GENERAL MOTORS RACK & PINION

Chevette

DESCRIPTION

Steering gear is a rack and pinion design with integral steering linkage. Steering gear consists of tube and housing assembly containing pinion shaft and steering rack. Pinion is supported by and rotates within a sealed ball bearing (upper) and a pressed in roller bearing (lower). Wear take-up is provided by an adjuster spring which forces engagement of rack to pinion teeth. Inner tie rod ends are threaded and staked to the rack. These assemblies contain a Belleville spring loaded spherical joint, which permits both rocking and rotating tie rod movement.

REMOVAL & INSTALLATION

STEERING GEAR

Removal – Raise vehicle and remove lower shield. Remove tie rod cotter pin and nut and disengage tie rods from steering knuckles. Remove steering column flexible coupling pinch bolt. Remove four bolts at gear clamps and remove assembly from vehicle.

Installation – To install, reverse removal procedure.

OVERHAUL

DISASSEMBLY

1) Position assembly in soft jaw vise, clamping housing near center. Loosen jam nuts and remove outer tie rod. **NOTE** – *Use care while loosening nuts to ensure that rack does not rotate and cause damage to internal gear components.* Remove inner boot clamp by cutting off clamp. Remove outer spring boot clamp and pull boot off assembly. Repeat procedure for other boot.

2) Move rack to extreme end of travel and position in soft jaw vise. Remove both inner tie rod assemblies. **CAUTION** – *To prevent internal gear damage when removing inner tie rods, turn tie rods counterclockwise until they separate from rack.* Remove adjuster plug lock nut, adjuster plug, spring and rack bearing from housing. Clean seal surface and pierce seal at one of the two round spots on surface. Pry out seal. Using snap ring pliers, remove retaining ring from housing bore.

3) Position end of pinion shaft in soft jaw vise and tap housing to separate pinion assembly from housing. **CAUTION** – *With pinion removed, rack may slide from housing and be damaged.* Remove rack from housing. Clean all components, except inner tie rod assemblies, with appropriate solvent, air dry, and inspect all components. Replace any seals which are cut or badly worn. If pinion seal is removed, it must be replaced.

INDIVIDUAL COMPONENT SERVICING

Mounting Grommets – Do not remove grommets unless replacement is required. Replace both grommets if either requires replacement. To replace grommets; cut through grommet and remove. Lube inside of grommet with chassis lube and force left side grommet past right side boss. Start right side grommet and then assemble grommets to housing.

Guide Bushings – Do not attempt to replace guide bushing. If bushing is worn or damaged, replace entire housing.

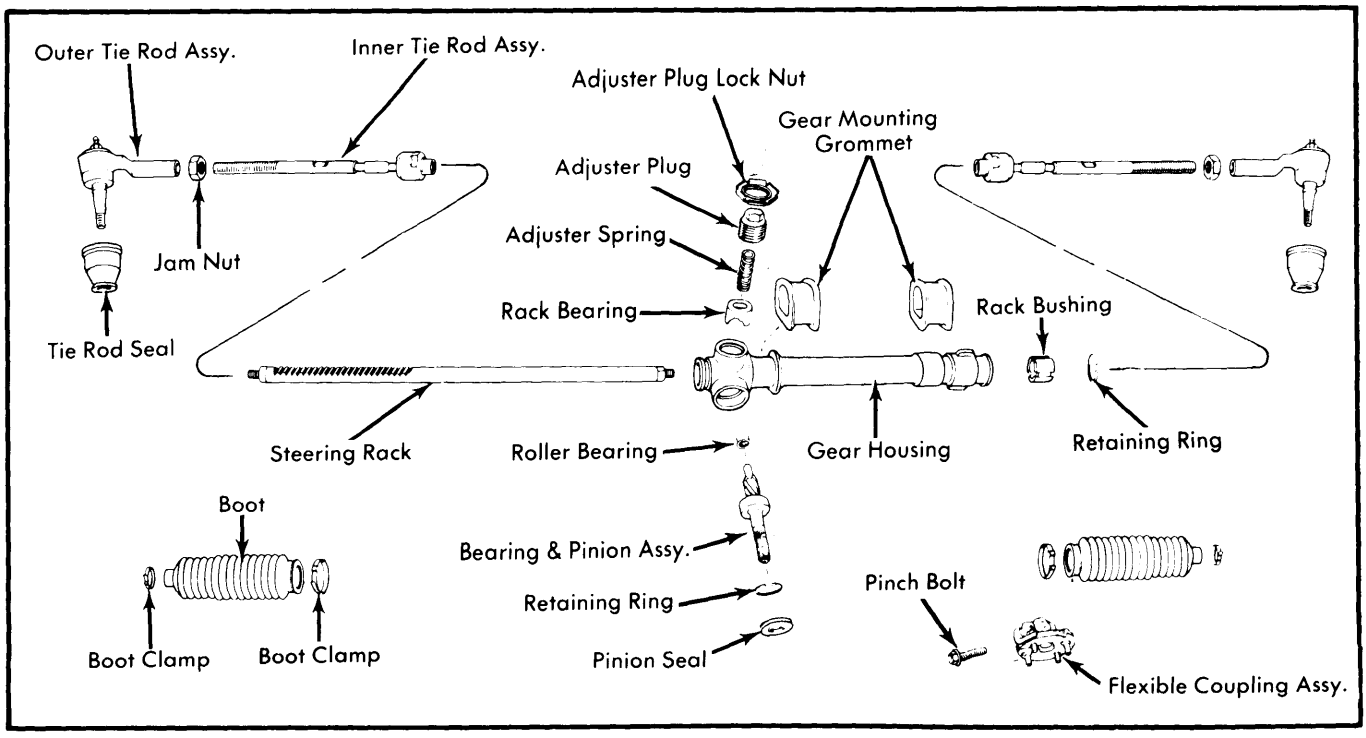

Fig. 1 Steering Gear & Linkage Assembly

GENERAL MOTORS RACK & PINION (Cont.)

Rack Bushing – Rack bushing should only be replaced if evidence of heavy wear is noted. To remove bushing, remove retaining ring and using a suitable size socket and extension, drive bushing out of housing. If a puller is available, position puller fingers behind bushing and remove using a slide hammer. To install bushing, press in using suitable size socket until bushing bottoms in housing. Install retaining ring.

Roller Bearing Assembly – Check condition of pinion shaft. If scored or badly worn, replace pinion and roller bearing assembly. To remove bearng, press or tap out bearing using drift and press or hammer. Install new bearing using a suitable size socket to press or drive bearing in until it bottoms.

Bearing & Pinion Assembly – Inspect pinion shaft, teeth, and rotor bearing assembly. If shaft is scored, teeth are chipped, or bearing is loose on shaft, bearing and pinion assembly should be replaced.

Inner Tie Rods – Inner tie rods are serviced as an assembly only. If pivot is loose or if joint rocking or turning torque exceeds 150 INCH lbs., replace inner tie rod assemblies.

REASSEMBLY

1) Install rack with teeth facing pinion. The flat on teeth should be parallel with pinion shaft. Place rack in housing so that end of rack is 2.70" from lip of housing (see illustration). Insert pinion with flat on pinion at 75° from vertical. Tap on pinion shaft with soft hammer until pinion seats. Reset rack to 2.70" dimension, flat should now be vertical. If flat is at ±30° from vertical, remove pinion and start over. NOTE – *Rack must be centered as described. If not, steering wheel cannot travel fully, causing unequal turning radii.*

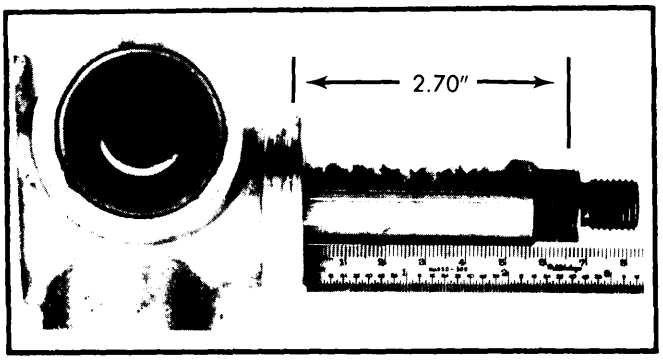

Fig. 2 Centering Rack in Housing

2) Install pinion retaining ring using suitable tool (J-4245). Beveled edge of ring should be up. Liberally coat top of pinion bearing with anhydrous calcium grease, then seat pinion seal flush with housing. Seal can be seated by tapping on alternate sides with hammer. Coat rack bearing with lithium grease and install. Coat both ends of preload spring and threads of adjuster plug with lithium grease and assemble spring and plug into housing. Turn adjuster plug clockwise until it bottoms, then back off 45-60°. Torque required to turn pinion should be 8-10 INCH lbs. Turn adjuster plug in or out to adjust as required. Tighten plug lock nut.

3) Lube both ends of rack and rack teeth with lithium grease. Move rack back and forth several times by turning pinion shaft, adding grease to rack teeth each time. Install inner tie rod assemblies on rack. Turn assemblies until they bottom out. NOTE – *Hold rack in vise or with another wrench to prevent internal gear damage.* Use wood block or vise for support and stake tie rod ends to rack flat on both sides.

4) Position one large boot clamp on housing and place boot lip into position over undercut. Position clamp over boot at undercut and secure using side cutter type pliers or suitable tool (J-22610). Slip other end of boot into tie rod undercut, do not tighten clamp over boot until toe-in adjustment is made. Repeat procedure for other boot and ensure that boots are not twisted.

5) Thread jam nuts onto both tie rods, then thread on tie rod ends. Do not tighten jam nuts until toe-in adjustment is made. Slip on coupling assembly. Flat on inside diameter of coupling must mate with flat on pinion shaft. Install pinch bolt, but do not tighten. Install gear in vehicle, then tighten coupling pinch bolt. Adjust toe-in. *See Wheel Alignment Specifications & Procedures in WHEEL ALIGNMENT Section.* Tighten jam nuts and secure boot clamps.

TIGHTENING SPECIFICATIONS

Application	Ft. Lbs.
Tie Rod Jam Nuts	50
Adjuster Plug Lock Nut	50
Rack & Pinion Assembly Clamp Bolts	14
Flexible Coupling Pinch Bolt	30