2006 5.3L (LM7) PARALLEL HYBRID TRUCK
Hybrid Control Module (HCM)
DIAGNOSTIC PARAMETERS

2006file11_HCM.doc

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
HCM system fault	P0A1D	This DTC detects the failure of HCM system checks. It also detects when the HCM is awake when it supposed to be powered off. It also detects low system supply voltage	1. System_Error_Type = UNDEFINED_SOFTWARE_RESET OR SCHEDULER_CYCLE_TOO_LONG OR SCHEDULED_MODULE_OUT_OF_SEQUENCE OR NON_MASKABLE_INTERRUPT OR SYSTEM_STACK_UNDERFLOW OR SYSTEM_STACK_OVERFLOW OR UNDEFINED_OP_CODE OR PROTECTED_INSTRUCTION_FAULT OR ILLEGAL_WORD_OPERAND_ACCESS OR ILLEGAL_INSTRUCTION_ACCESS OR ILLEGAL_EXTERNAL_BUS_ACCESS OR OSCILLATOR_FAULT OR PROGRAM_DATA_MISMATCH OR USER_STACK_UNDERFLOW OR USER_STACK_OVERFLOW 2. Main program is still executing after Ignition_state = Off and Power_Maintain = Off 3. 8 volts > IGN0 > 18 volts	1. All the time the HCM is powered 2. All the time the HCM is powered 3. ((Ignition_state = Run OR Crank) OR (Power maintain relay = ON AND APM_direction = 42 to 14) AND Ign_state_fault = Passed OR Not_Tested AND Run_time > HCM_volt_diag_disable_tim AND EngSpd > HCM_volt_diag_eng_speed AND No engine speed faults AND VehSpd > HCM_volt_diag_veh_speed AND No vehicle speed faults	1. Any single event 2. Any single event 3. 50 fails from 60 samples 1 sample/100ms	DTC Type B

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5V regulator fault	P1AC8	This DTC detects a hardware fault with the external 5V supply. It also detects a voltage difference between the external sensor 5V supply and internal reference 5V supplies.	1. External 5V error flag 5Verr = True 2. 2.45V >Vcc >2.55V 3. 5VX regulator on at power up	Test enable criteria 1 & 2. HCM run time > 5 seconds AND 3. 8 volts > IGN0 > 16 volts	125 fails in 125 samples 1 sample/20ms	DTC Type B
Service calibration	P1AC9	This DTC indicates that the HCM contains a service calibration	Service Replacement = 1	Once at start up	Once at start up	DTC Type A
Ignition relay rationality fault	P2533	This DTC detects IGN1 relay/ Power maintain relay stuck on or off	1. HCM_ignition_state = Run Or Crank AND Power Mode = Run OR Crank AND PCM_state = Power off OR Extended Power off 2. Power Maintain relay = ON AND AND PCM_state = Power off OR Extended Power off 3. HCM_ignition_state =Accessory OR Off AND Power Mode = Accessory OR Off AND PCM_state <> Power off OR Extended Power off	Test enable criteria Ignition_state = (Run OR Crank) OR Power maintain relay = ON AND APM_direction = 42 to 14 OR (Power maintain relay is Off AND Ignition state = Off)	125 fails from 125 samples 1 sample/20ms	DTC Type C (Service)
Auxiliary transmission pump output driver	P2796	This DTC determines if the auxiliary transmission pump output driver circuit is overload, shorted Load over temperature, open Load or shorted to Ground	Diagnostic information from Siemens TLE 6220 GP output driver hardware.	Test enable criteria 1. Ignition rationality (B1422) = Passed OR Not_Tested 2. Ignition_state = (Run OR Crank) AND 8 Volts < IGN 0 > 16 volts OR Power maintain relay = ON AND APM_direction = 42 to 14	125 fails in 125 samples 1 sample/20 ms	DTC Type B

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Auxiliary transmission pump rationality	P2797	This DTC determines if transmission pressure is maintained when the engine is turned off at idle	Pressure manifold switch range <> D3 OR D4	PRNDL = D4 OR D3 HCM_Run_Time > KE_ATP_diag_Enable_Time Transmission auxiliary pump is on AND Engine speed = 0 for > Enable time (from table value based upon transmission fluid temperature) No transmission Park to Drive range change for 9 seconds No transmission D3 to D4 or D4 to D3 for 3 seconds HCM ignition voltage > Enable voltage (from table value based upon transmission fluid temperature No PRNDL related faults No Pressure_Switch_Manifold_Status gear related faults No ATP output driver fault No Transmission temperature faults No 5V diagnostic faults	250 test failures within 250 test samples in any one engine off event 3 consecutive failing engine off events 50 sample/sec	DTC Type B
APO LED output driver	B0979	This DTC determines if the auxiliary power outlet LED output driver circuit is overload, shorted Load over temperature, open Load or shorted to Ground	Diagnostic information from Siemens TLE 6220 GP output driver hardware.	<u>Test enable criteria</u> 1. Ignition rationality (B1422) = Passed OR Not_Tested 2. Ignition_state = (Run OR Crank) AND 8 Volts < IGN 0 > 16 volts OR Power maintain relay = ON AND APM_direction = 42 to 14	125 fails in 125 samples 1 sample/20 ms	DTC Type C (Service)

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Ignition rationality fault	B1422	This DTC detects invalid states of the IGN0, IGN1 and crank data within the HCM	1. IGN0 = OFF AND IGN1 = OFF AND Crank = True 2. IGN0 = OFF AND IGN1 = ON AND Crank = (True or False) 3. IGN0 = ON AND IGN1 = OFF AND Crank = True	Enabled at all times HCM is powered.	125 fails from 125 samples 1 sample/20ms	DTC Type C (Service)
APO on relay output driver	B1452	This DTC determines if the auxiliary power outlet relay output driver circuit is overload, shorted Load over temperature, open Load or shorted to Ground	Diagnostic information from Siemens TLE 6220 GP output driver hardware.	Test enable criteria 1. Ignition rationality (B1422) = Passed OR Not_Tested 2. Ignition_state = (Run OR Crank) AND 8 Volts < IGN 0 > 16 volts OR Power maintain relay = ON AND APM_direction = 42 to 14	125 fails in 125 samples 1 sample/20 ms	DTC Type C (Service)
Hood Switch Invalid range	B3006	This DTC determines if the voltage from the hood switch is in an invalid range	0.05V < hood switch voltage < 2.05V OR 2.30V < hood switch voltage < 4.16V OR 4.56V < hood switch voltage < 4.95V	No 5V supply faults HCM run time > 5 seconds	125 fails in 125 samples 1 sample/20 ms	DTC Type B
Hood Switch out of range low	B3008	This DTC determines if the voltage from the hood switch is out of range low	hood switch voltage <0.05V	No 5V supply faults HCM run time > 5 seconds	125 fails in 125 samples 1 sample/20 ms	DTC Type B
Hood Switch out of range high	B3009	This DTC determines if the voltage from the hood switch is out of range high	hood switch voltage > 4.95V	No 5V supply faults HCM run time > 5 seconds	125 fails in 125 samples 1 sample/20 ms	DTC Type B
APO switch invalid range	B3654	This DTC determines if the voltage from the APO switch is in an invalid range	0.05V < APO switch voltage < 1.96V OR 2.36V < APO switch voltage < 3.20V OR 3.45V < APO switch voltage < 4.95V	No 5V supply faults HCM run time > 5 seconds	125 fails in 125 samples 1 sample/20 ms	DTC Type C (Service)
APO switch out of range low	B3655	This DTC determines if the voltage from the APO switch is out of range low	APO switch voltage <0.05V	No 5V supply faults HCM run time > 5 seconds	125 fails in 125 samples 1 sample/20 ms	DTC Type C (Service)

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APO switch out of range high	B3656	This DTC determines if the voltage from the APO switch is out of range high	APO switch voltage > 4.95V	No 5V supply faults HCM run time > 5 seconds	125 fails in 125 samples 1 sample/20 ms	DTC Type C (Service)
Auxiliary coolant pump output driver	B3844	This DTC determines if the auxiliary coolant pump output driver circuit is overload, shorted Load over temperature, open Load or shorted to Ground	Diagnostic information from Siemens TLE 6220 GP output driver hardware.	Test enable criteria 1. Ignition rationality (B1422) = Passed OR Not_Tested 2. Ignition_state = (Run OR Crank) AND 8 Volts < IGN 0 > 16 volts OR Power maintain relay = ON AND APM_direction = 42 to 14	125 fails in 125 samples 1 sample/20 ms	DTC Type C (Service)
CAN fault ESCM module	U1888	This DTC detects that either the rolling counter from this module has frozen. It also detects if any of the CAN messages from this module has timed out.	Change in rolling counter = 0 OR An individual message has not been received in 2.5 transmission periods of the message concerned Message 1 – 125ms timeout Message 2 – 250ms timeout	Test enable criteria Ignition_state = (Run OR Crank) AND 8 Volts < IGN 0 > 16 volts OR Power maintain relay = ON AND APM_direction = 42 to 14	250 fails from 500 samples 1 sample/20ms	DTC Type B
Class II communication fault Body Control Module	U1889	This DTC detects if the state of health message has disappeared from this controller	Time between state of health messages > 5 seconds	Test enable criteria Ignition_state = (Run OR Crank) AND 8 Volts < IGN 0 > 16 volts OR Power maintain relay = ON AND APM_direction = 42 to 14	Executed every 250ms	DTC Type C (Service)
Class II communication fault HVAC module	U1890	This DTC detects if the state of health message has disappeared from this controller	Time between state of health messages > 5 seconds	Test enable criteria Ignition_state = (Run OR Crank) AND 8 Volts < IGN 0 > 16 volts OR Power maintain relay = ON AND APM_direction = 42 to 14	Executed every 250ms	DTC Type C

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Class II communication fault IPC module	U1891	This DTC detects if the state of health message has disappeared from this controller	Time between state of health messages > 5 seconds	Test enable criteria Ignition_state = (Run OR Crank) AND 8 Volts < IGN 0 > 16 volts OR Power maintain relay = ON AND APM_direction = 42 to 14	Executed every 250ms	DTC Type C (Service)
CAN fault EHPS module	U1892	This DTC detects that either the rolling counter from this module has frozen. It also detects if any of the CAN messages from this module has timed out.	Change in rolling counter = 0 OR An individual message has not been received in 2.5 transmission periods of the message concerned Message 1 – 62.5ms timeout	Test enable criteria Ignition_state = (Run OR Crank) AND 8 Volts < IGN 0 > 16 volts OR Power maintain relay = ON AND APM_direction = 42 to 14	250 fails from 500 samples 1 sample/20ms	DTC Type C
CAN fault PCM module	U1893	This DTC detects that either the rolling counter from this module has frozen. It also detects if any of the CAN messages from this module has timed out.	Change in rolling counter = 0 OR An individual message has not been received in 2.5 transmission periods of the message concerned Message 1 – 1500ms timeout Message 2 – 75ms timeout Message 3 – 75ms timeout Message 4 – 250ms timeout Message 5 – 75ms timeout	Test enable criteria Ignition_state = (Run OR Crank) AND 8 Volts < IGN 0 > 16 volts OR Power maintain relay = ON AND APM_direction = 42 to 14	250 fails from 500 samples 1 sample/20ms	DTC Type B
CAN fault SGCM module	U1894	This DTC detects that either the rolling counter from this module has frozen. It also detects if any of the CAN messages from this module has timed out.	Change in rolling counter = 0 OR An individual message has not been received in 2.5 transmission periods of the message concerned Message 1 – 250ms timeout Message 2 – 62.5ms timeout	Test enable criteria Ignition_state = (Run OR Crank) AND 8 Volts < IGN 0 > 16 volts OR Power maintain relay = ON AND APM_direction = 42 to 14	250 fails from 500 samples 1 sample/20ms	DTC Type B