COMPONENT DESCRIPTION > ELECTRICAL ENERGY MANAGEMENT

NOTE: When any vehicle module is being programmed, connect an external battery charger to make sure the module programming is completed without interruption due to the load shedding feature becoming active. The external battery charger must maintain a system voltage above 13 volts. This may require a charger setting higher than the lowest charge setting. The external battery charger negative connection must be made to an engine or vehicle chassis ground and not the negative battery terminal. If the connection is to the negative battery terminal, load shedding may begin and module programming may be corrupted. After charging has begun, start the engine to clear any load shed states and then turn the engine off and proceed with programming.

This vehicle is equipped with an Electrical Energy Management system which manages battery charging and monitors the battery state of charge. The Electrical Energy Management system software is housed in the BCM. It has the algorithms and control structure for the Smart Regenerative Charging, and Load Shed Control Strategy. The Electrical Energy Management system is equipped with 2 unique sensors to monitor the battery depending on the vehicle system features / operation.

- Battery current sensor
- Generator current sensor

These sensors serve as input to the Electrical Energy Management system software. If the sensors malfunction due to wiring issues or failure, a DTC will be set. In most cases the Electrical Energy Management system functions will be turned off until the sensor operation is restored.

DESCRIPTION AND OPERATION > CHARGING SYSTEM - SYSTEM OPERATION AND COMPONENT DESCRIPTION > BATTERY STATE OF CHARGE

The BCM uses the battery current sensor to keep track of the battery state of charge. The battery current sensor is a Hall-effect sensor attached to the battery ground cable. During a drive cycle the Electrical Energy Management software adjusts the battery state of charge by monitoring the charge and discharge current and adjusting the state of charge up during charging, and down during discharge. During rest periods (key off with no electrical loads) when the vehicle enters sleep mode, the battery voltage is sampled to calibrate the State of Charge. The BCM automatically executes this calibration anytime the vehicle enters sleep mode and when the total vehicle current draw is below 300mA. It takes 8 hours in the sleep mode to calibrate the battery state of charge to high accuracy. If the system draw does not allow the battery state of charge calibration over the previous 7 to 10 days the State of Charge quality factor changes to flag this and some Electrical Energy Management Functions which rely on the accuracy of the battery state of charge may be temporarily turned off until a calibration takes place.

DESCRIPTION AND OPERATION > CHARGING SYSTEM - SYSTEM OPERATION AND COMPONENT DESCRIPTION > ENGINE OFF LOAD SHED

When the engine is off, and the BCM determines the battery state of charge is below 40% or 10% of the charge has been drained or 45 minutes have elapsed, a load shed message is sent over the CAN. This message turns off the audio/navigation system to save the remaining battery charge. Under this condition, the FDIM displays SYS OFF TO SAVE BATT (without navigation) or BATTERY SAVER - SYSTEM OFF PLEASE START THE ENGINE (with navigation) to notify the driver that battery protection actions are