

POWER WINDOWS

TABLE OF CONTENTS

	page		page
POWER WINDOWS		WINDOW SWITCH	
DESCRIPTION	20	DIAGNOSIS AND TESTING - WINDOW	
OPERATION	20	SWITCH	21
DIAGNOSIS AND TESTING - POWER		REMOVAL	21
WINDOWS	20	INSTALLATION	22
WINDOW MOTOR			
REMOVAL	21		

POWER WINDOWS

DESCRIPTION

The power window system allows each of the door windows to be raised and lowered electrically by actuating a switch on each door panel. A master switch on the drivers door allows the driver to raise or lower each of the passenger door windows and to lock out the individual switches on the passenger doors from operation. The power window system receives battery feed through a fuse in the Integrated Power Module (IPM) and a circuit breaker located in the instrument panel wiring harness near the park brake pedal, only when the ignition switch is in the RUN or ACCESSORY position.

OPERATION

WINDOW SWITCH

The power window switches control the battery and ground feeds to the power window motors. The passenger door power window switches receive their battery and ground feeds through the circuitry of the drivers window switch. When the power window lock-out switch is in the Lock position, the battery feed for the passenger door window switches is interrupted.

WINDOW MOTOR

Window motors use permanent type magnets. The B+ and ground applied at the motor terminal pins will cause the motor to rotate in one direction. Reversing current through the motor terminals will cause the motor to rotate in the opposite direction.

DIAGNOSIS AND TESTING - POWER WINDOWS

WIRING VOLTAGE TEST

The following wiring test determines whether or not voltage is continuous through the body harness to the front switch.

(1) Remove the Driver Door Module (Refer to 8 - ELECTRICAL/POWER LOCKS/DOOR MODULE - REMOVAL).

(2) Disconnect wire connector from back of power window switch.

(3) Switch ignition to the ON position.

(4) Connect the clip end of a 12 volt test light to Pin 14 of the window switch harness connector. Touch the test light probe to Pin 10.

- If the test light illuminates, the wiring circuit between the battery and switch is OK.

- If the lamp does not illuminate, first check the fuse in the Integrated Power Module (IPM). Check the circuit breaker located near the park brake pedal. If fuse and circuit breaker are OK, then check for a broken wire.

Refer to the appropriate wiring information.

POWER WINDOW MOTOR TEST

If the power window motor is receiving proper current and ground and does not operate, proceed with motor test.

(1) Remove front door trim panel as necessary to gain access to power window motor wire connector (Refer to 23 - BODY/DOOR - FRONT/TRIM PANEL - REMOVAL).

(2) Disconnect power window motor wire connector from door harness.

(3) Using two jumper wires, connect one to a battery (+) source and the other to a good ground (-).

(4) Connect the Negative (-) jumper probe to one of the motor connector terminals.

POWER WINDOWS (Continued)

(5) Momentarily touch the Positive (+) jumper probe to the other motor connector terminal.

When positive probe is connected the motor should rotate in one direction to either move window up or down. If window is all the way up or down the motor will grunt and the inner door panel will flex when actuated in that one direction.

(6) Reverse jumper probes at the motor connector terminals and window should now move in opposite direction. If window does not move or grunt, replace the motor.

If window moved completely up or down, reverse the jumper probes and cycle window to the opposite position to verify full operation.

If motor grunts and does not move, verify that regulator is not binding.

WINDOW MOTOR

REMOVAL

The window motor is serviced with the window regulator (Refer to 23 - BODY/DOOR - FRONT/WINDOW REGULATOR - REMOVAL) or (Refer to 23 - BODY/DOORS - REAR/WINDOW REGULATOR - REMOVAL).

WINDOW SWITCH

DIAGNOSIS AND TESTING - WINDOW SWITCH

The Light-Emitting Diode (LED) illumination lamps for all of the power window and lock switch and bezel unit switch paddles receive battery current through the power window circuit breaker in the junction block. If all of the LEDs are inoperative in both the power window and lock switch units and the power windows are inoperative, (Refer to 8 - ELECTRICAL/POWER WINDOWS - DIAGNOSIS AND TESTING). If the power windows operate, but any or all of the LEDs are inoperative, the power window and lock switch units with the inoperative LED(s) is faulty and must be replaced. For complete circuit diagrams, refer to the appropriate wiring information.

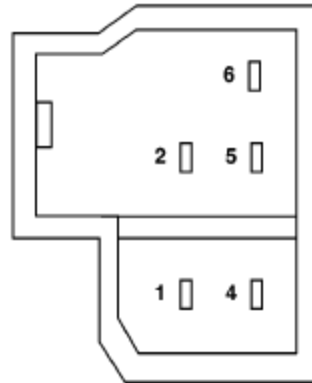
(1) Check the fuse in the Integrated Power Module (IPM) and the circuit breaker located near the park brake pedal. If OK, go to Step 2. If not OK, replace the faulty fuse or circuit breaker.

(2) Turn the ignition switch to the On position. Check for battery voltage at the fuse in the Integrated Power Module (IPM). If OK, turn the ignition switch to the Off position and go to Step 3. If not OK, check circuit breaker and repair the circuit to the ignition switch as required.

(3) Disconnect and isolate the battery negative cable. Remove the power window switch unit from

the door trim panel (passenger doors). The drivers door switch is included with the Driver Door Module (Refer to 8 - ELECTRICAL/POWER LOCKS/DOOR MODULE - DIAGNOSIS AND TESTING) for service procedures. Unplug the wire harness connector from the switch unit.

(4) Test the power window switch continuity. See the Power Window Switch Continuity charts to determine if the continuity is correct in the Off, Up and Down switch positions (Fig. 1). If OK, (Refer to 8 - ELECTRICAL/POWER WINDOWS - DIAGNOSIS AND TESTING). If not OK, replace the faulty switch.



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**Fig. 1 PASSENGER DOOR SWITCH
POWER WINDOW SWITCH CONTINUITY
CHART**

SWITCH POSITION	CONTINUITY BETWEEN
NEUTRAL	PIN 2 AND 5, PIN 4 AND 1
UP (FRONT PASSENGER)	PIN 6 AND 5
UP (REAR PASSENGER)	PIN 6 AND 1
DOWN (FRONT PASSENGER)	PIN 6 AND 1
DOWN (REAR PASSENGER)	PIN 6 AND 5

REMOVAL

FRONT PASSENGER

(1) Disconnect and isolate the battery negative cable.

(2) Remove the door trim panel (Refer to 23 - BODY/DOOR - FRONT/TRIM PANEL - REMOVAL).

(3) Remove the switch from the trim panel bezel.

WINDOW SWITCH (Continued)**REAR PASSENGER**

- (1) Disconnect and isolate the battery negative cable.
- (2) Remove the door trim panel (Refer to 23 - BODY/DOORS - REAR/TRIM PANEL - REMOVAL).
- (3) Gently pry switch from door trim panel.

INSTALLATION**FRONT PASSENGER**

- (1) Insert switch to trim panel bezel.

- (2) Install door trim panel (Refer to 23 - BODY/DOOR - FRONT/TRIM PANEL - INSTALLATION).
- (3) Connect battery negative cable.

REAR PASSENGER

- (1) Install switch to door trim panel
- (2) Install door trim panel (Refer to 23 - BODY/DOORS - REAR/TRIM PANEL - INSTALLATION).
- (3) Connect battery negative cable.

DRIVER DOOR MODULE

DESCRIPTION

A Driver Door Module (DDM) is used on all models equipped with power locks, power windows, and power mirrors. The DDM houses the following switches:

- **Power Lock Switch** - The DDM includes a two-way, momentary, resistor multiplexed switch to control the power lock system.
- **Power Mirror Selector Switch** - A three-position rocker switch in the DDM selects the right or left power mirror for adjustment, or turns the power mirror system Off.
- **Power Mirror Adjustment Switches** - Four momentary, arrowhead shaped, directional switches allow the driver to adjust the selected power mirror in the Up, Down, Right, or Left directions.
- **Power Window Lockout Switch** - A two-way, latching, push-button switch in the DDM allows the vehicle operator to lock out the power window switches on each passenger door so that the passenger door power windows may be operated only from the master switches in the DDM.
- **Power Window Switches** - The DDM houses a two-way, momentary power window switch for the driver side front door. This switch also has a second detent in the Down direction and internal circuitry to provide an Auto-Down feature for the driver side front door power window. In addition to the power window switch for its own door, the DDM houses individual master switches for each passenger door power window.

The DDM also incorporates several green Light-Emitting Diodes (LEDs) that illuminate the power lock and power window switch paddles, and the power mirror switch directional buttons to improve switch visibility in dark ambient lighting conditions. The DDM cannot be adjusted or repaired and, if faulty or damaged, the entire DDM unit must be replaced.

OPERATION

The Driver Door Module (DDM) combines a power lock switch, a driver power window switch with an Auto-down feature, master switches for each passenger door power window, a power window lockout switch, a power mirror selector switch, and four power mirror adjustment switches in a single unit. The switches in the DDM can be diagnosed using conventional diagnostic tools and methods.

Power Lock Switch

The DDM power lock switch circuitry is connected in series between ground and the driver door switch mux input of the instrument cluster. Each power lock

switch position (Lock, Unlock, and Neutral) provides a different resistance value to the instrument cluster input, which allows the instrument cluster to sense the switch position. Based upon the power lock switch input, the instrument cluster controls the battery and ground feed outputs to the individual power lock motors to lock or unlock the door latches. The Light-Emitting Diode (LED) in the DDM power lock switch is connected to battery current through the power window circuit breaker in the Integrated Power Module (IPM) on a fused ignition switch output (run-acc) circuit so that the switch will be illuminated whenever the ignition switch is in the On or Accessory positions.

Power Window Switches

The DDM power window switch circuitry is connected to battery current through a circuit breaker in the Integrated Power Module (IPM) on a fused ignition switch output (run-acc) circuit so that the power windows will operate whenever the ignition switch is in the On or Accessory positions. Each two-way, momentary master passenger power window switch in the DDM provides battery current and ground to the individual power window switches on each passenger door so that the power window switch controls the battery current and ground feeds to its respective power window motor. The DDM switch for the driver side front door power window is labeled "Auto" and includes an auto-down feature. When this switch is depressed to a second momentary detent position and released, the driver door power window is automatically operated through an internal circuit and relay to its fully lowered position. The Auto-down event is cancelled if the switch paddle is depressed a second time in either the Up or Down direction. When the two position window lockout switch in the DDM is depressed and latched in the lockout position, the battery current feed to each of the individual passenger power window switches is interrupted so that the passenger door power windows can only be operated from the master switches in the DDM. The window lockout switch also controls the battery current feed for the LED in each passenger power window switch so that the switch will not be illuminated when it is locked out.

Power Mirror Switches

The DDM power mirror switch circuitry is connected to battery current through a fuse in the IPM on a fused B(+) circuit so that the power mirrors remain operational regardless of the ignition switch position. A rocker type selector switch has three positions, one to select the right mirror, one to select the left mirror, and a neutral Off position. After the right or left mirror is selected, one of four directional but-

DRIVER DOOR MODULE (Continued)

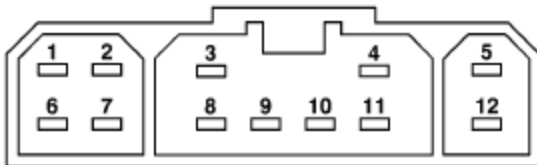
tons is depressed to move the selected mirror Up, Down, Right or Left. The DDM power mirror switch circuitry controls the battery current and ground feeds to each of the four (two in each mirror head) power mirror motors. The Light-Emitting Diode (LED) in the DDM power mirror switch is connected to battery current through the power window circuit breaker in the IPM on a fused ignition switch output (run-acc) circuit so that the switch directional buttons will be illuminated whenever the ignition switch is in the On or Accessory positions.

DIAGNOSIS AND TESTING - DRIVER DOOR MODULE

The Light-Emitting Diode (LED) illumination lamps for all of the Driver Door Module (DDM) power window, power lock, and power mirror switches receive battery current through the power window circuit breaker in the Integrated Power Module (IPM). If all of the LEDs are inoperative in the DDM, be certain to diagnose the power window system before replacing the switch unit. (Refer to 8 - ELECTRICAL/POWER WINDOWS - DIAGNOSIS AND TESTING). If only one LED in the DDM is inoperative, replace the faulty DDM. If the driver side front door power window operates in a normal manner, but the Auto-Down feature is inoperative, replace the faulty DDM. Refer to the appropriate wiring information.

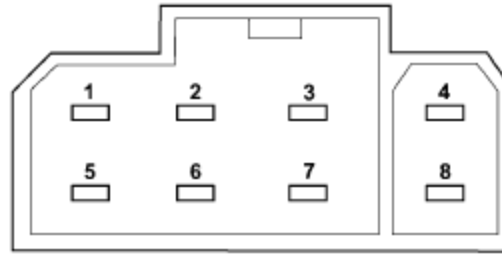
(1) Disconnect and isolate the battery negative cable. Remove the DDM from the door trim panel. Disconnect the door wire harness connectors for the DDM from the DDM connector receptacles.

(2) Test the DDM switch continuity. See the Driver Door Module Switch Tests chart to determine if the continuity is correct for the suspect switches in each switch position (Fig. 2) and/or (Fig. 3). If not OK, replace the faulty DDM as required.



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Fig. 2 Driver Door Module Connector C1 Receptacle



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Fig. 3 Driver Door Module Connector C2 Receptacle

DRIVER DOOR MODULE SWITCH TESTS	
POWER LOCK SWITCH	
SWITCH POSITION	RESISTANCE BETWEEN CONNECTOR C-1 PINS 7 & 11
NEUTRAL	10 KILOHMS \pm 1%
LOCK	820 OHMS \pm 5%
UNLOCK	330 OHMS \pm 5%
POWER MIRROR SWITCH	
SWITCH POSITION	CONTINUITY BETWEEN PINS OF CONNECTOR C-2
LEFT MIRROR SELECTED	
UP	PINS 1 & 3
DOWN	PINS 2 & 3
RIGHT	PINS 2 & 3
LEFT	PINS 3 & 6
RIGHT MIRROR SELECTED	
UP	PINS 3 & 7
DOWN	PINS 2 & 3
RIGHT	PINS 2 & 3
LEFT	PINS 3 & 4
POWER WINDOW SWITCH	
SWITCH POSITION	CONTINUITY BETWEEN PINS OF CONNECTOR C-1
NEUTRAL	PINS 1 & 8, PINS 2 & 8, PINS 3 & 8, PINS 4 & 8, PINS 5 & 8, PINS 6 & 8, PINS 8 & 10, PINS 8 & 12
LEFT FRONT UP	PINS 5 & 9

DRIVER DOOR MODULE (Continued)

DRIVER DOOR MODULE SWITCH TESTS	
LEFT FRONT DOWN	PINS 9 & 12
RIGHT FRONT UP	PINS 3 & 9
RIGHT FRONT DOWN	PINS 6 & 9
LEFT REAR UP	PINS 4 & 9
LEFT REAR DOWN	PINS 9 & 10
RIGHT REAR UP	PINS 2 & 9
RIGHT REAR DOWN	PINS 1 & 9
POWER WINDOW LOCKOUT SWITCH	
SWITCH POSITION	CONTINUITY BETWEEN
OFF (SWITCH BUTTON RAISED - NOT DEPRESSED)	PIN 9 OF CONNECTOR C-1 & PIN 8 OF CONNECTOR C-2

REMOVAL

- (1) Disconnect and isolate the battery negative cable.
- (2) Remove the door trim panel (Refer to 23 - BODY/DOOR - FRONT/TRIM PANEL - REMOVAL).
- (3) Remove the driver door module from the trim panel bezel.

INSTALLATION

- (1) Install driver door module to trim panel bezel.
- (2) Install door trim panel (Refer to 23 - BODY/DOOR - FRONT/TRIM PANEL - INSTALLATION).
- (3) Connect battery negative cable.

REMOTE KEYLESS ENTRY MODULE**DESCRIPTION**

When an RKE lock message is sent to the instrument cluster, the instrument cluster actuates the door locks, the interior lighting is turned off, the horn chirps (if this feature is enabled), the park lamps flash (if this feature is enabled) and, if the vehicle is so equipped, the Vehicle Theft Security System (VTSS) is armed. When an RKE unlock message is sent to the instrument cluster, the instrument cluster actuates the driver side front door (or all doors if this feature is enabled) unlock, the interior lighting is turned on and, if the vehicle is so equipped, the VTSS is disarmed.

When an RKE panic message is sent to the instrument cluster, the instrument cluster actuates the driver side front door (or all doors if this feature is enabled) unlock, the interior lighting is turned on and, if the vehicle is so equipped, the VTSS is disarmed. The panic message will also cause the exterior lamps (including the headlights) to flash, and

the horn to sound for about three minutes, or until a second panic message is sent to the instrument cluster. A vehicle speed of about 25.7 kilometers-per-hour (15 miles-per-hour) will also cancel the panic event.

Refer to the owner's manual for more information on the features, use and operation of the RKE system.

OPERATION

Whenever the vehicle battery power is interrupted, the Remote Keyless Module (RKE) Module will retain all vehicle access codes in its memory. When replacing or adding a key fob transmitter (maximum of 4) a DRB III® scan tool is required to program the RKE Module to accept the new Vehicle Access Code if a customer owned transmitter is not available.

If a functioning transmitter is available, (Refer to 8 - ELECTRICAL/POWER LOCKS/KEYLESS ENTRY TRANSMITTER - STANDARD PROCEDURE)

DIAGNOSIS AND TESTING - REMOTE KEYLESS ENTRY MODULE

The most reliable, efficient, and accurate means to diagnose the power lock system requires the use of a DRBIII® scan tool and the proper Diagnostic Procedures manual.

Refer to the appropriate wiring information.

REMOVAL

- (1) Disconnect and isolate the battery negative cable.
- (2) Remove the instrument cluster (Refer to 8 - ELECTRICAL/INSTRUMENT CLUSTER - REMOVAL).
- (3) Remove remote keyless entry module from instrument cluster (Fig. 4).

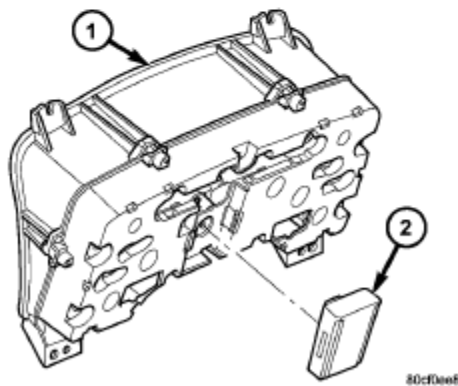


Fig. 4 REMOTE KEYLESS ENTRY MODULE

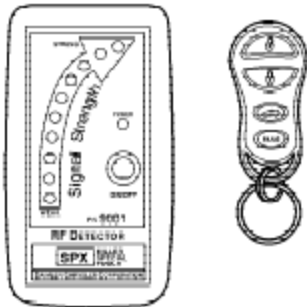
- 1 - INSTRUMENT CLUSTER
- 2 - REMOTE KEYLESS ENTRY MODULE

REMOTE KEYLESS ENTRY MODULE (Continued)**INSTALLATION**

- (1) Install remote keyless entry module to instrument cluster.
- (2) Install instrument cluster (Refer to 8 - ELECTRICAL/INSTRUMENT CLUSTER - INSTALLATION).
- (3) Connect the battery negative cable.

REMOTE KEYLESS ENTRY TRANSMITTER**DIAGNOSIS AND TESTING - REMOTE KEYLESS ENTRY TRANSMITTER**

Using special tool 9001, first test to ensure that the transmitter is functioning. Typical testing distance is 2.5 centimeters (1 inch) for Asian transmitters and 30.5 centimeters (12 inches) for all others. To test, position the transmitter as shown (Fig. 5). Press any transmitter button, then test each button individually. The tool will beep if a radio signal strength that lights five or more LEDs is detected. Repeat this test three times. If transmitter fails any of the test refer to the Diagnostic Procedures manual.



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Fig. 5 TRANSMITTER DIAGNOSIS

STANDARD PROCEDURE**STANDARD PROCEDURE - RKE TRANSMITTER BATTERIES**

NOTE: Do not disturb the metal terminal near the batteries. Avoid touching the new batteries. Skin oils may cause battery deterioration. If batteries are touched, clean with rubbing alcohol.

The Remote Keyless Entry (RKE) transmitter case snaps open and shut for battery access. To replace the RKE transmitter batteries:

- (1) Using a thin coin, gently pry at the notch in the center seam of the RKE transmitter case halves near the key ring until the two halves unsnap. Be careful not to damage the rubber gasket when separating the case halves.
- (2) Lift the back half of the transmitter case off of the RKE transmitter.
- (3) Remove the two batteries from the RKE transmitter.
- (4) Replace the two batteries with new 3V lithium 2016 cell. Install the batteries with the positive terminal up. Reference the "+ SIDE UP" on the inside of the bottom half of the transmitter case.
- (5) Align the two RKE transmitter case halves with each other, and squeeze them firmly and evenly together until they snap back into place. Test transmitter operation.

STANDARD PROCEDURE - RKE TRANSMITTER CUSTOMER PREFERENCES**AUTOMATIC (ROLLING) LOCKS**

The rolling locks feature can be toggled ON/OFF by using the DRB III® only.

HORN CHIRP DISABLING / ENABLING

The horn chirp can be toggled using a DRB III® or by using the Remote Keyless Entry (RKE) transmitter that is already programmed to the vehicle.

To **DISABLE** (cancel) the horn chirp feature:

- (1) Enter the vehicle and close all doors.
- (2) Fasten the seat belt (this will cancel the seat belt chime).
- (3) Turn the ignition to the ON position.
- (4) Press and hold the LOCK button for 4 seconds. Within 6 seconds with the LOCK button still depressed, press the UNLOCK button. When a single chime is heard, release both buttons.
- (5) Turn the ignition OFF.
- (6) Turn the ignition ON or wait 60 seconds.
- (7) Test the horn chirp feature by pressing the LOCK button.

If a chime is not heard, program mode was canceled before the feature could be disabled. If necessary, repeat the procedure.

To **ENABLE** the horn chirp feature, repeat the above procedure.

OPTICAL CHIRP (FLASH) DISABLING / ENABLING

The optical chirp can be toggled using a DRB III® or by using the Remote Keyless Entry (RKE) transmitter that is already programmed to the vehicle.