

LAMPS

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LAMPS/LIGHTING - EXTERIOR

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LAMPS/LIGHTING - EXTERIOR**DESCRIPTION**

The exterior lighting system for this model include the following components:

- Backup Lamps
- Brake Lamps
- Daytime Running Lamps
- Front Fog Lamps
- Hazard Warning Lamps
- Headlamps
- Park Lamps
- Turn Signal Lamps

Other components of the exterior lighting system for this model include:

- Backup Lamp Switch
- Brake Lamp Switch
- Front Control Module
- Front Fog Lamp Relay
- Hazard Switch
- Multi-Function Switch
- Park Lamp Relay
- Trailer Tow Connectors

Some of the interior and exterior lighting functions are governed by the front control module. The headlamp, dome, and door ajar switches provide signals to the instrument cluster. The instrument cluster sends a J1850 message to the front control module to enable the necessary components for illumination. Hard wired circuitry connects the exterior lighting system components to the electrical system of the vehicle. Refer to the appropriate wiring information.

OPERATION**DAYTIME RUNNING LAMPS**

Power is reduced using pulse-width modulation to the high beams, where by the power is switched on and off rapidly instead of remaining on continuously. The duration and interval of the power pulses is programmed into the Front Control Module (FCM).

HEADLAMP SYSTEM

The instrument cluster monitors both the multiplexed headlamp and multifunction switches. The instrument cluster transmits a J1850 bus message to the front control module (FCM) to activate the headlamps. The headlamp system will default to headlamps ON position when ignition switch is ON and when an open or short circuit failure occurs on the headlamp switch input to the instrument cluster. The system will return to normal operation when the open or short is repaired. A fault will be reported by the Instrument Cluster when a failure occurs on the dimmer or headlamp switch input.

If the exterior lamps are ON, and the headlamp switch is in any position other than OFF, with the ignition switch OFF (LOCK) after 5 minutes, the Instrument Cluster transmits a message via J1850 informing the the FCM. The FCM will then turn off the headlamps, park lamps and fog lamps. This feature (load shed) prevents the vehicle battery from being discharged when the vehicle lights have been left ON.

HEADLAMP TIME DELAY SYSTEM

The headlamp time delay system is activated by turning the headlamps ON (high or low beam) while the engine is running, turning the ignition switch OFF, and then turning the headlamp switch OFF

LAMPS/LIGHTING - EXTERIOR (Continued)

within 45 seconds. The system will not activate if more than 45 seconds elapse between ignition switch OFF and headlamp switch OFF. The FCM will allow the headlamps to remain ON for 60 seconds (configurable) before they automatically turn off (If the key is in the ignition during the headlamp time delay mode, then the headlamps including panel dimming will be ON).

LAMP OUTAGE

If one or more of the following lamps (Low and/or High beams, Brake and/or Turn Signal) are out, then a "lamps out" indicator located in the cluster will illuminate.

OPTICAL HORN/HIGH BEAMS

When the multiplexed multifunction switch is pulled to the first detent (optical horn) signal, the headlamps are ON, the Instrument Cluster shall send a message via J1850 to the FCM to turn on the headlamps drivers to illuminate all four filaments (Low and High beams). When the multifunction switch is pulled to the second detent (high beam) signal and the headlamps are ON, the Instrument Cluster shall send a message via J1850 to the FCM to turn on the headlamps drivers. The High Beams are illuminated and the Low Beams and Fog Lamps (if ON) are extinguished. If the headlamps were in the high beam configuration when power was removed from the headlamps, the headlamps will return to their last state prior to being shut off.

DIAGNOSIS AND TESTING - LAMPS/LIGHTING - EXTERIOR

WARNING: EYE PROTECTION SHOULD BE USED WHEN SERVICING GLASS COMPONENTS. PERSONAL INJURY CAN RESULT.

CAUTION: Do not touch the glass of halogen bulbs with fingers or other possibly oily surface, reduced bulb life will result. Do not use bulbs other than those indicated in the Bulb Application table. Damage to lamp and/or Daytime Running Lamp Module can result. Do not use fuses, circuit breakers or relays having greater amperage value than indicated on the fuse panel or in the Owners Manual.

When a vehicle experiences problems with the headlamp system, verify the condition of the battery connections, fuses, charging system, headlamp bulbs, wire connectors, relay, multifunction switch, and headlamp switch. Refer to the appropriate wiring information.

Each vehicle is equipped with various lamp assemblies. A good ground is necessary for proper lighting operation. Grounding is provided by the lamp socket when it comes in contact with the metal body, or through a separate ground wire.

When changing lamp bulbs check the socket for loose pin connections and corrosion. Repair as necessary.

When it is necessary to remove components to service another, it should not be necessary to apply excessive force or bend a component to remove it. Before damaging a trim component, verify hidden fasteners or captured edges are not holding the component in place.

LAMPS/LIGHTING - EXTERIOR (Continued)

HEADLAMP DIAGNOSIS

CONDITION	POSSIBLE CAUSES	CORRECTION
HEADLAMPS ARE DIM WITH ENGINE IDLING OR IGNITION TURNED OFF	1. Loose or corroded battery cables. 2. Loose or worn generator drive belt. 3. Charging system output too low. 4. Battery has insufficient charge. 5. Battery is sulfated or shorted. 6. Poor lighting circuit ground.	1. Clean and secure battery cable clamps and posts. 2. Adjust or replace generator drive belt. 3. Test and repair charging system, refer to Electrical, Charging 4. Test battery state-of-charge, refer to Electrical, Battery System. 5. Load test battery, refer to Electrical, Battery System. 6. Test for voltage drop across ground circuits, refer to Electrical, Wiring Diagram Information.
HEADLAMP BULBS BURN OUT FREQUENTLY	1. Integrated Control Module (ICM) not controlling voltage. 2. Loose or corroded terminals or splices in circuit.	1. Test and repair Integrated Control Module. 2. Inspect and repair all connectors and splices. Refer to Electrical, Wiring Information.
HEADLAMPS ARE DIM WITH ENGINE RUNNING ABOVE IDLE	1. Charging system output too low. 2. Poor lighting circuit ground. 3. High resistance in headlamp circuit.	1. Test and repair charging system, refer to Electrical, Wiring Information. 2. Test for voltage drop across ground circuits, refer to Electrical, Wiring Information. 3. Test amperage draw of headlamp circuit.
HEADLAMPS FLASH RANDOMLY	1. Poor lighting circuit ground. 2. Variable resistance in headlamp circuit. 3. Loose or corroded terminals or splices in circuit. 4. Faulty headlamp switch. 5. Front Control Module Malfunction.	1. Test for voltage drop across ground locations, refer to Electrical, Wiring Information. 2. Test amperage draw of headlamp circuit. 3. Inspect and repair all connectors and splices, refer to Electrical, Wiring Information. 4. Replace headlamp switch. 5. Refer to appropriate ICM/FCM diagnostics.

LAMPS/LIGHTING - EXTERIOR (Continued)

CONDITION	POSSIBLE CAUSES	CORRECTION
HEADLAMPS DO NOT ILLUMINATE	1. No voltage to headlamps. 2. No ground at headlamps. 3. Broken connector terminal or wire splice in headlamp circuit. 4. Faulty or burned out bulb. 5. Integrated Control Module malfunction. 6. J1850 Bus Communication 7. Front Control Module Malfunction.	1. Repair open headlamp circuit, refer to Electrical, Wiring Information. 2. Repair circuit ground, refer to Electrical, Wiring Information. 3. Repair connector terminal or wire splice. 4. Replace headlamp bulb(s). 5. Refer to appropriate Body Control Module diagnostics. 6. Verify messages being transmitted by Instrument Cluster and received by FCM. 7. Refer to appropriate ICM/FCM diagnostics.
HEADLAMPS ON WITH IGNITION IN RUN, WITH HEADLAMP SWITCH OFF	1. Faulty headlamp switch. 2. Diagnostic tool indicates (4.7 - 5.0V) on headlamp switch input to Instrument Cluster. 3. J1850 Bus Communication. 4. Front Control Module Malfunction.	1. Replace headlamp switch (review Instrument Cluster logged faults). 2. Inspect and repair terminals, connectors and open circuits. 3. Verify messages being transmitted by Instrument Cluster and received by FCM. 4. Refer to appropriate ICM/FCM diagnostics.

FOG LAMP DIAGNOSIS

CONDITION	POSSIBLE CAUSES	CORRECTION
FOG LAMPS ARE DIM WITH ENGINE IDLING OR IGNITION TURNED OFF.	1. Loose or corroded battery cables. 2. Loose or worn generator drive belt. 3. Charging system output too low. 4. Battery has insufficient charge. 5. Battery is sulfated or shorted. 6. Poor lighting circuit ground.	1. Clean and secure battery cable clamps and posts. 2. Adjust or replace generator drive belt. 3. Test and repair charging system. Refer to Electrical, Charging, 4. Test battery state-of-charge. Refer to Electrical, Battery System. 5. Load test battery. Refer to Electrical, Battery System. 6. Test for voltage drop across ground locations. Refer to Electrical, Wiring Information.
FOG LAMP BULBS BURN OUT FREQUENTLY	1. Charging system output too high. 2. Loose or corroded terminals or splices in circuit.	1. Test and repair charging system. Refer to Electrical, Charging. 2. Inspect and repair all connectors and splices. Refer to Electrical, Wiring Information.

LAMPS/LIGHTING - EXTERIOR (Continued)

CONDITION	POSSIBLE CAUSES	CORRECTION
FOG LAMPS ARE DIM WITH ENGINE RUNNING ABOVE IDLE	1. Charging system output too low. 2. Poor lighting circuit ground. 3. High resistance in fog lamp circuit.	1. Test and repair charging system. Refer to Electrical, Charging. 2. Test for voltage drop across ground locations. Refer to Electrical, Wiring Information. 3. Test amperage draw of fog lamp circuit.
FOG LAMPS FLASH RANDOMLY	1. Poor lighting circuit ground. 2. Variable resistance in fog lamp circuit. 3. Faulty fog lamp switch (part of headlamp switch). 4. Loose or corroded terminals or splices in circuit. 5. Is relay engaging properly? 6. J1850 Bus Communication.	1. Test for voltage drop across ground locations. Refer to Electrical, Wiring Information. 2. Test amperage draw of fog lamp circuit. 3. Replace headlamp switch. 4. Inspect and repair all connectors and splices. Refer to Electrical, Wiring Information. 5. Verify function of fog lamp relay in IPM. 6. Verify J1850 message (fog lamp info) transmitted from Instrument Cluster and received by FCM.
FOG LAMPS DO NOT ILLUMINATE	1. Blown fuse for fog lamp. 2. No ground at fog lamps. 3. Faulty fog lamp switch (part of headlamp switch). 4. Broken connector terminal or wire splice in fog lamp circuit. 5. Faulty or burned out bulb. 6. Is relay engaging? 7. J1850 Bus Communication.	1. Replace fuse. Refer to Electrical, Wiring Information. 2. Repair circuit ground. Refer to Electrical, Wiring Information. 3. Replace headlamp switch. 4. Repair connector terminal or wire splice. 5. Replace bulb. 6. Verify function of fog lamp relay in IPM. 7. Verify J1850 message (fog lamp info) transmitted from Instrument Cluster and received by FCM.

DAYTIME RUNNING LAMP (CANADA ONLY) DIAGNOSIS

CONDITION	POSSIBLE CAUSES	CORRECTION
DAYTIME RUNNING LAMPS DO NOT OPERATE	1. Parking brake engaged. 2. Parking brake circuit shorted to ground. 3. Headlamp circuit shorted to ground. 4. FCM, Instrument Cluster not programmed with Canadian country code.	1. Disengage parking brake. 2. Check cluster telltale, refer to the appropriate wiring information. 3. Refer to the appropriate wiring information. 4. Check country code.

LAMPS/LIGHTING - EXTERIOR (Continued)**STANDARD PROCEDURE****SAFETY PRECAUTIONS**

WARNING: EYE PROTECTION SHOULD BE USED WHEN SERVICING GLASS COMPONENTS. PERSONAL INJURY CAN RESULT.

CAUTION: Do not touch the glass of halogen bulbs with fingers or other possibly oily surface, reduced bulb life will result. Do not use bulbs with higher candle power than indicated in the Bulb Application table. Damage to lamp and/or Daytime Running Lamp Module can result. Do not use fuses, circuit breakers or relays having greater amperage value than indicated on the fuse panel or in the Owners Manual.

When it is necessary to remove components to service another, it should not be necessary to apply excessive force or bend a component to remove it. Before damaging a trim component, verify hidden fasteners or captured edges are not holding the component in place.

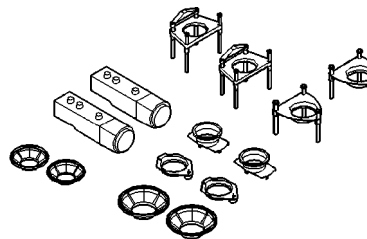
SPECIFICATIONS**EXTERIOR LAMPS**

CAUTION: Do not use bulbs that have a higher candle power than the bulb listed in the Bulb Application Table. Damage to lamp can result. Do not touch halogen bulbs with fingers or other oily surfaces. Bulb life will be reduced.

The following Bulb Application Table lists the lamp title on the left side of the column and trade number or part number on the right.

BULB APPLICATION TABLE

LAMP	BULB
Back-up	3157
Center High Mounted Stop lamp	912
Fog lamp	9006LL
Front Park/Turn Signal	4157NAK
Head lamp	9007
License Plate	7F69
Tail, Brake, Turn Signal	3157
Side Marker, Tail Gate, Cab Clearance	168

SPECIAL TOOLS - HEADLAMP ALIGNMENT*Headlamp Aiming Kit C-4466-A***BACKUP LAMP****REMOVAL**

- (1) Remove and isolate the negative battery cable.
- (2) Remove the taillamp unit (Refer to 8 - ELECTRICAL/LAMPS/LIGHTING - EXTERIOR/TAIL LAMP UNIT - REMOVAL).
- (3) Remove the bulb back plate from the tail lamp unit.
- (4) Separate the bulb from the socket.

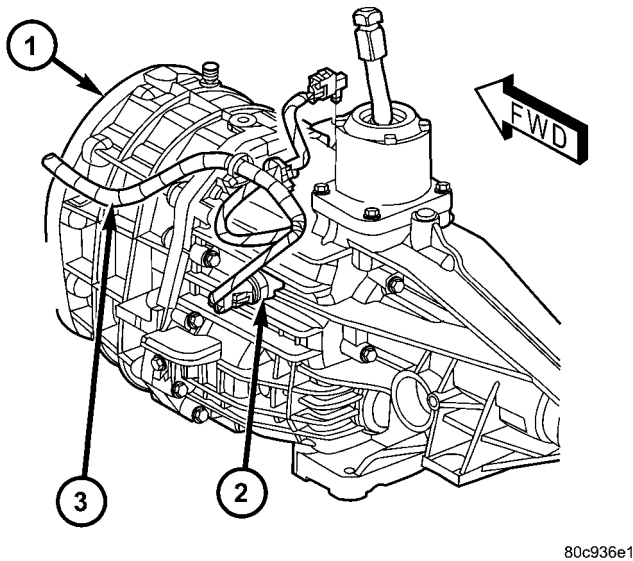
INSTALLATION

- (1) Install the bulb into the socket.
- (2) Install the bulb back plate to the tail lamp unit.
- (3) Install the tail lamp unit (Refer to 8 - ELECTRICAL/LAMPS/LIGHTING - EXTERIOR/TAIL LAMP UNIT - INSTALLATION).
- (4) Reconnect the negative battery cable.

BACKUP LAMP SWITCH**DESCRIPTION**

Vehicles equipped with a manual transmission have a normally open, spring-loaded plunger type back-up lamp switch (Fig. 1). The backup lamp switch is located in a threaded hole on the side of the manual transmission housing. The backup lamp switch has a threaded body and a hex formation near the plunger end of the switch, and an integral connector at the opposite end of the switch. When installed, only the connector and the hex formation are visible on the outside of the transmission housing. Vehicles with an optional electronic automatic transmission have a Transmission Range Sensor (TRS) that is used to perform several functions, including that of the backup lamp switch. The TRS is described in further detail elsewhere in this service information. The backup lamp switch cannot be adjusted or repaired and, if faulty or damaged, the entire switch unit must be replaced.

BACKUP LAMP SWITCH (Continued)

**Fig. 1 Backup Lamp Switch - Typical**

- 1 - MANUAL TRANSMISSION
2 - BACKUP LAMP SWITCH
3 - ENGINE WIRE HARNESS

OPERATION

The backup lamp switch controls the flow of battery voltage to the backup lamp bulbs through an output on the back-up lamp feed circuit. The switch plunger is mechanically actuated by the gearshift mechanism within the transmission, which will depress the switch plunger and close the switch contacts whenever the reverse gear has been selected. The switch receives battery voltage through a fuse in the Integrated Power Module (IPM) on a fused ignition switch output (run) circuit whenever the ignition switch is in the On position. A take out of the engine wire harness connects the backup lamp switch to the vehicle electrical system. The backup lamp switch and circuits can be tested using conventional diagnostic tools and methods.

DIAGNOSIS AND TESTING - BACKUP LAMP SWITCH

- (1) Disconnect and isolate the battery negative cable.
- (2) Raise and support the vehicle.
- (3) Locate and disconnect the engine wire harness connector for the backup lamp switch.
- (4) Check for continuity between the two terminal pins in the backup lamp switch connector.
 - (a) With the gear selector lever in the Reverse position, there should be continuity.
 - (b) With the gear selector lever in any position other than Reverse, there should be no continuity.

BRAKE LAMP**REMOVAL**

- (1) Disconnect and isolate the negative battery cable.
- (2) Remove the tail lamp unit (Refer to 8 - ELECTRICAL/LAMPS/LIGHTING - EXTERIOR/TAIL LAMP UNIT - REMOVAL).
- (3) Remove the bulb back plate from the tail lamp unit.
- (4) Remove the bulb from the back plate.

INSTALLATION

- (1) Install the bulb into the back plate.
- (2) Install the bulb back plate to the tail lamp unit.
- (3) Install the tail lamp unit (Refer to 8 - ELECTRICAL/LAMPS/LIGHTING - EXTERIOR/TAIL LAMP UNIT - INSTALLATION).
- (4) Connect the negative battery cable.

BRAKE LAMP SWITCH**DESCRIPTION**

The plunger type brake lamp switch is mounted on a bracket attached to the base of the steering column, under the instrument panel.

CAUTION: The switch can only be adjusted during initial installation. If the switch is not adjusted properly a new switch must be installed.

OPERATION

The brake lamp switch is hard wired to the Center High Mount Stop Lamp (CHMSL) and also monitored by the Instrument Cluster for use by the brake lamp, speed control brake sensor circuits and electronic brake distribution (EBD). The brake lamp circuit is open until the plunger is depressed. The speed control and brake sensor circuits are closed until the plunger is depressed. When the brake lamp switch transitions, the CHMSL transitions and instrument cluster transmits a brake applied/released message on the bus. The Integrated Power Module (IPM) will then transition the brake lamps.

When the brake light switch is activated, the Powertrain Control Module (PCM) receives an input indicating that the brakes are being applied. After receiving this input, the PCM maintains idle speed to a scheduled rpm through control of the Idle Air Control (IAC) motor. The brake switch input is also used to disable vent and vacuum solenoid output signals to the speed control servo.

BRAKE LAMP SWITCH (Continued)

Vehicles equipped with the speed control option use a dual function brake lamp switch. The PCM monitors the state of the dual function brake lamp switch.

The brake switch is equipped with three sets of contacts, one normally open and the other two normally closed (brakes disengaged). The PCM sends a 12 volt signal to one of the normally closed contacts in the brake switch, which is returned to the PCM as a brake switch state signal. With the contacts closed, the 12 volt signal is pulled to ground causing the signal to go low. The low voltage signal, monitored by the PCM, indicates that the brakes are not applied. When the brakes are applied, the contacts open, causing the PCM's output brake signal to go high, disengaging the speed control, cutting off PCM power to the speed control solenoids.

The second set of normally closed contacts supplies 12 volts from the PCM any time speed control is turned on. Through the brake switch, voltage is routed to the speed control servo solenoids. The speed control solenoids (vacuum, vent and dump) are provided this voltage any time the speed control is ON and the brakes are disengaged.

When the driver applies the brakes, the contacts open and voltage is interrupted to the solenoids. The normally open contacts are fed battery voltage. When the brakes are applied, battery voltage is supplied to the brake lamps.

The brake lamp switch can only be adjusted once. That is at the initial installation of the switch. If the switch is not adjusted properly or has been removed, a new switch must be installed and adjusted.

DIAGNOSIS AND TESTING - BRAKE LAMP SWITCH

The brake lamp switch can be tested with an ohmmeter. The ohmmeter is used to check continuity between the pin terminals (Fig. 2).

SWITCH CIRCUIT IDENTIFICATION

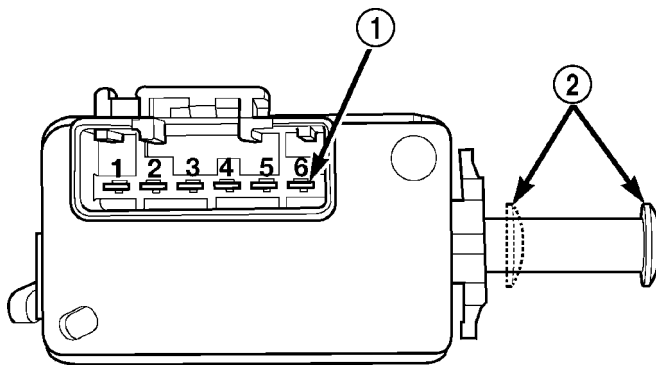
- Terminals 1 and 2: brake lamp circuit
- Terminals 3 and 4: RWAL/ABS module and Powertrain Control Module (PCM) circuit
- Terminals 5 and 6: speed control circuit

SWITCH CONTINUITY TEST

NOTE: Disconnect switch harness before testing switch continuity.

With switch plunger extended, attach test leads to pins 1 and 2. Replace switch if meter indicates no continuity.

With switch plunger retracted, attach test leads to pins 3 and 4. Replace switch if meter indicates no continuity.



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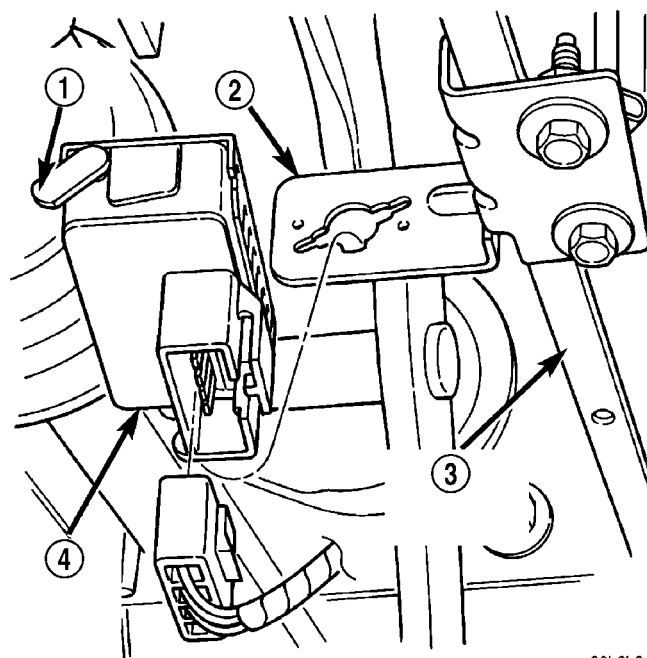
Fig. 2 Brake Lamp Switch Terminal Identification

- 1 - TERMINAL PINS
- 2 - PLUNGER TEST POSITIONS

With switch plunger retracted, attach test leads to pins 5 and 6. Replace switch if meter indicates no continuity.

REMOVAL

- (1) Disconnect the switch harness (Fig. 3).
- (2) Press and hold the brake pedal in applied position.
- (3) Rotate the switch counterclockwise about 30° to align the switch lock tab with the notch in bracket.
- (4) Pull the switch rearward out of the mounting bracket and release the brake pedal.



80b6b2a7

Fig. 3 Brake Lamp Switch & Bracket

- 1 - RELEASE LEVER
- 2 - BRACKET
- 3 - BRAKE PEDAL SUPPORT
- 4 - BRAKE LAMP SWITCH

BRAKE LAMP SWITCH (Continued)

INSTALLATION

- (1) Press and hold the brake pedal down.
- (2) Align the tab on the **new** switch with the notch in the switch bracket. Insert the switch in the bracket and turn it clockwise about 30° to lock it in place.
- (3) Connect the harness wires to the switch.
- (4) Release the brake pedal.
- (5) Move the release lever on the switch parallel with the connector to engage the switch plunger. The switch is now adjusted and **can not** be adjusted again.

CENTER HIGH MOUNTED STOP LAMP

REMOVAL

- (1) Disconnect and isolate the battery negative cable.
- (2) Remove the CHMSL from the roof panel. Refer to (Refer to 8 - ELECTRICAL/LAMPS/LIGHTING - EXTERIOR/CENTER HIGH MOUNTED STOP LAMP UN - REMOVAL).
- (3) Turn the bulb socket 1/4 turn counterclockwise.
- (4) Separate the socket from the lamp.
- (5) Remove the bulb.

INSTALLATION

- (1) Position the bulb in the socket and press into place.
- (2) Position the socket in the lamp.
- (3) Turn the bulb socket 1/4 turn clockwise.
- (4) Install the CHMSL. Refer to (Refer to 8 - ELECTRICAL/LAMPS/LIGHTING - EXTERIOR/CENTER HIGH MOUNTED STOP LAMP UN - INSTALLATION).
- (5) Connect the battery negative cable.

CENTER HIGH MOUNTED STOP LAMP UNIT

REMOVAL

- (1) Disconnect and isolate the battery negative cable.
- (2) Remove screws holding CHMSL to roof panel (Fig. 4).
- (3) Separate CHMSL from roof.
- (4) Disengage wire connector from body wire harness.
- (5) Separate CHMSL from vehicle.

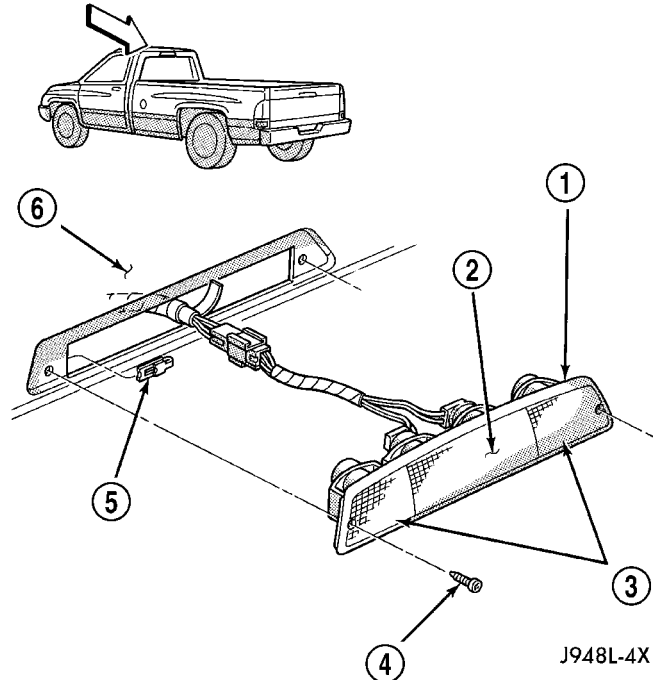


Fig. 4 CENTER HIGH MOUNT STOP LAMP — TYPICAL

- 1 - CHMSL CARGO LAMP HOUSING
- 2 - CHMSL
- 3 - CARGO LAMPS
- 4 - SCREW
- 5 - CLIP
- 6 - CAB

INSTALLATION

- (1) Position lamp at cab roof and connect wire connector.
- (2) Install screws holding CHMSL to roof panel. Tighten securely.
- (3) Connect the battery negative cable.

CAB CLEARANCE LAMP

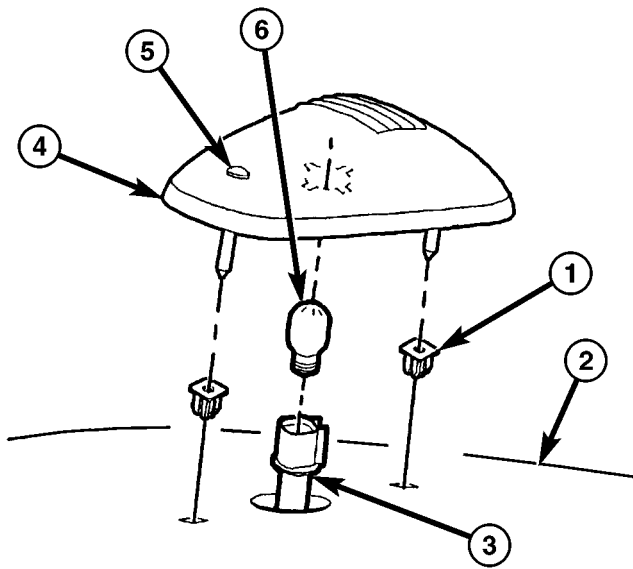
REMOVAL

- (1) Remove both retaining screws and separate the lamp from the roof.
- (2) Quarter turn counter clockwise to separate bulb socket from lamp.

INSTALLATION

- (1) Quarter twist the bulb socket clockwise into the lamp housing.
- (2) Position the lamp assembly onto the roof and install retaining screws. (Fig. 5)

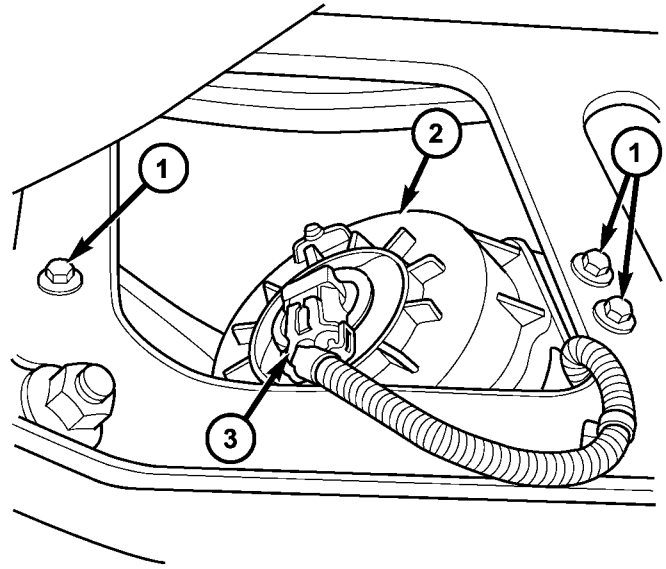
CAB CLEARANCE LAMP (Continued)



80f3024f

Fig. 5 CLEARANCE LAMP

- 1 - NUT
- 2 - CAB ROOF
- 3 - BULB SOCKET
- 4 - CLEARANCE LAMP
- 5 - SCREW
- 6 - BULB



80d140cc

Fig. 6 Fog Lamp

- 1 - SCREW
- 2 - FOG LAMP UNIT
- 3 - CONNECTOR

FOG LAMP

REMOVAL

NOTE: The fog lamps are serviced from the rearward side of the front bumper.

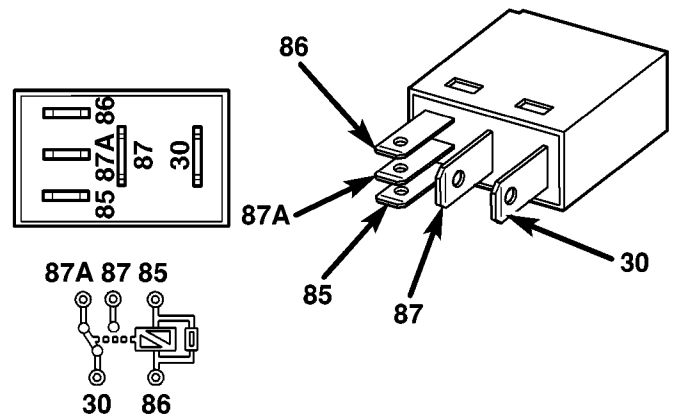
- (1) Disconnect and isolate the battery negative cable.
- (2) Disengage fog lamp harness connector.
- (3) Remove the bolts attaching the fog lamp to the bumper (Fig. 6).
- (4) Separate fog lamp from bumper.

INSTALLATION

- (1) Position fog lamp in bumper.
- (2) Install the bolts attaching the fog lamp to the bumper.
- (3) Connect fog lamp harness connector.
- (4) Connect the battery negative cable.
- (5) Check for proper operation and beam alignment.

FOG LAMP RELAY

DESCRIPTION



80ce807b

Fig. 7 ISO Micro Relay

- 30 - COMMON FEED
- 85 - COIL GROUND
- 86 - COIL BATTERY
- 87 - NORMALLY OPEN
- 87A - NORMALLY CLOSED

The front fog lamp relay is located in the Power Distribution Center (PDC) in the engine compartment of the vehicle. The front fog lamp relay is a conventional International Standards Organization

FOG LAMP RELAY (Continued)

(ISO) micro relay (Fig. 7). Relays conforming to the ISO specifications have common physical dimensions, current capacities, terminal patterns, and terminal functions. The relay is contained within a small, rectangular, molded plastic housing and is connected to all of the required inputs and outputs by five integral male spade-type terminals that extend from the bottom of the relay base.

The front fog lamp relay cannot be adjusted or repaired and, if faulty or damaged, the unit must be replaced.

OPERATION

The front fog lamp relay is an electromechanical switch that uses a low current input from the Front Control Module (FCM) to control a high current output to the front fog lamps. The movable common feed contact point is held against the fixed normally closed contact point by spring pressure. When the relay coil is energized, an electromagnetic field is produced by the coil windings. This electromagnetic field draws the movable relay contact point away from the fixed normally closed contact point, and holds it against the fixed normally open contact point. When the relay coil is de-energized, spring pressure returns the movable contact point back against the fixed normally closed contact point. A resistor is connected in parallel with the relay coil in the relay, and helps to dissipate voltage spikes and electromagnetic interference that can be generated as the electromagnetic field of the relay coil collapses.

The front fog lamp relay terminals are connected to the vehicle electrical system through a connector receptacle in the Power Distribution Center (PDC). The inputs and outputs of the front fog lamp relay include:

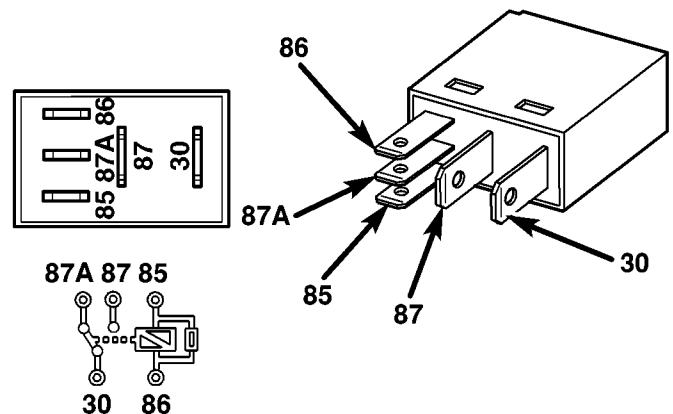
- **Common Feed Terminal** - The common feed terminal (30) receives battery voltage at all times from a fuse in the PDC through a fused B(+) circuit.
- **Coil Ground Terminal** - The coil ground terminal (85) is connected to a control output of the Front Control Module (FCM) through a front fog lamp relay control circuit. The FCM controls front fog lamp operation by controlling a ground path through this circuit.
- **Coil Battery Terminal** - The coil battery terminal (86) receives battery voltage at all times from a fuse in the PDC through a fused B(+) circuit.
- **Normally Open Terminal** - The normally open terminal (87) is connected to the front fog lamps through a front fog lamp relay output circuit and provides battery voltage to the front fog lamps whenever the relay is energized.
- **Normally Closed Terminal** - The normally closed terminal (87A) is not connected in this application.

The front fog lamp relay can be diagnosed using conventional diagnostic tools and methods.

DIAGNOSIS AND TESTING - FRONT FOG LAMP RELAY

The front fog lamp relay (Fig. 8) is located in the Power Distribution Center in the engine compartment. Refer to the appropriate wiring information.

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, DISABLE THE SUPPLEMENTAL RESTRAINT SYSTEM BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, DRIVER AIRBAG, PASSENGER AIRBAG, SEAT BELT TENSIONER, FRONT IMPACT SENSORS, SIDE CURTAIN AIRBAG, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. DISCONNECT AND ISOLATE THE BATTERY NEGATIVE (GROUND) CABLE, THEN WAIT TWO MINUTES FOR THE SYSTEM CAPACITOR TO DISCHARGE BEFORE PERFORMING FURTHER DIAGNOSIS OR SERVICE. THIS IS THE ONLY SURE WAY TO DISABLE THE SUPPLEMENTAL RESTRAINT SYSTEM. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.



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Fig. 8 ISO Micro Relay

- 30 - COMMON FEED
- 85 - COIL GROUND
- 86 - COIL BATTERY
- 87 - NORMALLY OPEN
- 87A - NORMALLY CLOSED

(1) Remove the front fog lamp relay from the PDC. (Refer to 8 - ELECTRICAL/LAMPS/LIGHTING - EXTERIOR/FRONT FOG LAMP RELAY - REMOVAL).

(2) A relay in the de-energized position should have continuity between terminals 87A and 30, and no continuity between terminals 87 and 30. If OK, go to Step 3. If not OK, replace the faulty relay.

FOG LAMP RELAY (Continued)

(3) Resistance between terminals 85 and 86 (electromagnet) should be 75 ± 8 ohms. If OK, go to Step 4. If not OK, replace the faulty relay.

(4) Connect a battery to terminals 85 and 86. There should now be continuity between terminals 30 and 87, and no continuity between terminals 87A and 30. If OK, reinstall the relay and use a DRBIII® scan tool to perform further testing. Refer to the appropriate diagnostic information.

REMOVAL

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, DISABLE THE SUPPLEMENTAL RESTRAINT SYSTEM BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, DRIVER AIRBAG, PASSENGER AIRBAG, SEAT BELT TENSIONER, FRONT IMPACT SENSORS, SIDE CURTAIN AIRBAG, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. DISCONNECT AND ISOLATE THE BATTERY NEGATIVE (GROUND) CABLE, THEN WAIT TWO MINUTES FOR THE SYSTEM CAPACITOR TO DISCHARGE BEFORE PERFORMING FURTHER DIAGNOSIS OR SERVICE. THIS IS THE ONLY SURE WAY TO DISABLE THE SUPPLEMENTAL RESTRAINT SYSTEM. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

(1) Disconnect and isolate the battery negative cable.

(2) Remove the cover for the Power Distribution Center (PDC).

(3) Remove the front fog lamp relay by grasping it firmly and pulling it straight out from the receptacle in the PDC.

INSTALLATION

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, DISABLE THE SUPPLEMENTAL RESTRAINT SYSTEM BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, DRIVER AIRBAG, PASSENGER AIRBAG, SEAT BELT TENSIONER, FRONT IMPACT SENSORS, SIDE CURTAIN AIRBAG, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. DISCONNECT AND ISOLATE THE BATTERY NEGATIVE (GROUND) CABLE, THEN WAIT TWO MINUTES FOR THE SYSTEM CAPACITOR TO DISCHARGE BEFORE PERFORMING FURTHER DIAGNOSIS OR SERVICE. THIS IS THE ONLY SURE WAY TO DISABLE THE SUPPLEMENTAL RESTRAINT SYSTEM. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

(1) Position the front fog lamp relay to the proper receptacle in the Power Distribution Center (PDC).

(2) Align the front fog lamp relay terminals with the terminal cavities in the PDC.

(3) Press firmly and evenly on the top of the front fog lamp relay until the terminals are fully seated in the PDC.

(4) Reconnect the battery negative cable.

HAZARD SWITCH**DESCRIPTION**

The hazard switch is activated by a push button located in the multifunction switch on the top of the steering column between the steering wheel and instrument cluster.

The hazard warning system allows the vehicle operator to provide other vehicle operators in the near proximity an optical indication that the vehicle is disabled or an obstacle to traffic flow. The hazard warning system has battery voltage at all times, regardless of ignition position.

OPERATION

The instrument cluster monitors the multiplexed multifunction switch operation. When the hazard warning switch is activated, the instrument cluster will send a J1850 bus message to the Front Control Module (FCM), then activate the two turn signal indicators and audible click in the instrument cluster.

The FCM will then activate the necessary relays in the Power Distribution Center (PDC) to begin flashing both the front and rear turn signal indicator lamps.

HEADLAMP**REMOVAL**

(1) Disconnect and isolate the negative battery cable.

(2) Remove the headlamp unit (Refer to 8 - ELECTRICAL/LAMPS/LIGHTING - EXTERIOR/HEADLAMP UNIT - REMOVAL).

(3) Separate the socket from the headlamp unit.

INSTALLATION

CAUTION: Do Not Touch the bulb glass with fingers or other oily surfaces. Reduced bulb life will result.

(1) Install the socket into the headlamp unit.

(2) Install the headlamp unit (Refer to 8 - ELECTRICAL/LAMPS/LIGHTING - EXTERIOR/HEADLAMP UNIT - INSTALLATION).

(3) Connect the negative battery cable.

HEADLAMP SWITCH

DESCRIPTION

The multiplexed headlamp switch is located on the instrument panel. The headlamp switch controls the parking lamps, fog lamps and the headlamps. A separate switch in the module controls the interior lamps and instrument cluster illumination. This switch also contains a rheostat for controlling the illumination level of the cluster lamps.

OPERATION

The multiplexed headlamp switch has an off, parking lamp, fog lamp and a headlamp on position. High beams are controlled by the multiplexed multifunction switch on the steering column. The fog lamps are illuminated by pulling back on the headlamp switch knob when in the parking lamp or headlamp ON position. The headlamp switch cannot be repaired. It must be replaced.

The Instrument Cluster monitors the headlamp and multifunction switch operation. When the headlamp switch is rotated to the parking lamp or On position the Instrument Cluster sends a J1850 message to the Front Control Module, which is mated to the power distribution center to become the Integrated Control Module, to illuminate the appropriate bulbs. When the multifunction switch is activated to the optical horn or high beam position the Instrument Cluster illuminates the high beam indicator and sends a J1850 message to the Front Control Module to illuminate the appropriate bulbs.

REMOVAL

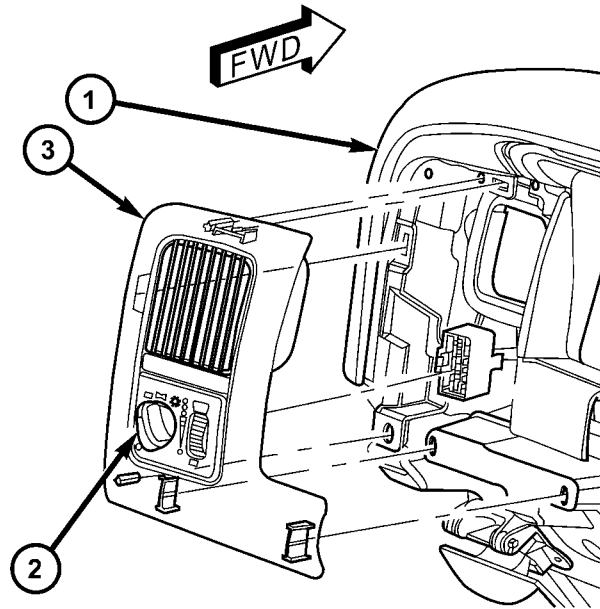
WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, DISABLE THE AIRBAG SYSTEM BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. DISCONNECT AND ISOLATE THE BATTERY NEGATIVE (GROUND) CABLE, THEN WAIT TWO MINUTES FOR THE AIRBAG SYSTEM CAPACITOR TO DISCHARGE BEFORE PERFORMING FURTHER DIAGNOSIS OR SERVICE. THIS IS THE ONLY SURE WAY TO DISABLE THE AIRBAG SYSTEM. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

(1) Disconnect and isolate the battery negative cable.

(2) Remove the left instrument panel bezel. (Refer to 23 - BODY/INSTRUMENT PANEL/CLUSTER BEZEL - REMOVAL).

(3) Disconnect the harness connector.

(4) Remove the screws that secure the headlamp switch to the instrument panel bezel (Fig. 9).



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Fig. 9 Headlamp Switch Removal

- 1 - DASH BOARD
- 2 - HEADLAMP SWITCH
- 3 - INSTRUMENT PANEL BEZEL

(5) Remove the headlamp switch from the instrument panel bezel.

INSTALLATION

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, DISABLE THE AIRBAG SYSTEM BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. DISCONNECT AND ISOLATE THE BATTERY NEGATIVE (GROUND) CABLE, THEN WAIT TWO MINUTES FOR THE AIRBAG SYSTEM CAPACITOR TO DISCHARGE BEFORE PERFORMING FURTHER DIAGNOSIS OR SERVICE. THIS IS THE ONLY SURE WAY TO DISABLE THE AIRBAG SYSTEM. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

(1) Position the headlamp switch to the left instrument panel bezel and secure with screws. Tighten the screws to 2.2 N·m (20 in. lbs.).

(2) Reconnect the instrument panel wire harness connector for the headlamp switch.

(3) Position the left instrument panel bezel on to the instrument panel.

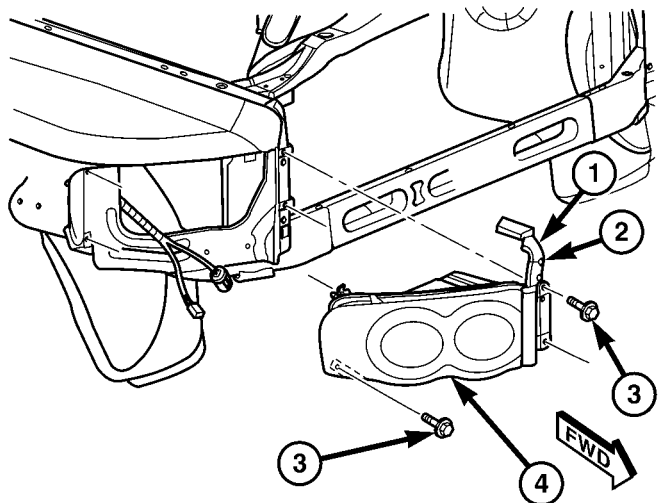
HEADLAMP SWITCH (Continued)

- (4) Install the cluster bezel onto the instrument panel (Fig. 9).
- (5) Connect the battery negative cable.

HEADLAMP UNIT

REMOVAL

- (1) Disconnect and isolate the battery negative cable.
- (2) Remove the push pins attaching the seal to the fender.
- (3) Remove the bolts attaching the headlamp unit to the fender (Fig. 10).
- (4) Remove the bulb sockets from the headlamp unit
- (5) Separate headlamp unit from vehicle.



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Fig. 10 HEADLAMP — TYPICAL

- 1 - SEAL
- 2 - PUSH PIN
- 3 - SCREW
- 4 - HEADLAMP UNIT

INSTALLATION

CAUTION: Do not touch the bulb glass with fingers or other oily surfaces. Reduced bulb life will result.

- (1) Install the bulb sockets for the front park/turn signal and headlamp.
- (2) Position headlamp unit in inner fender panel.
- (3) Install the bolts attaching headlamp unit to the fender (Fig. 10).
- (4) Align the seal and install the push pins.
- (5) Connect the battery negative cable.

ADJUSTMENTS

Headlamps can be aligned using the screen method provided in this section. Alignment Tool C-4466-A or equivalent can also be used. Refer to instructions provided with the tool for proper procedures.

LAMP ALIGNMENT SCREEN PREPARATION

- (1) Position vehicle on a level surface perpendicular to a flat wall 7.62 meters (25 ft) away from front of headlamp lens (Fig. 11).
- (2) If necessary, tape a line on the floor 7.62 meters (25 ft) away from and parallel to the wall.
- (3) Up 1.27 meters (5 feet) from the floor, tape a line on the wall at the centerline of the vehicle. Sight along the centerline of the vehicle (from rear of vehicle forward) to verify accuracy of the line placement.
- (4) Rock vehicle side-to-side three times to allow suspension to stabilize.
- (5) Jounce front suspension three times by pushing downward on front bumper and releasing.
- (6) Measure the distance from the center of headlamp lens to the floor. Transfer measurement to the alignment screen (with tape). Use this line for up/down adjustment reference.
- (7) Measure distance from the centerline of the vehicle to the center of each headlamp being aligned. Transfer measurements to screen (with tape) to each side of vehicle centerline. Use these lines for left/right adjustment reference.

VEHICLE PREPARATION FOR HEADLAMP ALIGNMENT

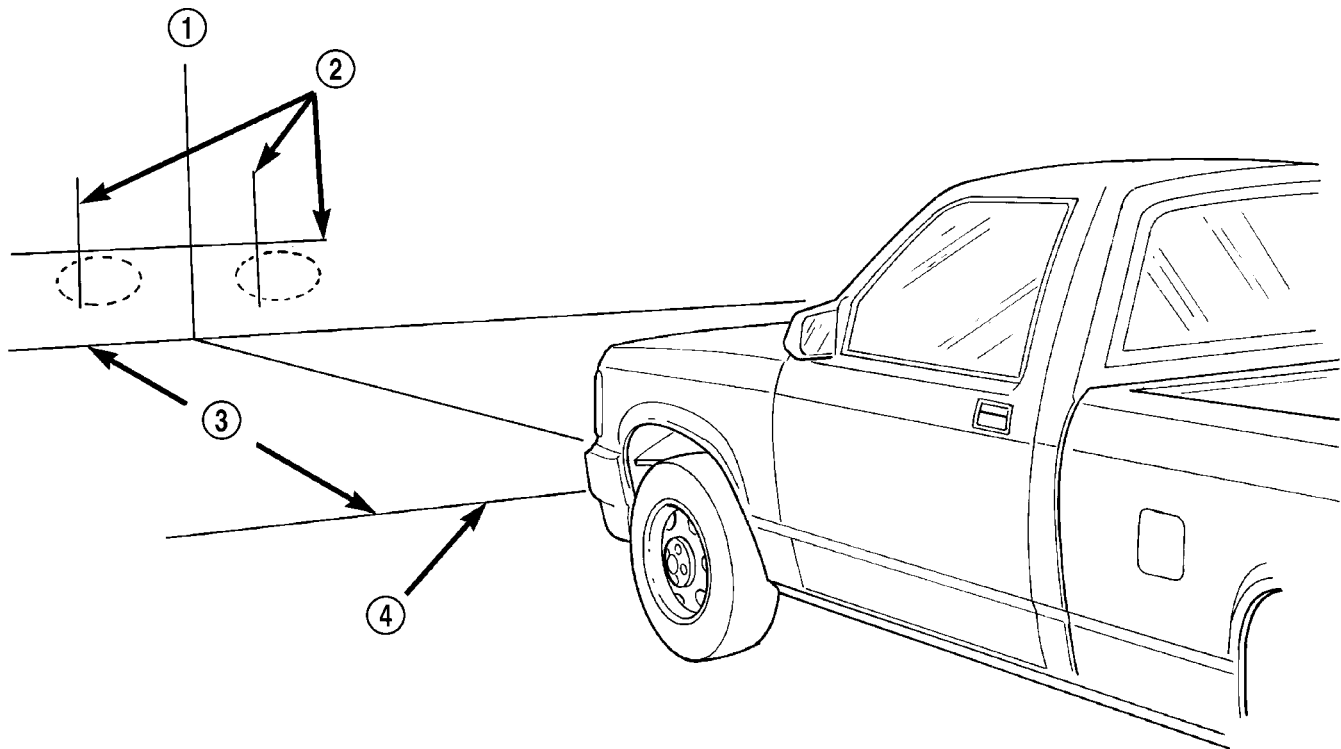
- (1) Verify headlamp dimmer switch and high beam indicator operation.
- (2) Correct defective components that could hinder proper headlamp alignment.
- (3) Verify proper tire inflation.
- (4) Clean headlamp lenses.
- (5) Verify that luggage area is not heavily loaded.
- (6) Fuel tank should be FULL. Add 2.94 kg (6.5 lbs.) of weight over the fuel tank for each estimated gallon of missing fuel.

HEADLAMP ALIGNMENT

A properly aimed low beam headlamp will project top edge of high intensity pattern on screen from 50 mm (2 in.) above to 50 mm (2 in.) below headlamp centerline. The side-to-side outboard edge of high intensity pattern should be from 50 mm (2 in.) left to 50 mm (2 in.) right of headlamp centerline (Fig. 11). **The preferred headlamp alignment is 1" down for the up/down adjustment and 0 for the left/right adjustment.** The high beam pattern should be correct when the low beams are aligned properly.

To adjust low beam headlamp, rotate alignment screws to achieve the specified aim.

HEADLAMP UNIT (Continued)



8020cdol

Fig. 11 Headlamp Alignment Screen—Typical

1 - CENTER OF VEHICLE
2 - CENTER OF HEADLAMP

3 - 7.62 METERS (25 FT.)
4 - FRONT OF HEADLAMP

LICENSE PLATE LAMP

REMOVAL

- (1) Disconnect and isolate the battery negative cable.
- (2) Grasp license plate bulb socket and 1/4 turn left to release from the license plate lamp unit.
- (3) Pull bulb from license plate lamp socket.

INSTALLATION

- (1) Install the bulb in the socket.
- (2) Install the socket in to the license plate lamp unit and 1/4 turn to lock.
- (3) Connect the battery negative cable.

LICENSE PLATE LAMP UNIT

REMOVAL

- (1) Disconnect and isolate the battery negative cable.
- (2) Disconnect the harness connector.
- (3) Remove the retaining clip. (Fig. 12).
- (4) Separate license plate lamp from vehicle.

INSTALLATION

- (1) Position license plate lamp on the bumper.
- (2) Install the clip.
- (3) Reconnect the harness connector.
- (4) Connect the battery negative cable.

MARKER LAMP UNIT

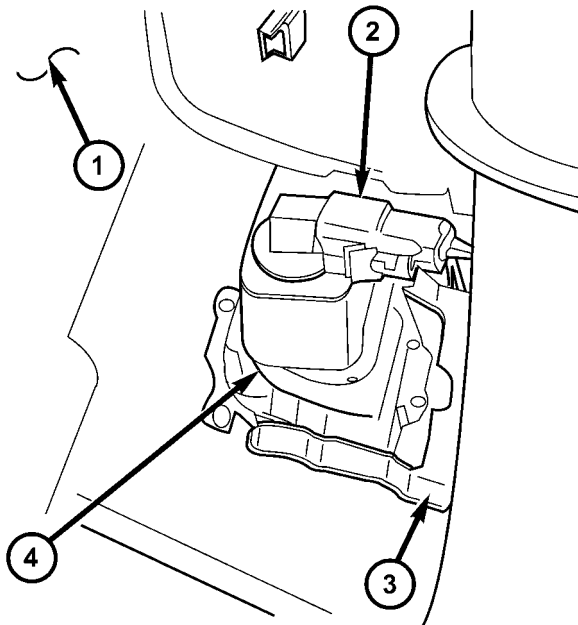
REMOVAL**REMOVAL**

- (1) Grasp the lens assembly firmly and pushing rearward, remove the lens assembly from the fender.
- (2) Quarter turn the bulb socket counterclockwise and remove it from lens assembly.

REMOVAL

- (1) Remove the lens mounting screws.
- (2) Quarter twist counterclockwise the tailgate marker lamp bulb sockets and remove lamp housing.

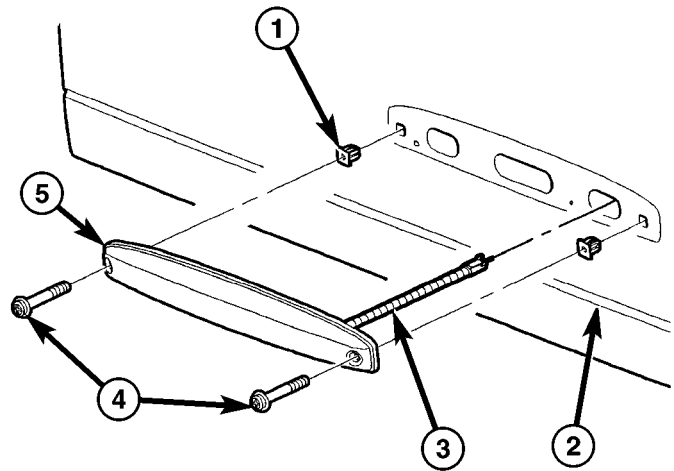
MARKER LAMP UNIT (Continued)



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Fig. 12 License Plate Lamp Panel

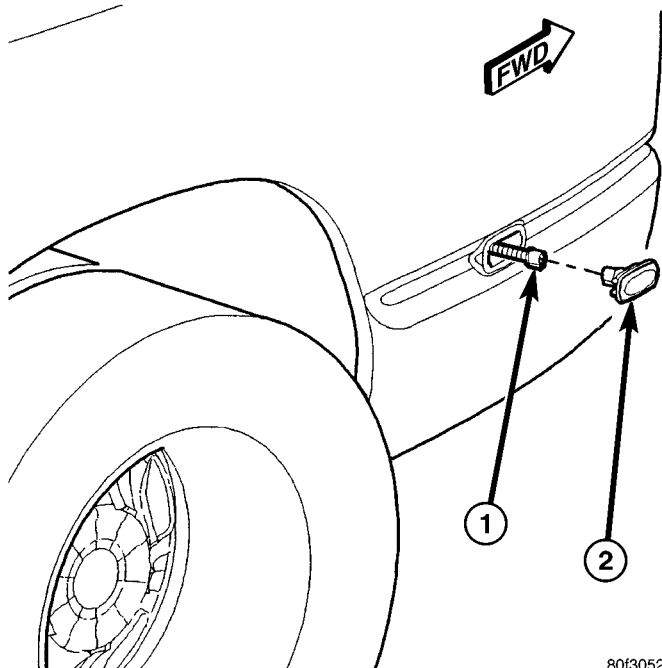
- 1 - REAR BUMPER
- 2 - WIRING CONNECTOR
- 3 - CLIP
- 4 - LICENSE PLATE LAMP UNIT



80f30400

Fig. 14 Tailgate Marker Lamp Housing

- 1 - Nut
- 2 - Tailgate
- 3 - Bulb Harness
- 4 - Screw
- 5 - Lens



80f30529

Fig. 13 FENDER EXTENSION AND MARKER LAMP ASSEMBLY

- 1 - WIRING HARNESS
- 2 - MARKER LAMP

INSTALLATION

INSTALLATION

(1) Quarter twist the bulb socket into the lamp assembly

(2) Position the lamp assembly against the fender, using firm pressure insert the lens into the fender. (Fig. 13)

INSTALLATION

(1) Position the tailgate marker bulb harness to the lens and quarter twist each bulb assembly clockwise to seat bulb sockets.

(2) Position the tailgate marker lens to the tailgate and install the retaining screws. (Fig. 14)

MULTI-FUNCTION SWITCH

DESCRIPTION - TURN SIGNAL SYSTEM

The multi-function switch is a resistive MUX switch that is monitored by the Instrument Cluster. The turn signals are actuated with the lever on Multi-Function Switch. The signals are automatically turned off by a canceling cam (two lobes molded to the back of the clock spring mechanism). The cam comes in contact with the cancel actuator on the turn signal (multi-function) switch assembly. Either cam

MULTI-FUNCTION SWITCH (Continued)

lobe, pushing on the cancel actuator, returns the switch to the OFF position.

OPERATION - TURN SIGNAL SYSTEM

The Instrument Cluster monitors the multiplexed multifunction switch. In a turning event the Instrument Cluster senses a change in the turn signal lever and illuminates the appropriate turn signal indicator. At the same time, the Instrument Cluster will send a J1850 message on the PCI bus to the Front Control Module (FCM). The FCM will respond by activating the appropriate relay in the Power Distribution Center.

A chime will sound after the turn is completed if vehicle has traveled a distance of approximately 1.0 mile and a speed of 15 mph, with the turn signal ON.

DIAGNOSIS AND TESTING - MULTI-FUNCTION SWITCH

To test the turn signal, headlamp beam select and optical horn portion of the multi-function switch:

(1) Remove the multi-function switch, refer to Electrical, Lamps/Lighting - Exterior, Multi-Function Switch, Removal, and Installation.

(2) Using an ohmmeter check the resistance readings between multi-function switch pins. Refer to Wiring Diagrams for proper pin numbers and the MULTI-FUNCTION SWITCH TESTS table.

MULTI-FUNCTION SWITCH TESTS

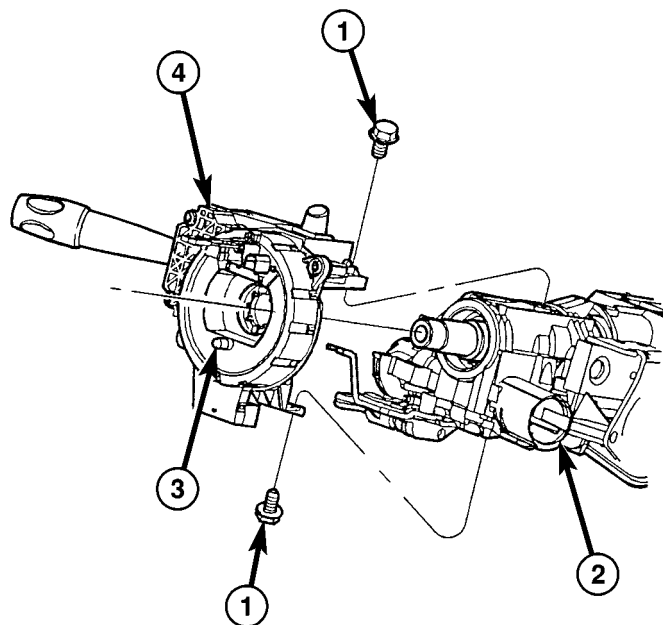
EXTERIOR LIGHTING FUNCTIONS		
SWITCH POSITION	CONNECTOR PINS	RESISTANCE (OHMS)
Off	1 - 2	Open
Headlamp High Beams On	1 - 2	518 - 575
Hazard	3 - 2	115 - 128
Optical Horn (Flash-to-Pass) On	1 - 2	1257 - 1397
Off	3 - 2	2643 - 2937
Turn Signal Left	3 - 2	345 - 384
Turn Signal Right	3 - 2	786 - 873
FRONT WIPER FUNCTIONS		
SWITCH POSITION	CONNECTOR PINS	RESISTANCE (OHMS) $\pm 10\%$
Front Wiper Off	2 - 4	6910 - 7678
Delay 1	2 - 4	2128 - 2365
Delay 2	2 - 4	1089 - 1210
Delay 3	2 - 4	627 - 697
Delay 4	2 - 4	388 - 431
Delay 5	2 - 4	234 - 261
Front Wiper Low	2 - 4	125 - 140
Front Wiper High	2 - 4	50 - 56
Wash	1 - 2	2584 - 2871

REMOVAL

WARNING: BEFORE SERVICING THE STEERING COLUMN THE AIRBAG SYSTEM MUST BE DISARMED. REFER TO THE ELECTRICAL RESTRAINT SYSTEM FOR SERVICE PROCEDURES. FAILURE TO DO SO MAY RESULT IN ACCIDENTAL DEPLOYMENT OF THE AIRBAG AND POSSIBLE PERSONAL INJURY

- (1) Disconnect and isolate battery negative cable.
- (2) Remove the steering wheel and the upper and lower steering column shrouds. Refer to Steering, Column, Shroud, Removal.
- (3) Disconnect the wire connector from the back of the multi-function switch.
- (4) Remove the screws retaining the multi-function switch to the steering column adapter collar (Fig. 15).
- (5) Remove the multi-function switch.

MULTI-FUNCTION SWITCH (Continued)



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Fig. 15 MULTIFUNCTION SWITCH

- 1 - SCREW
- 2 - COLUMN
- 3 - CLOCK SPRING
- 4 - MULTI - FUNCTION SWITCH

(6) Remove the screws retaining the clock spring to the multifunction switch.

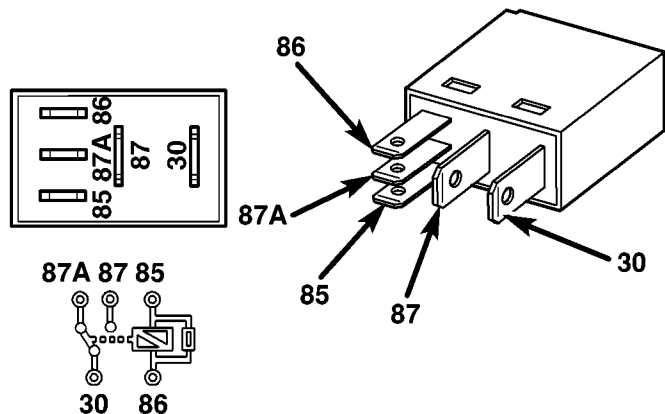
INSTALLATION

WARNING: BEFORE SERVICING THE STEERING COLUMN THE AIRBAG SYSTEM MUST BE DISARMED. REFER TO THE ELECTRICAL RESTRAINT SYSTEM FOR SERVICE PROCEDURES. FAILURE TO DO SO MAY RESULT IN ACCIDENTAL DEPLOYMENT OF THE AIRBAG AND POSSIBLE PERSONAL INJURY.

- (1) Install the clock spring on the multifunction switch.
- (2) Position the switch on to the steering column.
- (3) Install the retaining screws (Fig. 15).
- (4) Connect the wire harness connector.
- (5) Install the upper, lower steering column shrouds and the steering wheel. Refer to Steering, Column, Shroud, Installation.
- (6) Connect the battery negative cable.

PARK LAMP RELAY**DESCRIPTION**

The park lamp relay is located in the Power Distribution Center (PDC) of the vehicle. The park lamp



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Fig. 16 ISO Micro Relay

- 30 - COMMON FEED
- 85 - COIL GROUND
- 86 - COIL BATTERY
- 87 - NORMALLY OPEN
- 87A - NORMALLY CLOSED

relay is a conventional International Standards Organization (ISO) micro relay (Fig. 16). Relays conforming to the ISO specifications have common physical dimensions, current capacities, terminal patterns, and terminal functions.

The park lamp relay cannot be adjusted or repaired and, if faulty or damaged, the unit must be replaced.

OPERATION

The park lamp relay is an electromechanical switch that uses a low current input from the Front Control Module (FCM) to control a high current output to the park lamps. The movable common feed contact point is held against the fixed normally closed contact point by spring pressure. When the relay coil is energized, an electromagnetic field is produced by the coil windings. This electromagnetic field draws the movable relay contact point away from the fixed normally closed contact point, and holds it against the fixed normally open contact point. When the relay coil is de-energized, spring pressure returns the movable contact point back against the fixed normally closed contact point. A resistor is connected in parallel with the relay coil in the relay, and helps to dissipate voltage spikes and electromagnetic interference that can be generated as the electromagnetic field of the relay coil collapses.

The park lamp relay terminals are connected to the vehicle electrical system through a connector in the Junction Block (JB). The inputs and outputs of the headlamp low beam relay include:

- **Common Feed Terminal** - The common feed terminal (30) is connected to the park lamps through

PARK LAMP RELAY (Continued)

the park lamp relay output circuit and provides ground to the park lamps when the relay is de-energized, and battery current to the park lamps whenever the relay is energized.

- **Coil Ground Terminal** - The coil ground terminal (85) is connected to a control output of the Front Control Module (FCM) through a park lamp relay control circuit. The FCM controls park lamp operation by controlling a ground path through this circuit.

- **Coil Battery Terminal** - The coil battery terminal (86) receives battery current at all times from a fuse in the PDC through a fused B(+) circuit.

- **Normally Open Terminal** - The normally open terminal (87) receives battery current at all times from a fuse in the Power Distribution Center (PDC) through a fused B(+) circuit.

- **Normally Closed Terminal** - The normally closed terminal (87A) is connected to ground at all times.

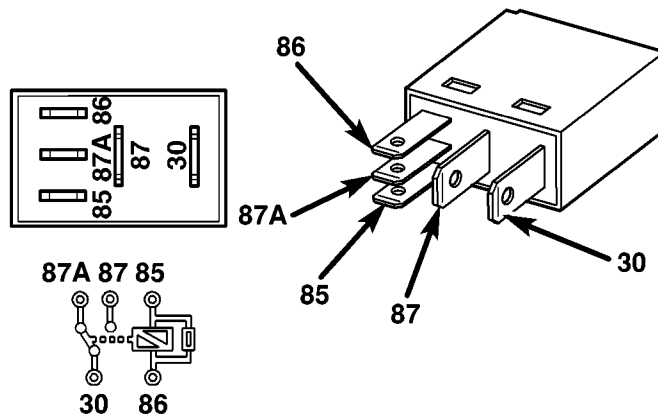
The park lamp relay can be diagnosed using conventional diagnostic tools and methods.

DIAGNOSIS AND TESTING - PARK LAMP RELAY

The park lamp relay (Fig. 17) is located in the Power Distribution Center (PDC). Refer to the appropriate wiring information.

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, DISABLE THE SUPPLEMENTAL RESTRAINT SYSTEM BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, DRIVER AIRBAG, PASSENGER AIRBAG, SEAT BELT TENSIONER, FRONT IMPACT SENSORS, SIDE CURTAIN AIRBAG, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. DISCONNECT AND ISOLATE THE BATTERY NEGATIVE (GROUND) CABLE, THEN WAIT TWO MINUTES FOR THE SYSTEM CAPACITOR TO DISCHARGE BEFORE PERFORMING FURTHER DIAGNOSIS OR SERVICE. THIS IS THE ONLY SURE WAY TO DISABLE THE SUPPLEMENTAL RESTRAINT SYSTEM. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

- (1) Remove the park lamp relay from the PDC.
- (2) A relay in the de-energized position should have continuity between terminals 87A and 30, and no continuity between terminals 87 and 30. If OK, go to Step 3. If not OK, replace the faulty relay.
- (3) Resistance between terminals 85 and 86 (electromagnet) should be 75 ± 8 ohms. If OK, go to Step 4. If not OK, replace the faulty relay.



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Fig. 17 ISO Micro Relay

30 - COMMON FEED
85 - COIL GROUND
86 - COIL BATTERY
87 - NORMALLY OPEN
87A - NORMALLY CLOSED

(4) Connect a battery to terminals 85 and 86. There should now be continuity between terminals 30 and 87, and no continuity between terminals 87A and 30. If OK, reinstall the relay and use a DRBIII® scan tool to perform further testing. Refer to the appropriate diagnostic information.

REMOVAL

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, DISABLE THE SUPPLEMENTAL RESTRAINT SYSTEM BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, DRIVER AIRBAG, PASSENGER AIRBAG, SEAT BELT TENSIONER, FRONT IMPACT SENSORS, SIDE CURTAIN AIRBAG, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. DISCONNECT AND ISOLATE THE BATTERY NEGATIVE (GROUND) CABLE, THEN WAIT TWO MINUTES FOR THE SYSTEM CAPACITOR TO DISCHARGE BEFORE PERFORMING FURTHER DIAGNOSIS OR SERVICE. THIS IS THE ONLY SURE WAY TO DISABLE THE SUPPLEMENTAL RESTRAINT SYSTEM. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

- (1) Disconnect and isolate the battery negative cable.
- (2) Remove the Power Distribution Center (PDC) cover.
- (3) Remove the park lamp relay by grasping it firmly and pulling it straight out from the receptacle in the PDC.

PARK LAMP RELAY (Continued)**INSTALLATION**

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, DISABLE THE SUPPLEMENTAL RESTRAINT SYSTEM BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, DRIVER AIRBAG, PASSENGER AIRBAG, SEAT BELT TENSIONER, FRONT IMPACT SENSORS, SIDE CURTAIN AIRBAG, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. DISCONNECT AND ISOLATE THE BATTERY NEGATIVE (GROUND) CABLE, THEN WAIT TWO MINUTES FOR THE SYSTEM CAPACITOR TO DISCHARGE BEFORE PERFORMING FURTHER DIAGNOSIS OR SERVICE. THIS IS THE ONLY SURE WAY TO DISABLE THE SUPPLEMENTAL RESTRAINT SYSTEM. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

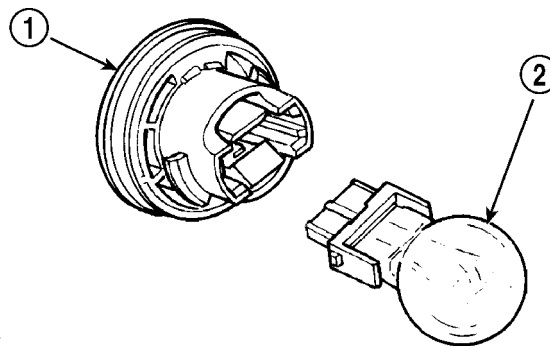
- (1) Position the park lamp relay to the proper receptacle in the Power Distribution Center (PDC).
- (2) Align the park lamp relay terminals with the terminal cavities in the PDC.
- (3) Press firmly and evenly on the top of the park lamp relay until the terminals are fully seated in the PDC.
- (4) Install the PDC cover.
- (5) Reconnect the battery negative cable.

PARK/TURN SIGNAL LAMP**REMOVAL**

- (1) Disconnect and isolate the negative battery cable.
- (2) Remove the headlamp unit.(Refer to 8 - ELECTRICAL/LAMPS/LIGHTING - EXTERIOR/HEAD-LAMP UNIT - REMOVAL).
- (3) Separate the socket from the headlamp unit.
- (4) Release the bulb socket locking tabs and separate the bulb from the socket (Fig. 18).

INSTALLATION

- (1) Install the bulb into the socket.
- (2) Install the socket into the headlamp unit.
- (3) Install the headlamp unit (Refer to 8 - ELECTRICAL/LAMPS/LIGHTING - EXTERIOR/HEAD-LAMP UNIT - INSTALLATION).
- (4) Connect the negative battery cable.



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Fig. 18 Pull Bulb From Socket

- 1 - SOCKET
2 - BULB

TAIL LAMP**REMOVAL**

- (1) Disconnect and isolate the negative battery cable.
- (2) Remove the tail lamp unit (Refer to 8 - ELECTRICAL/LAMPS/LIGHTING - EXTERIOR/TAIL LAMP UNIT - REMOVAL).
- (3) Remove the bulb back plate from the tail lamp unit.
- (4) Release the bulb locking tabs and remove the bulb from the back plate (Fig. 18).

INSTALLATION

- (1) Install the bulb into the back plate.
- (2) Install the bulb back plate to the tail lamp unit.
- (3) Install the tail lamp unit (Refer to 8 - ELECTRICAL/LAMPS/LIGHTING - EXTERIOR/TAIL LAMP UNIT - INSTALLATION).
- (4) Connect the negative battery cable.

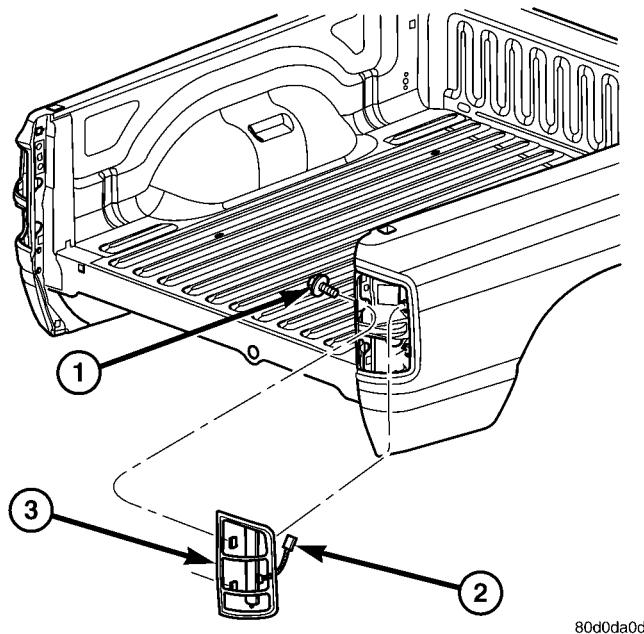
TAIL LAMP UNIT**REMOVAL**

- (1) Lower the tail gate.
- (2) Remove the screws
- (3) Disengage the taillamp unit from the body panel.
- (4) Disconnect the electrical connector (Fig. 19).

INSTALLATION

- (1) Connect the wiring harness connector.
- (2) Position the taillamp unit into the body panel.
- (3) Install the screws (Fig. 19).

TAIL LAMP UNIT (Continued)



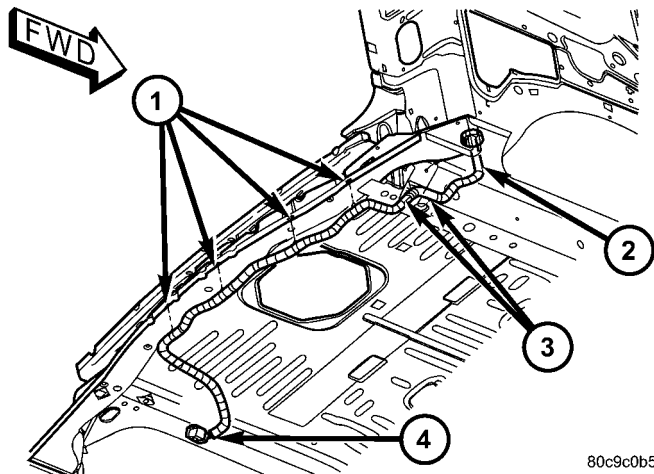
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Fig. 19 TAIL LAMP UNIT

- 1 - SCREW
- 2 - ELECTRICAL CONNECTOR
- 3 - TAILLAMP UNIT

TRAILER TOW WIRING

DESCRIPTION



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Fig. 20 Trailer Tow Wiring

- 1 - RETAINER CLIP (4)
- 2 - REAR BODY HARNESS (TRAILER TOW TAKE OUT)
- 3 - RETAINER CLIP (2)
- 4 - WIRE HARNESS CONNECTOR

Vehicles equipped with an optional factory-installed trailer towing package have a rear body wire harness that includes an integral trailer tow wiring take out that connects to a heavy duty, sealed, 7-pin trailer tow connector located in the rear bumper (Fig.

20). This harness includes an adapter harness that adapts the 7-pin trailer tow connector to a standard, light-duty, 4-pin trailer tow connector. Refer to the appropriate wiring information.

TURN LAMP

REMOVAL

- (1) Disconnect and isolate the negative battery cable.
- (2) Remove the tail lamp unit (Refer to 8 - ELECTRICAL/LAMPS/LIGHTING - EXTERIOR/TAIL LAMP UNIT - REMOVAL).
- (3) Remove the bulb back plate from the tail lamp unit.
- (4) Separate the bulb from the lamp bar.

INSTALLATION

- (1) Install the bulb into the back plate.
- (2) Install the bulb back plate to the tail lamp unit.
- (3) Install the tail lamp unit (Refer to 8 - ELECTRICAL/LAMPS/LIGHTING - EXTERIOR/TAIL LAMP UNIT - INSTALLATION).
- (4) Connect the negative battery cable.

UNDERHOOD LAMP

REMOVAL

- (1) Disconnect and isolate the battery negative cable.
- (2) Insert a small flat blade in the access slot between the lamp base and lamp lens.
- (3) Pry the lamp lens upward and remove the lamp lens (Fig. 21).
- (4) Depress the bulb terminal inward (Fig. 22) to release the bulb.

INSTALLATION

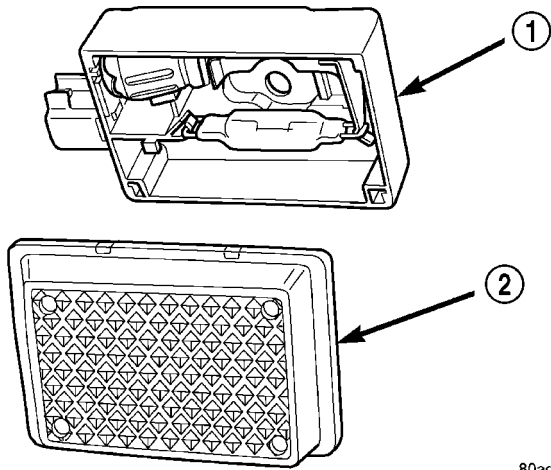
- (1) Engage the replacement bulb wire loop to the terminal closest to the lamp base wire connector (Fig. 22).
- (2) Depress the opposite terminal inward and engage the remaining bulb wire loop.
- (3) Position the lamp lens on the lamp base and press into place (Fig. 21).
- (4) Connect the battery negative cable.

UNDERHOOD LAMP UNIT

REMOVAL

- (1) Disconnect and isolate the battery negative cable.

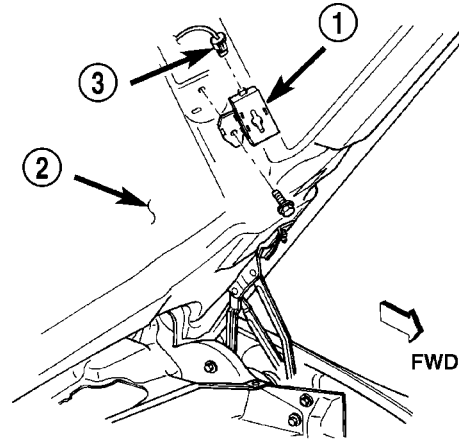
UNDERHOOD LAMP UNIT (Continued)



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Fig. 21 Underhood Lamp Lens

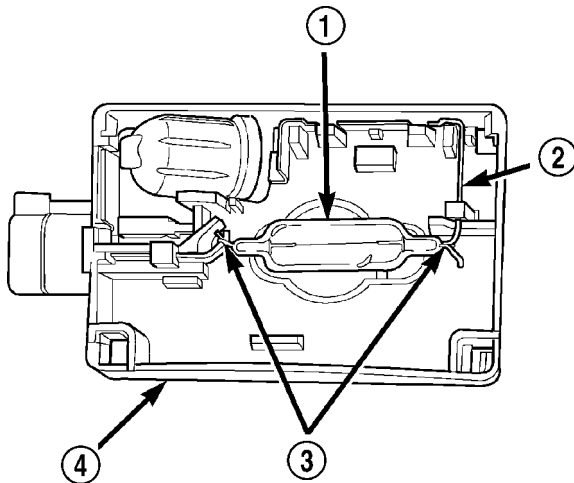
- 1 - LAMP
- 2 - LAMP LENS



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Fig. 23 Underhood Lamp

- 1 - UNDER HOOD LAMP
- 2 - HOOD
- 3 - CONNECTOR



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Fig. 22 Underhood Lamp Bulb

- 1 - BULB
- 2 - DEPRESS TERMINAL INWARD
- 3 - BULB WIRE LOOP
- 4 - LAMP BASE

INSTALLATION

- (1) Install bulb.
- (2) Install lamp lens.
- (3) Position the underhood lamp on the hood inner panel.
- (4) Install the attaching screw through the lamp and into the hood panel (Fig. 23). Tighten the screw securely.
- (5) Fold lamp housing over and firmly press onto base to snap into place.
- (6) Connect the wire harness connector to the lamp.
- (7) Connect the battery negative cable.

- (2) Disconnect the wire harness connector from the lamp.
- (3) Remove lamp lens.
- (4) Remove bulb.
- (5) Remove screw attaching underhood lamp to the inner hood panel (Fig. 23).
- (6) Separate underhood lamp from vehicle.

LAMPS/LIGHTING - INTERIOR

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DOME LAMP

DESCRIPTION

The dome lamp is controlled by the instrument cluster which provides power at all times, regardless of the ignition switch position. The ground circuit for the lamp is switched through the integral dome lamp switch or through the door ajar switches via the instrument cluster.

The dome lamp lens and bulb are available for service replacement. If either of the lamp switch or bulb holders is faulty or damaged, the dome lamp assembly must be replaced.

For service of the dome lamp bulb, refer to the appropriate wiring information.

OPERATION

The dome lamp is activated by the door ajar switches via the instrument cluster. When all of the doors are closed, the lamp can be activated by depressing the lens. When any door is open, depressing the lamp lense to activate the lamp switch will not turn the lamps off.

The instrument cluster monitors the door ajar switches. When a door is open the instrument cluster grounds the low side drivers to turn on the lamp. Upon closing all doors, the instrument cluster initiates a 30 second timer. If any of the doors are opened during the "time out" cycle, the instrument cluster will reset the timer until all doors are closed. The instrument cluster will faid to off when the doors are closed and the ignition is turned ON, the time out expires or the power locks are activated.

REMOVAL

(1) Using a small flat blade, pry the left side (driver's side) of the dome lamp lens downward from dome lamp.

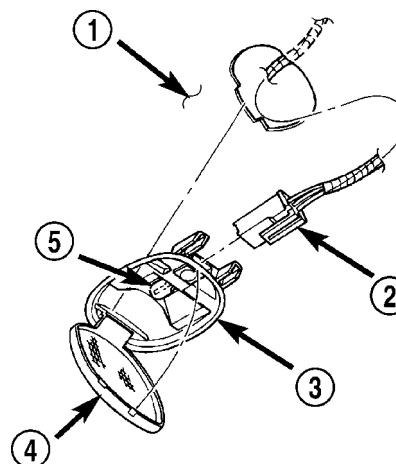
(2) Allow the lens to hang down (Fig. 1), this will disengage the right side of the lamp (passenger's side) from the headliner.

(3) Pull the right side of the lamp down and slide the lamp to the right (Fig. 2).

(4) Separate the lamp from the headliner.

(5) Disengage dome lamp wire connector from body wire harness.

(6) Separate dome lamp from vehicle.



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Fig. 1 Dome Lamp Lens

- 1 - HEADLINER
- 2 - CONNECTOR
- 3 - DOME LAMP
- 4 - LENS
- 5 - BULB

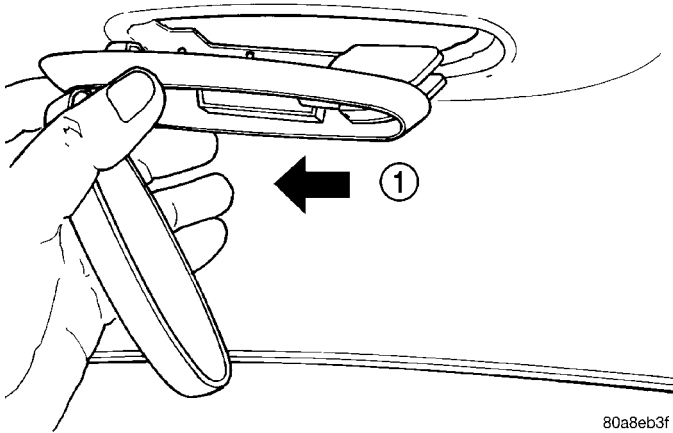
INSTALLATION

(1) Position dome lamp at headliner.

(2) Connect dome lamp wire connector to body wire harness.

(3) Position the left side of the lamp in the headliner opening and slide lamp to the left (Fig. 1).

(4) Push the right side of the lamp in the headliner opening and push the lamp lens up into the lamp to secure (Fig. 1).

DOME LAMP (Continued)**Fig. 2 Dome Lamp**

1 - SLIDE LAMP

DOOR AJAR SWITCH**DESCRIPTION**

The door ajar switches are integral to the door latches on each door. The switches close a path to ground for the Instrument Cluster when a door is opened.

The door ajar switches cannot be repaired and, if faulty or damaged, the door latch unit must be replaced. Refer to the Body section under Doors for the removal and installation procedure.

OPERATION

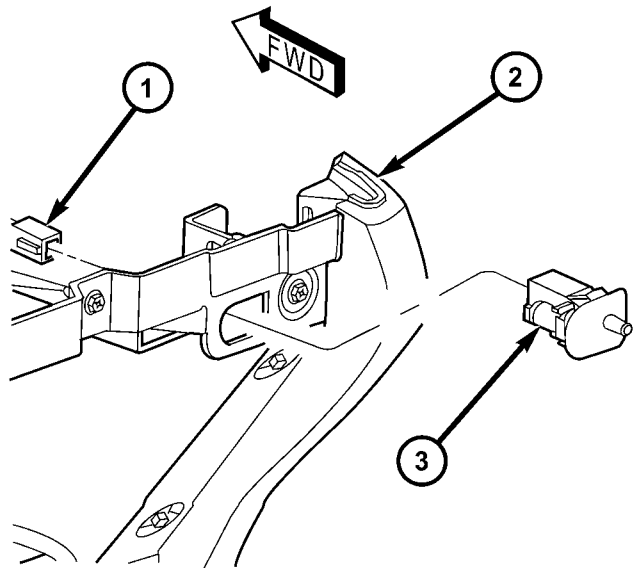
The door ajar switches close a path to ground for the Instrument Cluster when a door is opened. The passenger front door is connected in a parallel-series circuit between ground and the Instrument Cluster, while the driver side front door ajar switch is connected in series between ground and the Instrument Cluster to provide a unique input. The Instrument Cluster reads the switch status, then sends the proper switch status messages to other electronic modules over the Programmable Communications Interface (PCI) data bus network. The door ajar switches can be diagnosed using conventional diagnostic tools and methods. Refer to the Body section under Doors for the Removal and Installation procedures.

GLOVE BOX LAMP/SWITCH**REMOVAL**

(1) Disconnect and isolate the battery negative cable.

(2) Remove the glove box from the instrument panel. (Refer to 23 - BODY/INSTRUMENT PANEL/GLOVE BOX - REMOVAL) for the procedures.

(3) Reach through the glove box opening and behind the glove box lamp and switch mounting bracket to access the instrument panel wire harness connector on the glove box lamp and switch (Fig. 3).



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Fig. 3 Glove Box Lamp and Switch Remove/Install

- 1 - WIRE HARNESS CONNECTOR
- 2 - DASH BOARD
- 3 - GLOVE BOX SWITCH/LIGHT

(4) Disconnect the instrument panel wire harness connector from the connector receptacle on the back of the glove box lamp and switch unit.

(5) Reach through the glove box opening and behind the glove box lamp and switch mounting bracket to depress the retaining tabs on the top and bottom of the glove box lamp and switch housing.

(6) While holding the retaining tabs depressed, push the glove box lamp and switch unit out through the hole in the mounting bracket on the instrument panel glove box opening upper reinforcement.

(7) Remove the glove box lamp and switch unit from the instrument panel.

INSTALLATION

(1) Reach through the glove box opening and behind the glove box lamp and switch mounting bracket to feed the instrument panel wire harness connectors out through the hole in the glove box lamp and switch housing mounting bracket.

(2) Position the glove box lamp and switch unit to the instrument panel.

(3) Reconnect the instrument panel wire harness connector to the connector receptacle on the back of the glove box lamp and switch unit.

GLOVE BOX LAMP/SWITCH (Continued)

(4) Push the glove box lamp and switch unit into the hole in the mounting bracket on the instrument panel glove box opening upper reinforcement.

(5) Install the glove box onto the instrument panel. (Refer to 23 - BODY/INSTRUMENT PANEL/GLOVE BOX - INSTALLATION) for the procedures.

(6) Close the glove box.

(7) Reconnect the battery negative cable.

READING LAMP

DESCRIPTION

The overhead console in this vehicle is equipped with two individual reading and courtesy lamps. The lamp lenses are the only visible components of these lamps. Each lamp has its own switch, bulb, reflector and lens within the overhead console.

The overhead console reading and courtesy lamps are controlled by the instrument cluster which provides power at all times, regardless of the ignition switch position. The ground circuit for the lamps is switched through the integral reading and courtesy lamp switches or through the door ajar switches. Each lamp is designed and aimed to provide illumination that will be directed only to that side of the vehicle on which the lamp is located.

The reading and courtesy lamp lenses and bulbs are available for service replacement. The reading and courtesy lamp switches, bulb holders and wiring are only available as part of the overhead console wire harness. If either of the lamp switches or bulb holders is faulty or damaged, the entire overhead console wire harness assembly must be replaced.

For service of the reading and courtesy lamp bulbs, refer to the appropriate wiring information.

OPERATION

All reading and courtesy lamps located in the overhead console are activated by the door ajar switches via the instrument cluster. When all of the doors are closed, these lamps can be individually activated by depressing the corresponding lens. When any door is open, depressing the lamp lenses to activate the lamp switches will not turn the lamps off.

The instrument cluster monitors the door ajar switches. When a door is open the instrument cluster grounds the low side drivers to turn on the lamps. Upon closing all doors, the instrument cluster initiates a 30 second timer. If any of the doors are opened during the "time out" cycle, the instrument cluster will reset the timer until all doors are closed. The instrument cluster will fail to off when the doors are closed and the ignition is turned ON, the time out expires or the power locks are activated.

REMOVAL

(1) Disconnect and isolate the battery negative cable.

(2) Insert a long, narrow, flat-bladed tool between the curved (outboard) edge of the reading and courtesy lamp lens and the overhead console housing (Fig. 4).

(3) Gently pry inward and downward against the lens until the latch tab in the center of the outboard edge of the reading and courtesy lamp lens is disengaged from the overhead console housing.

(4) Pull firmly on the lens toward the outboard side of the vehicle to disengage the two pivot tabs on the inboard edge of the reading and courtesy lamp lens are disengaged from the overhead console housing.

(5) Remove the reading and courtesy lamp lens from the overhead console housing.

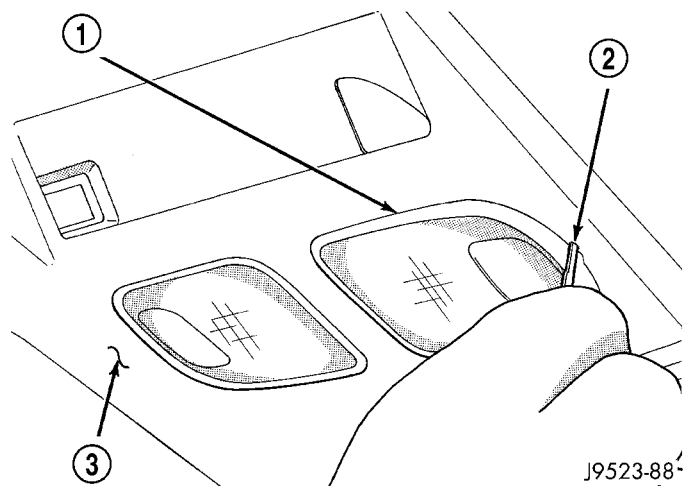


Fig. 4 Overhead Console Reading Lamp Bulb Removal

- 1 - LENS
- 2 - FLAT BLADE
- 3 - CONSOLE

INSTALLATION

(1) Position the reading and courtesy lamp lens onto the overhead console housing.

(2) Align the two pivot tabs on the inboard edge of the reading and courtesy lamp lens with the two pivot holes in the overhead console housing.

(3) Push firmly on the lens toward the inboard side of the vehicle to insert the two pivot tabs on the inboard edge of the reading and courtesy lamp lens into the two pivot holes in the overhead console housing.

(4) Pivot the lens back up into position and press upward firmly until the latch tab in the center of the outboard edge of the reading and courtesy lamp lens snaps back into the overhead console housing.

(5) Reconnect the battery negative cable.