GENERAL: This group contains information on the steering components from the coach steering wheel to the front wheel steering arms. It includes all components necessary to provide power steering if coach is so equipped.

SPECIFICS: As applicable

...Power Steering Hydraulic Lines, fittings and Reservoir

...Power Steering Pump (on engine)

...Power Steering Pump Drive Components

...Steering Gear

...Steering Gear Column and Mounting Parts

...Steering Linkage From Pitman Arm to Front Wheels

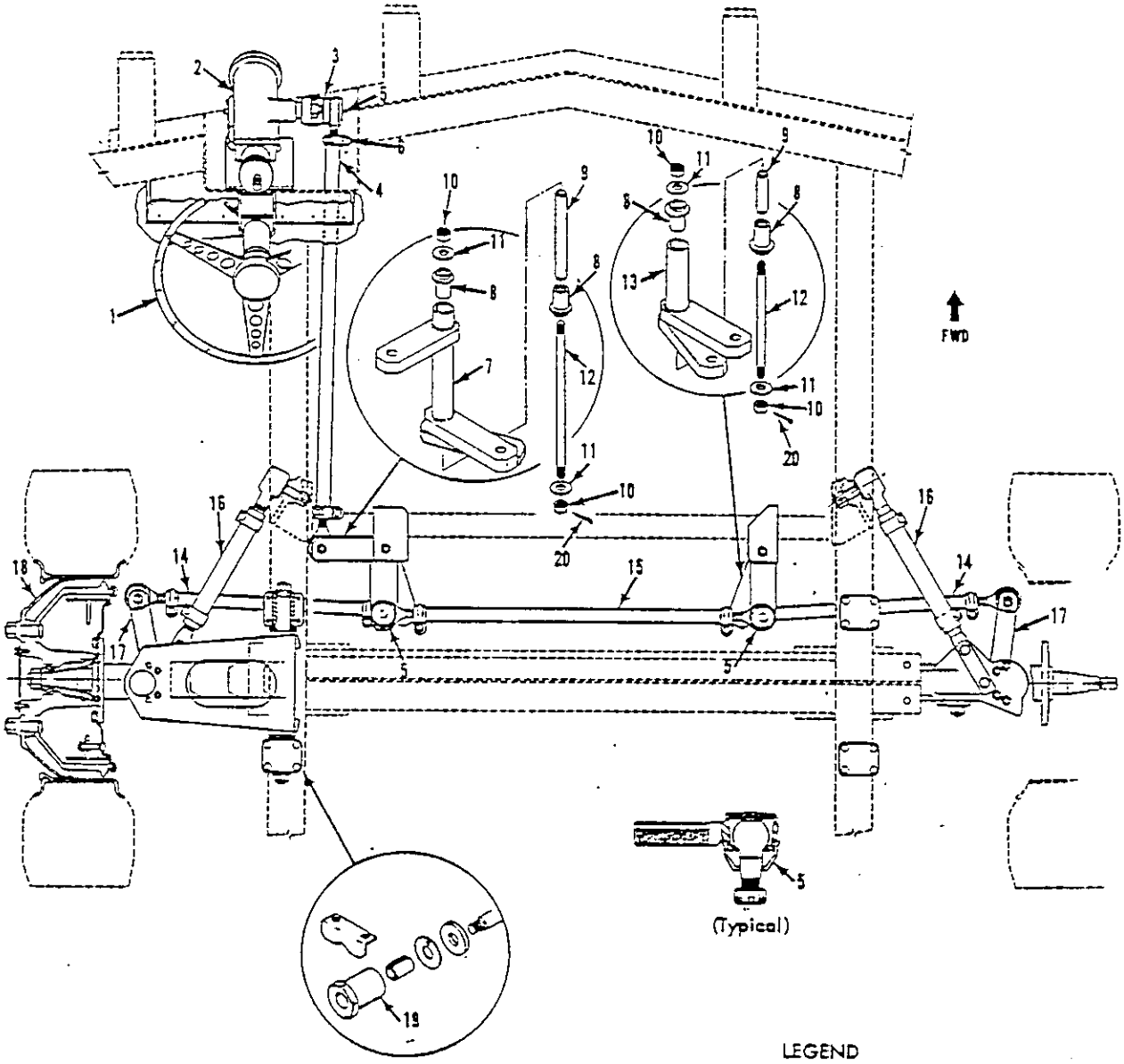
...Steering Wheel and Mounting Parts (including horn button, turn lever, tilt lever, etc.).

GROUP 7

STEERING

TABLE OF CONTENTS

PARAGRAPH		PAGE
7-1	DESCRIPTION	7-3
	a. General	7-3
	b. Steering System Components	7-3
	c. Steering Gear	7-3
7-2	TROUBLESHOOTING	7-3
7-3	REMOVAL/INSTALLATION	7-6
	a. General	7-6
	b. Steering Wheel Removal	7-6
	c. Steering Wheel Installation	7-7
	d. Steering Column Removal	7-7
	e. Steering Column Installation	7-7
	f. Steering Gear Removal	7-7
	g. Steering Gear Installation	7-9
	h. Pitman Arm Removal	7-9
	i. Pitman Arm Installation	7-9
	j. Drag Link Rod Removal	7-9
	k. Drag Link Rod Installation	7-10
	l. Control Link Rod Removal	7-10
	m. Control Link Rod Installation	7-10
	n. Cross Link Rod Removal	7-10
	o. Cross Link Rod Installation	7-10
	p. Idler Arm Removal	7-10
	q. Idler Arm Installation	7-10
	r. Bellcrank Removal	7-12
	s. Bellcrank Installation	7-12
	t. Control Arm Removal	7-12
	u. Control Arm Installation	7-12
	v. Power Steering Reservoir Removal	7-12
	w. Power Steering Reservoir Installation	7-12
7-4	INSPECTION/CLEANING	7-12
7-5	REPAIR	7-12
	a. General	7-12
	b. Pressure Lines	7-12
7-6	GENERAL INFORMATION	7-13
	a. Checking Fluid Level and Drive Belt Tension	7-13
	b. Bleeding The Power Steering System	7-13
	c. Testing The System	7-13
	d. Leak Detection	7-13
	e. Noise Problems	7-13
	f. Wheel Alignment	7-14
	(1) Levelling the Coach	7-14
	(2) Camber Adjustment	7-14
	(3) Caster Adjustment	7-15
	(4) Toe-in-Adjustment (Front)	7-16
	(5) Toe-in-Adjustment (Rear)	7-16
	(6) Steering Wheel Spoke Positioning	7-17



LEGEND

1. STEERING WHEEL
2. STEERING GEAR
3. PITMAN ARM
4. DRAG LINK ROD
5. SOCKET ASSEMBLY
6. ROD END CLAMP
7. BELLCRANK
8. BUSHING
9. SPACER
10. NUT
11. WASHER
12. SHAFT
13. IDLER ARM
14. CONTROL LINK
15. CROSS LINK
16. RADIUS ROD
17. CONTROL ARM
18. WHEEL AND DRUM
19. ALIGNMENT CAM
20. COTTER PIN

SD-138

Figure 7-1. Steering System

GROUP 7

STEERING

7-1. DESCRIPTION (fig. 7-1)

a. General. The coach has an integral type power steering system. The integral power steering gear assembly (gearbox) is joined by a flexible coupling to the steering wheel and shaft which is enclosed in the tiltable steering column. The integral gearbox is of the torsion bar type and consists of a worm and valve assembly. The pitman-arm-sector shaft incorporates a worm follower, and a power piston rack which are all integrally contained in a common housing. The steering gear (gearbox) functions to combine and synchronize power inputs from both manual effort and pressurized fluid to steer the coach front wheels. Pressurized fluid is supplied by the rear-mounted engine-driven power steering pump through a high pressure line to the gearbox. A hose returns the fluid to the reservoir. The gearbox will continue the steering function with only manual effort applied, in the event fluid power should cease to be available. Recirculating balls in the gearbox act as a rolling thread between the worm shaft and the rack-piston. When turned, the balls move the rack-piston, assisted by fluid force. The rack-piston's teeth engage the pitman arm shaft sector teeth. As the pitman arm shaft is turned, it moves the pitman arm fore or aft to transmit steering movement via the drag link rod to the bellcrank and steering linkages. This group provides service instructions for the power steering system and its components. For service information on related systems such as Front Suspension (Group 5) or Wheels (Group 8) refer to the applicable group. For information on part numbers and procurement of replacement parts, refer to Group 7 in the 2900R Parts Catalog.

b. Steering System Components. The power steering systems major components are the steering linkages (figure 7-1), steering wheel (figure 7-2), steering column and steering gear (figure 7-3), fluid reservoir, pump, and fluid supply and return hoses, tubes and fittings (figure 7-4).

c. Steering Gear. The gearbox incorporates variable ratio teeth on the pitman arm shaft sector. As the steering wheel turns the column, the gearbox stub shaft (figure 7-2) rotates the spool valve, routing pressurized fluid to the rack-piston, as the interconnecting torsion bar transmits a very slightly delayed (as designed) turning motion to the worm shaft. This allows the fluid assist force to be applied at full pressure to the rack-piston at the same time the driver is turning the steering wheel.

7-2. TROUBLESHOOTING

Instructions for troubleshooting the steering system are contained in table 7-1. Prior to troubleshooting, a preliminary visual inspection to assist in locating the problem should be made as outlined in paragraph 7-4.

Table 7-1. Troubleshooting Steering System

Malfunction (symptoms)	Probable causes	Corrective action (remedies)
Steering wheel hard to turn	Low fluid level	Check for leaks; fill reservoir as required
	Loose pump belt	Adjust to increase tension
Coach tends to pull to one side. (Keep in mind road condition and wind. Test coach on flat road going in both directions.)	Front end misaligned	Align front end; refer to paragraph 7-6f.
	Dragging brakes	Check in accordance with Group 9
	Incorrect tire pressure	Inflate tires to 75 pounds pressure

Table 7-1. Troubleshooting Steering System (Continued)

Malfunction (symptoms)	Probable causes	Corrective action (remedies)
	Bent linkage or socket binding	Replace
	Excessively worn front wheel bearings	Replace
Steering wheel shimmy	Wheels and/or tires out of balance	Balance wheels
	Worn bellcrank or idler bushings	Replace
	Badly worn and/or unevenly worn tires	Rotate tires or replace as necessary; refer to Group 8
	Loose or worn steering linkage	Tighten or replace
	Loose steering gear mounting bolts	Tighten
Poor recovery from turns	Tires not properly inflated	Inflate to 75 pounds pressure
	Improper front wheel alignment	Check caster, camber, or toe-in and adjust as necessary
		With front wheels still on alignment pads of front end turntable, disconnect pitman arm. Turn front wheels by hand. If wheels will not turn or turn with considerable effort, check for binding linkage or sockets
	Steering linkage binding	Replace or adjust linkage as required
	Sockets binding	Replace
Excessive play	Air in system	Bleed system and add fluid to reservoir
	Loose hose fittings	Check for leaks; tighten
	Steering gear loose on frame	Tighten attaching bolts
	Steering column flexible coupling loose on shaft	Tighten pinch bolt
	Steering linkage sockets worn	Replace
	Front wheel bearings worn	Replace

Table 7-1. Troubleshooting Steering System (Continued)

Malfunction (symptoms)	Probable causes	Corrective action (remedies)
Momentary increase in effort when turning steering wheel fast to right or left	Low fluid level	Add fluid to reservoir
	Pump belt slipping	Tighten or replace belt
Noise in steering pump	Fluid level low	Fill reservoir to proper level
	Air in lines or poor pressure hose connection	Tighten fitting; bleed system
	Excessive back pressure in hoses or steering gear	Located restriction and correct
Rattle or knock noise in steering pump	Loose nut on pump pulley	Tighten nut and recheck
Pump vibration	Pump pulley out of round or loose	Replace or tighten
	Engine crankshaft pulley loose or damaged	Tighten or replace
Noise in steering gear	Gearbox loose on mount bracket	Tighten attachment bolts
	Steering drag link loose	Check link socket for wear; tighten or replace
	Loose pitman arm	Tighten attaching nut; refer to paragraph 7-31.
Turn signal switch lever does not cancel	Loose switch mounting screws	Torque to 25 INCH pounds
	Switch or anchor bosses broken	Replace switch
	Broken, missing or out-of-position detent, return or cancelling spring	Reposition or replace
	Uneven or incorrect cancelling cam-to-cancelling spring interference	Adjust switch position; if interference is correct and switch will still not cancel, replace switch
Turn signal switch difficult to operate	Actuator rod loose	Tighten mounting screw to 12 INCH pounds
	Yoke broken or distorted	Replace switch
	Loose springs	Reposition or replace springs
	Switch mounted loosely	Tighten mounting screws to 25 INCH pounds

Table 7-1. Troubleshooting Steering System (Continued)

Malfunctions (symptoms)	Probable causes	Corrective action (remedies)
Turn signal will not stay in turn position	Foreign material or loose parts impeding movement	Remove material and recheck
	Broken or missing detent or cancelling springs	Replace

7-3. REMOVAL/INSTALLATION

a. General. Step-by-step instructions for replacement of steering system components are provided herein. Order replacement parts as listed in the 2900R Parts Catalog.

b. Steering Wheel Removal (fig. 7-2).

(1) Disconnect automotive battery and the wiring harness from the steering column.

(2) Remove horn button (cap) by lifting on one side and turning it 1/4 inch.

(3) Remove hub spring and disconnect horn wire terminal.

(4) Remove shoulder bolts and contactor ring retainer.

(5) Remove steering wheel nut and washer. Pull on the steering wheel using a rocking side-to-side motion to remove.

(6) Remove post cover, pulling horn wire clear.

(7) Disconnect horn wire snap-in sleeve and brass plug.

(8) To remove hub, use a puller tool.

(9) Remove turn signal cam.

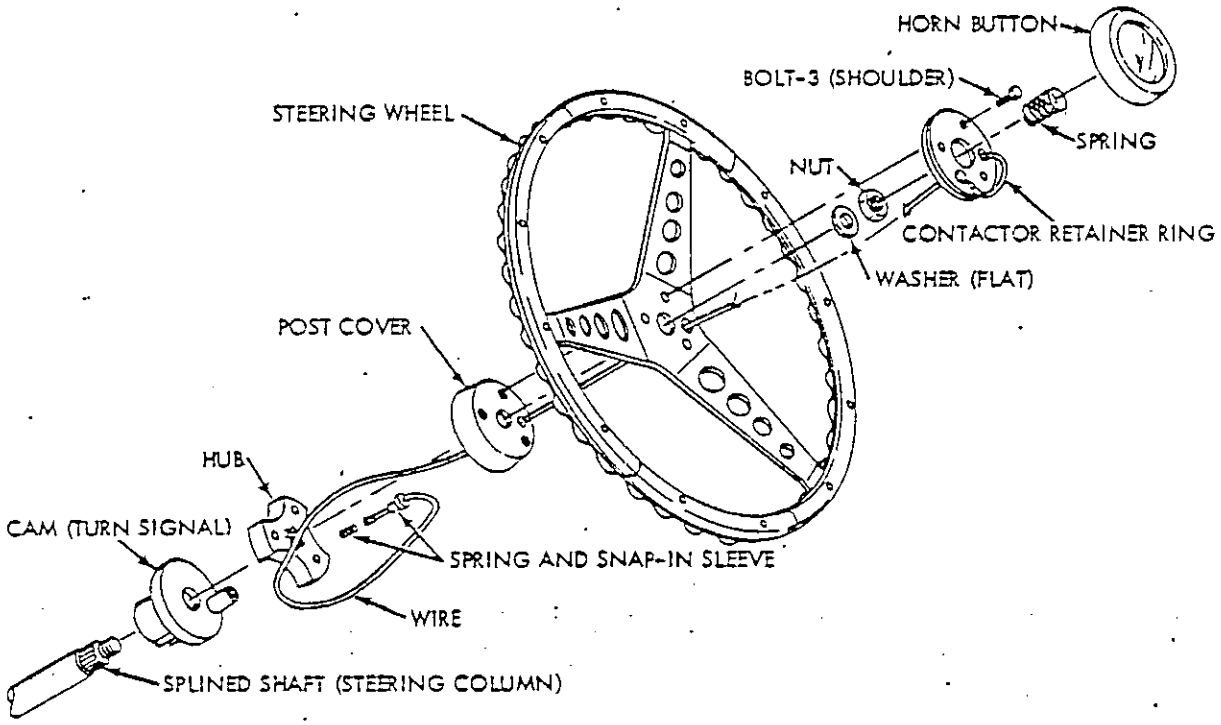


Figure 7-2. Steering Wheel Replacement

c. Steering Wheel Installation (fig. 7-2).

(1) Set front wheels of coach straight forward, aligning marked end of shaft top center. (Shaft end was marked during factory installation).

(2) Install turn signal cam on splined shaft, with tower facing upward and a shaft position of 10 o'clock.

(3) Thread horn wire around hub then press hub over splined shaft and turn signal cam tower. Position hub on splined shaft so that "top" is aligned with front of coach (wheels straight ahead).

(4) Set brass plug end of horn wire assembly into turn signal cam tower.

(5) Place post cover on hub. Position the steering wheel and insert three (3) shoulder bolts; finger-tighten only.

(6) With coach wheels in proper position, install flat washer on splined shaft and secure with nut; torque nut 30 to 40 foot-pounds.

(7) Remove shoulder bolts, position contactor retainer ring with fiber surface facing outward, then install shoulder bolts and tighten.

(8) Connect terminal end of horn wire assembly to terminal on contactor retainer ring.

(9) Place spring on top of shaft nut, then set horn cap, over spring and press down until the cap inner edge just fits over fiber edge.

(10) Connect auto motive battery and wiring harness; test horn.

d. Steering Column Removal (fig. 7-3).

(1) Unscrew two allen-head screws (the outside two of the three) and remove fiberglass gearbox cover by sliding it up on column.

(2) Disconnect automotive battery.

(3) Unscrew two phillips-head screws, separate column clamp from bracket.

(4) Tilt steering column toward driver's seat, then raise gearbox cover to a point that it will not slide down and coupling area is accessible.

(5) Mark coupling assembly to permit correct reassembly.

(6) Loosen pinch bolt (above two hex bolts at coupling assembly) which secures the column to the steering gearbox.

(7) Disconnect electrical wiring harness at connectors.

(8) Remove steering column from coupling by lifting up.

e. Steering Column Installation (fig. 7-3).

(1) Slide steering gear cover on column including rubber boot. Position to be out of the way when doing subsequent steps.

(2) Position steering column with splined end of shaft inserted onto coupling and aligned with markings on the lower coupling end.

(3) Allow the column to rest against the front edge of the driver's seat.

(4) Secure column shaft to coupling assembly by tightening pinch bolt 25 to 35 foot-pounds torque.

(5) Place steering gear cover in floor mounting position and secure with two allen-head screws.

(6) Tilt column forward into clamping position, place clamp around column and secure with two phillip-head screws; operate column fore and aft and check for freedom of movement and that lock lever holds when depressed.

(7) Connect electrical wiring at connectors (connect like colors together).

NOTE

If steering wheel is to be installed refer to procedures outlined in paragraph 7-3c.

(8) Connect automotive battery and test horn and turn signal operation.

f. Steering Gear Removal (fig. 7-3).

(1) Remove steering column assembly as described in paragraph 7-3d.

(2) Pull carpeting away from base of steering column (about a 10-inch working radius).

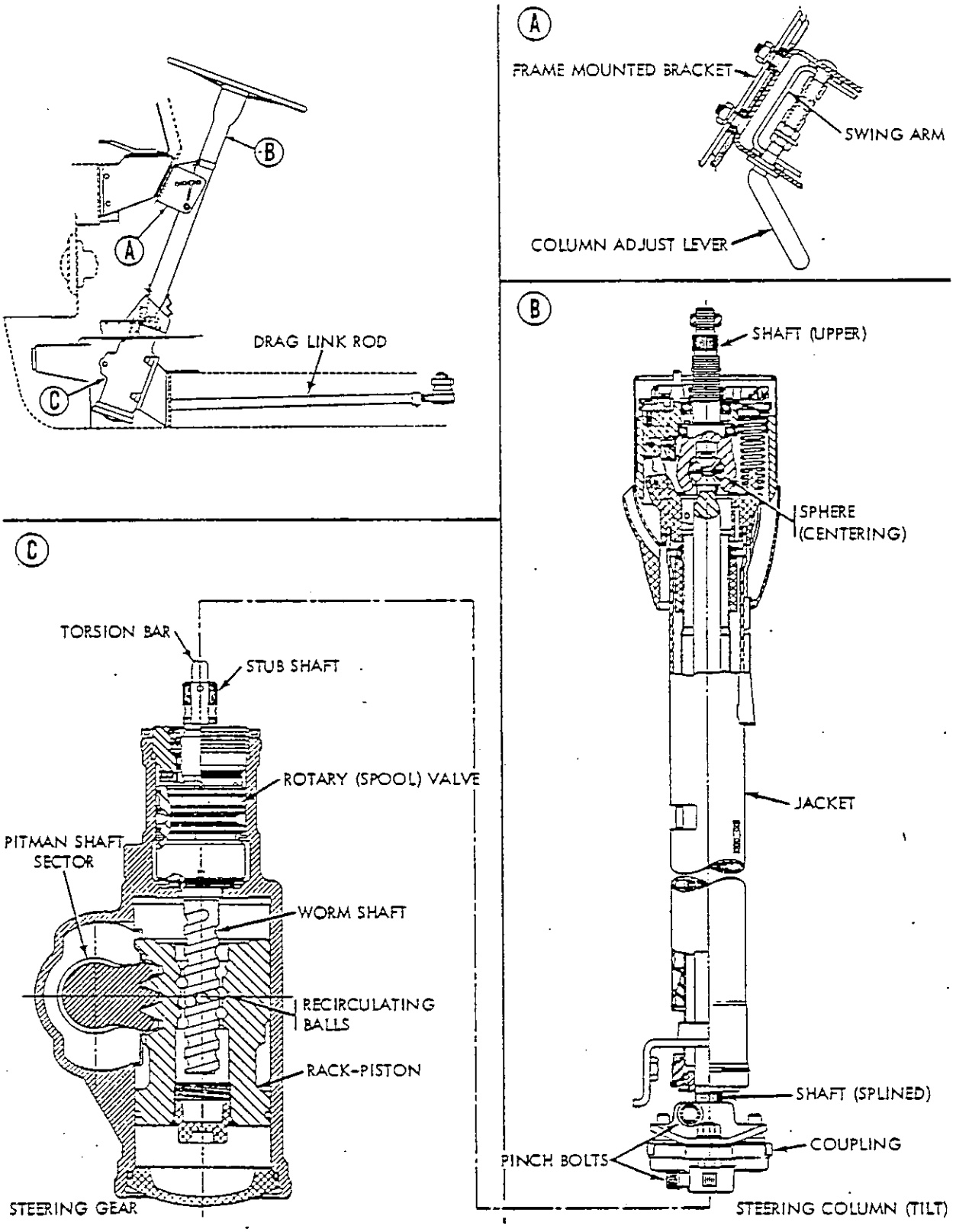


Figure 7-3. Power Steering Controls

SD-140

(3) Unscrew 16 sheet metal screws from floor cover plate over steering gear, and remove surrounding silicone putty.

(4) Lift cover plate and remove the one allen-head screw holding dimmer switch to bracket.

(5) From underside of coach, at base of steering gear mounting bracket, remove four nuts and washers.

(6) Disconnect pitman arm; refer to paragraph 7-3h.

(7) Place suitable container below gearbox, then remove both pressure and return hose fittings (mark inlet and outlet fittings).

(8) Remove steering gear assembly, coupling, and bracket from coach.

(9) Remove gear from coupling and bracket.

g. Steering Gear Installation (fig. 7-3).

(1) Place steering gear on bracket, secure with four bolts, nuts, and washers; install coupling.

(2) Install steering gear with mounting bracket in position on coach frame; secure bracket to frame with four bolts, nuts, and washers; torque to 70 foot-pounds.

(3) Rotate the gearbox stub shaft by turning coupling until it stops, then turn back 2 1/8 turns.

(4) Install pitman arm; refer to paragraph 7-3i.

(5) Secure pitman arm to steering gear splined shaft with nut and washer; torque 180 to 210 foot-pounds.

(6) Connect fluid hose fittings to inlet and outlet ports on steering gear; torque to 30 foot-pounds.

(7) Attach dimmer switch to bracket of cover plate and secure with two allen-head screws.

(8) Install cover plate and secure with 16 sheet metal screws. Apply a thick bead of silicone putty around the plate edges.

(9) Install steering column as outlined in paragraph 7-3e.

(10) With front wheels jacked up, bleed steering system with engine running, by turning steering wheel full left and right from stop-to-stop being careful not to hit stops too hard; refer to paragraph 7-6b.

(11) Install carpeting.

h. Pitman Arm Removal.

(1) Remove cotter pin and socket stud nut securing drag link rod to pitman arm.

NOTE

Socket removal is normally accomplished with a tuning fork or "pickle fork" type tool. The forks are driven between the socket head to separate the tapered socket stud from the mount hole.

(2) Using a pickle fork, separate drag link rod from pitman arm.

(3) Remove nut and washer securing pitman arm to gearbox.

(4) Using pickle fork, remove pitman arm from splined shaft of steering gear.

i. Pitman Arm Installation.

(1) Align front wheels straight forward.

(2) Place pitman arm pointing straight down on splined shaft of steering gear.

(3) Install nut and washer on steering gear pitman arm shaft, and torque to 180 to 210 foot-pounds.

(4) Place socket end of drag link rod in pitman arm tapered hole and secure to socket stud with nut and cotter pin.

j. Drag Link Rod Removal (fig. 7-1).

(1) Remove cotter pin and nut securing pitman arm to drag link rod socket stud.

(2) Remove cotter pin and nut securing drag link rod socket stud to bell crank.

(3) Using a ball joint press (remover) or pickle fork at sockets, remove drag link rod socket stud from tapered holes in bellcrank and pitman arm.

NOTE

Only a pickle fork at drag link socket location will work to remove stud from tapered hole in pitman arm, because of space limitations.

k. Drag Link Rod Installation (fig. 7-1).

(1) Set front wheels straight ahead, and pre-adjust socket ends of new drag link rod so the same number of threads are exposed on each end of rod.

NOTE

Using old rod for reference, make certain that length of the new rod is the same.

(2) Place socket stud of one end of drag link rod through tapered hole in bellcrank upper arm, then secure with nut and cotter pin.

(3) Place socket stud of other end of rod through tapered hole in pitman arm, then secure with nut and cotter pin.

(4) Tighten both rod end clamp nuts/bolts.

l. Control Link Rod Removal (fig. 7-1).

(1) Remove cotter pin and nut from socket connecting to bellcrank arm (for left-hand control link, and idler arm for right-hand control link).

(2) Remove cotter pin and nut from socket connecting control link and control arm on spindle.

(3) Using a ball joint press (remover) or pickle fork on socket, remove control link rod from bellcrank (for left-hand control link, and from idler arm for right-hand control link).

m. Control Link Rod Installation (fig. 7-1).

(1) Set front wheels straight ahead and pre-adjust socket assembly threaded ends of new control link rod so that the same number of threads are exposed on each end of rod. Use old rod for reference and make certain the lengths are the same.

(2) Place socket stud through tapered hole in bellcrank lower arm (for left-hand control link rod and idler arm for right-hand rod), then secure socket stud with nut and cotter pin.

(3) Place control link socket stud in tapered hole in the control arm, then secure socket stud with nut and cotter pin.

(4) Tighten both rod end clamp nuts/bolts.

n. Cross Link Rod Removal (fig. 7-1).

(1) Remove cotter pins and nuts connecting the bellcrank arm and the idler arm to the cross link rod socket studs.

(2) Using ball joint press (remover) or pickle fork, separate cross link rod socket studs from bellcrank and idler arm tapered holes.

o. Cross Link Rod Installation (fig. 7-1).

(1) Set front wheels straight ahead and pre-adjust socket threaded ends of new cross link rod so the same number of threads are exposed on each end of rod. Using old rod for reference, adjust replacement rod to same.

> ***Caution***
>
> Be sure the positioning of the extended portion of the cross link rod end clamp bolts does not drag or bind on nearby wiring or tubing.

(2) Place end of cross link rod socket studs through bellcrank and idler arms tapered holes, and secure with nuts and cotter pins.

(3) Tighten both rod end clamp nuts/bolts.

p. Idler Arm Removal (fig. 7-1).

(1) Remove cotter pin and nuts from socket studs connecting right-hand control arm and cross link rod to idler arm.

(2) Using a ball joint press (remover) on socket studs, separate control arm and cross link rod from idler arm.

(3) Remove cotter pin, nut, washer, and shaft holding idler arm to frame bracket; remove idler arm.

q. Idler Arm Installation (fig. 7-1).

(1) Place idler arm in position and secure to frame bracket with shaft, washer, nut, and cotter pin.

(2) Place stud end of socket control arm on lower arm of idler, and socket stud of cross link rod on upper arm.

(3) Secure each socket stud with nut and cotter pin.

r. Bellcrank Removal (fig. 7-1).

(1) Remove cotter pins and nuts from socket studs connection left-hand control arm and cross link rod to bellcrank arm.

(2) Using a ball joint press (remover) on sockets, separate control arm socket stud from cross link rod to bellcrank arm.

(3) Remove cotter pin, nut, washer, and shaft holding bellcrank to frame bracket; remove bellcrank.

s. Bellcrank Installation (fig. 7-1).

(1) Place bellcrank in position and secure to frame bracket with shaft, washer, nut, and cotter pin.

(2) Place socket stud of left-hand control arm on lower arm of bellcrank, and socket stud of cross link rod in upper arm tapered holes.

(3) Secure each socket stud with nut and cotter pin.

t. Control Arm Removal (fig. 7-1).

(1) Remove nut on socket stud between control arm and control link rod.

(2) Using ball joint press (remover) on socket stud, separate control link rod from control arm.

(3) Remove cotter pin and nut holding control arm to spindle, and pull arm and woodruff key out of spindle.

u. Control Arm Installation (fig. 7-1).

(1) Place control arm in position, with woodruff key installed, and secure with nut and cotter pin.

(2) Place socket stud of control link rod into control arm, secure socket with nut and cotter pin.

v. Power Steering Reservoir Removal (fig. 7-4).

(1) Drain reservoir by removing clamp and cap from small line protruding from pump housing; reinstall cap and clamp.

(2) Remove "elephant" hose clamps and hose.

(3) Remove two clamps holding reservoir to bracket; remove reservoir.

w. Power Steering Reservoir Installation (fig. 7-4).

(1) Set reservoir in position on bracket and secure with clamps.

(2) Place hose in position and secure with hose clamps.

(3) Fill reservoir with "AT-Dexron" automatic transmission fluid.

(4) Jack front of coach at center spring support plate.

(5) With engine running, remove air from the steering system by turning steering wheel several times from stop to stop, being careful not to hit stop to hard; refer to paragraph 7-6b.

7-4. INSPECTION/CLEANING

Periodic inspection of sockets, belt tension on power steering pump, and level of fluid in reservoir is recommended. Check for conditions which are not directly related to the steering linkage but may create problems, such as worn shock absorbers, weak or broken springs, misaligned caster or camber, loose wheel bearings, improper wheel balance, incorrect tire pressure, or badly worn tires.

7-5. REPAIR

a. General. In correcting any malfunctions, be sure that the symptoms of the trouble have been isolated and are directly related to the steering linkage or power steering components before removing or disassembling a steering component.

Before beginning a formal repair on the power steering components, check reservoir level, hose condition, belt wear and tension, hydraulic fittings, front end alignment, and tire pressure.

b. Pressure Lines (fig. 7-4). The following five steps apply to both pressure and return lines. When replacing lines, it is recommended that both be replaced at the same time.

(1) Drain system and remove old line. Discard old fluid; it should never be reused. Do this by first removing one connection from both pressure and return lines.

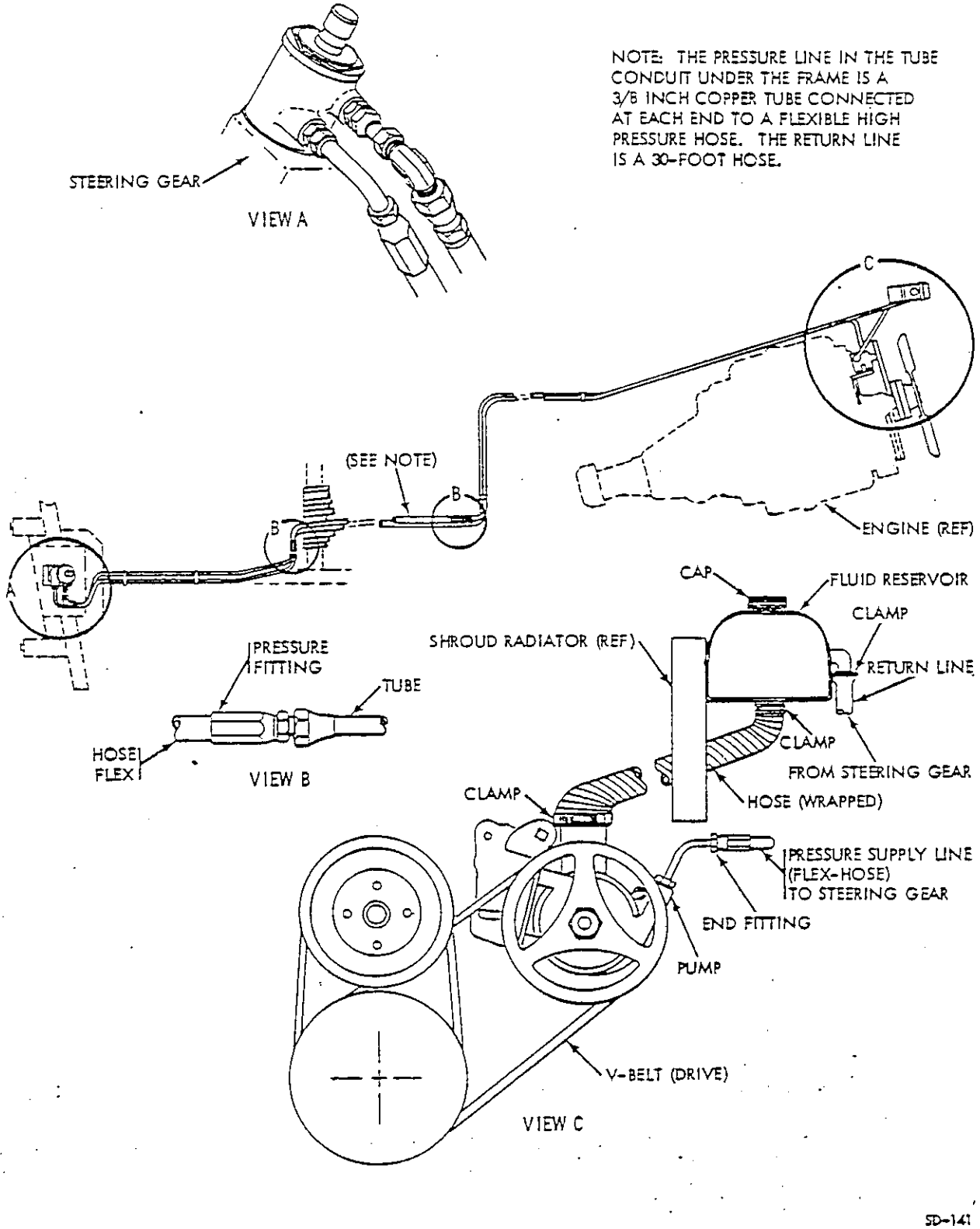


Figure 7-4. Pump, Supply and Return Lines

(2) Check threads on housing fittings to avoid stripping threads on new hose fittings. Blow air through replacement line to clear out dust or other materials which could contaminate system.

(3) Attach new line assembly. Start fittings by hand. Tighten to 30 foot-pounds torque.

(4) Add new power steering fluid. Bleed the system by jacking both front wheels then starting the engine and turning the steering wheel to both extremes several times.

NOTE

Do not hit stops hard or hold in extreme position for more than a few seconds; build-up of excessive pressure and temperature can burst lines.

(5) Recheck fluid level and top-up if needed. Build-up of pressure may have released air bubbles into reservoir.

7-6. GENERAL INFORMATION

a. Checking Fluid Level and Drive Belt Tension. Never diagnose power steering problems without first checking the fluid level and drive belt tension. The power steering pump should give little trouble if the fluid used is clean and type "AT-Dexron" automatic transmission fluid. The fluid level must be maintained and should be checked at every 4,000 miles, or 6 months, or each oil change, or when there are apparent leaks.

Drive belts that are adjusted too tight can cause seal failure very quickly. Belts that are too loose will slip and overheat the pulley, and in turn will also cause seal failure.

To insure proper tension, a belt tension gage should be used.

b. Bleeding System.

(1) Fill the fluid reservoir.

(2) Jack both front wheels of coach.

(3) Start the engine.

(4) Rotate the steering wheel from stop to stop.

Caution

Do not hit stop too hard or hold against the stops for more than 5 seconds, to avoid damage to the gearbox or lines.

(5) Refill reservoir as needed.

c. Testing the System. Most of the problems which develop in a power steering system can be detected by a test of the pressure lines as follows:

(1) Disconnect the pressure hose at pump; use a container to catch fluid.

(2) Connect a spare pressure hose to the open connection on pump.

(3) Connect a pressure gage "in-line" by attaching gage to both pressure hoses. Refill fluid reservoir.

(4) Start engine, allow system to reach operating temperature.

(5) Check line pressure.

(6) Turn steering wheel to each stop and record pressures. If the pressure rises but can not reach maximum, the gear is leaking internally and must be disassembled and repaired.

(7) Stop engine, remove gage and spare hose, reconnect system for normal operation, and replenish fluid lost.

d. Leak Detection. Whenever the system fluid is low, a leak is indicated, which must be stopped to prevent internal component damage due to lack of fluid.

By wiping the surface of each component, running the engine, operating the steering linkage, and performing a visual inspection, leaks can be located. The most common points of this surface leakage are the line fittings, the pump shaft seals, and the pitman shaft seals.

e. Noise Problems. Two common noises occur: belt slippage and pump noise. Belt slippage generally occurs when the steering wheel is held against left or right turn stops. This is corrected by replacing and re-adjusting the drive belt.

Pump noise is usually caused by the pump impeller sucking air because of a low fluid level (indicating a leak). When air is forced into the system this way it will appear as surface bubbles in the reservoir. To cure this noise, simply repair leak, fill the reservoir, then bleed the system.

Other noises such as worn pump bushings and bearings can be isolated by using a mechanics stethoscope, or improvising with a piece of hose.

f. Wheel Alignment. Proper wheel alignment ensures that the suspension and steering systems will function to provide optimum handling, steering, and stability with minimum tire wear.

Six adjustments are required to properly align the coach suspension and steering system.

Levelling – Coach should be level laterally (side-to-side) and the rear end should be 1/8 inch lower than the front.

Camber – The angle the top of the front wheel tilts out (positive) or (negative) in relation to true vertical. The coach front wheels tilt outward at the top at an angle of 1 (± 1/4) degree positive camber.

Caster – The forward or rearward angle of tilt from true vertical of the steering spindle as established at lower and upper attachment points to the suspension arms. The spindle attachment point to the upper arm on the coach is aft of the lower attachment point. A centerline drawn from the spindle lower-to-upper attach points would, if viewed from the side, indicate the difference from true vertical to be 2 and 1/2 (± 1/2) degrees positive caster.

Toe-in (front) – The difference in measured inches between the front edges (of outer tread edge) of the two front tires vs the difference of the rear edges when measured at approximately hub level. The coach measurement should indicate the front edge tire-to-tire distance to be 1/8 (± 1/16) inch less than rear.

Toe-in (rear outboard wheels) – Measure same as front; should be 1/8 (plus 0, minus 1/16).

Steering wheel spoke positioning – see figure 7-1. Position spokes as shown, in accordance with paragraph 7-6f(6).

(1) Levelling the Coach. Prior to wheel alignment, check levelling and adjust as required. The height of the rear end of the coach should be 1/8 inch lower than the front. This can be adjusted as follows:

(a) Place turntables (swivel pads) with lock-pins installed on a level, preferably concrete floor, directly in front of coach front and rear outboard wheels.

(b) Drive coach straight onto turntables and center the tires on swivel pads; front wheels positioned straight ahead.

(c) Set parking brake.

(d) Check all tires for 75 pounds pressure. Inflate or deflate, as required, to obtain specified psi.

> **Caution**
>
> A normal road-operating load should be on the coach for these procedures. Domestic and automotive systems serviced, holding tanks empty or low, normal kitchenware, supplies, and baggage in place in cabinets and closets.

(e) Measure coach height at two front and two rear jack points, jot down location and measurements, and compare the figures. Each rear measurement should be equal and each should be 1/8 inch lower than the front end measurement. If these measurements are obtained, proceed to paragraph 7-6f(2); if not, perform steps (f) and (g) below.

(f) Adjust rear end height by removing four tap screws and torsion bar anchor cover plate located on forward wall of each wheel well. To get access to the plate, pull the rubber strip inboard out of the retainer groove. Turn torsion bar anchor adjustment bolt, as required, to increase or decrease until specified rear end height is obtained.

NOTE

When adjusting, check left-hand and right-hand side measurements frequently, as adjustment on one side affects height of opposite side. Coach must be level laterally while maintaining proper height.

(g) Reinstall access plates, and insert rubber strips upon completion of previous step.

(2) Camber adjustment (fig. 7-1, 7-4, and 7-5). With coach leveled as specified in previous paragraph, adjust camber to (positive) 1 (± 1/4) degree as follows:

(a) Loosen the nuts and bolts securing rod end clamps (fig. 7-1, item 6) to control link rod (fig. 7-1, item 14) on both right-hand and left-hand rods, at each end of each rod. Rods must be free to turn on threaded ends of sockets. Also loosen radius rod end clamps in same manner to accomplish later steps.

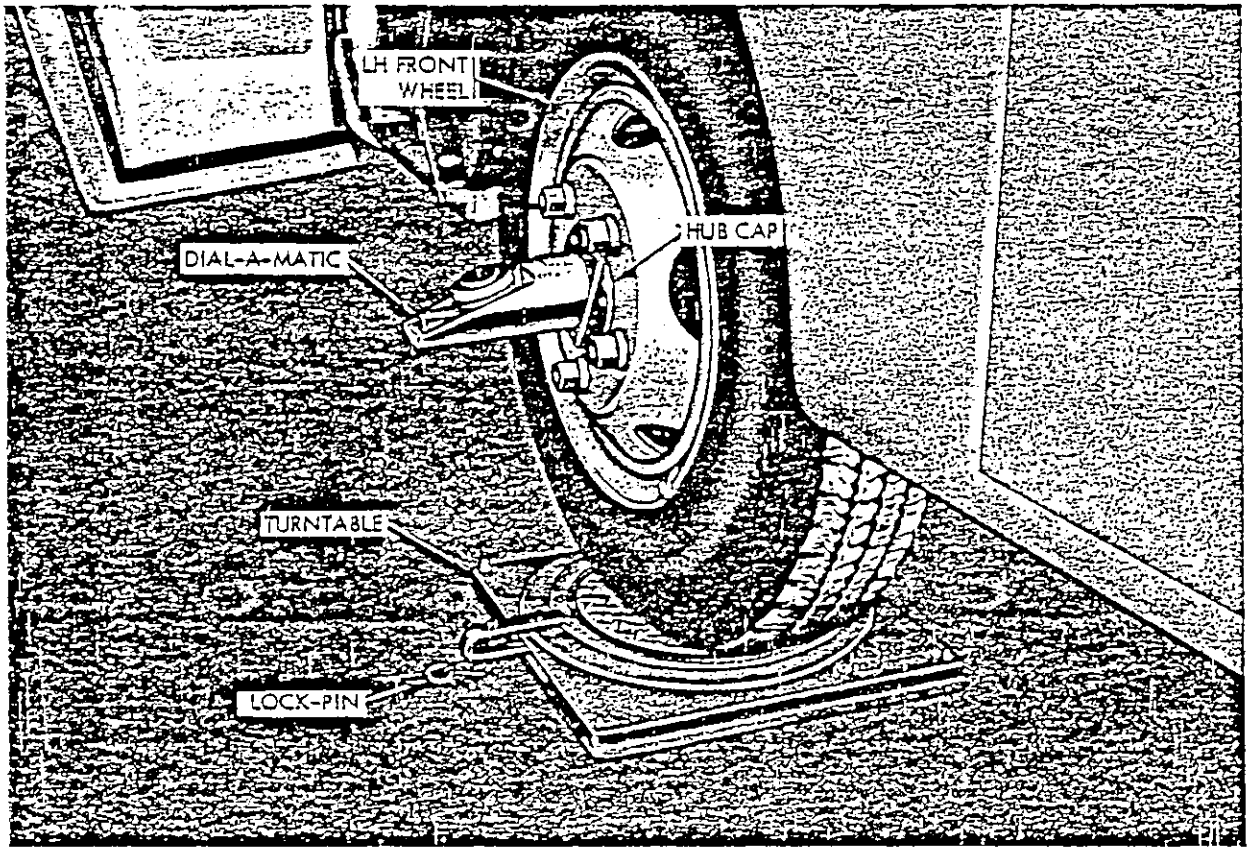


Figure 7-5. Front Wheel Alignment

(b) Using a John Bean "Dial-A-Matic" caster, camber and dual-level indicating device (fig. 7-5), or equivalent, magnetically attach to left-hand front wheel hub cap, with adapter, to get readings directly in line from spindle axle.

(c) Remove the lock-pins from front wheel turntable swivel pads. Set to zero "0" reading on gage.

(d) Remove the two hold-down bolts securing the alignment cam lock to each end of the forward and aft split-block mounts; remove locks (fig. 7-1, item 19).

Warning

To permit rotation of alignment cam, slightly loosen the two hold-down bolts remaining in the two split-block mounts. If loosened too far, they might strip-out, allowing wheel assembly to abruptly sag outward.

(e) Check the camber for a 1 (± 1/4) reading on the Dial-A-Matic by first rotating to center the cross-level bubble. Then turn the dial wheel to center the dial-level bubble. Read camber from the camber dial (large outer dial).

(f) Adjust the forward and aft eccentric alignment cams equally, using a 1 and 7/8 inch socket, until a 1 (± 1/4) degree positive camber reading is obtained. Tighten mount block bolts, then reinstall cam locks and secure with bolts; torque all bolts 32 to 34 foot-pounds.

(g) Repeat procedures on right-hand wheel.

(3) Caster Adjustment (fig. 7-5). With levelling and camber adjusted as outlined in preceding steps, proceed to adjust caster to 2 1/2 (± 1/2) degrees positive as follows:

(a) Reinstall Dial-A-Matic as previously described, on left-hand hub cap.

(b) Turn wheel to a 15-degree angle outboard (left-hand turn) setting on turntable gage. Center the cross and dial level bubbles on the Dial-A-Matic. Set caster dial to "0" by holding the dial wheel stationary and turning the hex knob to align the "0" line on the caster dial with the index mark on the parapet.

(c) Turn until front of wheel is at a 15-degree angle inboard (right-hand turn) indication in turntable gage.

(d) Center the Dial-A-Matic cross and dial level bubbles.

(e) The Dial-A-Matic caster reading should be 2 and 1/2 (± 1/2) degrees positive. If necessary, adjust by turning radius rod (use a pipe wrench if necessary).

(f) Recycle wheel to all of the previous positions and verify that adjustment stays within allowable tolerance.

(g) Repeat procedure on right-hand wheel.

(h) Remove Dial-A-Matic and adapter from hub cap mount holes; reinstall hub cap attaching bolts (both sides).

(4) Toe-in Adjustment (Front) (fig. 7-5). With levelling, camber and caster adjusted as outlined in preceeding steps, adjust toe-in 1/8 (± 1/16) inches as follows:

(a) Position front wheel straight ahead on turntable.

(b) Use a 6-inch square and check that the lower aft-extending arm (fig. 7-1) on the bellcrank (left-hand side) is parallel with adjacent coach frame. If not parallel, loosen nuts and bolts on the clamps at each end of the drag link rod, which attaches the upper bellcrank arm to the pitman arm, and adjust lower arms until parallel; retighten clamps.

(c) Make a preliminary toe-in check by measuring the distance between the frame and inboard edge of the wheel rim at the rear end of wheel; then measure at front end. The measurement at the front should be 1/16 (± 1/32) inch less than the rear measurement.

(d) Adjust, if required to obtain the toe-in specified in previous step, by turning the control link rod which connects bellcrank to the spindle control arm.

(e) Repeat steps (a), (c), and (d) on right-hand wheel.

(f) Using a steel tape or other measuring device, measure the distance between the aft end of the right-hand and left-hand front wheel tires (at the outer thread edge approximately hub level); then measure at the front ends of the wheels. The distance at the front should be 1/8 (± 1/16) inch less at the front than at the rear.

(g) If toe-in specified in the previous step is not obtained, repeat step (d) on both right-hand and left-hand wheels until required toe-in is obtained.

NOTE

Retighten all linkage rod end clamps by tightening the attaching nuts and bolts at each end.

(5) Toe-in Adjustment (Rear) (fig. 7-6). With front toe-in adjusted as outlined above, check the the rear outboard wheel toe-in and adjust, if required, as follows:

(a) Using a cord (twine or string) of approximately 30-foot length, wrap one end around right-hand outboard rear tire at approximately hub level. Secure to the inboard side of tire. Pull cord taut and extend length of coach to front tire, and secure opposite end of cord to front tire same position as rear. Front wheels are positioned as adjusted in previous procedures.

(b) Check that cord touches front tire fore and aft outboard surfaces evenly; then check for same condition at rear outboard tire.

(c) If rear outboard tire surfaces do not contact cord both fore and aft outer edges, adjust rear toe-in in accordance with the following steps (d) through (j). If cord is properly contacting tire surfaces, no further rear toe-in adjustments are necessary. Check opposite side.

(d) Determine amount of rear wheel toe-in adjustment needed; if small, adjust only at the outboard trailing arm pivot mount block.

(e) Loosen the four bolts securing the upper half of the split pivot block to the frame.

(f) On the forward end of the upper half of the mount block, a jam nut secures the nut on the opposite end of the adjustment bolt, located in the center of the block. Loosen jam nut.

(g) Turn the adjustment bolt until cord properly contacts tire surfaces fore and aft.

(h) Tighten nut on forward end of adjustment against the spring lock washer, then back off slightly and secure by tightening jam nut.

(i) Tighten the four bolts in the upper half of the pivot block; torque 86 to 94 foot-pounds.

(j) Remove cord from tires.

(k) Repeat procedures on opposite rear wheel, as required.

(6) Steering Wheel Spoke Positioning (fig. 7-1). The spokes of the steering wheel should be positioned as shown when the wheels are properly aligned and pointed straight ahead. Turntable gage reading "0". If spokes are not properly aligned, remove steering wheel (par. 7-3b) and reinstall steering wheel with spokes properly aligned (par. 7-3c).

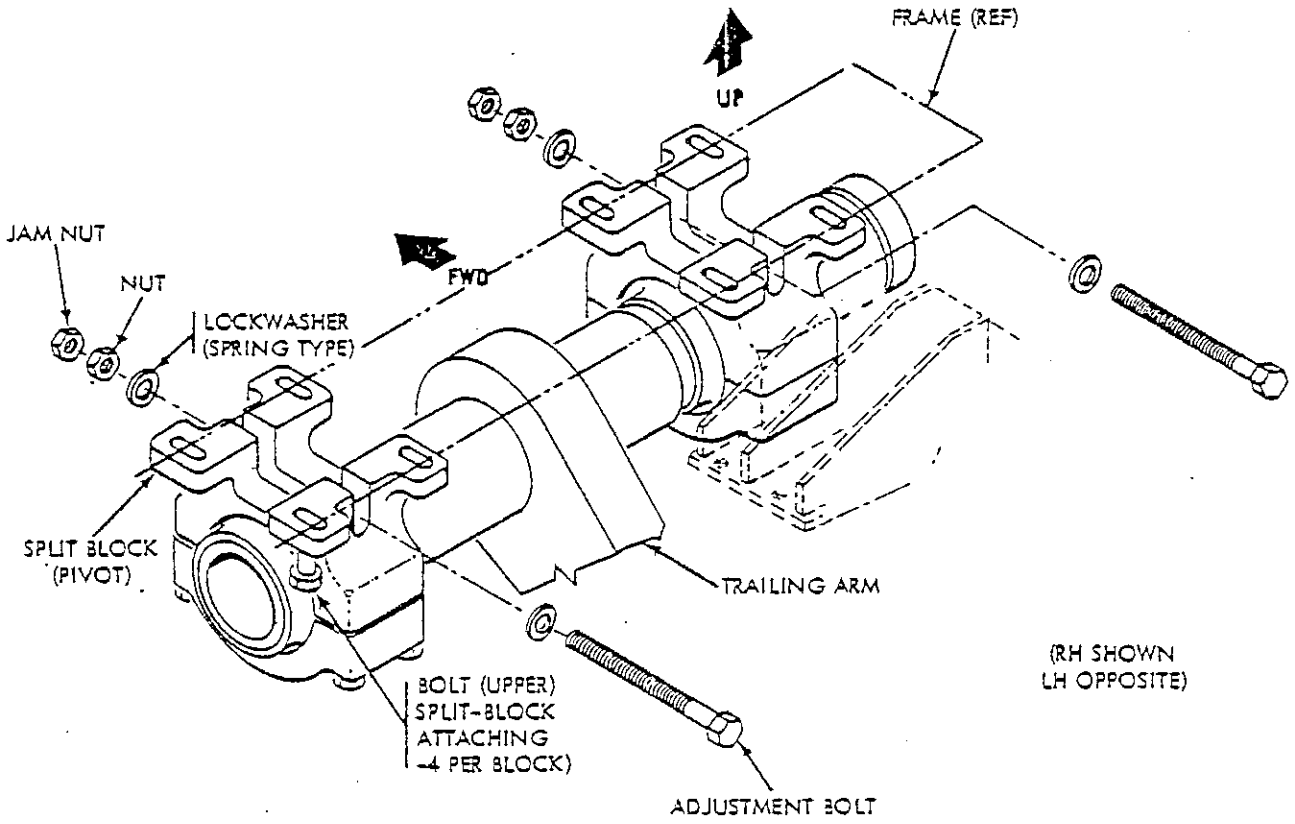


Figure 7-6. Rear toe-in adjustment points.

FMC Corporation
Recreational Vehicle Division
333 Brokaw Road Box 664 Santa Clara, California 95052

☐ URGENT ☐ ROUTINE
☐ MANDATORY ☒ INFORMATIONAL

Service Bulletin

DATE 6 August 1973 NUMBER 2907 40001

ATTENTION: SERVICE MANAGER

GROUP 7

SUBJECT

Positioning Steering Cross-Link Rod End Clamp Bolts

MODEL (S) AFFECTED

2900R

This bulletin provides information showing proper positioning of the steering cross-link rod end clamps for both RH and LH rods.
Following any maintenance affecting these components, see Figure 1 and position the rod end clamps as shown, with bolts located on the lower side of the rod end clamp; tighten nut to secure clamps in this position.

WARNING

ENSURE THAT CLAMP BOLT IS ALWAYS SECURED (NUT TIGHTENED) IN THIS POSITION TO PREVENT INTERFERENCE WITH IDLER ARM OR BELLCRANK.

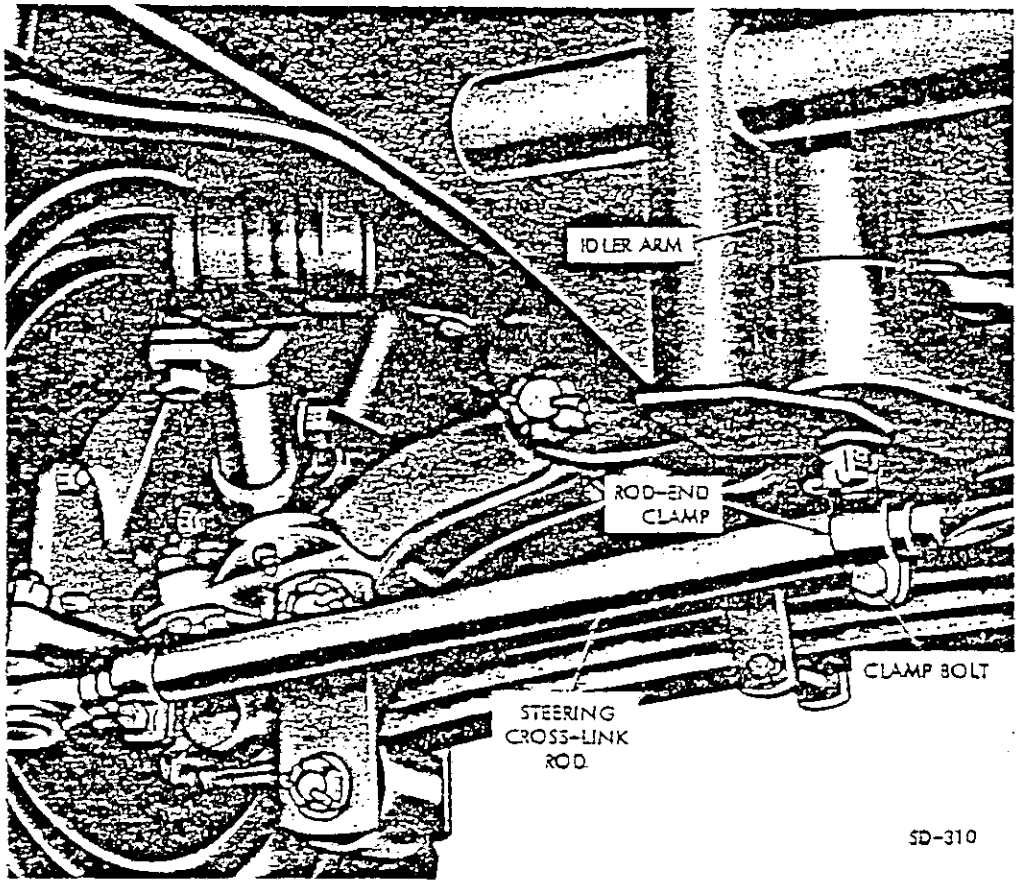


FIGURE 1

POSITIONING STEERING CROSS-LINK ROD END CLAMP BOLTS

John L. Strever
Service Manager

(Factory Use Only)
Information added to:

OWNER MANUAL (S)

SERVICE MANUAL (S)

PARTS MANUAL (S)

WARRANTY MANUAL (S)

OTHER

FMC Corporation
Recreational Vehicle Division
[illegible] Seaview Road Box 664 Santa Cruz, California 95062

☒ URGENT ☐ ROUTINE
☐ MANDATORY ☐ INFORMATIONAL

Service Bulletin

DATE 17 December 1973 NUMBER 2907 1000Z

ATTENTION: SERVICE MANAGERS

GROUP
7

SUBJECT
REPLACEMENT OF PITMAN ARM

MODEL (S) AFFECTED
2900R

(Factory Use Only) Information added to:

OWNER MANUAL (S)

SERVICE MANUAL (S)

PARTS MANUAL (S)

WARRANTY MANUAL (S)

OTHER

DESCRIPTION

This bulletin provides instructions for replacement of the present pitman arm on the FMC 2900R motor coach.

COMPLIANCE

Dealers must comply with this bulletin prior to delivery of coach to owner. Present owners must return coach to dealer for this modification in accordance with recall notification number A0702, dated 17 December 1973.

MANPOWER

Estimated accomplishment time for one mechanic is approximately two hours.

MATERIAL

Parts supplied at no charge by FMC-RVD are:

TITLE	RVD P/N	QTY PER COACH
Pitman Arm	5106072	1

ACCOMPLISHMENT INSTRUCTIONS

A. To accomplish replacement of the pitman arm, jack up coach front end and install jack stands at designated jack point per Owner's Manual, to obtain access from underneath the front through access hole in structure.

B. Position front wheels straight ahead.

C. See Figure 1. Using chalk or scribing device, mark the following points to facilitate correct positioning of components during reassembly:

(1) Place a mark on the threads of each of the drag link rod ends at the point where they enter the I.D. of the rod so that the drag link rod can be reinstalled in its original position.

(2) Place a straight-line mark across the upper end of the pitman arm, the splined shaft and the protruding area of the steering gearbox housing so that indexing of the pitman arm to the gearbox can be easily done during reassembly.

RVD-34 (5-73)

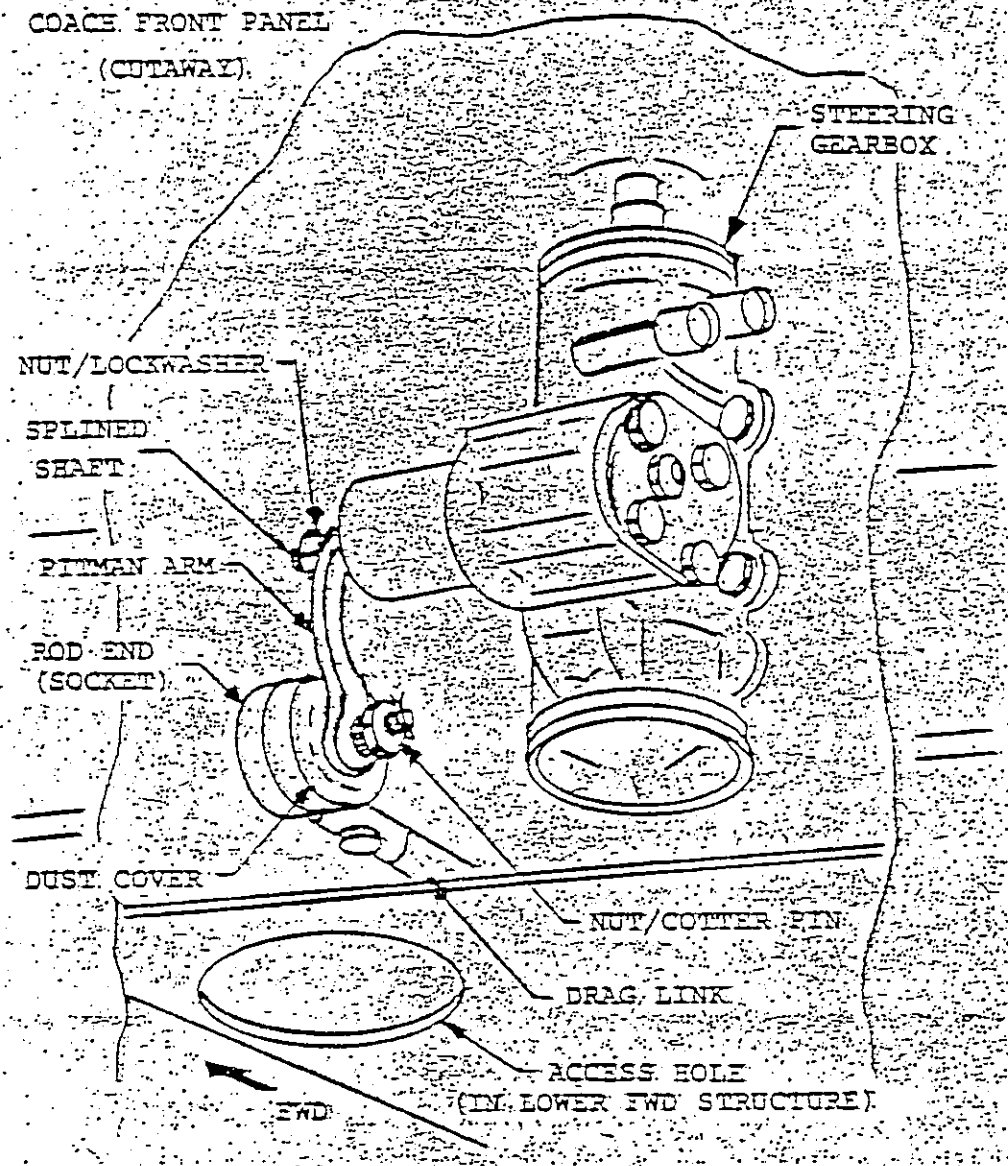
FMC Corporation
Recreational Vehicle Division
333 Brokaw Road Box 664 Santa Clara, California 95052

☒ URGENT ☐ ROUTINE
☐ MANDATORY ☐ INFORMATIONAL

Service Bulletin

DATE 17 December 1973 NUMBER 2907 10002

ATTENTION: SERVICE MANAGERS



NOTE: Accomplish replacement as specified in text.

FIGURE 1. PITMAN ARM REPLACEMENT

GROUP 7

SUBJECT
REPLACEMENT OF PITMAN ARM

MODEL (S) AFFECTED
2900R

(Factory Use Only)
Information added to:

OWNER MANUAL (S)

SERVICE MANUAL (S)

PARTS MANUAL (S)

WARRANTY MANUAL (S)

OTHER

RVD-84 (6-73)

FMC Corporation
Recreational Vehicle Division
333 Brokaw Road Box 664 Santa Clara, California 95052

☑ URGENT ☐ ROUTINE
☐ MANDATORY ☐ INFORMATIONAL

Service Bulletin

DATE 17 December 1973 NUMBER 2907 10002

ATTENTION: SERVICE MANAGERS

GROUP 7

SUBJECT
REPLACEMENT OF PITMAN ARM

MODEL (S) AFFECTED
2900R

(Factory Use Only)
Information added to:
OWNER MANUAL (S)
SERVICE MANUAL (S)
PARTS MANUAL (S)
WARRANTY MANUAL (S)
OTHER

ACCOMPLISHMENT INSTRUCTIONS (continued)

D. Remove drag link rod from rod ends by loosening the clamp nut/bolt (one at pitman arm end and the other aft at the bellcrank end) until clamps allow rotation of rod.

E. Using pipe wrench, if necessary, or hand rotate the drag link rod until each end clears the rod end threads; lay rod on the floor in the same position as when installed to assure proper threading during reassembly.

F. Rotate the threaded end of the forward rod end (socket) up and forward until approximately parallel with pitman arm, to obtain room to use a wrench when removing the nut/lockwasher attaching the pitman arm to the splined shaft of the gearbox. Remove nut and lock washer.

NOTE

The nut removal can be speeded-up by having one man hold the wrench and another turning the steering wheel to rotate the splined shaft (coach on jacks).

G. Using a tuning fork type tool (pickle fork or other suitable prying tool) force pitman arm off the splined shaft.

H. Remove the pitman arm (with rod end socket still attached) down through the access hole and disassemble as follows:

(1) Remove cotter pin and nut securing rod end socket to pitman arm.

(2) Using a ball joint press (remover) or a vice to hold the pitman arm, remove the rod end socket in a manner that does not damage the threads, the nut or the socket dust cover.

I. Using the old pitman arm, position adjacent to the new arm and add mark at the same location as on old arm; scrap the old pitman arm.

FMC Corporation
Recreational Vehicle Division
333 Brokaw Road Box 664 Santa Clara, California 95052

☒ URGENT ☐ ROUTINE
☐ MANDATORY ☐ INFORMATIONAL

Service Bulletin

DATE 17 December 1973 NUMBER 2907 10002

ATTENTION: SERVICE MANAGERS

GROUP 7

SUBJECT
REPLACEMENT OF PITMAN ARM

MODEL (S) AFFECTED
2900R

(Factory Use Only)
Information added to:

OWNER MANUAL (S)

SERVICE MANUAL (S)

PARTS MANUAL (S)

WARRANTY MANUAL (S)

OTHER

ACCOMPLISHMENT INSTRUCTIONS (continued)

J. Install the rod end in the new pitman arm and secure with nut and cotter pin.

CAUTION

Turn steering wheel, as required, to ensure that the straight line mark on the splined shaft and the gearbox housing are aligned, prior to accomplishment of the next step.

K. Insert the new pitman arm with rod end installed per step J, up through the access hole. Align mark on upper pitman arm end with the mark on the splined shaft then install arm on shaft; secure with lockwasher and nut (see NOTE in step Z.). Torque nut 180 to 210 foot pounds.

L. Position the threaded ends of the forward and aft rod end sockets to receive the drag link rod, then install rod by rotating onto the threaded ends until the previously marked location is reached. Secure rod by tightening the clamp nut/bolt at each end.

M. Perform the following checks to ensure proper operation of steering system:

(1) With coach front wheels straight ahead, check that new pitman arm is pointing straight down.

NOTE

If the above condition is not present, loosen the two drag link rod clamp nuts/bolts and turn rod to obtain position specified; retighten nuts/bolts when complete.

(2) Start coach engine.

(3) Rotate the steering wheel to turn wheels to hit left-hand stop and check that the turn angle is equal to the right-hand turn angle.

FMC Corporation
Recreational Vehicle Division
333 Brokaw Road Box 664 Santa Clara, California 95052

☒ URGENT ☐ ROUTINE
☐ MANDATORY ☒ INFORMATIONAL

Service Bulletin

DATE 17 December 1973 NUMBER 2907 I0002

ATTENTION: SERVICE MANAGER S

GROUP 7

SUBJECT
REPLACEMENT OF PITMAN ARM

MODEL (S) AFFECTED
2900R

(Factory Use Only)
Information added to:
OWNER MANUAL (S)
SERVICE MANUAL (S)
PARTS MANUAL (S)
WARRANTY MANUAL (S)
OTHER

ACCOMPLISHMENT INSTRUCTIONS (continued)

CAUTION

Do not hit stop too hard or hold against the stops for more than 5 seconds, to avoid damage to the gearbox or lines.

(4) Shut down engine, remove jack stands and road test steering system.

John L. Strever

JOHN L. STREVER
Service Manager

RVD-84 (6-73)

FMC Corporation
Recreational Vehicle Division
333 Brokaw Road Box 664 Santa Clara, California 95052

☒ URGENT ☐ ROUTINE
☐ MANDATORY ☐ INFORMATIONAL

Service Bulletin

DATE 12 March 1974 NUMBER 2907 10003

ATTENTION: SERVICE MANAGER

GROUP
7

SUBJECT
REPLACEMENT OF PITMAN ARM

MODEL (S) AFFECTED
2900R

(Factory Use Only)
Information added to:
OWNER MANUAL (S)
SERVICE MANUAL (S)
PARTS MANUAL (S)
WARRANTY MANUAL (S)
OTHER

DESCRIPTION

It has been brought to our attention that some Pitman Arms (P/N 5106072) shipped with Service Bulletin #2907 10002 were incorrectly machined. Therefore, in replacing the old Pitman Arm with the new one, you may find that the new part will not sufficiently engage the steering sector output shaft far enough to allow adequate retaining nut thread engagement.

We have also found out that damage to the steering sector output shaft may result when removing the old Pitman Arm from the shaft by the method outlined in Service Bulletin #2907 10002.

COMPLIANCE

This bulletin supplements Service Bulletin #2907 10002 issued 17 December 1973 and dealers must comply as outlined in that bulletin except where Service Bulletin #2907 10003 modifies those procedures.

MATERIAL

TITLE	RVD P/N	QTY
Pitman Arm Puller	5100062-R088	1

INSTRUCTIONS

1. Use FMC supplied Pitman Arm Puller (P/N 5100062-R088 to remove old Pitman Arm. We have found that the method described under Item G Service Bulletin #2907 10002 utilizing "tuning fork, pickie fork, or other suitable prying tool", can damage the internal shaft of the steering sector.

2. An indication of a damaged output shaft is a considerable amount of shaft looseness.

3. The Pitman Arm Puller is being sent to you at a charge equivalent to our cost. If you do not wish to retain the puller after the recall campaign has been accomplished, we will accept the return of the part and reimburse you for the amount paid. However, it is recommended that you keep the puller for future use if you do not presently have an equivalent tool to accomplish the Pitman Arm removal.

FMC Corporation
Recreational Vehicle Division
333 Brokaw Road Box 664 Santa Clara, California 95052

☒ URGENT ☐ ROUTINE
☐ MANDATORY ☐ INFORMATIONAL

Service Bulletin

DATE 12 March 1974 NUMBER 2907 10003

ATTENTION: SERVICE MANAGER

GROUP
7

SUBJECT
REPLACEMENT OF PITMAN ARM

MODEL (S) AFFECTED
2900R

4. To determine if the new Pitman Arm is satisfactory for installation, slide the arm onto the steering sector splined shaft. If the arm will not allow at least one-half of the retaining nut thickness engagement after a reasonable amount of torque has been applied to the retaining nut, remove the Pitman Arm and try another.

5. Contact FMC service office in each such incident immediately so that a new Pitman Arm can be sent. The incorrect arm should be returned to FMC/RVD Service Department.

6. All other instructions in Service Bulletin #2907 10002 are applicable.

John L Strever

JOHN L. STREVER
Service Manager

(Factory Use Only)
Information added to:

OWNER MANUAL (S)

SERVICE MANUAL (S)

PARTS MANUAL (S)

WARRANTY MANUAL (S)

OTHER

FMC Corporation
Recreational Vehicle Division
333 Brokaw Road Box 664 Santa Clara, California 95052

☐ URGENT ☐ ROUTINE
☑ MANDATORY ☐ INFORMATIONAL

Service Bulletin

DATE 6 June 1974 NUMBER 2907 20004

ATTENTION: SERVICE MANAGERS

GROUP
7
STEERING

SUBJECT
PRE-DELIVERY FRONT END ALIGNMENT

MODEL (S) AFFECTED
MOTOR COACHES (2900R)
CLUB COACHES (2900C)
SHUTTLE COACHES (2900L)
TRANSIT COACHES (2900T)

(Factory Use Only)
Information added to:

OWNER MANUAL (S)

SERVICE MANUAL (S)

PARTS MANUAL (S)

WARRANTY MANUAL (S)

OTHER

DESCRIPTION

It has been determined that the front end alignment on new vehicles changes from the correct settings made at the manufacturing plant. This is due to the wearing-in of the transverse leaf spring after a period of time traveling on the highway. A realignment may be required prior to delivery to the purchaser.

COMPLIANCE

Each new coach shall have a toe-in alignment check made with the required adjustments to bring the front suspension components within the latest FMC toe-in specifications (see below) prior to delivery of the coach to the new owner.

The directives of this bulletin will remain in effect until a modification to the front spring, eliminating the need for realignment, is incorporated in new vehicles. You will be notified when the modification takes place.

MANPOWER

The estimated accomplishment time for this activity is 2 man-hours. We will allow up to the 2 hours to accomplish this activity.

ALIGNMENT SPECIFICATIONS

The toe-in alignment specification for all FMC 2900 series vehicles is 0 inches ± 1/16 inches.

To accomplish this, the holding tanks shall be empty or low and the potable water tanks full. The coach should be level both longitudinally (fore and aft) and transversely (side-to-side). Also, the front end should not be jacked to remove weight from the wheels while making the toe-in check or the actual realignment as this may result in erroneous settings by allowing the spring to once again assume an unnatural final position relative to the vehicle body.

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JOHN L. STREVER
Service Manager

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Motor Coach Division
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☐ URGENT ☐ ROUTINE
☐ MANDATORY ☒ INFORMATIONAL

Service Bulletin

DATE 18 September 1974 NUMBER 2907 40002

ATTENTION: SERVICE MANAGERS AND OWNERS

GROUP
7
STEERING

SUBJECT
WHEEL ALIGNMENT SPECIFICATIONS

MODEL (S) AFFECTED
00001 TO 00645
2900R
MOTOR HOME
AND
2900C
CLUB COACHES

(Factory Use Only)
Information added to:

OWNER MANUAL (S)

SERVICE MANUAL (S)

PARTS MANUAL (S)

WARRANTY MANUAL (S)

OTHER

DESCRIPTION

The Service Manual covering the 2900R Motor Home contains incorrect wheel alignment specifications. This bulletin is issued to reflect the latest specifications and in brief to define wheel alignment terminology. Section 7 of the Service Manual will be corrected in the near future to cover these new specifications.

WHEEL ALIGNMENT

Proper wheel alignment ensures that the suspension and steering systems will function to provide optimum handling, steering, and stability with minimum tire wear.

CAUTION

A normal road operating load should be on the coach for proper wheel alignment. Domestic and automotive systems serviced, holding tanks empty or low, potable water tanks full, normal kitchenware, supplies, and baggage in place in cabinets and closets. DO NOT JACK COACH DURING ALIGNMENT PROCEDURES.

NOTE

If coach was jacked for maintenance work - such as installing a new spring - drive coach with a normal road operating load (see above CAUTION) at least 25 miles before aligning wheels.

SPECIFICATIONS

Leveling. Coach should be level laterally (side-to-side) and the rear end should be 1/8 inch lower than the front (see fig. 1).

Camber. The angle at which the top of the front wheel tilts out (positive) or tilts in (negative) in relation to true vertical (0 degrees). The coach front wheels tilt inward at the top at an angle of 1/2 degree negative camber (fig. 1). If these negative camber specifications can not be obtained, then adjust as close to 1/2 degree as possible.

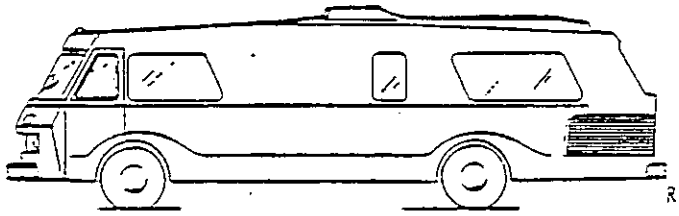
FMC Corporation
Motor Coach Division
333 Brokaw Road Box 664 Santa Clara California 95052

☐ URGENT ☐ ROUTINE
☐ MANDATORY ☒ INFORMATIONAL

Service Bulletin

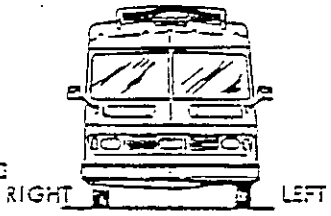
DATE 18 September 1974 NUMBER 2907 40002

ATTENTION: SERVICE MANAGERS AND OWNERS



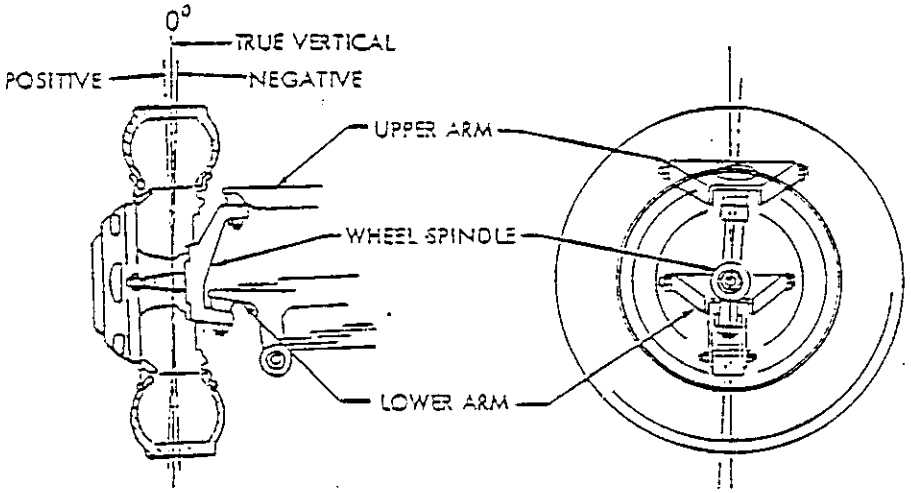
LONGITUDINAL

REAR OF COACH 1/8" LOWER THAN FRONT.



LATERAL

SIDE-TO-SIDE MUST BE LEVEL NO DIFFERENCE IN MEASUREMENTS

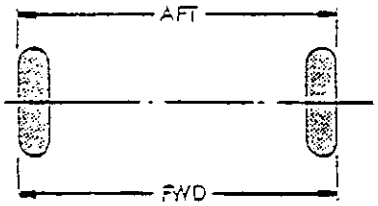


CAMBER

1/2 DEGREE TOP OF WHEEL TILTS INBOARD FROM TRUE VERTICAL

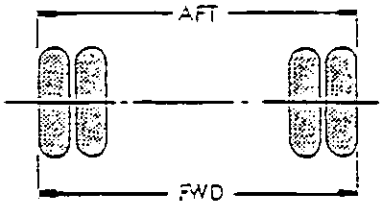
CASTER

2 DEGREES ± 0° 15' POSITIVE SPINDLE ATTACHMENT POINT TO UPPER ARM IS AFT OF THE LOWER ATTACHMENT POINT TO THE LOWER ARM



FRONT WHEELS

TOE-OUT FWD DIMENSION 3/8 INCH MORE THAN AFT DIMENSION



REAR WHEELS

TOE-IN FWD DIMENSION 1/8 INCH PLUS 0, MINUS 1/16 INCH LESS THAN AFT DIMENSION

FIGURE 1. WHEEL ALIGNMENT SPECIFICATIONS SD-553

GROUP
7
STEERING

SUBJECT
WHEEL ALIGNMENT SPECIFICATIONS

MODEL (S) AFFECTED
00001 TO 00645
2900R
MOTOR HOME
AND
2900C
CLUB COACHES

(Factory Use Only)
Information added to:

OWNER MANUAL (S)

SERVICE MANUAL (S)

PARTS MANUAL (S)

WARRANTY MANUAL (S)

FMC Corporation
Motor Coach Division
333 Brokaw Road Box 864 Santa Clara California 95052

☐ URGENT ☐ ROUTINE
☐ MANDATORY ☒ INFORMATIONAL

Service Bulletin

DATE 18 September 1974 NUMBER 2907 40002

ATTENTION: SERVICE MANAGERS AND OWNERS

GROUP
7
STEERING

SUBJECT
WHEEL ALIGNMENT SPECIFICATIONS

MODEL (S) AFFECTED
00001 TO 00645
2900R
MOTOR HOME
AND
2900C
CLUB COACHES

(Factory Use Only)
Information added to:
OWNER MANUAL (S)
SERVICE MANUAL (S)
PARTS MANUAL (S)
WARRANTY MANUAL (S)
OTHER

Caster. The forward or rearward angle of tilt from true vertical of the steering spindle as established at lower and upper attachment points to the suspension arms. The spindle attachment point to the upper arm on the coach is aft of the lower attachment point. A center line drawn from the spindle lower-to-upper attachment point would, if viewed from the side, indicate the difference from true vertical to be 2 degrees + 0° 15' positive caster (fig. 1).

Toe-Out (front). The difference in measured inches between the front edges (outer tread edge) of the front tires vs. the difference of the rear edges when measured at approximately hub level. The coach measurement should indicate the front edge tire-to-tire distance to be 3/8 inch more than the rear (fig. 1).

1. Use a 6 inch square and check that the lower aft extending arm on the bellcrank (left hand side) is parallel with the coach frame. If not parallel, loosen nuts and bolts on the clamps at each end of the drag link rod, which attaches the upper bellcrank arm to the pitman arm, and adjust lower arms until parallel; retighten clamps.

2. Make a preliminary toe-out check by measuring the distance between the frame and inboard edge of the wheel rim at the rear end of wheel; then measure at front end. The measurement at the front should be 3/16 inch more than the rear measurement.

3. Adjust, if required to obtain the toe-out specified in previous step, by turning the control link rod which connects bellcrank to the spindle control arm.

Toe-In (rear outboard wheels). Measure in same manner as front; forward dimension should be 1/8 inch (plus 0, minus 1/16) less than aft dimension (fig. 1).

1. Using a cord (twine or string) of approximately 30 foot length, wrap one end around right hand outboard rear tire at approximately hub level. Secure to the inboard side of tire. Pull cord taut and extend length of coach to front tire, and secure opposite end of cord to front tire same position as rear. Front wheels are positioned as adjusted in previous procedures.

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Motor Coach Division
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☐ URGENT ☐ ROUTINE
☐ MANDATORY ☒ INFORMATIONAL

Service Bulletin

DATE 18 September 1974 NUMBER 2907 40002

ATTENTION: SERVICE MANAGER

2. Check that cord touches front tire fore and aft outboard surfaces evenly; then check for same condition at rear outboard tire.

3. If rear outboard tire surfaces do not contact cord both fore and aft outer edges, adjust rear toe-in at the outboard trailing arm pivot mount block.

Max L Snavely
MAX L. SNAVELY
Service Manager

GROUP
7
STEERING

SUBJECT

WHEEL ALIGNMENT SPECIFICATIONS

MODEL (S) AFFECTED

00001 TO 00645
2900R
MOTOR HOME
AND
2900C
CLUB COACHES

(Factory Use Only)
Information added to:

OWNER MANUAL (S)

SERVICE MANUAL (S)

PARTS MANUAL (S)

WARRANTY MANUAL (S)

OTHER

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Motor Coach Division
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Service Bulletin

DATE 10 February 1975 NUMBER 2907 20006

ATTENTION: SERVICE MANAGER AND OWNERS

GROUP
7

SUBJECT
INSTALLATION OF STEERING LINKAGE STOP KIT

MODEL (S) AFFECTED
2900R
SERIAL NUMBERS 00646 THROUGH 00720

DESCRIPTION

This bulletin provides FMC-RVD drawing 5107609 with instructions for installation of steering linkage stop kit on the coaches listed herein.

COMPLIANCE

Dealers must comply with this bulletin prior to delivery of coach to owner. Present owners must return coach to dealer for this modification. Owners should contact dealer and arrange an appointment for kit installation as soon as practicable after receipt of this bulletin.

MANPOWER

Estimated accomplishment time for one mechanic/welder is approximately one hour.

WARRANTY REIMBURSEMENT

FMC Motor Coach Division will allow a maximum of one labor hour and reimbursement for Kit 5107609 on a properly submitted Warranty Claim (Form RVD 69) for this modification.

KIT CONTENTS (5107609)

Kit contents consists of the parts listed on attached FMC-RVD drawing number 5107609.

ACCOMPLISHMENT INSTRUCTIONS

A. To accomplish installation of the steering linkage stop kit, jack up coach front end and install jack stands at designated jack points per Owner's Manual. Obtain access from underneath the front end of coach.

B. Position front wheels straight ahead.

C. Prepare for kit installation by removal of under coating at areas where stops are to be installed; see drawing.

D. See drawing and install the kit components as specified, observing the following:

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Service Bulletin

DATE 10 February 1975 NUMBER 2907 20006

ATTENTION: SERVICE MANAGER AND OWNERS

GROUP 7

SUBJECT

MODEL (S) AFFECTED

ACCOMPLISHMENT INSTRUCTIONS (continued)

(1) To position wheels as specified on adjustment NOTE, start coach engine and use power steering when rotating the steering wheel to turn linkages to hit stops.

CAUTION

- Do not hit stops too hard or hold against the stops for more than 5 seconds, to avoid damage to the gearbox or lines.
- Following the adjustment make sure steering linkage control-link rods do not contact the outer lower edge of the cross beam structure when in maximum LH and RH turn positions. If contact is made, the prescribed 3 inch adjustment must be increased until rods clear structure.

(2) The adjustment NOTE statement "------ to back side of lower arm ------", should read "---------- to back side of lower suspension ("A") arm ----------".

(3) During final adjustment of stop bolt, hold bolt in place while tightening lock (jam) nut, to prevent turning of bolt.

(4) Shut down engine, remove jack stands.

Max I Snavely
MAX SNAVELY
Service Manager

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Motor Coach Division
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☒ URGENT ☐ ROUTINE
☐ MANDATORY ☐ INFORMATIONAL

Service Bulletin

DATE 10 February 1975 NUMBER 2907 10005

ATTENTION: SERVICE MANAGER

GROUP
7

SUBJECT
INSTALLATION OF REINFORCEMENT KIT FOR STEERING GEARBOX MOUNT BRACKET

MODEL (S) AFFECTED

S-5-08-J-00630
S-5-09-A-00654
S-5-09-A-00655
S-5-10-A-00656
S-5-10-J-00658
S-5-10-J-00659
S-5-10-J-00660
S-5-10-J-00663
S-5-10-E-00664
S-5-10-A-00665
S-5-10-A-00666
S-5-10-J-00667
S-5-10-J-00669
S-5-11-J-00680
S-5-11-J-00682
S-5-11-J-00684
S-5-11-J-00686
S-5-11-J-00688
S-5-12-J-00690
S-5-12-J-00692
S-5-12-J-00694
S-5-12-J-00696

DESCRIPTION

This bulletin provides instructions for installation of a reinforcement kit on the steering gearbox mount bracket on the coaches listed herein.

COMPLIANCE

Dealers must comply with this bulletin prior to delivery of coach to owner.

MANPOWER

Estimated accomplishment time for one mechanic is approximately two and one-half hours.

WARRANTY REIMBURSEMENT

FMC Motor Coach Division will allow a maximum of two and one-half labor hours and reimbursement for Kit 5100116-R006 on a properly submitted Warranty Claim (Form RVD 69) for this modification.

KIT CONTENTS (5100116-R006)

FIGURE 1

ITEM NO.	TITLE	MCD P/N	QTY PER COACH
1	Bracket, steer gear mount bracket reinforce	5107644	1
2	Bolt, reinforce bracket to mount bracket attach (5/8 in. - 11 x 4 1/4 in. long)	M18194	3
3	Washer, lock, bracket bolt (5/8 in. I.D.)	M17008	3

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Service Bulletin.

DATE 10 February 1975 NUMBER 2907 10005

ATTENTION: SERVICE MANAGER

GROUP 7

SUBJECT

MODEL (S) AFFECTED

KIT CONTENTS (5100116-R006) (continued)

FIGURE 1

ITEM NO.	TITLE	MCD P/N	QTY PER COACH
4	Rod, stabilizer for reinforce kit	5107645	1
5	Nut, castellated, rod-to-bracket attach (1 in. -8)	M17028	2
6	Bolt, stabilizer-to-inboard bump spring bracket attach (1/2 in. -13 X 2 1/2 in. lg.)	M18035	2
7	Nut, lock, stabilizer rod bolt (1/2 in. -13)	M17049	2
8	Bracket, outboard bump spring-to-frame attach	5107643	1
9 (not shown)	Plate, backup, on frame behind item 4 rod attachment bracket	5107646	1

ACCOMPLISHMENT INSTRUCTIONS

A. To accomplish installation of the reinforcement Kit, jack up coach front end and install jack stands at designated jack points per Owner's Manual. Obtain access from underneath the front through lower openings in front panel (panel removal not required).

B. Position front wheels straight ahead.

C. Prepare for kit installation by removal of certain parts and perform minor modifications to provide access as specified. Retain parts, when specified, for reuse during reassembly. Discard old parts not specified for retention. Suggest that retained parts be arranged on

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Service Bulletin

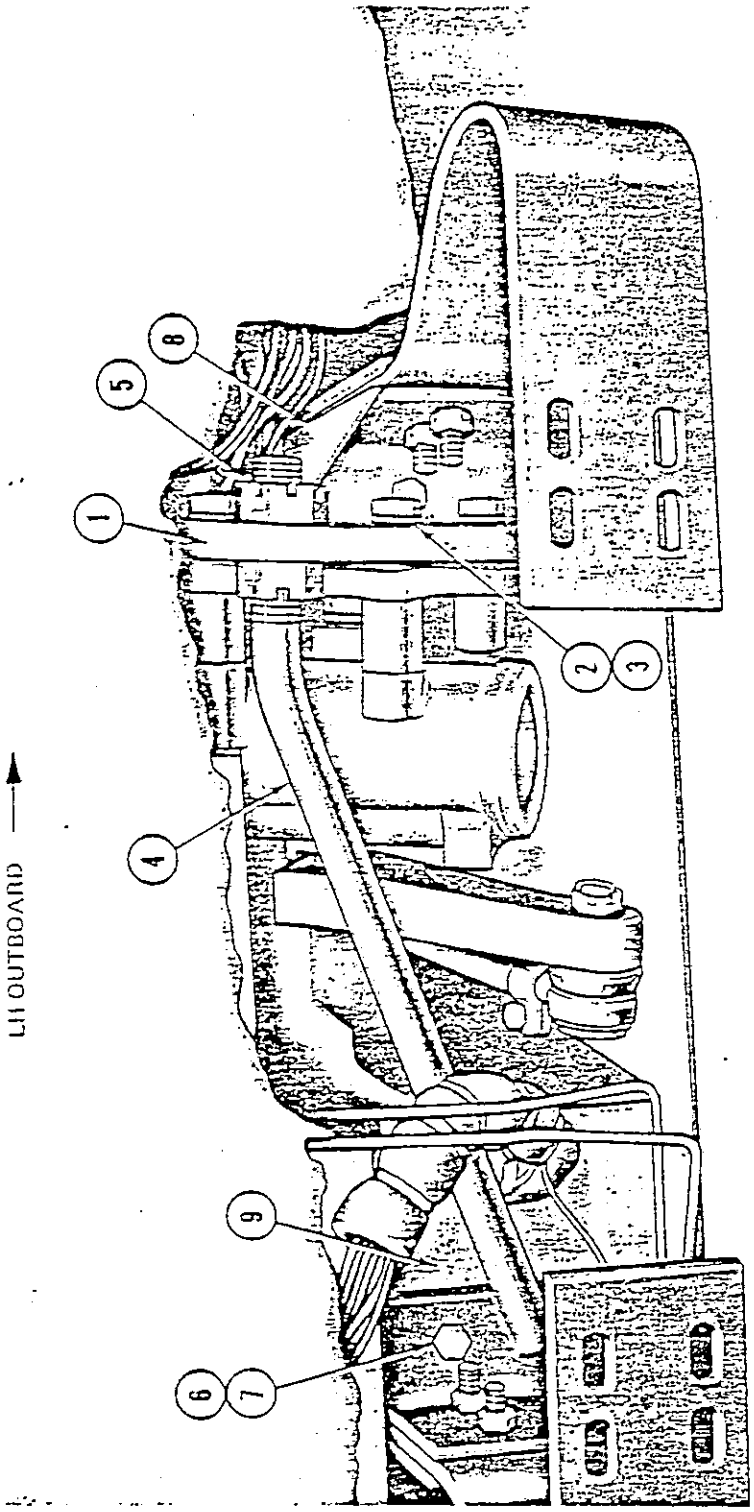
DATE 10 February 1975 NUMBER 2907 10005

ATTENTION: SERVICE MANAGER

GROUP
7

SUBJECT

MODEL (S) AFFECTED



SD 601

FIGURE 1. STEERING GEAR REINFORCEMENT KIT INSTALLATION

NOTE: THIS FIGURE SHOWS FRONT NOSE PANEL REMOVED FOR CLARITY. KIT INSTALLATION DOES NOT REQUIRE REMOVAL OF PANEL.

RVD-84 (6-73)

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Service Bulletin

DATE 10 February 1975 NUMBER 2907 10005

ATTENTION: SERVICE MANAGER

GROUP 7

SUBJECT

MODEL (S) AFFECTED

ACCOMPLISHMENT INSTRUCTIONS (continued)

floor underneath coach in a general pattern resembling the installed configuration, to facilitate rapid location of reused attaching hardware during reinstallation. Proceed as follows:

(1) Remove the nuts, washers and bolts attaching the front bumper to the two, bumper mount, leaf springs, located on LH side of coach; do not remove bumper.

(2) Remove locknuts and bolts attaching the two LH inboard and outboard bumper leaf springs to the four frame mount brackets; remove springs and retain. Retain attaching nuts and bolts.

(3) Remove the frame mount bracket, nearest to coach centerline, of the inboard mount bracket set, by removing lock nut and attachment bolts, Retain bracket, locknuts and bolts. Repeat removal procedure for adjacent bracket, but discard nuts and bolts and retain bracket only.

NOTE

To provide better access to the top bolt for the next step and for installing new parts, the lower corner edges of the panel and the aluminum angle in the vicinity of work area, may be bent back about 50 degrees, using vise grip pliers or similiar tool. Temporarily tie-back or tape all wiring back away from bracket mount areas during these procedures.

(4) Repeat step (3) for the outboard bumper spring-leaf-to-frame attach bracket set but retain all attaching locknuts and bolts; discard only the two brackets.

(5) Remove the three bolts and lockwashers attaching the steering gearbox to the mount bracket; discard bolts and washers.

D. See figure 1 and install the reinforcement kit components and the parts retained during disassembly, in the following sequence:

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Service Bulletin

DATE 10 February 1975 NUMBER 2907 10005

ATTENTION: SERVICE MANAGER

GROUP 7

SUBJECT

MODEL (S) AFFECTED

ACCOMPLISHMENT INSTRUCTIONS (continued)

(1) Loosely install the steering gearbox reinforcement bracket (item 1) where shown, using three lockwashers (item 3), three bolts (item 2) and two bolts and locknuts retained from step C (4). Do not tighten.

(2) Insert the plate (non-threaded) end of the stabilizer rod (item 5) up and inboard through the coach front panel opening for the inboard bumper spring. Move rod inboard toward coach center line until threaded end clears opening. Feed rod (threaded end) behind harness and tubing (as shown). Just before inserting though the hole in the reinforcement bracket, install one castellated nut (item 5) all the way on threaded end of rod.

(3) With stabilizer rod threaded end inserted in bracket hole, assemble the rod end plate on bracket retained from step C (3), with the back-up plate (9) behind the frame structure. Align holes and use two new bolts (item 6) and nuts (item 7) to loosely secure rod end, bracket and back-up plate in position.

(4) Loosely install the inboard frame mount bracket section retained from step C (3) with the retained locknut and bolts.

(5) Loosely install inboard bumper spring retained from step C (2) in brackets, using the retained locknuts and bolts.

(6) Loosely connect bumper to inboard spring with nuts, bolts and washers retained from step C (1).

CAUTION

Prior to accomplishing next step, check that no wiring has dropped in between the new reinforcement bracket and frame mount structure.

(7) Tighten the reinforcement bracket attach bolts previously installed in step (1).

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☒ URGENT ☐ ROUTINE
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Service Bulletin

DATE 10 February 1975 NUMBER 2907 10005

ATTENTION: SERVICE MANAGER

GROUP 7

SUBJECT

MODEL (S) AFFECTED

ACCOMPLISHMENT INSTRUCTIONS (continued)

NOTE

Standard dry (non-lubricated) torque value for the three 5/8 inch size bolt attaching the reinforcement bracket-to-steering gearbox mount is approximately 110 foot pounds. The 1/2 inch size bolts require 55 foot pounds torque.

(8) Tighten the inboard bumper spring-to-frame bracket attach bolts previously installed in step (3).

(9) Turn the inboard castellated nut, installed on stabilizer rod in step (2), until it firmly contacts the reinforcement bracket.

(10) Install and tighten the outboard castellated nut (item 5) on the stabilizer rod end. Torque 200 ft. lb.

(11) Loosely install the new outboard spring-leaf-to frame attach bracket (item 8), using locknuts and bolts retained from step C (4).

(12) Loosely install outboard bumper spring, retained from step C (2), in between the reinforcement and outer brackets, using the retained locknut and bolts.

(13) Loosely connect bumper to spring with nuts, bolts and washers retained from step C (1).

(14) Align (level) bumper and tighten all remaining attaching nuts/bolts for total installation; recheck previously tightened bolts to ensure tightness.

E. Remove tape, installed to hold wiring out of the way, and remove jack stands.

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☐ MANDATORY ☒ INFORMATIONAL

Service Bulletin

DATE March 6, 1975 NUMBER 2907 40003

ATTENTION: SERVICE MANAGER AND OWNERS

GROUP
7
STEERING

SUBJECT
WHEEL ALIGNMENT SPECIFICATIONS WITH NEW SUSPENSION

MODEL (S) AFFECTED
00646 AND UP
2900R
MOTOR HOME
AND
2900C
CLUB COACHES

DESCRIPTION

This service bulletin is issued to cover the wheel alignment specifications on all coaches equipped with heavy duty suspension and in brief to define wheel alignment terminology.

WHEEL ALIGNMENT

Proper wheel alignment ensures that the suspension and steering systems will function to provide optimum handling, steering, and stability with minimum tire wear.

CAUTION

A normal road operating load should be on the coach for proper wheel alignment. Domestic and automotive systems serviced, holding tanks empty or low, potable water tanks full, normal kitchenware, supplies, and baggage in place in cabinets and closets. DO NOT JACK COACH DURING ALIGNMENT PROCEDURES.

NOTE

If coach was jacked for maintenance work - such as installing a new spring - drive coach with a normal road operating load (see above CAUTION) at least 25 miles before aligning wheels.

SPECIFICATIONS

Leveling. Coach should be level laterally (side-to-side) and the rear end should be 1/8 inch lower than the front (see fig. 1).

Camber. The angle at which the top of the front wheel tilts out (positive) or tilts in (negative) in relation to true vertical (0 degrees). The coach front wheels are set at the true vertical position (0 degrees) (fig. 1).

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Service Bulletin

DATE March 6, 1975 NUMBER 2907 40003

ATTENTION: SERVICE MANAGER AND OWNERS

GROUP
7
STEERING

SUBJECT
WHEEL ALIGNMENT SPECIFICATIONS NEW SUSPENSION

MODEL (S) AFFECTED
00646 AND UP
2900R
MOTOR HOME
AND
2900C
CLUB COACHES

SPECIFICATIONS (Con't)

Caster. The forward or rearward angle of tilt from true vertical of the steering spindle as established at lower and upper attachment points to the suspension arms. The spindle attachment point to the upper arm on the coach is aft of the lower attachment point. A center line drawn from the spindle lower-to-upper attachment point would, if viewed from the side, indicate the difference from true vertical to be 2 degrees. (fig. 1).

Toe-In (front). The difference in measured inches between the front edges (outer tread edge) of the front tires vs. the difference of the rear edges when measured at approximately hub level. The coach measurement should indicate the front edge tire-to-tire distance to be 1/16 inch less than the rear (fig. 1).

(1) Use a small square to check the perpendicularity of the extended arm of the bellcrank and the idler arm to coach frame. If not perpendicular, adjust the length of the drag link between the bellcrank and idler arms until the extended arm on each is perpendicular to the coach frame simultaneously.

(2) While maintaining above perpendicularity, make a preliminary toe-in check by measuring the distance between the coach frame and inboard edge of the wheel rim at both the rear and front of the wheel. Check both front wheels. The measurement at the front edge of the wheel should be the same as the rear edge of the wheel. To obtain the specified toe-in, adjust by turning the control link rods which connect the spindle control arms to the bellcrank and idler arms.

(3) Center the steering gear by adjusting the length of the drag link from pitman arm to bellcrank. When properly centered it should require two complete turns of the steering wheel (right or left) to hit steering stops on frame.

Toe-In (rear outboard wheels). Measure in same manner as front; forward dimension should be 1/8 inch (plus 0, minus 1/16) less than aft dimension (fig. 1).

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Service Bulletin

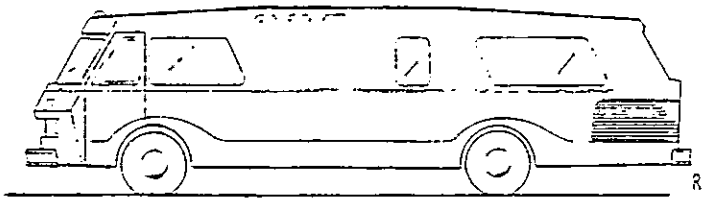
DATE March 6, 1975 NUMBER 2907 40003

ATTENTION: SERVICE MANAGER AND OWNERS

GROUP
7
STEERING

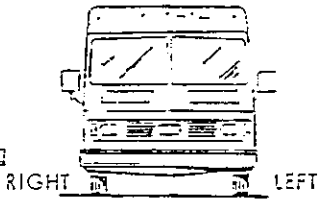
SUBJECT
WHEEL ALIGNMENT SPECIFICATIONS NEW SUSPENSION

MODEL (S) AFFECTED
00646 AND UP
2900R
MOTOR HOME
AND
2900C
CLUB COACHES



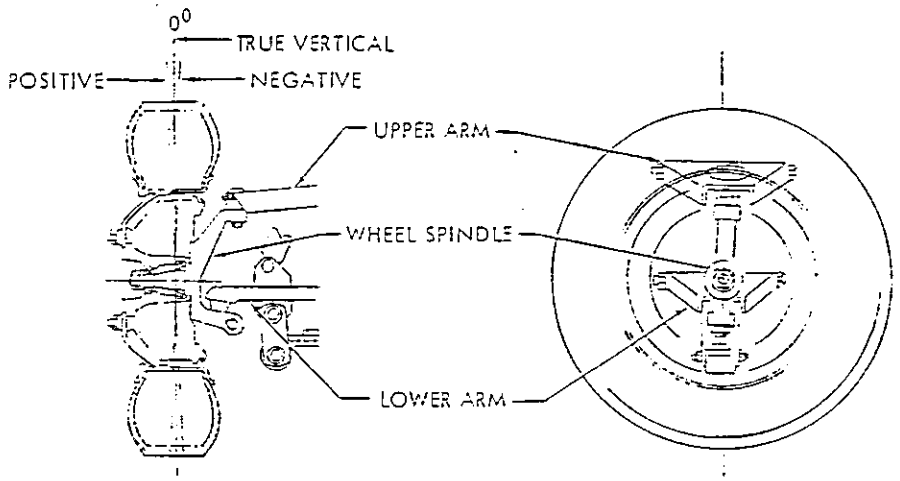
LONGITUDINAL

REAR OF COACH 1/8" LOWER THAN FRONT



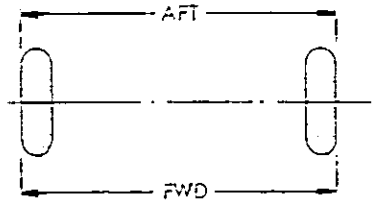
LATERAL

SIDE-TO-SIDE MUST BE LEVEL NO DIFFERENCE IN MEASUREMENTS



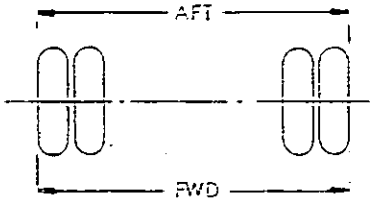
CAMBER
0 DEGREE TOP OF WHEEL FROM TRUE VERTICAL

CASTER
2 DEGREES POSITIVE. SPINDLE ATTACHMENT POINT TO UPPER ARM IS AFT OF THE LOWER ATTACHMENT POINT TO THE LOWER ARM



FRONT WHEELS

TOE-IN
FWD DIMENSION 1/16 INCH LESS THAN AFT DIMENSION



REAR WHEELS

TOE-IN
FWD DIMENSION 1/8 INCH PLUS 0, MINUS 1/16 INCH LESS THAN AFT DIMENSION

SD-603

FIGURE 1. WHEEL ALIGNMENT SPECIFICATIONS

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Service Bulletin

DATE March 6, 1975 NUMBER 2907 40003

ATTENTION: SERVICE MANAGER AND OWNERS

GROUP
7
STEERING

SUBJECT
WHEEL ALIGNMENT SPECIFICATIONS NEW SUSPENSION

(1) Using a cord (twine or string) of approximately 30 foot length, wrap one end around right hand outboard rear tire at approximately hub level. Secure to the inboard side of tire. Pull cord taut and extend length of coach to front tire, and secure opposite end of cord to front tire same position as rear. Front wheels are positioned as adjusted in previous procedures.

(2) Check that cord touches front tire fore and aft outboard surfaces evenly; then check for same condition at rear outboard tire.

(3) If rear outboard tire surfaces do not contact cord both fore and aft outer edges, adjust rear toe-in at the outboard trailing arm pivot mount block.

Max L Snavely
MAX L. SNAVELY
Service Manager

MODEL (S) AFFECTED
00646 AND UP
2900R
MOTOR HOME
AND
2900C
CLUB COACHES

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333 Brokaw Road Box 664 Santa Clara California 95052

☒ URGENT ☐ ROUTINE
☐ MANDATORY ☐ INFORMATIONAL

Service Bulletin

DATE June 18, 1976 NUMBER 2907-10006

ATTENTION: SERVICE MANAGER

GROUP 7

SUBJECT

Steering Gear to Frame Mounting Bolts.

MODEL (S) AFFECTED

Transit Coaches 00647 to 00997

DESCRIPTION

This bulletin provides instructions for replacement of the steering gear to frame bracket mounting bolts with improved mounting bolts.

COMPLIANCE

Service Managers and owners must comply with this bulletin as soon as possible per recall notification #A0706.

MANPOWER

Estimated accomplishment time for one mechanic is 1½ hours. FMC/MCD will reimburse for labor up to a maximum of 1½ hours.

MATERIAL

Replacement parts supplied no charge by FMC/MCD are:

4 ea. #5109226 Bolt 5/8-11 x 3½ Grade 5 w/nylon patch

4 ea. #M17197 Washer, Flat 21/32 ID x 1 5/16 OD Hardened

ACCOMPLISHMENT INSTRUCTIONS

1. Remove left bumper bracket at frame and bumper. Set entire assembly aside.
2. Examine area around top mounting bolt for an aluminum obstruction protruding from inner body panel. If such obstruction is present cut-off panel to gain clear access to all mounting bolts.
3. Remove existing steering gear to frame mounting bolts and lockwashers.
4. Install flat washer (M17197) between bolt and mounting bracket; install bolt (5109226) through bracket into steering gear housing and torque evenly to 110 foot pounds each.

   CAUTION: Flat washers must be used to keep bolt from bottoming out in steering gear housing.
5. Replace left bumper bracket at frame and bumper. Tighten all bolts securely.

F.M.C., AS OF 12/31/75, NO LONGER HONORS PARTS OR LABOR REIMBURSEMENT AS OUTLINED IN THIS BULLETIN

RVS RECREATIONAL VEHICLE SERVICES, INC.

R. R. 2, BOX M140 + MORGAN HILL, CALIFORNIA 95037 + (408) 779-3173 (408) 227-1644

While at FMC a number of questions were asked me about zerk fittings in the rod ends. Engineers at TRW informed me with this illustration and information about the hyrid joint used on the FMC as shown external lubrication is not necessary. An attempt to install zerks would (1) contaminate the socket with metal shavings (2) probably unseat the ball during even hand type lubrication (3) destroy the built-in long term integrity of the joint. A worn socket of this type, says TRW would take less than 2 ft. lbs. to move from side to side.

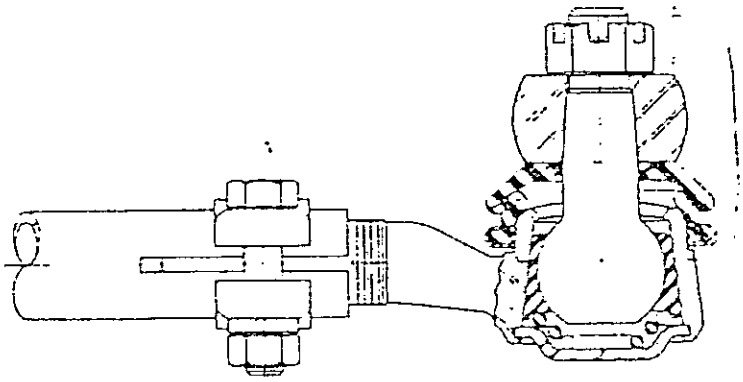

Figure 6

A nylon wedge tie rod socket is shown in figure 6. This socket utilizes a plastic bearing material, such as nylon, around the head of a steel ball stud. When slight wear occurs, a calibrated spring urges the nylon bearing to close in around the ball stud and maintain correct wear clearance. The nylon bearing has the desirable characteristic of isolating road vibration and thereby providing a smoother steering system. This socket design is especially adaptable to extended lubrication cycles or permanent lubrication.

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☐ URGENT ☑ ROUTINE
☐ MANDATORY ☐ INFORMATIONAL

Service Bulletin

DATE March 1, 1977 NUMBER 2907-30002

ATTENTION: SERVICE MANAGER

GROUP
7

SUBJECT
Torque requirements for bell crank bolts.

Coaches 00645 and up

MODEL (S) AFFECTED
All Transit Coaches from 00645 and up

Motor Coaches

DESCRIPTION

This bulletin provides instructions for proper torque of the bellcrank nuts on the coach steering linkage.

COMPLIANCE

Owners are urged to check and tighten bellcrank nuts to avoid premature failure of the bellcrank bushings.

INSTRUCTIONS (See attached illustration)

1. With coach on hoist check left and right bellcrank nuts. Each nut should be tightened to 110 ft lbs.
2. Any replacement of a bellcrank bushing requires that the bellcrank nut be tightened to 110 ft-lbs.
3. It is recommended that these nuts be checked and retorqued to 110 ft lbs after 1000 miles of operation, and again after 5000 miles of operation.
4. Bellcrank bushings should be checked every 10,000 miles after initial torquing. To check, place coach on hoist and vigorously shake steering links. Note the amount of movement of bolt in bellcrank housing. Replace any bushing that is worn.

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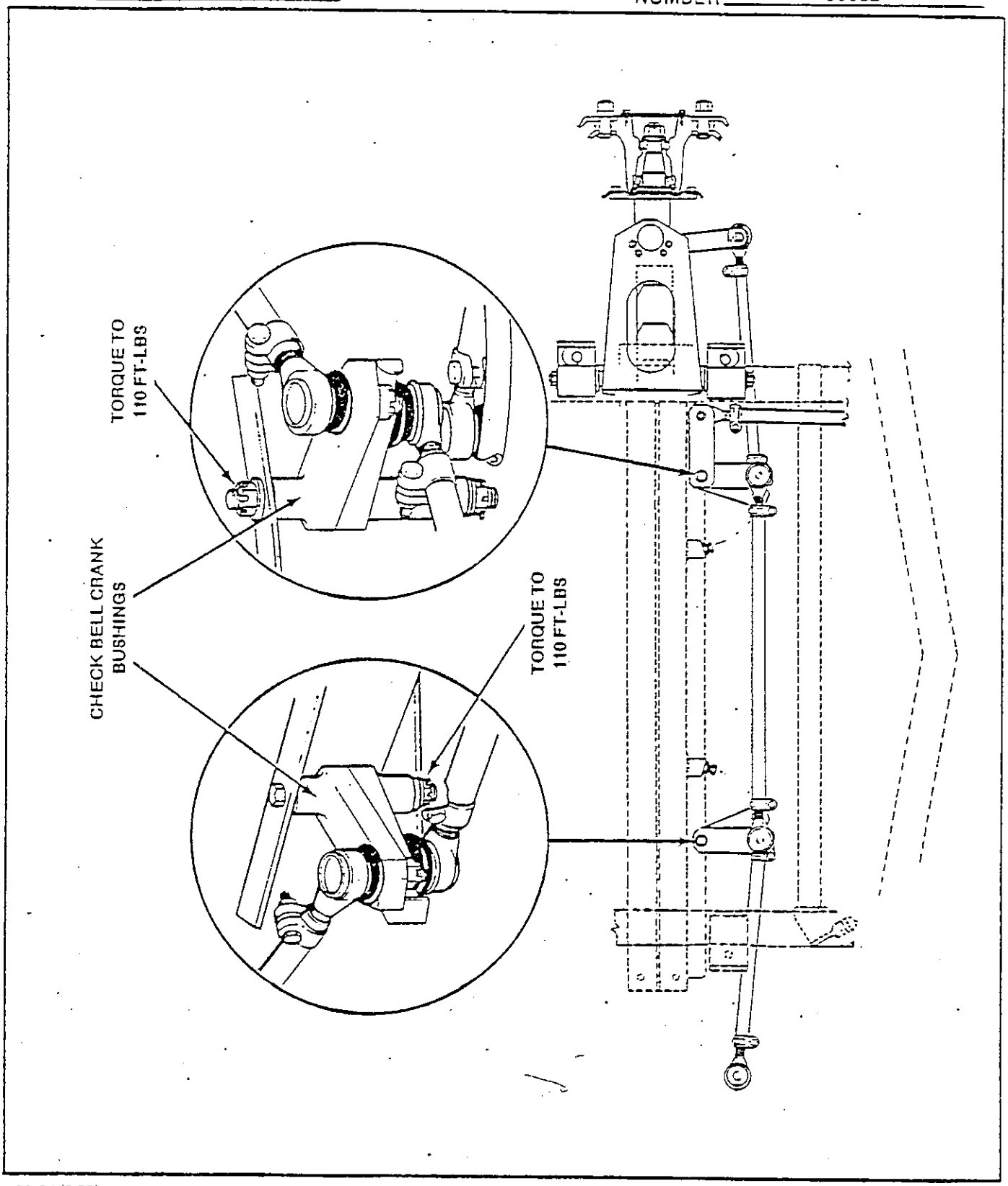
Service Bulletin

DATE March 1, 1977 NUMBER 2907-30002



FMC Corporation
Motor Coach Division
333 Brokaw Road Box 664 Santa Clara California 95052

☑ URGENT ☐ ROUTINE
☐ MANDATORY ☐ INFORMATIONAL

Service Bulletin

DATE June 30, 1977 NUMBER 2907-10004

ATTENTION: SERVICE MANAGERS AND OWNERS

On motor homes that fall within the serial range of 00001 to 00365, a black rubber cap was used on the power steering pump. Over a period of time, and with the accumulation of mileage on your coach, this black rubber cap could deteriorate and leak oil.

Please check your coach and if you have a black rubber cap on the power steering pump, remove it and replace with the new grey rubber cap furnished with this bulletin. Use existing clamp to install new cap.

See illustration for details and make the above change as soon as possible.

Should there be a charge to you for installing the new cap, submit the bill to us and we will reimburse you, but only up to a maximum of $3.00 per coach.

Dave Enget
Service Manager

RECALL NOTIFICATION #A0708

GROUP
7
Motor Home

SUBJECT
Power Steering Pump Capped Outlet

MODEL (S) AFFECTED
Motor Homes Serial 00001 to 00365 approximately

(Factory Use Only)
Information added to:

OWNER MANUAL (S)

SERVICE MANUAL (S)

PARTS MANUAL (S)

WARRANTY MANUAL (S)

OTHER

FMC Corporation
Motor Coach Division
333 Brokaw Road Box 664 Santa Clara California 95052

☒ URGENT ☐ ROUTINE
☐ MANDATORY ☐ INFORMATIONAL

Service Bulletin

DATE June 30, 1977 NUMBER 2907-10004

ATTENTION: SERVICE MANAGERS AND OWNERS

GROUP 7

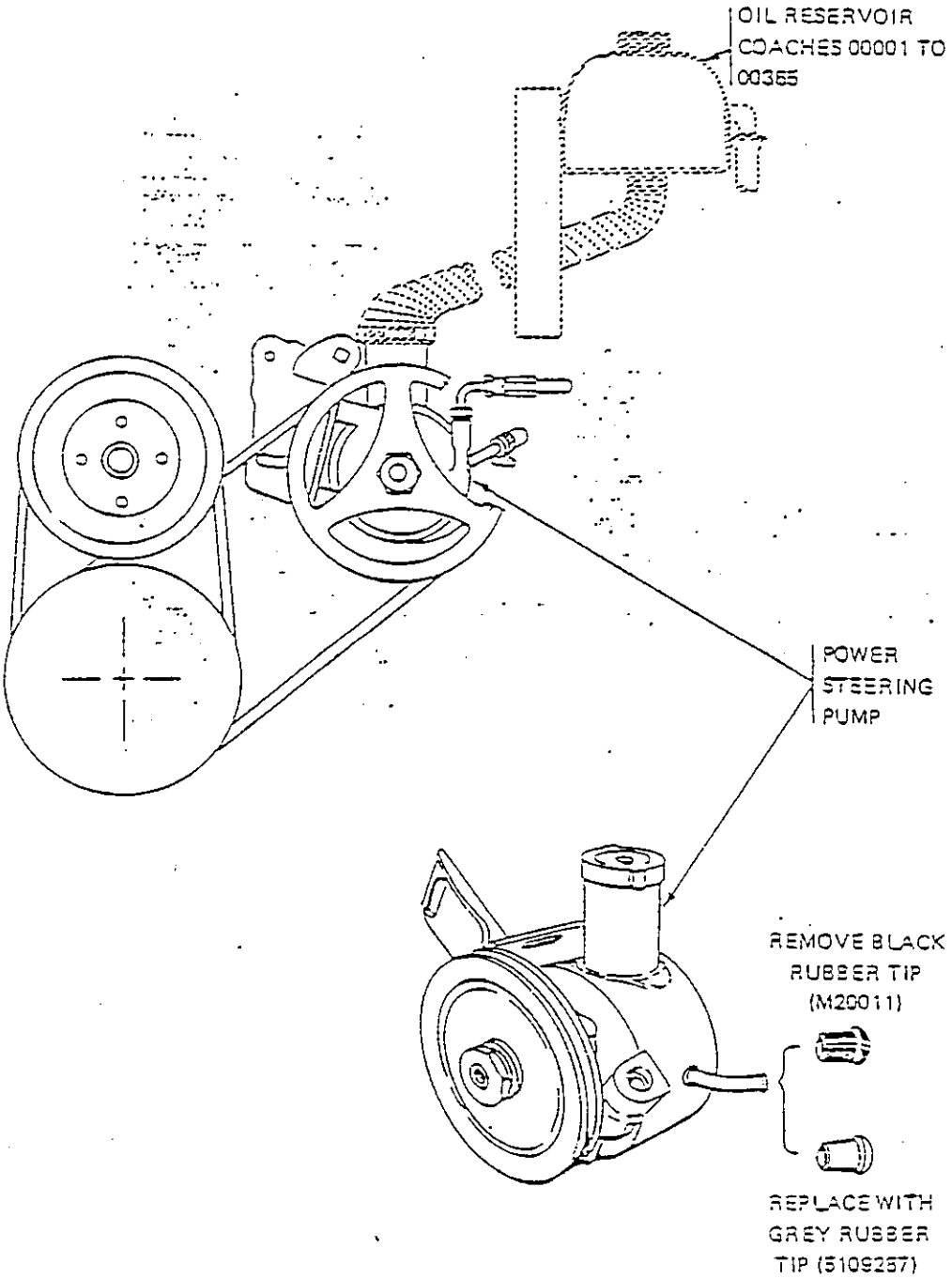
MOTOR HOME

SUBJECT

POWER STEERING PUMP CAPPED OUTLET

MODEL (S) AFFECTED

MOTOR HOMES SERIAL 00001 TO 00365 APPROXIMATELY



POWER STEERING PUMP CAP

(7)

FMC Corporation

Motor Coach Operations
Box 1201
San Jose, California 95108
(408) 289 0111

July 18, 1977

Dear FMC Owner:

This notice is sent to you in accordance with the requirements of the National Traffic and Motor Vehicle Safety Act.

It has come to the attention of Motor Coach Operations that a certain number of FMC motor homes may have faulty rubber caps on the power steering pump. The caps function is to seal off the power steering pump return tube when using an external reservoir. It has been determined that the existing caps may deteriorate, possibly creating a sudden loss of fluids from the power steering system. Should this occur, it will require manual effort in steering the coach. Our records indicate that the vehicle in your possession is involved.

The rubber cap in question should be checked at once to determine its condition and then cautiously driven to your nearest FMC service center for replacement. If there is no FMC center in your area, you may contact a reliable dealer within the desired area to complete the work. Even though control of the coach can be maintained, it will require a greater amount of effort with manual steering. We at FMC feel the rubber cap must be replaced immediately to avoid a sudden loss of power steering which may cause momentary confusion and indecision for the driver, possibly causing an accident and injury to passengers.

To correct this condition on your vehicle, you should perform the modification as described in the attached service bulletin #2907-10004. After the new parts have been installed, please complete and mail the enclosed pre-addressed post card. If you have sold or disposed of the subject vehicle, please note on the prepaid card so that we may adjust our records accordingly.

FMC Motor Coach Operations has furnished you with the necessary replacement parts and instructions to complete this modification. The necessary time to perform this change is approximately 5 minutes per coach. You will be reimbursed a maximum of $3.00 for installation by submitting a copy of the repair bill to: MOTOR COACH OPERATIONS, P.O. BOX 1201, SAN JOSE, CA. 95108. There will be no charge for the replacement parts, please allow 30 days to receive your reimbursement.

(7)

If you need assistance in performing these modifications, please don't hesitate to contact Motor Coach Operations at (408) 289-3665. Through our mutual cooperation, these modifications can be readily accomplished.

Although FMC/MCO has informed the Department of Transportation of this recall, we are required by Federal Law to provide you with the address of the Secretary of Transportation in case of any questions regarding this campaign. Address as follows:

Secretary of Transportation
Motor Vehicle Programs
National Highway Traffic Safety Administration
Washington, D.C. 20590

We are sorry to cause you this inconvenience; however, we have taken this action in the interest of your continued satisfaction with our products.

Your prompt cooperation is urged.

Sincerely,

Dave Enget

DAVE ENGET
Service Manager

DE/pf

Enclosure

FMC Corporation
Motor Coach Operations
Box 1201
San Jose, California 95108
(408) 289 0111

(7)

Aug. 19, 1977

FMC

REFERENCE: July 18, 1977 Letter

Dear FMC Owner:

This notice is sent to you in accordance with the requirements of the National Traffic and Motor Vehicle Safety Act.

It has come to the attention of Motor Coach Operations that the power steering pump cap which was recently supplied to you under a Federal Recall Campaign, may itself be faulty. We have noted that a small portion of these may split open upon installation. This is caused by an improper curing process when being manufactured.

If the cap which was included in our last notice has not yet been installed, please dispose of it and use only the cap supplied with this letter. These caps are identical by sight and would be extremely difficult to determine the difference should they become mixed. For this reason, care should be taken in keeping them separated. Under no circumstance should the first cap be installed after receiving the latest one.

If the previously supplied cap has been installed, remove it and replace with the one sent with this notice. These should be installed as described in our service bulletin dated June 30, 1977, #2903-10004. As stated in the first notice, each owner will be reimbursed a maximum of $3.00 for the installation by submitting us a copy of the repair bill. If the first installation has been completed, you will be reimbursed a maximum of $6.00 for installation by submitting two repair bills to: MOTOR COACH OPERATIONS, P.O. Box 1201, SAN JOSE, CA. 95108. There will be no charge for the replacement parts, please allow 30 days to receive your reimbursement.

If you need assistance in performing these modifications, please don't hesitate to contact Motor Coach Operations at (408) 289-3665. We are sorry to cause you this inconvenience; however, we have taken this action in the interest of your continued satisfaction with our products. Your prompt cooperation is urged.

Sincerely,

Dave Enget

DAVE ENGET
Service Manager

DE/pf

Enclosure

FMC Corporation
Motor Coach Operations
Box 1201
San Jose, California 95108
(408) 289 0111

7

November 1, 1977

Dear FMC Owner:

This notice is sent to you in accordance with the requirements of the National Traffic and Motor Vehicle Safety Act.

FMC Motor Coach Operations has determined that a defect which relates to motor vehicle safety exists in the FMC motor home and transit vehicles. The defect in question are the four steering control tubes in the steering linkage assembly. Their function is to transmit fore or aft movement from the steering box pitman arm via the drag link to the bellcrank and other steering tubes which control the left and right turning movement of the front wheels. It has been determined that the existing tubes may experience fatigue failure. Should this occur, control of the vehicle would be seriously limited.

We at FMC feel these new tubes, which are higher strength material and increased wall thickness, must be installed immediately to avoid any adverse conditions possibly causing an accident and injury. The vehicle should be cautiously driven to your nearest FMC service dealer for repairs. If there is no FMC center within a reasonable distance, please contact a reliable dealer within your desired area. As a precaution, we strongly recommend that the vehicle not be operated until the defect is corrected. If the vehicle must be driven, it should be operated with caution because there is no prior warning to the failure.

To correct this condition on your vehicle, they should perform the modification as described in the attached service bulletin #2907-10007. After the new parts have been installed, please complete and mail the enclosed pre-addressed post card. If you have sold or disposed of the subject vehicle, please note on the prepaid card so that we may adjust our records accordingly.

FMC Motor Coach Operations will furnish you with the necessary replacement parts and instructions to complete these repairs. We are requesting each owner to pay for the service rendered on this modification. FMC Motor Coach will reimburse you a maximum of eighty dollars per vehicle by submitting a copy of the repair bill to: Motor Coach Operations, P.O. Box 1201, San Jose, CA. 95108.

There will be no charges for the replacement parts. Should there be any discrepancies in the allowable time as described in Bulletin #2907-10007, Motor Coach Operations customer service should be contacted prior to beginning at (408) 289-3665. Please allow 30 days to receive your reimbursement.

We wish to inform each owner that they may submit a complaint to the Administrator, National Highway Traffic Safety Administration, Washington, D.C. if you feel that FMC relinquished their responsibility by not correcting the defect without charge and within a reasonable time of this notice.

Your prompt cooperation in this recall is urged.

Sincerely,

Dave Enget

DAVE ENGET
Service Manager

DE/pf

Enclosure

FMC Corporation
Motor Coach Operation
1105 Coleman Avenue P.O. Box 1201
San Jose, California 95108

☒ URGENT ☐ ROUTINE
☐ MANDATORY ☐ INFORMATIONAL

Service Bulletin

DATE October 7, 1977 NUMBER 2907-10007

ATTENTION: SERVICE MANAGERS AND OWNERS

GROUP
7

SUBJECT
New Steering Drag Link and Control Tubes

MODEL (S) AFFECTED
Coaches 00001 to 01050

(Factory Use Only)
Information added to:

OWNER MANUAL (S)

SERVICE MANUAL (S)

PARTS MANUAL (S)

WARRANTY MANUAL (S)

OTHER

DESCRIPTION

This bulletin provides instructions for replacement of the steering drag link and control tubes. All new tubes have been fabricated from high tensile steel.

COMPLIANCE

Service Managers and Owners must comply with this bulletin as soon as possible per recall notification No. A0709. Do not attempt to deviate from this bulletin. If a vehicle can not be retrofitted within the guide lines of this bulletin call FMC Service Department 408-289-3665 for instructions.

MANPOWER

Estimated accomplishment time for one mechanic to install new drag link and control tubes, and set front wheel toe-in to proper specifications is 2.0 hours. FMC/MCD will reimburse for labor up to a maximum of 3.0 hours. Any labor charges which exceed $80.00 must have FMC/MCD approval BEFORE proceeding with this bulletin. A signed yellow 'Status Report Card' must accompany your bill before reimbursement can be made.

MATERIAL

Replacement parts supplied no charge by FMC/MCD are:

For coaches 00001 to 00645;

1	5100053-05	Cross Link Tube (1 1/4 O.D. x 26.70)
2	5100053-06	Control Link Tube (1 1/4 O.D. x 17.15)
1	5100053-08	Drag Link Tube (1 1/4 O.D. x 32.70)
8	5107759	Tube Clamp

For coaches 00646 to 01050;

*1	5106834-01	Drag Link Tube (Heavy-Duty Strg Gear, 1 1/4 O.D. x 36.00)
		or
*1	5106834-04	Drag Link Tube (Standard Strg Gear, 1 1/4 O.D. x 38.00)
2	5106834-02	Control Link Tube (1 1/4 O.D. x 18.50)
1	5106834-03	Cross Link Tube (1 1/4 O.D. x 24.50)

*Heavy-duty steering gear has a double housing gear box, while the standard steering gear has a single housing gear box. The heavy duty gear box uses a shorter drag link than the standard.

FMC Corporation
Motor Coach Operation
1105 Coleman Avenue P.O. Box 1201
San Jose, California 95108

☒ URGENT ☐ ROUTINE
☐ MANDATORY ☐ INFORMATIONAL

Service Bulletin

DATE October 7, 1977 NUMBER 2907-10007

ATTENTION: SERVICE MANAGERS AND OWNERS

GROUP 7

SUBJECT

MODEL (S) AFFECTED

(Factory Use Only) Information added to:

OWNER MANUAL (S)

SERVICE MANUAL (S)

PARTS MANUAL (S)

WARRANTY MANUAL (S)

OTHER

Coaches equipped with heavy duty steering gear:

00630, 00634, 00655, 00656, 00658, 00659, 00660, 00663, 00664, 00665, 00666, 00667, 00669, 00680, 00682, 00684, 00686, 00688, 00690, 00692, 00694, and 00696.

COMMON TOOLS REQUIRED

5/8 socket and box end wrench
11/16 socket and box end wrench
3/4 socket and box end wrench
1/2 breaker bar, ratchet, and extension
impact wrench and sockets
12-18 inch pipe wrench
steering wheel retaining clamp

ACCOMPLISHMENT INSTRUCTIONS (Figure 1)

On all coaches check length of new drag link tube with existing drag link tube BEFORE you attempt to remove the old tube. If new tube DOES NOT match the old tube in length, call the FMC/MCD Service Dept 408-289-3665 for further directions.

1. Drive coach onto turntables, start engine, and position front wheels straight ahead.

2. Rotate the steering wheel full left, then full right, and count the number of steering wheel revolutions for each turn. If number of turns left equals number of turns right the steering gear pitman arm is centered.

3. Secure steering wheel with a wheel retainer clamp.

4. Measure distance from coach frame to bellcrank. Bellcrank should be square with frame (Fig 1). Record this measurement.

5. Saturate all tube clamps and tie rod ends with "WD40", "Liquid Wrench", or other suitable penetrating oil. Wait at least 10 minutes.

6. Loosen clamps on cross link and remove cross link tube. Discard old tube.

7. Install new cross link tube, starting each end simultaneously, position clamps so that bolt faces downward, and tighten clamp bolts.

NOTE: If coach serial number is 00646 or higher use existing clamps: If coach serial number is between 00001 and 00645 use new clamps (5100759).

FMC Corporation
Motor Coach Coeration
1105 Coleman Avenue P.O. Box 1201
San Jose, California 95108

☒ URGENT ☐ ROUTINE
☐ MANDATORY ☐ INFORMATIONAL

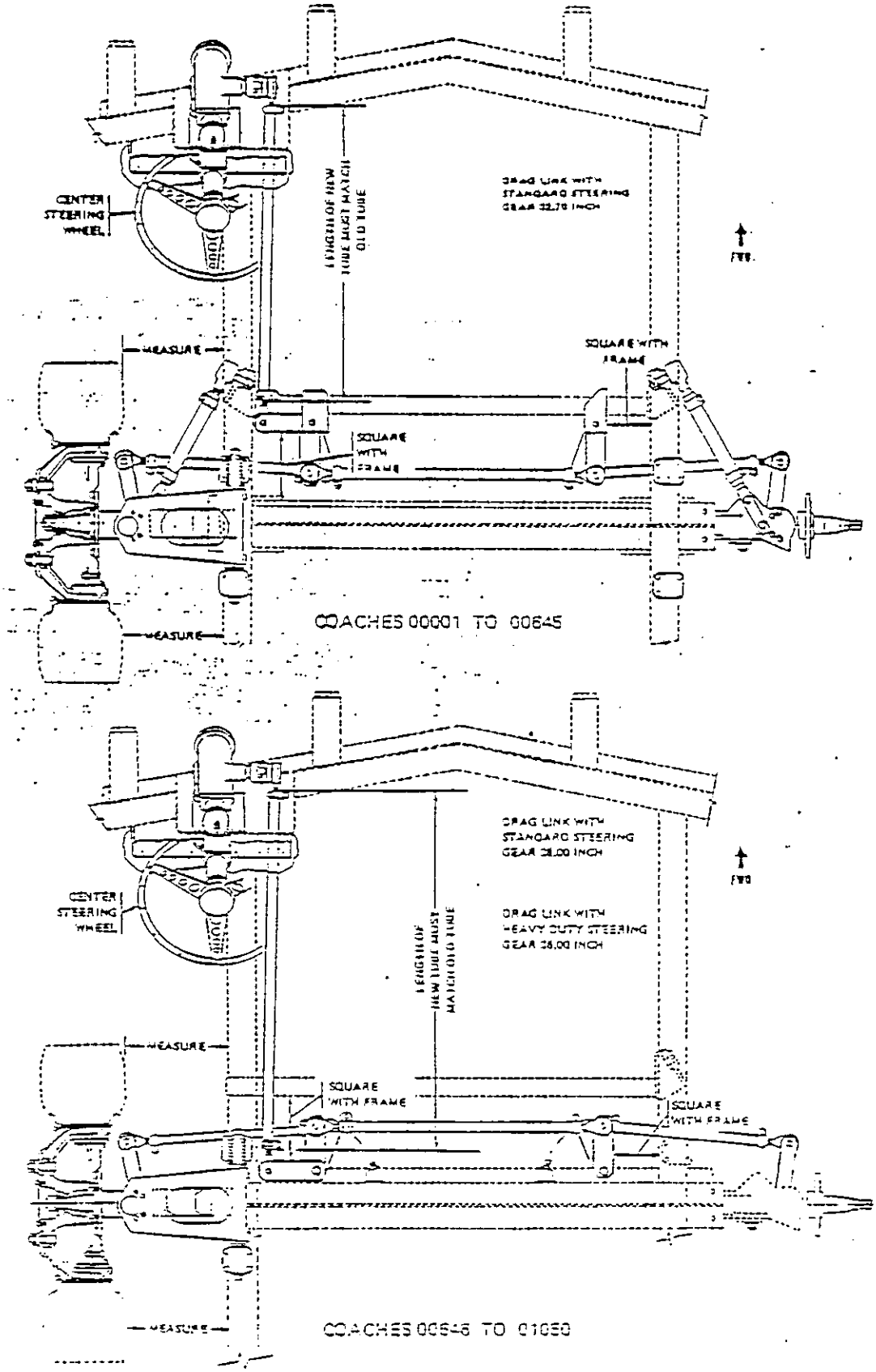


Figure 1. Steering linkage.

FMC Corporation
Motor Coach Operation
1105 Coleman Avenue P.O. Box 1201
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☒ URGENT ☐ ROUTINE
☐ MANDATORY ☐ INFORMATIONAL

Service Bulletin

DATE October 7, 1977 NUMBER 2907-10007

ATTENTION: SERVICE MANAGERS AND OWNERS

GROUP
7

SUBJECT

MODEL (S) AFFECTED

(Factory Use Only)
Information added to:

OWNER MANUAL (S)

SERVICE MANUAL (S)

PARTS MANUAL (S)

WARRANTY MANUAL (S)

OTHER

It might be necessary to spread existing clamps before installing on new tube.

8. Loosen clamps on control link tube and remove control link tube. Discard old tube.

9. Install new control link tube, position clamps so that bolt faces downward, and tighten clamp bolts.

10. Repeat steps 8 and 9 for control link on opposite side of vehicle. See note in step 7 regarding new clamps.

11. Loosen clamps on drag link tube and remove drag link tube. Discard old tube.

12. Install new drag link tube, position clamps so that bolt faces downward, and tighten clamp bolts. See note 7 regarding new clamps.

13. With steering wheel centered, check clearance between new drag link tube and hole in frame crossmember. You should have a minimum of 1/8 inch clearance between drag link and hole (Fig 2).

If necessary grind out hole to provide clearance, BUT DO NOT grind on mounting surface of steering gear bracket.

FRONT WHEEL TOE-IN

Proper wheel alignment ensures that the steering system will function to provide optimum handling, steering, and stability with minimum tire wear.

CAUTION

A normal road operating load should be on the coach for proper wheel alignment. Domestic and automotive systems serviced, holding tanks empty or low, potable water tanks full, normal kitchenware, supplies, and baggage in place in cabinets and closets. DO NOT JACK COACH DURING ALIGNMENT PROCEDURES. If coach was jacked for maintenance work, drive coach with a normal road operating load at least 25 miles before aligning wheels.

To obtain the correct front wheel measurements, turn the control link rods which connect the spindle control arms to the bellcrank and idler arms. Center the steering gear by adjusting the length of the drag link from pitman arm to bellcrank. When properly centered it should require two complete turns of the steering wheel (right or left) to hit the steering stops. Measurement at front of tire and measurement at rear of tire should be the same. See figure 3.

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☒ URGENT ☐ ROUTINE
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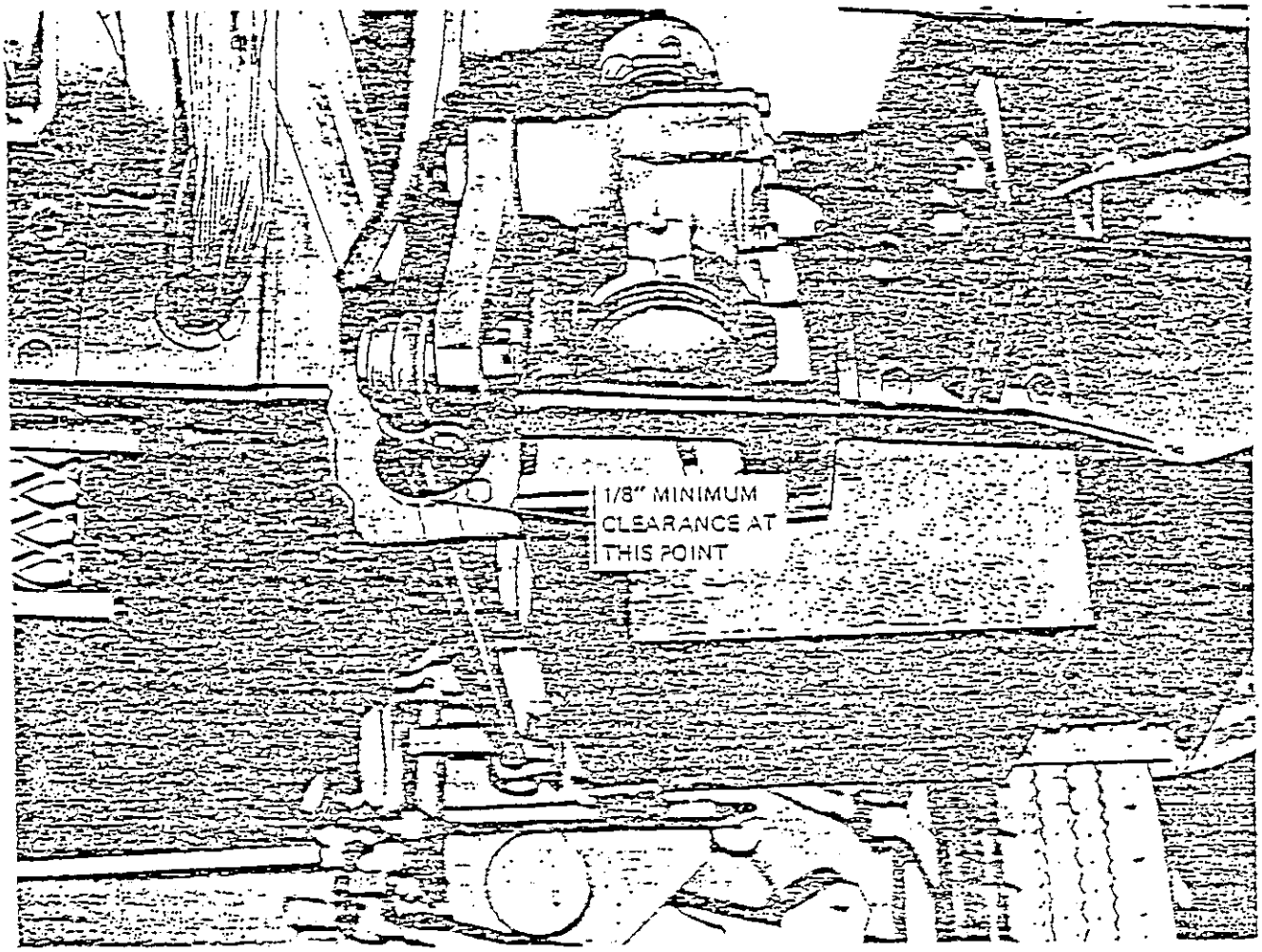
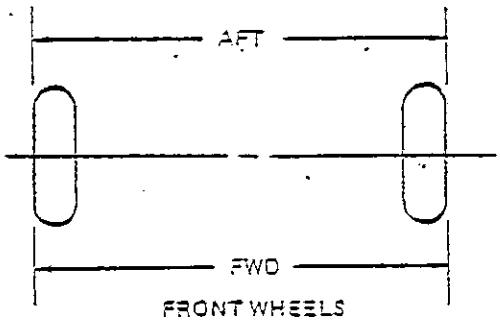


Figure 2. Drag link clearance.



FRONT WHEELS
TOE-IN

FWD DIMENSION
SHOULD EQUAL AFT
DIMENSION TO
OBTAIN ZERO TOE-IN

Figure 3. Front wheel alignment.

FMC Corporation
Motor Coach Operation
1105 Coleman Avenue P.O. Box 1201
San Jose, California 95108

☒ URGENT ☐ ROUTINE
☐ MANDATORY ☒ INFORMATIONAL

Service Bulletin

DATE October 7, 1977 NUMBER 2907-10007

ATTENTION: SERVICE MANAGERS AND OWNERS

GROUP
7

SUBJECT

INSPECTION

With coach fully loaded, have a helper observe all parts of steering linkage for free and unobstructed movement through full left and right turning patterns. Linkage must not bind or come in contact with any water, hydraulic, or vacuum lines that are mounted underneath the coach frame.

MODEL (S) AFFECTED

(Factory Use Only)
Information added to:

OWNER MANUAL (S)

SERVICE MANUAL (S)

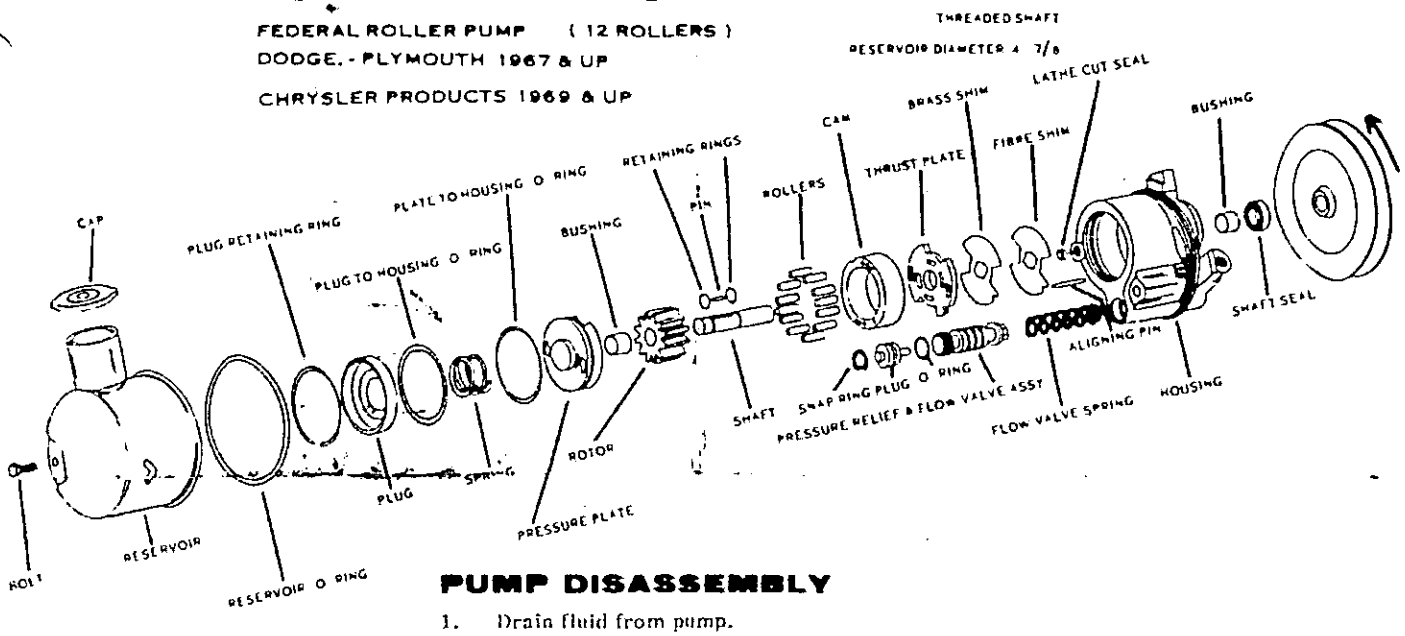
PARTS MANUAL (S)

WARRANTY MANUAL (S)

OTHER

POWER STEERING PUMP ASSEMBLY

FEDERAL ROLLER PUMP (12 ROLLERS)
DODGE. - PLYMOUTH 1967 & UP
CHRYSLER PRODUCTS 1969 & UP



PUMP DISASSEMBLY

1. Drain fluid from pump.
2. Clean reservoir and housing with solvent.
3. Remove pulley with suitable puller, (Oldforge 2540 or equivalent).
4. Remove studs and brackets.
5. Place pump in vise, shaft horizontal. Tap reservoir flange with wood block and hammer to remove reservoir.
6. Rotate housing plug retaining ring until ring opening and access hole line up. With punch or drift, push ring from groove, carefully prying out of groove with screwdriver.
7. Remove plug by tapping lightly, spring will force plug outward.
8. Hold housing over clean cloth, shaft up, tapping shaft with plastic mallet to remove impeller section.
9. Remove flow valve snap ring with snap ring pliers and pull from housing.
10. Remove and discard "O" rings from inner housing and flange, pressure plate and flow valve plug. Remove lathe cut seal from housing bolt hole.
12. Remove shaft seal from housing hub.
13. Inspect shaft and bushings for wear. Replace bushings if worn.
14. Inspect thrust plate, pressure plate and cam ring for burrs, scratches or unusual wear.
15. Place flow valve in valve bore to check for binding; valves should move freely. (Rotate valve upon installing to prevent cocking.)
16. Clean all parts in suitable solvent. Air dry. Burrs, rust or slight roughness may be removed with crocus cloth. Place clean parts in pan containing clean power steering fluid.

continued

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PUMP ASSEMBLY

Work on clean surface, dirt is the largest cause of power steering failures.

Lubricate "hard" parts with transmission fluid. If possible, use brake assembly fluid for rubber parts.

1. Press new shaft seal into pump housing with suitable installer. Seal face should be flush or slightly inside of housing.

2. Insert aligning pin in drilled hole inside housing.

3. Install fiber shim, then brass shim (if used) over pin.

4. Slide thrust plate over pin, keeping deep grooves down, polished face up.

5. NOTE: Some cam rings have notches on both upper and lower surfaces of outer ring. If one notch is present, it goes down. If two notches, place notch which is 180 degrees from aligning pin down. Slide cam ring over pin, making sure it is down all the way.

6. Install long end of shaft, rotor attached, through shaft seal, until rotor is flush with face of cam.

7. Insert lubricated rollers into rotor slots.

8. Scribe a line on back of housing and top of pressure plate to assist in lining up on pin. Place "O" ring on pressure plate. Slide pressure plate over pin, do not force. Tap around top of plate to insure that it is seated against cam. When properly seated, roller will not rattle when housing is tipped from top to bottom.

9. Install "O" ring in second internal housing groove, place spring over projection on pressure plate.

10. Install plug, concave side up, in housing. PRESS plug into place past retaining ring groove. Install retaining ring. DO NOT attempt to tap plug in as distortion may result.

11. Place spring in valve bore, lubricate and install flow valve, hex down. Use rotary motion to eliminate binding.

12. Install "O" ring on valve plug. Insert plug with gas pliers beyond snap ring groove. Install snap ring while holding valve down. "O" ring must be lubricated to avoid damage.

13. Place reservoir "O" ring in flange groove and lathe cut seal in stud hole.

14. Clean, check for roughness, and lubricate flange and seal area of reservoir.

15. Align reservoir and housing bolt, slide reservoir into place. Tap reservoir with block of wood, being careful not to dislodge lathe cut seal. Install bolt and tighten.

16. Using Oldforge tool #7050 (or equivalent) install pulley, puller flange out, until flush with end of shaft.