

GENERAL MOTORS

MODEL IDENTIFICATION

References will be made in the following text to certain body types. The table below will identify these body types by GM division and car name. Only cars with power windows available are listed.

GM Division	Body Type	Car Name
Buick	A	Century, Regal
Chevrolet	A	Chevelle, Monte Carlo
Oldsmobile	A	Cutlass
Pontiac	A	Grand Am, Grand Prix
	A	LeMans
Buick	B	Estate Wagon, LeSabre
Chevrolet	B	Biscayne, Bel Air Impala, Caprice
Oldsmobile	B	Delta
Pontiac	B	Catalina, Bonneville
	B	Grand Ville
Buick	C	Electra, Limited
Cadillac	C	Fleetwood, Calais
	C	DeVille
Oldsmobile	C	Ninety Eight
Buick	E	Riviera
Cadillac	E	Eldorado
Oldsmobile	E	Toronado
Chevrolet	F	Camaro
Pontiac	F	Firebird
Buick	X	Apollo
Chevrolet	X	Nova
Oldsmobile	X	Omega
Pontiac	X	Ventura

DESCRIPTION

DOOR & QUARTER WINDOWS

Window regulators are individually powered by a reversible electric motor located in each door. The motor which is secured to the regulator assembly, contains an internal circuit breaker and a self-locking gear drive. Two way switches, located on each door, with a master control switch located on left door, control window operation.

CIRCUIT BREAKER

Circuitry and wiring for power equipment is protected by a 40 Amp circuit breaker of the plug in type. It is mounted on the fuse panel for all GM divisions.

CONTROL SWITCHES

In addition to individual control switches adjacent to individual windows, a master control switch is mounted either in the arm rest or on the trim pad. Master switch is a four button switch for front and rear windows.

BLOCKOUT SWITCH (CADILLAC ONLY)

A two position switch is installed on left front door armrest. Switch should be left in "NORMAL" position to permit normal operation from all switch positions. In "LOCK" position, the windows will operate only from master control switch.

IGNITION RELAY

All GM divisions except Cadillac use a relay in the window circuit to prevent window operation until ignition is turned on. The feed circuit for Cadillac is through the ignition switch. Relay is located on left shroud side panel for all styles except "F" style which is located on steering column lower support.

ACCESSORY JUNCTION BLOCK

Located on the reinforcement at the left shroud and used to supply current to power operated circuits. Current is supplied to junction block from the circuit breaker. The power window harness plugs into the junction block.

TROUBLE SHOOTING

WINDOWS WILL NOT OPERATE WITH IGNITION ON

Open circuit or short in power feed circuit. Switch defective.

RIGHT REAR WINDOW WILL NOT OPERATE WITH EITHER MASTER OR WINDOW SWITCH BUT LEFT REAR WINDOW OPERATES

Open circuit or short between rear window harness and front window harness. Open circuit or short in right rear window switch or motor circuit. Binding in window channels. Defective window motor.

RIGHT WINDOWS OPERATE WITH MASTER SWITCH BUT WILL NOT OPERATE WITH RIGHT CONTROL SWITCHES, LEFT WINDOWS OPERATE

Open circuit or short in front harness feed circuit.

TESTING

CIRCUIT BREAKER

Check power feed to circuit breaker, with no power available, feed wire is open or shorted. Test breaker output terminal, if power fails, breaker is inoperative.

IGNITION RELAY

Test relay feed ORANGE-BLACK wire for voltage, without voltage available, check wire leading to circuit breaker. Turn ignition "ON" and test relay RED-WHITE wire terminal. If power fails, test relay coil voltage PINK or TAN wire terminal. If power is now available, replace relay. If power fails, check circuit along PINK or TAN wire and check fuse.

MASTER CONTROL SWITCH

Check power feed RED-WHITE wire at switch, if power fails, test wire between relay and master switch. *NOTE — If power fails at master switch on Cadillac models, check blowout switch.*

BLOCKOUT SWITCH (CADILLAC ONLY)

With ignition "ON", test blockout switch using a jumper wire between the RED-WHITE wire and PINK-BLACK wire terminals. Operate control switches, if windows operate with jumper, but not with blockout switch, the switch is defective.

Power Windows

GENERAL MOTORS (Cont.)

WINDOW CONTROL SWITCH

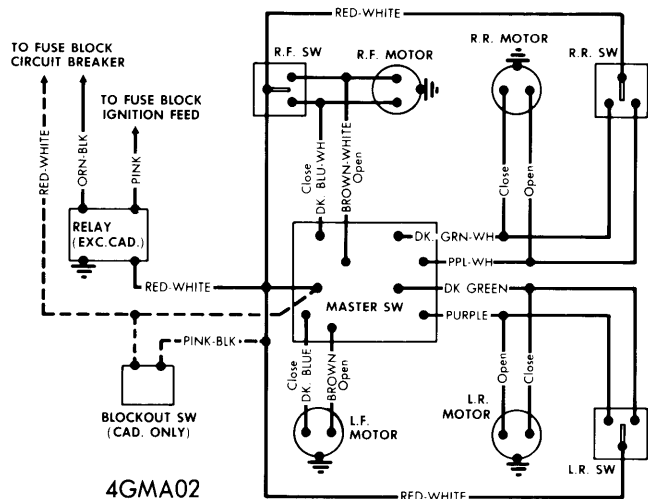
- 1) Connect one lead of test lamp to switch connector feed wire and ground other lamp lead. If lamp does not light, an open or short circuit exists between switch and power source.
- 2) Insert one end of a jumper wire in switch connector and other end of jumper to motor lead in connector. Repeat procedure for motor lead terminal. If motor operates with jumper wire but does not operate with switch, replace switch.

WINDOW SWITCH TO WINDOW MOTOR HARNESS

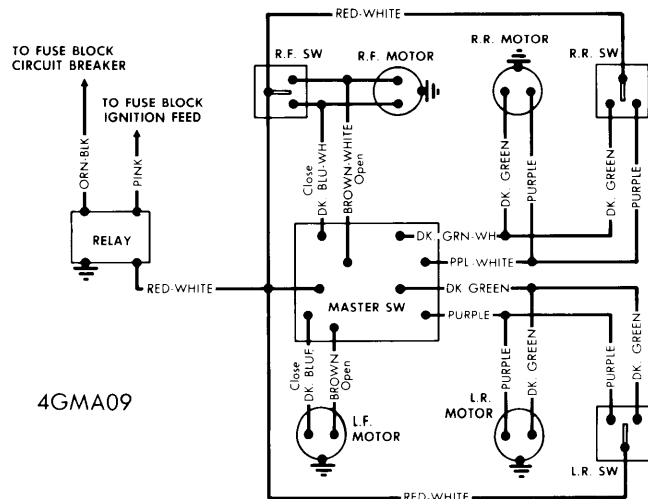
- 1) Disconnect harness connector from motor. Insert one end of a jumper wire in switch connector and other end of jumper to motor lead in connector. Using a test lamp, check for current at motor connector. If lamp does not light, switch to motor harness is shorted or has open circuit. Check other terminal using same procedure.

WINDOW MOTOR

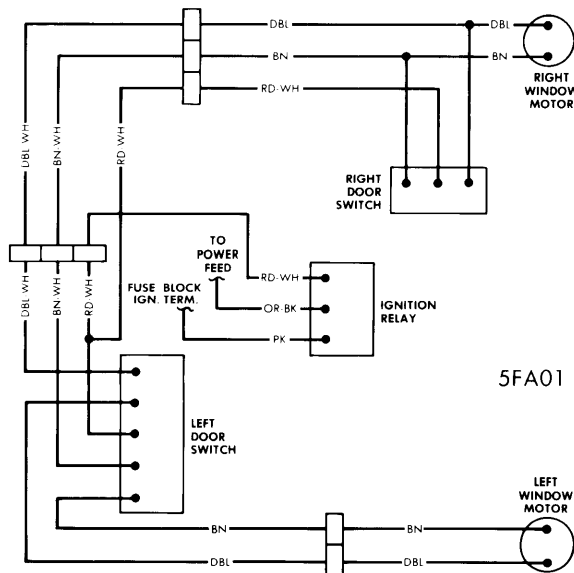
Check power feed wire to motor terminals, if power is available, check motor ground. Inspect window regulator and channels for possible binding. Connect a jumper wire to power source and one of the motor terminals, then connect to the other motor terminal. Motor should operate window up and down, if not, replace motor.



"B", "C" & "E" BODY (EXC. TWO-WINDOW TYPE) POWER WINDOW WIRING DIAGRAM



"A" & "X" BODY POWER WINDOW WIRING DIAGRAM



"F" BODY POWER WINDOW WIRING DIAGRAM ("B", "C" & "E" BODY TWO-WINDOW TYPE SIMILAR)

REMOVAL & INSTALLATION

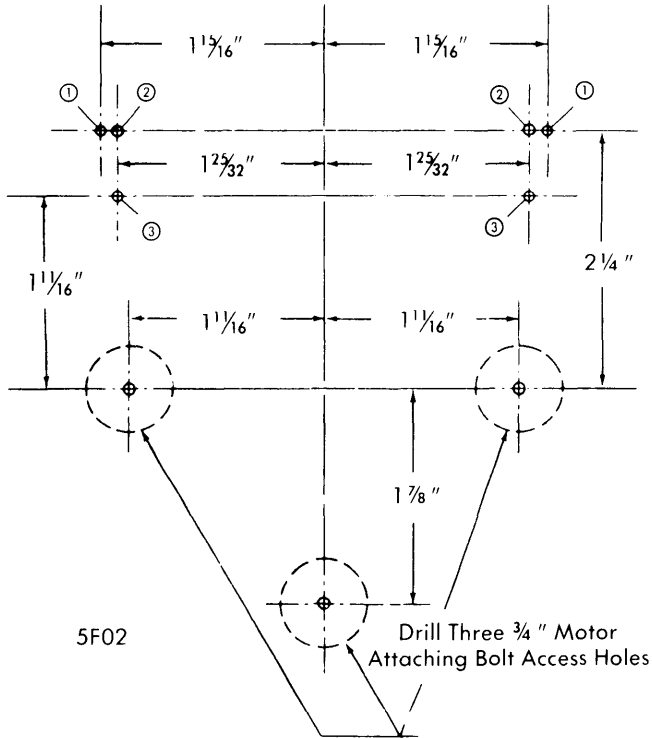
REGULATOR MOTOR (EXC. "A" BODY FRONT DOORS)

NOTE - Following procedures are for removal of regulator motor for door and quarter windows on all models, except for front doors on "A" body models.

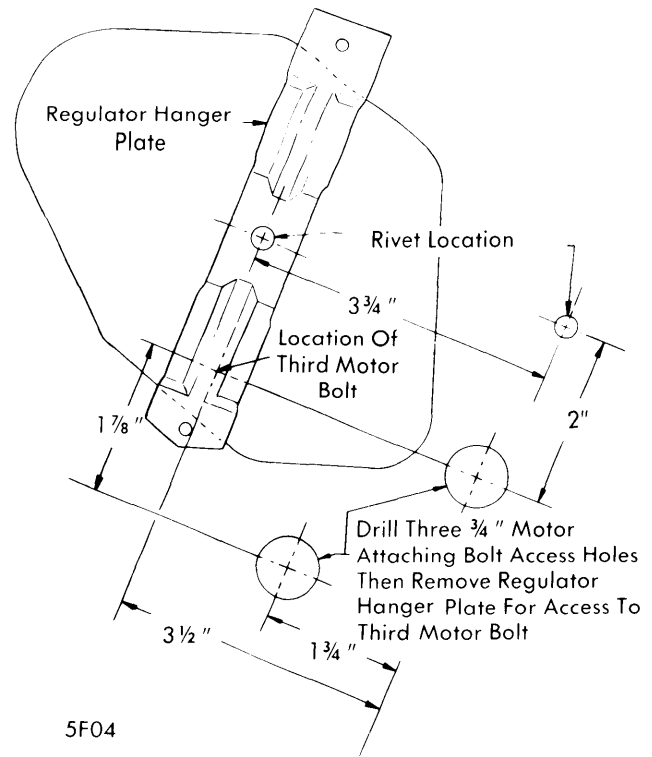
- 1) Remove door trim and watershield. Disconnect harness connector at motor. Refer to template illustrations for appropriate template for locating window motor to regulator attaching bolts. Use window regulator to door inner panel attaching bolts as reference points.
- 2) Align regulator bolt location specified on template with appropriate regulator attaching bolts on door. Secure template in place with tape. Using a center punch, dimple door inner panel at center of each 3/4" holes to be drilled as indicated on template. Using a 3/4" hole saw, drill three 3/4" motor to regulator attaching bolt access holes.
- 3) Remove motor attaching bolts through the 3/4" access holes, and remove motor from panel. *NOTE* - Although window regulator lift arm is under tension of counterbalance spring, weight of window assembly prevents lift arm from moving. If necessary window can be moved manually to clear access holes.

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4) To install, reverse removal procedure noting that after replacing motor and prior to trim installation, waterproof tape must be applied to seal any hole outside of water deflector area.



5F02

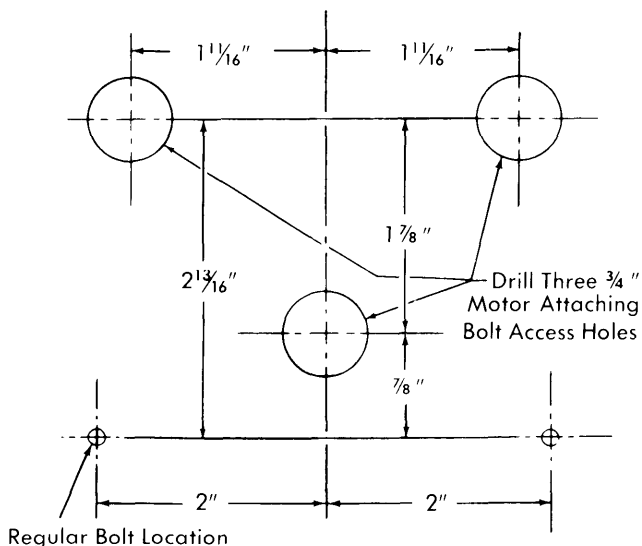


5F04

ALIGNMENT TEMPLATE, "X" BODY (FRONT DOOR)

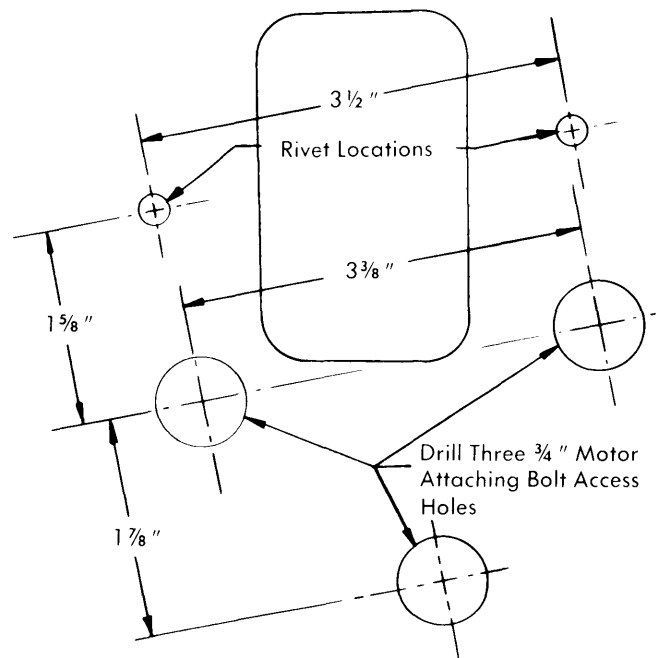
- ① - "B", "C", & "E"-37,47,57 & 67 Style Front Doors.
- ② - "C"-69 Rear Doors.
- ③ - "B"-35,39,45,69 & "C"-49 Front & Rear Doors, "C"-69 Front Doors.

ALIGNMENT TEMPLATE, "B", "C" & "E" BODY



5F03

ALIGNMENT TEMPLATE, "F" BODY



5F05

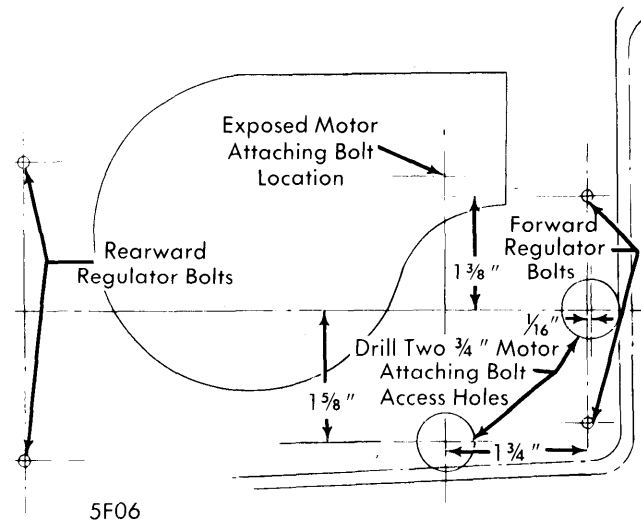
ALIGNMENT TEMPLATE, "X" BODY (REAR DOOR)

GENERAL MOTORS (Cont.)

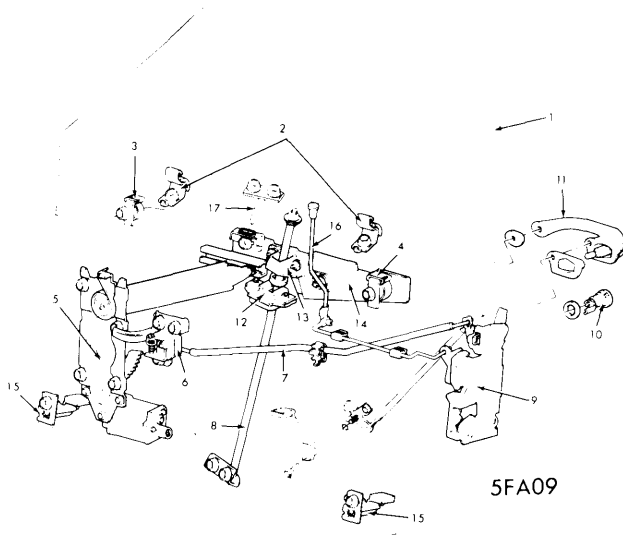
"A" BODY STYLE FRONT DOORS

CAUTION — Regulator lift arms are under tension from counterbalance spring and weight of glass is required to neutralize spring during motor removal. Two motor removal procedures are given for use depending on condition of glass.

Glass Intact & Attached to Regulator — With glass intact, remove motor from regulator as follows: Remove upper and lower door trim assemblies and watershield. Use a $\frac{7}{16}$ " socket to remove motor attaching bolts from outboard side of motor. Lift motor to gain access to wire harness, disconnect harness and remove motor. To install motor, reverse removal procedure. Lubricate motor drive gear and sector teeth with suitable grease (cold weather approved to a minimum of -20°F).



ALIGNMENT TEMPLATE, "A" BODY (REAR DOOR)



- 1 — Window Assembly
- 2 — Belt Trim Support Retainers
- 3 — Upper Front Stop
- 4 — Upper Rear Stop
- 5 — Electric Window Regulator
- 6 — Remote Lock Assy.
- 7 — Remote Lock Assy.
- 8 — Window Guide Tube Assy.
- 9 — Door Lock
- 10 — Door Lock Cylinder
- 11 — Outside Door Handle
- 12 — Guide Assy.
(Lower Sash Lower)
- 13 — Guide Assy.
(Lower Sash Upper)
- 14 — Sash Guide Plate Assy.
- 15 — Window Bumper Support
- 16 — Inside Locking Rod
- 17 — Guide Pin Stabilizer

**"B", "C" & "E" BODY 2 DR. HARDTOP DOOR HARDWARE
OTHERS SIMILAR**

Glass Broken Or Not Attached To Regulator — 1) With glass broken, motor and regulator must be removed as an assembly. See *Front Door Window Regulator Removal & Installation* for "A" body doors.

2) After removing motor and regulator from door, lock sector gear before removing motor from regulator by drilling a $\frac{1}{8}$ " hole through regulator sector gear and back plate. Install a suitable sheet metal screw $\frac{3}{4}$ " in length in drilled hole to lock gear position.

3) Remove motor attaching screws and remove motor from regulator. To install, reverse removal procedure. Lubricate motor drive gear and sector teeth with suitable grease (cold weather approved to minimum of -20°F).

FRONT DOOR WINDOW REGULATOR

NOTE — For body identification see *Model Identification Chart*.

CAUTION — To prevent personal injury after removing regulator and motor assembly, lock sector gear to back plate before removing motor as follows: Drill a $\frac{1}{8}$ " hole through sector gear and back plate. Do not drill closer than $\frac{1}{2}$ " to edge of sector gear. Install a suitable metal screw ($\frac{3}{4}$ " in length) to lock gear, then remove motor.

"A" Body (Closed Style Door) — Remove upper and lower door trim panel and watershield. Prop window in full up position by inserting a rubber door stop between window and door inner panel. Mark location and remove inner panel cam attaching bolts. Remove regulator attaching bolts. Disconnect wire harness at window motor. Slide front regulator upper balance arm off sash cam, then slide rear lift arm forward off sash cam. Slide regulator rearward and remove through lower rear access hole. To install, reverse removal procedure.

GENERAL MOTORS (Cont.)

"A" Body (Hardtop Style Door)—Remove upper and lower door trim panel and watershield. Prop window in full up position by inserting a rubber door stop between window and door inner panel. Mark location and remove inner panel cam attaching bolts. Mark location and remove rear guide upper and lower attaching bolts, and remove guide. Mark location and remove down travel stop, and front window glass stabilizer plate. Disconnect wire harness at motor. Remove regulator bolts and front lower sash channel cam-to-glass attaching nut. Slide regulator forward until front upper balance arm roller is out of sash channel cam. Lift regulator to clear roller on glass and slide rear lift arm rearward until it disengages from rear of sash channel cam. Remove regulator through rear access hole. To install, reverse removal procedure.

"B", "C", "E" Body (Two Door Hardtop & Convertible Styles) — 1) Remove door trim panel and watershield. Remove inside locking rod as follows: Slide front locking rod-to-door inner panel plastic retainer toward rear of door. Disengage rod from lock, and lower locking rod through beltline to remove.

2) Lower window to half down position and remove regulator attaching bolts. Disengage regulator lift arm roller from lower sash channel cam and prop window in full up position. Rotate regulator assembly clockwise so that motor portion of regulator comes out access hole first. To install, reverse removal procedure.

"B" & "C" Body (Four Door Styles) — Remove upper and lower portion of door trim panel and watershield. Remove front and rear window up-travel stops. Loosen front and rear window stabilizer strips. With window in $\frac{3}{4}$ down position, remove lower sash channel cam-to-glass attaching nuts. Remove window by lifting straight up and aligning rollers with notches provided in inner door panel. Remove rear end of window first, then front end. Disconnect wire harness connector at regulator motor. Remove regulator attaching bolts, and regulator. To install, reverse removal procedure.

"F" Body Door — Remove door trim assembly and watershield. Mark location and remove front and rear window up-travel stops. Loosen front and rear window stabilizer strips. With window in $\frac{3}{4}$ down position, remove lower sash channel cam-to-glass attaching nuts. Remove window by lifting straight up and aligning rollers with notches provided in door inner panel. Disconnect wire harness connector at regulator motor. Remove regulator attaching bolts and remove regulator. To install, reverse removal procedure.

"X" Body — 1) Remove door trim panel and watershield. Prop window in full up position and hold in place with cloth backed tape applied over door frame. Mark location and remove inner panel cam attaching bolts.

2) Disconnect electrical connection at window motor. Using a center punch, drive out rivet center pin. Using a $\frac{1}{4}$ " drill, drill out all regulator retaining rivets. Remove regulator.

3) To install regulator, reverse removal procedure noting the following: Attach regulator to inner panel using a suitable screw (Part No. 9642853). If regulator is not equipped with a cinch nut in back plate, install a suitable "J" nut (Part No. 1494257) over attaching hole in back plate.

REAR DOOR WINDOW REGULATOR

NOTE — For body identification see Model Identification chart.

CAUTION — To prevent personal injury after removing regulator and motor assembly, lock sector gear to back plate before removing motor as follows: Drill a $\frac{1}{8}$ " hole through sector gear and back plate. Do not drill closer than $\frac{1}{2}$ " to edge of sector gear. Install a suitable metal screw ($\frac{3}{4}$ " in length) to lock gear, then remove motor.

"A" Body (Hardtop Door) — Remove upper and lower door trim assembly, and watershield. Loosen belt trim support retainer attachments. Remove front and rear-up travel stops. Remove lower sash guide plate assembly-to-glass attaching stud nuts. Tilt upper edge of glass inboard to disengage glass from guide plate. Remove window by lifting straight up. Remove four regulator attaching bolts. Then disengage regulator lift arm from sash plate guide cam. Remove upper and lower guide tube assembly attaching screws, and remove guide tube and lower sash guide plate assembly from door. Disconnect wire harness and remove regulator from door. To install, reverse removal procedure.

"B" Body (Closed Style Doors) — Remove upper and lower portion of door trim panel and watershield. Lower window to a $\frac{3}{4}$ down position, remove lower sash channel cam-to-glass attaching stud nuts. While supporting glass, disengage cam from rollers on regulator lift balance arms and remove cam. Raise window to full up position and secure with cloth-backed body tape. Remove inner panel cam attaching bolts. Loosen window regulator attaching bolts and remove regulator through access hole. To install, reverse removal procedure.

"B" & "C" Body Hardtop (Exc. Cad. Fleetwood) — 1) Remove upper portion of door trim panel and watershield. Prop window in full up position, remove center guide cam upper and lower attaching bolts. Pull guide downward to disengage from window lower sash guide plate assembly. Remove guide through access hole.

2) Prop glass in full up position by placing rubber door wedge stops between glass and inner panel (at belt) at front and rear of glass. Remove regulator attaching bolts, slide regulator lift arm roller out of lower sash channel cam and remove regulator through large access hole. To install, reverse removal procedure.

"C" Body Cadillac Fleetwood — Remove upper and lower portion of door trim assembly and inner panel watershield. Remove window regulator attaching bolts, disconnect regulator lift arm roller from lower sash channel cam and prop window in full up position. Rotate regulator assembly clockwise so motor portion of regulator assembly comes out first. To install, reverse removal procedure.

"B" Body (Sedan) — 1) Remove door trim panel and watershield. Lower window to within 2" of full down position. Insert rubber wedge door stop between window and inner panel. Remove lower sash channel to cam-to-glass attaching stud nuts. Disengage cam from rollers on regulator lift and balance arms and remove cam.

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2) Prop window in full up position and hold in place with cloth backed tape applied over door frame. Mark location and remove inner cam attaching bolts. If regulator is attached with bolts, remove bolts and rotate regulator 90° to remove through access hole. Disconnect motor electrical connector and remove motor and regulator.

3) If regulator is attached with rivets, drive out rivet center pin with a center punch. Using a 1/4" drill, drill out all regulator retaining rivets. Disconnect motor electrical connector, rotate motor and regulator 90° and remove through access hole.

4) To install regulator, reverse removal procedure noting the following. Attach regulator at inner panel using a suitable screw (Part No. 9419723). If regulator is not equipped with a cinch nut in back plate, install a suitable "J" nut (Part No. 1494257) over attaching hole in back plate.

"X" Body — 1) Remove door trim panel and watershield. Remove locking rod link bolt and disconnect locking rod at lock. Place window at full up position and hold in place with cloth backed tape applied over door frame.

2) Disconnect electrical connection at window motor. Using a center punch, drive out rivet center pin. Using a 1/4" drill, drill out all regulator retaining rivets. Remove regulator.

3) To install regulator, reverse removal procedure noting the following: Attach regulator to inner panel using a suitable screw (Part No. 9419723). If regulator is not equipped with a cinch nut in back plate, install a suitable "J" nut (Part No. 1494257) over attaching hole in back plate.

REAR QUARTER WINDOW REGULATOR

CAUTION — To prevent personal injury after removing regulator and motor assembly, lock sector gear to back plate before removing motor as follows: Drill a 1/8" hole through sector gear and back plate. Do not drill closer than 1/2" to edge of sector gear. Install a suitable metal screw (3/4" in length) to lock gear, then remove motor.

"B" & "E" Body (Convertible & Chevrolet Hardtop

W/Rear Sail Window — 1) Remove rear seat cushion and seat back. Remove quarter trim and watershield. Lower window to half down position. Remove travel stops from inner panel. Remove retaining bolts from upper and lower guide supports. Disengage regulator lift arm from sash channel cam. Remove glass and guide assembly.

2) Disconnect electrical connection at motor. Remove regulator retaining bolts and remove regulator through access hole. To install, reverse removal procedure.

"B" Body (Hardtop W/Rear Sail Window, Exc. Chevrolet)

— 1) Remove upper and lower quarter trim assembly and watershield. Disconnect electrical connection at motor. Remove regulator retaining bolts. Disengage regulator lift arm roller from quarter window lower sash guide plate.

2) Prop window in full up position and hold in position with cloth backed tape. Remove regulator and motor assembly through access hole. To install, reverse removal procedure.