

Module Controlled Functions - System Operation and Component Description

System Operation

Body Control Module (BCM)

The BCM controls various systems by monitoring inputs from switches, sensors and network messages from other modules on the HS-CAN1 and from the GWM. Based on the received inputs, the BCM activates outputs. For example, the BCM monitors the headlamp switch position. Based on this input, the BCM may provide voltage to the exterior lamps.

Battery Saver

The battery saver feature is used to conserve battery voltage. The BCM provides automatic shut-off of the interior lamps after a time-out period when the ignition is off.

Refer to: [Interior Lighting - System Operation and Component Description](#) (417-02 Interior Lighting, Description and Operation).

Battery Load Shed

The BCM monitors the battery state of charge and when necessary will shut off accessories in order to save the remaining battery charge.

Refer to: [Charging System - 2.7L EcoBoost \(238kW/324PS\)/3.5L EcoBoost \(272kW/370PS\) - Overview](#) (414-00 Charging System - General Information, Description and Operation).

Refer to: [Charging System - 3.3L Duratec - V6/5.0L 32V Ti-VCT - System Operation and Component Description](#) (414-00 Charging System - General Information, Description and Operation).

Field Effect Transistor (FET) Protection

The BCM utilizes an Field Effect Transistor (FET) protective circuit strategy for many of its outputs, for example, lamp output circuits. Output loads (current level) are monitored for excessive current (typically short circuits) and are shut down (turns off the voltage or ground provided by the module) when a fault event is detected.

A Field Effect Transistor (FET) is a type of transistor that the control module software uses to control and monitor current flow on module outputs. The Field Effect Transistor (FET) protection strategy prevents module damage in the event of excessive current flow.

Output loads (current level) are monitored for excessive current draw (typically short circuits). When a fault event is detected the Field Effect Transistor (FET) turns off and a short circuit DTC sets. The module resets the Field Effect Transistor (FET) protection and allows the circuit to function when the fault is corrected or the ignition state is cycled off and then back on.

When the excessive circuit load occurs often enough, the module shuts down the output until a repair procedure is carried out. Each Field Effect Transistor (FET) protected circuit has 3 predefined levels of short circuit tolerance based on a module lifetime level of fault events based upon the durability of the Field Effect Transistor (FET). If the total tolerance level is determined to be 600 fault events, the 3 predefined levels would be 200, 400 and 600 fault events.

When each level is reached, the DTC associated with the short circuit sets along with DTC U1000:00. These Diagnostic Trouble Codes (DTCs) can be cleared using the module on-demand self-test, then the Clear DTC operation on the scan tool (if the on-demand test shows the fault corrected). The module never resets the fault event counter to zero and continues to advance the fault event counter as short circuit fault events occur.

If the number of short circuit fault events reach the third level, then Diagnostic Trouble Codes (DTCs) U1000:00 and U3000:49 set along with the associated short circuit DTC. DTC **U3000:49 cannot be cleared** and the module **must** be replaced after the repair.

Post Crash Alert Function

The post crash alert is a function controlled by the BCM. If the RCM determines an impact of enough severity has occurred (the airbags may or may not be deployed), the post crash alert function activates.

The post crash alert function:

- sounds the horn.
- turns on the hazard lights.
- turns on the interior lights.

- unlocks the doors.

The post crash alert function can be turned off by:

- pressing the hazard flasher lamp switch (which may need to be pressed twice).
- pressing the transmitter unlock button.
- pressing the RKE transmitter PANIC button.
- cycling the ignition switch (RUN-OFF-RUN-OFF-RUN).
- opening the driver door.

Factory-Transport Mode

During vehicle build, some modules (such as the IPC and the BCM) are set to factory mode. When the vehicle build is complete, the vehicle is set to transport mode.

Transport mode is used to reduce the drain on the battery during longer periods when the vehicle is not used. Various system functions can be altered or disabled when in the transport mode. While in transport mode, the IPC displays TRANSPORT MODE in the message center. Transport mode can be disabled and placed into normal operation mode.

Refer to: [Transport Mode Deactivation](#) (419-10 Multifunction Electronic Modules, General Procedures).

Car Configuration Parameters

The parameters are set in the BCM. The parameters are also set in the IPC as backup data for service, in case online As-Built data is not available. For more information,

Refer to: [Module Configuration - System Operation and Component Description](#) (418-01 Module Configuration, Description and Operation).

Snowplow Mode

Refer to: [Snow Plow Package](#) (419-10 Multifunction Electronic Modules, Description and Operation).

Component Description

BCM

The BCM is a multifunction module that requires a PMI when replaced.

Refer to: [Module Programming](#) (418-01 Module Configuration, General Procedures).

DDM

The DDM receives power window commands from the driver door window control switch through a LIN. The DDM supplies voltage and ground to operate the driver door window regulator motor. The DDM also communicates driver door window control switch requests to the PDM through the MS-CAN.

For the power mirror functions, the DDM controls the LH exterior mirror glass position by supplying voltage and ground to the LH exterior mirror motors based on inputs from the master window control switch. When the RH exterior mirror is selected, the DDM forwards the movement requests to the PDM through the MS-CAN. To control the heated mirror function, the DDM supplies voltage and ground to the LH exterior mirror glass heating element based on messages received from the FCIM. For the memory mirror function, the DDM supplies voltage and ground to the LH mirror motor potentiometers. The DDM monitors the feedback from these potentiometers to determine the mirror glass position. Memory mirror positions are stored in the DDM memory. For more information:

- Refer to: [Handles, Locks, Latches and Entry Systems - System Operation and Component Description](#) (501-14 Handles, Locks, Latches and Entry Systems, Description and Operation).
- Refer to: [Glass, Frames and Mechanisms - System Operation and Component Description](#) (501-11 Glass, Frames and Mechanisms, Description and Operation).
- Refer to: [Rear View Mirrors - System Operation and Component Description](#) (501-09 Rear View Mirrors, Description and Operation).

The DDM requires PMI when replaced.

Refer to: [Module Programming](#) (418-01 Module Configuration, General Procedures).

PDM

For the power window function, the PDM receives power window commands from the passenger door window control switch or from the DDM through the MS-CAN.

For the power mirror function, the PDM controls the RH exterior mirror glass position by supplying voltage and ground to the RH exterior mirror motors based on messages received from the DDM. To control the heated mirror function, the PDM supplies voltage and ground to the RH exterior mirror glass heating element based on messages received from the FCIM. For the memory mirror function, the PDM supplies voltage and ground to the RH mirror motor potentiometers. The PDM monitors the feedback from these potentiometers to determine the mirror glass position. Passenger mirror positions are stored in the PDM memory. For more information:

- Refer to: [Handles, Locks, Latches and Entry Systems - System Operation and Component Description](#) (501-14 Handles, Locks, Latches and Entry Systems, Description and Operation).
- Refer to: [Glass, Frames and Mechanisms - System Operation and Component Description](#) (501-11 Glass, Frames and Mechanisms, Description and Operation).
- Refer to: [Rear View Mirrors - System Operation and Component Description](#) (501-09 Rear View Mirrors, Description and Operation).

The PDM requires PMI when replaced.

Refer to: Module Configuration (418-01 Module Configuration) .

RTM

The RTM communicates all RKE and passive key information to the BCM over a LIN circuit and (when the network is awake) the CAN. The RTM is an antenna that receives the high frequency signals from passive keys.

- Refer to: [Handles, Locks, Latches and Entry Systems - System Operation and Component Description](#) (501-14 Handles, Locks, Latches and Entry Systems, Description and Operation).
- Refer to: [Tire Pressure Monitoring System \(TPMS\) - System Operation and Component Description](#) (204-04B Tire Pressure Monitoring System (TPMS), Description and Operation).
- Refer to: [Rear View Mirrors - System Operation and Component Description](#) (501-09 Rear View Mirrors, Description and Operation).

The RTM requires PMI when replaced.

Refer to: [Module Programming](#) (418-01 Module Configuration, General Procedures).