

SAAB RACK & PINION

97 Sonett III
99

NOTE — Power steering may be used on some models as optional equipment. See Saab Power-Assisted Rack & Pinion under POWER STEERING in this section.

DESCRIPTION

Steering gear is the rack and pinion type. Rack is protected from dirt by rubber bellows. The pinion bearing uses an adjustable spring-loaded plunger. The gear is oil-lubricated. The steering linkage is a direct link from the steering rack to the steering knuckles, consisting of tie rods and ball joints.

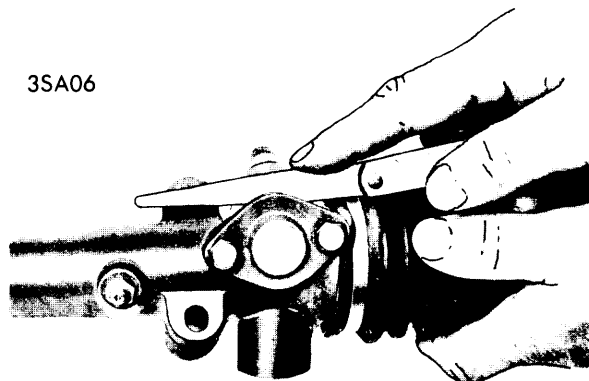
ADJUSTMENT

NOTE — The following adjustments apply to 97 Sonett III models only. For adjustments of 99 model steering gear, see Overhaul.

PINION AXIAL PLAY

Excessive axial play in the pinion can be corrected by inserting shims under pinion cover. Clearance between pinion and cover should be .005" (.12 mm). Adjustment may be performed without removing steering gear from vehicle.

- 1) Raise front of vehicle until front wheels are clear of floor. Back off adjusting screw lock nut, then screw out adjusting screw until all tension is taken from damper spring. Remove pinion end cover with shims.
- 2) Replace the flat washer and pinion cover without shims. Snugly tighten cover bolts. Measure gap between cover and gear housing with a feeler gauge. To the measurement taken, add the proper amount of shims to make a clearance of .005" (.12 mm) between pinion end and cover. Remove cover and position shims.
- 3) Ensure washer is in position and apply grease around pinion stub. Install cover and tighten bolts. Check pinion for free movement. Adjust Rack Radial Play as described below.



MEASURING PINION COVER CLEARANCE

RACK RADIAL PLAY

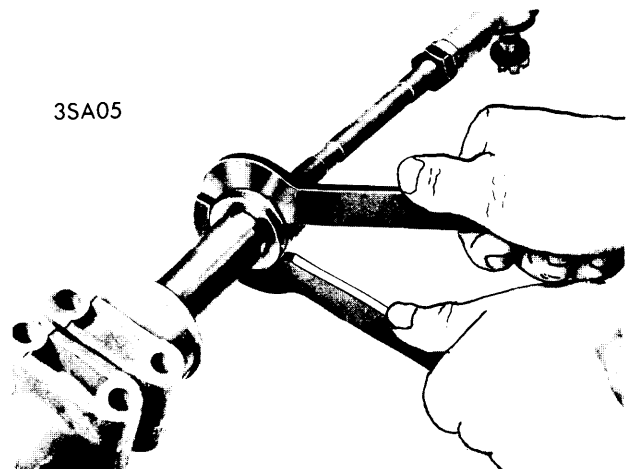
After adjustment of axial play of pinion, rack radial play must be adjusted. Steering gear may be adjusted without removing it from vehicle.

Back off adjusting screw lock nut. Tighten adjusting screw until minimal play is felt without rack moving stiffly. Tighten lock nut. Turn steering wheel from lock to lock to ensure smooth operation.

TIE ROD INNER BALL JOINTS

Steering gear must be removed to perform this adjustment. Normally, this adjustment is performed when steering gear has been removed from vehicle for repairs or linkage has been disconnected.

- 1) Release clamps and remove both rubber bellows (if not already removed). Pull rack out to one side; drill and remove lock pin from inner ball joint. Remove outer bearing cup and lock nut using suitable tools (784071 and 783962). Clean all parts thoroughly.
 - 2) Refit nut to rack. Pass outer bearing cup onto tie rod and fill cup with chassis grease. Position spring and inner bearing cup. Tighten cup until ball joint has no play, but stiff movement is not incurred. *NOTE — If rack is held vertically, ball joint should be tightened such that tie rod, with tie rod end attached, can be moved to any position without falling under its own weight.*
 - 3) Tighten lock nut to bearing cup with same tools as during removal. Check again for correct ball joint tightening. Drill new hole for lock pin and install pin. Secure lock pin by four center-punches at edge of hole. *CAUTION — Ensure new hole is located 45° from key grip hole in lock nut. Be aware that new drilling does not enter steering gear.*
 - 4) Repeat procedure for other side inner ball joint. Replace rubber bellows and clamp securely. Replace steering gear in vehicle.
- NOTE — If steering gear is stiff in any position after adjustments have been made, stiffness is probably due to stresses incurred when tightening bolts. Back off two retaining bolts at end opposite pinion and insert spacer under steering gear at bolt where it does not lie flush. Some vehicles may already have these factory-fitted spacers.*



REMOVING OUTER BEARING CUP & LOCK NUT

Steering Gears & Linkage

SAAB RACK & PINION (Cont.)

REMOVAL & INSTALLATION

97 SONETT III

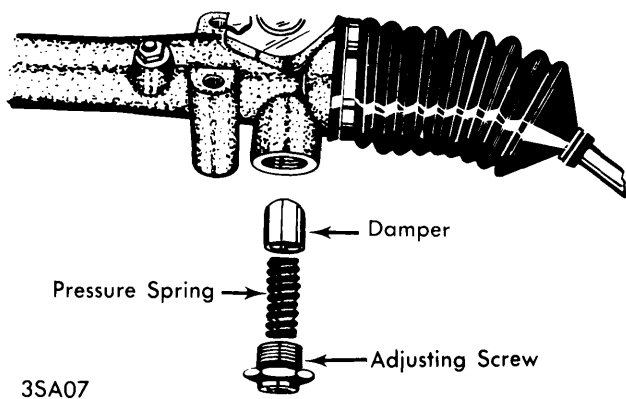
Removal — 1) Remove hood. Disconnect battery cables. Raise front of vehicle and remove front wheels. Detach tie rod ends from steering arms.

2) Remove lower taper pin from gear shift shaft universal joint as follows: Remove nut and place it on other end of taper pin. Tighten nut until pin is loosened. Release flywheel control from transmission case.

3) Release throttle control spring. Spring can then be used as a support for gear shift shaft joint. Disconnect speedometer cable from transmission case.

4) Back off and remove clamping screw in steering column yoke, and lift steering wheel to pull column out of yoke. **NOTE** — It may be necessary to slacken column stand screws so that stand can be moved to its upper position.

5) Back off adjusting screw lock nut on underside of steering gear. Remove adjuster screw. Withdraw pressure spring and damper. Remove screws holding pinion bearing and extract bearing. Note shims in this position. Take out pinion. Pull steering gear out through left side wheel housing.



REMOVING ADJUSTER COMPONENTS

Installation — To install, reverse removal procedure, and check toe-in.

99

Removal — 1) Raise front of vehicle and remove front wheels. Disconnect tie rod ends from steering arms and remove both retaining caps. Turn back floor carpet around steering shaft and pull up rubber boot. Remove clamping screw on steering gear pinion.

2) Separate upper joint and remove four screws retaining steering column tube. Pull up steering column slightly, remove intermediate shaft, then unbolt and remove steering gear assembly.

Installation — To install, reverse removal procedure and check toe-in.

OVERHAUL

97 SONETT III

Disassembly — Remove tie rod ends and rubber bellows. Remove (by drilling) lock pins from inner ball joints. Remove outer bearing cup and lock nut, and then remove piston and spring from gear housing. Loosen bolts of pinion bearing and lift out bearing and pinion. Pull out rack. Remove spacer ring from pinion and press bushing out.

Inspection — Inspect all components for excessive wear or damage. Replace parts as necessary.

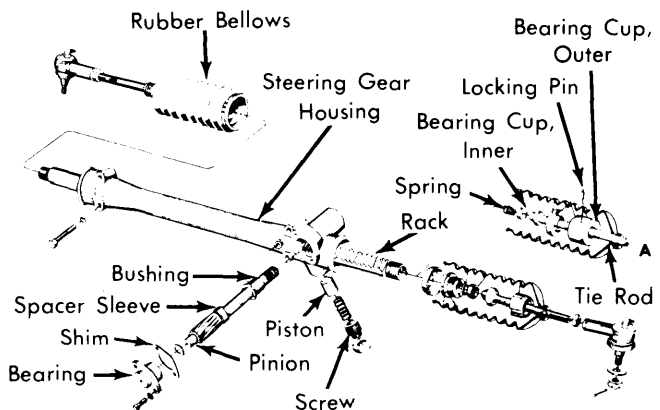
Assembly — 1) Lubricate rack and pinion with suitable steering gear grease. If removed, install pinion bushing into housing. Install inner ball joint to pinion end of rack. Adjust as outlined above (see Adjustment). Drill a new $\frac{3}{16}$ " hole for lock pin. Insert pin and counterpunch edges. Install rack in steering gear housing with spacer sleeve behind rack. Install pinion.

2) Adjust axial and rack radial play. See Adjustment. Refit ball joint on opposite end and adjust as required. Position rubber bellows and clamp in place. Ensure tie rod can be turned in bellows. Replace lock nuts and screw tie rod ends in place.

99

Disassembly — Remove tie rod ends and rubber bellows. Drill out lock pins from inner ball joints, using a 4 mm bit and drilling only $\frac{3}{8}$ " deep. Remove outer bearing cups and lock nuts. Remove rack adjustment screw, cap with gasket, shims, spring, and plunger. Remove pinion and cap with gasket shims, and upper bearing. Pull rack out from housing. Tap out lower pinion bearing. **NOTE** — Bushing in end of steering housing should not normally be changed as it must be precision reamed in order to perform properly.

Assembly — 1) Ensure all parts are thoroughly cleaned before proceeding with assembly. Lubricate all parts during assembly. Seat the lower pinion bearing. **NOTE** — Ensure extended parts of the inner bearing tracks are facing each other.



3SA08

A — Alternative Design

SAAB RACK & PINION GEAR

SAAB RACK & PINION (Cont.)

2) Assemble inner ball joint on pinion end of rack as follows: Thread lock nut onto rack. Fit outer bearing cup on rack and fill with suitable gear oil. Insert spring and inner bearing cup. Tighten bearing cup so that there is no looseness in ball joint, but without tightness. If rack, with tie rod mounted, is held horizontally, the tie rod should be able to be placed in any position without falling under its own weight. Tighten lock nut against bearing cup and recheck ball joint tightness. Drill a new 4 mm hole $\frac{3}{8}$ " deep and insert and stake lock a new lock pin.

3) Insert rack into housing, then fit pinion and upper bearing. Adjust pinion with shims so that there is no axial play when pinion gasket and cap are attached.

4) Adjust radial play of rack as follows: Insert plunger without spring and gasket, then attach cap with bolts (fingertight only). Measure clearance which exists between the cap and the housing face. To this measurement add .002-.006" (.05-.15 mm), to allow for play after completion of adjuster assembly. This total thickness will be the thickness of gasket shims required. Remove cap, install spring, shims, gasket, and cap. Check rack for free movement across entire length of its travel by rotating pinion.

5) Assemble and adjust other ball joint in same manner as previously described. Attach bellows after lubricating contact area between bellows and tie rod (use silicone grease). Attach both inner clamps. Stand gear on end and pour 5 fl. oz. of suitable EP 90 gear oil into bellows. Attach outboard bellows clamps. *NOTE — Outer clamps should be protected with rubber caps.* Screw on lock nuts and mount tie rod end assemblies to tie rods.