



# Bum Steer

We decided to ask a man who rebuilds power steering racks for import vehicles to share his many years of experience in this area with our readers. Dale Lumby at Maval Manufacturing took us on a guided tour through bins of bad steering racks, stopping here and there to point out problem areas. Mr. Lumby knows racks.

But we were more interested in hearing about some of the feedback he gets from the field. We wanted to know about problems with certain racks. We also wanted to know why many rack replacements are not successful, and why some applications are confusing when the new rack is the right rack, but doesn't look the same.

The following items are tops on his list for causing confusion, consternation, and comebacks. Some have to do with modifications needed to make the rack in the box fit the car on your lift. Some deal with adjustments, and there are also some tips on diagnosis. In any event, we hope they save you some busted knuckles and angry words.

—By Ralph Birnbaum





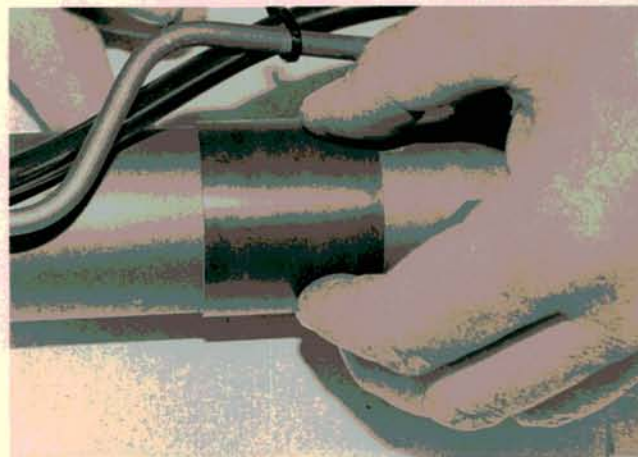
Saabs use a GM style steering rack. You domestic car techs are familiar with the term "morning sickness," an ailment common in GM produced Saginaw steering gears. The pinion shaft spool valve seals in units of this design rotate inside the aluminum bore of the pinion housing. The sealing rings on the spools have a high fiberglass content and as a result they are very abrasive. Over time they wear deep grooves in the housing bore. The grooves allow fluid pressure to leak past the sealing rings, especially when the fluid is cold.



When the owner of the car starts it in the morning, everything is of course, cold. Until the unit heats up, fluid pressure leaks past the sealing rings, resulting in reduced power assist. That's why this condition has been nicknamed Morning Sickness. As things heat up and expand, steering assist increases. In badly worn units, however, even warm racks will have less assist than normal, and eventually all assist is lost. Rebuilders bore the housings and install steel sleeves to eliminate this problem.



Volvo replacement racks can be confusing, since a total of six different rack configurations were installed in 1979-88 Volvo 240-260 models. If the replacement rack doesn't look like the old rack, don't panic until you check the instructions which should be in the box with the new rack. You may be forced to change mounting hardware (mounting blocks, u-bolts, and different nuts and washers), but any one of the six styles will fit, regardless of the appearance of the old rack.



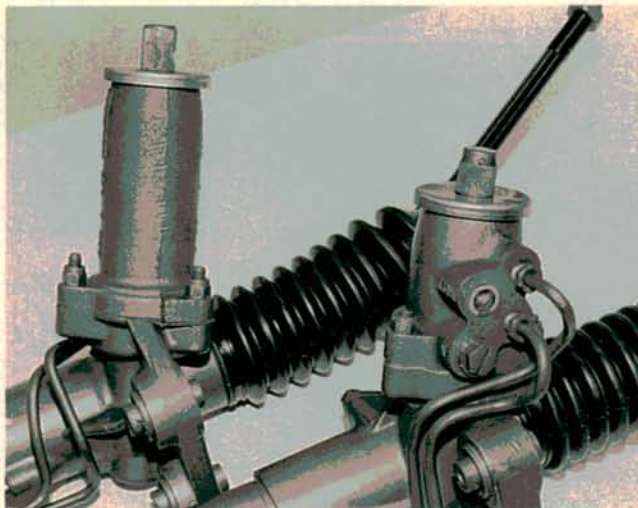
For 1985-88 Nissan Maximas, there are only two choices. The two racks are the same except for a slight difference in rack tube diameter. The rack with the larger diameter tube has an aluminum end cap. If the replacement rack is the same as the one on the car, no modifications are necessary. If you're replacing a larger diameter rack with a smaller one, install adhesive backed neoprene strips on the rack tube beneath the mount brackets. If you're replacing a thin tube with a thick one, remove the old spacer strips from the mounting brackets.



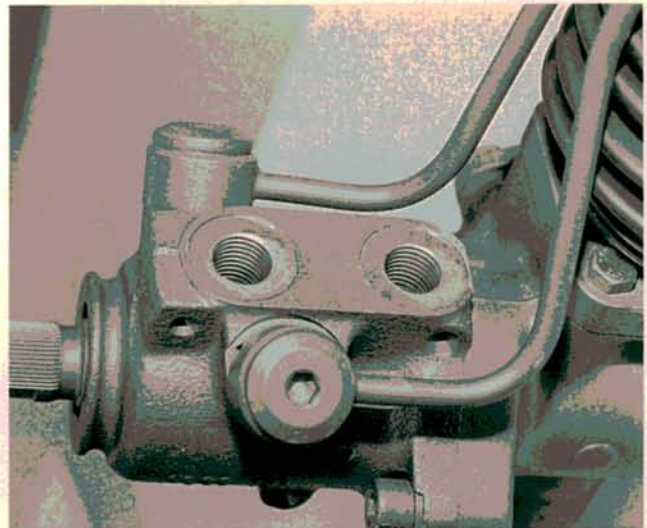
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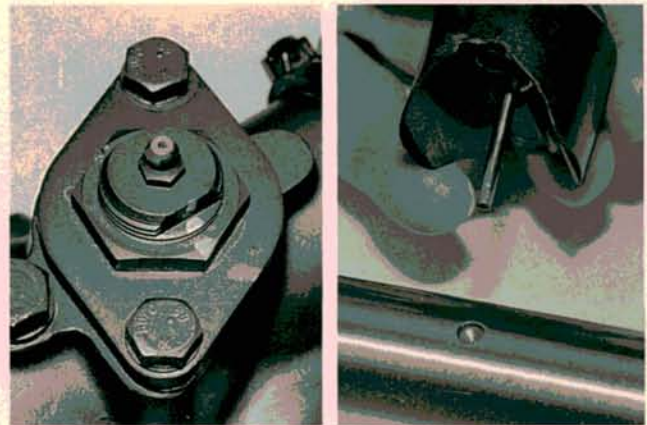
**5** More on the Maxima racks. Your rack should come from the factory in the centered position. If someone turns the rack off center, count the number of turns lock to lock. Turn the rack back from full lock half that distance and finally center the rack using the indicator mark on the pinion dust cover. Be very careful not to overtighten the hydraulic fittings when you install the pressure and return lines. Torque them to the prescribed 15 ft-lb and no more, or you'll crack the thin walled housings.



**7** Jaguar racks present similar problems for the installer. Racks in 1973 through 1977 Jaguars have a taller pinion housing than those used in 1978 through 1982½ cars. Both use 16 mm tie rods. Racks used from 1982½ through 1987 are also short tower units, but they have 14 mm tie rod ends. Tall tower units can be replaced with an early style short tower if a new steering coupler is installed. If you use a late style short tower to replace a tall tower, replace the coupler and also use 14 mm tie rod ends.



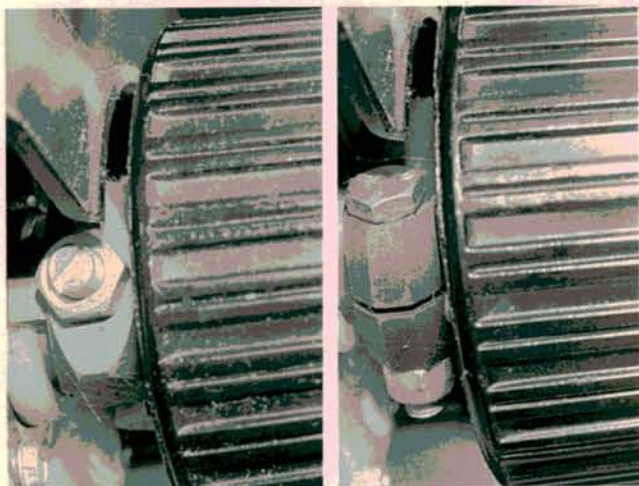
**6** Steering racks on 1984-88 Audi 5000 models present a different problem. This is a very high pressure system (over 2000 PSI). The low and high side pressure connections at the rack are the SAME size fittings. It is possible to reverse the connections as a result. Then the fun starts. The nose of the pinion shaft sticks through the firewall below the dash. If you reverse the lines, the first time you turn the steering wheel with the engine running, that ton of pressure blows out the pinion shaft seal and sprays oil all over that fancy interior. Guess where you don't want to be sitting just then.



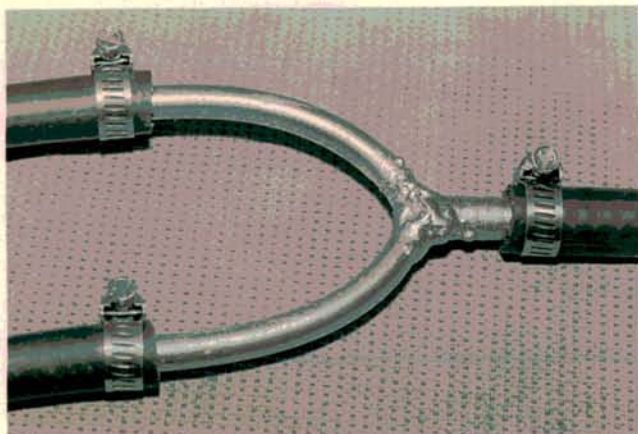
**8** When Jaguar racks were originally assembled, there was no set procedure for indexing the pinch bolt groove on the splined pinion shaft. The rebuilder has no idea which way it points on the old rack. So the odds are high that the steering wheel will be off center after you connect the lower steering universal to the pinion. Before attempting to straighten the steering wheel, make sure the rack is dead centered by removing this grease fitting and installing a pin which will fall into a locator hole in the rack when the rack is centered.



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**9** The Jaguar steering column is a unique set up. A Jag specialist showed us the easiest way to recenter a steering wheel. Drop the lower steering column panel. You'll see a through bolt and a slotted head set screw with a jam nut. Remove the through bolt. Loosen the jam nut on the slotted head screw and back it off two or three turns. Pull the entire steering wheel/upper column assembly out of its splines in the lower shaft. Turn the wheel to recenter it and slide it back into the lower shaft. Reinstall the through bolt, and tighten the pinch bolt and its jam nut.



**11** If you have a car with too much assist at road speed, is it because the pump gears in the speed sensor are so worn that they can't pump enough oil? Or is there another problem? To check the speed sensor, simply bypass it. Tee the two smaller hoses into the large return line. Then with the car sitting still and the engine running, attach a fish scale to the steering wheel. If it takes less than an 11 pound pull to move the steering wheel, the problem isn't the speed sensor. Look for a restricted hose, stuck pressure relief in the main pump, or a defective steering gear.



**10** A speed sensor is used in this Honda Accord to control the amount of power assist based on vehicle speed. Its internal pump is driven by the final drive and also does double duty as the drive for the speedometer cable. With the vehicle stationary, pressure flow through the sensor is blocked by the pump gear. When the vehicle drives away, the speed sensor reduces pressure at the cut off valve by pumping fluid the other way—to the fluid reservoir. This reduces pressure at the cut off valve. The faster the vehicle goes, the faster the pump turns, further reducing pressure, further reducing assist.



**12** Leaking racks mean fluid loss. Eventually this leaves the pump sucking air. Sometimes the noisy pump scares the owner into opening the hood and adding fluid. But the rack keeps leaking, and sooner or later the pump runs dry again. This can only happen so often before the pump is ruined. Checking pump pressure is part of a good diagnosis, especially when the rack has been leaking for some time. Also check the fluid. Run a sampling of the old fluid through a coffee filter. If you catch any shavings in the filter, replace the pump and flush the system with fresh fluid, or you'll ruin the new rack.