08 GRP08a BAS Hybrid SGCM

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Req'd	MIL Illum
SGCM 3 Phase current sensor:								
Starter/Generator Phase U-V-W Correlation (rationality)	P1AAE	To detect electrical failure of phase current sensor.	Sum of 3 phase current	> 200A	Main Relay	Closed	20ms	two trips
			Sum of 3 phase current	< - 200A	Wakeup Signal	On		
Starter/Generator Phase U-V-W Current Sensor Overcurrent	P1AB1	To detect 3 Phase over current and to protect MOSFET.	Over current signal	> 1000 A	Wakeup Signal	On	20ms	two trips
Starter/Generator Phase U Current Sensor Circuit Low Voltage	P1AB3	Circuit Low monitor to detect the failure of U-phase current sensor circuit below valid range	U Phase current sensor output voltage at highside	< 0.5 V	Wakeup Signal	On.	0.5ms	two trips
Starter/Generator Phase U Current Sensor Circuit High Voltage	P1AB4	Circuit High monitor to detect the failure of U-phase current sensor circuit above valid range	U Phase current sensor output voltage at highside	> 4.50 V	Wakeup Signal	On.	0.5ms	two trips
Starter/Generator Phase V Current Sensor Circuit Low Voltage	P1AB5	Circuit Low monitor to detect the failure of V-phase current sensor circuit below valid range	V Phase current sensor output voltage at highside	< 0.5V	Wakeup Signal	On.	0.5ms	two trips
Starter/Generator Phase V Current Sensor Circuit High Voltage	P1AB6	Circuit High monitor to detect the failure of V-phase current sensor circuit above valid range	V Phase current sensor output voltage at highside	> 4.5V	Wakeup Signal	On.	0.5ms	two trips
Starter/Generator Phase W Current Sensor Circuit Low Voltage	P1AB7	Circuit Low monitor to detect the failure of W-phase current sensor circuit below valid range	W Phase current sensor output voltage at highside	< 0.5V	Wakeup Signal	On.	0.5ms	two trips
Starter/Generator Phase W Current Sensor Circuit High Voltage	P1AB8	Circuit High monitor to detect the failure of W-phase current sensor circuit above valid range	W Phase current sensor output voltage at highside	> 4.5V	Wakeup Signal	On.	0.5ms	two trips
SGCM 36V battery voltage sensor:								
Hybrid Battery System Voltage High	P0AFB	To detect over voltage and to protect MOSFET.(Load dump)	In the hardware, Over voltage signal from protection circuit	> 56V	WakeUp signal	On	5sec	two trips
			In the software, 36V output voltage	> 50V	Control module voltage	> 10V	5sec	
					Main relay	Closed		
					WakeUp signal	On		

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Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Req'd	MIL Illum
Starter/Generator Control Module Hybrid Battery Voltage Sense Circuit Low Voltage	P1A97	Circuit Low monitor to detect the failure of 36V output voltage sensor circuit below valid range	Sensor signal	< 0.2V	36V voltage from BDU (42VIN)	> 0V.	20ms	two trips
			absolute value (36V Battery Voltage - 36V output Voltage)	> 5V	Main relay	Closed		
					V42IN invalid Flag	OFF		
Starter/Generator Control Module Hybrid Battery Voltage Sense Circuit High Voltage	P1A98	Circuit High monitor to detect the failure of 36V output voltage sensor circuit above valid range	Sensor signal	> 4.0V	36V voltage from BDU (42VIN)	> 0V.	20ms	two trips
			absolute value (36V Battery Voltage - 36V output Voltage)	> 5V	Main relay	Closed		
					V42IN invalid Flag	OFF		
Hybrid System Voltage	P0AF8	To correlation of ESCM Battery Voltage and SGCM output Voltage to detect 3 phase cable open, or fuse/relay 's failure.	absolute value (36V Battery Voltage - 36V output Voltage)	> 5V	36V voltage from BDU (42VIN)	> 0V.	4sec	two trips
					Main relay	Closed		
					V42IN invalid Flag	OFF		
Starter/Generator Phase U-V-W ACR Circuit	P1AAF	To detect phase wire open/short.	ACR output	> 200A	Main relay	Closed	200ms	two trips
			ACR output	> -200A				
14 Volt Power Module Voltage Sensor								
14 Volt Power Module Voltage Sensor Circuit Low Voltage	P1A8D	Circuit Low monitor to detect the failure of APM 12V voltage sensor circuit below valid range	Sensor output voltage	< 0.2V	Wakeup Signal	On	0.5ms	two trips
			absolute value (12V Power supply Voltage - 12V APM output Voltage)	> 5V				
14 Volt Power Module Voltage Sensor Circuit High Voltage	P1A8E	Circuit High monitor to detect the failure of APM 12V voltage sensor circuit above a valid range	Sensor output voltage	> 3.84V	Wakeup Signal	On	0.5ms	two trips

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Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Req'd	MIL Illum
			absolute value (12V Power supply Voltage - 12V APM output Voltage)	> 5V				
SGCM system voltage:								
Starter/Generator Control Module System Voltage Performance	P1A70	Performance monitor to detect 12V DC wire electrical failure by compairing the 12v input to the 12v output values	ABS| 12V power supply voltage - 12V APM output voltage |	> 5V	Wakeup Signal	On	1ms	two trips
			Wait 15 seconds to see if fault occurs again during this time.		No APM voltage sensor faults	P1A8D	15sec	
					No APM voltage sensor faults	P1A8E		
APM current Sensor:								
14 Volt Power Module Current Sensor Circuit Range/Performance	P0A87	Performance Monitor to detect the failure of APM current sensor circuit.	ABS| APM current - APM High (+130A)|	>39A	APM Output voltage	> 7V	25ms	two trips
					42V Output voltage	> 28V		
					APM Status	Current limit		
14 Volt Power Module Current Sensor Circuit Low Current	P0A88	Circuit Low Monitor to detect the failure of APM current sensor circuit.	Sensor signal for APM	<0.5V	Wakeup Signal	On	0.5ms	two trips
14 Volt Power Module Current Sensor Circuit High Current	P0A89	Circuit High Monitor to detect the failure of APM Current sensor circuit.	Sensor signal for APM	>4.5V	Wakeup Signal	On	0.5ms	two trips
14 Volt Power Module Current Sensor Overcurrent	P1A8F	To detect over current and to protect MOSFET. In the hardware an over current protection circuit is used to limit the current, and software monitors for an over current reading in the sensor	If either hardware signal 1. 36V Over current hardware signal	250 A	Wakeup Signal	On	20ms	two trips
			2. 12V Over current hardware signal	250 A			20ms	
			In the software, ABS|Current sensor|	> 150A			2sec	
APM Performance								

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Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Req'd	MIL Illum
14 Volt Power Module Stuck Off	P1A93	To check APM On/Off, DC - DC direction is commanded ON but converter is OFF	DC to DC direction is ON, abs|14V Output V - APM Commanded V||	> 0.2V	Wakeup Signal	On	1 sec	two trips
14 Volt Power Module Stuck On	P1A94	To detect APM on when it is not commanded on causing a large current output.	DC-DC direction is OFF, converter remains ON, ABS|APM current|	> 20A	Wakeup Signal	On	1 sec	two trips
DC/DC Converter Stuck in 42-14 Volt Direction	P1A96	To detct APM fault when the APM is commanded in the Buck moded but is set to Boost mode causing an over current	When DCDC direction indicates 14-42 direction, but the converter stays in the 42-14 direction, Boost mode current	> 20A	APM Mode	Buck	1 sec	two trips
APM temp sensor								
14 Volt Power Module Temperature Sensor Performance	P1A90	To detect the failure of APM temperature sensor circuit by taking the avereage of the 2 PIM sensors and subtracting the Modue temperature and looking for a large difference. This can be done because the sensors are on the same board close together.	ABS|APM temp - (PIMTemp1 + PIMTemp2)/2|	> 55 deg C	no APM over temp fault no APM temp sensor circuit (High/Low) faults	P0A7F P1A91 P1A92	2 sec	two trips
14 Volt Power Module Temperature Sensor Circuit Low Voltage	P1A91	FET temperature sensor signal for APM is less than 0.2V for 50 times of 20ms(1s).	Sensor output voltage	< 0.2V	no APM over temp fault	P0A7F	1 sec.	two trips
14 Volt Power Module Temperature Sensor Circuit High Voltage	P1A92	Sensor output voltage greater than 4.6 V(-14.3degC) && | DDTEMP - (PIMTEMP1+PIMTEMP2)/2 | > 55degC for 50 times of 20ms(1s).	Sensor output voltage and ABS|DDTEMP - (PIMTEMP1 + PIMTEMP2)/2|	> 4.6V > 55 deg C	no APM over temp fault	P0A7F	1 sec	two trips
AUX Pump Control								

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Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Req'd	MIL Illum
Auxiliary Transmission Fluid Pump Motor Pump Supply Voltage Circuit/Open	P0B09	To detect the Auxilary Transmission Fluid Pump supply relay circuit is faulted by an error feedback line.	Eco-back signal (Low) does not match to the LSD output signal (CVTP1_D)	0	WakeUp signal	On	320ms	two trips
			Eco-back signal (High) does not match to the LSD output signal (CVTP1_D)	1				
Auxiliary Transmission Fluid Pump Control Circuit/Open	P2796	To detect the Auxailary Transmission Fluid Pump control PWM circuit is faulted using error feedback line.	Eco-back signal (PWM output duty) is out of range, CVTPERR or CVTPERR	> 2.06V or < 0.68V	WakeUp signal	On	1 sec	two trips
Board temp sensor								
Starter/Generator Control Module Temperature Sensor Performance	P1A7B	To determine if the sensor is reading correctly, by comparing it to average of 3 other sensors after 480min soak.	|Ave(PIMTEMP1,PIMTEMP2,APMTEMP) - BOARDTEMP|	> 30deg C	No Board Over Temp fault	P0A7C	n/a	two trips
					No Board temp sensor circuit fault	P1A7C or P1A7D		
					Engine Off Timer	> 480min		
Starter/Generator Control Module Temperature Sensor Circuit Low Voltage	P1A7C	To detect failure of temperature sensor shorted high.	Sensor output voltage	< 0.2V	No Board Over Temp fault	P0A7C	1 sec	two trips
Starter/Generator Control Module Temperature Sensor Circuit High Voltage	P1A7D	To detect failure of temperature sensor shorted Low	Sensor output voltage	> 4.6V	No Board Over Temp fault	P0A7C	1 sec	two trips
			PIMTEMP1 greater than 80degC && PIMTEMP2 greater than 80degC && APMTEMP greater than 80degC					
CAN								

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Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Req'd	MIL Illum
Starter / Generator Control Module Lost Communication With Battery Energy Control Module	U1897	To detect loss of communication on the CAN bus with the ESCM module base on messages $220, $484, $486	10 out of 10 timeouts based on the "GensigTimeoutTime" for each message from BDU. Each message timeout is measured seperately. (Reception error), sum error or rolling counter error.		WakeUp	On		two trips
			MSG $220	10 out of 10 timeouts			500ms	
			MSG $484	10 out of 10 timeouts			2000ms	
			MSG $486	10 out of 10 timeouts			2000ms	
Starter/Generator Control Module Lost Communication With Engine Control Module (ECM)	U1899	To detect the loss of communication on the CAN bus with the ECM module base on messages $260, $350, $440	10 out of 10 timeouts based on the "GensigTimeoutTime" for each from ECM. Each message timeout is measured separatly. (Reception error), sum error or rolling counter error.		WakeUp	On		two trips
			MSG $260	10 out of 10 timeouts			625	
			MSG $350	10 out of 10 timeouts			625	
			MSG $440	10 out of 10 timeouts			2000	
Field Coil Current Control								
Starter/Generator Field Coil Circuit	P1AA8	To detect a field coil circuit fault in the Motor Generator from the error feedback line	ABS | Field coil current - Command current) |	> 0.5A	WakeUp	On	1 sec	two trips
Starter/Generator Field Coil Current Sensor Circuit Low Voltage	P1AB9	Starter/Generator Field Coil Current Sensor Circuit Low Voltage	Sensor output voltage	< 1.8V	WakeUp	On	20ms	two trips
Generator Field Coil Current Sensor Circuit High Voltage	P1ABA	Generator Field Coil Current Sensor Circuit High Voltage	Sensor output voltage	> 4.1V	WakeUp	On	20ms	two trips
Starter/Generator Field Coil Current Sensor Overcurrent	P1ABB	Starter/Generator Field Coil Current Sensor Overcurrent	Field coil current	> 6A	WakeUp	On	20ms	two trips
Hood Switch								

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Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Req'd	MIL Illum
Engine Hood Switch Circuit	P254F	To detect a fault in the vehicle hood switch	Hood Switch1 signal = Hood Switch2 signal (ex.Hood Switch1 is high and Hood Switch2 is high or Hood Switch1 is low and Hood Switch2 is low)	Switch 1 = Switch 2	WakeUp	On	100ms	two trips
System Voltage								
Starter/Generator Control Module System Voltage Low	P1A6D	To detect the system voltage sensor is shorted low	Sensor output voltage is less than 0.2 V (1.56V) && | 12V power supply - 12V output voltage | greater than 5V for 4 times of 119us (0.5ms).		WakeUp	On	0.5 ms	two trips
			Sensor output voltage	< 0.2V				
			ABS | 12V power supply - 12V output voltage |	> 5V				
Starter/Generator Control Module System Voltage High	P1A6E	To detect the system voltage sensor is shorted high	Sensor output voltage is greater than 3.84 V (30.0V) && | 12V power supply - 12V output voltage | greater than 5V for 4 times of 119us (0.5ms).		WakeUp	On	0.5 ms	two trips
			Sensor output voltage	> 3.84V				
			ABS | 12V power supply - 12V output voltage |	> 5V				
Infrastructure								
Starter/Generator Control Module Internal Performance	P0A1E	CPU calculation error, ACR task check error, dual path error, sub CPU error, clock monitor check	CPU calculation error, ACR task check error, dual path error, sub CPU error, clock monitor check		WakeUp	On	1 fail	two trips
Starter/Generator Control Module Internal Driver Error	P1A63	To detect a fault in the internal drive error.Gate driver error flag from driver IC is low. (Gate driver voltage error, PWM output logic error)	"Gate driver voltage fault signal is low" OR "PWM logic error fault signal is low".		WakeUp	On	1 fail	two trips

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Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Req'd	MIL Illum
Starter/Generator Control Module Random Access Memory (RAM)	P1A69	To detect an error in the SGCM RAM write area.	RAM check error		WakeUp	On	1 fail	two trips
Starter/Generator Control Module Read Only Memory (ROM)	P1A6A	To detect an error in the SGCM ROM using a checksum calculation	ROM check error Cuaculated ROMSUM value does not match with defined value.		WakeUp	On	1 fail	two trips
Starter/Generator Control Module 5 Volt Reference Circuit	P1A6B	To detect a fault in the 5 volt reference circuit	5V reference fault 5V input AD value(2 byte) is out of following range for 10 times of 10ms (100ms). ave_vbb_chk (497 to 575) ave_vcc_chk (496 to 528) ave_vn_chk (499 to 453) ave_vref_chk (482 to 542)		WakeUp	On	100ms	two trips
SGCM not programmed								
Starter/Generator Control Module Not Programmed	P1A6C	Starter/Generator Control Module Not Programmed	This diagnostic will be set in service parts. SGCM will not function			Always		One trip
MGU Performance								
Motor Torque Delivered Performance	P1A62	To detect the deliverd Torque value is not within tollerance meaning that the MGU is not able to deliver the requested torque.	Compare the PEB "internal torque" - PEB "Delivered Torque" greater than 10Nm for 1 second and the MGU is in normal charge mode.	> 10 Nm difference	WakeUp Motor Mode	On Normal charge mode with external set point	1 sec	two trips
MGU temp. sensor								

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Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Req'd	MIL Illum
Generator Temperature Sensor Circuit Range/Performance	P0A37	To detect the performance of the motor generator temperature sensor to validate is within range of the other temperature sensors, buy compairing it to the other sensors it controls.	ABS |Average(PIMTEMP1,PIMTEMP2,APMTEMP,BOARDTEMP) - MGUTEMP|	> 30 deg C				two trips
					No Motor Over Temp fault	P0A3B		
					No Motor temp sensor circuit (High/Low) faults	P0A38 or P0A39		
					Engine off time	> 480min		
Generator Temperature Sensor Circuit Low	P0A38	To detect the Motor Generator temperature sensor is shorted low	Sensor output voltage less than 0.2V (280degC)	< 0.2V	No Motor Over Temp fault	P0A3B	1 sec	two trips
Generator Temperature Sensor Circuit High	P0A39	To detect the Motor Generator temperature sensor is shorted high	Sensor output voltage greater than 3.95V&& PIMTEMP1 greater than 80degC && PIMTEMP2 greater than 80degC && APMTEMP greater than 80degC	> 3.95V	No Motor Over Temp fault	P0A3B	1 sec	two trips
Inverter temp sensor								
Starter/Generator Inverter Phase U Temperature Sensor Performance	P1A9B	To detect the failure of inverter temp sensor circuit usin rationality of other temperature sensors to determine if it is out of range	| PIMTEMP1 - (DDTEMP+PIMTEMP2)/2 | > 55degC or | PIMTEMP2 - (DDTEMP+PIMTEMP1)/2 | > 55degC for 50 times of 20ms(2.0s)	> 55 deg C			2 sec	two trips
					No V Phase or W Phase Over Temp fault	P1A9E or P1AA2		

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Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Req'd	MIL Illum
					No V Phase or W Phase temp sensor circuit (High/Low)	P1A9C or P1A9D or P1AA0 or P1AA1)		
Starter/Generator Inverter Phase U Temperature Sensor Circuit Low Voltage	P1A9C	To detect the inverter phase u temperature sensor is shoted low	Sensor output voltage is less than 0.2 V(200degC) 50 times of 20ms (1.0 s)	< 0.2 V	No V Phase or W Phase Over Temp fault	P1A9E or P1AA2	1 sec	two trips
Starter/Generator Inverter Phase U Temperature Sensor Circuit High Voltage	P1A9D	To detect the inverter phase u temperature sensor is shoted lhigh	Sensor output voltage greater than 4.6 V(-14.3degC) && | PIMTEMP1 - (DDTEMP+PIMTEMP2)/2 | > 55degC for 50 times of 20ms(1s).	> 4.6 V	No V Phase or W Phase Over Temp fault	P1A9E or P1AA2	1 sec	two trips
Starter/Generator Inverter Phase V Temperature Sensor Circuit Low Voltage	P1AA0	To detect the inverter phase v temperature sensor circuit is shorted low	Sensor output voltage is less than 0.2 V(200degC) for 50 times of 20ms (1.0 s)	< 0.2V	No V Phase or W Phase Over Temp fault	P1A9E or P1AA2	1 sec	two trips
Starter/Generator Inverter Phase V Temperature Sensor Circuit High Voltage	P1AA1	To detect the inverter phase v temperature sensor circuit is shorted high	Sensor output voltage greater than 4.6 V(-14.3degC) && | PIMTEMP2 - (DDTEMP+PIMTEMP1)/2 | > 55degC for 50 times of 20ms(1s).	> 4.6 V	No V Phase or W Phase Over Temp fault	P1A9E or P1AA2	1 sec	two trips
Motor R/D Sensor								
Generator Position Sensor Circuit	P0A4B	To detect Loss of speed signal or converter error (line open, short) in the Motor Generator position sensor circuit	R/D converter error (loss of signal or tracking)	100ms	WakeUp	On	100ms	two trips

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Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Req'd	MIL Illum
Generator Position Sensor Circuit Range/Performance	P0A4C	To detect a fault in the angle data read by the motor generator position sensor circuit.	(data error) R/D IC angle data does not match with micro computer angle data. (initialization error)self check fault when initial sequence		WakeUp	On	init	two trips
Generator Position Sensor Circuit Overspeed	P0A50	To detect an over speed condition in the motor generator position sensor circuit	absolute motor speed	> 21000 rpm	WakeUp	On	10ms	two trips
PEB Elec. Coolant Pump								
Motor Electronics Coolant Pump Control Circuit Low High	P0A06	To detect control voltage relay circuit open or short to ground fault for the SGCM coolant pump	Eco-back signal (High) does not match to the LSD output signal (COOIP_D) for 4 times of 80ms.	0	WakeUp	On	320ms	two trips
Motor Electronics Coolant Pump Control Circuit High Low	P0A07	To detect the PWM circuit open or short to ground fault of the SGCM coolant pump	Eco-back signal (Low) does not match to the LSD output signal (COOIP_D) for 4 times of 80ms.	1	WakeUp	On	320ms	two trips
Auxilliary Transmission Fluid Pump Performance								

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Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Req'd	MIL Illum
(Passive test)	P2797	To detect the Auxiliary Transmission Fluid Pump is not creating enough pressure in the Transmission to keep the pressure switch closed.	This diagnostic checks to see if the transmission auxiliary pump is running. If the pump is determined to be off, using x out of y logic, then fail the test and set a DTC. If we get 160 bad samples out of 320 then diagnostic fails using the RPND4 PSM switch to tell us that the auxiliary transmission fluid pump is on If test runs to completion the Auxpump Test completed flag is set to true and the intrusive part of the test is not run during this ignition cycle.	160 bad samples(PRND 4 PSM switch is open) out of 320 total			7 sec	two trips
					The diagnostic system	Not disabled		
					The Diagnostic	Enabled		
					hybrid engine off	TRUE		
					Transmission temperature	> 10C and < 100C		
					The run/crank ignition voltage	>9V and <18V		
					The PSM input PRND4	= valid		
					On board prime	Not Active		
					Enough time has passed to allow the pump pressure to stabilize	2 sec		

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Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Req'd	MIL Illum
(Onboard prime)	P2797	To detect the Auxiliary Transmission Fluid Pump is not creating enough pressure in the Transmission to keep the pressure switches closed.	On Board Prime The three PSM switches are read during a hybrid engine off event while the aux pump is commanded on if all of switches do not read on then the voltage to the pump is increased for a calibrated amount of time (30 seconds) if the three switches are still off (0)then a fault is set.	switch reads 0			30 sec	two trips
					Hybrid Engine Off	TRUE		
					SbHYBC_PumpPrime Needed	TRUE		
					SeHYBC_b_EngineRunningPrev	FALSE		
					LeHYBC_b_EngineRunning	TRUE		
Starter/Generator System No Crank at Restart	P1A6F	To determine performance failure of the Hybrid Motor Generator	This function performs the motor generator restart failed diagnostic. During a 36v motor generator start. If (VeENED_Cnt_MG_RestartFailedCntr >= 1 fails) Then Report Test Failed using CeDFIR_e_SGCM_NoCrankAtRestart	1 fail			N/A	two trips
					VeDRER_DiagSystemDsbl (the diagnostic system has not been disabled)	is equal to FALSE ,		
					And The calibrations:			

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Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Req'd	MIL Illum
					And VeENED_b_HB_GenrPerf_FA	is equal to FALSE (there are no belt slip faults),		
					And VePMDR_b_RunCrankActive	does not equal False (the ignition switch is in the run/crank position),		
					And VeHYBR_b_MtrTorqDlvdPerf_FA	is equal to FALSE (there are no MGU torque delivered faults)		
					And VeEONV_Pct_FuelLevel	> KeENED_Pct_MinFuelRestart (10%)		
Transmission Fluid Pressure (TFP) Position Switch								

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Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Req'd	MIL Illum
Stuck Off	P1808	To determine if the PRND4 PSM switch circuit is open or stuck off	This function checks the PRND4 PSM switch to see if it is Off when it should be on. Each time the function is called a sample timer is incremented, If VeHYBI_b_DRI_D_Raw =FALSE then the fail counter is also incremented If fail counter >= 80 counts out of sample counts 160 Then Report test Fail If sample count = 160 and fail count less than 80 Then report test pass	Switch is off			2 sec	two trips
					And GetEPSR_b_CrankSnsr_FA()	FALSE		
					and VeHYBI_b_DRI_D_R_StateVld	TRUE		
					and VeEPSR_b_EngineRunning	TRUE		
					And VeHYBI_b_DRI_D_Raw	FALSE		

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Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Req'd	MIL Illum
Stuck On	P1809	To determine if the PRND4 PSM switch circuit is short to ground or stuck on	This function checks the PRND4 PSM switch to see if it is On when it should be off. If VeHYBI_b_DRI_D_Raw = TRUE for 1 second after key off then Report test failed If VeHYBI_b_DRI_D_RAW = False for 3 seconds Then report test passed	Switch is on			1 sec	two trips
					VePMDR_b_RunCrankActive	!= TRUE, (Key off)		
					And If (VeHYBD_t_EnblPressIndDepress	>= 5 seconds (wait 5 seconds after key off to let pressure settle)		
					And Vehicle Speed	== 0.0		
					And Engine movement detected	== FALSE		
					And VeHYBD_b_PRND4_ShutdownEnbld	== CbFALSE		
Hybrid Generator Performance	P0A92	The monitor is used to determine if the mechanical drive belt connection between the Engine and the Motor Generator has faulted.	If difference between the filtered, weighted predicted MGU speed and the actual filtered MGU speed)	> 25 or < -25			N/A	two trips
					VeDRER_DiagSystemDsbl	is equal to FALSE (the diagnostic system has not been disabled), and		

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Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Req'd	MIL Illum
					VePMDR_b_RunCrankActive	is equal to TRUE (ignition position is run or crank)		
					VeEPSR_b_CKP_SnsrFaultActive	is equal to FALSE (there are no crank sensor faults)		
					VeECTR_b_ECT_SnsrFA	is equal to FALSE (there are no engine coolant temperature sensor faults)		
					VeMAPR_b_MAP_SnsrFA	is equal to FALSE (there are no mass air flow sensor faults)		
					VeEITR_b_IAT_SnsrCktFA	is equal to FALSE (there are no intake air temperature sensor faults)		
					VeENER_b_MG_TempVldty	is equal to TRUE (there are no motor/generator temperature faults)		

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Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Req'd	MIL Illum
					VeENER_b_MG_AnglrPstnVldty	is equal to TRUE (there are no motor/generator position sensor faults)		
					VeENER_b_MG_SpdVldty	is equal to TRUE (there are no motor/generator speed faults)		
					VeENER_b_MG_DlvdTorqVldty	is equal to TRUE (there are no motor/generator torque delivered faults		
Park Neutal Position Switch								
Circuit Low	P0851	The monitor is used to determine if the Park Neutral Position Switch is stuck in the P/N Position (low).	Park Neutral Switch reads low when it should be high	0 V (Short to Ground)			3.125 sec	two trips
					Engine Torque	> 50Nm		
					Engine Speed	> 1000rpm		
					Transmission Torque Converter Slip	> -10Nm and < 20Nm		
					Throttle Position	> 10%		
					Vehicle Speed	> 10 kph		