

Fixing Power Windows.

Another toll-booth, another mile—or at least it seems as if the tollbooths come every mile on this road, with a half mile of traffic idling its leisurely way up to the token monster. Within an arm's length of the bin, you toggle the power window switch with one hand while the other hand fingers a token, preparing to whip it into the basket just as you floor the throttle. All goes as planned—except the window doesn't move, the token bounces back into your face, and you have to jam on the brakes, crack the door and pitch a second token backhanded to keep from getting a ticket as a toll evader, all to the tune of horns blaring from the cars behind you.

Fortunately, power windows are usually one of the more reliable systems on a late-model car. And diagnosis and repair are usually pretty straightforward.



Carefully backprobe the window switches to isolate any electrical faults in the switches, connectors or wiring.

What's Up? The most common power window mechanism is pretty basic. There's a simple regulator mechanism, usually similar to the mechanism used on garden-variety hand-cranked windows. It comes in several varieties—rack, sector and cable drive.

Troubleshooting is pretty straightforward, once you get the door panels off—but your problem may be

terribly simple and may not require removing any trim at all.

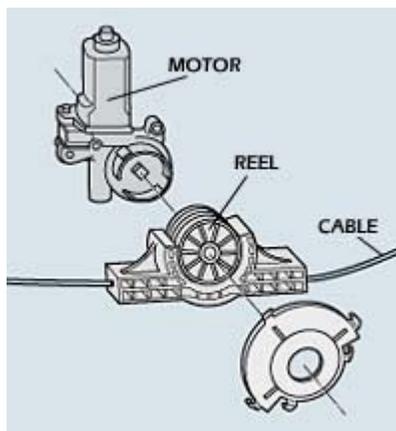
First: Are all of the windows on the fritz? Or just one? If you can't move any of the windows, the first place to look is at the fuse. Window regulators are high-current devices, and the fuse is sized to just barely be able to open all four windows together. Age and a few sticky window channels can pop a fuse. Turn the key to the Run position, but don't start the car.

If the fuse is blown, pushing a window button will do nothing at all: The motor won't groan and the glass won't quiver. If the fuse is good and you can hear the motor, or the glass acts like it wants to move, then

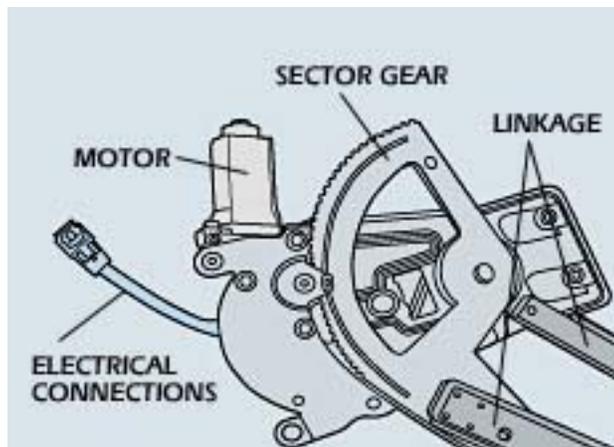
you've got some sort of mechanical problem. If not, check the fuse. If the fuse box isn't labeled, check the owner's manual to see which fuse is the culprit. Don't go yanking fuses willy-nilly looking for a bad one—you might interrupt the power to the engine management computer, causing poor driveability for 30 minutes or so—or you might reset all the buttons on your car radio to that undersea-alien rock-gospel station.

Fuse okay, but the window still won't budge? Again, are all the windows dormant? Or just one? If it's just one, you still may get an opportunity to go spelunking inside the door. If it's all four, maybe it's something simpler you can troubleshoot under the dash.

At this point, if you've narrowed the fault down to some electrical problem that's not as simple as a blown fuse you need to round up a schematic of your car's electrical system and a voltmeter or 12v test light. All that's necessary now is to start at the fuse panel and follow the wiring to the switch, and from there move on to the motor, testing along the way for 12 volts. Somewhere, you'll find a loose or corroded connector interrupting the voltage to the motor. Or, the switch itself might be bad. If the driver's door switch won't open the right rear door, but the switch in the door will, look for either a bad switch in the driver's door or a fault in the intervening wiring.



Reel and cable window regulators are simple mechanisms, but can be fussy about cable routing and may snag if jammed.



Severe misalignment caused by loose fasteners can jam gear-type regulators.

off all of the door pulls and handles. The perimeter of the panel is customarily held on fragile plastic studs intended for one-time use. Pry them up carefully, and you should be able to reuse them.

Once you've got the door panel off, carefully remove the weather sheeting. You'll need to replace this later, and you may need fresh contact cement to do so.

Warning: You now have the ability to put your fingers into places where fingers normally don't go. As our mechanic pal Lefty points out, "A power window motor has enough torque to put a serious hurtin' on ya if it's actuated while errant digits are in the gears."

Open Sesame At this point, you probably need to be able to access the inside of the switch panel. On some vehicles, like the one in our lead illustration, you can simply pry the panel up with your fingers and backprobe the connectors. Other vehicles may require that you remove the panel.

Door panels are held on with a bewildering variety of fasteners. Start by pulling

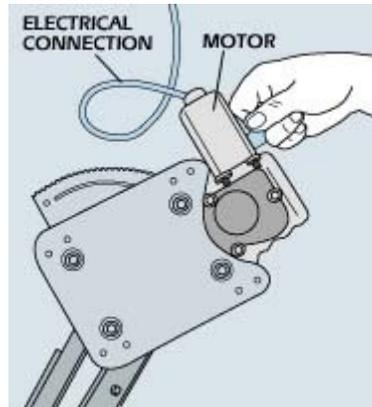
Proof Positive As an absolute proof that the problem is electrical, try running a jumper wire direct from the battery positive terminal to the positive side of the motor to see if it comes alive. Be aware that a few window regulator systems supply 12v constantly, and switch the ground side of the circuit. Check the schematic. Also, most vehicles have the ability to lock—and deactivate—the rear windows. Check this switch if only the rears are balky. Occasionally, the true problem is a duff motor. You'll have to replace it. Otherwise, you can simply trace the wires until you find the problem.

Sticky All windows have gaskets and seals to keep wind noise and rain out. If the window has a slow spot or won't open or close properly, check the gaskets. A gasket that's misplaced or torn can prevent proper operation. If the gasket is loose, or even torn, you may be able to repair it. If the gasket is simply loose, get some 3M Super Weatherstrip Adhesive at the auto parts store. Clean off the old adhesive with lacquer thinner and reglue the gasket into place. Allow this to dry overnight with the window closed, and be certain you're not gluing the window to the gasket.

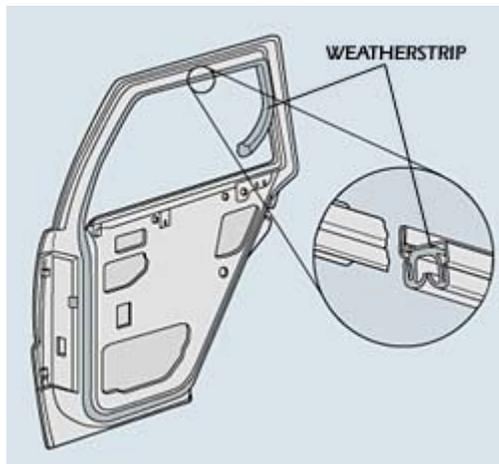
If the gasket is torn, you might be able to use a super glue to simply repair the tear. You may be able to judiciously trim a loose corner of gasket away with a single-edge razor blade. Be particularly careful about doing this on the part of the gasket that sits outside of the glass, because it may admit rain and salt spray to the inside of the door in quantities too large for the door's internal drainage system to cope with.

Replacing a gasket or seal with a new part is generally straightforward. If it's not obvious that the gasket is astray, inspect the entire gasket and channel carefully. Look for damage, but also look for such things as pine sap, fossilized Froot Loops or other foreign objects that might make the window stick or bind. Clean the surface of the gasket and window with lacquer thinner to remove oxidized rubber and scum.

There's a fair amount of friction between the gasket and the window glass. Almost any misalignment can dramatically increase the friction to the point where the motor no longer has



It may be possible to replace a bad motor, or you may need the entire mechanism.



Check the weatherstripping and window channel for torn, loose or folded rubber parts, or foreign objects in the way.

enough torque to move the glass properly.

Lubricate the entire channel with silicone spray or protectant, because the reduced friction just might get your window working again.

It's also possible that the problem is deeper inside the door. If so, you'll need to pull the door panel and go poking around. Remember to pull the fuse to prevent amputating your fingers. You can use either a rubber wedge doorstop or a couple of feet of duct tape to anchor the glass up while you work.

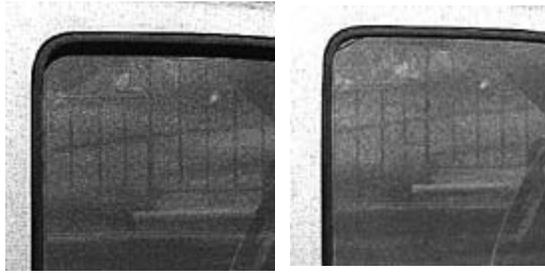
Sometimes the problem is nothing more than a loose bolt allowing the door's inner structure to move

around, misaligning the window track. Many doors have slotted holes for the attachment points for internal parts, so careful consideration of the misalignment will sometimes let you simply slide one adjustment a 1/4 in. or so and straighten it all out. All bets are off if the door has been damaged in a crash. It may take a long time to get everything working right.

Lastly, the mechanism that runs the window up and down may be faulty. Whether it's a gear-and-sector, scissors lift or cable-operated mechanism, you'll need to watch it moving up and down a few times. Again, keep your fingers out of the works. Sometimes the problem will be a loose fastener or rivet, sometimes a broken or missing bushing. Cables can bind on the drum or become sticky. Lube all the friction points with white grease. Don't forget there are gaskets in the window track down below the top of the door, and you may need to reglue, repair or lubricate them.

HOW IT WORKS: Automatic Windows

Some late-model high-end cars have frameless windows that automatically crank themselves open a quarter-inch or so as the doors are opened. It happens so fast that you may not notice it. The window opens rapidly, clearing the seal before the door latch clears. It then



The window magically, instantly cranks down just enough to clear the lip on the seal (left), and rolls itself up again when the door closes.

closes automatically about a second after the door latch latches. There are two advantages to this. First, the slightly open window vents interior air, which can actually make doors on tightly sealed cars hard to open by springing the door back open against air pressure. It also lets the manufacturer use a vastly different style of seal on

the top of the window. The seal can more closely resemble a sedan door seal, with a small lip protruding over the top of the glass. This type of seal won't work on frameless windows because the glass has to clear the seal as it opens and closes. This type of seal allows less water and noise intrusion. The downside is with the logic control module needed to achieve this. Repairs will probably need a factory shop manual and, potentially, some expensive parts.