

8W - 97 POWER DISTRIBUTION

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POWER DISTRIBUTION

DESCRIPTION

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

- Integrated Power Module (IPM)
- Front Control Module (FCM)
- 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:

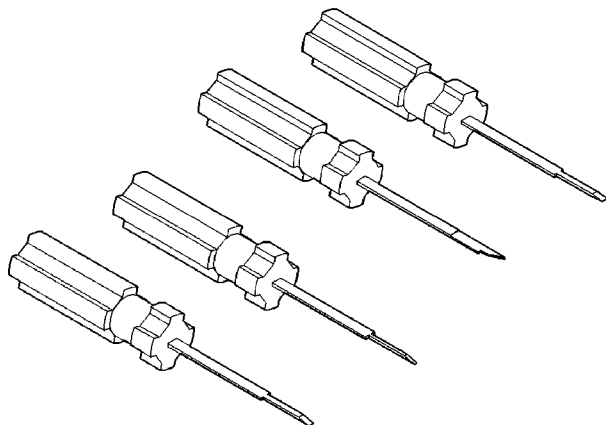
- Automatic resetting circuit breakers
- Blade-type fuses
- Bus bars
- Cartridge fuses
- Circuit splice blocks
- Flashers
- Fusible links
- Relays

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 vehicle technician to use when conducting diagnosis and repair of faulty 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

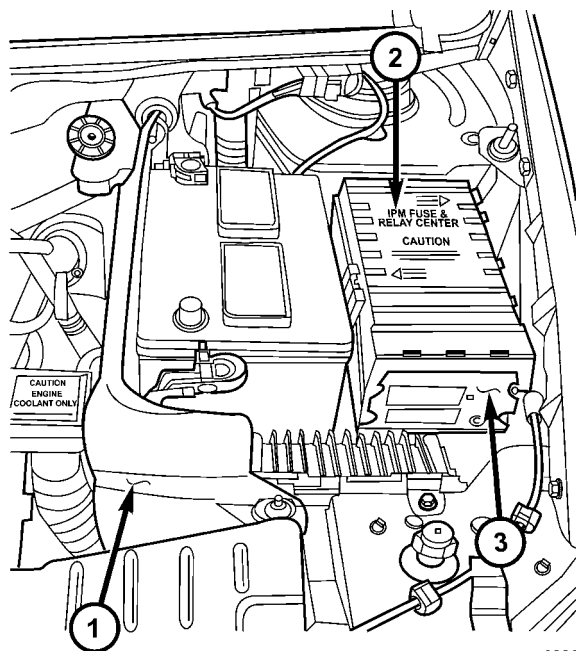
### POWER DISTRIBUTION SYSTEMS



**Terminal Pick Kit 6680**

## INTEGRATED POWER MODULE

### DESCRIPTION



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**Fig. 1 INTEGRATED POWER MODULE**

- 1 - BATTERY THERMAL GUARD
- 2 - INTEGRATED POWER MODULE
- 3 - FRONT CONTROL MODULE

The Integrated Power Module (IPM) is a combination of the Power Distribution Center (PDC) and the Front Control Module (FCM). The IPM is located in the engine compartment, next to the battery. (Fig. 1). The PDC 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. This IPM connects directly to the

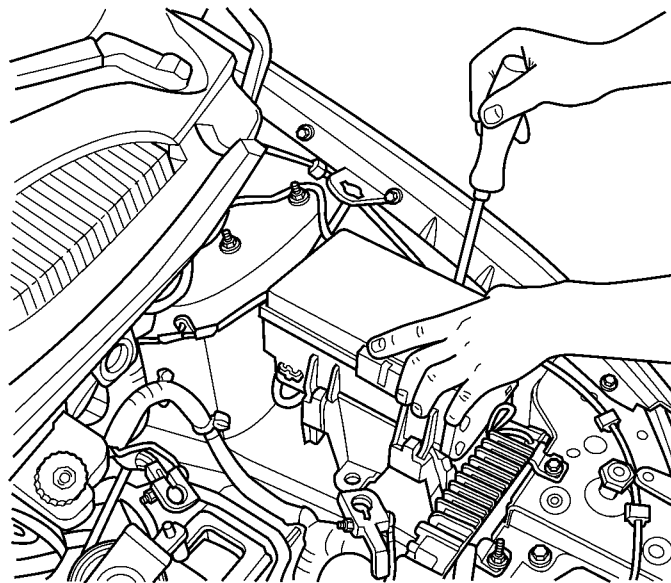
battery positive through a four pin connector. The ground connection is through two other connectors. The IPM provides the primary means of voltage distribution and protection for the entire vehicle.

### OPERATION

All of the current from the battery and the generator output enters the Integrated Power Module (IPM) through a four-pin connector on the bottom 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

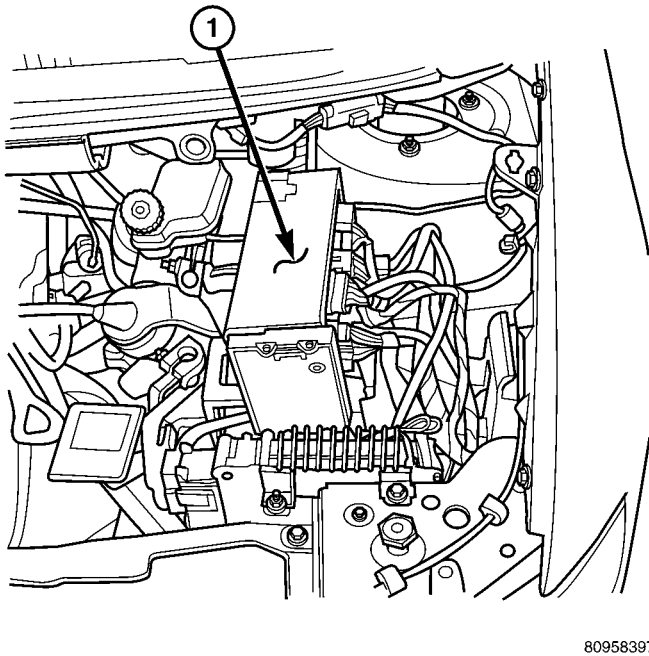
- (1) Disconnect the negative and positive battery cables.
- (2) Remove the battery thermal guard.
- (3) Remove the battery (Refer to 8 - ELECTRICAL/BATTERY SYSTEM/BATTERY - REMOVAL).
- (4) Using a flat-bladed screwdriver, twist the Integrated Power Module (IPM) bracket retaining latch outward to free the IPM from its mounting bracket (Fig. 2).



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**Fig. 2 INTEGRATED POWER MODULE**

- (5) Rotate the IPM counter-clockwise to access and disconnect the electrical connectors (Fig. 3).



**Fig. 3 DISCONNECTING IPM**

1 - INTEGRATED POWER MODULE

- (6) Remove the IPM bracket clips from the hinge.

## INSTALLATION

(1) Snap the left side of the Integrated Power Module (IPM) housing in its mounting bracket and connect the various electrical connectors.

**NOTE:** Ensure that the **Connector Positive Assurance (CPA)** on the five-pin B+ connector is positively engaged to prevent generating a Diagnostic Trouble Code (DTC).

- (2) Rotate the IPM clock-wise until secured in mounting bracket. An audible click may be heard.
- (3) Install the battery (Refer to 8 - ELECTRICAL/BATTERY SYSTEM/BATTERY - INSTALLATION).
- (4) Install the battery thermal guard.
- (5) Connect the negative and positive battery cables.
- (6) Using a scan tool, check for any stored diagnostic trouble codes. Ensure that all vehicle options are operational.

## IOD FUSE

### DESCRIPTION

All vehicles are equipped with an Ignition-Off Draw (IOD) fuse that is removed from its normal cavity in the Integrated Power Module (IPM) when the vehicle is shipped from the factory. Dealer personnel are to remove the IOD fuse from the storage location and install it into the IPM fuse cavity

marked IOD as part of the preparation procedures performed just prior to new vehicle delivery.

The IOD fuse is a 20 ampere blade-type mini fuse and, when removed, it is stored in a fuse cavity adjacent to the washer fuse within the IPM.

### OPERATION

The term ignition-off draw (IOD) 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, including the clock. The only reason the IOD fuse is removed 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 by both vehicle transportation company and dealer personnel.

The IOD fuse is removed from the Integrated Power Module (IPM) fuse cavity when the vehicle is shipped from the assembly plant. Dealer personnel must install 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 only another Fused B(+) circuit fuse. The IOD fuse serves no useful purpose to the dealer technician in the service or diagnosis of any vehicle system or condition, other than the same purpose as that of any other standard circuit protection device.

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 approximately thirty days. However, it must be remembered that removing the IOD fuse will not eliminate IOD, but only reduce this normal condition. If a vehicle will be stored for more than 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.

## POWER OUTLET

### DESCRIPTION

Two power outlets are installed in the instrument panel center lower bezel. Two additional power outlets are incorporated into the left rear C-pillar and the center console (if equipped). The power outlets bases are secured by a snap fit. A hinged plug flips

closed to conceal and protect the power outlet base when not in use.

## OPERATION

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 on the instrument panel marked with a battery receives battery voltage from a fuse in the Integrated Power Module (IPM) at all times. The other power outlet on the instrument panel marked with a key receives battery voltage only when the key is in the on position.

The power outlet located in the center console receives battery voltage all the time when positioned between the **front seats** and key-on voltage when positioned between the **rear seats**. The power outlet located on the C-pillar receives battery voltage only when the key is in the ON position.

## DIAGNOSIS AND TESTING

### DIAGNOSIS & TESTING - POWER OUTLET

**WARNING: ON VEHICLES EQUIPPED WITH AIR-BAGS, REFER TO RESTRAINTS BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, SEAT OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.**

(1) Check the fused B(+) fuse in the Integrated Power Module (IPM). If OK, go to Step 2. If not OK, repair the shorted circuit or component as required and replace the faulty fuse.

(2) Check for battery voltage at the fused B(+) fuse in the IPM. If OK, go to Step 3. If not OK, repair the open fused B(+) circuit to the IPM fuse as required.

(3) Open the power outlet door. Check for continuity between the inside circumference of the power outlet receptacle and a good ground. There should be continuity. If OK, go to Step 4. If not OK, go to Step 5.

(4) Check for battery voltage at the insulated contact located at the back of the power outlet receptacle. If not OK, go to Step 5.

(5) Disconnect and isolate the battery negative cable. Remove the appropriate bezel. Check for continuity between the ground circuit cavity of the power outlet wire harness connector and a good ground. There should be continuity. If OK, go to Step 6. If not OK, repair the open ground circuit to ground as required.

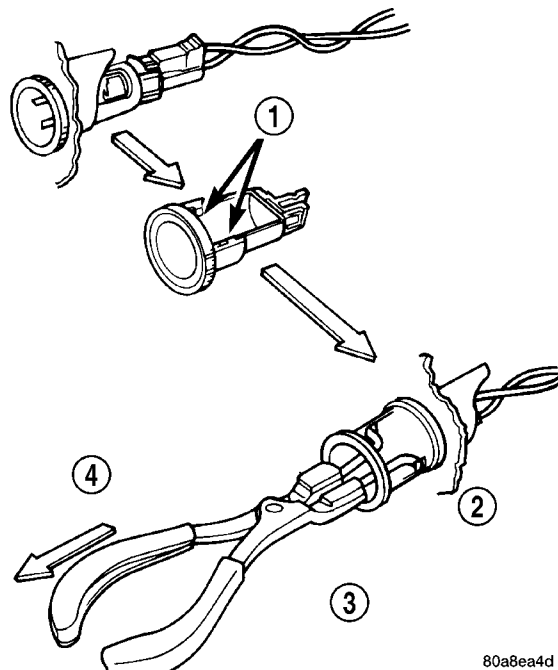
(6) Connect the battery negative cable. Check for battery voltage at the fused B(+) circuit cavity of the

power outlet wire harness connector. If OK, replace the faulty power outlet receptacle. If not OK, repair the open fused B(+) circuit to the IPM fuse as required.

## REMOVAL

(1) Disconnect and isolate the battery negative cable.

(2) Note position of the retaining bosses (Fig. 4).



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**Fig. 4 POWER OUTLET**

- 1 - RETAINING BOSSES-ENGAGE PLIERS HERE
- 2 - PARTIALLY REMOVED
- 3 - EXTERNAL SNAP-RING PLIERS
- 4 - PULL BASE OUT-THROUGH MOUNTING RING

(3) Using external snap ring pliers with 90 degree tips. Insert pliers with tips against bosses and squeeze forcing bosses out of base.

(4) Pull out the base through mounting ring by gently rocking pliers.

(5) Disconnect the base wires.

(6) Remove light ring and disconnect wire.

## INSTALLATION

(1) Position the mounting ring on the instrument panel and feed the wires through the ring. Index the cap and the mounting ring with the index tab at the 9 o'clock position to the key in the instrument panel. Install the ring.

(2) Connect the wires to the base. Orientate the base alignment rib at the 11 o'clock position to mate the groove in the mounting ring to the base.

(3) Push the base into the bezel until it locks in place.

(4) Check operation of outlet or element and install the outlet cap.