Battery Load Shed

The main purpose of controlling electrical consumption with a load management strategy is to:

- Limit battery discharge
- Monitor the battery charge status

For vehicles with gas engines the alternator is not dimensioned to support all loads in all situations. In some situations energy has to be drawn from the battery. These are mainly during:

- engine idle
- cold climate with a lot of electrical heating functions active
- warm conditions with the engine cooling fan running
- large transient loads (i.e. EPAS)

For HEV/BEV vehicles, a DC/DC converter control module is not dimensioned to support all loads in all situations. In some situations, energy has to be drawn from the battery. Vehicles built before 2025 have a partial load shed strategy. Vehicles built after 2025 contain the full load shed strategy.

During cold conditions, the charge acceptance of the battery is very low which increases the time needed to recharge the battery. This means that it can take up to several hours of driving before the battery is recharged.

The electrical consumption control is using Ignition_Status, Remote_Start_Status and EngineStateInternal in order to define the load management strategy during the different operating states of the vehicle.

The BCM is the primary module that is responsible for controlling the load management strategy. The BCM processes measurements of the system and uses the information for calculations and load prioritization

The strategy allows drain to occur from the battery. Load Management minimizes the drain by controlling the time and magnitude of the drain that can occur. The battery drain changes depending on the driving cycle and the types of loads the driver has activated, therefore, the BCM must be able to shut down or reduce the loads if necessary. The intent of the initial load shed stage, LSHED1, is to reduce electrical loads in a manner that is not noticed by the vehicle operator. During LSHED1, requests are sent in a prioritized order for the appropriate modules to begin shedding available loads. In order to prevent customer satisfaction issues, the loads are requested to reduce power consumption with minimum impact to the customer.

The second load shed event, LSHED2, occurs in two stages, SHED2_TRANS and SHED2_CONTIN. During operation of a vehicle equipped with large transient loads, there are transient peaks for current draw. The Load Management algorithm reacts to these spikes by using the SHED2_TRANS state. This state requires all non-critical loads to shed immediately, without customer indication, so that large transient loads can operate normally with little to no adverse impact to the customer. SHED2_CONTIN is a continuous deactivation of the loads to ensure the vehicle is able to re-start once the ignition is turned off. During SHED2_CONTIN, a message is displayed to the vehicle operator notifying them of the vehicle's charging system status.

Independent of load shed requests, the Load Management control can request boosts to the engine idle speed. Boosting the engine idle speed allows for increased output of the alternator to deliver more current to the battery. Idle speed increases are done through network IBoost messages.

The load shed charts provide a general overview of the features available on the vehicle based on the build options.

Load Shed Charts

Priority List Load Shedding 1

Priority List Load Shedding 1, Engine Running	System Affected	Battery State Of Charge (SOC)	Battery Voltage
Charging system at 95 % capacity	Heated washer fluid	Below 62%	Below 11.6 Volts
	Heated steering wheel		
	Smart trailer tow battery charge		
	Heated and cooled seats		
	Heated back glass, Heated mirrors		
	Heated wind screen (windshield)		
	Rear Aux blower		
	Engine cooling fan		

Priority List Load Shedding 2

Priority List Load Shedding 2, Engine Running (which includes load shedding 1)	System Affected	Battery State Of Charge (SOC)	Battery Voltage
Charging system at 95 % capacity	Energy management relay	Below or equal to 50%	Below 9 Volts
	Non-Chime related information		
	110 volt inverter		
	12 volt power points		
	Ambient lighting		
	Manual climate control blower (less FMVSS required for operation)		
	NOTE: *The electric booster heater has it's own Load Management strategy which includes idle boost request to the PCM and current limiting capabilities.* Electric booster heater		

Priority List Load Shedding Engine Off

Priority List Load Shedding Engine Off	System Affected	Battery State Of Charge (SOC)	Battery Voltage

NOTE: *Battery SOC threshold may increase slightly as the battery temperature gets colder (i.e. < 0°C /32°F)* • Ignition on/engine off for > 30 minutes and battery voltage <= to 12.8 Volts (Gasoline engines) • Ignition on/engine off for > 30 minutes and battery voltage <= to 13.2 Volts (Electric vehicles) • Ignition on/engine off for > 5 minutes and battery voltage <= to 12.8 Volts and battery SOC < 40% (Gasoline engines) • Ignition on/engine off for > 5 minutes and battery voltage <= to 13.2 Volts and battery SOC < 40% (Electric vehicles)	Heated washer fluid	Loads determined by the engine off timer by the BCM sets the load control status
	Heated steering wheel	
	Smart trailer tow battery charge	
	Heated and cooled seat (Rear Driver) - stage 3	
	Heated and cooled seat (Rear Passenger) - stage 3	
	Heated seat Only (Rear Driver)	
	Heated seat Only (Rear Passenger)	
	Heated wind screen (windshield)	
	Dual automatic climate control front blower (less FMVSS required for operation)	
	Manual climate control blower (less FMVSS required for operation)	
NOTE: *Battery SOC threshold may increase slightly as the battery temperature gets colder (i.e. < 0°C /32°F)* • Ignition on/engine off for > 30 minutes and battery voltage <= to 12.8 Volts (Gasoline engines) • Ignition on/engine off for > 30 minutes and battery voltage <= to 13.2 Volts (Electric vehicles) • Ignition on/engine off for > 5 minutes and battery voltage <= to 12.8 Volts and battery SOC < 40% (Gasoline engines) • Ignition on/engine off for > 5 minutes and battery voltage <= to 13.2 Volts and battery SOC < 40% (Electric vehicles)	Heated back glass, Heated mirrors	Loads determined by the engine off timer by the BCM sets the load control status
	Split-screen Heated back glass, Heated mirrors	
	Energy management relay	
	Infotainment	
	Electronic Finish Panel (less FMVSS required operation)	
	110 volt inverter	
	12 volt power points	
	Ambient lighting	
	Passive entry cap sensors (only allowed driver door passive entry sensor)	