POWER MIRROR SYSTEMS

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OUTSIDE POWER MIRRORS

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DESCRIPTION AND OPERATION

POWER MIRROR SYSTEM

DESCRIPTION

Driver and passenger side power operated outside rear view mirrors are standard factory-installed equipment on this model. The power mirror system allows the driver to adjust both outside mirrors electrically from the driver seat position by operating a switch on the driver side front door trim panel. The power mirror system receives non-switched battery current through a fuse in the Power Distribution Center (PDC) so that the power mirrors remain operational, regardless of the ignition switch position.

The standard equipment power operated outside rear view mirrors are also equipped with the heated mirror system, which will only operate when the ignition switch is in the On position and the rear window defogger switch is turned on. When the rear window defogger switch is in the On position, electric heater grids on the rear window glass and behind both outside rear view mirror glasses are energized. These electric heater grids produce heat to help clear the rear window glass and outside rear view mirrors of ice, snow, or fog. Refer to **Outside Mirror Heating Grid** in the Rear Window Defogger System section of Group 8N - Electrically Heated Systems for more information on this feature.

A driver side automatic dimming outside mirror that dims the mirror to reduce the glare of bright lights approaching the vehicle from behind, and a memory system that automatically positions the power mirrors for two different drivers are optional factory-installed equipment on this model. Refer to **Automatic Dimming Outside Mirror** in the Inside Power Mirrors section of this group for more information on the automatic dimming outside mirror. Refer to **Memory System** in the Memory System section of Group 8R - Power Seat Systems for more information on the memory system.

This group covers the following components of the power mirror system:

- Power mirrors
- Power mirror switch.

Certain functions and features of the power mirror system rely upon resources shared with other electronic modules in the vehicle over the Programmable Communications Interface (PCI) data bus network. The PCI data bus network allows the sharing of sensor information. This helps to reduce wire harness complexity, internal controller hardware, and component sensor current loads. At the same time, this system provides increased reliability, enhanced diagnostics, and allows the addition of many new feature capabilities. For diagnosis of these electronic modules or of the PCI data bus network, the use of a DRB scan tool and the proper Diagnostic Procedures manual are recommended.

DESCRIPTION AND OPERATION (Continued)

The other electronic modules that may affect power mirror system operation are as follows:

- **Body Control Module (BCM)** - Refer to **Body Control Module** in the Description and Operation section of Group 8E - Instrument Panel Systems for more information.
- **Driver Door Module (DDM)** - Refer to **Door Module** in the Power Lock System section of Group 8P - Power Lock Systems for more information.
- **Passenger Door Module (PDM)** - Refer to **Door Module** in the Power Lock System section of Group 8P - Power Lock Systems for more information.

Refer to **Power Mirrors** in the Contents of Group 8W - Wiring Diagrams for complete circuit diagrams. Following are general descriptions of the major components in the power mirror system.

OPERATION

The Driver Door Module (DDM) and the Passenger Door Module (PDM) each contain the power mirror control logic for the mirror on its respective door. The DDM also houses the power mirror switch. Each door module controls the positioning of its respective outside mirror through hard wired outputs to that mirror. When the power mirror switch on the DDM is used to position the passenger side outside mirror, the DDM sends mirror positioning messages to the PDM over the Programmable Communications Interface (PCI) data bus. The PDM responds to these messages by sending control outputs to move the passenger side mirror accordingly.

Both the PDM and DDM respond to the defogger switch status messages sent by the Body Control Module (BCM) over the PCI data bus to control the electric heater grids of their respective mirrors. Refer to **Outside Mirror Heating Grid** in the Rear Window Defogger System section of Group 8N - Electrically Heated Systems for more information on this feature.

On models equipped with the optional memory system, each door module also receives a hard wired input from the two power mirror motor position potentiometers that are integral to each power mirror. Each door module then stores the Driver 1 and Driver 2 mirror position information for its respective mirror. When the DDM receives a Driver 1 or Driver 2 memory recall message from the memory switch on the driver side front door trim panel or from the Remote Keyless Entry (RKE) receiver in the PDM, the DDM positions the driver side mirror and sends a memory recall message back to the PDM over the PCI data bus to position the passenger side mirror.

See the owner's manual in the vehicle glove box for more information on the features, use and operation of the power mirror system.

POWER MIRROR

DESCRIPTION

Mechanically folding, power operated outside rear view mirrors are standard equipment on this model. Each power mirror housing contains two electric motors, two drive mechanisms, an electric heating grid, the mirror glass case and the mirror glass. One motor and drive controls mirror up-and-down (vertical) movement, and the other controls right-and-left (horizontal) movement. If the vehicle is equipped with the optional memory system, each mirror head also contains two position potentiometers. One position potentiometer monitors the vertical mirror motor, and the other monitors the horizontal mirror motor.

An optional driver side automatic dimming mirror is able to automatically change its reflectance level. This mirror is controlled by the circuitry of the automatic day/night inside rear view mirror. A thin layer of electrochromic material between two pieces of conductive glass make up the face of the mirror. Refer to **Automatic Dimming Outside Mirror** in the Inside Power Mirrors section of this group for more information on this feature.

The power mirror unit cannot be repaired. Only the mirror glass and glass case are serviced separately. The replacement mirror glass is supplied with an instruction sheet that details the recommended replacement procedure. If any other component of the power mirror unit is faulty or damaged, the entire power mirror unit must be replaced.

OPERATION

Each of the two outside power mirrors includes two reversible electric motors that are secured within the power mirror housing. Each motor moves the mirror case and glass through an integral drive unit. When a power mirror motor is supplied with battery current and ground, it moves the mirror case and glass through its drive unit in one direction. When the battery current and ground feeds to the motor are reversed, it moves the mirror case and glass in the opposite direction.

The power mirrors are equipped with a standard equipment electric heating grid that is applied to the back of each outside rear view mirror glass. When an electrical current is passed through the resistor wire of the heating grid, it warms the mirror glass. Refer to **Outside Mirror Heating Grid** in the Rear Window Defogger System section of Group 8N - Electrically Heated Systems for more information on the operation of the heated mirrors and the rear window defogger system.

If the driver side mirror is equipped with the automatic dimming outside mirror option, two photocell

DESCRIPTION AND OPERATION (Continued)

sensors on the inside rear view mirror are used to monitor light levels and adjust the reflectance of both the inside and driver side outside mirrors. This change in reflectance helps to reduce the glare of headlamps approaching the vehicle from the rear. Refer to **Automatic Dimming Outside Mirror** in the Inside Power Mirrors section of this group for more information on this feature.

If the vehicle is equipped with the optional memory system, the Driver Door Module (DDM) and the Passenger Door Module (PDM) store the mirror position information as monitored through the mirror motor position potentiometers. When the memory system requests a recall of the stored mirror position, the DDM and the PDM are able to duplicate the stored mirror positions by moving the mirror motors until the potentiometer readings match the stored values.

POWER MIRROR SWITCH

DESCRIPTION

Both the right and left power outside mirrors are controlled by a single multi-function switch unit located on the driver side front door trim panel. The power mirror switch unit includes a three-position rocker selector switch and four momentary directional push button switches.

The power mirror switch unit is integral to the Driver Door Module (DDM). The power mirror switch cannot be repaired or adjusted and, if faulty or damaged, the entire DDM unit must be replaced. Refer to **Door Module** in the Power Lock System section of Group 8P - Power Lock Systems for the DDM service procedures.

OPERATION

The power mirror selector switch is moved right (right mirror control), left (left mirror control), or center to turn the power outside mirror system off. When the selector switch is in the right mirror control or left mirror control position, one of the four directional control buttons is depressed to control movement of the selected mirror up, down, right, or left. When the selector switch is in the Off position, depressing any of the directional switches will not change either mirror position.

See the owner's manual in the vehicle glove box for more information on the features, use and operation of the power mirror switches.

DIAGNOSIS AND TESTING

POWER MIRROR SYSTEM

Following are tests that will help to diagnose the hard wired components and circuits of the power mirror system. However, these tests may not prove conclusive in the diagnosis of this system. In order to obtain conclusive testing of the power mirror system, the Programmable Communications Interface (PCI) data bus network and all of the electronic modules that provide inputs to, or receive outputs from the power mirror system components must be checked.

The most reliable, efficient, and accurate means to diagnose the power mirror system requires the use of a DRB scan tool and the proper Diagnostic Procedures manual. The DRB scan tool can provide confirmation that the PCI data bus is functional, that all of the electronic modules are sending and receiving the proper messages on the PCI data bus, that the power mirror motors are being sent the proper hard wired outputs, and that the mirror position potentiometers are returning the proper outputs to the door modules for them to perform their power mirror system functions.

POWER MIRROR

For complete circuit diagrams, refer to **Power Mirrors** in the Contents of Group 8W - Wiring Diagrams.

BOTH MIRRORS INOPERATIVE

(1) Check the operation of the power lock switch on the driver side front door. If all of the doors lock and unlock, replace the faulty Driver Door Module (DDM). If not OK, go to Step 2.

(2) Check the operation of the power lock switch on the passenger side front door. If all of the doors lock and unlock, replace the faulty DDM. If not OK, go to Step 3.

(3) Check the fused B(+) fuse in the Power Distribution Center (PDC). If OK, go to Step 4. If not OK, repair the shorted circuit or component as required and replace the faulty fuse.

(4) Check for battery voltage at the fused B(+) fuse in the PDC. If OK, go to Step 5. If not OK, repair the open fused B(+) circuit to the battery as required.

(5) Disconnect and isolate the battery negative cable. Remove the trim panel from the driver side front door. Disconnect the 15-way door wire harness connector from the DDM connector receptacle. Check for continuity between the ground circuit cavity of the 15-way door wire harness connector for the DDM 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.

DIAGNOSIS AND TESTING (Continued)

(6) Reconnect the battery negative cable. Check for battery voltage at the fused B(+) circuit cavity of the 15-way door wire harness connector for the DDM. If OK, replace the faulty DDM. If not OK, repair the open fused B(+) circuit to the fuse in the PDC as required.

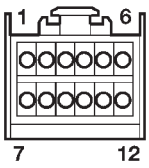
ONE MIRROR INOPERATIVE

(1) If the one inoperative mirror is on the passenger side, go to Step 2. If the one inoperative mirror is on the driver side, go to Step 3.

(2) Check if the passenger front door will lock and unlock using the power lock switch on the driver side front door. If OK, go to Step 3. If not OK, go to Step 6.

(3) Disconnect and isolate the battery negative cable. Remove the trim panel from the front door. Disconnect the 12-way mirror wire harness connector from the door wire harness connector.

(4) Using two jumper wires, test the mirror as shown in the Mirror Test chart (Fig. 1). If the mirror tests OK, go to Step 5. If the mirror does not test OK, replace the faulty mirror.



POWER MIRROR TEST		
APPLY 12 VOLTS TO:	APPLY GROUND TO:	MIRROR REACTION
DRIVER SIDE		
6	12	LEFT
12	6	RIGHT
11	12	UP
12	11	DOWN
PASSENGER SIDE		
1	7	LEFT
7	1	RIGHT
8	7	UP
7	8	DOWN

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Fig. 1 Mirror Test

(5) Disconnect the 12-way door wire harness connector from the door module connector receptacle. Check all of the circuits of the door wire harness between the connector for the mirror and the connector for the door module for opens or shorts. If all of the circuits are OK, replace the faulty door module. If any of the circuits are not OK, repair the open or shorted circuit(s) as required.

(6) Use a DRB scan tool and the proper Diagnostic Procedures manual to test and repair the faulty Programmable Communications Interface (PCI) data bus communication between the two door modules.

NO MIRROR HEAT

If both mirror heaters are inoperative, refer to **Outside Mirror Heating Grid** in the Rear Window Defogger System section of Group 8N - Electrically Heated Systems.

(1) Disconnect and isolate the battery negative cable. Remove the front door trim panel on the side of the inoperative mirror heater.

(2) Disconnect the 12-way door wire harness connector from the door module connector receptacle. Check for continuity between the heater switched ground circuit cavity and the heater 12V supply circuit cavity of the 12-way door wire harness connector for the door module. There should be continuity. If OK, use a DRB scan tool and the proper Diagnostic Procedures manual to test the door module and the PCI data bus. If not OK, replace the faulty power mirror unit.

NO MIRROR DIMMING (Driver Side Only)

(1) Test the operation of the automatic day/night mirror. Refer to **Automatic Day/Night Mirror** in the Inside Power Mirrors section of this group. If OK, go to Step 2. If not OK, repair the automatic day/night mirror unit as required.

(2) Disconnect and isolate the battery negative cable. Remove the driver side front door trim panel.

(3) Disconnect the door wire harness connector from the power mirror wire harness connector. Connect a voltmeter between the electrochromatic (+) and electrochromatic (–) circuit cavities of the door wire harness connector for the power mirror. Turn on the automatic day/night mirror system while observing the voltmeter. A voltmeter reading of 1.45 ± 0.05 volts indicates a proper dimming signal is being received at the door wire harness connector for the power mirror. If OK, replace the faulty power mirror. If not OK, repair the shorted or open electrochromatic (+) or electrochromatic (–) circuit(s) to the automatic day/night mirror as required.

DIAGNOSIS AND TESTING (Continued)

NO MIRROR MEMORY

For diagnosis of the memory system, the use of a DRB scan tool and the proper Diagnostic Procedures manual are recommended. Refer to **Memory System** in the Memory System section of Group 8P - Power Seat Systems.

REMOVAL AND INSTALLATION

POWER MIRROR

REMOVAL

(1) Disconnect and isolate the battery negative cable.

(2) Remove the trim panel from the front door. Refer to **Front Door Trim Panel** in the Removal and Installation section of Group 23 - Body for the procedures.

(3) Disconnect the power mirror wire harness connector from the door wire harness connector (Fig. 2).

(4) Remove the mirror flag seal from the inner door panel.

(5) Remove the three nuts that secure the power mirror mounting studs to the door flag.

(6) Remove the power mirror from the outside of the door.

INSTALLATION

(1) Position the power mirror onto the outside of the door.

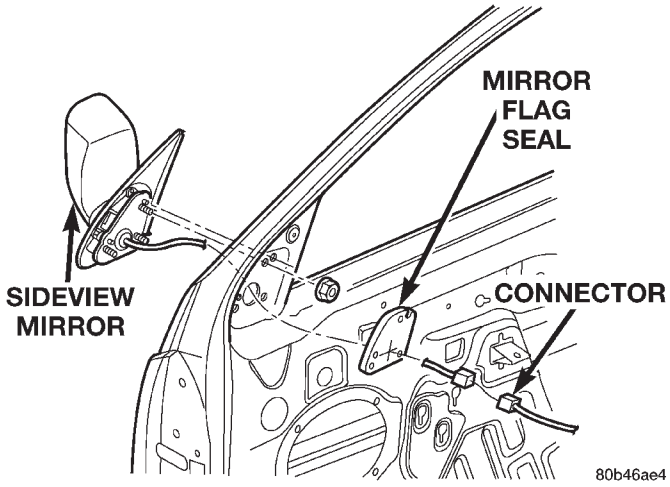

Fig. 2 Power Mirror Remove/Install

(2) Install and tighten the three nuts that secure the power mirror mounting studs to the door flag. Tighten the nuts to 7.4 N·m (65 in. lbs.).

(3) Install the mirror flag seal onto the inner door panel.

(4) Reconnect the power mirror wire harness connector to the door wire harness connector.

(5) Install the trim panel onto the front door. Refer to **Front Door Trim Panel** in the Removal and Installation section of Group 23 - Body for the procedures.

(6) Reconnect the battery negative cable.

INSIDE POWER MIRRORS

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DESCRIPTION AND OPERATION

AUTOMATIC DAY/NIGHT MIRROR SYSTEM

DESCRIPTION

An automatic day/night mirror system is an available factory-installed option on this model. The automatic dimming inside day/night rear view mirror system is a completely self-contained unit that replaces the standard equipment inside rear view mirror. This system will automatically change the reflectance of the inside rear view mirror to protect the driver from the unwanted headlight glare of trailing vehicles while driving at night. The automatic day/night inside mirror receives ignition switched battery current through a fuse in the junction block, and will only operate when the ignition switch is in the On position.

Vehicles equipped with the automatic day/night mirror system are also available with an optional factory-installed automatic dimming outside rear view mirror for the driver side of the vehicle. Refer to **Automatic Dimming Outside Mirror** in the Description and Operation section of this group for more information on this option.

The automatic day/night mirror sensitivity cannot be repaired or adjusted. If any component of this unit is faulty or damaged, the entire automatic day/night inside rear view mirror unit must be replaced. Refer to **Automatic Day/Night Mirror** in the Component Index of Group 8W - Wiring Diagrams for complete circuit diagrams.

OPERATION

The automatic day/night mirror switch allows the driver a manual control of whether the automatic dimming feature is operational. This switch is a momentary rocker-type switch located on the lower rear-facing surface of the mirror housing. When Auto is selected, a Light-Emitting Diode (LED) on the mirror housing just to the right of the switch illuminates to indicate that automatic day/night mirror is turned on. When Off is selected, the LED is turned off. The mirror also senses the backup lamp circuit, and will automatically disable its self-dimming feature whenever the transmission gear selector is in the Reverse position.

A thin layer of electrochromatic material between two pieces of conductive glass make up the face of the mirror. Two photocell sensors are used to monitor light levels and adjust the reflectance of the mirror. The ambient photocell sensor faces forward, to detect the outside light levels. The headlamp sensor is located on the mirror housing just to the left of the switch and facing rearward, to detect the light level received at the rear window side of the mirror. When the difference between the two light levels becomes too great (the light level received at the rear of the mirror is much higher than that at the front of the mirror), the mirror begins to darken.

On models with an optional driver side automatic dimming outside mirror, the signal to control the dimming of that mirror is generated by the automatic day/night inside rear view mirror circuitry. That signal is then delivered to the driver side outside rear view mirror on a hard wired circuit.

See the owner's manual in the vehicle glove box for more information on the features, use and operation of the automatic day/night mirror system.

AUTOMATIC DIMMING OUTSIDE MIRROR

DESCRIPTION

An automatic dimming outside rear view mirror is an available factory-installed option for the driver side of the vehicle, if the vehicle is also equipped with the automatic day/night inside rear view mirror. The automatic dimming outside mirror is completely controlled by the circuitry of the automatic day/night inside rear view mirror. The automatic dimming outside mirror will automatically change the reflectance of the driver side outside rear view mirror to protect the driver from the unwanted headlight glare of trailing vehicles while driving at night. The auto-

DESCRIPTION AND OPERATION (Continued)

matic dimming outside mirror will only operate when the ignition switch is in the On position.

The automatic dimming outside mirror sensitivity cannot be repaired or adjusted. If any component of this unit is faulty or damaged, the entire automatic dimming outside mirror unit must be replaced. Refer to **Power Mirror** in the Outside Power Mirrors section of this group for diagnosis and service of the automatic dimming outside mirror. Refer to **Automatic Day/Night Mirror** in the Component Index of Group 8W - Wiring Diagrams for complete circuit diagrams.

OPERATION

The automatic dimming outside mirror is operated by the same controls and circuitry as the automatic day/night mirror. When the automatic day/night mirror is turned on or off, the automatic dimming outside mirror is likewise turned on or off. Like in the automatic day/night mirror, a thin layer of electrochromatic material between two pieces of conductive glass make up the face of the automatic dimming outside mirror. However, the signal to control the dimming of the outside mirror is generated by the automatic day/night inside rear view mirror circuitry.

See the owner's manual in the vehicle glove box for more information on the features, use and operation of the automatic dimming outside mirror.

DIAGNOSIS AND TESTING

AUTOMATIC DAY/NIGHT MIRROR

For complete circuit diagrams, refer to **Automatic Day/Night Mirror** in the Component Index of Group 8W - Wiring Diagrams.

(1) Check the fused ignition switch output (run/start) fuse in the junction block. If OK, go to Step 2. If not OK, repair the shorted circuit or component as required and replace the faulty fuse.

(2) Turn the ignition switch to the On position. Check for battery voltage at the fused ignition switch output (run/start) fuse in the junction block. If OK, go to Step 3. If not OK, repair the open fused ignition switch output (run/start) circuit to the ignition switch as required.

(3) Disconnect the overhead wire harness connector from the automatic day/night mirror connector receptacle. Check for battery voltage at the fused ignition switch output (run/start) circuit cavity of the overhead wire harness connector for the automatic day/night mirror. If OK, go to Step 4. If not OK, repair the open fused ignition switch output (run/start) circuit to the fuse in the junction block as required.

(4) Turn the ignition switch to the Off position. Check for continuity between the ground circuit cavity of the overhead wire harness connector for the automatic day/night mirror and a good ground. There should be continuity. If OK, go to Step 5. If not OK, repair the open ground circuit to ground as required.

(5) Turn the ignition switch to the On position. Set the parking brake. Place the transmission gear selector lever in the Reverse position. Check for battery voltage at the backup lamp switch output circuit cavity of the overhead wire harness connector for the automatic day/night mirror. If OK, reconnect the overhead wire harness connector to the automatic day/night mirror connector receptacle and go to Step 6. If not OK, repair the open backup lamp switch output circuit as required.

(6) Place the transmission gear selector lever in the Neutral position. Place the automatic day/night mirror switch in the Auto (LED next to the switch is lighted) position (Fig. 1). Cover the forward facing ambient photocell sensor to keep out any ambient light.

NOTE: The ambient photocell sensor must be covered completely, so that no light reaches the sensor. Use a finger pressed tightly against the sensor, or cover the sensor completely with electrical tape.

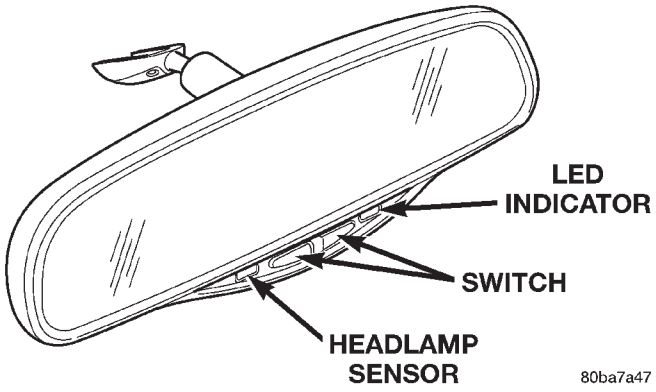

Fig. 1 Automatic Day/Night Mirror

(7) Shine a light into the rearward facing headlamp photocell sensor. The automatic day/night mirror should darken. If OK, go to Step 8. If not OK, replace the faulty automatic day/night mirror unit.

(8) With the mirror darkened, place the transmission gear selector lever in the Reverse position. The automatic day/night mirror should return to its normal reflectance. If not OK, replace the faulty automatic day/night mirror unit.

REMOVAL AND INSTALLATION

AUTOMATIC DAY/NIGHT MIRROR

REMOVAL

(1) Disconnect and isolate the battery negative cable.

(2) Disconnect the overhead wire harness connector from the automatic day/night mirror connector receptacle (Fig. 2).

(3) Remove the screw that secures the automatic day/night mirror to the support button on the windshield.

(4) Slide the automatic day/night mirror mounting base upwards far enough to clear the support button on the windshield.

(5) Remove the automatic day/night mirror from the support button on the windshield.

INSTALLATION

(1) Position the automatic day/night mirror above the support button on the windshield.

(2) Slide the automatic day/night mirror mounting base downwards over the support button on the windshield.

(3) Install and tighten the screw that secures the automatic day/night mirror to the support button on the windshield. Tighten the screw to 1.7 N·m (15 in. lbs.).

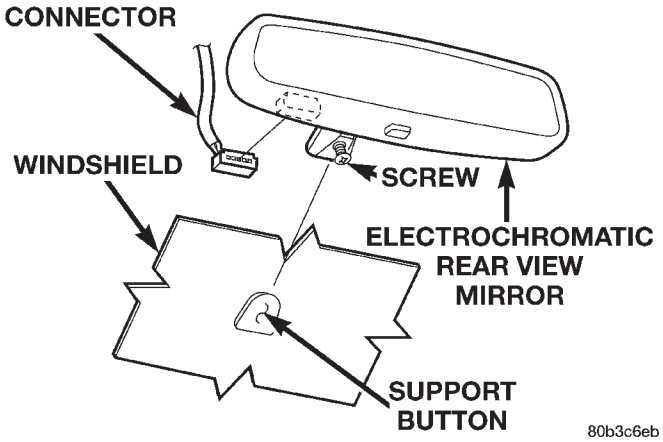

Fig. 2 Automatic Day/Night Mirror Remove/Install

(4) Reconnect the overhead wire harness connector to the automatic day/night mirror connector receptacle.

(5) Reconnect the battery negative cable.