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2009 FORD Explorer OEM Service and Repair Workshop Manual

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Module Controlled Functions - Overview

419-10 Multifunction Electronic Modules	***2022 F-150***
Description and Operation	***Procedure revision date: 08/24/2022***

Module Controlled Functions - Overview

Body Control Module (BCM)

The BCM (body control module) may control the following:

- Ambient lighting
- Battery load shed function
- Battery management function
- Brake shift interlock
- Delayed accessory function
- Dimmable backlighting
- HCM (headlamp control module) exterior lighting
- Heated exterior mirrors
- Ignition state messaging
- Interior lighting
- Keyless entry keypad
- PATS (passive anti-theft system)
- Perimeter alarm

- Starter relay
- Transmission relay
- Wiper and washer relays

information,

Refer to: Module Configuration - System Operation and Component Description

(418-01A Module Configuration, Description and Operation).

Factory-Transport Mode

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

Transport mode reduces the drain on the battery during longer periods when the vehicle is not in use. Various system functions can be altered or disabled when in the transport mode. While in transport mode, the IPC (instrument panel cluster) displays TRANSPORT MODE in the message center. Transport mode can be disabled and placed into normal operation mode.

Field Effect Transistor (FET) Protection

The BCM (body control module) 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 FET is a type of transistor the control module software uses to control and monitor current flow on module outputs. The 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 FET turns off and a short circuit DTC (diagnostic trouble code) sets. The module resets the 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 excessive circuit loads occur often enough, the module shuts down the output until a repair procedure is carried out. Each FET protected circuit has 3 predefined levels of short circuit tolerance based on a module lifetime level of fault events and upon the durability of the 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 (diagnostic trouble code) associated with the short circuit sets along with DTC (diagnostic trouble code) U1000:00. These Diagnostic Trouble Codes (DTCs) can be cleared using the module on-demand self-test, then the Clear DTC (diagnostic trouble code) 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 (diagnostic trouble code) . DTC (diagnostic trouble code) **U3000:49 cannot be cleared** and the module **must** be replaced after the repair.

Post-Crash Alert Function

communicates driver door window control switch requests to the PDM (passenger door module) through the MS-CAN (medium speed-controller area network) .

For the power mirror functions, the DDM (driver door module) operates as follows:

- LH (left-hand) exterior mirror glass position by supplying voltage and ground to the exterior mirror motors based on inputs from the master window control switch.
- Forwards the RH (right-hand) exterior mirror movement requests to the PDM (passenger door module) through the MS-CAN (medium speed-controller area network) .
- When the heated mirror function is selected, it supplies voltage and ground to the LH (left-hand) exterior mirror glass heating element based on messages received from the FCIM (front controls interface module) .
- When the memory mirror function is selected, it supplies the voltage and ground to the LH (left-hand) mirror motor and monitors the potentiometers to determine the mirror glass position. Memory mirror positions are stored in the DDM (driver door module) memory.

For additional 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 - Vehicles With: One-Touch Open and Close Front Windows - 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 (driver door module) requires PMI (programmable module installation) when replaced.

For additional information,

Refer to: Module Programming

(418-01A Module Configuration, General Procedures).

PDM (passenger door module)

For the power window function, the PDM (passenger door module) receives power window commands from the passenger door window control switch or from the DDM (driver door module) through the MS-CAN (medium speed-controller area network) .

For the power mirror functions, the PDM (passenger door module) operates as follows:

- RH (right-hand) exterior mirror glass position by supplying voltage and ground to the exterior mirror motors based on messages from the DDM (driver door module) .

Refer to: Module Programming

(418-01A Module Configuration, General Procedures).

Auxiliary Switches

419-10 Multifunction Electronic Modules	***2022 F-150***
Diagnosis and Testing	***Procedure revision date: 07/21/2020***

Auxiliary Switches

Global Customer Symptom Code (GCSC) Chart

Diagnostics in this manual assume a certain skill level and knowledge of Ford-specific diagnostic practices.

REFER to: Diagnostic Methods

(100-00 General Information, Description and Operation).

Global Customer Symptom Code Chart

Customer Symptom	Action
Driver Aides & Information > Power/Charge Port > Performance > Inoperative	GO to Pinpoint Test A
Driver Aides & Information > Power/Charge Port > Performance > Inoperative	GO to Pinpoint Test B

Symptom Chart

Diagnostics in this manual assume a certain skill level and knowledge of Ford-specific diagnostic practices.

REFER to: Diagnostic Methods

(100-00 General Information, Description and Operation).

Condition	Actions
An auxiliary switch controlled component is inoperative	GO to Pinpoint Test A

- Place the upfitter switch in question to the ON position.
- **NOTE**

  When measuring the voltage at the upfitter relay fuse make sure the fuse is seated enough to make contact with the BJB (battery junction box) (BCMC (body control module C)) terminal and the positive lead probe from the meter. A fuse jumper wire may be used to aid in this measurement.

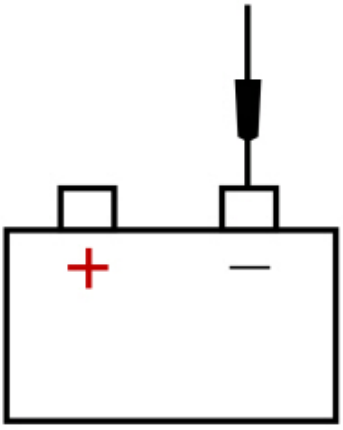
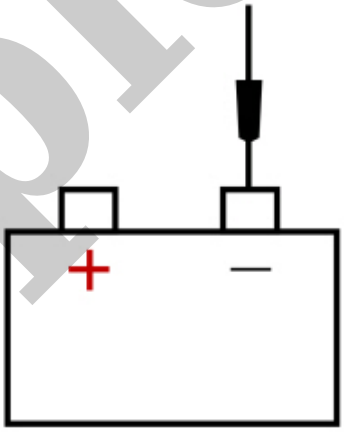
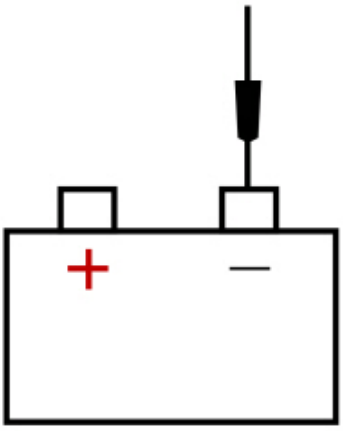
  For the upfitter relay fuse in question, measure:

Positive Lead	Measurement / Action	Negative Lead
(Upfitter Relay 1 Fuse, FS60, 15A)	V	Ground
(Upfitter Relay 2 Fuse, FS61, 15A)	V	Ground
(Upfitter Relay 3 Fuse, FS62, 10A)	V	Ground
(Upfitter Relay 4 Fuse, FS63, 10A)	V	Ground
(Upfitter Relay 5 Fuse, FS305, 5A)	V	Ground
(Upfitter Relay 6 Fuse, FS306, 5A)	V	Ground

Is the voltage greater than 11 volts?

Yes	REPAIR the Upfitter relay output to customer installed equipment circuit in question.

No	GO to A3

C9120-3 (AUX 2)		
C9120-4 (AUX 3)		
C9120-10 (AUX 4)		

(Upfitter Relay 4 Fuse, FS63, 10A)	V	Ground
(Upfitter Relay 5 Fuse, FS305, 5A)	V	Ground
(Upfitter Relay 6 Fuse, FS306, 5A)	V	Ground

Is the voltage greater than 11 volts?

Yes	REMOVE the fused jumper wire. INSTALL a new auxiliary switch assembly. REFER to: Auxiliary Switches (419-10 Multifunction Electronic Modules, Removal and Installation).

No	REMOVE the fused jumper wire. GO to A4

A4 CHECK THE CONTROL VOLTAGE TO THE UPFITTER RELAY

- Disconnect Upfitter switch C9120 .
- Disconnect For the circuit in question, BJB (battery junction box) (BCMC (body control module C)) C1035C or BJB (battery junction box) (BCMC (body control module C)) C1035B .
- For the auxiliary switch in question, measure:

Positive Lead	Measurement / Action	Negative Lead
C9120-2 (AUX 1)	Ω	C1035B-42 (AUX 1)
C9120-3 (AUX 2)	Ω	C1035B-40 (AUX 2)
C9120-4 (AUX 3)	Ω	C1035B-35 (AUX 3)