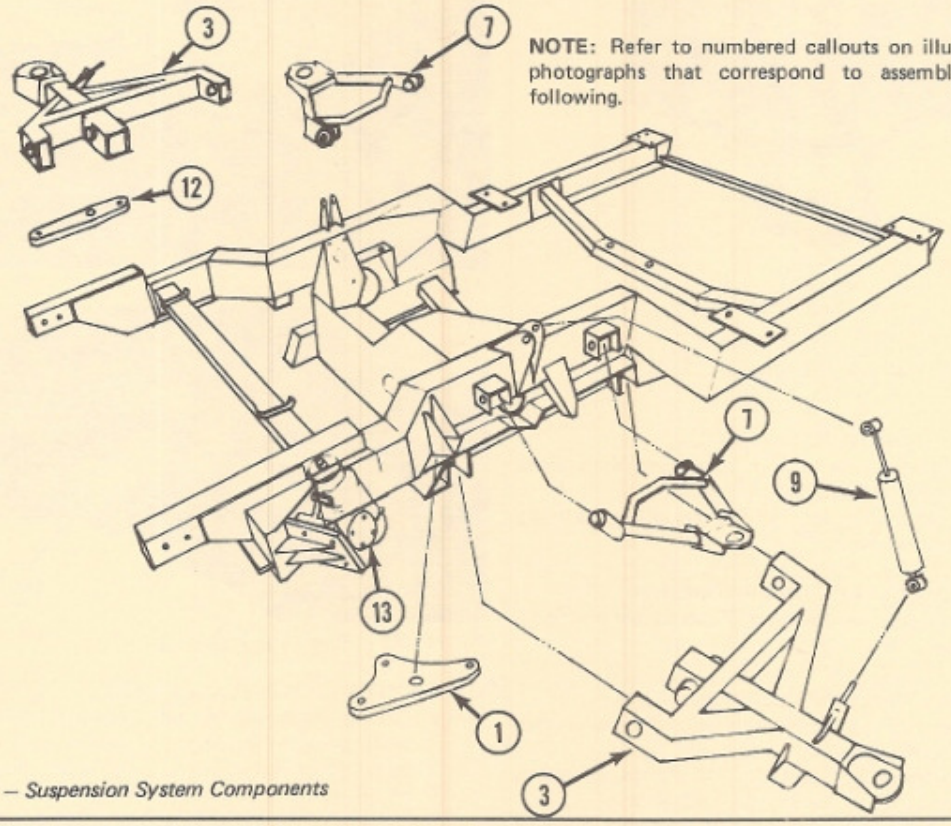
SUSPENSION SYSTEM



NOTE: Refer to numbered callouts on illustrations and photographs that correspond to assembly procedure following.

Figure 117 – Suspension System Components

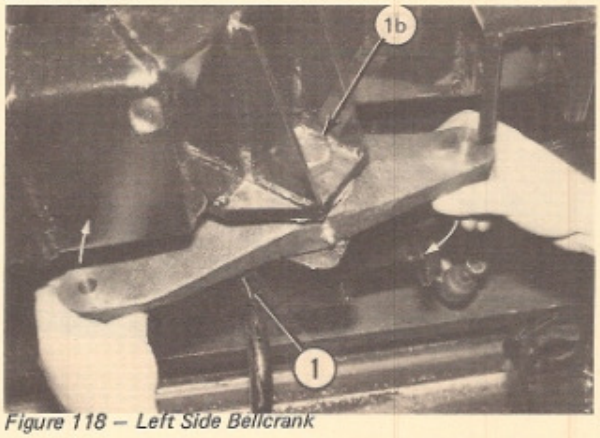


Figure 118 – Left Side Bellcrank

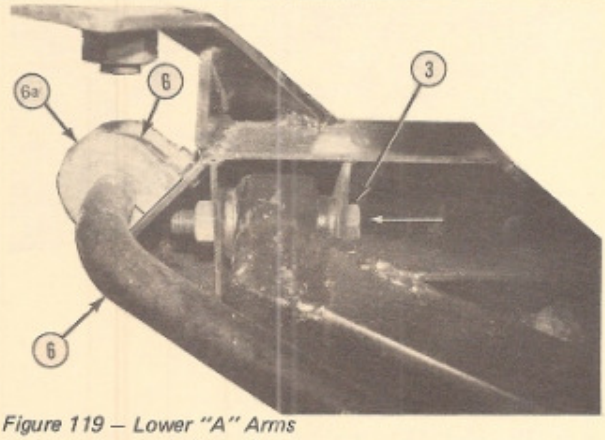


Figure 119 – Lower "A" Arms

1. **LEFT SIDE BELLCRANK:**
   NOTE: Be sure that stainless steel washers and Teflon lubricator disc are in place, except on later models which use a flanged bushing.*
   a. Slip bellcrank assembly between flange supports at right side of frame, being sure that short arm of the idler is to the rear of frame and the grease fitting is pointed out from the frame.
   b. Torque nut down to 100-150 ft. lbs. so as to allow arm to be moved with one hand firmly, with no up and down rocking movement (see figure 118).

*Flanged 2-piece bushing is not interchangeable with early design.

2. **INSTALL RIGHT AND LEFT JOUNCE STOPS.**

3. **LOWER RIGHT AND LEFT "A" ARMS:**
   NOTE: Be sure torsion bar socket is open to the rear of the frame, since arms are NOT interchangeable.
   a. Install two (2) bolts and nuts from rear of arm.
   b. Torque bolts to 120-150 ft. lbs. so that there is metal-to-metal contact between bushing collars and frame flanges.
   c. Tighten bolts so that "A" arm remains in level position when work is complete in step 3b.

SUSPENSION SYSTEM (Continued)

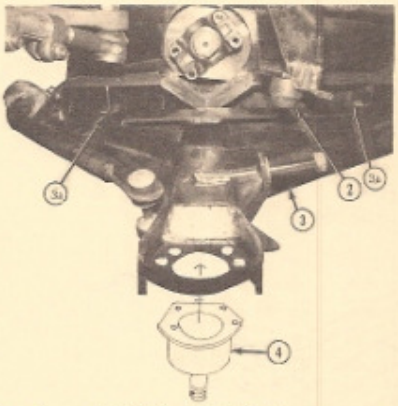


Figure 120 – Lower Ball Joint Installation

4. **LOWER BALL JOINTS INSTALLATION:**
   NOTE: Ball joint spindle to be pointed down, then raised into contact with "A" arm (see figure 120).
   a. Use four (4) binding locknut washers with nuts being installed from above.

5. **14" TIE ROD AT LEFT SIDE OF COACH:**
   a. Same as step 9, being sure to install to rear position of bellcrank.

6. **FRONT SWAY ARM INSTALLATION:**
   a. Cut rubber bushings on one side only to slip over sway arm at required location.
   b. Secure to frame with two (2) "U" clamps, using two (2) binding locknuts and bolts at both sides.

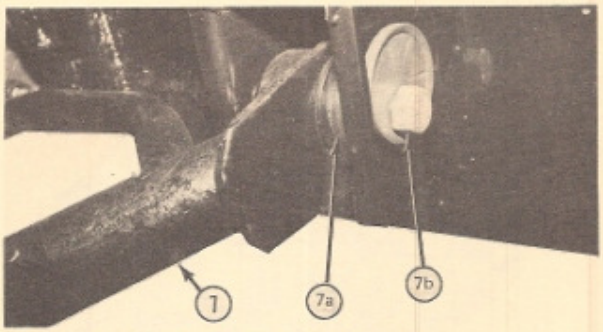


Figure 121 – Upper "A" Arm Installation

7. **UPPER "A"ARM INSTALLATION:**
   NOTE: Upper "A" arms are identical, left or right.
   a. Use mallet to tap upper arms into place, aligning bushing sleeves with frame bolt holes.
   b. Install camber bolts and washers with smooth side of washer always pointed to center of "A" arm on both sides (see figure 121).
   c. Torque bolts to 50 ft. lbs.

8. **UPPER BALL JOINT INSTALLATION:**
   a. Insert ball joint spindle from above "A" arm.
   b. Install ball joint flexible boot from below; then secure with four (4) binding locknuts.

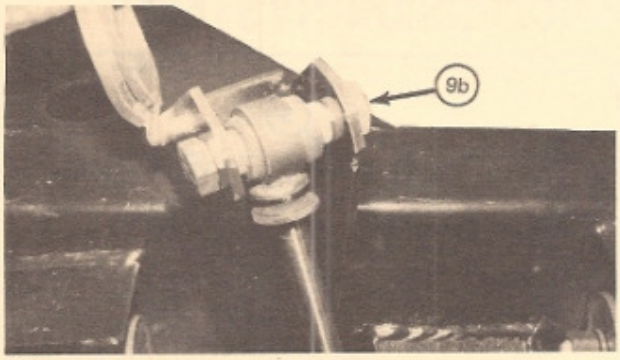


Figure 122 – Front Shock Installation

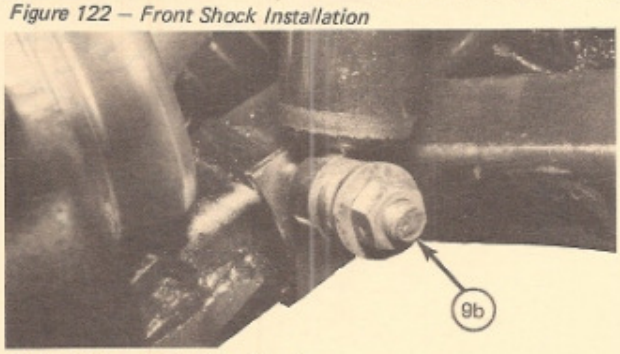


Figure 123 – Front Shock Locknut

9. **FRONT SHOCK INSTALLATION:**
   a. Extend shock arm to full extension being sure that while doing so the shock is vertical with the housing body down (so as to prevent shock fluid leakage).
   b. Install bolt and nut at top of shock (figure 122). Install nut only at bottom of welded stud on lower arm (fig.123).
   c. Torque locknuts to 60-75 ft. lbs.

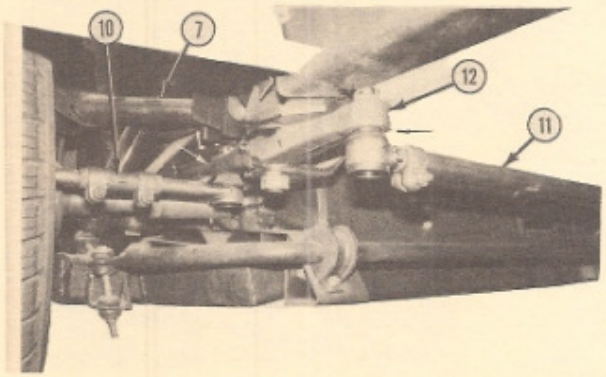


Figure 124 – Steering Linkage

10. **14" TIE-ROD AT RIGHT SIDE OF COACH:**
    a. Insert tie-rod into rear position of idler arm from below. **NOTE:** Center link is interchangeable side to side.
    b. Torque nut to 75 ft. lbs.

11. **48" CENTER LINK INSTALLATION:**
    a. Insert center link into front position of idler arm from below.
    b. Torque nut to 75 ft. lbs.

SUSPENSION SYSTEM (Continued)

12. **RIGHT SIDE IDLER ARM:**
    NOTE: Be sure that stainless steel washers and Teflon lubricator disc are in place (see figure 124), except on later models which use a flanged bushing.
    a. Slip idler assembly between flange supports at right side of frame, being sure that short arm of the idler is to rear of frame and the grease fitting is pointed out from the frame.
    b. Torque nut down to 100-150 ft. lbs. so as to allow arm to be moved with one hand firmly with no up and down movement (see figure 124).

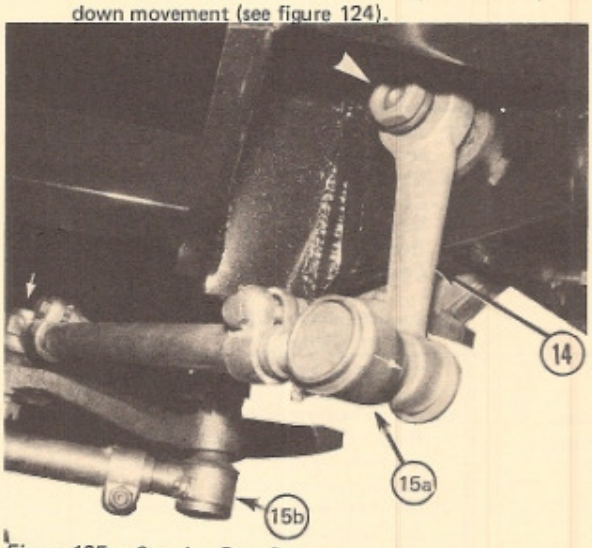


Figure 125 – Steering Gear Box

13. **STEERING GEAR BOX:** (See figure 125.)
    a. Install with four (4) bolts torqued down to 100 ft. lbs. each.
    NOTE: Steering spline shaft must be centered. This is done by first marking a spot on top of the housing and top spline.
    b. Next, rotate the top spline completely to the left (either direction will do).
    c. Now note total rotation of spline to the right about the marked spot and split the difference to center the top spline.

14. **PITMAN ARM:**
    a. Insert over spline shaft of steering gear box and torque nut to 150 ft. lbs.

15. **DRAG LINK:**
    a. Install drag link to lower pitman arm position.
    b. Install drag link to middle bellcrank position.

FRONT SUSPENSION ALIGNMENT RACK PROCEDURE

1. **RIDE HEIGHT (Front)** – The ride height is measured from the ground to the bottom of the frame alongside the bellcrank and idler position. The correct measurement is 17".

2. **CAMBER with 63 pounds tire pressure (Front)** – Set camber as follows:
   Left side – 0 to 1/4 degrees positive
   Right side – 0 to 1/4 degrees negative

3. **CASTER** – Set both sides at 4 1/2 degrees + (positive) to 5 degrees + . Check that a clearance exists between the frame and the control arm mounting bosses on the upper control arms.

4. **TOE IN-OUT** – After camber and caster is set, use the sighting device on the gauges to align the front wheels to the rear; then check that the bellcrank-to-idler cross link is the correct length of 42 3/4" center of joint to center of joint. Set the bellcrank and idler in the straight ahead position relative to the frame. Recheck that the front wheels are still in line to the rear and, by adjusting the tie-rods, set the toe to 1/8" total toe out (1/16" out each side). After the toe has been set, recheck the straight ahead position of the bellcrank and idler and front to rear alignment.

5. **EQUAL RIGHT AND LEFT TURN ANGLES** – By adjusting the drag link that connects the steering gear Pitman Arm to the bellcrank, it is possible to adjust the amount of left and right lock.
   a. Turn the steering wheel to full left lock. Read the angle on the circular plate under the left wheel. It should be approximately 31 degrees.
   b. Turn the steering wheel to full right lock and read the angle of the circular plate under the right wheel, it should be the same as the left, (approximately 31 degrees).
   c. If the steering lock angles do not match, adjust the drag link length and repeat the lock angle measurement until both sides are turning the same amount.

6. **TIE-ROD CLAMPS** – Tighten all tie rod clamps and ball joint nuts.
   NOTE: Check that all clamps are oriented correctly and that there is no interference between any steering link clamp and the frame or steering components. Also, check that all cotter pins are installed correctly.

7. **BALL JOINTS** – Grease all ball joints.

8. **STEERING** – With the steering on left lock– then right lock – then straight –, grease the bellcrank and idler bushings.

9. **BELLCRANKS AND IDLERS** – Check that bellcranks and idlers have plastic bearings, not brass, in center pivots. Tighten bellcrank and idler mounting bolts to 150 ft. lbs. torque.

10. **LUG NUTS** – Tighten lug nuts to 140-180 ft. lbs.

11. **TIRE INFLATION** – With Michelin radial tires, the correct front tire pressure is 63 psi. The correct rear tire pressure is 57 psi.

12. **STEERING WHEEL POSITION** – After setting alignment with wheels set straight ahead, check steering wheel

SUSPENSION SYSTEM (Continued)

position. If the wheel is not straight, it can only be straightened by removing the steering shaft from between the column and wheel. Straighten steering wheel with wheels straight ahead. Replace steering shaft on steering gear. Do **NOT** adjust the drag link.

13. **JOUNCE STOP** – Check that the rubber jounce snubber is installed and tight. Then check that there is sufficient jounce clearance between the flange on the metal jounce bracket and the control arm. With the ride height set at 17", the shortest distance from the metal flange on the jounce stop to the lower control arm where it would make contact after the snubber has compressed, should be 1".

14. **LEAKS** – Before removing the vehicle from the alignment pit, check it for oil and water leaks. Check all hose ends and connections and check all drain plugs for looseness.

NOTE: Never adjust torsion bars to change ride height unless the vehicle is jacked up and the suspension is hanging down in full rebound position.

SUSPENSION DIAGNOSIS

CONDITION	POSSIBLE CAUSE	CORRECTION
Vehicle leans to one side.	1. Incorrect tire pressure. 2. Improper tire/wheel usage. 3. Vehicle overloaded or unevenly loaded. 4. Loose, worn or damaged front or rear suspension components. 5. Improper spring usage or improperly installed and seated. 6. U-bolt loose at rear axle.	1. Assure uniform tire pressure for all six tires. 2. Install correct tire/wheel combination. 3. Correct as required. 4. Visually inspect suspension systems. Repair or replace as required. 5. Correct as required. 6. Jounce vehicle. Tighten U-bolts to specs. Recheck height.
Front bottoming or riding low.	1. Incorrect tire pressure. 2. Improper tire/wheel usage. 3. Vehicle overloaded or unevenly loaded. 4. Broken or incorrectly installed torsion bar adjusting cams. 5. Loose or broken shock absorbers. 6. Distorted or split jounce bumper. 7. Improper ride height.	1. Correct as required. 2. Install correct tire/wheel combination. 3. Correct as required. 4. Repair or replace as necessary. 5. Tighten or replace as necessary. 6. Correct as required. 7. Measure vertical distance between ground and bottom of front frame next to bell-crank and idler arms. If height is below ride heights, adjust torsion bars to correct.
Dog tracking of rear wheels	1. Loose or damaged front or rear suspension components. 2. Loose rear spring U-bolts. 3. Rear springs improperly installed on axle. 4. Rear spring center bolt bent.	1. Inspect, repair or replace as required. 2. Tighten to specification. 3. Repair as required. 4. Replace center bolt.
Shimmy or wheel tramp	1. Tire pressure. 2. Excessive tire sidewall deflection. 3. Irregular tire wear or tire sizes not uniform. 4. Loose wheel lug nuts. 5. Wheel bearing adjustment. 6. Out-of-round wheels. 7. Out-of-round tires. 8. Wheel and tire lateral runout not to specifications. 9. Wheel and tire balance. 10. Front wheel alignment (toe-in caster). 11. Deteriorated "A" arm bushing. 12. Loose or damaged shock absorbers. 13. Loose, worn or damaged steering linkage and idler arm connections. 14. Broken or sagging springs. 15. Loose steering gear mounting. 16. Incorrect steering gear adjustment. 17. Worn ball joints.	1. Adjust air pressure in tires. 2. Inspect, adjust air pressure and replace as necessary. 3. Check front wheel alignment, adjust and replace with same size tires. 4. Tighten to specifications. 5. Adjust to specifications. 6. Replace as required. 7. Replace as required. 8. Follow tire and wheel runout check 9. Balance wheels and tires. 10. Set toe to specifications. Set caster to specifications. 11. Replace. 12. Tighten and replace as necessary. 13. Tighten or replace as necessary. 14. Replace as required. 15. Tighten to specifications. 16. Adjust to specifications. 17. Replace ball joints.

SUSPENSION SYSTEM (Continued)

CONDITION	POSSIBLE CAUSE	CORRECTION
Sway or roll	1. Unequal load distribution (side-to-side). 2. Excessive load or body height. 3. Tire pressure. 4. Loose wheel lug nuts. 5. Worn or loose stabilizer assembly. 6. Loose or defective shock absorbers. 7. Broken or sagging spring. 8. Steering gear adjustment. 9. Loose steering gear mounting. 10. Excessive front or rear overhang. 11. Broken tie bolts on rear spring.	1. Correct as necessary. 2. Correct as necessary. 3. Adjust air pressure in tires. 4. Tighten to specifications. 5. Tighten or replace as required. 6. Tighten or replace as required. 7. Replace as required. 8. Adjust to specifications. 9. Tighten to specifications. 10. Correct as necessary. 11. Replace as required.

STEERING DIAGNOSIS

CONDITION	POSSIBLE CAUSE	CORRECTION
Power steering pump leaks.	1. Fluid, cap and dipstick 2. Loose or damaged hose connections. 3. Leakage between reservoir and housing. 4. Leakage at pump shaft seal area.	1. Check for indications of false leakage — overfilled reservoir, improperly installed, damaged or lost cap or dipstick. 2. Repair or replace as required. 3. Repair or replace as required. 4. Replace shaft seal or pump.
Noise in steering column. Squeak or creak Clunk	1. Steering column cover interference. 2. Steering column out of alignment. 3. Lack of lubrication where horn brush contacts rub plate of steering wheel. 4. Loose steering column mounting bolts. 5. Spline coupling bottoming. 6. Loose coupling to steering column bolt. 7. Improper steering gear mesh load.	1. Adjust or reposition as required. 2. Align or adjust as required. 3. Lube or adjust as required. 4. Tighten to specification. 5. Align or adjust as required. 6. Tighten to specification. 7. Readjust to specification.
Steering wheel off-center.	1. Improperly installed steering wheel. 2. Incorrect toe setting. 3. Misalignment of intermediate shaft to coupling.	1. Readjust steering wheel relative to column. 2. Set to specification. 3. Align as required.
Excessive Steering Effort	1. Improper oversized tires. 2. Tires not uniform. 3. Tire pressure. 4. Misaligned flexible coupling (if so equipped) to gear interference. 5. Steering wheel to column interference. 6. Steering column alignment. 7. Steering linkage or front axle ball joints for a binding condition or lack of lubrication. 8. Bind in bellcrank or idler arm. 9. Steering gear adjustment. 10. Power steering pump belt loose, glazed or broken. 11. Power steering pump fluid level and possible leak in system. 12. Power steering pump pressure and flow below specification. 13. Air in power steering system. 14. Contaminated fluid, incorrect fluid. 15. Steering gear valve binding or out of adjustment. (Integral Power Steering) 16. Excessive internal integral gear leakage. 17. Obstruction within steering gear or lines (including bent or kinked steel tubing).	1. Install correct tire and wheel combination. 2. Install correct tire and wheel combination. 3. Adjust air pressure in tires. 4. Align or adjust as required. 5. Align or adjust as required. 6. Align or adjust as required. 7. Lube, inspect, adjust or replace as required. 8. Lube, inspect, adjust or replace as required. 9. Adjust to specification. 10. Inspect, adjust belt tension or replace as required. 11. Add fluid, tighten connections and correct as necessary. 12. Conduct pump flow and relief pressure tests and adjust or repair as necessary. 13. Add fluid, tighten connections and bleed system. 14. Replace with correctly specified fluid. 15. Inspect, adjust. 16. Inspect, repair or replace as required. 17. Inspect, remove obstruction(s), and repair or replace as required.
Wanders Side to Side —	1. Vehicle overloaded or unevenly loaded. Alignment incorrect.	1. Correct as required.

WHEELS AND TIRES

NOTE: The Wheel bolt and nut fasteners are an important attaching part 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 of lesser quality or substitute design. Torque values must be used as specified during reassembly to assure proper retention of this part.

GENERAL DESCRIPTION – The factory installed tires and wheels are designed to operate satisfactorily with loads up to and including the full rated load capacity when inflated to the recommended inflation pressures.

Correct tire pressures and driving techniques have an important influence on tire life. Heavy cornering, excessively rapid acceleration, and unnecessary sharp braking increase tire wear.

REPLACEMENT TIRES

CAUTION: Do not mix different types of tires on the same vehicle such as radial, bias, and bias-belted tires except in emergencies, because vehicle handling may be seriously affected and may result in loss of control.

Some truck-type tires and most passenger-car-type radial tires have a TPC Spec. No. (Tire Performance Criteria Specification Number) molded into the tire sidewall near the tire size marking. This shows that the tire meets rigid size and performance standards which were developed for the vehicle. The TPC Spec. No. assures a proper combination of endurance, load capacity, handling, and traction on wet, dry and snow covered surfaces. When replacing tires with tires having the same TPC Spec. No., tires will be compatible with the vehicle. When replacing tires with those not having a TPC Spec. No. use the same size, load range, and construction type (bias, bias-belted, or radial) as the original tires on the vehicle.

Use of any other size or type tire may affect load carrying capacity, ride, handling, speedometer/odometer calibration, vehicle ground clearance, and tire clearance to the body and chassis. If replacing only a single tire, it should be paired on the same axle with the least worn tire of the others.

All tires on four-wheel drive vehicles must be of equal size (but not necessarily the same ply rating) and have the same tread configuration.

Replace tires when:

1. Tires are worn to a point where 2/32 inch (1.6 millimeters) or less tread remains, or the cord or fabric is exposed. To help detect this, tires have built-in tread wear indicators (figure 127) that appear between the tread grooves when tread depth is 2/32 inch (1.6mm) or less. When the indicators appear in two or more adjacent grooves at three spots around the tire, the tire should be replaced.
2. Tire thread or sidewall is cracked, or snagged deep enough to expose the cord or fabric.
3. Tire has a bump, bulge, or split.
4. Tire sustains a puncture, cut, or any other injury that cannot be correctly repaired because of the size or location of the injury.

METRIC TIRES – Metric tires are available in two load ranges: Standard load and Extra load. Figure 126 shows the meaning of the metric tire format. Most metric tire sizes do not have the exact corresponding alpha tire sizes. For example, a P205/75R15 is not exactly equal in size and load carrying capacity to an FR 78-15. For this reason, replacement tires should be of the same size, load range, and construction as those originally on the car. If metric tires must be replaced with other sizes, such as in the case of snow tires, a tire dealer should be consulted. Tire companies can best recommend the closest match of alpha to metric sizes within their own tire lines.

The metric term for tire inflation pressure is the Kilopascal (kPa). Tire pressure will usually be printed in both kPa and psi. Metric tire gauges are available from tool suppliers. The chart (figure 127) converts commonly-used inflation pressures from kPa to psi.

REPLACEMENT WHEELS – Wheels must be replaced if they become damaged (for example: bent, heavily rusted, leak air) or if wheel nuts often become loose. Do not use bent wheels which have been straightened, and do not use inner tubes in leaking wheels which are designed for tubeless tires. Such wheels may have structural damage and could fail without warning.

The wheels originally equipped on the vehicle will provide optimum life up to the maximum load and inflation pressures

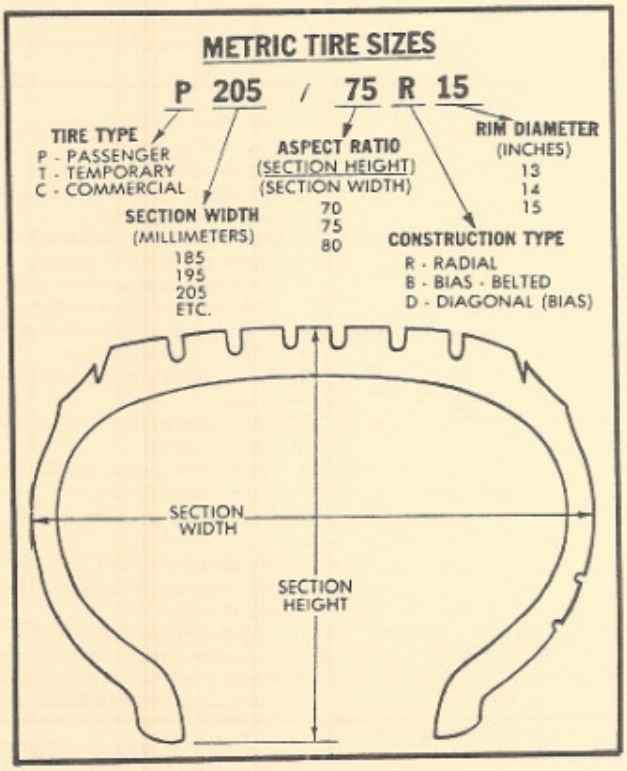


Figure 127 – Metric Tire Size Formula

WHEELS AND TIRES (Continued)

shown in the Wheel Code and Limits Chart. Maximum loads, maximum inflation pressures, wheel identification codes, and wheel sizes, are stamped on each wheel. Service tested and approved wheels are available from service. When obtaining wheels for any reason from any other source, the replacement wheels should be equal in load capacity, inflation pressure capacity, diameter, width, offset, and mounting configurations to those originally installed on the vehicle.

A wheel of the wrong size or type may adversely affect load carrying capacity, wheel and bearing life, brake cooling, speedometer/odometer calibration, stopping ability, headlight aim, bumper height, vehicle ground clearance, and tire clearance to the body and chassis. Replacement with "used" wheels is not advised: they may have been subjected to harsh treatment or very high mileage and could fail without warning.

The use of wheels and/or tires with higher load carrying limits than originally equipped on the vehicle does not in itself increase the GAWR or the GVWR of the vehicle.

REVCON RIM AND TIRE SIZES:

FRONT-RIM – 8.25 x 16.5 with 10R x 16.5 tire
GAWR – 5000 lbs.

REAR-RIM – 8.25 x 16.5 with 10R x 16.5 tire

GAWR per axle: 5000 lbs. all models

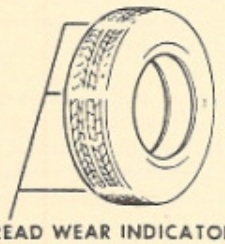
NOTE: REVCON wheel has a 2.71 inch offset. (1979 models and newer)

INFLATION PRESSURE CONVERSION CHART
(KILOPASCALS TO PSI)

kPa	psi	kPa	psi
140	20	215	31
145	21	220	32
155	22	230	33
160	23	235	34
165	24	240	35
170	25	250	36
180	26	275	40
185	27	310	45
190	28	345	50
200	29	380	55
205	30	415	60

Conversion: 6.9 kPa = 1 psi

Figure 126 – Inflation Pressure Conversion



TREAD WEAR INDICATORS

Figure 127 – Tread Wear Indicators

TIRE SERVICE OPERATIONS –

CAUTION: Servicing of tires mounted on multi-piece rims requires proper tools, safety equipment and specialized training. Severe injuries can result from improper servicing techniques.

TIRE INSPECTION AND ROTATION – Front and rear tires perform different jobs and can wear differently depending on the type of roads driven, individual driving habits, etc. To obtain maximum tire life, tires should be inspected and rotated regularly .

For the longest tire life, any time irregular wear is noticed, the tires should be inspected and rotated and the cause of the uneven wear corrected. Be certain to check wheel nut tightness and to adjust the tire pressures, front and rear, after rotation to agree with those recommended in the tire inflation charts.

TIRE INFLATION PRESSURE – Improper tire inflation pressures for the load the vehicle is carrying can adversely affect tire life and vehicle performance. The cold inflation pressures for the factory installed tires are given in the alignment specifications and also on the manufacturer's plate in the REVCON.

Too low an air pressure can result in tire overloading, abnormal tire wear, adverse vehicle handling, and reduced fuel economy. The tire flexes more and can build up excessive heat, which weakens the tire and increases susceptibility to damage from road hazards. Lower inflation pressures should be used only with reduced vehicle loads and the rear tire pressure may be equal to or less than the front pressure on single wheel application. After determining the load on each tire by weighing the vehicle on a scale, the correct cold inflation pressures for the actual tire loads can be obtained from the Tire/Wheel Load and Inflation Pressure Charts shown in this section.

CORRECTING IRREGULAR TIRE WEAR

Heel and Toe Wear – This is a saw-toothed effect where one end of each tread block is worn more than the other. The end that wears is the one that first grips the road when the brakes are applied.

Heel and toe wear is less noticeable on front tires than on rear tires, because the propelling action of the front wheels creates a force which tends to wear the opposite end of the tread blocks.

WHEELS AND TIRES (Continued)

The two forces, propelling and braking, make for even wear of the front tires, whereas only the braking forces act on the rear wheels, and the saw-tooth effect is more noticeable.

A certain amount of heel and toe wear is normal. Excessive wear is usually due to high speed driving and excessive use of brakes. The best remedy, in addition to cautioning the owner on his driving habits, is to interchange tires regularly.

Side Wear – This may be caused by incorrect wheel camber, underinflation, high cambered roads or by taking corners at too high a rate of speed. The first two causes are the most common. Camber wear can be readily identified because it occurs only on one side of the treads, whereas underinflation causes wear on both sides. Camber wear requires correction of the camber first and then interchanging the tires. There is, of course, no correction for high cambered roads. Cornering wear is discussed further on.

Misalignment Wear – This is wear due to excessive toe-in or toe-out. In either case, tires will revolve with a side motion and scrape the tread rubber off. If misalignment is severe, the rubber will be scraped off of both tires; if slight, only one will be affected. The scraping action against the face of the tire causes a small feather edge of rubber to appear on one side of the tread and this feather edge is certain indication of misalignment. The remedy is readjusting toe-in, or rechecking the entire front end alignment if necessary.

Uneven Wear – Uneven or spotty wear is due to such irregularities as unequal caster or camber, bent front suspension parts, out-of-balance wheels, brake drums out of round, brakes out of adjustment or other mechanical conditions. The remedy in each case consists of locating the mechanical defect and correcting it.

Cornering Wear – When a motorhome makes an extremely fast turn, the weight is shifted from an even loading on all wheels to an abnormal load on the tires on the outside of the curve and a very light load on the inside tires, due to centrifugal force. This unequal loading may have unfavorable results.

The transfer of weight may also overload the outside tires so much that they are laterally distorted resulting in excessive wear on the outside half of the tire, producing a type of wear like that caused by excessive positive camber.

Cornering wear can be most easily distinguished from abnormal camber wear by the rounding of the outside shoulder or edge of the tire and by the roughening of the tread surface which denotes abrasion.

Cornering wear often produces a fin or raised portion along the inside edge of each row in the tread pattern. In some cases this fin is almost as pronounced as a toe-in fin, and in others, it tapers into a row of tread blocks to such an extent that the tire has a definite "step wear" appearance.

The only remedy for cornering wear is the proper instruction of operators. Driving more slowly on curves and turns will avoid grinding rubber off tires. To offset normal cornering wear as much as possible, tires should be interchanged at regular intervals.

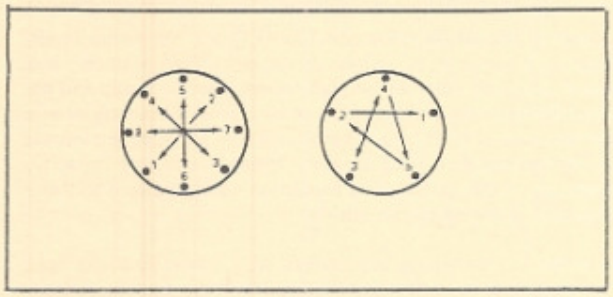


Figure 128 – Wheel Nut Tightening Sequence

Wheel and Tire Balancing – It is desirable from the standpoints of tire wear and vehicle ride and handling ease, to maintain proper balance of wheel and tire assemblies on all models. This may be accomplished by either of the two types of balancing systems in current use which balance wheels either on the vehicle or off.

> **NOTE:** The "on the vehicle" type, however, is the more desirable in that all rolling components (brake drums, bearings, seals, etc.) are included in the balancing procedure and thereby have any existing unbalance corrected.

Wheel Balance Weights – Wheel balance weights should be installed on both inner and outer flanges of each wheel.

Dynamic Balance – Dynamic balance (sometimes called running balance) means that the wheel must be in static balance, and also run smoothly at all speeds.

To insure successful, accurate balancing, the following precautions must be observed:

Wheel and tire must be clean and free from all foreign matter.

The tires should be in good condition and properly mounted with the balance mark on the tire, if any, lined up with the valve.

Bent wheels that have runout over 1/16" should be replaced.

Inspect tire and wheel assembly to determine if an eccentric or out-of-round condition exists. Note that this condition, if severe, cannot be "balanced out." An assembly which has an out-of-round condition exceeding 3/16" on tire sizes through 16.5" is not suitable for use on the front of the vehicle. Its use on the rear should be governed by its general condition and whether the roundness defect seriously detracts from overall ride quality.

When balancing wheels and tires, it is recommended that the instructions covering the operation of the wheel balancer being used be closely followed.

On-the-motor-home type balancing is to be used for the best results.

WHEELS AND TIRES (Continued)

FRONT WHEEL ASSEMBLY BALANCING PROCEDURE – The front wheel/tire assembly should be balanced as a unit. This is due to the many major components that make up the front-drive-wheel assembly, anyone of which can cause front-end vibration. For this reason, REVCON uses the following method to spin balance their coaches:

NOTE: The rear tires must be spin balanced on the vehicle. (See Rear Tire Balancing procedure on this page.)

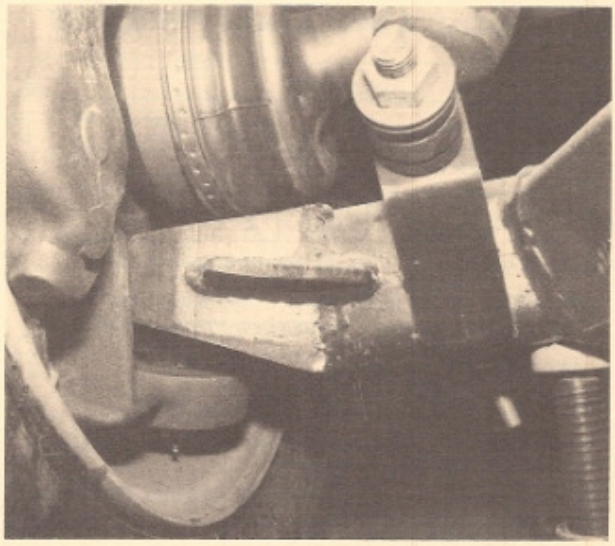


Figure 129 – Jack Location for Wheel Balancing

The Revcon's own engine is used to spin the front wheels. Do not use the electric drive of the spin balancer, only use the sensors and strobe of the unit.

1. With a 5-ton minimum floor jack, raise the wheel/drive line of the tire to be tested as follows: Place the jack pad as far outboard as possible under the lower "A" arm (see figure 129). Raise "A" arm so that the tire clears the ground and the half-shaft is nearly parallel with the ground.*
   NOTE: By raising the coach on one wheel, as shown, only the raised wheel will be driven. This is made possible by the construction of the differential. If properly done, this method is safe. However, safety precautions must be observed. Do not stand in front of the coach, and do not work under the coach when front-drive is engaged.
2. With one operator in the coach to operate the engine and speed, and another operator outside using the balancing equipment, start the engine and raise speed to 55-60 mph, registered. Stop the wheel gradually with light brake pressure, as required.
3. Balance tire, checking to see if the inside operator feels any vibrations through the steering wheel. When all vibrations are eliminated from one side, proceed to other side and repeat the procedure. Be sure to install lead weights on inner and outer side of wheel, to evenly balance the tires.

*Do not spin the wheel if both wheels are allowed to hang by the suspension. The half-shafts will be damaged.

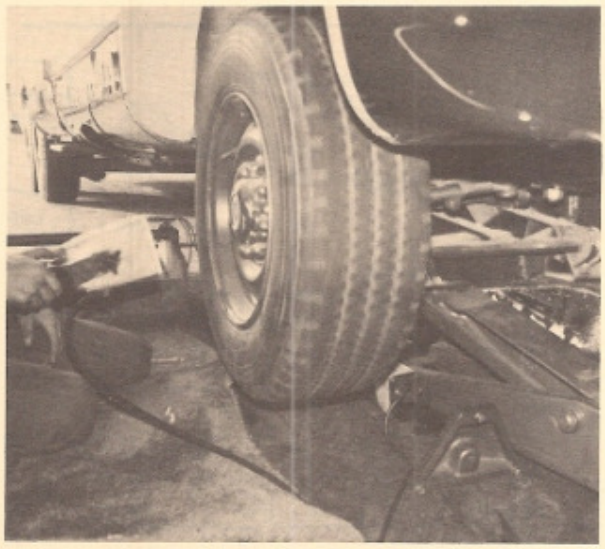


Figure 130 – Wheel Balancing

4. Remember to always mark one wheel stud in relation to any wheel to be removed, since the drive line has been balanced, not just the wheel.

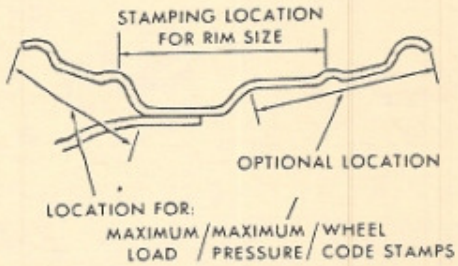
REAR TIRE BALANCING (See figures 131 and 133.)

Notes: The rear brake drums **are not balanced** and must be mounted on the axle with the tire and steel wheel. Each tire must be balanced as a unit, tire, steel wheel, and brake drum, with a spin balancing unit.

1. Raise both tires of one side at rear axle hanger beam. (See figure 133.)
2. Place vibration sensor of spin balancer under the "walking beam" as close to the wheel being balanced as possible and under rear axle bar.
3. Proceed with wheel balancing using the electric motor drive of the spin balancer and the strobe light.
4. If wheel weights allow, distribute the weight on both the front and back of the steel wheels.

Figure 131 – Rear Tire Balancing

WHEELS AND TIRES (Continued)



WHEEL CODE AND LIMITS			
PART NUMBER & CODE	TYPE AND SIZE OF WHEEL	WHEEL LIMITS	
		MAX. LOAD (LBS.)	MAX. PRESS. (PSI)
BUDD P/N	16.5 x 8.25	2,750	65
R92250	2.71 inches offset		

TIRE/WHEEL LOAD & INFLATION PRESSURE

Wheel Code	Tire Size	Load Range	Tire Load Limits at Various Inflation Pressures									
			30	35	40	45	50	55	60	65*	70	75
WIDE BASE TUBELESS TIRES USED AS SINGLES												
* 10 R x 16.5	D	–	–	–	1870	2047	2235	2417	2625			

Figure 132 – Tire/Wheel Load and Inflation Pressure

*65 psi is maximum pressure allowable by wheel specifications.

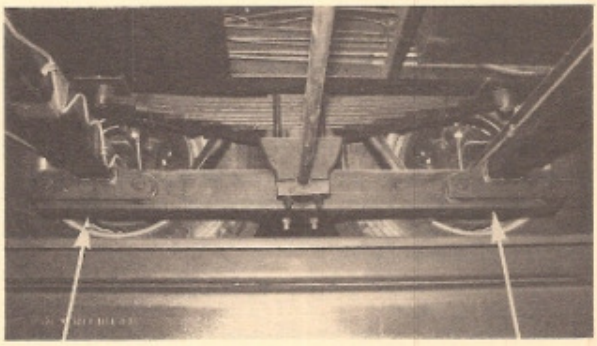


Figure 133 – Rear Axle Hanger Beam

WHEEL INSTALLATION (Single Wheels) – When installing the tire and wheel on the vehicle, follow this procedure:

After wheel nuts are put on loosely, turn the wheel until one nut is at the top of the bolt circle; tighten the nut just snug.

Snug up the remaining nuts criss-cross to minimize runout; then tighten the nuts to the recommended torque alternately and evenly to avoid excessive runout.

RADIAL TIRES MOUNTING – Recommended truck tire mounting and inflation procedures are especially important with radial truck tires. Failure to follow these recommendations can cause bead deformation in both tube type and tubeless tires due to incorrect bead setting. Bead deformation may lead to chafing, lower sidewall and bead area cracking, demounting difficulties, eccentric wear, ride vibration, and non-retreadable casing.

Series	Description	Torque
8 bolts on 6½" bolt circle	9/16" bolts (8) or 5/8" bolts (8)	150 ft.lbs.

Figure 134 – Wheel Nut Torque .

To insure correct mounting and bead seating and to prevent bead deformation, the following steps must be taken:

Tubeless Tires

1. Only use rims approved for radial tire usage by rim manufacturer. Thoroughly clean rim, removing all rust and other foreign material.
2. Thoroughly lubricate tire beads and rim bead seats with an approved rubber lubricant.

NOTE: Do not use silicone base lubricants. This could cause the tire to slip on the wheel.

3. Inflate tire to operating pressure. Due to the construction of radial truck tires, particularly in the lower sidewall and bead area, it may be difficult to get the tire to take air. An inflation aid may be necessary to help seat the bead of tubeless radial tires. Two types of inflation aids are commercially available: 1) Metal rings which use compressed air to seat beads, and 2) Rubber rings which seal between the tirebead and rim bead seat, allowing the bead to move out and seat. Lubrication is mandatory with both items. The Michelin tire may be inflated to 90 psi to assure that the tire seats.
4. Check bead seating. This check is made by measuring the space between the rim flange and one of the three lower sidewall rim line rings while the tire is laying flat (measurements should be taken each 90 degrees around the circumference of the rim flange). If spacing is uneven around the bead from side to side, repeat steps 1 through 3, and recheck.

NOTE: It is important that this procedure be followed to insure proper bead seating in order to prevent bead deformation.

5. Radial tires, as well as the bias tires, must be mounted and inflated in accordance with safety precautions noted in RMA Radial and Bias Truck Tire Service Manuals. Adjust tire pressure per alignment specification section.

TIRE REPAIR – There are many different materials and techniques on the market to repair tires. As not all of these work on all types of tires, tire manufacturers have published

WHEELS AND TIRES (Continued)

detailed instructions on how and when to repair tires. These instructions can be obtained from the tire manufacturers.

SNOW TIRES – If the vehicle is expected to encounter muddy or snowy driving conditions it is recommended that front driving wheels be equipped with mud and snow type tires.

If you equip your vehicle with mud and snow tires, they should be of the same size, load range, and construction as original equipment tires. It is recommended that vehicle speeds be limited to a maximum of 65 mph if mud and snow tires are installed.

TIRE WEAR AND ROTATION – Uneven or abnormal tire wear is usually the result of incorrect inflation pressure, improper wheel alignment, wheels being out-of-balance, or poor driving habits. Under-inflation, over-inflation, incorrect toe or camber and fast cornering produce different types of abnormal wear which can be diagnosed by your dealer.

To equalize wear it is recommended that the tires be rotated every 6000 miles (or sooner if irregular wear develops) as shown.

NOTE: It is recommended that disc brake pads be inspected for wear whenever tires are rotated.

The original equipment tires incorporate built-in tread wear indicators to assist you in determining when your tires have worn to the point of needing replacement. These indicators appear as 1/2-inch wide bands when tire tread depth is 1/16-inch or less. When the indicators appear in two or more adjacent grooves, tire replacement due to tread wear is recommended.

TIGHTENING WHEEL STUD NUTS – When your REVCON is new or after wheels have been replaced, it is the owner's responsibility to check wheel stud nuts at 500 miles and after every wheel removal thereafter. Nuts should be tightened to 150-ft.lbs. torque in sequence shown in figure 128.

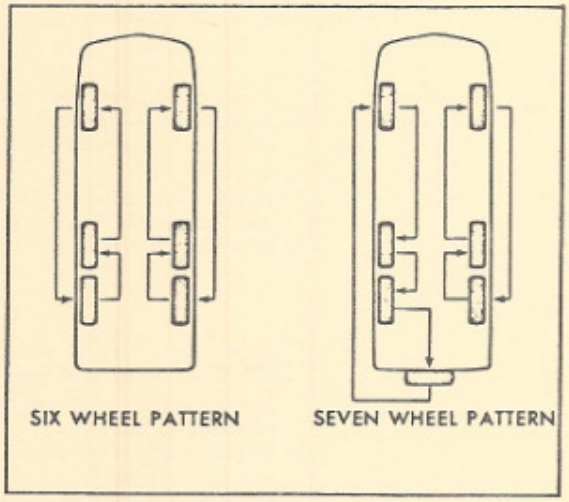


Figure 135 – Tire Rotation Diagram

TIRE SERVICE DIAGNOSIS

CONDITION	POSSIBLE CAUSE	CORRECTION
Tires show excess wear on edge of tread	1. Under inflated tires. 2. Vehicle overloaded. 3. High-speed cornering 4. Incorrect toe setting.	1. Adjust air pressure in tires. 2. Correct as required. 3. Correct as required. 4. Set toe to specification.
Tires show excess wear in center of tread	Tires over inflated.	Adjust air pressure in tires.
Other excessive tire wear problems	1. Improper tire pressure. 2. Incorrect tire/wheel usage. 3. Loose or leaking shock absorbers. 4. Front end out-of-alignment. 5. Front wheel bearings out of adjustment. 6. Loose, worn or damaged suspension components, bushings and ball joints. 7. Wheels and tires out of balance. 8. Excessive lateral and/or radial runout of wheel or tire.	1. Adjust air pressure in tires. 2. Install correct tire and wheel combinations. 3. Tighten or replace as necessary. 4. Align front end. 5. Adjust front wheel bearings. 6. Inspect, repair or replace as required. 7. Balance wheels and tires. 8. Check, repair or replace as required. Use dial indicator to accurately determine runout.
Excessive vehicle vibration, rough steering, or severe tire wear.	1. Loose or improper attaching parts. 2. Overloading or unbalanced loads.	1. Tighten or replace. 2. Check wheel and tire specs against work load requirements. Recommend correct tire and rim. Check on loading procedure.

WHEELS AND TIRES (Continued)

TIRE SERVICE DIAGNOSIS (Continued)

CONDITON	POSSIBLE CAUSE	CORRECTION
Vehicle vibrations	1. Loose or worn driveline or suspension parts.	1. Identify location of vibration carefully as it may be transmitted through frame making a rear end vibration appear to come from the front. Repair or replace loose and worn parts.
	2. Improper front end alignment.	2. Align front end.
	3. Excessive lateral runout (wheel or tire). Use a dial indicator to accurately verify runout reading.	3. Replace wheel or tire.
	4. Bent or distorted wheel disc from overloading, road impact hazards or improper handling.	4. Replace wheel. Attempts to straighten wheel can result in fractures in the steel and weakening of the disc or the weld between disc and rim. Check loading and operating conditions and the shop practices.
	5. Loose mountings – damaged studs, cap nuts, enlarged stud holes, worn or broken hub face or foreign material on mounting surfaces.	5. Tighten and/or replace worn or damaged parts. Clean mounting surfaces.
	6. Out-of-balance wheel and/or tire or hub and drum assembly.	6. Determine the out-of-balance component and balance or replace.
	7. Out-of-round wheel or tire (excessive radial runout). Use a dial indicator to accurately verify runout reading.	7. Replace the wheel or tire and check for overloading and unbalanced loads, rugged operating conditions, proper wheel and tire specifications.
	8. Water in tires.	8. Remove water.
Wheel mounting is difficult	1. Improper application or mismatched parts, including studs and nuts.	1. Follow manufactures specifications.
	2. Corroded or worn parts.	2. Clean or replace.
Wheel-rust corrosion	Poor maintenance.	Keep clean and protect with paint.

REPACKING FRONT WHEEL BEARINGS AND RESURFACING BRAKE DISC – To replace the front wheel bearings or to resurface the brake discs, the hub/disc/knuckle assembly must be removed from the vehicle and disassembled.

DISASSEMBLY

1. Remove the brake caliper and place the caliper so that the brake hose is not damaged.
2. Remove the upper and lower ball joint tapered studs from the steering knuckle. Also, remove the tie-rod end stud from the knuckle.
3. Remove the nut which holds the hub to the half-shaft and slide the assembly off the half-shaft splines.
4. Pry or press the hub/disc sub-assembly out of the inner bearing of the knuckle. Separate the disc and hub. If the disc is to be resurfaced, press out the lug bolts. Pry the outer bearing from the center shaft of the hub. Discard inner and outer seals. Each bearing set consists of two (2) races, two (2) bearings, and a spacer. Each part of the set has a 4-digit number scribed on it (such as 4897). One race and one bearing will have the letter "A" behind the number (such as 4897A) and are to be used together. Record the part position as they are removed if the bearings are to be reused.
5. Lubricate the bearings with Quaker State Lithum Complex NLG1 No. 2, 525°F high temperature grease or equivalent brand.

REASSEMBLY

1. To reassemble the hub and disc, place the eight (8) lug bolts in the holes. Install a flat washer and nut on each lug bolt and tighten the bolts to draw the hub and disc together. Discard the washers and nuts.
2. Install outer bearing and outer seal into knuckle and place knuckle over the center shaft of hub/disc assembly. Using a suitable collar, press the outer bearing down the center shaft of the hub. Use a force of 500 ft. lbs. maximum if necessary to "bottom" the bearing.
3. Install the spacer.
4. Press the inner bearing down the center shaft of the hub and install the inner seal.
5. Reattach the hub/disc/knuckle assembly to vehicle. Torque half-shaft nut to 150 ft. lbs.

POWER STEERING

POWER STEERING GEAR – The Saginaw power steering unit (see figures 136 and 137) is a torsion-bar type of hydraulic-assisted system. The system furnishes power to reduce turning effort at the steering wheel. It also reduces road shock and vibrations.

The torsion bar power steering unit includes a worm and one-piece rack piston, meshed to the gear teeth on the steering sector shaft. The unit also includes a rotary style hydraulic valve consisting of input shaft, control valve body, and torsion bar. The valve body is pinned to the worm, and the input shaft is connected to the worm through the torsion bar. Hydraulic action is generated by relative rotary motion between input shaft and worm/sleeve assembly.

The torsion-bar type of power steering gear is designed with the one-piece rack piston, worm, sector shaft, and the rotary valve assembly in one housing. This makes possible internal fluid passages between valve and power cylinder, eliminating all external lines and hoses, except the pressure and return hoses between the pump and gear assembly.

The power cylinder piston is an integral part of the gear housing. The piston is double acting, in that fluid pressure may be applied to either side of the piston.

The control valve is a unique rotary design that uses relative rotational motion of the input shaft and valve body to direct fluid flow. In a neutral (straight ahead) position, where no

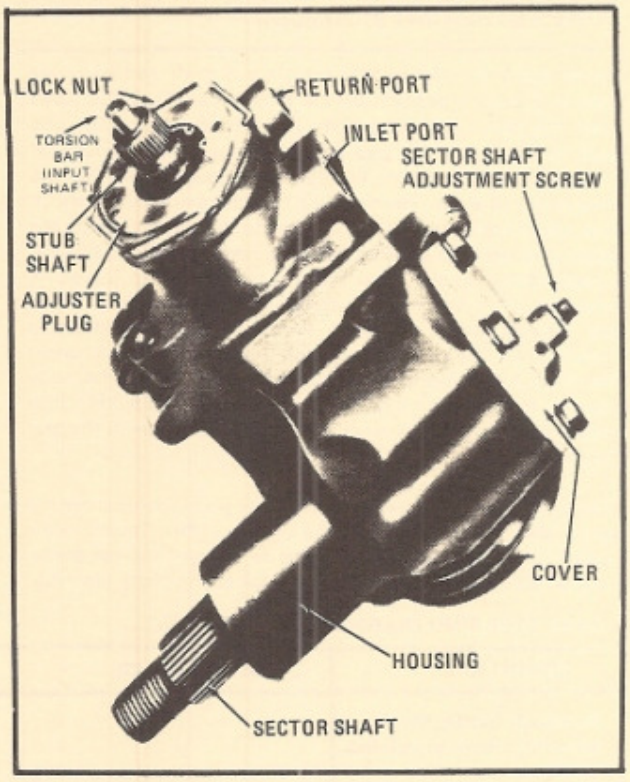


Figure 136 – Steering Gear

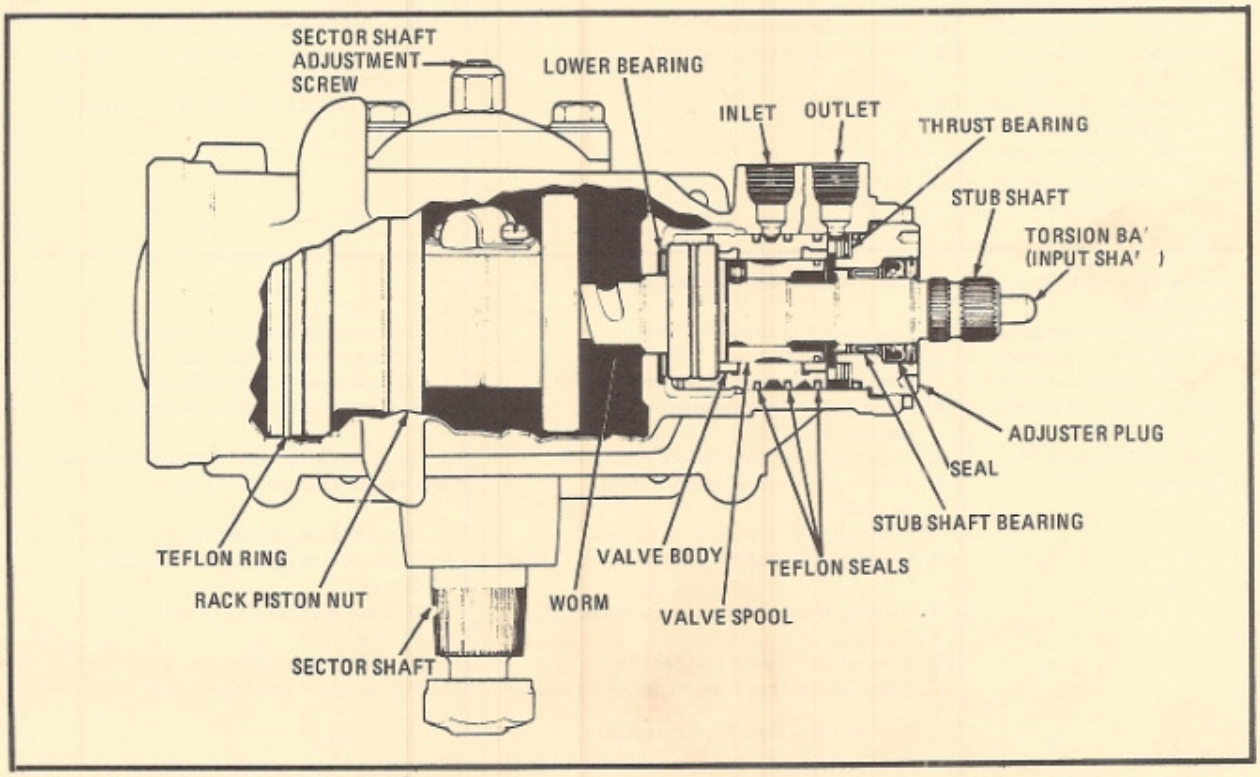


Figure 137 – Cutaway View of Steering Gear

POWER STEERING (Continued)

power assist is required, the valve input shaft and body are held in a central position by the torsion bar. The fluid flows from the inlet port through the valve to the outlet port and back to the pump. No area of the steering gear is under high pressure in this position. The valve and housing cylinder are always full of power steering fluid, which dampens road shock that otherwise would be transmitted to the driver through the steering wheel. The steering force, applied through the steering wheel/column to the input shaft, is transmitted to the worm where it meets the resisting forces of the road wheels. When the steering forces are great enough, rotational deflection (twisting) of the torsion bar occurs. This deflection changes the relative position of the input shaft and control valve body causing throttling of the hydraulic flow and directing high pressure fluid to the appropriate end of the piston in the gear housing.

The difference in pressure forces on the piston helps move the sector shaft, thus assisting in the turning effort. The oil in the opposite end of the gear housing is forced out through the return outlet of the control valve and back to the pump reservoir.

With higher steering efforts, increased valve displacement will give the driver proportionately higher assisting pressure. The driver will have a smooth hydraulic assist at all times.

When the driver stops applying steering effort, the valve body and input shaft are returned to a centered position.

The valve input shaft is attached on one end to the steering column and steering wheel. The same end is connected to the worm through the torsion bar providing the load to the road wheel side of the steering system.

NOTE: A hissing noise is a normal characteristic of rotary valve steering gear and in no way affects steering. A replacement valve will also exhibit slight noise, so it is not always a cure for the complaint. Any metal-to-metal contacts at the flexible steering shaft coupling (due to column misalignment) will transmit severe valve hissing noise into the passenger compartment and should be corrected.

POWER STEERING DIAGNOSIS AND TESTING –

CONDITION	POSSIBLE CAUSE	CORRECTION
Feedback (rattle, chuckle, knocking noises in steering gear). Feedback is a condition that is noticed when a car is driven over rough pavement and this roughness felt in the steering wheel by the driver. In addition, if the gear is not adjusted properly, excessive rattle, knocking and/or chuckle noises can be heard inside the car.	1. Deteriorated shock absorbers. 2. Gear loose on frame. 3. Steering linkage balljoints loose/worn. 4. Insufficient meshload. 5. Pressure hose touching other parts of vehicle. 6. Loose pitman arm.	1. Replace shock absorbers. 2. Tighten mounting bolts (3) to specification. 3. Replace appropriate tie rod end assemblies. 4. Set meshload to specification. 5. Loosen, reposition and retighten fitting to specified torque. 6. Tighten sector shaft nut to specification.
Heavy Steering Efforts, Poor Assist A heavy effort and poor assist condition is recognized by the driver while turning corners and especially while parking. A road test can verify the condition.	**Poor Assist – Both Directions.** 1. Low steering system fluid fill. 2. Engine idle too low. 3. Low power steering pump belt tension. 4. Pump flow/relief pressure not to specification. 5. External leakage giving low fluid level. 6. Two or more valve plastic O-rings cut or twisted. 7. Piston plastic O-ring cut or twisted. 8. Loose/missing rubber backup piston O-ring. 9. Valve/gear housing oil passages blocked. 10. Leakage past piston end cap. 11. Porosity in piston bore on housing casting. **Poor Assist – One Turn Direction** 12. One valve plastic O-ring.	1. Add steering fluid to proper level. 2. Set engine idle to specification. 3. Set belt tension to specification. 4. Test pump, and service as necessary. 5. See diagnosis guide for external leakage. 6. Replace valve plastic O-rings. 7. Replace piston plastic O-ring. 8. Replace/install rubber backup piston O-ring. 9. Replace gear housing or valve housing as required. 10. Tighten piston end cap to specification. 11. Replace gear housing. 12. Replace valve plastic O-rings.

POWER STEERING (Continued)

CONDITION	POSSIBLE CAUSE	CORRECTION
Poor Returnability — Sticky Feeling Poor returnability is a condition that is noticed when the vehicle is in a turn and returns to center with effort from the driver. In addition, when the driver returns the steering wheel to center, it may have a sticky or catchy feel.	1. Wheel alignment not to specification. 2. Binding steering column. 3. Steering column not properly aligned — flex coupling distorted. 4. Meshload set to tight. 5. End lash adjusting screw not properly staked to sector. 6. Damaged stub shaft bearing. 7. Binding in valve assembly.	1. Reset wheel alignment. 2. Service steering column as required. 3. Align steering column. 4. Reset meshload to specification. 5. Replace sector assembly. 6. Replace valve assembly. 7. Replace valve assembly.
External Leakage One of the most common conditions causing repeat repairs is fluid leaks. Make sure you clean off the steering gear first before any steering gear external leakage checks are performed.	1. Overfilled reservoir. 2. Loose hose fittings. 3. Missing/damaged hose assembly O-rings. 4. Leak from stub shaft seal. 5. Leak at adjuster plug face to housing joint. 6. Leak at sector adjuster screw lock nut. 7. Leak at sector shaft seal. 8. Leak between torsion bar and stub shaft. 9. Leak at housing ball seat. 10. Leak at housing end plug. 11. Leak from gear housing.	1. Adjust to proper level. 2. Tighten hose fittings to specification. 3. Install/replace O-rings. 4. Replace stub shaft seal and dust seal. 5. Replace adjuster plug O-ring. 6. Replace lock nut. 7. Replace sector shaft seals and examine sector shaft for pitting or corrosion. Replace sector shaft if necessary. 8. Replace valve assembly. 9. Install new ball per directions in service manual. 10. Replace end plug O-ring. 11. Replace gear housing.
Hissing Sound There is some noise in all power steering systems. One of the most common is a hissing sound most evident at standstill parking. There is no relationship between this noise and the performance of the steering gear.	1. "Hiss" may be expected when the steering wheel is at the end of travel or when turning it at standstill.	1. Hiss is a normal characteristic of rotary valve steering gears and in no way affects steering. Do not replace the input shaft and valve assembly unless the hiss is extremely objectionable. A replacement valve will also exhibit a slight noise and is not always a cure for the condition. Investigate for a grounded column or a loose boot at the dash panel. Any metal to metal contacts will transmit valve hiss into the passenger compartment through the steering column. Verify clearance between flexible coupling components. Be sure steering column shaft and gear are aligned so flexible coupling rotates in a flat plane and is not distorted as shaft rotates.

MESH LOAD — GEAR REMOVED —

1. Turn the input shaft stub from stop to stop, counting the total number of turns. Starting at either stop, turn the stub shaft 1/2 the total number of turns. This is the "center" of the gear. (The flat on the stub shaft is normally up when the gear is "on center" (see figure 137) and the block tooth on the sector shaft is in line with the mesh adjusting screw (see figure 137).
2. Loosen the locknut and turn the mesh adjusting screw clockwise (left hand thread) until it stops, then turn it counterclockwise one full turn.
3. Rotate the torque wrench approximately 45 degrees each side of the center, and "read" near or on center (highest reading) (see figure 138). Turn the mesh adjusting screw until the correct "O" center torque, in excess of the reading just taken, is obtained (see figure 139).

NOTE: Limits for "new" and "used" gears differ as follows:

a. "New" gear overcenter torque to be 4-8 in.-lbs. additional torque.

b. "Used" gear (more than 400 miles) overcenter torque to be 4-5 in.-lbs.

POWER STEERING (Continued)

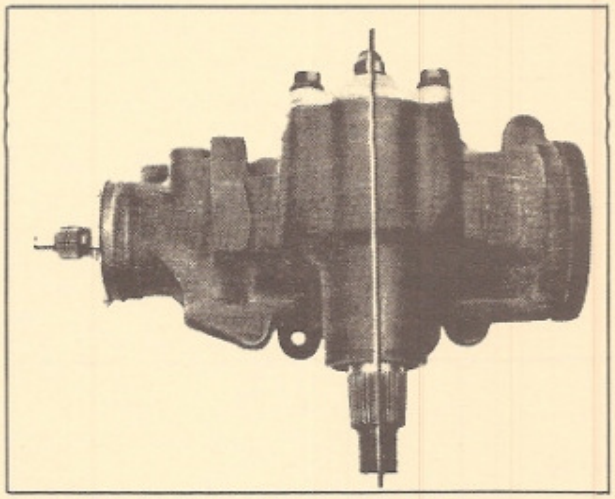


Figure 138 – Aligning Sector Shaft Block Tooth

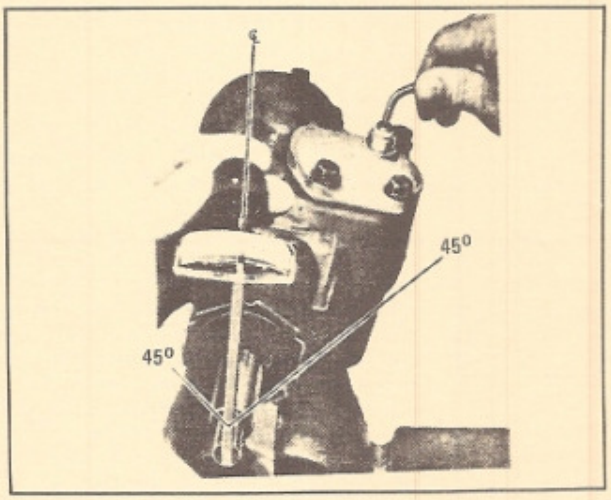


Figure 139 – Checking Overcenter Rotational Torque

Tighten the lock nut to 27-37 ft.-lbs. while holding the mesh adjuster screw. Recheck the overcenter adjustment.

MESH LOAD – IN VEHICLE – Adjust the total overcenter position load (mesh load) to eliminate excessive lash between the sector shaft and rack piston teeth as follows:

1. Disconnect the Pitman arm from the sector shaft. Remove the steering wheel hub.
2. Disconnect the fluid return line at the reservoir, and cap the reservoir return line pipe.
3. Place the end of the return line in a clean container and turn the steering wheel from left to right to discharge the fluid from the gear.
4. Turn the gear one-half turn off center in either direction. Using 24 in.-lbs. torque wrench on the steering wheel nut, determine the torque required to rotate the shaft slowly through a 20 degree arc.
5. Turn the gear back to center and repeat step 4. Loosen the adjuster lock nut and turn the mesh adjusting screw inward using 7/32-inch Allen wrench, until the reading is 5 in.-lbs. greater than the reading taken in step 4. Retighten the lock nut while holding the mesh adjusting screw in place.
6. Recheck the readings and replace the Pitman arm and steering wheel hub.
7. Connect the fluid return line to the reservoir and fill the reservoir with C1AZ-19582-A, C, or -D or equivalent to specification.

STEERING GEAR REMOVAL – When servicing the steering gear, label hoses before disconnecting them.

1. Remove the Pitman arm at this time from the sector shaft using a Pitman arm puller.
2. Position a drain pan under the steering gear. Disconnect the pressure and return lines from the steering gear and plug the lines and ports in the gear to prevent entry of dirt.
3. Raise the vehicle on a hoist and remove the drag link from the Pitman arm.
4. Remove the nuts that secure the cardan joint to the steering column shaft assembly (see figure 140).
5. Support the steering gear and remove the steering gear attaching bolts.
6. Remove the bolt from the U-joint and remove the coupling from the gear.

STEERING GEAR INSTALLATION –

1. Before installing the gear in the vehicle, attach U-joint from steering column to the steering gear. Install bolt and tighten to specification.
2. Slide the steering gear into place on the frame side rail. Install the attaching bolts and tighten to 70 ft.-lbs.
3. Center the steering gear stub shaft.
4. Install the Pitman arm on the sector shaft with Pitman arm facing forward. Install the Pitman arm attaching washer and nut. Tighten nut to specification.

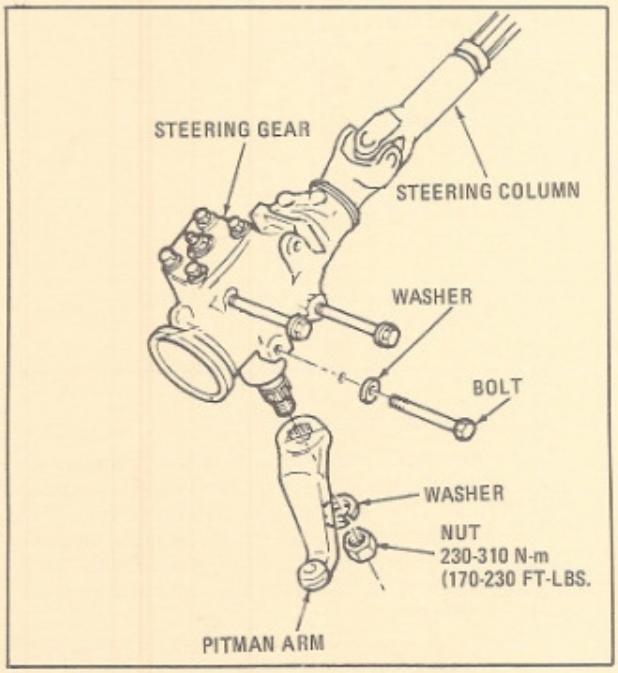


Figure 140 – Power Steering Gear Installation

POWER STEERING (Continued)

NOTE: If new steering gear attaching bolts and washers are required, use only the bolt and washer specified. Use grade 8 bolts.

5. Move steering column shaft flange into place on the cardan joint.
6. Connect and tighten the pressure and return lines to the steering gear. Tighten fittings to specifications.
7. Fill the power steering pump reservoir to specification with power steering fluid C1AZ-19582-A, C, D, or equivalent. Run the engine and turn the steering wheel from left to right to distribute the fluid and bleed out trapped air. Inspect for fluid leaks.
8. Recheck fluid level and add fluid C1AZ-19582-A, C, D or equivalent, if necessary.

STEERING GEAR DISASSEMBLY AND ASSEMBLY – Take the following precautions when servicing the steering gear:

Use a clean workbench and tools.

Thoroughly clean the exterior of the gear with solvent and drain off excess hydraulic fluid, if necessary.

Do not use solvent on seals.

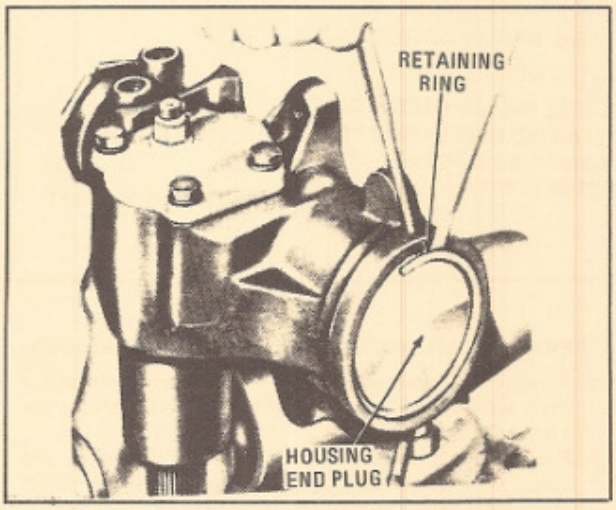


Figure 141 – Removing End Plug Retaining Ring

1. Mount the steering gear in a vise (see figure 140).
2. Rotate the housing end plug retaining ring until one end of the ring is opposite the hole in the housing.
3. Working through the hole in the housing (figure 140), unseat the retaining ring and work it out of the groove with a screwdriver.
4. Rotate the input shaft clockwise, using a 3/4 inch, 12-point socket wrench to force the end plug out of the housing. **Do not rotate the shaft any more than necessary to remove the plug. Further rotation will allow the balls to fall from their circuit and allow the rack-piston to become disengaged from the sector shaft.** Remove the O-ring from the housing and discard it.
5. Rotate the input shaft counterclockwise one-half turn to draw the piston inward.
6. Turn the rack-piston end plug (figure 140), counterclockwise out of the piston using a 1/2-inch drive extension.
7. Remove the lock nut from the mesh adjusting screw. Discard the nut.
8. Remove the cover attaching screws. Rotate the mesh adjusting screw with an Allen wrench until the cover is free of the housing. Remove the cover and the O-ring. Discard the O-ring.
9. Turn the input shaft to center the sector shaft teeth in the housing.
10. Tap the end of the sector shaft with a soft-faced hammer to free it from the housing.
11. Remove the adjuster plug lock nut.
12. Remove the adjuster plug using spanner wrench number T65P-3A537-A (see figure 145).
13. Insert Tool T65P-3D517-A, rack piston arbor (figure 144) into the end of the rack-piston until it contacts the worm shaft. Rotate the stub shaft clockwise until the worm is free of the rack-piston. Withdraw the rack-piston from the housing holding the tool all the way in the piston to avoid dropping the balls. **Do not disassemble the rack-piston at this time.**
14. Pull the stub shaft and valve assembly from the housing.
15. Lift the worm, lower thrust bearing and races out of the housing.

STEERING GEAR ASSEMBLY –

1. Secure the steering gear housing in a vise.
2. Lubricate the worm shaft, lower thrust bearing, and races with steering gear fluid D, or equivalent, and install the thrust bearing and races on the worm.

   Align the valve body drive pin on the worm with the narrow pin slot in the valve body. Install the O-ring seal between the valve body and the worm flange. Lubricate the Teflon ring and lower cap O-ring with petrolatum.
3. Place the valve assembly and worm shaft in the housing as a unit (figure 142). **Do not push against the stub shaft as this could cause the stub shaft and cap to pull out of the valve body, allowing the spool seal to slip into valve body fluid grooves.** Install the valve assembly by pushing on the outer diameter of the valve body with the finger tips. Be sure that the Teflon rings do not bind inside the housing. The valve assembly is correctly seated when the fluid return hole in the gear housing is fully visible.
4. Place the Tool R65P-3A537-B, adjuster plug seal protector, over the end of the stub shaft (see figure 145).
5. Lubricate a new adjuster plug "O"-ring with Power Steering Fluid, C1AZ-19582-A, C, D, or equivalent, and install in groove on adjuster plug. Place Seal Protector T65P-3A537-B over stub shaft, then install the adjuster plug assembly in the housing until it seats against the valve body (figure 145). Remove Seal Protector.
6. Adjust the thrust bearing pre-load according to the procedure given under Adjustments in this part.
7. Install Tool T65P-3805-A piston rack seal compressor in the steering gear housing. Position the rack-piston as shown in figure 144. Be sure Tool T65P-3D517-A, rack-piston arbor, contacts the worm shaft. Push the rack-piston inward until it contacts the worm shaft, while keeping pressure applied to Tool T65P-3D517-A. Turn the stub shaft counterclockwise until the middle rack groove in the rack-piston is aligned with the center of the sector shaft roller bearing. Remove the tool from the housing.
8. Install a new O-ring. Lubricate it with power steering fluid, C1AZ-19582-A, C, D, or equivalent and place it in the