

# Sunroofs Repair And Adjustment



My first car with a sunroof was a 1961 VW Beetle. The top was a cloth and vinyl affair, powered by my right arm. It folded up like an accordion as you slid it back, and stuck up in the air high enough to whistle seven different tunes at highway speeds. It was so low tech that unless the top got ripped or torn, there was almost nothing to go wrong with it. And unless you pitched both ends of a doubleheader the day before, there was always power to open and close it.

Today we have motor driven, metal or glass sunroofs that slide neatly into the roofline at the touch of a button. Some even have tilt positions that elevate the rear of the sunroof.

If you're familiar with Murphy's Law, maybe you already know where this added complexity is heading. A quick scan through recent Technical Service Bulletins (check this month's **Dealer Direct**) shows that everyone from Acura to Volkswagen has had sunroof problems.

If you put a hole in a car's roof big enough to climb through, any misadjustment of the sunroof is an open invitation for water. Smaller adjustment problems can

cause wind noises, or difficult and noisy operation. Clogged sunroof water drains can give new meaning to the term "drip dry."

## Schnitzel and Sushi

While all sunroofs aren't identical, most have a basic similarity in their design. We're going to take apart two separate sunroofs. Our first patient is a late model BMW 535i. We'll show you the major components of the system, and highlight some test and adjustment procedures.

Our second victim is a 1985 Nissan Maxima. Unlike the BMW, the Maxima's sunroof has no limit switch to stop the motor when the sunroof is fully closed. There are a total of four relays and a circuit breaker in the sunroof circuit, but nothing except the roof of the car to stop the motor once the sunroof reaches the end of the line.

Something has to give, since the gear reduction sunroof motor hates to take "no" for an answer. If the "close" switch is held in the on position, the sunroof

drive cables can get pushed aside by the motor's drive pinion, resulting in a loud grinding noise. The circuit breaker is too shy to step in and break up the fight.

The noise is enough to get most folks to take their finger off the "close" button in a hurry. This usually prevents any serious damage. Not everyone gets the idea though, and they keep their finger on the button too long. We'll take you through the factory recommended procedure for rebuilding the sunroof motor. It will eliminate the grinding noise nearly 100% of the time.

As usual, the customary few words of caution are in order before we begin:

• **Most of the work we'll be doing is inside the car.** If you've just finished a transmission overhaul, take the first layer of grease off yourself or protect the interior in some other way. Grease stains can be especially hard to remove from interior fabrics, and even harder to explain to the customer.

• **Headliner materials and plastic interior trim parts are notoriously fragile.** Take your time disassembling these parts. I know this may sound obvious, but the cost of replacing a torn headliner will quickly erase any profit you might expect to see on the job.

• **To verify the customer's complaint, test the sunroof operation before beginning repairs.** The customer may not understand how to operate his sunroof properly.

• **Water test the repair before returning the car.** A drive-through car wash isn't the place for the customer to find out he still has a leak.

If you're not squeamish about pulling down the headliner, sunroof repair offers an interesting change of pace. A broken sunroof isn't the kind of repair that can be put off for too long. When it breaks, the customer will want it fixed quickly. It might as well be by you.

—By Karl Seyfert and Ralph Birnbaum



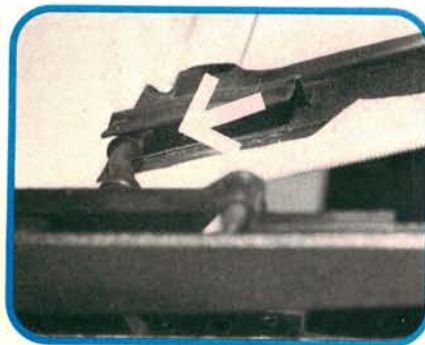
1

If the motor isn't working, the sunroof may be stranded somewhere between open and closed. BMW provides this emergency crank for closing the sun roof when the power goes out. Loosen the locknut with a spark plug socket. Then use the crank key to move the roof up or back so you can work on it.



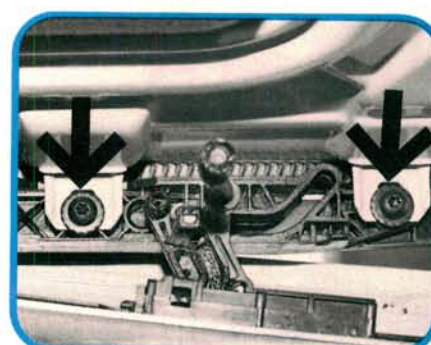
2

The front edge of the inner trim panel is held to the sunroof by metal clips. They snap in place and believe me, they're tight. Open the roof about halfway. Then use a wide-bladed tool to unsnap the clips so you don't tear them out of the trim panel. Slide the trim panel rearward into the roof.



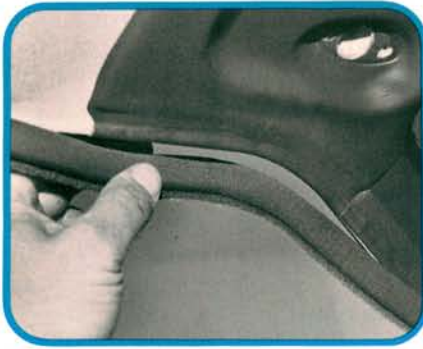
3

The rear of the trim panel is held to the sunroof by metal hooks that slide on two pins. The hooks float on the pins and pull the trim panel upward when the sunroof is in the tilt position. Sliding the trim panel rearward with the front clips removed unhooks the panel from the pins.



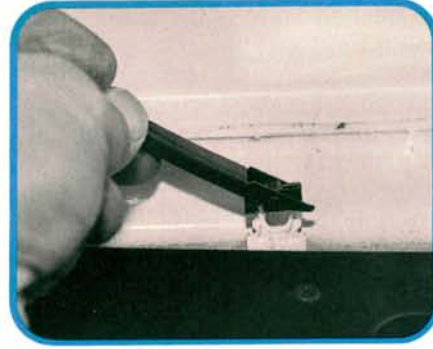
4

Slide the trim panel rearward to expose the six Torx®-headed screws holding the roof to the drive mechanism. The screws sit in elongated slots that allow you to adjust the sunroof height at reassembly. Remove all six screws. Carefully remove the sunroof and lay it aside on a clean, soft cloth.



# 5

Getting to the drive motor is a little bit more complicated. Remove both sunvisors and both sunvisor support mounts from the headliner. Pull back the weatherstrip beading from the top of the A-pillars as shown. This frees the outer edges of the front headliner panel.



# 6

Now go upstairs again. Remove the wind deflector legs by gently prying up on these plastic clips. The clips snap into metal tabs in the rain gutter. Once they're loose, you can pull forward on the wind deflector and remove the screws holding the deflector assembly. Remove the assembly and lay it aside.



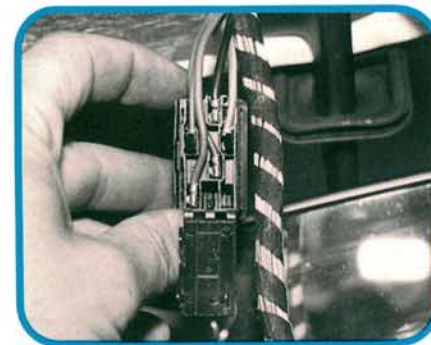
# 7

Pull back the headliner vinyl in the area below the deflector strip. There are two more screws hiding down there, and they're easy to miss. They screw into metal brackets glued to the headliner. If you forget these screws and start pulling on the headliner to remove it, something will break.



# 8

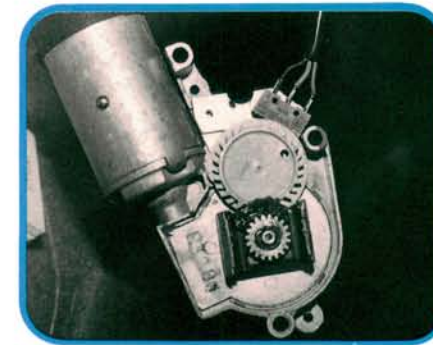
Now you can drop the front headliner trim panel. Your next step depends on the nature of your problem. If the motor isn't working at all, disconnect it. Check for voltage at the black wire with the ignition on and the "close" button pressed. The blue wire is hot when the "open" button is pressed.



# 9

The switch values are also easy to check. Pop back the cover on the harness plug. Here are the values for the wires:

- The green/blue wire is hot with the key on.
- Brown wires are ground.
- The black wire is hot with the switch in the "close" position.
- Blue is hot when you press the "open" button.



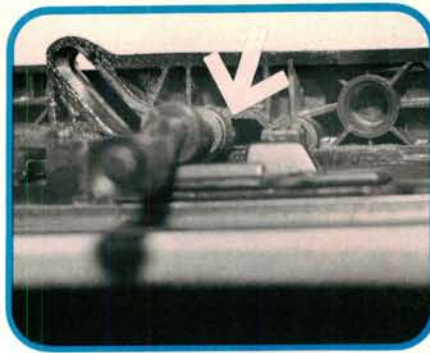
# 10

As we mentioned, the motor is also equipped with a microswitch that stops the motor in three separate positions: sunroof closed, sunroof fully open, and sunroof tilt. If you're replacing the motor, or remove the motor and run it, you'll need to resynchronize the motor stops to the drive cable mechanisms.



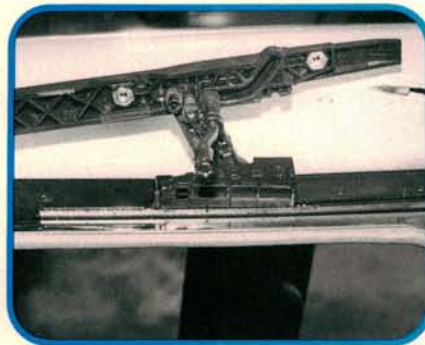
# 11

Another critical adjustment has to do with the drive cables themselves. If you are replacing one or both of the cables, you have to make sure they're installed evenly. If you've ever been on a horse, you know what happens when you pull too hard on only one of the reins. The sunroof will try to turn too.



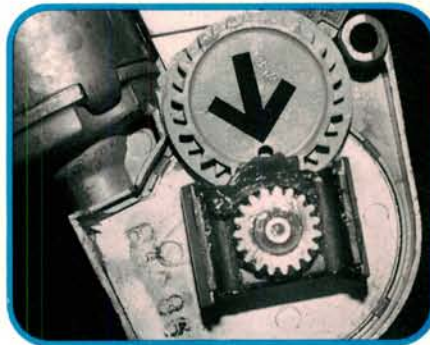
# 12

Here's one way to get everything working together. Run the motor until the drive mechanisms are in the position shown. This is the sunroof-closed position. Both pins should be at the same height. If one is higher than the other, remove the motor and move the cables until they're even.



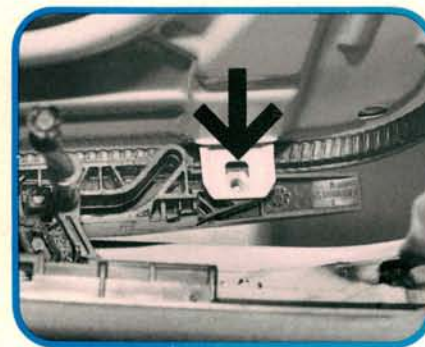
# 13

The slots in the drive mechanism are made so that the sunroof drops down slightly as it opens, or elevates the rear in the tilt position. "Closed" is that midpoint between the two where the mechanism just raises the sunroof flush with the roof. Run it back and forth a couple of times to get the idea.



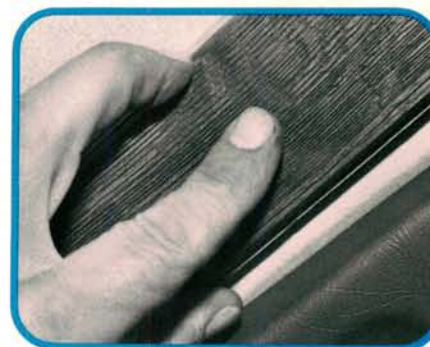
# 14

Run the motor until the microswitch shuts the motor off with the reference hole in the plastic gear next to the drive pinion as shown. Reinstall the motor. You've just synchronized the motor's microswitch with the cables. Run the motor back and forth to see that both drives move smoothly and evenly.



# 15

With the drive mechanism in the closed position, reinstall the sunroof. Remember that the mounting holes in the sunroof allow you to adjust the sunroof height. It's very important that you make this adjustment properly or you'll have wind noise. Put threadlock on the screws.



# 16

Run the sunroof back and forth several times to make sure everything is properly aligned and working smoothly. When you replace the sunroof liner, catch the hooks at the rear first. Then resnap the front of the liner using a piece of wood so your thumb won't leave indentations in the trim panel.

## Nissan Maxima Sunroof Motor Rebuild

Nissan offers a sunroof motor rebuild kit, P/N 73685-01F25, to correct the grinding noise we described in the introduction. For whatever reason, one washer, P/N 73688-01E62, and a motor gasket, P/N 73690-01E60, aren't included with the kit. They're supposed to be replaced as needed.

Unless you want to take the sunroof apart first to see what you're going to need, I'd suggest ordering the washer and gasket at the same time that you order the rebuild kit. For a couple dollars extra, you'll have everything that you need. If the extra parts don't get used on this job, they'll be on hand for the next one.

It's hard to tell if the drive cable and guide assembly have been damaged until after the sunroof motor has been rebuilt. The grinding noise is so annoying that most people either stop using the sunroof or learn to shut it off as soon as it closes. This seems

to prevent the guide assembly and cable from getting badly damaged. Rebuilding the motor with the factory replacement parts kit has fixed every one I've seen.

Part numbers for the cable guide assemblies are 73670-41L10 for sedans and 73671-W3300 for wagons, just in case.

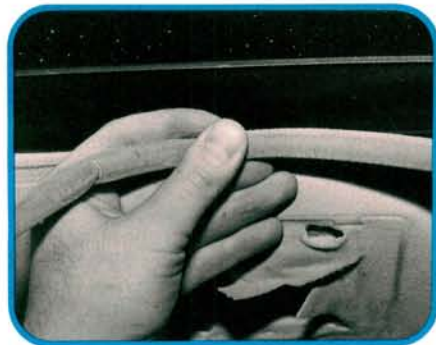
Take the time to go over proper sunroof operating procedures with the customer before returning his car. The "close" button should never be held for more than two or three seconds after the sunroof is fully closed. The same rule applies when the sunroof is fully opened.

Even after rebuilding the sunroof motor, there's still no limit switch to shut off the motor when the sunroof is either fully opened or fully closed. If the customer continues to hold his finger on the sunroof control button after the sunroof has reached the end of its travel, the sunroof motor drive pinion, or drive cables and guides could be damaged all over again.



# 17

Pre-1985 Maximas had a removable plug for hand crank closing the sunroof like the BMW. 1985 and later Maximas still have a crank slot in the motor, but now it's hidden under the map light housing. Remove the two screws holding the housing and drop it down. Remove the sunvisors and rearview mirror.



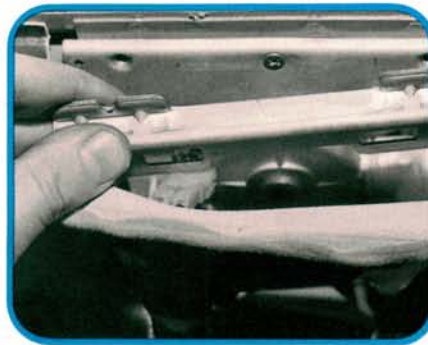
# 18

Don't disconnect the wiring from the sunroof switch just yet. Retract the sunroof about halfway, then remove the welt molding from the edge of the sunroof opening. Start at one side and carefully peel back the adhesive edge of the headliner until the motor is exposed.



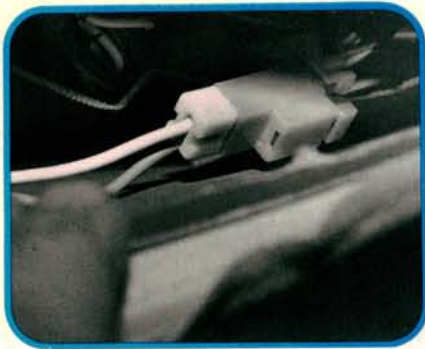
# 19

Remove the molding from the top of the windshield, then pull the headliner loose if you want a little more room. The headliner material is pretty fragile so take it slow to avoid ripping the headliner. Close the sunroof completely, then disconnect the map light and sunroof switch wiring.

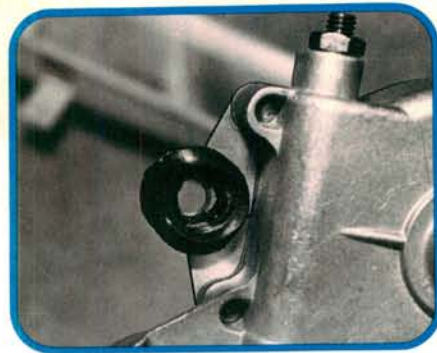


# 20

Remove the two small screws at the rear and two larger screws at the front of the reinforcement surrounding the sunroof motor. You may have to sneak your screwdriver through an opening in the headliner to get to the screws near the windshield. Slide the reinforcement out from under the headliner.



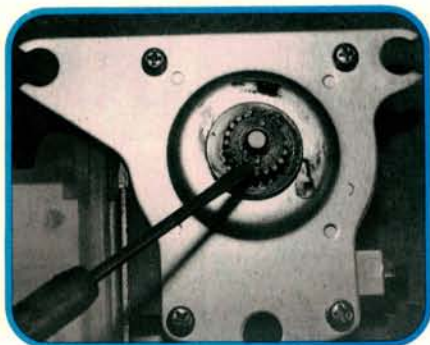
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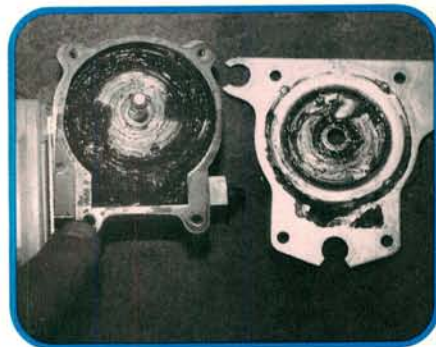
# 22

Peel back the blue plastic cover to the right of the sunroof motor and disconnect the motor wiring. Relays for the sunroof circuit are also located under this cover. Remove the three sunroof motor bolts, then drop the motor out through the opening you made when you lowered the headliner.

The original sunroof motor mounts are rubber insulated. It may be quieter when it's new, but the motor's high torque gradually pulls the rubber mounts out of shape. When the mounts get as bad as this one, the motor pinion jumps out of engagement with the drive cables when the sunroof is operated.



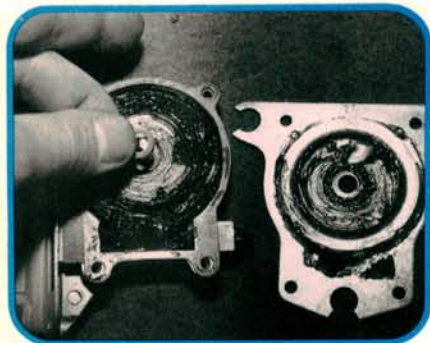
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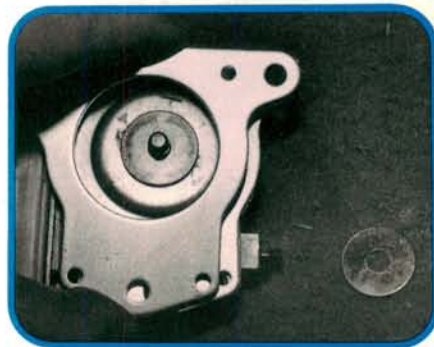
# 24

Remove and discard all three rubber mounts and spacers from the motor mounting plate. Pop the clip off the end of the motor shaft. Remove the drive pinion and washer. Put the washer aside for now. Remove the four mounting plate screws, then remove the mounting plate.

Remove one flat and one wave washer from the motor shaft. This motor gasket (or packing) isn't included in the rebuild kit. Check with your local dealer for parts availability before you tear into the job. I had to special order everything.



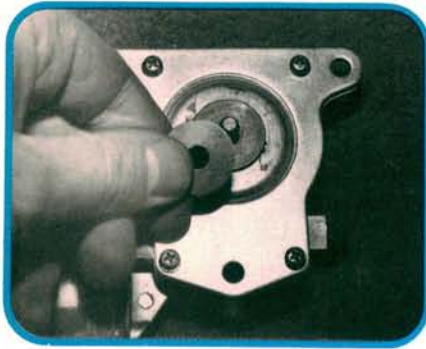
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# 26

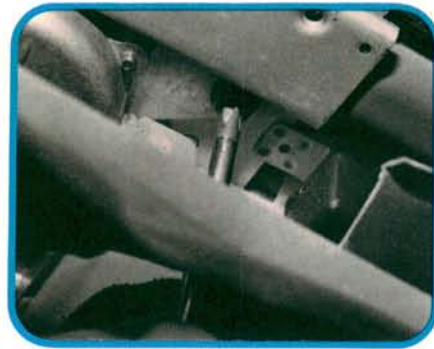
Replace the motor flat washer if it's damaged. Exchange the wave washer with the new flat washer from the rebuild kit. Replace the motor gasket if it's damaged. Coat the new washers and the motor shaft with grease from the mounting plate, then reinstall the old motor mounting plate.

Position the new motor mounting plate on top of the old plate. Put a dab of thread lock on each of the four longer screws from the rebuild kit, then attach both mounting plates to the sunroof motor. The new plate converts the motor to a solid mounting.



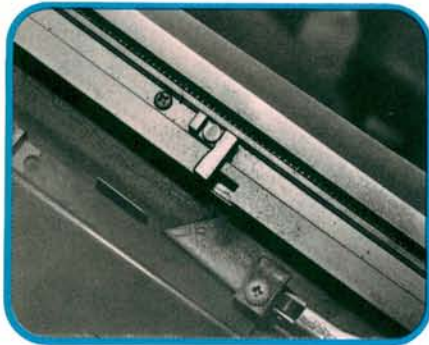
# 27

Place the original flat washer and the second washer from the rebuild kit on the motor shaft. Install the new drive pinion and retaining clip. The new flat washers inside and outside the motor will remove most of the end play. This keeps the pinion from jumping out of the drive cables.



# 28

Reinstall the rebuilt sunroof motor. Temporarily install the sunroof switch and check for proper operation. The rebuild should stop the grinding. Even so, don't hold the switch in the "close" position after the sunroof has fully closed. The motor is still capable of damaging the drive cables.



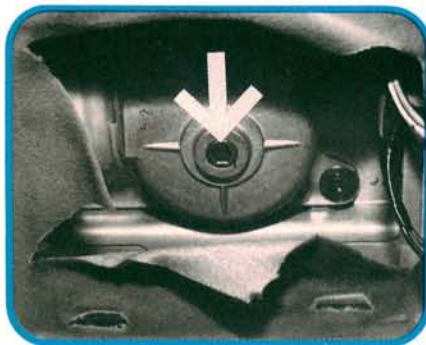
# 29

If the motor still grinds after the sunroof is fully closed, reopen it and check through the openings in the cable guides for signs of damage to the drive cables (arrow). Also check for bent cable guides near the motor. The sunroof tub must be lowered to replace the cable guide assembly.



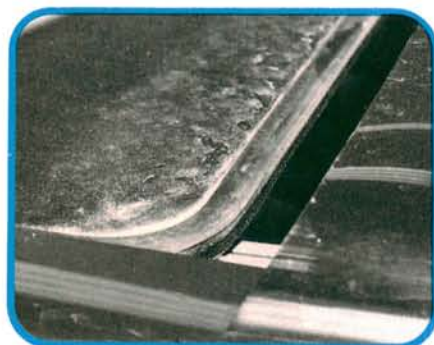
# 30

Pull the headliner back into position along the edge of the sunroof opening. This can get tricky because the headliner material is easily stretched out of shape, making it hard to get all of the wrinkles out. Reinstalling the molding around the sunroof opening will take up some of the slack.



# 31

Pull any loose headliner fabric into the motor opening, then reinstall the map light housing. Nissan still provides a crank handle for the emergency slot (arrow) in the sunroof motor. Most owners probably wouldn't know where to put it. Reinstall both sunvisors and the rearview mirror.



# 32

The Maxima's glass sunroof panel offers a lot less sound deadening than a conventional metal sunroof. Some owners complain of wind noise with the sunroof closed and the interior trim panel open. Even if there are no leaks, you'll still have some noise from air flowing over the sunroof.