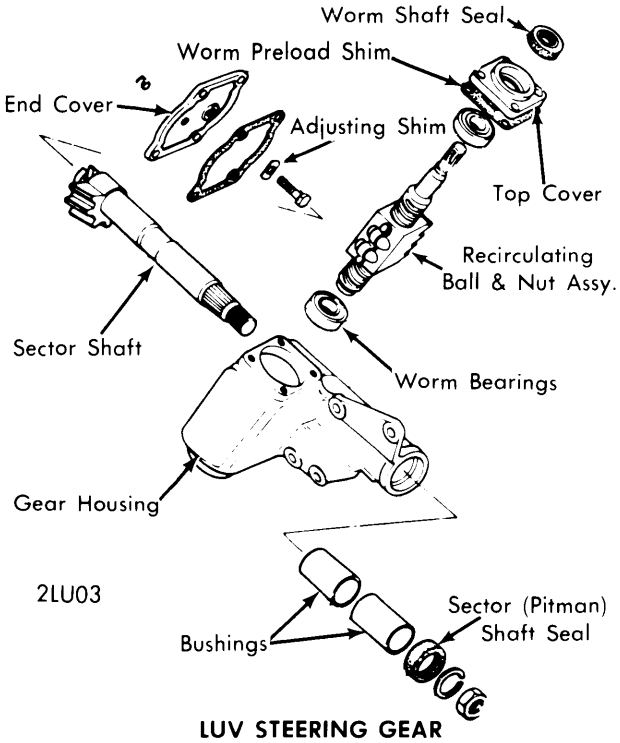
# LUV RECIRCULATING BALL

**Chevrolet LUV**

## DESCRIPTION

### STEERING GEARS

Steering gear is a recirculating ball and nut type. A worm gear is incorporated on lower end of steering shaft and is engaged with ball-nut through a number of recirculating balls. These balls carry the turning motion of steering shaft onto the sector shaft with minimal loss of friction. The balls circulate through the ball-nut outlet to a ball tube and back to ball-nut inlet. Adjustment is provided for backlash between sector gear and rack by a tapered sector gear in steering unit (adjustment screw is on sector shaft).




**LUV STEERING GEAR**

### STEERING LINKAGE

Linkage consists of splined pitman arm connected to adjustable center link and a tie rod. Center link is connected to idler arm at right end, which in turn is connected to other tie rod and idler arm pivot shaft. Shaft is fastened to frame by a bracket. Tie rods are non-adjustable and connected to brake backing plates by tie rod links. All ball stud connections and idler arm have lubrication fittings. Toe-in is set by adjustable intermediate rod.

## ADJUSTMENT

### PRELOAD & LASH

1) Disconnect battery ground cable. Remove pitman arm nut and mark relative position of arm to shaft. Remove arm using suitable tool. Remove horn shroud and spring.

2) Turn steering wheel in one direction until stopped by gear, then turn back half way. *CAUTION — Do not turn wheel hard against stops, as damage to ball guides may result.* Measure and record "bearing drag" by applying torque wrench to steering wheel nut and rotate through 90° arc. *NOTE — Do not use torque wrench having a maximum reading of more than 50 INCH lbs.*

3) Adjust sector lash by turning steering wheel from one stop to the other, turn wheel back exactly halfway (to obtain center position), then turn sector adjusting screw clockwise to eliminate backlash between ball-nut and sector gear. Tighten lock nut.

4) Check torque at steering wheel nut, taking highest reading as steering wheel turns through center. Torque should be 3.5-8.5 INCH lbs. (4.0-9.8 cmkg). If not, loosen lock nut and readjust sector screw. Tighten lock nut and recheck torque at steering wheel.

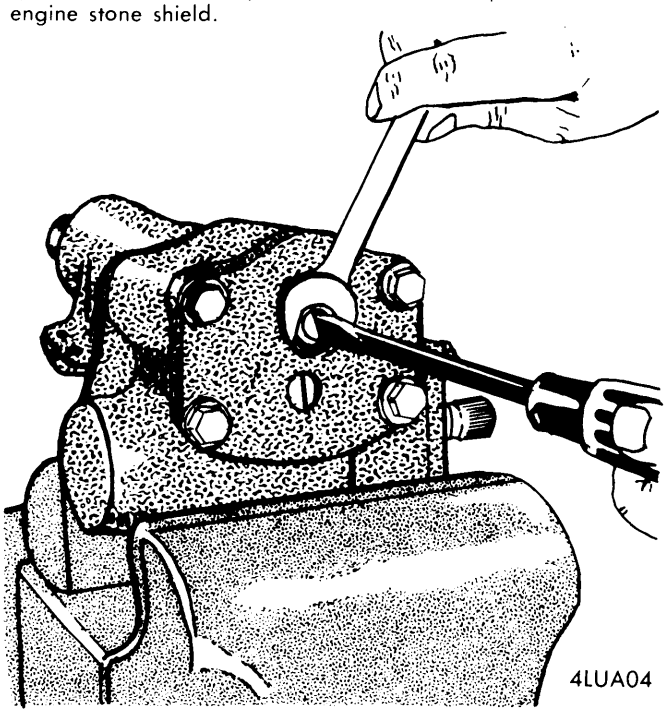
5) If maximum specification is exceeded, turn adjusting screw counterclockwise, then turn adjuster lock nut clockwise. Reassemble pitman arm to shaft, lining up marks made during removal. Tighten pitman shaft nut to specifications. Install horn spring and shroud. Connect battery cable.

## REMOVAL & INSTALLATION

### STEERING GEAR

**Removal** — Raise vehicle on hoist. Remove pitman arm nut and mark relative position of pitman arm to shaft. Using suitable tool, remove arm from shaft. Remove engine stone shield. Remove lower clamp-to-flexible coupling bolts. Remove gear.

**Installation** — Place gear in position and start (do not torque) gear mounting bolts. Install clamp-to-coupling bolts and torque to specifications. Torque gear mounting bolts to specifications. Install pitman arm nut as specified. Install engine stone shield.




**ADJUSTING SECTOR LASH**

## LUV RECIRCULATING BALL (Cont.)

### OVERHAUL

#### STEERING GEAR

*NOTE — Recirculating ball and nut assembly parts are selectively combined. Ball tube clamp plate is sealed with paint to avoid disturbing. Any worn part, therefore, necessitates entire assembly replacement.*

**Disassembly** — 1) Remove steering gear as previously described. Disconnect flexible coupling from worm shaft. Drain gear box through filler plug hole (no drain hole is provided). Bring steering shaft into straight-ahead position.

2) Remove top cover bolts and adjusting screw lock nut. Separate top cover from gear box by turning adjusting screw clockwise. *NOTE — Hold sector shaft in straight-ahead position during removal. Do not drive shaft off gear box by impact.*

3) Remove adjusting screw and sector shaft from gear case. Remove bolts retaining end cover and shims. Remove worm and ball-nut assembly from gear box and take out lower bearing. *CAUTION — Keep assembly in horizontal position or ball-nut will fall onto end of worm gear, damaging ball tubes.*

**Inspection** — Check all parts for wear or other abnormalities; replace if conditions are noticeable. Ball-nut noise or roughness necessitates replacement of entire steering shaft assembly.

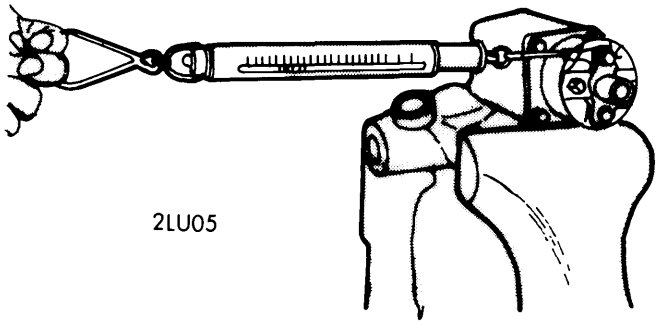
**Reassembly & Adjustment** — 1) Insert lower bearing into position in gear box. Install worm shaft assembly in box. Check lower end of worm shaft for proper fit in lower bearing.

2) Assemble upper bearing onto worm shaft and install adjusting shims between gear box and end cover. Install and torque bolts. *NOTE — Apply liquid gasket to end cover during installation.*

3) At this point, measure starting torque of pinion shaft (see illustration). Reading should be 3.0-5.6 INCH lbs. (3.5-6.4 cmkg) when coupling begins to rotate. If not within limits, add or remove shims as necessary.

4) Bring ball-nut to center of worm and insert sector shaft into gear box. Engage center tooth of shaft with center tooth of worm. Insert adjusting screw in sector shaft slot. Screw should slide freely within the slot and have no more than .001" (.025 mm) clearance. If clearance is excessive, insert adjusting shim. Install sector cover by turning adjusting screw out. Tighten lock nut.

5) Connect sector shaft to pitman arm (align marks make during removal) and torque pitman arm as specified. Install and torque pinch bolt. Fill gear box (10 oz.). Do not overfill.




**MEASURING STARTING TORQUE**

#### PITMAN SHAFT SEAL REPLACEMENT

If replacement has been determined as necessary, it may be done without removing the steering gear as follows:

Raise vehicle on hoist. Remove pitman arm, as previously described. Clean area around seal. Pry out old seal, being careful not to damage housing bore. *CAUTION — Check gear lubricant for contamination. If contamination of any kind is detected, gear overhaul is necessary.* Coat new seal with gear lubricant and tap into position. Install pitman arm. Lower vehicle and check lubricant level in gear box (10 oz.).

### TIGHTENING SPECIFICATIONS

| Application | Ft. Lbs. (mkg) |
|---|---|
| Pitman Arm-to-Gear | 160 (22.1) |
| Gear & Idler Arm-to-Frame | |
| Large Bolts | 50 (6.91) |
| Small Bolts | 20 (2.77) |
| Adjusting Screw Lock Nut | 20 (2.77) |
| Linkage Ball Joints | 44 (6.08) |
| Center Link Lock Nuts | 90 (12.4) |
| Coupling Pinch Bolt | 20 (2.77) |