circuit Performance	P19FF	Coolant Pump Feedback signal is not functioning as intended	Coolant Pump Feedback signal is not functioning as intended in actuated state:	**Fail Threshold:** RESS Pump Feedback Fault low Threshold < **Pump feedback filter speed error** > RESS Pump Feedback Fault high Threshold	System VoltageSystem Voltage Coolant Pump Enable Pump control commanded speed Diagnostics enable delay time No Active DTCs (RESS Pump) No Active DTCs (Inlet Temperature Sensor) RESS Coolant Inlet temperature	> 10.20 V = TRUE 11.00 % < DC < 90.00 % > 5.00 s P1E8C, P1E8D, P0C47, P19FD, P19FE P0C43, P0C44, P0C45, -20.00 °C < RESS inlet temp < 9,999.00 °C	Up To 257 s	Type B, 2 Trips
			Coolant Pump Feedback signal is not functioning as intended in non-actuated state:	Pump feedback RPM > 250.00	System VoltageSystem Voltage Coolant Pump Enable No Active DTC from atuated state	> 10.20 V = FALSE for 10.00 sec P19FF	80.00 fails / 100.00 samples at 100ms	
			Coolant Pump Feedback signal is not functioning as intended in actuated state:	**Pass Threshold after Fail:** RESS Pump Feedback Repass High Threshold > **Pump feedback filter speed error** < RESS Pump Feedback Repass Low Threshold	System VoltageSystem Voltage Coolant Pump Enable Pump control commanded speed Diagnostics enable delay time No Active DTCs (RESS Pump)	> 10.20 V = TRUE 11.00 % < DC < 90.00 % > 5.00 s P1E8C, P1E8D, P0C47, P19FD, P19FE	Up To 547 s	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					No Active DTCs (Inlet Temperature Sensor) RESS Coolant Inlet temperature Coolant Pump Enable Diagnostics enable delay time	P0C43, P0C44, P0C45, -20.00 °C < RESS inlet temp < 9,999.00 °C = FALSE > 10.00 s		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AA Circuit Range/ Performance	P1B16	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement OR < 0.005 V	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.022 V U185A	7 seconds out of a 8 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AB Circuit Range/ Performance	P1B19	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement OR < 0.005 V	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.022 V U185A	7 seconds out of a 8 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AC Circuit Range/ Performance	P1B1C	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement OR < 0.005 V	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.022 V U185A	7 seconds out of a 8 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AD Circuit Range/ Performance	P1B1F	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement OR < 0.005 V	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.022 V U185A	7 seconds out of a 8 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AE Circuit Range/ Performance	P1B22	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement OR < 0.005 V	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.022 V U185A	7 seconds out of a 8 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AF Circuit Range/ Performance	P1B25	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement OR < 0.005 V	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.022 V U185A	7 seconds out of a 8 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AG Circuit Range/ Performance	P1B45	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement OR < 0.005 V	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.022 V U185A	7 seconds out of a 8 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AH Circuit Range/ Performance	P1B48	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement OR < 0.005 V	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.022 V U185A	7 seconds out of a 8 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AI Circuit Range/ Performance	P1B4B	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement OR < 0.005 V	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.022 V U185A	7 seconds out of a 8 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AJ Circuit Range/ Performance	P1B4E	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement OR < 0.005 V	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.022 V U185A	7 seconds out of a 8 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AK Circuit Range/ Performance	P1B51	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement OR < 0.005 V	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.022 V U185A	7 seconds out of a 8 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AL Circuit Range/ Performance	P1B54	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement OR < 0.005 V	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.022 V U185A	7 seconds out of a 8 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AM Circuit Range/ Performance	P1B57	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement OR < 0.005 V	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.022 V U185A	7 seconds out of a 8 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AN Circuit Range/ Performance	P1B5A	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement OR < 0.005 V	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.022 V U185A	7 seconds out of a 8 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AO Circuit Range/ Performance	P1B5D	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement OR < 0.005 V	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.022 V U185A	7 seconds out of a 8 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AP Circuit Range/ Performance	P1B60	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement OR < 0.005 V	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.022 V U185A	7 seconds out of a 8 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AQ Circuit Range/ Performance	P1B63	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement OR < 0.005 V	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.022 V U185A	7 seconds out of a 8 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AR Circuit Range/ Performance	P1B66	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement OR < 0.005 V	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.022 V U185A	7 seconds out of a 8 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AS Circuit Range/ Performance	P1B69	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement OR < 0.005 V	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.022 V U185A	7 seconds out of a 8 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AT Circuit Range/ Performance	P1B6C	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement OR < 0.005 V	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.022 V U185A	7 seconds out of a 8 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AU Circuit Range/ Performance	P1B6F	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement OR < 0.005 V	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.022 V U185A	7 seconds out of a 8 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AV Circuit Range/ Performance	P1B72	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement OR < 0.005 V	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.022 V U185A	7 seconds out of a 8 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AW Circuit Range/ Performance	P1B75	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement OR < 0.005 V	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.022 V U185A	7 seconds out of a 8 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AX Circuit Range/ Performance	P1B78	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement OR < 0.005 V	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.022 V U185A	7 seconds out of a 8 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AY Circuit Range/ Performance	P1B7B	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement OR < 0.005 V	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.022 V U185A	7 seconds out of a 8 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense AZ Circuit Range/ Performance	P1B7E	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement OR < 0.005 V	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.022 V U185A	7 seconds out of a 8 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BA Circuit Range/ Performance	P1B81	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement OR < 0.005 V	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.022 V U185A	7 seconds out of a 8 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BB Circuit Range/ Performance	P1B84	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement OR < 0.005 V	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.022 V U185A	7 seconds out of a 8 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BC Circuit Range/ Performance	P1B87	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement OR < 0.005 V	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.022 V U185A	7 seconds out of a 8 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BD Circuit Range/ Performance	P1B8A	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement OR < 0.005 V	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.022 V U185A	7 seconds out of a 8 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BE Circuit Range/ Performance	P1B8D	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement OR < 0.005 V	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.022 V U185A	7 seconds out of a 8 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BF Circuit Range/ Performance	P1B90	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement OR < 0.005 V	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.022 V U185A	7 seconds out of a 8 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BG Circuit Range/ Performance	P1B93	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement OR < 0.005 V	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.022 V U185A	7 seconds out of a 8 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BH Circuit Range/ Performance	P1B96	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement OR < 0.005 V	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.022 V U185A	7 seconds out of a 8 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BI Circuit Range/ Performance	P1B99	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement OR < 0.005 V	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.022 V U185A	7 seconds out of a 8 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BJ Circuit Range/ Performance	P1B9C	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement OR < 0.005 V	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.022 V U185A	7 seconds out of a 8 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BK Circuit Range/ Performance	P1B9F	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement OR < 0.005 V	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.022 V U185A	7 seconds out of a 8 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BL Circuit Range/ Performance	P1BA2	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement OR < 0.005 V	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.022 V U185A	7 seconds out of a 8 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BM Circuit Range/ Performance	P1BA5	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement OR < 0.005 V	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.022 V U185A	7 seconds out of a 8 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BN Circuit Range/ Performance	P1BA8	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement OR < 0.005 V	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.022 V U185A	7 seconds out of a 8 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BO Circuit Range/ Performance	P1BAB	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement OR < 0.005 V	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.022 V U185A	7 seconds out of a 8 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BP Circuit Range/ Performance	P1BAE	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement OR < 0.005 V	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.022 V U185A	7 seconds out of a 8 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BQ Circuit Range/ Performance	P1BB1	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement OR < 0.005 V	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.022 V U185A	7 seconds out of a 8 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BR Circuit Range/ Performance	P1BB4	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement OR < 0.005 V	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.022 V U185A	7 seconds out of a 8 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BS Circuit Range/ Performance	P1BB7	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement OR < 0.005 V	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.022 V U185A	7 seconds out of a 8 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BT Circuit Range/ Performance	P1BBA	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement OR < 0.005 V	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.022 V U185A	7 seconds out of a 8 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BU Circuit Range/ Performance	P1BBD	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement OR < 0.005 V	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.022 V U185A	7 seconds out of a 8 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BV Circuit Range/ Performance	P1BC0	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement OR < 0.005 V	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.022 V U185A	7 seconds out of a 8 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BW Circuit Range/ Performance	P1BC3	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement OR < 0.005 V	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.022 V U185A	7 seconds out of a 8 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BX Circuit Range/ Performance	P1BC6	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement OR < 0.005 V	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.022 V U185A	7 seconds out of a 8 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BY Circuit Range/ Performance	P1BC9	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement OR < 0.005 V	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.022 V U185A	7 seconds out of a 8 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense BZ Circuit Range/ Performance	P1BCC	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement OR < 0.005 V	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.022 V U185A	7 seconds out of a 8 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense CA Circuit Range/ Performance	P1BCF	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement OR < 0.005 V	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.022 V U185A	7 seconds out of a 8 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense CB Circuit Range/ Performance	P1BD2	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement OR < 0.005 V	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.022 V U185A	7 seconds out of a 8 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense CC Circuit Range/ Performance	P1BD5	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement OR < 0.005 V	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.022 V U185A	7 seconds out of a 8 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense CD Circuit Range/ Performance	P1BD8	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement OR < 0.005 V	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.022 V U185A	7 seconds out of a 8 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense CE Circuit Range/ Performance	P1BDB	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement OR < 0.005 V	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.022 V U185A	7 seconds out of a 8 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense CF Circuit Range/ Performance	P1BDE	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement OR < 0.005 V	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.022 V U185A	7 seconds out of a 8 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense CG Circuit Range/ Performance	P1BE1	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement OR < 0.005 V	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.022 V U185A	7 seconds out of a 8 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense CH Circuit Range/ Performance	P1BE4	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement OR < 0.005 V	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.022 V U185A	7 seconds out of a 8 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense CI Circuit Range/ Performance	P1BE7	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement OR < 0.005 V	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.022 V U185A	7 seconds out of a 8 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense CJ Circuit Range/ Performance	P1BEA	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement OR < 0.005 V	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.022 V U185A	7 seconds out of a 8 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense CK Circuit Range/ Performance	P1BED	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement OR < 0.005 V	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.022 V U185A	7 seconds out of a 8 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense CL Circuit Range/ Performance	P1BF0	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement OR < 0.005 V	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.022 V U185A	7 seconds out of a 8 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense CM Circuit Range/ Performance	P1BF3	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement OR < 0.005 V	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.022 V U185A	7 seconds out of a 8 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense CN Circuit Range/ Performance	P1BF6	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement OR < 0.005 V	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.022 V U185A	7 seconds out of a 8 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense CO Circuit Range/ Performance	P1BF9	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement OR < 0.005 V	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.022 V U185A	7 seconds out of a 8 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense CP Circuit Range/ Performance	P1BFC	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement OR < 0.005 V	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.022 V U185A	7 seconds out of a 8 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense CQ Circuit Range/ Performance	P1E01	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement OR < 0.005 V	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.022 V U185A	7 seconds out of a 8 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Voltage Sense CR Circuit Range/ Performance	P1E04	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement OR < 0.005 V	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.022 V U185A	7 seconds out of a 8 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Pack Coolant Pump Enable Circuit Low	P1E8C	Coolant Pump Enable has a circuit fault	Coolant Pump Enable line is shorted to ground	Board Support Package returns coolant pump control line fault = True	System Voltage HWIO Pump Control Circuit Status Coolant Pump Enable	> 10.20 V ≠ Indeterminate = TRUE	40.00 fails / 50.00 samples at 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Pack Coolant Pump Enable Circuit High	P1E8D	Coolant Pump Enable has a circuit fault	Coolant Pump Enable line is open or shorted to voltage	Board Support Package returns coolant pump control line fault = True	System Voltage HWIO Pump Control Circuit Status Coolant Pump Enable	> 10.20 V ≠ Indeterminate = FALSE	40.00 fails / 50.00 samples at 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Energy Control Module Hybrid/EV Battery Cell Overvoltage	P1EAB	Voltage too high	Cell Voltage OR Any BECM response to HPC2 request to NOT test overvoltage signal/circuit (assert line logic-level-high).	> 4.5 V = Overvoltage Signal/ Circuit line logic-level-low	No active DTC's: System Voltage RUN/CRANK Transitions to Charger contactor Status CellVoltageRationalityFA (see Fault Bundle Page) Inverter voltage System Voltage No active DTC's: Must Send CPID	(U185A AND U0111) >10.2V = ON for > 5 s = Open = FALSE > 312.00 V >10.2 V (U185A AND U0111) 0x7E4 07 AE 32 0C 0C 00 00 00	2 seconds out of a 2.5 seconds window 10 seconds out of a 10 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid/EV Battery Cell Overvoltage Signal/ Circuit Performance	P1EAC	Over voltage circuit 2nd protection - Fault Flag Test	Any BECM response to HPC2 request to test overvoltage signal/circuit (assert line logic-level-low).	= Overvoltage Signal/ Circuit line logic-level-high	RUN/CRANK Transitions to	= ON for > 5 s	5 seconds out of a 5 seconds window	Type A, 1 Trips
					Charger contactor Status	= Open		
					CellVoltageRationalityFA (see Fault Bundle Page)	= FALSE		
					Inverter voltage	> 312.00 V		
					System Voltage	> 10.2V		
					No active DTC's:	(U185A AND U0111)		
			OR					
			BECM overvoltage signal/ circuit test response.	= Test Active	HPC2 overvoltage signal/ circuit test request to BECM.	= Cease Test	10 seconds out of a 10 seconds window	
					System Voltage	> 10.2V		
					No active DTC's:	(U185A AND U0111)		
			OR					
			BECM overvoltage signal/ circuit test response.	= Not Test Active	HPC2 overvoltage signal/ circuit test request to BECM.	= Run Test	10 seconds out of a 10 seconds window	
					System Voltage	> 10.2V		
					No active DTC's:	(U185A AND U0111)		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
High Voltage Energy Management Communication Bus Enable Circuit	P1EB9	Detects a fault in the High Voltage Energy Management Communication (HVEM) Bus Enable Circuit	Case 1: Short to Ground		Diagnostic Enabled HVEM Bus Enabled	= TRUE =TRUE	480.00 failed samples within 560.00 samples 1 sample every 12.5ms	Type A, 1 Trips
			Case 2: Short to Battery or open circuit		Diagnostic Enabled HVEM Bus Enabled	= TRUE =FALSE		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Charging System Contactor(s) Stuck Open	P1EBD	This DTC determines if the charge bus is open by comparing charger bus voltage to battery voltage.	OBCM Processed charger voltage / Processed Battery Voltage	< 80.00 %	12V Battery Voltage Charging Mode Status RESS Heating Mode OBCM Processed Charger Voltage Processed Battery Voltage Charge Ready Flag	> 10.2V Closed Not Commanded On Not Faulted Not Faulted Enabled DTC Pass	40 failures out of 50 samples, 12.5 ms /sample Runs once near the beginning of each Charge Cycle 625 ms	Type A, 1 Trips
			OBCM Processed charger voltage / Processed Battery Voltage	< 80.00 %	12V Battery Voltage Charge Ready Flag RESS Heating Mode OBCM Processed Charger Voltage Processed Battery Voltage	> 10.2V Not Enabled Commanded On Not Faulted Not Faulted DTC Pass	40 failures out of 50 samples, 12.5 ms /sample Runs once near the beginning of each Charge Cycle 625 ms	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid/EV Battery System Contactor(s) Stuck Open	P1EC0	This DTC checks for stuck open contactors by comparing Bus Voltage to Battery Voltage after the contactors are closed.	Bus Voltage / Battery Voltage	< 80.00 %	Bus Voltage Sensor Battery Voltage Sensor Time since Main Contactors have closed 12V Battery Voltage Main Contactor Status Charger Contactor Status Charge Ready Flag	No Faults No Faults > 1 sec > 10.2V Closed Closed True DTC Pass	6 failures out of 6 samples 12.5 ms /sample Continuous 75 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid/EV Battery Pack Heater Transistor Control Circuit/Open	P1EC3	Heater Transistor Control Circuit has a circuit fault	Heater Transistor Control Circuit is open, shorted to voltage or shorted to ground	Board Support Package returns Heater Transistor Control Circuit line fault = True	System Voltage Battery coolant inlet temperature sensor status Heater control Commanded PWM	> 10.20 V ≠ Stale 0.00 % <command< 100.00 %	20.00 fails / 40.00 samples at 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery Pack Heater Performance	P1EC6	Battery Heater is not performing as intended	Heater is not warming RESS Coolant adequately if the Inlet Coolant Temperature does NOT rise to be greater than the threshold in the required amount of time.	Case: AC Compressor ON > 3.00 °C OR Case: AC Compressor OFF > 3.00 °C	PSA Mode Propulsion System Active Charge Mode Plugged in Charge System Voltage RESS Thermal Mode HV SOC No Active DTCs (RESS Coolent Level Sensor) No Active DTCs (Inlet Temperature Sensor) Battery High/Medium Severrity Status High Voltage Battery voltage Then overrides as follows: 1. Comand pump and heater 2. Command pump and heater	Once per Drive cycle If diagnostic did not complete in charge Once per Drive Cycle If diagnostic did not complete in PSA AND > 10.20 V Active heat request > 5.00 % P1FFB, P1FFC, P1FFD, P1FFE P0C44, P0C45, P0C43 None > 280.00 V Pump 7.00 % DC and Heater DC 100.00 % for 4.10 s Heater DC based on battery voltage to input 30,600.00 kJ with heater resistance of 70.00 ohms for 90.00 s and and pump DC 7.00 %	154.1 seconds to fail.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					3. Turn heater off Wait for temperature change	<= 60.00 s with heater DC 0.00 %		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
A/C Compressor Motor Speed Performance	P1F0A	Detect if the electric compressor is funtioning properly by monitoring and comparing the compressor feedback speed to the actual control commanded compressor speed.	**Case 1 - Monitor HV Compressor Motor Speed - Compressor ON Fail** (Compressor commanded to run and not meeting requested speed) Compressor Speed Difference RPM Filtered Error OR Compressor Speed Difference RPM Filtered Error (Compressor Speed Difference RPM Filtered Error = Filtered difference between Commanded Speed and Feedback Speed)	> CompON_FaultHi < CompON_FaultLo (See supporting tables for the above threshold values)	All of the following conditions are met for time: No Active Run/Crank DTCs: No Active Loss of Communication DTCs: System Voltage (Accessory On Signal OR Run Crank Active Signal) for time Compressor Sensor Data Alive Rolling Count Fault Present Signal Compressor Speed Request No Active HSRP Sensor DTCs: No active High Voltage Battery DTCs: No Active Speed Request Alive Rolling Count DTC No Active High Voltage Contactor DTCs: Climate Control HV Device Shutdown	> 6.00 s P2534, P2535 U016B > 10.20 V = True = True > 1.00 s = False 960.00 RPM < Speed Request < 8,600.00 RPM P0532, P0533 P0ABB, P0ABC, P0ABD, (U1111 AND U185A) P15C6 P3061, P0C78, P0AD9, P0AA4, P0D5E, P1EC3 = False	Continuous Check every 250ms (Fail time upto 1700s)	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Command Compressor Commanded to Run High Side Refrigerant Pressure Sensor Data High Voltage Battery Cell Voltage High Voltage Positive, Negative and Charging Contactor for time	 = True < 2,800.00 kPa > 270.00 V = Closed > 1.00 s		
			Case 2 - Monitor HV Compressor Motor Speed - Compressor ON Repass Compressor Speed Difference RPM Filtered Error OR Compressor Speed Difference RPM Filtered Error (Compressor Speed Difference RPM Filtered Error = Filtered difference between Commanded Speed and Feedback Speed)	< CompON_RepassHi > CompON_RepassLo (See supporting tables for the above threshold values)	All of the following conditions are met for time: No Active Run/Crank DTCs: No Active Loss of Communication DTCs: System Voltage (Accessory On Signal OR Run Crank Active Signal) for time Compressor Sensor Data Alive Rolling Count Fault Present Signal Compressor Speed Request	> 6.00 s P2534, P2535 U016B > 10.20 V = True = True > 1.00 s = False 960.00 RPM < Speed Request < 8,600.00 RPM	Continuous Check every 250ms (Repass time upto 2237s)	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					No Active HSRP Sensor DTCs:	P0532, P0533		
					No active High Voltage Battery DTCs:	P0ABB, P0ABC, P0ABD, (U1111 AND U185A)		
					No Active Speed Request Alive Rolling Count DTC:	P15C6		
					No Active High Voltage Contactor DTCs:	P3061, P0C78, P0AD9, P0AA4, P0D5E, P1EC3		
					Climate Control HV Device Shutdown Command	= False		
					Compressor Commanded to Run	= True		
					High Side Refrigerant Pressure Sensor Data	< 2,800.00 kPa		
					High Voltage Battery Cell Voltage	> 270.00 V		
					High Voltage Positive, Negative and Charging Contactor for time	= Closed > 1.00 s		
			Case 3 - Monitor HV Compressor Motor Speed - Compressor OFF state (If compressor has failed in ON state, then it is required to repass the ON case before running OFF monitor)		No Active DTC from Compressor ON Failure (Case 1) AND If any of the following conditions is met for time:	P1F0A > 10.00 s	32.00 fails / 40.00 samples at 250ms rate	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Compressor Speed Feedback	> 960.00 RPM	Compressor Speed Request OR Climate Control High Voltage Device Shutdown Commanded OR Active Speed Request Alive Rolling Count DTC)	< 959.00 RPM = True P15C6		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Electric A/C Compressor Control Module A/C Compressor Motor Current Feedback Circuit Low	P1F0C	Detect an out of range low condition on the compressor current sensor circuit. Monitors the instantaneous status reported by the Compressor.	Compressor DC Link Current Sensor Value	< -3.29 A	Compressor Sensor State Packet Alive Rolling Count Fault Present Signal System Voltage No Active Run/Crank DTCs: AND No Active Loss of Comm DTCs: (Accessory On Signal OR Run Crank Active Signal) for time	= False > 10.20 V P2534, P2535 U016B = True = True > 1.00 s	40.00 fails / 50.00 samples at 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Electric A/C Compressor Control Module A/C Compressor Motor Current Feedback Circuit High	P1F0D	Detect an out of range high condition on the compressor current sensor circuit. Monitors the instantaneous status reported by the Compressor.	Compressor DC Link Current Sensor Value	> 32.71 A	Compressor Sensor State Packet Alive Rolling Count Fault Present Signal Common Diag Enable: System Voltage No Active Run/Crank DTCs AND No Active Loss of Comm DTCs Accessory On Signal OR Run Crank Active Signal) for time	= False > 10.20 V P2534, P2535 U016B = True = True > 1.00 s	40.00 fails / 50.00 samples at 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
System Isolation / Impact Sensor Fault - Hybrid Battery System Contactors Open	P1F17	This DTC will latch when the HPC1 detects a "passive" isolation fault and due to a variety of additional failures it becomes necessary to latch the contactors open until the vehicle is repaired.	Control Module Hybrid Battery Voltage System Isolation Fault (P1AF0,P1AF2, or P1E22)in HPC1	Active	Rollover or Airbag or Inertial Sensors	Not working	25 ms Once set, this DTC cannot pass. DTC passes when latch is not set.	Type A, 1 Trips
			Control Module Hybrid Battery Voltage System Isolation Fault (P1AF0,P1AF2, or P1E22)in HPC1	Active	Lost Communication with Inflatable Restraint Sensing and Diagnostic Module on Bus F (U184E)	Active	25 ms Once set, this DTC cannot pass. DTC passes when latch is not set.	
			Lost Comm with HPC1	Active	Lost Communication with Inflatable Restraint Sensing and Diagnostic Module on Bus F (U184E)	Active	25 ms Once set, this DTC cannot pass. DTC passes when latch is not set.	
			Lost Comm with HPC1 DTC Clear	Active Must Send CPID	Rollover or Airbag or Inertial Sensors 0x7E4 07 AE 32 01 01	Not working	25 ms Once set, this DTC cannot pass. DTC passes when latch is not set.	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid/EV Electronics Coolant Pump Enable Circuit Low	P1F44	Coolant Pump Enable signal has a shorted to ground circuit fault	Coolant Pump Enable line is shorted to ground	Board Support Package returns pump enable line fault = TRUE	System Voltage HWIO Pump Enable Circuit Status Coolant Pump Enable	> 10.20 V ≠ Indeterminate = True	16.00 fails / 20.00 samples at 250ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid/EV Electronics Coolant Pump Enable Circuit High	P1F45	Coolant Pump Enable signal has a shorted to voltage circuit fault	Coolant Pump Enable line is shorted to voltage	Board Support Package returns pump enable line fault = TRUE	System Voltage HWIO Pump Enable Circuit Status Coolant Pump Enable	> 10.20 V ≠ Indeterminate = False	16.00 fails / 20.00 samples at 250ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
P1FFB (Hybrid/EV Battery Pack Coolant Level Sensor Circuit)	P1FFB	DTC monitors the sensed voltage to determine if the circuit is in-range, but invalid	Coolant Level Sensor Sensed Voltage	2.85 V ≤ Sensed Voltage ≤ 3.11 V	12V Battery Voltage	> 10.20 V	40.00 out of 50.00 samples at 100ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid/EV Battery Pack Coolant Level Sensor Circuit Low Voltage	P1FFC	DTC monitors the sensed voltage to determine if the circuit is out-of-range Low	Coolant Level Sensor Sensed Voltage	Sensed Voltage ≤ 1.37 V	12V Battery Voltage	> 10.20 V	40.00 out of 50.00 samples at 100ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid/EV Battery Pack Coolant Level Sensor Circuit High Voltage	P1FFD	DTC monitors the sensed voltage to determine if the circuit is out-of-range High or circuit Open	Coolant Level Sensor Sensed Voltage	Sensed Voltage ≥ 4.00 V	12V Battery Voltage	> 10.20 V	40.00 out of 50.00 samples at 100ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid/EV Battery Pack Coolant Level Low	P1FFE	DTC monitors the sensor voltage to determine if the coolant level is low	Coolant Level Sensor Sensed Voltage	1.38 V ≤ Sensed Voltage ≤ 2.84 V (Low State)	[(Vehicle Speed in Range for time) OR (Propulsion System Off Time AND Vehicle Speed)] AND HV Battery Temperature in Range for time HV Battery Temperature Signal Status Propulsion System Off Time Signal Status Loss of Communication, Ignition Off Timer, Output Speed Sensor, Battery Voltage Sensor DTC's are not ACTIVE	-1.00 < Vehicle speed < 1.00 KPH > 30.00 s > 30.00 s < 1.00 KPH 0.00 °C < HV Battery Temp < 120.00 °C > 30.00 s = Valid = Valid U0100, P2610, P0721, P077B, P215C, U0101, Battery Voltage Sensor	16.00 out of 20.00 samples at 250ms at least twice within 3 key cycles	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
System Isolation/ Coolant Level Sensor Fault - Hybrid/EV Battery Charging System	P1FFF	This DTC checks the integrity of the charging system by monitoring if the battery pack is suffering from a low coolant level condition or if the battery pack has an isolation fault.	RESS Coolant Level Sensor Circuit Fault Active RESS Coolant Level Low Battery Isolation Status Active Isolation Circuit Fault Active	TRUE TRUE Isolation Test Failed TRUE			Diagnostic will fail as soon as any of the malfunction criteria transitions to their threshold value	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
A/C Refrigerant Pressure Sensor B Stuck Performance	P2516	Low Side Refrigerant Pressure Sensor is not functioning as intended/stuck	IF Low Side Refrigerant Pressure at Start Of Diag - Low Side Refrigerant Pressure at End of Diag	< 4.00 kpa after 180.00 s	System Voltage No active temperature sensor DTCs: No active clock DTC: No active engine coolant temperature sensor DTCs: Engine Present Engine Coolant Temperature Signal Status Power mode OAT_Filtd Status Compressor Off Time Compressor Running Flag TRUE for Compressor Running Flag ABS (Engine Coolant Temperature - Outside Ambient Temperature Filtered)	> 10.20 V P0074, P0073, P0072, P0071 P0606 P0119, P0118, P0117, P0116 = TRUE = Valid ≠ Crank = Valid or Uninitialized > 3,600.00 s < 185.00 s = TRUE > 15.00 C Diagnostic has not already reported a Pass this trip	Up to 180.00 s	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
A/C Refrigerant Pressure Sensor B Circuit Low Input	P2517	Signal has an out of range low circuit fault or an open circuit fault	Sensor voltage	< 2.00 % (0.10 V) of reference voltage	System Voltage	> 10.20 V	16.00 fails / 20.00 samples at 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
A/C Refrigerant Pressure Sensor B Circuit High Input	P2518	Signal has an out of range high circuit fault	Sensor voltage	> 98.00 % (4.90 V) of reference voltage	System Voltage	> 10.20 V	40.00 fails / 50.00 samples at 100ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Ignition Switch Run/ Start Position Circuit Low	P2534	Detects a run crank relay open circuit	Run Crank Line Voltage	< 2 volts	Diagnostic Enabled CAN Communication ECM Run/Crank Active Data	= TRUE Enabled Available and Active	2.5 seconds out of a 5 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Ignition Switch Run/ Start Position Circuit High	P2535	Detects a run crank relay short to power	Run Crank Line Voltage	> 5 volts	Diagnostic Enabled CAN Communication ECM Run/Crank Active Data	= TRUE Enabled Available and False	2.5 seconds out of a 5 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Ignition Switch Accessory Position Circuit Low	P2537	See Malfunction criteria for Case Description	Detects an accessory position circuit open	False	P2537 Propulsion System Propulsion System Active Time	Not Test Failed This Key On and Not Test Passed This Key On Active > 0.5 seconds	0.1 seconds (8 * 0.0125)	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Hood Switch Performance	P257D	Rationality Check for the Vehicle Hood Switch	Hood Switch Position Sensor reading within an invalid range	Within the following ranges: 67.80 % < reading < 71.50 % 43.40 % < reading < 45.70 % 14.60 % < reading < 17.20 %	Diagnostic Enabled Battery System in Range Diagnostic System Disable	= TRUE =TRUE = FALSE	1 seconds out of a 1.25 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Hood Switch Circuit Low Voltage	P257E	Detects if the Vehicle Hood Switch is Shorted to Ground	Hood Switch Position Sensor reading below a threshold	<= 14.60 %	Diagnostic Enabled Battery System in Range Diagnostic System Disable	= TRUE =TRUE = FALSE	1 seconds out of a 1.25 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Hood Switch Circuit High Voltage	P257F	Detects if the Vehicle Hood Switch is Shorted to Battery	Hood Switch Position Sensor reading above a threshold	>= 71.50 %	Diagnostic Enabled Battery System in Range Diagnostic System Disable	= TRUE =TRUE = FALSE	1 seconds out of a 1.25 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Power Off Timer Performance	P262B	Detects a fault in the internal Control Module off-timer	The aboslute value of the difference between the Control Module 'Off' Timer and Control Module 'On' Timer (both timers operating during Controller 'On') exceeds a threshold	Difference > 0.056	Diagnostic Enabled Controller 'On' Time RunCrank DTCs Not Active	= TRUE > 60.00 seconds =TRUE P0601, P0602, P0603, P062F, P0604 and P0606	Runs once per drive cycle (when Run/ Crank transitions from TRUE to FALSE).	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Coolant Bypass Valve Control Circuit Low	P2682	Valve Motor drive 1 has a short to low fault.	Valve Motor Driver 1 HWIO Sense State	= LOW	System Voltage Valve	> 10.20 V Must be commanded to Low position	4.00 fails / 5.00 samples at 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Coolant Bypass Valve Control Circuit High	P2683	Valve Motor drive 1 has a short to high fault.	Valve Motor Driver 1 HWIO Sense State	= HIGH	System Voltage Valve	> 10.20 V Must be Stopped or commanded to High position	16.00 fails / 20.00 samples at 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Coolant Bypass Valve A Position Sensor Circuit Range/ Performance	P26A5	If valve feedback position has exceeded valid ranges.	Valve feedback has exceeded valid range - low end OR Valve feedback has exceeded valid range - high end	5.00 % < Feedback < 30.00 % 70.00 % < Feedback < 95.00 %	Propulsion System Active System Voltage No Active Valve DTCs	= True > 10.20 V P2682, P2683, P26AD, P26AE, P26A6, P26A7	80.00 fails / 100.00 samples at 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Coolant Bypass Valve Position Sensor Circuit Low	P26A6	Valve Feedback signal has a out of range low circuit fault	Valve feedback voltage	< 5.00 % of reference voltage (0.25 V)	System Voltage	> 10.20 V	40.00 fails / 50.00 samples at 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Coolant Bypass Valve Position Sensor Circuit High	P26A7	Valve Feedback signal has a out of range high circuit fault or an open circuit fault	Valve feedback voltage	> 95.00 % of reference voltage (4.75 V)	System Voltage	> 10.20 V	40.00 fails / 50.00 samples at 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Coolant Bypass Valve Position Sensor Stop/ Minimum Stop Performance	P26A9	This performance fault detects if the valve is stuck or end position learn failed. An open circuit fault on the Valve Control Circuit 1 or 2 will also cause valve learn fail.	IF Valve has not reached its commanded position THEN attempt valve relearn IF Valve still does not reach its commanded position	< 15.00 s up to 3.00 times < 10.00 s	System Voltage No active Valve or ECT Sensor DTCs Propulsion System Active Engine Coolant Temperature OR Legislated Diagnostics Minimum Engine Coolant Temperature Reached Signal	> 10.20 V P2682, P2683, P26AD, P26AE, P26A6, P26A7, P0116, P0117, P0118, P0119 Diag has not already run this key cycle = True > 58.00 °C = True	up to 25 secs.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Coolant Bypass Valve Control Circuit 2 Low Voltage	P26AD	Valve Motor drive 2 has a short to low fault.	Valve Motor Driver 2 HWIO Sense State	= LOW	System Voltage Valve	> 10.20 V Must be commanded to High position	4.00 fails / 5.00 samples at 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Coolant Bypass Valve Control Circuit 2 High Voltage	P26AE	Valve Motor drive 2 has a short to high fault.	Valve Motor Driver 2 HWIO Sense State	= HIGH	System Voltage Valve	> 10.20 V Must be Stopped or commanded to Low position	16.00 fails / 20.00 samples at 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid/EV Battery Precharge Current Too High	P3061	This DTC sets if battery current remains too high for too long after the contactor status changes from open to precharge.	Battery Current	> 3.00 Amperes for 87.50 ms while waiting for Bus Voltage to reach 95.00 % of Battery Voltage	Battery Current Sensor Battery Voltage Sensor Contactor Status OR Charger Contactor Status RESS Heating Mode	Valid Valid Precharging Not Commanded On	87.50 ms Executed Once Per Precharge Event	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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.			Controller On Bus A Communication Enabled	=TRUE > 2 seconds	5 failures out of 5 samples 1 s loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Communication Bus B Off	U0074	Detects that a CAN serial data bus shorted condition has occurred to force the CAN device driver to enter a bus-off state.			Controller On Bus B Communication Enabled	=TRUE > 2 seconds	5 failures out of 5 samples 1 s loop	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Communication Bus H Off	U007A	Detects that a CAN serial data bus shorted condition has occurred to force the CAN device driver to enter a bus-off state.			Controller On Bus H Communication Enabled	=TRUE > 2 seconds	5 failures out of 5 samples 1 s loop	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication With ECM on Bus A	U0100	Detects Lost Communication with ECM	Detects that CAN serial data communication has been lost with the ECM on Bus A - Messages have not been received from the ECM for a specified time	≥ 500ms	Controller On Bus A Communication Enabled Battery Voltage	=TRUE >2 seconds > 10.20 V	Runs in 10ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Battery Energy Control Module	U0111	Detects Lost Communication with Battery Energy Control Module	Detects that CAN serial data communication has been lost with the Battery Energy Control Module on Bus A - Messages have not been received from the BECM for a specified time	≥ 500ms	Controller On Bus A Communication Enabled Battery Voltage	=TRUE > 2 seconds > 10.20 V	Runs in 10ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Brake System Control Module	U0129	Detects Lost Communication with Brake System Control Module	Detects that CAN serial data communication has been lost with the Brake System Control Module on Bus A - Messages have not been received from the EBCM for a specified time	≥ 500ms	Controller On Bus A Communication Enabled Battery Voltage	=TRUE > 2 seconds > 10.20 V	Runs in 10ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Electric A/C Compressor Control Module	U016B	Detects Lost Communication with Electric A/C Compressor Control Module	Detects that CAN serial data communication has been lost with the Electric A/C Compressor Control Module on Bus A - Messages have not been received from the EACCM for a specified time	≥ 500ms	Controller On Bus A Communication Enabled Battery Voltage	=TRUE > 2 seconds > 10.20 V	Runs in 10ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication With Hybrid Powertrain Control Module	U0293	Detects Lost Communication with Hybrid Powertrain Control Module	Detects that CAN serial data communication has been lost with the Hybrid Powertrain Control Module on Bus A - Messages have not been received from the HCP for a specified time	≥ 500ms	Controller On Bus A Communication Enabled Battery Voltage	=TRUE > 2 seconds > 10.20 V	Runs in 10ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Hybrid Powertrain Control Module on Bus B	U1817	Detects Lost Communication with Hybrid Powertrain Control Module on Bus B	Detects that CAN serial data communication has been lost with the Hybrid Powertrain Control Module on Bus B - Messages have not been received from the HCP for a specified time	≥ 500ms	Controller On Bus B Communication Enabled Battery Voltage	=TRUE > 2 seconds > 10.20 V	Runs in 10ms loop	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication With ECM on Bus B	U1818	Detects Lost Communication with ECM on Bus B	Detects that CAN serial data communication has been lost with the ECM on Bus B - Messages have not been received from the ECM for a specified time	≥ 500ms	Controller On Bus B Communication Enabled Battery Voltage	=TRUE > 2 seconds > 10.20 V	Runs in 10ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Battery Energy Control Module on Bus H	U185A	Detects Lost Communication with Battery Energy Control Module on Bus H	Detects that CAN serial data communication has been lost with the Battery Energy Control Module on Bus H - Messages have not been received from the Battery Energy Control Module for a specified time	≥ 500ms	Controller On Bus H Communication Enabled Battery Voltage	=TRUE > 2 seconds > 10.20 V	Runs in 10ms loop	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Electric A/C Compressor Control Module Lost Communication with Hybrid Powertrain Control Module B	U1860	Detect when there is a one-sided loss of communication on the HS GMLAN Bus where the Compressor is able to send but not receive serial data from the host controller. This function monitors the instantaneous status reported by the Compressor based on its internal processing of the CAN bus status.	Case 1 - DTC Fail Compressor Detected Loss of Communication with Host Controller (Fault detected by the compressor CAN Handler - Messages have not been received from the Host Controller for 250ms)	= True	No Active Run/Crank DTCs: No Active Loss of Communication DTCs: System Voltage (Accessory On Signal OR Run Crank Active Signal) for time Compressor Data Packet Alive Rolling Count Fault Present Signal	P2534, P2535 U016B > 10.20 V = True = True > 1.00 s = False	40.00 fails / 50.00 samples at 100ms loop rate	Type B, 2 Trips
			Case 2 - DTC Pass Compressor Detected Loss of Communication with Host Controller (Compressor received CAN message from the Host controller-Status reported every 100ms by the compressor)	= False,	No Active Run/Crank DTCs: No Active Loss of Communication DTCs: System Voltage (Accessory On Signal OR Run Crank Active Signal) for time Compressor Data Packet Alive Rolling Count Fault Present Signal	P2534, P2535 U016B > 10.20 V = True = True > 1.00 s = False	less than 40.00 fails / 50.00 samples at 100ms loop rate	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Improper Wake-up Performance	U3012	Control Module Wake-up Circuit Performance (Self Wakeup Fault)	Control module unable to do a Self Wakeup when there is a request to do so		Diagnostic Enabled Self-Wakeup Requested	= TRUE =TRUE	Runs once at powerup if a Self-Wakeup request was active last power down	Type A, 1 Trips

Conditions for Ambient Temperature Emissions Status Using OAT Sensor to be Valid
OAT Validity is VALID where no OAT diagnostic fault active for DTC P0071, P0072, P0073, P0074
If all of the following conditions are TRUE, the Mask = Use Data

1. Startup OAT is less than previous trip EAT	
OR	
2. Startup ECT - previous trip EAT	<= 0 °C
OR	
3. Engine Off Time	>= 7,200 seconds
OR	
4. At startup, time since previous EAT valid and able to learn	>= 3,600 seconds
OR	
5. EAT - current OAT	0°C <= difference <= 2 °C
OR	
6. EAT < current OAT and speed timer	>= 420 seconds
and current OAT - EAT	<= 2 °C

Speed timer increments at 100msec rate and increments vary based on the vehicle speed as follows:

Vehicle speed < 26 mph for 2 seconds
26 mph < speed < 56 mph for 1 seconds
56 mph < speed < 199 mph for 2 seconds
199 mph < speed < 200 mph for 2 seconds

Speed timer can never be less than 0 seconds
If OAT Validity = VALID and Mask = Use Data, then Status = VALID

Conditions for Corrected / Estimated Ambient Temperature Status Using OAT Sensor to be Valid
OAT Validity is VALID where no OAT diagnostic fault active for DTC P0071, P0072, P0073, P0074
AND
Engine Time Off Validity = VALID
AND
Vehicle Speed Validity = VALID
AND
If all of the following conditions are TRUE, the Mask = Use Data
1. Startup OAT is less than previous trip EAT
OR
2. Startup ECT - previous trip EAT <= 0 °C
OR
3. Engine Off Time >= 7,200 seconds
OR
4. At startup, time since previous EAT valid and able to learn >= 3,600 seconds
OR
5. EAT - current OAT 0°C <= difference <= 2 °C
OR
6. EAT < current OAT and speed timer >= 420 seconds
and current OAT - EAT <= 2 °C
Speed timer increments at 100msec rate and increments vary based on the vehicle speed as follows:
Vehicle speed < 26 mph for 2 seconds
26 mph < speed < 56 mph for 1 seconds
56 mph < speed < 199 mph for 2 seconds
199 mph < speed < 200 mph for 2 seconds
Speed timer can never be less than 0 seconds
If OAT Validity = VALID and Mask = Use Data, then Status = VALID

Conditions for Arbitrated Ambient Temperature Status Using OAT Sensor to be Valid
Path 1:
Run Crank Active Fault Active Flag is TRUE (DTC P2534 or P2535)
AND
Vehicle Power Mode Status is Valid
AND
Vehicle Power Mode = Run
THEN
Outside Air Temperature Arbitrated Status = Outside Air Temperature Corrected Status (See tab)
ELSE
Outside Air Temperature Arbitrated Status = Outside Air Temperature Emissions Status (See tab)

Path 2:
Run Crank Active Fault Active Flag is TRUE (DTC P2534 or P2535)
AND
Run Crank Active = TRUE
AND
Accessory = TRUE
THEN
Outside Air Temperature Arbitrated Status = Outside Air Temperature Corrected Status (See tab)
ELSE
Outside Air Temperature Arbitrated Status = Outside Air Temperature Emissions Status (See tab)

16 OBDG01 Supporting Table - P0D5C Fail Threshold

Description:									
Notes:									
y/x	1.00	2.00	3.00	4.00	5.00	6.00	7.00	8.00	9.00
1.00	11..66	11.66	53.18	53.18	53.18	51.00	48.08	8.74	
2.00	12.43	12.43	56.71	56.71	56.71	54.37	51.27	9.32	
3.00	13.20	13.20	60.23	60.23	60.23	57.75	54.45	9.90	
4.00	13.66	13.66	62.32	62.32	62.32	59.76	56.35	10.25	
5.00	13.71	13.71	62.54	62.54	62.54	59.97	56.54	10.28	
6.00	13.77	13.77	62.81	62.81	62.81	60.23	56.79	10.33	
7.00	13.82	13.82	63.05	63.05	63.05	60.46	57.00	10.37	
8.00	13.95	13.95	63.65	63.65	63.65	61.03	57.55	10.46	
9.00	13.95	13.95	63.65	63.65	63.65	61.03	57.55	10.46	

16 OBDG01 Supporting Table - KtBSED_U_BUV_CellVoltThresh

Description:									
Notes:									
y/x	1	2	3	4	5	6	7	8	9
1	1.550	1.550	1.720	1.720	1.720	1.720	1.720	1.720	1.720

16 OBDG01 Supporting Table - KtBSED_U_BUV_PackVoltThresh

Description:									
Notes:									
y/x	1	2	3	4	5	6	7	8	9
1	148.900	148.900	164.900	164.900	164.900	164.900	164.900	164.900	164.900

16 OBDG01 Supporting Table - KtBSED_U_BOV_CellVoltThresh

Description:									
Notes:									
y/x	1	2	3	4	5	6	7	8	9
1	4.564	4.564	4.564	4.564	4.564	4.564	4.564	4.564	4.564

16 OBDG01 Supporting Table - KtBSED_U_BOV_PackVoltThresh

Description:									
Notes:									
y/x	1	2	3	4	5	6	7	8	9
1	438.300	438.300	438.300	438.300	438.300	438.300	438.300	438.300	438.300

16 OBDG01 Supporting Table - KtBSED_P_BPD_D_EndOfLifePwrThrsh

Description:	
Notes:	
y/x	1
1	-3.728
2	-5.119
3	-6.290
4	-7.831
5	-9.007
6	-9.255
7	-9.463
8	NaN

16 OBDG01 Supporting Table - P0534 Case 2 (CompOFF_Pass)

Description: LSRP pass threshold for compressor off/soaked

Notes:

y/x	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	9,999	150	150	150	150	180	209	241	275	311	350	392	436	484	534	588	646

16 OBDG01 Supporting Table - P0534 Case 2 (CompOFF_Fail)

Description: LSRP fail threshold for compressor off/soaked

Notes:

y/x	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	0	78	100	123	148	175	204	236	270	306	345	387	431	479	529	583	641

16 OBDG01 Supporting Table - P0534 Case 1 (CompON)

Description: LSRP fail/pass threshold for compressor running

Notes:

y/x	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	0	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90

16 OBDG01 Supporting Table - RESS Pump Feedback Fault high Threshold

Description:										
Notes:										
y/x	1	2	3	4	5	6	7	8	9	10
1	450	450	450	450	450	450	450	450	450	450

16 OBDG01 Supporting Table - RESS Pump Feedback Fault low Threshold

Description:										
Notes:										
y/x	1	2	3	4	5	6	7	8	9	10
1	-450	-450	-450	-450	-450	-450	-450	-450	-450	-450

16 OBDG01 Supporting Table - RESS Pump Feedback Repass High Threshold

Description:										
Notes:										
y/x	1	2	3	4	5	6	7	8	9	10
1	-250	-250	-250	-250	-250	-250	-250	-250	-250	-250

16 OBDG01 Supporting Table - RESS Pump Feedback Repass Low Threshold

Description:										
Notes:										
y/x	1	2	3	4	5	6	7	8	9	10
1	250	250	250	250	250	250	250	250	250	250

16 OBDG01 Supporting Table - CompON_FaultHi

Description: Compressor Speed Feedback Rationality - Compressor ON - Fail Threshold High										
Notes:										
y/x	1	2	3	4	5	6	7	8	9	10
1	900	900	900	900	900	900	900	900	900	900

16 OBDG01 Supporting Table - CompON_FaultLo

Description: Compressor Speed Feedback Rationality - Compressor ON - Fail Threshold Low

Notes:

y/x	1	2	3	4	5	6	7	8	9	10
1	-900	-900	-900	-900	-900	-900	-900	-900	-900	-900

16 OBDG01Supporting Table - CompON_RepassHi

Description: Compressor Speed Feedback Rationality - Compressor ON - Repass Threshold High										
Notes:										
y/x	1	2	3	4	5	6	7	8	9	10
1	875	875	875	875	875	875	875	875	875	875

16 OBDG01 Supporting Table - CompON_RepassLo

Description: Compressor Speed Feedback Rationality - Compressor ON - Repass Threshold Low										
Notes:										
y/x	1	2	3	4	5	6	7	8	9	10
1	-875	-875	-875	-875	-875	-875	-875	-875	-875	-875

16 OBDG01 Supporting Table - PCOD Pump Feedback Fault High Threshold

Description: Pump Feedback Fault High Threshold										
Notes:										
y/x	1	2	3	4	5	6	7	8	9	10
1	800	800	800	800	800	800	800	800	800	800

16 OBDG01 Supporting Table - PCOD Pump Feedback Fault Low Threshold

Description: Pump Feedback Fault Low Threshold										
Notes:										
y/x	1	2	3	4	5	6	7	8	9	10
1	-800	-800	-800	-800	-800	-800	-800	-800	-800	-800

16 OBDG01 Supporting Table - PCOD Pump Feedback Repass High Threshold

Description: Pump Feedback Repass High Threshold										
Notes:										
y/x	1	2	3	4	5	6	7	8	9	10
1	600	600	600	600	600	600	600	600	600	600

16 OBDG01 Supporting Table - PCOD Pump Feedback Repass Low Threshold

Description: Pump Feedback Repass Low Threshold										
Notes:										
y/x	1	2	3	4	5	6	7	8	9	10
1	-600	-600	-600	-600	-600	-600	-600	-600	-600	-600

16 OBDG01 Fault Bundle Definitions

Bundle Name: Battery Current Sensor
P0AC1, P0AC2, P1EBA, P1A07, P0B13, P0B10, P0B11, P1EBB, (U0111 and U185A)
Bundle Name: Battery Voltage Sensor
P0ABC, P0ABD, P1A07, P0AF8, P0ABB, (U0111 and U185A)
Bundle Name: Bus Voltage Sensor
P1AE8, P1AE9, P1AEA, P1AEB, P1AEC, P1AED, P1E20, P1E21, P1E28, U0293
Bundle Name: Cell Voltage Ckt High
P0B3E, P0B43, P0B48, P0B4D, P0B52, P0B57, P0B5C, P0B61, P0B66, P0B6B, P0B70, P0B75, P0B7A, P0B7F, P0B84, P0B89, P0B8E, P0B93, P0B98, P0B9D, P0BA2, P0BA7, P0BAC, P0BB1, P0BB6, P0BBB, P1B18, P1B1B, P1B1E, P1B21, P1B24, P1B27, P1B47, P1B4A, P1B4D, P1B50, P1B53, P1B56, P1B59, P1B5C, P1B5F, P1B62, P1B65, P1B68, P1B6B, P1B6E, P1B71, P1B74, P1B77, P1B7A, P1B7D, P1B80, P1B83, P1B86, P1B89, P1B8C, P1B8F, P1B92, P1B95, P1B98, P1B9B, P1B9E, P1BA1, P1BA4, P1BA7, P1BAA, P1BAD, P1BB0, P1BB3, P1BB6, P1BB9, P1BBC, P1BBF, P1BC2, P1BC5, P1BC8, P1BCB, P1BCE, P1BD1, P1BD4, P1BD7, P1BDA, P1BDD, P1BE0, P1BE3, P1BE6, P1BE9, P1BEC, P1BEF, P1BF2, P1BF5, P1BF8, P1BFB, P1BFE, P1E03, P1E06
Bundle Name: Cell Voltage Ckt Low
P0B3D, P0B42, P0B47, P0B4C, P0B51, P0B56, P0B5B, P0B60, P0B65, P0B6A, P0B6F, P0B74, P0B79, P0B7E, P0B83, P0B88, P0B8D, P0B92, P0B97, P0B9C, P0BA1, P0BA6, P0BAB, P0BB0, P0BB5, P0BBA, P1B17, P1B1A, P1B1D, P1B20, P1B23, P1B26, P1B46, P1B49, P1B4C, P1B4F, P1B52, P1B55, P1B58, P1B5B, P1B5E, P1B61, P1B64, P1B67, P1B6A, P1B6D, P1B70, P1B73, P1B76, P1B79, P1B7C, P1B7F, P1B82, P1B85, P1B88, P1B8B, P1B8E, P1B91, P1B94, P1B97, P1B9A, P1B9D, P1BA0, P1BA3, P1BA6, P1BA9, P1BAC, P1BAF, P1BB2, P1BB5, P1BB8, P1BBB, P1BBE, P1BC1, P1BC4, P1BC7, P1BCA, P1BCD, P1BD0, P1BD3, P1BD6, P1BD9, P1BDC, P1BDF, P1BE2, P1BE5, P1BE8, P1BEB, P1BEE, P1BF1, P1BF4, P1BF7, P1BFA, P1BFD, P1E02, P1E05
Bundle Name: CellVoltageRationalityFA
P0B3D, P0B42, P0B47, P0B4C, P0B51, P0B56, P0B5B, P0B60, P0B65, P0B6A, P0B6F, P0B74, P0B79, P0B7E, P0B83, P0B88, P0B8D, P0B92, P0B97, P0B9C, P0BA1, P0BA6, P0BAB, P0BB0, P0BB5, P0BBA, P1B17, P1B1A, P1B1D, P1B20, P1B23, P1B26, P1B46, P1B49, P1B4C, P1B4F, P1B52, P1B55, P1B58, P1B5B, P1B5E, P1B61, P1B64, P1B67, P1B6A, P1B6D, P1B70, P1B73, P1B76, P1B79, P1B7C, P1B7F, P1B82, P1B85, P1B88, P1B8B, P1B8E, P1B91, P1B94, P1B97, P1B9A, P1B9D, P1BA0, P1BA3, P1BA6, P1BA9, P1BAC, P1BAF, P1BB2, P1BB5, P1BB8, P1BBB, P1BBE, P1BC1, P1BC4, P1BC7, P1BCA, P1BCD, P1BD0, P1BD3, P1BD6, P1BD9, P1BDC, P1BDF, P1BE2, P1BE5, P1BE8, P1BEB, P1BEE, P1BF1, P1BF4, P1BF7, P1BFA, P1BFD, P1E02, P1E05, P0B3E, P0B43, P0B48, P0B4D, P0B52, P0B57, P0B5C, P0B61, P0B66, P0B6B, P0B70, P0B75, P0B7A, P0B7F, P0B84, P0B89, P0B8E, P0B93, P0B98, P0B9D, P0BA2, P0BA7, P0BAC, P0BB1, P0BB6, P0BBB, P1B18, P1B1B, P1B1E, P1B21, P1B24, P1B27, P1B47, P1B4A, P1B4D, P1B50, P1B53, P1B56, P1B59, P1B5C, P1B5F, P1B62, P1B65, P1B68, P1B6B, P1B6E, P1B71, P1B74, P1B77, P1B7A, P1B7D, P1B80, P1B83, P1B86, P1B89, P1B8C, P1B8F, P1B92, P1B95, P1B98, P1B9B, P1B9E, P1BA1, P1BA4, P1BA7, P1BAA, P1BAD, P1BB0, P1BB3, P1BB6, P1BB9, P1BBC, P1BBF, P1BC2, P1BC5, P1BC8, P1BCB, P1BCE, P1BD1, P1BD4, P1BD7, P1BDA, P1BDD, P1BE0, P1BE3, P1BE6, P1BE9, P1BEC, P1BEF, P1BF2, P1BF5, P1BF8, P1BFB, P1BFE, P1E03, P1E06, P0B3B, P0B40, P0B45, P0B4A, P0B4F, P0B54, P0B59, P0B5E, P0B63, P0B68, P0B6D, P0B77, P0B7C, P0B81, P0B86, P0B8B, P0B95, P0B9A, P0B9F, P0BA4, P0BA9, P0BAE, P0BB3, P0BB8, P1B28, P1B29, P1B2A, P1B2B, P1B2C, P1B2D, P1E4C, P1E4D, P1E4E, P1E4F, P1E50, P1E51, P1E52, P1E53, P1E54, P1E56, P1E57, P1E58, P1E59, P1E5A, P1E5B, P1E5C, P1E5D, P1E5E, P1E5F, P1E60, P1E61, P1E62, P1E63, P1E64, P1E65, P1E66, P1E67, P1E68, P1E69, P1E6A, P1E6B, P1E6C, P1E6E, P1E6F, P1E70, P1E71, P1E72, P1E73, P1E74, P1E75, P1E76, P1E77, P1E78, P1E79, P1E7A, P1E7B, P1E7C, P1E7D, P1E7E, P1E7F, P1E80, P1E81, P1E82, P1E83, P1E84, P1E86, P1E87, P1E88, P1E89, P1E8A, U2603, U2604, U2605, U2606, U2617, U2618, U2619, U2620, U2621, U2622, U2623, U2624, P1EB1, P1EB2, P1EB3, P1EB4, P1EB5, P1FA6, P1FA7, P1FA8, P1FA9, P1FAA, P1FAB, P3030, P303B
Bundle Name: Charger Current Sensor
P0D53, P0D54, U1838
Bundle Name: Open Sense Line Fault
P0B3B, P0B40, P0B45, P0B4A, P0B4F, P0B54, P0B59, P0B5E, P0B63, P0B68, P0B6D, P0B72, P0B77, P0B7C, P0B81, P0B86, P0B8B, P0B90, P0B95, P0B9A, P0B9F, P0BA4, P0BA9, P0BAE, P0BB3, P0BB8, P1B28, P1B29, P1B2A, P1B2B, P1B2C, P1B2D, P1E4C, P1E4D, P1E4E, P1E4F, P1E50, P1E51, P1E52, P1E53, P1E54, P1E55, P1E56, P1E57, P1E58, P1E59, P1E5A, P1E5B, P1E5C, P1E5D, P1E5E, P1E5F, P1E60, P1E61, P1E62, P1E63, P1E64, P1E65, P1E66, P1E67, P1E68, P1E69, P1E6A, P1E6B, P1E6C, P1E6D P1E6E, P1E6F, P1E70, P1E71, P1E72, P1E73, P1E74, P1E75, P1E76, P1E77, P1E78, P1E79, P1E7A, P1E7B, P1E7C, P1E7D, P1E7E, P1E7F, P1E80, P1E81, P1E82, P1E83, P1E84, P1E86, P1E87, P1E88, P1E89, P1E8A
Bundle Name: Slave Cell Balancing Fault

16 OBDG01 Fault Bundle Definitions

P1E92, P1E98, P1E9E, P1EA4, P1FC9, P1FCA, P1FCB, P1FCC, P1FCD, P1FCE, P3036, P3041
Bundle Name: Slave Internal Performance Fault
P1E8E, P1E94, P1E9A, P1EA0, P1FBD, P1FBE, P1FBF, P1FC0, P1FC1, P1FC2, P3034, P303F
Bundle Name: Slave Loss of Comm Fault
U2603, U2604, U2605, U2606, U2617, U2618, U2619, U2620, U2621, U2622, U2623, U2624
Bundle Name: TempRationalityFA
P0AC6, P0ACB, P0AE9, P0BC3, P0C34, P0A9E, P0AC8, P0ACD, P0AEB, P0BC5, P0C36, P0A9D, P0AC7, P0ACC, P0AEA, P0BC4, P0C35, P1EB1, P1EB2, P1EB3, P1EB4, P1EB5, P1FA6, P1FA7, P1FA8, P1FA9, P1FAA, P1FAB, P3030, P303B, U2401, U2603, U2604, U2605, U2606, U2617, U2618, U2619, U2620, U2621, U2622, U2623, U2624
Bundle Name: VICMVoltageFA
P0B3D, P0B42, P0B47, P0B4C, P0B51, P0B56, P0B5B, P0B60, P0B65, P0B6A, P0B6F, P0B74, P0B79, P0B7E, P0B83, P0B88, P0B8D, P0B92, P0B97, P0B9C, P0BA1, P0BA6, P0BAB, P0BB0, P0BB5, P0BBA, P1B17, P1B1A, P1B1D, P1B20, P1B23, P1B26, P1B46, P1B49, P1B4C, P1B4F, P1B52, P1B55, P1B58, P1B5B, P1B5E, P1B61, P1B64, P1B67, P1B6A, P1B6D, P1B70, P1B73, P1B76, P1B79, P1B7C, P1B7F, P1B82, P1B85, P1B88, P1B8B, P1B8E, P1B91, P1B94, P1B97, P1B9A, P1B9D, P1BA0, P1BA3, P1BA6, P1BA9, P1BAC, P1BAF, P1BB2, P1BB5, P1BB8, P1BBB, P1BBE, P1BC1, P1BC4, P1BC7, P1BCA, P1BCD, P1BD0, P1BD3, P1BD6, P1BD9, P1BDC, P1BDF, P1BE2, P1BE5, P1BE8, P1BEB, P1BEE, P1BF1, P1BF4, P1BF7, P1BFA, P1BFD, P1E02, P1E05, P0B3E, P0B43, P0B48, P0B4D, P0B52, P0B57, P0B5C, P0B61, P0B66, P0B6B, P0B70, P0B75, P0B7A, P0B7F, P0B84, P0B89, P0B8E, P0B93, P0B98, P0B9D, P0BA2, P0BA7, P0BAC, P0BB1, P0BB6, P0BBB, P1B18, P1B1B, P1B1E, P1B21, P1B24, P1B27, P1B47, P1B4A, P1B4D, P1B50, P1B53, P1B56, P1B59, P1B5C, P1B5F, P1B62, P1B65, P1B68, P1B6B, P1B6E, P1B71, P1B74, P1B77, P1B7A, P1B7D, P1B80, P1B83, P1B86, P1B89, P1B8C, P1B8F, P1B92, P1B95, P1B98, P1B9B, P1B9E, P1BA1, P1BA4, P1BA7, P1BAA, P1BAD, P1BB0, P1BB3, P1BB6, P1BB9, P1BBC, P1BBF, P1BC2, P1BC5, P1BC8, P1BCB, P1BCE, P1BD1, P1BD4, P1BD7, P1BDA, P1BDD, P1BE0, P1BE3, P1BE6, P1BE9, P1BEC, P1BEF, P1BF2, P1BF5, P1BF8, P1BFB, P1BFE, P1E03, P1E06, P0B3B, P0B40, P0B45, P0B4A, P0B4F, P0B54, P0B59, P0B5E, P0B63, P0B68, P0B6D, P0B77, P0B7C, P0B81, P0B86, P0B8B, P0B95, P0B9A, P0B9F, P0BA4, P0BA9, P0BAE, P0BB3, P0BB8, P1B28, P1B29, P1B2A, P1B2B, P1B2C, P1B2D, P1E4C, P1E4D, P1E4E, P1E4F, P1E50, P1E51, P1E52, P1E53, P1E54, P1E56, P1E57, P1E58, P1E59, P1E5A, P1E5B, P1E5C, P1E5D, P1E5E, P1E5F, P1E60, P1E61, P1E62, P1E63, P1E64, P1E65, P1E66, P1E67, P1E68, P1E69, P1E6A, P1E6B, P1E6C, P1E6E, P1E6F, P1E70, P1E71, P1E72, P1E73, P1E74, P1E75, P1E76, P1E77, P1E78, P1E79, P1E7A, P1E7B, P1E7C, P1E7D, P1E7E, P1E7F, P1E80, P1E81, P1E82, P1E83, P1E84, P1E86, P1E87, P1E88, P1E89, P1E8A, P0B3C, P0B41, P0B46, P0B4B, P0B50, P0B55, P0B5A, P0B5F, P0B64, P0B69, P0B6E, P0B73, P0B78, P0B7D, P0B82, P0B87, P0B8C, P0B91, P0B96, P0B9B, P0BA0, P0BA5, P0BAA, P0BAF, P0BB4, P0BB9, P1B16, P1B19, P1B1C, P1B1F, P1B22, P1B25, P1B45, P1B48, P1B4B, P1B4E, P1B51, P1B54, P1B57, P1B5A, P1B5D, P1B60, P1B63, P1B66, P1B69, P1B6C, P1B6F, P1B72, P1B75, P1B78, P1B7B, P1B7E, P1B81, P1B84, P1B87, P1B8A, P1B8D, P1B90, P1B93, P1B96, P1B99, P1B9C, P1B9F, P1BA2, P1BA5, P1BA8, P1BAB, P1BAE, P1BB1, P1BB4, P1BB7, P1BBA, P1BBD, P1BC0, P1BC3, P1BC6, P1BC9, P1BCC, P1BCF, P1BD2, P1BD5, P1BD8, P1BDB, P1BDE, P1BE1, P1BE4, P1BE7, P1BEA, P1BED, P1BF0, P1BF3, P1BF6, P1BF9, P1BFC, P1E01, P1E04, U2603, U2604, U2605, U2606, U2617, U2618, U2619, U2620, U2621, U2622, U2623, U2624, P1EB1, P1EB2, P1EB3, P1EB4, P1EB5, P1FA6, P1FA7, P1FA8, P1FA9, P1FAA, P1FAB, P3030, P303B, P0ABC, P0ABD

16 OBDG01 SUMMARY PARAMETER TABLES - THPC (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Crankshaft Position (CKP) Sensor A Circuit	P0335	Detects Lack of Response from 58X Crank Sensor	Crank Sync State	= No Activity	HWIO based crank decode status	NOT DisableCrank	1.40 s (250ms)	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Crankshaft Position (CKP) Sensor A Performance	P0336	Detects Invalid 58X Crank Sensor Signal	Crank Sync State	= Activity Detected	HWIO based crank decode status	NOT DisableCrank	1.40 s (12.5ms)	Type B, 2 Trips
			Crank Sync State	= Activity Detected	HWIO based crank decode status	NOT DisableCrank	15.00 crank re-sync events in a 10.00 s window (250ms)	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Idle Air Control (IAC) System - RPM Too Low	P0506	This DTC sets when the idle speed is lower than the targeted idle speed	Idle Speed	Fail Criteria: Filtered input speed error (desired - actual), is greater than the fail threshold of 91 RPM. Filter coefficient for engine speed = 0.003 Pass Criteria: Filtered input speed error (desired - actual), is less than fail threshold 81 . Filter coefficient for engine speed = 0.003	No Active DTCs: No Active DTCs: No Active DTCs: Accelerator pedal position Engine State Vehicle Speed Engine Coolant Commanded RPM Delta Idle Conditons Present	Motor A speed faults: P0A3F, P1B03, P0A40, P0C52, P0C53, P0C5C, P0C5D Motor B speed faults: P0A45, P1B04, P0A46, P0C57, P0C58, P0C61, P0C62 Vehicle Speed/TOS sensor faults: P0722, P077B, P215C Not Defaulted & <= 1.00 % Running (not starting or stopping states) <= 2 kph >= 60.00 Deg C < 50 RPM >= 10.00 seconds	1 loop execution at 100 ms rate Pass condition met for 10.00 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Idle Air Control (IAC) System - RPM Too High	P0507	This DTC sets when the idle speed is higher than the targeted idle speed	Idle Speed	Fail Criteria: Filtered input speed error (desired - actual), is less than the fail threshold of -182 RPM. Filter coefficient for engine speed = 0.003 Pass Criteria: Filtered input speed error (desired - actual), is greater than fail threshold -172 . Filter coefficient for engine speed = 0.003	No Active DTCs: No Active DTCs: No Active DTCs: Accelerator pedal position Engine State Vehicle Speed Engine Coolant Commanded RPM Delta Idle Conditons Present	Motor A speed faults: P0A3F, P1B03, P0A40, P0C52, P0C53, P0C5C, P0C5D Motor B speed faults: P0A45, P1B04, P0A46, P0C57, P0C58, P0C61, P0C62 Vehicle Speed/TOS sensor faults: P0722, P077B, P215C Not Defaulted & <= 1.00 % Running (not starting or stopping states) <= 2 kph >= 60.00 Deg C < 25 RPM >= 10.00 seconds	1 loop execution at 100 ms rate Pass condition met for 10.00 seconds	Type B, 2 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - THPC (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
System Voltage Performance	P0561	Sets when there is a difference between the 12V input and the Ignition Run/Crank Voltage	Difference between 12V Battery Voltage Input and Ignition Run/Crank Voltage	> 3.00 Volts	Enable Calibration is True Diagnostic System Code Clear Requested Diagnostic System Reset Complete Battery input is present Ignition Run/Crank Voltage 12V Starte Engaged	= 1.00 (1 is Enabled) = False = True = 1.00 (1 is Available) > 6.0 Volts = False	4 seconds out of a 5 seconds window	Type C, No MIL

16 OBDG01 SUMMARY PARAMETER TABLES - THPC (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
System Voltage Low	P0562	Sets when the low voltage system voltage is below a threshold	Ignition Voltage	≤ 10.00 Volts	Enable Calibration is True 12V Starter Engaged Ignition Run/Crank Voltage Engine Speed	= 1.00 (1 is Enabled) = False > 6.0 Volts ≥ 0.00 RPM	5 seconds out of a 6 seconds window	Type C, No MIL

16 OBDG01 SUMMARY PARAMETER TABLES - THPC (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
System Voltage High	P0563	Sets when the low voltage system voltage is above a threshold	Ignition Voltage	≥ 16.00 Volts	Enable Calibration is True Ignition Run/Crank Voltage	= 1.00 (1 is Enabled) > 6.0 Volts	5 seconds out of a 6 seconds window	Type C, No MIL

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Read Only Memory (ROM)	P0601	This Diagnostic tests the checksum on ROM (flash) memory	Calculated Checksum of the Boot ROM	≠ Expected Checksum	Controller Status ROM Checksum in Progress (Diagnostic System Code Clear Requested AND Diagnostic System Reset Complete)	= On ≠ True = False = True	1 failure if it occurs during the first ROM test of the ignition cycle otherwise 5 failures	Type A, 1 Trips
			2nd Processor State of Health ROM fault latched	= TRUE	Controller Status ROM Checksum in Progress (Diagnostic System Code Clear Requested AND Diagnostic System Reset Complete)	= On ≠ True = False = True	Runs continuously in the background	
			Calculated Checksum of Torque Security Related Calibrations	≠ Expected Checksum	Controller Status (Diagnostic System Code Clear Requested AND Diagnostic System Reset Complete) = Enable Calibration is True = Enable Calibration is True	= On = False = True = 0 (0 is Enabled) = 1 (1 is Enabled)	1 failure if it occurs during the first ROM test of the ignition cycle otherwise 5 failures	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			ECC Fault detected in Flash memory	= TRUE	Controller Status Power Up Reset AND HWIO BINVDM ECC State AND HWIO ROM Fault Enable Calibration is true	= On = False = False = True = 1 (1 is Enabled)	Greater than 5 failures at controller initialization Runs once at initialization	
			ROM fault Active AND 2nd SOH ROM Fault Latched AND Main SOH ROM Fault Latched	≠ True ≠ True ≠ True	(Diagnostic System Code Clear Requested AND Diagnostic System Reset Complete)	= False = True	Runs in the Background	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Not Programmed	P0602	This Diagnostic ensures that the Processor was programmed aftering arriving from the supplier	No Start Calibration is True	= 0 (1 is for No Start Condition)	(Diagnostic System Code Clear Requested AND Diagnostic System Reset Complete)	= False = True	Runs once at controller initialization and every 1 second there after	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - THPC (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Long Term Memory Reset	P0603	This Diagnostic tests for BINVDM errors	Static NVM Checksum at power-up	≠ Checksum at power-down	Ignition Status Enable Calibration is True	= Run or Crank = 1 (1 is Enabled)	1 failure Runs once at controller initialization	Type A, 1 Trips
			Preserved NVM Checksum at power-up	≠ Checksum at power-down	Ignition Status Enable Calibration is True	= Run or Crank = 1 (1 is Enabled)	1 failure Runs once at controller initialization	
			Power Up Reset BINVDM NVM Checksum at power-up	= False ≠ Checksum at power-down	Ignition Status Enable Calibration is True	= Run or Crank = 1 (1 is Enabled)	Runs once at controller initialization 3 out of 5 controller initilizations for Failure	
			Dynamic NVM checksum at power-up AND Shutdown Finished	≠ Checksum at power-down = TRUE	Ignition Status Enable Calibration is True	= Run or Crank = 1 (1 is Enabled)	1 failure Runs once at controller initialization	
			Static NVM Error Dynamic NVM Error BINVDM ECC Error	= False = False = False	Enable Calibration is True	= 1 (1 is Enabled)	Runs once at controller initialization	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Random Access Memory (RAM)	P0604	This Diagnostic tests the checksum on RAM memory	Secure "Y" variable	≠ Primary "V" variable for greater than 125 ms	Current Time Execution - Time of Last DualStore Error	> 25 ms	Executes in Background loop	Type A, 1 Trips
			HWIO detects an illegal write to Write Protected RAM	= TRUE	(Diagnostic System Code Clear Requested AND Diagnostic System Reset Complete)	= False = True	Executes in Background loop 0 counts to fail	
			2nd Processor State of Health RAM Fault Latched	= TRUE	(Diagnostic System Code Clear Requested AND Diagnostic System Reset Complete)	= False = True	Executes in Background loop every 1000ms	
			Checksum of PreservedNVM_Region for Main Processor State of Health and 2nd Processor State Of Health	≠ Expected checksum value	(Diagnostic System Code Clear Requested AND Diagnostic System Reset Complete)	= False = True	Runs once at Initialization	
			HWIO detects fault in System RAM	= TRUE	(Diagnostic System Code Clear Requested AND Diagnostic System Reset Complete)	= False = True	Runs once at Initialization 3 count to fail	
			HWIO detects fault in Cache RAM	= TRUE	(Diagnostic System Code Clear Requested AND Diagnostic System Reset Complete)	= False = True	Runs once at Initialization 3 count to fail	
			HWIO detects fault in eTPU RAM	= TRUE	(Diagnostic System Code Clear Requested AND Diagnostic System Reset Complete)	= False = True	Runs once at Initialization 3 count to fail	
			Main SOH RAM Fault Latched AND SPI Fault Latched	= 0 = False	(Diagnostic System Code Clear Requested AND Diagnostic System Reset	= False = True	Executes in Background loop every 1000ms	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			AND System RAM Fault Count AND Cache RAM Fault Count AND eTPU RAM Fault Count	 = 0 = 0 = 0	Complete) Time Since Last Duel Store Error	 > 1,000 ms		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Performance	P0606	This Diagnostic tests all the internal processor subsystems for faults which suggest that the integrity of the processor can not be trusted.	Inhibit Path Test Failed Indicates that the Processor is not demonstrating the ability to inhibit the system (take remedial action) during the Inhibit Path Test "2ndFailsToTakeRmdlActn "	>= 3 Failures	HV Batt contactor Staus Available Invertor State HV Batt Voltage HV Contactors 12V Batt Voltage Vehicle Speed Motor Faults Motor Speed SRAR Shutdowns SPI Fault RunCrank Active Ram or ROM fault Seed received in wrong order fault Seed/Key Timeout Powermode Off time	= TRUE = Off >= 80.00 V = Closed > 9.50 V < 0.00 kph = FALSE (None active) <= 20.00 rpm = FALSE = FALSE (No active P0606) = FALSE = FALSE (No active P0601, P0604) = FALSE (No active P0606) = FALSE < 5.00 s	Executes in a 12.5ms loop Increment/ Decrement counter = 3	Type A, 1 Trips
			Key Value Indicates that the Processor received incorrect key values for the associated seed values that it sent out to the secondary processor	≠ expected key value	Number Of Mains Processors to monitor IPT status SPI Fault	> 0 = Not Running = FALSE (No active P0606)	Executes in a 12.5ms loop Detects in 150ms or two consecutive faulty keys	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			"2ndRxIncorrectKeys"		Run/Crank Voltage	>= 9.50 V		
			New Seed Update Time Indicates that the Processor did not receive a key value from the secondary processor during the expected time frame "MainDtctdSdKeyTimeout"	> 1.00 sec	Number Of Mains Processors to monitor AND SPI Faults AND Seed/Key Init delay timer AND Run/Crank Voltage OR 12V Battery Voltage	> 0 = FALSE (No active P0606) >= 1.00 s >= 9.50 V > 11 V	Executes in a 12.5ms loop Detects in 1 second	
			Seed sequence Indicates that the Processor received key values in the incorrect order from the secondary processor "MainDtctdSdRxWrongOrdr"	≠ expected order	Number Of Mains Processors to monitor AND SPI Faults AND Run/Crank Voltage OR 12V Battery Voltage	> 0 = FALSE (No active P0606) >= 9.50 V > 11 V	0.15 seconds out of a 0.2 seconds window Executes in a 12.5ms loop	
			Program Sequence Watch Seed time Since Seed Change Indicates that the Processor detected that a program Seed was not sending for the Program Sequence Watch "MainSequenceFlt"	> 0.20 ms	Seed Update Key Store Fault Enable is true	= 0 (1 is Enabled)	Executes in a 50ms loop after controller initialization	
			Program Sequence Watch Fault on a CPU Indicates that the Processor detected that a program was ran out of sequence according to the Program Sequence Watch "MainSequenceFlt"	seed sequence ≠ expected sequence	Program Sequence Watch Enabled (KaPISD_b_ProgSeqWatchEnbl[x])	= TRUE	0.15 seconds out of a 0.2 seconds window	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			HWIO detects Fault in ALU Test Indicates that the Processor detected an ALU fault in the processor "MainALU_Flt"	= 2 faults in a key cycle	Enabled Calibration is True (Diagnostic System Code Clear Requested AND Diagnostic System Reset Complete) AND Run Crank Ingnition Low Voltage AND Run Crank Low Voltage Crank	= 1 (1 is Enabled) = False = True ≠ True ≠ True	Runs continuously in 12.5ms loop	
			HWIO detects Fault in Configuration Registry Test Indicates that the Processor detected a Configuration Register fault in the processor "MainCfgRegFlt"	= 2 faults in a key cycle	Enable Calibration is True (Diagnostic System Code Clear Requested AND Diagnostic System Reset Complete) AND Run Crank Ingnition Low Voltage AND Run Crank Low Voltage Crank	= 1 (1 is Enabled) = False = True ≠ True ≠ True	Runs continuously in 12.5ms loop	
			HWIO detects Fault in the Stack Limit Test Indicates that the CPU Stack memory exceeded the limit "MainStackFlt"	= 2 faults since power up	Enable Calibration is True (Diagnostic System Code Clear Requested AND Diagnostic System Reset Complete)	= 1 (1 is Enabled) = False = True	Runs Continuously in 100ms loop	
			voltage diff between real circuit and test circuit Indicates that the Processor detected a problem with the Analog	> 9 V	Enable Calibration is True AND Run/Crank Voltage (Diagnostic System Code Clear Requested	= 1 (1 is Enabled) >= 7 V = False	0.15 seconds out of a 0.2 seconds window OR A2D Converter Test Error >=	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			to Digital convertor test circuit "MainADC_Flt"		AND Diagnostic System Reset Complete)	= True	0.20 seconds	
			HWIO detects Fault that the Processor detected a problem with the Flash ECC (error correction code) test circuit "FlashECC_CktTest"	= TRUE	Enable Calibration is True AND Power-Up Reset	= 1 (1 is Enabled) = TRUE	Executes once at every power up reset 3.00 failed cycles out of 10.00 cycles (turns on MIL) 5.00 failed cycles out of 10.00 cycles (shutdown vehicle)	
			HWIO detects Fault that the Processor detected a problem with the RAM ECC (error correction code) test circuit "RAM_ECC_CktTest"	= TRUE	Enable Calibration is True AND Power-Up Rest	= 1 (1 is Enabled) = TRUE	Executes once at every power up reset 3.00 failed cycles out of 10.00 cycles (turns on MIL) 5.00 failed cycles out of 10.00 cycles (shutdown vehicle)	
			HWIO detects Fault in Transfer Test from Flash to RAM OR HWIO detects Fault in the Memory Data From Flash Indicates that the Processor detected a	= TRUE = TRUE	Enable Calibration is True (Diagnostic System Code Clear Requested AND Diagnostic System Reset Complete)	= 1 (1 is Enabled) = False = True	50ms Execution Rate after controller initialization	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			problem in the data transfer from Flash memory to RAM memory "DMA_XferTest"					
			First ROM Test Complete AND Processor Performance System Run Time Met AND Processor Integrity Fault Lower AND Processor Integrity Fault Upper	= True = 1 (1 is Enabled) after Controller Initialization = No Fault = No Fault	End of Test in Progress AND Diagnostic End of Trip in Progress AND Inhibit Path Test State	= True = False = Test Aborted OR Test Completed	Executes at the end of every trip	

16 OBDG01 SUMMARY PARAMETER TABLES - THPC (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Torque Performance	P061A	This Diagnostic tests if the regen is reported correctly to the Brake Control Module	Calculated Output Torque (To)	> Upper limit of Output Torque (ToMax) plus Regen Torque Request OR > Regen Torque Request plus Output Toruqe Request plus 363.00 Nm	Ignition Run Crank Security Voltage OR Ignition Run/Crank Voltage AND Enable Calibration is True	>= 9.50 V >= 11.00 V = 0 (0 is Enabled)	0.1875 seconds out of a 0.2 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Torque Calculation Performance	P061B	This Diagnostic tests if the hybrid torque command can create an unitended acceleration/ decelerration or wrong direction hazard	Difference between Immediate Axle Torque command primary and secondary OR Regen Brake Torque Output command minus 0.00 Nm	> 363.00 Nm >= 342.00 Nm	Run/Crank Voltage OR Ignition Run/Crank Voltage Enable Calibration is True	>= 9.50 V >= 11.00 V = 0 (0 is Enabled)	0.1875 seconds out of a 0.2 seconds window	Type A, 1 Trips
			Calculated Output Torque (To)	> Max of Drivers Output Torque Request plus 363.00 Nm OR 363.00 Nm	Run/Crank Voltage OR Ignition Run/Crank Voltage Enable Calibration is True	>= 9.50 V >= 11.00 V = 0 (0 is Enabled)	0.1875 seconds out of a 0.2 seconds window	
			Calculated Output Torque (To)	< Min of Drivers Output Torque Request minus 363.00 Nm OR - 363.00 Nm	Run/Crank Voltage OR Ignition Run/Crank Voltage Enable Calibration is True	>= 9.50 V >= 11.00 V = 0 (0 is Enabled)	0.1875 seconds out of a 0.2 seconds window	
			[Trans Range State AND Output Torque Command AND Shaped Torque for Sign Diff test] OR [Trans Range State AND Output Torque Command AND Shaped Torque for Sign Diff test]	= Drive <= -363.00 Nm >= 0Nm = Reverse >= 363.00 Nm <= 0Nm	Run/Crank Voltage OR Ignition Run/Crank Voltage Transient Torque Condition AND [Computed TOS OR Range Inhibit Error] Enable Calibration is True	>= 9.50 V >= 11.00 V = FALSE <= 236.00 rpm = TRUE = 0 (0 is Enabled)	0.1875 seconds out of a 0.2 seconds window	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Motor A torque command	> ShortTerm motor A capacity plus 126.00 Nm OR < ShortTerm motor A capacity minus 126.00 Nm	Run/Crank Voltage OR Ignition Run/Crank Voltage Enable Calibration is True	>= 9.50 V >= 11.00 V = 0 (0 is Enabled)	0.1875 seconds out of a 0.2 seconds window	
			Motor B torque command	> ShortTerm motor B capacity plus 118.00 Nm OR < ShortTerm motor B capacity minus 118.00 Nm	Run/Crank Voltage OR Ignition Run/Crank Voltage Enable Calibration is True	>= 9.50 V >= 11.00 V = 0 (0 is Enabled)	0.1875 seconds out of a 0.2 seconds window	

16 OBDG01 SUMMARY PARAMETER TABLES - THPC (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Long Term Memory Performance	P062F	This Diagnostic tests for unuseable BINVDM (flash) memory (or EEPROM)	HWIO reports next write to NVM will not succeed OR HWIO reports the assembly calibration integrity check has failed	= True = True	Enable Calibration is True Controller Status	= 1 (1 is Enabled) = Initialization	Runs once at controller initialization	Type B, 2 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - THPC (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
HSD1 Actuator Supply Circuit Voltage Low	P0658	This detects a circuit low in the high side driver 1	HWIO circuitry detects if an electrical circuit low is present or not. HSD 1 Short to Ground Fault Status	 =TRUE	Enable Calibration is True HSD 1	= 1 (1 is Enabled) = On	0.13125 seconds out of a 0.15625 seconds window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - THPC (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
HSD1 Actuator Supply Circuit Voltage High	P0659	This detects a circuit high in the high side driver 1	HWIO circuitry detects if an electrical circuit low is present or not. HSD 1 Short to Power Fault Status	 =TRUE	Enable Calibration is True	= 1 (1 is Enabled)	0.00625 seconds (1 Loop)	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Torque Managment System - Forced Engine Shutdown	P06AF	This Diagnostic checks that the ECM is functioning correctly	Received pattern from the ECM OR Received pattern skip count	≠ expected pattern (F, 5, B, D, A, 6, 3, 0) >= 2 counts	Run/Crank Voltage OR Ignition Run/Crank Voltage Run Crank Active Time	>= 9.50 V >= 11.00 V >= 0.10 seconds	0.1 seconds out of a 0.15 seconds window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - THPC (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Sensor Power Supply C Circuit Low	P06E7	Detects Sensor Power Supply (15V) below an acceptable threshold.	Scaled 15V IGBT Supply Voltage	< 12.00 V	Wakeup Signal	ON	Failure Conditions Met for 0.32 seconds out of a 0.4 seconds window OR Continuous Fail Time > 0.30 seconds	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - THPC (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Sensor Power Supply C Circuit High	P06E8	Detects Sensor Power Supply (15V) above an acceptable threshold.	Scaled 15V IGBT Supply Voltage	> 22.00 V	Wakeup SIgnal	ON	Failure Conditions Met for 0.32 seconds out of a 0.4 seconds window OR Continuous Fail Time > 0.30 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Fluid Temperature (TFT) Sensor Performance	P0711	Monitors the performance of Transmission Fluid Temperature (TFT) circuit by comparing the temperature calculated from the resistance vs temp table to an estimated cold soak average temperature or verifying that the temperature calculated from the resistance vs temp table has not latched at a value after a period of time.	Transmission Fluid Temperature Sensor compared to a Cold Soak Average Temperature	≥ (See supporting tables for failure threshold value)	Rationality Enable Calibration is True Time after init controller Cold Soak Enable Calibration is True Cold Soak Average Temperature Message Cold Soak Average Temperature P0712, P0713, U179A, U0293 TFT temperature	= 1 (1 is Enabled) ≥ 3.00 seconds = 1 (1 is Enabled) = Use Data ≥ -40.00 C NOT Fault Active -40.00 ≤ X ≤ 130.00 C	One diagnostic loop once all enable criteria have been met	Type A, 1 Trips
			Continuous Check for Transmission Fluid Temperature Stuck in Range Transmission Oil Temperature Raw - Previous Transmission Oil Temperature	≤ 0.00 C	Rationality Enable Calibration is True Time after init controller Continuous Rationality Enable Calibration is True Engine Speed Vehicle Speed Transmission Oil Temperature Raw	= 1 (1 is Enabled) ≥ 3.00 seconds = 1 (1 is Enabled) 0.00 ≤ X ≤ 7,500.00 RPM for 5.00 seconds ≤ 124.27 MPH for 5.00 seconds -40.00 ≤ X ≤ 130.00 C	≥ 300.00 seconds	

16 OBDG01 SUMMARY PARAMETER TABLES - THPC (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Fluid Temperature (TFT) Sensor Circuit Low Voltage	P0712	Monitors the Transmission Fluid Temperature (TFT) circuit resistance to detect a low voltage condition	Transmission Fluid Temperature (TFT) circuit resistance	≤ 68.60 ohms (Corresponds to 149 C)	Enable Calibration is True 12V Battery Voltage Ignition Run/Crank Voltage	= 1 (1 is Enabled) > 9.00 for 0.10 seconds > 9.00 for 0.10 seconds	2 seconds out of a 3 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Fluid Temperature (TFT) Sensor Circuit High Voltage	P0713	Monitors the Transmission Fluid Temperature (TFT) circuit resistance to detect a high voltage condition	Transmission Fluid Temperature (TFT) circuit resistance	≥ 83,641.00 ohms (Corresponds to a temperature below -50 C)	Enable Calibration is True 12V Battery Voltage Ignition Run/Crank Voltage	= 1 (1 is Enabled) > 9.00 for 0.10 seconds > 9.00 for 0.10 seconds	2 seconds out of a 3 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Output Speed (TOS) Sensor Wrong Direction	P0721	The DTC detects incorrect TOS direction.	TOS Raw Direction	TOS Direction Raw is not Forward or Reverse	Enable Calibration is True TOS Sample Period TOS Sensor Type	= 1 (1 is Enabled) ≠ 0 = CeTOSR_e_Directional	2.5 seconds out of a 3.125 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Output Speed Sensor Circuit - Direction Error	P077B	The DTC detects if the Transmission Output Speed Sensor Direction is Incorrect by Comparing with Calculated Direction from Motor Speed Sign	Transmission Output Speed Direction Raw	≠ Motor Direction	Enable Calibration is True P0721, P077C, P077D, P215C Hybrid Motor Speed based Estimated Output Speed is Valid Transmission Output Speed and Motor Output Speed Difference Motor Estimated Transmission Output Speed	= 1 (1 is Enabled) NOT Fault Active Calculated based on Stable Speed Equation ≤ 50.00 RPM ≥ 50.00 RPM	0.35 seconds out of a 5 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Output Speed Sensor Circuit Low	P077C	Monitor to detect a low-voltage fault on the Transmission Output Speed Sensor	Transmission Output Speed Sensor Voltage	< 0.36 Volts	Enable Calibration is True P077D Ignition Run/Crank Voltage 12V Battery Voltage	= 1 (1 is Enabled) NOT Fault Active ≥ 6.00 Volts for 0.00 seconds 9.00 ≤ X ≤ 16.00 V for 0.00 seconds	≥ 0.01 seconds for 36.00 counts at 25 ms	Type A, 1 Trips
			Transmission Output Speed Sensor Voltage Pass Criteria	> 0.36 Volts	Same as FailEnable Calibration is True P077D Ignition Run/Crank Voltage 12V Battery Voltage	Same as Fail= 1 (1 is Enabled) NOT Fault Active ≥ 6.00 Volts for 0.00 seconds 9.00 ≤ X ≤ 16.00 V for 0.00 seconds	≥ 1.50 seconds	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Output Speed Sensor Circuit High	P077D	Monitor to detect a high-voltage fault on the Transmission Output Speed Sensor	Transmission Output Speed Sensor Voltage	> 4.25 Volts	Enable Calibration is True P077C Ignition Run/Crank Voltage 12V Battery Voltage	= 1 (1 is Enabled) NOT Fault Active ≥ 6.00 Volts for 0.00 seconds 9.00 ≤ X ≤ 16.00 Volt for 0.00 seconds	≥ 0.01 seconds for 36.00 counts at 25 ms	Type A, 1 Trips
			Transmission Output Speed Sensor Voltage Pass Criteria	< 4.25 Volts	Enable Calibration is True P077C Ignition Run/Crank Voltage 12V Battery VoltageSame as Fail	= 1 (1 is Enabled) NOT Fault Active ≥ 6.00 Volts for 0.00 seconds 9.00 ≤ X ≤ 16.00 Volt for 0.00 seconds	≥ 1.50 seconds	

16 OBDG01 SUMMARY PARAMETER TABLES - THPC (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Clutch 1 Slip	P079A	Monitors clutch 1 slip by comparing the slip speed across the clutch to a threshold or comparing the calculated slip energy to a threshold	Clutch 1 Slip Speed	>= 190.00 RPM	Line Pressure Estimate Clutch Torque Estimate Clutch Status Motor Speeds Wheel Slip Shutdown Command	>= 190.00 kPa > 74.00 Nm =Locked = not faulted =0 =0	Fail Condition met for 0.60 seconds out of 0.80 seconds Retry Count: 3.00	Type A, 1 Trips
			Clutch 1 Energy	>= 8,003.30 J	Line Pressure Estimate Clutch Torque Estimate Clutch Status Motor Speeds Wheel Slip Shutdown Command	>= 190.00 kPa > 74.00 Nm =Locked = not faulted =0 =0	Instantly once Clutch 1 Energy >= 8,003.30 J Retry Count: 3.00	

16 OBDG01 SUMMARY PARAMETER TABLES - THPC (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Clutch 2 Slip	P079B	Monitors clutch 2 slip by comparing the slip speed across the clutch to a threshold or comparing the calculated slip energy to a threshold	Clutch 2 Slip Speed	>= 100.00 RPM	Line Pressure Estimate Clutch Torque Estimate Clutch Status Motor Speeds Wheel Slip Shutdown Command	>= 190.00 kPa > 15.00 Nm =Locked = not faulted =0 =0	Fail Condition met for 2.50 seconds out of 3.33 seconds Retry Count: 3.00	Type A, 1 Trips
			Clutch 2 Energy	>= 5,851.40 J	Line Pressure Estimate Clutch Torque Estimate Clutch Status Motor Speeds Wheel Slip Shutdown Command	>= 190.00 kPa > 15.00 Nm =Locked = not faulted =0 =0	Instantly once Clutch 1 Energy >= 5,851.40 J Retry Count: 3.00	

16 OBDG01 SUMMARY PARAMETER TABLES - THPC (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Clutch 3 Slip	P079C	Monitors clutch 3 slip by comparing slip across the clutch to a threshold.	Clutch 3 Slip Speed	>= 100.00 RPM	Line Pressure Estimate Clutch Status Motor Speeds Wheel Slip Shutdown Command	>= 190.00 kPa =Locked = not faulted =0 =0	Fail Condition met for 1.00 seconds out of 1.25 seconds Retry Count: 1.00	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Clutch 1 Stuck On	P07A3	Detects if clutch 1 is stuck on by comparing actual clutch 1 slip speed to a desired slip profile or by detecting that slip across the clutch is not above a threshold when slip is expected.	C1 Offgoing Slip Expected	=1	Motor Speed Clutch 1 State	= not faulted = offgoing	Fail condition met for 0.50 seconds out of 0.75 seconds. Retry Count: 3.00	Type A, 1 Trips
			C1 Slip Speed C1 Profiled Slip Speed	=< Clutch1FailSlipSpeed >= Clutch1ProfiledSlipSpd Thd	Clutch Status Shutdown command Motor Speed	=Released =0 =not faulted	Fail condition met for 0.50 seconds out of 0.75 seconds. Retry Count: 3.00	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Clutch 2 Stuck On	P07A5	Detects if clutch 2 is stuck on by comparing actual clutch 2 slip speed to a desired slip profile or by detecting that slip across the clutch is not above a threshold when slip is expected.	C2 Offgoing Slip Expected	=1	Motor Speed Clutch 2 State	= not faulted =off going	Fail condition met for 0.50 seconds out of 0.75 seconds. Retry Count: 3.00	Type A, 1 Trips
			C2 Slip Speed C2 Profiled Slip Speed	=< Clutch2FailSlipSpeed >= Clutch2ProfiledSlipSpeedThd	Clutch Status Shutdown command Motor Speed	=Released =0 = not faulted	Fail condition met for 0.50 seconds out of 0.75 seconds. Retry Count: 3.00	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Clutch 3 (Diode) Stuck	P07A7	Detects if clutch 3 is stuck on by comparing actual clutch 3 slip speed to a desired slip profile.	C3 Slip Speed C3 Profiled Slip Speed	=< Clutch3FailSlipSpeed >= Clutch3ProfiledSlipSpeedThd	Clutch Status Shutdown command Motor Speeds	=Released =0 =not faulted	Fail condition met for 0.38 seconds out of 0.50 seconds. Retry Count: 1.00	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - THPC (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid A Control Circuit Open	P0960	This DTC sets when the PCSA control circuit has been detected to be open	HWIO circuitry detects if an electrical circuit open is present or not. PCS A Circuit Open Fault Status	 =TRUE	Battery Voltage Ignition voltage Engine Speed Vehicle Speed PropSysActive	≥ 11 and ≤ 18 volts > 9 volts ≥ 0 and ≤ 7,500 RPM for ≥ 5 seconds ≤ 124 mph for ≥ 5 seconds = 1	Fail condition met for 0.30 seconds in a 0.40 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - THPC (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid A Control Circuit Low Voltage	P0962	This DTC sets when the PCSA control circuit has been detected to be shorted to ground	HWIO circuitry detects if an electrical circuit low is present or not. PCS A Circuit Low Fault Status	 =TRUE	Battery Voltage Ignition voltage Engine Speed Vehicle Speed PropSysActive	≥ 11 and ≤ 18 volts > 9 volts ≥ 0 and ≤ 7,500 RPM for ≥ 5 seconds ≤ 124 mph for ≥ 5 seconds = 1	Fail condition met for 0.30 seconds in a 0.40 second window.	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - THPC (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid A Control Circuit High Voltage	P0963	This DTC sets when PCS1 has been detected to be shorted to power	HWIO circuitry detects if an electrical circuit high is present or not. PCS A Circuit High Fault Status	 =TRUE	Battery Voltage Ignition voltage Engine Speed Vehicle Speed PropSysActive	≥ 11 and ≤ 18 volts > 9 volts ≥ 0 and ≤ 7,500 RPM for ≥ 5 seconds ≤ 124 mph for ≥ 5 seconds = 1	Fail condition met for 0.30 seconds in a 0.40 second window.	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - THPC (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid B Control Circuit Open	P0964	This DTC sets when the PCSB control circuit has been detected to be open	HWIO circuitry detects if an electrical circuit open is present or not PCS B Open Circuit Fault Status	HWIO circuitry detects if an electrical circuit open is present or not. =TRUE	Battery Voltage Ignition voltage Engine Speed Vehicle Speed PropSysActive	≥ 11 and ≤ 18 volts > 9 volts ≥ 0 and ≤ 7,500 RPM for ≥ 5 seconds ≤ 124 mph for ≥ 5 seconds = 1	Fail condition met for 0.30 seconds in a 0.40 second window.	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid B Control Circuit Low Voltage	P0966	This DTC sets when the PCSB control circuit has been detected to be shorted to ground	HWIO circuitry detects if an electrical circuit low is present or not PCS B Circuit Low Fault Status	 =TRUE	Battery Voltage Ignition voltage Engine Speed Vehicle Speed PropSysActive	≥ 11 and ≤ 18 volts > 9 volts ≥ 0 and ≤ 7,500 RPM for ≥ 5 seconds ≤ 124 mph for ≥ 5 seconds = 1	Fail condition met for 0.075 seconds in a 0.10 second window.	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - THPC (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid B Control Circuit High Voltage	P0967	This DTC sets when PCSb has been detected to be shorted to power	HWIO circuitry detects if an electrical circuit high is present or not. PCS B Circuit High Fault Status	 =TRUE	Battery Voltage Ignition voltage Engine Speed Vehicle Speed PropSysActive	≥ 11 and ≤ 18 volts > 9 volts ≥ 0 and ≤ 7,500 RPM for ≥ 5 seconds ≤ 124 mph for ≥ 5 seconds = 1	Fail condition met for 0.30 seconds in a 0.40 second window.	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - THPC (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid C Control Circuit Open	P0968	This DTC sets when the PCSC control circuit has been detected to be open circuit	HWIO circuitry detects if an electrical circuit open is present or not. PCS C Open Circuit Fault Status	 =TRUE	Battery Voltage Ignition voltage Engine Speed Vehicle Speed PropSysActive	≥ 11 and ≤ 18 volts > 9 volts ≥ 0 and ≤ 7,500 RPM for ≥ 5 seconds ≤ 124 mph for ≥ 5 seconds = 1	Fail condition met for 0.30 seconds in a 0.40 second window.	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid C Control Circuit Low Voltage	P0970	This DTC sets when the PCSC control circuit has been detected to be shorted to ground	HWIO circuitry detects if an electrical circuit low is present or not. PCS C Circuit Low Fault Status	 =TRUE	Battery Voltage Ignition voltage Engine Speed Vehicle Speed PropSysActive	≥ 11 and ≤ 18 volts > 9 volts ≥ 0 and ≤ 7,500 RPM for ≥ 5 seconds ≤ 124 mph for ≥ 5 seconds = 1	Fail condition met for 0.30 seconds in a 0.40 second window.	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid C Control Circuit High Voltage	P0971	This DTC sets when PCSC has been detected to be shorted to power	HWIO circuitry detects if an electrical circuit high is present or not. PCS C Circuit High Fault Status	 =TRUE	Battery Voltage Ignition voltage Engine Speed Vehicle Speed PropSysActive	≥ 11 and ≤ 18 volts > 9 volts ≥ 0 and ≤ 7,500 RPM for ≥ 5 seconds ≤ 124 mph for ≥ 5 seconds = 1	Fail condition met for 0.30 seconds in a 0.40 second window.	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid System Performance	P0AB9	This diagnostic indicates an autostart or autostop attempt failed or an engine stall	Engine Sensed Torque	≤ 0.00 Nm	Commanded Engine Torque Engine State Low Fuel Condition Fuel Level Data Fault Engine Positiong Fault (CAM or Crank) DTC's not Fault Active	> 20.00 Nm = Auto-starting = FALSE = FALSE = FALSE = P16E0	15.00 s	Type A, 1 Trips
			Engine Speed	< 700.00 RPM	Engine State Low Fuel Condition Fuel Level Data Fault Engine Positiong Fault (CAM or Crank) DTC's not Fault Active	= Engine Running = FALSE = FALSE = FALSE = P16E0	25.00 RPM seconds (integrated value) (12.5ms) (i.e. if RPM = 0, diag. set in 2 execution loops; if RPM = 600, diag sets in 8 execution loops)	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Auxiliary Transmissio n Fluid Pump Phase U Current Low	P0B01	Auxiliary Transmission Fluid Pump Missing Motor Current checks for minimum current in Phase U when rotor position is near that peak's phase axis. Each phase is checked individually as rotor turns.	Peak Phase Axis Current on the U Phase	< 1.00 Amps	Drive State Delay Timer Inverter State Inverter Power Stage Inverter Voltage Rotor Position Squared Current Comanded	RUN > 10.00 ms !=Active Discharge Normal PWM > 50.00 V -30 deg < Phase Axis < +30 deg > 5.00 Amps^2	0.4 seconds out of a 0.6 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Auxiliary Transmissio n Fluid Pump Phase V Current Low	P0B04	Auxiliary Transmission Fluid Pump Missing Motor Current checks for minimum current in Phase V when rotor position is near that peak's phase axis. Each phase is checked individually as rotor turns.	Peak Phase Axis Current on the V Phase	< 1.00 Amps	Drive State Delay Timer Inverter State Inverter Power Stage Inverter Voltage Rotor Position Squared Current Comanded	Run > 10.00 ms !=Active Discharge Normal PWM > 50.00 V -30 deg < Phase Axis < +30 deg > 5.00 Amps^2	0.4 seconds out of a 0.6 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Auxiliary Transmissio n Fluid Pump Phase W Current Low	P0B07	Auxiliary Transmission Fluid Pump Missing Motor Current checks for minimum current in Phase W when rotor position is near that peak's phase axis. Each phase is checked individually as rotor turns.	Peak Phase Axis Current on the W Phase	< 1.00 Amps	Drive State Delay Timer Inverter State Inverter Power Stage Inverter Voltage Rotor Position Squared Current Comanded	RUN > 10.00 ms !=Active Discharge Normal PWM > 50.00 V -30 deg < Phase Axis < +30 deg > 5.00 Amps^2	0.4 seconds out of a 0.6 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Auxiliary Transmission Fluid Pump Motor Current High	P0C28	Fail Case 1: To detect fast, repeated 3 Phase over currents and to protect IGBT. Fail Case 2: To detect slow, intermittent 3 Phase over currents and to protect IGBT.	U, V, or W Phase Current Sensor	> 35.00 Amps	Wakeup Signal	On	0.00416 seconds out of a 0.0624 seconds window	Type A, 1 Trips
			D Axis current less than calculated threshold determined by stator temperature listed in supporting table unless the motor temperature reading is faulted then D Axis current threshold is determined by a default value.	D-Axis Current < - 35.00 (Faulted Motor temperature value) P0C28 D-Axis Current Thresholds (See supporting Tables for expected threshold values for non faulted motor temperature threshold values)	Wakeup Signal	On	0.00416 seconds out of a 0.0624 seconds window	
			U, V, or W Phase Current Sensor	> 35.00 Amps	Wakeup Signal	On	0.0104 seconds out of a 0.104 seconds window	
			D Axis current less than calculated threshold determined by stator temperature listed in supporting table unless the motor temperature reading is faulted then D Axis current threshold is determined by a default value.	D-Axis Current < - 35.00 (Faulted Motor Speed value) P0C28 D-Axis Current Thresholds (See supporting Tables for expected threshold values for non faulted motor temperature threshold values)	Wakeup Signal	On	0.0104 seconds out of a 0.104 seconds window	

16 OBDG01 SUMMARY PARAMETER TABLES - THPC (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Battery System Discharge Time Too Long	P0C76	Monitors the high voltage bus discharge system performance when contactors are open	High voltage inverter rationalized voltage after discharge	> 200 volts	Enable calibration is True High voltage main contactor status IF discharge during charging is Not Allowed THEN High voltage charging contactor status	= 1 (1 is Enabled) = OPEN = 0 (0 is Not Allowed) = OPEN	3.5 seconds Diagnostic must run 2 times before failure is reported	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - THPC (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Supply Voltage Circuit 2 Low Voltage	P150D	Supply Voltage Circuit 2 is below a threshold	12 volt battery supply circuit 2	< 8.00 Volts	Enable Calibration is True Diagnostic System Code Clear Requested Diagnostic System Reset Complete	= 1.00 (1 is Enabled) = False = True	2 seconds out of a 2.5 seconds window	Type C, No MIL

16 OBDG01 SUMMARY PARAMETER TABLES - THPC (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Supply Voltage Circuit 1 Low Voltage	P150E	Supply Voltage Circuit 1 Low Voltage	12 volt battery supply circuit 1	< 8.00 Volts	Enable Calibration is True Diagnostic System Code Clear Requested Diagnostic System Reset Complete	= 1.00 (1 is Enabled) = False = True	2 seconds out of a 2.5 seconds window	Type C, No MIL

16 OBDG01 SUMMARY PARAMETER TABLES - THPC (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Regen On Demand	P152A	Regenerative Braking Control Switch A Stuck ON	Checks to see if tapdown circuit is pressed for calibratable amount of time in given state.	Tap switch state reported by BCM to THCP is TapDown	Regen on demand is enabled, Tapswitch state = tapdown and gear states are Drive and Low	1.00 1.00 1.00 1.00	600.00	Type C, No MIL
			Checks to see if tapdown circuit is pressed for calibratable amount of time in given state	Tap switch state reported by BCM to THCP is TapDown	Regen on demand is enabled, Tapswitch state = tapdown and gear states are Drive and Low	1.00 1.00 1.00 1.00	600.00	
			Checks to see if the Tap down Circuit Input is not active for calibratable amount of time	Tap switch state reported by BCM does not equal TapDown	Regen on demand is enabled, the pass condition is checked when tapdown switch position is not active	1.00 1.00	2.00	

16 OBDG01 SUMMARY PARAMETER TABLES - THPC (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Regenerative Braking Control Switch Signal Message Counter Incorrect	P152C	Monitors for corruption in the regenerative braking control switch signal message	Tap Up Tap Down Switch Alive Rolling Count Error	> 3 Errors	Enable Calibration is True Enable Calibration is True	= 1 (1 is Enabled) = 1 (1 is Enabled)	10 ms out of 10 ms window	Type C, No MIL

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Regen On Demand	P152D	Invalid Voltage Range Diagnostic	If Regen On Demand switch circuit state reported by BCM reads invalid voltage state	Invalid voltage	Enable Updown switch diag	1.00 1.00	60.00	Type C, No MIL
			If Regen On Demand Switch circuit state ready by BCM reads within valid voltage range	Valid voltage state	Enable updown switch diag	1.00 1.00	10.00	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Alive Rolling Count/ Protection Value Fault - Engine Actual Torque Steady State	P15F0	This Diagnostic checks for corruption in signals sent over CAN for the Engine Actual Torque Steady State	Current ARC value OR Primary signal value	≠ Previous ARC value plus 1 (0-3) ≠ Protection Value	Propulsion System Active Run/Crank Active time AND Run/Crank Voltage OR Ignition Run/Crank Voltage	= TRUE >= 0.50 secomds >= 9.50 V >= 11.00 V	0.125 seconds out of a 0.2 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Alive Rolling Count/ Protection Value Fault - Commanded Axle Torque Predicted	P15F1	This Diagnostic checks for corruption in signals sent over CAN for the Commanded Axle Torque Predicted	Current ARC value OR Primary signal value	≠ Previous ARC value plus 1 (0-3) ≠ Protection Value	Run/Crank Active time AND (Run/Crank Voltage OR Ignition Run/Crank Voltage	>= 0.50 secomds >= 9.50 V >= 11.00 V	0.125 seconds out of a 0.2 seconds window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - THPC (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Alive Rolling Count/ Protection Value Fault - Contactor Status Signal Circuit	P15FC	This Diagnostic checks for corruption in signals sent over CAN for the Contactor Status Signal Circuit	Current ARC value OR Primary signal value	≠ Previous ARC value plus 1 (0-3) ≠ Protection Value	Ignition Status	= Run or Crank	0.45 seconds out of a 0.5 seconds window Executes every time PE GMLAN msg $1D8 is received	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Performance - No Torque Detected	P16E0	This diagnostic indicates that the engine is not producing torque	Reported Engine Torque - Sensed Engine Torque	> 50.00 Nm	All Secondary Parameters Listed below must be meet for 2.00 seconds		3.5 seconds out of a 4 seconds window	Type A, 1 Trips
					Engine Actual Torque Fault	= FALSE		
					DTC's not Fault Active	= U0100		
					Engine Start Stop State	= Engine Running		
					Engine Torque Command Immediate	≥ 50.00 Nm		
					Engine Sensed Torque	> 0.00 Nm		
					Low Fuel Condition	= FALSE		
					Fuel Level Data Fault	= FALSE		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Serial Peripheral Interface Bus 2	P16E9	Checking SPI communication between THCP and MCP2	CRC error on receive Number of missing messages OR Alive Rolling Count (ARC) incremented from previous value (0-3)	=True ≠ True	(Diagnostic System Code Clear Requested AND Diagnostic System Reset Complete) OR CAN communication Disabled OR Run Crank In Range Voltage AND Run Crank In Range Security Voltage AND 12V Battery Voltage	= False = True = False > 11.00 V >= 9.50 V > 11.00 V	0.175 seconds out of a 0.2 seconds window	Type A, 1 Trips
			HWIO Received Errors AND Receiving Data in Progress	≠ 0 ≠ True	(Diagnostic System Code Clear Requested AND Diagnostic System Reset Complete) OR CAN communication Disabled OR Run Crank In Range Voltage AND Run Crank In Range Security Voltage AND 12V Battery Voltage	= False = True = False > 11.00 V >= 9.50 V > 11.00 V	0.175 seconds out of a 0.2 seconds window	
			Number of Missing Received Messages	> 4 messages	(Diagnostic System Code Clear Requested AND Diagnostic System Reset Complete)	= False = True	0.175 seconds out of a 0.2 seconds window	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					OR CAN communication Disabled OR Run Crank In Range Voltage AND Run Crank In Range Security Voltage AND 12V Battery Voltage	= False > 11.00 V >= 9.50 V > 11.00 V		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Serial Peripheral Interface Bus 1	P16F0	Checking SPI communication between THCP and MCP1	CRC error on receive Number of missing messages OR Alive Rolling Count (ARC) incremented from previous value (0-3)	=True ≠ True	(Diagnostic System Code Clear Requested AND Diagnostic System Reset Complete) OR CAN communication Disabled OR Run Crank In Range Voltage AND Run Crank In Range Security Voltage AND 12V Battery Voltage	= False = True = False > 11.00 V >= 9.50 V > 11.00 V	0.175 seconds out of a 0.2 seconds window	Type A, 1 Trips
			HWIO Received Errors AND Receiving Data in Progress	≠ 0 ≠ True	(Diagnostic System Code Clear Requested AND Diagnostic System Reset Complete) OR CAN communication Disabled OR Run Crank In Range Voltage AND Run Crank In Range Security Voltage AND 12V Battery Voltage	= False = True = False > 11.00 V >= 9.50 V > 11.00 V	0.175 seconds out of a 0.2 seconds window	
			Number of Missing Received Messages	> 4 messages	(Diagnostic System Code Clear Requested AND Diagnostic System Reset	= False = True	0.175 seconds out of a 0.2 seconds window	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Complete) OR CAN communication Disabled OR Run Crank In Range Voltage AND Run Crank In Range Security Voltage AND 12V Battery Voltage	 = False > 11.00 V >= 9.50 V > 11.00 V		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Redundant Memory Performance	P16F3	Detect the Dual Store memory fault by comparing the primary value and the dual store value of the individual variables.	Rate Limited Secure Vehicle Speed (Re)	≠ Dual Stored Rate Limited Secure Vehicle Speed (Ve)	Run Crank Voltage Enable Calibration is True	>= 11.00 V = 1 (1 is Enabled)	0.125 seconds out of a 0.2 seconds window	Type A, 1 Trips
			TOS to Wheel Speed Conversion Factor TOS to Wheel Speed Conversion Factor	>= 1.10 (High & Neu) OR <= 0.10 (High & Neu) >= 1.10 (4WD Low) OR <= 0.10 (4WD Low)	Run Crank Voltage	>= 11.00 V	0.125 seconds out of a 0.2 seconds window	
			Engine Actual Torque Steady State WOM (Ve)	≠ Dual Stored Engine Actual Torque Steady State WOM (We)	Run Crank Voltage	>= 11.00 V	0.125 seconds out of a 0.2 seconds window	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Transmission Range Control Performance	P16F4	Detect transmission range errors by comparing the Direction IMS switches with the Range IMS information from the THCP	Valid Range IMS transmission position	≠ Valid Direction IMS transmission position	Run/Crank Voltage	>= 9.50 Volts	150.00 ms out of a 200.00 ms window Executes in a 25ms loop	Type A, 1 Trips
		DTC Fail case 1: Positive transmission ranges that do not match	Valid Range IMS transmission position	≠ Error corrected Direction IMS transmission position	Run/Crank Voltage	>= 9.50 Volts	150.00 ms out of a 200.00 ms window Executes in a 25ms loop	
		DTC Fail case 2: Error corrected Direction IMS does not match						
		DTC Fail case 3: Range IMS is between valid transmission positions and Direction IMS is error corrected	Range IMS indicates a transitional state AND Direction IMS has an error corrected transmision position		Run/Crank Voltage	>= 9.50 Volts	150.00 ms out of a 200.00 ms window Executes in a 25ms loop	
		DTC Fail case 4: Range IMS is invalid and Direction IMS is error corrected	Range IMS is invalid due to a fault or problem with THCP, AND the Direction IMS has an error corrected transmission position		Run/Crank Voltage	>= 9.50 Volts	150.00 ms out of a 200.00 ms window Executes in a 25ms loop	
		DTC Fail case 5: Range IMS is between valid transmission positions and Direction IMS is invalid						
		DTC Fail case 6: Range IMS and Direction IMS are both invalid	Range IMS indicates a transitional state AND Direction IMS is invalid due to a fault or problem with the THCP		Run/Crank Voltage	>= 9.50 Volts	150.00 ms out of a 200.00 ms window Executes in a 25ms loop	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Range IMS is invalid due to a fault or problem with the THCP, AND the Direction IMS is invalid due to a fault or a problem with the THCP		Run/Crank Voltage	>= 9.50 Volts	150.00 ms out of a 200.00 ms window Executes in a 25ms loop	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Commanded Range State	P16F6	The Transmission Range State monitor verifies that there are no mismatches in system equations, the transmission range state being executed is valid, and the transmission range state has not performed an invalid transition	The current Transmission Range State being used is detected to be an invalid value within the current Transmission range State Group		(Run/Crank Voltage OR Ignition Voltage) Enable Calibration is True Enable Calibration is True Enable Calibration is True	>= 11.00 V >= 9.50 V = 1 (1 is Enabled) = 1 (1 is Enabled) = 1 (1 is Enabled)	0.2 seconds out of a 0.2125 seconds window	Type A, 1 Trips
			The current Transmission Range State Group being used by the system is an invalid value		(Run/Crank Voltage OR Ignition Voltage) Enable Calibration is True Enable Calibration is True Enable Calibration is True	>= 11.00 V >= 9.50 Volts = 1 (1 is Enabled) = 1 (1 is Enabled) = 1 (1 is Enabled)	0.2 seconds out of a 0.2125 seconds window	
			The current Transmission Range State has changed, and the change in value is not one of the supported transitions from the previous Transmission Range State		(Run/Crank Voltage OR Ignition Voltage) Enable Calibration is True Enable Calibration is True Enable Calibration is True	>= 11.00 V >= 9.50 V = 1 (1 is Enabled) = 1 (1 is Enabled) = 1 (1 is Enabled)	0.2 seconds out of a 0.2125 seconds window	
			The Range Equation can not be rationalized against the current Transmission Range State		(Run/Crank Voltage OR Ignition Voltage) Enable Calibration is True Enable Calibration is True Enable Calibration is True	>= 11.00 V >= 9.50 V = 1 (1 is Enabled) = 1 (1 is Enabled) = 1 (1 is Enabled)	0.2 seconds out of a 0.2125 seconds window	
			The Torque Determination State can not be rationalized against the current Transmission Range State		(Run/Crank Voltage OR Ignition Voltage) Enable Calibration is True Enable Calibration is True Enable Calibration is True	>= 11.00 V >= 9.50 V = 1 (1 is Enabled) = 1 (1 is Enabled) = 1 (1 is Enabled)	0.2 seconds out of a 0.2125 seconds window	
			The Input Torque Optimization State can not be rationalized against		(Run/Crank Voltage OR Ignition Voltage)	>= 11.00 V >= 9.50 V	0.2 seconds out of a 0.2125 seconds window	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			the current Transmission Range State		Enable Calibration is True Enable Calibration is True Enable Calibration is True	= 1 (1 is Enabled) = 1 (1 is Enabled) = 1 (1 is Enabled)		

16 OBDG01 SUMMARY PARAMETER TABLES - THPC (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Pressure Control Solenoid Command Incorrect	P16F7	Detects tie up conditions for the solenoids	Clutch commanded off OR Clutch commanded on	= Clutch State On = Clutch State Off	Direct control of Solenoids AND Direct control of clutches AND Hydralic default state AND (Run Crank Voltage OR Ignition Voltage)	= Inactive = Inactive = False >= 11.00 V >= 9.50 V	0.125 seconds out of a 0.2 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Auxiliary Transmissio n Fluid Pump Overspeed	P179A	To detect when Auxiliary Transmission Fluid Pump has exceeded operational maximum speed.	ABS(Motor Speed)	> 6,500.00 rpm	Wakeup Signal	On	Failure Conditions Met for 0.0832 seconds out of a 0.1664 seconds window, 5 retries available in 10 seconds.	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Clutch 1 Slip Adapt	P179C	Detects an excessive amount of clutch slip adapt from slip intervention	Max clutch 1 capacity reserve adapt	= 1	Enable Calibration is True Hydraulic System	= 1 (1 is Enabled) = Enabled	10.00 cycles of max clutch capacity reserve adapt being observed	Type B, 2 Trips
			Slip intervention requested without holding the adapt	= 1	Enable Calibration is True Hydraulic System	= 1 (1 is Enabled) = Enabled	65,535.00 cycles of slip intervention without holding the adapt being observed	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Clutch 2 Slip Adapt	P179D	Detects an excessive amount of clutch slip adapt from slip intervention	Max clutch 2 capacity reserve adapt	= 1	Enable Calibration is True Hydraulic System	= 1 (1 is Enabled) = Enabled	10.00 cycles of max clutch capacity reserve adapt being observed	Type B, 2 Trips
			Slip intervention requested without holding the adapt	= 1	Enable Calibration is True Hydraulic System	= 1 (1 is Enabled) = Enabled	65,535.00 cycles of slip intervention without holding the adapt being observed	

16 OBDG01 SUMMARY PARAMETER TABLES - THPC (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Internal Mode Switch P Circuit High Voltage	P1824	This DTC Monitors if the IMS P Circuit is Shorted	IMS P Voltage	> 2.49	Ignition Voltage Run/Crank Voltage Enable Calibration is True	>= 9.0 volts and <= 32.0 volts > 6.00 volts = 1 (1 is Enabled)	Fail condition met for 1.75 seconds in a 2.00 second window	Type B, 2 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - THPC (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Internal Mode Switch A Circuit Low Voltage	P182A	This DTC Monitors if the IMS A Circuit is Shorted to a Low Voltage	IMS A Voltage	<= 0.66	Ignition Voltage Run/Crank Voltage Enable Calibration is True	>= 9.0 volts and <= 32.0 volts > 6.00 volts =1 1 (1 is Enabled)	Fail condition met for 1.75 seconds in a 2.00 second window	Type B, 2 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - THPC (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Internal Mode Switch B Circuit Low Voltage	P182B	This DTC Monitors if the IMS B Circuit is Shorted to a Low Voltage	IMS B Voltage	<= 0.66	Ignition Voltage Run/Crank Voltage Enable Calibration is True	>= 9.0 volts and <= 32.0 volts > 6.00 volts = 1 (1 is Enabled)	Fail condition met for 1.75 seconds in a 2.00 second window	Type B, 2 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - THPC (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Internal Mode Switch B Circuit High Voltage	P182C	This DTC Monitors if the IMS B Circuit is Shorted	IMS B Voltage	> 2.49	Ignition Voltage Run/Crank Voltage Enable Calibration is True	>= 9.0 volts and <= 32.0 volts > 6.00 volts = 1 (1 is Enabled)	Fail condition met for 1.75 seconds in a 2.00 second window	Type B, 2 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - THPC (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Internal Mode Switch P Circuit Low Voltage	P182D	This DTC Monitors if the IMS P Circuit is Shorted to a Low Voltage	IMS P Voltage	<= 0.66	Ignition Voltage Run/Crank Voltage Enable Calibration is True	>= 9.0 volts and <= 32.0 volts > 6.00 volts = 1 (1 is Enabled)	Fail condition met for 1.75 seconds in a 2.00 second window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Internal Mode Switch Invalid Range	P182E	This DTC Monitors if the IMS is Reporting an Invalid Range	Converted Directional IMS	= Illegal	Ignition Voltage Run/Crank Voltage Enable Calibration is True	>= 9.0 volts and <= 32.0 volts > 6.00 volts = 1 (1 is Enabled)	Fail condition met for 2.70 seconds in a 3.13 second window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - THPC (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Internal Mode Switch C Circuit High Voltage	P182F	This DTC Monitors if the IMS C Circuit is Shorted	IMS C Voltage	> 2.49	Ignition Voltage Run/Crank Voltage Enable Calibration is True	>= 9.0 volts and <= 32.0 volts > 6.00 volts = 1 (1 is Enabled)	Fail condition met for 1.75 seconds in a 2.00 second window	Type B, 2 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - THPC (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Internal Mode Switch A Circuit High Voltage	P1838	This DTC Monitors if the IMS A Circuit is Shorted	IMS A Voltage	> 2.49	Ignition Voltage Run/Crank Voltage Enable Calibration is True	>= 9.0 volts and <= 32.0 volts > 6.00 volts = 1 (1 is Enabled)	Fail condition met for 1.75 seconds in a 2.00 second window	Type B, 2 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - THPC (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Internal Mode Switch C Circuit Low Voltage	P1839	This DTC Monitors if the IMS C Circuit is Shorted to a Low Voltage	IMS C Voltage	<= 0.66	Ignition Voltage Run/Crank Voltage Enable Calibration is True	>= 9.0 volts and <= 32.0 volts > 6.00 volts = 1 (1 is Enabled)	Fail condition met for 1.75 seconds in a 2.00 second window	Type B, 2 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - THPC (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Internal Mode Switch S Circuit Low Voltage	P1840	This DTC Monitors if the IMS S Circuit is Shorted to a Low Voltage	IMS S Voltage	<= 0.66	Ignition Voltage Run/Crank Voltage Enable Calibration is True	>= 9.0 volts and <= 32.0 volts > 6.00 volts = 1 (1 is Enabled)	Fail condition met for 1.75 seconds in a 2.00 second window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Internal Mode Switch S Circuit High Voltage	P1841	This DTC Monitors if the IMS S Circuit is Shorted	IMS S Voltage	> 2.49	Ignition Voltage Run/Crank Voltage Enable Calibration is True	>= 9.0 volts and <= 32.0 volts > 6.00 volts = 1 (1 is Enabled)	Fail condition met for 1.75 seconds in a 2.00 second window	Type B, 2 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - THPC (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Internal Mode Switch A Circuit Short	P18B5	This DTC Monitors if the IMS A Circuit is Shorted	IMS A Voltage	> 1.02 Volts and < 1.62 Volts	Ignition Voltage Run/Crank Voltage Enable Calibration is True	>= 9.0 volts and <= 32.0 volts > 6.00 volts = 1 (1 is Enabled)	Fail condition met for 1.75 seconds in a 2.00 second window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Internal Mode Switch B Circuit Short	P18B6	This DTC Monitors if the IMS B Circuit is Shorted	IMS A Voltage	> 1.02 Volts and < 1.62 Volts	Ignition Voltage Run/Crank Voltage Enable Calibration is True	>= 9.0 volts and <= 32.0 volts > 6.00 volts = 1 (1 is Enabled)	Fail condition met for 1.75 seconds in a 2.00 second window	Type B, 2 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - THPC (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Internal Mode Switch C Circuit Short	P18B7	This DTC Monitors if the IMS C Circuit is Shorted	IMS A Voltage	> 1.02 Volts and < 1.62 Volts	Ignition Voltage Run/Crank Voltage Enable Calibration is True	>= 9.0 volts and <= 32.0 volts > 6.00 volts = 1 (1 is Enabled)	Fail condition met for 1.75 seconds in a 2.00 second window	Type B, 2 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - THPC (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Internal Mode Switch P Circuit Short	P18B8	This DTC Monitors if the IMS P Circuit is Shorted	IMS P Voltage	> 1.02 Volts and < 1.62 Volts	Ignition Voltage Run/Crank Voltage Enable Calibration is True	>= 9.0 volts and <= 32.0 volts > 6.00 volts = 1 (1 is Enabled)	Fail condition met for 1.75 seconds in a 2.00 second window	Type B, 2 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - THPC (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Internal Mode Switch S Circuit Short	P18B9	This DTC Monitors if the IMS S Circuit is Shorted	IMS S Voltage	> 1.02 Volts and < 1.62 Volts	Ignition Voltage Run/Crank Voltage Enable Calibration is True	>= 9.0 volts and <= 32.0 volts > 6.00 volts = 1 (1 is Enabled)	Fail condition met for 1.75 seconds in a 2.00 second window	Type B, 2 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - THPC (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Internal Mode Switch A Stuck Off	P18BA	This DTC Monitors if the IMS A Circuit is Stuck Off	Converted Directional IMS Directional IMS A	Transitional 30 IMS A has not been observed Low	Ignition Voltage Run/Crank Voltage Enable Calibration is True	>= 9.0 volts and <= 32.0 volts > 6.00 volts = 1 (1 is enabled)	Fail condition met for 2.70 seconds in a 3.13 second window	Type B, 2 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - THPC (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Internal Mode Switch C Stuck Off	P18BC	This DTC Monitors if the IMS C Circuit is Stuck Off	Converted Directional IMS Directional IMS C	Transitional 27 IMS C has not been observed Low	Ignition Voltage Run/Crank Voltage Enable Calibration is True	>= 9.0 volts and <= 32.0 volts > 6.00 volts = 1 (1 is enabled)	Fail condition met for 2.70 seconds in a 3.13 second window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Internal Mode Switch A Stuck On	P18BF	This DTC Monitors if the IMS A Circuit is Stuck On	Converted Directional IMS AND Directional IMS A	Transitional 17 IMS A has not been observed High	Ignition Voltage Run/Crank Voltage Enable Calibration is True Converted Directional IMS AND Directional IMS A	>= 9.0 volts and <= 32.0 volts > 6.00 volts = 1 (1 is Enabled) =Transitional 2 Has not been observed High in park for 1.50 seconds	Fail condition met for 2.70 seconds in a 3.13 second window	Type B, 2 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - THPC (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Internal Mode Switch B Stuck On	P18C0	This DTC Monitors if the IMS B Circuit is Stuck On	Converted Directional IMS AND Directional IMS B	Drive IMS B has not been observed High	Ignition Voltage Run/Crank Voltage Enable Calibration is True Converted Directional IMS AND Directional IMS B	>= 9.0 volts and <= 32.0 volts > 6.00 volts = 1 (1 is Enabled) Drive Has not been observed High in Park for 1.50 seconds.	Fail condition met for 2.70 seconds in a 3.13 second window	Type B, 2 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - THPC (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Internal Mode Switch P Stuck On	P18C2	This DTC Monitors if the IMS P Circuit is Stuck On	Converted Directional IMS AND Directional IMS P	Transitional 24 IMS P as not been observed High	Ignition Voltage Run/Crank Voltage Enable Calibration is True	>= 9.0 volts and <= 32.0 volts > 6.00 volts = 1 (1 is Enabled)	Fail condition met for 2.70 seconds in a 3.13 second window	Type B, 2 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - THPC (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Internal Mode Switch S Stuck On	P18C3	This DTC Monitors if the IMS S Circuit is Stuck On	Converted Directional IMS AND Directional IMS S	LowManual IMS S has not been observed High	Ignition Voltage Run/Crank Voltage Converted Directional IMS Enable Calibration is True AND Directional IMS S	>= 9.0 volts and <= 32.0 volts > 6.00 volts =Park = 1 (1 is Enabled) has not been observed High in park for 1.50 seconds	Fail condition met for 2.70 seconds in a 3.13 second window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Alive Rolling Count/ Protection Value Fault - Regenerative Braking Torque Request Circuit	P1B15	This Diagnostic checks for corruption in signals sent over CAN for the Regenerative Braking Torque Request Circuit	Current ARC value OR Primary signal value	≠ Previous ARC value plus 1 (0-3) ≠ Protection Value	Run/Crank Active time AND Run/Crank Voltage OR Ignition Run/Crank Voltage	>= 0.50 seconds >= 9.50 Volts >= 11.00 V	0.1875 seconds out of a 0.25 seconds window Executes every time CE GMLAN msg $235 is received	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Auxiliary Transmission Fluid Pump Control Module Hybrid Battery Voltage Isolation Sensing Performance	P1E1B	To check correlation of sum of mid-pack voltages against HV and HV_Battery	ABS(Total High Voltage Measured By the Battery Pack - High Voltage Measured from Positve to Ground - High Voltage Measured from Negative to Ground)	>= 70.00 V	No Active DTCs: Controller Initialization Contactors	P1AE8, P1AE9, P1B0B, P1B0C Complete Closed	Failure conditions met for 0.175 seconds out of a 0.2 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Auxiliary Transmission Fluid Pump Control Module Hybrid Battery Voltage Isolation Sensor 1 Circuit Low	P1E1C	Circuit 1 Low monitor of Pos mid-pack voltage sensor	Pos mid-pack voltage	< 20.00 Volts	Controller Initialization Run Crank Active Contactors	Complete True Closed	Failure Conditions Met for 0.7 seconds out of a 1.5 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Auxiliary Transmission Fluid Pump Control Module Hybrid Battery Voltage Isolation Sensor 2 Circuit Low	P1E1E	Circuit 2 Low monitor of Neg mid-pack voltage sensor	Negative mid-pack voltage	< 20.00 Volts	Controller Initialization Run/Crank Active Contactors	Complete True Closed	Failure conditions met for 0.7 seconds out of a 1 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Auxiliary Transmission Fluid Pump Control Module Hybrid Battery Voltage Isolation Sensor 2 Circuit High	P1E1F	Circuit 2 High monitor of Neg mid-pack voltage sensor	High Voltage Negative to Ground Reading - Total High Voltage Reading from High Voltage Battery	> 60.00 Volts	Controller Initialization Run/Crank Active Contactors	Complete True Closed	Failure conditions met for 0.5 seconds out of a 1 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Auxiliary Transmission Fluid Pump Control Module Hybrid Battery Voltage System Isolation Fault	P1E22	Isolation Lost between mid-pack voltage and chassis	Isolation Ratio (Neg mid-pack voltage / Pos mid-pack voltage)	> 4.53 OR < 0.21	No Active DTCs: Controller Initialization	P1AE8, P1AE9, P1AEC Complete	Failure conditions met for 2.5 seconds out of a 5 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Auxiliary Transmission Fluid Pump Control Module Calculated Motor Position Performance	P1E29	To detect a loss of sensorless control or a polarity detection fault.	Motor Speed Achieved	< -500.00 rpm	Wakeup Signal	ON	5.00 Retries Allowed after failure conditions met for 0.0006 seconds out of a 0.002 seconds window	Type A, 1 Trips
			Rotor Speed ERS	> 62.80 Rad/S	Wakeup Signal	ON	5.00 Retries Allowed after failure conditions met for 0.0006 seconds out of a 0.002 seconds window	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Auxiliary Transmission Fluid Pump Motor Phase U Current Sensor Circuit Low	P1E2A	Circuit Low monitor to detect the failure of U-phase current sensor circuit below valid range	U Phase current sensor output at highside	< -50.00 Amps	Wakeup Signal Run Flag	On = 1.00	0.05 seconds out of a 0.1 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Auxiliary Transmission Fluid Pump Motor Phase U Current Sensor Circuit High	P1E2B	Circuit High monitor to detect the failure of U-phase current sensor circuit above valid range	U phase current sensor output at highside	> 50.00 amps	Wakeup Signal Run Flag	On = 1.00	0.05 seconds out of a 0.1 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Auxiliary Transmission Fluid Pump Motor Phase U Current Sensor Circuit Range/ Performance	P1E2C	Offset Circuit monitor to detect the failure of U-phase offset current above valid range	U phase current sensor offset learn value	> 2.00 amps	Wakeup Signal Delay Timer Motor Fauts Inverter Faults	On 0.10 Sec None None	Fail conditions met 0.10 sec after enable conditions met	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Auxiliary Transmission Fluid Pump Motor Phase V Current Sensor Circuit Low	P1E2D	Circuit Low monitor to detect the failure of V-phase current sensor circuit below valid range.	U phase current sensor output at highside	< -50.00 amps	Wakeup Signal Run Flag	On = 1.00	0.05 seconds out of a 0.1 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Auxiliary Transmission Fluid Pump Motor Phase V Current Sensor Circuit High	P1E2E	Circuit High monitor to detect the failure of V-phase current sensor circuit above valid range	V phase Current Sensor output highside	> 50.00	Wakeup Signal Run Flag	On = 1.00	0.05 seconds out of a 0.1 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Auxiliary Transmission Fluid Pump Motor Phase V Current Sensor Circuit Range/ Performance	P1E2F	Offset Circuit monitor to detect the failure of U-phase offset current above valid range.	U phase current sensor offset learn value	> 2.00 amps	Wakeup Signal Delay Timer Motor Faults Inverter Faults	On 0.10 Sec None None	Fail conditions met 0.10 sec after enable conditions met	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - THPC (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Auxiliary Transmission Fluid Pump Motor Inverter Temperature Sensor Circuit High	P1E34	To detect Aux. Pump Temperature Sensor voltage Out of Range high	PIM Temperature Sensor A	< -50.00 degrees C	Sensor Exists Wakeup Signal Inverter Warmup Time at or above inverter warmup torque	= 1.00 ON >= 600.00 s >=ABS(1.00)Nm	Failure conditions met for 2.5 seconds out of a 3.5 seconds window	Type B, 2 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - THPC (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Auxiliary Transmissio n Fluid Pump Motor Inverter Termperatur e Sensor Circuit Low	P1E35	To detect Aux. Pump Temperature Sensor Out of Range low (voltage)	PIM Temperature Sensor A	> 170.00 degrees C	Sensor Exists WakeUp Signal	= 1.00 On	Failure condittions met for 2.5 seconds out of a 3.5 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Auxiliary Transmission Fluid Pump Motor Inverter Temperature Sensor Circuit Range/ Performance	P1E36	Inverter A Temperature Sensor #1 In-Range Rationality Check	ABS(Inverter A Temp- Cold Soak Average Temp)	> 10.00 degrees C	Cold Start Average Temperature No Active Power Inverter Temp Out Of Range Faults:	> -20.00 C P0AF0 and P0AEF	Fail conditions met 5.13 seconds after enable conditions then 0.5 seconds out of a 0.6 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Auxiliary Transmission Fluid Pump Motor Inverter Over Temperature	P1E37	To detect an in-range overtemperature condition that can potentially damage inverter	PIM Phase U Temperature	> 122.00 degrees C	PIM Phase U Temperature	TEMP NORMAL	Failure Conditions Met For: 1.2 seconds out of a 2 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Auxiliary Transmission Fluid Pump Motor Power Supply Circuit/Open	P1E38	Detects IGBT Bias Faults, Monitors hw status line to detect loss of power supply to gate drive board	Phase A, B, or C Power Supply	Failed (Status Fault Bit)	Inverter State	Initialization Complete	Failure conditions met for 0.002 seconds out of a 0.024 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Auxiliary Transmissio ni Fluid Pump Motor Inverter Performance	P1E39	Detects IGBT Desaturation Faults, Monitors hw status line to detect internal overcurrent faults, shoot through, or loss of switching control events	Phase A, B, or C High or Low Side IGBT	DSatFltPending (Status Fault Bit)	Wakeup Signal	ON	Failure conditionis met for 0.002 seconds out of a 1 seconds window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - THPC (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Auxilliary Transmissio n Fluid Pump Motor Torque Delivered Performance	P1E3A	Motor speed plausibility check	(Motor speed using AB pulse from RDC - Motor speed from MCP) AND Motor torque commanded	> 200.00 > 6.50	Diagnostic is enabled AND Motor speed fault active AND Motor control	= 1.00 (1 = Run diagnostic) = False = Normal PWM control	(Motor RPM based) 80 failed revolutions out of 2,500 revolutions multiplied by 5.00 failed retry attempts	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - THPC (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Redundant Drive Motor A Speed Sensing Circuit	P1E4A	This diagnostic monitors the HCP's motor speed signal from the resolver for accuracy	Difference between Resolver based Motor Speed and Emulated Encoder based Motor Speed	> 400.00 rpm	Enable Calibration is True AND (Run/Crank Voltage OR Ignition Run/Crank Voltage) AND SPI Receive Fault Active	= 1 (1 is Enabled) >= 9.50 Volts >= 11.00 V = FALSE	3.3375 seconds out of a 5 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Redundant Drive Motor B Speed Sensing Circuit	P1E4B	This diagnostic monitors the HCP's motor speed signal from the resolver for accuracy	Difference between Resolver based Motor Speed and Emulated Encoder based Motor Speed	> 400.00 rpm	Enable Calibration is True AND (Run/Crank Voltage OR Ignition Run/Crank Voltage) AND SPI Receive Fault Active	= 1 (1 is Enabled) >= 9.50 Volts >= 11.00 V = FALSE	3.3375 seconds out of a 5 seconds window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - THPC (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Auxiliary Transmission Fluid Pump Motor Inverter Temperature Sensor Circuit Erratic	P1F00	To Detect when a temperature sensor starts reporting erratically	A rolling average of temperature readings calculated over 0.38 s this calculation is known as a string length. Temperature readings are taken every .025s.	> an estimated string length calculated based on stator current.	Start-Up Delay	> 0.13 s	1.75 seconds out of a 2.375 seconds window	Type B, 2 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - THPC (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid/EV System Discharge Switch Circuit Performance	P1F63	Performance monitor for the high voltage discharge switch	High voltage rationalized inverter voltage delta during discharge switch commanded on time	< 20 volts = 0.1 seconds	Enable calibration is True High voltage inverter rationalized voltage before discharge High voltage inverter rationalized voltage after discharge completes Motor Speeds High voltage main contactor status IF discharge during charging is Not Allowed THEN High voltage charging contactor status	= 1 (1 is Enabled) > 330 Volts < 200 Volts < 200 RPM = OPEN = 0 (0 is Not Allowed) = OPEN	1 Failure	Type A, 1 Trips
			High voltage bus discharge circuit status is DISABLED or UNAVAILABLE	10 consecutive discharge attempts	Enable calibration is True	= 1 (1 is Enabled)		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid/EV System Discharge Switch Circuit Low	P1F64	Monitors the high voltage discharge switch for a circuit low fault	Active discharge circuit open status	HWIO determines if the active discharge resistor is failed open. =TRUE	Enable calibration is True	= 1 (1 is Enabled	0.125 seconds out of a 0.15 seconds window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - THPC (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid/EV System Discharge Switch Circuit High	P1F65	Monitors the high voltage discharge switch for a circuit high fault	Active discharge circuit high status	HWIO determines if the active discharge resistor is failed high. =TRUE	Enable calibration is True	= 1 (1 is Enabled)	0.125 seconds out of a 0.15 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Vehicle Speed Output Shaft Speed Correlation	P215B	The DTC Monitors if the Difference between the Transmission Output Speed, Output Speed Calculated from the Wheel Speed Sensors, and Output Speed Calculated from the Motor Speeds.	Transmission Output Speed and Output Speed Calculated from the Wheel Speed Sensors and Output Speed Calculated from the Motor Speeds difference	> 12.42 mph	Number of Secured Vehicle Speed Sources	CeVSPI_e_ThreeSrcSystem		Type A, 1 Trips
					Secured Vehicle Speed Use Transmission Output Speed	1	0.15 seconds	
					Secured Vehicle Speed Use Wheel Speed	1	0.15 seconds	
					Secured Vehicle Speed Use Motor Speed	1	0.15 seconds	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Output Shaft Speed (OSS) - Wheel Speed Correlation	P215C	The DTC Correlates the Transmission Output Speed with the ABS Wheel Speed and Motor Speed to Detect any Failures in the Transmission Output Speed Sensor	Difference between Transmission Output Speed and the Calculated Average of Output Speed from the Motors and Wheel Speed Sensors	≥ 50.00 RPM	Enable Calibration is True OBD Wheel Speed Sensors Driven Wheel Estimated Vehicle Speed Fault Propulsion System Active TOS calculated from Wheel Speeds TOS calculated from Motor Speeds	= 1 (1 is Enabled) True False True ≥ 200.00 RPM ≥ 200.00 RPM	0.23 seconds	Type B, 2 Trips
			Difference between Transmission Output Speed and the Calculated Average of Output Speed from the Motors and Wheel Speed Sensors	≥ 60.00 RPM	Enable Calibration is True OBD Wheel Speed Sensors Driven Wheel Estimated Vehicle Speed Fault Propulsion System Active TOS calculated from Wheel Speeds TOS calculated from Motor Speeds	= 1 (1 is Enabled) True False True ≤ 200.00 RPM ≤ 200.00 RPM	0.23 seconds	
			Difference between Transmission Output Speed and the Calculated Average of Output Speed from the Motors and Wheel Speed Sensors Pass Criteria	≤ 49.99 RPM	Enable Calibration is True OBD Wheel Speed Sensors Driven Wheel Estimated Vehicle Speed Fault	= 1 (1 is Enabled) True False	0.48 seconds	

16 OBDG01 SUMMARY PARAMETER TABLES - THPC (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Propulsion System Active	True		

16 OBDG01 SUMMARY PARAMETER TABLES - THPC (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Ignition Switch Run/ Start Position Circuit Low	P2534	Detects a run crank relay open circuit	Runk Crank Line Voltage	≤ 2.0 Volts	Enable Calibration is True CAN Communication ECM Run Crank Active CAN Data Diagnostic System Code Clear Requested Diagnostic System Reset Complete	= 1 (1 is Enabled) Enabled Available and Active = False = True	Fail condition met for 2.50 seconds in a 5.00 second window.	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - THPC (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Ignition Switch Run/ Start Position Circuit High	P2535	Detects a run crank relay short to power	Runk Crank Line Voltage	> 6.0 V	Enable Calibration is True CAN Communication ECM Run Crank Active CAN Data Diagnostic System Code Clear Requested Diagnostic System Reset Complete	= 1 (1 is True) Enabled Available and False = False = True	Fail condition met for 2.50 seconds in a 5.00 second window.	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - THPC (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Ignition Switch Accessory Position Circuit Low	P2537	Detects an accessory position circuit open	Accessory	False	P2537 Propulsion System Propulsion System Active Time	Not Test Failed This Key On and Not Test Passed This Key On Active > 0.50 seconds	0.10 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
HSD2 Actuator Supply Circuit Voltage Low	P2670	This detects a circuit low in the high side driver 2	HWIO circuitry detects if an electrical circuit low is present or not. HSD 2 Short to Ground Fault Status	 =TRUE	Enable Calibration is True HSD 2	= 1 (1 is Enabled) = On	0.13125 seconds out of a 0.15625 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
HSD2 Actuator Supply Circuit Voltage High	P2671	This detects a circuit high in the high side driver 2	HWIO circuitry detects if an electrical circuit low is present or not. HSD 2 Short to Power Fault Status	 =TRUE	Enable Calibration is True	= 1 (1 is Enabled)	0.00625 seconds (1 Loop)	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid D Control Circuit Open	P2718	This DTC sets when the PCSD control circuit has been detected to be open circuit	HWIO circuitry detects if an electrical circuit open is present or not. PCS D Open Circuit Fault Status	 =TRUE	Battery Voltage Ignition voltage Engine Speed Vehicle Speed PropSysActive	≥ 11 and ≤ 18 volts > 9 volts ≥ 0 and ≤ 7,500 RPM for ≥ 5 seconds ≤ 124 mph for ≥ 5 seconds = 1	Fail condition met for 0.30 seconds in a 0.40 second window.	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - THPC (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid D Control Circuit Low Voltage	P2720	This DTC sets when the PCSD control circuit has been detected to be shorted to power	HWIO circuitry detects if an electrical circuit low is present or not. PCS D Circuit Low Fault Status	 =TRUE	Battery Voltage Ignition voltage Engine Speed Vehicle Speed PropSysActive	≥ 11 and ≤ 18 volts > 9 volts ≥ 0 and ≤ 7,500 RPM for ≥ 5 seconds ≤ 124 mph for ≥ 5 seconds = 1	Fail condition met for 0.03 seconds in a 0.04 second window.	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid D Control Circuit High Voltage	P2721	This DTC sets when PCSD has been detected to be shorted to power	HWIO circuitry detects if an electrical circuit high is present or not. PCS D Circuit High Fault Status	 =TRUE	Battery Voltage Ignition voltage Engine Speed Vehicle Speed PropSysActive	≥ 11 and ≤ 18 volts > 9 volts ≥ 0 and ≤ 7,500 RPM for ≥ 5 seconds ≤ 124 mph for ≥ 5 seconds = 1	Fail condition met for 0.30 seconds in a 0.40 second window.	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid E Control Circuit Open	P2727	This DTC sets when the PCSE control circuit has been detected to be open circuit	HWIO circuitry detects if an electrical circuit open is present or not. PCS E Open Circuit Fault Status	 =TRUE	Battery Voltage Ignition voltage Engine Speed Vehicle Speed PropSysActive	≥ 11 and ≤ 18 volts > 9 volts ≥ 0 and ≤ 7,500 RPM for ≥ 5 seconds ≤ 124 mph for ≥ 5 seconds = 1	Fail condition met for 0.30 seconds in a 0.40 second window.	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid E Control Circuit Low Voltage	P2729	This DTC sets when the PCSE control circuit has been detected to be shorted to ground	HWIO circuitry detects if an electrical circuit low is present or not. PCS E Circuit Low Fault Status	 =TRUE	Battery Voltage Ignition voltage Engine Speed Vehicle Speed PropSysActive	≥ 11 and ≤ 18 volts > 9 volts ≥ 0 and ≤ 7,500 RPM for ≥ 5 seconds ≤ 124 mph for ≥ 5 seconds = 1	Fail condition met for 0.30 seconds in a 0.40 second window.	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid E Control Circuit High Voltage	P2730	This DTC sets when PCS5 has been detected to be shorted to power	HWIO circuitry detects if an electrical circuit high is present or not. PCS E Circuit High Fault Status	 =TRUE	Battery Voltage Ignition voltage Engine Speed Vehicle Speed PropSysActive	≥ 11 and ≤ 18 volts > 9 volts ≥ 0 and ≤ 7,500 RPM for ≥ 5 seconds ≤ 124 mph for ≥ 5 seconds = 1	Fail condition met for 0.30 seconds in a 0.40 second window.	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - THPC (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Auxiliary Transmission Fluid Pump Performance	P2797	This diagnostic monitors the aux pump performance based on aux pump filtered desired and actual speed values.	Difference between desired and actual aux pump speed AND Aux Pump Motor Estimated Temperature	See supporting tables for P2797 failure threshold P2797 Pump Performance Speed Delta Threshold < 165C	Aux Pump Speed Command Run/Crank Voltage	>= 5.00 RPM for 1.00 s > 6.00 volts	Fail Condition met for 3.00 seconds in a 3.75 second window	Type A, 1 Trips
			Difference between desired and actual aux pump speed AND Aux Pump Motor Estimated Temperature	See supporting tables for P2797 failure threshold P2797 Pump Performance Speed Delta Threshold Case 2 > 165C	Aux Pump Speed Command Run/Crank Voltage	>= 5.00 RPM for 1.00 s > 6.00 volts	Fail Condition met for 2.00 seconds in a 2.50 second window	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
DID 76 Calibration Incorrect	P27A7	Detects if the solenoid calibration is incorrect	Solenoid not programmed	=1			Instantly	Type A, 1 Trips
			Solenoid programming falut(stored solenoid type and class configuration calibrations do not match)	=1			Instantly	
			Checksum Mismatch	=1			Instantly	
			Access Decreasing Fault	=1			Instantly	

16 OBDG01 SUMMARY PARAMETER TABLES - THPC (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Internal Control Module Drive Motor Control Performance	P3260	Detects excessive motor torque and engine speed when driver selects neutral gear	((Motor A torque AND Ignore Motor A torque) OR (Motor B torque AND Ignore Motor B torque) OR (Engine speed AND Ignore Engine speed))	!< 1.00 Nm = 0.00 (0 = use Motor A torque) !< 1.00 Nm != 1.00 (1 = Do not use Motor B torque) !< 200.00 RPM = 0.00 (0 = use Engine speed)	Vehicle speed AND No motor neutral diagnostic enabled AND Gear position	< 5.00 kph = 1 (1 = Enabled) = CeHSER_e_N1_RngEqn (Nuetral)	Timer from shift to neutral to all conditions being met > 33.00 seconds Debounce timer > 375.00 msec	Type A, 1 Trips
			((Motor A torque AND Ignore Motor A torque) OR (Motor B torque AND Ignore Motor B torque) OR (Engine speed AND Ignore Engine speed))	< 1.00 Nm = 0.00 (0 = use Motor A torque) < 1.00 Nm != 1.00 (1 = do not use Motor B torque) !< 200.00 RPM = 0.00 (0 = use Engine speed)	Case 1 test passed AND Gear position	= CeHSER_e_N1_RngEqn (Nuetral)	Debounce timer > 375.00 msec	

16 OBDG01 SUMMARY PARAMETER TABLES - THPC (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Communication Bus A Off	U0073	This DTC monitors for a BUS A off condition	Bus off failures exceeds before the sample time is reached	4 counts (equivalent to 0.05 seconds)	General Enable Criteria: U0073 Normal CAN transmission on Bus A Device Control High Voltage Virtual Network Management Ignition Voltage Criteria: Ignition voltage Power Mode Off Cycle Enable Criteria: Enable Calibration is True Ignition Accessory Line and Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for CAN hardware is bus OFF for	 Not Active on Current Key Cycle Enabled Not Active Not Active >= 9.50 = run = 1 (1 is Enabled) = Active > 9.50 > 3.00 seconds > 0.1125 seconds	0.56 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Communication Bus B Off	U0074	This DTC monitors for a BUS B off condition	Bus off failures exceeds before the sample time is reached	4 counts (equivalent to 0.05 seconds)	General Enable Criteria: U0074 Normal CAN transmission on Bus B Device Control High Voltage Virtual Network Management Ignition Voltage Criteria: Ignition voltage Power Mode Off Cycle Enable Criteria: Enable Calibration is True Ignition Accessory Line and Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for CAN hardware is bus OFF for	 Not Active on Current Key Cycle Enabled Not Active Not Active >= 9.50 = run = 1 (1 is Enabled) = Active > 9.50 > 3.00 seconds > 0.1125 seconds	0.56 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Communication Bus E Off	U0077	This DTC monitors for a BUS E off condition	Bus off failures exceeds before the sample time is reached	4 counts (equivalent to 0.05 seconds)	General Enable Criteria: U0077 Normal CAN transmission on Bus E Device Control High Voltage Virtual Network Management Ignition Voltage Criteria: Ignition voltage Power Mode Off Cycle Enable Criteria: Enable Calibration is True Ignition Accessory Line and Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met CAN hardware is bus OFF for	 Not Active on Current Key Cycle Enabled Not Active Not Active >= 9.50 = run = 1 (1 is Enabled) = Active > 9.50 > 3.00 seconds > 0.1125 seconds	0.56 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with ECM/PCM A	U0100	This DTC monitors for a loss of communication with the Engine Control Module on Bus A	Message is not received from controller for Message $0AA Message $0C9 Message $1A3 Message $1AA Message $1C5 Message $287 Message $3DC Message $3E9 Message $3FB Message $4A3 Message $4C1 Message $4C7 Message $4F1 Message $589	 ≥ 0.50 seconds ≥ 10.00 seconds ≥ 10.00 seconds ≥ 10.00 seconds ≥ 10.00 seconds ≥ 10.00 seconds ≥ 10.00 seconds ≥ 10.00 seconds ≥ 10.00 seconds ≥ 10.00 seconds ≥ 10.00 seconds ≥ 10.00 seconds ≥ 10.00 seconds ≥ 10.00 seconds	General Enable Criteria: U0073 Normal CAN transmission on Bus A Device Control High Voltage Virtual Network Management Ignition Voltage Criteria: Ignition voltage Power Mode Off Cycle Enable Criteria: Enable Calibration is True Ignition Accessory Line and Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for Power Mode is in accessory or run or crank and High Voltage Virtual Network Management is not active for U0100	 Not Active on Current Key Cycle Enabled Not Active Not Active >= 9.50 = run = 1 (1 indicates enabled) = Active > 9.50 > 3.0000 seconds > 0.4000 seconds Not Active on Current Key	See Threshold Value Diagnostic runs in 12.5 ms loop	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					ECM	Cycle is present on the bus		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication With Brake System Control Module	U0129	This DTC monitors for a loss of communication with the Brake System Control Module.	Message is not received from controller for Message $0C1 Message $0C5 Message $0D1 Message $0F1 Message $1E9 Message $4E9	 ≥ 10.0 seconds ≥ 10.0 seconds ≥ 10.0 seconds ≥ 10.0 seconds ≥ 10.0 seconds ≥ 10.0 seconds	General Enable Criteria: U0073 Normal CAN transmission on Bus A Device Control High Voltage Virtual Network Management Ignition Voltage Criteria: Ignition voltage Power Mode Off Cycle Enable Criteria: Enable Calibration is True Ignition Accessory Line and Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for Power Mode is in accessory or run or crank and High Voltage Virtual Network Management is not active for U0129	 Not Active on Current Key Cycle Enabled Not Active Not Active >= 9.50 = run = 1 (1 indicates enabled) = Active > 9.50 > 3.0000 seconds > 0.4000 seconds Not Active on Current Key Cycle	See Threshold Value Diagnostic runs in 12.5 ms loop	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Brake System Control Module	is present on the bus		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Hybrid Powertrain Control Module B	U179A	This DTC monitors for a loss of communication with the Hybrid Powertrain Control Module B	Message is not received from controller for Message $3DD Message $4CB	 ≥ 10.00 seconds ≥ 10.00 seconds	General Enable Criteria: U0073 Normal CAN transmission on Bus A Device Control High Voltage Virtual Network Management Ignition Voltage Criteria: Ignition voltage Power Mode Off Cycle Enable Criteria: Enable Calibration is True Ignition Accessory Line and Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for Power Mode is in accessory or run or crank and High Voltage Virtual Network Management is not active for U179A	 Not Active on Current Key Cycle Enabled Not Active Not Active >= 9.50 = run = 1 (1 indicates enabled) = Active > 9.50 > 3.0000 seconds > 0.4000 seconds Not Active on Current Key Cycle	See Threshold Value Diagnostic runs in 12.5 ms loop	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					HPCM_B	is present on the bus		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with ECM/PCM A on Bus B	U1818	This DTC monitors for a loss of communication with the Engine Control Module on Bus B	Message is not received from controller for Message $091 Message $0A5 Message $184 Message $187 Message $18C Message $18D Message $1C2 Message $283 Message $383 Message $489	 ≥ 10.00 seconds ≥ 10.00 seconds ≥ 0.50 seconds ≥ 10.00 seconds ≥ 10.00 seconds ≥ 10.00 seconds ≥ 10.00 seconds ≥ 10.00 seconds ≥ 10.00 seconds ≥ 10.00 seconds	General Enable Criteria: U0074 Normal CAN transmission on Bus A Device Control High Voltage Virtual Network Management Ignition Voltage Criteria: Ignition voltage Power Mode Off Cycle Enable Criteria: Enable Calibration is True Ignition Accessory Line and Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for Power Mode is in accessory or run or crank and High Voltage Virtual Network Management is not active for U1818	 Not Active on Current Key Cycle Enabled Not Active Not Active >= 9.50 = run = 1 (1 indicates enabled) = Active > 9.50 > 3.0000 seconds > 0.4000 seconds Not Active on Current Key	See Threshold Value Diagnostic runs in 12.5 ms loop	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					ECM	Cycle is present on the bus		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication With Hybrid Powertrain Control Module B on Bus B	U182D	This DTC monitors for a loss of communication with the Hybrid Powertrain Control Module B on Bus B	Message is not received from controller for Message $18D Message $1D8 Message $3C5 Message $3D5 Message $3D7 Message $3DA Message $3DB Message $3DF	 ≥ 10.0 seconds ≥ 0.5 seconds ≥ 10.0 seconds ≥ 10.0 seconds ≥ 10.0 seconds ≥ 10.0 seconds ≥ 10.0 seconds ≥ 10.0 seconds	General Enable Criteria: U0074 Normal CAN transmission on Bus B Device Control High Voltage Virtual Network Management Ignition Voltage Criteria: Ignition voltage Power Mode Off Cycle Enable Criteria: Enable Calibration is True Ignition Accessory Line and Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for Power Mode is in accessory or run or crank and High Voltage Virtual Network Management is not active for U182D	 Not Active on Current Key Cycle Enabled Not Active Not Active >= 9.50 = run = 1 (1 indicates enabled) = Active > 9.50 > 3.0000 seconds > 0.4000 seconds	See Threshold Value Diagnostic runs in 12.5 ms loop	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Hybrid Powertrain Control Module B (VICM)	Not Active on Current Key Cycle is present on the bus		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication With Brake System Control Module on Bus E	U1833	This DTC monitors for a loss of communication with the Brake System Control Module on Bus E	Message is not received from controller for Message $0C1 Rdnt Message $0C5 Rdnt Message $235	 ≥ 10.00 seconds ≥ 10.00 seconds ≥ 0.50 seconds	General Enable Criteria: U0077 Normal CAN transmission on Bus A Device Control High Voltage Virtual Network Management Ignition Voltage Criteria: Ignition voltage Power Mode Off Cycle Enable Criteria: Enable Calibration is True Ignition Accessory Line and Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for Power Mode is in accessory or run or crank and High Voltage Virtual Network Management is not active for U1833	 Not Active on Current Key Cycle Enabled Not Active Not Active >= 9.50 = run = 1 (1 indicates enabled) = Active > 9.50 > 3.0000 seconds > 0.4000 seconds Not Active on Current Key Cycle	See Threshold Value Diagnostic runs in 12.5 ms loop	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Brake System Control Module	is present on the bus		

16 OBDG01 Supporting Table - P2797 Pump Performance Speed Delta Threshold

Description:						
Notes:						
y/x	1	2	3	4	5	6
1	67	100	500	500	500	500

16 OBDG01 Supporting Table - P2797 Pump Performance Speed Delta Threshold Case 2

Description:						
Notes:						
y/x	1	2	3	4	5	6
1	1,000	900	800	700	600	500

16 OBDG01 Supporting Table - StuckClutchFail

Description:					
Notes:					
y/x	0	1	2	3	4
1	20	20	15	65,535	65,535

16 OBDG01 Supporting Table - StuckClutchSample

Description:					
Notes:					
y/x	0	1	2	3	4
1	30	30	20	65,534	65,534

16 OBDG01 Supporting Table - Clutch1ProfiledSlipSpdThd

Description:						
Notes:						
y/x	1	2	3	4	5	6
1	250	250	250	250	175	120

16 OBDG01 Supporting Table - Clutch1FailSlipSpeed

Description:						
Notes:						
y/x	1	2	3	4	5	6
1	20	20	20	20	30	30

16 OBDG01 Supporting Table - Clutch2ProfiledSlipSpeedThd

Description:						
Notes:						
y/x	1	2	3	4	5	6
1	350	350	350	350	350	250

16 OBDG01 Supporting Table - Clutch2FailSlipSpeed

Description:						
Notes:						
y/x	1	2	3	4	5	6
1	20	20	20	20	30	30

16 OBDG01 Supporting Table - Clutch3ProfiledSlipSpeedThd

Description:						
Notes:						
y/x	1	2	3	4	5	6
1	200	200	200	200	200	200

16 OBDG01 Supporting Table - Clutch3FailSlipSpeed

Description:						
Notes:						
y/x	1	2	3	4	5	6
1	20	20	20	20	20	20

16 OBDG01 Supporting Table - P0C28 D-Axis Current Thresholds

Description: X-Axis is stator temperature, Y-Axis is current threshold for the D-Axis current										
Notes:										
y/x	1	2	3	4	5	6	7	8	9	10
1	-1,000	-1,000	-1,000	-1,000	-1,000	-1,000	-1,000	-1,000	-1,000	-1,000

16 OBDG01 SUMMARY PARAMETER TABLES - MCPA (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Sensor Power Supply A Circuit Low	P06B1	Detects Sensor Power Supply (15V) below an acceptable threshold.	Scaled 15V IGBT Supply Voltage	< 12.00 V	Wakeup Signal	ON	Failure Conditions Met for 0.34 seconds out of a 0.42 seconds window OR Continuous Fail Time > 0.30 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Sensor Power Supply A Circuit High	P06B2	Detects Sensor Power Supply (15V) above an acceptable threshold.	Scaled 15V IGBT Supply Voltage	> 22.00 V	Wakeup SIgnal	ON	Failure Conditions Met for 0.34 seconds out of a 0.42 seconds window OR Continuous Fail Time > 0.30 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor A Control Module Performance	P0A1B	This Diagnostic tests all the internal processor subsystems for faults which suggest that the integrity of the processor can not be trusted.	Inhibit Path Test Failed Indicates that the Processor is not demonstrating the ability to inhibit the system (take remedial action) during the Inhibit Path Test "2ndFailsToTakeRmdlActn "	>= 3 Failures	HV Batt contactor Staus Available Invertor State HV Batt Voltage HV Contactors 12V Batt Voltage Vehicle Speed Motor Faults Motor Speed SRAR Shutdowns SPI Fault RunCrank Active Ram or ROM fault Seed received in wrong order fault Seed/Key Timeout Powermode Off time	= TRUE = Off >= 80.00 V = Closed > 9.50 V < 0.00 kph = FALSE (None active) <= 10.00 rpm = FALSE = FALSE (No active P0606) = FALSE = FALSE (No active P0601, P0604) = FALSE (No active P0606) = FALSE < 5.00 s	Executes in a 12.5ms loop Increment/ Decrement counter = 3	Type A, 1 Trips
			Key Value Indicates that the Processor received incorrect key values for the associated seed values that it sent out to the secondary processor	≠ expected key value	Number Of Mains Processors to monitor IPT status SPI Fault	> 0 = Not Running = FALSE (No active P0606)	Executes in a 12.5ms loop Detects in 150ms or two consecutive faulty keys	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			"2ndRxIncorrectKeys"		Run/Crank Voltage	>= 9.50 V		
			New Seed Update Time Indicates that the Processor did not receive a key value from the secondary processor during the expected time frame "MainDtctdSdKeyTimeout"	> 1.00 sec	Number Of Mains Processors to monitor AND SPI Faults AND Seed/Key Init delay timer AND Run/Crank Voltage OR 12V Battery Voltage	> 0 = FALSE (No active P0606) >= 1.00 s >= 9.50 V > 11 V	Executes in a 12.5ms loop Detects in 1 second	
			Seed sequence Indicates that the Processor received key values in the incorrect order from the secondary processor "MainDtctdSdRxWrongOrdr"	≠ expected order	Number Of Mains Processors to monitor AND SPI Faults AND Run/Crank Voltage OR 12V Battery Voltage	> 0 = FALSE (No active P0606) >= 9.50 V > 11 V	0.15 seconds out of a 0.2 seconds window Executes in a 12.5ms loop	
			Program Sequence Watch Seed time Since Seed Change Indicates that the Processor detected that a program Seed was not sending for the Program Sequence Watch "MainSequenceFlt"	> 0.20 ms	Seed Update Key Store Fault Enable is true	= 0 (1 is Enabled)	Executes in a 50ms loop after controller initialization	
			Program Sequence Watch Fault on a CPU Indicates that the Processor detected that a program was ran out of sequence according to the Program Sequence	seed sequence ≠ expected sequence	Program Sequence Watch Enabled (KaPISD_b_ProgSeqWatchEnbl[x])	= TRUE	0.15 seconds out of a 0.2 seconds window	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Watch "MainSequenceFlt"					
			HWIO detects Fault in ALU Test Indicates that the Processor detected an ALU fault in the processor "MainALU_Flt"	= 2 faults in a key cycle	Enabled Calibration is True (Diagnostic System Code Clear Requested AND Diagnostic System Reset Complete) AND Run Crank Ingnition Low Voltage AND Run Crank Low Voltage Crank	= 1 (1 is Enabled) = False = True ≠ True ≠ True	Runs continuously in 12.5ms loop	
			HWIO detects Fault in Configuration Registry Test Indicates that the Processor detected a Configuration Register fault in the processor "MainCfgRegFlt"	= 2 faults in a key cycle	Enable Calibration is True (Diagnostic System Code Clear Requested AND Diagnostic System Reset Complete) AND Run Crank Ingnition Low Voltage AND Run Crank Low Voltage Crank	= 1 (1 is Enabled) = False = True ≠ True ≠ True	Runs continuously in 12.5ms loop	
			HWIO detects Fault in the Stack Limit Test Indicates that the CPU Stack memory exceeded the limit "MainStackFlt"	= 2 faults since power up	Enable Calibration is True (Diagnostic System Code Clear Requested AND Diagnostic System Reset Complete)	= 1 (1 is Enabled) = False = True	Runs Continuously in 100ms loop	
			voltage diff between real circuit and test circuit Indicates that the	> 16 V	Enable Calibration is True AND Run/Crank Voltage	= 1 (1 is Enabled) >= 7 V	0.15 seconds out of a 0.2 seconds window OR	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Processor detected a problem with the Analog to Digital convertor test circuit "MainADC_Flt"		(Diagnostic System Code Clear Requested AND Diagnostic System Reset Complete)	= False = True	A2D Converter Test Error >= 0.20 seconds	
			HWIO detects Fault that the Processor detected a problem with the Flash ECC (error correction code) test circuit "FlashECC_CktTest"	= TRUE	Enable Calibration is True AND Power-Up Reset	= 1 (1 is Enabled) = TRUE	Executes once at every power up reset 3.00 failed cycles out of 10.00 cycles (turns on MIL) 5.00 failed cycles out of 10.00 cycles (shutdown vehicle)	
			HWIO detects Fault that the Processor detected a problem with the RAM ECC (error correction code) test circuit "RAM_ECC_CktTest"	= TRUE	Enable Calibration is True AND Power-Up Rest	= 1 (1 is Enabled) = TRUE	Executes once at every power up reset 3.00 failed cycles out of 10.00 cycles (turns on MIL) 5.00 failed cycles out of 10.00 cycles (shutdown vehicle)	
			HWIO detects Fault in Transfer Test from Flash to RAM OR HWIO detects Fault in the Memory Data From Flash	= TRUE = TRUE	Enable Calibration is True (Diagnostic System Code Clear Requested AND Diagnostic System Reset Complete)	= 1 (1 is Enabled) = False = True	50ms Execution Rate after controller initialization	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Indicates that the Processor detected a problem in the data transfer from Flash memory to RAM memory "DMA_XferTest"					
			First ROM Test Complete AND Processor Performance System Run Time Met AND Processor Integrity Fault Lower AND Processor Integrity Fault Upper	= True = 1 (1 is Enabled) after Controller Initialization = No Fault = No Fault	End of Test in Progress AND Diagnostic End of Trip in Progress AND Inhibit Path Test State	= True = False = Test Aborted OR Test Completed	Executes at the end of every trip	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor A Position Sensor Circuit	P0A3F	To detect Loss of Signal or converter error (line open, short) in the Motor Resolver circuit.	Amplitude of Sin or Cos Signal	<2.3V	Wakeup Signal Resolver Initialization Delay Once Resolver has indicated a fault, a Retry timer is initiated. Retry Timer must be	ON 1.00 s > 0.05 s	Failure Conditions Met for 0.20 to 0.40 seconds out of a 2.00 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor A Position Sensor Circuit Range/ Performance	P0A40	To detect a Degradation of Signal fault in the angle data read by the Motor Resolver circuit.	Sin or Cos Signal	>4.0V	Wakeup Signal Resolver Initialization Delay Once Resolver has indicated a fault, a Retry timer is initiated. Retry Timer must be	ON 1.00 s > 0.05 s	Failure Conditions Met for 0.20 to 0.40 seconds out of a 2.00 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor "A" Phase U Current Low	P0A5E	Drive Motor "A" Missing Motor Current checks for minimum current in Phase U when rotor position is near that peak's phase axis. Each phase is checked individually as rotor turns.	Peak Phase Axis Current on the U phase	< 9.00 Amps	Drive State Delay Timer Inverter State Inverter Power Stage Inverter Voltage Rotor Position Squared Current Comanded	RUN > 10.00 ms != Active Discharge Normal PWM > 50.00 V -30 deg < Phase Axis < +30 deg > 900.00 Amps^2	0.4 seconds out of a 0.6 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor "A" Phase V Current Low	P0A61	Drive Motor "A" Missing Motor Current checks for minimum current in Phase V when rotor position is near that peak's phase axis. Each phase is checked individually as rotor turns.	Peak Phase Axis Current on the V phase	< 9.00 Amps	Drive State Delay Timer Inverter State Inverter Power Stage Inverter Voltage Rotor Position Squared Current Comanded	Run > 10.00 ms != Active Discharge Normal PWM > 50.00 V -30 deg < Phase Axis < +30 deg > 900.00 Amps^2	0.4 seconds out of a 0.6 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor "A" Phase W Current Low	P0A64	Drive Motor "A" Missing Motor Current checks for minimum current in Phase W when rotor position is near that peak's phase axis. Each phase is checked individually as rotor turns.	Peak Phase Axis Current on the W phase	< 9.00 Amps	Drive State Delay Timer Inverter State Inverter Power State Inverter Voltage Rotor Position Squared Current Comanded	Run > 10.00 ms !=Active Discharge Normal PWM > 50.00 V -30 deg < Phase Axis < +30 deg > 900.00 Amps^2	0.4 seconds out of a 0.6 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor A Inverter Performance	P0A78	Detects IGBT Desaturation Faults, Monitors hw status line to detect internal overcurrent faults, shoot through, or loss of switching control events	Phase A, B, or C High or Low Side IGBT	DSatFltPending (Status Fault Bit)	Wakeup Signal	ON	Failure conditionis met for 0.002 seconds out of a 1 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor Inverter Temperature Sensor A Circuit Range/ Performance	P0AEE	Inverter A Temperature Sensor #1 In-Range Rationality Check	ABS(Inverter A Temp- Cold Soak Average Temp)	> 20.00 degrees C	Cold Start Average Temperature No Active Power Inverter Temp Out Of Range Faults:	> -20.00 C P0AF0 and P0AEF	Fail conditions met 5.13 seconds after enable conditions then 0.525 seconds out of a 0.625 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor Inverter Temperature Sensor A Circuit Low	P0AEF	To detect Inverter A Temperature Sensor #1 Out of Range low (voltage)	PIM Temperature Sensor A	> 170.00 degrees C	Sesor Exists WakeUp Signal	= 1.00 On	Failure conditions met for 2.5 seconds out of a 3.5 seconds window	Type B, 2 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - MCPA (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor Inverter Temperature Sensor A Circuit High	P0AF0	To detect Inverter A Temperature Sensor #1 voltage Out of Range high	PIM Temperature Sensor A	< -50.00 degrees C	Sensor Exists Wakeup Signal Inverter Warmup Time at or above inverter warmup torque	= 1.00 ON >= 90.00 s >=ABS(20.00)Nm	Failure conditions met for 2.625 seconds out of a 3.65 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor Inverter Temperature Sensor C Circuit Range/ Performance	P0BD2	Inverter A Temperature Sensor #2 In-Range Rationality Check	ABS(Inverter C Temp- Cold Soak Average Temp)	> 20.00 degrees C	Cold Start Average Temperature No Active Power Inverter Temp Out Of Range Faults:	> -20.00 C P0BD3 and P0BD4	Fail conditions met 5.13 seconds after enable conditions then 0.525 seconds out of a 0.625 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor Inverter Temperature Sensor C Circuit Low	P0BD3	To detect Inverter A Temperature Sensor #2 Out of Range low (voltage)	PIM Temperature Sensor C	> 170.00 degrees C	Sesor Exists WakeUp Signal	= 1.00 ON	Failure conditions met for 2.5 seconds out of a 3.5 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor Inverter Temperature Sensor C Circuit High	P0BD4	To detect Inverter A Temperature Sensor #2 Out of Range high (voltage)	PIM Temperature Sensor C	< -50.00 degrees C	Sensor Exists Wakeup Signal Inverter Warmup Time at or above inverter warmup torque	= 1.00 ON >= 90.00 s >=ABS(20.00)Nm	Failure conditions met for 2.625 seconds out of a 3.65 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor Inverter Temperature Sensor E Circuit Range/ Performance	P0BDC	Inverter A Temperature Sensor #3 In-Range Rationality Check	ABS(Inverter E Temp- Cold Soak Average Temp)	> 20.00 degrees C	Cold Start Average Temperature No Active Power Inverter Temp Out Of Range Faults:	> -20.00 C P0BDD and P0BDE	Fail conditions met 5.13 seconds after enable conditions then 0.525 seconds out of a 0.625 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor Inverter Temperature Sensor E Circuit Low	P0BDD	To detect Inverter A Temperature Sensor #3 Out of Range low (voltage).	PIM Temperature Sensor E	> 170.00 degrees C	Sesor Exists WakeUp Signal	= 1.00 ON	Failure conditions met for 2.5 seconds out of a 3.5 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor Inverter Temperature Sensor E Circuit High	P0BDE	To detect Inverter A Temperature Sensor #3 Out of Range high (voltage).	PIM Temperature Sensor E	< -50.00 degrees C	Sensor Exists Wakeup Signal Inverter Warmup Time at or above inverter warmup torque	= 1.00 ON >= 90.00 s >=ABS(20.00)Nm	Failure conditions met for 2.625 seconds out of a 3.65 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor "A" Phase U Current Sensor Offset Out-of Range	P0BE6	Offset Circuit monitor to detect the failure of U-phase offset current above valid range	U phase offset current learn value	> 30.00 amps	Wakeup Signal Delay Timer Motor Faults Inverter Faults	On 0.10 Sec None None	Fail conditions met 0.10 sec after enable conditions met	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor "A" Phase U Current Sensor Circuit Low	P0BE7	Circuit Low monitor to detect the failure of U-phase current sensor circuit below valid range	U phase current sensor output at highside	< -700.00 amps	Wakeup Signal Run Flag	On = 1.00	0.05 seconds out of a 0.1 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor "A" Phase U Current Sensor Circuit High	P0BE8	Circuit High monitor to detect the failure of U-phase current sensor circuit above valid range	U phase current sensor output highside	> 700.00 amps	Wakeup Signal Enable Flag	On = 1.00	0.05 seconds out of a 0.1 seconds window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - MCPA (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor "A" Phase V Current Sensor Offset Out-of Range	P0BEA	Offset Circuit monitor to detect the failure of V-phase offset current above valid range	V phase current sensor offset learn value	> 30.00 amps	Wakeup Signal Delay Timer Motor Faults Inverter Faults	On 0.10 Sec None None	Fai conditions met 0.10 Sec after enable conditions met	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor "A" Phase V Current Sensor Circuit Low	P0BEB	Circuit Low monitor to detect the failure of V-phase current sensor circuit below valid range.	V phase current sensor output at highside	< -700.00 amps	Wakeup Signal Run Flag	On = 1.00	0.05 seconds out of a 0.1 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor "A" Phase V Current Sensor Circuit High	P0BEC	Circuit High monitor to detect the failure of V-phase current sensor circuit above valid range	V phase current Sensor output at highside	> 700.00 amps	Wakeup Signal Run Flag	On = 1.00	0.05 seconds out of a 0.1 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor "A" Phase W Current Sensor Offset Out-of Range	P0BEE	Offset Circuit monitor to detect the failure of U-phase offset current above valid range.	W phase current sensor offset learn value	> 30.00 amps	Wakeup Signal Delay Timer Motor Faults Inverter Faults	On 0.10 Sec None None	Fail condidtions met 0.10 sec after enable conditoins met	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor "A" Phase W Current Sensor Circuit Low	P0BEF	Circuit Low monitor to detect the failure of W-phase current sensor circuit below valid range.	W phase current sensor output at highside	< -700.00 amps	Wakeup Signal Run Flag	On = 1.00	0.05 seconds out of a 0.1 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor "A" Phase W Current Sensor Circuit High	P0BF0	Circuit High monitor to detect the failure of W-phase current sensor circuit above valid range.	W phase current sensor output at high side	> 700.00 amps	Wakeup Signal Run Flag	On = 1.00	0.05 seconds out of a 0.1 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor "A" Phase U-V-W Correlation	P0BFD	To detect electrical failure of phase current sensor.	Sum of U-V-W phase currents	>= 110.00 amps	Wakeup Signal Run Flag	On = 1.00	0.02 seconds out of a 0.02 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor "A" Phase U-V-W Current Sensor Overcurrent	P0C01	To detect fast repeated and slow intermittent over current to protect IGBT.	U, V, or W Phase Current Sensor	> 600.00 amps	Wakeup Signal	On	0.0104 seconds out of a 0.104 seconds window	Type A, 1 Trips
			D Axis current less than calculated threshold determined by stator temperature listed in supporting table unless the motor temperature reading is faulted, then D Axis current threshold is determined by a default value	D-Axis Current<- 600.00 amps (faulted motor temp value) P0C01 D-Axis Current Thresholds (See supporting tables for expected threshold values for non-faulted motor temperature readings)	Wakeup Signal	On	0.0104 seconds out of a 0.104 seconds window	
			U, V, or W Phase Current Sensor	> 600.00 amps	Wakeup Signal	On	0.00416 seconds out of a 0.0208 seconds window	
			D Axis current less than calculated threshold determined by stator temperature listed in supporting table unless the motor temperature reading is faulted, then D Axis current threshold is determined by a default value	D-Axis Current<- 600.00 amps (faulted motor temp value) P0C01 D-Axis Current Thresholds (See supporting tables for expected threshold values for non-faulted motor temperature readings)	Wakeup Signal	On	0.00416 seconds out of a 0.0208 seconds window	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor A Inverter Power Supply Circuit/Open	P0C0B	Detects IGBT Bias Faults, Monitors hw status line to detect loss of power supply to gate drive board	Phase A, B, or C Power Supply	Failed (Status Fault Bit)	Inverter State	Initialization Complete	Failure conditions met for 0.002 seconds out of a 0.024 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor "A" Inverter Phase U Over Temperature	P0C11	To detect an in-range overtemperature condition that can potentially damage inverter	PIM Phase U Temperature	> 126.00 degrees C	PIM Phase U Temperature	TEMP NORMAL	Failure Conditions Met For: 1.2 seconds out of a 2 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor "A" Inverter Phase V Over Temperature	P0C12	To detect an in-range overtemperature condition that can potentially damage inverter	PIM Phase V Temperature	> 126.00 degrees C	PIM Phase V Temperature	TEMP Normal	Failure Conditions Met For: 1.2 seconds out of a 2 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor "A" Inverter Phase W Over Temperature	P0C13	To detect an in-range overtemperature condition that can potentially damage inverter	PIM Phase W Temperature	> 126.00 degrees C	PIM Phase W Temperature	TEMP NORMAL	Failure Conditions Met For: 1.2 seconds out of a 2 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor A Position Sensor Not Learned	P0C17	To detect an unvalidated Resolver Offset Learn Value AND No Stored Previously Valid Value.	Initial Offset Learn Could Not Complete Because: ABS(Motor Speed)	> 50.00 rpm	Key Off	TRUE	0.30 s Learn Time	Type A, 1 Trips
			Initial Offset Learn Could Not Complete Because: Filtered DC	< 200.00 V	Key Off	TRUE	0.30 s Learn Time	
			Initial Offset Learn Could Not Complete Because: ALL phase Current	< 15.00 A	Key Off	TRUE	0.30 s Learn Time	
			Initial Offset Learn Could Not Complete Because: Learn Timer	> 1.40 s	Key Off	TRUE	0.30 s Learn Time	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor A Torque Delivered Performance	P0C19	Slewed MCP torque command is different by the MCP calculated torque achieved	Absolute value of (Commanded torque - Torque Command Slewed)	> 123.00 Nm	DTCs not Fault Active AND DTCs not Fault Active AND Motor Drive State ID AND ((DTCs not Fault Active) OR (Voltage Hazard Active AND Motor Temperature Fault Active))	(P1AF5 or P1B0C or P1B41) (P0A3F or P0A40 or P1B03 or P16EB) = Run P0BFD = True = False	0.1875 seconds out of a 0.2 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor A Position Exceeded Learning Limit	P0C4E	Fail Case 1: To detect an OOR Offset Learn Value. Fail Case 2: To detect a sudden jump from previously stored offset learn value.	Offset Learn Completes AND ABS(Offset Correction Angle)	> 30.00 degrees	Key Off Offset Learn Status	TRUE Complete	5 key off cycles of out of offset angle being out of range	Type A, 1 Trips
			Offset Learn Completes AND ABS(Offset Correction Angle - prevoiusly stored value)	> 10.00 degrees	Key Off Offset Learn Status	TRUE Complete	5 key off cycles of out of offset angle being out of range	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor A Position Sensor Circuit A Low	P0C52	To detect Resolver Circuit S1/3 Out of Range Low	Resolver S13 Circuit Reference Voltage	< 0.50 V	Wakeup Signal	ON	Failure Conditions met for 0.525 seconds out of a 0.8375 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor A Position Sensor Circuit A High	P0C53	To detect Resolver Circuit S1/3 Out of Range High	Resolver S13 Circuit Reference Voltage	> 4.50 V	Wakeup Signal	ON	Failure Conditions met for 0.2125 seconds out of a 0.3125 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor A Position Sensor Circuit B Low	P0C5C	To detect Resolver Circuit S2/4 Out of Range Low.	Resolver S24 Circuit Reference Voltage	< 0.50 V	Wakeup Signal	ON	Failure Conditions met for 0.525 seconds out of a 0.8375 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor A Position Sensor Circuit B High	P0C5D	To detect Resolver Circuit S2/4 Out of Range High	Resolver S24 Circuit Reference Voltage	> 4.50 V	Wakeup Signal	ON	Failure Conditions met for 0.2125 seconds out of a 0.3125 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Serial Peripheral Interface Bus 1	P16F0	This monitors the SPI bus between the motor controller and Hybrid Powertrain Control Module	CRC error on receive Number of missing messages OR Alive Rolling Count (ARC) incremented from previous value (0-3)	=True ≠ True	(Diagnostic System Code Clear Requested AND Diagnostic System Reset Complete) OR CAN communication Disabled OR Run Crank In Range Voltage AND Run Crank In Range Security Voltage AND 12V Battery Voltage	= False = True = False > 11.00 V >= 9.50 V > 11.00 V	0.175 seconds out of a 0.2 seconds window	Type A, 1 Trips
			HWIO Received Errors AND Receiving Data in Progress	≠ 0 ≠ True	(Diagnostic System Code Clear Requested AND Diagnostic System Reset Complete) OR CAN communication Disabled OR Run Crank In Range Voltage AND Run Crank In Range Security Voltage AND 12V Battery Voltage	= False = True = False > 11.00 V >= 9.50 V > 11.00 V	0.175 seconds out of a 0.2 seconds window	
			Number of Missing Received Messages	> 4 messages	(Diagnostic System Code Clear Requested AND Diagnostic System Reset	= False = True	0.175 seconds out of a 0.2 seconds window	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Complete) OR CAN communication Disabled OR Run Crank In Range Voltage AND Run Crank In Range Security Voltage AND 12V Battery Voltage	 = False > 11.00 V >= 9.50 V > 11.00 V		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor "A" Inverter Phase U Temperature Sensor Erratic	P190A	To Detect when a temperature sensor starts reporting erratically	A rolling average of temperature readings calculated over 0.38 s this calculation is known as a string length. Temperature readings are taken every .025s.	> an estimated string length calculated based on stator current.	Start-Up Delay	> 0.13 s	1.75 seconds out of a 2.375 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor "A" Inverter Phase V Temperature Sensor Erratic	P190B	To Detect when a temperature sensor starts responding erratically	A rolling average of temperature readings calculated over 0.38 s this calculation is known as a string length. Temperature readings are taken every .025s.	> an estimated string length calculated based on stator current.	Start-Up Delay	> 0.13 s	1.75 seconds out of a 2.375 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor "A" Inverter Phase W Temperature Sensor Erratic	P190C	To Detect when a temperature sensor starts responding erratically	A rolling average of temperature readings calculated over 0.38 s this calculation is known as a string length. Temperature readings are taken every .025s.	> an estimated string length calculated based on stator current.	Start-Up Delay	> 0.13 s	1.75 seconds out of a 2.375 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor A Control Module Not Programmed	P1A4F	This diagnostic prevents flashing different MCP software into MCP A that does not match its ID	MCP Processor Configuration ID	≠ Motor Control Processor 1 (CeMCGR_i_MCP1)	None	NA	0.125 seconds out of a 0.2 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor A Control Module Random Access Memory (RAM)	P1A50	This Diagnostic tests the checksum on RAM memory	Secure "Y" variable	≠ Primary "V" variable for greater than 125 ms	Current Time Execution - Time of Last DualStore Error	> 25 ms	Executes in Background loop	Type A, 1 Trips
			HWIO detects an illegal write to Write Protected RAM	= TRUE	(Diagnostic System Code Clear Requested AND Diagnostic System Reset Complete)	= False = True	Executes in Background loop 0 counts to fail	
			2nd Processor State of Health RAM Fault Latched	= TRUE	(Diagnostic System Code Clear Requested AND Diagnostic System Reset Complete)	= False = True	Executes in Background loop every 1000ms	
			Checksum of PreservedNVM_Region for Main Processor State of Health and 2nd Processor State Of Health	≠ Expected checksum value	(Diagnostic System Code Clear Requested AND Diagnostic System Reset Complete)	= False = True	Runs once at Initialization	
			HWIO detects fault in System RAM	= TRUE	(Diagnostic System Code Clear Requested AND Diagnostic System Reset Complete)	= False = True	Runs once at Initialization 1 count to fail	
			HWIO detects fault in Cache RAM	= TRUE	(Diagnostic System Code Clear Requested AND Diagnostic System Reset Complete)	= False = True	Runs once at Initialization 1 count to fail	
			HWIO detects fault in eTPU RAM	= TRUE	(Diagnostic System Code Clear Requested AND Diagnostic System Reset Complete)	= False = True	Runs once at Initialization 1 count to fail	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Main SOH RAM Fault Latched AND SPI Fault Latched AND System RAM Fault Count AND Cache RAM Fault Count AND eTPU RAM Fault Count	= 0 = False = 0 = 0 = 0	(Diagnostic System Code Clear Requested AND Diagnostic System Reset Complete) Time Since Last Duel Store Error	= False = True > 1,000 ms	Executes in Background loop every 1000ms	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor A Control Module Read Only Memory (ROM)	P1A51	This Diagnostic tests the checksum on ROM (flash) memory	Calculated Checksum of the Boot ROM	≠ Expected Checksum	Controller Status ROM Checksum in Progress (Diagnostic System Code Clear Requested AND Diagnostic System Reset Complete)	= On ≠ True = False = True	1 failure if it occurs during the first ROM test of the ignition cycle otherwise 5 failures	Type A, 1 Trips
			2nd Processor State of Health ROM fault latched	= TRUE	Controller Status ROM Checksum in Progress (Diagnostic System Code Clear Requested AND Diagnostic System Reset Complete)	= On ≠ True = False = True	Runs continuously in the background	
			Calculated Checksum of Torque Security Related Calibrations	≠ Expected Checksum	Controller Status (Diagnostic System Code Clear Requested AND Diagnostic System Reset Complete) = Enable Calibration is True = Enable Calibration is True	= On = False = True = 0 (0 is Enabled) = 1 (1 is Enabled)	1 failure if it occurs during the first ROM test of the ignition cycle otherwise 5 failures	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			ECC Fault detected in Flash memory	= TRUE	Controller Status Power Up Reset AND HWIO BINVDM ECC State AND HWIO ROM Fault Enable Calibration is true	= On = False = False = True = 1 (1 is Enabled)	Greater than 5 failures at controller initialization Runs once at initialization	
			ROM fault Active AND 2nd SOH ROM Fault Latched AND Main SOH ROM Fault Latched	≠ True ≠ True ≠ True	(Diagnostic System Code Clear Requested AND Diagnostic System Reset Complete)	= False = True	Runs in the Background	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor A Control Module Long Term Memory Performance	P1ADC	This Diagnostic tests for unuseable BINVDM (flash) memory (or EEPROM)	HWIO reports next write to NVM will not succeed OR HWIO reports the assembly calibration integrity check has failed	= True = True	Enable Calibration is True Controller Status	= 1 (1 is Enabled) = Initialization	Runs once at controller initialization	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor A Control Module System Voltage Low	P1ADE	Sets when the low voltage system voltage is below a threshold	Ignition Voltage	≤ 10.00 Volts	Enable Calibration is True AND 12V Starter Engaged AND Ignition Run/Crank Voltage AND Engine Speed (Diagnostic System Code Clear Requested AND Diagnostic System Reset Complete)	= 1 (1 is Enabled) = False > 6.0 Volts ≥ 0.00 RPM = False = True	5 seconds out of a 6 seconds window	Type C, No MIL

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor A Control Module System Voltage High	P1ADF	Sets when the low voltage system voltage is above a threshold	Ignition Voltage	≥ 16.00 Volts	Enable Calibration is True AND Ignition Run/Crank Voltage (Diagnostic System Code Clear Requested AND Diagnostic System Reset Complete)	= 1.00 (1 is Enabled) > 6.0 Volts = False = True	5 seconds out of a 6 seconds window	Type C, No MIL

16 OBDG01 SUMMARY PARAMETER TABLES - MCPA (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor "A" Hybrid Battery System Voltage High	P1AEE	To detect over voltage and to protect TPIM HV Circuit	High Voltage Sensor Voltage OR High Voltage Hardware Flag	> 450.00 Volts = True	Controller Initialization	Complete	Failure conditions met for 0.004 seconds out of a 0.1 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor "A" Control Module Hybrid Battery Voltage System Isolation Fault	P1AF0	Isolation Lost between mid-pack voltage and chassis	Isolation Ratio (Neg mid-pack voltage / Pos mid-pack voltage)	> 4.53 OR < 0.21	No Active DTCs: Controller Initialization	P1AE8, P1AE9, P1AEC Complete	Failure conditions met for 2.5 seconds out of a 5 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor "A" Control Module Hybrid Battery Voltage Isolation Sensor 1 Circuit Low	P1AF4	Circuit 1 Low monitor of Pos mid-pack voltage sensor	Pos mid-pack voltage	< 20.00 Volts	Controller Initialization Run Crank Active Contactors	Complete True Closed	Failure Conditions Met for 0.7375 seconds out of a 1.05 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor "A" Control Module Hybrid Battery Voltage Isolation Sensor 1 Circuit High	P1AF5	Circuit 1 High monitor of Pos mid-pack voltage sensor	Pos mid-pack voltage - High Voltage sensor voltage	> 60.00 Volts	Controller Initialization Run/Crank Active Contactors	Complete True Closed	Failure conditions met for 0.525 seconds out of a 1.05 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor A Position Sensor Circuit Loss of Tracking	P1B03	To detect a Loss of Tracking fault in the Motor Resolver circuit.	Internal Tracking Error	>5 Degrees	Wakeup Signal Resolver Initialization Delay Once Resolver has indicated a fault, a Retry timer is initiated. Retry Timer must be	ON 1.00 > 0.05 s	Failure Conditions Met for 0.20 to 0.40 seconds out of a 2.00 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor "A" Control Module Hybrid Battery Voltage Isolation Sensor 2 Circuit Low	P1B0B	Circuit 2 Low monitor of Neg mid-pack voltage sensor	Negative mid-pack voltage	< 20.00 Volts	Controller Initialization Run/Crank Active Contactors	Complete True Closed	Failure conditions met for 0.7375 seconds out of a 1.05 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor "A" Control Module Hybrid Battery Voltage Isolation Sensor 2 Circuit High	P1B0C	Circuit 2 High monitor of Neg mid-pack voltage sensor	High Voltage Negative to Ground Reading - Total High Voltage Reading from High Voltage Battery	> 60.00 Volts	Controller Initialization Run/Crank Active Contactors	Complete True Closed	Failure conditions met for 0.525 seconds out of a 1.05 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor A Position Sensor Circuit Overspeed	P1B0D	To detect when Motor A has exceeded operational maximum speed.	ABS(Motor Speed)	> 12,700.00 rpm	Wakeup Signal	On	Failure Conditions Met for 0.09 seconds out of a 0.1 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor A Position Sensor Learn Incorrect	P1B0F	To detect an unvalidated Resolver Offset Learn Value AND a Stored Previously Valid Value.	Offset Learn Could Not Complete Because: ABS(Motor Speed) Key Cycles Of Offset Learn Imcomplete	 > 50.00 rpm > 15.00 cycles	Key Off	TRUE	0.30 s Learn Time With 15.00 Retries of Key Cycles	Type B, 2 Trips
			Initial Offset Learn Could Not Complete Because: Filtered DC Key Cycles Of Offset Learn Imcomplete	 < 200.00 V > 15.00 cycles	Key Off	TRUE	0.30 s Learn Time With 15.00 Retries of Key Cycles	
			Initial Offset Learn Could Not Complete Because: ALL phase Current Key Cycles Of Offset Learn Imcomplete	 < 15.00 A > 15.00 cycles	Key Off	TRUE	0.30 s Learn Time With 15.00 Retries of Key Cycles	
			Initial Offset Learn Could Not Complete Because: Learn Timer Key Cycles Of Offset Learn Imcomplete	 > 1.40 s > 15.00 cycles	Key Off	TRUE	0.30 s Learn Time With 15.00 Retries of Key Cycles	

16 OBDG01 SUMMARY PARAMETER TABLES - MCPA (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor "A" Control Module Hybrid Battery Voltage Isolation Sensing Performance	P1B41	To check correlation of sum of mid-pack voltages against HV and HV_Battery	ABS(Total High Voltage Measured By the Battery Pack - High Voltage Measured from Positve to Ground - High Voltage Measured from Negative to Ground)	>= 70.00 V	No Active DTCs: Controller Initialization Contactors	P1AE8, P1AE9, P1B0B, P1B0C Complete Closed	Failure conditions met for 0.175 seconds out of a 0.2 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor A Control Module Torque Calculation Performance	P1E0A	This diagnostic detects the torque command path calculation errors	Absolute difference between Torque Achieved in primary and secondary path is greater than the threshold value	> 123.00 Nm	DriveStateID TorqCalcPerf Flt Active OR TorqCalcPerf TPTKO OR TorqCalcPerf Flt counter OR TrqMntr Fault	= Run = TRUE = FALSE ≠ 0 = TRUE	0.1875 seconds out of a 0.2 seconds window	Type A, 1 Trips
			Absolute difference between Torque Commmanded in primary and secondary path is greater than the threshold value Abs(Primary - Secondary) Or Absolute difference between Mtr Minimum Short Term Torque Commmanded in primary and secondary path is greater than the threshold value Abs(Primary - Secondary) Or Absolute difference between Mtr Maximum Short Term Torque Commmanded in primary and secondary path is greater than the threshold value Abs(Primary - Secondary)	> 123.00 Nm > 123.00 Nm > 123.00 Nm	DriveStateID TorqCalcPerf Flt Active OR TorqCalcPerf TPTKO OR TorqCalcPerf Flt counter OR TrqMntr Fault	= Run = TRUE = FALSE ≠ 0 = TRUE	0.1875 seconds out of a 0.2 seconds window	
			Difference between Issd in primary and secondary path is greater than the threshold value	> 50.00 Amps	DriveStateID TorqCalcPerf Flt Active OR TorqCalcPerf TPTKO OR	= Run = TRUE = FALSE	0.1875 seconds out of a 0.2 seconds window	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					TorqCalcPerf Flt counter OR TrqMntr Fault	≠ 0 = TRUE		
			Absolute difference between Issq in primary and secondary path is greater than the threshold value	> 50.00 Amps	DriveStateID TorqCalcPerf Flt Active OR TorqCalcPerf TPTKO OR TorqCalcPerf Flt counter OR TrqMntr Fault	= Run = TRUE = FALSE ≠ 0 = TRUE	0.1875 seconds out of a 0.2 seconds window	
			Absolute difference between IssCmnd Torque in primary and secondary path is greater than the threshold value	> 123.00 Nm	DriveStateID TorqCalcPerf Flt Active OR TorqCalcPerf TPTKO OR TorqCalcPerf Flt counter OR TrqMntr Fault	= Run = TRUE = FALSE ≠ 0 = TRUE	0.1875 seconds out of a 0.2 seconds window	
			Absolute difference between Back emf Torque in primary and secondary path is greater than the threshold value	> 0.015 Nm	DriveStateID TorqCalcPerf Flt Active OR TorqCalcPerf TPTKO OR TorqCalcPerf Flt counter OR TrqMntr Fault	= Run = TRUE = FALSE ≠ 0 = TRUE	0.1875 seconds out of a 0.2 seconds window	
			Absolute difference between Usd Limited in primary and secondary path is greater than the threshold value Or Absolute difference between Usq Limited in primary and secondary	> 0.40 V (for Usd) > 0.40 V (for Usd)	DriveStateID TorqCalcPerf Flt Active OR TorqCalcPerf TPTKO OR TorqCalcPerf Flt counter OR TrqMntr Fault	= Run = TRUE = FALSE ≠ 0 = TRUE	0.1875 seconds out of a 0.2 seconds window	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			path is greater than the threshold value					
			UsdLmt Squared plus UsqLmt Squared OR DutyQ Squared plus DutyD Squared AND Duty Squared minus UsLmt Squared OR Perf Squared Duty Squared minus UsLmt Squared OR Perf Squared	> 0.70 > 0.70 > 0.30 > 1.00 > 0.10 > 0.15	DriveStateID TorqCalcPerf Flt Active OR TorqCalcPerf TPTKO OR TorqCalcPerf Flt counter OR TrqMntr Fault	= Run = TRUE = FALSE ≠ 0 = TRUE	0.1875 seconds out of a 0.2 seconds window	
			Absolute difference of the Mod Index Square Calcluation for Usd and Usq for Volt Hz mode in primary and seconday paths	> 5.00 V	DriveStateID TorqCalcPerf Flt Active OR TorqCalcPerf TPTKO OR TorqCalcPerf Flt counter OR TrqMntr Fault	= Run = TRUE = FALSE ≠ 0 = TRUE	0.1875 seconds out of a 0.2 seconds window	
			Difference between Power Input in primary and secondary path is greater than or equal to the threshold value	>= 40,000.00 Watts	DriveStateID TorqCalcPerf Flt Active OR TorqCalcPerf TPTKO OR TorqCalcPerf Flt counter OR TrqMntr Fault	= Run = TRUE = FALSE ≠ 0 = TRUE	0.1875 seconds out of a 0.2 seconds window	
			Difference between Vdc Adapt in primary and secondary path is greater than or equal to the threshold value	>= 0.07 Volts	DriveStateID TorqCalcPerf Flt Active OR TorqCalcPerf TPTKO OR TorqCalcPerf Flt counter	= Run = TRUE = FALSE ≠ 0	0.1875 seconds out of a 0.2 seconds window	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					OR TrqMntr Fault	 = TRUE		
			Difference between Reactive Power (Qest) in the primary and secondary path is greater than or equal to the threshold value	>= 43,755.40 Watts	DriveStateID TorqCalcPerf Flt Active OR TorqCalcPerf TPTKO OR TorqCalcPerf Flt counter OR TrqMntr Fault	= Run = TRUE = FALSE ≠ 0 = TRUE	0.1875 seconds out of a 0.2 seconds window	
			Calculated resolver Mtr Speed difference in the primary and secondary path is greater than the threshold value OR Calculated resolver Mtr Speed difference in the primary and secondary path is greater than the threshold value To Pass: Calculated resolver Mtr Speed AND Calculated Mtr Speed in radians/sec	> 20,000.00 rpm > 510.00 radians/sec < 19,000.00 rpm <= 146.00 rad	DriveStateID TorqCalcPerf Flt Active OR TorqCalcPerf TPTKO OR TorqCalcPerf Flt counter OR TrqMntr Fault	= Run = TRUE = FALSE ≠ 0 = TRUE	0.1875 seconds out of a 0.2 seconds window	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor A Control Module Long Term Memory Reset	P1EB6	This Diagnostic tests for BINVDM errors	Static NVM Checksum at power-up	≠ Checksum at power-down	Ignition Status Enable Calibration is True	= Run or Crank = 1 (1 is Enabled)	1 failure Runs once at controller initialization	Type A, 1 Trips
			Preserved NVM Checksum at power-up	≠ Checksum at power-down	Ignition Status Enable Calibration is True	= Run or Crank = 1 (1 is Enabled)	1 failure Runs once at controller initialization	
			Power Up Reset BINVDM NVM Checksum at power-up	= False ≠ Checksum at power-down	Ignition Status Enable Calibration is True	= Run or Crank = 1 (1 is Enabled)	Runs once at controller initialization 3 out of 5 controller initilizations for Failure	
			Dynamic NVM checksum at power-up AND Shutdown Finished	≠ Checksum at power-down = TRUE	Ignition Status Enable Calibration is True	= Run or Crank = 1 (1 is Enabled)	1 failure Runs once at controller initialization	
			Static NVM Error Dynamic NVM Error BINVDM ECC Error	= False = False = False	Enable Calibration is True	= 1 (1 is Enabled)	Runs once at controller initialization	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor Control Module A Lost Communication With Hybrid Powertrain Control Module B on Bus B	U182E	This DTC monitors for a Drive Motor Control Module A loss of communication with the Hybrid Powertrain Control Module B on Bus B	Message is not received from controller for Message $1D8 Message $3C5 Message $3D7	 ≥ 0.5 seconds ≥ 0.5 seconds ≥ 0.5 seconds	General Enable Criteria: U0074 Normal CAN transmission on Bus B Device Control High Voltage Virtual Network Management Ignition Voltage Criteria: Ignition voltage Power Mode Off Cycle Enable Criteria: Enable Calibration is True Ignition Accessory Line and Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for Power Mode is in accessory or run or crank and High Voltage Virtual Network Management is not active for	 Not Active on Current Key Cycle Enabled Not Active Not Active >= 11.00 volts or >= 9.50 volts = run = 1 (1 indicates enabled) = Active > 11.00 volts > 3.0000 seconds > 0.4000 seconds	See Threshold Value Diagnostic runs in 12.5 ms loop	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					U182E Hybrid Powertrain Control Module B (VICM)	Not Active on Current Key Cycle is present on the bus		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor Control Module A Lost Communication With Hybrid Powertrain Control Module	U1845	This DTC monitors for a Drive Motor Control Module A loss of communication with the Hybrid Powertrain Control Module	Message is not received from controller for Message $1DF Message $1F5	 ≥ 10.00 seconds ≥ 10.00 seconds	General Enable Criteria: U0073 Normal CAN transmission on Bus A Device Control High Voltage Virtual Network Management Ignition Voltage Criteria: Ignition voltage Power Mode Off Cycle Enable Criteria: KeCAND_b_OffKeyCycle DiagEnbl Ignition Accessory Line and Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for Power Mode is in accessory or run or crank and High Voltage Virtual Network Management is not active for	 Not Active on Current Key Cycle Enabled Not Active Not Active >= 11.00 volts or >= 9.50 volts = run = 1 (1 indicates enabled) = Active > 11.00 volts > 3.0000 seconds > 0.4000 seconds	See Threshold Value Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					U0293 Hybrid Powertrain Control Module	Not Active on Current Key Cycle is present on the bus		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor A Control Module Lost Communication With Engine Control Module (ECM)/ Powertrain Control Module (PCM)	U1876	This DTC monitors for a Drive Motor Control Module A loss of communication with the Engine Control Module	Message is not received from controller for Message $0C9 Message $1A3 Message $4C1 Message $4C7 Message $4F1	 ≥ 10.00 seconds ≥ 10.00 seconds ≥ 10.00 seconds ≥ 10.00 seconds ≥ 10.00 seconds	General Enable Criteria: U0073 Normal CAN transmission on Bus A Device Control High Voltage Virtual Network Management Ignition Voltage Criteria: Ignition voltage Power Mode Off Cycle Enable Criteria: KeCAND_b_OffKeyCycle DiagEnbl Ignition Accessory Line and Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for Power Mode is in accessory or run or crank and High Voltage Virtual Network Management is not active for	 Not Active on Current Key Cycle Enabled Not Active Not Active >= 11.00 volts or >= 9.50 volts = run = 1 (1 indicates enabled) = Active > 11.00 volts > 3.0000 seconds > 0.4000 seconds	See Threshold Value Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					U0293 Hybrid Powertrain Control Module	Not Active on Current Key Cycle is present on the bus		

16 OBDG01 Supporting Table - P0C01 D-Axis Current Thresholds

Description: X-Axis is stator temperature, Y-Axis is current threshold for the D-Axis current										
Notes:										
y/x	1	2	3	4	5	6	7	8	9	10
1	-438	-438	-438	-438	-438	-438	-438	-438	-438	-438

16 OBDG01 SUMMARY PARAMETER TABLES - MCPB (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Sensor Power Supply B Circuit Low	P06B4	Detects Sensor Power Supply (15V) below an acceptable threshold.	Scaled 15V IGBT Supply Voltage	< 12.00 V	Wakeup Signal	ON	Failure Conditions Met for 0.34 seconds out of a 0.42 seconds window OR Continuous Fail Time > 0.30 seconds	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - MCPB (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Sensor Power Supply B Circuit High	P06B5	Detects Sensor Power Supply (15V) above an acceptable threshold.	Scaled 15V IGBT Supply Voltage	> 22.00 V	Wakeup SIgnal	ON	Failure Conditions Met for 0.34 seconds out of a 0.42 seconds window OR Continuous Fail Time > 0.30 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor B Control Module Performance	P0A1C	This Diagnostic tests all the internal processor subsystems for faults which suggest that the integrity of the processor can not be trusted.	Inhibit Path Test Failed Indicates that the Processor is not demonstrating the ability to inhibit the system (take remedial action) during the Inhibit Path Test "2ndFailsToTakeRmdlActn"	>= 3 Failures	HV Batt contactor Staus Available Invertor State HV Batt Voltage HV Contactors 12V Batt Voltage Vehicle Speed Motor Faults Motor Speed SRAR Shutdowns SPI Fault RunCrank Active Ram or ROM fault Seed received in wrong order fault Seed/Key Timeout Powermode Off time	= TRUE = Off >= 80.00 V = Closed > 9.50 V < 0.00 kph = FALSE (None active) <= 10.00 rpm = FALSE = FALSE (No active P0606) = FALSE = FALSE (No active P0601, P0604) = FALSE (No active P0606) = FALSE < 5.00 s	Executes in a 12.5ms loop Increment/ Decrement counter = 3	Type A, 1 Trips
			Key Value Indicates that the Processor received incorrect key values for the associated seed values that it sent out to the secondary processor "2ndRxIncorrectKeys"	≠ expected key value	Number Of Mains Processors to monitor IPT status SPI Fault Run/Crank Voltage	> 0 = Not Running = FALSE (No active P0606) >= 9.50 V	Executes in a 12.5ms loop Detects in 150ms or two consecutive faulty keys	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			New Seed Update Time Indicates that the Processor did not receive a key value from the secondary processor during the expected time frame "MainDtctdSdKeyTimeout"	> 1.00 sec	Number Of Mains Processors to monitor AND SPI Faults AND Seed/Key Init delay timer AND Run/Crank Voltage OR 12V Battery Voltage	> 0 = FALSE (No active P0606) >= 1.00 s >= 9.50 V > 11 V	Executes in a 12.5ms loop Detects in 1 second	
			Seed sequence Indicates that the Processor received key values in the incorrect order from the secondary processor "MainDtctdSdRxWrongOrdr"	≠ expected order	Number Of Mains Processors to monitor AND SPI Faults AND Run/Crank Voltage OR 12V Battery Voltage	> 0 = FALSE (No active P0606) >= 9.50 V > 11 V	0.15 seconds out of a 0.2 seconds window Executes in a 12.5ms loop	
			Program Sequence Watch Seed time Since Seed Change Indicates that the Processor detected that a program Seed was not sending for the Program Sequence Watch "MainSequenceFlt"	> 0.20 ms	Seed Update Key Store Fault Enable is true	= 0 (1 is Enabled)	Executes in a 50ms loop after controller initialization	
			Program Sequence Watch Fault on a CPU Indicates that the Processor detected that a program was ran out of sequence according to the Program Sequence Watch "MainSequenceFlt"	seed sequence ≠ expected sequence	Program Sequence Watch Enabled (KaPISD_b_ProgSeqWatchEnbl[x])	= TRUE	0.15 seconds out of a 0.2 seconds window	
			HWIO detects Fault in	= 2 faults in a key cycle	Enabled Calibration is	= 1 (1 is Enabled)	Runs	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			ALU Test Indicates that the Processor detected an ALU fault in the processor "MainALU_Flt"		True (Diagnostic System Code Clear Requested AND Diagnostic System Reset Complete) AND Run Crank Ingnition Low Voltage AND Run Crank Low Voltage Crank	= False = True ≠ True ≠ True	continuously in 12.5ms loop	
			HWIO detects Fault in Configuration Registry Test Indicates that the Processor detected a Configuration Register fault in the processor "MainCfgRegFlt"	= 2 faults in a key cycle	Enable Calibration is True (Diagnostic System Code Clear Requested AND Diagnostic System Reset Complete) AND Run Crank Ingnition Low Voltage AND Run Crank Low Voltage Crank	= 1 (1 is Enabled) = False = True ≠ True ≠ True	Runs continuously in 12.5ms loop	
			HWIO detects Fault in the Stack Limit Test Indicates that the CPU Stack memory exceeded the limit "MainStackFlt"	= 2 faults since power up	Enable Calibration is True (Diagnostic System Code Clear Requested AND Diagnostic System Reset Complete)	= 1 (1 is Enabled) = False = True	Runs Continuously in 100ms loop	
			voltage diff between real circuit and test circuit Indicates that the Processor detected a problem with the Analog to Digital convertor test	> 16 V	Enable Calibration is True AND Run/Crank Voltage (Diagnostic System Code Clear Requested AND	= 1 (1 is Enabled) >= 7 V = False	0.15 seconds out of a 0.2 seconds window OR A2D Converter Test Error >= 0.20 seconds	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			circuit "MainADC_Flt"		Diagnostic System Reset Complete)	= True		
			HWIO detects Fault that the Processor detected a problem with the Flash ECC (error correction code) test circuit "FlashECC_CktTest"	= TRUE	Enable Calibration is True AND Power-Up Reset	= 1 (1 is Enabled) = TRUE	Executes once at every power up reset 3.00 failed cycles out of 10.00 cycles (turns on MIL) 5.00 failed cycles out of 10.00 cycles (shutdown vehicle)	
			HWIO detects Fault that the Processor detected a problem with the RAM ECC (error correction code) test circuit "RAM_ECC_CktTest"	= TRUE	Enable Calibration is True AND Power-Up Rest	= 1 (1 is Enabled) = TRUE	Executes once at every power up reset 3.00 failed cycles out of 10.00 cycles (turns on MIL) 5.00 failed cycles out of 10.00 cycles (shutdown vehicle)	
			HWIO detects Fault in Transfer Test from Flash to RAM OR HWIO detects Fault in the Memory Data From Flash Indicates that the Processor detected a problem in the data	= TRUE = TRUE	Enable Calibration is True (Diagnostic System Code Clear Requested AND Diagnostic System Reset Complete)	= 1 (1 is Enabled) = False = True	50ms Execution Rate after controller initialization	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			transfer from Flash memory to RAM memory "DMA_XferTest"					
			First ROM Test Complete AND Processor Performance System Run Time Met AND Processor Integrity Fault Lower AND Processor Integrity Fault Upper	= True = 1 (1 is Enabled) after Controller Initialization = No Fault = No Fault	End of Test in Progress AND Diagnostic End of Trip in Progress AND Inhibit Path Test State	= True = False = Test Aborted OR Test Completed	Executes at the end of every trip	

16 OBDG01 SUMMARY PARAMETER TABLES - MCPB (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor B Position Sensor Circuit	P0A45	To detect Loss of Signal or converter error (line open, short) in the Motor Resolver circuit.	Amplitude of Sin or Cos Signal	<2.3V	Wakeup Signal Resolver Initialization Delay Once Resolver has indicated a fault, a Retry timer is initiated. Retry Timer must be	ON 1.00 s > 0.05 s	Failure Conditions Met for 0.20 to 0.40 seconds out of a 2.00 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor B Position Sensor Circuit Range/ Performance	P0A46	To detect a Degradation of Signal fault in the angle data read by the Motor Resolver circuit.	Sin or Cos Signal	>4.0V	Wakeup Signal Resolver Initialization Delay Once Resolver has indicated a fault, a Retry timer is initiated. Retry Timer must be	ON 1.00 s > 0.05 s	Failure Conditions Met for 0.20 to 0.40 seconds out of a 2.00 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor "B" Phase U Current Low	P0A67	Drive Motor "B" Missing Motor Current checks for minimum current in Phase U when rotor position is near that peak's phase axis. Each phase is checked individually as rotor turns.	Peak Phase Axis Current on the U phase	< 9.00 Amps	Drive State Delay Timer Inverter State Inverter Power Stage Inverter Voltage Rotor Position Squared Current Comanded	RUN > 10.00 ms != Active Discharge Normal PWM > 50.00 V -30 deg < Phase Axis < +30 deg > 900.00 Amps^2	0.4 seconds out of a 0.6 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor "B" Phase V Current Low	P0A6A	Drive Motor "A" Missing Motor Current checks for minimum current in Phase V when rotor position is near that peak's phase axis. Each phase is checked individually as rotor turns.	Peak Phase Axis Current on the V phase	< 9.00 Amps	Drive State Delay Timer Inverter State Inverter Power Stage Inverter Voltage Rotor Position Squared Current Comanded	Run > 10.00 ms != Active Discharge Normal PWM > 50.00 V -30 deg < Phase Axis < +30 deg > 900.00 Amps^2	0.4 seconds out of a 0.6 seconds window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - MCPB (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor "B" Phase W Current Low	P0A6D	Drive Motor "A" Missing Motor Current checks for minimum current in Phase W when rotor position is near that peak's phase axis. Each phase is checked individually as rotor turns.	Peak Phase Axis Current on the W phase	< 9.00 Amps	Drive State Delay Timer Inverter State Inverter Power State Inverter Voltage Rotor Position Squared Current Comanded	Run > 10.00 ms !=Active Discharge Normal PWM > 50.00 V -30 deg < Phase Axis < +30 deg > 900.00 Amps^2	0.4 seconds out of a 0.6 seconds window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - MCPB (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor B Inverter Performance	P0A79	Detects IGBT Desaturation Faults, Monitors hw status line to detect internal overcurrent faults, shoot through, or loss of switching control events	Phase A, B, or C High or Low Side IGBT	DSatFltPending (Status Fault Bit)	Wakeup Signal	ON	Failure conditionis met for 0.002 seconds out of a 1 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor Inverter Temperature Sensor B Circuit Range/ Performance	P0AF3	Inverter B Temperature Sensor #1 In-Range Rationality Check	ABS(Inverter B Temp- Cold Soak Average Temp)	> 20.00 degrees C	Cold Start Average Temperature No Active Power Inverter Temp Out Of Range Faults:	> -20.00 C P0AF0 and P0AEF	Fail conditions met 5.13 seconds after enable conditions then 0.525 seconds out of a 0.625 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor Inverter Temperature Sensor B Circuit Low	P0AF4	To detect Inverter B Temperature Sensor #1 Out of Range low (voltage)	PIM Temperature Sensor B	> 170.00 degrees C	Sesor Exists WakeUp Signal	= 1.00 On	Failure conditions met for 2.5 seconds out of a 3.5 seconds window	Type B, 2 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - MCPB (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor Inverter Temperature Sensor B Circuit High	P0AF5	To detect Inverter B Temperature Sensor #1 voltage Out of Range high	PIM Temperature Sensor B	< -50.00 degrees C	Sensor Exists Wakeup Signal Inverter Warmup Time at or above inverter warmup torque	= 1.00 ON >= 90.00 s >=ABS(20.00)Nm	Failure conditions met for 2.625 seconds out of a 3.65 seconds window	Type B, 2 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - MCPB (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor Inverter Temperature Sensor D Circuit Range/ Performance	P0BD7	Inverter B Temperature Sensor #2 In-Range Rationality Check	ABS(Inverter D Temp- Cold Soak Average Temp)	> 20.00 degrees C	Cold Start Average Temperature No Active Power Inverter Temp Out Of Range Faults:	> -20.00 C P0BD3 and P0BD4	Fail conditions met 5.13 seconds after enable conditions then 0.525 seconds out of a 0.625 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor Inverter Temperature Sensor D Circuit Low	P0BD8	To detect Inverter B Temperature Sensor #2 Out of Range low (voltage)	PIM Temperature Sensor D	> 170.00 degrees C	Sesor Exists WakeUp Signal	= 1.00 ON	Failure conditions met for 2.5 seconds out of a 3.5 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor Inverter Temperature Sensor D Circuit High	P0BD9	To detect Inverter B Temperature Sensor #2 Out of Range high (voltage)	PIM Temperature Sensor D	< -50.00 degrees C	Sensor Exists Wakeup Signal Inverter Warmup Time at or above inverter warmup torque	= 1.00 ON >= 90.00 s >=ABS(20.00)Nm	Failure conditions met for 2.625 seconds out of a 3.65 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor Inverter Temperature Sensor F Circuit Range/ Performance	P0BE1	Inverter B Temperature Sensor #3 In-Range Rationality Check	ABS(Inverter F Temp- Cold Soak Average Temp)	> 20.00 degrees C	Cold Start Average Temperature No Active Power Inverter Temp Out Of Range Faults:	> -20.00 C P0BDD and P0BDE	Fail conditions met 5.13 seconds after enable conditions then 0.525 seconds out of a 0.625 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor Inverter Temperature Sensor F Circuit Low	P0BE2	To detect Inverter B Temperature Sensor #3 Out of Range low (voltage).	PIM Temperature Sensor F	> 170.00 degrees C	Sesor Exists WakeUp Signal	= 1.00 ON	Failure conditions met for 2.5 seconds out of a 3.5 seconds window	Type B, 2 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - MCPB (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor Inverter Temperature Sensor F Circuit High	P0BE3	To detect Inverter BTemperature Sensor #3 Out of Range high (voltage).	PIM Temperature Sensor F	< -50.00 degrees C	Sensor Exists Wakeup Signal Inverter Warmup Time at or above inverter warmup torque	= 1.00 ON >= 90.00 s >=ABS(20.00)Nm	Failure conditions met for 2.625 seconds out of a 3.65 seconds window	Type B, 2 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - MCPB (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor "B" Phase U Current Sensor Offset Out-of Range	P0BF2	Offset Circuit monitor to detect the failure of U-phase offset current above valid range	U phase offset current learn value	> 30.00 amps	Wakeup Signal Delay Timer Motor Faults Inverter Faults	On 0.10 Sec None None	Fail conditions met 0.10 sec after enable conditions met	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor "B" Phase U Current Sensor Circuit Low	P0BF3	Circuit Low monitor to detect the failure of U-phase current sensor circuit below valid range	U phase current sensor output at highside	< -700.00 amps	Wakeup Signal Run Flag	On = 1.00	0.05 seconds out of a 0.1 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor "B" Phase U Current Sensor Circuit High	P0BF4	Circuit High monitor to detect the failure of U-phase current sensor circuit above valid range	U phase current sensor output highside	> 700.00 amps	Wakeup Signal Enable Flag	On = 1.00	0.05 seconds out of a 0.1 seconds window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - MCPB (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor "B" Phase V Current Sensor Offset Out-of Range	P0BF6	Offset Circuit monitor to detect the failure of V-phase offset current above valid range	V phase current sensor offset learn value	> 30.00 amps	Wakeup Signal Delay Timer Motor Faults Inverter Faults	On 0.10 Sec None None	Fai conditions met 0.10 Sec after enable conditions met	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor "B" Phase V Current Sensor Circuit Low	P0BF7	Circuit Low monitor to detect the failure of V-phase current sensor circuit below valid range.	V phase current sensor output at highside	< -700.00 amps	Wakeup Signal Run Flag	On = 1.00	0.05 seconds out of a 0.1 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor "B" Phase V Current Sensor Circuit High	P0BF8	Circuit High monitor to detect the failure of V-phase current sensor circuit above valid range	V phase current Sensor output at highside	> 700.00 amps	Wakeup Signal Run Flag	On = 1.00	0.05 seconds out of a 0.1 seconds window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - MCPB (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor "B" Phase W Current Sensor Offset Out-of Range	P0BFA	Offset Circuit monitor to detect the failure of W-phase offset current above valid range.	W phase current sensor offset learn value	> 30.00 amps	Wakeup Signal Delay Timer Motor Faults Inverter Faults	On 0.10 Sec None None	Fail condidtions met 0.10 sec after enable conditoins met	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor "B" Phase W Current Sensor Circuit Low	P0BFB	Circuit Low monitor to detect the failure of W-phase current sensor circuit below valid range.	W phase current sensor output at highside	< -700.00 amps	Wakeup Signal Run Flag	On = 1.00	0.05 seconds out of a 0.1 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor "B" Phase W Current Sensor Circuit High	P0BFC	Circuit High monitor to detect the failure of W-phase current sensor circuit above valid range.	W phase current sensor output at high side	> 700.00 amps	Wakeup Signal Run Flag	On = 1.00	0.05 seconds out of a 0.1 seconds window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - MCPB (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor "B" Phase U-V-W Correlation	P0BFE	To detect electrical failure of phase current sensor.	Sum of U-V-W phase currents	>= 110.00 amps	Wakeup Signal Run Flag	On = 1.00	0.02 seconds out of a 0.02 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor "B" Phase U-V-W Current Sensor Overcurrent	P0C04	To detect fast repeated and slow intermittent 3 phase over currents and to protect IGBT.	U, V, or W Phase Current Sensor	> 600.00 amps	Wakeup Signal	On	0.0104 seconds out of a 0.104 seconds window	Type A, 1 Trips
			D Axis current less than calculated threshold determined by stator temperature listed in supporting table unless the motor temperature reading is faulted, then D Axis current threshold is determined by a default value	D-Axis Current<- 600.00 amps (faulted motor temp value) P0C04 D-Axis Current Thresholds (See supporting tables for expected threshold values for non-faulted motor temperature readings)	Wakeup Signal	On	0.0104 seconds out of a 0.104 seconds window	
			U, V, or W Phase Current Sensor	> 600.00 amps	Wakeup Signal	On	0.00416 seconds out of a 0.0208 seconds window	
			D Axis current less than calculated threshold determined by stator temperature listed in supporting table unless the motor temperature reading is faulted, then D Axis current threshold is determined by a default value	D-Axis Current<- 600.00 amps (faulted motor temp value) P0C04 D-Axis Current Thresholds (See supporting tables for expected threshold values for non-faulted motor temperature readings)	Wakeup Signal	On	0.00416 seconds out of a 0.0208 seconds window	

16 OBDG01 SUMMARY PARAMETER TABLES - MCPB (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor B Inverter Power Supply Circuit/Open	P0C0E	Detects IGBT Bias Faults, Monitors hw status line to detect loss of power supply to gate drive board	Phase A, B, or C Power Supply	Failed (Status Fault Bit)	Inverter State	Initialization Complete	Failure conditions met for 0.002 seconds out of a 0.024 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor "B" Inverter Phase U Over Temperature	P0C14	To detect an in-range overtemperature condition that can potentially damage inverter	PIM Phase U Temperature	> 131.00 degrees C	PIM Phase U Temperature	TEMP NORMAL	Failure Conditions Met For: 1.2 seconds out of a 2 seconds window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - MCPB (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor "B" Inverter Phase V Over Temperature	P0C15	To detect an in-range overtemperature condition that can potentially damage inverter	PIM Phase V Temperature	> 131.00 degrees C	PIM Phase V Temperature	TEMP Normal	Failure Conditions Met For: 1.2 seconds out of a 2 seconds window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - MCPB (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor "B" Inverter Phase W Over Temperature	P0C16	To detect an in-range overtemperature condition that can potentially damage inverter	PIM Phase W Temperature	> 131.00 degrees C	PIM Phase W Temperature	TEMP NORMAL	Failure Conditions Met For: 1.2 seconds out of a 2 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor B Position Sensor Not Learned	P0C18	To detect an unvalidated Resolver Offset Learn Value AND No Stored Previously Valid Value.	Initial Offset Learn Could Not Complete Because: ABS(Motor Speed)	> 50.00 rpm	Key Off	TRUE	0.30 s Learn Time	Type A, 1 Trips
			Initial Offset Learn Could Not Complete Because: Filtered DC	< 200.00 V	Key Off	TRUE	0.30 s Learn Time	
			Initial Offset Learn Could Not Complete Because: ALL phase Current	< 30.00 A	Key Off	TRUE	0.30 s Learn Time	
			Initial Offset Learn Could Not Complete Because: Learn Timer	> 1.40 s	Key Off	TRUE	0.30 s Learn Time	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor B Torque Delivered Performance	P0C1A	Slewed MCP torque command is different by the MCP calculated torque achieved	Absolute value of (Commanded torque - Torque Command Slewed)	> 132.00 Nm	DTCs not Fault Active AND DTCs not Fault Active AND Motor Drive State ID AND ((DTCs not Fault Active) OR (Voltage Hazard Active AND Motor Temperature Fault Active))	(P1AF5 or P1B0C or P1B41) (P0A3F or P0A40 or P1B03 or P16EB) = Run P0BFD = True = False	0.1875 seconds out of a 0.2 seconds window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - MCPB (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor B Position Exceeded Learning Limit	P0C4F	Fail Case 1: To detect an OOR Offset Learn Value. Fail Case 2: To detect a sudden jump from previously stored offset learn value.	Offset Learn Completes AND ABS(Offset Correction Angle)	> 30.00 degrees	Key Off Offset Learn Status	TRUE Complete	5 key off cycles of out of offset angle being out of range	Type A, 1 Trips
			Offset Learn Completes AND ABS(Offset Correction Angle - prevoiusly stored value)	> 10.00 degrees	Key Off Offset Learn Status	TRUE Complete	5 key off cycles of out of offset angle being out of range	

16 OBDG01 SUMMARY PARAMETER TABLES - MCPB (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor B Position Sensor Circuit A Low	P0C57	To detect Resolver Circuit S1/3 Out of Range Low	Resolver S13 Circuit Reference Voltage	< 0.50 V	Wakeup Signal	ON	Failure Conditions met for 0.525 seconds out of a 0.8375 seconds window	Type B, 2 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - MCPB (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor B Position Sensor Circuit A High	P0C58	To detect Resolver Circuit S1/3 Out of Range High	Resolver S13 Circuit Reference Voltage	> 4.50 V	Wakeup Signal	ON	Failure Conditions met for 0.2125 seconds out of a 0.3125 seconds window	Type B, 2 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - MCPB (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor B Position Sensor Circuit B Low	P0C61	To detect Resolver Circuit S2/4 Out of Range Low.	Resolver S24 Circuit Reference Voltage	< 0.50 V	Wakeup Signal	ON	Failure Conditions met for 0.525 seconds out of a 0.8375 seconds window	Type B, 2 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - MCPB (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor B Position Sensor Circuit B High	P0C62	To detect Resolver Circuit S2/4 Out of Range High	Reslover S24 Circuit Reference Voltage	> 4.50 V	Wakeup Signal	ON	Failure Conditions met for 0.2125 seconds out of a 0.3125 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor "B" Inverter Phase U Temperature Sensor Erratic	P190D	To Detect when a temperature sensor starts reporting erratically	A rolling average of temperature readings calculated over 0.38 s this calculation is known as a string length. Temperature readings are taken every .025s.	> an estimated string length calculated based on stator current.	Start-Up Delay	> 0.13 s	1.75 seconds out of a 2.375 seconds window	Type B, 2 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - MCPB (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor "B" Inverter Phase V Temperature Sensor Erratic	P190E	To Detect when a temperature sensor starts responding erratically	A rolling average of temperature readings calculated over 0.38 s this calculation is known as a string length. Temperature readings are taken every .025s.	> an estimated string length calculated based on stator current.	Start-Up Delay	> 0.13 s	1.75 seconds out of a 2.375 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor "B" Inverter Phase W Temperature Sensor Erratic	P190F	To Detect when a temperature sensor starts responding erratically	A rolling average of temperature readings calculated over 0.38 s this calculation is known as a string length. Temperature readings are taken every .025s.	> an estimated string length calculated based on stator current.	Start-Up Delay	> 0.13 seconds	1.75 seconds out of a 2.375 seconds window	Type B, 2 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - MCPB (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor B Control Module Not Programmed	P1A52	This diagnostic prevents flashing different MCP software into MCP B that does not match its ID	MCP Processor Configuration ID	≠ CeMCGR_i_MCP2	None	NA	0.125 seconds out of a 0.2 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor B Control Module Random Access Memory (RAM)	P1A53	This Diagnostic tests the checksum on RAM memory	Secure "Y" variable	≠ Primary "V" variable for greater than 125 ms	Current Time Execution - Time of Last DualStore Error	> 25 ms	Executes in Background loop	Type A, 1 Trips
			HWIO detects an illegal write to Write Protected RAM	= TRUE	(Diagnostic System Code Clear Requested AND Diagnostic System Reset Complete)	= False = True	Executes in Background loop 0 counts to fail	
			2nd Processor State of Health RAM Fault Latched	= TRUE	(Diagnostic System Code Clear Requested AND Diagnostic System Reset Complete)	= False = True	Executes in Background loop every 1000ms	
			Checksum of PreservedNVM_Region for Main Processor State of Health and 2nd Processor State Of Health	≠ Expected checksum value	(Diagnostic System Code Clear Requested AND Diagnostic System Reset Complete)	= False = True	Runs once at Initialization	
			HWIO detects fault in System RAM	= TRUE	(Diagnostic System Code Clear Requested AND Diagnostic System Reset Complete)	= False = True	Runs once at Initialization 1 count to fail	
			HWIO detects fault in Cache RAM	= TRUE	(Diagnostic System Code Clear Requested AND Diagnostic System Reset Complete)	= False = True	Runs once at Initialization 1 count to fail	
			HWIO detects fault in eTPU RAM	= TRUE	(Diagnostic System Code Clear Requested AND Diagnostic System Reset Complete)	= False = True	Runs once at Initialization 1 count to fail	
			Main SOH RAM Fault Latched AND SPI Fault Latched	= 0 = False	(Diagnostic System Code Clear Requested AND Diagnostic System Reset	= False = True	Executes in Background loop every 1000ms	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			AND System RAM Fault Count AND Cache RAM Fault Count AND eTPU RAM Fault Count	 = 0 = 0 = 0	Complete) Time Since Last Duel Store Error	 > 1,000 ms		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor B Control Module Read Only Memory (ROM)	P1A54	This Diagnostic tests the checksum on ROM (flash) memory	Calculated Checksum of the Boot ROM	≠ Expected Checksum	Controller Status ROM Checksum in Progress (Diagnostic System Code Clear Requested AND Diagnostic System Reset Complete)	= On ≠ True = False = True	1 failure if it occurs during the first ROM test of the ignition cycle otherwise 5 failures	Type A, 1 Trips
			2nd Processor State of Health ROM fault latched	= TRUE	Controller Status ROM Checksum in Progress (Diagnostic System Code Clear Requested AND Diagnostic System Reset Complete)	= On ≠ True = False = True	Runs continuously in the background	
			Calculated Checksum of Torque Security Related Calibrations	≠ Expected Checksum	Controller Status (Diagnostic System Code Clear Requested AND Diagnostic System Reset Complete) = Enable Calibration is True = Enable Calibration is True	= On = False = True = 0 (0 is Enabled) = 1 (1 is Enabled)	1 failure if it occurs during the first ROM test of the ignition cycle otherwise 5 failures	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			ECC Fault detected in Flash memory	= TRUE	Controller Status Power Up Reset AND HWIO BINVDM ECC State AND HWIO ROM Fault Enable Calibration is true	= On = False = False = True = 1 (1 is Enabled)	Greater than 5 failures at controller initialization Runs once at initialization	
			ROM fault Active AND 2nd SOH ROM Fault Latched AND Main SOH ROM Fault Latched	≠ True ≠ True ≠ True	(Diagnostic System Code Clear Requested AND Diagnostic System Reset Complete)	= False = True	Runs in the Background	

16 OBDG01 SUMMARY PARAMETER TABLES - MCPB (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor B Control Module Long Term Memory Performance	P1ADD	This Diagnostic tests for unuseable BINVDM (flash) memory (or EEPROM)	HWIO reports next write to NVM will not succeed OR HWIO reports the assembly calibration integrity check has failed	= True = True	Enable Calibration is True Controller Status	= 1 (1 is Enabled) = Initialization	Runs once at controller initialization	Type B, 2 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - MCPB (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor B Control Module System Voltage Low	P1AE0	Sets when the low voltage system voltage is below a threshold	Ignition Voltage	≤ 10.00 Volts	Enable Calibration is True AND 12V Starter Engaged AND Ignition Run/Crank Voltage AND Engine Speed (Diagnostic System Code Clear Requested AND Diagnostic System Reset Complete)	= 1.00 (1 is Enabled) = False > 6.0 Volts ≥ 0.00 RPM = False = True	5 seconds out of a 6 seconds window	Type C, No MIL

16 OBDG01 SUMMARY PARAMETER TABLES - MCPB (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor B Control Module System Voltage High	P1AE1	Sets when the low voltage system voltage is above a threshold	Ignition Voltage	≥ 16.00 Volts	Enable Calibration is True AND Ignition Run/Crank Voltage (Diagnostic System Code Clear Requested AND Diagnostic System Reset Complete)	= 1.00 (1 is Enabled) > 6.0 Volts = False = True	5 seconds out of a 6 seconds window	Type C, No MIL

16 OBDG01 SUMMARY PARAMETER TABLES - MCPB (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor B Hybrid Battery System Voltage High	P1AEF	To detect over voltage and to protect TPIM HV Circuit	High Voltage Sensor Voltage OR High Voltage Hardware Flag	> 450.00 Volts = True	Controller Initialization	Complete	Failure conditions met for 0.004 seconds out of a 0.1 seconds window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - MCPB (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor B Control Module Hybrid Battery Voltage System Isolation Fault	P1AF2	Isolation Lost between mid-pack voltage and chassis	Isolation Ratio (Neg mid-pack voltage / Pos mid-pack voltage)	> 4.53 OR < 0.21	No Active DTCs: Controller Initialization	P1AE8, P1AE9, P1AEC Complete	Failure conditions met for 2.5 seconds out of a 5 seconds window	Type B, 2 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - MCPB (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor B Control Module Hybrid Battery Voltage Isolation Sensor 1 Circuit Low	P1AF6	Circuit 1 Low monitor of Pos mid-pack voltage sensor	High Voltage Positive to Ground Reading - Total High Voltage Reading from High Voltage Battery	< 20.00 Volts	Controller Initialization Run Crank Active Contactors	Complete True Closed	Failure Conditions Met for 0.7375 seconds out of a 1.05 seconds window	Type A, 1 Trip

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor B Control Module Hybrid Battery Voltage Isolation Sensor 1 Circuit High	P1AF7	Circuit 1 High monitor of Pos mid-pack voltage sensor	High Voltage Positive to Ground Reading - Total High Voltage Reading from High Voltage Battery	> 60.00 Volts	Controller Initialization Run/Crank Active Contactors	Complete True Closed	Failure conditions met for 0.525 seconds out of a 1.05 seconds window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - MCPB (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor B Position Sensor Circuit Loss of Tracking	P1B04	To detect a Loss of Tracking fault in the Motor Resolver circuit.	Internal Tracking Error	>5 Degrees	Wakeup Signal Resolver Initialization Delay Once Resolver has indicated a fault, a Retry timer is initiated. Retry Timer must be	ON 1.00 > 0.05 s	Failure Conditions Met for 0.20 to 0.40 seconds out of a 2.00 second window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor B Position Sensor Circuit Overspeed	P1B0E	To detect when Motor A has exceeded operational maximum speed.	ABS(Motor Speed)	> 12,700.00 rpm	Wakeup Signal	On	Failure Conditions Met for 0.09 seconds out of a 0.1 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor B Position Sensor Learn Incorrect	P1B10	To detect an unvalidated Resolver Offset Learn Value AND a Stored Previously Valid Value.	Offset Learn Could Not Complete Because: ABS(Motor Speed) Key Cycles Of Offset Learn Imcomplete	 > 50.00 rpm > 15.00 cycles	Key Off	TRUE	0.30 s Learn Time With 15.00 Retries of Key Cycles	Type B, 2 Trips
			Initial Offset Learn Could Not Complete Because: Filtered DC Key Cycles Of Offset Learn Imcomplete	 < 200.00 V > 15.00 cycles	Key Off	TRUE	0.30 s Learn Time With 15.00 Retries of Key Cycles	
			Initial Offset Learn Could Not Complete Because: ALL phase Current Key Cycles Of Offset Learn Imcomplete	 < 30.00 A > 15.00 cycles	Key Off	TRUE	0.30 s Learn Time With 15.00 Retries of Key Cycles	
			Initial Offset Learn Could Not Complete Because: Learn Timer Key Cycles Of Offset Learn Imcomplete	 > 1.40 s > 15.00 cycles	Key Off	TRUE	0.30 s Learn Time With 15.00 Retries of Key Cycles	

16 OBDG01 SUMMARY PARAMETER TABLES - MCPB (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor B Control Module Hybrid Battery Voltage Isolation Sensing Performance	P1B42	To check correlation of sum of mid-pack voltages against HV and HV_Battery	ABS(Total High Voltage Measured By the Battery Pack - High Voltage Measured from Positve to Ground - High Voltage Measured from Negative to Ground)	>= 70.00 V	No Active DTCs: Controller Initialization Contactors	P1AE8, P1AE9, P1B0B, P1B0C Complete Closed	Failure conditions met for 0.175 seconds out of a 0.2 seconds window	Type A, 1 Trips

16 OBDG01 SUMMARY PARAMETER TABLES - MCPB (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor B Control Module Hybrid Battery Voltage Isolation Sensor 2 Circuit Low	P1B43	Circuit 2 Low monitor of Neg mid-pack voltage sensor	High Voltage Negative to Ground Reading - Total High Voltage Reading from High Voltage Battery	< 20.00 Volts	Controller Initialization Run/Crank Active Contactors	Complete True Closed	Failure conditions met for 0.7375 seconds out of a 1.05 seconds window	Type A, 1 Trip

16 OBDG01 SUMMARY PARAMETER TABLES - MCPB (Volt)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor B Control Module Hybrid Battery Voltage Isolation Sensor 2 Circuit High	P1B44	Circuit 2 High monitor of Neg mid-pack voltage sensor	High Voltage Negative to Ground Reading - Total High Voltage Reading from High Voltage Battery	> 60.00 Volts	Controller Initialization Run/Crank Active Contactors	Complete True Closed	Failure conditions met for 0.525 seconds out of a 1.05 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor B Control Module Torque Calculation Performance	P1E0B	This diagnostic detects the torque command path calculation errors	Absolute difference between Torque Achieved in primary and secondary path is greater than the threshold value	> 132.00 Nm	DriveStateID TorqCalcPerf Flt Active OR TorqCalcPerf TPTKO OR TorqCalcPerf Flt counter OR TrqMntr Fault	= Run = TRUE = FALSE ≠ 0 = TRUE	0.1875 seconds out of a 0.2 seconds window	Type A, 1 Trips
			Absolute difference between Torque Commmanded in primary and secondary path is greater than the threshold value Abs(Primary - Secondary) OR Absolute difference between Mtr Minimum Short Term Torque Commmanded in primary and secondary path is greater than the threshold value Abs(Primary - Secondary) OR Absolute difference between Mtr Maximum Short Term Torque Commmanded in primary and secondary path is greater than the threshold value Abs(Primary - Secondary)	> 132.00 Nm > 132.00 Nm > 132.00 Nm	DriveStateID TorqCalcPerf Flt Active OR TorqCalcPerf TPTKO OR TorqCalcPerf Flt counter OR TrqMntr Fault	= Run = TRUE = FALSE ≠ 0 = TRUE	0.1875 seconds out of a 0.2 seconds window	
			Difference between Issd in primary and secondary path is greater than the threshold value	> 50.00 Amps	DriveStateID TorqCalcPerf Flt Active OR TorqCalcPerf TPTKO OR	= Run = TRUE = FALSE	0.1875 seconds out of a 0.2 seconds window	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					TorqCalcPerf Flt counter OR TrqMntr Fault	≠ 0 = TRUE		
			Absolute difference between Issq in primary and secondary path is greater than the threshold value	> 50.00 Amps	DriveStateID TorqCalcPerf Flt Active OR TorqCalcPerf TPTKO OR TorqCalcPerf Flt counter OR TrqMntr Fault	= Run = TRUE = FALSE ≠ 0 = TRUE	0.1875 seconds out of a 0.2 seconds window	
			Absolute difference between IssCmnd Torque in primary and secondary path is greater than the threshold value	> 132.00 Nm	DriveStateID TorqCalcPerf Flt Active OR TorqCalcPerf TPTKO OR TorqCalcPerf Flt counter OR TrqMntr Fault	= Run = TRUE = FALSE ≠ 0 = TRUE	0.1875 seconds out of a 0.2 seconds window	
			Absolute difference between Back emf Torque in primary and secondary path is greater than the threshold value	> 0.015 Nm	DriveStateID TorqCalcPerf Flt Active OR TorqCalcPerf TPTKO OR TorqCalcPerf Flt counter OR TrqMntr Fault	= Run = TRUE = FALSE ≠ 0 = TRUE	0.1875 seconds out of a 0.2 seconds window	
			Absolute difference between Usd Limited in primary and secondary path is greater than the threshold value OR Absolute difference between Usq Limited in primary and secondary	> 0.40 V (for Usd) > 0.40 V (for Usd)	DriveStateID TorqCalcPerf Flt Active OR TorqCalcPerf TPTKO OR TorqCalcPerf Flt counter OR TrqMntr Fault	= Run = TRUE = FALSE ≠ 0 = TRUE	0.1875 seconds out of a 0.2 seconds window	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			path is greater than the threshold value					
			UsdLmt Squared plus UsqLmt Squared OR DutyQ Squared plus DutyD Squared AND Duty Squared minus UsLmt Squared OR Perf Squared Duty Squared minus UsLmt Squared OR Perf Squared	> 0.70 > 0.70 > 0.30 > 1.00 > 0.10 > 0.15	DriveStateID TorqCalcPerf Flt Active OR TorqCalcPerf TPTKO OR TorqCalcPerf Flt counter OR TrqMntr Fault	= Run = TRUE = FALSE ≠ 0 = TRUE	0.1875 seconds out of a 0.2 seconds window	
			Absolute difference of the Mod Index Square Calcluation for Usd and Usq for Volt Hz mode in primary and seconday paths	> 5.00 V	DriveStateID TorqCalcPerf Flt Active OR TorqCalcPerf TPTKO OR TorqCalcPerf Flt counter OR TrqMntr Fault	= Run = TRUE = FALSE ≠ 0 = TRUE	0.1875 seconds out of a 0.2 seconds window	
			Difference between Power Input in primary and secondary path is greater than or equal to the threshold value	>= 40,000.00 Watts	DriveStateID TorqCalcPerf Flt Active OR TorqCalcPerf TPTKO OR TorqCalcPerf Flt counter OR TrqMntr Fault	= Run = TRUE = FALSE ≠ 0 = TRUE	0.1875 seconds out of a 0.2 seconds window	
			Difference between Vdc Adapt in primary and secondary path is greater than or equal to the threshold value	>= 0.07 Volts	DriveStateID TorqCalcPerf Flt Active OR TorqCalcPerf TPTKO OR TorqCalcPerf Flt counter	= Run = TRUE = FALSE ≠ 0	0.1875 seconds out of a 0.2 seconds window	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					OR TrqMntr Fault	= TRUE		
			Difference between Reactive Power (Qest) in the primary and secondary path is greater than or equal to the threshold value	>= 43,755.40 Watts	DriveStateID TorqCalcPerf Flt Active OR TorqCalcPerf TPTKO OR TorqCalcPerf Flt counter OR TrqMntr Fault	= Run = TRUE = FALSE ≠ 0 = TRUE	0.1875 seconds out of a 0.2 seconds window	
			Calculated resolver Mtr Speed difference in the primary and secondary path is greater than the threshold value OR Calculated resolver Mtr Speed difference in the primary and secondary path is greater than the threshold value To Pass: Calculated resolver Mtr Speed AND Calculated Mtr Speed in radians/sec	> 20,000.00 rpm > 510.00 radians/sec < 19,000.00 rpm <= 146.00 rad	DriveStateID TorqCalcPerf Flt Active OR TorqCalcPerf TPTKO OR TorqCalcPerf Flt counter OR TrqMntr Fault	= Run = TRUE = FALSE ≠ 0 = TRUE	0.1875 seconds out of a 0.2 seconds window	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor B Control Module Long Term Memory Reset	P1EB7	This Diagnostic tests for BINVDM errors	Static NVM Checksum at power-up	≠ Checksum at power-down	Ignition Status Enable Calibration is True	= Run or Crank = 1 (1 is Enabled)	1 failure Runs once at controller initialization	Type A, 1 Trips
			Preserved NVM Checksum at power-up	≠ Checksum at power-down	Ignition Status Enable Calibration is True	= Run or Crank = 1 (1 is Enabled)	1 failure Runs once at controller initialization	
			Power Up Reset BINVDM NVM Checksum at power-up	= False ≠ Checksum at power-down	Ignition Status Enable Calibration is True	= Run or Crank = 1 (1 is Enabled)	Runs once at controller initialization 3 out of 5 controller initilizations for Failure	
			Dynamic NVM checksum at power-up AND Shutdown Finished	≠ Checksum at power-down = TRUE	Ignition Status Enable Calibration is True	= Run or Crank = 1 (1 is Enabled)	1 failure Runs once at controller initialization	
			Static NVM Error Dynamic NVM Error BINVDM ECC Error	= False = False = False	Enable Calibration is True	= 1 (1 is Enabled)	Runs once at controller initialization	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor Control Module B Lost Communication With Hybrid Powertrain Control Module B on Bus B	U182F	This DTC monitors for a Drive Motor Control Module B loss of communication with the Hybrid Powertrain Control Module B on Bus B	Message is not received from controller for Message $1D8 Message $3C5 Message $3D7	 ≥ 0.5 seconds ≥ 0.5 seconds ≥ 0.5 seconds	General Enable Criteria: U0074 Normal CAN transmission on Bus B Device Control High Voltage Virtual Network Management Ignition Voltage Criteria: Ignition voltage Power Mode Off Cycle Enable Criteria: Enable Calibration is True Ignition Accessory Line and Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for Power Mode is in accessory or run or crank and High Voltage Virtual Network Management is not active for U182F	 Not Active on Current Key Cycle Enabled Not Active Not Active >= 11.00 volts or >= 9.50 volts = run = 1 (1 indicates enabled) = Active > 11.00 volts > 3.0000 seconds > 0.4000 seconds Not Active on Current Key	See Threshold Value Diagnostic runs in 12.5 ms loop	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Hybrid Powertrain Control Module B (VICM)	Cycle is present on the bus		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor Control Module B Lost Communication With Hybrid Powertrain Control Module	U1846	This DTC monitors for a Drive Motor Control Module B loss of communication with the Hybrid Powertrain Control Module	Message is not received from controller for Message $1DF Message $1F5	 ≥ 10.00 seconds ≥ 10.00 seconds	General Enable Criteria: U0073 Normal CAN transmission on Bus A Device Control High Voltage Virtual Network Management Ignition Voltage Criteria: Ignition voltage Power Mode Off Cycle Enable Criteria: Enable Calibration is True Ignition Accessory Line and Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for Power Mode is in accessory or run or crank and High Voltage Virtual Network Management is not active for	 Not Active on Current Key Cycle Enabled Not Active Not Active >= 11.00 volts or >= 9.50 volts = run = 1 (1 indicates enabled) = Active > 11.00 volts > 3.0000 seconds > 0.4000 seconds	See Threshold Value Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					U1846 Hybrid Powertrain Control Module	Not Active on Current Key Cycle is present on the bus		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Drive Motor B Control Module Lost Communication With Engine Control Module (ECM)/ Powertrain Control Module (PCM)	U1879	This DTC monitors for a Drive Motor Control Module B loss of communication with the Engine Control Module	Message is not received from controller for Message $0C9 Message $1A3 Message $4C1 Message $4C7 Message $4F1	 ≥ 10.00 seconds ≥ 10.00 seconds ≥ 10.00 seconds ≥ 10.00 seconds ≥ 10.00 seconds	General Enable Criteria: U0073 Normal CAN transmission on Bus A Device Control High Voltage Virtual Network Management Ignition Voltage Criteria: Ignition voltage Power Mode Off Cycle Enable Criteria: Enable Calibration is True Ignition Accessory Line and Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for Power Mode is in accessory or run or crank and High Voltage Virtual Network Management is not active for	 Not Active on Current Key Cycle Enabled Not Active Not Active >= 11.00 V or >= 9.50 V = run = 1 (1 indicates enabled) = Active > 9.50 > 3.0000 seconds > 0.4000 seconds	See Threshold Value Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					U1879 Hybrid Powertrain Control Module	Not Active on Current Key Cycle is present on the bus		

16 OBDG01 Supporting Table - P0C04 D-Axis Current Thresholds

Description: X-Axis is stator temperature, Y-Axis is current threshold for the D-Axis current										
Notes:										
y/x	1	2	3	4	5	6	7	8	9	10
1	-712	-598	-500	-458	-458	-458	-458	-458	-458	-458

DIAGNOSTIC SUMMARY TABLES--HCP (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Crank Pulse Diagnostics								
Crankshaft Position (CKP) Sensor A Circuit	P0335	Detects Lack of Response from 58X Crank Sensor	Crank Sync State (Lores Crank Compared to Hires Crank)	No Activity	HWIO based crank decode status	NOT DisableCrank	5s **Pass Conditions:** Crank Sync State ≠ No Activity	Two Trips, Type B
Crankshaft Position (CKP) Sensor A Performance	P0336	Detects Invalid 58X Crank Sensor Signal	Crank Sync State (Lores Crank Compared to Hires Crank)	Verify Sync	HWIO based crank decode status	NOT DisableCrank	5s OR 10 crank re-sync events in a 10 second window **Pass Criteria:** Crank Status = CrankInSync for 10 seconds	Two Trips, Type B
Idle Speed Diagnostics								
Idle Diagnostics P0506, P0507 have the following common enable criteria	***				No Active DTCs: No Active DTCs: No Active DTCs: Accelerator pedal position Accel Pedal position Engine State Vehicle speed Commanded RPM Delta IdleConditons present	Motor A speed faults: P0A3F, P1B03, P0A40, P0C52, P0C53, P0C5C, P0C5D Motor B speed faults: P0A45, P1B04, P0A46, P0C57, P0C58, P0C61, P0C62 Vehicle Speed/TOS sensor faults: P0722, P077B, P215C Not Defaulted <= 1 % Running (not starting or stopping states) <= 0.6 mph < 50 RPM for >= 5 seconds		
Idle Air Control (IAC) System - RPM Too Low	P0506	This DTC sets when the idle speed is lower than the targeted idle speed	Idle speed	Filtered input speed error (desired - actual) is greater than fail threshold 75 RPM. Filter coefficient for engine speed = 0.002	** Common Enables		1 loop execution at 100 ms rate	Two Trips, Type B

DIAGNOSTIC SUMMARY TABLES--HCP (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
		DTC Pass	Idle speed		** Common Enables		Pass condition met for 15 seconds	
		DTC RePass after failure	Idle Speed	Filtered input speed error (desired - actual), is less than fail threshold 50. Filter coefficient for engine speed = 0.002	No Active DTCs: ** Common Enables	P0507	Pass condition met for 15 seconds	
Idle Air Control (IAC) System - RPM Too High	P0507	This DTC sets when the idle speed is higher than the targeted idle speed	Idle speed	Filtered input speed error (desired - actual) is less than fail threshold -150 RPM. Filter coefficient for engine speed = 0.002	** Common Enables		1 loop execution at 100 ms rate	Two Trips, Type B
		DTC Pass	Idle speed		** Common Enables		Pass condition met for 15 seconds	
		DTC RePass after failure	Idle Speed	Filtered input speed error (desired - actual), is greater than fail threshold -140. Filter coefficient for engine speed = 0.00375	No Active DTCs: ** Common Enables	P0506	Pass condition met for 15 seconds	
Power Moding Diagnostics								
System Voltage Low	P0562	Sets when the low voltage system voltage is below a threshold	Ignition Voltage	<= 10 Volts	Ignition Key Status Engine Speed	RUN/CRANK >= 0 RPM	5 seconds in a 6 second window	Special Type C
		DTC Pass		> 10 Volts			1 second	
System Voltage Hi	P0563	Sets when the low voltage system voltage is above a threshold	Ignition Voltage	>= 18 Volts	Ignition Key Status	RUN/CRANK	5 seconds in a 6 second window	Special Type C
		DTC Pass		Ignition Voltage < 18 Volts			1 second	
Ignition Switch Run/Start Position Circuit Low	P2534	Detects a run crank relay open circuit	Runk Crank Line voltage	<= 2 Volts	CAN Communication ECM run crank active data	enabled available and active	60 seconds (2400 * 0.025) in a 65 second window (2600 * 0.025)	One Trip, Type A
		DTC Pass	Run Crank Line Voltage	> 5 Volts			5 seconds (200 * 0.025)	
Ignition Switch Run/Start Position Circuit High	P2535	Detects a run crank relay short to power	Runk Crank Line voltage	> 5 V	CAN Communication ECM run crank active data	enabled available and false	12 seconds (480 * 0.025) in a 15 second window (600 * 0.025)	One Trip, Type A
		DTC Pass	Run Crank Line Voltage	< 2V			3 seconds (120 * 0.025)	
Ignition Switch Accessory Position Circuit Low	P2537	Detects an accessory position circuit open	Accessory	FALSE	P2537 Propulsion System Propulsion System Active Time	Not Test Failed This Key On and Not Test Passed This Key On Active > 0.5 seconds	0.2 seconds (8 * 0.025)	One Trip, Type A
		DTC Pass	Accessory	TRUE			0.2 seconds (8 * 0.025)	
Stuck Clutch Diagnostics								

DIAGNOSTIC SUMMARY TABLES--HCP (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Transmission Friction Element A Stuck On	P07A3	Detects an applied or welded clutch (C1)	Clutch slip observed	=0	C1 clutch state Clutch slip	=offgoing <= 30 RPM/s	2s * 3 fail attempts + 2 *30 second wait between attempts 3 time retry strategy	One Trip, Type A
		DTC Pass	C1 Slip observed	=1	C1 Slip Speed	> 30 RPM		
Transmission Friction Element B Stuck On	P07A5	Detects an applied or welded offgoing clutch (C2) **OR** Detects an applied or welded clutch (C2)	Clutch slip observed **OR** Clutch slip ref Clutch slip actual	=0 **OR** >360 rpm <100 rpm	C2 clutch state Clutch slip	=offgoing <= 30 RPM/s	.9s 20.6s = (.2s * 3 fail attempts + 2 *10 second wait between attempts)	One Trip, Type A
		DTC Pass	C2 Slip observed Clutch slip reference Clutch slip actual	=1 >360 rpm >200 rpm	C2 Slip Speed	> 30 RPM	.3 s (12*.025s)	
Transmission Friction Element C Stuck On	P07A7	Detects an applied or welded clutch (C2)	Clutch slip ref Clutch slip actual	>360 rpm <100 rpm			20.6s = (.2s * 3 fail attempts + 2 *10 second wait between attempts)	One Trip, Type A
		DTC Pass	Clutch slip reference Clutch slip actual	>360 rpm >200 rpm			.3 s (12*.025s)	
Transm'n Auxilary Oil Pump Diagnostics								
Auxiliary Transmission Fluid Pump Performance	P2797	This diagnostic monitors the aux pump performance based on aux pump filtered desired and actual speed values	Difference between desired and actual aux pump speed	>650 rpm for >.25s	Aux Pump Speed Command RunCrankActive	>= 600 RPM FOR 1 second = 1 for > 0.2 s	Fail Condition met for 3 seconds (120 * 0.025) in a 1.25 second (150 * 0.025) window	One Trip, Type A
		DTC Pass	Aux pump speed	|Aux pump speed - Commanded Aux pump Speed| <= 650 RPM			Pass met for 0.5 seconds ((165-160) * 0.025)	
Transm'n Output Speed Sensor								
Output Speed Sensor Circuit Direction Error	P077B	The DTC detects if the Transmission Output Speed Sensor Direction is Incorrect by Comparing with Calculated Direction from Motor Speed Sign	Transmission Output Speed Direction Raw	≠ Motor Direction	Transmission Output Speed Hybrid Motor Speed based Estimated Output Speed is Valid Transmission Output Speed and Motor Output Speed Difference Motor Estimated Transmission Output	Not FAULT ACTIVE Calculated based on M1 or M2 Speed Equation ≤ 50 RPM ≥ 50 RPM	0.325 seconds (13 counts at 25ms) **Pass Conditions** Opposite of FAIL for 5 seconds (200 counts at 25ms)	One Trip, Type A

DIAGNOSTIC SUMMARY TABLES--HCP (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					Speed			
Vehicle Speed Output Shaft Speed Correlation	P215B	The DTC Monitors if the Difference between the Transmission Output Speed and Output Speed Calculated from the Wheel Speed Sensors	Transmission Output Speed and Output Speed Calculated from the Wheel Speed Sensors Difference	6.2 mph	Number of Secured Vehicle Speed Sources Secured Vehicle Speed Use Transmission Output Speed Secured Vehicle Speed Use Wheel Speed	2 TRUE TRUE	10 seconds (400 counts at 25ms) **Pass Conditions** Opposite of Fail for 20 seconds (800 counts at 25ms)	Two Trips, Type B
Internal Mode Switch 2								
** Common Enable Criteria All IMS Diagnostics have the following Common Enable Criteria	***				Ignition Voltage Run/Crank Active Vehicle Speed Engine Speed	11V < IGN < 32V TRUE < 124 mph for 5 seconds 0 ≤ Engine Speed ≤ 7500 RPM		
Internal Mode Switch 2 R1 Circuit Low Voltage	P181C	The DTC Monitors if the IMS R1 Circuit is Shorted to a Low Voltage	Converted Directional IMS AND Directional IMS R1	Transitional 17 R1 Circuit Has Not Been Observed High	Converted Directional IMS AND Directional IMS R1 **Common Enable Criteria	Transitional 2 R1 Circuit NOT High for 5 seconds	2.7 seconds (108 counts at 25ms) **Pass Conditions** IMS R1 Circuit Has Been Observed High for 3.125 seconds (125 counts at 25ms)	Two Trips, Type B
Internal Mode Switch 2 R1 Circuit High Voltage	P181D	The DTC Monitors if the IMS R1 Circuit is Shorted to a High Voltage	Converted Directional IMS AND Directional IMS R1	Transitional 30 R1 Circuit Has Not Been Observed Low	**Common Enable Criteria		2.7 seconds (108 counts at 25ms) **Pass Conditions** IMS R1 Circuit Has Been Observed Low for 3.125 seconds (125 counts at 25ms)	Two Trips, Type B
Internal Mode Switch 2 R2 Circuit Low Voltage	P181E	The DTC Monitors if the IMS R2 Circuit is Shorted to a Low Voltage	Converted Directional IMS	DRIVE	Converted Directional IMS	PARK	2.7 seconds (108 counts at 25ms)	Two Trips, Type B

DIAGNOSTIC SUMMARY TABLES--HCP (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
			AND Directional IMS R2	R2 Circuit Has Not Been Observed High	AND Directional IMS R2 Directional IMS R2 **Common Enable Criteria	R2 Circuit Low for 5 seconds	**Pass Conditions** IMS R2 Circuit Has Been Observed High for 3.125 seconds (125 counts at 25ms)	
Internal Mode Switch 2 R2 Circuit High Voltage	P181F	The DTC Monitors if the IMS R2 Circuit is Shorted to a High Voltage	Converted Directional IMS AND Directional IMS R2	Transitional 14 OR Transitional 29 R2 Circuit Has Not Been Observed Low	**Common Enable Criteria		2.7 seconds (108 counts at 25ms) **Pass Conditions** IMS R2 Circuit Has Been Observed Low for 3.125 seconds (125 counts at 25ms)	Two Trips, Type B
Internal Mode Switch 2 D1 Circuit Low Voltage	P183A	The DTC Monitors if the IMS D1 Circuit is Shorted to a Low Voltage	Converted Directional IMS AND Directional IMS D1	Transitional 8 OR Transitional 20 D1 Circuit Has Not Been Observed High	**Common Enable Criteria		2.7 seconds (108 counts at 25ms) **Pass Conditions** IMS D1 Circuit Has Been Observed High for 3.125 seconds (125 counts at 25ms)	Two Trips, Type B
Internal Mode Switch 2 D1 Circuit High Voltage	P183B	The DTC Monitors if the IMS D1 Circuit is Shorted to a High Voltage	Converted Directional IMS AND Directional IMS D1	Transitional 27 D1 Circuit Has Not Been Observed Low	**Common Enable Criteria		2.7 seconds (108 counts at 25ms) **Pass Conditions** IMS D1 Circuit Has Been Observed Low for 3.125 seconds (125 counts at 25ms)	Two Trips, Type B
Internal Mode Switch 2 D2 Circuit Low Voltage	P183C	The DTC Monitors if the IMS D2 Circuit is Shorted to a Low Voltage	Converted Directional IMS AND Directional IMS D1	Transitional 24 D2 Circuit Has Not Been Observed High	**Common Enable Criteria		2.7 seconds (108 counts at 25ms) **Pass Conditions** IMS D2 Circuit Has Been Observed High for 3.125 seconds (125 counts at 25ms)	Two Trips, Type B
Internal Mode Switch 2 D2 Circuit High Voltage	P183D	The DTC Monitors if the IMS D2 Circuit is Shorted to a High Voltage	Converted Directional IMS AND Directional IMS D2	Transitional 11 AND Transitional 23 D2 Circuit Has Not Been Observed Low	**Common Enable Criteria		2.7 seconds (108 counts at 25ms)	Two Trips, Type B

DIAGNOSTIC SUMMARY TABLES--HCP (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
							Pass Conditions IMS D2 Circuit Has Been Observed Low for 3.125 seconds (125 counts at 25ms)	
Internal Mode Switch 2-Invalid Range	P183E	The DTC Monitors if the IMS is in an Invalid Range	Converted Directional IMS	Illegal (All Circuits Open)	**Common Enable Criteria		2.7 seconds (108 counts at 25ms) **Pass Conditions** Opposite of Fail for 3.125 seconds (125 counts at 25ms)	Two Trips, Type B
Internal Mode Switch 1-2 Correlation	P183F	The DTC Monitors if the IMS Direction and Range Correlation is Invalid	Converted Directional IMS	Correlation Fault Neutral (With No IMS Faults the Direction IMS and Range IMS Indicate Different Detent Postions)	**Common Enable Criteria		1.25 seconds (50 counts at 25ms) **Pass Conditions** Opposite of Fail for 1.7 seconds (68 counts at 25ms)	One Trip, Type A
Internal Mode Switch 2 S Circuit Low Voltage	P184A	The DTC Monitors if the IMS S Circuit is Shorted to a Low Voltage	Converted Directional IMS AND Directional IMS S Circuit	Transitional 9 Has Not Been Observed High	**Common Enable Criteria		2.7 seconds (108 counts at 25ms) **Pass Conditions** IMS S Circuit Has Been Observed High for 3.125 seconds (125 counts at 25ms)	Two Trips, Type B
Internal Mode Switch 2 S Circuit High Voltage	P184B	The DTC Monitors if the IMS S Circuit is Shorted to a High Voltage	Converted Directional IMS AND Directional IMS S Circuit AND Directional IMS R1	Transitional 26 AND DRIVE Has Not Been Observed Low R1 Has Been Observed Low	**Common Enable Criteria		2.7 seconds (108 counts at 25ms) **Pass Conditions** IMS S Circuit Has Been Observed Low for 3.125 seconds (125 counts at 25ms)	Two Trips, Type B
Battery Pack Diagnostics								
Hybrid Battery System Discharge Time Too Long	P0C76	High voltage bus discharge time too long	High Voltage Inverter Rationalized Voltage	> 200V after 3.5 seconds	Vehicle Power Mode	= RUN	2 Failures out of 2 Samples Frequency: Runs Once per Key-Cycle	One Trip, Type A
Discharge Switch Circuit Open	P1A56	High voltage bus discharge circuit failed Discharge circuit status	High voltage bus voltage delta after commanded discharge circuit event Unavailable	< 75V after 500ms 10 counts	Vehicle Power Mode	= RUN	1 Failure 10 discharge unavailable events	Special Type C

DIAGNOSTIC SUMMARY TABLES--HCP (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
							Frequency: Runs once per key-cycle Pass: High voltage bus delta > 75V after 500ms of a commanded discharge event	
Autostart Diagnostic								
Hybrid System Performance	P0AB9	This diagnostic indicates an autostart or autostop attempt failed.	Engine state	not running	Clutch 3 slip state	Not fault pending or fault active	15s	One Trip, Type A
Engine Performance Diagnostic								
Engine Performance - No Torque Detected	P16E0	This diagnostic indicates that the engine is not producing torque.	Measured Engine Sensed Torque	< 0 Nm	All Secondary Parameters Listed below must be meet for 2 seconds		3.5s out of a 4s window (12.5ms)	One Trip, Type A
			AND Sensed Engine Torque Error	> 50 Nm	Engine Actual Torque Fault	FALSE		
					DTC's not Fault Active	U0100		
					Engine Start Stop State	= Engine Running		
					Engine Torque Command Immediate	≥ 50 Nm		
					Low Fuel Condition	FALSE		
					Fuel Level Data Fault	FALSE		
Controller Diagnostics								
Control Module Read Only Memory (ROM)	P0601	*This Diagnostic tests the checksum on ROM (flash) memory*						One Trip, Type A
		DTC Fail case 1: This DTC will be stored if any check sum in the **boot** is incorrect	Calculated Checksum does not match stored checksum		Ignition Status	= Run or Crank	1 failure if it occurs during the first ROM test of the ignition cycle otherwise 5 failures Frequency: Runs continuously in the background	
		DTC Fail case 2: This DTC will be stored if any check sum in the **calibration** is incorrect						
		DTC Fail case 3: This DTC will be stored if any check sum in the **software** is incorrect						
		DTC Pass:		ROM fault = false 2nd SOH ROM fault = false Main SOH ROM fault = false				
Control Module Not Programmed	P0602	*This Diagnostic tests for whether a controller has been programmed*						One Trip, Type A
		DTC Fail case 1: Indicates that the HCP needs to be programmed	Fails if No Start Calibration is set to true which is only available on a new un-programmed HCP		Ignition Status	= Run or Crank	Runs once at power up	

DIAGNOSTIC SUMMARY TABLES--HCP (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
		DTC Pass:		Enable cal = false				
Control Module Long Term Memory Reset	P0603	*This Diagnostic tests for BINVDM errors*						One Trip, Type A
		DTC Fail case 1: Non-volatile memory (**Static**) checksum error at controller power-up	Checksum at power-up does not match checksum at power-down		Ignition Status	= Run or Crank	1 failure Frequency: Once at powerup	
		DTC Fail case 2: Non-volatile memory (**Preserved**) checksum error at controller power-up						
		DTC Fail case 3: Non-volatile memory (**BINVDM**) checksum error at controller power-up						
		DTC Fail case 4: Non-volatile memory (**ShutdownFinished**) checksum error at controller power-up						
		DTC Pass:		No ROM memory faults				
Control Module Random Access Memory (RAM) Failure	P0604	*This Diagnostic tests that the RAM is functioning correctly*						One Trip, Type A
		DTC Fail case 1: The primary Ye variable does not match the redundant Ya variable **Dual Store** RAM	Ye variable	≠ Ya Variable	Ignition Status	= Run or Crank	Runs real time	
		DTC Fail case 2: Indicates that HCP is unable to correctly write to **Write Protect** RAM	Memory location is locked	Function is trying to write to that location			1 failure Frequency: Once at powerup	
		DTC Fail case 4: Indicates that HCP is unable to correctly write and read data to and from **System** RAM	HWIO detects Fault	= true				
		DTC Fail case 5: Indicates that HCP is unable to correctly write and read data to and from **Cache** RAM	HWIO detects Fault	= true				
		DTC Fail case 6: Indicates that HCP is unable to correctly write and read data to and from **eTPU** RAM	HWIO detects Fault	= true				
		DTC Pass:		No errors in 1000ms MainSOH RAM faults = false CommFlts = false System RAM faults = false CacheRam faults = false eTPU RAM faults = false				
Control Module Internal Performance	P0606	*This Diagnostic tests all the internal processor integrity subsystems*						One Trip

DIAGNOSTIC SUMMARY TABLES--HCP (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Performance		**DTC Fail case 1:** Indicates that the HCP has detected an internal processor integrity fault CePISR_e_MainDtctdSPI_Flt	HWIO detects Fault	= true (in SPI Hardware)	Run/Crank Voltage OR Powertrain Relay Voltage Diagnostic System Enable Powermoding	> 9.5 Volts = true = Accesory or Off	28 fail counts out of 32 sample counts Executes in a 6.25ms loop Detects in 200ms	Type A
		DTC Fail case 2: Indicates that the HCP has detected an internal processor integrity fault CePISR_e_2ndNotRunningSeedKyTst	Key Value	= Calibration Value	SRAR shutdowns SPI Fault RunCrank Active Ram or ROM fault 12V battery Seed received in wrong order fault Vehicle Speed Seed/Key Timeout Powermode	= False =False = False = false >11V = false <= 0 MPH = False = off for less than 5 seconds	Detects in 150ms	

DIAGNOSTIC SUMMARY TABLES--HCP (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
		DTC Fail case 3: Indicates that the HCP has detected an internal processor integrity fault CePISR_e_2ndFailsToTakeRmdlActn	IPT Detects faulty harware in Inhibit path IPT feedback	≠ calibration Value	HV Bat contactor Staus Available MMDR HPMR HV Battery Contactors Motor Faults Motor Speed SRAR shutdowns SPI Fault RunCrank Active Ram or ROM fault	= True = Powerdown Wait State = Eval BP Open State >= 80 V = Closed = False <= 10 RPM = False =False = False = False	Up down counter = 3	
					12V battery Seed received in wrong order fault Vehicle Speed Seed/Key Timeout Powermode	>11V = false <= 0 MPH = False = off for less than 5 seconds		
		DTC Fail case 4: Indicates that the HCP has detected an internal processor integrity fault CePISR_e_2ndRxIncorrectKeys	Key Value	≠ Calibration Value	1. Number Of Mains 2. IPT status	1. > 0 2. = Not running for > 0.075s	Detects in 150ms or two consecutive faulty keys	

DIAGNOSTIC SUMMARY TABLES--HCP (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
		DTC Fail case 5: Indicates that the HCP has detected an internal processor integrity fault CePISR_e_MainDtctdSdKeyTimeout	seed does not update	within Calibration threshold	1. Number Of Monitors 2. SPI faults	1. > 0 2. = FALSE	Detects in 1 sec	
		DTC Fail case 6: Indicates that the HCP has detected an internal processor integrity fault CePISR_e_MainDtctdSdRxWrongOrdr	Seed sequence	≠ expected order	1. Number Of Monitors 2. SPI faults	1. > 0 2. = FALSE	12 fail counts out of 16 sample counts Executes in a 12.5ms loop Detects in 200ms	
		DTC Fail case 7: Indicates that the HCP has detected an internal processor integrity fault CePISR_e_MainSequenceFlt	Seed timeout PSW Fault	> 200 ms = True	1. Seed Update Key StoreFault Enable OR 2. Program Sequence Watch Enable	1. = True 2. = True	3 fail counts out of 4 sample counts Executes in a 50ms loop Detects in 200ms	
		DTC Fail case 8: Indicates that the HCP has detected an internal processor integrity fault CePISR_e_MainALU_Flt	HWIO detects Fault	=2 (ina row)	1. ALU Test Enabled 2. Diagnostic system status 3. Code clear active 4. PMDI Low voltage clear diag enable conditons met	1. = TRUE 2. = Enabled 3. >= 0.15s 4. = True	runs continuously in 12.5ms loop Detects in 12.5ms	
		DTC Fail case 9: Indicates that the HCP has detected an internal processor integrity fault CePISR_e_MainCfgRegFlt	HWIO detects Fault	=2 (in arow)	1. Diagnostic Test Enabled 2. Diagnostic system status 3. Code clear active 4. PMDI Low voltage clear diag enable conditons met	1. = TRUE 2. = Enabled 3. >= 0.15s 4. = True	runs continuously in 12.5ms loop Detects in 12.5ms	
		DTC Fail case 10: Indicates that the HCP has detected an internal processor integrity fault CePISR_e_MainStackFlt	HWIO detects Fault	= 5 (Since Powerup)	Diagnostic Test Enabled Diagnostic System Enables	= True =True	Runs Continuously in 100ms loop Detects in 500ms	
		DTC Fail case 11: Indicates that the HCP has detected an internal processor integrity fault CePISR_e_MainADC_Flt	Continuous Fault	> 200ms	1. A2D Converter Test Enabled 2. PT Relay Voltage 3. Run Crank Voltage	1. = TRUE 2. > -1 3. > 7	5 fail counts out of 8 sample counts Executes in a 50ms loop Detects in 200ms	

DIAGNOSTIC SUMMARY TABLES--HCP (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
		DTC Fail case 12: Indicates that the HCP has detected an internal processor integrity fault CePISR_e_RunCrankCorrFlt	Run Crank on Seconday Processor	≠ Run Crank Active	1. Run Crank Discrete Diagnostic Enable 2. SPI Faults	1. = True 2. = False	5 fail counts out of 8 sample counts Executes in a 25ms loop Detects in 200ms	
		DTC Fail case 13: Indicates that the HCP has detected an internal processor integrity fault CePISR_e_FlashECC_CktTest	HWIO detects Fault	= 3 /10 5/10	1. Flash ECC Circuit Test Enable 2. Power-Up Reset	1. = True 2. = True	3 fail counts out of 10 sample counts (turns on MIL) 5 fail counts out of 10 sample counts (shutdown vehicle) Executes once at every power up reset	
		DTC Fail case 14: Indicates that the HCP has detected an internal processor integrity fault CePISR_e_RAM_ECC_CktTest	HWIO detects Fault	= 3 /10 5/10	1. RAM ECC Circuit Test Enable 2. Power-Up Reset	1. = True 2. = True	3 fail counts out of 10 sample counts (turns on MIL) 5 fail counts out of 10 sample counts (shutdown vehicle) Executes once at every power up reset	
		DTC Fail case 15: Indicates that the HCP has detected an internal processor integrity fault CePISR_e_DMA_XferTest	HWIO detects Fault or Memory Copy Error	= True or =True	Diagnostic Test Enabled	= TRUE		
Torque Security Diagnostics								
Internal Control Module Torque Performance	P061A	*This Diagnostic tests if the regen is reported accurately to the brake control module*						One Trip, Type A
		DTC Fail case 1: The Estimated output torque Commanded exceeds the upper Regen torque limit	The Estimated output torque Commanded	>The drivers output torque Request + .2g (534Nm)	Regenerative Braking Torque	> 0 Nm	14 fail counts out of 16 sample counts Executes in a 12.5ms loop Detects in 200ms	
		DTC Pass:		The Estimated output torque Commanded <= The drivers output torque Request + .2g (534Nm)				
Internal Control Module Torque Calculation Performance	P061B	*This Diagnostic tests if the hybrid torque command can create an unintended acceleration/decelerration or wrong direction hazzard*						One Trip, Type A

DIAGNOSTIC SUMMARY TABLES--HCP (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Performance		**DTC Fail case 1:** The Estimated output torque Commanded exceeds the upper torque limit To Max Fault	The Estimated output torque Commanded	> Maximum of either the drivers output torque request or zero plus .2g (534Nm)		Runs continuously when a torque source is present	14 fail counts out of 16 sample counts Executes in a 12.5ms loop Detects in 200ms	Type A
		DTC Fail case 2: The Estimated output torque Commanded exceeds the lower torque limit To Min Fault	The Estimated output torque Commanded	< Minimum of either the drivers output torque request or zero minus .2g (534Nm)				
		DTC Fail case 3: Transmission output torque rationality check violated To Req Rat Fault	Axle torque request is converted to transmission output torque. When this converted output torque violates the rationality check comparison by 1 Nm for greater than 200ms a failure is flagged.	1Nm				
		DTC Fail case 4: Brake torque request rationality check violated To Req Rat Fault	Brake torque request is converted to transmission output torque. When this converted output torque violates the rationality check comparison by 1 Nm for greater than 200ms a failure is flagged.					
		DTC Fail case 5: Output torque negative when driver request is positive Sign Diff Fault	When the PRNDL equals drive and the driver requested torque is positive while the commanded output torque is negative and below a -0.2g (-534Nm) threshold for greater than 200ms.	-534Nm (equivalent to -0.2g)	Vehicle Speed TOSS sensor fault is active or vehicle speed sensor fault is active	< 7mph		
		DTC Fail case 6: Output torque positive when driver request is negative Sign Diff Fault	When the PRNDL equals reverse and driver requested torque is negative while the commanded output torque is positive and greater than a 0.2g (534Nm) threshold for greater than 200ms.	534Nm (equivalent to 0.2g)				
		DTC Fail case 7: The primary Input Torque Correction does not equal the redundant calculation Ti Corr Fault	When the redundant calculation of the input torque correction is .2g (534Nm)	> or < the primary calculation		Runs continuously when a torque source is present		

DIAGNOSTIC SUMMARY TABLES--HCP (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
		DTC Fail case 8: The Traction Motor torque command exceeds the motor torque capacity Tm Cmd Fault	The Traction Motor torque command	>Maximum motor torque capacity plus .2g (534Nm) or less than the minimum torque capacity minus .2g (534Nm)				
Control Module Long Term Memory Performance	P062F	*This Diagnostic tests for unuseable BINVDM (flash) memory only*						One Trip, Type A
		DTC Fail case 1: Indicates that the NVM Error flag **HWIO Bat Write will not succeed** set	Last EEPROM write did not complete		Ignition State	= accesory, run, or crank	1 failure Frequency: Once at power-up	
		DTC Fail case 2: Indicates that the NVM Error flag **HWIO Assembly Cal** set						
		DTC Pass:		NV writewillnotsucceed = fail Assemblycalfail = false				
Torque Management System – Forced Engine Shutdown	P06AF	*This Diagnostic checks that the ECM is still functioning correctly*						One Trip, Type A
		DTC Fail case 1: The main processor monitor ring compares the ECM 2nd pattern (nibble pattern) to known good pattern to determine ECM state of health.	The nibble pattern is incorrect	The pattern does not match (F, 5, B, D, A, 6, 3, 0)	Run/Crank Voltage OR Powertrain Relay Voltage	> 9.5 Volts	8 fail counts out of 12 sample counts Executes in a 12.5 ms Loop Detects in 200ms	
		DTC Pass:		2nd RX pattern smpl > Smpl Limit Nibble pattern completed				
Supply Voltage Circuit Diagnostics								
Supply Voltage Circuit 2 Low Voltage	P150D							Special Type C
		DTC Fail case 1: Supply Voltage Circuit 2 Low Voltage	Ignition Voltage	< 8V	Enable Cals Diag System Disable	= true = false	20 Fail count out of 25 sample counts Executes in a 100ms loop Detects in 2.5s	
		DTC Pass:		No failure in 2.5s				
Supply Voltage Circuit 1 Low Voltage	P150E							Special Type C

DIAGNOSTIC SUMMARY TABLES--HCP (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
		DTC Fail case 1: Supply Voltage Circuit 1 Low Voltage	Ignition Voltage	< 8V	Enable Cals Diag System Disable	= true = false	20 Fail count out of 25 sample counts Executes in a 100ms loop Detects in 2.5s	
		DTC Pass:		No failure in 2.5s				
Alive Rolling Count Diagnostics								
Alive Rolling Count / Protection Value fault for the Engine Actual Torque Steady State	P15F0	*This Diagnostic checks for corruption in signals sent over CAN for the Engine Actual Torque Steady State*						One Trip, Type A
		DTC Fail case 1: Detect the ARC (Alive Rolling Count) or Protection Value fault by checking the ARC and Protection Value of the Engine Actual Torque Steady State	The current alive rolling count value does not equal the previous alive rolling count value incremented by 1 OR The primary signal value does not equal the protection value	Current ARC ≠ Previous ARC +1 Primary Value ≠ Protection Value	Ignition Key Status	Run/Crank for > 0.5 seconds	14 fail counts out of 16 sample counts Executes in a 12.5 ms Loop Detects in 200ms	
Alive Rolling Count / Protection Value fault for the commanded predicted axle torque	P15F1	*This Diagnostic checks for corruption in signals sent over CAN for the commanded predicted axle torque*						One Trip, Type A
		DTC Fail case 1: Detect the ARC (Alive Rolling Count) or Protection Value fault by checking the ARC and Protection Value of the commanded predicted axle torque	The current alive rolling count value does not equal the previous alive rolling count value incremented by 1 OR The primary signal value does not equal the protection value	Current ARC ≠ Previous ARC +1 Primary Value ≠ Protection Value	Ignition Key Status	Run/Crank for > 0.5 seconds	14 fail counts out of 16 sample counts Executes in a 12.5 ms Loop Detects in 200ms	
Alive Rolling Count / Protection Value fault for the Regenerative Braking Axle Torque	P1B15	*This Diagnostic checks for corruption in signals sent over CAN for the Regenerative Braking Axle Torque*						One Trip, Type A
		DTC Fail case 1: Detect the ARC (Alive Rolling Count) Protection Value fault by checking the ARC and Protection Value of the Regenerative Braking Axle Torque	The current alive rolling count value does not equal the previous alive rolling count value incremented by 1 OR The primary signal value does not equal the protection value	Current ARC ≠ Previous ARC +1 Primary Value ≠ Protection Value	Ignition Key Status	Run/Crank for > 0.5 seconds	21 fail counts out of 32 sample counts Executes in a 6.25 ms Loop Detects in 200ms	
Internal Control Module Transmission Direction Range Switch	P16F2	*Detect transmission direction errors by reading the states of the Direction IMS switches as well as determining a transmission direction and comparing it to the transmission direction from the primary controls path.*						One Trip, Type A

DIAGNOSTIC SUMMARY TABLES--HCP (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
		DTC Fail case 1: No direction match with no IMS failures	Read the Direction IMS switches and determine that they represent a valid transmission direction (P,R,N,D) but it does not match the transmission direction determined by the primary controls path.		Run/Crank Voltage OR Powertrain Relay Voltage	> 9.5 Volts	5 fail counts out of 8 sample counts Executes in a 25ms loop Detects in 200ms	
		DTC Fail case 2: Multiple transmission directions with no IMS failures	Read the Direction IMS switches and determine that they represent more than one valid transmission direction (P,R,N,D).					
		DTC Fail case 3: No direction match with one IMS failure	Read the Direction IMS switches and determine that one switch has failed and calculate a transmission direction, but it does not match the transmission direction determined by the primary controls path.					
		DTC Fail case 4: Multiple transmission directions with one IMS failure	Read the Direction IMS switches and determine that one switch has failed and calculate a transmission direction and determine that they represent more than one valid transmission direction (P,R,N,D).					
		DTC Fail case 5: Unable to determine transmission direction	Reads the Direction IMS switches and determine that more than one switch has failed and cannot calculate a transmission direction.					
Internal Control Module Redundant Memory Performance	P16F3	*Detect the dual store memory fault by comparing the primary value and the dual store value of the individual variables*						One Trip, Type A
		DTC Fail case 1: Detect the dual store memory fault by comparing the primary Ve signals and the We redundant signals	The primary value and the dual store value are not equal			Runs continuously	Signal DependendantX fail counts out of Y sample counts Executes in a Xms loop **All Detected in 200ms**	
		DTC Fail case 2: Detect the dual store memory fault by comparing the primary Ye signals and the Ya redundant signals				Fail Timer incremented Runs continuously	> 175ms Detects in 200ms	
		DTC Pass:		No errors in 1000ms				
Internal Control Module Transmission Range Control Performance	P16F4	*Detect transmission range errors by comparing the Direction IMS switches with the Range IMS information from the TCM.*						One Trip, Type A
		DTC Fail case 1: Positive transmission ranges that do not match	The Range IMS and Direction IMS from the primary controls path and both have valid transmission positions (P, R, N, D) but the two do not match.		Run/Crank Voltage OR Powertrain Relay Voltage	> 9.5 Volts	5 fail counts out of 8 sample counts Executes in a 25ms loop Detects in 200ms	

DIAGNOSTIC SUMMARY TABLES--HCP (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
		DTC Fail case 2: Error corrected Direction IMS does not match	The Range IMS has a valid transmission position and the Direction IMS from the primary controls path has an error corrected transmission position, but the two do not match.					
		DTC Fail case 3: Range IMS is between valid transmission positions and Direction IMS is error corrected	The Range IMS indicates a transitional PRNDL position and the Direction IMS has an error corrected transmission position.					
		DTC Fail case 4: Range IMS is invalid and Direction IMS is error corrected	The Range IMS is invalid due to a fault or a problem with the TCM, and the Direction IMS has an error corrected transmission position.					
		DTC Fail case 5: Range IMS is between valid transmission positions and Direction IMS is invalid	The Range IMS indicates a transitional PRNDL position and the Direction IMS is invalid due to a fault or a problem with the HCP					
		DTC Fail case 6: Range IMS and Direction IMS are both invalid	The Range IMS is invalid due to a fault or a problem with the TCM, and the Direction IMS is invalid due to a fault or a problem with the HCP					
Internal Control Module Commanded Range State	P16F6	*The Transmission Range State monitor verifies that there are no mismatches in system equations, the transmission range state being executed is valid, and the transmission range state has not performed an invalid transition*						One Trip, Type A
		DTC Fail case 1: Invalid Transmission Range State	The current Transmission Range State being used by the system is detected to be an invalid value within the current Transmission Range State Group.			Runs continuously	1 failure Detected within 25ms of failure	
		DTC Fail case 2: Invalid Transmission Range State Group	The current Transmission Range State Group being used by the system is an invalid value.					
		DTC Fail case 3: Invalid Transmission Range State transition	The current Transmission Range State has changed, and the change in value is not one of the supported transitions from the previous Transmission Range State.					
		DTC Fail case 4: Range Equation mismatches current Transmission Range State	The Range Equation can not be rationalized against the current Transmission Range State.					
		DTC Fail case 5: Torque Determination State mismatches current Transmission Range State	The Torque Determination State can not be rationalized against the current Transmission Range State.					
		DTC Fail case 6: Input Torque Optimization State mismatches current Transmission Range State	The Input Torque Optimization State can not be rationalized against the current Transmission Range State					
Redundant Speed Sensor Circuit Diagnostics								
Control Module Redundant Drive Motor A	P1E4A	*This Diagnostic rationalizes the HCP calculated MTR Aspeed against MCP A calculated MTR A speed*						One Trip,

DIAGNOSTIC SUMMARY TABLES--HCP (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Speed Sensing Circuit		**DTC Fail case 1:** The difference between Mtr A calculated speed and HCP calculated MTR A speed exceeds a threshold	The difference between Mtr A calculated speed and HCP calculated MTR A speed	> 400	Enable Cal Run/Crank Voltage OR Run/Crank Voltage Secured	= true = true	21 fail counts out of 32 sample counts Executes in a 6.25ms loop Detects in 200ms	Type A
Control Module Redundant Drive Motor B Speed Sensing Circuit	P1E4B	*This Diagnostic rationalizes the HCP calculated MTR B speed against MCP B calculated MTR B speed*						One Trip, Type A
		DTC Fail case 1: The difference between Mtr B calculated speed and HCP calculated MTR B speed exceeds a threshold	The difference between Mtr B calculated speed and HCP calculated MTR B speed	> 400	Enable Cal Run/Crank Voltage OR Run/Crank Voltage Secured	= true = true	21 fail counts out of 32 sample counts Executes in a 6.25ms loop Detects in 200ms	
Communication Diagnostics								
Control Module Comm'n Bus A Off	U0073	*This diagnostic indicates a bus off condition on HSGMLAN (Bus A)*						One Trip, Type A
		DTC Fail case 1: Detects that a CAN serial data bus shorted condition has occurred to force the CAN device driver to enter a bus-off state.	CAN device driver	= bus-off state.	Run/Crank Voltage OR Powertrain Relay Voltage Power Mode Bus Off Fault Active Normal Communication Enabled Normal Message Transmission Diagnostic System Disable Diagnostic Enable Timer	> 9.5 Volts =RUN =FALSE =TRUE =TRUE =FALSE >=3 sec	4 fail counts out of 5 samples counts Executes in a 12.5ms loop Detects in 450 ms	
Control Module Comm'n Bus B Off	U0074	*This diagnostic indicates a bus off condition on the PTE (Bus B)*						One Trip, Type A
		DTC Fail case 1: Detects that a CAN serial data bus shorted condition has occurred to force the CAN device driver to enter a bus-off state.	CAN device driver	= bus-off state.	Run/Crank Voltage OR Powertrain Relay Voltage	> 9.5 Volts	4 fail counts out of 5 samples counts Executes in a 12.5ms loop Detects in 450 ms	

DIAGNOSTIC SUMMARY TABLES--HCP (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					Power Mode	=RUN		
					Bus Off Fault Active	=FALSE		
					Normal Communication Enabled	=TRUE		
					Normal Message Transmission	=TRUE		
					Diagnostic System Disable	=FALSE		
					Diagnostic Enable Timer	>=3 sec		
Control Module Comm'n Bus E Off	U0077	*This diagnostic indicates a bus off condition on the CE (Bus E)*						One Trip, Type A
		DTC Fail case 1: Detects that a CAN serial data bus shorted condition has occurred to force the CAN device driver to enter a bus-off state.	CAN device driver	= bus-off state.	Run/Crank Voltage OR Powertrain Relay Voltage	> 9.5 Volts	4 fail counts out of 5 samples counts Executes in a 12.5ms loop Detects in 450 ms	
					Power Mode	=RUN		
					Bus Off Fault Active	=FALSE		
					Normal Communication Enabled	=TRUE		
					Normal Message Transmission	=TRUE		
					Diagnostic System Disable	=FALSE		
					Diagnostic Enable Timer	>=3 sec		
Lost Comm'n With ECM/PCM on Bus A	U0100	*This diagnostic indicates a lost communication between the HCP and the ECM on Bus A*						One Trip, Type A
		DTC Fail case 1: Detects that CAN serial data communication has been lost with the ECM on Bus A	Missed ECM Messages		Run/Crank Voltage OR Powertrain Relay Voltage	> 9.5 Volts	Executes in a 6.25ms loop Detects in 500 ms	
					Power Mode	=RUN/ACC		
					Bus Off Fault Active	=FALSE		

DIAGNOSTIC SUMMARY TABLES--HCP (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					Normal Communication Enabled	=TRUE		
					Normal Message Transmission	=TRUE		
					Diagnostic System Disable	=FALSE		
					Diagnostic Enable Timer	>=3 sec		
Lost Comm'n With TCM	U0101	*This diagnostic indicates a lost communication between the HCP and the TCM on Bus A*						One Trip, Type A
		DTC Fail case 1: Detects that CAN serial data communication has been lost with the TCM on Bus A	Missed TCM Messages		Run/Crank Voltage OR Powertrain Relay Voltage	> 9.5 Volts	Executes in a 6.25ms loop	
					Power Mode	=RUN/ACC	Detects in 500 ms	
					Bus Off Fault Active	=FALSE		
					Normal Communication Enabled	=TRUE		
					Normal Message Transmission	=TRUE		
					Diagnostic System Disable	=FALSE		
					Diagnostic Enable Timer	>=3 sec		
Lost Comm'n With Brake System Control Module	U0129	*This diagnostic indicates a lost communication between the HCP and the BSCM on Bus A*						Two Trips, Type B
		DTC Fail case 1: Detects that CAN serial data communication has been lost with the EBCM on Bus A	Missed EBCM Messages		Run/Crank Voltage OR Powertrain Relay Voltage	> 9.5 Volts	Executes in a 6.25ms loop	
					Power Mode	=RUN/ACC	Detects in 500 ms	
					Bus Off Fault Active	=FALSE		
					Normal Communication Enabled	=TRUE		
					Normal Message Transmission	=TRUE		
					Diagnostic System Disable	=FALSE		
					Diagnostic Enable Timer	>=3 sec		
Lost Communication With	U0140	*This diagnostic indicates a lost communication between the HCP and the BCM on Bus A*						Special

DIAGNOSTIC SUMMARY TABLES--HCP (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Body Control Module								Type C
		DTC Fail case 1: Detects that CAN serial data communication has been lost with the BCM on Bus A	Missed BCM Messages		Run/Crank Voltage OR Powertrain Relay Voltage Power Mode Bus Off Fault Active Normal Communication Enabled Normal Message Transmission Diagnostic System Disable Diagnostic Enable Timer	> 9.5 Volts =RUN/ACC =FALSE =TRUE =TRUE =FALSE >=3 sec	Executes in a 6.25ms loop Detects in 500 ms	
Lost Comm'n With Hybrid Powertrain Control Module B	U179A	*This diagnostic indicates a lost communication between the HCP and the VICM on Bus A*						One Trip, Type A
		DTC Fail case 1: Lost Communication with	Missed VICM Messages		Run/Crank Voltage OR Power Mode Bus Off Fault Active Normal Communication Enabled Normal Message Transmission Diagnostic System Disable Diagnostic Enable Timer	> 9.5 Volts =RUN/ACC =FALSE =TRUE =TRUE =FALSE >=3 sec	Executes in a 6.25ms loop	
Lost Comm'n With ECM/PCM on Bus B	U1818	*This diagnostic indicates a lost communication between the HCP and the ECM on Bus B*						One Trip, Type A
		DTC Fail case 1: Detects that CAN serial data	Missed ECM Messages		Run/Crank Voltage OR Power Mode Bus Off Fault Active Normal Communication Enabled Normal Message Transmission	> 9.5 Volts =RUN/ACC =FALSE =TRUE =TRUE	Executes in a 6.25ms loop	

DIAGNOSTIC SUMMARY TABLES--HCP (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					Diagnostic System Disable	=FALSE		
					Diagnostic Enable Timer	>=3 sec		
Lost Comm'n With Hybrid Powertrain Control Module B on Bus B	U182D	*This diagnostic indicates a lost communication between the HCP and the VICM on Bus B*						One Trip, Type A
		DTC Fail case 1: Lost Communication with Hybrid Powertrain Control Module B on Bus B (VICM)	Missed VICM Messages		Run/Crank Voltage OR Powertrain Relay Voltage	> 9.5 Volts	Executes in a 6.25ms loop	
					Power Mode	=RUN/ACC	Detects in 500 ms	
					Bus Off Fault Active	=FALSE		
					Normal Communication Enabled	=TRUE		
					Normal Message Transmission	=TRUE		
					Diagnostic System Disable	=FALSE		
					Diagnostic Enable Timer	>=3 sec		
Lost Comm'n With BSCM on Bus E	U1833	*This diagnostic indicates a lost communication between the HCP and the BSCM on Bus E*						Two Trips, Type B
		DTC Fail case 1: Detects that CAN serial data communication has been lost with the BSCM	Missed BSCM Messages		Run/Crank Voltage OR Powertrain Relay Voltage	> 9.5 Volts	Executes in a 6.25ms loop	
					Power Mode	=RUN/ACC	Detects in 500 ms	
					Bus Off Fault Active	=FALSE		
					Normal Communication Enabled	=TRUE		
					Normal Message Transmission	=TRUE		
					Diagnostic System Disable	=FALSE		
					Diagnostic Enable Timer	>=3 sec		

DIAGNOSTIC SUMMARY TABLES--TCM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Power Moding Diagnostics								
System Voltage Low	P0562	Sets when the low voltage system voltage is below a threshold	Ignition Voltage	Ignition Voltage <= 10 Volts	RunCrankActive Engine Speed	= 1 >= 0 RPM	5 seconds in a 6 second window	Special Type C
		DTC Pass		Ignition Voltage > 10 Volts			1 second	
System Voltage Hi	P0563	Sets when the low voltage system voltage is above a threshold	Ignition Voltage	Ignition Voltage >= 18 Volts	RunCrankActive	= 1	5 seconds in a 6 second window	Special Type C
		DTC Pass		Ignition Voltage < 18 Volts			1 second	
Shift Solenoid Hydraulic Diagnostics								
Shift Solenoid Hydraulic Diagnostics P0751, P0752, P0756, P0757 have the following common enable criteria	***				Line Pressure Estimate Propulsion System Active	> 325 kpa AND >= 325 kpa FOR > 1 seconds AND > 100 kpa = 1		
Shift Solenoid Valve A Stuck Off	P0751	This DTC will indicate when Shift Solenoid Valve A (X Valve) is stuck in the hydraulically low position This detection only occurs during an X valve transition	X valve is determined to be in a hydraulically Low state when it has been commanded hydraulically High.	X Commanded Hi for > XvalveTurnOnTime + 1 seconds Where XValveTurnOnTime: Trans Fluid Temp Time -40 0.50 -30 0.35 -20 0.250 -10 0.09 20 0.05 140 0.02	X Command X Position	1 0	Fail conditions met for 3 seconds. 3 retries with failure to move solenoid required to set MIL	One Trip, Type A
		DTC Pass	X valve completes Low to High transition without failure		X Command X Position	1 1	1 loop execution at 0.0125 seconds	

DIAGNOSTIC SUMMARY TABLES--TCM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Shift Solenoid Valve A Stuck On	P0752	This DTC will indicate when Shift Solenoid Valve A (X Valve) is stuck in the hydraulically hi position This DTC is linked to both a steady state and transitional test.	X valve is determined to be in a hydraulically high state when it has been commanded to a low state.	**Transition Case:** X commanded Low for > (XvalveTurnOffTm + 1) seconds Where XValveTurnOffTime: Trans Fluid Temp Time -40 4 -30 2.25 -20 1.4 -10 .5 20 0.265 140 0.0325	X Command X Position	0 1	Fail conditions met for 3 seconds. 3 retries with failure to move solenoid required to set MIL	One Trip, Type A
		DTC Pass (**Transitional Pass**)	X valve completes High to Low transition without failure		X Command X position PCS2 and PCS4 Monitors	0 0 No Fault Pending	5 seconds	
				Steady State Case: Simultaneous failures occur on both PCS2 and PCS4 monitors	XY state PCS2 and PCS4 faults	EVT Lo **OR** EVT Hi Occur Simultaneously - within (VlvXStckHiSteadyStWindow + 0.1) seconds Where VlvXStckHiSteadyStWindow: Trans Fluid Temp Time -50 0.50 -32 0.50 -24 0.50 -5 0.50 4 0.50 40 0.50	Fail Conditions met for 2 seconds	
		DTC Pass (**Steady State Pass**)	X valve completes High to Low transition without failure		X Command X position PCS2 and PCS4 Monitors	0 0 No Fault Pending	5 seconds	

DIAGNOSTIC SUMMARY TABLES--TCM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Shift Solenoid Valve B Stuck Off	P0756	This DTC will indicate when Shift Solenoid Valve B (Y Valve) is stuck in the hydraulically low position This detection only occurs during an Y valve transition	The Y valve is determined to be in a hydraulically Low state when it has been commanded hydraulically High.	Y Commanded Hi for > (Yvalve_TurnOnTm + 1 seconds Where Yvalve_TurnOnTm: Trans Fluid Temp Time -40 15 -30 10 -20 5 -10 0.30 20 0.15 140 0.05	Y Command Y Position	1 0	Fail Conditions met for 4.5 seconds. 3 retries with failure to move solenoid required to set MIL	One Trip, Type A
		DTC Pass	Y valve completes Low to High transition without failure		Y command Y Position	1 1 (as indicated by YPSw showing 0 value)	Pass conditions met for 2 seconds	
Shift Solenoid Valve B Stuck On	P0757	This DTC will indicate when Shift Solenoid Valve B (Y Valve) is stuck in the hydraulically hi position This detection only occurs during an Y valve transition	The Y valve is determined to be in a hydraulically Hi state when it has been commanded hydraulically Lo	Y Commanded Lo for > (Yvalve_TurnOffTm + 1) seconds Where Yvalve_TurnOffTm: Trans Fluid Temp Time -40 4 -30 2.7 -20 1.4 -10 .7 20 .2 140 .05	Y Command Y Position	0 1	Fail Conditions met for 4.5 seconds. 3 retries with failure to move solenoid required to set MIL	One Trip, Type A
		DTC Pass	Y valve completes High to Low transition without failure		Y Command Y Position	0 0 (as indicated by YPSw showing 1 value)	Pass conditions met for 2 seconds	
Pressure Control Solenoid Hydraulic Diagnostics								
Pressure Control Solenoid hydraulic diagnostics P0777, P0797, P2715, share these common secondary parameter enable conditions	***				Xvalve transition X Valve Stuck Hi Detection	X valve is not in a transition, and hasn't transitioned in the last 0.275 seconds (0.025 + .25) No fault pending		

DIAGNOSTIC SUMMARY TABLES--TCM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					LinePressure Estimate Propulsion System Active	> 325 kpa AND >=325 kpa FOR > 1 seconds =1		
Pressure Control (PC) Solenoid B Stuck ON	P0777	This DTC will determine if Pressure Control Solenoid 2 (B) is stuck in the hydraulically hi position. This DTC has two fail cases.	The pressure switch associated with pressure control solenoid B (PCS2) is indicating that the PCS is in the full feed position when the PCS has been commanded regulating exhaust.	**Fail Case 1:** PCS2PS (PSw3) indicates hi hydraulic pressure	PCS commanded pressure *** Common Hydraulic Enables	<= 5 kpa for >= (FFDelay + 0.1) seconds Where FFDelay: Temp Time -50 4.50 -30 1.40 -18 0.80 -4 0.30 13 0.19 40 0.08	Failure exists for 30 seconds (2400 * 0.0125)	One Trip, Type A
		DTC Pass	Pass when PCS2PS and PCS2Cmnd are in agreement (Reg Exhaust)	PCS2PS (PSw3) indicates Low hydraulic pressure			1.25 seconds ((2500 - 2400) * 0.0125)	
			The warning threshold for Fail Case 1 has been met 5 times in a single key cycle	**Fail Case 2:** Fail case 1 criteria met for at least 0.5 seconds (40 * 0.0125), more than 10 times in a given key cycle	Same as **Fail Case 1.**		N/A	
Pressure Control (PC) Solenoid C Stuck ON	P0797	This DTC will determine if Pressure Control Solenoid 3 (C) is stuck in the hydraulically hi position. This DTC has two fail cases.	The pressure switch associated with pressure control solenoid C (PCS3) is indicating that the PCS is in the full feed position when the PCS has been commanded regulating exhaust.	**Fail Case 1:** PCS3PS (PSw1) indicates hi hydraulic pressure	PCS commanded pressure *** Common Hydraulic Enables	<=5 kpa for >= (FFDelay + 0.1) seconds Where FFDelay: Trans Fluid Temp Time -50 4.50 -30 1.40 -18 0.80 -4 0.30 13 0.19 40 0.08	Failure exists for 30 seconds (2400 * 0.0125)	Two Trips, Type B
		DTC Pass	Pass when PCS3PS and PCS3Cmnd are in agreement (Reg Exhaust)	PCS3PS (PSw1) indicates Low hydraulic pressure			1.25 seconds ((2500 - 2400) * 0.0125)	

DIAGNOSTIC SUMMARY TABLES--TCM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
			The warning threshold for Fail Case 1 has been met 5 times in a single key cycle	**Fail Case 2:** Fail case 1 criteria met for at least 0.5 seconds (40 * 0.0125), more than 10 times in a given key cycle	Same as **Fail Case 1.**		N/A	
Pressure Control (PC) Solenoid D Stuck ON	P2715	This DTC will determine if Pressure Control Solenoid 4 (D) is stuck in the hydraulically hi position. This DTC has two fail cases.	The pressure switch associated with pressure control solenoid D (PCS4) is indicating that the PCS is in the full feed position when the PCS has been commanded regulating exhaust.	**Fail Case 1:** PCS4PS (PSw4) indicates hi hydraulic pressure	PCS commanded pressure *** Common Hydraulic Enables	<= 5 kpa for >= (FFDelay + 0.1) seconds Where FFDelay: Trans Fluid Temp Time -50 4.50 -30 1.40 -18 0.80 -4 0.30 13 0.19 40 0.08	Failure exists for 30 seconds (2400 * 0.0125)	Two Trips, Type B
		DTC Pass	Pass when PCS4PS and PCS4Cmnd are in agreement (Reg Exhaust)	PCS4PS (PSw4) indicates Low hydraulic pressure			1.25 seconds ((2500 - 2400) * 0.0125)	
			The warning threshold for Fail Case 1 has been met 5 times in a single key cycle	**Fail Case 2:** Fail case 1 criteria met for at least 0.2 seconds (16 * 0.0125), more than 5 times in a given key cycle	Same as **Fail Case 1.**		N/A	
Clutch Slip Diagnostics								
Clutch slip diagnostics P079A, P079B, P079C share these common secondary parameter enable conditions	***				LinePressureEstimate	> 235 kpa **AND** > (MinLinePressure - 2) kpa Where MinLinePressure is a lookup table Trans Fluid Temp vs Line Pressure: Temp Kpa -40 1200 -30 1200 -20 1000 -10 700 0 500 10 265		
Clutch 1 Slip	P079A	This DTC sets when excessive slip is observed on C1 while commanded on	Clutch 1 Slip Speed	C1 Slip > 200 RPM	C1 Pressure Command C1 Torq Estimate C1 Fill detected	> = 1800 kpa > = 200 Nm =1 Predicted Mtr A spd Predicted Mtr B spd	63 seconds (3 retries * 1s failtime * 30 seconds between attempts **OR** Instantly if >6300 **OR** >9500	One Trip, Type A

DIAGNOSTIC SUMMARY TABLES--TCM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
		DTC Pass	Clutch 1 Slip Speed	C1 Slip < 50 RPM	C1 Pressure Command C1 Torq Estimate C1 Fill detected	> = 1800 kpa > = 20 Nm = 1	0.125 seconds (10 * 0.0125)	
Clutch 2 Slip	P079B	This DTC sets when excessive slip is observed on C2 while commanded on	C2 Slip Speed	C2 Slip > 200 RPM	C2 Pressure Command C2 Torq Estimate C2 Fill detected	> = 1800 kpa > = 200 Nm = 1 Predicted Mtr A spd Predicted Mtr B spd	63 seconds (3 retries * 1s failtime * 30 seconds between attempts **OR** Instantly if >6300 **OR** >9500	One Trip, Type A
		DTC Pass	C2 Slip Speed	C2 Slip < 50 RPM	C2 Pressure Command C2 Torq Estimate C2 Fill detected	> = 1800 kpa > = 20 Nm =1	0.125 seconds (10 * 0.0125)	
Clutch 3 Slip	P079C	This DTC sets when excessive slip is observed on C3 while C3 has been commanded on	C3 Slip Speed	C3 Slip > 300 RPM	C3 Pressure Command C3 Torq Estimate C3 Fill detected	> = 1800 kpa > = 200 Nm = 1 Predicted Mtr A spd Predicted Mtr B spd	63 seconds (3 retries * 1s failtime * 30 seconds between attempts **OR** Instantly if >6300 **OR** >9500	One Trip, Type A
		DTC Pass	C3 Slip Speed	C3 Slip < 50 RPM	C3 Pressure Command C3 Torq Estimate C3 Fill detected	> = 1800 kpa > = 20 Nm = 1	0.125 seconds (10 * 0.0125)	
Pressure Control Solenoid Electrical Diagnostics								
All Pressure Control Solenoid electrical diagnostics P0961, P0962, P0963, P0965, P0966, P0967, P0969, P0970, P0971, P2719, P2720, P2721, P2728, P2729, P2730, P0973, P0974, P0976, P0977 share these common secondary parameter enable conditions	***				Ignition voltage Engine Speed Vehicle Speed PropSysActive	> = 11 Volts && <= 32 Volts >= 0 RPM && <= 7500 RPM for >= 5 seconds <= 200 mph for >= 5 seconds =1		

DIAGNOSTIC SUMMARY TABLES--TCM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Pressure Control (PC) Solenoid A System Performance	P0961	This DTC sets when an invalid voltage in PCS1 control circuit has been detected	PCS1 electrical status	HWIO circutry detects out of range error is present	DTC P0961 *** Common Electrical Enables	Not failed this key on	Failure detected for 4 seconds (320 * 0.0125) out of a 5 second (400 * 0.0125) window	Two Trips, Type B
		DTC Pass		HWIO circuitry detects an out of range error is not present			1 second ((400 - 320) * 0.0125)	
Pressure Control (PC) Solenoid A Control Circuit Low Voltage	P0962	This DTC sets when the PCS1 control circuit has been detected to be shorted to ground	PCS1 electrical status	HWIO circuitry detects an electrical low pressure error is present	DTC P0962 *** Common Electrical Enables	Not failed this key on	Failure detected for 0.4 seconds (32 * 0.0125) out of a 0.5 second (40 * 0.0125) window	One Trip, Type A
		DTC Pass		HWIO circuitry detects an electrical low pressure error is not present			0.1 seconds ((40 - 32) * 0.0125)	
Pressure Control (PC) Solenoid A Control Circuit High Voltage	P0963	This DTC sets when PCS1 has been detected to be shorted to power or open circuited.	PCS1 electrical status	HWIO circuitry detects an electrical hi pressure error is present.	DTC P0963 *** Common Electrical Enables	Not failed this key on	Failure detected for 0.4 seconds (32 * 0.0125) out of a 0.5 second (40 * 0.0125) window	One Trip, Type A
		DTC Pass		HWIO circuitry detects an electrical hi pressure error is not present			0.1 seconds ((40 - 32) * 0.0125)	
Pressure Control (PC) Solenoid B System Performance	P0965	This DTC sets when an invalid voltage in PCS2 control circuit has been detected	PCS2 electrical status	HWIO circutry detects out of range error is present.	DTC P0965 *** Common Electrical Enables	Not failed this key on	Failure detected for 4 seconds (320 * 0.0125) out of a 5 second (400 * 0.0125) window	Two Trips, Type B
		DTC Pass		HWIO circuitry detects an out of range error is not present			1 second ((400 - 320) * 0.0125)	
Pressure Control (PC) Solenoid B Control Circuit Low Voltage	P0966	This DTC sets when the PCS2 control circuit has been detected to be shorted to ground	PCS2 electrical status	HWIO circuitry detects an electrical low pressure error is present.	DTC P0966 *** Common Electrical Enables	Not failed this key on	Failure detected for 0.4 seconds (32 * 0.0125) out of a 0.5 second (40 * 0.0125) window	One Trip, Type A

DIAGNOSTIC SUMMARY TABLES--TCM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
		DTC Pass		HWIO circuitry detects an electrical low pressure error is not present			0.1 seconds ((40 - 32) * 0.0125)	
Pressure Control (PC) Solenoid B Control Circuit High Voltage	P0967	This DTC sets when PCS2 has been detected to be shorted to power or open circuited.	PCS2 electrical status	HWIO circuitry detects an electrical hi pressure error is present.	DTC P0967 *** Common Electrical Enables	Not failed this key on	Failure detected for 0.4 seconds (32 * 0.0125) out of a 0.5 second (40 * 0.0125) window	One Trip, Type A
		DTC Pass		HWIO circuitry detects an electrical hi pressure error is not present			0.1 seconds ((40 - 32) * 0.0125)	
Pressure Control (PC) Solenoid C System Performance	P0969	This DTC sets when an invalid voltage in PCS3 control circuit has been detected	PCS3 electrical status	HWIO circutry detects out of range error is present.	DTC P0965 *** Common Electrical Enables	Not failed this key on	Failure detected for 4 seconds (320 * 0.0125) out of a 5 second (400 * 0.0125) window	Two Trips, Type B
		DTC Pass		HWIO circuitry detects an out of range error is not present			1 second ((400 - 320) * 0.0125)	
Pressure Control (PC) Solenoid C Control Circuit Low Voltage	P0970	This DTC sets when the PCS3 control circuit has been detected to be shorted to ground	PCS3 electrical status	HWIO circuitry detects an electrical low pressure error is present.	DTC P0966 *** Common Electrical Enables	Not failed this key on	Failure detected for 0.4 seconds (32 * 0.0125) out of a 0.5 second (40 * 0.0125) window	One Trip, Type A
		DTC Pass		HWIO circuitry detects an electrical low pressure error is not present			0.1 seconds ((40 - 32) * 0.0125)	
Pressure Control (PC) Solenoid C Control Circuit High Voltage	P0971	This DTC sets when PCS3 has been detected to be shorted to power or open circuited.	PCS3 electrical status	HWIO circuitry detects an electrical hi pressure error is present.	DTC P0967 *** Common Electrical Enables	Not failed this key on	Failure detected for 0.2 seconds (16 * 0.0125) out of a 0.5 second (40 * 0.0125) window	One Trip, Type A
		DTC Pass		HWIO circuitry detects an electrical hi pressure error is not present			0.1 seconds ((40 - 16) * 0.0125)	
Pressure Control (PC) Solenoid D System Performance	P2719	This DTC sets when an invalid voltage in PCS4 control circuit has been detected	PCS4 electrical status	HWIO circutry detects out of range error is present.	DTC P2719 *** Common Electrical Enables	Not failed this key on	Failure detected for 4 seconds (320 * 0.0125) out of a 5 second (400 * 0.0125) window	Two Trips, Type B
		DTC Pass		HWIO circuitry detects an out of range error is not present			1 second ((400 - 320) * 0.0125)	
Pressure Control (PC) Solenoid D Control Circuit Low Voltage	P2720	This DTC sets when the PCS4 control circuit has been detected to be open circuit or shorted to power	PCS4 electrical status	HWIO circuitry detects an electrical low pressure error is present.	DTC P2720	Not failed this key on	Failure detected for 0.4 seconds (32 * 0.0125) out of a 0.5 second (40 * 0.0125) window	One Trip, Type A

DIAGNOSTIC SUMMARY TABLES--TCM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					*** Common Electrical Enables			
		DTC Pass		HWIO circuitry detects an electrical low pressure error is not present			0.1 seconds ((40 - 32) * 0.0125)	
Pressure Control (PC) Solenoid D Control Circuit High Voltage	P2721	This DTC sets when PCS4 has been detected to be shorted to ground	PCS4 electrical status	HWIO circuitry detects an electrical hi pressure error is present.	DTC P2721 *** Common Electrical Enables	Not failed this key on	Failure detected for 0.4 seconds (32 * 0.0125) out of a 0.5 second (40 * 0.0125) window	One Trip, Type A
		DTC Pass		HWIO circuitry detects an electrical hi pressure error is not present			0.1 seconds ((40 - 32) * 0.0125)	
Pressure Control (PC) Solenoid E System Performance	P2728	This DTC sets when an invalid voltage in PCS5 control circuit has been detected	PCS5 electrical status	HWIO circutry detects out of range error is present.	DTC P2719 *** Common Electrical Enables	Not failed this key on	Failure detected for 4 seconds (320 * 0.0125) out of a 5 second (400 * 0.0125) window	Two Trips, Type B
		DTC Pass		HWIO circuitry detects an out of range error is not present			1 second ((400 - 320) * 0.0125)	
Pressure Control (PC) Solenoid E Control Circuit Low Voltage	P2729	This DTC sets when the PCS5 control circuit has been detected to be open circuit or shorted to power	PCS5 electrical status	HWIO circuitry detects an electrical low pressure error is present.	DTC P2720 *** Common Electrical Enables	Not failed this key on	Failure detected for 0.4 seconds (32 * 0.0125) out of a 0.5 second (40 * 0.0125) window	One Trip, Type A
		DTC Pass		HWIO circuitry detects an electrical low pressure error is not present			0.1 seconds ((40 - 32) * 0.0125)	
Pressure Control (PC) Solenoid E Control Circuit High Voltage	P2730	This DTC sets when PCS5 has been detected to be shorted to ground	PCS5 electrical status	HWIO circuitry detects an electrical hi pressure error is present.	DTC P2721 *** Common Electrical Enables	Not failed this key on	Failure detected for 0.4 seconds (32 * 0.0125) out of a 0.5 second (40 * 0.0125) window	One Trip, Type A
		DTC Pass		HWIO circuitry detects an electrical hi pressure error is not present			0.1 seconds ((40 - 32) * 0.0125)	
Shift Solenoid A Control Circuit Low	P0973	This DTC detects a short to power or open circuit in the X valve control circuit.	X Valve Electrical Status	HWIO circuitry detects an open circuit or short to power error is present.	DTC P0973 *** Common Electrical Enables	Not failed this key on	Failure detected for 0.4 seconds (32*0.0125) out of a 0.5 second (40*0.0125) window	One Trip, Type A
		DTC Pass		HWIO circuitry detects an open circuit or short to power error is not present.			0.1 seconds ((20 - 16) * 0.025)	

DIAGNOSTIC SUMMARY TABLES--TCM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Shift Solenoid A Control Circuit High	P0974	This DTC detects a short to ground in the X valve control circuit.	X Valve Electrical Status	HWIO circuitry detects short to ground error is present.	DTC P0974 *** Common Electrical Enables	Not failed this key on	Failure detected for 0.4 seconds (32*0.0125) out of a 0.5 second (40*0.0125) window	One Trip, Type A
		DTC Pass		HWIO circuitry detects short to ground error is not present.			0.1 seconds ((20 - 16) * 0.025)	
Shift Solenoid B Control Circuit Low	P0976	This DTC detects a short to power or open circuit in the Y valve control circuit.	Y Valve Electrical Status	HWIO circuitry detects an electrical low pressure error is present.	DTC P0976 *** Common Electrical Enables	Not failed this key on	Failure detected for 0.4 seconds (32*0.0125) out of a 0.5 second (40*0.0125) window	One Trip, Type A
		DTC Pass		HWIO circuitry detects an open circuit or short to power error is not present.			0.1 seconds ((20 - 16) * 0.025)	
Shift Solenoid B Control Circuit High	P0977	This DTC detects a short to ground in the Y valve control circuit.	Y Valve Electrical Status	HWIO circuitry detects an electrical hi pressure error is present.	DTC P0977 *** Common Electrical Enables	Not failed this key on	Failure detected for 0.4 seconds (32*0.0125) out of a 0.5 second (40*0.0125) window	One Trip, Type A
		DTC Pass		HWIO circuitry detects short to ground error is not present.			0.1 seconds ((20 - 16) * 0.025)	
Power Moding Diagnostics								
Ignition Switch Run/Start Position Circuit Low	P2534	Detects a run crank relay open circuit	Runk Crank Line voltage	Ignition Run Crank line voltage <= 2 Volts	CAN Communication ECM run crank active data	enabled available and active	60 seconds (2400 * 0.025) in a 65 second window (2600 * 0.025)	One Trip, Type A
		DTC Pass	Run Crank Line Voltage	Ignition Run Crank line voltage > 2 Volts			5 seconds (200 * 0.025)	
Ignition Switch Run/Start Position Circuit High	P2535	Detects a run crank relay short to power	Runk Crank Line voltage	Ignition Run Crank line voltage > 5 V	CAN Communication ECM run crank active data	enabled available and false	12 seconds (480 * 0.025) in a 15 second window (600 * 0.025)	One Trip, Type A
		DTC Pass	Run Crank Line Voltage	Ignition Run Crank line voltage < 2V			3 seconds (120 * 0.025)	
Ignition Switch Accessory Position Circuit Low	P2537	Detects an accessory position circuit open	Accessory On	FALSE	P2537 Propulsion System Propulsion System Active Time	Not Test Failed This Key On and Not Test Passed This Key On Active > 0.5 seconds	0.2 seconds (8 * 0.025)	One Trip, Type A
		DTC Pass	Accessory On	TRUE			0.2 seconds (8 * 0.025)	
TCM Substrate Temp Sensor								
Transmission Control Module (TCM) Internal	P0634	The DTC detects the electronic circuitry is at high	Transmission Substrate Temperature	≥ 142 °C	Transmission Substrate Temperature	-50 °C ≤ Transmission Substrate Temperature	≥ 5 seconds	One Trip,

DIAGNOSTIC SUMMARY TABLES--TCM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Temperature Too High		operating temperature.				≤ 146 °C for 0.25 seconds		Type A
			OR					
			Ignition Voltage AND Substrate Temperature	≥ 18 V ≥ 50 °C			≥ 2 seconds **Pass Conditions** Transm'n Substrate Temp ≤ 142 °C and Ignition Voltage is ≤ 18 V for 10 seconds **OR** Transm'n Substrate Temp ≤ 50 °C and Ignition Voltage is ≥ 18 V for 10 seconds	
Transmission Control Module (TCM) Substrate Temperature Sensor Circuit Range/Performance	P0667	The DTC detects the TCM substrate temperature sensor is reporting an incorrect value	Delta between TCM substrate temperature sensor and transmission fluid temperature sensor (TFT)	> Highest of transmission temperature sensors Temp / Delta -40.1 / 256 -40 / 50 -20 / 30 0 / 30 30 / 30 60 / 30 100 / 30 149.0 / 30 149.1 / 256	IF vehicle speed is < 5 mph and accelerator position is > 20% for more than 7 seconds, then diagnostic is disabled. Once above conditions are removed > 20 seconds, diagnostic is re-enabled		> 300 seconds (3000 counts at 100ms)	Two Trips, Type B
			AND					
			Delta between TCM substrate temperature sensor and TCM powerup temperature sensor	> Highest of transmission temperature sensors Temp / Delta -40.1 / 256 -40 / 15 -20 / 15 0 / 15 30 / 15	Transmission state Engine Torque Inaccurate Accelerator Position Sensor Failure	NOT in park/neutral Must be FALSE Must be FALSE		

DIAGNOSTIC SUMMARY TABLES--TCM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
				60 15 100 15 149.0 15 149.1 256	P0721, P0722, P0723, P215C, P0658, P0668, P0669, P0712, P0713, P06AD, P06AE	NOT Fault Active OR Failed This Key On		
					Engine Speed	0 ≤ Engine Speed ≤ 7500 RPM for 5 seconds		
					Vehicle Speed	≤ 124 MPH for 5 seconds		
		DTC Pass	Transm'n substrate temp delta between powerup temp sensor AND fluid temp sensor	< value in fail criteria table			> 70 sec (700 counts at 100ms)	
Transmission Control Module (TCM) Substrate Temperature Sensor Circuit Low (Failed at a low temperature - circuit short to ground).	P0668	The DTC detects TCM substrate temperature sensor short to ground error.	TCM Substrate Temperature Sensor	≤ -60 °C	Engine Speed	0 ≤ Engine Speed ≤ 7500 RPM for 5 seconds	≥ 60 seconds	Two Trips, Type B
					Vehicle Speed	≤ 124 MPH for 5 seconds	**Pass Conditions** Transm'n Substrate Temp ≥ -55 °C for 4 seconds	
Transmission Control Module (TCM) Substrate Temperature Sensor Circuit High (Failed at a high temperature - circuit open or short to power).	P0669	The DTC detects TCM substrate temperature sensor open or short to power error.	TCM Substrate Temperature Sensor	≥ 160 °C	Engine Speed	0 ≤ Engine Speed ≤ 7500 RPM for 5 seconds	≥ 60 seconds	Two Trips, Type B
					Vehicle Speed	≤ 124 MPH for 5 seconds		
					Transmission Output Speed	Transmission Output Speed ≥ 200 RPM for 5 seconds cumulative.		
					Estimated Motor Power Loss	Estimated Motor Power Loss ≥ 0.4 kW for 200 seconds cumulative.		

DIAGNOSTIC SUMMARY TABLES--TCM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
							Pass Conditions Transm'n Substrate Temp ≤ 150 °C for 4 seconds	
TCM Powerup Temp Sensor								
Transmission Control Module (TCM) Powerup Temperature Sensor Circuit Range/Performance	P06AC	The DTC detects the TCM powerup temperature sensor is reporting an incorrect value	Delta between TCM powerup temperature sensor and transmission fluid temperature sensor (TFT)	>Highest of transmission temperature sensors Temp Delta -40.1 256 -40 50 -20 30 0 30 30 30 60 30 100 30 149.0 30 149.1 256	IF vehicle speed is < 5 mph and accelerator position is > 20% for more than 7 seconds, then diagnostic is disabled. Once conditions are removed > 20 seconds, diagnostic re-enabled		> 300 seconds (3000 counts at 100ms)	Two Trips, Type B
			AND					
			Delta between TCM powerup temperature sensor and TCM substrate temperature sensor	> Highest of transmission temperature sensors Temp Delta -40.1 256 -40 15 -20 15 0 15 30 15 60 15 100 15 149.0 15 149.1 256	Transmission state	NOT in park/neutral		
					Engine Torque Inaccurate	Must be FALSE		
					Accelerator Position Sensor Failure	Must be FALSE		
					P0721, P0722, P0723, P215C, P0658, P0668, P0669, P0712, P0713, P06AD, P06AE	NOT Fault Active OR Failed This Key On		
					Engine Speed	0 ≤ Engine Speed ≤ 7500 RPM for 5 seconds		
					Vehicle Speed	≤ 124 MPH for 5 seconds		
		DTC Pass	Transm'n substrate temp delta between powerup temp sensor AND fluid temp	< value in fail criteria table			> 70 sec (700 counts at 100ms)	

DIAGNOSTIC SUMMARY TABLES--TCM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
			sensor					
Transmission Control Module (TCM) Powerup Temperature Sensor Low (Failed at a low temperature - circuit short to ground).	P06AD	The DTC detects TCM powerup sensor short to ground error.	TCM Power Up Temperature Sensor	≤ -59 °C	Engine Speed Vehicle Speed Estimated Motor Power Loss NOT Fault Active OR Failed This Key On	0 ≤ Engine Speed ≤ 7500 RPM for 5 seconds ≤ 124 MPH for 5 seconds Estimated Motor Power Loss ≥ 0.4 kW for 200 seconds cumulative. P0721, P0722, P0723, P215C	≥ 60 seconds **Pass Conditions** Transm'n Substrate Temp ≥ -40 °C for 4 seconds	Two Trips, Type B
Transmission Control Module (TCM) Powerup Temperature Sensor Circuit High (Failed at a high temperature - circuit open or short to power).	P06AE	The DTC detects TCM powerup sensor open or short to power error.	TCM Power Up Temperature Sensor	≥ 164 °C	Engine Speed Vehicle Speed	0 ≤ Engine Speed ≤ 7500 RPM for 5 seconds ≤ 124 MPH for 5 seconds	≥ 60 seconds **Pass Conditions** Transm'n Substrate Temp ≤ 150 °C for 4 seconds	Two Trips, Type B
Transmission Fluid Temp Sensor								
Transmission Fluid Temperature Sensor Circuit Range/Performance	P0711	The DTC detects the transmission fluid temperature is reporting an incorrect value	Delta between transmission fluid temperature (TFT) and TCM powerup temperature sensor	> Highest of transmission temperature sensors Temp Delta -40.1 256 -40 50 -20 30 0 30 30 30	IF vehicle speed is < 5 mph and accelerator position is > 20% for more than 7 seconds, then diagnostic is disabled. Once conditions are removed > 20 seconds.		> 300 seconds (3000 counts at 100ms)	Two Trips, Type B

DIAGNOSTIC SUMMARY TABLES--TCM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
				60 30 100 30 149.0 30 149.1 256	diagnostic is re-enabled			
			AND					
			Delta between transmission fluid temperature (TFT) and TCM substrate temperature sensor	> Highest of transmission temperature sensors Temp Delta -40.1 256 -40 50 -20 30 0 30 30 30 60 30 100 30 149.0 30 149.1 256	Transmission state	NOT in park/neutral		
					Engine Torque Inaccurate	Must be FALSE		
					Accelerator Position Sensor Failure	Must be FALSE		
					P0721, P0722, P0723, P215C, P0658, P0668, P0669, P0712, P0713, P06AD, P06AE	NOT Fault Active OR Failed This Key On		
					Engine Speed	0 ≤ Engine Speed ≤ 7500 RPM for 5 seconds		
					Vehicle Speed	≤ 124 MPH for 5 seconds		
		DTC Pass	Transm'n substrate temp delta between powerup temp sensor AND fluid temp sensor	< value in fail criteria table			> 70 sec (700 counts at 100ms)	
Transmission Fluid Temperature Sensor Circuit Low (Failed at a low temperature - circuit short to ground).	P0712	The DTC detects transmission fluid sensor short to ground error.	Transmission Sump Temperature Sensor	≤ -60 °C	P0721, P0722, P0723, P077B, P215C	NOT Fault Active OR Failed This Key On	≥ 60 seconds	One Trip, Type A
					Engine Speed	0 ≤ Engine Speed ≤ 7500 RPM for 5 seconds		
					Vehicle Speed	≤ 124 MPH for 5 seconds		
					Estimated Motor Power Loss	Estimated Motor Power Loss ≥ 0.4 kW for 200 seconds cumulative.		

DIAGNOSTIC SUMMARY TABLES--TCM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
							Pass Conditions Transm'n Sump Temp ≥ -50 °C for 4 seconds	
Transmission Fluid Temperature Sensor Circuit High (Failed at a high temperature - circuit open or short to power).	P0713	The DTC detects substrate sensor open or short to power error.	Transmission Sump Temperature Sensor	≥ 160 °C	P0721, P0722, P0723, P077B, P215C Engine Speed Vehicle Speed	NOT Fault Active OR Failed This Key On 0 ≤ Engine Speed ≤ 7500 RPM for 5 seconds ≤ 124 MPH for 5 seconds	≥ 60 seconds **Pass Conditions** Transm'n Substrate Temp ≤ 149 °C for 4 seconds	One Trip, Type A
Transmission Output Speed Sensor								
Transmission Output Speed (TOS) Sensor Wrong Direction	P0721	The DTC detects incorrect TOS direction.	TOS Raw Direction	TOS Direction Raw is not Forward or Reverse	TOS Sample Period	≠ 0	≥ 2.5 seconds (100 counts at 25ms) **Pass Conditions** TOS Direction Raw = Forward or Reverse for 3.125 seconds (125 counts at 25ms)	One Trip, Type A
Output Speed Sensor Circuit - Direction Error	P077B	The DTC detects if the Transmission Output Speed Sensor Direction is Incorrect by Comparing with Calculated Direction from Motor Speed Sign	Transmission Output Speed Direction Raw	≠ Motor Direction	CAN Communication Lost With Transmission P215C TOS Hardware Input Output Transmission	FALSE NOT Fault Active Valid	0.35 seconds (14 counts at 25ms)	One Trip, Type A

DIAGNOSTIC SUMMARY TABLES--TCM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					Hybrid Motor Speed based Estimated Output Speed is Valid	Calculated based on M1 or M2 Speed Equation		
					Transmission Output Speed and Motor Output Speed Difference	≤ 50 RPM	**Pass Conditions** Opposite as FAIL for 5 seconds (200 counts at 25ms)	
					Motor Estimated Transmission Output Speed	≥ 50 RPM		
Output Shaft Speed (OSS) - Wheel Speed Correlation	P215C	The DTC Correlates the Transmission Output Speed with the ABS Wheel Speed and Motor Speed to Detect any Failures in the Transmission Output Speed Sensor.	Difference between Transmission Output Speed and the Calculated Average of Output Speed from the Motors and Wheel Speed Sensors	≥ 175 RPM	WHEN Output Speed Calculated from Wheel Speeds AND Output Speed Calculated from Motor Speeds	> 150 RPM	200 ms (8 counts at 25ms)	Two Trips, Type B
					Output Speed Calculated from Motor Speeds AND Output Speed Calculated from Wheel Speeds Difference	≤ 40 RPM	**Pass Conditions** Difference between Transm'n Output Speed and the Calculated Average of Output Speed from the Motors and Wheel Speed Sensors ≤ 125 RPM for 0.5 seconds (20 counts at 25ms)	
					OBD Wheel Speed Sensors	TRUE		
					Driven Wheel Estimated Vehicle Speed Fault	FALSE		
					Propulsion System Active	TRUE		
					Hybrid Motor Speed based Estimated Output Speed is Valid	Calculated based on M1 or M2 Speed Equation		
Transmission Internal Mode Switch								

DIAGNOSTIC SUMMARY TABLES--TCM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Internal Mode Switch P Circuit High Voltage	P1824	The DTC monitors if the IMS P Circuit is shorted to a High Voltage	Transmission Direction State	PARK	P1824	NOT Fault Active OR Failed This Key On	2.5 seconds + 1 count at 6.25ms	Two Trips, Type B
			PRNDL P Circuit Sensed	Has Not Been Observed Low	Transmission Direction State Fault Active	FALSE	Pass Conditions PRNDL P Circuit Has Been Observed Low for 1.5875 seconds	
					Ignition Voltage	11V < IGN < 32V		
					Run/Crank Active	TRUE		
					Vehicle Speed	≤ 124 MPH for 5 seconds		
					Engine Speed	0 ≤ Engine Speed < 7500RPM		
Internal Mode Switch A Circuit Low Voltage	P182A	The DTC monitors if the IMS A Circuit is shorted to a Low Voltage	PRNDL State	Transitional 1	Automatic Transmission Type	EVT	8 seconds + 1 count at 6.25ms	Two Trips, Type B
			Trans Direction State	DRIVE	P182A	NOT Fault Active OR Failed This Key On	**Pass Conditions** PRNDL A Circuit Has Been Observed High for 1.5875 seconds	
					PRNDL State	PARK		
					PRNDL A Circuit Sensed	PRNDL A Circuit Has NOT Been Observed High for 1 second		
					Trans Direction State Fault Active			
					Ignition Voltage	11V < IGN < 32V		
					Run/Crank Active	TRUE		
					Vehicle Speed	< 124 mph for 5 seconds		
					Engine Speed	0 ≤ Engine Speed < 7500RPM		
Internal Mode Switch B Circuit Low Voltage	P182B	The DTC monitors if the IMS B Circuit is shorted to a Low Voltage	Transmission Direction State	PARK	P182B	NOT Fault Active OR Failed This Key On	2.5 seconds + 1 count at 6.25ms	Two Trips, Type B
			PRNDL B Circuit Sensed	PRNDL B Circuit Has Not Been Observed High	Transmission Direction State Fault Active	FALSE	**Pass Conditions** PRNDL B Circuit Has Been Observed High for 1.5875 seconds	
					Ignition Voltage	11V < IGN < 32V		
					Run/Crank Active	TRUE		
					Vehicle Speed	≤ 124 MPH for 5 seconds		

DIAGNOSTIC SUMMARY TABLES--TCM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					Engine Speed	0 ≤ Engine Speed ≤ 7500 RPM for 5 seconds		
Internal Mode Switch B Circuit High Voltage	P182C	The DTC monitors if the IMS B Circuit is shorted to a High Voltage	PRNDL State Trans Direction State	Transitional 13 DRIVE	Automatic Transmission Type P182C PRNDL State PRNDL B Circuit Sensed Trans Direction State Fault Active Ignition Voltage Run/Crank Active Vehicle Speed Engine Speed	EVT NOT Fault Active OR Failed This Key On PARK Has Been Observed High for 1 Second FALSE 11V < IGN < 32 TRUE ≤ 124 MPH for 5 seconds 0 ≤ Engine Speed ≤ 7500 RPM for 5 seconds	8 seconds + 1 count at 6.25ms **Pass Conditions** PRNDL B Circuit Has Been Observed Low for 1.5875 seconds	Two Trips, Type B
Internal Mode Switch P Circuit Low Voltage	P182D	The DTC monitors if the IMS P Circuit is shorted to a Low Voltage	PRNDL State Trans Direction State	Transitional 8 DRIVE	Automatic Transmission Type P182D PRNDL State PRNDL P Circuit Sensed Trans Direction State Fault Active Ignition Voltage Run/Crank Active Vehicle Speed Engine Speed	EVT NOT Fault Active OR Failed This Key On PARK Has Been Observed Low for 1 second FALSE 11V < IGN < 31.99 TRUE ≤ 124 MPH for 5 seconds 0 ≤ Engine Speed ≤ 7500 RPM for 5 seconds	8 seconds + 1 count at 6.25ms **Pass Conditions** PRNDL P Circuit Has Been Observed High for 1.5875 seconds	Two Trips, Type B

DIAGNOSTIC SUMMARY TABLES--TCM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Internal Mode Switch-Invalid Range	P182E	The DTC monitors if the IMS is in an Invalid Range	PRNDL State	Illegal	Engine Speed Vehicle Speed P182E Ignition Voltage Run/Crank Active Vehicle Speed Engine Speed	0 ≤ Engine Speed ≤ 7500 RPM for 5 seconds ≤ 124 MPH for 5 seconds NOT Fault Active OR Failed This Key On 11V < IGN < 31.99 TRUE < 124 mph for 5 sec 0 ≤ Engine Speed ≤ 7500 RPM for 5 seconds	5 seconds **Pass Conditions** PRNDL State is NOT Illegal for 5 seconds	Two Trips, Type B
Internal Mode Switch C Circuit High Voltage	P182F	The DTC monitors if the IMS C Circuit is shorted to a High Voltage	Transmission Direction State PRNDL C Circuit Sensed	DRIVE Has Not Been Observed Low	Automatic Transmission Type P182F Trans Direction State Fault Active Ignition Voltage Run/Crank Active TOS Sensor	EVT NOT Fault Active OR Failed This Key On FALSE 11V < IGN < 31.99 TRUE Not Fault Active	2.5 seconds + 1 count at 6.25ms **Pass Conditions** PRNDL C Circuit Has Been Observed Low for 4 seconds + 1 count at 6.25ms	Two Trips, Type B
Internal Mode Switch A Circuit High Voltage	P1838	The DTC monitors if the IMS A Circuit is shorted to a High Voltage	Transmission Direction State PRNDL A Circuit Sensed	PARK Has Not Been Observed Low	P1838 Trans Direction State Fault Active Ignition Voltage Run/Crank Active	NOT Fault Active OR Failed This Key On FALSE 11V < IGN < 31.99 TRUE	2.5 seconds + 1 count at 6.25ms **Pass Conditions** PRNDL A Circuit Has Been Observed Low for 1.5875 seconds	Two Trips, Type B
Internal Mode Switch C Circuit Low Voltage	P1839	The DTC monitors if the IMS C Circuit is shorted to a Low Voltage	Transmission Direction State	PARK	P1839	NOT Fault Active OR Failed This Key On	2.5 seconds + 1 count at 6.25ms	Two Trips, Type B

DIAGNOSTIC SUMMARY TABLES--TCM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
			PRNDL C Circuit Sensed	PRNDL C Circuit Has Not Been Observed High	Trans Direction State Fault Active Ignition Voltage Run/Crank Active	FALSE 11V < IGN < 31.99 TRUE	**Pass Conditions** PRNDL C Circuit Has Been Observed Low for 1.5875 seconds	
Controller Diagnostics								
Control Module Read Only Memory (ROM)	P0601	*This Diagnostic tests the checksum on ROM (flash) memory*						One Trip, Type A
		DTC Fail case 1: This DTC will be stored if any check sum in the **boot** is incorrect	Calculated Checksum does not match stored checksum		Ignition Status	= Run or Crank	1 failure if it occurs during the first ROM test of the ignition cycle otherwise 5 failures Frequency: Runs continuously in the background	
		DTC Fail case 2: This DTC will be stored if any check sum in the **calibration** is incorrect						
		DTC Fail case 3: This DTC will be stored if any check sum in the **software** is incorrect						
		DTC Pass:		ROM fault = false 2nd SOH ROM fault = false Main SOH ROM fault = false				
Control Module Not Programmed	P0602	*This Diagnostic tests for whether a controller has been programmed*						One Trip, Type A
		DTC Fail case 1: Indicates that the HCP needs to be programmed	Fails if No Start Calibration is set to true which is only available on a new un-programmed HCP		Ignition Status	= Run or Crank	Runs once at power up	
		DTC Pass:		Enable cal = false				
Control Module Long Term Memory Reset	P0603	*This Diagnostic tests for BINVDM errors*						One Trip, Type A
		DTC Fail case 1: Non-volatile memory (**Static**) checksum error at controller power-up	Checksum at power-up does not match checksum at power-down		Ignition Status	= Run or Crank	1 failure Frequency: Once at powerup	
		DTC Fail case 2: Non-volatile memory (**Preserved**) checksum error at controller power-up						

DIAGNOSTIC SUMMARY TABLES--TCM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
		DTC Fail case 3: Non-volatile memory (**ShutdownFinished**) checksum error at controller power-up						
		DTC Pass:		No ROM memory faults				
Control Module Random Access Memory (RAM) Failure	P0604	*This Diagnostic tests the checksum on RAM memory*						One Trip, Type A
		DTC Fail case 1: Indicates that HCP is unable to correctly write and read data to and from RAM	Data read does not match data written		Ignition Status	Run or Crank	Should finish within 30 seconds at all operating conditions	
Bosch T43 TEHCM Security- Output Disable/IPT Test	P0606	*This Diagnostic tests that the HWIO executes the IPT (Inhibit Path Test) exactly once at every ignition on to test the ability of the external monitoring module (CG122) to shutoff high-side drivers to the transmission hydraulics and reset the main processor.*						One Trip, Type A
		DTC Fail case 1: Abort IPT, because HSD may be short-circuited to ground or to battery voltage	Actuator supply is out of voltage threshold range during more than 40 msec.		IPT test started	end of Initialization	3.125ms loop	
		DTC Fail case 2: Abort IPT, because HSD may be short-circuited to ground or to battery voltage	Actuator supply is lower than 90% of Batt. voltage or WD(Watch Dog for TCM main processor) error count is greater than 0 during more than 40 msec. AND Output stage is not interlocked AND Actuator supply is out of voltage threshold range.	or > 5.5 volts	IPT test started	end of Initialization	3.125ms loop	
		DTC Fail case 3: Abort IPT, because HSD may be short-circuited to ground or to battery voltage	Actuator supply is out of voltage threshold range during more than 40 msec. AND WD error counter is equal or higher than threshold. AND Output stage is interlocked AND Actuator supply is lower than 90% of Batt. Voltage.	- WD error counter: >=5	IPT test started	end of Initialization	3.125ms loop	
		DTC Fail case 4: WD error counter doesn't reach its desired level (sdi_Ufet = 1)	WD error count is higher than threshold	- WD error count: 0	IPT test started	end of Initialization	3.125ms loop	
		DTC Fail case 5: WD error counter does not reach its desired level (sdi_Ufet = 4)	WD error count is equal or higher than threshold	- WD error count: 4	IPT test started	end of Initialization	3.125ms loop	

DIAGNOSTIC SUMMARY TABLES--TCM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
		DTC Fail case 6: WD error counter does not reach its desired level (sdi_Ufet = 6)	WD error count is equal or higher than threshold	- WD error count: 6	IPT test started	end of Initialization	3.125ms loop	
		DTC Fail case 7: HSD(High Side Driver) cannot be switched on at WD error counter <= 4	Actuator supply is lower than 90% of Batt. Voltage or WD error count is higher than threshold during more than 40 msec. AND Output stage is not interlocked AND Actuator supply voltage is within range	- WD error counter: > 0 - actuator supply voltage: >1.5 volts and <= 5.5 volts	IPT test started	end of Initialization	3.125ms loop	
		DTC Fail case 8: DReset line = low level, HSD cannot be switched on (fgtr_DReset = True)	Actuator supply is lower than 90% of Batt. Voltage or WD error count is higher than 0 during more than 40 msec. AND Output stage is interlocked.		IPT test started	end of Initialization	3.125ms loop	
		DTC Fail case 9: HSD cannot be switched off at WD error counter >= 5	Actuator supply voltage is out of range or WD error count is lower than threshold during more than 40 msec. AND Output stage is interlocked AND Actuator supply voltage is equal or higher than 90% of the Batt. Voltage.	- actuator supply voltage: < 1.5 volts or > 5.5 volts -WD error counter:<5	IPT test started	end of Initialization	3.125ms loop	
		DTC Fail case 10: DReset line = high level, HSD cannot be switched off (fgtr_DReset = False)	Actuator supply voltage is out of threshold range during more than 40 msec. AND WD error count is equal or higher than threshold AND Output stage is not interlocked	- actuator supply voltage: < 1.5 volts or > 5.5 volts -WD error counter:<5	IPT test started	end of Initialization	3.125ms loop	
		DTC Fail case 11: Run time of IPT function too long	IPT execution time is equal or greater than time threshold.	- time threshold : 300ms	IPT test started	end of Initialization	3.125ms loop	
Internal Control Module A/D Processing	P060B	*HWIO executes the A/D converter test. This test checks the Vref voltage at 3 levels.*						One Trip,

DIAGNOSTIC SUMMARY TABLES--TCM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Performance		**DTC Fail case 1:** AtoD converter test result is failed	0 x Vref is higher than voltage threshold	> approx. 0.01467 Volts	Run/Crank Voltage OR Powertrain Relay Voltage	> 9.5 Volts	6.25ms	Type A
		DTC Fail case 2: AtoD converter test result is failed	0.5 x Vref is out of voltage threshold	< approx. 2.479 Volts OR > approx. 2.518 Volts			6.25ms	
		DTC Fail case 3: AtoD converter test result is failed	1.0 x Vref is out of voltage threshold.	< approx. 4.978 Volts OR > approx. 2.518 Volts			6.25ms	
Torque Security								
Control Module Long Term Memory Performance	P062F	*This Diagnostic tests for unuseable BINVDM (flash) memory only*						One Trip, Type A
		DTC Fail case 1: Indicates that the NVM Error flag **HWIO Bat Dynamic Write will not succeed** set	Last EEPROM write did not complete		Ignition voltage	≥ 5 volts	1 failure Frequency: Once at power-up	
		DTC Fail case 2: Indicates that the NVM Error flag **HWIO Bat Static Write will not succeed** set						
		DTC Pass:		Dynamic or static Batwritewillnotsucceed = fail				
Internal Control Module Redundant Memory Performance	P16F3	*Detect the dual store memory fault by comparing the primary value and the dual store value of the individual variables*						One Trip, Type A
		DTC Fail case 1: Detect the dual store memory fault by comparing the primary Ve signals and the We redundant signals	The primary value and the dual store value are not equal			Runs continuously	Signal DependendantX fail counts out of Y sample counts Executes in a Xms loop Detects in 200ms	
Clutch pressure combination / valve commands do not fit to allowed range state	P16F7	*Detects controller faults such that solenoid commands doesn't match with it's expected associated Range State value.*						One Trip, Type A
		DTC Fail case 1:	Control State Request for Clutch 1 is NOT Active AND X Valve Command is 0 AND Y Valve Command is 0 AND Clutch 1 Pressure Command has been corrupted to higher than threshold	Clutch 1 Pressure > 153kpa time threshold: 200msec	Ignition switch	in crank or run	Executes in a 12.5ms loop	
		DTC Fail case 2:	Control State Request for Clutch 2 is NOT Active AND X Valve Command is 0 AND Y Valve Command is 1 AND Clutch 2 Pressure Command has been corrupted to higher than threshold	Clutch 2 Pressure > 178kpa time threshold: 200msec				

DIAGNOSTIC SUMMARY TABLES--TCM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
		DTC Fail case 3:	Control State Request for Clutch 1 is NOT Active AND X Valve Command is 1 AND Y Valve Command is 0 AND Clutch 1 Pressure Command has been corrupted to higher than threshold	Clutch 1 Pressure > 153kpa time threshold: 200msec				
		DTC Fail case 4:	Control State Request for Clutch 2 is NOT Active AND X Valve Command is 1 AND Y Valve Command is 0 AND Clutch 2 Pressure Command has been corrupted to higher than threshold	Clutch 2 Pressure > 178kpa time threshold: 200msec				
		DTC Fail case 5:	Control State Request for Clutch 3 is NOT Active AND X Valve Command is 1 AND Y Valve Command is 0 AND Clutch 3 Pressure Command has been corrupted to higher than threshold	Clutch 3 Pressure > 199kpa time threshold: 200msec				
		DTC Fail case 6:	Control State Request for Clutch 2 is NOT Active AND X Valve Command is 1 AND Y Valve Command is 1 AND Clutch 2 Pressure Command has been corrupted to higher than threshold	Clutch 2 Pressure > 178kpa time threshold: 200msec				
		DTC Fail case 7:	Control State Request for Clutch 3 is NOT Active AND X Valve Command is 1 AND Y Valve Command is 1 AND Clutch 3 Pressure Command has been corrupted to higher than threshold	Clutch 3 Pressure > 199kpa time threshold: 200msec				
Alive Rolling Count / Protection Value fault	P179B	*This Diagnostic checks for corruption in signals sent over CAN for the Hybrid Range State*						One Trip, Type A
		DTC Fail case 1: Detect the ARC (Alive Rolling Count) or Protection Value fault by checking the ARC and Protection Value of the Hybrid Range State	Current ARC is not equal to previous ARC + 1 and Primary Value is not equal to protection value		Run/Crank Voltage OR Powertrain Relay Voltage	> 9.5 Volts	14 fail counts out of 16 sample counts	

DIAGNOSTIC SUMMARY TABLES--TCM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
							Executes in a 12.5ms loop Detects in 200ms	
		DTC Pass:		No errors in 1000ms				
Communication Diagnostics								
Control Module Comm'n Bus A Off	U0073	*This diagnostic indicates a bus off condition on HSGMLAN (Bus A)*						One Trip, Type A
		DTC Fail case 1: Detects that a CAN serial data bus shorted condition has occurred to force the CAN device driver to enter a bus-off state.	CAN device driver	= bus-off state.	Run/Crank Voltage OR Powertrain Relay Voltage Power Mode Bus Off Fault Active Normal Communication Enabled Normal Message Transmission Diagnostic System Disable Diagnostic Enable Timer	> 9.5 Volts =RUN =FALSE =TRUE =TRUE =FALSE >=3 sec	4 fail counts out of 5 samples counts Executes in a 12.5ms loop Detects in 450 ms	
Lost Comm'n With ECM/PCM on Bus A	U0100	*This diagnostic indicates a lost communication between the TCM and the ECM on Bus A*						One Trip, Type A
		DTC Fail case 1: Detects that CAN serial data communication has been lost with the ECM on Bus A	Missed ECM Messages		Run/Crank Voltage OR Powertrain Relay Voltage Power Mode Bus Off Fault Active Normal Communication Enabled Normal Message Transmission Diagnostic System Disable Diagnostic Enable Timer	> 9.5 Volts =RUN/ACC =FALSE =TRUE =TRUE =FALSE >=3 sec	Executes in a 6.25ms loop Detects in 500 ms	

DIAGNOSTIC SUMMARY TABLES--TCM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Lost Comm'n With Brake System Control Module	U0129	*This diagnostic indicates a lost communication between the TCM and the BSCM on Bus A*						Two Trips, Type B
		DTC Fail case 1: Detects that CAN serial data communication has been lost with the EBCM on Bus A	Missed EBCM Messages		Run/Crank Voltage OR Powertrain Relay Voltage Power Mode Bus Off Fault Active Normal Communication Enabled Normal Message Transmission Diagnostic System Disable Diagnostic Enable Timer	> 9.5 Volts =RUN/ACC =FALSE =TRUE =TRUE =FALSE >=3 sec	Executes in a 6.25ms loop Detects in 500 ms	
Lost Communication With Body Control Module	U0140	*This diagnostic indicates a lost communication between the HCP and the BCM on Bus A*						Special Type C
		DTC Fail case 1: Detects that CAN serial data communication has been lost with the BCM on Bus A	Missed BCM Messages		Run/Crank Voltage OR Powertrain Relay Voltage Power Mode Bus Off Fault Active Normal Communication Enabled Normal Message Transmission Diagnostic System Disable Diagnostic Enable Timer	> 9.5 Volts =RUN/ACC =FALSE =TRUE =TRUE =FALSE >=3 sec	Executes in a 6.25ms loop Detects in 500 ms	
Lost Comm'n With Hybrid Controller	U0293	*This diagnostic indicates a lost communication between the TCM and the HCP*						One Trip, Type A
		Detects that CAN serial data communication has been lost with the HCP	Missed HCP Messages		Run/Crank Voltage OR Powertrain Relay Voltage Power Mode Bus Off Fault Active	> 9.5 Volts =RUN/ACC =FALSE	Detects within 500 msec at 6.25 msec loop rate	

DIAGNOSTIC SUMMARY TABLES--TCM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					Normal Communication Enabled	=TRUE		
					Normal Message Transmission	=TRUE		
					Diagnostic System Disable	=FALSE		
					Diagnostic Enable Timer	>=3 sec		

DIAGNOSTIC SUMMARY TABLES--VICM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Contactor Diagnostics								
High Voltage System Interlock Circuit Low	P0A0C	DTC monitors the sensed voltage when the commanded voltage is high to determine if the circuit is faulty	HVIL Sensed % of Reference Voltage	< 30%	HVIL Source Status 12V Battery Voltage	Sourced (5V) > 10.2V	2 failures out of 2 samples 12.5 ms /sample	One Trip, Type A
		DTC Pass					25 ms	
High Voltage System Interlock Circuit High	P0A0D	DTC monitors the sensed voltage when the commanded voltage is high and low to determine if the circuit is faulty	HVIL Sensed % of Reference Voltage	> 24%	HVIL Source Status 12V Battery Voltage	Unsourced (0V) > 10.2V	5 failures out of 6 samples 12.5 ms /sample	One Trip, Type A
			OR					
			HVIL Sensed % of Reference Voltage	> 44%	HVIL Source Status 12V Battery Voltage	Sourced (5V) > 10.2V	4 failures out of 6 samples 12.5 ms /sample	
		DTC Pass					75 ms	
Hybrid Battery Positive Contactor Circuit Stuck Closed	P0AA1	This DTC detects when the Positive Contactor is Stuck Closed by comparing the the Bus Voltage to the Battery Voltage.	Bus Voltage / Battery Voltage	> 60%	Bus Voltage Sensor Battery Voltage Sensor Negative Contactor Positive Contactor Precharge FET	Not Failed Not Failed Closed Open for > 8 seconds Off for > 8 seconds	3 failures out of 7 samples 12.5 ms /sample Executed Once Per Precharge Event	One Trip, Type A
		DTC Pass					87.5 ms	
Hybrid Battery Voltage System Isolation Fault	P0AA6	This DTC will determine if the measured resistance between the high voltage bus and chassis ground Is too low which indicates that the internals of the battery are no longer adequately isolated from chassis ground	Case 1 Active Isolation Resistance	< 325 KOhm	P0AA6 Positive Contactor Negative Contactor	DTC Not Active Open for 10 Seconds Open for 10 Seconds	Fail if last resistance measurement is below theshold AND any (5) measurements out of last (10) measurements are below resistance theshold. No more than one resistance measurement is taken per HPC2 Wakeup Cycle.	One Trip, Type A
			OR Case 2 Active Isolation Resistance	< 400 KOhm	P0AA6 Positive Contactor Negative Contactor	DTC Active Open for 10 Seconds Open for 10 Seconds		

DIAGNOSTIC SUMMARY TABLES--VICM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
		DTC Pass					Pass if any single resistance measurement exceeds resistance threshold	
Hybrid Battery Positive Contactor Control Circuit	P0AD9	This DTC checks the circuit for electrical integrity during operation.	The HPC2 detects that the commanded state of the driver and the actual state of the control circuit do not match. Exception: It cannot detect the Short to Ground Fault	Open Load detected while OFF and output voltage > 4V. Short to VBATT detected while OFF and output voltage is > (VPWR -0.4V) Open while ON detected when current sense feedback < 194 mA	12V Battery Voltage	> 10.2V	40 failures out of 50 samples 12.5 ms /sample Continuous	One Trip, Type A
		DTC Pass					625 ms	
Hybrid Battery Negative Contactor Control Circuit	P0ADD	This DTC checks the circuit for electrical integrity during operation.	The HPC2 detects that the commanded state of the driver and the actual state of the control circuit do not match. Exception: It cannot detect the Short to Ground Fault	Open Load detected while OFF and output voltage > 4V. Short to VBATT detected while OFF and output voltage is > (VPWR -0.4V) Open while ON detected when current sense feedback < 194 mA	12V Battery Voltage	> 10.2V	40 failures out of 50 samples 12.5 ms /sample Continuous	Two Trips, Type B
		DTC Pass					625 ms	
Hybrid Battery Precharge Contactor Circuit Stuck Closed	P0AE2	This DTC detects when the Precharge FET is Stuck Closed by comparing the the Bus Voltage to the Battery Voltage.	Bus Voltage / Battery Voltage	> 60%	Positive Contactor Precharge FET Bus Voltage Sensor Battery Voltage Sensor Negative Contactor Multipurpose Contactor	Open for > 8 seconds Off for > 8 seconds Not Failed Not Failed Closed Closed	3 failures out of 9 samples 12.5 ms /sample Executed Once Per Precharge Event	One Trip, Type A
		DTC Pass					112.5 ms	
Hybrid Battery Precharge Contactor Control Circuit	P0AE4	This DTC checks the circuit for electrical integrity during operation.	The HPC2 detects that the commanded state of the driver and the actual state of the control circuit do not match. Exception: It cannot detect the Open Ckt Fault and the Short to Ground Fault	Open Load detected while OFF and output voltage > 4V. Short to VBATT detected while OFF and output volage is > (VPWR -0.4V)	12V Battery Voltage	> 10.2V	40 failures out of 50 samples 12.5 ms /sample Continuous	One Trip, Type A
		DTC Pass					625 ms	
Hybrid Battery System Precharge Time Too Short	P0C77	This DTC sets if Bus Voltage gets too high too fast during contactor precharge.	Bus Voltage / Battery Voltage	> 95% in less than 50 ms from the start of precharge	Battery Current Sensor Bus Voltage Bus Voltage Sensor	Valid < 40 Volts before the start of precharge Valid	50 ms Executed Once Per Precharge Event	One Trip, Type A
		DTC Pass					50 ms	

DIAGNOSTIC SUMMARY TABLES--VICM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery System Precharge Time Too Long	P0C78	This DTC sets if either the Bus Voltage does not get high enough in 700 ms or battery current remains too high for too long after the contactor status changes from open to precharge	Bus Voltage / Battery Voltage	has not reached 95% in less than 700 ms from the start of contactor precharge	Battery Voltage Sensor	Valid	700 ms Executed Once Per Precharge Event	One Trip, Type A
					Bus Voltage Sensor	Valid		
			or					
			Battery Current	> Battery Voltage/27.63 for longer than 87.5 ms while waiting for Bus Voltage to reach 95% of Battery Voltage	Battery Current Sensor	Valid	Executed Once Per Precharge Event	
		DTC Pass					700 ms or less	
Battery Charging System Positive Contactor Control Circuit	P0D0A	This DTC checks the circuit for electrical integrity during operation.	The HPC2 detects that the commanded state of the driver and the actual state of the control circuit do not match. Exception: It cannot detect the Short to Ground Fault	Open Load detected while OFF and output voltage > 4V. Short to VBATT detected while OFF and output voltage is > (VPWR -0.4V) Open while ON detected when current sense feedback < 57 mA	12V Battery Voltage	> 10.2V	40 failures out of 50 samples 12.5 ms /sample Continuous	One Trip, Type A
		DTC Pass					625 ms	
Battery Charging System Negative Contactor Control Circuit/Open	P0D11	This DTC checks the circuit for electrical integrity during operation.	The HPC2 detects that the commanded state of the driver and the actual state of the control circuit do not match. Exception: It cannot detect the Short to Ground Fault	Open Load detected while OFF and output voltage > 4V. Short to VBATT detected while OFF and output voltage is > (VPWR -0.4V) Open while ON detected when current sense feedback < 57 mA	12V Battery Voltage	> 10.2V	40 failures out of 50 samples 12.5 ms /sample Continuous	One Trip, Type A
		DTC Pass					625 ms	
Battery Charging System High Voltage Interlock Circuit Low	P0D17	DTC monitors the sensed voltage when the commanded voltage is high to determine if the circuit is faulty	Charging HVIL Sensed % of Reference Voltage	< 30%	Charging HVIL Source Status 12V Battery Voltage	Sourced (5V) > 10.2V	2 failures out of 2 samples 12.5 ms /sample	One Trip, Type A
		DTC Pass					25 ms	
Battery Charging System High Voltage Interlock Circuit High	P0D18	DTC monitors the sensed voltage when the commanded voltage is high and low to determine if the circuit is faulty	Charging HVIL Sensed % of Reference Voltage	> 24%	Charging HVIL Source Status 12V Battery Voltage	Unsourced (0V) > 10.2V	5 failures out of 8 samples 12.5 ms /sample	One Trip, Type A
			OR					
			Charging HVIL Sensed % of Reference Voltage	> 44%	Charging HVIL Source Status	Sourced (5V)	4 failures out of 6 samples 12.5 ms /sample	

DIAGNOSTIC SUMMARY TABLES--VICM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					12V Battery Voltage	> 10.2V		
		DTC Pass					75 ms	
Battery Charger Hybrid/EV System Discharge Time Too Long	P0D5E	This DTC stores the result of the OBCM test (refer to OBCM Parameter Page) or when a discharge cannot be confirmed will run an intrusive backup/safety test which checks to see if battery current is flowing through what could be a stuck closed multifunction contactor	Condition A OBCM Status for P0D5E	Fail reported from OBCM			Executed Once Per Charger Discharge Event	One Trip, Type A
			OR					
			Condition B Battery Current	> 2.5 amps (averaged from 6 to 10 sec after discharge while HFET is commanded on for 2 seconds)	OBCM Status for P0D5E Battery Current Sensor	No Confirmed Pass or Fail from OBCM Not Failed	Executed Once 10 seconds after Charger Discharge Event if no status is received from the OBCM for P0D5E	
		DTC Pass					See OBCM Parm Page	
Hybrid/EV Battery Multifunction Contactor Control Circuit	P1EBC	This DTC checks the circuit for electrical integrity during operation.	The HPC2 detects that the commanded state of the driver and the actual state of the control circuit do not match. Exception: It cannot detect the Short to Ground Fault	Open Load detected while OFF and output voltage > 4V. Short to VBATT detected while OFF and output voltage is > (VPWR -0.4V) Open while ON detected when current sense feedback < 57 mA	12V Battery Voltage	> 10.2V	40 failures out of 50 samples 12.5 ms /sample Continuous	Two Trips, Type B
		DTC Pass					625 ms	
Hybrid/EV Battery Multifunction Contactor Stuck Open	P1EBE	This DTC determines if the Multipurpose Contactor is Stuck Open by commanding the heater on for 2 sec and observing the accumulated battery current during the Accumulation Time	Accumulated Battery Current	< 100 A	12V Battery Voltage Battery Current Sensor Charger Current Sensor Charge Control Mode Charge System Mode Main Contactor Status Multifunction Contactor Status Accumulation Time	> 10.2V No Faults No Faults Constant Current or Constant Voltage Not Heat Only AND Not Idle Open Closed = 4 sec	Runs once near the beginning of each Charge Cycle	One Trip, Type A
		DTC Pass					4 sec	

DIAGNOSTIC SUMMARY TABLES--VICM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid/EV Battery Multifunction Contactor Stuck Closed	P1EBF	Sets if Charger Voltage is Too High Too Soon After Charger Positive Contactor Closure	Charger Voltage	Average Charger Voltage >= 133 Volts	Positive Charge Contactor 12V Battery Voltage	Was open for more than 2 seconds but is closed now > 10.2V	300 ms / Runs once during charger precharge	Two Trips, Type B
			OR					
		Sets if the Absolute Value of Battery Current is Too High During Heater Only Mode	Battery Current	Absolute Value (Battery Current) > 1 A	Charge System Mode 12V Battery Voltage	Heater Only Mode > 10.2V	160 failures out of 240 samples 12.5 ms / sample	
Hybrid/EV Battery System Contactor(s) Stuck Open	P1EC0	This DTC checks for stuck open contactors by comparing Bus Voltage to Battery Voltage after the contactors are closed	Bus Voltage / Battery Voltage	< 80%	Bus Voltage Sensor Battery Voltage Sensor Time since Main Contactors have closed 12V Battery Voltage	No Faults No Faults > 1 sec > 10.2V	6 failures out of 6 samples 12.5 ms /sample Continuous	One Trip, Type A
		DTC Pass					0.5 sec	
Hybrid Battery Pack Heater Transistor Stuck Off	P1EC4	This DTC determines if the Heater FET is Stuck Off by commanding it on for 2 sec and observing the accumulated difference between charger and battery current during the Accumulation Time	Accumulated (Charger Current -Battery Current)	< 200 A	12V Battery Voltage Battery Current Sensor Charger Current Sensor Charge Control Mode Charge System Mode Charge Contactor Status Main Contactor Status Multifunction Contactor Status Accumulation Time	> 10.2V No Faults No Faults Constant Current or Constant Voltage Not Heat Only AND Not Idle Closed Open Closed = 4 sec	Runs once near the beginning of each Charge Cycle	Two Trips, Type B
		DTC Pass					4 sec	
Hybrid Battery Pack Heater Transistor Stuck On	P1EC5	This DTC checks for a stuck on heater transistor by checking for too much Charger Current when the multipurpose contactor and the heater transistor are both commanded off in charger precharge mode.	Charger Current	> 0.4 A	12V Battery Voltage Charger Positive Contactor Charger Negative Contactor Multipurpose Contactor	> 10.2V Closed Closed Open	4 failures out of 48 samples 12.5 ms /sample Once per Charge Cycle	One Trip, Type A

DIAGNOSTIC SUMMARY TABLES--VICM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					Heater Commanded Duty Cycle Charger Current Sensor Battery Current Sensor Charge Control Mode	< 5% for at least 2 seconds No Faults No Faults Precharge		
		DTC Pass					600 ms	
Battery Charging Voltage System Isolation Fault	P0DAA	This DTC will determine if the measured resistance between the high voltage charging bus and chassis ground is too low which indicates that the integrity of the charging bus and/or battery are no longer adequately isolated from chassis ground	Active Isolation Resistance OR Active Isolation Resistance	< 325 KOhm < 400 KOhm	P0DAA Charge Only Mode P0DAA Charge Only Mode	DTC Not Active 10 seconds DTC Active 10 seconds	Fail if last resistance measurement is below theshold AND any (5) measurements out of last (10) measurements are below resistance theshold. No more than one resistance measurement is taken per HPC2 Wakeup Cycle.	One Trip, Type A
		DTC Pass					Pass if any single resistance measurement exceeds resistance threshold	
System Isolation / Impact Sensor Fault - Hybrid Battery System Contactors Open	P1F17	This DTC will latch when the HPC1 detects a "passive" isolation fault and due to a variety of additional failures it becomes necessary to latch the contactors open until the vehicle is repaired.	Condition 1 Control Module Hybrid Battery Voltage System Isolation Fault (P1AF0,P1AF2, or P1E22)in HPC1 Condition 2 Control Module Hybrid Battery Voltage System Isolation Fault (P1AF0,P1AF2, or P1E22)in HPC1 Condition 3 Lost Comm with HPC1 Condition 4 Lost Comm with HPC1	 Active Active Active Active	 Rollover or Airbag or Inertial Sensors Lost Communication with Inflatable Restraint Sensing and Diagnostic Module on Bus F (U184E) Lost Communication with Inflatable Restraint Sensing and Diagnostic Module on Bus F (U184E) Rollover or Airbag or	 Not working Active Active Not working	25 ms	One Trip, Type A
		DTC Pass					Once set, this DTC cannot pass. DTC passes when latch is not set.	

DIAGNOSTIC SUMMARY TABLES--VICM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Battery Pack Coolant Valve Diagnostics								
Hybrid/EV Battery Pack Coolant Control Valve A Stuck	P1F56	This performance fault detects if the 4 port valve is not functioning as intended.			System Voltage	>10.2V		Two Trips, Type B
					No active DTCs	P0CE2, P0CE3, P0CE6, P0CE7, P1EC7, P1EC8		
			IF: Either valve end stop is out of range	30.28% < Low End Stop < 69.52% OR 50.64% < High End Stop < 69.52%		State A has not already run this key cycle.	1 fail / 1 sample at 6.25ms (22s) in State A	
			OR IF: End stop span is out of range	15% < Span < 33%				
			OR IF: Feedback spikes out of range during end stop learn procedure	Feedback > 69.52% OR Feedback < 30.28%				
			IF valve does not reach the endstop	<=22s	Propulsion System Active	= True		
Hybrid/EV Battery Pack Coolant Control Valve Position Sensor Performance	P0CE5	If valve has not reached commanded position.	Valve has not reached its commanded position	<=22s	P1F56	not running (or has completed)	1280 fails / 1600 samples at 6.25ms in State B/C	Two Trips, Type B

DIAGNOSTIC SUMMARY TABLES--VICM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid/EV Battery Pack Coolant Control Valve Position Sensor Performance - Unexpected Position Change Detected	P1F58	If valve feedback has drifted out of position.	Valve feedback position	>3%	P1F56 Valve has not moved for	not running (or has completed) >15s	1280 fails / 1600 samples at 6.25ms in State B/C	Two Trips, Type B
Hybrid/EV Battery Pack Coolant Control Valve A Control Circuit Low	P0CE2	Valve Motor drive 1 has a short to low fault.	Valve Motor Driver 1 State	LOW	System Voltage Valve	>10.2V must be moving in reverse direction	90 fails / 100 samples at 6.25ms	Two Trips, Type B
Hybrid/EV Battery Pack Coolant Control Valve A Control Circuit High	P0CE3	Valve Motor drive 1 has a short to high fault.	Valve Motor Driver 1 State	HIGH	System Voltage Valve	>10.2V must be stopped or moving in forward direction	90 fails / 100 samples at 6.25ms	Two Trips, Type B
Hybrid/EV Battery Pack Coolant Control Valve Position Sensor Circuit Low	P0CE6	Valve Feedback signal has a out of range low circuit fault	Valve feedback voltage	< 28% of reference voltage	System Voltage	>10.2V	640 fails / 800 samples at 6.25ms	Two Trips, Type B
Hybrid/EV Battery Pack Coolant Control Valve Position Sensor Circuit High	P0CE7	Valve Feedback signal has a out of range high circuit fault	Valve feedback voltage	> 72% of reference voltage	System Voltage	>10.2V	640 fails / 800 samples at 6.25ms	Two Trips, Type B
Hybrid/EV Battery Pack Coolant Control Valve B Control Circuit Low	P1EC7	Valve Motor drive 2 has a short to low fault.	Valve Motor Driver 2 State	LOW	System Voltage Valve	>10.2V must be moving in forward direction	90 fails / 100 samples at 6.25ms	Two Trips, Type B
Hybrid/EV Battery Pack Coolant Control Valve B Control Circuit High	P1EC8	Valve Motor drive 2 has a short to high fault.	Valve Motor Driver 2 State	HIGH	System Voltage Valve	>10.2V must be stopped or moving in reverse direction	90 fails / 100 samples at 6.25ms	Two Trips, Type B
Battery Thermal Controls Diagnostics								
Hybrid Battery Pack Coolant Temperature Sensor Circuit Range/Performance	P0C43	Coolant Temp. Sensor 1 is not reading a rational value.	IF RESS Thermal conditioning mode = Active Heat then IF: ABS (RESS Inlet Temperature - RESS Outlet Temperature) AND IF: ABS (RESS Inlet Temperature - Battery Cell Average Temperature Sensor)	>=30C >=30C	System Voltage No active DTCs: Coolant Pump speed If RESS Thermal System Voltage	>10.2V P1E8C, P1E8D, P0C44, P0C47, P0C45, P0C4A, P0CD7, P0CD8, P0A9C,P0A9D,P0A9E,U0111 >= 20% for more than 1 min >= 70 sec has elapsed since the >10.2V	32 fails / 40 samples at 250ms	Two Trips, Type B
			IF RESS Thermal conditioning mode =	>= 30C				

DIAGNOSTIC SUMMARY TABLES--VICM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
			IF: ABS (RESS Inlet Temperature - Battery Cell Average Temperature Sensor)	>= 30C				
					No active DTCs:	P1E8C, P1E8D, P0C44, P0C47, P0C45, P0C4A, P0CD7, P0CD8, P0A9C,P0A9D,P0A9E,U0111		
					Coolant Pump speed	>= 20% for more than 1 min		
					If RESS Thermal conditioning mode changes then	>= 70 sec has elapsed since the change		
			IF RESS Thermal conditioning mode = Passive Cool then IF: ABS (RESS Inlet Temperature - RESS Outlet Temperature) AND	>= 55C	System Voltage	>10.2V		
			IF: ABS (RESS Inlet Temperature - Battery Cell Average Temperature Sensor)	>= 55C				
					No active DTCs:	P1E8C, P1E8D, P0C44, P0C47, P0C45, P0C4A, P0CD7, P0CD8, P0A9C,P0A9D,P0A9E,U0111		
					Coolant Pump speed	>= 20% for more than 1 min		
					If RESS Thermal conditioning mode changes then	>= 70sec has elapsed since the change		
Hybrid/EV Battery Pack Coolant Temperature Sensor B Circuit Range/Performance	P0CD6	Coolant Temp. Sensor 2 is not reading a rational value.	IF: ABS (RESS Outlet Temperature - RESS Inlet Temperature) AND	>=20C	System Voltage	>10.2V	32 fails / 40 samples at 250ms	Two Trips, Type B
			IF: ABS (RESS Outlet Temperature - Battery Cell Average Temperature Sensor)	>=20C				
					No active DTCs:	P1E8C, P1E8D, P0C44, P0C47, P0C45, P0C4A, P0CD7, P0CD8,P0A9C,P0A9D,P0A9E, U0111		
					Coolant Pump speed	>=20% for more than 1 min		
Hybrid Battery Pack Coolant Pump Control Circuit/Open	P0C47	Coolant Pump Control line has a circuit fault	Coolant Pump Control line is open, shorted to voltage or shorted to ground	Board Support Package returns coolant pump control line fault = True	System Voltage	>10.2V	40 fails / 50 samples at 100ms	Two Trips, Type B
					Pump Commanded PWM	Between 5% and 95%		
					Coolant Pump Enable	= High		
Hybrid Battery Pack Coolant Pump Control Performance	P0C4A	Passive Pump determination is enabled first. If not passed them intrusive determination is			Propulsion System Active	If diagnostic did not complete in charge		Two Trips, Type B

DIAGNOSTIC SUMMARY TABLES--VICM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
		initiated for final evaluation			Plugged in Charge Charge Mode RESS Inlet temp RESS Outlet Temp Battery Mininum Cell Temp RESS Valve Learn No active DTCs: Battery Severrity Status Battery Discharge Limit High Voltage SOC Fault	Once per Drive Cycle Actively Charging < 50°C and > -20°C > -20°C > -20°C Complete in Propulsion System Active P1EC5, P1FFB, P1FFC, P1FFD, P1FFE, P0C44, P0C45, P0C43, P1F56, P1F58, P0CE5, P0CE2, P0CE3, P1EC7, P1EC8, P0CE6, P0CE7. None Not Faulted Not Faulted		
		Passive Pump Determination - Pass only DTC Pass			Move Battery Pack Coolant Valve Turn pump on Thermal Mode	Radiator for 15s then to Bypass position on for 66s 90% DC for 81s Not Active Heat	81s RESS inlet coolant absolute temperature rate of temperature change>0.2°C/s	
		Intrusive Pump Determiniation	IF: RESS Inlet Coolant Temperature rate of temperature decrease	< 0.05°C/s	RESS inlet coolant absolute temperature rate of temperature change Turn pump on Heater Performance Diagnostic - P1EC6	<0.2°C/s during passive pump determination 90% DC for 24s Diagnostic has completed and passed:	24s	
Hybrid Battery Pack Coolant Pump Enable Circuit Low	P1E8C	Coolant Pump Enable has a circuit fault	Coolant Pump Enable line is shorted to ground		System Voltage Coolant Pump Enable	>10.2V = High	40 fails / 50 samples at 100ms	Two Trips, Type B
Hybrid Battery Pack Coolant Pump Enable Circuit High	P1E8D	Coolant Pump Enable has a circuit fault	Coolant Pump Enable line is open or shorted to voltage		System Voltage Coolant Pump Enable	>10.2V = Low	40 fails / 50 samples at 100ms	Two Trips, Type B
Hybrid/EV Battery Pack Heater Transistor Control Circuit/Open	P1EC3	Heater Transistor Control Circuit has a circuit fault	Heater Transistor Control Circuit is open, shorted to voltage or shorted to ground		System Voltage	>10.2V	40 fails / 50 samples at 100ms	Two Trips, Type B
Hybrid Battery Pack Heater Performance	P1EC6	Battery Heater is not performing as intended	IF: RESS Inlet Coolant Temperature rate of temperature rise	< 0.15°C/s	Propulsion System Active Plugged in Charge Charge Mode RESS Inlet temp	If diagnostic did not complete in charge Once per Drive Cycle Actively Charging < 50°C and > -20°C	up to 161s	Two Trips, Type B

DIAGNOSTIC SUMMARY TABLES--VICM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					RESS Outlet Temp Battery Mininum Cell Temp MPC Status RESS Valve Learn Passive Pump No Test Failed This Key On: Battery Severrity Status Battery Discharge Limit High Voltage SOC Fault Move Battery Pack Coolant Valve Turn pump on Turn pump off Turn heater on Turn heater off	> -20°C > -20°C Closed Complete in Propulsion System Active Not Passed P1EC5, P1FFB, P1FFC, P1FFD, P1FFE, P0C44, P0C45, P0C43, P1F56, P1F58, P0CE5, P0CE2, P0CE3, P1EC7, P1EC8, P0CE6, P0CE7. None Not Faulted Not Faulted Radiator for 15s then to Bypass position on for 66s 90% DC for 81s DC based on battery voltage to input 31kJ within 40 seconds Wait 40 second for temperature change		
Coolant Level Sensor Diagnostics								
Hybrid/EV Battery Pack Coolant Level Sensor Circuit	P1FFB	DTC monitors the sensed voltage to determine if the circuit is in-range, but invalid	Coolant Level Sensor Sensed Voltage	2.85V < Sensed Voltage < 3.11V	12V Battery Voltage	> 10.2V	40 out of 50 samples at 100ms	One Trip, Type A
Hybrid/EV Battery Pack Coolant Level Sensor Circuit Low Voltage	P1FFC	DTC monitors the sensed voltage to determine if the circuit is out-of-range Low	Coolant Level Sensor Sensed Voltage	Sensed Voltage < 1.4V	12V Battery Voltage	> 10.2V	40 out of 50 samples at 100ms	One Trip, Type A
Hybrid/EV Battery Pack Coolant Level Sensor Circuit High Voltage	P1FFD	DTC monitors the sensed voltage to determine if the circuit is out-of-range High	Coolant Level Sensor Sensed Voltage	Sensed Voltage > 4.0V	12V Battery Voltage	> 10.2V	40 out of 50 samples at 100ms	One Trip, Type A

DIAGNOSTIC SUMMARY TABLES--VICM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid/EV Battery Pack Coolant Level Low	P1FFE	DTC monitors the sensor voltage to determin if the coolant level is low	Coolant Level Sensor Sensed Voltage	1.38V < Sensed Voltage < 2.84V (Low State)	[Vehicle Speed for OR (Propulsion System Off Time AND Vehicle Speed)] AND RESS Outlet Coolant Temperature for	< 1 KPH > 30 s > 30 s < 1 KPH >0°C 30s	16 out of 20 samples at 250ms at least once in 2 out of 3 key cycles (moving window)	One Trip, Type A
					DTC's are not ACTIVE	P0CD6, P0CD7, P0CD8, U185A, TempRationalityFA (see Fault Bundles), U0100, P2610, P0721, P077B, P215C, U0101		
System Isolation / Coolant Level Sensor Fault - Hybrid/EV Battery Charging System Disabled	P1FFF	System level RESS HV isolation monitor. Used to invoke remedial action in the event the RESS HV isolation integrity cannot be guaranteed due to any of the listed Malfunction Criteria (prevents vehicle from charging in the event the RESS may have lost coolant). Once set DTC will not re-pass. Requires a code clear.	RESS coolant level sensor fault (P1FFB, P1FFC, P1FFD) OR RESS coolant level low fault (P1FFE) OR RESS HV active isolation failed OR Active isolation check is inhibited due to isolation voltage sensor fault (P1AE6)	= TRUE = TRUE = TRUE = TRUE			5 sec	One Trip, Type A
Outside Air Temperature Sensor Diagnostics								
Ambient Air Temperature Sensor Range/Performance	P0071	Outside Air Temperature sensor is not performing as intended	ABS (Outside Air Temperature - Inlet Air Temperature)	> 30°C	System Voltage Power mode	>10.2V = Run for less than 20 seconds	32 fails / 40 samples at 250ms	Two Trips, Type B

DIAGNOSTIC SUMMARY TABLES--VICM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					Test Complete this trip No active DTCs: ABS(Power Up IAT - Propulsion Off Timer Power Electronic Pump off soak time before Enable Compressor Off soak time	= FALSE P0111, P0112, P0113, P0114, P0116, P0117, P0118, P0119, P0072, P0073, U0100 < 10 degC >21600 seconds >3600 seconds >3600 seconds		
Ambient Air Temperature Sensor Circuit Low Input	P0072	Outside Air Temperature sensor has an out of range low circuit fault	Sensor voltage	< 2% (0.1V) of reference voltage	System Voltage	>10.2V	16 fails / 20 samples at 250ms	Two Trips, Type B
Ambient Air Temperature Sensor Circuit High Input	P0073	Outside Air Temperature sensor has an out of range high circuit fault	Sensor voltage	> 98% (4.9V) of reference voltage	System Voltage	>10.2V	16 fails / 20 samples at 250ms	Two Trips, Type B
Cooling Fan Diagnostics								
Cooling Fan 1 Control Circuit	P0480	Engine Cooling Fan has a circuit fault	Engine Cooling Fan line is open, shorted to voltage or shorted to ground		System Voltage	>10.2V	16 fails / 20 samples at 250ms	Two Trips, Type B
Cooling Fan Signal Circuit Performance	P148A	Engine Cooling fan signal is not performing as intended	IF ABS (Hardware I/O Radiator fan period from ECM - 10.0) OR ABS (Hardware I/O Radiator fan duty cycle from ECM - Engine Cooling Fan Speed from CAN bus)	> 0.2 > 30%	System Voltage Power mode No active DTCs: If ABS(Current Engine Propulsion system active OR (Propulsion system active AND Energy storage system thermal condition request AND Engine Cooling fan operation enable)	>10.2V ≠ crank P148B, P148C, U0293 >5% = True for longer than 10 seconds = False = ActiveCool = True for longer than 10 seconds	32 fails / 40 samples at 250ms	Two Trips, Type B
Cooling Fan Signal Circuit Low	P148B	Engine Cooling fan signal has a out of range low circuit fault	HWIO duty cycle (from ECM)	< 3%	System Voltage	>10.2V	16 fails / 20 samples at 250ms	Two Trips, Type B
Cooling Fan Signal Circuit High	P148C	Engine Cooling fan signal has a out of range high circuit fault	HWIO duty cycle (from ECM)	> 97%	System Voltage Propulsion system active	>10.2V = True for longer than 10	16 fails / 20 samples at 250ms	Two Trips, Type B

DIAGNOSTIC SUMMARY TABLES--VICM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Power Electronics Cooling Diagnostics								
Hybrid/EV Electronics Coolant Pump Control Circuit/Open	P0CE9	Coolant Pump Control line has a circuit fault	Coolant Pump Control line is open, shorted to voltage or shorted to ground		System Voltage HWIO Pump Control Circuit Status Coolant Pump Enable	>10.2V ≠ Indeterminate = True	16 fails / 20 samples at 250ms	Two Trips, Type B
Hybrid/EV Electronics Coolant Pump Performance	P0CEA	Power Electronics Coolant Pump is not functioning as intended	IF Vehicle Charging ABS (Power Electronics Coolant temperature sensor - High Voltage Charger temperature) OR HV Charger Temperature AND ABS (Power Electronics Coolant temperature sensor - High Voltage Charger temperature) ELSE ABS (Power Electronics Coolant temperature sensor - High Voltage Charger temperature)	> KtPCOD_dT_PECL_OBCM_Charge >60C for > 600sec > 10 > KtPCOD_dT_PECL_OBCM_Drive	System Voltage No active DTCs: Power Electronics Coolant pump speed AND Power Electronics Coolant pump enabled Outside Air Temperature Status Outside Air Temperature Slope Threshold Outside Air Temperature Stable Time	>10.2V P0CF1, P0CF0, P1F44, P1F45, P0CE9, P0071, P0072, P0073, P1ED7, P1ED6, P1ED8 >30% to Enable AND <25% to Disable (Hysterisis) >300 s = Valid < 0.4 >300s	32 fails / 40 samples at 250ms	Two Trips, Type B
Hybrid/EV Electronics	P1F44	Coolant Pump Enable signal	Coolant Pump Enable line is shorted to		System Voltage HWIO Pump Enable Circuit Status Coolant Pump Enable	>10.2V ≠ Indeterminate = True	16 fails / 20 samples at	Two
Hybrid/EV Electronics Coolant Pump Enable Circuit High	P1F45	Coolant Pump Enable signal has a shorted to voltage circuit fault	Coolant Pump Enable line is shorted to voltage		System Voltage HWIO Pump Enable Coolant Pump Enable	>10.2V ≠ Indeterminate = False	16 fails / 20 samples at 250ms	Two Trips, Type B
Hybrid/EV Electronics Coolant Temperature Sensor Circuit Low	P0CF0	Power Electronics Coolant Temp Sensor has a out of range low circuit fault	Sensor voltage	< 2% (0.1V) of reference voltage	System Voltage	>10.2V	16 fails / 20 samples at 250ms	Two Trips, Type B
Hybrid/EV Electronics Coolant Temperature Sensor Circuit High	P0CF1	Power Electronics Coolant Temp Sensor has a out of range high circuit fault	Sensor voltage	> 98% (4.9V) of reference voltage	System Voltage	>10.2V	16 fails / 20 samples at 250ms	Two Trips, Type B

DIAGNOSTIC SUMMARY TABLES--VICM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid/EV Electronics Coolant Temperature Sensor Circuit Range/Performance	P0CEF	Power Electronics Coolant Temp Sensor is not functioning as intended	IF Power Inverter Module request pump speed, Then ABS (Power Electronics Coolant temperature sensor - High Voltage Charger temperature), Else ABS (Power Electronics Coolant temperature sensor - High Voltage Charger temperature)	>35°C >35°C	System Voltage No active DTCs: Power Electronics Coolant pump speed AND Power Electronics Coolant pump enabled High Voltage Charger Temperature	>10.2V P0CF1, P0CF0, P0CE9, P0CED, P1F44, P1F45, P1ED7, P1ED6, P1ED8 >30% to Enable AND <25% to Disable (Hysterisis) >300 s >-40C	32 fails / 40 samples at 250ms	Two Trips, Type B
Engine Coolant Bypass Valve Diagnostics								
Engine Coolant Bypass Valve Control Circuit / Open	P2681	Valve Drive (control) Circuit has a circuit fault	Valve Deive Circuit is open, shorted to voltage or shorted to ground		System Voltage HWIO Valve Drive Circuit Status	>10.2V ≠ Indeterminate	40 fails / 50 samples at 100ms	Two Trips, Type B
Engine Coolant Bypass Valve Position Sensor Stuck	P26A9	Valve is stuck or end position learn failed	Valve end postion learn request Valve has not reached its commanded position THEN attempt valve relearn IF Valve still does not reach its commanded position	=FAIL <=15s up to 3 times <=10s	System Voltage No active DTCs: Engine Coolant Temperature Propulsion system active System Voltage No active DTCs: Propulsion system active	>10.2V P2681, P26A6, P26A7, P0119; P0118, P0117, P0116, >50C = True >10.2V P2681, P26A6, P26A7 = True	1 fails / 1 samples at 100ms (15s)	Two Trips, Type B

DIAGNOSTIC SUMMARY TABLES--VICM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Engine Coolant Bypass Valve Position Sensor Circuit Low	P26A6	Valve Feedback signal has a out of range low circuit fault	Valve feedback percentage	< 5% of reference voltage	System Voltage	>10.2V	40 fails / 50 samples at 100ms	Two Trips, Type B
Engine Coolant Bypass Valve Position Sensor Circuit High	P26A7	Valve Feedback signal has a out of range high circuit fault	Valve feedback percentage	> 95% of reference voltage	System Voltage	>10.2V	40 fails / 50 samples at 100ms	Two Trips, Type B
Engine Coolant Bypass Valve Position Sensor Stop/Minimum Stop Performance	P26A5	If valve has not reached commanded position	State A: IF Valve feedback percentage is OR IF Valve feedback percentage is	5% < Feedback percentage < 30% 70% < Feedback percentage < 95%	System Voltage No active DTCs: Propulsion system active	>10.2V P2681, P26A6, P26A7 = True	3 fails / 5 samples at 100ms	Two Trips, Type B
Engine Coolant Bypass Valve Position Sensor Circuit Range/Performance - Unexpected Position Change Detected	P15C5	If valve feedback has drifted out of position	Valve feedback Drift	>3%	System Voltage No active DTCs: Propulsion system active	>10.2V P2681, P26A6, P26A7 = True	80 fails / 100 samples at 100ms	Two Trips, Type B
Air Conditioning Compressor and Rationality Diagnostics								
Air Conditioner (A/C) Refrigerant Charge Loss	P0534	Cooling performance not adequate/Low charge/Plugged refrigerant line.	CASE 1		System Voltage	>10.2V		Two Trips, Type B
			IF Power mode AND Pump Performance diagnostic OR Power mode THEN	=Run Mode AND =Complete = Not Run Mode				
			Start Timer if Energy Storage System Thermal conditioning request = Active Cooling THEN	>2s				
			Start Total Run Timer THEN	=491s	No active DTCs:	P0CE0; P0CE2; P0CE3; P0CE6; P0CE7; P1CE7; P1CE8		
			Override Flag THEN	=TRUE				
			RESS Thermal Valve Position THEN	=100% Chill				
			For Secondary Run Timer Coolant Pump Duty Cycle AND For Secondary Run Timer Coolant Pump Duty Cycle AND	<= 180 =35% > 180 =53%	No active DTCs:	P0C47; P0C4A; P1E8C, P1E8D		

DIAGNOSTIC SUMMARY TABLES--VICM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
			For this Active Cooling cycle, one time check if Compressor RPM has been	>2200				
			Continuous Compressor RPM check	>2250RPM to Enable <2200RPM to Disable (Hysterisis)	No active DTCs:	P0C44, P0C45, P0C43		
			Start Secondary Run Timer THEN	=300s	Inlet Temperature sensor validity	= Valid		
			RESS Coolant Outlet Temperature Sensor - RESS Coolant Inlet Temperature Sensor	< P0534 Fail Threshold KtACXR_T_ThreshTableOn and Table KtACXR_T_ThreshTableOff if the compressor is on for cabin & RESS cooling OR < P0534 Fail Threshold Table KtACXR_T_ThreshTableOff if the compressor is on for RESS cooling only	No active DTCs:	P0CD7, P0CD8, P0CD6		
					Outlet Temp Sensor Status	= Valid		
					Complete Flag	=False		
					Compressor On	>2s		
					No active DTCs:	P0073; P0072; P0071		
					HighSidePressure	>2250kpa for greater than 20 consecutive seconds, disable for current active cooling cycle. Re-enable if <2000kpa within that 20 second count.		
					OAT Arb Status	= valid or unitialized		
			CASE 2		CASE 2			
			IF Low Side Refrigerant Pressure based on OAT Arb AND	<150Kpa when OAT >=20C OR 0Kpa when OAT <=15C (Linear Interoplation between 20C and 15C)	System Voltage	>10.2V		
			Low Side Pressure Time	>30s	No active DTCs:	P2517; P2518; P2516		
					No active DTCs:	P0606		
					No active DTCs:	P0073; P0072; P0071		
					OAT Arb Status	= Valid or uninitalized		
					Compressor Off Time	>240s		
			CASE 3		CASE 3			
			IF Low Side Refrigerant Pressure based on OAT Arb AND	< 100Kpa when OAT >=5C OR 0Kpa when OAT <5C	System Voltage	>10.2V		
			Low Side Pressure Time	>4s	No active DTCs:	P2517; P2518; P2516		
					No active DTCs:	P0073; P0072; P0071		
					OAT Arb Status	= Valid or uninitalized		

DIAGNOSTIC SUMMARY TABLES--VICM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					Compressor running flag	= ON		
			CASE 4		CASE 4			
			IF High Side Refrigerant Pressure	>5000Kpa	System Voltage	>10.2V		
			AND					
			High Side Pressure Time	>30s	No active DTCs:	P0533; P0532; P0531		
					HSRP Status	= Valid		
					No active DTCs:	P0606		
					No active DTCs:	P0073; P0072; P0071		
					OAT Arb Status	= Valid or uninitalized		
					Compressor Off Time	>240s		
A/C Compressor Motor Voltage Sensor Performance	P0D69	ACCM Motor Voltage Sensor is not performing as intended	ABS (Compressor Input Voltage - VITM Battery Cell Voltage)	>15V	System Voltage	>10.2V	35 fails / 40 samples at 100ms	Two Trips, Type B
					No active DTCs:	P0D6A; P0D6B		
					Compressor High Voltage Status	= Valid		
					No active DTCs:	P0ABC, P0ABD, P0ABB, P0AF8, P1A07, (U1111 AND U185A)		
					Battery Cell Voltage Status	= Valid		
					No active DTCs:	P0AE4, P0AD9, P0AA1, P0ADD, P1EBC, P0AE2		
					Power mode	≠ Crank		
					High Voltage Battery Contactor	= Closed		
Electric A/C Compressor Control Module Internal Temperature Sensor Performance	P0D71	ACCM CPU Temp. Sensor is not performing as intended	IF ABS (Compressor CPU Temperature Sensor - Intake Air Temperature Sensor)	> 10C	System Voltage	>10.2V	35 fails / 40 samples at 100ms	Two Trips, Type B
			AND					
			IF ABS (Compressor CPU Temperature Sensor - Compressor IGBT Sensor)	>10C	No active DTCs:	P0D77; P0D78		
					IGBT Status	= Valid		
					No active DTCs:	P0606		
					No active DTCs:	P0073; P0072; P0071		
					OAT_Filtd Status	= Valid or uninitalized		
					OAT_Filtd	>-7C		
					No active DTCs:	P0113, P0112, P0111, P0114		
					No active DTCs:	P0119; P0118; P0117; P0116		
					ECT Status	= Valid		
					No active DTCs:	P0D72; P0D73		
					CPU Temp Status	= Valid		
					Power mode	≠ Crank		

DIAGNOSTIC SUMMARY TABLES--VICM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					Engine Coolant Temp - Outside Air Temperature Filtered	< 15C		
					Compressor Off Time	> 21600s		
Electric A/C Compressor Control Module Output Driver Temperature Sensor Performance	P0D76	ACCM IGBT Temp. Sensor is not performing as intended	IF ABS (Compressor IGBT Temperature Sensor - OAT_Raw Temperature Sensor) AND IF ABS (Compressor IGBT Temperature Sensor - Intake Air Temperature Sensor)	>15C >10C	System Voltage No active DTCs: IGBT Status No active DTCs: No active DTCs: OAT_Filtd Status OAT_Filtd No active DTCs: OAT_Raw Status No active DTCs: No active DTCs: ECT Status Power mode Engine Coolant Temp - Outside Ambient Temperature Filtered Compressor Off Time	>10.2V P0D77; P0D78 = Valid P0606 P0073; P0072; P0071 = Valid or uninitalized >-7C P0073; P0072; P0071 = Valid or uninitalized P0113, P0112, P0111, P0114 P0119; P0118; P0117; P0116 = Valid ≠ Crank < 15C > 21600s	35 fails / 40 samples at 100ms	Two Trips, Type B
A/C Refrigerant Pressure Sensor B Rationality	P151C	Low Side Refrigerant Pressure Sensor is not functioning as intended	ABS (Low Side Refrigerant Pressure - High Side Refrigerant pressure)	>200kpa	System Voltage No active DTCs: Power mode No active DTCs: OAT Raw/Filtd Status No active DTCs: ECT Status Outside Air Temp raw reading HSRP Engine Coolant Temp - Outside Ambient Temperature Filtered HSRP Status No active DTCs: No active DTCs:	>10.2V P2517; P2518 ≠ Crank P0073; P0072; P0071 = Valid P0119; P0118; P0117; P0116 = Valid 0C < OAT_raw < 25C 0 Kpa < HSRP < 675 Kpa < 15C = Valid P0537;P0538;P153B P0606	32 fails / 40 samples at 100ms	Two Trips, Type B

DIAGNOSTIC SUMMARY TABLES--VICM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					Compressor Off Time	> 3600s		
A/C Refrigerant Pressure Sensor B Stuck Performance	P2516	Low Side Refrigerant Pressure Sensor is not functioning as intended	IF Low Side Refrigerant Pressure Start Of Diag - Low Side Refrigerant Pressure End of Diag	< 4kpa after 180s	System Voltage No active DTCs: Power mode No active DTCs: OAT_Filtd Status No active DTCs: Engine Coolant Tempeature Status Engine Coolant Temp - Outside Air Temperature No active DTCs: Compressor Off Time Compressor Running Flag TRUE for Compressor Running Flag	>10.2V P2517;P2518 ≠ Crank P0073; P0072; P0071 = Valid or uninitalized P0119; P0118; P0117; P0116 = Valid < 15C P0606 >3600s <185 s TRUE		One Trip, Type A
A/C Refrigerant Pressure Sensor B Circuit Low Input	P2517	Signal has a out of range low circuit fault	Sensor voltage	< 2% (0.1V) of reference voltage	System Voltage	>10.2V	16 fails / 20 samples at 100ms	Two Trips, Type B
A/C Refrigerant Pressure Sensor B Circuit High Input	P2518	Signal has a out of range high circuit fault	Sensor voltage	> 98% (4.9V) of reference voltage	System Voltage	>10.2V	40 fails / 50 samples at 100ms	One Trip, Type A
High Voltage Battery Diagnostics								
Hybrid Battery Voltage Sense A Circuit Range/Performance	P0B3C	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.006V U185A	20 Failures out of 40 Samples Frequency: 200ms	One Trip, Type A
Hybrid Battery Voltage Sense B Circuit Range/Performance	P0B41	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.006V U185A	20 Failures out of 40 Samples Frequency: 200ms	One Trip, Type A
Hybrid Battery Voltage Sense C Circuit Range/Performance	P0B46	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.006V U185A	20 Failures out of 40 Samples Frequency: 200ms	One Trip, Type A
Hybrid Battery Voltage Sense D Circuit Range/Performance	P0B4B	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	CellVoltageRationalityFA (see Fault Bundle Page)	= FALSE	20 Failures out of 40 Samples	One Trip, Type A

DIAGNOSTIC SUMMARY TABLES--VICM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					Average Cell Voltage Movement No active DTCs:	> 0.006V U185A	Frequency: 200ms	
Hybrid Battery Voltage Sense E Circuit Range/Performance	P0B50	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.006V U185A	20 Failures out of 40 Samples Frequency: 200ms	One Trip, Type A
Hybrid Battery Voltage Sense F Circuit Range/Performance	P0B55	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.006V U185A	20 Failures out of 40 Samples Frequency: 200ms	One Trip, Type A
Hybrid Battery Voltage Sense G Circuit Range/Performance	P0B5A	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.006V U185A	20 Failures out of 40 Samples Frequency: 200ms	One Trip, Type A
Hybrid Battery Voltage Sense H Circuit Range/Performance	P0B5F	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.006V U185A	20 Failures out of 40 Samples Frequency: 200ms	One Trip, Type A
Hybrid Battery Voltage Sense I Circuit Range/Performance	P0B64	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.006V U185A	20 Failures out of 40 Samples Frequency: 200ms	One Trip, Type A
Hybrid Battery Voltage Sense J Circuit Range/Performance	P0B69	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.006V U185A	20 Failures out of 40 Samples Frequency: 200ms	One Trip, Type A
Hybrid Battery Voltage Sense K Circuit Range/Performance	P0B6E	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.006V U185A	20 Failures out of 40 Samples Frequency: 200ms	One Trip, Type A
Hybrid Battery Voltage Sense L Circuit Range/Performance	P0B73	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.006V U185A	20 Failures out of 40 Samples Frequency: 200ms	One Trip, Type A

DIAGNOSTIC SUMMARY TABLES--VICM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Voltage Sense M Circuit Range/Performance	P0B78	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.006V U185A	20 Failures out of 40 Samples Frequency: 200ms	One Trip, Type A
Hybrid Battery Voltage Sense N Circuit Range/Performance	P0B7D	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.006V U185A	20 Failures out of 40 Samples Frequency: 200ms	One Trip, Type A
Hybrid Battery Voltage Sense O Circuit Range/Performance	P0B82	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.006V U185A	20 Failures out of 40 Samples Frequency: 200ms	One Trip, Type A
Hybrid Battery Voltage Sense P Circuit Range/Performance	P0B87	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.006V U185A	20 Failures out of 40 Samples Frequency: 200ms	One Trip, Type A
Hybrid Battery Voltage Sense Q Circuit Range/Performance	P0B8C	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.006V U185A	20 Failures out of 40 Samples Frequency: 200ms	One Trip, Type A
Hybrid Battery Voltage Sense R Circuit Range/Performance	P0B91	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.006V U185A	20 Failures out of 40 Samples Frequency: 200ms	One Trip, Type A
Hybrid Battery Voltage Sense S Circuit Range/Performance	P0B96	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.006V U185A	20 Failures out of 40 Samples Frequency: 200ms	One Trip, Type A
Hybrid Battery Voltage Sense T Circuit Range/Performance	P0B9B	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.006V U185A	20 Failures out of 40 Samples Frequency: 200ms	One Trip, Type A
Hybrid Battery Voltage Sense U Circuit Range/Performance	P0BA0	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement	= FALSE > 0.006V	20 Failures out of 40 Samples	One Trip, Type A

DIAGNOSTIC SUMMARY TABLES--VICM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					No active DTCs:	U185A	Frequency: 200ms	
Hybrid Battery Voltage Sense V Circuit Range/Performance	P0BA5	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.006V U185A	20 Failures out of 40 Samples Frequency: 200ms	One Trip, Type A
Hybrid Battery Voltage Sense W Circuit Range/Performance	P0BAA	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.006V U185A	20 Failures out of 40 Samples Frequency: 200ms	One Trip, Type A
Hybrid Battery Voltage Sense X Circuit Range/Performance	P0BAF	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.006V U185A	20 Failures out of 40 Samples Frequency: 200ms	One Trip, Type A
Hybrid Battery Voltage Sense Y Circuit Range/Performance	P0BB4	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.006V U185A	20 Failures out of 40 Samples Frequency: 200ms	One Trip, Type A
Hybrid Battery Voltage Sense Z Circuit Range/Performance	P0BB9	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.006V U185A	20 Failures out of 40 Samples Frequency: 200ms	One Trip, Type A
Hybrid Battery Voltage Sense AA Circuit Range/Performance	P1B16	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.006V U185A	20 Failures out of 40 Samples Frequency: 200ms	One Trip, Type A
Hybrid Battery Voltage Sense AB Circuit Range/Performance	P1B19	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.006V U185A	20 Failures out of 40 Samples Frequency: 200ms	One Trip, Type A
Hybrid Battery Voltage Sense AC Circuit Range/Performance	P1B1C	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.006V U185A	20 Failures out of 40 Samples Frequency: 200ms	One Trip, Type A
Hybrid Battery Voltage Sense AD Circuit Range/Performance	P1B1F	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	CellVoltageRationalityFA (see Fault Bundle Page)	= FALSE	20 Failures out of 40 Samples	One Trip, Type A

DIAGNOSTIC SUMMARY TABLES--VICM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					Average Cell Voltage Movement No active DTCs:	> 0.006V U185A	Frequency: 200ms	
Hybrid Battery Voltage Sense AE Circuit Range/Performance	P1B22	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.006V U185A	20 Failures out of 40 Samples Frequency: 200ms	One Trip, Type A
Hybrid Battery Voltage Sense AF Circuit Range/Performance	P1B25	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.006V U185A	20 Failures out of 40 Samples Frequency: 200ms	One Trip, Type A
Hybrid Battery Voltage Sense AG Circuit Range/Performance	P1B45	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.006V U185A	20 Failures out of 40 Samples Frequency: 200ms	One Trip, Type A
Hybrid Battery Voltage Sense AH Circuit Range/Performance	P1B48	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.006V U185A	20 Failures out of 40 Samples Frequency: 200ms	One Trip, Type A
Hybrid Battery Voltage Sense AI Circuit Range/Performance	P1B4B	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.006V U185A	20 Failures out of 40 Samples Frequency: 200ms	One Trip, Type A
Hybrid Battery Voltage Sense AJ Circuit Range/Performance	P1B4E	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.006V U185A	20 Failures out of 40 Samples Frequency: 200ms	One Trip, Type A
Hybrid Battery Voltage Sense AK Circuit Range/Performance	P1B51	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.006V U185A	20 Failures out of 40 Samples Frequency: 200ms	One Trip, Type A
Hybrid Battery Voltage Sense AL Circuit Range/Performance	P1B54	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.006V U185A	20 Failures out of 40 Samples Frequency: 200ms	One Trip, Type A

DIAGNOSTIC SUMMARY TABLES--VICM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Voltage Sense AM Circuit Range/Performance	P1B57	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.006V U185A	20 Failures out of 40 Samples Frequency: 200ms	One Trip, Type A
Hybrid Battery Voltage Sense AN Circuit Range/Performance	P1B5A	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.006V U185A	20 Failures out of 40 Samples Frequency: 200ms	One Trip, Type A
Hybrid Battery Voltage Sense AO Circuit Range/Performance	P1B5D	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.006V U185A	20 Failures out of 40 Samples Frequency: 200ms	One Trip, Type A
Hybrid Battery Voltage Sense AP Circuit Range/Performance	P1B60	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.006V U185A	20 Failures out of 40 Samples Frequency: 200ms	One Trip, Type A
Hybrid Battery Voltage Sense AQ Circuit Range/Performance	P1B63	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.006V U185A	20 Failures out of 40 Samples Frequency: 200ms	One Trip, Type A
Hybrid Battery Voltage Sense AR Circuit Range/Performance	P1B66	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.006V U185A	20 Failures out of 40 Samples Frequency: 200ms	One Trip, Type A
Hybrid Battery Voltage Sense AS Circuit Range/Performance	P1B69	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.006V U185A	20 Failures out of 40 Samples Frequency: 200ms	One Trip, Type A
Hybrid Battery Voltage Sense AT Circuit Range/Performance	P1B6C	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.006V U185A	20 Failures out of 40 Samples Frequency: 200ms	One Trip, Type A
Hybrid Battery Voltage Sense AU Circuit Range/Performance	P1B6F	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement	= FALSE > 0.006V	20 Failures out of 40 Samples	One Trip, Type A

DIAGNOSTIC SUMMARY TABLES--VICM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					No active DTCs:	U185A	Frequency: 200ms	
Hybrid Battery Voltage Sense AV Circuit Range/Performance	P1B72	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.006V U185A	20 Failures out of 40 Samples Frequency: 200ms	One Trip, Type A
Hybrid Battery Voltage Sense AW Circuit Range/Performance	P1B75	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.006V U185A	20 Failures out of 40 Samples Frequency: 200ms	One Trip, Type A
Hybrid Battery Voltage Sense AX Circuit Range/Performance	P1B78	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.006V U185A	20 Failures out of 40 Samples Frequency: 200ms	One Trip, Type A
Hybrid Battery Voltage Sense AY Circuit Range/Performance	P1B7B	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.006V U185A	20 Failures out of 40 Samples Frequency: 200ms	One Trip, Type A
Hybrid Battery Voltage Sense AZ Circuit Range/Performance	P1B7E	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.006V U185A	20 Failures out of 40 Samples Frequency: 200ms	One Trip, Type A
Hybrid Battery Voltage Sense BA Circuit Range/Performance	P1B81	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.006V U185A	20 Failures out of 40 Samples Frequency: 200ms	One Trip, Type A
Hybrid Battery Voltage Sense BB Circuit Range/Performance	P1B84	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.006V U185A	20 Failures out of 40 Samples Frequency: 200ms	One Trip, Type A
Hybrid Battery Voltage Sense BC Circuit Range/Performance	P1B87	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.006V U185A	20 Failures out of 40 Samples Frequency: 200ms	One Trip, Type A
Hybrid Battery Voltage Sense BD Circuit Range/Performance	P1B8A	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	CellVoltageRationalityFA (see Fault Bundle Page)	= FALSE	20 Failures out of 40 Samples	One Trip, Type A

DIAGNOSTIC SUMMARY TABLES--VICM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					Average Cell Voltage Movement No active DTCs:	> 0.006V U185A	Frequency: 200ms	
Hybrid Battery Voltage Sense BE Circuit Range/Performance	P1B8D	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.006V U185A	20 Failures out of 40 Samples Frequency: 200ms	One Trip, Type A
Hybrid Battery Voltage Sense BF Circuit Range/Performance	P1B90	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.006V U185A	20 Failures out of 40 Samples Frequency: 200ms	One Trip, Type A
Hybrid Battery Voltage Sense BG Circuit Range/Performance	P1B93	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.006V U185A	20 Failures out of 40 Samples Frequency: 200ms	One Trip, Type A
Hybrid Battery Voltage Sense BH Circuit Range/Performance	P1B96	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.006V U185A	20 Failures out of 40 Samples Frequency: 200ms	One Trip, Type A
Hybrid Battery Voltage Sense BI Circuit Range/Performance	P1B99	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.006V U185A	20 Failures out of 40 Samples Frequency: 200ms	One Trip, Type A
Hybrid Battery Voltage Sense BJ Circuit Range/Performance	P1B9C	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.006V U185A	20 Failures out of 40 Samples Frequency: 200ms	One Trip, Type A
Hybrid Battery Voltage Sense BK Circuit Range/Performance	P1B9F	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.006V U185A	20 Failures out of 40 Samples Frequency: 200ms	One Trip, Type A
Hybrid Battery Voltage Sense BL Circuit Range/Performance	P1BA2	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.006V U185A	20 Failures out of 40 Samples Frequency: 200ms	One Trip, Type A

DIAGNOSTIC SUMMARY TABLES--VICM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Voltage Sense BM Circuit Range/Performance	P1BA5	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.006V U185A	20 Failures out of 40 Samples Frequency: 200ms	One Trip, Type A
Hybrid Battery Voltage Sense BN Circuit Range/Performance	P1BA8	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.006V U185A	20 Failures out of 40 Samples Frequency: 200ms	One Trip, Type A
Hybrid Battery Voltage Sense BO Circuit Range/Performance	P1BAB	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.006V U185A	20 Failures out of 40 Samples Frequency: 200ms	One Trip, Type A
Hybrid Battery Voltage Sense BP Circuit Range/Performance	P1BAE	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.006V U185A	20 Failures out of 40 Samples Frequency: 200ms	One Trip, Type A
Hybrid Battery Voltage Sense BQ Circuit Range/Performance	P1BB1	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.006V U185A	20 Failures out of 40 Samples Frequency: 200ms	One Trip, Type A
Hybrid Battery Voltage Sense BR Circuit Range/Performance	P1BB4	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.006V U185A	20 Failures out of 40 Samples Frequency: 200ms	One Trip, Type A
Hybrid Battery Voltage Sense BS Circuit Range/Performance	P1BB7	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.006V U185A	20 Failures out of 40 Samples Frequency: 200ms	One Trip, Type A
Hybrid Battery Voltage Sense BT Circuit Range/Performance	P1BBA	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.006V U185A	20 Failures out of 40 Samples Frequency: 200ms	One Trip, Type A
Hybrid Battery Voltage Sense BU Circuit Range/Performance	P1BBD	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement	= FALSE > 0.006V	20 Failures out of 40 Samples	One Trip, Type A

DIAGNOSTIC SUMMARY TABLES--VICM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					No active DTCs:	U185A	Frequency: 200ms	
Hybrid Battery Voltage Sense BV Circuit Range/Performance	P1BC0	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.006V U185A	20 Failures out of 40 Samples Frequency: 200ms	One Trip, Type A
Hybrid Battery Voltage Sense BW Circuit Range/Performance	P1BC3	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.006V U185A	20 Failures out of 40 Samples Frequency: 200ms	One Trip, Type A
Hybrid Battery Voltage Sense BX Circuit Range/Performance	P1BC6	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.006V U185A	20 Failures out of 40 Samples Frequency: 200ms	One Trip, Type A
Hybrid Battery Voltage Sense BY Circuit Range/Performance	P1BC9	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.006V U185A	20 Failures out of 40 Samples Frequency: 200ms	One Trip, Type A
Hybrid Battery Voltage Sense BZ Circuit Range/Performance	P1BCC	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.006V U185A	20 Failures out of 40 Samples Frequency: 200ms	One Trip, Type A
Hybrid Battery Voltage Sense CA Circuit Range/Performance	P1BCF	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.006V U185A	20 Failures out of 40 Samples Frequency: 200ms	One Trip, Type A
Hybrid Battery Voltage Sense CB Circuit Range/Performance	P1BD2	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.006V U185A	20 Failures out of 40 Samples Frequency: 200ms	One Trip, Type A
Hybrid Battery Voltage Sense CC Circuit Range/Performance	P1BD5	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.006V U185A	20 Failures out of 40 Samples Frequency: 200ms	One Trip, Type A
Hybrid Battery Voltage Sense CD Circuit Range/Performance	P1BD8	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	CellVoltageRationalityFA (see Fault Bundle Page)	= FALSE	20 Failures out of 40 Samples	One Trip, Type A

DIAGNOSTIC SUMMARY TABLES--VICM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					Average Cell Voltage Movement No active DTCs:	> 0.006V U185A	Frequency: 200ms	
Hybrid Battery Voltage Sense CE Circuit Range/Performance	P1BDB	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.006V U185A	20 Failures out of 40 Samples Frequency: 200ms	One Trip, Type A
Hybrid Battery Voltage Sense CF Circuit Range/Performance	P1BDE	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.006V U185A	20 Failures out of 40 Samples Frequency: 200ms	One Trip, Type A
Hybrid Battery Voltage Sense CG Circuit Range/Performance	P1BE1	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.006V U185A	20 Failures out of 40 Samples Frequency: 200ms	One Trip, Type A
Hybrid Battery Voltage Sense CH Circuit Range/Performance	P1BE4	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.006V U185A	20 Failures out of 40 Samples Frequency: 200ms	One Trip, Type A
Hybrid Battery Voltage Sense CI Circuit Range/Performance	P1BE7	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.006V U185A	20 Failures out of 40 Samples Frequency: 200ms	One Trip, Type A
Hybrid Battery Voltage Sense CJ Circuit Range/Performance	P1BEA	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.006V U185A	20 Failures out of 40 Samples Frequency: 200ms	One Trip, Type A
Hybrid Battery Voltage Sense CK Circuit Range/Performance	P1BED	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.006V U185A	20 Failures out of 40 Samples Frequency: 200ms	One Trip, Type A
Hybrid Battery Voltage Sense CL Circuit Range/Performance	P1BF0	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.006V U185A	20 Failures out of 40 Samples Frequency: 200ms	One Trip, Type A

DIAGNOSTIC SUMMARY TABLES--VICM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Voltage Sense CM Circuit Range/Performance	P1BF3	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.006V U185A	20 Failures out of 40 Samples Frequency: 200ms	One Trip, Type A
Hybrid Battery Voltage Sense CN Circuit Range/Performance	P1BF6	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.006V U185A	20 Failures out of 40 Samples Frequency: 200ms	One Trip, Type A
Hybrid Battery Voltage Sense CO Circuit Range/Performance	P1BF9	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.006V U185A	20 Failures out of 40 Samples Frequency: 200ms	One Trip, Type A
Hybrid Battery Voltage Sense CP Circuit Range/Performance	P1BFC	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.006V U185A	20 Failures out of 40 Samples Frequency: 200ms	One Trip, Type A
Hybrid Battery Voltage Sense CQ Circuit Range/Performance	P1E01	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.006V U185A	20 Failures out of 40 Samples Frequency: 200ms	One Trip, Type A
Hybrid Battery Voltage Sense CR Circuit Range/Performance	P1E04	Rationality compares cell voltage to movement of other cell voltages	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	CellVoltageRationalityFA (see Fault Bundle Page) Average Cell Voltage Movement No active DTCs:	= FALSE > 0.006V U185A	20 Failures out of 40 Samples Frequency: 200ms	One Trip, Type A
Hybrid Battery Pack Voltage Sense Circuit Rationality	P0ABB	Rationality compares pack voltage sensor to average cell voltage * 96	|Average cell voltage * 96 - Battery Pack voltage|	> 10 V	VICMVoltageFA (see Fault Bundle Page) No active DTCs:	= FALSE U0111 U185A	60 Failures out of 80 Samples Frequency: 100ms	One Trip, Type A
Hybrid Battery Pack Voltage Sense Circuit Correlation	P0AF8	Correlation compares pack voltage sensor to either TPIM Bus Voltage or Charger Bus Voltage	|Battery Pack voltage - TPIM Bus Voltage |	> 12 V	Main Contactor Status No active DTCs:	= Closed P0ABC P0ABD P1A07 P0ABB P1E28 P1AE8 P1AEA U1817	400 Failures out of 1995 Samples Frequency: 25ms	One Trip, Type A

DIAGNOSTIC SUMMARY TABLES--VICM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
			OR					
			|Battery Pack voltage - Charger Bus Voltage |	> 12 V	Charger and Multipurpose Contactor Status = Closed No active DTCs:	P0ABC P0ABD P1A07 P0ABB P0D4E P0D4F P1EEB P1EEC P0D5C P1ECE P16C5 U1838	400 Failures out of 1995 Samples Frequency: 25ms	
Hybrid Battery System Voltage High	P0AFB	Voltage too high	High Voltage Battery Pack Voltage	> KtBSED_U_BOV_PackVoltThresh (V) (see VICM Supporting Tables)	No active DTCs:	P0ABC P0ABD P1A07 P0AF8 P0ABB U0111 U185A	320 Failures out of 1595 Samples Frequency: 25ms	One Trip, Type A
			OR					
		DTC Clear	Any Cell Voltage	> KtBSED_U_BOV_CellVoltThresh (V) (see VICM Supporting Tables)	VICMVoltageFA (see Fault Bundle Page) = FALSE No active DTCs: Must Send CPID	U0111 U185A 0x7E4 07 AE 32 0C 0C 00 00 00	40 Failures out of 195 Samples Frequency: 25ms	
Battery Energy Control Module Hybrid/EV Battery Cell Overvoltage	P1EAB	Voltage too high	Cell Voltage	> 4.5 V	No active DTC's: System Voltage	(U185A AND U0111) >10.2V	80 Failures out of 80 Samples Frequency: 25ms	One Trip, Type A
			OR					
			Any BECM response to HPC2 request to NOT test overvoltage signal/circuit (assert line logic-level-high).	= Overvoltage Signal/Circuit line logic-level-low	RUN/CRANK Transitions to = ON for > 5 s Charger contactor Status = Open CellVoltageRationalityFA (see Fault Bundle Page) = FALSE		400 Fail Samples	

DIAGNOSTIC SUMMARY TABLES--VICM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					Inverter voltage System Voltage No active DTC's:	> 225 V >10.2V (U185A AND U0111)		
		DTC Clear			Must Send CPID	0x7E4 07 AE 32 0C 0C 00 00 00	Frequency: 25ms	
Hybrid/EV Battery Cell Overvoltage Signal/Circuit Performance	P1EAC	Over voltage circuit 2nd protection - Fault Flag Test	Any BECM response to HPC2 request to test overvoltage signal/circuit (assert line logic-level-low).	= Overvoltage Signal/Circuit line logic-level-high	RUN/CRANK Transitions to Charger contactor Status CellVoltageRationalityFA (see Fault Bundle Page) Inverter voltage System Voltage No active DTC's:	= ON for > 5 s = Open = FALSE > 225 V >10.2V (U185A AND U0111)	2000 Fail Samples Frequency: 25ms	One Trip, Type A
		OR						
		Test Active Stuck On	BECM overvoltage signal/circuit test response.	= Test Active	HPC2 overvoltage signal/circuit test request to BECM. System Voltage No active DTC's:	= Cease Test >10.2V (U185A AND U0111)	400 Fail Samples Frequency: 25ms	
		OR						
		Test Active Stuck Off	BECM overvoltage signal/circuit test response.	= Not Test Active	HPC2 overvoltage signal/circuit test request to BECM. System Voltage No active DTC's:	= Run Test >10.2V (U185A AND U0111)	400 Fail Samples Frequency: 25ms	
Hybrid Battery System Voltage Low	P0AFA	Voltage too low	High Voltage Battery Pack Voltage	< KtBSED_U_BUV_PackVoltThresh (V) (see VICM Supporting Tables)	No active DTCs:	P0ABC P0ABD P1A07 P0AF8 P0ABB U0111 U185A	320 Failures out of 1595 Samples Frequency: 25ms	One Trip, Type A
			OR					
			Any Cell Voltage	< KtBSED_U_BUV_CellVoltThresh (V) (see VICM Supporting Tables)	VICMVoltageFA (see Fault Bundle Page) No active DTCs:	= FALSE U0111	40 Failures out of 195 Samples	

DIAGNOSTIC SUMMARY TABLES--VICM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
		DTC Clear			Must Send CPID	U185A 0x7E4 07 AE 32 0C 0C 00 00 00	Frequency: 25ms	
Hybrid Battery Pack Current Sensor A/B Correlation	P0B13	Checks for deviation between Fine and Coarse current sensors	| Fine Current - Coarse Current |	> 10 A	Fine Current measured	Between -20A and 20A	400 Failures out of 1995 Samples	One Trip, Type A
					OR			
					Coarse Current measured No active DTCs:	Between -20A and 20A P0AC1 P0AC2 P1EBA P1A07 P0B13 P0B10 P0B11 P1EBB U0111 U185A	Frequency: 25ms	
Hybrid Battery Temperature Sensor Range/Performance	P0A9C	Rationality compares temperature with the other sensor values read	| Temperature input deviates from the average battery temperature of other Module_Groups |	> 20 ºC	TempRationalityFA (see Fault Bundle Page)	= FALSE	50 Failures out of 67 Samples Frequency: 100ms	Two Trips, Type B
Hybrid Battery 2 Temperature Sensor Performance	P0AC6	Rationality compares temperature with the other sensor values read	| Temperature input deviates from the average battery temperature of other Module_Groups |	> 20 ºC	TempRationalityFA (see Fault Bundle Page)	= FALSE	50 Failures out of 67 Samples Frequency: 100ms	Two Trips, Type B
Hybrid Battery 3 Temperature Sensor Performance	P0ACB	Rationality compares temperature with the other sensor values read	| Temperature input deviates from the average battery temperature of other Module_Groups |	> 20 ºC	TempRationalityFA (see Fault Bundle Page)	= FALSE	50 Failures out of 67 Samples Frequency: 100ms	Two Trips, Type B
Hybrid Battery 4 Temperature Sensor Performance	P0AE9	Rationality compares temperature with the other sensor values read	| Temperature input deviates from the average battery temperature of other Module_Groups |	> 20 ºC	TempRationalityFA (see Fault Bundle Page)	= FALSE	50 Failures out of 67 Samples Frequency: 100ms	Two Trips, Type B
Hybrid Battery Temperature Sensor E Circuit Range/Performance	P0BC3	Rationality compares temperature with the other sensor values read	| Temperature input deviates from the average battery temperature of other Module_Groups |	> 20 ºC	TempRationalityFA (see Fault Bundle Page)	= FALSE	50 Failures out of 67 Samples Frequency: 100ms	Two Trips, Type B
Hybrid Battery Temperature Sensor F Range/Performance	P0C34	Rationality compares temperature with the other sensor values read	| Temperature input deviates from the average battery temperature of other Module_Groups |	> 20 ºC	TempRationalityFA (see Fault Bundle Page)	= FALSE	50 Failures out of 67 Samples Frequency: 100ms	Two Trips, Type B
Hybrid Battery Temperature Sensor G Circuit Range/Performance	P0C7D	Rationality compares temperature with the other sensor values read	| Temperature input deviates from the average battery temperature of other Module_Groups |	> 20 ºC	TempRationalityFA (see Fault Bundle Page)	= FALSE	50 Failures out of 67 Samples Frequency: 100ms	Two Trips, Type B
Hybrid Battery Temperature Sensor H Circuit Range/Performance	P0C82	Rationality compares temperature with the other sensor values read	| Temperature input deviates from the average battery temperature of other Module_Groups |	> 20 ºC	TempRationalityFA (see Fault Bundle Page)	= FALSE	50 Failures out of 67 Samples	Two Trips, Type B

DIAGNOSTIC SUMMARY TABLES--VICM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
							Frequency: 100ms	
Hybrid Battery Temperature Sensor I Circuit Range/Performance	P0C89	Rationality compares temperature with the other sensor values read	| Temperature input deviates from the average battery temperature of other Module_Groups |	> 20 ºC	TempRationalityFA (see Fault Bundle Page)	= FALSE	50 Failures out of 67 Samples Frequency: 100ms	Two Trips, Type B
Hybrid Battery Pack Life(EV Range)	P0A7F	High Pack Power capability	Power limits	< KtBSED_P_BPD_EndOfLIfe PwrThrsh (kW) - see VICM Supporting Tables	Maximum battery temperature Minimum battery temperature Battery SOC RunCrank System Voltage Battery Voltage Sensor fault bundle (see Fault Bundle Page) Battery Current Sensor fault bundle (see Fault Bundle Page) TempRationalityFA (see Fault Bundle Page) Actual battery power exceedance of power limits in terms of % overshoot multiplied by seconds of duration	< 46 ºC > 10 ºC > 19.5% < 90% = TRUE >10.2V = False = False = False > 50 %-Sec	300 Samples Frequency: 100ms	Two Trips, Type B
Hybrid Battery Pack Over temperature	P0A7E	Battery temp. too high	Battery Module Temperature	> 73.5 ºC	TempRationalityFA (see fault bundle page)	= FALSE	50 Failures out of 67 Samples Frequency: 100ms	One Trip, Type A
Miscellaneous Diagnostics								
Engine Hood Switch Performance	P257D	Rationality Check for the Vehicle Hood Switch	Hood Switch Position Sensor reading within an invalid range	Within the following ranges: 67.8% - 71.5% 43.4% - 45.7% 14.6% - 17.2%	Diagnostic Enabled Propulsion System Active	=TRUE =TRUE	6 failed samples within 8 samples 1 sample every 12.5ms	Two Trips, Type B
Engine Hood Switch Circuit Low Voltage	P257E	Detects if the Vehicle Hood Switch is Shorted to Ground	Hood Switch Position Sensor reading below a threshold	<14.6%	Diagnostic Enabled Propulsion System Active	=TRUE =TRUE	6 failed samples within 8 samples 1 sample every 12.5ms	Two Trips, Type B
Engine Hood Switch Circuit High Voltage	P257F	Detects if the Vehicle Hood Switch is Shorted to Battery	Hood Switch Position Sensor reading above a threshold	>71.5%	Diagnostic Enabled Propulsion System Active	=TRUE =TRUE	6 failed samples within 8 samples 1 sample every 12.5ms	Two Trips, Type B

DIAGNOSTIC SUMMARY TABLES--VICM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Control Pilot Indicator Control Circuit	P0D2B	Detects a fault with the Control Pilot LED Output Driver Control Circuit	Case 1: Short to Ground		Diagnostic Enabled LED Commanded On Charge Cord Plugged In	=TRUE =TRUE =TRUE	12 failed samples within 15 samples 1 sample every 100 ms	One Trip, Type A
			Case 2: Short to Battery or Open Circuit		Diagnostic Enabled LED Commanded On Charge Cord Plugged In	=TRUE =FALSE =FALSE	40 failed samples within 50 samples 1 sample every 100 ms	
Charge Status Indicator Control Circuit	P0D2C	Detects a fault with the Charge Status LED Output Driver Control Circuit	Case 1: Short to Ground		Diagnostic Enabled LED Commanded On Charge Cord Plugged In	= TRUE =TRUE =TRUE	40 failed samples within 50 samples; 1 sample every 100ms	One Trip, Type A
			Case 2: Short to Battery or Open Circuit		Diagnostic Enabled LED Commanded On Charge Cord Plugged In	=TRUE = FALSE =FALSE	40 failed samples within 50 samples; 1 sample every 100ms	
Control Module Power Off Timer Performance	P262B	Detects a fault in the internal Control Module off-timer	The aboslute value of the difference between the Control Module 'Off' Timer and Control Module 'On' Timer (both timers operating during Controller 'On') exceeds a threshold	Difference > 5.6%	Diagnostic Enabled Controller 'On' Time RunCrank DTCs Not Active	=TRUE > 60 seconds =TRUE P0601, P0602, P0603, P062F, P0604 and P0606	Runs once per drive cycle (when Run/Crank transitions from TRUE to FALSE).	Two Trips, Type B
High Voltage Energy Management Communication Bus Enable Circuit	P1EB9	Detects a fault in the High Voltage Energy Management Communication (HVEM) Bus Enable Circuit	Case 1: Short to Ground		Diagnostic Enabled HVEM Bus Enabled	=TRUE =TRUE	480 failed samples within 560 samples 1 sample every 12.5ms	One Trip, Type A
			Case 2: Short to Battery or open circuit		Diagnostic Enabled HVEM Bus Enabled	=TRUE =FALSE		

DIAGNOSTIC SUMMARY TABLES--VICM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Control Module Wake-up Circuit Performance	P06E4	Detects a fault in the Control Module Output Wake-Up Circuit	Case 1: Short to Ground		Diagnostic Enabled Control Module Output Wake-Up Circuit Enabled	=TRUE =TRUE	480 failed samples within 560 samples 1 sample every 12.5ms	One Trip, Type A
			Case 2:Short to Battery or Open circuit		Diagnostic Enabled Control Module Output Wake-Up Circuit Enabled	=TRUE =FALSE		
Ignition Switch Run/Start Position Circuit Low	P2534	Detects if the Run/Crank input circuit is low	Short to Ground or Open condition	<2volts	Diagnostic Enabled CAN Communication ECM Run/Crank Active Data	=TRUE Enabled Available and Active	10 failed samples within 20 samples 1 sample every 250ms	One Trip, Type A
Ignition Switch Run/Start Position Circuit High	P2535	Detects if the Run/Crank input circuit is high	Short to Battery	>5volts	Diagnostic Enabled CAN Communication ECM Run/Crank Active	=TRUE Enabled Available and False	10 failed samples within 20 samples 1 sample every 250ms	One Trip, Type A
Ignition Switch Accessory Position Circuit Low	P2537	Detects an accessory position circuit open	Accessory	FALSE	P2537 Propulsion System Propulsion System Active Time	Not Test Failed This Key On and Not Test Passed This Key On Active > 0.5 seconds	0.1 seconds (8 * 0.0125)	Two Trips, Type B
		DTC Pass	Accessory	TRUE			0.1 seconds (8 * 0.0125)	
System Voltage Low	P0562	Detects if Battery input voltage is below a threshold	Battery voltage is below a threshold	≤ 10.2volts		Continuous	1 failed sample for 500ms below Threshold value	Special Type C
Control Module Read Only Memory (Rom)	P0601	This DTC will be stored if any software or calibration checksum is incorrect	Calculated Checksum does not match stored checksum				Runs once per powerup	One Trip, Type A
		Flash ECC Circuit Test	Failed validation of test data written to ECC			Continuous	1s loop, 3 failures in powerup cycle	
Control Module Not Programmed	P0602	Indicates that the Control Module needs to be programmed	'No Start' Calibration is set to true which is only available on a new un-programmed Module			Continuous	1s loop, 1 failure	One Trip, Type A

DIAGNOSTIC SUMMARY TABLES--VICM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Control Module Long Term Memory Reset	P0603	Non-volatile memory checksum error	Checksum at power-up does not match checksum at power-down			Runs at battery connect OR after a controller reset OR When Battery Backed RAM failure detected OR next controller init when Failure counter increments to 1 OR Fault is active OR Test not passed since code clear OR Test failed this key on OR MIL Request is ON	2 consecutive failed samples	One Trip, Type A
Control Module Random Access Memory (RAM) Failure	P0604	Control Module is unable to correctly write and read data to and from RAM	Data read does not match data written	> 3 samples (each sample represents 2 writes and 2 reads)		Continuous	Will finish first memory scan within 240 seconds at all engine conditions - diagnostic runs continuously (background loop)	One Trip, Type A
		RAM ECC Circuit Test	Failed validation of test data written to ECC			Continuous	1s loop, 3 failures in powerup cycle	
Control Module Internal Performance	P0606	ALU and Register Test	Control Module fails to execute a diagnostic test algorithm			Continuous	1s loop, 3 failures in powerup cycle	One Trip, Type A
		Configuration Registers Test	Comparison of current configuration register settings with predefined values fails			Continuous	1s loop, 3 failures in powerup cycle	
		MMU Test	Test of memory management related instructions fails	Fails MMU instruction		Continuous	1s loop, 3 failures in powerup cycle	
		MMU Configuration Fault	Verifies MMU TLB's are properly configured for the application	TLB set incorrectly		Continuous	1s loop, 3 failures in powerup cycle	
		Stack Limits Test	Verifies stack usage does not exceed maximum stack size	Stack usage exceeds 100%		Continuous	1s loop, 3 failures in powerup cycle	
		Clock Status	Checks for loss of lock/clock, forces a reset if failed			Continuous	1s loop, 3 failures in powerup cycle	
		Auxiliary ALU Test	Auxiliary microprocessor fails to run a defined diagnostic algorithm			Continuous	100ms loop, 3 failures in powerup cycle	
		Auxiliary RAM Test	Auxiliary microprocessor fails a write/read data diagnostic RAM test			Continuous	1s loop, 3 failures in powerup cycle	
		Auxiliary ROM Test	Auxiliary microprocessor ROM checksum error			Continuous	2.5s loop, 3 failures in powerup cycle	
		Auxiliary Register Configuration Test	Configuration register values do not match expected pre-configured values			Continuous	100ms loop, 3 failures in powerup cycle	
		Auxiliary Stack Test	Auxiliary microprocessor stack underflow or overflow			Continuous	100ms loop, 3 failures in powerup cycle	
		Seed and Key Test	Seed and key test failed - invalid order, timeout, incorrect seed, incorrect key			Continuous	100ms loop, 3 failures in powerup cycle	

DIAGNOSTIC SUMMARY TABLES--VICM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
		Main Detected Seed Incorrect Order	Seed and key test failed - main microprocessor received seed from the auxiliary icroprocessor out of order			Continuous	100ms loop, 3 failures in powerup cycle	
		Main Detected Unknown Seed	Seed and key test failed - main microprocessor received an unknown seed			Continuous	100ms loop, 3 failures in powerup cycle	
		Internal IO Diagnostic (BVREF)	5V reference voltages out of range	10.46 % above or below		Continuous	1s loop, 3 failures in powerup cycle	
		Internal IO Diagnostic (IVPWR)	IVPWR voltage out of range	IVPWR less than 9V or greater than 18V		Never	1s loop, 3 failures in powerup cycle	
		Internal IO Diagnostic (IVBAT)	IVBAT voltage out of range	IVBAT less than 9V or greater than 18V		Never	1s loop, 3 failures in powerup cycle	
		Internal IO Diagnostic (Analog 25% reference line)	25% reference line out of range	Reference less than 22% or greater than 28%		Continuous	1s loop, 3 failures in powerup cycle	
		Internal IO Diagnostic (Analog 75% reference line)	75% reference line out of range	Reference less than 72% or greater than 78%		Continuous	1s loop, 3 failures in powerup cycle	
		Control Module Wake-up Circuit Performance (Self Wakeup Fault)	Control module unable to do a Self Wakeup when there is a request to do so		Diagnostic Enabled Self-Wakeup Requested	=TRUE =TRUE	Runs once at powerup if a Self-Wakeup request was active last power down	
		SPI Fault Detection Test	SPI B, C, or D fault detected			Continuous	1s loop, 3 failures in powerup cycle	
		SPI B Fault Detection Test	Fault detected via echo test on SPI bus B			Continuous	1s loop, 3 failures in powerup cycle	
		SPI C Fault Detection Test	Fault detected via echo test on SPI bus C			Continuous	1s loop, 3 failures in powerup cycle	
		SPI D Fault Detection Test	Fault detected via echo test on SPI bus D			Continuous	1s loop, 3 failures in powerup cycle	
Control Module Long Term Memory Performance	P062F	Update BINVDM operation	Battery independent non-volatile status update failed				Runs at controller shutdown and after new data is written to EEPROM (which is checked every 600 seconds) 2 consecutive failed samples	One Trip, Type A
Communication Faults								
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.			Controller On Bus A Communication Enabled	=TRUE > 2 seconds	5 failures out of 5 samples 1 s loop	Two Trips, Type B
Control Module Communication Bus B Off	U0074	Detects that a CAN serial data bus shorted condition has occurred to force the CAN device driver to enter a bus-off state.			Controller On Bus B Communication Enabled	=TRUE > 2 seconds	5 failures out of 5 samples 1 s loop	One Trip, Type A
Control Module	U007A	Detects that a CAN serial data			Controller On Bus H Communication Enabled	=TRUE > 2 seconds	5 failures out of 5 samples	One

DIAGNOSTIC SUMMARY TABLES--VICM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Lost Communication With	U0100	Detects that CAN serial data	Messages have not been received from	≥ 500ms	Controller On Bus A Communication Enabled Battery Voltage	=TRUE > 2 seconds >10.2V	Runs in 10ms loop	Two
		DTC Pass					10ms after receiving any message from the supervised source	
Lost Communication with Transmission Control Module	U0101	Detects that CAN serial data communication has been lost with the TCM on Bus A	Messages have not been received from the TCM for a specified time	≥ 1500ms	Controller On Bus A Communication Enabled Battery Voltage	=TRUE > 2 seconds >10.2V	Runs in 10ms loop	Two Trips, Type B
		DTC Pass					10ms after receiving any message from the supervised source	
Lost Communication with Battery Energy Control Module	U0111	Detects that CAN serial data communication has been lost with the Battery Energy Control Module on Bus A	Messages have not been received from the BECM for a specified time	≥ 500ms	Controller On Bus A Communication Enabled Battery Voltage	=TRUE > 2 seconds >10.2V	Runs in 10ms loop	Two Trips, Type B
		DTC Pass					10ms after receiving any message from the supervised source	
Lost Communication with Brake System Control Module	U0129	Detects that CAN serial data communication has been lost with the Brake System Control Module on Bus A	Messages have not been received from the EBCM for a specified time	≥ 500ms	Controller On Bus A Communication Enabled Battery Voltage	=TRUE > 2 seconds >10.2V	Runs in 10ms loop	Two Trips, Type B
		DTC Pass					10ms after receiving any message from the supervised source	
Lost Communication with Electric A/C Compressor Control Module	U016B	Detects that CAN serial data communication has been lost with the Electric A/C Compressor Control Module on Bus A	Messages have not been received from the EACCM for a specified time	≥ 500ms	Controller On Bus A Communication Enabled Battery Voltage	=TRUE > 2 seconds >10.2V	Runs in 10ms loop	Two Trips, Type B
		DTC Pass					10ms after receiving any message from the supervised source	
Lost Communication With Hybrid Powertrain Control Module	U0293	Detects that CAN serial data communication has been lost with the Hybrid Powertrain Control Module on Bus A	Messages have not been received from the HCP for a specified time	≥ 500ms	Controller On Bus A Communication Enabled	=TRUE > 2 seconds	Runs in 10ms loop	Two Trips, Type B

DIAGNOSTIC SUMMARY TABLES--VICM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					Battery Voltage	>10.2V		
		DTC Pass					10ms after receiving any message from the supervised source	
Lost Communication with Hybrid Powertrain Control Module on Bus B	U1817	Detects that CAN serial data communication has been lost with the Hybrid Powertrain Control Module on Bus B	Messages have not been received from the HCP for a specified time	≥ 500ms	Controller On Bus B Communication Enabled Battery Voltage	=TRUE > 2 seconds >10.2V	Runs in 10ms loop	One Trip, Type A
		DTC Pass					10ms after receiving any message from the supervised source	
Lost Communication With ECM on Bus B	U1818	Detects that CAN serial data communication has been lost with the ECM on Bus B	Messages have not been received from the ECM for a specified time	≥ 500ms	Controller On Bus B Communication Enabled Battery Voltage	=TRUE > 2 seconds >10.2V	Runs in 10ms loop	Two Trips, Type B
		DTC Pass					10ms after receiving any message from the supervised source	
Lost Communication with	U1838	Detects that CAN serial data	Messages have not been received from	≥ 500ms	Controller On Bus H Communication Enabled Battery Voltage	=TRUE > 2 seconds >10.2V	Runs in 10ms loop	One
		DTC Pass					10ms after receiving any message from the supervised source	
Lost Communication with	U185A	Detects that CAN serial data	Messages have not been received from	≥ 500ms	Controller On Bus H Communication Enabled Battery Voltage	=TRUE > 2 seconds >10.2V	Runs in 10ms loop	One
		DTC Pass					10ms after receiving any message from the supervised source	
Fuel Door Diagnostics								
Fuel Fill Door Switch Stuck Closed	P04B6	Fuel Door Position Rationality	Fuel door opened AND refuel request AND refuel detected	FALSE TRUE TRUE	Fuel Fill Door Switch Stuck Closed Diagnostic Enable Calibration	=TRUE	50ms	Two Trips, Type B
Fuel Fill Door Position Sensor/Switch Circuit	P04B8	Detects if sensor reading is invalid	Fuel Fill Door Position Sensor reading within an invalid range	65.9%< Reported Position <=81.6%	Fuel Fill Door Position Sensor/Switch Circuit Diagnostic calibration	=TRUE	6 out of 8 samples @ 500ms per sample	Two Trips, Type B
Fuel Fill Door Position	P04B9	Detects if the Circuit is	Fuel Fill Door Position Sensor reading	Reported Position<22.9%	Fuel Fill Door Position	=TRUE	6 out of 8 samples @	Two
Fuel Fill Door Position Sensor/Switch Circuit High	P04BA	Detects if the Circuit is Shorted to Battery	Fuel Fill Door Position Sensor reading above a threshold	Reported Position > 94.5%	Fuel Fill Door Position Sensor/Switch Circuit High Diagnostic Enable Calibration	=TRUE	6 out of 8 samples @ 500ms per sample	Two Trips, Type B
Fuel Fill Door Lock	P04BB	Detects a fault in the Fuel Fill	Hardware Reported Test Result for	Fault =TRUE	Fuel Fill Door Lock	=TRUE	80% of total number	One

DIAGNOSTIC SUMMARY TABLES--VICM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
			OR		The Hardware reported test result, for an open circuit or short to power condition	≠ INDETERMINANT		
			Hardware Reported Test Result for SHORT Circuit to Battery		The door lock driver circuit must be active to assert an Unlock	=ASSERT UNLOCK		
					OR			
					The door lock driver	=ASSERT LOCK		
			Hardware Reported Test Result for SHORT Circuit to Ground	Fault =TRUE	Fuel Fill Door Lock Control Circuit/Open Diagnostic Enable Calibration	=TRUE	64 out of 80 samples @ 50ms per sample	
					The Hardware reported test result is for short circuit condition	≠ INDETERMINANT		
					The door lock driver circuit is NOT be active	=ASSERT NONE		
Fuel Fill Door Lock Control Range/Performance	P04BC	Performance for the Fuel Fill Door Lock Control	Fuel Door Does NOT transition Unlocked to Locked		Fuel Fill Door Lock Control Range/Performance Diagnostic Enable Calibration	=TRUE	600ms	Two Trips, Type B
					No active DTCs:	P04BB, P04BD, P04BE, P04BF, P04C1, P04C2, P04C3, P04C5, P04C6,		
					The Fuel Fill Door Lock is comanded to the Lock position	=ASSERTLOCK		
					The Fuel Fill Door is not already in the Lock postion	=TRUE		
Fuel Fill Door Unlock Control Range/Performance	P04C0	Performance for the Fuel Fill Door Unlock Control	Fuel Door Lock state does NOT transition from Locked to Unlock		Fuel Fill Door Unlock Control Range/Performance Diagnostic Enable Calibration	=TRUE	600ms	Two Trips, Type B
					No active DTCs:	P04BB, P04BD, P04BE, P04BF, P04C1, P04C2, P04C3, P04C5, P04C6,		

DIAGNOSTIC SUMMARY TABLES--VICM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					The Fuel Fill Door Lock is commanded to the unlock position	=ASSERTUNLOCK		
					The Fuel Fill Door is not already in the Unlock postion	=TRUE		
Fuel Fill Door Lock Position Sensor/Switch Circuit	P04C3	Detects if the circuit resistance is incorrect	Switch sensor reading within invalid range	65.9%> Reported Positon <=81.6%	Fuel Fill Door Lock Position Sensor/Switch Circuit Diagnostic Enable Calibration	=TRUE	6 out of 8 samples @ 500ms per sample	Two Trips, Type B
Fuel Fill Door Lock Position Sensor/Switch Circuit Range/Performance	P04C4	Performance for the Fuel Fill Door Lock Position Sensor/Switch Circuit	The current Fuel Fill Door position is determined to be	NOT LOCKED	Fuel Fill Door Lock Position Sensor/Switch Circuit Diagnostic Enable Calibration	=TRUE	16 out of 20 samples @ 50ms per sample	Two Trips, Type B
			AND the previous lock position is	LOCKED	No active DTCs:	P04BB, P04BD, P04BE, P04BF, P04C1, P04C2, P04C3, P04C5, P04C6,		
			AND the Fuel Fill Door lock has NOT been commanded to UNLOCK	≠ASSERT UNLOCK				
Fuel Fill Door Lock Position Sensor/Switch Circuit Low	P04C5	Detects if the circuit is shorted to ground	Switch sensor reading less than threshold	Reported Position<22.9%	Fuel Fill Door Lock Position Sensor/Switch Circuit Low Diagnostic Enable Calibration	=TRUE	6 out of 8 samples @ 500ms per sample	Two Trips, Type B
Fuel Fill Door Lock Position Sensor/Switch Circuit High	P04C6	Detects if the circuit is shorted to battery or open	Switch sensor reading greater than threshold	Reported Position > 94.5%	Fuel Fill Door Lock Position Sensor/Switch Circuit High Diagnostic Enable Calibration	=TRUE	6 out of 8 samples @ 500ms per sample	Two Trips, Type B
Fuel Fill Door Open Request Sensor/Switch Circuit	P04C8	Detects if the circuit resistance is incorrect	Switch sensor reading within invalid range	65.9%< Reported Position <=81.6%	Fuel Fill Door Open Request Sensor/Switch Circuit Diagnostic Enable Calibration	=TRUE	6 out of 8 samples @ 500ms per sample	Two Trips, Type B
Fuel Fill Door Open Request Sensor/Switch Circuit Low	P04CA	Detects if the circuit is shorted to ground	Fuel Fill Door Lock Request Switch sensor reading less than threshold	Reported Position<22.9%	Fuel Fill Door Open Request Sensor/Switch Circuit Low Diagnostic Enable Calibration	=TRUE	6 out of 8 samples @ 500ms per sample	Two Trips, Type B
Fuel Fill Door Open Request Sensor/Switch Circuit High	P04CB	Detects if the Circuit is shorted to battery or open	Fuel Fill Door Request Switch sensor reading above threshold	Reported Position > 94.5%	Fuel Fill Door Open Request Sensor/Switch Circuit High Diagnostic Enable Calibration	=TRUE	6 out of 8 samples @ 500ms per sample	Two Trips, Type B
Evaporative Emission (EVAP) System Pressure Incorrect During Fuel Fill Door Open Request	P1461	Detects incorrect EVAP System pressure during a Fuel Fill Door Open Request	The Fuel Tank Vapor Pressure does NOT fall within a pressure range	Fuel Tank Vapor Pressure >= .623 Kpa OR Fuel Tank Vapor Pressure < -.623 Kpa	Evaporative Emission (EVAP) System Pressure Incorrect During Fuel Fill Door Open Request Diagnostic Enable Calibration	=TRUE	120sec	One Trip, Type A

DIAGNOSTIC SUMMARY TABLES--VICM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					A request to refuel the vehicle has been detected	=TRUE		
Fuel Fill Door Switch Wake-up Circuit Performance	P169D	Detects a circuit fault in the Fuel Fill Door Switch Wake-Up Circuit	Refuel Request Wake- up circuit state not equal to Refuel request Switch Postion State		Fuel Fill Door Switch Wake-up Circuit Performance Diagnostic Enable Calibration	=TRUE		Two Trips, Type B
					No Active DTCs for the Open Request Sensor/Switch Circuit	P04C8, P04CA, P04CB		
			Case 1: Fuel Fill Door Switch Wake-Up Circuit Active	=FALSE	Fuel Fill Door Open Switch Request	=TRUE	4 out of 5 samples @ 50ms per sample	
			Case 2: Fuel Fill Door Switch Wake-Up	=TRUE	Fuel Fill Door Open	=FALSE	64 out of 80 samples @	
Charging Diagnostics								
Control Pilot Circuit High	P0CF6	Sets when % control pilot signal (voltage/system) is above a threshold	% Control Pilot Signal	> 58 %	System Voltage Vehicle Speed Charge Cord State	> 9.0V > = 5 mph Not Connected	30 failures out of 50 samples 100 ms rate	One Trip, Type A
		DTC Pass					5 seconds	
Control Pilot Circuit Low	P0CF5	Sets when % control pilot signal (voltage/system) is below a threshold	% Control Pilot Signal	< 3 %	System Voltage Control Pilot Diag Switch Charge Cord State	> 9.0V On Not Connected	30 failures out of 50 samples 100 ms rate	One Trip, Type A
		DTC Pass					5 seconds	
Control Pilot Circuit Range/Performance	P0CF4	This diagnostic tests the integrity of the Charge Control Pilot.There are two tests to ensure proper functioning of the pilot.	Part A: % Control Pilot Signal OR Aux Micro Logic State OR Main Micro Logic State	 > 3 % High Low	Part A: CPDIAG Switch State Vehicle Speed System Voltage Charge Cord State	 Not Asserted (see Definitions) > = 5 mph > 9.0V Not Connected	30 failures out of 50 samples 100 ms rate	One Trip, Type A

DIAGNOSTIC SUMMARY TABLES--VICM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
			Part B: % Control Pilot Signal	> 55 % OR < 30%	Part B: CPDIAG Switch State	Asserted		
			OR		Control Pilot Charging Switch State	Open		
			Aux Micro Logic State	Low	Charging Ventilation Switch State	Open		
			OR		Charge Cord State	Not Connected		
			Main Micro Logic State	High	System Voltage	> 10.2 V		
		DTC Pass					5 seconds	
Proximity Detection Circuit High	P0D59	Sets when Proximity Detection Circuit Voltage is above a threshold	Proximity Detection Circuit Voltage	> 4.8 V.	System Voltage Vehicle Speed Shift Lever Position No Faults on Vehicle Speed	> 9.0V > 12.4 mph Not in Park	30 failures out of 50 samples 100 ms rate	One Trip, Type A
		DTC Pass					5 seconds	
Proximity Detection Circuit Low	P0D58	Sets when Proximity Detection Circuit Voltage is below a threshold	Proximity Detection Circuit Voltage	< 4.2 V.	System Voltage Vehicle Speed Shift Lever Position No Faults on Vehicle Speed	> 9.0V > 12.4 mph Not in Park	30 failures out of 50 samples 100 ms rate	One Trip, Type A
		DTC Pass					5 seconds	

DIAGNOSTIC SUMMARY TABLES--VICM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Battery Charger System Precharge Time Too Long	P0D26	This diagnostic tests whether precharge has occurred in the appropriate amount of time in a characteristic way. The target voltage is battery pack voltage. A deviation or deadband around pack voltage is calculated in the form of a percentage deviation. To have a successful or passing precharge, the bus voltage must rise and be within the calculated deadband window for a continuous time of at least 0.25 seconds and before 10 seconds has elapsed since the beginning of precharge.	Not Passing (see pass criteria below)	>= 10 seconds	System Voltage AND Multi-Purpose Contactor AND Charger Contactor State Precharge Too Long Time	> 9.0V open Precharge < = 10 sec.	10 sec	One Trip, Type A
		DTC Pass	abs({[Charger Bus Voltage / Battery Pack Voltage] - 1}x 100) AND Precharge Complete Window Time	< 5% >= 0.25 seconds			0.25 sec	

DIAGNOSTIC SUMMARY TABLES--VICM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Battery Charger Output Shorted	P0D23	Sets Charger Bus Current is above a threshold	Bus Current	> .35 A	System Voltage Multi-Purpose Contactor Charger Contactor State No Active DTCs on HV output current sensor signal No Active Cooling No Active Heating	> 9.0V Open Precharge P0D53, P0D54, P1EEB, P1EEC, P1ECE, P0D5C, P16C5, P1EFD, P1F16 (See Definitions tab)	4 failures out of 5 samples 100 ms rate	One Trip, Type A
		DTC Pass					0.5 seconds	
Battery Charger Input Current Too High	P0D2A	Sets when Charger AC Input Current is above a threshold If AC Voltage >= 180 V If AC Voltage < 160 V	AC input current AC input current	> 17 A > 13 A	No Active DTCs on AC Input Voltage No Active DTCs on AC Input Current Signal Control Pilot Charging Switch State	P0D3F, P0D40, P1EE7, P1EE8, P0D3E, P1ECE, P0D5C, P0D5B, P16C4, P1EFD P0D3A, P0D3B, P1EE7, P1EE8, P1ECE, P0D5C, P0D5B, P16C4, P1EFD, P1F14 Closed	240 failures out of 300 samples 100 ms rate	One Trip, Type A
		DTC Pass					5 seconds	
Battery Charger Output Current Performance	P0D22	This DTC can be set in either of two ways (Part A or Part B). Part A monitors for the charger output HV current to be within an acceptable deviation band about the commanded current. If this allowable deviation is exceeded, the DTC will be set. Part B monitors for the special case where the OBCM has been commanded on but the	Part A: abs(Charger HV Output Current Deviation)	>=Table F(Commanded Current) See Supporting Tables	Part A & Part B Common: System Voltage Part A: Charge Control Mode Commanded HV Current Charging Contactor	 > 9.0V Constant Current OR Constant Voltage >0.5A	Part A: 255 failures out of 320 samples 100 ms rate	One Trip, Type A

DIAGNOSTIC SUMMARY TABLES--VICM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
		charger has not turned on its HV output. If this condition occurs the DTC will be set. Part A and Part B are mutually exclusive fault detection strategies.	Part B: Charger HV Power Supply Status	= UNAVAILABLE	Part B: Charger HV Power Supply Enable Command Commanded HV Voltage Charger Turn On Delay Time (B) (has expired)	 = TRUE >201V >=6 Sec	Part B: 255 failures out of 320 samples 100 ms rate	
		DTC Pass					32 sec	
Battery Charger Output Voltage Too Low	P0D21	This DTC sets when the Battery Chargers output voltage is too low. It is conducted in distinct parts. Part A: Not in Charger Heat Only Mode	Bus Voltage Actual Charger Bus Voltage /Expected Charger Bus Voltage	< 150 V < 67 %	Part A: [Charge Control Mode No Active DTCs on HV Output Voltage Sensor Charge System Mode Multipurpose Contactor State Charging Contactor State	Constant Current OR Constant Voltage P0D4E, P0D4F, P1EEB, P1EEC, P1ECE, P0D5C P16C5, P1EFD Charge OR Charge&Heat OR Cool OR Charge&Cool Closed Closed	8 failures out of 10 samples	Two Trips, Type B
		Part B: In Charger Heat Only Mode	Note: Expected Charger Bus Voltage = HV Charger Current x 78 Ohms		Part B: Charge Control Mode Thermal Condition Request Multi-Purpose Contactor State System Voltage	Constant Current Active Heat Open > 9 V	100 ms rate	

KtBSED_U_BUV_CellVoltThresh

Temperature (°C, average battery temp)	-30	-20	-10	0	10	20	30	40	50
Voltage (V)	1.85	1.86	1.96	1.96	1.98	2.05	2.05	2.05	2.05

KtBSED_U_BUV_PackVoltThresh

Temperature (°C, average battery temp)	-30	-20	-10	0	10	20	30	40	50
Voltage (V)	184.1	186.07	195.67	195.67	198.87	205.27	205.27	205.27	205.27

KtBSED_U_BOV_CellVoltThresh

Temperature (°C, average battery temp)	-30	-20	-10	0	10	20	30	40	50
Voltage (V)	4.348	4.354	4.358	4.398	4.398	4.398	4.398	4.398	4.398

KtBSED_U_BOV_PackVoltThresh

Temperature (°C, average battery temp)	-30	-20	-10	0	10	20	30	40	50
Voltage (V)	414.3	414.94	415.26	419.1	419.1	419.1	419.1	419.1	419.1

KtBSED_P_BPD_EndOfLIfePwrThrs

SOC (%) \ Temperature(°C)	-30	-20	-10	0	20	30	50	80	90
10	-2.320	-4.660	-6.240	-10.270	-25.340	-29.390	-27.760	9.000	9.000
20	-2.780	-6.390	-9.780	-18.560	-30.000	-30.880	-28.630	7.550	7.520
30	-3.100	-7.170	-12.240	-21.780	-31.070	-31.800	-29.320	1.715	1.740
40	-3.440	-7.370	-14.070	-22.340	-31.760	-32.510	-29.980	0.827	0.827
60	-3.730	-7.780	-15.150	-23.710	-33.370	-34.020	-31.270	0.694	0.694
80	-3.880	-8.100	-15.850	-24.760	-34.730	-35.370	-32.440	0.388	0.388
90	-3.950	-8.200	-16.100	-25.120	-35.290	-35.950	-32.980	0.320	0.320

P0D22: Engine Off Time Before Vehicle Off Maximum as a Function of Estimated Ambient Temperature

Charger HV Output Current Deviation as a Function of Desired Current

Curve : Charger HV Output Current Deviation Table (in percent)
Axis: Desired Current in Amps

Axis	0	1	2	3	3.5	4	5
Curve	35	35	35	35	35	30	20

KtESTD_DC_HVHeatIGBTDiag

Energy Storage System Battery Voltage (V)	254	262	271	280	291	303	317	333	351	373	405
Duty Cycle (%)	84	79	74	69	64	59	54	49	44	39	33
	84	79	74	69	64	59	54	49	44	39	33
	84	79	74	69	64	59	54	49	44	39	33
	84	79	74	69	64	59	54	49	44	39	33
	84	79	74	69	64	59	54	49	44	39	33
	84	79	74	69	64	59	54	49	44	39	33
	84	79	74	69	64	59	54	49	44	39	33
	84	79	74	69	64	59	54	49	44	39	33
	84	79	74	69	64	59	54	49	44	39	33
	84	79	74	69	64	59	54	49	44	39	33
	84	79	74	69	64	59	54	49	44	39	33
	84	79	74	69	64	59	54	49	44	39	33

KtESTD_DC_RESSPumpSpdDiagHtr

Energy Storage System Outlet Temperature (°C)	-50	-40	-30	-20	-10	0	10	20	30	40	50	60
Duty Cycle (%)	0	0	0	0	0	0	0	0	0	0	0	0

KtESTD_dT_HtrDgInltTmpMinSlope

Energy Storage System Outlet Temperature (°C)	-50	-40	-30	-20	-10 0	10		20	30	40	50	60
Slope Threshold (deg °C/sec)	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15

KtESTD_dT_InletSlopeTime

Energy Storage System Outlet Temperature (°C)	-40	-30	-20	-10	0
Time (sec)	10	10	10	10	10

KtESTD_dT_PsvPumpPerfThreshold

Energy Storage System Outlet Temperature (°C)	-40	-30	-20	-10	0
Slope Threshold (deg °C/sec)	0.2	0.2	0.2	0.2	0.2

DIAGNOSTIC SUPPORTING TABLES--VICM (ELR)

KtESTD_dT_PumpPerfThreshold	Energy Storage System Outlet Temperature (°C)	-40	-30	-20	-10	0												
	Slope Threshold	-0.05	-0.05	-0.05	-0.05	-0.05												
KtESTD_t_HVHtrDiagIGBTOnTm																		
	Energy Storage System Inlet Temperature (°C)	-40	-20	0	20	40												
	Time (sec)	40	40	40	40	40												
		40	40	40	40	40												
		40	40	40	40	40												
		40	40	40	40	40												
		40	40	40	40	40												
		40	40	40	40	40												
KtACXR_p_R134AHSRPOffFailThrsh																		
	Temperature (°C, Outside air temperature, emissions related)	-20	-15	-10	-5	4.9	5	10	15	20	25	30	35	40	45	50	55	60
	Threshold (°C)	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000
KtACXR_p_R134ALSRPOffFailThrsh																		
	Temperature (°C, Outside air temperature, emissions related)	-20	-15	-10	-5	4.9	5	10	15	20	25	30	35	40	45	50	55	60
	Threshold (°C)	0	0	0	0	0	0	0	0	150	150	150	150	150	150	150	150	150
KtACXR_p_R134ALSRPOnFailThrsh																		
	Temperature (°C, Outside air temperature, emissions related)	-20	-15	-10	-5	4.9	5	10	15	20	25	30	35	40	45	50	55	60
	Threshold (°C)	0	0	0	0	0	100	100	100	100	100	100	100	100	100	100	100	100
KtACXR_T_ThreshTableOff																		
	Temperature (°C, Outside air temperature, emissions related)	25	30	35	40	45	50	55	60									
	Threshold (°C)	4.5	4.5	3.5	3.5	3.5	3	3	3									
KtACXR_T_ThreshTableOn																		
	Temperature (°C, Outside air temperature, emissions related)	25	30	35	40	45	50	55	60									
	Threshold (°C)	5	4.5	4	4	4	4	4	4									
KtPCOD_dT_PECL_OBCM_Charge	Temperature (°C, Outside air temperature, emissions related)	-40	-20	-10	0	10	15	25	30	45	50							
	Threshold (°C)	40	30	15	15	15	15	15	15	15	15							
KtPCOD_dT_PECL_OBCM_Drive	Temperature (°C, Outside air temperature, emissions related)	-40	-20	-10	0	10	15	25	30	45	50							
	Threshold (°C)	40	30	25	20	20	20	20	20	20	15							
KtOATD_p_HSRP	Temperature (°C, Outside air temperature, emissions related)	-20	-19	-18	-17	-16	-15	-14	-13	-12	-11	-10	-9	-8	-7	-6	-5	-4
	Pressure (Kpa)	31.5	37	43.3	49.5	55.97	62.6	69	76.6	83.9	91.4	99.2	107.2	115.5	124	133	141.8	151
		-3	-2	-1	0	1	2	3	4	5	6	7	8	9	10	11	12	13
		160.7	170.5	180.6	191	202	213	224	235.7	247	259.9	272	285.4	298.6	312.2	326	340.5	355
		14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
		370.2	385.6	401.4	417.5	434	451	468.4	486.2	504.3	522.9	541.99	561.46	581.38	601.7	622.6	643.8	665.6
		31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47
		687.8	710.5	733.7	757.4	781.6	806.3	831.6	857.3	883.6	910.5	937.9	965.8	994.3	1023.4	1053	1083.3	1114
		48	49	50	51	52	53	54	55	56	57	58	59	60				
		1145	1177.6	1210.3	1243.5	1277.5	1312	1347	1383	1419.7	1456.9	1494.9	1533	1572.8				

16 OBDG01 DIAGNOSTIC FAULT BUNDLE TABLES--VICM (ELR)

Cert Doc Bundle Name NOTE: If any one of these codes were set for N sensors, these FA get set to TRUE for said N sensor

Battery Current Sensor

P0AC1	P0AC2	P1EBA	P1A07	P0B13	P0B10	P0B11	P1EBB	(U0111 and U185A)

Battery Voltage Sensor

P0ABC	P0ABD	P1A07	P0AF8	P0ABB	(U0111 and U185A)

Bus Voltage Sensor

P1AE8	~~P1AE9~~	P1AEA	P1AEB	P1AEC	~~P1AED~~	P1E20	P1E21	P1E28	U0293

Charger Current Sensor

P0D53	P0D54	U1838

CellVoltageRationalityFA

P0B3D	P1B6D	P1BF4	P1B5C	P1BE3	P1E4F	P1E7E
P0B42	P1B70	P1BF7	P1B5F	P1BE6	P1E50	P1E7F
P0B47	P1B73	P1BFA	P1B62	P1BE9	P1E51	P1E80
P0B4C	P1B76	P1BFD	P1B65	P1BEC	P1E52	P1E81
P0B51	P1B79	P1E02	P1B68	P1BEF	P1E53	P1E82
P0B56	P1B7C	P1E05	P1B6B	P1BF2	P1E54	P1E83
P0B5B	P1B7F	P0B3E	P1B6E	P1BF5	P1E56	P1E84
P0B60	P1B82	P0B43	P1B71	P1BF8	P1E57	P1E86
P0B65	P1B85	P0B48	P1B74	P1BFB	P1E58	P1E87
P0B6A	P1B88	P0B4D	P1B77	P1BFE	P1E59	P1E88
P0B6F	P1B8B	P0B52	P1B7A	P1E03	P1E5A	P1E89
P0B74	P1B8E	P0B57	P1B7D	P1E06	P1E5B	P1E8A
P0B79	P1B91	P0B5C	P1B80	P0B3B	P1E5C	U2603
P0B7E	P1B94	P0B61	P1B83	P0B40	P1E5D	U2604
P0B83	P1B97	P0B66	P1B86	P0B45	P1E5E	U2605
P0B88	P1B9A	P0B6B	P1B89	P0B4A	P1E5F	U2606
P0B8D	P1B9D	P0B70	P1B8C	P0B4F	P1E60	P1EB1
P0B92	P1BA0	P0B75	P1B8F	P0B54	P1E61	P1EB2
P0B97	P1BA3	P0B7A	P1B92	P0B59	P1E62	P1EB3
P0B9C	P1BA6	P0B7F	P1B95	P0B5E	P1E63	P1EB4
P0BA1	P1BA9	P0B84	P1B98	P0B63	P1E64	P1EB5
P0BA6	P1BAC	P0B89	P1B9B	P0B68	P1E65	
P0BAB	P1BAF	P0B8E	P1B9E	P0B6D	P1E66	
P0BB0	P1BB2	P0B93	P1BA1	P0B77	P1E67	

Cert Doc Bundle Name NOTE: If any one of these codes were set for N sensors, these FA get set to TRUE for said N sensor

CellVoltageRationalityFA - Continued…

P0BB5	P1BB5	P0B98	P1BA4	P0B7C	P1E68
P0BBA	P1BB8	P0B9D	P1BA7	P0B81	P1E69
P1B17	P1BBB	P0BA2	P1BAA	P0B86	P1E6A
P1B1A	P1BBE	P0BA7	P1BAD	P0B8B	P1E6B
P1B1D	P1BC1	P0BAC	P1BB0	P0B95	P1E6C
P1B20	P1BC4	P0BB1	P1BB3	P0B9A	P1E6E
P1B23	P1BC7	P0BB6	P1BB6	P0B9F	P1E6F
P1B26	P1BCA	P0BBB	P1BB9	P0BA4	P1E70
P1B46	P1BCD	P1B18	P1BBC	P0BA9	P1E71
P1B49	P1BD0	P1B1B	P1BBF	P0BAE	P1E72
P1B4C	P1BD3	P1B1E	P1BC2	P0BB3	P1E73
P1B4F	P1BD6	P1B21	P1BC5	P0BB8	P1E74
P1B52	P1BD9	P1B24	P1BC8	P1B28	P1E75
P1B55	P1BDC	P1B27	P1BCB	P1B29	P1E76
P1B58	P1BDF	P1B47	P1BCE	P1B2A	P1E77
P1B5B	P1BE2	P1B4A	P1BD1	P1B2B	P1E78
P1B5E	P1BE5	P1B4D	P1BD4	P1B2C	P1E79
P1B61	P1BE8	P1B50	P1BD7	P1B2D	P1E7A
P1B64	P1BEB	P1B53	P1BDA	P1E4C	P1E7B
P1B67	P1BEE	P1B56	P1BDD	P1E4D	P1E7C
P1B6A	P1BF1	P1B59	P1BE0	P1E4E	P1E7D

VICMVoltageFA

P0B3D	P1B6D	P1BF4	P1B5C	P1BE3	P1E4F	P1E7E	P1B48	P1BCF
P0B42	P1B70	P1BF7	P1B5F	P1BE6	P1E50	P1E7F	P1B4B	P1BD2
P0B47	P1B73	P1BFA	P1B62	P1BE9	P1E51	P1E80	P1B4E	P1BD5
P0B4C	P1B76	P1BFD	P1B65	P1BEC	P1E52	P1E81	P1B51	P1BD8
P0B51	P1B79	P1E02	P1B68	P1BEF	P1E53	P1E82	P1B54	P1BDB
P0B56	P1B7C	P1E05	P1B6B	P1BF2	P1E54	P1E83	P1B57	P1BDE
P0B5B	P1B7F	P0B3E	P1B6E	P1BF5	P1E56	P1E84	P1B5A	P1BE1
P0B60	P1B82	P0B43	P1B71	P1BF8	P1E57	P1E86	P1B5D	P1BE4
P0B65	P1B85	P0B48	P1B74	P1BFB	P1E58	P1E87	P1B60	P1BE7
P0B6A	P1B88	P0B4D	P1B77	P1BFE	P1E59	P1E88	P1B63	P1BEA
P0B6F	P1B8B	P0B52	P1B7A	P1E03	P1E5A	P1E89	P1B66	P1BED
P0B74	P1B8E	P0B57	P1B7D	P1E06	P1E5B	P1E8A	P1B69	P1BF0
P0B79	P1B91	P0B5C	P1B80	P0B3B	P1E5C	P0B3C	P1B6C	P1BF3

Cert Doc Bundle Name NOTE: If any one of these codes were set for N sensors, these FA get set to TRUE for said N sensor

VICMVoltageFA - Continued

P0B7E	P1B94	P0B61	P1B83	P0B40	P1E5D	P0B41	P1B6F	P1BF6
P0B83	P1B97	P0B66	P1B86	P0B45	P1E5E	P0B46	P1B72	P1BF9
P0B88	P1B9A	P0B6B	P1B89	P0B4A	P1E5F	P0B4B	P1B75	P1BFC
P0B8D	P1B9D	P0B70	P1B8C	P0B4F	P1E60	P0B50	P1B78	P1E01
P0B92	P1BA0	P0B75	P1B8F	P0B54	P1E61	P0B55	P1B7B	P1E04
P0B97	P1BA3	P0B7A	P1B92	P0B59	P1E62	P0B5A	P1B7E	U2603
P0B9C	P1BA6	P0B7F	P1B95	P0B5E	P1E63	P0B5F	P1B81	U2604
P0BA1	P1BA9	P0B84	P1B98	P0B63	P1E64	P0B64	P1B84	U2605
P0BA6	P1BAC	P0B89	P1B9B	P0B68	P1E65	P0B69	P1B87	U2606
P0BAB	P1BAF	P0B8E	P1B9E	P0B6D	P1E66	P0B6E	P1B8A	U2401
P0BB0	P1BB2	P0B93	P1BA1	P0B77	P1E67	P0B73	P1B8D	P1EB1
P0BB5	P1BB5	P0B98	P1BA4	P0B7C	P1E68	P0B78	P1B90	P1EB2
P0BBA	P1BB8	P0B9D	P1BA7	P0B81	P1E69	P0B7D	P1B93	P1EB3
P1B17	P1BBB	P0BA2	P1BAA	P0B86	P1E6A	P0B82	P1B96	P1EB4
P1B1A	P1BBE	P0BA7	P1BAD	P0B8B	P1E6B	P0B87	P1B99	P1EB5
P1B1D	P1BC1	P0BAC	P1BB0	P0B95	P1E6C	P0B8C	P1B9C	P0ABC
P1B20	P1BC4	P0BB1	P1BB3	P0B9A	P1E6E	P0B91	P1B9F	P0ABD
P1B23	P1BC7	P0BB6	P1BB6	P0B9F	P1E6F	P0B96	P1BA2	
P1B26	P1BCA	P0BBB	P1BB9	P0BA4	P1E70	P0B9B	P1BA5	
P1B46	P1BCD	P1B18	P1BBC	P0BA9	P1E71	P0BA0	P1BA8	
P1B49	P1BD0	P1B1B	P1BBF	P0BAE	P1E72	P0BA5	P1BAB	
P1B4C	P1BD3	P1B1E	P1BC2	P0BB3	P1E73	P0BAA	P1BAE	
P1B4F	P1BD6	P1B21	P1BC5	P0BB8	P1E74	P0BAF	P1BB1	
P1B52	P1BD9	P1B24	P1BC8	P1B28	P1E75	P0BB4	P1BB4	
P1B55	P1BDC	P1B27	P1BCB	P1B29	P1E76	P0BB9	P1BB7	
P1B58	P1BDF	P1B47	P1BCE	P1B2A	P1E77	P1B16	P1BBA	
P1B5B	P1BE2	P1B4A	P1BD1	P1B2B	P1E78	P1B19	P1BBD	
P1B5E	P1BE5	P1B4D	P1BD4	P1B2C	P1E79	P1B1C	P1BC0	
P1B61	P1BE8	P1B50	P1BD7	P1B2D	P1E7A	P1B1F	P1BC3	
P1B64	P1BEB	P1B53	P1BDA	P1E4C	P1E7B	P1B22	P1BC6	
P1B67	P1BEE	P1B56	P1BDD	P1E4D	P1E7C	P1B25	P1BC9	
P1B6A	P1BF1	P1B59	P1BE0	P1E4E	P1E7D	P1B45	P1BCC	

TempRationalityFA

P0A9D	P0C83	P0CB4
P0A9E	P0C84	P0CB5

Cert Doc Bundle Name		NOTE: If any one of these codes were set for N sensors, these FA get set to TRUE for said N sensor
P0AC7	P0C8A	P0CB9
P0AC8	P0C8B	P0CBA
P0ACC	P0C8F	P1EB1
P0ACD	P0C90	P1EB2
P0AEA	P0C94	P1EB3
P0AEB	P0C95	P1EB4
P0BC4	P0C99	P1EB5
P0BC5	P0C9A	U2401
P0C35	P0CAA	U2603
P0C36	P0CAB	U2604
P0C7E	P0CAF	U2605
P0C7F	P0CB0	U2606

16 OBDG01 VICM Suppprting Definitions

CPDIAG Switch	The Control Pilot Diagnostic circuit switch is used in diagnosing the vehicle portion of the control pilot circuit. The sole purpose is to be used for diagnostics.
CPDIAG Switch State	Asserted: The control pilot circuit is being energized for diagnostic purposes. Not Asserted: The control pilot circuit is not being diagnosed.
Control Pilot Charging Switch	This is called the S2 switch. The Control Pilot Charging Switch is used by the VICM to enable/disable AC power to the vehicle and does so by modifying the EVSE generated Control Pilot Signal voltage
Charging Ventilation Switch	This is called S3 switch. The Charging Ventilation Switch is available to the VICM to enable/disable indoor ventilation when charging. The functionality is not being used for the MY11 EREV program, but the switch is diagnosed since a switch failure could corrupt the Control Pilot Signal adversly affecting the charging process.
Charger Contactor State: Precharge	The process of raising the OBCM high voltage output terminal voltage to match the high voltage battery voltage.
Aux Micro Logic State (digital logic state at input pin)	Low: expected state when CPDIAG is Not Asserted High: expected state when CPDIAG is Asserted
Main Micro Logic State (digital logic state at input pin)	Low: expected state when CPDIAG is Asserted High: expected state when CPDIAG is Not Asserted
No Active Cooling	No active cooling means that the battery pack is currently not being thermally managed via cooling.
No Active Heating	No active heating means that the battery pack is currently not being thermally managed via heating.

DIAGNOSTIC SUMMARY TABLES--EBCM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Wheel Speed Sensor Diagnostics								
Left Front Wheel Speed Sensor Circuit Low	C1232	The left front wheel speed sensor (WSS) is open.	WSS feedback voltage < Threshold Pass Threshold: > 0.20v	0.20v Nominal range: (0.20v < WSS voltage range < 2.20v)	Sys Voltage Sys Voltage Processing_Enabled No Active DTCs	> 9.0 < 19.5 True (Note 1) C1207	> 100ms	two trips
Right Front Wheel Speed Sensor Circuit Low	C1233	The right front wheel speed sensor is open.	WSS feedback voltage < Threshold Pass Threshold: > 0.20v	0.20v Nominal range: (0.20v < WSS voltage range < 2.20v)	Sys Voltage Sys Voltage Processing_Enabled No Active DTCs	> 9.0 < 19.5 True (Note 1) C1208	> 100ms	two trips
Left Rear Wheel Speed Sensor Circuit Low	C1234	The left rear wheel speed sensor is open.	WSS feedback voltage < Threshold Pass Threshold: > 0.20v	0.20v Nominal range: (0.20v < WSS voltage range < 2.20v)	Sys Voltage Sys Voltage Processing_Enabled No Active DTCs	> 9.0 < 19.5 True (Note 1) C1209	> 100ms	two trips
Right Rear Wheel Speed Sensor Circuit Low	C1235	The right rear wheel speed sensor is open.	WSS feedback voltage < Threshold Pass Threshold: > 0.20v	0.20v Nominal range: (0.20v < WSS voltage range < 2.20v)	Sys Voltage Sys Voltage Processing_Enabled No Active DTCs	> 9.0 < 19.5 True (Note 1) C1210	> 100ms	two trips
Left Front Wheel Speed Sensor Circuit High	C1207	The left front wheel speed sensor is shorted.	WSS feedback voltage > Threshold1 OR ORION ASIC detects current > Threshold2 Pass Threshold: < 2.2v	Threshold1 = 2.20v Threshold2 = 35ma Nominal range: (0.20v < WSS voltage range < 2.20v)	Sys Voltage Sys Voltage Processing_Enabled	> 9.0 < 19.5 True (Note 1)	> 100ms	two trips
Right Front Wheel Speed Sensor Circuit High	C1208	The right front wheel speed sensor is shorted.	WSS feedback voltage > Threshold1 OR ORION ASIC detects current > Threshold2 Pass Threshold: < 2.2v	Threshold1 = 2.20v Threshold2 = 35ma Nominal range: (0.20v < WSS voltage range < 2.20v)	Sys Voltage Sys Voltage Processing_Enabled	> 9.0 < 19.5 True (Note 1)	> 100ms	two trips
Left Rear Wheel Speed Sensor Circuit High	C1209	The left rear wheel speed sensor is shorted.	WSS feedback voltage > Threshold1 OR ORION ASIC detects current > Threshold2 Pass Threshold: < 2.2v	Threshold1 = 2.20v Threshold2 = 35ma Nominal Range: 0.20v < WSS voltage range < 2.20v	Sys Voltage Sys Voltage Processing_Enabled	> 9.0 < 19.5 True (Note 1)		two trips
Right Rear Wheel Speed Sensor Circuit High	C1210	The right rear wheel speed sensor is shorted.	WSS feedback voltage > Threshold1 OR ORION ASIC detects current > Threshold2 Pass Threshold: < 2.2v	Threshold1 = 2.20v Threshold2 = 35ma Nominal range: (0.20v < WSS voltage range < 2.20v)	Sys Voltage Sys Voltage Processing_Enabled	> 9.0 < 19.5 True (Note 1)	> 100ms	two trips
Left Front Wheel Speed Sensor Circuit	C1221	The left front WSS signal has dropped out. It has stopped producing edges.	Number of detected edges = 0	0 edges Nominal Range: (N/A)	Veh Vel System Voltage Processing_Enabled No Active DTCs	> 8 mph < 19.5 True (Note 1) C1207	70ms	two trips

DIAGNOSTIC SUMMARY TABLES--EBCM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
		Missing signal. The left front wheel speed sensor is no longer being detected.	For Single Missing, TC Active, and Multiple Missing WSS's: Missing Threshold = Larger of: (0.2 x Max)m/s or 1.8m/s Max is the maximum filtered velocity from the other 3 wheels Pass Threshold: WSS signal is detected	See Malfunction Criteria Nominal Range: (0.6kph < WSS vel range < 240kph)	Accel (on all wheels) Veh Vel (largest from all 4 wheels) Processing_Enabled No Active DTCs	< 17.16m/s/s > 12.8kph True (Note 1) C1207	Single: Time > 5s Single TC Active: Time > 60s Multiple: Time > 2minutes / > 15 ms	
Right Front Wheel Speed Sensor Circuit	C1222	The right front WSS signal has dropped out. It has stopped producing edges.	Number of detected edges = 0	0 edges Nominal Range: (N/A)	Veh Vel System Voltage Processing_Enabled No Active DTCs	> 8 mph < 19.5 True (Note 1) C1208	70ms	two trips
		Missing signal. The right front wheel speed sensor is no longer being detected.	For Single Missing, TC Active, and Multiple Missing WSS's: Missing Threshold = Larger of: (0.2 x Max)m/s or 1.8m/s Max is the maximum filtered velocity from the other 3 wheels Pass Threshold: WSS signal is detected	See Malfunction Criteria Nominal Range: (0.6kph < WSS vel range < 240kph)	Accel (on all wheels) Veh Vel (largest from all 4 wheels) Processing_Enabled No Active DTCs	< 17.16m/s/s > 12.8kph True (Note 1) C1208	Single: Time > 5s Single TC Active: Time > 60s Multiple: Time > 2minutes / > 15 ms	
Left Rear Wheel Speed Sensor Circuit	C1223	The left rear WSS signal has dropped out. It has stopped producing edges.	Number of detected edges = 0	0 edges Nominal Range: (N/A)	Veh Vel System Voltage Processing_Enabled No Active DTCs	> 8 mph < 19.5 True (Note 1) C1209	70ms	two trips
		Missing signal. The left rear wheel speed sensor is no longer being detected.	For Single Missing, TC Active, and Multiple Missing WSS's: Missing Threshold = Larger of: (0.2 x Max)m/s or 1.8m/s Max is the maximum filtered velocity from the other 3 wheels Pass Threshold: WSS signal is detected	See Malfunction Criteria Nominal Range: (0.6kph < WSS vel range < 240kph)	Accel (on all wheels) Veh Vel (largest from all 4 wheels) Processing_Enabled No Active DTCs	< 17.16m/s/s > 12.8kph True (Note 1) C1209	Single: Time > 5s Single TC Active: Time > 60s Multiple: Time > 2minutes / > 15 ms	
Right Rear Wheel Speed Sensor Circuit	C1224	The right rear WSS signal has dropped out. It has stopped producing edges.	Number of detected edges = 0	0 edges Nominal Range: (N/A)	Veh Vel System Voltage Processing_Enabled No Active DTCs	> 8 mph < 19.5 True (Note 1) C1210	70ms	two trips
		Missing signal. The right rear wheel speed sensor is no longer being detected.	For Single Missing, TC Active, and Multiple Missing WSS's: Missing Threshold = Larger of: (0.2 x Max)m/s or 1.8m/s Max is the maximum filtered velocity from the other 3 wheels Pass Threshold: WSS signal is detected	See Malfunction Criteria Nominal Range: (0.6kph < WSS vel range < 240kph)	Accel (on all wheels) Veh Vel (largest from all 4 wheels) Processing_Enabled No Active DTCs	< 17.16m/s/s > 8 mph True (Note 1) C1210	Single: Time > 5s Single TC Active: Time > 60s Multiple: Time > 2minutes / > 15ms	

DIAGNOSTIC SUMMARY TABLES--EBCM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Left Front Wheel Speed Sensor Circuit Range/Performance	C1225	Erratic signal. The left front WSS is exhibiting erratic behavior with a large acceleration.	WSS Accel > Threshold Pass Threshold: < 491m/s/s	491m/s/s Nominal Range: (N/A)	Veh Vel Processing_Enabled No Active DTCs	> 8 mph True (Note 1) C1207	280ms Pass >30s	two trips
Right Front Wheel Speed Sensor Circuit Range/Performance	C1226	Erratic signal. The right front WSS is exhibiting erratic behavior with a large acceleration.	WSS Accel > Threshold Pass Threshold: < 491m/s/s	491m/s/s Nominal Range: (N/A)	Veh Vel Processing_Enabled No Active DTCs	> 8 mph True (Note 1) C1208	280ms Pass >30s	two trips
Left Rear Wheel Speed Sensor Circuit Range/Performance	C1227	Erratic signal. The left rear WSS is exhibiting erratic behavior with a large acceleration.	WSS Accel > Threshold Pass Threshold: < 491m/s/s	491m/s/s Nominal Range: (N/A)	Veh Vel Processing_Enabled No Active DTCs	> 8 mph True (Note 1) C1209	280ms Pass >30s	two trips
Right Rear Wheel Speed Sensor Circuit Range/Performance	C1228	Erratic signal. The right rear WSS is exhibiting erratic behavior with a large acceleration.	WSS Accel > Threshold Pass Threshold: < 491m/s/s	491m/s/s Nominal Range: (N/A)	Veh Vel Processing_Enabled No Active DTCs	> 8 mph True (Note 1) C1210	280ms Pass >30s	two trips
Tire Size Mismatch	C122E	This detects that there may be mismatched sized tires on the vehicle	|WSS (one wheel) – WSS(other 3)| / Wheel Vel(other 3) > Threshold	20% Nominal Range: N/A	Vehicle Velocity Cornering Wheel Slip Brake Pedal Apply Detected Processing_Enabled No Active DTCs	>4m/s < 3% (Note 10) Not Detected (Note 10) True (Note 2) True (Note 1) C1207 C1208 C1209 C1210	30ms	two trips
Pedal Travel								
Brake Pedal Position Sensor Power Circuit Low	C120F	The supply to the pedal position sensor is shorted to ground.	Pedal supply voltage < Threshold Pass Threshold > 0.5v	0.5v	Processing_Enabled	True (Note 1)	30ms	Two trips
Brake Pedal Position Sensor Reference Circuit	C12E5	Determines if the voltage supply to the pedal sensor is out of range.	Pedal supply voltage < Threshold Low Pedal supply voltage > Threshold High Pass Threshold 4.75 < Volt <5.25	Low = 4.75v High = 5.25v Nominal Range: (N/A)	Processing_Enabled	True (Note 1)	30ms	Two trips
Brake Pedal Position Sensor 3 Circuit Low	C129A	Brake pedal position 3 input signal voltage is low.	Brake Ped Pos 3 Voltage < Threshold Pass Threshold > 5% of sensor supply voltage	5% of sensor supply voltage Nominal Range: 4.75v - 5.25v - Supply	Sensor Supply Voltage Sensor Supply Voltage Processing_Enabled No Active DTCs	> 4.75v < 5.25 True (Note 1) C120F	75ms	two trips
Brake Pedal Position Sensor 3 Circuit High	C129B	Brake pedal position 3 input signal voltage is high.	Brake Ped Pos 3 Voltage > Threshold Pass Threshold > 95% of sensor supply voltage	95% of sensor supply voltage Nominal Range: 4.75v - 5.25v - Supply	Sensor Supply Voltage Sensor Supply Voltage Processing_Enabled No Active DTCs	> 4.75v < 5.25 True (Note 1) C120F	75ms	two trips

DIAGNOSTIC SUMMARY TABLES--EBCM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Brake Pedal Position Sensor 3 Circuit Offset Error	C129C	The brake pedal position 3 input signal offset voltage is out of range	Brake Ped Pos 3 input offset > Threshold Pass Threshold Brake Ped Pos 3 input offset < Threshold	33 mm Nominal Range: 4.75v - 5.25v - Supply	Brake Pedal Apply Detected OR Pressure Zeroing Enable AND Processing_Enabled No Active DTCs	True (Note 2) True (Note 3) True (Note 1) C120F C127D C129A C129B C12E5 C12F8	15ms	two trips
		Base brake pedal travel sensor 3 offset error	Brake Pedal Travel Sensor 3 > Max Threshold	Max Threshold = 33 mm	Brake Pedal Apply Detected	True (Note 2)	7ms	
Brake Pedal Position Sensor 3 Plausibility	C12F8	The difference of the two travel sensor inputs is greater than a predefined threshold.	|(%Input 1 - %Input 2)| >= Threshold	10%	Pedal Supply Voltage Failure Brake Pedal Sensor is enabled Sensor Supply Voltage Sensor Supply Voltage Brake Pedal Position Sensor 1 Input = Valid Brake Pedal Position Sensor 2 Input = Valid	False True > 4.75v < 5.25 True True	30ms	two trips
Brake Pedal Position Sensor 4 Circuit Low	C129D	Brake pedal position 4 input signal voltage is low.	Brake Ped Pos 4 Voltage < Threshold Pass Threshold >5% of sensor voltage	5% of sensor supply voltage Nominal Range: 4.75v - 5.25v - Supply	Sensor Supply Voltage Sensor Supply Voltage Processing_Enabled No Active DTCs	> 4.75v < 5.25 True (Note 1) C120F	75ms	two trips
Brake Pedal Position Sensor 4 Circuit High	C129E	Brake pedal position 4 input signal voltage is high.	Brake Ped Pos 4 Voltage > Threshold Pass Threshold <95% of sensor supply voltage	95% of sensor supply voltage Nominal Range: 4.75v - 5.25v - Supply	Sensor Supply Voltage Sensor Supply Voltage Processing_Enabled No Active DTCs	> 4.75v < 5.25 True (Note 1) C120F	75ms	two trips

DIAGNOSTIC SUMMARY TABLES--EBCM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Brake Pedal Position Sensor 4 Circuit Offset Error	C129F	The brake pedal position 2 input signal offset voltage is out of range	Brake Ped Pos 4 input offset > Threshold Pass Thresold Brake Ped Pos 4 input offset <Threshold	33 mm Nominal Range: 4.75v - 5.25v - Supply	Brake Pedal Apply Detected OR Pressure Zeroing Enable AND Processing_Enabled No Active DTCs	True (Note 2) True (Note 3) True (Note 1) C120F C127D C129D C129E C12E5 C120C	15ms	two trips
		Base brake pedal travel sensor 4 offset error	Brake Pedal Travel Sensor 4 > Max Threshold	Max Threshold = 33 mm	Brake Pedal Apply Detected	True (Note 2)	7 ms	
				Pressure Sensors				
ABS Sensor Reference Output Circuit	C12E4	Determines if the internal 5v voltage supply is out of range.	Internal supply voltage < Threshold Low Internal supply voltage > Threshold High Pass Threshold 4.75 < Volt <5.25	Low = 4.75v High = 5.25v Nominal Range: (N/A)	Processing_Enabled	True (Note 1)	30ms	Two trips
ABS **Master Cylinder** Pressure Sensor and Brake Pedal Position Sensor Correlation	C12B1	The Master Cylinder Pressure sensor reading does not correlate with the pedal travel sensor readings.	M/C pressure input outside correlation table with Brake Ped Pos x inputs M/C Pressure has not changed by more than Threshold 1 while pedal travel inputs have changed more than Threshold 2	Outside acceptance table (Note 4) Threshold 1 = 50.0 kPa Threshold 2 =2.0 mm (rod)	Processing_Enabled System self test complete One brake apply M/C Pressure signal stable No Active DTCs	True (Note 1) True True True (Note 5) C120C C120F C12B2 C12B3 C12B4 C128B C128E C127D C129A C129B C129C C129D C129E C129F C12E5 C12F8	150ms (condition 1) 100ms (condition 2)	Two trips
ABS **Master Cylinder** Pressure Sensor Circuit Open or Shorted Low	C12B2	Out of range Low The MCP sensor is either open or shorted to ground.	MCP Voltage < Threshold Pass Threshold: > 5%	5% Nominal Range: (4.75v - 5.25v - Supply 0.5 - 4.5v - Sensor)	Processing_Enabled	True (Note 1)	100ms	two trips
ABS **Master Cylinder** Pressure Sensor Circuit Shorted High	C12B3	The MCP sensor signal is shorted high.	MCP Voltage > Supply Threshold Pass Threshold: < 95%	95% Nominal Range: (4.75v - 5.25v - Supply 0.5 - 4.5v - Sensor)	Processing_Enabled	True (Note 1)	100ms	two trips

DIAGNOSTIC SUMMARY TABLES--EBCM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
ABS **Master Cylinder** Pressure Sensor Performance	C12B4	An MCP erratic condition exist if the ohmic fault status has changed since the last time the ohmic check was performed.	Transitions from Valid to Open/Shorted State Pass Threshold: Transitions do not occur.	Successive Loops Nominal Range: (4.75v - 5.25v - Supply 0.5 - 4.5v - Sensor)	Processing_Enabled No active DTCs:	True (Note 1) C12B2 C12B3	100ms Pass =150ms	Two trips
ABS **Master Cylinder** Pressure Sensor Offset Error	C128B	The MCP sensor's input signal offset is out of range.	MCP Offset > Threshold	800 kPa (0.7v typically) Nominal Range: (4.75v - 5.25v - Supply 0.5 - 4.5v - Sensor)	(Brake Switch Veh Accel Pump Motor) or Brake Pedal Apply Detected AND Processing_Enabled No active DTCs:	False > 0.4m/s2 Not Active True (Note 2) True (Note 1) C12B2 C12B3 C128E	20ms	Two trips
		Emulator pressure offset is out of range.	Emulator Pressure Offset > Max Threshold	800 kPa	Emulator Pressure Detected	TRUE	7 ms	
ABS **Master Cylinder** Pressure Sensor Raw Offset Error	C128E	The MCP sensor's raw offset is out of range.	MCP Raw Offset > Threshold	5000 kPa (1.64v typical) Nominal Range: (4.75v - 5.25v - Supply 0.5 - 4.5v - Sensor)	Brake Control Vehicle Acceleration Vehicle Velocity Accelerator Pedal Position Brake Switch Processing_Enabled No active DTCs:	False (Note 6) > -0.5m/s/s > 2.0m/s < 10% False True (Note 1) C12B2 C12B3 C128E	1s	Two trips
ABS **HPA** Pressure Sensor Circuit Open or Shorted Low	C12B6	Out of range low. The HPA pressure sensor is either open or shorted to ground.	HPA Voltage < Threshold Pass Threshold: > 5%	5% Nominal Range: (4.75v - 5.25v - Supply 0.5 - 4.5v - Sensor)	Processing_Enabled	True (Note 1)	100ms	Two trips
ABS **HPA** Pressure Sensor Circuit Shorted High	C12B7	The HPA pressure sensor signal is shorted high.	HPA Voltage > Supply Threshold Pass Threshold: < 95%	95% Nominal Range: (4.75v - 5.25v - Supply 0.5 - 4.5v - Sensor)	Processing_Enabled	True (Note 1)	100ms	Two trips
ABS **HPA** Pressure Sensor Erratic	C12B8	An HPA pressure sensor erratic condition exist if the ohmic fault status has changed since the last time the ohmic check was performed	Transitions from Valid to Open/Shorted State Pass Threshold: Transitions do not occur.	Successive Loops Nominal Range: (4.75v - 5.25v - Supply 0.5 - 4.5v - Sensor)	Processing_Enabled No active DTCs:	True (Note 1) C12B6 C12B7	100ms Pass = 150ms	Two trips
ABS **Boost** Pressure Sensor Circuit Open or Shorted Low	C12BC	The boost pressure sensor is either open or shorted to ground.	Boost Voltage < Threshold Pass Threshold: > 5%	5% Nominal Range: (4.75v - 5.25v - Supply 0.5 - 4.5v - Sensor)	Processing_Enabled	True (Note 1)	100ms	Two trips
ABS **Boost** Pressure Sensor Circuit Shorted High	C12BD	The boost pressure sensor signal is shorted high.	Boost Voltage > Supply Threshold Pass Threshold: < 95%	95% Nominal Range: (4.75v - 5.25v - Supply 0.5 - 4.5v - Sensor)	Processing_Enabled	True (Note 1)	100ms	Two trips

DIAGNOSTIC SUMMARY TABLES--EBCM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
ABS **Boost** Pressure Sensor Erratic	C12BE	A boost pressure sensor erratic condition exist if the ohmic fault status has changed since the last time the ohmic check was performed	Transitions from Valid to Open/Shorted State Pass Threshold: Transitions do not occur.	Successive Loops Nominal Range: (4.75v - 5.25v - Supply 0.5 - 4.5v - Sensor)	Processing_Enabled No active DTCs:	True (Note 1) C12BC C12BD	100ms Pass = 150ms	Two trips
ABS **Boost** Pressure Sensor Raw Offset Error	C128D	The boost pressure sensor's raw offset is out of range.	Boost Signal Raw Offset > Threshold	5000 kPa (1.64v typical) Nominal Range: (4.75v - 5.25v - Supply 0.5 - 4.5v - Sensor)	Brake Control Vehicle Acceleration Vehicle Velocity Accelerator Pedal Position Brake Switch Processing_Enabled No active DTCs:	False (Note 6) > -0.5m/s/s > 2.0m/s < 10% False True (Note 1) C12BC C12BD C12BE	1s	Two trips
ABS **Boost** Pressure Sensor Offset Error	C128A	The boost pressure sensor's input signal offset is out of range.	Boost Signal Offset > Threshold Pass Threshold: < 800 kPa	800 kPa (0.7v typically) Nominal Range: (4.75v - 5.25v - Supply 0.5 - 4.5v - Sensor)	Brake Switch Vehicle Acceleration Pump Motor Processing_Enabled No active DTCs:	False > 0.4m/s2 Not Active True (Note 1) C12BC C12BD C12BE	20ms	Two trips
ABS **Boost** Pressure Performance	C120A	Determines if the boost pressure being commanded is being achieved or not.	Boost Pres Diff(BPD) = |Boost Pres(filtered, zeroed) – test command| With VSC or TC or ABS active: BPD > Thrshld1 Without VSC and TC and ABS active: BPD > Thrshld2	Thrshld1 = 3000 kPa Thrshld2 = 1500 kPa Nominal Range: (N/A)	Processing_Enabled No active DTCs:	True (Note 1) C12B6 C12B7 C12B8 C12BC C12BD C12BE C128A C128D C127D C12E4	500ms	two trips

DIAGNOSTIC SUMMARY TABLES--EBCM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
ABS **Boost** Pressure Loss	C12FE	The Boost Loss Fault is used to allow the boost control function to keep operating, despite motor failures or other failures and conditions that cause the boost pressure to be limited to less than commanded. The boost control will continue, applying as much pressure as possible, until the boost pressure available is no greater than the master cylinder pressure the driver is applying, at which time a fault will be set and the system will revert to 'push through'	Boost Press(slow filtered) < Threshold1 AND MC Press Greater Than Boost Press Time >= Time1 AND Accum Pres Filtered > Threshold2 OR Boost Loss First Apply Time > Time2	Threshold1 = 7000 kPa Time1 = 250msec Threshold2 = 16000 kPa Time2 = 250msec	Boost Pressure Valid Boost Loss Condition MC Press Greater Than Boost Press Time Incremented When: Boost Pressure Commanded > (Boost Press + 1500 kPa) AND MC Pressure > (Boost Press – 2 bar) No active DTCs	True False C12BC C12BD C12BE C128A C128D C127D C12E4	250 ms	Two trips
		This diagnostic is set when the boost loss condition described in the "Boost Loss Fault" is a result of certain situations such as the Engine Run Active being low. This diagnostic is used to effect the proper system reaction without indicating a hardware fault.	Boost Press < Threshold1 AND MCP Greater Than Boost Press Time >= Time1 AND Accum Pres Filtered > Threshold2 OR Boost Loss First Apply Time > Time2	Threshold1 = 7000 kPa Time1 = 250msec Threshold2 = 16000 kPa Time2 = 250msec	Boost Pressure Valid Boost Loss Condition Boost Loss Condition Fault	True True False	250 ms	
BB Solenoids								
ABS **Power Switch** Circuit Open	C12E6	When the power switch has been commanded on the voltage level is monitored for proper operation.	Voltage Level (switched battery) < Threshold Pass Threshold > 80% bat volt	80% bat voltage Nominal Range: (N/A)	Power Switch Base Brake Enabled Power Switch Command	True (Note 8) On	50ms	Two trips
ABS **Power Switch** Circuit Shorted	C12E7	The Base Brake Power switch voltage decay is monitored after the power switch is turned off. Voltage too high indicates a shorted switch. Voltage too low indicates a missing filter capacitor.	Power Switch Short Fault: Power switch feedback > Threshold1 Power Switch Short FSM Capacitor Fault: Power switch feedback < Threshold2 Pass Threshold 80% < fdbk <50%	Threshold1 = 80% bat volt Threshold2 = 50% bat volt Nominal Range: (N/A)	Power Switch Command Motor	Off != Running	50ms	Two trips
ABS **Base Brake Open** Solenoid **Circuit Open**	C12D6	Whenever the Power Switch **Base Brake** is closed and the driver transistor is not turned on (solenoid commanded off) the feedback voltage should be **high.**	Solenoid feedback voltage < Threshold Solenoid feedback voltage > Threshold Pass Threshold >80% Pass Threshold <30%	80% battery 30% battery Nominal Range: (8v > 16v)	Power Switch Base Brake Enabled Solenoid Power Supply Solenoid Power Supply Coil Command	True (Note 8) > 8v < 16v Off	30ms	Two trips

DIAGNOSTIC SUMMARY TABLES--EBCM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
		Whenever the Power Switch **Base Brake** is closed and the driver transistor is not turned on (solenoid commanded off) the feedback voltage should be **high.**	Solenoid feedback voltage < Threshold Pass Threshold >65.23%	65.23% battery Nominal Range: (8v > 16v)	Power Switch Base Brake Enabled Solenoid Power Supply Solenoid Power Supply Coil Command	True (Note 8) > 8v < 16v Off	21ms (Solenoid in PWM Mode)	
ABS **Base Brake Open** Solenoid **Circuit Shorted**	C12D7	Whenever the Power Switch **Base Brake** is closed and the driver transistor is turned on (solenoid commanded on) the feedback voltage should be **low.**	Solenoid feedback voltage > Threshold Pass Threshold: < Threshold	30% of battey (Solenoid in ON/OFF Mode)	Power Switch Slip Control Enabled Solenoid Power Supply Solenoid Power Supply Coil Command	True (Note 7) > 8v < 16v On	15ms (Solenoid in ON/OFF Mode)	Two trips
		Whenever the Power Switch **Base Brake** is closed and the driver transistor is turned on (solenoid commanded on) the feedback voltage should be **low.**	Solenoid feedback voltage > Threshold Pass Threshold: < 85%	85% of batter (Solenoid in PWM Mode) Nominal Range: (8v > 16v)	Power Switch Slip Control Enabled Solenoid Power Supply Solenoid Power Supply Coil Command	True (Note 7) > 8v < 16v On	21ms (Solenoid in PWM Mode)	
ABS **Base Brake Open** Solenoid **Driver Shorted**	C12D8	Whenever the Power Switch **Base Brake** is closed and the driver transistor is not turned on (solenoid commanded off) the feedback voltage should be **high.**	Solenoid feedback voltage < Threshold Pass Threshold >30%	30% battery Nominal Range: (8v > 16v)	Power Switch Base Brake Enabled Solenoid Power Supply Solenoid Power Supply Coil Command	True (Note 8) > 8v < 16v Off	30ms	Two trips
		Whenever the Power Switch Base Brake is closed and the driver transistor is not turned on (solenoid commanded off) the feedback voltage should be **high**.	Solenoid feedback voltage < Threshold Pass Pass Threshold > 43.49%	43.49% battery Nominal Range: (8v > 16v)	Power Switch Base Brake Enabled Solenoid Power Supply Solenoid Power Supply Coil Command	True (Note 8) > 8v < 16v Off	21ms (Solenoid in PWM Mode)	
ABS **Base Brake Closed** Solenoid **Circuit Open**	C12D9	Whenever the Power Switch Base Brake is closed and the driver transistor is not turned on (solenoid commanded off) the feedback voltage should be **high**.	Solenoid feedback voltage < Threshold Solenoid feedback voltage > Threshold Pass Threshold >80% Pass Threshold <30%	80% battery 30% battery Nominal Range: (8v > 16v)	Power Switch Base Brake Enabled Solenoid Power Supply Solenoid Power Supply Coil Command	True (Note 8) > 8v < 16v Off	30ms	Two trips
		Whenever the Power Switch Base Brake is closed and the driver transistor is not turned on (solenoid commanded off) the feedback voltage should be **high.**	Solenoid feedback voltage < Threshold Pass Threshold >65.23%	65.23% battery Nominal Range: (8v > 16v)	Power Switch Base Brake Enabled Solenoid Power Supply Solenoid Power Supply Coil Command	True (Note 8) > 8v < 16v Off	21ms (Solenoid in PWM Mode)	
ABS **Base Brake Closed** Solenoid **Circuit Shorted**	C12DA	Whenever the Power Switch **Base Brake** is closed and the driver transistor is turned on (solenoid commanded on) the feedback voltage should be **low.**	Solenoid feedback voltage > Threshold Pass Threshold: < Threshold	30% of battey (Solenoid in ON/OFF Mode)	Power Switch Slip Control Enabled Solenoid Power Supply Solenoid Power Supply Coil Command	True (Note 7) > 8v < 16v On	15ms (Solenoid in ON/OFF Mode)	Two trips

DIAGNOSTIC SUMMARY TABLES--EBCM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
		Whenever the Power Switch **Base Brake** is closed and the driver transistor is turned on (solenoid commanded on) the feedback voltage should be **low.**	Solenoid feedback voltage > Threshold Pass Threshold: < Threshold	85% of batter (Solenoid in PWM Mode) Nominal Range: (8v > 16v)	Power Switch Slip Control Enabled Solenoid Power Supply Solenoid Power Supply Coil Command	True (Note 7) > 8v < 16v On	21ms (Solenoid in PWM Mode)	
ABS **Base Brake Closed** Solenoid **Driver Shorted**	C12DB	Whenever the Power Switch **Base Brake** is closed and the driver transistor is not turned on (solenoid commanded off) the feedback voltage should be **high.**	Solenoid feedback voltage < Threshold Pass Threshold >30%	30% battery Nominal Range: (8v > 16v)	Power Switch Base Brake Enabled Solenoid Power Supply Solenoid Power Supply Coil Command	True (Note 8) > 8v < 16v Off	30ms	Two trips
		Whenever the Power Switch **Slip Control** is closed and the driver transistor is not turned on (solenoid commanded off) the feedback voltage should be **high.**	Solenoid feedback voltage < Threshold Pass Pass Threshold > 43.49%	43.49% battery Nominal Range: (8v > 16v)	Power Switch Base Brake Enabled Solenoid Power Supply Solenoid Power Supply Coil Command	True (Note 8) > 8v < 16v Off	21ms (Solenoid in PWM Mode)	
ABS Boost Valve Solenoid Circuit **Shorted**	C12DD	This failsafe is for shorted coil detection for HW CLC coils	Current Feedback > Threshold Pass Threshold: < 150% of requested current	150% of requested current Nominal Range: (8v > 16v)	Power Switch Base Brake Enabled Solenoid Power Supply Solenoid Power Supply Commanded Current Commanded Current	True (Note 8) > 8v < 16v > 0.25a < 0.35a	15ms	Two trips
ABS Boost Valve Solenoid **Circuit Performance**	C12A7	The current from the closed loop current controlled valve coil is diagnosed by checking if the difference of the measured current feedback and the commanded current is within a tolerance range.	Coil Feedback Current > Threshold Pass Threshold: < 25% of commanded current	25% of Commanded Current Nominal Range: (8v > 16v)	Power Switch Base Brake Enabled Solenoid Power Supply Solenoid Power Supply Commanded Current Commanded Current	True (Note 8) > 8v < 16v > 0.44a < 1.5a	100ms	Two trips
		Whenever the Power Switch Base Brake is closed and the driver transistor is not turned on (solenoid commanded off) the feedback current should be 0 amps.	Current feedback > Threshold Pass Threshold < 0.10amp	0.10amp Nominal Range: (8v > 16v)	Power Switch Base Brake Enabled Solenoid Power Supply Solenoid Power Supply Coil Command	True (Note 8) > 8v < 16v Off	30ms	
FSM Pump Motor								
ABS Pump Motor Run On	C12E9	This fault occurs if the Motor is continuously on for greater than 60s for 5 consecutive run times during an ignition cycle.	FSM Run-On Fault counter > Threshold Pass Threshold < 5	5 Nominal Range: (10v > 16v)	Motor_Enabled Motor_ON	True (Note 9) > 60s	15 ms	Two trips
ABS Pump Motor Locked	C12E8	This fault is set when the motor control micro communicates to the system micro that the motor is unable or will not rotate.	FS_Motor_No_Edge_Counter < Threshold	50 Nominal Range: (10v > 16v)	Motor_Enabled	True (Note 9)	15 ms	Two trips

DIAGNOSTIC SUMMARY TABLES--EBCM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
		This fault is set when the motor control micro communicates to the system micro that the motor is unable or will not rotate. 150 PWM cycles are applied to the FS motor during motor start. If a turning point is not recognized during those 150 PWM cycles the fault counter will be incremented by one. If the fault count increase to 5 the fault will set The turning point fault is monitored during motor start (not during motor spinning state)	Motor start PWM cycles > Threshold (without a recognized turning point)	750 cycles	Motor_Enabled	True (Note 9)	4.75 s	Two trips
		This fault is set when the motor control micro communicates to the system micro that the motor is unable or will not rotate. The interrupt order fault is set, if the calls of the requested interrupt-services are not in the correct order. The interrupt order fault is monitored during motor start and motor spinning state	Requested "interrupt-services" order = Value	Value = Incorrect order	Motor_Enabled	True (Note 9)	Interrupt frequency is tied to motor speed, so it is speed dependent.	Two trips
ABS Pump Motor Performance	C12E0	This fault checks to see if a condition exists in which the accumulator is not charging	Accumulator Pressure < Threshold Pass Threshold > 12000 kPa	11000 kPa Nominal Range: (10v > 16v)	Brake Pedal Apply Detected Motor_Enabled Boost_Pressure < Command + 150 kPa No active DTCs:	True (Note 2) True (Note 9) True C12B6 C12B7 C12B8 C127D C12E4	100ms	Two trips

Power Inputs

DIAGNOSTIC SUMMARY TABLES--EBCM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
EBCM Device Voltage Low	C12E1	System voltage is too low for certain operations. **If the vehicle is not moving or if the vehicle is in park and the park signal is valid, the fault maturation time will be 20 sec. Otherwise the fault maturation time will be 100msec.**	System voltage < Threshold Pass Threshold Volt >9.3v	9v Nominal Range: (N/A)	Ignition **Vehicle Moving** **PRNDL** **OR** **PRNDL_P Signal Valid** **Wheel Speeds Valid**	!= Crank **!= TRUE** **!= Park** **False** **False**	**20s** 100ms	Special C
EBCM Device Voltage High	C12E2	System voltage is too high for certain operations.	System voltage > Threshold Pass Threshold Volt <15.7v	16v Nominal Range: (N/A)	Ignition	!= Crank	100ms	Two trips
				Wake Inputs				
Ignition Circuit Low	C1240	Ignition voltage is too Low	Ignition Voltage < Threshold Pass Threshold > 6v	6v	EngRunCrankTerminalStatus EngRunCrankTerminalStatusValid	!= False = True	5s	Two trips
Ignition Circuit High	C1241	Ignition voltage is too High	Ignition Voltage > Threshold Pass Threshold < 6v	6v	EngRunCrankTerminalStatus EngRunCrankTerminalStatusValid	= False = True	5s	Two trips
ACC Wake Up Circuit Low	C1242	Wakeup voltage is too Low at startup	Vakeup voltage < Threshold Pass Threshold > 6v	6v	Engine run flag active Diagnostic ran this ignition cycle Normal Communiction Enabled	= True for 3s = False = True	5s	Two trips
				Controller				
EBCM Self Test Failed	C127C	The Built In Self Test (BIST) is responsible for testing the internal functionality of the core within the main microprocessor	Fail Consecutive Times = Threshold	2 Nominal Range: (N/A)		Upon Starting Scheduler in the Application	15ms	one trip
EBCM Processor Performance	C127B	**Normal Operation:** The micro sends a watchdog enable command(WEC) via the SPI to the Orion ASIC every schedule loop. If the ASIC does not receive this message, the external watchdog circuit inhibits the power switches. **Ignition Self-Test:** The external watchdog circuit is tested by not sending the WEC via the SPI to the ASIC so that the external watchdog is off and then commanding the power switch to on	Power Switch Slip Control Voltage Feedback > Threshold Pass Threshold < 80% bat volt	80% bat volt Nominal Range: (N/A)		Run during Start-up	30ms	one trip

DIAGNOSTIC SUMMARY TABLES--EBCM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
EBCM Random Access Memory (RAM)	C1255	The following tests are continuously ran: 1. Read/write of the micro's RAM registers. 2. Address check of the RAM address lines. 3. Verify that the RAM location used to store the persistent address line test address (offset) advances to the next address line address. 4. Perform data check on a RAM address that includes a dependency check against another RAM location that is address adjacent to the RAM location being tested. 5. Verify that the RAM location used to store the persistent data test address advances to the next test address.	If any of the tests fail, the system is forced into a reset by writing an invalid watchdog key to the system registers. If the RAM failure is NOT detected by the bootloader static RAM check algorithm then a fault code is set and the exact type of RAM failure is written to NVRAM.	See Malfunction Criteria Nominal Range: (N/A)		Upon Starting Scheduler in the Application	15ms	one trip
EBCM Read Only Memory (ROM)	C1256	This check is called from the scheduler each loop. Each ROM section is check-summed by byte. Each byte will be added to the current checksum for a section. If the byte being checked is the last byte of a section, then the section is verified for a correct checksum.	ROM Section's Checksum != Threshold	0 Nominal Range: (N/A)		Upon Starting Scheduler in the Application	Immediate	one trip
EBCM Stack Overrun	C126E	To detect underflow and overflow of the system stacks, a word of RAM is reserved at the end of each of the system stacks. A word of RAM is also reserved at the upper-most address of the stack section. The contents of these reserved words will be monitored periodically to determine if they have been modified. To detect cases where the application could be pushing a value onto the stack that matches the test value, the test value that is stored at these reserved addresses will be changed each update.	End of Stack != Threshold	Set value changed every software release Nominal Range: (N/A)		Upon Starting Scheduler in the Application	Immediate	one trip

DIAGNOSTIC SUMMARY TABLES--EBCM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
EBCM Processor Overrun	C121D	Processor did not perform a proper shutdown. NVRAM blocks written at shutdown do not match expected values upon startup. Processing interrupt occurred.	The contents of the two NVRAM blocks are compared upon start-up with expected values from shutdown process.	Blocks do not compare	Vehicle moving On Brake	True True Upon Starting Scheduler in the Application	15ms	two trips
EBCM Unimplemented Interrupt	C121E	This fault is set if an interrupt occurs that has no explicit interrupt handler defined.	Interrupt Set = Threshold	Not Defined Interrupt Handler Nominal Range: (N/A)		**Upon Starting Scheduler in the Application**	6 interrupts	Two trips
EBCM Unexpected Exception	C121F	This fault is set if an exception that is not supported in our system has been generated.	Exception Not Supported = Condition	N/A Nominal Range: (N/A)		Upon Starting Scheduler in the Application	15ms	Two trips
EBCM A/D Conversion Timeout	C127D	If the Analog to digital converter does not complete its conversion in a set amount of time then this fault is set.	A/D Conversion Counter = Threshold	0 (Counts down from 100) Nominal Range: (N/A)		Upon Starting Scheduler in the Application	100 clock cycles	one trip
EBCM Non-Volatile Random Access Memory (NVRAM) / Non-volatile RAM	C12FF	Checksum Error Fault	NVRAM status bit sent out by core software reports a failed NVRAM	NVRAMDiagstat > 0 Fault Counts > 0 Nominal Range: (N/A)		Upon Starting Scheduler in the Application	15ms	Two trips
EBCM Non-Volatile Random Access Memory (NVRAM) / Software Learn ID		Software ID held in NVRAM does not match ID hard coded in software	BB NVRAM SW BLOCK ID ~=Software ID	SwVerIDStat > 0 Nominal Range: (N/A)		Upon Starting Scheduler in the Application	15ms	
EBCM High End Timer Performance	C127A	Execution of the High End Timer (HET) program is limited to the actual instructions of the HET program. Execution of default instructions indicates program execution error.	Default Instructions = Threshold	Executed Nominal Range: (N/A)		Upon Starting Scheduler in the Application	15ms	one trip
EBCM High End Timer Program Overflow	C123B	If the HET program does not complete execution time within one HET loop time, the current HET program is aborted and the next program execution is started and a fault code is set.	HET Program Exectution Time > Threshold	HET Loop Time Nominal Range: (N/A)		Upon Starting Scheduler in the Application	15ms	one trip

DIAGNOSTIC SUMMARY TABLES--EBCM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
EBCM High End Timer (HET) RAM Fault	C123C	The following tests are continuously ran: 1. Read/write of the micro's HET RAM registers. 2. Address check of the HET RAM address lines. 3. Verify that the HET RAM location used to store the persistent address line test address (offset) advances to the next address line address. 4. Perform data check on a HET RAM address that includes a dependency check against another HET RAM location that is address adjacent to the HET RAM location being tested. 5. Verify that the HET RAM location used to store the persistent data test address advances to the next test address. The following test is run at power up and reset 1. CAN device RAM check on the mailbox area	If any of the tests fail, the system is forced into a reset by writing an invalid watchdog key to the system registers. If the RAM failure is NOT detected by the bootloader static RAM check algorithm then a fault code is set and the exact type of RAM failure is written to NVRAM.	See Malfunction Criteria Nominal Range: (N/A)		Upon Starting Scheduler in the Application	15ms	one trip
EBCM High End Timer (HET) Watchdog	C123A	If the HET monitor task is not executed within the allowed time frame, a counter is decremented. When the counter decrements to zero, an interrupt is generated and this fault is set.	Counter = Threshold	0 Nominal Range: (N/A)		Upon Starting Scheduler in the Application	15ms	one trip
EBCM High End Timer Periodic Interrupt	C123E	This failsafe verifies that a solenoid feedback interrupt generates a high end timer(HET) interrupt every loop cycle.	Solenoid Feedback Interrupt from the HET = Threshold	Calculated based on Solenoid activity Nominal Range: (N/A)		Upon Starting Scheduler in the Application	15ms	one trip
EBCM Solenoid Timeout	C123D	Each solenoid in the system should generate a HET interrupt. At the completion of the System Self-Test, the number of valid HET interrupts is expected to be equal to the number of solenoids in the system.	Number of Valid HET Interrupts != Number	12 Nominal Range: (N/A)		Upon Starting Scheduler in the Application	15ms	one trip
CAN / Communications								

DIAGNOSTIC SUMMARY TABLES--EBCM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
EBCM Internal Communication Error	C121C	The periodic Internal Processor Communication (IPC) packet transmission service checks for previous transmission request completion before the new request is made. If the previous transmission was not completed, then the IPC handler declares an IPC packe	Slave micro has not sent a packet for 3.5 sec	Time Nominal Range: (N/A)	3.5 sec	Upon Starting Scheduler in the Application	15 ms	two trips
		The periodic Internal Processor Communication (IPC) packet transmission service checks for previous transmission request completion before the new request is made. If the previous transmission was not completed, then the IPC handler declares an IPC packe	Secondary micro-processor communication packet does not re-synchonize with expected start-up sequence and with in set time.	Time Nominal Range: (N/A)	100msec	Upon Starting Scheduler in the Application	15 ms	
EBCM Serial Peripheral Interface Performance	C126F	2 data bytes are sent to the Orion ASIC. The Orion sends back the first byte.	Received Data != Sent Data for Threshold # of attempts	3 Nominal Range: (N/A)		Upon Starting Scheduler in the Application	20 ms	one trip
EBCM Serial Peripheral Interface Inoperative	C123F	Each time data is sent out from the SPI port, a counter is loaded. The counter is decremented each check that the micro polls the SPI status to see if the data transfer is complete. The counter should never reach zero before the data transfer is complete. If the counter reaches zero, it means that the peripheral, NVRAM, appears to be non-functional	Counter = Threshold	0 Nominal Range: (N/A)		Upon Starting Scheduler in the Application	15 ms	one trip

DIAGNOSTIC SUMMARY TABLES--EBCM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Control Module Communication Bus E Off	U180D	The hardware confirmation timeout condition is monitored every time the CAN driver initialization service is called. The CAN driver init service is called after power up, in Bus Off, or in transmit acknowledgement recovery. The number of counts the CAN driver is allowed to wait for hardware confirmation is 11. If the confirmation is not received by this number then the fault is set.	# of initialization attempts > threshold	11		Upon Starting Scheduler in the Application	15 ms	two trips
		The CAN peripheral monitors CAN bus activity and increments an error counter if the following errors are present: 1) BIT ERROR: If the bit sent does not match what was expected to be sent, increment the counter. 2) STUFF ERROR: This error has to be detected at the bit time of the 6th consecutive equal bit level in a message field that should be coded by the method of bit stuffing. 3) CRC ERROR: This error is detected if the calculated result of the receiver is not the same as that received from the transmitter. 4) FORM ERROR: This error is detected when a fixed-form bit field contains one or more illegal bits. 5) ACKNOWLEDGMENT ERROR: This error is detected by a transmitter whenever it does not monitor a dominant bit during the ACK SLOT. If the transmit error counter or receive error counter reach a value of 256 this fault is set.	CAN Hardware Transmit Error Counter > Threshold	256 Nominal Range: (N/A)		Upon Starting Scheduler in the Application	15 ms	

DIAGNOSTIC SUMMARY TABLES--EBCM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
		The CAN frame does not receive acknowledgement for predefined amount of time. If this fault is enabled in the node supervisor then transmit confirmation is expected within 200 ms.Transmit request sets the timeout timer and successful transmission resets the timeout timer.	CAN Frame acknowledgement not received	Not Received Nominal Range: (N/A)		Upon Starting Scheduler in the Application	200ms	
Antilock Brake System Control Module Lost Communication With Hybrid Powertrain Control Module on Bus E	U1858	MISSING_PRV_CTRL_RGN_BRK_TRQ_CE Communication message is missing.	The specified input packet with consistent data was not received by COMMS for a predefined time. Every periodic input packet is monitored for input deadline timeout. The deadline timeout is reset each time new packet data is received. The deadline timeout is either set in DBC file or during the configuration of the COMMS subsystem.	Nominal Range: (N/A)		Upon Starting Scheduler in the Application	190msec	two trips
		PRIV_REGEN_BRAKE_ARC_ERROR	Out of the 16 received frames, 4 ARC values do not match the calculated values.	Nominal Range: (N/A)		Upon Starting Scheduler in the Application	190msec	
		PRIV_REGEN_BRAKE_PROT_ERROR	Out of the 16 received frames, 4 protection values do not match the calculated values.	Nominal Range: (N/A)		Upon Starting Scheduler in the Application	190msec	
Antilock Brake System Control Module Lost Communication With Engine Control Module on Bus E	U186A	MISSING_PTEI_AXLE_TORQUE_CMD Communication message is missing.	The specified input packet with consistent data was not received by COMMS for a predefined time. Every periodic input packet is monitored for input deadline timeout. The deadline timeout is reset each time new packet data is received. The deadline timeout is either set in DBC file or during the configuration of the COMMS subsystem.	Nominal Range: (N/A)		Upon Starting Scheduler in the Application	190msec	two trips
		GMLAN_CMD_AXLE_TRQ_ARC_ERROR	Out of the 16 received frames, 4 ARC values do not match the calculated values.	Nominal Range: (N/A)		Upon Starting Scheduler in the Application	190msec	

DIAGNOSTIC SUMMARY TABLES--EBCM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
		GMLAN_CMD_AXLE_TRQ_PROT_ERROR	Out of the 16 received frames, 4 protection values do not match the calculated values.	Nominal Range: (N/A)		Upon Starting Scheduler in the Application	190msec	
Antilock Brake System Control Module Lost Communication With Transmission Control Module	U186B	PPEI_TRANS_GEN_STAT_2 Communication message is missing.	The specified input packet with consistent data was not received by COMMS for a predefined time. Every periodic input packet is monitored for input deadline timeout. The deadline timeout is reset each time new packet data is received. The deadline timeout is either set in DBC file or during the configuration of the COMMS subsystem.	Nominal Range: (N/A)		Upon Starting Scheduler in the Application	175msec	two trips

Note #1 - Processing_Enable is set to FALSE when the following DTCs are set to 'Fault': C1255, C1256, C126E, C123C, C127C

Note #2 - Brake Pedal Apply Detected is the determination that the driver has applied the brake pedal. It is a combination of indications from the 4 driver inputs: Brake Switch, Master Cylinder Pressure, Brake Pedal Position 3 and Brake Pedal Position 4. Typically, 2 out of 4 sensors indicating Brake Apply will set the Brake Pedal Apply Detected flag.

Note #3 - Pressure Zeroing Enable. When the vehicle is in a known state that the driver brake pedal should be released, the Pressure Zeroing Enable is set. Typical vehicle conditions are:
1) There is no vehicle brake control active
2) Vehicle acceleration > -0.5m/s² (not decelerating)
3) Vehicle velocity > 2.0m/s
4) Accelerator pedal position < 10%
5) Brake switch is not pressed

Note #4 - See Correlation Table below

Note #5 - M/C Pressure Sensor stable is a comparision of the raw M/C pressure reading against 2 filtered versions of the reading (0.5 Hz and 5 Hz.) If all 3 values are within a small tolerance (7 kpa) then the driver's input is considered stable.

Note #6 - Brake Control is considered 'False' when there is no activity being performed by the hydaulic modulator - no wheel control valves are being commanded and the motor is not being commanded.

Note #7 - Power Switch Slip Control Enable is used to open the power control FET in the electronics as a safety mechanism for the brake controller. It is set to FALSE when the following DTCs are set to 'Fault': C12C2, C12C5, C12D2, C12D5, C12CC, C12CF, C12C6, C12C8, C12DE, C12D8, C12D2, C1256, C1255, C126E, C123C, C127C, C121E, C121F, C120D, C127B

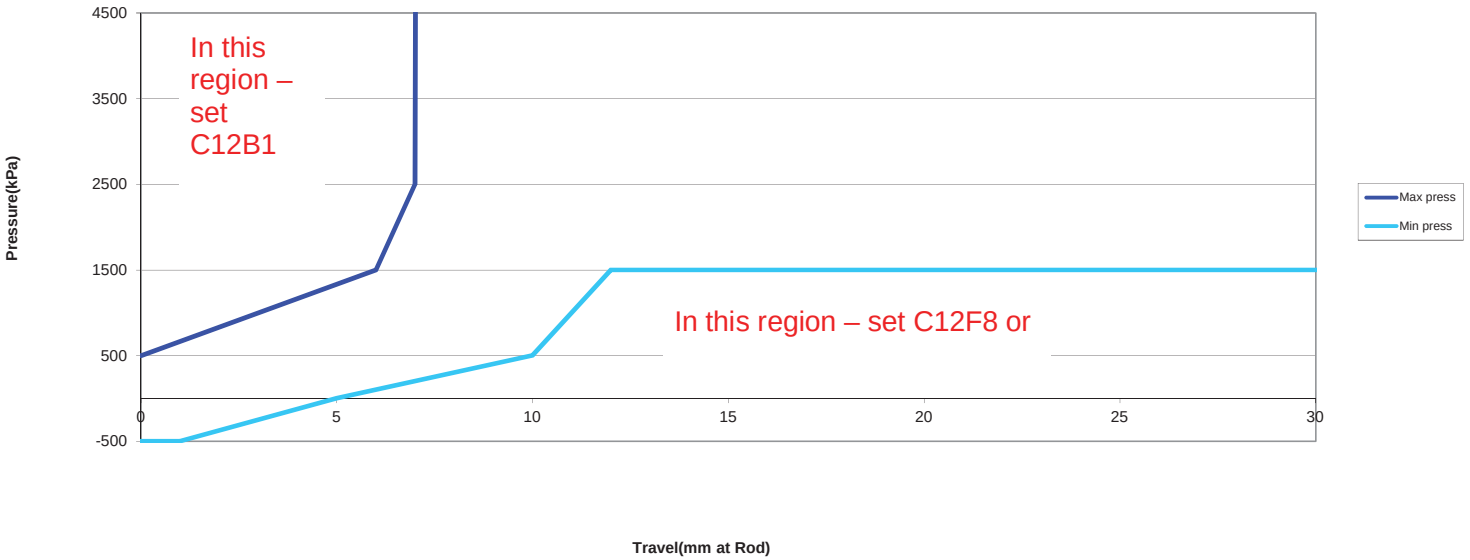
Note #8 - Power Switch Base Brake Control Enable is used to open the Base Brake power control FET in the electronics as a safety mechanism for the brake controller. It is set to FALSE when the following DTCs are set to 'Fault': C12DB, C12DC, C12D8, C12D3, C1256, C1255, C126E, C123C, C127C, C121E, C121F, C12E6, C127B

Note #9 - Motor_Enable is used to indicate when the motor is allowed to be commanded on. Motor_Enable is set to FALSE when the following DTCs are set to 'Fault': C12B7, C12B6, C12B8, C12D8, C12DB, C12DC, C12E9, C12E8, C1256, C1255, C126E, C123C, C123E, C123A, C127A, C123B, C127C, C121E, C121F, C123D, C126F, C121C, C120C, C12E6, C12E7, C127B

Note #10 - Cornering determination is a comparison of the 4 wheel speeds to estimate the percentage of road wheel angle of the drive wheels relative to their full amount of articulation. Wheel slip is the calculated ratio of individual wheel velocities to the calculated average vehicle velocity. Vehicle velocity is calculated from the 4 wheel speed sensors.

Note 4:
Correlation Table

DIAGNOSTIC SUMMARY TABLES--EBCM (ELR)								
Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum



DIAGNOSTIC SUMMARY TABLES--VITM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Voltage Sense A Circuit Low	P0B3D	Sets when cell voltage is detected below threshold	Cell Voltage A	<= 0.2V	Diagnostic Enable	TRUE	1.4second in a 2 second window	One Trip
Hybrid Battery Voltage Sense B Circuit Low	P0B42		Cell Voltage B	<= 0.2V	Run/Crank, Accessory/Run or HVEM EB Comm Enable	TRUE		
Hybrid Battery Voltage Sense C Circuit Low	P0B47		Cell Voltage C	<= 0.2V	No Active DTCs associated with VTSM Loss of Comm	U2603, U2604, U2605, U2606		
Hybrid Battery Voltage Sense D Circuit Low	P0B4C		Cell Voltage D	<= 0.2V				
Hybrid Battery Voltage Sense E Circuit Low	P0B51			<= 0.2V	No Active DTCs associated with Open Sense Line	P0B3B, P0B40, P0B45, P0B4A, P0B4F, P0B54, P0B59, P0B5E, P0B63, P0B68, P0B6D, P0B77, P0B7C, P0B81, P0B86, P0B8B, P0B95, P0B9A, P0B9F, P0BA4, P0BA9, P0BAE, P0BB3, P0BB8, P1B28, P1B29, P1B2A, P1B2B, P1B2C, P1B2D, P1E4C, P1E4D, P1E4E, P1E4F, P1E50, P1E51, P1E52, P1E53, P1E54, P1E56, P1E57, P1E58, P1E59, P1E5A, P1E5B, P1E5C, P1E5D, P1E5E, P1E5F, P1E60, P1E61, P1E62, P1E63, P1E64,		
Hybrid Battery Voltage Sense F Circuit Low	P0B56		Cell Voltage F	<= 0.2V				
Hybrid Battery Voltage Sense G Circuit Low	P0B5B		Cell Voltage G	<= 0.2V				
Hybrid Battery Voltage Sense H Circuit Low	P0B60		Cell Voltage H	<= 0.2V				
Hybrid Battery Voltage Sense I Circuit Low	P0B65		Cell Voltage I	<= 0.2V				
Hybrid Battery Voltage Sense J Circuit Low	P0B6A		Cell Voltage J	<= 0.2V				
Hybrid Battery Voltage Sense K Circuit Low	P0B6F		Cell Voltage K	<= 0.2V	2nd Protection Self Test Diagnostic	Not Running		
Hybrid Battery Voltage Sense L Circuit Low	P0B74		Cell Voltage L	<= 0.2V	2nd Protection Self Test Diagnostic	Not Running		
Hybrid Battery Voltage Sense M Circuit Low	P0B79		Cell Voltage M	<= 0.2V	No Active DTCs associated with VTSM Cell Balancing Fault	P1E92, P1E98, P1E9E, P1EA4		
Hybrid Battery Voltage Sense N Circuit Low	P0B7E		Cell Voltage N	<= 0.2V	No Active DTCs associated with VTSM Internal Performance	P1E8E, P1E94, P1E9A, P1EA0		
Hybrid Battery Voltage Sense O Circuit Low	P0B83		Cell Voltage O	<= 0.2V				
Hybrid Battery Voltage Sense P Circuit Low	P0B88		Cell Voltage P	<= 0.2V				
Hybrid Battery Voltage Sense Q Circuit Low	P0B8D		Cell Voltage Q	<= 0.2V				
Hybrid Battery Voltage Sense R Circuit Low	P0B92		Cell Voltage R	<= 0.2V				
Hybrid Battery Voltage Sense S Circuit Low	P0B97		Cell Voltage S	<= 0.2V				
Hybrid Battery Voltage Sense T Circuit Low	P0B9C		Cell Voltage T	<= 0.2V				
Hybrid Battery Voltage Sense U Circuit Low	P0BA1		Cell Voltage U	<= 0.2V				
Hybrid Battery Voltage Sense V Circuit Low	P0BA6		Cell Voltage V	<= 0.2V				
Hybrid Battery Voltage Sense W Circuit Low	P0BAB		Cell Voltage W	<= 0.2V				

DIAGNOSTIC SUMMARY TABLES--VITM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Voltage Sense X Circuit Low	P0BB0		Cell Voltage X	<= 0.2V				
Hybrid Battery Voltage Sense Y Circuit Low	P0BB5		Cell Voltage Y	<= 0.2V				
Hybrid Battery Voltage Sense Z Circuit Low	P0BBA		Cell Voltage Z	<= 0.2V				
Hybrid Battery Voltage Sense AA Circuit Low	P1B17		Cell Voltage AA	<= 0.2V				
Hybrid Battery Voltage Sense AB Circuit Low	P1B1A		Cell Voltage AB	<= 0.2V				
Hybrid Battery Voltage Sense AC Circuit Low	P1B1D		Cell Voltage AC	<= 0.2V				
Hybrid Battery Voltage Sense AD Circuit Low	P1B20		Cell Voltage AD	<= 0.2V				
Hybrid Battery Voltage Sense AE Circuit Low	P1B23		Cell Voltage AE	<= 0.2V				
Hybrid Battery Voltage Sense AF Circuit Low	P1B26		Cell Voltage AF	<= 0.2V				
Hybrid Battery Voltage Sense AG Circuit Low	P1B46		Cell Voltage AG	<= 0.2V				
Hybrid Battery Voltage Sense AH Circuit Low	P1B49		Cell Voltage AH	<= 0.2V				
Hybrid Battery Voltage Sense AI Circuit Low	P1B4C		Cell Voltage AI	<= 0.2V				
Hybrid Battery Voltage Sense AJ Circuit Low	P1B4F		Cell Voltage AJ	<= 0.2V				
Hybrid Battery Voltage Sense AK Circuit Low	P1B52		Cell Voltage AK	<= 0.2V				
Hybrid Battery Voltage Sense AL Circuit Low	P1B55		Cell Voltage AL	<= 0.2V				
Hybrid Battery Voltage Sense AM Circuit Low	P1B58		Cell Voltage AM	<= 0.2V				
Hybrid Battery Voltage Sense AN Circuit Low	P1B5B		Cell Voltage AN	<= 0.2V				
Hybrid Battery Voltage Sense AO Circuit Low	P1B5E		Cell Voltage AO	<= 0.2V				
Hybrid Battery Voltage Sense AP Circuit Low	P1B61		Cell Voltage AP	<= 0.2V				
Hybrid Battery Voltage Sense AQ Circuit Low	P1B64		Cell Voltage AQ	<= 0.2V				
Hybrid Battery Voltage Sense AR Circuit Low	P1B67		Cell Voltage AR	<= 0.2V				
Hybrid Battery Voltage Sense AS Circuit Low	P1B6A		Cell Voltage AS	<= 0.2V				
Hybrid Battery Voltage Sense AT Circuit Low	P1B6D		Cell Voltage AT	<= 0.2V				
Hybrid Battery Voltage Sense AU Circuit Low	P1B70		Cell Voltage AU	<= 0.2V				
Hybrid Battery Voltage Sense AV Circuit Low	P1B73		Cell Voltage AV	<= 0.2V				
Hybrid Battery Voltage Sense AW Circuit Low	P1B76		Cell Voltage AW	<= 0.2V				

DIAGNOSTIC SUMMARY TABLES--VITM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Voltage Sense AX Circuit Low	P1B79		Cell Voltage AX	<= 0.2V				
Hybrid Battery Voltage Sense AY Circuit Low	P1B7C		Cell Voltage AY	<= 0.2V				
Hybrid Battery Voltage Sense AZ Circuit Low	P1B7F		Cell Voltage AZ	<= 0.2V				
Hybrid Battery Voltage Sense BA Circuit Low	P1B82		Cell Voltage BA	<= 0.2V				
Hybrid Battery Voltage Sense BB Circuit Low	P1B85		Cell Voltage BB	<= 0.2V				
Hybrid Battery Voltage Sense BC Circuit Low	P1B88		Cell Voltage BC	<= 0.2V				
Hybrid Battery Voltage Sense BD Circuit Low	P1B8B		Cell Voltage BD	<= 0.2V				
Hybrid Battery Voltage Sense BE Circuit Low	P1B8E		Cell Voltage BE	<= 0.2V				
Hybrid Battery Voltage Sense BF Circuit Low	P1B91		Cell Voltage BF	<= 0.2V				
Hybrid Battery Voltage Sense BG Circuit Low	P1B94		Cell Voltage BG	<= 0.2V				
Hybrid Battery Voltage Sense BH Circuit Low	P1B97		Cell Voltage BH	<= 0.2V				
Hybrid Battery Voltage Sense BI Circuit Low	P1B9A		Cell Voltage BI	<= 0.2V				
Hybrid Battery Voltage Sense BJ Circuit Low	P1B9D		Cell Voltage BJ	<= 0.2V				
Hybrid Battery Voltage Sense BK Circuit Low	P1BA0		Cell Voltage BK	<= 0.2V				
Hybrid Battery Voltage Sense BL Circuit Low	P1BA3		Cell Voltage BL	<= 0.2V				
Hybrid Battery Voltage Sense BM Circuit Low	P1BA6		Cell Voltage BM	<= 0.2V				
Hybrid Battery Voltage Sense BN Circuit Low	P1BA9		Cell Voltage BN	<= 0.2V				
Hybrid Battery Voltage Sense BO Circuit Low	P1BAC		Cell Voltage BO	<= 0.2V				
Hybrid Battery Voltage Sense BP Circuit Low	P1BAF		Cell Voltage BP	<= 0.2V				
Hybrid Battery Voltage Sense BQ Circuit Low	P1BB2		Cell Voltage BQ	<= 0.2V				
Hybrid Battery Voltage Sense BR Circuit Low	P1BB5		Cell Voltage BR	<= 0.2V				
Hybrid Battery Voltage Sense BS Circuit Low	P1BB8		Cell Voltage BS	<= 0.2V				
Hybrid Battery Voltage Sense BT Circuit Low	P1BBB		Cell Voltage BT	<= 0.2V				
Hybrid Battery Voltage Sense BU Circuit Low	P1BBE		Cell Voltage BU	<= 0.2V				
Hybrid Battery Voltage Sense BV Circuit Low	P1BC1		Cell Voltage BV	<= 0.2V				
Hybrid Battery Voltage Sense BW Circuit Low	P1BC4		Cell Voltage BW	<= 0.2V				

DIAGNOSTIC SUMMARY TABLES--VITM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Voltage Sense BX Circuit Low	P1BC7		Cell Voltage BX	<= 0.2V				
Hybrid Battery Voltage Sense BY Circuit Low	P1BCA		Cell Voltage BY	<= 0.2V				
Hybrid Battery Voltage Sense BZ Circuit Low	P1BCD		Cell Voltage BZ	<= 0.2V				
Hybrid Battery Voltage Sense CA Circuit Low	P1BD0		Cell Voltage CA	<= 0.2V				
Hybrid Battery Voltage Sense CB Circuit Low	P1BD3		Cell Voltage CB	<= 0.2V				
Hybrid Battery Voltage Sense CC Circuit Low	P1BD6		Cell Voltage CC	<= 0.2V				
Hybrid Battery Voltage Sense CD Circuit Low	P1BD9		Cell Voltage CD	<= 0.2V				
Hybrid Battery Voltage Sense CE Circuit Low	P1BDC		Cell Voltage CE	<= 0.2V				
Hybrid Battery Voltage Sense CF Circuit Low	P1BDF		Cell Voltage CF	<= 0.2V				
Hybrid Battery Voltage Sense CG Circuit Low	P1BE2		Cell Voltage CG	<= 0.2V				
Hybrid Battery Voltage Sense CH Circuit Low	P1BE5		Cell Voltage CH	<= 0.2V				
Hybrid Battery Voltage Sense CI Circuit Low	P1BE8		Cell Voltage CI	<= 0.2V				
Hybrid Battery Voltage Sense CJ Circuit Low	P1BEB		Cell Voltage CJ	<= 0.2V				
Hybrid Battery Voltage Sense CK Circuit Low	P1BEE		Cell Voltage CK	<= 0.2V				
Hybrid Battery Voltage Sense CL Circuit Low	P1BF1		Cell Voltage CL	<= 0.2V				
Hybrid Battery Voltage Sense CM Circuit Low	P1BF4		Cell Voltage CM	<= 0.2V				
Hybrid Battery Voltage Sense CN Circuit Low	P1BF7		Cell Voltage CN	<= 0.2V				
Hybrid Battery Voltage Sense CO Circuit Low	P1BFA		Cell Voltage CO	<= 0.2V				
Hybrid Battery Voltage Sense CP Circuit Low	P1BFD		Cell Voltage CP	<= 0.2V				
Hybrid Battery Voltage Sense CQ Circuit Low	P1E02		Cell Voltage CQ	<= 0.2V				
Hybrid Battery Voltage Sense CR Circuit Low	P1E05		Cell Voltage CR	<= 0.2V				
Hybrid Battery Voltage Sense A Circuit High	P0B3E	Sets when cell voltage is detected above threshold	Cell Voltage A	>= 4.8V	Diagnostic Enable	TRUE	1.4second in a 2 second window	One Trip
Hybrid Battery Voltage Sense B Circuit High	P0B43		Cell Voltage B	>= 4.8V	Run/Crank, Accessory/Run or HVEM EB Comm Enable	TRUE		
Hybrid Battery Voltage Sense C Circuit High	P0B48		Cell Voltage C	>= 4.8V	No Active DTCs associated with VTSM Loss of Comm	U2603, U2604, U2605, U2606		
Hybrid Battery Voltage Sense D Circuit High	P0B4D		Cell Voltage D	>= 4.8V				

DIAGNOSTIC SUMMARY TABLES--VITM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Voltage Sense E Circuit High	P0B52		Cell Voltage E	>= 4.8V	No Active DTCs associated with Open Sense Line	P0B3B, P0B40, P0B45, P0B4A, P0B4F, P0B54, P0B59, P0B5E, P0B63, P0B68, P0B6D, P0B77, P0B7C, P0B81, P0B86, P0B8B, P0B95, P0B9A, P0B9F, P0BA4, P0BA9, P0BAE, P0BB3, P0BB8, P1B28, P1B29, P1B2A, P1B2B, P1B2C, P1B2D, P1E4C, P1E4D, P1E4E, P1E4F, P1E50, P1E51, P1E52, P1E53, P1E54, P1E56, P1E57, P1E58, P1E59, P1E5A, P1E5B, P1E5C, P1E5D, P1E5E, P1E5F, P1E60, P1E61, P1E62, P1E63, P1E64, P1E65, P1E66, P1E67, P1E68, P1E69, P1E6A, P1E6B, P1E6C, P1E6E, P1E6F, P1E70, P1E71, P1E72, P1E73, P1E74, P1E75, P1E76, P1E77, P1E78, P1E79, P1E7A, P1E7B, P1E7C, P1E7D, P1E7E, P1E7F, P1E80, P1E81, P1E82, P1E83, P1E84, P1E86, P1E87, P1E88, P1E89, P1E8A		
Hybrid Battery Voltage Sense F Circuit High	P0B57		Cell Voltage F	>= 4.8V				
Hybrid Battery Voltage Sense G Circuit High	P0B5C		Cell Voltage G	>= 4.8V				
Hybrid Battery Voltage Sense H Circuit High	P0B61		Cell Voltage H	>= 4.8V				
Hybrid Battery Voltage Sense I Circuit High	P0B66		Cell Voltage I	>= 4.8V				
Hybrid Battery Voltage Sense J Circuit High	P0B6B		Cell Voltage J	>= 4.8V				
Hybrid Battery Voltage Sense K Circuit High	P0B70		Cell Voltage K	>= 4.8V				
Hybrid Battery Voltage Sense L Circuit High	P0B75		Cell Voltage L	>= 4.8V				
Hybrid Battery Voltage Sense M Circuit High	P0B7A		Cell Voltage M	>= 4.8V				
Hybrid Battery Voltage Sense N Circuit High	P0B7F		Cell Voltage N	>= 4.8V				
Hybrid Battery Voltage Sense O Circuit High	P0B84		Cell Voltage O	>= 4.8V	2nd Protection Self Test Diagnostic	Not Running		
Hybrid Battery Voltage Sense P Circuit High	P0B89		Cell Voltage P	>= 4.8V	No Active DTCs associated with VTSM Cell Balancing Fault	P1E92, P1E98, P1E9E, P1EA4		
Hybrid Battery Voltage Sense Q Circuit High	P0B8E		Cell Voltage Q	>= 4.8V	No Active DTCs associated with VTSM Internal Performance	P1E8E, P1E94, P1E9A, P1EA0		
Hybrid Battery Voltage Sense R Circuit High	P0B93		Cell Voltage R	>= 4.8V				
Hybrid Battery Voltage Sense S Circuit High	P0B98		Cell Voltage S	>= 4.8V				
Hybrid Battery Voltage Sense T Circuit High	P0B9D		Cell Voltage T	>= 4.8V				
Hybrid Battery Voltage Sense U Circuit High	P0BA2		Cell Voltage U	>= 4.8V				
Hybrid Battery Voltage Sense V Circuit High	P0BA7		Cell Voltage V	>= 4.8V				
Hybrid Battery Voltage Sense W Circuit High	P0BAC		Cell Voltage W	>= 4.8V				
Hybrid Battery Voltage Sense X Circuit High	P0BB1		Cell Voltage X	>= 4.8V				
Hybrid Battery Voltage Sense Y Circuit High	P0BB6		Cell Voltage Y	>= 4.8V				
Hybrid Battery Voltage Sense Z Circuit High	P0BBB		Cell Voltage Z	>= 4.8V				

DIAGNOSTIC SUMMARY TABLES--VITM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Voltage Sense AA Circuit High	P1B18		Cell Voltage AA	>= 4.8V				
Hybrid Battery Voltage Sense AB Circuit High	P1B1B		Cell Voltage AB	>= 4.8V				
Hybrid Battery Voltage Sense AC Circuit High	P1B1E		Cell Voltage AC	>= 4.8V				
Hybrid Battery Voltage Sense AD Circuit High	P1B21		Cell Voltage AD	>= 4.8V				
Hybrid Battery Voltage Sense AE Circuit High	P1B24		Cell Voltage AE	>= 4.8V				
Hybrid Battery Voltage Sense AF Circuit High	P1B27		Cell Voltage AF	>= 4.8V				
Hybrid Battery Voltage Sense AG Circuit High	P1B47		Cell Voltage AG	>= 4.8V				
Hybrid Battery Voltage Sense AH Circuit High	P1B4A		Cell Voltage AH	>= 4.8V				
Hybrid Battery Voltage Sense AI Circuit High	P1B4D		Cell Voltage AI	>= 4.8V				
Hybrid Battery Voltage Sense AJ Circuit High	P1B50		Cell Voltage AJ	>= 4.8V				
Hybrid Battery Voltage Sense AK Circuit High	P1B53		Cell Voltage AK	>= 4.8V				
Hybrid Battery Voltage Sense AL Circuit High	P1B56		Cell Voltage AL	>= 4.8V				
Hybrid Battery Voltage Sense AM Circuit High	P1B59		Cell Voltage AM	>= 4.8V				
Hybrid Battery Voltage Sense AN Circuit High	P1B5C		Cell Voltage AN	>= 4.8V				
Hybrid Battery Voltage Sense AO Circuit High	P1B5F		Cell Voltage AO	>= 4.8V				
Hybrid Battery Voltage Sense AP Circuit High	P1B62		Cell Voltage AP	>= 4.8V				
Hybrid Battery Voltage Sense AQ Circuit High	P1B65		Cell Voltage AQ	>= 4.8V				
Hybrid Battery Voltage Sense AR Circuit High	P1B68		Cell Voltage AR	>= 4.8V				
Hybrid Battery Voltage Sense AS Circuit High	P1B6B		Cell Voltage AS	>= 4.8V				
Hybrid Battery Voltage Sense AT Circuit High	P1B6E		Cell Voltage AT	>= 4.8V				
Hybrid Battery Voltage Sense AU Circuit High	P1B71		Cell Voltage AU	>= 4.8V				
Hybrid Battery Voltage Sense AV Circuit High	P1B74		Cell Voltage AV	>= 4.8V				
Hybrid Battery Voltage Sense AW Circuit High	P1B77		Cell Voltage AW	>= 4.8V				
Hybrid Battery Voltage Sense AX Circuit High	P1B7A		Cell Voltage AX	>= 4.8V				
Hybrid Battery Voltage Sense AY Circuit High	P1B7D		Cell Voltage AY	>= 4.8V				
Hybrid Battery Voltage Sense AZ Circuit High	P1B80		Cell Voltage AZ	>= 4.8V				

DIAGNOSTIC SUMMARY TABLES--VITM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Voltage Sense BA Circuit High	P1B83		Cell Voltage BA	>= 4.8V				
Hybrid Battery Voltage Sense BB Circuit High	P1B86		Cell Voltage BB	>= 4.8V				
Hybrid Battery Voltage Sense BC Circuit High	P1B89		Cell Voltage BC	>= 4.8V				
Hybrid Battery Voltage Sense BD Circuit High	P1B8C		Cell Voltage BD	>= 4.8V				
Hybrid Battery Voltage Sense BE Circuit High	P1B8F		Cell Voltage BE	>= 4.8V				
Hybrid Battery Voltage Sense BF Circuit High	P1B92		Cell Voltage BF	>= 4.8V				
Hybrid Battery Voltage Sense BG Circuit High	P1B95		Cell Voltage BG	>= 4.8V				
Hybrid Battery Voltage Sense BH Circuit High	P1B98		Cell Voltage BH	>= 4.8V				
Hybrid Battery Voltage Sense BI Circuit High	P1B9B		Cell Voltage BI	>= 4.8V				
Hybrid Battery Voltage Sense BJ Circuit High	P1B9E		Cell Voltage BJ	>= 4.8V				
Hybrid Battery Voltage Sense BK Circuit High	P1BA1		Cell Voltage BK	>= 4.8V				
Hybrid Battery Voltage Sense BL Circuit High	P1BA4		Cell Voltage BL	>= 4.8V				
Hybrid Battery Voltage Sense BM Circuit High	P1BA7		Cell Voltage BM	>= 4.8V				
Hybrid Battery Voltage Sense BN Circuit High	P1BAA		Cell Voltage BN	>= 4.8V				
Hybrid Battery Voltage Sense BO Circuit High	P1BAD		Cell Voltage BO	>= 4.8V				
Hybrid Battery Voltage Sense BP Circuit High	P1BB0		Cell Voltage BP	>= 4.8V				
Hybrid Battery Voltage Sense BQ Circuit High	P1BB3		Cell Voltage BQ	>= 4.8V				
Hybrid Battery Voltage Sense BR Circuit High	P1BB6		Cell Voltage BR	>= 4.8V				
Hybrid Battery Voltage Sense BS Circuit High	P1BB9		Cell Voltage BS	>= 4.8V				
Hybrid Battery Voltage Sense BT Circuit High	P1BBC		Cell Voltage BT	>= 4.8V				
Hybrid Battery Voltage Sense BU Circuit High	P1BBF		Cell Voltage BU	>= 4.8V				
Hybrid Battery Voltage Sense BV Circuit High	P1BC2		Cell Voltage BV	>= 4.8V				
Hybrid Battery Voltage Sense BW Circuit High	P1BC5		Cell Voltage BW	>= 4.8V				
Hybrid Battery Voltage Sense BX Circuit High	P1BC8		Cell Voltage BX	>= 4.8V				
Hybrid Battery Voltage Sense BY Circuit High	P1BCB		Cell Voltage BY	>= 4.8V				
Hybrid Battery Voltage Sense BZ Circuit High	P1BCE		Cell Voltage BZ	>= 4.8V				

DIAGNOSTIC SUMMARY TABLES--VITM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Voltage Sense CA Circuit High	P1BD1		Cell Voltage CA	>= 4.8V				
Hybrid Battery Voltage Sense CB Circuit High	P1BD4		Cell Voltage CB	>= 4.8V				
Hybrid Battery Voltage Sense CC Circuit High	P1BD7		Cell Voltage CC	>= 4.8V				
Hybrid Battery Voltage Sense CD Circuit High	P1BDA		Cell Voltage CD	>= 4.8V				
Hybrid Battery Voltage Sense CE Circuit High	P1BDD		Cell Voltage CE	>= 4.8V				
Hybrid Battery Voltage Sense CF Circuit High	P1BE0		Cell Voltage CF	>= 4.8V				
Hybrid Battery Voltage Sense CG Circuit High	P1BE3		Cell Voltage CG	>= 4.8V				
Hybrid Battery Voltage Sense CH Circuit High	P1BE6		Cell Voltage CH	>= 4.8V				
Hybrid Battery Voltage Sense CI Circuit High	P1BE9		Cell Voltage CI	>= 4.8V				
Hybrid Battery Voltage Sense CJ Circuit High	P1BEC		Cell Voltage CJ	>= 4.8V				
Hybrid Battery Voltage Sense CK Circuit High	P1BEF		Cell Voltage CK	>= 4.8V				
Hybrid Battery Voltage Sense CL Circuit High	P1BF2		Cell Voltage CL	>= 4.8V				
Hybrid Battery Voltage Sense CM Circuit High	P1BF5		Cell Voltage CM	>= 4.8V				
Hybrid Battery Voltage Sense CN Circuit High	P1BF8		Cell Voltage CN	>= 4.8V				
Hybrid Battery Voltage Sense CO Circuit High	P1BFB		Cell Voltage CO	>= 4.8V				
Hybrid Battery Voltage Sense CP Circuit High	P1BFE		Cell Voltage CP	>= 4.8V				
Hybrid Battery Voltage Sense CQ Circuit High	P1E03		Cell Voltage CQ	>= 4.8V				
Hybrid Battery Voltage Sense CR Circuit High	P1E06		Cell Voltage CR	>= 4.8V				
Hybrid Battery Voltage Sense A Circuit	P0B3B	Sets when cell voltage is detected open	|1st Cell V – 2nd Cell V| **Case 2: General Cell Voltage Sensing Line** Affected Cell Voltage- Adjacent Cell **Case 3: Bus Bar (+) Side Sensing Line** Affected Cell Voltage- One Cell **Case 4: Bus Bar (-) Side Sensing Line** Affected Cell Voltage- One Cell **Case 5: Common Power Line**	Case 2 : |1st Cell V – 2nd Cell V| > 1V Case 3 : Busbar Cap Voltage > 0.7V **&** Busbar + Side Cell Voltage < 2.5V	Diagnostic Enable	TRUE	600 ms out of a 600 ms window Frequency- 200 ms	One Trip
Hybrid Battery Voltage Sense B Circuit	P0B40				Run/Crank, Accessory/Run or HVEM EB Comm Enable	TRUE		
Hybrid Battery Voltage Sense C Circuit	P0B45				No Active DTCs associated with VTSM Loss of Comm	U2603, U2604, U2605, U2606		
Hybrid Battery Voltage Sense D Circuit	P0B4A							

DIAGNOSTIC SUMMARY TABLES--VITM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Voltage Sense E Circuit	P0B4F		Affected Cell Voltage- Adjacent Cells (No Power Off) *Note- **Case 1: Single Power Line** Case 1 causes the slave ASIC to not be powered resulting in all affected cell voltages = 0V	Case 4 : Busbar Cap Voltage > 0.7V **&** Busbar + Side Cell Voltage > 2.5V Case 5 : |1st Cell V – 2nd Cell V| > 0.5V				
Hybrid Battery Voltage Sense F Circuit	P0B54							
Hybrid Battery Voltage Sense G Circuit	P0B59							
Hybrid Battery Voltage Sense H Circuit	P0B5E							
Hybrid Battery Voltage Sense I Circuit	P0B63							
Hybrid Battery Voltage Sense J Circuit	P0B68							
Hybrid Battery Voltage Sense K Circuit	P0B6D							
Hybrid Battery Voltage Sense M Circuit	P0B77							
Hybrid Battery Voltage Sense N Circuit	P0B7C							
Hybrid Battery Voltage Sense O Circuit	P0B81				2nd Protection Self Test Diagnostic	Not Running		
Hybrid Battery Voltage Sense P Circuit					No Active DTCs associated with VTSM Cell Balancing Fault	P1E92, P1E98, P1E9E, P1EA4		
Hybrid Battery Voltage Sense Q Circuit	P0B86				No Active DTCs associated with VTSM Internal Performance	P1E8E, P1E94, P1E9A, P1EA0		
Hybrid Battery Voltage Sense S Circuit	P0B8B							
Hybrid Battery Voltage Sense T Circuit	P0B95							
Hybrid Battery Voltage Sense U Circuit	P0B9A							
Hybrid Battery Voltage Sense V Circuit	P0B9F							
Hybrid Battery Voltage Sense W Circuit	P0BA4							
Hybrid Battery Voltage Sense X Circuit	P0BA9							
	P0BAE							

DIAGNOSTIC SUMMARY TABLES--VITM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Voltage Sense Y Circuit	P0BB3							
Hybrid Battery Voltage Sense Z Circuit	P0BB8							
Hybrid Battery Voltage Sense AA Circuit	P1B28							
Hybrid Battery Voltage Sense AB Circuit	P1B29							
Hybrid Battery Voltage Sense AC Circuit	P1B2A							
Hybrid Battery Voltage Sense AD Circuit	P1B2B							
Hybrid Battery Voltage Sense AE Circuit	P1B2C							
Hybrid Battery Voltage Sense AF Circuit	P1B2D							
Hybrid Battery Voltage Sense AG Circuit	P1E4C							
Hybrid Battery Voltage Sense AH Circuit	P1E4D							
Hybrid Battery Voltage Sense AI Circuit	P1E4E							
Hybrid Battery Voltage Sense AJ Circuit	P1E4F							
Hybrid Battery Voltage Sense AK Circuit	P1E50							
Hybrid Battery Voltage Sense AL Circuit	P1E51							
Hybrid Battery Voltage Sense AM Circuit	P1E52							
Hybrid Battery Voltage Sense AN Circuit	P1E53							
Hybrid Battery Voltage Sense AO Circuit	P1E54							
Hybrid Battery Voltage Sense AQ Circuit	P1E56							
Hybrid Battery Voltage Sense AR Circuit	P1E57							
Hybrid Battery Voltage Sense AS Circuit	P1E58							
Hybrid Battery Voltage Sense AT Circuit	P1E59							
Hybrid Battery Voltage Sense AU Circuit	P1E5A							
Hybrid Battery Voltage Sense AV Circuit	P1E5B							
Hybrid Battery Voltage Sense AW Circuit	P1E5C							
Hybrid Battery Voltage Sense AX Circuit	P1E5D							
Hybrid Battery Voltage Sense AY Circuit	P1E5E							

DIAGNOSTIC SUMMARY TABLES--VITM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Voltage Sense AZ Circuit	P1E5F							
Hybrid Battery Voltage Sense BA Circuit	P1E60							
Hybrid Battery Voltage Sense BB Circuit	P1E61							
Hybrid Battery Voltage Sense BC Circuit	P1E62							
Hybrid Battery Voltage Sense BD Circuit	P1E63							
Hybrid Battery Voltage Sense BE Circuit	P1E64							
Hybrid Battery Voltage Sense BF Circuit	P1E65							
Hybrid Battery Voltage Sense BG Circuit	P1E66							
Hybrid Battery Voltage Sense BH Circuit	P1E67							
Hybrid Battery Voltage Sense BI Circuit	P1E68							
Hybrid Battery Voltage Sense BJ Circuit	P1E69							
Hybrid Battery Voltage Sense BK Circuit	P1E6A							
Hybrid Battery Voltage Sense BL Circuit	P1E6B							
Hybrid Battery Voltage Sense BM Circuit	P1E6C							
Hybrid Battery Voltage Sense BO Circuit	P1E6E							
Hybrid Battery Voltage Sense BP Circuit	P1E6F							
Hybrid Battery Voltage Sense BQ Circuit	P1E70							
Hybrid Battery Voltage Sense BR Circuit	P1E71							
Hybrid Battery Voltage Sense BS Circuit	P1E72							
Hybrid Battery Voltage Sense BT Circuit	P1E73							
Hybrid Battery Voltage Sense BU Circuit	P1E74							
Hybrid Battery Voltage Sense BV Circuit	P1E75							
Hybrid Battery Voltage Sense BW Circuit	P1E76							
Hybrid Battery Voltage Sense BX Circuit	P1E77							
Hybrid Battery Voltage Sense BY Circuit	P1E78							
Hybrid Battery Voltage Sense BZ Circuit	P1E79							

DIAGNOSTIC SUMMARY TABLES--VITM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Voltage Sense CA Circuit	P1E7A							
Hybrid Battery Voltage Sense CB Circuit	P1E7B							
Hybrid Battery Voltage Sense CC Circuit	P1E7C	DTC Pass		Case 2 : |1st Cell V – 2nd Cell V| <= 1V			600 ms	
Hybrid Battery Voltage Sense CD Circuit	P1E7D							
Hybrid Battery Voltage Sense CE Circuit	P1E7E			Case 3 : Busbar Cap Volt <= 0.7V				
Hybrid Battery Voltage Sense CF Circuit	P1E7F							
Hybrid Battery Voltage Sense CG Circuit	P1E80			Case 4 : Busbar Cap Volt > 0.7V				
Hybrid Battery Voltage Sense CH Circuit	P1E81							
Hybrid Battery Voltage Sense CI Circuit	P1E82			Case 5: |1st Cell V - 2nd Cell V| <= 0.5V				
Hybrid Battery Voltage Sense CJ Circuit	P1E83							
Hybrid Battery Voltage Sense CK Circuit	P1E84							
Hybrid Battery Voltage Sense CM Circuit	P1E86							
Hybrid Battery Voltage Sense CN Circuit	P1E87							
Hybrid Battery Voltage Sense CO Circuit	P1E88							
Hybrid Battery Voltage Sense CP Circuit	P1E89							
Hybrid Battery Voltage Sense CQ Circuit	P1E8A							
Hybrid Battery Temperature Sensor Circuit Low	P0A9D	Sets when Temperature Sensor X falls below a Threshold	Temperature Sensor X	Temperature Sensor X > 87.5C (ADC Count < 680)	Diagnostic Enable	TRUE	1.4 seconds in a 2 second window Frequency- 200 ms	Two Trips
Hybrid Battery 2 Temperature Sensor Circuit Low Voltage	P0AC7				Run/Crank, Accessory/Run or HVEM EB Comm Enable	TRUE		
Hybrid Battery 3 Temperature Sensor Circuit Low Voltage	P0ACC				No Active DTCs associated with VTSM Loss of Comm	U2603, U2604, U2605, U2606		
Hybrid Battery 4 Temperature Sensor Circuit Low Voltage	P0AEA							
Hybrid Battery Temperature Sensor E Circuit Low	P0BC4							

DIAGNOSTIC SUMMARY TABLES--VITM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Temperature Sensor F Circuit Low Hybrid Battery Temperature Sensor G Circuit Low Hybrid Battery Temperature Sensor H Circuit Low Hybrid Battery Temperature Sensor I Circuit Low	P0C35 P0C7E P0C83 P0C8A				2nd Protection Self Test Diagnostic No Active DTCs associated with VTSM Internal Performance	Not Running P1E8E, P1E94, P1E9A, P1EA0		
		DTC Pass		Temperature Sensor X <= 87.5C (ADC Count >= 680)			2 Seconds	
Hybrid Battery Temperature Sensor Hybrid Battery 2 Temperature Sensor Circuit High Voltage Hybrid Battery 3 Temperature Sensor Circuit High Voltage Hybrid Battery 4 Temperature Sensor Circuit High Voltage Hybrid Battery Temperature Sensor E Circuit High Hybrid Battery Temperature Sensor F Circuit High Hybrid Battery Temperature Sensor G Circuit High Hybrid Battery Temperature Sensor H Circuit High Hybrid Battery Temperature Sensor I Circuit High	P0A9E P0AC8 P0ACD P0AEB P0BC5 P0C36 P0C7F P0C84 P0C8B	Sets when Temperature Sensor X falls above a Threshold	Temperature Sensor X	Temperature Sensor X < -40C (ADC Count > 3992)	Diagnostic Enable Run/Crank, Accessory/Run or HVEM EB Comm Enable No Active DTCs associated with VTSM Loss of Comm No Active DTCs associated with VTSM 5V Ref Diagnostic 2nd Protection Self Test Diagnostic No Active DTCs associated with VTSM Internal Performance No Active DTCs on VITM RESS Bus Off	TRUE TRUE U2603, U2604, U2605, U2606 P1E93, P1E99, P1E9F, P1EA5 Not Running P1E8E, P1E94, P1E9A, P1EA0 U2401	1.4 seconds in a 2 second window Frequency- 200 ms	Two Trips
		DTC Pass		Temperature Sensor X >= -40C (ADC Count <= 3992)			2 Seconds	

DIAGNOSTIC SUMMARY TABLES--VITM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Battery Energy Control Module Hybrid Battery Voltage Isolation Sensor Circuit	P1AE6	Sets when AC (alternating current) Isolation Circuit is detected Faulted	AC (alternating current) Isolation Circuit	If there is no return signal for isolation test signal (sine-wave)	Diagnostic Enable Run/Crank, Accessory/Run or HVEM EB Comm Enable VICM Isolation Start Request VITM System Voltage No Active DTC for Battery Energy Control Module Lost Communication with Hybrid Processor Control Module B on Bus H High Voltage Contactor Status	TRUE TRUE TRUE > 11V U185B Open	1.4 seconds in a 2 second window Frequency- 200 ms	One Trip
		DTC Pass		If there is return signal for isolation test signal (sine-wave)			2 Seconds	
Hybrid Battery Pack Coolant Temperature Sensor Circuit Low	P0C44	Sets when Inlet Coolant Temp Sensor falls below a Threshold	Inlet Temp	Inlet Temp >= 87.9C (ADC Count <= 130)	Diagnostic Enable Run/Crank, Accessory/Run or HVEM EB Comm Enable VITM System Voltage	TRUE TRUE >= 9V	1.75 seconds in a 2.5 seconds window Frequency- 250 ms	Two Trips
		DTC Pass		Inlet Temp < 87.9C (ADC Count > 130)			2.5 Seconds	
Hybrid Battery Pack Coolant Temperature	P0C45	Sets when Inlet Coolant Temp Sensor goes above a	Inlet Temp	Inlet Temp < -40C	Diagnostic Enable	TRUE	1.75 seconds in a 2.5 seconds window	Two Trips

DIAGNOSTIC SUMMARY TABLES--VITM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Sensor Circuit High		Threshold		(ADC Count > 3823)	Run/Crank, Accessory/Run or HVEM EB Comm Enable VITM System Voltage	TRUE >= 9V	Frequency- 250 ms	
		DTC Pass		Inlet Temp >= -40C (ADC Count <= 3823)			2.5 Seconds	
Hybrid/EV Battery Pack Coolant Temperature Sensor B Circuit Low	P0CD7	Sets when Outlet Coolant Temp Sensor falls below a Threshold	Outlet Temp	Inlet Temp >= 87.9C (ADC Count <= 130)	Diagnostic Enable Run/Crank, Accessory/Run or HVEM EB Comm Enable VITM System Voltage	TRUE TRUE >= 9V	1.75 seconds in a 2.5 seconds window Frequency- 250 ms	Two Trips
		DTC Pass		Inlet Temp < 87.9C (ADC Count > 130)			2.5 Seconds	
Hybrid/EV Battery Pack Coolant Temperature Sensor B Circuit High	P0CD8	Sets when Outlet Coolant Temp Sensor goes above a Threshold	Outlet Temp	Outlet Temp < -40C (ADC Count > 3823)	Diagnostic Enable Run/Crank, Accessory/Run or HVEM EB Comm Enable VITM System Voltage	TRUE TRUE >= 9V	1.75 seconds in a 2.5 seconds window Frequency- 250 ms	Two Trips
		DTC Pass		Outlet Temp >= -40C			2.5 Seconds	

DIAGNOSTIC SUMMARY TABLES--VITM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
				(ADC Count <= 3823)				
Hybrid Battery Pack Voltage Sense Circuit Low	P0ABC	If Pack side Voltage is below Threshold	Pack Voltage	< 24V	Diagnostic Enable Run/Crank, Accessory/Run or HVEM EB Comm Enable VITM System Voltage	TRUE TRUE >= 9V	175 ms in a 250 ms window Frequency-25 ms	One Trip
		DTC Pass		Pack Voltage >= 24V			250 ms	
Hybrid Battery Pack Voltage Sense Circuit High	P0ABD	If Pack side Voltage is above Threshold	Pack Voltage	> 456V	Diagnostic Enable Run/Crank, Accessory/Run or HVEM EB Comm Enable VITM System Voltage	TRUE TRUE >= 9V	175 ms in a 250 ms window Frequency-25 ms	One Trip
		DTC Pass		Pack Voltage <= 456V			250 ms	
Hybrid Battery Pack Current Sensor B Circuit Low	P0B10	If Fine Current is below Threshold	Fine Current	< -23A	Diagnostic Enable Run/Crank, Accessory/Run or HVEM EB Comm Enable VITM System Voltage	TRUE TRUE >= 9V	175 ms in a 250 ms window Frequency-25 ms	One Trip

DIAGNOSTIC SUMMARY TABLES--VITM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
		DTC Pass		Fine Current >= -23A			250 ms	
Hybrid Battery Pack Current Sensor B Circuit High	P0B11	If Fine Current is above Threshold	Fine Current	> 23A	Diagnostic Enable Run/Crank, Accessory/Run or HVEM EB Comm Enable VITM System Voltage	TRUE TRUE >= 9V	175 ms in a 250 ms window Frequency- 25 ms	One Trip
		DTC Pass		Fine Current <= 23A			250 ms	
Hybrid Battery Pack Current Sensor Circuit Low	P0AC1	If Coarse Current is below Threshold	Coarse Current	< -655.36A (Serial data rail. Equivalent to 0.2V or 163ADC)	Diagnostic Enable Run/Crank, Accessory/Run or HVEM EB Comm Enable VITM System Voltage	TRUE TRUE >= 9V	175 ms in a 250 ms window Frequency- 25 ms	One Trip
		DTC Pass	Coarse Current	>= -655.36A (Serial data rail. Equivalent to 0.2V or 163 ADC)			250 ms	

DIAGNOSTIC SUMMARY TABLES--VITM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Pack Current Sensor Circuit High	P0AC2	If Coarse Current is above Threshold	Coarse Current	> 292.7V (4.8V or 3931 ADC)	Diagnostic Enable Run/Crank, Accessory/Run or HVEM EB Comm Enable VITM System Voltage	TRUE TRUE >= 9V	175 ms in a 250 ms window Frequency-25ms	One Trip
		DTC Pass	Coarse Current	<= 292.7V (4.8V or 3931 ADC)			250 ms	
Hybrid/EV Battery Pack Current Sensor A Exceeded Learning Limit	P1EBA	If Pack Current Coarse Offset is out of range	|Pack Current Coarse Offset|	> 10A	Diagnostic Enable Run/Crank, Accessory/Run or HVEM EB Comm Enable High Voltage Contactor Status Charger Contactor Status VITM System Voltage VITM Initalization Status Extended No Active DTC for Battery Energy Control Module Lost Communication with Hybrid Processor Control Module B on Bus H	TRUE TRUE Open Open >= 9V Initializing U185B	At power up - 185 ms	One Trip
		DTC Pass	|Pack Current Coarse Offset|	<= 10A			At power up - 185 ms	

DIAGNOSTIC SUMMARY TABLES--VITM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid/EV Battery Pack Current Sensor B Exceeded Learning Limit	P1EBB	If Pack Current Fine Offset is out of range	Pack Current Fine Offset	> 2.5A	Diagnostic Enable Run/Crank, Accessory/Run or HVEM EB Comm Enable High Voltage Contactor Status Charger Contactor Status VITM System Voltage VITM Initalization Status Extended No Active DTC for Battery Energy Control Module Lost Communication with Hybrid Processor Control Module B on Bus H	TRUE TRUE Open Open >= 9V Initializing U185B	At power up - 185 ms	One Trip
		DTC Pass	|Pack Current Fine Offset|	<= 2.5A			At power up - 185 ms	
Battery Energy Control Module 5 Volt Reference Circuit	P1A07	Sets when 5V VITM reference voltage is out of range	5V Reference Value (Circuit for Reference Diagnostic, Shunt Regulator)	5V Reference Value < 2.8V or 5V Reference Value > 3.2V	Diagnostic Enable Run/Crank, Accessory/Run or HVEM EB Comm Enable VITM System Voltage	TRUE TRUE >= 9V	600 ms in a 1 second window Frequency- 25 ms	One Trip
		DTC Pass		2.8V <= 5V Reference Value <= 3.2V			1 Second	
Battery Energy Control Module System Voltage Low	P1A0C	If 12V System Voltage is below Threshold	12V System Voltage	< 9.0V	Diagnostic Enable Run/Crank, Accessory/Run or HVEM EB Comm Enable	TRUE TRUE	5 seconds in a 6 seconds window Frequency: 1 Second	Special Type C

DIAGNOSTIC SUMMARY TABLES--VITM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
		DTC Pass	12V System Voltage	>= 9.0V			6 Seconds	
Battery Energy Control Module System Voltage High	P1A0D	If 12V System Voltage is above Threshold	12V System Voltage	>18.5V	Diagnostic Enable Run/Crank, Accessory/Run or HVEM EB Comm Enable	TRUE TRUE	5 seconds in a 6 seconds window Frequency: 1 Second	Special Type C
		DTC Pass	12V System Voltage	>= 18.5V			6 Seconds	
Battery Energy Control Module Communication Bus A Off	U180B	If Bus Off is Detected	Transmit Error Counter (TEC)	TEC > 255	Diagnostic Enable Run/Crank or Accessory/Run VITM System Voltage	TRUE TRUE >= 9V	1.4 seconds in a 2 seconds window Frequency- 200 ms	Two Trips

DIAGNOSTIC SUMMARY TABLES--VITM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
		DTC Pass		TEC < 255			2 Seconds	
Battery Energy Control Module Communication Bus H Off	U1806	If Bus Off is Detected	Transmit Error Counter (TEC)	TEC > 255	Diagnostic Enable Run/Crank or Accessory/Run VITM System Voltage	TRUE TRUE >= 9V	1.4 seconds in a 2 seconds window Frequency- 200 ms	Two Trips
		DTC Pass		TEC < 255			2 Seconds	
Battery Energy Control Module Lost Communication with Hybrid Powertrain Control Module B on Bus H	U185B	If message $20A is not Received by VITM	Loss of Supervision with VICM module on Charger CAN bus	# of consecutive $20A message not received > 5	Diagnostic Enable Run/Crank, Accessory/Run or HVEM EB Comm Enable VITM System Voltage	TRUE TRUE >= 9V	700 ms in a 1 second window Frequency- 100 ms	Two Trips
		DTC Pass		1			1 Second	
Battery Energy Control Module Lost Communication With Hybrid Powertrain Control Module	U1885	If message $1DF is not Received by VITM	Loss of Supervision with HCP module on HS GMLAN bus	# of consecutive $20A message not received > 10	Diagnostic Enable Run/Crank, Accessory/Run or HVEM EB Comm Enable VITM System Voltage	TRUE TRUE >= 9V	1.75 seconds in a 2 second window Frequency- 250 ms	Two Trips

DIAGNOSTIC SUMMARY TABLES--VITM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					Flashing Programming Session (Other Modules or itself) Mode $28 Executed on HS Bus	Completed TRUE		
		DTC Pass		1			2 Seconds	
Battery Energy Control Module Random Accessoryess Memory (RAM)	P1A05	RAM Read Write function Failed	RAM Read not Equal to RAM Written	1	Diagnostic Enable Run/Crank, Accessory/Run or HVEM EB Comm Enable VITM Initalization Status Extended VITM System Voltage	TRUE TRUE Initializing >= 9V	At power up - 10 ms	One Trip
		DTC Pass		1			At power up - 10 ms	
Battery Energy Control Module Read Only Memory (ROM)	P1A06	Flash ROM Checksum method	Flash ROM Checksum Value Calculated is Different than Stored	1	Diagnostic Enable Run/Crank, Accessory/Run or HVEM EB Comm Enable VITM Initalization Status Extended VITM System Voltage	TRUE TRUE Initializing >= 9V	At power up - 5 ms up to 400 ms	One Trip

DIAGNOSTIC SUMMARY TABLES--VITM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
		DTC Pass		1			At power up - 5 ms up to 400 ms	
Battery Energy Control Module Internal Performance	P0A1F	VITM Software Watchdog	If Watchdog resets controller	1	Diagnostic Enable Run/Crank, Accessory/Run or HVEM EB Comm Enable VITM System Voltage	TRUE TRUE >= 9V	N/A Immediate	One Trip
		DTC Pass		1				
Battery Energy Control Module Ignition Switch Run/Start Position Circuit Low	P1A5E	If RunCrank input state is below Threshold and RunCrank Received Serial Data State = Active	RunCrank Hardwire Input and Serial Data signal	RunCrank Input < 5V	Diagnostic Enable Run/Crank, Accessory/Run or HVEM EB Comm Enable VITM System Voltage No Active DTC for Battery Energy Control Module Lost Communication with Hybrid Processor Control Module B on Bus H	TRUE TRUE >= 9V U185B	5 seconds in a 6 second window Frequency- 1000 ms	One Trip

DIAGNOSTIC SUMMARY TABLES--VITM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
		DTC Pass		RunCrank Input >= 5V			6 seconds	
Battery Energy Control Module Ignition Switch Run/Start Position Circuit High	P1A5F	If RunCrank input state is above Threshold and RunCrank Received Serial Data State = Inactive	RunCrank Hardwire Input and Serial Data signal	RunCrank Input >= 5V	Diagnostic Enable Run/Crank, Accessory/Run or HVEM EB Comm Enable VITM System Voltage No Active DTC for Battery Energy Control Module Lost Communication with Hybrid Processor Control Module B on Bus H	TRUE TRUE >= 9V U185B	5 seconds in a 6 second window Frequency- 1000 ms	One Trip
		DTC Pass		RunCrank Input < 5V			6 seconds	
Battery Energy Control Module Ignition Switch Accessory Position Circuit Low	P1A60	If Acessory input state is below Threshold and received serial data Propulsion System Active state = True and Accessory Diagnostic Delay is Expired	Accessory Hardwire Input	Accessory Input < 5V	Diagnostic Enable Run/Crank, Accessory/Run or HVEM EB Comm Enable No Active DTC for Battery Energy Control Module Lost Communication With with HCP (TPIM) on Bus A (HS GMLAN Bus) VITM System Voltage Propulsion System Active Accessory Diagnostic Delay	TRUE TRUE U1885 >= 9V TRUE Expired	0.1 seconds (8*0.0125)	Two Trips

DIAGNOSTIC SUMMARY TABLES--VITM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
		DTC Pass		Accessory Input < 5V			0.1 seconds (8*0.0125)	
Battery Energy Control Module Lost Communication with Hybrid Batterry Interface Control Module X	U2603 U2604 U2605 U2606	If associated message from Slave is not received	Loss of Supervision with VTSMx on Private CAN bus	# of consecutive serial data message from VTSMx not received > 7	Diagnostic Enable Run/Crank, Accessory/Run or HVEM EB Comm Enable 2nd Protection Self Test Diagnostic VITM System Voltage	TRUE TRUE Not Running >= 9V	2.8 seconds in a 4 second window Frequency- 400 ms	One Trip
		DTC Pass		1			4 Seconds	
Battery Energy Control Module High Voltage Energy Management Communication Bus Enable Circuit Low	P1EC1	If High Voltage Energy Management (HVEM) Wakeup input state is below Threshold and HVEM Received Serial Data State = Active	HVEM Hardwire Input and Serial Data signal	HVEM Input < 5V	Diagnostic Enable Run/Crank, Accessory/Run or HVEM EB Comm Enable VITM System Voltage No Active DTC for Battery Energy Control Module System Voltage Low No Active DTC for Battery Energy Control Module Lost Communication with Hybrid Processor Control Module B on Bus A (HS)	TRUE TRUE >= 9V P1A0C U2602	7 seconds in a 10 second window Frequency- 1000 ms	One Trip

DIAGNOSTIC SUMMARY TABLES--VITM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
		DTC Pass		HVEM Input >= 5V			10 Seconds	
Battery Energy Control Module Dedicated Bus 1 Off	U2401	If Bus Off is Detected	Transmit Error Counter (TEC)	TEC > 255	Diagnostic Enable Run/Crank, Accessory/Run or HVEM EB Comm Enable VITM System Voltage	TRUE TRUE >= 9V	1.4 seconds in a 2 second window Frequency- 200 ms	One Trip
		DTC Pass		TEC < 255			2 Seconds	
Battery Energy Control Module Lost Communication with Hybrid Processor Control Module B on HS	U2602	If message $236 is not Received by VITM	Loss of Supervision with VICM module on HS GMLAN bus	# of consecutive $236 message not received > 3	Diagnostic Enable Run/Crank, Accessory/Run or HVEM EB Comm Enable VITM System Voltage Flashing Programming Session (Other Modules or itself) Mode $28 Executed on HS Bus	TRUE TRUE >= 9V Completed TRUE	2.8 seconds in a 4 second window Frequency- 100 ms	Two Trips
		DTC Pass		1			4 Seconds	
Hybrid Battery Interface Control Module x Cell	P1E92	Cell Balance switch output	Cell Balance switch is below threshold	4.0V < Cell Voltage < 5.0V Threshold	Diagnostic Enable	TRUE	14 seconds in a 20 seconds window	One Trip

DIAGNOSTIC SUMMARY TABLES--VITM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Balancing Circuit	P1E98 P1E9E P1EA4			= 66mV 3.5V < Cell Voltage < 4.0V Threshold = 41mV 3.0V < Cell Voltage < 3.5V Threshold = 22mV	Run/Crank, Accessory/Run or HVEM EB Comm Enable No Active DTCs associated with VTSM Loss of Comm 2nd Protection Self Test Diagnostic No Active DTCs associated with VTSM Internal Performance	TRUE U2603, U2604, U2605, U2606 Not Running P1E8E, P1E94, P1E9A, P1EA0	Frequency- 200 ms	
		DTC Pass		Threshold is above values specified for Cell Voltage specified			20 Seconds	
Hybrid Battery Interface Control Module x ROM	P1E90 P1E96 P1E9C P1EA2	ROM Checksum method	ROM Checksum Value Calculated is Different than Stored	1	Diagnostic Enable Run/Crank, Accessory/Run or HVEM EB Comm Enable No Active DTCs associated with VTSM Loss of Comm	TRUE Transitions: TRUE to FALSE (During VTSMx Power down) U2603, U2604, U2605, U2606	At power down- Total of 824 ms for all slaves	One Trip
		DTC Pass		1			At power down- Total of	
Hybrid Battery Interface Control Module x RAM	P1E8F P1E95	RAM Read Write function Failed	RAM Read not Equal to RAM Written	1	Diagnostic Enable Run/Crank, Accessory/Run or HVEM EB Comm Enable	TRUE Transitions: TRUE to FALSE (During VTSMx Power down)	At power up- Total of 58 ms for all slaves	One Trip

DIAGNOSTIC SUMMARY TABLES--VITM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
	P1E9B P1EA1				No Active DTCs associated with VTSM Loss of Comm	U2603, U2604, U2605, U2606		
		DTC Pass		1			At power up- Total of 58 ms for all slaves	
Hybrid Battery Interface Control Module x KAM	P1E91 P1E97 P1E9D P1EA3	Using Checksum method	EEPROM Checksum Value Calculated is Different than Stored	1	Diagnostic Enable Run/Crank, Accessory/Run or HVEM EB Comm Enable No Active DTCs associated with VTSM Loss of Comm	TRUE Transitions: TRUE to FALSE (During VTSMx Power down) U2603, U2604, U2605, U2606	At power down- Total of 26 ms for all Slaves	One Trip
		DTC Pass		1			At power down- Total of 26 ms for all Slaves	
Hybrid Battery Interface Control Module x Performance	P1E8E P1E94 P1E9A P1EA0	VTSMx Software Watchdog OR SPI Bus Malfunction (Read Value from Register Not Equal to Written Value)	If Watchdog resets controller OR Wrong value Read	1	Diagnostic Enable Run/Crank, Accessory/Run or HVEM EB Comm Enable VITM System Voltage	TRUE TRUE >= 9V	N/A instantaneous - Watchdog Reset 500us - SPI Bus	One Trip

DIAGNOSTIC SUMMARY TABLES--VITM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
		DTC Pass		Both should pass			500 us in 200ms window	
Hybrid Battery Interface Control Module x 5V Ref	P1E93 P1E99 P1E9F P1EA5	Sets when 5V VTSM reference voltage is out of range	5V Reference Value (Circuit for Reference Diagnostic, Shunt Regulator)	5V Reference Value < 2.8V or 5V Reference Value > 3.2V	Diagnostic Enable Run/Crank, Accessory/Run or HVEM EB Comm Enable No Active DTCs associated with VTSM Loss of Comm 2nd Protection Self Test Diagnostic	TRUE TRUE U2603, U2604, U2605, U2606 Not Running	1.4 seconds in a 2.0 seconds window Frequency- 200ms	One Trip
		DTC Pass		2.8V <= 5V Reference Value <=3.2V			2.0 seconds	
Hybrid/EV Battery Interface Control Module Software IncompatibleBattery Energy Control Module Lost Communication with Hybrid Processor Control Module B on HS	P1EB1	VITM Software version and Software version of ALL Slave modules are compatible	If any software version incompatibility is detected	1	Diagnostic Enable Run/Crank, Accessory/Run or HVEM EB Comm Enable VITM System Voltage No Active DTCs associated with VTSM Loss of Comm	TRUE TRUE >= 9V U2603, U2604, U2605, U2606	At power up-200 ms	One Trip
		DTC Pass		1			At power up-200 ms	

DIAGNOSTIC SUMMARY TABLES--VITM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid/EV Battery Interface Control Module x Not Programmed	P1EB2	If VTSMx did not Program correctly	Wrong or No response from Slave indicating error in Programming	1	After Programming session		As soon as Programming session ends	One Trip
	P1EB3				Diagnostic Enable	TRUE		
	P1EB4				Run/Crank, Accessory/Run or HVEM EB Comm Enable	TRUE		
	P1EB5				VITM System Voltage	>= 9V		
		DTC Pass		1			As soon as Programming session ends	
Hybrid/EV Battery Interface Control Module x Processor Performance	P1F06	Compare VTSMx Reported Value with Expected Value in VITM	Reported Key Value by VTSMx is not correct	5	Diagnostic Enable	TRUE	1 second in a 1.4 second window Frequency-200 ms	Two Trips, Type B
	P1F07				Seed and Key Algorithm Calibration	TRUE		
	P1F08				Run/Crank, Accessory or HVEM EB Comm Enable	TRUE		
	P1F09				No Active DTCs associated with VTSM Loss of Comm	U2603, U2604, U2605, U2606		
					2nd Protection Self Test Diagnostic	Not Running		
		DTC Pass		5			1.4 seconds	

DIAGNOSTIC SUMMARY TABLES--MCPA (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
MCP A Phase Current Diagnostics								
Drive Motor "A" Phase U-V-W Correlation	P0BFD	To detect electrical failure of phase current sensor.	Sum of 3 phase currents	>156 A	Wakeup Signal	On	X: 160 ct Y: 190 ct R: 0.11 - 0.5 ms T: 17.6 - 80 ms	One Trip, Type A
Drive Motor "A" Phase U-V-W Current Sensor Overcurrent	P0C01	**Fail Case 1**: To detect fast, repeated 3 Phase over currents and to protect IGBT.	U, V, or W Phase current sensor	> 725 A	Wakeup Signal	On	X: 2 cts Y: 10 cts R: 2.08 ms T: 4.2 ms	One Trip, Type A
		Fail Case 2: To detect slow, intermittent 3 Phase over currents and to protect IGBT.					X: 5 cts Y: 50 cts R: 2.08 ms T: 10.4 ms	
Drive Motor "A" Phase U-V-W Circuit/Open	P0C05	Drive Motor "A" Missing Motor Current checks for minimum current in each phase when rotor position is near that peak's phase axis. Each phase is checked individually as rotor turns.	ABS(Peak Phase Axis Current)	< 9 A	Inverter State Inverter Voltage Rotor Position Current Commanded	RUN > 35 V -30 deg < Phase Axis < +30 deg >= 23 A	X: 200 ct Y: N/A R: 0.11-0.5 ms T: 22 - 100 ms	One Trip, Type A
Drive Motor "A" Phase U Current Sensor Circuit Low	P0BE7	Circuit Low monitor to detect the failure of U-phase current sensor circuit below valid range	U Phase current sensor output at highside	< -800 A	Wakeup Signal PWM Output Enable	On FALSE	X: 4 cts Y: 6 cts R: 10.4 ms T: 42 ms	One Trip, Type A
Drive Motor "A" Phase U Current Sensor Circuit High	P0BE8	Circuit High monitor to detect the failure of U-phase current sensor circuit above valid range	U Phase current sensor output at highside	> 800 A	Wakeup Signal PWM Output Enable	On FALSE	X: 4 cts Y: 6 cts R: 10.4 ms T: 42 ms	One Trip, Type A
Drive Motor "A" Phase U Current Sensor Offset Out-of Range	P0BE6	Offset Circuit monitor to detect the failure of U-phase offset current above valid range	U Phase offset current output at highside	>30 A	Wakeup Signal Power Stage No Active DTCs:	On OPEN P0BE7/P0BE8	X: 8 cts Y: N/A R: 10.4 ms T: 83 ms	One Trip, Type A
Drive Motor "A" Phase V Current Sensor Circuit Low	P0BEB	Circuit Low monitor to detect the failure of V-phase current sensor circuit below valid range	V Phase current sensor output at highside	< -800 A	Wakeup Signal PWM Output Enable	On FALSE	X: 4 cts Y: 6 cts R: 10.4 ms T: 42 ms	One Trip, Type A
Drive Motor "A" Phase V Current Sensor Circuit High	P0BEC	Circuit High monitor to detect the failure of V-phase current sensor circuit above valid range	V Phase current sensor output current at highside	> 800 A	Wakeup Signal PWM Output Enable	On FALSE	X: 4 cts Y: 6 cts R: 10.4 ms T: 42 ms	One Trip, Type A

DIAGNOSTIC SUMMARY TABLES--MCPA (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Drive Motor "A" Phase V Current Sensor Offset Out-of Range	P0BEA	Offset Circuit monitor to detect the failure of U-phase offset current above valid range	V Phase offset current output at highside	>30 A	Wakeup Signal Power Stage No Active DTCs:	On OPEN P0BEB/P0BEC	X: 8 cts Y: N/A R: 10.4 ms T: 83 ms	One Trip, Type A
Drive Motor "A" Phase W Current Sensor Circuit Low	P0BEF	Circuit Low monitor to detect the failure of W-phase current sensor circuit below valid range	W Phase current sensor output at highside	< -800 A	Wakeup Signal PWM Output Enable	On FALSE	X: 4 cts Y: 6 cts R: 10.4 ms T: 42 ms	One Trip, Type A
Drive Motor "A" Phase W Current Sensor Circuit High	P0BF0	Circuit High monitor to detect the failure of W-phase current sensor circuit above valid range	W Phase current sensor output at highside	> 800 A	Wakeup Signal PWM Output Enable	On FALSE	X: 4 cts Y: 6 cts R: 10.4 ms T: 42 ms	One Trip, Type A
Drive Motor "A" Phase W Current Sensor Offset Out-of Range	P0BEE	Offset Circuit monitor to detect the failure of U-phase offset current above valid range	W Phase offset current output at highside	>30 A	Wakeup Signal Power Stage No Active DTCs:	On OPEN P0BEF/P0BF0	X: 8 cts Y: N/A R: 10.4 ms T: 83 ms	One Trip, Type A
MCP A IGBT Diagnostics								
Drive Motor "A" Inverter Performance	P0A78	Detects IGBT Desaturation Faults Monitors hw status line to detect internal overcurrent faults, shoot through, or loss of switching control events	Phase A, B, or C High or Low Side Devices	OVERDRIVEN (Status Fault Bit)	Wakeup Signal High Voltage	On > 100V	X: 1 ct Y: N/A R: 2.08ms T: 2.08ms	One Trip, Type A
Drive Motor "A" Inverter Power Supply Circuit/Open	P0C0B	Detects IGBT Bias Faults Monitors hw status line to detect loss of power supply to gate drive board	Phase A, B, or C Power Supply	FAILED (Status Fault Bit)	Inverter State High Voltage	Initialization Complete > 100V	X: 1 ct Y: N/A R: 2.08ms T: 2.08ms	One Trip, Type A
MCP A High Voltage (HV) Diagnostics								
Drive Motor "A" Hybrid Battery System Voltage High	P1AEE	To detect over voltage and to protect TPIM HV Circuit	HV Sensor Voltage OR Hardware Over Voltage Flag	> 463V = TRUE	Controller Initialization	Complete	X: 3 cts Y: N/A R: 0.1 - 0.5 ms T: 0.3 - 1.50 ms	One Trip, Type A
Drive Motor "A" Control Module Hybrid Battery Voltage Sense Circuit Low Voltage	P1AE8	Circuit Low monitor of HV output voltage sensor	HV Sensor Voltage	<30V	Controller Initialization Run/Crank Contactors	Complete Active Closed	X: 15 cts Y: 20 cts R: 10.4ms T: 156.3ms	One Trip, Type A

DIAGNOSTIC SUMMARY TABLES--MCPA (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Drive Motor "A" Control Module Hybrid Battery Voltage Sense Circuit High Voltage	P1AE9	Circuit High monitor of HV output voltage sensor	HV Sensor Voltage	>500 V	Controller Initialization Run/Crank	Complete Active	X: 15 cts Y: 20 cts R: 10.4ms T: 156.3ms	One Trip, Type A
Drive Motor "A" Control Module Hybrid Battery System Voltage	P1AEC	To check correlation of HV with sum of mid-pack voltages and HV_Battery.	ABS(HV - HV_Battery) AND ABS(HV - sum of mid-pack voltages)	>= 40 V >= 50 V	No Active DTCs: Controller Initialization Contactors	P1AE8, P1AE9 Closed	X: 110 cts Y: 184 cts R: 10.4ms T: 1144ms	Two Trips, Type B
Drive Motor "A" Control Module Hybrid Battery Voltage System Isolation Fault	P1AF0	Isolation Lost between mid-pack voltage and chassis	Isolation Ratio (Neg mid-pack voltage / Pos mid-pack voltage)	>4.53	No Active DTCs: Controller Initialization	P1AE8, P1AE9, P1AEC Complete	X: 240 cts Y: 480 cts R: 10.4 ms T: 2496 ms	Two Trips, Type B
Drive Motor "A" Control Module Hybrid Battery Voltage Isolation Sensor 1 Circuit Low	P1AF4	Circuit 1 Low monitor of Pos mid-pack voltage sensor	Pos mid-pack voltage	<20V	Controller Initialization Run/Crank Contactors	Complete Active Closed	X: 70 cts Y: 100 cts R: 10.4ms T: 729ms	Two Trips, Type B
Drive Motor "A" Control Module Hybrid Battery Voltage Isolation Sensor 1 Circuit High	P1AF5	Circuit 1 High monitor of Pos mid-pack voltage sensor	Pos mid-pack voltage - HV OR Pos mid-pack - HV_Bat	>40 V >40V	No Active DTCs: Controller Initialization Run/Crank	P1AE8, P1AE9, P1AEC Complete Active	X: 70 cts Y: 100 cts R: 10.4ms T: 729ms	Two Trips, Type B
Drive Motor "A" Control Module Hybrid Battery Voltage Isolation Sensor 2 Circuit Low	P1B0B	Circuit 2 Low monitor of Neg mid-pack voltage sensor	Neg mid-pack voltage	<20V	Controller Initialization Run/Crank Contactors	Complete Active Closed	X: 70 cts Y: 100 cts R: 10.4ms T: 729ms	Two Trips, Type B
Drive Motor "A" Control Module Hybrid Battery Voltage Isolation Sensor 2 Circuit High	P1B0C	Circuit 2 High monitor of Neg mid-pack voltage sensor	Neg mid-pack voltage - HV OR Neg mid-pack - HV_Bat	>40 V >40V	No Active DTCs: Controller Initialization Run/Crank	P1AE8, P1AE9, P1AEC Complete Active	X: 70 cts Y: 100 cts R: 10.4ms T: 729ms	Two Trips, Type B
Drive Motor "A" Control Module Hybrid Battery Voltage Isolation Sensing Performance	P1B41	To check correlation of sum of mid-pack voltages against HV and HV_Battery	ABS(HV - HV_Battery) AND ABS(HV_Bat - Neg mid-pack - Pos mid-pack) OR ABS(HV - Neg mid-pack - Pos mid-pack) AND	>= 40 >= 50 >= 50	No Active DTCs: Controller Initialization Run/Crank	P1AE8, P1AE9, P1B0B, P1B0C, P1AEC, P1AF5, P1AF4 Complete Active	X: 100 cts Y: 150 cts R: 10.4ms T: 1040ms	Two Trips, Type B

DIAGNOSTIC SUMMARY TABLES--MCPA (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
			ABS(HV_Bat - Neg mid-pack - Pos mid-pack)	>= 50				
Motor Control Processor Voltage Diagnostics								
Sensor Power Supply "A" Circuit Low	P06B1	Detects Sensor Power Supply (15V) below an acceptable threshold.	Scaled 15V Supply Voltage	< 12.0V	Wakeup Signal	On	X: 40 cts Y: 50 cts R: 10.4ms T: 416 ms OR continuous fail time > 300 ms	One Trip, Type A
Sensor Power Supply "A" Circuit High	P06B2	Detects Sensor Power Supply (15V) above an acceptable threshold.	Scaled 15V Supply Voltage	> 18.0V	Wakeup Signal	On	X: 40 cts Y: 50 cts R: 10.4ms T: 416 ms OR continuous fail time > 300 ms	One Trip, Type A
System Voltage Low	P1ADE	*This is the 12V system voltage low diagnostic*						Special Type C
		DTC Fail case 1: Sets when the ignition voltage is below a threshold	Ignition Voltage	<= 10 Volts	Enable Cal RunCrankActive Engine Speed	= true = true >= 0 RPM	5 fail counts out of 6 sample counts Executes in a 1000ms loop Detects in 6 sec	
		DTC Pass:		Ignition Voltage > 10 Volts			1 second	
System Voltage Hi	P1ADF	*This is the 12V system voltage Hi diagnostic*						Special Type C
		DTC Fail case 1: Sets when the ignition voltage is above a threshold	Ignition Voltage	>= 18 Volts	Enable Cal RunCrankActive	= true = true	5 fail counts out of 6 sample counts Executes in a 1000ms loop Detects in 6 sec	
		DTC Pass:		Ignition Voltage < 18 Volts			1 second	
Motor A Inverter Temp Sensor Diagnostics								
Drive Motor Inverter Temperature Sensor A Circuit Range/Performance	P0AEE	Inverter A Temperature Sensor #1 In-Range Rationality Check	ABS (Inverter Temp A - Average of (Power Electronics Coolant Temp and Transmission Fluid Temp)) "ColdStartAvg"	>20 deg C	Wake Up Signal Propulsion System Inactive Time Thermal Conditioning Off Time Charge Off Time Cold Start Average Temperature	On >=21600s >=7200s >=7200s > -20C	700 cts Start Delay PLUS X: 200 cts Y: 300 cts R: 10.4ms T: 2080ms =9.36 sec total	One Trip, Type A

DIAGNOSTIC SUMMARY TABLES--MCPA (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					Power Electronics Coolant Temperature Available Power Electronics Coolant Temperature Fault Active Tranmission Fluid Temperature Valid Propulsion System Inactive Timer Fault Active Propulsion System Inactive Timer Mask Off Board Charging Inactive Timer Fault Active Off Board Charging Inactive Timer Mask Battery Thermal Conditioning Inactive Fault Active Battery Thermal Conditioning Inactive Mask Plug In Charging Present No Active Power Inverter Temp Out Of Range Faults:	TRUE FALSE TRUE FALSE Use Data FALSE Use Data FALSE Use Data TRUE P0AF0 and P0AEF		
Drive Motor Inverter Temperature Sensor A Circuit High	P0AF0	To detect Inverter A Temperature Sensor #1 voltage Out of Range high	PIM Temp A	< -58 deg C (near 5V)	Wakeup Signal When malfunction present at start of trip: Cumulative Inverter Warmup Time at or above Inverter Warmup Torque Threshold	ON >=90s >=ABS(20 Nm)	X: 250 cts Y: 350 cts R: 10.4ms T: 2600ms	One Trip, Type A
Drive Motor Inverter	P0AEF	To detect Inverter A	PIM Temp A	> 130 degC (near 0V)	WakeUp Signal	On	X: 250 cts	One

DIAGNOSTIC SUMMARY TABLES--MCPA (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Temperature Sensor A Circuit Low		Temperature Sensor #1 Out of Range low (voltage)					Y: 350 cts R: 10.4ms T: 2600ms	Trip, Type A
Drive Motor Inverter Temperature Sensor C Circuit Range/ Performance	P0BD2	Inverter A Temperature Sensor #2 In-Range Rationality Check	ABS(PIM Temp C - AVG(PwrElecCoolantTemp and TransTemp)) "ColdStartAvg"	>20 deg C	Wake Up Signal Propulsion System Inactive Time Thermal Conditioning Off Time Charge Off Time Cold Start Average Temperature Power Electronics Coolant Temperature Available Power Electronics Coolant Temperature Fault Active Tranmission Fluid Temperature Valid Propulsion System Inactive Timer Fault Active Propulsion System Inactive Timer Mask Off Board Charging Inactive Timer Fault Active Off Board Charging Inactive Timer Mask Battery Thermal Conditioning Inactive Fault Active Battery Thermal Conditioning Inactive Mask Plug In Charging Present	On >=21600s >=7200s >=7200s > -20C TRUE FALSE TRUE FALSE Use Data FALSE Use Data FALSE Use Data TRUE	300 cts Start Delay PLUS X: 550 cts Y: 700 cts R: 10.4ms T: 2080ms =8.84 sec total	One Trip, Type A

DIAGNOSTIC SUMMARY TABLES--MCPA (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					No Active Power Inverter Temp Out Of Range Faults:	P0BD4 and P0BD3		
Drive Motor Inverter Temperature Sensor C Circuit High	P0BD4	To detect Inverter A Temperature Sensor #2 Out of Range high (voltage)	PIM Temp C Temperature	< -58 deg C (near 5V)	Wakeup Signal When malfunction present at start of trip: Cumulative Inverter Warmup Time at or above Inverter Warmup Torque Threshold	ON >=90s >=ABS(20 Nm)	X: 250 cts Y: 350 cts R: 10.4ms T: 2600ms	One Trip, Type A
Drive Motor Inverter Temperature Sensor C Circuit Low	P0BD3	To detect Inverter A Temperature Sensor #2 Out of Range low (voltage)	PIM Temp C Temperature	> 130 degC (near 0V)	WakeUp Signal	On	X: 250 cts Y: 350 cts R: 10.4ms T: 2600ms	One Trip, Type A
Drive Motor Inverter Temperature Sensor E Circuit Range/Performance	P0BDC	Inverter A Temperature Sensor #3 In-Range Rationality Check	ABS(PIM Temp E - AVG(PwrElecCoolantTemp and TransTemp)) "ColdStartAvg"	>20 deg C	Wake Up Signal Propulsion System Inactive Time Thermal Conditioning Off Time Charge Off Time Cold Start Average Temperature Power Electronics Coolant Temperature Available Power Electronics Coolant Temperature Fault Active Tranmission Fluid Temperature Valid Propulsion System Inactive Timer Fault Active	On >=21600s >=7200s >=7200s > -20C TRUE FALSE TRUE FALSE	300 cts Start Delay PLUS X: 550 cts Y: 700 cts R: 10.4ms T: 2080ms =8.84 sec total	One Trip, Type A

DIAGNOSTIC SUMMARY TABLES--MCPA (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					Propulsion System Inactive Timer Mask Off Board Charging Inactive Timer Fault Active Off Board Charging Inactive Timer Mask Battery Thermal Conditioning Inactive Fault Active Battery Thermal Conditioning Inactive Mask Plug In Charging Present No Active Power Inverter Temp Out Of Range Faults:	Use Data FALSE Use Data FALSE Use Data TRUE P0BDE and P0BDD		
Drive Motor Inverter Temperature Sensor E Circuit High	P0BDE	To detect Inverter A Temperature Sensor #3 Out of Range high (voltage).	PIM Temp E Temperature	< -58 deg C (near 5V)	Wakeup Signal When malfunction present at start of trip: Cumulative Inverter Warmup Time at or above Inverter Warmup Torque Threshold	ON >=90s >=ABS(20 Nm)	X: 250 cts Y: 350 cts R: 10.4ms T: 2600ms	One Trip, Type A
Drive Motor Inverter Temperature Sensor E Circuit Low	P0BDD	To detect Inverter A Temperature Sensor #3 Out of Range low (voltage).	PIM Temp E Temperature	> 130 degC (near 0V)	Wakeup Signal	On	X: 250 cts Y: 350 cts R: 10.4ms T: 2600ms	One Trip, Type A
Drive Motor "A" Inverter Phase U Over Temperature	P0C11	To detect an in-range overtemperature condition that can potentially damage inverter	PIM Temp A Temperature	> 102.5 deg C	PIM Temperature No Active DTCs:	IN RANGE P0AEE	X: 500 cts Y: 1500 cts R: 10.4ms T: 5200ms	One Trip, Type A
Drive Motor "A" Inverter Phase V Over Temperature	P0C12	To detect an in-range overtemperature condition that can potentially damage	PIM Temp C Temperature	> 102.5 deg C	PIM Temperature	IN RANGE	X: 500 cts Y: 1500 cts R: 10.4ms	One Trip, Type A

DIAGNOSTIC SUMMARY TABLES--MCPA (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
		inverter			No Perf Fault; P0BDC	NOT ACTIVE	T: 5200ms	
Drive Motor "A" Inverter Phase W Over Temperature	P0C13	To detect an in-range overtemperature condition that can potentially damage inverter	PIM Temp E Temperature	> 102.5 deg C	PIM Temperature No Active DTCs:	IN RANGE P0BD2	X: 500 cts Y: 1500 cts R: 10.4ms T: 5200ms	One Trip, Type A
Motor A Resolver Sensors - Discrete Diagnostics								
Drive Motor "A" Position Sensor Circuit	P0A3F	To detect Loss of Signal or converter error (line open, short) in the Motor Resolver circuit	Sin or Cos Signal	<2.3V	Wakeup Signal Resolver Initialization Delay	On 2ms	Fast Fail X: 100 Y: 10000 R: 2 ms T: 200 ms Slow Fail X: 120 Y: 900000 R: 2 ms T: 240 ms	One Trip, Type A
Drive Motor "A" Position Sensor Circuit Range/Performance	P0A40	To detect a Degradation of Signal fault in the angle data read by the Motor Resolver circuit.	Sin or Cos Signal	>4.0V	Wakeup Signal Resolver Initialization Delay	On 2ms	Fast Fail X: 100 Y: 10000 R: 2 ms T: 200 ms Slow Fail X: 120 Y: 900000 R: 2 ms T: 240 ms	One Trip, Type A
Drive Motor "A" Position Sensor Circuit Loss of Tracking	P1B03	To detect a Loss of Tracking fault in the Motor Resolver circuit.	Internal Tracking Error	> 5 deg	Wakeup Signal Resolver Initialization Delay	On 2ms	Fast Fail X: 100 Y: 10000 R: 2 ms T: 200 ms Slow Fail X: 120 Y: 900000 R: 2 ms T: 240 ms	One Trip, Type A
Drive Motor "A" Position Sensor Circuit Overspeed	P1B0D	To detect when Motor A has exceeded operational maximum speed	ABS(Motor speed)	>6300 rpm	Wakeup Signal	On	X: 10 cts Y: 12 cts R: 10.4ms T: 104ms	One Trip, Type A

DIAGNOSTIC SUMMARY TABLES--MCPA (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Drive Motor "A" Position Sensor Not Learned	P0C17	To detect an unvalidated Resolver Offset Learn Value AND No Stored Previously Valid Value	Offset Learn DIDN'T complete because:		Key Off	TRUE	300 ms learn time	One Trip, Type A
			ABS(Motor Speed) OR Filtered DC OR ALL Phase Current OR TimeOut	>50 rpm < 192 V <15 A > 1.4 second for 1 Timeout	Wakeup Signal ABS(Motor Speed) High Voltage Valid Stored Offset	ON < 20 rpm > 192 V FALSE		
Drive Motor "A" Position Exceeded Learning Limit	P0C4E	**Fail Case 1:** To detect an OOR Offset Learn Value	Offset Learn Completes AND ABS(Offset Correction Angle)	> 30 degrees	ABS(Motor Speed) High Voltage	< 20 rpm > 192V	300 ms learn time	One Trip, Type A
		Fail Case 2: To detect a sudden jump from previously stored offset learn value	Offset Learn Completes AND ABS(Offset Correction Angle - prevoiusly stored value)	> 10 degrees				
Drive Motor "A" Position Sensor Learn Incorrect	P1B0F	To detect an unvalidated Resolver Offset Learn Value AND a Stored Previously Valid Value	Offset Learn DIDN'T complete because: ABS(Motor Speed)	> 50 rpm	Key Off	TRUE	300 ms learn time	Two Trips, Type B
			OR Filtered DC Voltage	< 192V	Wakeup Signal	TRUE		
			OR ALL Phase Current Max-Min Delta	< 15A	ABS(Motor Speed)	< 20 rpm	X: 30 ct Y: N/A R: 2.08ms T: 62.4ms	
					Valid Stored Offset	TRUE		
					High Voltage	> 192 V		
Motor A Resolver Sensors - Circuit Diagnostics								
Drive Motor "A" Position Sensor Circuit "A" Low	P0C52	To detect Resolver Circuit S1/3 Out of Range Low	Resolver S13 Circuit Reference Voltage	< 0.5 v	Wakeup Signal	On	X: 50 cts Y: 80 cts R: 10.4ms T: 520ms	Two Trips, Type B
Drive Motor "A" Position Sensor Circuit "A" High	P0C53	To detect Resolver Circuit S1/3 Out of Range High	Resolver S13 Circuit Reference Voltage	> 4.5 v	Wakeup Signal	On	X: 20 cts Y: 30 cts R: 10.4ms T: 208ms	Two Trips, Type B
Drive Motor "A" Position Sensor Circuit "B" Low	P0C5C	To detect Resolver Circuit S2/4 Out of Range Low	Resolver S24 Circuit Reference Voltage	< 0.5 v	Wakeup Signal	On	X: 50 cts Y: 80 cts R: 10.4ms T: 520ms	Two Trips, Type B
Drive Motor "A" Position Sensor Circuit "B" High	P0C5D	To detect Resolver Circuit S2/4 Out of Range High	Resolver S24 Circuit Reference Voltage	> 4.5 v	Wakeup Signal	On	X: 20 cts Y: 30 cts R: 10.4ms T: 208ms	Two Trips, Type B
MCPA Controller Fault Diagnostics								
Control Module Read	P1A51	*This Diagnostic tests the checksum on ROM (flash) memory*						One

DIAGNOSTIC SUMMARY TABLES--MCPA (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Only Memory (ROM)		**DTC Fail case 1:** This DTC will be stored if any check sum in the **boot** is incorrect **DTC Fail case 2:** This DTC will be stored if any check sum in the **calibration** is incorrect **DTC Fail case 3:** This DTC will be stored if any check sum in the **software** is incorrect	Calculated Checksum does not match stored checksum		Ignition Status	= Run or Crank	1 failure if it occurs during the first ROM test of the ignition cycle otherwise 5 failures Frequency: Runs continuously in the	Trip, Type A
		DTC Pass:		ROM fault = false 2nd SOH ROM fault = false Main SOH ROM fault = false				
Control Module Long Term Memory Reset	P1EB6	*This Diagnostic tests for BINVDM errors*						One Trip, Type A
		DTC Fail case 1: Non-volatile memory (**Static**) checksum error at controller power-up **DTC Fail case 2:** Non-volatile memory (**Preserved**) checksum error at controller power-up **DTC Fail case 3:** Non-volatile memory (**BINVDM**) checksum error at controller power-up **DTC Fail case 4:** Non-volatile memory (**ShutdownFinished**) checksum error at controller power-up	Checksum at power-up does not match checksum at power-down		Ignition Status	= Run or Crank	1 failure Frequency: Once at powerup	
		DTC Pass:		No ROM memory faults				
Control Module Random Access Memory (RAM) Failure	P1A50	*This Diagnostic tests the checksum on RAM memory*						One Trip, Type A
		DTC Fail case 1: Indicates that HCP is unable to correctly write and read data to and from **Dual Store** RAM **DTC Fail case 2:** Indicates that HCP is unable to correctly write and read data to and from **Write Protect** RAM **DTC Fail case 3:** Indicates that HCP is unable to correctly write and read data to and from **2nd SOH** RAM	Data read	does not match data written	Ignition Status	= Run or Crank	Should finish within 30 seconds at all operating conditions	

DIAGNOSTIC SUMMARY TABLES--MCPA (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
		DTC Fail case 4: Indicates that HCP is unable to correctly write and read data to and from **Main SOH** RAM						
		DTC Fail case 5: Indicates that HCP is unable to correctly write and read data to and from **System** RAM						
		DTC Fail case 6: Indicates that HCP is unable to correctly write and read data to and from **Cache** RAM						
		DTC Fail case 7: Indicates that HCP is unable to correctly write and read data to and from **eTPU** RAM						
		DTC Pass:		No errors in 1000ms MainSOH RAM faults = false CommFlts = false System RAM faults = false CacheRam faults = false eTPU RAM faults = false				
Control Module Internal Performance	P0A1B	*This Diagnostic tests all the internal processor integrity subsystems*						One Trip, Type A
		DTC Fail case 1: Indicates that the HCP has detected an internal processor integrity fault CePISR_e_MainDtctdSPI_Flt	HWIO detects Fault	= true (in SPI Hardware)	Run/Crank Voltage OR Powertrain Relay Voltage Diagnostic System Enable Powermoding	> 9.5 Volts = true = Accesory or Off	28 fail counts out of 32 sample counts Executes in a 6.25ms loop Detects in 200ms	

DIAGNOSTIC SUMMARY TABLES--MCPA (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
		DTC Fail case 2: Indicates that the HCP has detected an internal processor integrity fault CePISR_e_2ndNotRunningSeedKyTst	Key Value	= Calibration Value	SRAR shutdowns SPI Fault RunCrank Active Ram or ROM fault 12V battery Seed received in wrong order fault Vehicle Speed Seed/Key Timeout Powermode	= False =False = False = False >11V = False <= 0 MPH = False = off for less than 5 seconds	Detects in 150ms	
		DTC Fail case 3: Indicates that the HCP has detected an internal processor integrity fault CePISR_e_2ndFailsToTakeRmdlActn	IPT Detects faulty harware in Inhibit path IPT feedback	≠ calibration Value	HV Bat contactor Staus Available MMDR HPMR HV Battery Contactors Motor Faults Motor Speed SRAR shutdowns SPI Fault RunCrank Active Ram or ROM fault	= True = Powerdown Wait State = Eval BP Open State >= 80 V = Closed = False <= 10 RPM = False =False = False = false	Up down counter = 3	

DIAGNOSTIC SUMMARY TABLES--MCPA (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					12V battery Seed received in wrong order fault Vehicle Speed Seed/Key Timeout Powermode	>11V = false <= 0 MPH = False = off for less than 5 seconds		
		DTC Fail case 4: Indicates that the HCP has detected an internal processor integrity fault CePISR_e_2ndRxIncorrectKeys	Key Value	≠ Calibration Value	1. Number Of Mains 2. IPT status	1. > 0 2. = Not running for > 0.075s	Detects in 150ms or two consecutive faulty keys	
		DTC Fail case 5: Indicates that the HCP has detected an internal processor integrity fault CePISR_e_MainDtctdSdKeyTimeout	seed does not update	within Calibration threshold	1. Number Of Monitors 2. SPI faults	1. > 0 2. = FALSE	Detects in 1 sec	
		DTC Fail case 6: Indicates that the HCP has detected an internal processor integrity fault CePISR_e_MainDtctdSdRxWrongOrdr	Seed sequence	≠ expected order	1. Number Of Monitors 2. SPI faults	1. > 0 2. = FALSE	12 fail counts out of 16 sample counts Executes in a 12.5ms loop Detects in 200ms	
		DTC Fail case 7: Indicates that the HCP has detected an internal processor integrity fault CePISR_e_MainSequenceFlt	Seed timeout PSW Fault	> 200 ms = True	1. Seed Update Key StoreFault Enable OR 2. Program Sequence Watch Enable	1. = True 2. = True	3 fail counts out of 4 sample counts Executes in a 50ms loop Detects in 200ms	
		DTC Fail case 8: Indicates that the HCP has detected an internal processor integrity fault CePISR_e_MainALU_Flt	HWIO detects Fault	=2 (ina row)	1. ALU Test Enabled 2. Diagnostic system status 3. Code clear active 4. PMDI Low voltage clear diag enable conditons met	1. = TRUE 2. = Enabled 3. >= 0.15s 4. = True	runs continuously in 12.5ms loop Detects in 12.5ms	

DIAGNOSTIC SUMMARY TABLES--MCPA (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
		DTC Fail case 9: Indicates that the HCP has detected an internal processor integrity fault CePISR_e_MainCfgRegFlt	HWIO detects Fault	=2 (in arow)	1. Diagnostic Test Enabled 2. Diagnostic system status 3. Code clear active 4. PMDI Low voltage clear diag enable conditons met	1. = TRUE 2. = Enabled 3. >= 0.15s 4. = True	runs continuously in 12.5ms loop Detects in 12.5ms	
		DTC Fail case 10: Indicates that the HCP has detected an internal processor integrity fault CePISR_e_MainStackFlt	HWIO detects Fault	= 5 (Since Powerup)	Diagnostic Test Enabled Diagnostic System Enables	= True =True	Runs Continuously in 100ms loop Detects in 500ms	
		DTC Fail case 11: Indicates that the HCP has detected an internal processor integrity fault CePISR_e_MainADC_Flt	Continuous Fault	> 200ms	1. A2D Converter Test Enabled 2. PT Relay Voltage 3. Run Crank Voltage	1. = TRUE 2. > -1 3. > 7	5 fail counts out of 8 sample counts Executes in a 50ms loop Detects in 200ms	
		DTC Fail case 12: Indicates that the HCP has detected an internal processor integrity fault CePISR_e_RunCrankCorrFlt	Run Crank on Seconday Processor	≠ Run Crank Active	1. Run Crank Discrete Diagnostic Enable 2. SPI Faults	1. = True 2. = False	5 fail counts out of 8 sample counts Executes in a 25ms loop Detects in 200ms	
		DTC Fail case 13: Indicates that the HCP has detected an internal processor integrity fault CePISR_e_FlashECC_CktTest	HWIO detects Fault	= 3 /10 5/10	1. Flash ECC Circuit Test Enable 2. Power-Up Reset	1. = True 2. = True	3 fail counts out of 10 sample counts (turns on MIL) 5 fail counts out of 10 sample counts (shutdown vehicle) Executes once at every power up reset	
		DTC Fail case 14: Indicates that the HCP has detected an internal processor integrity fault CePISR_e_RAM_ECC_CktTest	HWIO detects Fault	= 3 /10 5/10	1. RAM ECC Circuit Test Enable 2. Power-Up Reset	1. = True 2. = True	3 fail counts out of 10 sample counts (turns on MIL) 5 fail counts out of 10 sample counts (shutdown vehicle) Executes once at every power up reset	

DIAGNOSTIC SUMMARY TABLES--MCPA (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
		DTC Fail case 15: Indicates that the HCP has detected an internal processor integrity fault CePISR_e_DMA_XferTest	HWIO detects Fault or Memory Copy Error	= True or =True	Diagnostic Test Enabled	= TRUE		
MCPA Torque Security Diagnostics								
Control Module Long Term Memory Performance	P1ADC	*This Diagnostic tests for unuseable BINVDM (flash) memory only*						One Trip, Type A
		DTC Fail case 1: Indicates that the NVM Error flag **HWIO Bat Write will not succeed** set	Last EEPROM write did not complete		Ignition voltage	≥ 5 volts	1 failure Frequency: Once at power-up	
		DTC Fail case 2: Indicates that the NVM Error flag **HWIO Assembly Cal** set						
		DTC Pass:		NV write will not succeed = fail Assembly cal fail = false				
Drive Motor A Torque Delivered Performance	P0C19	*This Diagnostic tests that the difference between the motor A torque command slew and the motor torque achieved is greater than a threshold.*						One Trip, Type A
		DTC Fail case 1: The slewed MCP torque command is different by the MCP torque achieved	the commanded torque - the achieved torque	< 138	Ignition switch	in crank or run		
Drive Motor A Control Module Not Programmed	P1A4F	*This diagnostic prevents flashing different MCP software into MCP A that does not match its ID*						One Trip, Type A
		DTC Fail case 1: The MCP ID hardware does not match the calibration for the specific MCP	MCP ID Hardware	≠ *Calibration*				
Drive Motor A Control Module Internal Control Module Torque Calculation Performance	P1E0A	*This diagnostic detects the torque command path calculation errors*						One Trip, Type A
		DTC Fail case 1: If the difference between the Torque achieved primary path signal and the redundant path signal is greater than a threshold (MTQR)	Difference between Primary and Redundant signals	> 164Nm	Fault Active TPTKO Torque Mon Fail	= True = False = True	30 fail counts out of 32 sample counts Executes in a 6.25 ms Loop Detects in 200ms	
		DTC Fail case 2: If the difference between the Torque Commanded primary path signal and the redundant path signal is greater than a threshold (MTDR)	Difference between Primary and Redundant signals	> 164Nm				

DIAGNOSTIC SUMMARY TABLES--MCPA (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
		DTC Fail case 3: Compares the ISSD primary path calculated signal in task 0 rate with redundant signal calculated in 6.25ms and fails if it is different than a threshold (MCUR)	Difference between Primary and Redundant signals	> 50A				
		DTC Fail case 4: Compares the ISSQ primary path calculated signal in task 0 rate with redundant signal calculated in 6.25ms and fails if it is different than a threshold (MCUR)	Difference between Primary and Redundant signals	> 50A				
		DTC Fail case 5: Compares the ISSCmd primary path calculated signal in task 0 rate with redundant signal calculated in 6.25ms and fails if it is different than a threshold (MCDR)	Difference between Primary and Redundant signals	> 50A				
		DTC Fail case 6: Compares the BEMF Dec primary path calculated signal in task 0 rate with redundant signal calculated in 6.25ms and fails if it is different than a threshold (MCDR)	Difference between Primary and Redundant signals	> .001Nm				
		DTC Fail case 7: Compares the Usdq Limited primary path calculated signal in task 0 rate with redundant signal calculated in 6.25ms and fails if it is different than a threshold (MCCR)	Difference between Primary and Redundant signals	> .5V				

DIAGNOSTIC SUMMARY TABLES--MCPA (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
		DTC Fail case 8: Compares the Duty ABC primary path calculated signal in task 0 rate with redundant signal calculated in 6.25ms and fails if it is different than a threshold (SVMR)	**For OverMod:** Mod Index Square or PerfSqr **For Linear:** Mod Index Square or PerfSqr	> .2Nm > 1Nm > .1Nm > .15Nm				
		DTC Fail case 9: Compares the Power Input Watts primary path calculated signal in task 0 rate with redundant signal calculated in 6.25ms and fails if it is different than a threshold (HVTR)	Difference between Primary and Redundant signals	>4000				
		DTC Fail case 10: Compares the VDC Adapt primary path calculated signal in task 0 rate with redundant signal calculated in 6.25ms and fails if it is different than a threshold (HVTR)	Difference between Primary and Redundant signals	> .03V				
		DTC Fail case 11: Compares the Qest primary path calculated signal in task 0 rate with redundant signal calculated in 6.25ms and fails if it is different than a threshold (HVTR)	Difference between Primary and Redundant signals	> 0Nm				
		DTC Fail case 12: Compares the Motor Speed primary path calculated signal in task 0 rate with redundant signal calculated in 6.25ms and fails if it is different than a threshold (MSPR)	Difference between Primary and Redundant signals	>116 RadPerSec				
Communication Diagnostics								
Lost Comm'n With	U1876	*This diagnostic indicates a lost communication between the MCPA and the ECM on Bus A*						Two

DIAGNOSTIC SUMMARY TABLES--MCPA (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
ECM/PCM on Bus A		**DTC Fail case 1:** Detects that CAN serial data communication has been lost with the ECM on Bus A	Missed ECM Messages		Run/Crank Voltage OR Powertrain Relay Voltage PowerMode Bus Off Fault Active Normal Communication Enabled Normal Message Transmission Diagnostic System Disable Diagnostic Enable Timer	> 9.5 Volts =RUN =FALSE =TRUE =TRUE =FALSE >=3 sec	Executes in a 6.25ms loop Detects in 500 ms	Trips, Type B
Lost Comm'n With TCM	U1849	*This diagnostic indicates a lost communication between the MCPA and the TCM on Bus A*						Two Trips, Type B
		DTC Fail case 1: Detects that CAN serial data communication has been lost with the TCM on Bus A	Missed TCM Messages		Run/Crank Voltage OR Powertrain Relay Voltage PowerMode Bus Off Fault Active Normal Communication Enabled Normal Message Transmission Diagnostic System Disable Diagnostic Enable Timer	> 9.5 Volts =RUN =FALSE =TRUE =TRUE =FALSE >=3 sec	Executes in a 6.25ms loop Detects in 500 ms	
Lost Comm'n With Hybrid Controller	U1845	*This diagnostic indicates a lost communication between the MCPA and the HCP*						Two Trips, Type B
		Detects that CAN serial data communication has been lost with the HCP	Missed HCP Messages		Run/Crank Voltage OR Powertrain Relay Voltage PowerMode Bus Off Fault Active Normal Communication Enabled	> 9.5 Volts =RUN =FALSE =TRUE	Detects within 500 msec at 6.25 msec loop rate	

DIAGNOSTIC SUMMARY TABLES--MCPA (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					Normal Message Transmission	=TRUE		
					Diagnostic System Disable	=FALSE		
					Diagnostic Enable Timer	>=3 sec		
Lost Comm'n With Hybrid Controller B on Bus B	U182E	*This diagnostic indicates a lost communication between the MCPA and the VICM on Bus B*						Two Trips, Type B
		DTC Fail case 1: Lost Communication with Hybrid Powertrain Control Module B on Bus B (VICM)	Missed VICM Messages		Run/Crank Voltage OR Powertrain Relay Voltage	> 9.5 Volts	Executes in a 6.25ms loop	
					PowerMode	=RUN	Detects in 500 ms	
					Bus Off Fault Active	=FALSE		
					Normal Communication Enabled	=TRUE		
					Normal Message Transmission	=TRUE		
					Diagnostic System Disable	=FALSE		
					Diagnostic Enable Timer	>=3 sec		
Lost Comm'n With Hybrid Controller B	U2613	*This diagnostic indicates a lost communication between the MCPA and the VICM*						Two Trips, Type B
		DTC Fail case 1: Lost Communication with Hybrid Powertrain Control Module B on Bus A (VICM)	Missed VICM Messages		Run/Crank Voltage OR Powertrain Relay Voltage	> 9.5 Volts	Executes in a 6.25ms loop	
					PowerMode	=RUN	Detects in 500 ms	
					Bus Off Fault Active	=FALSE		
					Normal Communication Enabled	=TRUE		
					Normal Message Transmission	=TRUE		
					Diagnostic System Disable	=FALSE		
					Diagnostic Enable Timer	>=3 sec		

APPENDIX

ALU= Arithmetic Logic Unit

DIAGNOSTIC SUMMARY TABLES--MCPA (ELR)

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

BPCM= Batt Pack Ctrl Module
HWIO= Hardware Input/Output
IGBT= Insulated Gate Bipolar Transistors (Phase Current Controllers)
OOR= Out of Range

EREV Inverter Temperature Sensor Mapping Grid				SAE
Drive Motor A	Phase U	PIM_A	PIM_0	A
	Phase V	PIM_C	PIM_2	E
	Phase W	PIM_B	PIM_1	C
Drive Motor B	Phase U	PIM_C	PIM_2	F
	Phase V	PIM_A	PIM_0	B
	Phase W	PIM_B	PIM_1	D

Time Required Legend:		
X: Fail Counts Loop Time Fault Detect Time	R: T:	Y: Sample Counts (N/A if no XofY structure)

DIAGNOSTIC SUMMARY TABLES--MCPB (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
MCP B Phase Current Diagnostics								
Drive Motor "B" Phase U-V-W Correlation	P0BFE	To detect electrical failure of phase current sensor.	Sum of 3 phase currents	> 156 A	Wakeup Signal	On	X: 160 ct Y: 190 ct R: 0.11 - 0.5 ms T: 17.6 - 80 ms	One Trip, Type A
Drive Motor "B" Phase U-V-W Current Sensor Overcurrent	P0C04	**Fail Case 1**: To detect fast, repeated 3 Phase over currents and to protect IGBT.	U, V, or W Phase current sensor	> 975 A	Wakeup Signal	On	X: 2 cts Y: 10 cts R: 2.08 ms T: 4.2 ms	One Trip, Type A
		Fail Case 2: To detect slow, intermittent 3 Phase over currents and to protect IGBT.					X: 5 cts Y: 50 cts R: 2.08 ms T: 10.4 ms	
Drive Motor "B" Phase U-V-W Circuit/Open	P0C08	Drive Motor "A" Missing Motor Current checks for minimum current in each phase when rotor position is near that peak's phase axis. Each phase is checked individually as rotor turns.	ABS(Peak Phase Axis Current)	< 9 A	Inverter State Inverter Voltage Rotor Position Current Commanded	RUN > 35 V -30 deg < Phase Axis < +30 deg >= 23 A	X: 200 ct Y: N/A R: 0.11-0.5 ms T: 22 - 100 ms	One Trip, Type A
Drive Motor "B" Phase U Current Sensor Circuit Low	P0BF3	Circuit Low monitor to detect the failure of U-phase current sensor circuit below valid range	U Phase current sensor output at highside	< -1050 A	Wakeup Signal PWM Output Enable	On FALSE	X: 4 cts Y: 6 cts R: 10.4 ms T: 42 ms	One Trip, Type A
Drive Motor "B" Phase U Current Sensor Circuit High	P0BF4	Circuit High monitor to detect the failure of U-phase current sensor circuit above valid range	U Phase current sensor output at highside	> 1050 A	Wakeup Signal PWM Output Enable	On FALSE	X: 4 cts Y: 6 cts R: 10.4 ms T: 42 ms	One Trip, Type A
Drive Motor "B" Phase U Current Sensor Offset Out-of Range	P0BF2	Offset Circuit monitor to detect the failure of U-phase offset current above valid range	U Phase offset current output at highside	>30 A	Wakeup Signal Power Stage No Active DTCs:	On OPEN P0BE7/P0BE8	X: 8 cts Y: N/A R: 10.4 ms T: 83 ms	One Trip, Type A
Drive Motor "B" Phase V Current Sensor Circuit Low	P0BF7	Circuit Low monitor to detect the failure of V-phase current sensor circuit below valid range	V Phase current sensor output at highside	< -1050 A	Wakeup Signal PWM Output Enable	On FALSE	X: 4 cts Y: 6 cts R: 10.4 ms T: 42 ms	One Trip, Type A
Drive Motor "B" Phase V Current Sensor Circuit High	P0BF8	Circuit High monitor to detect the failure of V-phase current sensor circuit above valid range	V Phase current sensor output current at highside	> 1050 A	Wakeup Signal PWM Output Enable	On FALSE	X: 4 cts Y: 6 cts R: 10.4 ms T: 42 ms	One Trip, Type A
Drive Motor "B" Phase V Current Sensor Offset Out-of Range	P0BF6	Offset Circuit monitor to detect the failure of U-phase offset current above valid range	V Phase offset current output at highside	>30 A	Wakeup Signal Power Stage	On OPEN	X: 8 cts Y: N/A R: 10.4 ms T: 83 ms	One Trip, Type A

DIAGNOSTIC SUMMARY TABLES--MCPB (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					No Active DTCs:	P0BEB/P0BEC		
Drive Motor "B" Phase W Current Sensor Circuit Low	P0BFB	Circuit Low monitor to detect the failure of W-phase current sensor circuit below valid range	W Phase current sensor output at highside	< -1050 A	Wakeup Signal PWM Output Enable	On FALSE	X: 4 cts Y: 6 cts R: 10.4 ms T: 42 ms	One Trip, Type A
Drive Motor "B" Phase W Current Sensor Circuit High	P0BFC	Circuit High monitor to detect the failure of W-phase current sensor circuit above valid range	W Phase current sensor output at highside	> 1050 A	Wakeup Signal PWM Output Enable	On FALSE	X: 4 cts Y: 6 cts R: 10.4 ms T: 42 ms	One Trip, Type A
Drive Motor "B" Phase W Current Sensor Offset Out-of Range	P0BFA	Offset Circuit monitor to detect the failure of U-phase offset current above valid range	W Phase offset current output at highside	>30 A	Wakeup Signal Power Stage No Active DTCs:	On OPEN P0BEF/P0BF0	X: 8 cts Y: N/A R: 10.4 ms T: 83 ms	One Trip, Type A
MCP B IGBT Diagnostics								
Drive Motor "B" Inverter Performance	P0A79	Detects IGBT Desaturation Faults Monitors hw status line to detect internal overcurrent faults, shoot through, or loss of switching control events	Phase A, B, or C High or Low Side Devices	OVERDRIVEN (Status Fault Bit)	Wakeup Signal High Voltage	On > 100V	X: 1 ct Y: N/A R: 2.08ms T: 2.08ms	One Trip, Type A
Drive Motor "B" Inverter Power Supply Circuit/Open	P0C0E	Detects IGBT Bias Faults Monitors hw status line to detect loss of power supply to gate drive board	Phase A, B, or C Power Supply	FAILED (Status Fault Bit)	Inverter State High Voltage	Initialization Complete > 100V	X: 1 ct Y: N/A R: 2.08ms T: 2.08ms	One Trip, Type A
MCP B High Voltage (HV) Diagnostics								
Drive Motor "B" Hybrid Battery System Voltage High	P1AEF	To detect over voltage and to protect TPIM HV Circuit	HV Sensor Voltage OR Hardware Over Voltage Flag	> 463V = TRUE	Controller Initialization	Complete	X: 3 cts Y: N/A R: 0.1 - 0.5 ms T: 0.3 - 1.50 ms	One Trip, Type A
Drive Motor "B" Control Module Hybrid Battery Voltage Sense Circuit Low Voltage	P1AEA	Circuit Low monitor of HV output voltage sensor	HV Sensor Voltage	<30V	Controller Initialization Run/Crank Contactors	Complete Active Closed	X: 15 cts Y: 20 cts R: 10.4ms T: 156.3ms	One Trip, Type A
Drive Motor "A" Control Module Hybrid Battery Voltage Sense Circuit High Voltage	P1AEB	Circuit High monitor of HV output voltage sensor	HV Sensor Voltage	>500 V	Controller Initialization Run/Crank	Complete Active	X: 15 cts Y: 20 cts R: 10.4ms T: 156.3ms	One Trip, Type A

DIAGNOSTIC SUMMARY TABLES--MCPB (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Drive Motor "B" Control Module Hybrid Battery System Voltage	P1AED	To check correlation of HV with sum of mid-pack voltages and HV_Battery.	ABS(HV - HV_Battery) AND ABS(HV - sum of mid-pack voltages)	>= 40 V >= 50 V	No Active DTCs: Controller Initialization Contactors	P1AEA, P1AEB Complete Closed	X: 110 cts Y: 184 cts R: 10.4ms T: 1144ms	Two Trips, Type B
MCPB Isolation Diagnostics								
Drive Motor "B" Control Module Hybrid Battery Voltage System Isolation Fault	P1AF2	Isolation Lost between mid-pack voltage and chassis	Isolation Ratio (Neg mid-pack voltage / Pos mid-pack voltage)	>4.53	No Active DTCs: Controller Initialization	P1AEA, P1AEB, P1AED Complete	X: 250 cts Y: 300 cts R: 10.4ms T: 2600ms	Two Trips, Type B
Drive Motor "B" Control Module Hybrid Battery Voltage Isolation Sensor Circuit Low	P1AF6	Circuit 1 Low monitor of Pos mid-pack voltage sensor	Pos mid-pack voltage	<20V	Controller Initialization Run/Crank Contactors	Complete Active Closed	X: 70 cts Y: 100 cts R: 10.4ms T: 729ms	Two Trips, Type B
Drive Motor "B" Control Module Hybrid Battery Voltage Isolation Sensor Circuit High	P1AF7	Circuit 1 High monitor of Pos mid-pack voltage sensor	Pos mid-pack voltage - HV OR Pos mid-pack - HV_Bat	>40 V >40V	No Active DTCs: Controller Initialization Run/Crank	P1AEA, P1AEB, P1AED Complete Active	X: 70 cts Y: 100 cts R: 10.4ms T: 728ms	Two Trips, Type B
Drive Motor "B" Control Module Hybrid Battery Voltage Isolation Sensor 2 Circuit Low	P1B43	Circuit 2 Low monitor of Neg mid-pack voltage sensor	Neg mid-pack voltage	<20V	Controller Initialization Run/Crank Contactors	Complete Active Closed	X: 70 cts Y: 100 cts R: 10.4ms T: 729ms	Two Trips, Type B
Drive Motor "B" Control Module Hybrid Battery Voltage Isolation Sensor 2 Circuit High	P1B44	Circuit 2 High monitor of Neg mid-pack voltage sensor	Neg mid-pack voltage - HV OR Neg mid-pack - HV_Bat	>40 V >40V	No Active DTCs: Controller Initialization Run/Crank	P1AEA, P1AEB, P1AED Complete Active	X: 70 cts Y: 100 cts R: 10.4ms T: 728ms	Two Trips, Type B
Drive Motor "B" Control Module Hybrid Battery Voltage Isolation Sensing Performance	P1B42	To check correlation of sum of mid-pack voltages against HV and HV_Battery	ABS(HV - HV_Battery) AND ABS(HV_Bat - Neg mid-pack - Pos mid-pack) OR ABS(HV - Neg mid-pack - Pos mid-pack) AND ABS(HV_Bat - Neg mid-pack - Pos mid-pack)	>= 40 >= 50 >= 50 >= 50	No Active DTCs: Run/Crank Controller Initialization	P1AEA, P1AEB, P1B43, P1B44, P1AED, P1AF7, P1AF6 Active Complete	X: 100 cts Y: 150 cts R: 10.4ms T: 1040ms	Two Trips, Type B
Motor B Temp Sensor Diagnostics								

DIAGNOSTIC SUMMARY TABLES--MCPB (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Drive Motor "B" Control Module Temperature Sensor Performance	P0A31	Motor B Temperature Sensor In-Range Rationality Check	ABS(Motor Thermistor Temperature - the average of (Power Electronic Coolant Temperature and Transmission Fluid Temperature)) "ColdStartAvg"	> 20 deg C	Wake Up Signal Propulsion System Inactive Time Thermal Conditioning Off Time Charge Off Time Cold Start Average Temperature Power Electronics Coolant Temperature Available Power Electronics Coolant Temperature Fault Active Tranmission Fluid Temperature Valid Propulsion System Inactive Timer Fault Active Propulsion System Inactive Timer Mask Off Board Charging Inactive Timer Fault Active Off Board Charging Inactive Timer Mask Battery Thermal Conditioning Inactive Fault Active Battery Thermal Conditioning Inactive Mask Plug In Charging Present No Active Motor Temp Out Of Range Faults:	On >=21600s >=7200s >=7200s > -20C TRUE FALSE TRUE FALSE Use Data FALSE Use Data FALSE Use Data TRUE P0A32 and P0A33	300 cts Start Delay PLUS X: 550 cts Y: 700 cts R: 10.4ms T: 2080ms =8.84 sec total	One Trip, Type A
Drive Motor "B" Control Module Temperature Sensor Circuit Out of Range High	P0A33	To detect temperature sensor voltage Out of Range high.	Motor Temp	< -41 deg C (near 5V)		Init Complete	X: 900 cts Y:1800cts R: 10.4ms T: 9378ms	One Trip, Type A

DIAGNOSTIC SUMMARY TABLES--MCPB (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					Warmup Time Warmup Torque	>=90s >=ABS(20 Nm)		
Drive Motor "B" Control Module Temperature Sensor Circuit Out of Range Low	P0A32	To detect temperature sensor voltage Out of Range low.	Motor Temp	> 184 degC (near 0V)		Init Complete	X: 250 cts Y: 350 cts R: 10.4ms T: 2600ms	One Trip, Type A
Drive Motor "B" Over Temperature	P0A35	To detect a sustained motor overtemperature condition	Motor Temperature exceeds inital fault threshold AND Does not decrease below reset threshold	> 149 deg C	Motor Temperature No Active Temp Performance Fault	IN RANGE P0A31	X: 500 cts Y: 1500 cts R: 10.4ms T: 5200ms	One Trip, Type A
Motor Control Processor Voltage Diagnostics								
Sensor Power Supply "B" Circuit Low	P06B4	Detects Sensor Power Supply (15V) below an acceptable threshold.	Scaled 15V Supply Voltage	< 12.0V	Wakeup Signal	On	X: 40 cts Y: 50 cts R: 10.4ms T: 416 ms OR continuous fail time > 300 ms	One Trip, Type A
Sensor Power Supply "B" Circuit High	P06B5	Detects Sensor Power Supply (15V) above an acceptable threshold.	Scaled 15V Supply Voltage	> 18.0V	Wakeup Signal	On	X: 40 cts Y: 50 cts R: 10.4ms T: 416 ms OR continuous fail time > 300 ms	One Trip, Type A
System Voltage Low	P1AE0	*This is the 12V system voltage low diagnostic*						Special Type C
		DTC Fail case 1: Sets when the ignition voltage is below a threshold	Ignition Voltage	<= 10 Volts	Enable Cal RunCrankActive Engine Speed	= true = true >= 0 RPM	5 fail counts out of 6 sample counts Executes in a 1000ms loop Detects in 6 sec	
		DTC Pass:		Ignition Voltage > 10 Volts			1 second	
System Voltage Hi	P1AE1	*This is the 12V system voltage Hi diagnostic*						Special Type C
		DTC Fail case 1: Sets when the ignition voltage is above a threshold	Ignition Voltage	>= 18 Volts	Enable Cal RunCrankActive	= true = true	5 fail counts out of 6 sample counts Executes in a 1000ms loop Detects in 6 sec	
		DTC Pass:		Ignition Voltage < 18 Volts			1 second	
Motor B Inverter Temp Sensor Diagnostics								
Drive Motor Inverter Temperature Sensor B	P0AF3	Inverter B Temperature Sensor #1 In-Range	ABS(PIM Temp B - AVG(PwrElecCoolantTemp and	>20 deg C	Wake Up Signal	On	300 cts Start Delay	One Trip,

DIAGNOSTIC SUMMARY TABLES--MCPB (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Circuit Range/Performance		Rationality Check	TransTemp)) "ColdStartAvg"		Propulsion System Inactive Time Thermal Conditioning Off Time Charge Off Time Cold Start Average Temperature Power Electronics Coolant Temperature Available Power Electronics Coolant Temperature Fault Active Tranmission Fluid Temperature Valid Propulsion System Inactive Timer Fault Active Propulsion System Inactive Timer Mask Off Board Charging Inactive Timer Fault Active Off Board Charging Inactive Timer Mask Battery Thermal Conditioning Inactive Fault Active Battery Thermal Conditioning Inactive Mask Plug In Charging Present No Active Power Inverter Temp Out Of Range Faults:	>=21600s >=7200s >=7200s > -20C TRUE FALSE TRUE FALSE Use Data FALSE Use Data FALSE Use Data TRUE P0AF4 and P0AF5	PLUS X: 550 cts Y: 700 cts R: 10.4ms T: 2080ms =8.84 sec total	Type A
Drive Motor Inverter Temperature Sensor B Circuit High	P0AF5	To detect Inverter B Temperature Sensor #1 voltage out of range high	PIM Temp B Temperature	< -58 deg C (near 5V)	Wakeup Signal When malfunction	ON	X: 250 cts Y: 350 cts R: 10.4ms	One Trip, Type A

DIAGNOSTIC SUMMARY TABLES--MCPB (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					present at start of trip: Cumulative Inverter Warmup Time at or above Inverter Warmup Torque Threshold	>=90s >=ABS(20 Nm)	T: 2600ms	
Drive Motor Inverter Temperature Sensor B Circuit Low	P0AF4	To detect Inverter B Temperature Sensor #1 Out of Range low (voltage)	PIM Temp B Temperature	> 130 degC (near 0V)	WakeUp Signal	On	X: 250 cts Y: 350 cts R: 10.4ms T: 2600ms	One Trip, Type A
Drive Motor Inverter Temperature Sensor D Circuit Range/Performance	P0BD7	Inverter B Temperature Sensor #2 In-Range Rationality Check	ABS(PIM Temp D - AVG(PwrElecCoolantTemp and TransTemp)) "ColdStartAvg"	>20 deg C	Wake Up Signal Propulsion System Inactive Time Thermal Conditioning Off Time Charge Off Time Cold Start Average Temperature Power Electronics Coolant Temperature Available Power Electronics Coolant Temperature Fault Active Tranmission Fluid Temperature Valid Propulsion System Inactive Timer Fault Active Propulsion System Inactive Timer Mask Off Board Charging Inactive Timer Fault Active	On >=21600s >=7200s >=7200s > -20C TRUE FALSE TRUE FALSE Use Data FALSE	300 cts Start Delay PLUS X: 550 cts Y: 700 cts R: 10.4ms T: 2080ms =8.84 sec total	One Trip, Type A

DIAGNOSTIC SUMMARY TABLES--MCPB (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					Off Board Charging Inactive Timer Mask Battery Thermal Conditioning Inactive Fault Active Battery Thermal Conditioning Inactive Mask Plug In Charging Present No Active Power Inverter Temp Out Of Range Faults:	Use Data FALSE Use Data TRUE P0BD8 and P0BD9		
Drive Motor Inverter Temperature Sensor D Circuit High	P0BD9	To detect Inverter B Temperature Sensor #2 Out of Range high (voltage)	PIM Temp D Temperature	< -58 deg C (near 5V)	Wakeup Signal When malfunction present at start of trip: Cumulative Inverter Warmup Time at or above Inverter Warmup Torque Threshold	ON >=90s >=ABS(20 Nm)	X: 250 cts Y: 350 cts R: 10.4ms T: 2600ms	One Trip, Type A
Drive Motor Inverter Temperature Sensor D Circuit Low	P0BD8	To detect Inverter B Temperature Sensor #2 Out of Range low (voltage)	PIM Temp D Temperature	> 130 degC (near 0V)	WakeUp Signal	On	X: 250 cts Y: 350 cts R: 10.4ms T: 2600ms	One Trip, Type A
Drive Motor Inverter Temperature Sensor F Circuit Range/Performance	P0BE1	Inverter B Temperature Sensor #3 In-Range Rationality Check	ABS(PIM Temp F - AVG(PwrElecCoolantTemp and TransTemp)) "ColdStartAvg"	>20 deg C	Wake Up Signal Propulsion System Inactive Time Thermal Conditioning Off Time Charge Off Time Cold Start Average Temperature Power Electronics Coolant Temperature Available	On >=21600s >=7200s >=7200s > -20C TRUE	700 cts Start Delay PLUS X: 200 cts Y: 300 cts R: 10.4ms T: 2080ms =9.36 sec total	One Trip, Type A

DIAGNOSTIC SUMMARY TABLES--MCPB (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					Power Electronics Coolant Temperature Fault Active	FALSE		
					Tranmission Fluid Temperature Valid	TRUE		
					Propulsion System Inactive Timer Fault Active	FALSE		
					Propulsion System Inactive Timer Mask	Use Data		
					Off Board Charging Inactive Timer Fault Active	FALSE		
					Off Board Charging Inactive Timer Mask	Use Data		
					Battery Thermal Conditioning Inactive Fault Active	FALSE		
					Battery Thermal Conditioning Inactive Mask	Use Data		
					Plug In Charging Present	TRUE		
					No Active Power Inverter Temp Out Of Range Faults:	P0BE2 and P0BE3		
Drive Motor Inverter Temperature Sensor F Circuit High	P0BE3	To detect Inverter B Temperature Sensor #3 Out of Range high (voltage).	PIM Temp F Temperature	< -58 deg C (near 5V)	Wakeup Signal When malfunction present at start of trip: Cumulative Inverter Warmup Time at or above Inverter Warmup Torque Threshold	ON >=90s >=ABS(20 Nm)	X: 250 cts Y: 350 cts R: 10.4ms T: 2600ms	One Trip, Type A
Drive Motor Inverter Temperature Sensor F Circuit Low	P0BE2	To detect Inverter B Temperature Sensor #3 Out of Range low (voltage).	PIM Temp F Temperature	> 130 degC (near 0V)	WakeUp Signal	On	X: 250 cts Y: 350 cts R: 10.4ms T: 2600ms	One Trip, Type A

DIAGNOSTIC SUMMARY TABLES--MCPB (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Drive Motor "B" Inverter Phase U Over Temperature	P0C14	To detect an in-range overtemperature condition that can potentially damage inverter	PIM Temp B Temperature	> 102.5 deg C	PIM Temperature No Active DTCs:	IN RANGE P0A3F	X: 500 cts Y: 1500 cts R: 10.4ms T: 5200ms	One Trip, Type A
Drive Motor "B" Inverter Phase V Over Temperature	P0C15	To detect an in-range overtemperature condition that can potentially damage inverter	PIM Temp D Temperature	> 102.5 deg C	PIM Temperature No Active DTCs:	IN RANGE P0BD7	X: 500 cts Y: 1500 cts R: 10.4ms T: 5200ms	One Trip, Type A
Drive Motor "B" Inverter Phase W Over Temperature	P0C16	To detect an in-range overtemperature condition that can potentially damage inverter	PIM Temp F Temperature	> 102.5 deg C	PIM Temperature No Active DTCs:	IN RANGE P0BE1	X: 500 cts Y: 1500 cts R: 10.4ms T: 5200ms	One Trip, Type A
Motor B Resolver Sensors - Discrete Diagnostics								
Drive Motor "B" Position Sensor Circuit	P0A45	To detect Loss of Signal or converter error (line open, short) in the Motor Resolver circuit	Sin or Cos signal	<2.3v	Wakeup Signal Resolver Initialization Delay	On 2ms	Fast Fail X: 100 Y: 10000 R: 2 ms T: 200 ms Slow Fail X: 120 Y: 900000 R: 2 ms T: 240 ms	One Trip, Type A
Drive Motor "B" Position Sensor Circuit Range/Performance	P0A46	To detect a Degradation of Signal fault in the angle data read by the Motor Resolver circuit.	Sin or Cos Signal	> 4.0v	Wakeup Signal Resolver Initialization Delay	On 2ms	Fast Fail X: 100 Y: 10000 R: 2 ms T: 200 ms Slow Fail X: 120 Y: 900000 R: 2 ms T: 240 ms	One Trip, Type A

DIAGNOSTIC SUMMARY TABLES--MCPB (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Drive Motor "B" Position Sensor Circuit Loss of Tracking	P1B04	To detect a Loss of Tracking fault in the Motor Resolver circuit.	Internal tracking Error	>5deg	Wakeup Signal Resolver Initialization Delay	On 2ms	Fast Fail X: 100 Y: 10000 R: 2 ms T: 200 ms Slow Fail X: 120 Y: 900000 R: 2 ms T: 240 ms	One Trip, Type A
Drive Motor "B" Position Sensor Circuit Overspeed	P1B0E	To detect when Motor B has exceeded operational maximum speed	ABS(Motor speed)	>9500 rpm	Wakeup Signal	On	X: 10 cts Y: 12 cts R: 10.4ms T: 104ms	One Trip, Type A
Drive Motor "B" Position Sensor Not Learned	P0C18	To detect an unvalidated Resolver Offset Learn Value AND No Stored Previously Valid Value	Offset Learn DIDN'T complete because: ABS(Motor Speed) OR Filtered DC Voltage OR ALL Phase Current Max-Min Delta OR TimeOut waiting for entry conditions	 >50 rpm < 192 V <100 A > 1.4 second for 1 timeout	Key Off Wakeup Signal ABS(Motor Speed) High Voltage Valid Stored Offset	TRUE ON < 20 rpm > 192 V FALSE	300 ms learn time	One Trip, Type A
Drive Motor B Position Exceeded Learning Limit	P0C4F	**Fail Case 1:** To detect an Oor Offset Learn Value	Offset Learn Completes AND ABS(Offset Correction Angle)	> 30 degrees	ABS(Motor Speed) High Voltage	< 20 rpm > 192V	300 ms learn time	One Trip, Type A
		Fail Case 2: To detect a sudden jump from previously stored offset learn value	Offset Learn Completes AND ABS(Offset Correction Angle - prevoiusly stored value)	> 10 degrees				
Drive Motor "A" Position Sensor Learn Incorrect	P1B10	To detect an unvalidated Resolver Offset Learn Value AND a Stored Previously Valid Value	Offset Learn DIDN'T complete because: ABS(Motor Speed)	> 50 rpm	Key Off	TRUE	300 ms learn time	Two Trips, Type B
			OR Filtered DC Voltage	< 192V	Wakeup Signal	TRUE		
			OR ALL Phase Current Max-Min Delta	< 15A	ABS(Motor Speed)	< 20 rpm	X: 30 ct Y: N/A R: 2.08ms T: 62.4ms	
					Valid Stored Offset	TRUE		
					High Voltage	> 192 V		
Motor B Resolver Sensors - Circuit Diagnostics								
Drive Motor "B" Position Sensor Circuit "A" Low	P0C57	To detect Resolver Circuit S1/3 Out of Range Low	Resolver S13 Circuit Reference Voltage	< 0.5 v	Wakeup Signal	On	X: 50 cts Y: 80 cts R: 10.4ms T: 520ms	Two Trips, Type B
Drive Motor "B" Position Sensor Circuit "A" High	P0C58	To detect Resolver Circuit S1/3 Out of Range High	Resolver S13 Circuit Reference Voltage	> 4.5 v	Wakeup Signal	On	X: 20 cts Y: 30 cts R: 10.4ms	Two Trips, Type B

DIAGNOSTIC SUMMARY TABLES--MCPB (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
							T: 208ms	
Drive Motor "B" Position Sensor Circuit "B" Low	P0C61	To detect Resolver Circuit S2/4 Out of Range Low	Resolver S24 Circuit Reference Voltage	< 0.5 v	Wakeup Signal	On	X: 50 cts Y: 80 cts R: 10.4ms T: 520ms	Two Trips, Type B
Drive Motor "B" Position Sensor Circuit "B" High	P0C62	To detect Resolver Circuit S2/4 Out of Range High	Resolver S24 Circuit Reference Voltage	> 4.5 v	Wakeup Signal	On	X: 20 cts Y: 30 cts R: 10.4ms T: 208ms	Two Trips, Type B
MCP B Controller Fault Diagnostics								
Control Module Read Only Memory (ROM)	P1A54	*This Diagnostic tests the checksum on ROM (flash) memory*						One Trip, Type A
		DTC Fail case 1: This DTC will be stored if any check sum in the **boot** is incorrect	Calculated Checksum does not match stored checksum		Ignition Status	= Run or Crank	1 failure if it occurs during the first ROM test of the ignition cycle otherwise 5 failures Frequency: Runs continuously in the background	
		DTC Fail case 2: This DTC will be stored if any check sum in the **calibration** is incorrect						
		DTC Fail case 3: This DTC will be stored if any check sum in the **software** is incorrect						
		DTC Pass:		ROM fault = false 2nd SOH ROM fault = false Main SOH ROM fault = false				
Control Module Long Term Memory Reset	P1EB7	*This Diagnostic tests for BINVDM errors*						One Trip, Type A
		DTC Fail case 1: Non-volatile memory (**Static**) checksum error at controller power-up	Checksum at power-up does not match checksum at power-down		Ignition Status	= Run or Crank	1 failure Frequency: Once at powerup	
		DTC Fail case 2: Non-volatile memory (**Preserved**) checksum error at controller power-up						
		DTC Fail case 3: Non-volatile memory (**BINVDM**) checksum error at controller power-up						

DIAGNOSTIC SUMMARY TABLES--MCPB (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
		DTC Fail case 4: Non-volatile memory (**ShutdownFinished**) checksum error at controller power-up						
		DTC Pass:		No ROM memory faults				
Control Module Random Access Memory (RAM) Failure	P1A53	*This Diagnostic tests the checksum on RAM memory*						One Trip, Type A
		DTC Fail case 1: Indicates that HCP is unable to correctly write and read data to and from **Dual Store** RAM	Data read	does not match data written	Ignition Status	= Run or Crank	Should finish within 30 seconds at all operating conditions	
		DTC Fail case 2: Indicates that HCP is unable to correctly write and read data to and from **Write Protect** RAM						
		DTC Fail case 3: Indicates that HCP is unable to correctly write and read data to and from **2nd SOH** RAM						
		DTC Fail case 4: Indicates that HCP is unable to correctly write and read data to and from **Main SOH** RAM						
		DTC Fail case 5: Indicates that HCP is unable to correctly write and read data to and from **System** RAM						
		DTC Fail case 6: Indicates that HCP is unable to correctly write and read data to and from **Cache** RAM						
		DTC Fail case 7: Indicates that HCP is unable to correctly write and read data to and from **eTPU** RAM						
		DTC Pass:		No errors in 1000ms MainSOH RAM faults = false CommFlts = false System RAM faults = false CacheRam faults = false eTPU RAM faults = false				
Control Module Internal	P0A1C	*This Diagnostic tests all the internal processor integrity subsystems*						One

DIAGNOSTIC SUMMARY TABLES--MCPB (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Performance		**DTC Fail case 1:** Indicates that the HCP has detected an internal processor integrity fault CePISR_e_MainDtctdSPI_Flt	HWIO detects Fault	= true (in SPI Hardware)	Run/Crank Voltage OR Powertrain Relay Voltage Diagnostic System Enable Powermoding	> 9.5 Volts = true = Accesory or Off	28 fail counts out of 32 sample counts Executes in a 6.25ms loop Detects in 200ms	Trip, Type A
		DTC Fail case 2: Indicates that the HCP has detected an internal processor integrity fault CePISR_e_2ndNotRunningSeedKyTst	Key Value	= Calibration Value	SRAR shutdowns SPI Fault RunCrank Active Ram or ROM fault 12V battery Seed received in wrong order fault Vehicle Speed Seed/Key Timeout Powermode	= False =False = False = false >11V = false <= 0 MPH = False = off for less than 5 seconds	Detects in 150ms	
		DTC Fail case 3: Indicates that the HCP has detected an internal processor integrity fault CePISR_e_2ndFailsToTakeRmdlActn	IPT Detects faulty harware in Inhibit path IPT feedback	≠ calibration Value	HV Bat contactor Staus Available MMDR HPMR HV Battery Contactors Motor Faults Motor Speed SRAR shutdowns	= True = Powerdown Wait State = Eval BP Open State >= 80 V = Closed = False <= 10 RPM = False	Up down counter = 3	

DIAGNOSTIC SUMMARY TABLES--MCPB (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					SPI Fault RunCrank Active Ram or ROM fault 12V battery Seed received in wrong order fault Vehicle Speed Seed/Key Timeout Powermode	=False = False = false >11V = false <= 0 MPH = False = off for less than 5 seconds		
		DTC Fail case 4: Indicates that the HCP has detected an internal processor integrity fault CePISR_e_2ndRxIncorrectKeys	Key Value	≠ Calibration Value	1. Number Of Mains 2. IPT status	1. > 0 2. = Not running for > 0.075s	Detects in 150ms or two consecutive faulty keys	
		DTC Fail case 5: Indicates that the HCP has detected an internal processor integrity fault CePISR_e_MainDtctdSdKeyTimeout	seed does not update	within Calibration threshold	1. Number Of Monitors 2. SPI faults	1. > 0 2. = FALSE	Detects in 1 sec	
		DTC Fail case 6: Indicates that the HCP has detected an internal processor integrity fault CePISR_e_MainDtctdSdRxWrongOrdr	Seed sequence	≠ expected order	1. Number Of Monitors 2. SPI faults	1. > 0 2. = FALSE	12 fail counts out of 16 sample counts Executes in a 12.5ms loop Detects in 200ms	

DIAGNOSTIC SUMMARY TABLES--MCPB (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
		DTC Fail case 7: Indicates that the HCP has detected an internal processor integrity fault CePISR_e_MainSequenceFlt	Seed timeout PSW Fault	> 200 ms = True	1. Seed Update Key StoreFault Enable OR 2. Program Sequence Watch Enable	1. = True 2. = True	3 fail counts out of 4 sample counts Executes in a 50ms loop Detects in 200ms	
		DTC Fail case 8: Indicates that the HCP has detected an internal processor integrity fault CePISR_e_MainALU_Flt	HWIO detects Fault	=2 (ina row)	1. ALU Test Enabled 2. Diagnostic system status 3. Code clear active 4. PMDI Low voltage clear diag enable conditons met	1. = TRUE 2. = Enabled 3. >= 0.15s 4. = True	runs continuously in 12.5ms loop Detects in 12.5ms	
		DTC Fail case 9: Indicates that the HCP has detected an internal processor integrity fault CePISR_e_MainCfgRegFlt	HWIO detects Fault	=2 (in arow)	1. Diagnostic Test Enabled 2. Diagnostic system status 3. Code clear active 4. PMDI Low voltage clear diag enable conditons met	1. = TRUE 2. = Enabled 3. >= 0.15s 4. = True	runs continuously in 12.5ms loop Detects in 12.5ms	
		DTC Fail case 10: Indicates that the HCP has detected an internal processor integrity fault CePISR_e_MainStackFlt	HWIO detects Fault	= 5 (Since Powerup)	Diagnostic Test Enabled Diagnostic System Enables	= True =True	Runs Continuously in 100ms loop Detects in 500ms	
		DTC Fail case 11: Indicates that the HCP has detected an internal processor integrity fault CePISR_e_MainADC_Flt	Continuous Fault	> 200ms	1. A2D Converter Test Enabled 2. PT Relay Voltage 3. Run Crank Voltage	1. = TRUE 2. > -1 3. > 7	5 fail counts out of 8 sample counts Executes in a 50ms loop Detects in 200ms	
		DTC Fail case 12: Indicates that the HCP has detected an internal processor integrity fault CePISR_e_RunCrankCorrFlt	Run Crank on Seconday Processor	≠ Run Crank Active	1. Run Crank Discrete Diagnostic Enable 2. SPI Faults	1. = True 2. = False	5 fail counts out of 8 sample counts Executes in a 25ms loop Detects in 200ms	

DIAGNOSTIC SUMMARY TABLES--MCPB (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
		DTC Fail case 13: Indicates that the HCP has detected an internal processor integrity fault CePISR_e_FlashECC_CktTest	HWIO detects Fault	= 3 /10 5/10	1. Flash ECC Circuit Test Enable 2. Power-Up Reset	1. = True 2. = True	3 fail counts out of 10 sample counts (turns on MIL) 5 fail counts out of 10 sample counts (shutdown vehicle) Executes once at every power up reset	
		DTC Fail case 14: Indicates that the HCP has detected an internal processor integrity fault CePISR_e_RAM_ECC_CktTest	HWIO detects Fault	= 3 /10 5/10	1. RAM ECC Circuit Test Enable 2. Power-Up Reset	1. = True 2. = True	3 fail counts out of 10 sample counts (turns on MIL) 5 fail counts out of 10 sample counts (shutdown vehicle) Executes once at every power up reset	
		DTC Fail case 15: Indicates that the HCP has detected an internal processor integrity fault CePISR_e_DMA_XferTest	HWIO detects Fault or Memory Copy Error	= True or =True	Diagnostic Test Enabled	= TRUE		
MCPB Torque Security Diagnostics								
Control Module Long Term Memory Performance	P1ADD	*This Diagnostic tests for unuseable BINVDM (flash) memory only*						One Trip, Type A
		DTC Fail case 1: Indicates that the NVM Error flag **HWIO Bat Write will not succeed** set	Last EEPROM write did not complete		Ignition voltage	≥ 5 volts	1 failure Frequency: Once at power-up	
		DTC Fail case 2: Indicates that the NVM Error flag **HWIO Assembly Cal** set						
		DTC Pass:		NV writewillnotsucceed = fail Assemblycalfail = false				
Drive Motor B Torque Delivered Performance	P0C1A	*This Diagnostic tests that the difference between the motor B torque command slew and the motor torque achieved is greater than a threshold.*						One Trip, Type A
		DTC Fail case 1: The slewed MCP torque command is different by the MCP torque achieved	the commanded torque - the achieved torque	< 138	Ignition switch	in crank or run		
Drive Motor B Control Module Not Programmed	P1A52	*This diagnostic prevents flashing different MCP software into MCP B that does not match its ID*						One Trip, Type A
		DTC Fail case 1: The MCP ID hardware does not match the calibration for the specific MCP	MCP ID Hardware	≠ *Calibration*				
Drive Motor B Control	P1E0B	*This diagnostic detects the torque command path calculation errors*						One

DIAGNOSTIC SUMMARY TABLES--MCPB (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Module Internal Control Module Torque Calculation Performance		**DTC Fail case 1:** If the difference between the Torque achieved primary path signal and the redundant path signal is greater than a threshold (MTQR)	Difference between Primary and Redundant signals	> 164Nm	Fault Active TPTKO Torque Mon Fail	= True = False = True	30 fail counts out of 32 sample counts Executes in a 6.25 ms Loop Detects in 200ms	Trip, Type A
		DTC Fail case 2: If the difference between the Torque Commanded primary path signal and the redundant path signal is greater than a threshold (MTDR)	Difference between Primary and Redundant signals	> 164Nm				
		DTC Fail case 3: Compares the ISSD primary path calculated signal in task 0 rate with redundant signal calculated in 6.25ms and fails if it is different than a threshold (MCUR)	Difference between Primary and Redundant signals	> 50A				
		DTC Fail case 4: Compares the ISSQ primary path calculated signal in task 0 rate with redundant signal calculated in 6.25ms and fails if it is different than a threshold (MCUR)	Difference between Primary and Redundant signals	> 50A				
		DTC Fail case 5: Compares the ISSCmd primary path calculated signal in task 0 rate with redundant signal calculated in 6.25ms and fails if it is different than a threshold (MCDR)	Difference between Primary and Redundant signals	> 50A				

DIAGNOSTIC SUMMARY TABLES--MCPB (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
		DTC Fail case 6: Compares the BEMF Dec primary path calculated signal in task 0 rate with redundant signal calculated in 6.25ms and fails if it is different than a threshold (MCDR)	Difference between Primary and Redundant signals	> .001Nm				
		DTC Fail case 7: Compares the Usdq Limited primary path calculated signal in task 0 rate with redundant signal calculated in 6.25ms and fails if it is different than a threshold (MCCR)	Difference between Primary and Redundant signals	> .5V				
		DTC Fail case 8: Compares the Duty ABC primary path calculated signal in task 0 rate with redundant signal calculated in 6.25ms and fails if it is different than a threshold (SVMR)	**For OverMod:** Mod Index Square or PerfSqr **For Linear:** Mod Index Square or PerfSqr	> .2Nm > 1Nm > .1Nm > .15Nm				
		DTC Fail case 9: Compares the Power Input Watts primary path calculated signal in task 0 rate with redundant signal calculated in 6.25ms and fails if it is different than a threshold (HVTR)	Difference between Primary and Redundant signals	>4000				
		DTC Fail case 10: Compares the VDC Adapt primary path calculated signal in task 0 rate with redundant signal calculated in 6.25ms and fails if it is different than a threshold (HVTR)	Difference between Primary and Redundant signals	> .03V				

DIAGNOSTIC SUMMARY TABLES--MCPB (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
		DTC Fail case 11: Compares the Qest primary path calculated signal in task 0 rate with redundant signal calculated in 6.25ms and fails if it is different than a threshold (HVTR)	Difference between Primary and Redundant signals	> 0Nm				
		DTC Fail case 12: Compares the Motor Speed primary path calculated signal in task 0 rate with redundant signal calculated in 6.25ms and fails if it is different than a threshold (MSPR)	Difference between Primary and Redundant signals	>116 RadPerSec				
Communication Diagnostics								
Lost Comm'n With ECM/PCM on Bus A	U1879	*This diagnostic indicates a lost communication between the MCPB and the ECM on Bus A*						Two Trips, Type B
		DTC Fail case 1: Detects that CAN serial data communication has been lost with the ECM on Bus A	Missed ECM Messages		Run/Crank Voltage OR Powertrain Relay Voltage PowerMode Bus Off Fault Active Normal Communication Enabled Normal Message Transmission Diagnostic System Disable Diagnostic Enable Timer	> 9.5 Volts =RUN =FALSE =TRUE =TRUE =FALSE >=3 sec	Executes in a 6.25ms loop Detects in 500 ms	
Lost Communication With TCM	U1850	*This diagnostic indicates a lost communication between the MCPB and the TCM on Bus A*						Two Trips, Type B
		DTC Fail case 1: Detects that CAN serial data communication has been lost with the TCM on Bus A	Missed TCM Messages		Run/Crank Voltage OR Powertrain Relay Voltage PowerMode Bus Off Fault Active Normal Communication Enabled	> 9.5 Volts =RUN =FALSE =TRUE	Executes in a 6.25ms loop Detects in 500 ms	

DIAGNOSTIC SUMMARY TABLES--MCPB (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					Normal Message Transmission	=TRUE		
					Diagnostic System Disable	=FALSE		
					Diagnostic Enable Timer	>=3 sec		
Lost Comm'n With Hybrid Controller	U1846	*This diagnostic indicates a lost communication between the MCPB and the HCP*						Two Trips, Type B
		Detects that CAN serial data communication has been lost with the HCP	Missed HCP Messages		Run/Crank Voltage OR Powertrain Relay Voltage	> 9.5 Volts	Detects within 500 msec at 6.25 msec loop rate	
					PowerMode	=RUN		
					Bus Off Fault Active	=FALSE		
					Normal Communication Enabled	=TRUE		
					Normal Message Transmission	=TRUE		
					Diagnostic System Disable	=FALSE		
					Diagnostic Enable Timer	>=3 sec		
Lost Comm'n With Hybrid Controller B on Bus B	U182F	*This diagnostic indicates a lost communication between the MCPB and the VICM on Bus B*						Two Trips, Type B
		DTC Fail case 1: Lost Communication with Hybrid Powertrain Control Module B on Bus B (VICM)	Missed VICM Messages		Run/Crank Voltage OR Powertrain Relay Voltage	> 9.5 Volts	Executes in a 6.25ms loop	
							Detects in 500 ms	
					PowerMode	=RUN		
					Bus Off Fault Active	=FALSE		
					Normal Communication Enabled	=TRUE		
					Normal Message Transmission	=TRUE		
					Diagnostic System Disable	=FALSE		
					Diagnostic Enable Timer	>=3 sec		
Lost Comm'n With Hybrid Controller B	U2614	*This diagnostic indicates a lost communication between the MCPB and the VICM*						Two Trips, Type B
		DTC Fail case 1: Lost Communication with Hybrid Powertrain Control Module B on Bus A (VICM)	Missed VICM Messages		Run/Crank Voltage OR Powertrain Relay Voltage	> 9.5 Volts	Executes in a 6.25ms loop	
							Detects in 500 ms	
					PowerMode	=RUN		

DIAGNOSTIC SUMMARY TABLES--MCPB (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					Bus Off Fault Active	=FALSE		
					Normal Communication Enabled	=TRUE		
					Normal Message Transmission	=TRUE		
					Diagnostic System Disable	=FALSE		
					Diagnostic Enable Timer	>=3 sec		

APPENDIX

ALU= Arithmetic Logic Unit
BPCM= Batt Pack Ctrl Module
HWIO= Hardware Input/Output
IGBT= Insulated Gate Bipolar Transistors (Phase Current Controllers)
OOR= Out of Range

EREV Inverter Temperature Sensor Mapping Grid				SAE
Drive Motor A	Phase U	PIM_A	PIM_0	A
	Phase V	PIM_C	PIM_2	E
	Phase W	PIM_B	PIM_1	C
Drive Motor B	Phase U	PIM_C	PIM_2	F
	Phase V	PIM_A	PIM_0	B
	Phase W	PIM_B	PIM_1	D

Time Required Legend:	
X: Fail Counts R: Loop Time T: Fault Detect Time	Y: Sample Counts (N/A if no XofY structure)

DIAGNOSTIC SUMMARY TABLES--ATPC (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
ATPC Voltage Diagnostics								
Sensor Power Supply C Circuit Low	P06E7	Detects Sensor Power Supply (15V) below an acceptable threshold.	Scaled 15V Supply Voltage	< 12.0 V	Wakeup Signal	ON	X: 40 ct Y: 50 ct R: 10.4 ms T: 416 ms OR 300 ms continuous fail time	One Trip, Type A
Sensor Power Supply C Circuit High	P06E8	Detects Sensor Power Supply (15V) above an acceptable threshold.	Scaled 15V Supply Voltage	> 18.0 V	Wakeup Signal	ON	X: 40 ct Y: 50 ct R: 10.4 ms T: 416 ms OR 300 ms continuous fail time	One Trip, Type A
Auxiliary Transmission Fluid Pump Control Module System Voltage Low	P1E19	*This is the 12V system voltage low diagnostic*						Special Type C
		DTC Fail case: Sets when the ignition voltage is below a threshold	Ignition Voltage	<= 10 Volts	Enable Cal RunCrankActive Engine Speed	= true = true >= 0 RPM	5 fail counts out of 6 sample counts Executes in a 1000ms loop Detects in 6 sec	
		DTC Pass:		Ignition Voltage > 10 Volts			1 second	
Auxiliary Transmission Fluid Pump Control Module System Voltage High	P1E1A	*This is the 12V system voltage Hi diagnostic*						Special Type C
		DTC Fail case: Sets when the ignition voltage is above a threshold	Ignition Voltage	>= 18 Volts	Enable Cal RunCrankActive	= true = true		
		DTC Pass:		Ignition Voltage < 18 Volts			1 second	
ATPC Phase Current Diagnostics								
Auxiliary Transmission Fluid Pump Phase U-V-W Circuit/Open	P0C20	Drive Motor "A" Missing Motor Current checks for minimum current in each phase when rotor position is near that peak's phase axis. Each phase is checked individually as rotor turns.	ABS(Peak Phase Axis Current)	< 1A	Inverter State	Run	X: 200 ct Y: N/A R: 0.11 ms T: 22 ms	One Trip, Type A
					High Voltage	> 35V		
					Rotor Position	-30 deg < Phase Axis < +30 deg		
					Current Command	>= 3A		
Auxiliary Transmission Fluid Pump Motor Current High	P0C28	**Fail Case 1**: To detect fast, repeated 3 Phase over currents and to protect IGBT.	U, V, or W Phase current sensor	> 35 A	Wakeup Signal	On	X: 2 cts Y: 30 cts R: 2.08 ms T: 4.2 ms	One Trip, Type A
		Fail Case 2: To detect slow, intermittent 3 Phase over currents and to protect IGBT.					X: 5 cts Y: 50 cts R: 2.08 ms T: 10.4 ms	
Auxiliary Transmission Fluid Pump Motor Phase U Current Sensor Circuit Low	P1E2A	Circuit Low monitor to detect the failure of U-phase current sensor circuit below valid range	U Phase current sensor output at highside	< -30A	Wakeup Signal PWM Output Enabled	ON FALSE	X: 8 ct Y: N/A R: 10.4 ms T: 83 ms	One Trip, Type A

DIAGNOSTIC SUMMARY TABLES--ATPC (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Auxiliary Transmission Fluid Pump Motor Phase U Current Sensor Circuit High	P1E2B	Circuit High monitor to detect the failure of U-phase current sensor circuit above valid range	U Phase current sensor output at highside	> 30A	Wakeup Signal PWM Output Enabled	ON FALSE	X: 4 ct Y: 6 ct R: 10.4 ms T: 42 ms	One Trip, Type A
Auxiliary Transmission Fluid Pump Motor Phase U Current Sensor Circuit Range/Performance	P1E2C	Offset Circuit monitor to detect the failure of U-phase offset current above valid range	U Phase offset current output at highside	> 2A	Wakeup Signal PowerStage No Active DTCs:	ON OPEN P1E2A/P1E2B	X: 8 ct Y: N/A R: 10.4 ms T: 83 ms	One Trip, Type A
Auxiliary Transmission Fluid Pump Motor Phase V Current Sensor Circuit Low	P1E2D	Circuit Low monitor to detect the failure of V-phase current sensor circuit below valid range	V Phase current sensor output at highside	< -30A	Wakeup Signal PWM Output Enabled	ON FALSE	X: 4 ct Y: 6 ct R: 10.4 ms T: 42 ms	One Trip, Type A
Auxiliary Transmission Fluid Pump Motor Phase V Current Sensor Circuit High	P1E2E	Circuit High monitor to detect the failure of V-phase current sensor circuit above valid range	V Phase current sensor output at highside	> 30A	Wakeup Signal PWM Output Enabled	ON FALSE	X: 4 ct Y: 6 ct R: 10.4 ms T: 42 ms	One Trip, Type A
Auxiliary Transmission Fluid Pump Motor Phase V Current Sensor Circuit Range/Performance	P1E2F	Offset Circuit monitor to detect the failure of V-phase offset current above valid range	V Phase offset current output at highside	> 2A	Wakeup Signal PowerStage No Active DTCs:	ON OPEN P1E2D/P1E2E	X: 8 ct Y: N/A R: 10.4 ms T: 83 ms	One Trip, Type A
Auxiliary Transmission Fluid Pump Motor Phase W Current Sensor Circuit Low	P1E30	Circuit Low monitor to detect the failure of W-phase current sensor circuit below valid range	W Phase current sensor output at highside	< -30A	Wakeup Signal PWM Output Enabled	ON FALSE	X: 4 ct Y: 6 ct R: 10.4 ms T: 42 ms	One Trip, Type A
Auxiliary Transmission Fluid Pump Motor Phase W Current Sensor Circuit High	P1E31	Circuit High monitor to detect the failure of W-phase current sensor circuit above valid range	W Phase current sensor output at highside	> 30A	Wakeup Signal PWM Output Enabled	ON FALSE	X: 4 ct Y: 6 ct R: 10.4 ms T: 42 ms	One Trip, Type A
Auxiliary Transmission Fluid Pump Motor Phase W Current Sensor Circuit Range/Performance	P1E32	Offset Circuit monitor to detect the failure of W-phase offset current above valid range	W Phase offset current output at highside	> 2A	Wakeup Signal PowerStage No Active DTCs:	ON OPEN P1E30/P1E31	X: 8 ct Y: N/A R: 10.4 ms T: 83 ms	One Trip, Type A
Auxiliary Transmission Fluid Pump Motor Phase U-V-W Current Sensor Correlation	P1E33	To detect electrical failure of phase current sensor.	Sum of 3 phase currents	> 5A	Wakeup Signal	ON	X: 160 ct Y: 190 ct R: 0.11 ms T: 17.6 ms	One Trip, Type A
ATPC IGBT Diagnostics								
Auxiliary Transmission Fluid Pump Motor Inverter Power Supply Circuit/Open	P1E38	Detects IGBT Bias Faults	Phase A, B, or C Power Supply	FAILED (Status Fault Bit)	Wakeup Signal	ON	X: 67 ct Y: 100 cnt R: 2 ms T: 134 ms	One Trip, Type A
		Monitors hw line to detect loss of power supply to gate drive board.			High Voltage	> 200V		
Auxiliary Transmission Fluid Pump Motor Inverter Performance	P1E39	Detects IGBT Desaturation Faults.	Phase A, B, or C High or Low Side Devices	OVERDRIVEN (Status Fault Bit)	Inverter State	Initialization Complete	66 ms (4 retries at 4ms with a 10ms wait time between each retry)	One Trip, Type A
		Monitors hw status line to detect internal overcurrent faults, shoot through or loss of switching control events			High Voltage	> 200V		

DIAGNOSTIC SUMMARY TABLES--ATPC (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
ATPC Sensorless Controls Diagnostics								
Auxiliary Transmission Fluid Pump Torque Performance	P1E3A	Detects Sensorless Stall of Aux Fluid Pump	Commanded speed - Actual speed	> 200 rpm	Torque command	> 6.8 Nm	X: 400 ct Y:2500 R: 2.08 ms T: 832 ms	One Trip, Type A
Auxiliary Transmission Fluid Pump Overspeed	P179A	To detect when Motor A has exceeded operational maximum speed	ABS(Motor speed) initially	>6500 rpm	Wake up signal	On	X: 10 cts Y: 12 cts R: 10.4ms T: 104ms	One Trip, Type A
Auxiliary Transmission Fluid Pump Control Module Calculated Motor Position Performance	P1E29	Loss of Sensorless Control OR Polarity Detection Fault	Motor Speed Speed Command OR Rotor Speed ERS	< -500 r/min > 0 > 62.8 rad/s	Wake up signal	On	X: 3 cts Y: 5 cts R: 2ms T: 6ms X:100 cts Y:N/A R:2ms Retries: 5 T:1s	One Trip, Type A
ATPC High Voltage (HV) Diagnostics								
Auxiliary Transmission Fluid Pump Control Module Hybrid Battery System Voltage High	P1E27	To detect over voltage and to protect TPIM HV Circuit	HV Sensor Voltage OR Hardware Over Voltage Flag	> 463V = TRUE	Controller Initialization	Complete	X: 3 cts Y: N/A R: 0.0002ms T: 600us	One Trip, Type A
Auxiliary Transmission Fluid Pump Control Module Hybrid Battery Voltage Sense Circuit Low Voltage	P1E20	Circuit Low monitor of HV output voltage sensor	HV Sensor Voltage	<30V	Controller Initialization Run/Crank Contactors	Complete Active Closed	X: 15 cts Y: 20 cts R: 10.4ms T: 156.3ms	One Trip, Type A
Drive Motor "A" Control Module Hybrid Battery Voltage Sense Circuit High Voltage	P1E21	Circuit High monitor of HV output voltage sensor	HV Sensor Voltage	>500 V	Controller Initialization Run/Crank	Complete Active	X: 15 cts Y: 20 cts R: 10.4ms T: 156.3ms	One Trip, Type A
Auxiliary Transmission Fluid Pump Control Module Hybrid Battery System Voltage	P1E28	To check correlation of HV with sum of mid-pack voltages and HV_Battery.	ABS(HV - HV_Battery) AND ABS(HV - sum of mid-pack voltages)	>= 40 V >= 50 V	No Active DTCs: Contactors	P1E20, P1E21 Closed	X: 110 cts Y: 184 cts R: 10.4ms T: 1144ms	Two Trips, Type B
ATPC Isolation Diagnostics								
Auxiliary Transmission Fluid Pump Control Module Hybrid Battery Voltage System Isolation Fault	P1E22	Isolation Lost between mid-pack voltage and chassis	Isolation Ratio (Neg mid-pack voltage / Pos mid-pack voltage)	>4.53	No Active DTCs: Controller Initialization	P1E20, P1E21, P1E28 Complete	X: 250 cts Y: 300 cts R: 10.4ms T: 2600ms	Two Trips, Type B

DIAGNOSTIC SUMMARY TABLES--ATPC (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Auxiliary Transmission Fluid Pump Control Module Hybrid Battery Voltage Isolation Sensor Circuit 1 Low	P1E1C	Circuit 1 Low monitor of Pos mid-pack voltage sensor	Pos mid-pack voltage	<20V	Controller Initialization Run/Crank Contactors	Complete Active Closed	X: 70 cts Y: 100 cts R: 10.4ms T: 729ms	Two Trips, Type B
Auxiliary Transmission Fluid Pump Control Module Hybrid Battery Voltage Isolation Sensor Circuit 1 High	P1E1D	Circuit 1 High monitor of Pos mid-pack voltage sensor	Pos mid-pack voltage - HV OR Pos mid-pack - HV_Bat	>40 V >40V	No Active DTCs: Controller Initialization Run/Crank	P1E20, P1E21, P1E28 Complete Active	X: 70 cts Y: 100 cts R: 10.4ms T: 729ms	Two Trips, Type B
Auxiliary Transmission Fluid Pump Control Module Hybrid Battery Voltage Isolation Sensor Circuit 2 Low	P1E1E	Circuit 2 Low monitor of Neg mid-pack voltage sensor	Neg mid-pack voltage	<20V	Controller Initialization Run/Crank Contactors	Complete Active Closed	X: 70 cts Y: 100 cts R: 10.4ms T: 729ms	Two Trips, Type B
Auxiliary Transmission Fluid Pump Control Module Hybrid Battery Voltage Isolation Sensor Circuit 2 High	P1E1F	Circuit 2 High monitor of Neg mid-pack voltage sensor	Neg mid-pack voltage - HV OR Neg mid-pack - HV_Bat	>40 V >40V	No Active DTCs: Controller Initialization Run/Crank	P1E20, P1E21, P1E28 Complete Active	X: 70 cts Y: 100 cts R: 10.4ms T: 729ms	Two Trips, Type B
Auxiliary Transmission Fluid Pump Control Module Hybrid Battery Voltage Isolation Sensing Performance	P1E1B	To check correlation of sum of mid-pack voltages against HV and HV_Battery	ABS(HV - HV_Battery) AND ABS(HV_Bat - Neg mid-pack - Pos mid-pack) OR ABS(HV - Neg mid-pack - Pos mid-pack) AND ABS(HV_Bat - Neg mid-pack - Pos mid-pack)	>= 40 >= 50 >= 50 >= 50	No Active DTCs: Controller Initialization Run/Crank	P1E20, P1E21, P1E1E, P1E1F, P1E28, P1E1D, P1E1C Complete Active	X: 100 cts Y: 150 cts R: 10.4ms T: 1040 ms	Two Trips, Type B
ATPC Temp Sensor Diagnostics								
Auxiliary Transmission Fluid Pump Motor Inverter Temperature Sensor Circuit High	P1E34	To detect Inverter A Temperature Sensor #1 voltage out of range high	PIM Temp A Temperature	< -58 deg C (near 5V)	Wakeup Signal When malfunction present at start of trip: Cumulative Inverter Warmup Time	ON >=600s	X: 250 cts Y: 350 cts R: 10.4ms T: 2600ms	Two Trips, Type B

DIAGNOSTIC SUMMARY TABLES--ATPC (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					at or above Inverter Warmup Torque Threshold	>=ABS(1 Nm)		
Auxiliary Transmission Fluid Pump Motor Inverter Temperature Sensor Circuit Low	P1E35	To detect Inverter A Temperature Sensor #1 Out of Range low (voltage)	PIM Temp B Temperature	> 130 degC (near 0V)	WakeUp Signal	On	X: 250 cts Y: 350 cts R: 10.4ms T: 2600ms	Two Trips, Type B
Auxiliary Transmission Fluid Pump Motor Inverter Temperature Sensor Circuit Range/Performance	P1E36	Inverter A Temperature Sensor #1 In-Range Rationality Check	ABS(PIMTemp - AVG(PwrElecCoolantTemp and TransTemp)) "ColdStartAvg"	> 20 deg C	Wake Up Signal Propulsion System Inactive Time Thermal Conditioning Off Time Charge Off Time Cold Start Average Temperature Power Electronics Coolant Temperature Available Power Electronics Coolant Temperature Fault Active Tranmission Fluid Temperature Valid Propulsion System Inactive Timer Fault Active Propulsion System Inactive Timer Mask Off Board Charging Inactive Timer Fault Active Off Board Charging Inactive Timer Mask Battery Thermal Conditioning Inactive Fault Active Battery Thermal Conditioning Inactive Mask	On >=21600s >=7200s >=7200s > -20C TRUE FALSE TRUE FALSE Use Data FALSE Use Data FALSE Use Data	300 cts Start Delay PLUS X: 550 cts Y: 700 cts R: 10.4ms T: 2080ms =8.84 sec total	Two Trips, Type B

DIAGNOSTIC SUMMARY TABLES--ATPC (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					Plug In Charging Present No Active Power Inverter Temp Out Of Range Faults:	TRUE P1E34 and P1E35		
Auxiliary Transmission Fluid Pump Motor Inverter Over Temperature	P1E37	To detect an in-range overtemperature condition that can potentially damage inverter	PIM Temp A Temperature	> 98 deg C initial fault	PIM Temperature No Active DTCs:	IN RANGE P1E36	X: 500 cts Y: 1500 cts R: 10.4ms T: 5200ms	Two Trips, Type B
ATPC Controller Diagnostics								
Auxiliary Transmission Fluid Pump Control Module Read Only Memory (ROM)	P1E25	*This Diagnostic tests the checksum on ROM (flash) memory*						One Trip, Type A
		DTC Fail case 1: This DTC will be stored if any check sum in the **boot** is incorrect	Calculated Checksum does not match stored checksum		Ignition Status	= Run or Crank	1 failure if it occurs during the first ROM test of the ignition cycle otherwise 5 failures Frequency: Runs continuously in the background	
		DTC Fail case 2: This DTC will be stored if any check sum in the **calibration** is incorrect						
		DTC Fail case 3: This DTC will be stored if any check sum in the **software** is incorrect						
		DTC Pass:		ROM fault = false 2nd SOH ROM fault = false Main SOH ROM fault = false				
Auxiliary Transmission Fluid Pump Control Module Long Term Memory Performance	P1E24	*This Diagnostic tests for BINVDM errors*						One Trip, Type A
		DTC Fail case 1: Non-volatile memory (**Static**) checksum error at controller power-up	Checksum at power-up does not match checksum at power-down		Ignition Status	= Run or Crank	1 failure Frequency: Once at powerup	
		DTC Fail case 2: Non-volatile memory (**Preserved**) checksum error at controller power-up						
		DTC Fail case 3: Non-volatile memory (**BINVDM**) checksum error at controller power-up						

DIAGNOSTIC SUMMARY TABLES--ATPC (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
		DTC Fail case 4: Non-volatile memory (**ShutdownFinished**) checksum error at controller power-up						
		DTC Pass:		No ROM memory faults				
Auxiliary Transmission Fluid Pump Control Module Random Access Memory (RAM)	P1E23	*This Diagnostic tests the checksum on RAM memory*						One Trip, Type A
		DTC Fail case 1: Indicates that HCP is unable to correctly write and read data to and from **Dual Store** RAM	Data read	does not match data written	Ignition Status	= Run or Crank	Should finish within 30 seconds at all operating conditions	
		DTC Fail case 2: Indicates that HCP is unable to correctly write and read data to and from **Write Protect** RAM						
		DTC Fail case 3: Indicates that HCP is unable to correctly write and read data to and from **2nd SOH** RAM						
		DTC Fail case 4: Indicates that HCP is unable to correctly write and read data to and from **Main SOH** RAM						
		DTC Fail case 5: Indicates that HCP is unable to correctly write and read data to and from **System** RAM						
		DTC Fail case 6: Indicates that HCP is unable to correctly write and read data to and from **Cache** RAM						
		DTC Fail case 7: Indicates that HCP is unable to correctly write and read data to and from **eTPU** RAM						
		DTC Pass:		No errors in 1000ms MainSOH RAM faults = false CommFlts = false System RAM faults = false CacheRam faults = false eTPU RAM faults = false				
Auxiliary Transmission	P0B0D	*This Diagnostic tests all the internal processor integrity subsystems*						One

DIAGNOSTIC SUMMARY TABLES--ATPC (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Fluid Pump Motor Control Module		**DTC Fail case 1:** Indicates that the HCP has detected an internal processor integrity fault CePISR_e_MainDtctdSPI_Flt	HWIO detects Fault	= true (in SPI Hardware)	Run/Crank Voltage OR Powertrain Relay Voltage Diagnostic System Enable Powermoding	> 9.5 Volts = true = Accesory or Off	28 fail counts out of 32 sample counts Executes in a 6.25ms loop Detects in 200ms	Trip, Type A
		DTC Fail case 2: Indicates that the HCP has detected an internal processor integrity fault CePISR_e_2ndNotRunningSeedKyTst	Key Value	= Calibration Value	SRAR shutdowns SPI Fault RunCrank Active Ram or ROM fault 12V battery Seed received in wrong order fault Vehicle Speed Seed/Key Timeout Powermode	= False =False = False = false >11V = false <= 0 MPH = False = off for less than 5 seconds	Detects in 150ms	

DIAGNOSTIC SUMMARY TABLES--ATPC (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
		DTC Fail case 3: Indicates that the HCP has detected an internal processor integrity fault CePISR_e_2ndFailsToTakeRmdlActn	IPT Detects faulty harware in Inhibit path IPT feedback	≠ calibration Value	HV Bat contactor Staus Available MMDR HPMR HV Battery Contactors Motor Faults Motor Speed SRAR shutdowns SPI Fault RunCrank Active Ram or ROM fault	= True = Powerdown Wait State = Eval BP Open State >= 80 V = Closed = False <= 10 RPM = False =False = False = False	Up down counter = 3	
					12V battery Seed received in wrong order fault Vehicle Speed Seed/Key Timeout Powermode	>11V = False <= 0 MPH = False = off for less than 5 seconds		
		DTC Fail case 4: Indicates that the HCP has detected an internal processor integrity fault CePISR_e_2ndRxIncorrectKeys	Key Value	≠ Calibration Value	1. Number Of Mains 2. IPT status	1. > 0 2. = Not running for > 0.075s	Detects in 150ms or two consecutive faulty keys	
		DTC Fail case 5: Indicates that the HCP has detected an internal processor integrity fault CePISR_e_MainDtctdSdKeyTimeout	seed does not update	within Calibration threshold	1. Number Of Monitors 2. SPI faults	1. > 0 2. = FALSE	Detects in 1 sec	

DIAGNOSTIC SUMMARY TABLES--ATPC (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
		DTC Fail case 6: Indicates that the HCP has detected an internal processor integrity fault CePISR_e_MainDtctdSdRxWrongOrdr	Seed sequence	≠ expected order	1. Number Of Monitors 2. SPI faults	1. > 0 2. = FALSE	12 fail counts out of 16 sample counts Executes in a 12.5ms loop Detects in 200ms	
		DTC Fail case 7: Indicates that the HCP has detected an internal processor integrity fault CePISR_e_MainSequenceFlt	Seed timeout PSW Fault	> 200 ms = True	1. Seed Update Key StoreFault Enable OR 2. Program Sequence Watch Enable	1. = True 2. = True	3 fail counts out of 4 sample counts Executes in a 50ms loop Detects in 200ms	
		DTC Fail case 8: Indicates that the HCP has detected an internal processor integrity fault CePISR_e_MainALU_Flt	HWIO detects Fault	=2 (ina row)	1. ALU Test Enabled 2. Diagnostic system status 3. Code clear active 4. PMDI Low voltage clear diag enable conditons met	1. = TRUE 2. = Enabled 3. >= 0.15s 4. = True	runs continuously in 12.5ms loop Detects in 12.5ms	
		DTC Fail case 9: Indicates that the HCP has detected an internal processor integrity fault CePISR_e_MainCfgRegFlt	HWIO detects Fault	=2 (in arow)	1. Diagnostic Test Enabled 2. Diagnostic system status 3. Code clear active 4. PMDI Low voltage clear diag enable conditons met	1. = TRUE 2. = Enabled 3. >= 0.15s 4. = True	runs continuously in 12.5ms loop Detects in 12.5ms	
		DTC Fail case 10: Indicates that the HCP has detected an internal processor integrity fault CePISR_e_MainStackFlt	HWIO detects Fault	= 5 (Since Powerup)	Diagnostic Test Enabled Diagnostic System Enables	= True =True	Runs Continuously in 100ms loop Detects in 500ms	
		DTC Fail case 11: Indicates that the HCP has detected an internal processor integrity fault CePISR_e_MainADC_Flt	Continuous Fault	> 200ms	1. A2D Converter Test Enabled 2. PT Relay Voltage 3. Run Crank Voltage	1. = TRUE 2. > -1 3. > 7	5 fail counts out of 8 sample counts Executes in a 50ms loop Detects in 200ms	
		DTC Fail case 12: Indicates that the HCP has detected an internal processor integrity fault CePISR_e_RunCrankCorrFlt	Run Crank on Seconday Processor	≠ Run Crank Active	1. Run Crank Discrete Diagnostic Enable 2. SPI Faults	1. = True 2. = False	5 fail counts out of 8 sample counts Executes in a 25ms loop Detects in 200ms	

DIAGNOSTIC SUMMARY TABLES--ATPC (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
		DTC Fail case 13: Indicates that the HCP has detected an internal processor integrity fault CePISR_e_FlashECC_CktTest	HWIO detects Fault	= 3 /10 5/10	1. Flash ECC Circuit Test Enable 2. Power-Up Reset	1. = True 2. = True	3 fail counts out of 10 sample counts (turns on MIL) 5 fail counts out of 10 sample counts (shutdown vehicle) Executes once at every power up reset	
		DTC Fail case 14: Indicates that the HCP has detected an internal processor integrity fault CePISR_e_RAM_ECC_CktTest	HWIO detects Fault	= 3 /10 5/10	1. RAM ECC Circuit Test Enable 2. Power-Up Reset	1. = True 2. = True	3 fail counts out of 10 sample counts (turns on MIL) 5 fail counts out of 10 sample counts (shutdown vehicle) Executes once at every power up reset	
		DTC Fail case 15: Indicates that the HCP has detected an internal processor integrity fault CePISR_e_DMA_XferTest	HWIO detects Fault or Memory Copy Error	= True or =True	Diagnostic Test Enabled	= TRUE		
Auxiliary Transmission Fluid Pump Control Module Long Term Memory Reset	P1EB8	*This Diagnostic tests for unuseable BINVDM (flash) memory only*						One Trip, Type A
		DTC Fail case 1: Indicates that the NVM Error flag **HWIO Bat Write will not succeed** set	Last EEPROM write did not complete		Ignition voltage	≥ 5 volts	1 failure Frequency: Once at power-up	
		DTC Fail case 2: Indicates that the NVM Error flag **HWIO Assembly Cal** set			Ignition voltage	≥ 5 volts	1 failure Frequency: Once at power-up	
		DTC Pass:		NV writewillnotsucceed = fail Assemblycalfail = false				
Auxiliary Transmission Fluid Pump Motor Control Module Not Programmed	P1BFF	*This diagnostic prevents flashing different MCP software into MCP C that does not match its ID*						One Trip, Type A
		DTC Fail case 1: The MCP ID hardware does not match the calibration for the specific MCP	MCP ID Hardware	≠ *Calibration*				
Control Module Long Term Memory Reset	P1EB8	*This Diagnostic tests for BINVDM errors*						One Trip, Type A
		DTC Fail case 1: Non-volatile memory (**Static**) checksum error at controller power-up	Checksum at power-up does not match checksum at power-down		Ignition Status	= Run or Crank	1 failure Frequency: Once at powerup	

DIAGNOSTIC SUMMARY TABLES--ATPC (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
		DTC Fail case 2: Non-volatile memory (**Preserved**) checksum error at controller power-up						
		DTC Fail case 3: Non-volatile memory (**BINVDM**) checksum error at controller power-up						
		DTC Fail case 4: Non-volatile memory (**ShutdownFinished**) checksum error at controller power-up						
		DTC Pass:		No ROM memory faults				
ATPC Comm'n								
Lost Comm'n With ECM/PCM on Bus A	U1839	*This diagnostic indicates a lost communication between the ATPC and the ECM on Bus A*						Two Trips, Type B
		DTC Fail case 1: Detects that CAN serial data communication has been lost with the ECM on Bus A	Missed ECM Messages		Run/Crank Voltage OR Powertrain Relay Voltage PowerMode Bus Off Fault Active Normal Communication Enabled Normal Message Transmission Diagnostic System Disable Diagnostic Enable Timer	> 9.5 Volts =RUN =FALSE =TRUE =TRUE =FALSE >=3 sec	Executes in a 6.25ms loop Detects in 500 ms	
Lost Comm'n With TCM	U183B	*This diagnostic indicates a lost communication between the ATPC and the TCM on Bus A*						Two Trips, Type B
		DTC Fail case 1: Detects that CAN serial data communication has been lost with the TCM on Bus A	Missed TCM Messages		Run/Crank Voltage OR Powertrain Relay Voltage PowerMode Bus Off Fault Active Normal Communication Enabled Normal Message Transmission	> 9.5 Volts =RUN =FALSE =TRUE =TRUE	Executes in a 6.25ms loop Detects in 500 ms	

DIAGNOSTIC SUMMARY TABLES--ATPC (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					Diagnostic System Disable	=FALSE		
					Diagnostic Enable Timer	>=3 sec		
Lost Comm'n With Hybrid Controller	U2611	*This diagnostic indicates a lost communication between the ATPC and the HCP*						Two Trips, Type B
		Detects that CAN serial data communication has been lost with the HCP	Missed HCP Messages		Run/Crank Voltage OR Powertrain Relay Voltage	> 9.5 Volts	Detects within 500 msec at 6.25 msec loop rate	
					PowerMode	=RUN		
					Bus Off Fault Active	=FALSE		
					Normal Communication Enabled	=TRUE		
					Normal Message Transmission	=TRUE		
					Diagnostic System Disable	=FALSE		
					Diagnostic Enable Timer	>=3 sec		
Lost Comm'n With Hybrid Controller B	U183C	*This diagnostic indicates a lost communication between the ATPC and the VICM on Bus A*						Two Trips, Type B
		DTC Fail case 1: Lost Communication with Hybrid Powertrain Control Module B on Bus B (VICM)	Missed VICM Messages		Run/Crank Voltage OR Powertrain Relay Voltage	> 9.5 Volts	Executes in a 6.25ms loop	
					PowerMode	=RUN	Detects in 500 ms	
					Bus Off Fault Active	=FALSE		
					Normal Communication Enabled	=TRUE		
					Normal Message Transmission	=TRUE		
					Diagnostic System Disable	=FALSE		
					Diagnostic Enable Timer	>=3 sec		
Lost Comm'n With Hybrid Controller B	U2615	*This diagnostic indicates a lost communication between the ATPC and the VICM*						Two Trips, Type B
		DTC Fail case 1: Lost Communication with Hybrid Powertrain Control Module B on Bus A (VICM)	Missed VICM Messages		Run/Crank Voltage OR Powertrain Relay Voltage	> 9.5 Volts	Executes in a 6.25ms loop	
					PowerMode	=RUN	Detects in 500 ms	

DIAGNOSTIC SUMMARY TABLES--ATPC (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					Bus Off Fault Active	=FALSE		
					Normal Communication Enabled	=TRUE		
					Normal Message Transmission	=TRUE		
					Diagnostic System Disable	=FALSE		
					Diagnostic Enable Timer	>=3 sec		

Time Required Legend:	
X: Fail Counts R: Loop Time T: Fault Detect Time	Y: Sample Counts (N/A if no XofY structure)

DIAGNOSTIC SUMMARY TABLES--EACCM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
A/C Compressor Control Module Ignition Switch	P15BA	Run/Crank circuit is stuck on	Run/Crank input AND GMLAN Signal "VICM Run Crank Terminal Status"	ON INACTIVE	System Voltage Comm with VICM	12V System Status > 10.25 V Message $236 recd.	5 fails out of 10 samples. Continuous sampling at 50 msec/sample	One Trip, Type A
A/C Compressor Control Module Ignition Switch	P15B9	Run/Crank circuit is stuck off	Run/Crank input AND GMLAN Signal "VICM Run Crank Terminal Status"	= OFF = ACTIVE	System Voltage HW Inputs Comm with VICM	12V System Status > 10.25 V Accessory Message $236 recd.	5 fails out of 10 samples. Continuous sampling at 50	One Trip,
A/C Compressor Motor Voltage Sensor Circuit High	P0D6A	Monitor High Voltage input to ACCM	Sets when HV >= Threshold	450V	System Voltage HW Inputs HV Battery Normal Operation Compressor Input Voltage reading within 15 V of Battery Cell Voltage reading	12V System Status > 10.25 V Accessory OR Run/Crank Battery Cell Voltage Fault Active is FALSE	30 fails out of 60 samples. Continuous 50 msec sampling rate	Two Trips, Type B
		Status Pass	HV <= Threshold	440V	System Voltage HW Inputs Speed Request Reset	12V System Status > 10.25 V Accessory OR Run/Crank After a fail, Speed request needs to go to 0 before PASS will be enabled.	30 fails out of 60 samples. Continuous 50 msec sampling rate	
A/C Compressor Motor Voltage Sensor Circuit Low	P0D6B	Monitor High Voltage input to ACCM	Sets when HV <= Threshold	190V	System Voltage HW Inputs Contactors Closed with no faults HV Battery Normal Operation Compressor Input Voltage reading within 15 V of Battery Cell Voltage reading	12V System Status > 10.25 V Accessory OR Run/Crank High Voltage Battery Contactor is CLOSED for 6.2 sec AND High Voltage Battery Contactor Fault Active is FALSE Battery Cell Voltage Fault Active is FALSE	30 fails out of 60 samples. Continuous 50 msec sampling rate	Two Trips, Type B
		Status Pass	HV >= Threshold	200V	System Voltage HW Inputs Speed Request Reset	12V System Status > 10.25 V Accessory OR Run/Crank After a fail, Speed request needs to go to 0 before PASS will be enabled.	30 passes out of 60 samples. Continuous 50 msec sampling rate	
A/C Compressor Motor Instantaneous Voltage High	P1ECA	Monitor High Voltage input to ACCM	Sets when HV >= Threshold	480V	System Voltage HW Inputs	12V System Status > 10.25 V Accessory OR Run/Crank	1 fail out of 1 sample Continuous 50 msec sampling rate	Two Trips, Type B
		Status Pass	HV <= Threshold	440V	System Voltage HW Inputs Speed Request Reset	12V System Status > 10.25 V Accessory OR Run/Crank After a fail, Speed request needs to go to 0 before PASS will be enabled.	1 pass out of 1 sample Continuous 50 msec sampling rate	
A/C Compressor Motor Phase U Current Low	P0D7A	Monitor U-phase motor current	U-phase Input >= Threshold	68 Amps	System Voltage HW Inputs	12V System Status > 10.25 V Accessory OR Run/Crank	30 fails out of 60 samples. Continuous 50 msec	Two Trips,

DIAGNOSTIC SUMMARY TABLES--EACCM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					Motor Stopped	Thermal Refrigerant Compressor Speed Request = 0 RPM	sampling rate	Type B
		Status Pass	U-phase Input < Threshold	68 Amps	System Voltage	12V System Status > 10.25 V	30 passes out of 60 samples. Continuous 50 msec sampling rate	
					HW Inputs	Accessory OR Run/Crank		
					ECU reset	After a FAIL a 12V reset is required before PASS will be enabled.		
A/C Compressor Motor Phase U Current High	P0D7B	Monitor U-phase motor current	U-phase Input <= Threshold	-68 Amps	System Voltage	12V System Status > 10.25 V	30 fails out of 60 samples. Continuous 50 msec sampling rate	Two Trips, Type B
					HW Inputs	Accessory OR Run/Crank		
					Motor Stopped	Thermal Refrigerant Compressor Speed Request = 0 RPM		
		Status Pass	U-phase Input > Threshold	-68 Amps	System Voltage	12V System Status > 10.25 V	30 passes out of 60 samples. Continuous 50 msec sampling rate	
					HW Inputs	Accessory OR Run/Crank		
					ECU reset	After a FAIL a 12V reset is required before PASS will be enabled.		
A/C Compressor Motor Phase V Current Low	P0D7C	Monitor V-phase motor current	V-phase Input >= Threshold	68 Amps	System Voltage	12V System Status > 10.25 V	30 fails out of 60 samples. Continuous 50 msec sampling rate	Two Trips, Type B
					HW Inputs	Accessory OR Run/Crank		
					Motor Stopped	Thermal Refrigerant Compressor Speed Request = 0 RPM		
		Status Pass	V-phase Input < Threshold	68 Amps	System Voltage	12V System Status > 10.25 V	30 passes out of 60 samples. Continuous 50 msec sampling rate	
					HW Inputs	Accessory OR Run/Crank		
					ECU reset	After a FAIL a 12V reset is required before PASS will be enabled.		
A/C Compressor Motor Phase V Current High	P0D7D	Monitor V-phase motor current	V-phase Input <= Threshold	-68 Amps	System Voltage	12V System Status > 10.25 V	30 fails out of 60 samples. Continuous 50 msec sampling rate	Two Trips, Type B
					HW Inputs	Accessory OR Run/Crank		
					Motor Stopped	Thermal Refrigerant Compressor Speed Request = 0 RPM		
		Status Pass	V-phase Input > Threshold	-68 Amps	System Voltage	12V System Status > 10.25 V	30 passes out of 60 samples. Continuous 50 msec sampling rate	
					HW Inputs	Accessory OR Run/Crank		
					ECU reset	After a FAIL a 12V reset is required before PASS will be enabled.		
A/C Compressor Motor Phase W Current Low	P0D7E	Monitor W-phase motor current	W-phase Input >= Threshold	68 Amps	System Voltage	12V System Status > 10.25 V	30 fails out of 60 samples. Continuous 50 msec sampling rate	Two Trips, Type B
					HW Inputs	Accessory OR Run/Crank		
					Motor Stopped	Thermal Refrigerant Compressor Speed Request = 0 RPM		
		Status Pass	W-phase Input < Threshold	68 Amps	System Voltage	12V System Status > 10.25 V	30 passes out of 60 samples. Continuous 50 msec sampling rate	
					HW Inputs	Accessory OR Run/Crank		
					ECU reset	After a FAIL a 12V reset is required before PASS will be enabled.		
A/C Compressor Motor Phase W Current High	P0D7F	Monitor W-phase motor current	W-phase Input <= Threshold	-68 Amps	System Voltage	12V System Status > 10.25 V	30 fails out of 60 samples. Continuous 50 msec sampling rate	Two Trips, Type B
					HW Inputs	Accessory OR Run/Crank		
					Motor Stopped	Thermal Refrigerant Compressor Speed Request = 0 RPM		

DIAGNOSTIC SUMMARY TABLES--EACCM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
		Status Pass	W-phase Input > Threshold	-68 Amps	System Voltage	12V System Status > 10.25 V	30 passes out of 60 samples. Continuous 50 msec sampling rate	
					HW Inputs	Accessory OR Run/Crank		
					ECU reset	After a FAIL a 12V reset is required before PASS will be enabled.		
A/C Compressor Motor Instantaneous Current High	P1EC9	Monitor DC Link current	Sets when DC Link > Threshold	60A	System Voltage	12V System Status > 10.25 V	1 fail out of 1 sample Continuous 50 msec sampling rate	Two Trips, Type B
					HW Inputs	Accessory OR Run/Crank		
		Status Pass	DC Link <= Threshold	60A	System Voltage	12V System Status > 10.25 V	1 pass out of 1 sample Continuous 50 msec sampling rate	
					HW Inputs	Accessory OR Run/Crank		
					Motor Running	Motor Spinning and reaching Speed Request (Thermal Refrigerant Compressor Speed Request > 0 RPM)		
					Speed Request Reset	After a fail, Speed request needs to go to 0 before PASS will be enabled.		
					Clear Codes	After 10 fails, need clear code from VICM		
A/C Compressor Motor Current High	P0D6F	Monitor DC Link current	Sets when DC Link > Threshold	27A	System Voltage	12V System Status > 10.25 V	30 fails out of 60 samples. Continuous 50 msec sampling rate	Two Trips, Type B
					HW Inputs	Accessory OR Run/Crank		
					Motor Running	Thermal Refrigerant Compressor Speed Request > 0 RPM		
		Status Pass	Input <= Threshold	27A	System Voltage	12V System Status > 10.25 V	30 passes out of 60 samples. Continuous 50 msec sampling rate	
					HW Inputs	Accessory OR Run/Crank		
					Motor Running	Motor Spinning and reaching Speed Request (Thermal Refrigerant Compressor Speed Request > 0 RPM)		
					Speed Request Reset	After a fail, Speed request needs to go to 0 before PASS will be enabled.		
A/C Compressor Control Module Random Access Memory (RAM) Error	P16B8	RAM memory read/write check	Sets on read/write fault to RAM		System Voltage	12V System Status > 10.25 V	< 250 msec after boot	One Trip, Type A
					HW Inputs	Accessory OR Run/Crank		
					Start up	Upon CPU boot (Run/Crank or ACC transition high)		
		Status Pass			System Voltage	12V System Status > 10.25 V		
					HW Inputs	Accessory OR Run/Crank		
					ECU reset	After a FAIL a 12V reset is required before PASS will be enabled.		
A/C Compressor Control Module Read Only Memory (ROM) Error	P16B9	ROM memory check sum	Sets on check sum error with ROM		System Voltage	12V System Status > 10.25 V	< 250 msec after boot	One Trip, Type A
					HW Inputs	Accessory OR Run/Crank		
					Start up	Upon CPU boot (Run/Crank or ACC transition high)		
		Status Pass			System Voltage	12V System Status > 10.25 V		
					HW Inputs	Accessory OR Run/Crank		
					ECU reset	After a FAIL a 12V reset is required before PASS will be enabled.		
A/C Compressor Control Module Keep Alive	P16BA	EEPROM memory check sum	Sets on check sum error with EEPROM		System Voltage	12V System Status > 10.25 V	< 250 msec after boot	One Trip,
					HW Inputs	Accessory OR Run/Crank		

DIAGNOSTIC SUMMARY TABLES--EACCM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Memory (KAM) Error					Start up	Upon CPU boot (Run/Crank or ACC transition high)		Type A
		Status Pass			System Voltage	12V System Status > 10.25 V		
					HW Inputs	Accessory OR Run/Crank		
					ECU reset	After a FAIL a 12V reset is required before PASS will be enabled.		
Electric A/C Compressor Control Module Lost Communication with Hybrid Powertrain Control Module B	U1860	Loss of communication with VICM ECU	Message $236 missed	30 times	System Voltage	12V System Status > 10.25 V	3 sec	Two Trips, Type B
		Status Pass	Message $236 detected		HW Inputs	Accessory OR Run/Crank		
				1 time	System Voltage	12V System Status > 10.25 V	< 110 msec. 10 msec scan rate	
					HW Inputs	Accessory OR Run/Crank		
Electric A/C Compressor Control Module Lost Communication with Hybrid Powertrain Control Module 1	U2608	Loss of communication with HCP ECU	Message $1DF missed	30 times	System Voltage	12V System Status > 10.25 V	3 sec	Two Trips, Type B
					HW Inputs	Accessory OR Run/Crank		
		Status Pass	Message $1DF detected	1 time	System Voltage	12V System Status > 10.25 V	< 110 msec. 10 msec scan rate	
					HW Inputs	Accessory OR Run/Crank		
Electric A/C Compressor Control Module Internal Temperature Sensor Circuit High	P0D72	Monitor ACCM CPU temperature	Tcpu input < Threshold	-40 deg C	System Voltage	12V System Status > 10.25 V	30 fails out of 60 samples. Continuous 50 msec sampling rate	Two Trips, Type B
					HW Inputs	Accessory OR Run/Crank		
					Outside Air Temperature	OAT > -7 deg C		
		Status Pass	Tcpu input >= Threshold	-40 deg C	System Voltage	12V System Status > 10.25 V	30 passes out of 60 samples. Continuous 50 msec sampling rate	
					HW Inputs	Accessory OR Run/Crank		
					ECU reset	After a FAIL a 12V reset is required before PASS will be enabled.		
					Outside Air Temperature	OAT > -7 deg C		
Electric A/C Compressor Control Module Internal Temperature Sensor Circuit Low	P0D73	Monitor ACCM CPU temperature	Tcpu input > Threshold	274 deg C	System Voltage	12V System Status > 10.25 V	30 fails out of 60 samples. Continuous 50 msec	Two Trips, Type B
		Status Pass	Tcpu input <= Threshold	274 deg C	HW Inputs	Accessory OR Run/Crank	30 passes out of 60 samples. Continuous 50 msec sampling rate	
					System Voltage	12V System Status > 10.25 V		
					HW Inputs	Accessory OR Run/Crank		
					ECU reset	After a FAIL a 12V reset is required before PASS will be enabled.		
Electric A/C Compressor Control Module Output Driver Temperature Sensor Circuit High	P0D77	Monitor ACCM IGBT temperature	Tigbt input = Threshold	-40 deg C	System Voltage	12V System Status > 10.25 V	30 fails out of 60 samples. Continuous 50 msec sampling rate	Two Trips, Type B
					HW Inputs	Accessory OR Run/Crank		
					Motor Speed Request	Compressor speed request > 0 rpm		
					Outside Air Temperature	OAT > -7 deg C		
		Status Pass	Tigbt input >= Threshold	-40 deg C	System Voltage	12V System Status > 10.25 V	30 passes out of 60 samples. Continuous 50 msec sampling rate	
					HW Inputs	Accessory OR Run/Crank		
					ECU reset	After a FAIL a 12V reset is required before PASS will be enabled.		
					Outside Air Temperature	OAT > -7 deg C		
Electric A/C Compressor Control Module Output	P0D78	Monitor ACCM IGBT temperature	Tigbt input > Threshold	274 deg C	System Voltage	12V System Status > 10.25 V	30 fails out of 60 samples. Continuous 50 msec	Two Trips,
					HW Inputs	Accessory OR Run/Crank		

DIAGNOSTIC SUMMARY TABLES--EACCM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Driver Temperature Sensor Circuit Low		Status Pass	Tigbt input <= Threshold	274 deg C	System Voltage	12V System Status > 10.25 V	30 passes out of 60 samples. Continuous 50 msec sampling rate	Type B
					ECU reset	After a FAIL a 12V reset is required before PASS will be enabled.		
A/C Compressor Control Module Wake-up Circuit Performance	P16B7	ACC circuit is stuck off	Accessory	OFF	System Voltage	12V System Status > 10.25 V	500 msec	Two Trips, Type B
					HW Inputs	Run/Crank		
					Prop Sys Active	Propulsion System Active = True		
					Timer	500 msec		
		Status Pass	Accessory	ON	System Voltage	12V System Status > 10.25 V	500 msec	
					HW Inputs	Run/Crank		
					Prop Sys Active	Propulsion System Active = True		
					Timer	500msec		
A/C Compressor Motor Start-Up Current Performance	P1F0B	Monitor Inverter Phase Currents	During driver circuit check for all U/V/W Phases, if any current < Threshold	1 A	System Voltage	12V System Status > 10.25 V	< 50 msec	Two Trips, Type B
					HW Inputs	Accessory OR Run/Crank		
					Motor Startup			
					Motor Running	Thermal Refrigerant Compressor Speed Request > 0 RPM		
		Status Pass	During driver circuit check for all U/V/W Phases, all currents >= Threshold	1 A	System Voltage	12V System Status > 10.25 V	1 pass out of 1 sample Continuous 50 msec sampling rate	
					HW Inputs	Accessory OR Run/Crank		
					ECU reset	After a FAIL a 12V reset is required before PASS will be enabled.		
					Motor Running	Thermal Refrigerant Compressor Speed Request > 0		
Electric A/C Compressor Control Module A/C Compressor Motor Current Feedback Circuit High	P1F0D	Monitor ACCM DC Link Current	Current input >= Threshold	36.7 Amps	System Voltage	12V System Status > 10.25 V	30 fails out of 60 samples. Continuous 50 msec sampling rate	Two Trips, Type B
					HW Inputs	Accessory OR Run/Crank		
					Motor Stopped	Thermal Refrigerant Compressor Speed Request = 0 RPM		
		Status Pass	Current input < Threshold	36.7 Amps	System Voltage	12V System Status > 10.25 V	30 passes out of 60 samples. Continuous 50 msec sampling rate	
					HW Inputs	Accessory OR Run/Crank		
					Motor Stopped	Thermal Refrigerant Compressor Speed Request = 0 RPM		
Electric A/C Compressor Control Module A/C Compressor Motor Current Feedback Circuit Low	P1F0C	Monitor ACCM DC Link Current	Current input <= Threshold	-2.5 Amps	System Voltage	12V System Status > 10.25 V	30 fails out of 60 samples. Continuous 50 msec sampling rate	Two Trips, Type B
					HW Inputs	Accessory OR Run/Crank		
					Motor Running	Thermal Refrigerant Compressor Speed Request > 0 RPM		

DIAGNOSTIC SUMMARY TABLES--EACCM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					Peak Motor Current	Exceeds threshold specified in EACCM Supporting Tables for 50 ms		
		Status Pass	Current input > Threshold	-2.5 Amps	System Voltage	12V System Status > 10.25 V	30 passes out of 60 samples. Continuous 50 msec	
					HW Inputs	Accessory OR Run/Crank		
					Motor Running	$236 Speed Request > 0		
A/C Compressor Motor Speed Performance	P1F0A	Monitor ACCM Motor Speed	Motor Speed < Threshold	1800 rpm	System Voltage	12V System Status > 10.25 V	20 sec	Two Trips, Type B
					HW Inputs	Accessory OR Run/Crank		
					Motor Startup	Motor Spinning but not reaching 1800 RPM		
					IGBT Temp	Tigbt < 85 degC		
					Timer	> 20 sec after motor starts spinning		
					OR			
					System Voltage	12V System Status > 10.25 V	1 min	
					HW Inputs	Accessory OR Run/Crank		
					Motor Startup	Motor Spinning but not reaching 1800 RPM		
					IGBT Temp	Tigbt > 85 degC		
					Increase in IGBT Temp	ΔTigbt >= 10 degC		
					Timer	> 1 min after motor starts spinning and IGBT Temp increases 10 deg		
		Status Pass	Motor Speed >= Threshold	1800 rpm	System Voltage	12V System Status > 10.25 V	15min	
					HW Inputs	Accessory OR Run/Crank		
					Motor Running	Thermal Refrigerant Compressor Speed Request > 0		
					ECU Reset	after a FAIL a 12V reset and 15 minutes is required to re-try the compressor.		

DIAGNOSTIC SUMMARY TABLES--OBCM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Battery Charger 14 Volt Output Current Sensor Circuit Low (12VC)	P0D49	DTC Fail Sets when the LV Current raw data, (12VC _AD_READ), is less than or equal to a threshold	Low Voltage DC Current (sensor reading)	<= 0.293 Amps	Low Voltage DC (Secondary) micro status	is AWAKE*	400 ms in a 500 ms window	One Trip, Type A
		DTC Pass	Low Voltage DC Current (sensor reading)	> 0.293 Amps			500 ms	
Battery Charger 14 Volt Output Current Sensor Circuit High (12VC)	P0D4A	DTC Fail Sets when the LV Current raw data, (12VC _AD_READ), is greater than or equal to a threshold	Low Voltage DC Current (sensor reading)	>= 54 Amps	Low Voltage DC (Secondary) micro status	is AWAKE*	400 ms in a 500 ms window	One Trip, Type A
		DTC Pass	Low Voltage DC Current (sensor reading)	< 54 Amps			500 ms	
Battery Charger 14 Volt Output Voltage Sensor Circuit Low (LVS)	P0D44	DTC Fail Sets when the LV Voltage raw data, (LVS _AD_READ), is less than or equal to a threshold	Low Voltage DC Voltage (sensor reading)	<= 1.87 Volts	Low Voltage DC (Secondary) micro status	is AWAKE*	400 ms in a 500 ms window	One Trip, Type A
		DTC Pass	Low Voltage DC Voltage (sensor reading)	> 1.87 Volts			500 ms	
Battery Charger 14 Volt Output Voltage Sensor Circuit High (LVS)	P0D45	DTC Fail Sets when the LV Voltage raw data, (LVS _AD_READ), is greater than or equal to a threshold	Low Voltage DC Voltage (sensor reading)	>= 16.88 Volts	Low Voltage DC (Secondary) micro status	is AWAKE*	400 ms in a 500 ms window	Two Trips, Type B
		DTC Pass	Low Voltage DC Voltage (sensor reading)	< 16.88 Volts			500 ms	
Battery Charger Cold Plate Temperature Sensor Circuit Low (THCP)	P1ED6	DTC Fail Sets when the Cold Plate Temperature raw data, (THCP _AD_READ), is less than or equal to a threshold	Cold Plate Temperature (sensor reading)	<= -49.5 ℃	Low Voltage DC (Secondary) micro status	is AWAKE*	1000 ms in a 1275 ms window	One Trip, Type A
		DTC Pass	Cold Plate Temperature (sensor reading)	> -49.5 ℃			1275 ms	
Battery Charger Cold Plate Temperature Sensor Circuit High (THCP)	P1ED7	DTC Fail Sets when the Cold Plate Temperature raw data, (THCP _AD_READ), is greater than or equal to a threshold	Cold Plate Temperature (sensor reading)	>= 135 ℃	Low Voltage DC (Secondary) micro status	is AWAKE*	1000 ms in a 1275 ms window	One Trip, Type A
		DTC Pass	Cold Plate Temperature (sensor reading)	< 135 ℃			1275 ms	

DIAGNOSTIC SUMMARY TABLES--OBCM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Battery Charger Control Module Reference Voltage "B" Circuit Low (Sec Reference Voltage)	P1EE9	DTC Fail Sets when the SEC Reference Voltage raw data,(SecVref _AD_READ), is less than or equal to a threshold	Low Voltage DC (Secondary) Micro Reference Voltage	<= 0.782 Volts	Low Voltage DC (Secondary) micro status	is AWAKE*	400 ms in a 500 ms window	One Trip, Type A
		DTC Pass	Low Voltage DC (Secondary) Micro Reference Voltage	> 0.782 Volts			500 ms	
Battery Charger Control Module Reference Voltage "B" Circuit High (Sec Reference Voltage)	P1EEA	DTC Fail Sets when the Sec Reference Voltage raw data,(SecVref _AD_READ), is greater than or equal to a threshold	Low Voltage DC (Secondary) Micro Reference Voltage	>= 1.407 Volts	Low Voltage DC (Secondary) micro status	is AWAKE*	400 ms in a 500 ms window	One Trip, Type A
		DTC Pass	Low Voltage DC (Secondary) Micro Reference Voltage	< 1.407 Volts			500 ms	
Battery Charger Hybrid/EV Battery Output Voltage Sensor Circuit Low (HVS)	P0D4E	DTC Fail Sets when the HV Voltage raw data,(HVS _AD_READ), is less than or equal to a threshold	High Voltage DC Voltage (sensor reading)	<= 2.62 Volts	Low Voltage DC (Secondary) micro status	is AWAKE*	400 ms in a 500 ms window	One Trip, Type A
					High Voltage DC (HV) micro status	is AWAKE*		
		DTC Pass	High Voltage DC Voltage (sensor reading)	> 2.62 Volts			500 ms	
Battery Charger Hybrid/EV Battery Output Voltage Sensor Circuit High (HVS)	P0D4F	DTC Fail Sets when the HV Voltage raw data,(HVS _AD_READ), is greater than or equal to a threshold	High Voltage DC Voltage (sensor reading)	>= 482 Volts	Low Voltage DC (Secondary) micro status	is AWAKE*	400 ms in a 500 ms window	One Trip, Type A
					High Voltage DC (HV) micro status	is AWAKE*		
		DTC Pass	High Voltage DC Voltage (sensor reading)	< 482 Volts			500 ms	
Battery Charger Hybrid/EV Battery Output Current Sensor Circuit Low (HVC)	P0D53	DTC Fail Sets when the HV Current raw data,(HVC_AD_READ), is less than or equal to a threshold	High Voltage DC Current (sensor reading)	<= 0.098 Amps	Low Voltage DC (Secondary) micro status	is AWAKE*	400 ms in a 500 ms window	One Trip, Type A
					High Voltage DC (HV) micro status	is AWAKE*		
		DTC Pass	High Voltage DC Current (sensor reading)	> 0.098 Amps			500 ms	
Battery Charger Hybrid/EV Battery Output Current Sensor Circuit High (HVC)	P0D54	DTC Fail Sets when the HV Current raw data,(HVC_AD_READ), is greater than or equal to a threshold	High Voltage DC Current (sensor reading)	>= 17.7 Amps	Low Voltage DC (Secondary) micro status	is AWAKE*	400 ms in a 500 ms window	One Trip, Type A

DIAGNOSTIC SUMMARY TABLES--OBCM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					High Voltage DC (HV) micro status	is AWAKE*		
		DTC Pass	High Voltage DC Current (sensor reading)	< 17.7 Amps			500 ms	
Battery Charger Control Module Reference Voltage "C" Circuit Low (HV Reference Voltage)	P1EEB	DTC Fail Sets when the HV Reference Voltage raw data,(HVVref_AD_READ), is less than or equal to a threshold	High Voltage DC (HV) Micro Reference Voltage	<= 0.782 Volts	Low Voltage DC (Secondary) micro status	is AWAKE*	400 ms in a 500 ms window	One Trip, Type A
					High Voltage DC (HV) micro status	is AWAKE*		
		DTC Pass	High Voltage DC (HV) Micro Reference Voltage	> 0.782 Volts			500 ms	
Battery Charger Control Module Reference Voltage "C" Circuit High (HV Reference Voltage)	P1EEC	DTC Fail Sets when the HV Reference Voltage raw data,(HVVref_AD_READ), is greater than or equal to a threshold	High Voltage DC (HV) Micro Reference Voltage	>= 1.407 Volts	Low Voltage DC (Secondary) micro status	is AWAKE*	400 ms in a 500 ms window	One Trip, Type A
					High Voltage DC (HV) micro status	is AWAKE*		
		DTC Pass	High Voltage DC (HV) Micro Reference Voltage	< 1.407 Volts			500 ms	
Battery Charger Control Module Ignition Switch Run/Start Position Circuit Low(PROG)	P1EF6	DTC Fail Sets if Run/Crank hardwire input state is low when Run/Crank Terminal Status serial data signal indicates hardwire state should be high	Run/Crank hardwire input state	<= 2.0 Volts	Low Voltage DC (Secondary) micro status	is AWAKE*	1200 ms in a 1500 ms window	One Trip, Type A
			VICM Run/Crank Terminal Status signal (CC)	= HIGH	Loss of Comm on HVEM	U185C not set		
		DTC Pass	Run/Crank hardwire input state VICM Run/Crank Terminal Status signal (CC)	>= 5.5 Volts = HIGH/LOW			1500 ms	
Battery Charger Control Module Ignition Switch Run/Start Position Circuit High(PROG)	P1EF7	DTC Fail Sets if Run/Crank hardwire input state is high when Run/Crank Terminal Status serial data signal indicates hardwire state should be low	Run/Crank hardwire input state	>= 5.5 Volts	Low Voltage DC (Secondary) micro status	is AWAKE*	1200 ms in a 1500 ms window	One Trip, Type A
			VICM Run/Crank Terminal Status signal (CC)	= LOW	Loss of Comm on HVEM	U185C not set		
		DTC Pass	Run/Crank hardwire input state VICM Run/Crank Terminal Status signal (CC)	<= 2.0 Volts = HIGH/LOW			1500 ms	

DIAGNOSTIC SUMMARY TABLES--OBCM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Battery Charger Control Module High Voltage Energy Management Communication Bus Enable Circuit Low (HVCEN)	P1EF8	DTC Fail Sets if HVEM Comm Enable hardwire input state is low when HVEM Comm Enable Terminal Status serial data signal indicates hardwire state should be high	HVEM Comm Enable hardwire input state VICM HVEM Comm Enable Terminal Status signal (HS)	<= 2.0 Volts = HIGH	Low Voltage DC (Secondary) micro status Loss of Comm VICM on HS	is AWAKE* U2612 not set	1200 ms in a 1500 ms window	One Trip, Type A
		DTC Pass	HVEM Comm Enable hardwire input state VICM HVEM Comm Enable Terminal Status signal (HS)	>= 5.5 Volts = HIGH/LOW			1500 ms	
On Board Charger Control Module Lost Communication with Hybrid Powertrain Control Module 2 on Bus H	U185C	DTC Fail Sets if signal supervision timeout detected while the OBCM is in communication with the VICM on the HVEM Expansion Bus.	Supervised signal timeout detected: Supervised signal	HVChrgrBsOutCrntCmd Message ID - $304 Message - High_V_Control_Energy_Mgmt CC	Low Voltage DC (Secondary) micro status Charger CAN Bus State	is AWAKE* is ACTIVE	250 ms	One Trip, Type A
		DTC Pass	Supervised signal received within timeout window				< 250 ms	
On Board Charger Control Module Lost Communication with Engine Control Module	U1861	DTC Fail Sets if signal supervision timeout detected while the OBCM is in communication with the ECM on the HSGMLAN bus.	Supervised signal timeout detected: Supervised signal	LegDiagStndCndMet Message ID - $4C1 Message - PPEI_Engine_General_Status 4	Low Voltage DC (Secondary) micro status HSGMLAN bus State	is AWAKE* is ACTIVE	1250 ms	Two Trips, Type B
		DTC Pass	Supervised signal received within timeout window				< 1250 ms	
Battery Charger Control Module Lost Communication with Hybrid Powertrain Control Module 2	U2612	DTC Fail Sets if signal supervision timeout detected while the OBCM is in communication with the VICM on the HSGMLAN bus.	Supervised signal timeout detected: Supervised signal	VICMHVEnMgCmEnTrS Message ID - $236 Message - VICM_Status_HS	Low Voltage DC (Secondary) micro status HSGMLAN bus State	is AWAKE* is ACTIVE	250 ms	Two Trips, Type B
		DTC Pass	Supervised signal received within timeout window				< 250 ms	

DIAGNOSTIC SUMMARY TABLES--OBCM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Battery Charger Control Module Lost Communication with Hybrid Powertrain Control Module 1	U2609	DTC Fail Sets if signal supervision timeout detected while the OBCM is in communication with the HCP on the HSGMLAN bus.	Supervised signal timeout detected: Supervised signal	 PrplsnSysAtv Message ID - $1DF Message - PTEI_Propulsion_General_Status 1	Low Voltage DC (Secondary) micro status HSGMLAN bus State	is AWAKE* is ACTIVE	250 ms	Two Trips, Type B
		DTC Pass	Supervised signal received within timeout window				< 250 ms	
On Board Charger Control Module Communications Bus H Off	U1807	DTC Fail Sets if HVEM Expansion Bus off error is detected	HVEM Expansion Bus off error	= TRUE	Low Voltage DC (Secondary) micro status	is AWAKE*	40 ms in a 40 ms window	One Trip, Type A
		DTC Pass	HVEM Expansion Bus off error	= FALSE			40ms	
Battery Charger Control Module System Voltage Low (LV System Voltage exceeds operating Range)	P1EFC	Subtest 1 of 2: LV Voltage System Check DTC Fail Sets if Low Voltage Output voltage is less tha a voltage threshold	Low Voltage voltage	< 10 Volts	Low Voltage DC (Secondary) micro status	is AWAKE*	5 sec in a 5 sec window	Special Type C
		DTC Pass	Low Voltage voltage	is not < 10 Volts			5 sec in a 5 sec window	
		Subtest 2 of 2: LV Voltage System Check DTC Fail Sets if Low Voltage Output voltage is less than a voltage threshold - two test cases: 1) LV output is OFF, but is requested to turn ON 2) LV output is ON	Case 1: Low Voltage voltage Case 2: Low Voltage voltage	< 9 Volts < 8 Volts	LV Output Command= LV Request= LV Output Command= Low Voltage DC (Secondary) micro status	 OFF ON ON is AWAKE*	400 ms in a 500 ms window 2 sec in a 2 sec window	
		DTC Pass	Case 1: Low Voltage voltage Case 2: Low Voltage voltage	>= 9 Volts is not < 8 Volts			500 ms 2 sec in a 2 sec window	
Battery Charger Control Module Random Access Memory (RAM) Error	P16C2	DTC Fail Each RAM location is written with a predefined value and verified. Sets when verfication on any RAM location fails.	Secondary RAM test result	= FAIL OR	Low Voltage DC (Secondary) micro status	is AWAKE*	10 ms in a 10 ms window, only execute after power up reset	One Trip, Type A

DIAGNOSTIC SUMMARY TABLES--OBCM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
			HV or Primary micor SPI Verify Command	Negative Acknowledgement	High Voltage DC (HV) micro status	is AWAKE*		
					High Voltage AC (Primary) micro status	is AWAKE*		
		DTC Pass	Secondary RAM test result HV or Primary micor SPI Verify Command	= PASS AND Positive Acknowledgment			10ms	
Battery Charger Control Module Read Only Memory (ROM) Error	P16C1	DTC Fail Sets When checksum verification on application/calibration area fails	Secondary ROM test result HV or Primary micor SPI Verify Command	= FAIL OR Negative Acknowledgement	Low Voltage DC (Secondary) micro status	is AWAKE*	20 ms in a 20 ms window, only execute after power up reset	One Trip, Type A
		DTC Pass	Secondary ROM test result HV or Primary micor SPI Verify Command	= PASS AND Positive Acknowledgment			20ms	
Battery Charger Control Module SPI Bus 1 (SPI Communication Fault - Primary)	P16C4	Sub-Test 1 of 5 SPI Primary Mico Message Checksum Error DTC Fail Sets when any Primary SPI checksum error count for a SPI Message is greater than or equal to the counter threshold	MessageChkSumErrCntr[AC Meas Msg], OR MessageChkSumErrCntr[OBD Msg], OR MessageChkSumErrCntr[Primary Status], OR MessageChkSumErrCntr[Temperature Msg]	>= 2 >= 2 >= 2 >= 2	Low Voltage DC (Secondary) micro status SPI mode	is AWAKE* = NORMAL	44 ms in a 44 ms window	Two Trips, Type B
		DTC Pass	MessageChkSumErrCntr[AC Meas Msg], AND MessageChkSumErrCntr[OBD Msg], AND MessageChkSumErrCntr[Primary Status], AND MessageChkSumErrCntr[Temperature Msg]	< 2 < 2 < 2 < 2			22 ms (message trans rate)	
		Sub-Test 2 of 5 SPI Primary Micro Message Timeout Error DTC Fail Sets when any Primary SPI Message is not received within an expected time window	MessageTimer[AC Meas Msg], OR MessageTimer[OBD Msg], OR MessageTimer[Primary Status], OR MessageTimer[Temperature Msg]	>= 65 ms >= 65 ms >= 65 ms >= 65 ms	Low Voltage DC (Secondary) micro status SPI mode	is AWAKE* = NORMAL	65 ms	

DIAGNOSTIC SUMMARY TABLES--OBCM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
		DTC Pass	MessageTimer[AC Meas Msg], AND MessageTimer[OBD Msg], AND MessageTimer[Primary Status], AND MessageTimer[Temperature Msg]	< 65 ms < 65 ms < 65 ms < 65 ms			< 65 ms	
		Sub-Test 3 of 5 SPI Primary Micro Node Timeout Error DTC Fail Sets when Primary SPI Resynch Error Counter is greater than or equal to the counter threshold	SpiResynchErrorCounter[PRI]	>= 1	Low Voltage DC (Secondary) micro status SPI mode	is AWAKE* = NORMAL OR SYNCH	3 - 5 ms	
		DTC Pass	SpiResynchErrorCounter[PRI]	< 1			< 3 - 5 ms (depends on message received)	
		Sub-Test 4 of 5 SPI Primary Micro Channel Rationality Error DTC Fail Sets when Primary Channel SPI Mode takes longer than a timer threshold to reach Normal Mode	SpiChannelRationalityTimerInst[PRI]	>= 1000 ms	Low Voltage DC (Secondary) micro status SPI mode HV channel SPI mode Primary channel	is AWAKE* = NORMAL = SYNCH OR VERIFY	1000 ms	
		DTC Pass	SpiChannelRationalityTimerInst[PRI]	< 1000 ms			< 1000 ms	
		Sub-Test 5 of 5 SPI Primary Micro Driver Hardware Error DTC Fail Sets when Primary SPI hardware driver errors received	spi_ResultStatus	Failed	Low Voltage DC (Secondary) micro status	is AWAKE*	1 ms	
		DTC Pass	spi_ResultStatus	Passed			1 ms	

DIAGNOSTIC SUMMARY TABLES--OBCM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Battery Charger Control Module SPI Bus 2 (SPI Communication Fault - HV DC)	P16C5	Sub-Test 1 of 5 SPI HV DC Micro Message Checksum Error DTC Fail Sets when any HV DC SPI checksum error count for a SPI Message is greater than or equal to the counter threshold	MessageChkSumErrCntr[HV DC Meas Msg]	>= 2	Low Voltage DC (Secondary) micro status SPI mode	is AWAKE* = NORMAL	44 ms in a 44 ms window	Two Trips, Type B
		DTC Pass	MessageChkSumErrCntr[HV DC Meas Msg]	< 2			22 ms (message trans rate)	
		Sub-Test 2 of 5 SPI HV DC Micro Message Timeout Error DTC Fail Sets when any HV DC SPI Message is not received within an expected time window	MessageTimer[HV DC Meas]	>= 65 ms	Low Voltage DC (Secondary) micro status SPI mode	is AWAKE* = NORMAL	65 ms	
		DTC Pass	MessageTimer[HV DC Meas]	< 65 ms			< 65 ms	
		Sub-Test 3 of 5 SPI HV DC Micro Node Timeout Error DTC Fail Sets when HV DC SPI Resynch Error Counter is greater than or equal to the counter threshold	SpiResynchErrorCounter[PRI]	>= 1	Low Voltage DC (Secondary) micro status SPI mode	is AWAKE* = NORMAL OR SYNCH	3 - 5 ms	
		DTC Pass	SpiResynchErrorCounter[PRI]	< 1			< 3 - 5 ms (depends on message received)	
		Sub-Test 4 of 5 SPI HV DC Micro Channel Rationality Error DTC Fail Sets when HV DC Channel SPI Mode takes longer than a timer threshold to reach Normal Mode	SpiChannelRationalityTimerInst[PRI]	>= 1000 ms	Low Voltage DC (Secondary) micro status SPI mode Primary channel SPI mode HV channel	is AWAKE* = NORMAL = SYNCH OR VERIFY	1000 ms	

DIAGNOSTIC SUMMARY TABLES--OBCM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
		DTC Pass	SpiChannelRationalityTimerInst[PRI]	< 1000 ms			< 1000 ms	
		Sub-Test 5 of 5 SPI HV DC Micro Driver Hardware Error DTC Fail Sets when HV DC SPI hardware driver errors received	spi_ResultStatus	Failed	Low Voltage DC (Secondary) micro status	is AWAKE*	1 ms	
		DTC Pass	spi_ResultStatus	Passed			1 ms	
Battery Charger Hybrid/EV Battery Output Power Performance (HV Output Power Rationality)	P0D5C	DTC Fail Sets when the measured High Voltage output power exceeds the theoretical power available (calculated as charger real AC input power X charger efficiency + offset)	High Voltage Power (HV Voltage x HV Current)	> (AC Power x 1.9995) + 120 Watts	HV Current Sensor faults HV Voltage Sensor faults High Voltage DC (HV) Micro Ref Voltage faults AC Input Power Status	P0D53 or P0D54 not set P0D4E or P0D4F not set P1EEB or P1EEC not set not FAILED	1.6 seconds in a 2 seconds window	One Trip, Type A
		DTC Pass	High Voltage Power (HV Voltage x HV Current)	<= (AC Power x 1.9995) + 120 Watts			2 seconds	
Battery Charger 14 Volt Output Power Performance (LV Output Power Rationality)	P0D5B	DTC Fail Sets when the measured Low Voltage output power exceeds the theoretical power available (calculated as charger real AC input power X charger efficiency + offset)	Low Voltage Power (LV Voltage x LV Current)	> (AC Power x 1.9995) + 125 Watts	LV Current Sensor faults LV Voltage Sensor faults Low Voltage DC (Secondary) Micro Ref Voltage faults AC Input Power Status	P0D49 or P0D4A not set P0D44 or P0D45 not set P1EE9 or P1EEA not set not FAILED	1.6 seconds in a 2 seconds window	One Trip, Type A
		DTC Pass	Low Voltage Power (LV Voltage x LV Current)	<= (AC Power x 1.9995) + 125 Watts			2 seconds	

DIAGNOSTIC SUMMARY TABLES--OBCM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Battery Charger Total Output Power Performance(Total Output Power Rationality)	P1ECE	DTC Fail Sets when the sum of the measured High Voltage output power and Low Voltage output power exceeds the theoretical power available (calculated as charger real AC input power X charger efficiency + offset)	High Voltage Power (HV Voltage x HV Current) + Low Voltage Power (LV Voltage x LV Current)	> (AC Power x 1.9995) + 130 Watts	HV Current Sensor faults HV Voltage Sensor faults LV Current Sensor faults LV Voltage Sensor faults High Voltage DC (HV) Micro Ref Voltage faults Low Voltage DC (Secondary) Micro Ref Voltage faults AC Input Power Status	P0D53 or P0D54 not set P0D4E or P0D4F not set P0D49 or P0D4A not set P0D44 or P0D45 not set P1EEB or P1EEC not set P1EE9 or P1EEA not set not FAILED	1.6 seconds in a 2 seconds window	One Trip, Type A
		DTC Pass	High Voltage Power (HV Voltage x HV Current) + Low Voltage Power (LV Voltage x LV Current)	<= (AC Power x 1.9995) + 130 Watts	AC Input Power Status	is Updated via SPI bus	2 seconds	
Battery Charger 14 Volt Output Voltage Comparator Circuit(12Volt Alarm Rationality)	P1EED	DTC Fail Monitors for an irrational combination of states consisting of: LV Converter Over/Under voltage input = HIGH, with a non-zero LV Current output.	12V Alarm hardware detection (triggered) AND Low Voltage Current	= TRUE > 1.0 Amps	Low Voltage DC (Secondary) micro status LV Current Sensor faults LV ON Command from Primary LV Hardware Shutdown (12V Alarm)	is AWAKE* P0D49 or P0D4A not set = ON = Shutdown	1.6sec in a 2sec window	One Trip, Type A
		DTC Pass	12V Alarm hardware detection (triggered) OR Low Voltage Current	= FALSE <= 1.0 Amps			2 seconds	

DIAGNOSTIC SUMMARY TABLES--OBCM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Battery Charger Input Voltage Conditioner Temperature Sensor Performance (PFC Temperature Sensor-Rationality)	P1EE1	Sub-Test 1 of 2 Exessively Large Rate of Change (Noisy Sensor) DTC Fail Sets when the absolute rate of change of measured temperature is greater than or equal to a temperature change rate threshold - temperature changes are normally relatively slow	ABS(PFC temperature current cycle - PFC temperature previous cycle)	>= 2℃	Low Voltage DC (Secondary) micro status PFC Temperature Sensor faults Primary MCU normal mode run time	is AWAKE* P1EDF or P1EE0 not set > 1 second	640ms in a 800ms window	One Trip, Type A
		DTC Pass	ABS(PFC temperature current cycle - PFC temperature previous cycle)	< 2℃			800ms	
		DTC Pass	PFC temperature max - PFC temperature min	>= 0.03125℃			40ms	
		Sub-Test 2 of 2 Zero Offset Check DTC Fail Charger contains multiple temperature sensors. After a sufficient charger off time to allow sensor normalization, temperature sensor values are compared at start up to detect sensor reading offset errors. All sensors should report within a deadband. Diagnostic fails if any one or more of below test conditions is true. 1 Sensor has 3 failures 2 All sensors have 2 failures 3 Sensor has 2 failures and at least one other sensor has only one failure one other sensor has only one failure. Sensor failure means the absolute difference of sensors is great or equal the threshold	Pfc_Failures==3 ||(Pfc_Failures==2&&(Min_failures=2&&Max_failures=2)||Min_failures<=1) the variables are calculate in following way: Temperature ABS(PFC -HV1), Pfc_Failures++,Hv1_Failures++; Temperature ABS(PFC -HV2), Pfc_Failures++,Hv2_Failures++; Temperature ABS(PFC -Case), Pfc_Failures++,Case_Failures++; Temperature ABS(HV1 -HV2), Hv1_Failures++,Hv2_Failures++; Temperature ABS(HV1 -Case), Hv1_Failures++++,Case_Failures++; Temperature ABS(HV2 -Case), Hv2_Failures++++,Case_Failures++; Min_failures=MIN(PFC,HV1,HV2,Case); Max_failures=MAX(PFC,HV1,HV2,Case);	>=20℃ >=20℃ >=20℃ >=20℃	Low Voltage DC (Secondary) micro status PFC Temperature Sensor faults HV 1kW Temperature Sensor faults HV 2kW Temperature Sensor faults	is AWAKE* P1EDF or P1EE0 not set P1ECB or P1ECC not set P1ED0 or P1ED1 not set	640ms in a 800ms window	

DIAGNOSTIC SUMMARY TABLES--OBCM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					Cold Plate Temperature Sensor faults Charger Off Time Charger Off Time V Charger Off Time M Charger Off Time Charger Off Time V Charger Off Time M The test only run as long as the module has not yet charged or precharged. After (pre)charge has been started the algorithm is allowed to run a a delay time. Secondary micro has to run	P1ED6 or P1ED7 not set >20 minutes ==use Data ==Valid ==Valid is true is true 10 seconds 1 second		
		DTC Pass	Compliment of fail conditions					
Battery Charger High Voltage Converter "A" Temparature Sensor Performance(1kW HV Converter Temperature Sensor-Rationality)	P1ECD	Sub-Test 1 of 2 Exessively Large Rate of Change (Noisy Sensor) DTC Fail Sets when the absolute rate of change of measured temperature is greater than or equal to a temperature change rate threshold - temperature changes are normally relatively slow	ABS(HV 1kW temperature current cycle - HV 1kW temperature previous cycle)	>= 2℃	Low Voltage DC (Secondary) micro status HV 1kW Temperature Sensor faults Primary MCU normal mode run time	is AWAKE* P1ECB or P1ECC not set > 1 second	640ms in a 800ms window	One Trip, Type A
		DTC Pass	ABS(HV 1kW temperature current cycle - HV 1kW temperature previous cycle)	< 2℃			800ms	

DIAGNOSTIC SUMMARY TABLES--OBCM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
		Sub-Test 2 of 2 Zero Offset Check DTC Fail Charger contains multiple temperature sensors. After a sufficient charger off time to allow sensor normalization, temperature sensor values are compared at start up to detect sensor reading offset errors. All sensors should report within a deadband. Diagnostic fails if any one or more of below test conditions is true. 1 Sensor has 3 failures 2 All sensors have 2 failures 3 Sensor has 2 failures and at least one other sensor has only one failure one other sensor has only one failure. Sensor failure means the absolute difference of sensors is great or equal the threshold	HV1_Failures==3 ||(HV1_Failures==2&&(Min_failures=2&&Max_failures=2)||Min_failures<=1) the variables are calculate in following way: Temperature ABS(PFC -HV1), Pfc_Failures++,Hv1_Failures++; Temperature ABS(PFC -HV2), Pfc_Failures++,Hv2_Failures++; Temperature ABS(PFC -Case), Pfc_Failures++,Case_Failures++; Temperature ABS(HV1 -HV2), Hv1_Failures++,Hv2_Failures++; Temperature ABS(HV1 -Case), Hv1_Failures++++,Case_Failures++; Temperature ABS(HV2 -Case), Hv2_Failures++++,Case_Failures++; Min_failures=MIN(PFC,HV1,HV2,Case); Max_failures=MAX(PFC,HV1,HV2,Case);	>=20℃ >=20℃ >=20℃ >=20℃ >=20℃	Low Voltage DC (Secondary) micro status PFC Temperature Sensor faults HV 1kW Temperature Sensor faults HV 2kW Temperature Sensor faults Cold Plate Temperature Sensor faults Charger Off Time Charger Off Time V Charger Off Time M Charger Off Time Charger Off Time V Charger Off Time M The test only run as long as the module has not yet charged or precharged. After (pre)charge has been started the algorithm is allowed to run a a delay time. Secondary micro has to run	is AWAKE* P1EDF or P1EE0 not set P1ECB or P1ECC not set P1ED0 or P1ED1 not set P1ED6 or P1ED7 not set >20 minutes ==use Data ==Valid ==Valid is true is true 10 seconds 1 second	640ms in a 800ms window	
		DTC Pass	Compliment of fail conditions					

DIAGNOSTIC SUMMARY TABLES--OBCM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Battery Charger High Voltage Converter "B" Temparature Sensor Performance (2kW HV Converter Temperature Sensor-Rationality)	P1ED2	Sub-Test 1 of 2 Exessively Large Rate of Change (Noisy Sensor) DTC Fail Sets when the absolute rate of change of measured temperature is greater than or equal to a temperature change rate threshold - temperature changes are normally relatively slow	ABS(HV 2kW temperature current cycle - HV 2kW temperature previous cycle)	>= 2℃	Low Voltage DC (Secondary) micro status HV 2kW Temperature Sensor faults Primary MCU normal mode run time	is AWAKE* P1ED0 or P1ED1 not set > 1 second	640ms in a 800ms window	One Trip, Type A
		DTC Pass	ABS(HV 2kW temperature current cycle - HV 2kW temperature previous cycle)	< 2℃			800ms	
		Sub-Test 2 of 2 Zero Offset Check DTC Fail Charger contains multiple temperature sensors. After a sufficient charger off time to allow sensor normalization, temperature sensor values are compared at start up to detect sensor reading offset errors. All sensors should report within a deadband. Diagnostic fails if any one or more of below test conditions is true. 1 Sensor has 3 failures 2 All sensors have 2 failures 3 Sensor has 2 failures and at least one other sensor has only one failure one other sensor has only one failure. Sensor failure means the absolute difference of sensors is great or equal the threshold	HV1_Failures==3 ||(HV1_Failures==2&&(Min_failures=2&&Max_failures=2)||Min_failures<=1) the variables are calculate in following way: Temperature ABS(PFC -HV1), Pfc_Failures++,Hv1_Failures++; Temperature ABS(PFC -HV2), Pfc_Failures++,Hv2_Failures++; Temperature ABS(PFC -Case), Pfc_Failures++,Case_Failures++; Temperature ABS(HV1 -HV2), Hv1_Failures++,Hv2_Failures++; Temperature ABS(HV1 -Case), Hv1_Failures++++,Case_Failures++; Temperature ABS(HV2 -Case), Hv2_Failures++++,Case_Failures++; Min_failures=MIN(PFC,HV1,HV2,Case); Max_failures=MAX(PFC,HV1,HV2,Case);	>=20℃ >=20℃ >=20℃ >=20℃ >=20℃	Low Voltage DC (Secondary) micro status PFC Temperature Sensor faults HV 1kW Temperature Sensor faults HV 2kW Temperature Sensor faults Cold Plate Temperature Sensor faults	is AWAKE* P1EDF or P1EE0 not set P1ECB or P1ECC not set P1ED0 or P1ED1 not set P1ED6 or P1ED7 not set	640ms in a 800ms window	

DIAGNOSTIC SUMMARY TABLES--OBCM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					Charger Off Time Charger Off Time V Charger Off Time M Charger Off Time Charger Off Time V Charger Off Time M The test only run as long as the module has not yet charged or precharged. After (pre)charge has been started the algorithm is allowed to run a a delay time. Secondary micro has to run	>20 minutes ==use Data ==Valid ==Valid is true is true 10 seconds 1 second		
		DTC Pass	Compliment of fail conditions					
Battery Charger Cold Plate Temperature Sensor Performance (Cold Plate Temperature Sensor-Rationality)	P1ED8	Sub-Test 1 of 2 Exessively Large Rate of Change (Noisy Sensor) DTC Fail Sets when the absolute rate of change of measured temperature is greater than or equal to a temperature change rate threshold - temperature changes are normally relatively slow	ABS(Cold Plate temperature current cycle - Cold Plate temperature previous cycle)	>= 2℃	Low Voltage DC (Secondary) micro status Cold Plate Temperature Sensor faults Primary MCU normal mode run time	is AWAKE* P1ED6 or P1ED7 not set > 1 second	640ms in a 800ms window	One Trip, Type A
		DTC Pass	ABS(Cold Plate temperature current cycle - Cold Plate temperature previous cycle)	< 2℃			800ms	

DIAGNOSTIC SUMMARY TABLES--OBCM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
		Sub-Test 2 of 2 Case Thermal Offset Rationality DTC Fail sets when one of below conditons is true. 1 Sensor has 3 failures 2 All sensors have 2 failures 3 Sensor has 2 failures and at least one other sensor has only one failure Sensor failure means the absolute difference of sensors is great or equal the threshold	Case_Failures==3 ||(Case_Failures==2&&(Min_failures=2 &&Max_failures=2)||Min_failures<=1) the variables are calculate in following way: Temperature ABS(PFC -HV1), Pfc_Failures++,Hv1_Failures++; Temperature ABS(PFC -HV2), Pfc_Failures++,Hv2_Failures++; Temperature ABS(PFC -Case), Pfc_Failures++,Case_Failures++; Temperature ABS(HV1 -HV2), Hv1_Failures++,Hv2_Failures++; Temperature ABS(HV1 -Case), Hv1_Failures++++,Case_Failures++; Temperature ABS(HV2 -Case), Hv2_Failures++++,Case_Failures++; Min_failures=MIN(PFC,HV1,HV2,Case); Max_failures=MAX(PFC,HV1,HV2,Case); DTC Pass	>=20℃ >=20℃ >=20℃ >=20℃ >=20℃ >=20℃	Low Voltage DC (Secondary) micro status PFC Temperature Sensor faults HV 1kW Temperature Sensor faults HV 2kW Temperature Sensor faults Cold Plate Temperature Sensor faults Charger Off Time Charger Off Time V Charger Off Time M Charger Off Time Charger Off Time V Charger Off Time M The test only run as long as the module has not yet charged or precharged. After (pre)charge has been started the algorithm is allowed to run a a delay time. Secondary micro has to run Compliment of fail conditions	is AWAKE* P1EDF or P1EE0 not set P1ECB or P1ECC not set P1ED0 or P1ED1 not set P1ED6 or P1ED7 not set >20 minutes ==use Data ==Valid ==Valid is true is true 10 seconds 1 second	640ms in a 800ms window	

DIAGNOSTIC SUMMARY TABLES--OBCM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Battery Charger 14 Volt Output Voltage Sensor Circuit Range/Performance (LV Output Voltage Sensor Rationality)	P0D43	DTC Fail The Low Voltage Output Voltage Sensor is rationalized against other analog measurements of vehicle system voltage. The diagnostic fails if a deviation limit is exceeded:	Case 1: Run/Crank = High ABS(LV Voltage-RunCrank Voltage) AND ABS(LV Voltage-HVEMB Enable Voltage) Case 2: Run/Crank = Low ABS(LV Voltage-HVEMB Enable Voltage)	>= 6 Volts >= 6 Volts >= 6 Volts	Low Voltage DC (Secondary) micro status Low Voltage DC (Secondary) Micro Ref Voltage faults LV Voltage Sensor faults	is AWAKE* P1EE9 or P1EEA not set P0D44 or P0D45 not set	4sec in a 5sec window	One Trip, Type A
		DTC Pass	Case 1: Run/Crank = High ABS(LV Voltage-RunCrank Voltage) OR ABS(LV Voltage-HVEMB Enable Voltage) Case 2: Run/Crank = Low ABS(LV Voltage-HVEMB Enable Voltage)	< 6 Volts < 6 Volts < 6 Volts			5sec	
Battery Charger High Voltage Converter "A" Output Power Regulation Performance(HV 1kW PWM Regulation Test-Functional Check)	P1EF0	Sub-Test 1 of 2 HV 1kW Voltage PWM Regulation Check DTC Fail Sets when one more of the following conditions is true: 1 The difference of the HV Voltage and HV Voltage Command is below or equal to the overshoot Threshold and the absolute difference of HV Voltage and the Voltage command is above voltage Threshold and the absolute difference of HV Current and the Current command is above Current Threshold 2 The difference of the HV Voltage and HV Voltage Command is above the overshoot Threshold and the HV Current is above the Current diff Threshold.	One of following two conditions are true: 1.HV Voltage - HV Voltage Command AND (ABS(HV Voltage-HV Voltage Command) AND ABS(HV Current-HV Current Command)) OR 2.HV Voltage - HV Voltage Command AND HV Current	<=25V >25V >1A >25V >2A	Low Voltage DC (Secondary) micro status HV DC HV ON Command HighlineTap mode	is AWAKE* =ON =Inactive	1.6sec in a 2sec window	One Trip, Type A

DIAGNOSTIC SUMMARY TABLES--OBCM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					HV Voltage Sensor faults HV Current Sensor faults High Voltage DC (HV) Micro Ref Voltage faults	P0D4E or P0D4F not set P0D53 or P0D54 not set P1EEB or P1EEC not set		
		DTC Pass	One of followings condition is true. 1. HV Voltage - HV Voltage Command AND (ABS(HV Voltage-HV Voltage Command) OR ABS(HV Current-HV Current Command)) 2. HV Voltage - HV Voltage Command AND HV Current	 <=25V <=25V <=1A >25V <=2A			2sec	
		Sub-Test 2 of 2 HV 1kW Current PWM Regulation Check DTC Fail Sets when the difference of the HV Current and HV Current Command is above a threshold.	HV Current - HV Current Command	>1A	Low Voltage DC (Secondary) micro status HV Voltage - HV Command from HV DC HV DC HV ON Command HighlineTap mode HV Voltage Sensor faults HV Current Sensor faults High Voltage DC (HV) Micro Ref Voltage faults	is AWAKE* <= 25V =ON =Inactive P0D4E or P0D4F not set P0D53 or P0D54 not set P1EEB or P1EEC not set	1.6sec in a 2sec window	
		DTC Pass	HV Current - HV Current Command	<=1A			2sec	

DIAGNOSTIC SUMMARY TABLES--OBCM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Battery Charger High Voltage Converter "B" Output Power Regulation Performance (HV 2kW PWM Regulation Test-Functional Check)	P1EF1	Sub-Test 1 of 2 HV 2KW Voltage PWM Regulation Functional DTC Fail Sets when one more of the following conditions is true: 1 The difference of the HV Voltage and HV Voltage Command is below or equal the overshoot Threshold and the absolute difference of HV Voltage and the Voltage command is above voltage Threshold and the absolute difference of HV Current and the Current command is above Current Threshold 2 The difference of the HV Voltage and HV Voltage Command is above the overshoot Threshold and the HV Current is above the Current diff Threshold	One of following two conditions are true: 1.HV Voltage - HV Voltage Command AND (ABS(HV Voltage-HV Voltage Command) AND ABS(HV Current-HV Current Command)) OR 2.HV Voltage - HV Voltage Command AND HV Current	 <=25V >25V >1A >25V >2A	Low Voltage DC (Secondary) micro status HV DC HV ON Command HighlineTap mode HV Voltage Sensor faults HV Current Sensor faults High Voltage DC (HV) Micro Ref Voltage faults	is AWAKE* ==ON = Active P0D4E or P0D4F not set P0D53 or P0D54 not set P1EEB or P1EEC not set	1.6sec in a 2sec window	One Trip, Type A
		DTC Pass	One of followings condition is true: 1.HV Voltage - HV Voltage Command AND (ABS(HV Voltage-HV Voltage Command) OR ABS(HV Current-HV Current Command)) 2.HV Voltage - HV Voltage Command AND HV Current	 <=25V <=25V <=1A >25V <=2A			2sec	
		Sub-Test 2 of 2 HV 2KW Current PWM Regulation Functional DTC Fail Sets when the difference of the HV Current and HV Current Command is above a threshold.	HV Current - HV Current Command	>1A	Low Voltage DC (Secondary) micro status HV Voltage - HV Command from HV DC HV DC HV ON Command HighlineTap mode	is AWAKE* <= 25V =ON =Active	1.6sec in a 2sec window	

DIAGNOSTIC SUMMARY TABLES--OBCM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					HV Voltage Sensor faults HV Current Sensor faults High Voltage DC (HV) Micro Ref Voltage faults	P0D4E or P0D4F not set P0D53 or P0D54 not set P1EEB or P1EEC not set		
		DTC Pass	HV Current - HV Current Command	<=1A			2sec	
Battery Charger 14V Converter Output Power Regulation Performance (LV PWM Regulation Test-Functional Check)	P1EEF	Sub-Test 1 of 2 LV Voltage PWM Regulation Functional DTC Fail Sets when one more of the following conditions is true: 1 The difference of the LV Voltage and LV_Voltage_SetPointFromCmd is below or equal the overshoot Threshold and the absolute difference of LV Voltage and the LV_Voltage_SetPointFromCmd is above voltage Threshold and the absolute difference of LV Current and the LV_Current_SetPointFromCmd is above Current Threshold 2 The difference of the LV Voltage and LV Voltage_SetPointFromCmd Command is above the overshoot Threshold and the LV Current is above the Current diff Threshold.	ABS(LV Voltage - LV Voltage Command) AND ABS(LV Current-LV Current Command) OR 2.LV Current	>2V >3A > 1A	Low Voltage DC (Secondary) micro status LV Output LV Output (SPI Signal) (LV Voltage - LV Voltage Command) LV Voltage Sensor faults LV Current Sensor faults Low Voltage DC (Secondary) Micro Ref Voltage faults	is AWAKE* =ON = UPDATED <= 1.5 Volts P0D44 or P0D45 not set P0D49 or P0D4A not set P1EE9 or P1EEA not set	50.4 sec in a 63 sec window	One Trip, Type A
		DTC Pass	ABS(LV Voltage - LV Voltage Command) OR ABS(LV Current-LV Current Command) OR 2.LV Current	<=2V <=3A <=1A			63 sec	

DIAGNOSTIC SUMMARY TABLES--OBCM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
		Sub-Test 2 of 2 LV Current PWM Regulation Functional DTC Fail Sets when the difference of the LV Current and LV_Current_SetPointFromCmd is above a threshold.	LV Current - LV Current Command	> 3A	Low Voltage DC (Secondary) micro status HV DC LV ON Command LV Voltage Sensor faults LV Current Sensor faults Low Voltage DC (Secondary) Micro Ref Voltage faults LV Voltage - LV Voltage Command	is AWAKE* = ON P0D44 or P0D45 not set P0D49 or P0D4A not set P1EE9 or P1EEA not set <= 1.5V	50.4 sec in a 63 sec window	
		DTC Pass	LV Current - LV Current Command	<= 3A			63 sec	
Battery Charger Power Efficiency (Power Efficiency Functional)	P1EFD	DTC Fail Sets when the absolute difference of the AC Input power and the sum of the HV Output Power and the LV Output Power is above or equal to a threshold. Indicative of a sensor rationality error.	ABS(AC Power - (HV Voltage*HV Current + LV Voltage*LV Current))	>= 3300 Watts	Low Voltage DC (Secondary) micro status LV Current Sensor faults LV Voltage Sensor faults HV Current Sensor faults HV Voltage Sensor faults High Voltage DC (HV) Micro Ref Voltage faults Low Voltage DC (Secondary) Micro Ref Voltage faults AC Input Power Status	is AWAKE* P0D49 or P0D4A not set P0D44 or P0D45 not set P0D53 or P0D54 not set P0D4E or P0D4F not set P1EEB or P1EEC not set P1EE9 or P1EEA not set not FAILED	1.6sec in a 2sec window	Two Trips, Type B
		DTC Pass	ABS(AC Power - (HV Voltage*HV Current + LV Voltage*LV Current))	< 3300 Watts			2 seconds	

DIAGNOSTIC SUMMARY TABLES--OBCM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Battery Charger Hybrid/EV System Discharge Time Too Long (Discharger Time Functional)	P0D5E	DTC Fail Sets if the High Voltage Output voltage is greater than or equal to a voltage threshold after an allowed discharge time period - discharge was unsuccessful.	High Voltage Output voltage Case 1: 1.5 seconds after receiving the High Voltage Charger Active Discharge Command OR Case 2: 1.5 seconds after a 5.25 second shut down delay timer has elapsed following confirmation of OBCM Loss of Comm With VICM (DTC U185C confirmed) - total elapsed time 6.75 seconds	>= 60 Volts	Low Voltage DC (Secondary) micro status HV Voltage Validity	is AWAKE* = VALID	1.5 sec in a 1.5 sec window	One Trip, Type A
		DTC Pass	High Voltage Output voltage Case 1: 1.5 seconds after receiving the High Voltage Charger Active Discharge Command OR Case 2: 1.5 seconds after a 5.25 second shut down delay timer has elapsed following confirmation of OBCM Loss of Comm With VICM (DTC U185C confirmed) - total elapsed time 6.75 seconds	< 60 Volts			< 1.5 sec	
Battery Charger Reverse Polarity Protection Circuit Performance (Reverse Battery Functional)	P1EFE	DTC Fail Sets when the Low Voltage Switch Enable signal is not equal to the LV Switch Enable Check (Relay status input should reflect relay control output state).	Low Voltage Switch Enable	≠ Low Voltage Switch Enable Check	Low Voltage DC (Secondary) micro status	is AWAKE*	1.6sec in a 2sec window	Two Trips, Type B
		DTC Pass	Low Voltage Switch Enable	= Low Voltage Switch Enable Check			2sec	
Battery Charger Control Module Long Term Memory (KAM) Error (EEPROM Integrity)	P16C3	DTC Fail Sets when the presence of predefined values at predefined locations in EEPROM cannot be confirmed	eepromPage00DiagDataByte OR eepromPage0ADiagDataByte	≠A5 (hex) ≠A5 (hex)	Low Voltage DC (Secondary) micro status	is AWAKE*	40 ms in a 40 ms window	One Trip, Type A
		DTC Pass	eepromPage00DiagDataByte AND eepromPage0ADiagDataByte	= A5 (hex) = A5 (hex)			40 ms	

DIAGNOSTIC SUMMARY TABLES--OBCM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Battery Charger Input Current Sensor Exceeded Learning Limit (AC Current Sensor Integrity)	P1F14	DTC Fail Sets if the AC Current Sensor calibration process has not been completed or if the calibration complete status flag in EEPROM has been erased or corrupted.	AC Current Sensor Cal Status	= FALSE	Low Voltage DC (Secondary) micro status	is AWAKE*	640ms in a 800ms window	One Trip, Type A
		DTC Pass	AC Current Sensor Cal Status	≠ FALSE			800 ms	
Battery Charger Hybrid/EV Battery Output Current Sensor Exceeded Learning Limit (HV Current Sensor Integrity)	P1F16	DTC Fail Sets if the High Voltage Output Current Sensor calibration process has not been completed or if the calibration complete status flag in EEPROM has been erased or corrupted.	High Voltage Current Sensor Cal Complete Flag (HV_Current_Cal_Hist_Status)	= 0	Low Voltage DC (Secondary) micro status	is AWAKE*	640ms in a 800ms window	One Trip, Type A
		DTC Pass	High Voltage Current Sensor Cal Complete Flag (HV_Current_Cal_Hist_Status)	≠ 0			800 ms	
Battery Charger 14 Volt Output Current Sensor Exceeded Learning Limit (LV Current Sensor Integrity)	P1F15	DTC Fail Sets if the Low Voltage Output Current Sensor calibration process has not been completed or if the calibration complete status flag in EEPROM has been erased or corrupted.	Low Voltage Current Sensor Cal Complete Flag (LV_Current_Cal_Hist_Status)	= 0	Low Voltage DC (Secondary) micro status	is AWAKE*	640ms in a 800ms window	One Trip, Type A
		DTC Pass	Low Voltage Current Sensor Cal Complete Flag (LV_Current_Cal_Hist_Status)	≠ 0			800 ms	
Battery Charger Control Module Wake-Up Circuit Performance (ACC)	P16C6	DTC Fail Sets when the Accessory Wake Up is detected as low when expected to be high.	Accessory Wake Up High State Timer (accOnTimer)	<= 100ms	Low Voltage DC (Secondary) micro status Prop System Active Status HSGMLAN bus State HSGMLAN Comm Faults HCP_HS_LossOfComm	is AWAKE* is Active is ACTIVE U2609 not set is False	<= 100ms	One Trip, Type A
		DTC Pass	Accessory Wake Up High State Timer (accOnTimer)	> 100ms			> 100ms	

DIAGNOSTIC SUMMARY TABLES--OBCM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Battery Charger Control Module Supply Voltage Sensor Circuit Range/Performance (PBIAS Voltage-Functional)	P1F03	DTC Fail The test uses two (2) sets of calibration values, one for determining if the PBIAS voltage is in range to turn the charger outputs on, and the other when the charger outputs are on to determine if the PBIAS voltage is sufficient to keep the outputs on.	PBIAS Voltage (BIASRAW) If the charger outputs (HV & LV) are off, PBIAS voltage must be: Else If the charger outputs are on (either HV or LV), PBIAS must be:	 < 10.5 Volts OR > 13.5 Volts < 10.0 Volts OR > 15.0 Volts	High Voltage AC (Primary) micro status	is AWAKE* (AC connected or Bulk residual power)	Low voltage fail time = 253ms High voltage fail time = 10.25sec (250ms fault maturity time after initial fault detection at 3ms or 10sec)	One Trip, Type A
		DTC Pass	PBIAS Voltage (BIASRAW) If the charger outputs (HV & LV) are off, PBIAS voltage must be: Else If the charger outputs are on (either HV or LV), PBIAS must be:	 >= 10.5 Volts OR <= 13.5 Volts >= 10.0 Volts OR <= 15.0 Volts			250 ms	
Battery Charger Input Voltage Conditioner Temperature Too High (PFC Thermal System Fault)	P1EF5	DTC Fail Diagnostic uses a hysteresis pair. FAIL sets when the PFC Thermister reported equivalent temperature is greater than or equal to an upper temperature threshold value	PFC Temperature	>= 100C	High Voltage AC (Primary) micro status	is AWAKE* (AC connected or Bulk residual power)	1ms in a 1ms window	One Trip, Type A
		DTC Pass Diagnostic uses a hysteresis pair. PASS sets when the PFC Thermister reported equivalent temperature is less than or equal to a lower temperature threshold value	PFC Temperature	<= 90C			1 ms	
Battery Charger High Voltage Converter "A" Temperature Too High (HV 1kW Converter Thermal System Fault)	P1EF3	DTC Fail Diagnostic uses a hysteresis pair. FAIL sets when the 1kW Converter Thermister reported equivalent temperature is greater than or equal to an upper temperature threshold value	1kW High Voltage Converter Temperature	>= 100C	High Voltage AC (Primary) micro status	is AWAKE* (AC connected or Bulk residual power)	1ms in a 1ms window	One Trip, Type A

DIAGNOSTIC SUMMARY TABLES--OBCM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
		DTC Pass Diagnostic uses a hysteresis pair. PASS sets when the 1kW Converter Thermister reported equivalent temperature is less than or equal to a lower temperature threshold value	1kW High Voltage Converter Temperature	<= 90C			1 ms	
Battery Charger High Voltage Converter "B" Temperature Too High (HV 2kW Converter Thermal System Fault)	P1EF4	DTC Fail Diagnostic uses a hysteresis pair. FAIL sets when the 2kW Converter Thermister reported equivalent temperature is greater than or equal to an upper temperature threshold value	2kW High Voltage Converter Temperature	>= 100C	High Voltage AC (Primary) micro status	is AWAKE* (AC connected or Bulk residual power)	1ms in a 1ms window	One Trip, Type A
		DTC Pass Diagnostic uses a hysteresis pair. PASS sets when the 2kW Converter Thermister reported equivalent temperature is less than or equal to a lower temperature threshold value	2kW High Voltage Converter Temperature	<= 90C			1 ms	
Battery Charger Converter Input Voltage Sensor "A" Circuit High (BLKS1)	P1EDA	DTC Fail Sets when the reported Bulk Voltage1 is greater than a voltage threshold	Bulk Voltage1	> 463 Volts	AC Voltage	> 80 Volts	400 ms in a 500 ms window	One Trip, Type A
		DTC Pass	Bulk Voltage1	<= 463 Volts			500 ms	
Battery Charger Converter Input Voltage Sensor "A" Circuit Low (BLKS1)	P1ED9	DTC Fail Sets when the reported Bulk Voltage1 is less than a voltage threshold	Bulk Voltage1	< 25 Volts	AC Voltage	> 80 Volts	400 ms in a 500 ms window	One Trip, Type A
		DTC Pass	Bulk Voltage1	>= 25 Volts			500 ms	
Battery Charger Converter Input Voltage Sensor "B" Circuit High (BLKS2)	P1EDD	DTC Fail Sets when the reported Bulk Voltage2 is greater than a voltage threshold	Bulk Voltage2	> 463 Volts	AC Voltage	> 80 Volts	400 ms in a 500 ms window	One Trip, Type A
		DTC Pass	Bulk Voltage2	<= 463 Volts			500 ms	
Battery Charger Converter Input Voltage Sensor "B" Circuit Low (BLKS2)	P1EDC	DTC Fail Sets when the reported Bulk Voltage2 is less than a voltage threshold	Bulk Voltage2	< 25 Volts	AC Voltage	> 80 Volts	400 ms in a 500 ms window	One Trip, Type A
		DTC Pass	Bulk Voltage2	>= 25 Volts			500 ms	
Battery Charger Control Module Supply Voltage Sensor Circuit High (PBIAS)	P1F02	DTC Fail Sets when the reported PBIAS Voltage is greater than a voltage threshold	PBIAS Voltage	> 16 Volts	AC Voltage	> 80 Volts	400 ms in a 500 ms window	One Trip, Type A

DIAGNOSTIC SUMMARY TABLES--OBCM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
		DTC Pass	PBIAS Voltage	<= 16 Volts			500 ms	
Battery Charger Control Module Supply Voltage Sensor Circuit Low (PBIAS)	P1F01	DTC Fail Sets when the reported PBIAS Voltage is less than a voltage threshold	PBIAS Voltage	< 6 Volts	AC Voltage	> 80 Volts	400 ms in a 500 ms window	One Trip, Type A
		DTC Pass	PBIAS Voltage	>= 6 Volts			500 ms	
Battery Charger Input Current Sensor Circuit High (IACS)	P0D3B	DTC Fail Sets when the reported AC Current is greater than a current threshold	AC Current	> 24.78 Amps	AC Voltage	> 80 Volts	160 ms in a 200 ms window	One Trip, Type A
		DTC Pass	AC Current	<= 24.78 Amps			200 ms	
Battery Charger Input Current Sensor Circuit Low (IACS)	P0D3A	DTC Fail Sets when the reported AC Current is less than a current threshold	AC Current	< 1.65 Amps	AC Voltage	> 80 Volts	160 ms in a 200 ms window	One Trip, Type A
		DTC Pass	AC Current	>= 1.65 Amps			200 ms	
Battery Charger High Voltage Converter "A" Temparature Sensor Circuit High (THMOD)	P1ECC	DTC Fail Sets when the 1kW HV Converter Temperature sensor voltage (THMOD) is greater than a voltage threshold	1kW HV Converter Temperature Sensor Voltage (THMOD)	> 3.28 Volts	AC Voltage	> 80 Volts	400 ms in a 500 ms window	One Trip, Type A
		DTC Pass	1kW HV Converter Temperature Sensor Voltage (THMOD)	<= 3.28 Volts			500 ms	
Battery Charger High Voltage Converter "A" Temparature Sensor Circuit Low (THMOD)	P1ECB	DTC Fail Sets when the 1kW HV Converter Temperature sensor voltage (THMOD) is less than a voltage threshold	1kW HV Converter Temperature Sensor Voltage (THMOD)	< 0.03 Volts	AC Voltage	> 80 Volts	400 ms in a 500 ms window	One Trip, Type A
		DTC Pass	1kW HV Converter Temperature Sensor Voltage (THMOD)	>= 0.03 Volts			500 ms	
Battery Charger Input Voltage Conditioner Temperature Sensor Circuit High (THPFC)	P1EE0	DTC Fail Sets when the PFC Temperature sensor voltage is greater than a voltage threshold	PFC Temperature Sensor Voltage	> 3.28 Volts	AC Voltage	> 80 Volts	400 ms in a 500 ms window	One Trip, Type A
		DTC Pass	PFC Temperature Sensor Voltage	<= 3.28 Volts			500 ms	
Battery Charger Input Voltage Conditioner Temperature Sensor Circuit Low (THPFC)	P1EDF	DTC Fail Sets when the PFC Temperature sensor voltage is less than a voltage threshold	PFC Temperature Sensor Voltage	< 0.03 Volts	AC Voltage	> 80 Volts	400 ms in a 500 ms window	One Trip, Type A
		DTC Pass	PFC Temperature Sensor Voltage	>= 0.03 Volts			500 ms	

DIAGNOSTIC SUMMARY TABLES--OBCM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Battery Charger Control Module Reference Voltage "A" Circuit High (HV DC Ref Voltage)	P1EE8	DTC Fail Sets when the High Voltage AC (HV DC) Micro reference voltage is greater than a voltage threshold	High Voltage AC (HV DC) Micro Reference Voltage	> 1.25 Volts	AC Voltage	> 80 Volts	400 ms in a 500 ms window	One Trip, Type A
		DTC Pass	High Voltage AC (HV DC) Micro Reference Voltage	<= 1.25 Volts			500 ms	
Battery Charger Control Module Reference Voltage "A" Circuit Low (HV DC Ref Voltage)	P1EE7	DTC Fail Sets when the High Voltage AC (HV DC) Micro reference voltage is less than a voltage threshold	High Voltage AC (HV DC) Micro Reference Voltage	< 1.00 Volts	AC Voltage	> 80 Volts	400 ms in a 500 ms window	One Trip, Type A
		DTC Pass	High Voltage AC (HV DC) Micro Reference Voltage	>= 1.00 Volts			500 ms	
Battery Charger Input Voltage Sensor Circuit High (VACS)	P0D40	DTC Fail Sets when the reported AC Voltage is greater than a voltage threshold	AC Peak Voltage	> 422 Volts	AC Present Bulk Voltage Dropping	is TRUE is FALSE	160 ms in a 200 ms window	One Trip, Type A
		DTC Pass	AC Peak Voltage	<= 422 Volts			200 ms	
Battery Charger Input Voltage Sensor Circuit Low (VACS)	P0D3F	DTC Fail Sets when the reported AC Voltage is less than a voltage threshold	AC Peak Voltage	< 90 Volts	AC Present Bulk Voltage Dropping	is TRUE is FALSE	5500 ms in a 6875 ms window	One Trip, Type A
		DTC Pass	AC Peak Voltage	>= 90 Volts			6875 ms	
Battery Charger High Voltage Converter "B" Temparature Sensor Circuit High (THMOD2)	P1ED1	DTC Fail Sets when the 2kW HV Converter Temperature sensor voltage (THMOD2) is greater than a voltage threshold	2kW HV Converter Temperature Sensor Voltage (THMOD2)	> 3.28 Volts	AC Voltage	> 80 Volts	400 ms in a 500 ms window	One Trip, Type A
		DTC Pass	2kW HV Converter Temperature Sensor Voltage (THMOD2)	<= 3.28 Volts			500 ms	
Battery Charger High Voltage Converter "B" Temparature Sensor Circuit Low (THMOD2)	P1ED0	DTC Fail Sets when the 2kW HV Converter Temperature sensor voltage (THMOD2) is less than a voltage threshold	2kW HV Converter Temperature Sensor Voltage (THMOD2)	< 0.03 Volts	AC Voltage	> 80 Volts	400 ms in a 500 ms window	One Trip, Type A
		DTC Pass	2kW HV Converter Temperature Sensor Voltage (THMOD2)	>= 0.03 Volts			500 ms	
Battery Charger High Voltage Converter "A" Input Current Sensor Circuit High (CSEN1)	P1EE3	DTC Fail CSEN1 Input is greater than a voltage threshold, (the micro performs this test internally)	CSEN1 Input Voltage	> 1.5 Volts	AC Voltage HV Output	> 80 Volts is OFF	950 ms in a 1000 ms window	One Trip, Type A

DIAGNOSTIC SUMMARY TABLES--OBCM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
		DTC Pass	CSEN1 Input Voltage	<= 1.5 Volts			1000 ms	
Battery Charger High Voltage Converter "B" Input Current Sensor Circuit High (CSEN2)	P1EE5	DTC Fail CSEN2 Input is greater than a voltage threshold, (the micro performs this test internally)	CSEN2 Input Voltage	> 1.5 Volts	AC Voltage HV Output	> 80 Volts is OFF	950 ms in a 1000 ms window	One Trip, Type A
		DTC Pass	CSEN2 Input Voltage	<= 1.5 Volts			1000 ms	
Battery Charger Input Voltage Sensor Circuit Range/Performance (AC Input Voltage Sensor-Rationality)	P0D3E	DTC Fail AC Peak Voltage is compared to two equivalent voltage measurements (Bulk1 and Bulk2). Fail is set if the deviation betweeen AC Peak Voltage and each of the two equivalent measurements is greater than voltage deviation thresholds.	ABS(AC Peak Voltage - Bulk1 Voltage) AND ABS(AC Peak Voltage - Bulk2 Voltage)	> 59 Volts > 59 Volts	AC Present Bulk Voltage Dropping PFC Discharged delay Bulk1 Voltage Sensor faults Bulk2 Voltage Sensor faults AC Voltage Sensor faults	is TRUE is FALSE is TRUE (delay expired) P1ED9 or P1EDA not set P1EDC or P1EDD not set P0D3F or P0D40 not set	1760ms in a 1920ms window	One Trip, Type A
		DTC Pass	ABS(AC Peak Voltage - Bulk1 Voltage) AND ABS(AC Peak Voltage - Bulk2 Voltage)	<= 59 Volts <= 59 Volts			1920ms	
Battery Charger Input Current Sensor Circuit Range/Performance (AC Input Current Sensor-Rationality)	P0D39	DTC Fail Sets when the AC Current zero offset value is greater than or equal to a current threshold.	AC Current	>= 1.4 Amps	AC Voltage AC Voltage Sensor faults PFC Discharged delay	> 80 Volts P0D3F or P0D40 not set is TRUE (delay expired)	512ms in a 640ms window	One Trip, Type A
		DTC Pass	AC Current	< 1.4 Amps			640ms	

DIAGNOSTIC SUMMARY TABLES--OBCM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Battery Charger Converter Input Voltage Sensor "A" Performance (Converter Input Bulk Voltage Sensor 1-Rationality)	P1EDB	DTC Fail Bulk1 Voltage is compared to two equivalent voltage measurements (AC Peak Voltage and Bulk2). Fail is set if the deviation betweeen Bulk1 Voltage and each of the two equivalent measurements is greater than voltage deviation thresholds.	ABS(Bulk1 Voltage - AC Peak Voltage) AND ABS(Bulk1 Voltage - Bulk2 Voltage)	> 59 Volts > 10 Volts	AC Voltage Bulk Voltage Dropping PFC Discharged delay Bulk1 Voltage Sensor faults Bulk2 Voltage Sensor faults AC Voltage Sensor faults	> 80 Volts is FALSE is TRUE (delay expired) P1ED9 or P1EDA not set P1EDC or P1EDD not set P0D3F or P0D40 not set	512ms in a 640ms window	One Trip, Type A
		DTC Pass	ABS(Bulk1 Voltage - AC Peak Voltage) AND ABS(Bulk1 Voltage - Bulk2 Voltage)	<= 59 Volts <= 10 Volts			640ms	
Battery Charger Converter Input Voltage Sensor "B" Performance (Converter Input Bulk Voltage Sensor 2-Rationality)	P1EDE	DTC Fail Bulk2 Voltage is compared to two equivalent voltage measurements (AC Peak Voltage and Bulk1). Fail is set if the deviation betweeen Bulk2 Voltage and each of the two equivalent measurements is greater than voltage deviation thresholds.	ABS(Bulk2 Voltage - AC Peak Voltage) AND ABS(Bulk2 Voltage - Bulk1 Voltage)	> 59 Volts > 10 Volts	AC Voltage Bulk Voltage Dropping PFC Discharged delay Bulk1 Voltage Sensor faults Bulk2 Voltage Sensor faults AC Voltage Sensor faults	> 80 Volts is FALSE is TRUE (delay expired) P1ED9 or P1EDA not set P1EDC or P1EDD not set P0D3F or P0D40 not set	512ms in a 640ms window	One Trip, Type A
		DTC Pass	ABS(Bulk2 Voltage - AC Peak Voltage) AND ABS(Bulk2 Voltage - Bulk1 Voltage)	<= 59 Volts <= 10 Volts			640ms	

DIAGNOSTIC SUMMARY TABLES--OBCM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Battery Charger Input Power Up Protection Circuit Peformance (AC Inrush RelayFunctionality)	P1EFF	DTC Fail Sets when the AC Relay Check input and the AC relay output are equal.(The AC Relay Check input should be opposite polarity of the AC Relay Output)	AC Relay Output	= AC Relay Check input	AC Voltage	> 80 Volts	2400ms in a 3000ms window	Two Trips, Type B
		DTC Pass	AC Relay Output	≠ AC Relay Check input			3000ms	

*** Microprossessor State Determination Table**

Inputs				Resulting State		
HVEM Comm Enable	RUN/CRANK	ACCESSORY	AC Power to Charger	LV DC Micro	HV DC Micro	HV AC Micro
Low	Low	Low	Off	Asleep	Asleep	Asleep
Low	Low	Low	On	Awake	Awake	Awake
Low	Low	High	Off	Awake	Asleep	Asleep
Low	Low	High	On	Awake	Awake	Awake
Low	High	Low	Off	Awake	Asleep	Asleep
Low	High	Low	On	Awake	Awake	Awake
Low	High	High	Off	Awake	Asleep	Asleep
Low	High	High	On	Awake	Awake	Awake
High	Low	Low	Off	Awake	Asleep	Asleep
High	Low	Low	On	Awake	Awake	Awake
High	Low	High	Off	Awake	Asleep	Asleep
High	Low	High	On	Awake	Awake	Awake
High	High	Low	Off	Awake	Asleep	Asleep
High	High	Low	On	Awake	Awake	Awake
High	High	High	Off	Awake	Asleep	Asleep
High	High	High	On	Awake	Awake	Awake

DIAGNOSTIC SUMMARY TABLES--FSCM (ELR)

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 [a] Intrusive Test Trigger: 1] Fuel Pump Duty Cycle Clamped Time (min or max duty cycle) >= 5 sec Or 2] Fuel Pres Err Variance <= calibration value KeFRPD_cmp_FPSS_MinPres Variance (typically 0.3 to 0.6); Otherwise, Report status as Pass [b] Intrusive test freq limit: 60 sec between intrusive tests that pass, [c] Intrusive test Fuel Flow limit: Fuel Flow Actual < Max allowed Fuel Flow rate]	Absolute value of fuel pressure change as sensed during intrusive test.	<= 30 kPa	1. Fuel Pres Sensor Circuit Low DTC (P018C) 2. Fuel Pres Sensor Circuit High DTC (P018D) 3. Fuel Pump Circuit Low DTC (P0231) 4. Fuel Pump Circuit High DTC (P0232) 5. Fuel Pump Circuit Open DTC (P023F) 6. Reference Voltage DTC (P0641) 7. Fuel Pump Control Module Driver Over-temperature DTC (P064A) 8. Control Module Internal Performance DTC (P0606) 9. Engine run time 10. Emissions fuel level (PPEI $3FB) 11. Fuel pump control 12. Fuel pump control state 13. Engine fuel flow	Not active Not active Not active Not active Not active Not active Not active >=5 seconds Not low Enabled Normal or Fuel Pres Sensor rationality control > 0.047 g/s	Frequency: Continuous; 12.5 ms loop. 60 seconds between intrusive tests that pass Intrusive test requested if fuel system is clamped for >= 5 seconds or fuel pressure error variance <= typically (0.3 to 0.6) (calculated over a 2.5sec period); otherwise report pass Duration of intrusive test is fueling related (5 to 12 seconds). Intrusive test is run when fuel flow is below Max allowed fuel flow rate (Typical values in the range of 11 to 50 g/s)	DTC Type B 2 trips

DIAGNOSTIC SUMMARY TABLES--FSCM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					14. ECM fuel control system failure (PPEI $1ED)	Not failed		
Fuel Rail Pressure (FRP) Sensor Circuit Low Voltage	P018C	This DTC detects if the fuel pressure sensor circuit is shorted low	Fuel Pres Sensor sensor voltage	< 0.14 V	Ignition	Run or Crank	72 failures out of 80 samples 1 sample/12.5 ms	DTC Type B 2 trips
Fuelel Rail Pressure (Fuel Pres Sensor) Sensor Circuit High Voltage	P018D	This DTC detects if the fuel pressure sensor circuit is shorted high	Fuel Pres Sensor sensor voltage	> 4.86 V	Ignition	Run or Crank	72 failures out of 80 samples 1 sample/12.5 ms	DTC Type B 2 trips
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 Ignition OR Fuel Pump Control AND Ignition Run/Crank Voltage	Run or Crank Accessory enabled 9V < voltage < 32V	72 test failures in 80 test samples if Fuel Pump Current <100A 1 sample/12.5 ms	DTC Type A 1 trip
Fuel Pump Control Circuit High Voltage	P0232	This DTC detects if the fuel pump control circuit is shorted to high	Voltage measured at fuel pump circuit	> 3.86 V	Commanded fuel pump output 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 B 2 trips
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 Ignition OR Fuel Pump Control AND Ignition Run/Crank Voltage	Run or Crank Accessory 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	Run or Crank	72 failures out of 80 samples 1 sample/12.5 ms	DTC Type A 1 trip

DIAGNOSTIC SUMMARY TABLES--FSCM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					PPEI Fuel System Request ($1ED)	valid		
Mechanical Actuator Performance (Functionality)	P059F	Compare commanded shutter position to sensed position	Failure to achieve commanded position	Two (2) consecutive intrusive tests fail to achieve commanded position. Intrusive tests are triggered immediately following any failure to achieve a commanded position.	1. Power mode 2. Shutter Control 3. Ignition Run/Crank Voltage	Run/Crank Enabled 11V < voltage < 32V	Frequency: 1 sample after every shutter movement. Intrusive test requested if shutter movement is commanded and position feedback differs after 19.5 seconds; otherwise report pass. Duration of intrusive test is shutter movement related (40 to 120 seconds)	DTC Type B 2 trips
Control Module Read Only Memory (ROM)	P0601	This DTC will be stored if any software or calibration check sum is incorrect	Calculated Checksum (CRC16)	≠ stored checksum for any of the parts (boot, software, application calibration, system calibration)	Ignition OR Ignition OR Fuel Pump Control	Run or Crank Accessory enabled	1 failure if it occurs during the first ROM test of the ignition cycle, otherwise 5 failures Frequency: Runs continuously in the background	DTC Type A 1 trip
Control Module Not Programmed	P0602	Indicates that the FPCM needs to be programmed	This DTC is set via calibration, when KeMEMD_b_NoStartCal	= TRUE	Ignition OR Ignition OR Fuel Pump Control	Run or Crank Accessory 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 Ignition OR Fuel Pump Control	Run or Crank Accessory enabled	1 failure Frequency: Once at power-up	DTC Type A 1 trip

DIAGNOSTIC SUMMARY TABLES--FSCM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
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 Ignition OR Fuel Pump Control	Run or Crank Accessory 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 3. External watchdog test	P0606	This DTC indicates the FSCM has detected an internal processor fault or external watchdog fault (PID 2032 discriminates the source of the fault)	1. For all I/O configuration register faults: •Register contents 2. For Processor Clock Fault: •EE latch flag in EEPROM. OR • RAM latch flag. 3. For External Watchdog Fault: • Software control of fuel pump driver	Incorrect value. 0x5A5A 0x5A Control Lost	Ignition OR Ignition OR Fuel Pump Control 1. For all I/O configuration register faults: •KeMEMD_b_ProcFltCfgRegEnbl 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)	Run or Crank Accessory enabled TRUE TRUE TRUE not active not active	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
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	Run or Crank	1 test failure Once on controller power-up	DTC Type B 2 trips

DIAGNOSTIC SUMMARY TABLES--FSCM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					Ignition OR Fuel Pump Control	Accessory enabled		
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 >= 5.5V active <= 4.5V active	Ignition	Run or Crank	15 failures out of 20 samples	DTC Type A
			OR Reference voltage	> 105% nominal (i.e., 5.25V) OR <95% nominal (i.e., 4.75V)				
Fuel Pump Control Module - Driver Over-temperature 1	P064A	This DTC detects if an internal fuel pump driver overtemperature condition exists under normal operating conditions	Pump Driver Temp	> 150C	Ignition OR Ignition OR Fuel Pump Control KeFRPD_b_FPOverTemp Ignition Run/Crank	Run or Crank Accessory Enabled TRUE 9V<voltage<32V	3 failures out of 15 samples 1 sample/12.5 ms	DTC Type B 2 trips
Active Grille Air Shutter Actuator 1 Signal Message Counter Incorrect	P151E	Detects loss of communication condition has occurred between ECU and device Active Grill Air Shutter "A" actuator	PWM Message	Undetected	1. Power mode 2. Ignition Run/Crank Voltage	Run/Crank 11V < voltage < 32V	Frequency: 100ms 150 failures out of 167 samples	DTC Type B 2 trips
Ignition 1 Switch Circuit Low Voltage	P2534	This DTC detects if the Ignition1 Switch circuit is shorted to low or open	Ignition 1 voltage	<= 6 V	Engine	Running	180 failures out of 200 samples 1 sample/25.0 ms	DTC Type A 1 trip
Ignition 1 Switch Circuit High Voltage	P2535	Detects if the Ignition1 Switch circuit is shorted to vehicle supply voltage	Ignition 1 voltage	> 11.7 V	Ignition Run_Crank terminal	Off	180 failures out of 200 samples 1 sample/25.0 ms	DTC Type A 1 trip

DIAGNOSTIC SUMMARY TABLES--FSCM (ELR)

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
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 (continuously calculated function of desired fuel rail pressure and fuel flow rate) OR >= High Threshold (continuously calculated function of desired fuel rail pressure and fuel flow rate) **(See P2635 Supporting Tables tab and P2635 Supporting Calculations tab)**	1. Fuel Pres Sensor 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. Fuel Pres Sensor Circuit High DTC (P018D)	Not active .		
					3. Fuel Rail Pressure Sensor Performance DTC (P018B)	Not active		
					4. FuelPump Circuit Low DTC (P0231)	Not active		
					5. FuelPump Circuit High DTC (P0232)	Not active		
					6. FuelPump Circuit Open DTC (P023F)	Not active		
					7. Reference Voltage DTC (P0641)	Not active		
					8. Fuel Pump Control Module Driver Over-temperature DTC's (P064A)	Not active		
					9. Control Module Internal Performance DTC (P0606)	Not active		
					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		

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	8.898	8.898	8.898	8.898	8.836	5.414	2.453	0	0
6	8.898	8.898	8.898	8.898	8.836	5.414	2.453	0	0
7.5	8.898	8.898	8.898	8.898	8.836	5.414	2.453	0	0
9	8.898	8.898	8.898	8.898	8.836	5.414	2.453	0	0
10.5	8.898	8.898	8.898	8.898	8.836	5.414	2.453	0	0
12	8.898	8.898	8.898	8.898	8.898	8.898	8.125	5.180	2.586
13.5	8.898	8.898	8.898	8.898	8.898	8.898	8.898	8.898	7.594
15	8.898	8.898	8.898	8.898	8.898	8.898	8.898	8.898	8.898
16.5	8.898	8.898	8.898	8.898	8.898	8.898	8.898	8.898	8.898
18	8.898	8.898	8.898	8.898	8.898	8.898	8.898	8.898	8.898
19.5	8.898	8.898	8.898	8.898	8.898	8.898	8.898	8.898	8.898
21	8.898	8.898	8.898	8.898	8.898	8.898	8.898	8.898	8.898
22.5	8.898	8.898	8.898	8.898	8.898	8.898	8.898	8.898	8.898
24	8.898	8.898	8.898	8.898	8.898	8.898	8.898	8.898	8.898
25.5	8.898	8.898	8.898	8.898	8.898	8.898	8.898	8.898	8.898
27	8.898	8.898	8.898	8.898	8.898	8.898	8.898	8.898	8.898
28.5	8.898	8.898	8.898	8.898	8.898	8.898	8.898	8.898	8.898

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
1.015	1.091	1.162	1.229	1.292	1.351	1.408	1.463	1.516	1.566	1.615	1.663	1.710	1.756	1.800	1.843	1.884
	488	508	528	548	568	588	608	628	648	668	688	708	728	748	768	
	1.965	2.003	2.040	2.076	2.112	2.147	2.181	2.214	2.247	2.282	2.316	2.349	2.382	2.414	2.447	

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

Calculation of Fault Thresholds:

Givens: Measured values observed at a typical operating point for an 80mph roadload --

Engine rpm = 1900 rev/min, Instantaneous Fuel Flow = 1.265 g/s, Fuel Line Pressure = 304 kPa (gage)

Example : Pressure Error Fault Threshold Low at chosen operating point:

Min Injector Flow [g/s] = **Minimum Injector Pulse Width** [ms] * **Fuel Injector Flow[mg/ms/inj]** * Number of Fuel Injectors / 2 [inj/rev] * Engine Speed [rev/min] * 1/60 [min/s] * 1/1000 [g/mg]

Min Injector Flow = 0.25 * 1.565918* 4 / 2 * 1900 / 60 / 1000 = 0.0247 g/s

Max Overfueling Error [] = (Instantaneous Injector Flow [g/s] / Min Injector Flow [g/s])

= 1.265 (g/s) / 0.0247 (g/s)

= 51.2147 / 100 (decimal conversion)

= 0.512147 (51 %)

The overfuelling fuel flow error is limited to the range of between 105% and 115% overfuelling depending on the actual fuel flow. The MaxOverfuelingError calculated above is **outside the scaling range**; therefore, the overperformance fault threshold for this operating point is then calculated using the limited value (105% or 1.05) as follows:

Pressure Error Fault Threshold Low[kPa]

= Injector Pressure Drop [kPa] *(1 -(Max Overfueling Error)^2)

Example : Pressure Error Fault Threshold High at same given operating point as the above example:

Max Injector Flow[g/s] = **Fuel Injector Flow[mg/ms/inj]** * Number of Fuel Injectors [inj] * 1/1000 [g/mg] * 1000 [ms/s]

Max Injector Flow[g/s] = 1.565918 * 4 *1/1000 *1000 = 6.26 g/s

Max Underfueling Error [] = (Instantaneous Injector Flow [g/s] / Max Injector Flow [g/s])

= 1.265 (g/s) / 6.26 (g/s)

= 0.202 (20%)

The underfuelling fuel flow error is limited to the range between 85% and 95% overfuelling depending on the actual fuel flow. The MaxUnderfuelingError calculated above falls **below limited range**, therefore it is **limited** to;

Max Underfueling Error [] = 0.85

The underperformance fault threshold for this operating point is then calculated as:

Pressure Error Fault Threshold High [kPa]

= Injector Pressure Drop [kPa] *(1 -(Max Underfueling Error)^2)

= 304 * (1-(0.85*0.85))

= **84.36 kPa**