

## 8W-97 POWER DISTRIBUTION - SERVICE INFORMATION

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## POWER DISTRIBUTION - SERVICE INFORMATION

### DESCRIPTION

The power distribution system for this vehicle consists of the following components:

- Cigar Lighter Outlet
- Front Control Module (FCM)
- Integrated Power Module (IPM)
- Power Distribution Center (PDC)
- Power Outlets

Refer to Wiring Diagrams for complete circuit schematics.

The power distribution system also incorporates various types of circuit control and protection features, including:

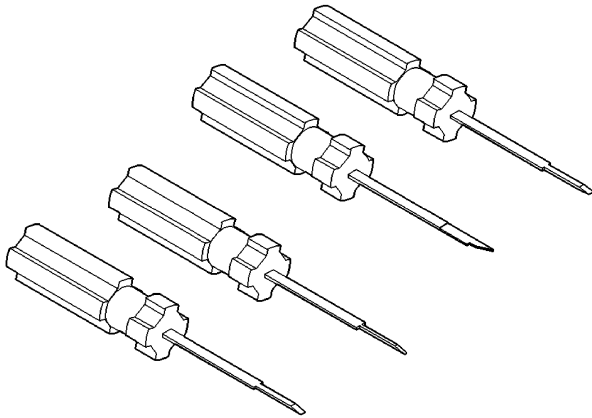
- Automatic resetting circuit breakers
- Blade-type fuses
- Cartridge fuses
- Relays

### OPERATION

The power distribution system for this vehicle is designed to provide safe, reliable, and centralized distribution points for the electrical current required to operate all of the many standard and optional factory-installed electrical and electronic powertrain, chassis, safety, security, comfort and convenience systems. At the same time, the power distribution system was designed to provide ready access to these electrical distribution points for the technician to use when conducting diagnosis and repair of inoperative circuits. The power distribution system can also prove useful for the sourcing of additional electrical circuits that may be required to provide the electrical current needed to operate many accessories that the vehicle owner may choose to have installed.

## SPECIAL TOOLS

### POWER DISTRIBUTION SYSTEMS



*Terminal Pick 6680*

## **CIGAR LIGHTER/POWER OUTLET**

### **DESCRIPTION**

#### **INSTRUMENT PANEL MOUNTED**

An instrument panel mounted cigar lighter/power outlet receptacle is optional equipment on this model. On models equipped with the optional Smoker's Package, the cigar lighter knob and heating element are included. On models without the Smoker's Package, the cigar lighter receptacle is equipped with a snap fit plastic cap and is treated as an auxiliary power outlet. The cigar lighter receptacle is installed in the instrument panel accessory switch bezel, which is located near the bottom of the instrument panel center stack area, below the radio. The cigar lighter base is secured by a snap fit within the center lower bezel. This power outlet has a constant 12 volt battery feed.

The cigar lighter receptacle is serviced with the accessory switch bezel and if defective, the entire switch bezel must be replaced. The plastic cap and the knob and heating element unit are available for service replacement. These components cannot be repaired and, if faulty or damaged, they must be replaced.

#### **FRONT CONSOLE AND REAR CARGO MOUNTED**

A front console mounted power outlet is standard equipment and a rear cargo area power outlet is optional equipment on this model. The front console mounted power outlet is mounted near the front of the console just in front of the cup holders. This outlet can be used as a cigar lighter or power outlet, but only has 12 volt battery voltage when the ignition is in the ON or ACC positions. The rear power outlet is installed in the right rear quarter trim panel, near the spare tire jack. The power outlet base and mount are secured by a snap fit within the quarter trim panel. A plastic protective cap snaps into the power outlet base when the power outlet is not being used, and hangs from the power outlet base mount by an integral bail strap while the power outlet is in use. While the power outlet is very similar to a cigar lighter base unit, it does not include the two small spring-clip retainers inside the bottom of the receptacle shell that are used to secure the cigar lighter heating element to the insulated contact. It has 12 volt battery voltage when the ignition is in the ON or ACC positions.

### **OPERATION**

#### **CIGAR LIGHTER/POWER OUTLET**

The cigar lighter consists of two major components: a knob and heating element unit, and the cigar lighter base or receptacle shell. The receptacle shell is connected to ground, and an insulated contact in the bottom of the shell is connected to battery current.

The cigar lighter knob and heating element are encased within a spring-loaded housing, which also features a sliding protective heat shield. When the knob and heating element are inserted in the receptacle shell, the heating element resistor coil is grounded through its housing to the receptacle shell. If the cigar lighter knob is pushed inward, the heat shield slides up toward the knob exposing the heating element, and the heating element extends from the housing toward the insulated contact in the bottom of the receptacle shell.

Two small spring-clip retainers are located on either side of the insulated contact inside the bottom of the receptacle shell. These clips engage and hold the heating element against the insulated contact long enough for the resistor coil to heat up. When the heating element is engaged with the contact, battery current can flow through the resistor coil to ground, causing the resistor coil to heat.

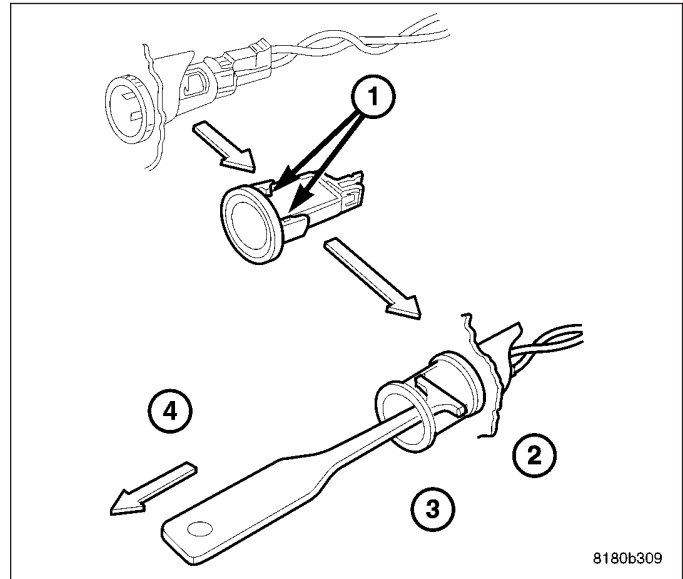
When the resistor coil becomes sufficiently heated, excess heat radiates from the heating element causing the spring-clips to expand. Once the spring-clips expand far enough to release the heating element, the spring-loaded housing forces the knob and heating element to pop back outward to their relaxed position. When the cigar lighter knob and element are pulled out of the receptacle shell, the protective heat shield slides downward on the housing so that the heating element is recessed and shielded around its circumference for safety.

#### **POWER OUTLET**

The power outlet base or receptacle shell is connected to ground, and an insulated contact in the bottom of the shell is connected to battery current. The power outlet receives battery voltage from a fuse in the Totally Integrated Power Module (TIPM) through a fuse in the fuse block when the ignition is in the ON or ACC positions.

## REMOVAL

1. Disconnect and isolate the battery negative cable.
2. Look inside and note position of the retaining bosses (1).
3. Using special tool 9857 Power Outlet Remover. Insert the tool forcing the bosses out of base.
4. Pull out the base through mounting ring by gently rocking the tool (3).
5. Disconnect the base wires.
6. Set base aside and remove base mount ring.



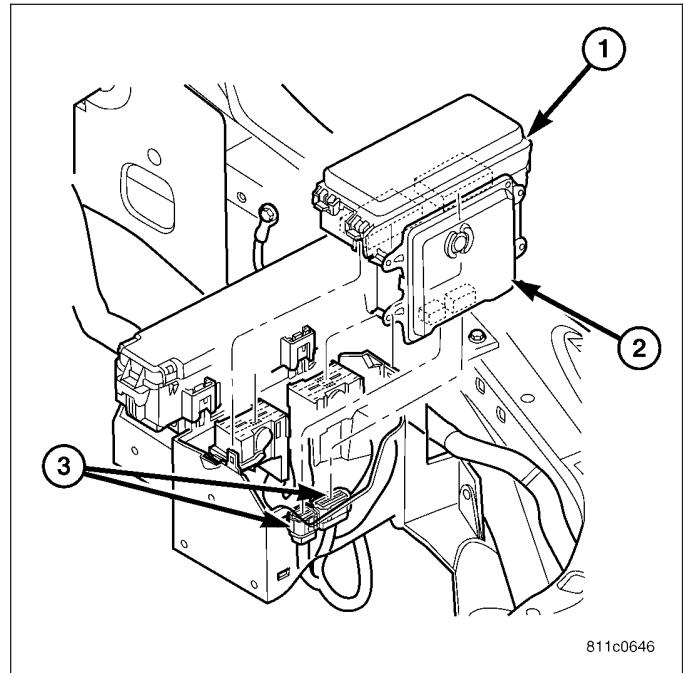
## INSTALLATION

1. Position mount ring to the instrument panel and feed the wires through ring. Index the cap and the mount ring with the index tab at 9 o'clock to the key in the instrument panel. Install the ring.
2. Connect wires to base. Orient base alignment rib at 11 o'clock to mate the groove in mount ring at the same location.
3. Push base into the bezel till it locks.
4. Install cigar lighter cap.
5. Connect the battery negative cable.

## MODULE-INTEGRATED POWER

### DESCRIPTION

The Integrated Power Module (IPM) is a combination of the Power Distribution Center (PDC) (1) and the Front Control Module (FCM) (2). The IPM is located in the engine compartment, next to the battery. The power distribution center mates directly with the (FCM) to form the IPM. The (PDC) is a printed circuit board based module that contains fuses and relays, while the FCM contains the electronics controlling the IPM and other functions. The IPM connects directly to the battery positive via a stud located on top of the unit. The ground connection is via electrical connectors. The IPM provides the primary means of voltage distribution and protection for the entire vehicle.

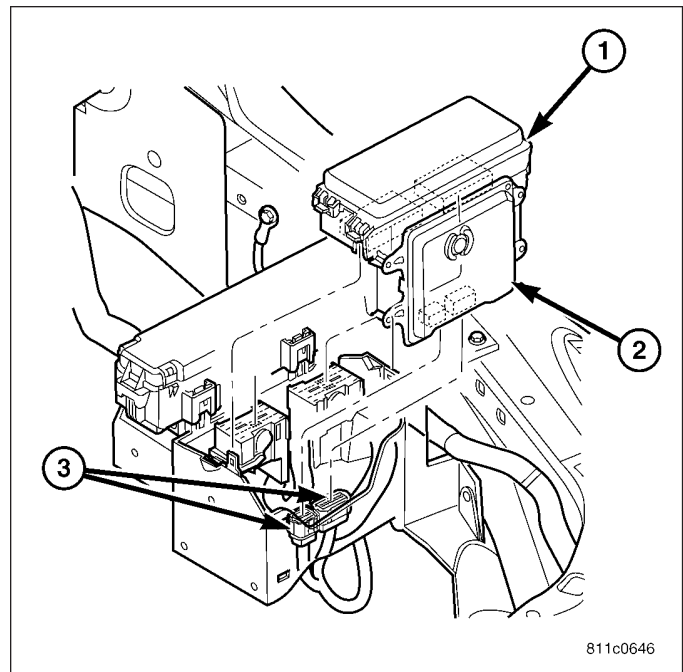


### OPERATION

All of the current from the battery and the generator output enters the integrated power module via a stud on the top of the module. Internal connections of all of the power distribution center circuits is accomplished by a combination of bus bars and a printed circuit board.

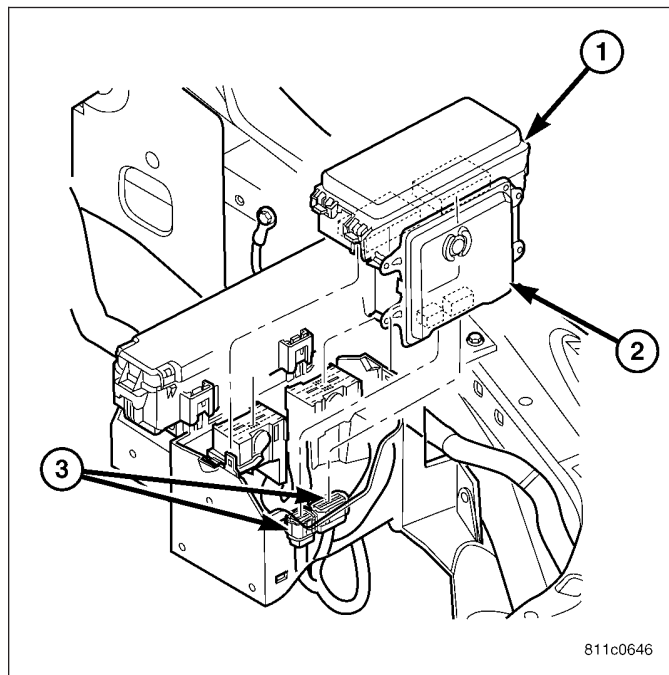
### REMOVAL

1. Disconnect the negative and positive battery cables.
2. Unsnap cover and remove the B+ terminal nut from the integrated power module (IPM). Remove the B+ cable.
3. Remove the IPM from the retaining bracket (1).
4. Disconnect the connectors from the (IPM).
5. Remove the Front Control Module (FCM) (2) retaining screws.
6. Disconnect the front control module by pulling it straight off the integrated power module.



## INSTALLATION

1. Install the Front Control Module (FCM) (2) to the Integrated Power Module (IPM).
2. Connect the electrical connectors to the IPM (1).
3. Install the IPM to the retaining bracket.
4. Install the B+ cable and nut on the IPM B+ terminal. Snap the cover in place.
5. Connect the negative and positive battery cables.



## IOD FUSE

### DESCRIPTION

All vehicles are equipped with an Ignition-Off Draw (IOD) fuse that is disconnected within the Integrated Power Module when the vehicle is shipped from the factory. Dealer personnel are to reconnect the IOD fuse in the Integrated Power Module as part of the preparation procedures performed just prior to new vehicle delivery. The following circuits are protected by the IOD fuse:

- Cluster (CCN)
- Diagnostic Connector
- Map Lamps
- Glove Box Lamp
- Courtesy Lamps
- Radio
- Underhood Lamp

### OPERATION

The term ignition-off draw identifies a normal condition where power is being drained from the battery with the ignition switch in the Off position. The IOD fuse feeds the memory and sleep mode functions for some of the electronic modules in the vehicle as well as various other accessories that require battery current when the ignition switch is in the Off position. The only reason the IOD fuse is disconnected is to reduce the normal IOD of the vehicle electrical system during new vehicle transportation and pre-delivery storage to reduce battery depletion, while still allowing vehicle operation so that the vehicle can be loaded, unloaded and moved as needed.

The IOD fuse is disconnected from Integrated Power Module when the vehicle is shipped from the assembly plant. Dealer personnel must reconnect the IOD fuse when the vehicle is being prepared for delivery in order to restore full electrical system operation. Once the vehicle is prepared for delivery, the IOD function of this fuse becomes transparent and the fuse that has been assigned the IOD designation becomes another Fused B(+) circuit fuse.

The IOD fuse can be used by the vehicle owner as a convenient means of reducing battery depletion when a vehicle is to be stored for periods not to exceed about thirty days. However, it must be remembered that disconnecting the IOD fuse will not eliminate IOD, but only reduce this normal condition. If a vehicle will be stored for more than about thirty days, the battery negative cable should be disconnected to eliminate normal IOD; and, the battery should be tested and recharged at regular intervals during the vehicle storage period to prevent the battery from becoming discharged or damaged.



## JUNCTION BLOCK

### DESCRIPTION

An electrical Junction Block (JB) (1) is concealed behind the left outboard end of the instrument panel cover. The JB combines the functions previously provided by a separate fuseblock module and relay center, serves to simplify and centralize numerous electrical components, and to distribute electrical current to many of the accessory systems in the vehicle. It also eliminates the need for numerous splice connections and serves in place of a bulkhead connector between many of the engine compartment, instrument panel, and body wire harnesses.

The molded plastic JB housing has integral mounting brackets that are secured with two screws to the left instrument panel end bracket. The left end of the instrument panel cover has a snap-fit fuse access panel that can be removed for service of the JB. A fuse puller and spare fuse holders are located on the back of the fuse access cover, as well as a fuse layout to help ensure proper fuse identification.

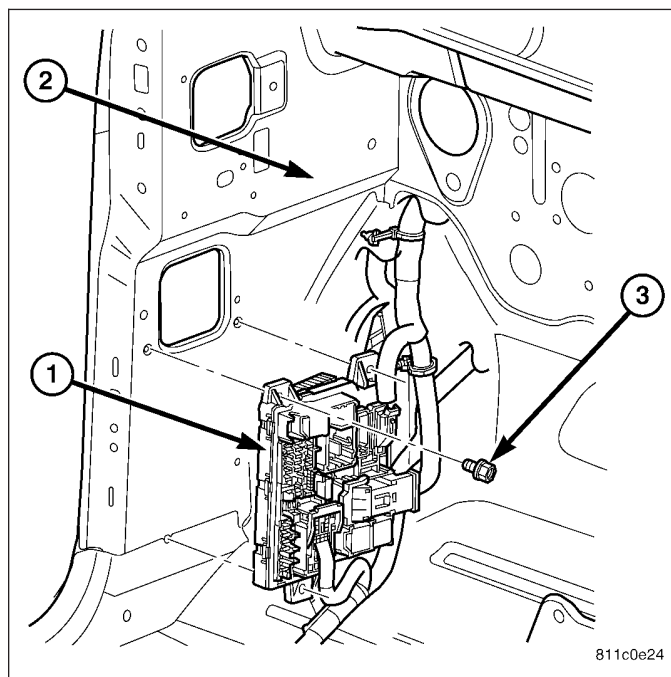
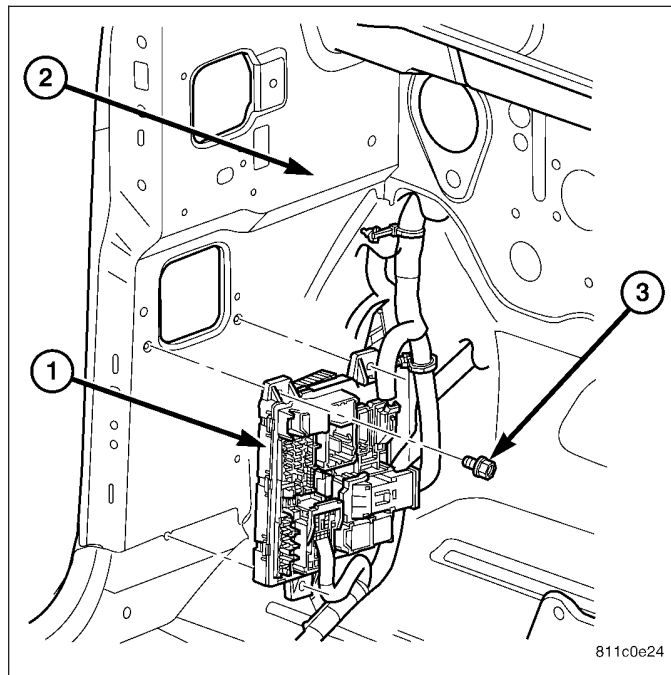
The JB unit cannot be repaired and is only serviced as an assembly. If any internal circuit or the JB housing is faulty or damaged, the entire JB unit must be replaced.

### OPERATION

All of the circuits entering and leaving the JB do so through wire harness connectors, which are connected to the JB through integral connector receptacles molded into the JB housing. Internal connection of all of the JB circuits is accomplished by an intricate combination of hard wiring and bus bars.

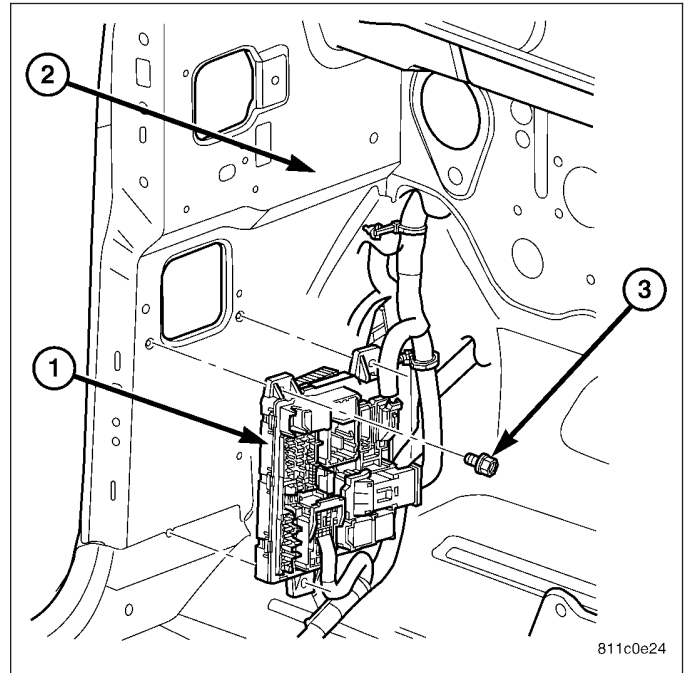
### REMOVAL

1. Disconnect and isolate the battery negative cable.
2. Remove the cowl trim cover (Refer to 23 - BODY/ INTERIOR/COWL TRIM COVER - REMOVAL).
3. Remove the mounting fasteners (3).
4. Disconnect the electrical harness connectors and remove Junction Block (1).
5. Transfer components as necessary.



## INSTALLATION

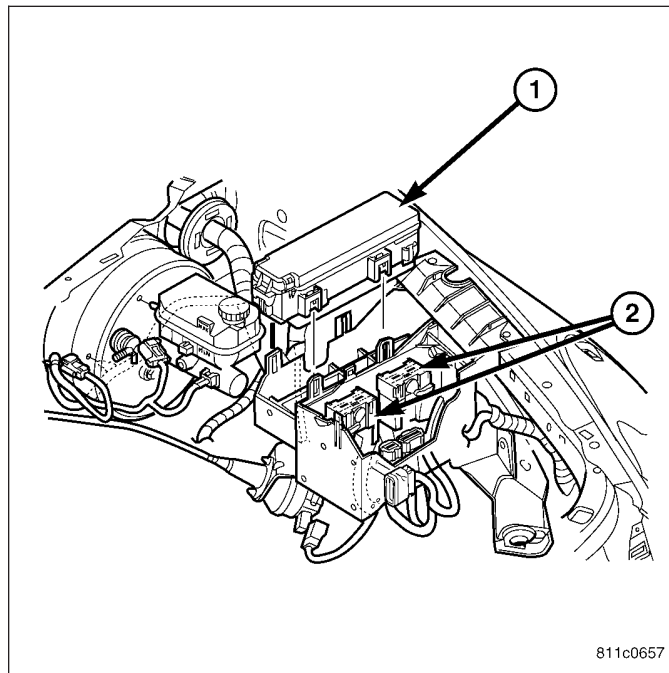
1. Connect wire harness connectors to the Junction Block (JB) (1).
2. Position JB and install mounting fasteners (3).
3. Install cowl trim cover (Refer to 23 - BODY/INTERIOR/COWL TRIM COVER - INSTALLATION).
4. Connect the battery negative cable.



## POWER DISTRIBUTION CENTER

### DESCRIPTION

All of the electrical current distributed throughout this vehicle is directed through the Power Distribution Center (PDC) (1). The molded plastic PDC housing is located in the left front corner of the engine compartment, just behind the battery. The PDC houses the generator cartridge fuse and maxi-type cartridge fuses, which replace all in-line fusible links. The PDC also houses blade-type fuses, relays, and a fuse puller.

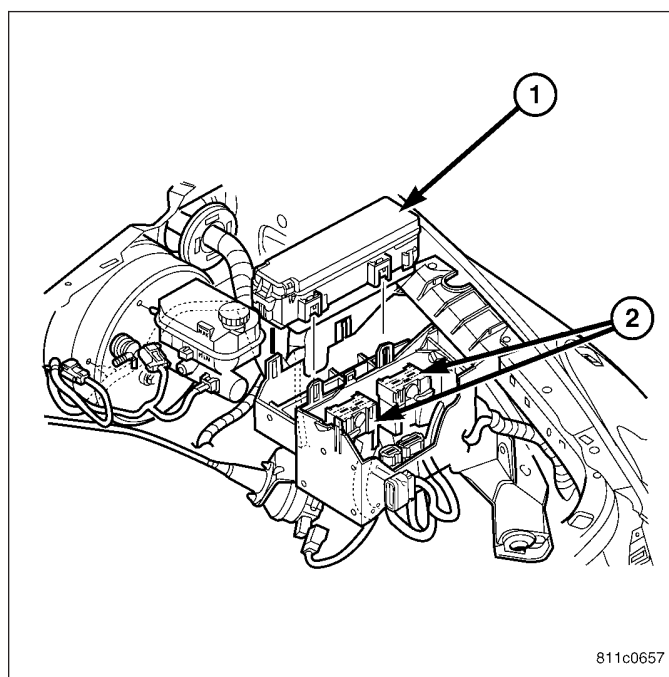


### OPERATION

All of the current from the battery and the generator output enters the PDC through two cables with eyelets that are secured with nuts to the two B(+) terminal studs located just inside the inboard end of the PDC housing. The PDC cover is unlatched and removed to access the battery and generator output connection B(+) terminal studs, the fuses, the relays, the joint connectors and the engine wire harness in-line connector.

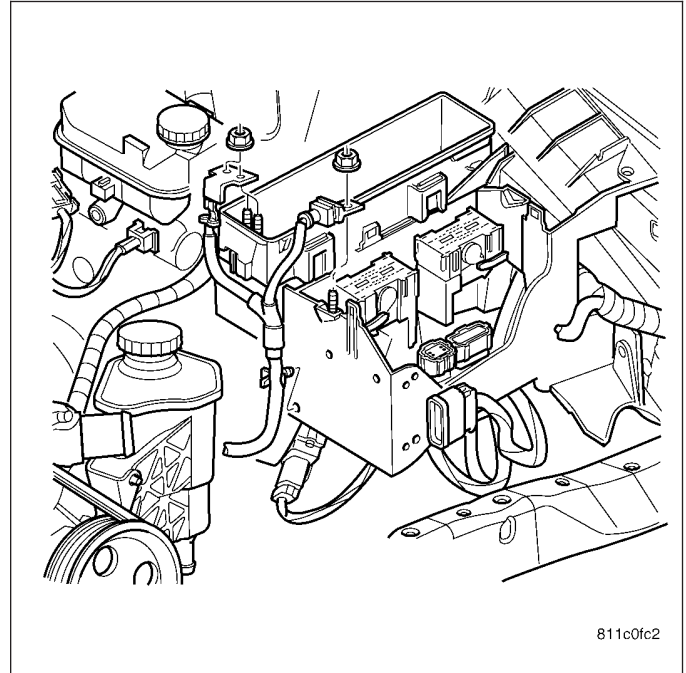
### REMOVAL

1. Disconnect and isolate the battery negative cable.
2. Depress retaining tabs on the side on the PDC (1).
3. Disconnect electrical harness connectors (2) and remove PDC.



## INSTALLATION

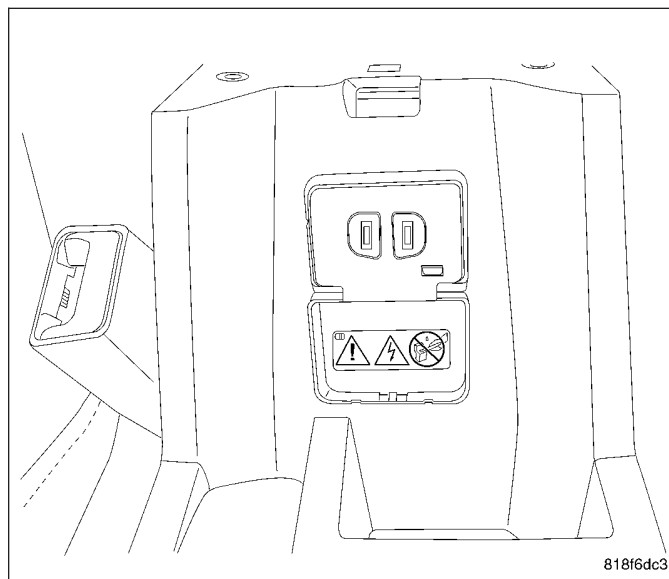
1. Connect electrical harness connectors to Power Distribution Center (PDC).
2. Position PDC and engage into the retaining tabs.
3. Connect the battery negative cable.



## POWER OUTLET-AC

### REMOVAL

1. Disconnect and isolate the negative battery cable.
2. Remove the center console. (Refer to 23 - BODY/INTERIOR/CENTER CONSOLE - REMOVAL).
3. Disconnect electrical connector.
4. Remove AC power outlet.



### INSTALLATION

1. Install the AC power outlet.
2. Connect electrical connector.
3. Install the center console. (Refer to 23 - BODY/INTERIOR/CENTER CONSOLE - REMOVAL).
4. Connect the battery negative cable.

