

# STEERING LINKAGE

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## DESCRIPTION AND OPERATION

### DESCRIPTION AND OPERATION OF TIE RODS

Tie rods on the GT are connected to both rack ends by means of a ball joint. Two rubber bellows between ball joint and steering gear housing protect rack and ball joints against dirt, dust and mud. The ball joints of the tie rods do not require service.

Tie rods on the Opel 1900 and Manta are connected to both rack ends by means of a axial joint. Two rubber bellows between the axial joint and steering gear housing protect the rack and axial joints against dirt, dust, and mud. The ball joint of the tie rod ends on the Opel 1900 and Manta are maintenance free and must not be disassembled.

## MAJOR REPAIR

### REMOVAL AND INSTALLATION OF TIE RODS

#### Removal

In order to avoid the possibility of dirt entering the steering gear assembly via the rack, it is recommended that rods and area immediately surrounding the gear assembly be wiped free of loose dirt prior to removal.

1. Remove cotter pins securing nuts on tie rod ends and remove nuts. Discard cotter pins.

2. Using remover J-21687, pull outer tie rod ball studs out of steering arms. See Figure 3B-2.

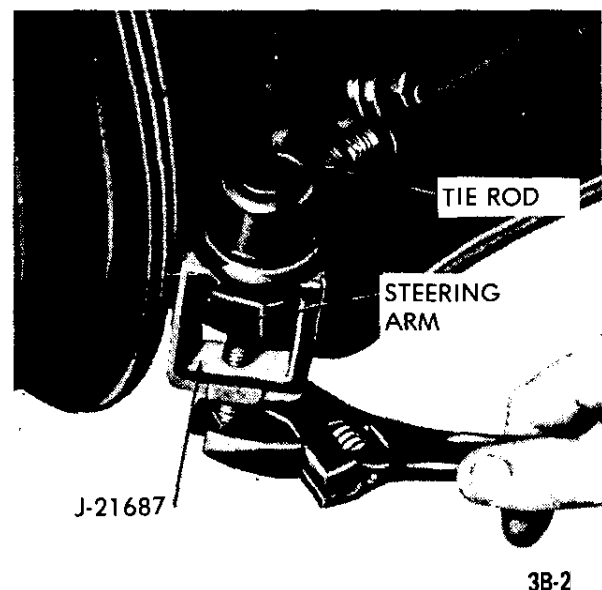


Figure 3B-2 Removing Ball Stud

3. Remove clamp securing one end of rubber bellows to tie rods and slip bellows off tie rods to expose nut or lock plates. See Figure 3B-3.

4. On the GT, bend up round edges of lock plate from tie rod ball studs and unscrew ball studs from rack. See Figure 3B-4.

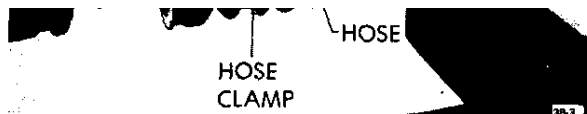


Figure 3B-3 Bellows Removed From Tie Rod GT

5. On the Opel 1900 - Manta, unscrew tie rod from axial joint. It is important that rack be held secure with open end wrench to prevent damage to rack teeth.

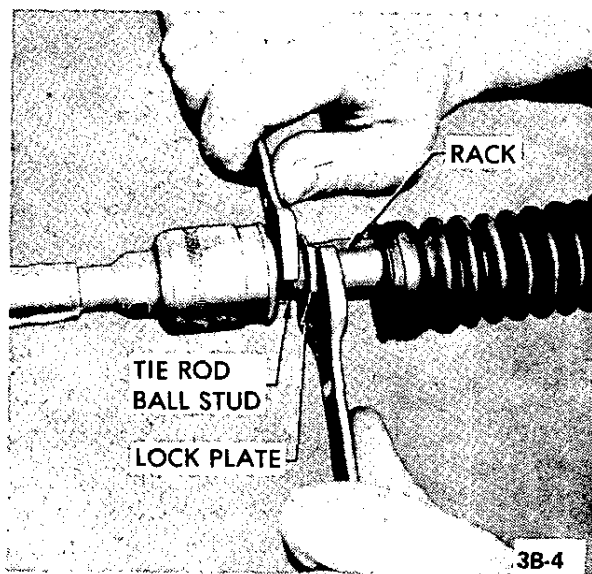


Figure 3B-4 Removing Tie Rods. GT

#### Installation . GT

**CAUTION:** Fasteners are important attaching parts in that they could affect the performance of vital components and systems, and/or could result in major repair expense. They must be replaced with one of the same part number or with an equivalent part if replacement becomes necessary. Do not use a replacement part or lesser quality or substitute design. Torque values must be used as specified during reassembly to assure proper retention of these parts.

1. Install new lock plates onto tie rod ball studs and screw ball studs into rack while holding bent tab of lock plates against flat on rack. Torque ball studs 43

lb.ft. See Figure 3B-5. It is important that rack be held secure with open end wrench to prevent damage to rack teeth.

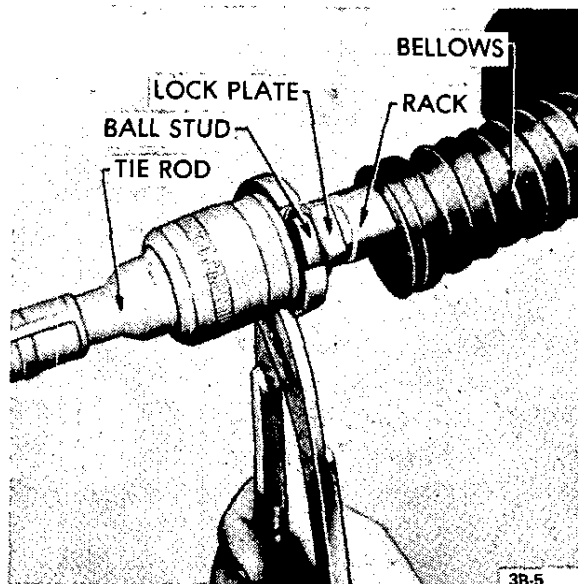


Figure 3B-5 Bending Lock Plate Over Ball Stud . GT

2. Bend round edges of lock plate over flat on ball stud to lock ball stud in position.

3. Position rubber bellows and hose clamps over tie rods and adjust clamp so that wire ends are pointing in same direction as adjusting screw. Check that bellows are not twisted and will compress and expand properly.

4. Connect outer tie rod ball stud to steering arm, torque castle nut to 29 lb.ft., and lock in position with new cotter pin.

#### Installation Opel 1900 - Manta

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1. Screw tie rod into axial joint.
2. Attach tie rod end to steering arm and torque nut to 29 lb.ft. Install new cotter pin.
3. Adjust toe-in and then torque lock nut of both tie rods to 47 lb.ft.

4. Attach rubber bellows to axial joint using hose clamp.

### DISASSEMBLY AND REASSEMBLY OF TIE RODS

The ball joint of the tie rod end on the Opel 1900 • Manta is maintenance free and must not be disassembled.

#### Disassembly • GT

1. Loosen tie rod clamp bolt and unscrew outer tie rod ball stud from tie rod. See Figure 3B-6.
2. Remove retainer ring from outer ball stud of tie rod and take off rubber sealing cap.

#### Reassembly GT

1. Install rubber sealing cap and retainer ring onto outer ball stud.
2. Screw outer tie rod ball stud into tie rod and tighten clamp bolt.

**CAUTION:** Fasteners for tie rods are important attaching parts in that they could affect the performance of vital components and systems, and-

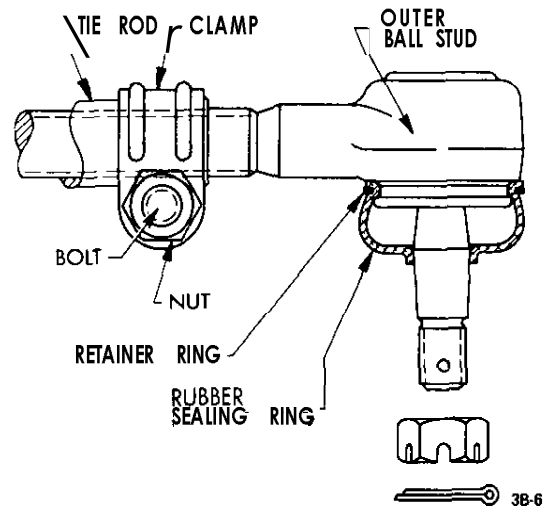


Figure 3B-6 Tie Rod and Outer Ball Stud

/or could result in major repair expense. They must be replaced with one of the same part number or with an equivalent part if replacement becomes necessary. Do not use a replacement part or lesser quality or substitute design. Torque values must be used as specified during reassembly to assure proper retention of these parts.

## SPECIFICATIONS

### TIGHTENING SPECIFICATIONS

Location	Torque Lb.Ft.
Ball Stud to Rack (GT)	43
Ball Stud to Steering Arm (GT)	29
Tie Rod End to Steering Arm (1900 • Manta)	29
Tie Rod Lock Nut (1900 • Manta)	47