



# ● Service Manual

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## 360° Rotators R-Series

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Serial Numbers 634366 through 666580

● Manual Number 667448

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This manual provides the installation instructions, periodic maintenance requirements, troubleshooting procedures, and service guides for Cascade 360° Rotator models R3R, R4R, R6R, and R7R.

## 1.1 Truck System Requirements

Pressure: 2000 psi maximum

Volume—Required volume to obtain rated rotation speed specification:

**R3R**—10 gpm

**R4R**—15 gpm

**R6R**—18 gpm

**R7R**—20 gpm

**NOTE:** If you have questions concerning these ratings, call Cascade's Service Department, toll-free, 800-547-5266.

## 1.2 Special Instructions Definitions

### **▲WARNING**

A statement preceded by **▲WARNING** is information that should be acted upon to prevent **bodily injury**. A **WARNING** is always inside a ruled box.

### **CAUTION**

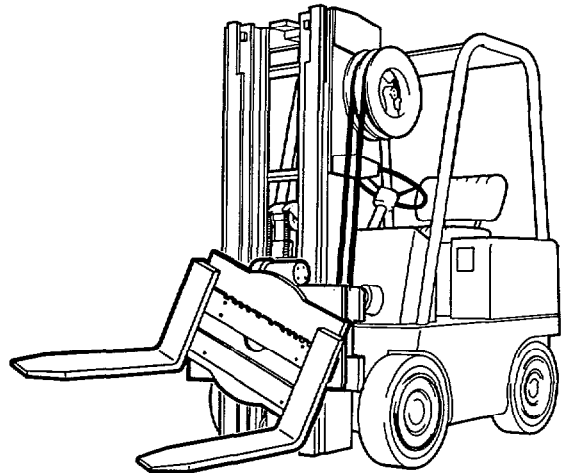
A statement preceded by **CAUTION** is information that should be acted upon to prevent **machine damage**.

### **IMPORTANT**

A statement preceded by **IMPORTANT** is information that possesses special significance.

### **NOTE**

A statement preceded by **NOTE** is information that is handy to know and may make your job easier.





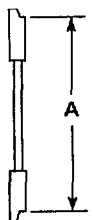
**WARNING:** Rated capacity of the truck/attachment combination is a responsibility of the original truck manufacturer and may be less than that shown on the attachment nameplate. Consult the truck nameplate.

## 2.1

## Truck System Requirements

- Truck relief valve setting: 2000 psi maximum.
  - Volume—Required volume to obtain rated rotation speed specification:
    - R3R**—10 gpm
    - R4R**—15 gpm
    - R6R**—18 gpm
    - R7R**—20 gpm
- NOTE:** If you have questions concerning these ratings, call Cascade's Service Department, toll-free, 800-547-5266.

- Recommended hose and fitting size: No. 8 (1/2 inch ID) with minimum fitting orifices of 0.375 (3/8) inch.
- Truck carriage must conform to the Industrial Truck Association (ITA) dimensional standards as shown in the following chart.



Mounting	Dimension A (in.)	
	Min.	Max.
Class II (R3R, R4R)	14.94	15.00
Class III (R4R, R6R)	18.68	18.74
Class IV (R6R, R7R)	23.44	23.50

- Make sure the truck carriage is clean and the notches are undamaged.

## 2.2

### Prior to Installation

1. Install the hydraulic hoses to the **truck junction blocks** using the correct Cascade Attachment Installation Kit (C-663584 for R3R, R4R, and R6R; C-663597 for R7R),

OR,

use hoses and fittings as shown in Figure 1 or 2. Be careful not to twist, pinch, or otherwise damage the hoses.

#### IMPORTANT

In order to conform to industry standard practice, the hoses should be connected to the truck auxiliary valve as indicated by the following chart.

Function	Attachment Movement	Motion of the operator's hand
Rotate	Clockwise	Rearward or Up
	Counter-clockwise	Forward or Down

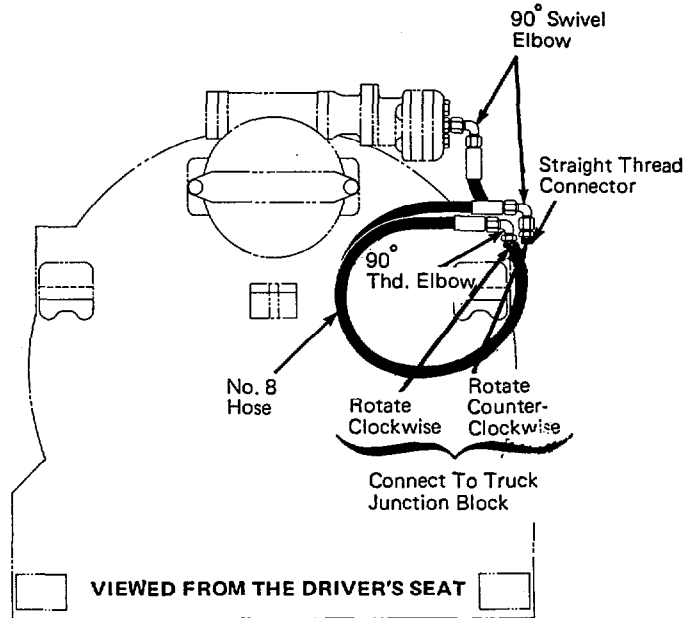


Figure 1. Plumbing Diagram for R3R, R4R, and R6R

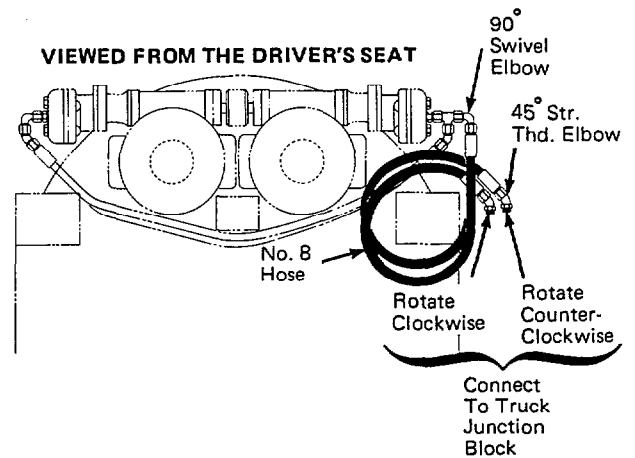
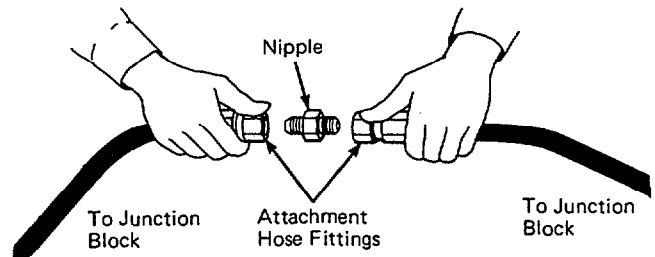


Figure 2. Plumbing Diagram for R7R

#### CAUTION:

2. Flush the hoses as follows to prevent damage to the rotator motor.
  - a. Connect the hoses from the junction block together.
  - b. Start the truck and actuate the truck control valve in both directions for about 30 seconds to carry any debris left in the hoses to the truck hydraulic tank and filter.



## 2.3 Installation

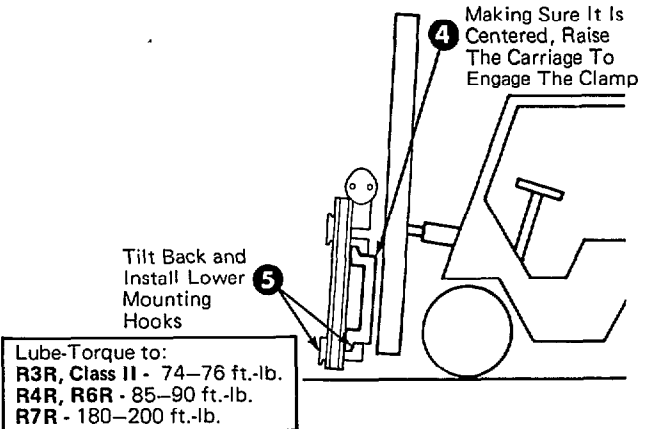
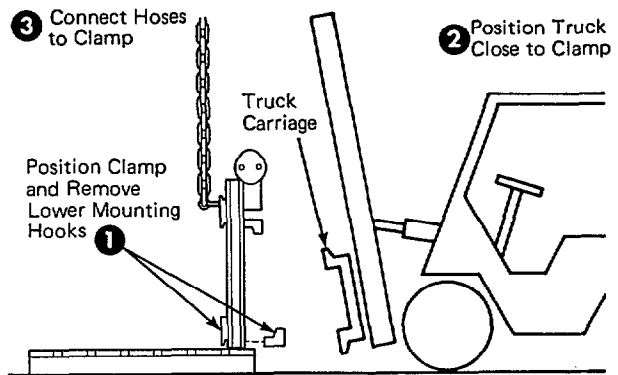
- 1 Install eyebolts on both sides of the rotator fork bar (or frame). Attach a hoist chain to the eyebolts and set the rotator vertically. Remove the lower mounting hooks.

**WARNING:** Make sure your overhead crane has a rated capacity of at least 3500 pounds.

- 2 Position the truck close enough so the hoses on the junction block can be connected to the attachment.
- 3 Connect the hoses to the attachment as shown in Figure 1 or 2 on page 4-3.
- 4 Raise the truck carriage and engage the attachment upper mounting hooks. Make sure the centering block on the attachment aligns with the center notch on the carriage.

**IMPORTANT:** Some models have a positioning block welded to the upper left-hand mounting hook. Center the attachment on the carriage, making sure the positioning block is engaged in a notch on the carriage.

- 5 Tilt the mast back and install the lower mounting hooks. Lube-torque the capscrews to:  
 R3R, Class II—74-76 ft.-lb.  
 R4R and R6R—85-90 ft.-lb.  
 R7R—180-200 ft.-lb.

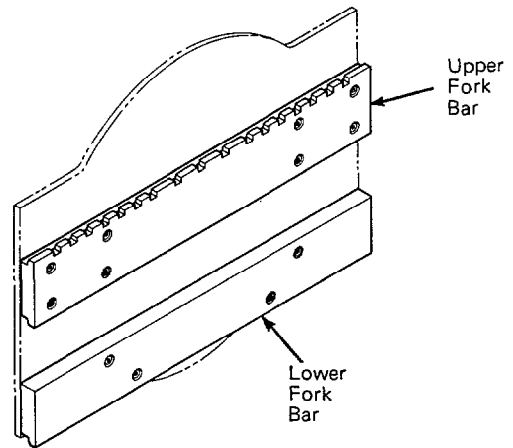


## 2.4 Fork Bar Installation

If your rotator was delivered without fork bars, install them as follows.

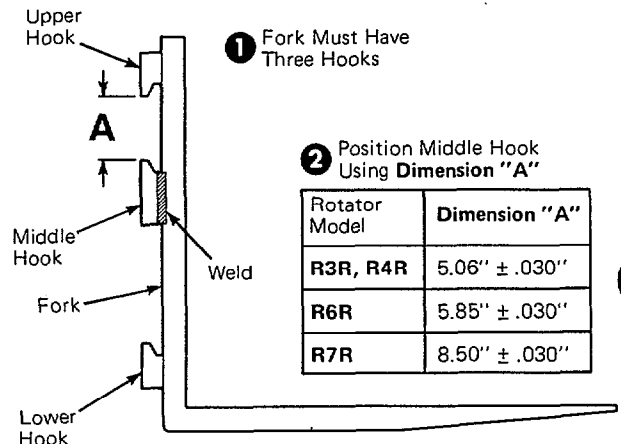
- 1 Locate the fork bars on the attachment faceplate.
- 2 Install and lube-torque the fork bar capscrews according to the following chart.

Rotator Model	Fork Bar Capscrew Torque Specifications (ft.-lb. lubed)	
	Upper Fork Bar	Lower Fork Bar
R3R	95-100	52-57
R4R and R6R	130-140	130-140
R7R	200-210	200-210



## 2.5 Middle Hook Installation on Fork

- 1 Each fork must have three hooks. Cascade forks for rotators are equipped with the third hook. If you need to install the hook yourself, use the following instructions.
- 2 Position the middle hook using the dimension shown.
- 3 Mark the hook position on the fork.
- 4 Use an E-10016 electrode for welding. Preheat the fork 400°-500° F.
- 5 Weld a 3/8 inch fillet on all four sides of the hook. Postheat to 600° F.



Rotator Model	Dimension "A"
R3R, R4R	5.06" ± .030"
R6R	5.85" ± .030"
R7R	8.50" ± .030"

2.6

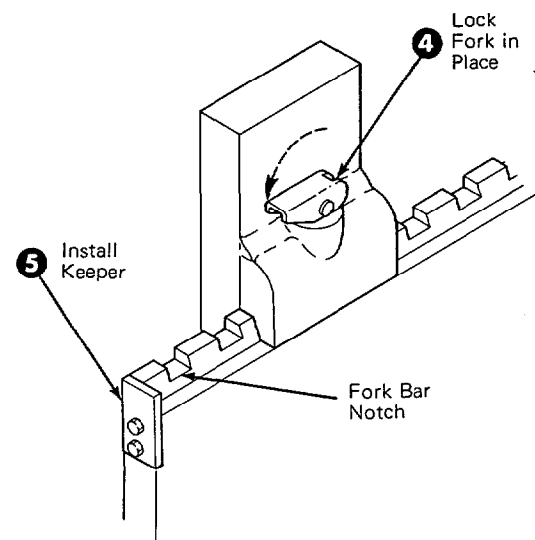
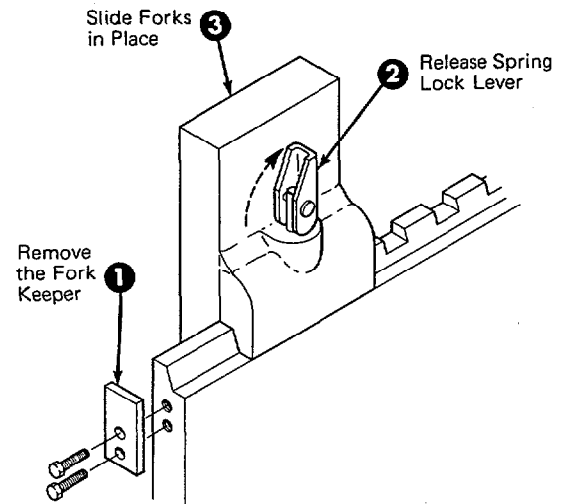
## How to Install and Position the Forks

**IMPORTANT:** Make sure each fork is equipped with three hooks (Cascade rotator forks have three hooks).

- 1 Remove the fork keeper at one end of the carriage.
- 2 Release the spring lock on the top of each fork.
- 3 Slide the forks into position on the fork bars.
- 4 Lock each fork in place by pushing the spring lock lever down, making sure the pin is engaged in the fork bar notch.
- 5 Install the fork keeper on the end of the carriage.
- 6 Removal is a reverse of installation.



**WARNING:** When removing the forks, handle with care to avoid dropping them on your fingers or feet.

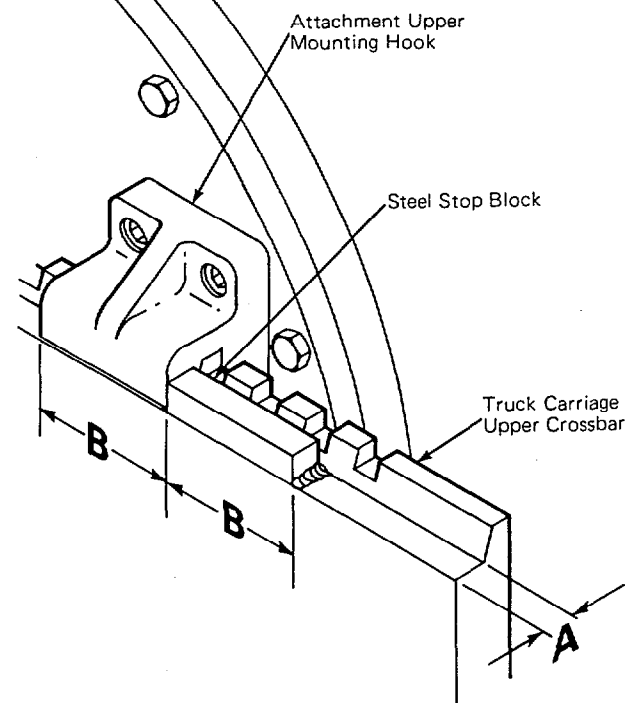


2.7

## Attachment Stop Blocks

Cascade recommends that a steel block be permanently welded on each side of the truck carriage upper crossbar adjacent to each attachment upper mounting hook. To perform the installation:

- 1 Select square steel stock with a width about equal to the flat of the carriage upper crossbar (dimension A).
- 2 Cut two blocks from the stock, each about as long as the width of the attachment upper mounting hook (dimension B).
- 3 Position the blocks adjacent to the upper mounting hooks. The blocks should not extend behind the flat of the carriage upper crossbar (dimension A).
- 4 Weld the blocks in place. Make sure you protect adjacent hoses and hydraulic components from weld splatter.



2.8

## Prior to Operation

- 1 Before picking up a load, operate the rotator through 360° in both directions to allow any air in the system to return to the truck hydraulic tank.
- 2 Pick up a maximum load and repeat the rotation in both directions. If the attachment is sluggish or does not rotate smoothly, recheck the plumbing. If the attachment still operates incorrectly, contact Cascade's Service Department, telephone 800-547-5266 (toll free), or, in Oregon, call 666-1511.

## 500 Hour Maintenance

After each 500 hours of lift truck operation, perform the following procedures.

- Retorque the mounting capscrews. Use the torque specifications shown in Section 2.
- Lubricate the ring gear/bearing assembly with wheel bearing grease. Rotate the attachment one full turn during lubrication.
- Remove the plug on the back of the baseplate and retorque all the ring gear/bearing assembly capscrews to 65-70 ft.-lb. (R7R—120-125 ft.-lb.) Replace the plug.
- Remove the plug on the side of the rotator drive gearcase and fill to capacity with Cascade Rotator Drive Lubricant (Cascade part number C-656300) or Keystone WG-1. Replace the plug.

**IMPORTANT:**

After completing any service procedure, always test each function through 5 complete cycles. First test the rotator empty to bleed excess air trapped in the system. Then test each function with a load to make sure the rotator operates correctly before returning it to the job.



## 4.1

## General Procedures



**WARNING:** Before servicing any hydraulic component, relieve pressure in the system. Turn the truck off and open the truck auxiliary valve several times in both directions.

After completing any service procedure, always test the unit. First rotate the attachment empty to bleed air trapped in the system to the truck system. Then rotate with a load to be sure the attachment operates correctly before returning it to the job. Stay clear of the load while testing.

### 4.1-1 Truck System Requirements

Pressure: 2000 psi maximum

Volume—Required volume to obtain rated rotation speed specification:

**R3R**—10 gpm

**R4R**—15 gpm

**R6R**—18 gpm

**R7R**—20 gpm

**NOTE:** If you have questions concerning these ratings, call Cascade's Service Department, toll-free, 800-547-5266.

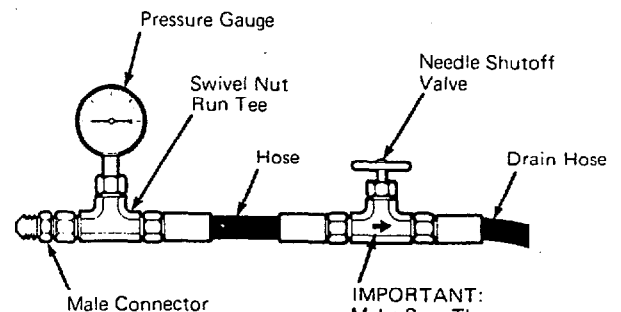
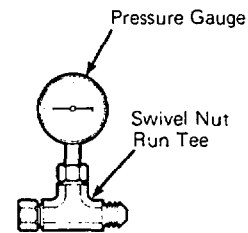
### 4.1-3 Get All The Facts Before You Begin Working On The Attachment

It is important that you gather all the facts regarding the problem before you begin service procedures. The best way is to talk with the operator. Ask for a complete description of the malfunction.

### 4.1-2 Tools Required

In addition to a normal selection of hand tools, you will need:

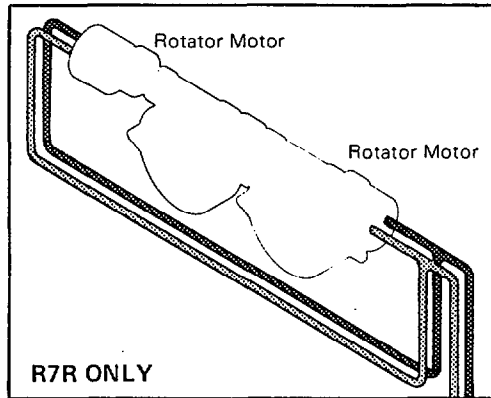
- Two pressure gauges capable of measuring pressure to 2500 psi.
- Two No. 8 swivel nut run tees (37° JIC) suitable for mounting gauges. Install the gauges in the tees.
- Needle shutoff valve, rated for 2500 psi service, minimum. (Recommended supplier for needle shutoff valve: Marsh Instrument Co., Skokie, Ill.)



# Section 4 Troubleshooting

## 4.2 Plumbing

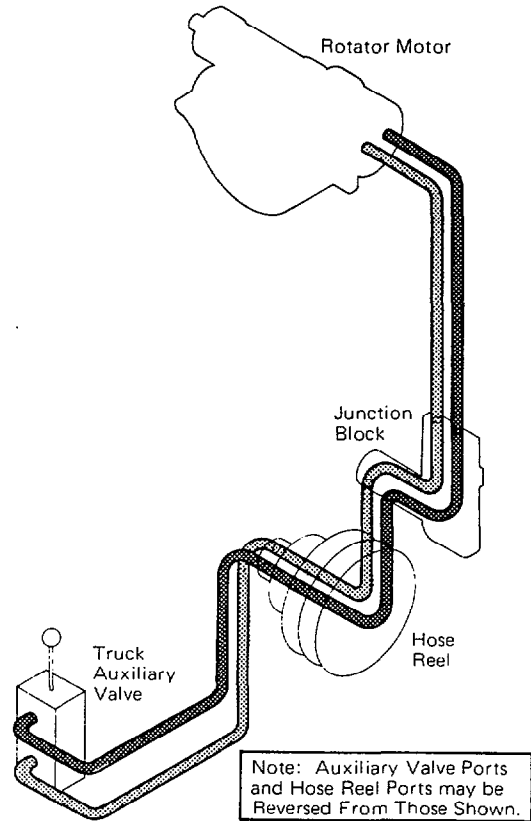
### 4.2-1 Hosing Diagram



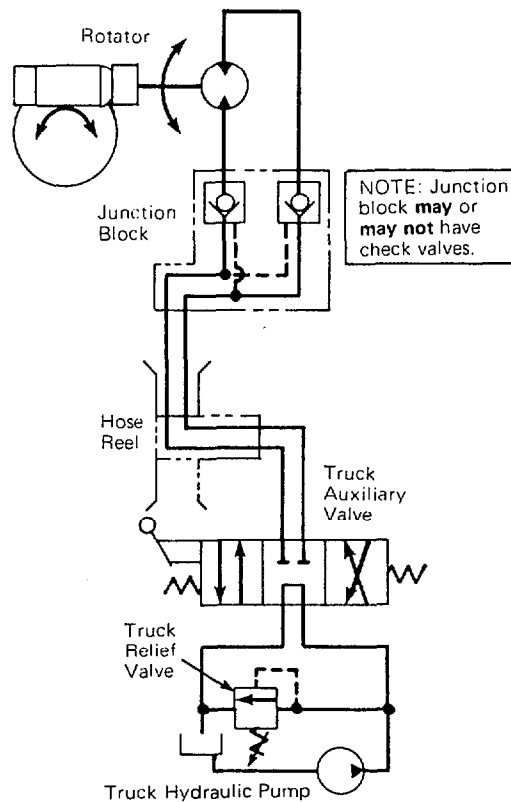
ROTATE-(COUNTERCLOCKWISE SHOWN)

PRESSURE

RETURN



### 4.2-2 Circuit Schematic



## 4.3

## Rotate Circuit Troubleshooting

The following are the most common problems you may encounter with the rotate circuit.

- Attachment will not rotate.
- Attachment will not rotate loads up to its rated capacity.
- Attachment rotates in one direction only.

### 4.3-1 Problem:

Attachment will not rotate or will not rotate loads up to its rated capacity.

#### Probable causes:

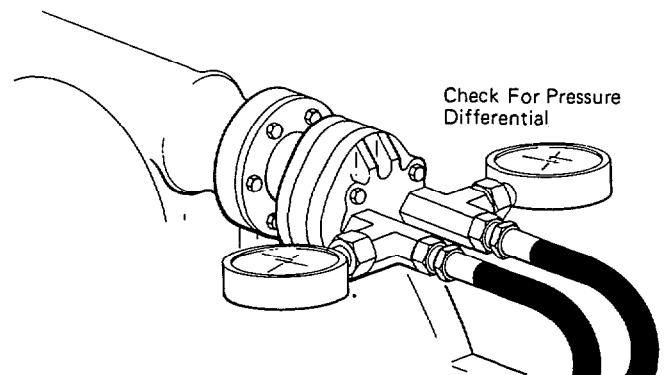
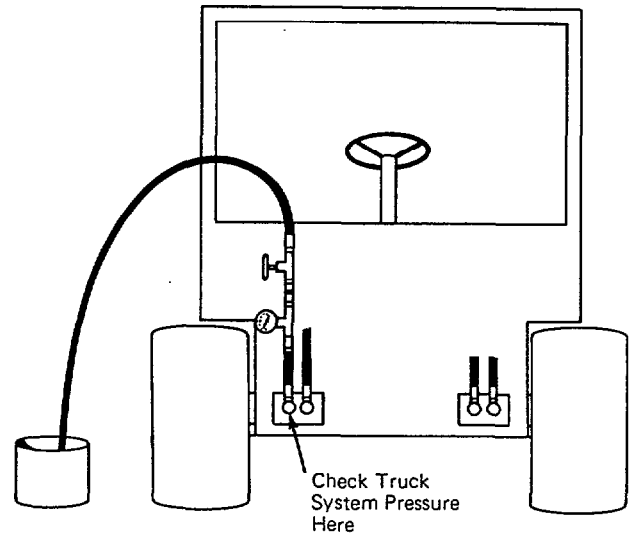
- Insufficient truck hydraulic pressure.
- Incorrect load handling.
- Excessive back pressure in the truck hydraulic system.

#### Tests:

- Check the pressure delivered by the truck hydraulic system. A pressure drop of no more than 100 psi at the auxiliary valve port is OK. If the pressure is not as specified, refer to the truck service manual for adjustment or service. **PRESSURE MUST NOT EXCEED 2000 PSI.**
- Make sure the operator is not handling loads beyond the capacity of the attachment. Heavy and long loads rotated off-center require a tremendous amount of torque.
- Install a pressure gauge into each port of the hydraulic motor.
- Rotate a load that weighs close to the capacity of the attachment and note the pressure readings on the gauges during rotation.

**If the lower pressure reading EXCEEDS 200 psi,** you have excessive back pressure in your supply circuit. Check for restrictions such as numerous fittings and elbows, hose sizes less than No. 8, clogged oil filter, etc.

**If the lower pressure does NOT EXCEED 200 psi,** and the truck pressure is within specifications, the hydraulic motor needs repair. Refer to Section 5, Paragraph 5.3-2 for service procedures.



## 4.3-2 Problem:

Attachment rotates in one direction only.

**Probable cause:**

The pilot spool in the junction block that supplies the rotator motor is jammed.

**Solution:**

Replace the junction block.

## Call Cascade's Service Department

If you have carefully and accurately completed this check list and you still have not solved the problem, call us. Our Service Department is open from 10:00 AM to 8:00 PM Eastern time.

**Call 800-547-5266 (toll free)  
In Oregon, 666-1511**

# Section 5 Service

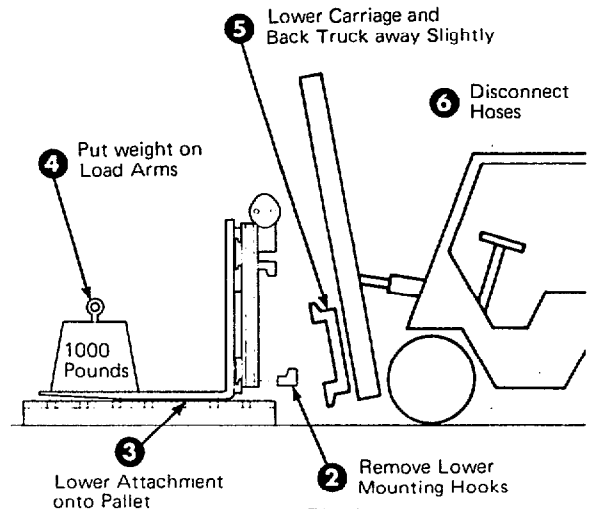
## 5.1 Attachment Removal and Installation

- 1 Rotate the attachment so the arms are positioned side-by-side.
- 2 Remove the lower mounting hooks. For reassembly, lube-torque the lower mounting hook capscrews to:  
R3R, Class II—74-76 ft.-lb.  
R4R and R6R—85-90 ft.-lb.  
R7R—180-200 ft.-lb.
- 3 Position wooden blocks or a shipping pallet under the attachment. Lower the mast carriage until the attachment is resting on the blocks.
- 4 Set a 1000-pound weight on the forks to hold the attachment upright.
- 5 Making sure the weight is secure, continue lowering the mast enough to clear the upper mounting hooks. Back the truck away a few inches to gain access to the hoses to the rotator motor.



**WARNING:** Before removing any hoses, relieve pressure that might be present in the hydraulic system. With the truck off, open the truck auxiliary control valve several times in both directions.

- 6 Disconnect the hoses to the rotator motor.
- 7 For reinstallation, reverse the above procedures, or consult the Installation Instructions, Section 2.



For Reassembly,  
Lube-Torque to:  
**R3R, Class II** - 74-76 ft.-lb.  
**R4R, R6R** - 85-90 ft.-lb.  
**R7R** - 180-200 ft.-lb.

## 5.2 Rotator Drive Group

Your attachment may be equipped with either a cushioned rotator drive group or an uncushioned unit. Cushioning is achieved by the installation of cone-shaped spring washers on both sides of the worm, powered by the rotator motor. The worm gear is in mesh with the rotator ring gear. Therefore, shock loads applied to the attachment arms are transferred to the worm through the worm gear and are absorbed by the spring washers.

All revolving clamps have a single drive group except the R7R, which has a dual drive unit. Special procedures for R7R models are noted in the following.

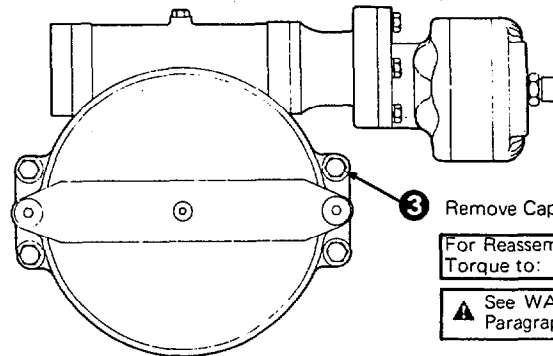
### 5.2-1 Rotator Drive Group Removal and Installation

- 1 Remove the attachment from the truck as described in Paragraph 5.1.
- 2 **R7R Models only.** Remove the four capscrews securing the two halves of the cover over the dual drive coupling and remove both cover halves. Then remove the chain around the coupling sprockets.
- 3 Remove the rotator gear drive case retaining capscrews and remove the gearcase(s) from the attachment baseplate.



**WARNING:** With the gearcase(s) removed, the baseplate is free to rotate. Keep clear of the baseplate to avoid being pinched.

- 4 **R7R Models only.** Remove the coupling sprockets from the worm shaft of each drive group.
- 5 Service the rotator drive group as described in Paragraphs 5.2-2 and 5.2-3.
- 6 Reinstallation of the rotator drive group is a reverse of removal, except the R7R. Perform the following Steps 7 through 16 to synchronize the R7R dual drive group.
- 7 Install the circular seal (located in the coupling cover) over one sprocket hub. The lip of the seal should face the sprocket teeth. Leave the felt dust seal in place in the coupling cover.
- 8 Install the coupling sprockets on the worm shaft of each drive group. Make sure the keys are in place. Don't tighten the setscrews in the sprocket hubs yet.
- 9 Install both drive groups onto the baseplate.



3 Remove Capscrews

For Reassembly Lube  
Torque to: 40 ft.-lbs.

▲ See WARNING in  
Paragraph 3.

## 5.2-1 Rotator Drive Group Removal and Installation (Cont.)

- 10** To synchronize the worm shafts, rotate each sprocket counterclockwise by hand until you feel resistance. Using the uppermost allen-head capscrew on the shaft end cap as a reference, mark one tooth of the sprocket. Then turn the sprocket clockwise, counting the teeth as they pass the allen-head capscrew. Stop turning when you feel resistance. Now rotate the sprocket back counterclockwise **half** the number of teeth counted. The sprockets are now positioned halfway between where you felt resistance.

- 11** Install the chain around the sprockets. If one sprocket does not align with the chain, rotate it no more than 1/2-tooth-width until it does.

- 12** Center the sprockets within 1/8 inch between the drive unit end housings. Tighten the setscrews on both sprocket hubs.

- 13** Coat the chain with Richfield No. 2MP grease or equivalent.

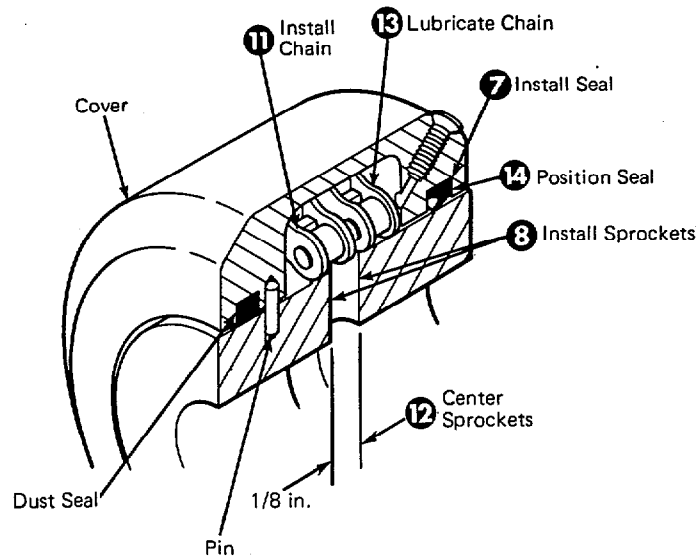
- 14** Position the seal on the sprocket so that it aligns with the grooves in the cover.

- 15** Install the cover over the sprockets, making sure the seals are in place.

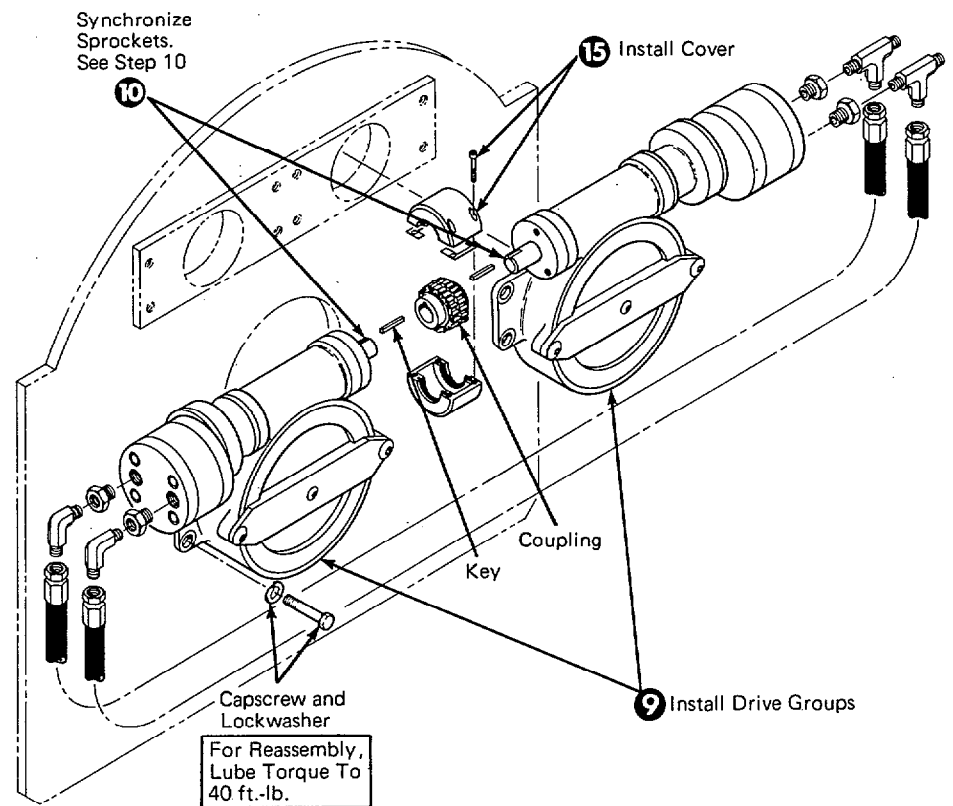
**CAUTION:** The steel pin on one cover half must align with the hole in the other half before you tighten the screws.

- 16** After the attachment is installed on the truck, power the rotator to check for clearance between the coupling and the baseplate.

- 17** Install the attachment onto the truck as described in Section 2.

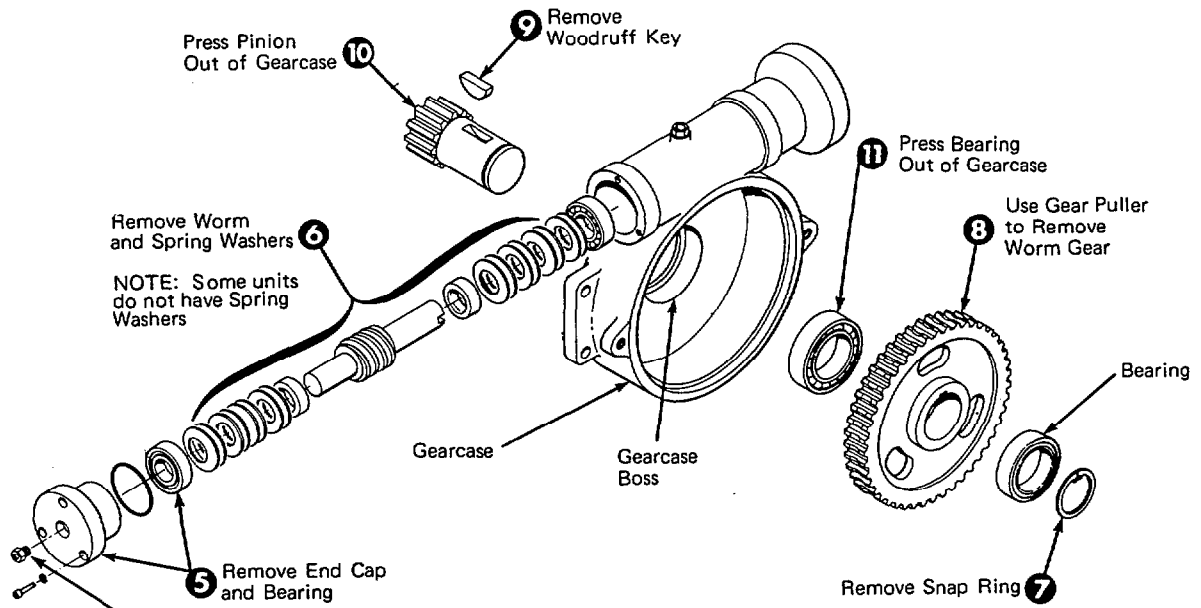
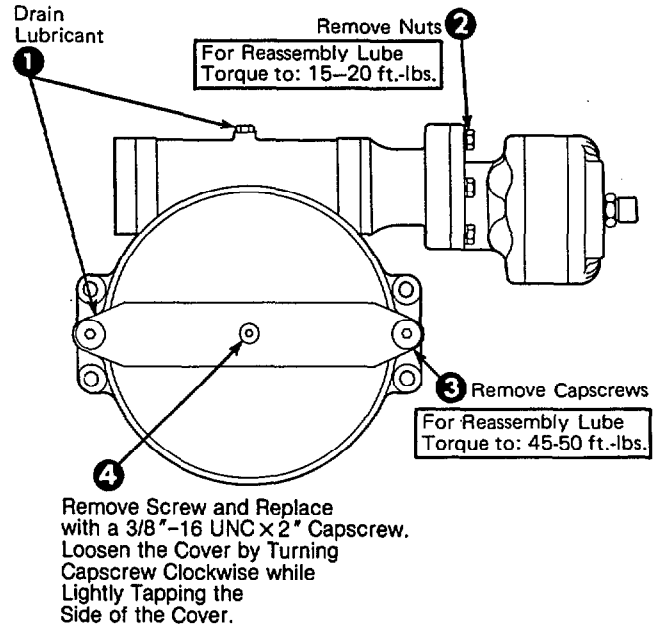


- 16** Check for Clearance on Truck



## 5.2-2 Rotator Drive Group Disassembly and Service

- 1 Drain the lubricant from the gearcase. Lay the gearcase (pinion down) on 4 x 4's placed on either side of the pinion.
- 2 Remove the rotator motor as described in Paragraph 5.3-1. Motor service procedures are described in Paragraph 5.3-2.
- 3 Remove the capscrews retaining the gearcase cover.
- 4 Remove the capscrew from the center of the cover and replace it with a 3/8-inch-16 UNC capscrew 2 inches long. Turn the capscrew clockwise while lightly tapping the side of the cover with a plastic-head hammer to loosen it.
- 5 Remove the end cap and bearing.
- 6 Remove the worm and spring washers (if equipped).
- 7 Remove the snap ring from the pinion shaft.
- 8 Using a gear puller, remove the worm gear from the pinion shaft.
- 9 Remove the Woodruff key from the pinion shaft.
- 10 Press the pinion out of the gearcase.
- 11 Press the pinion bearing out of the gearcase.
- 12 Clean and inspect the components. Replace any item that is worn or galled. Remove any burrs with an emery cloth or small hand grinder.



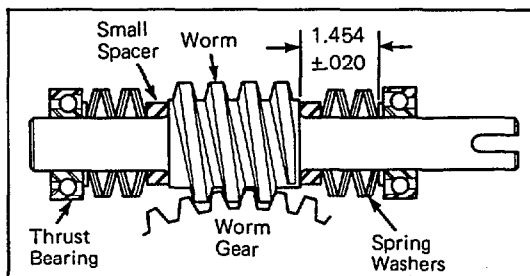
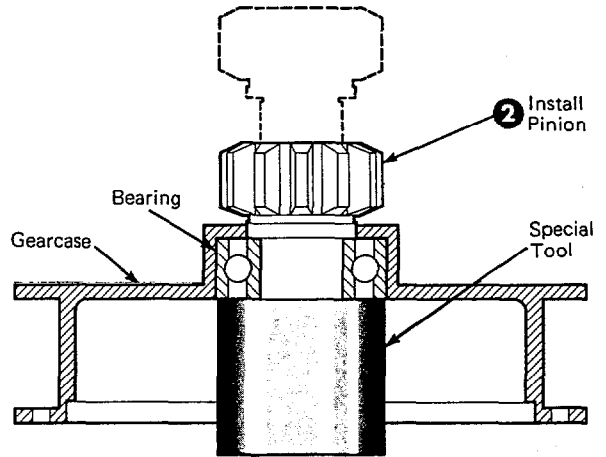
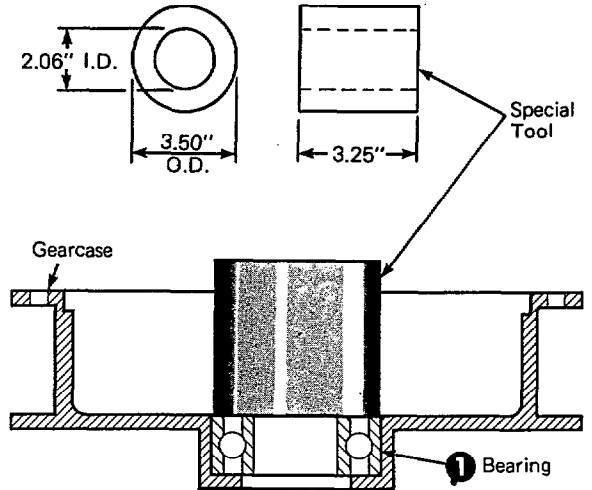
**CAUTION:** Some units will have this style relief fitting in the end cap. These units may have damaged ball thrust bearings due to low rotator fluid. Cascade has a drive box lube kit available which provides new ball thrust bearings and a new pressure relief fitting. See Technical Bulletin 114 for complete ordering instructions.



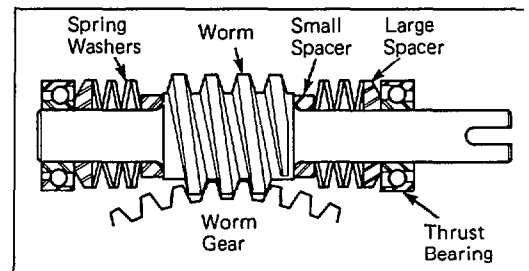
## 5.2-3 Rotator Drive Group Reassembly

- 1 Press the bearing into the housing from the inside using the special tool, Cascade part number C-664620. Make sure the bearing is fully seated and flush with the inside of the gearcase.
- 2 Support the bearing from the inside with the special tool and press the pinion into the bearing from the outside.
- 3 Install the Woodruff key into the pinion shaft.
- 4 Press the worm gear onto the pinion shaft, making sure you align it with the Woodruff key.
- 5 Press the bearing onto the pinion shaft.
- 6 Install the snap ring.
- 7 Assemble the spring washers, spacers (if equipped), and ball thrust bearings (See Caution below) on the worm shaft and install in the housing.

**CAUTION:** The ball thrust bearing must be assembled on the worm with the thickest portion of the outer race (the side stamped with the manufacturer and part number) facing away from the washers.

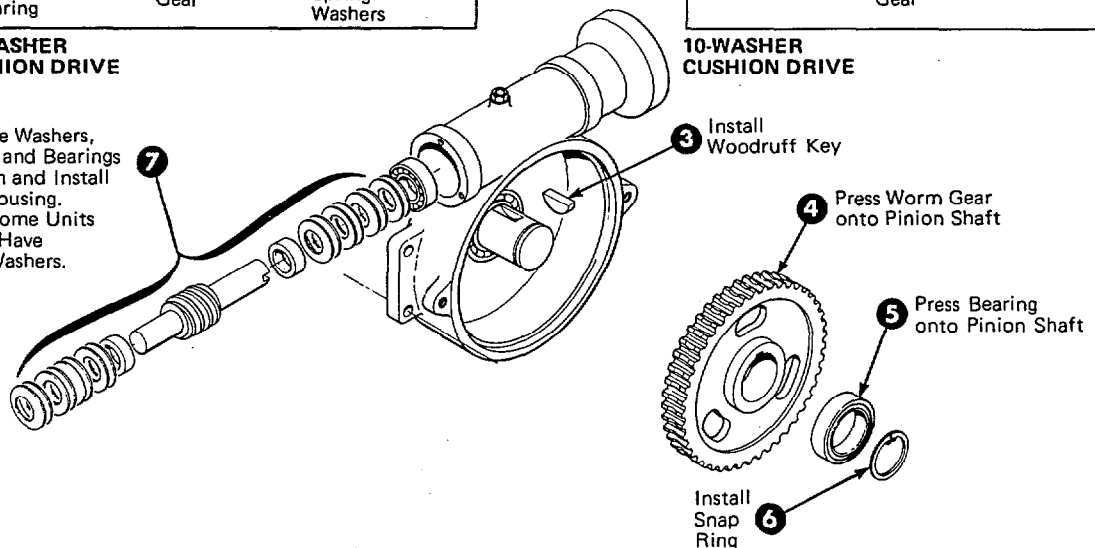


**16-WASHER CUSHION DRIVE**



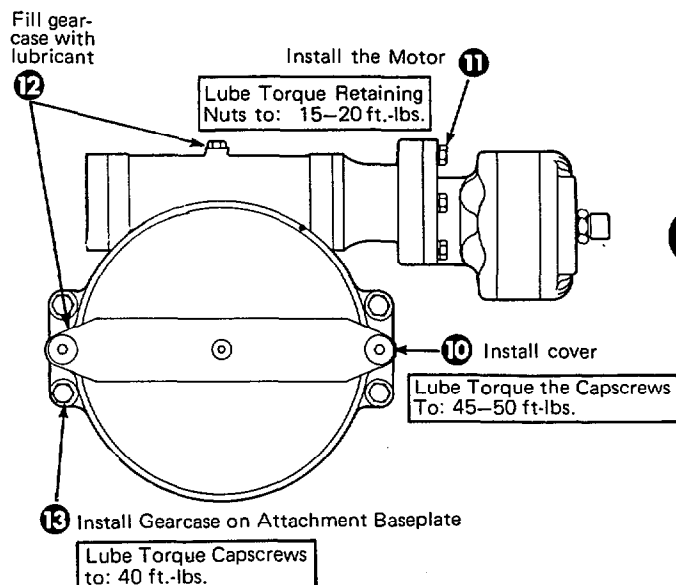
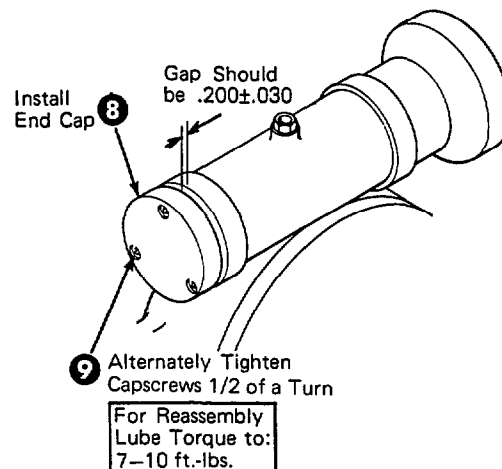
**10-WASHER CUSHION DRIVE**

Assemble Washers, Spacers, and Bearings on Worm and Install in the Housing.  
Note: Some Units Do Not Have Spring Washers.



## 5.2-3 Rotator Drive Group Reassembly (Cont.)

- 8 Install the end cap. If the gap on cushion drive units is greater than that shown, the spring washers are incorrectly stacked. Remove the worm and restack the washers.
- 9 Alternately tighten the endcap capscrews 1/2 of a turn. Lube torque to 7-10 ft.-lbs.
- 10 Install the cover.
- 11 Install the motor.
- 12 Fill the gearcase with 44 fluid ounces of Cascade Rotator Fluid (Cascade part number C-656300).  
NOTE: C-656300 = 32 fluid ounces.
- 13 Install the gearcase onto the attachment baseplate.



## 5.3

# Motor

### 5.3-1

## Motor Removal and Installation

The rotator motor can be removed for service with the attachment on the truck.

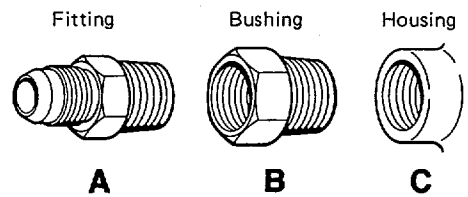
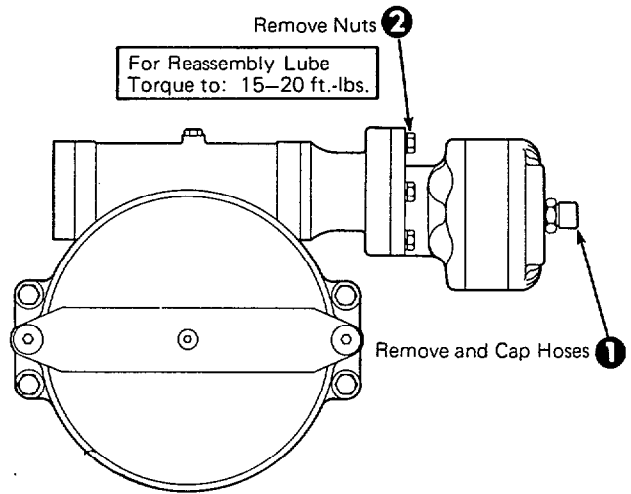
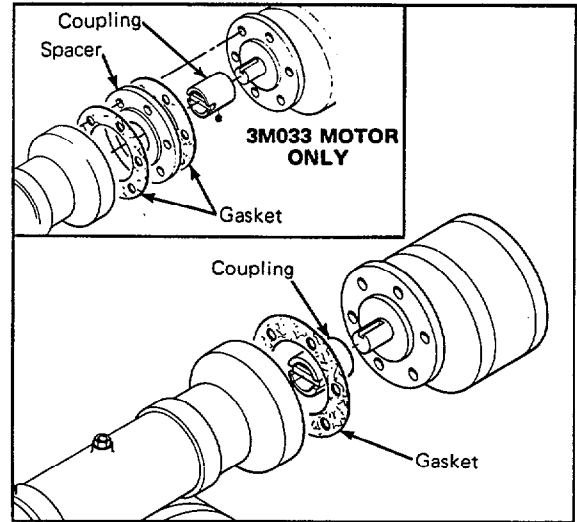


**WARNING:** Before removing supply hoses, relieve pressure that might be present in the hydraulic system. With the truck off, open the truck auxiliary control valves several times in both directions.

- 1 Remove, cap, and tag the supply hoses to the motor.
- 2 Remove the motor from the rotator drive assembly by removing the six retaining nuts. Slide the motor out of engagement and remove the coupling and key from the motor shaft.
- 3 Clean the motor and gear case mating surfaces with solvent. Apply LOCTITE 515 sealer to these surfaces.
- 4 Install the motor and tighten the retaining nuts to a torque of 15—20 ft.-lbs. (Lubed).

**CAUTION:** Because the threaded part in the pump is tapered, overtightening the fitting in the port will split the housing. Fittings should be snug but not overtightened. Install reducers and fittings as follows:

Thread hose fitting (A) into bushing (B) until tight. Fit the assembly of the bushing and hose (A + B) into the housing (C). Tighten the bushing (B) **only**. Any attempt to tighten the hose fitting after installation in the bushing may result in a cracked housing.

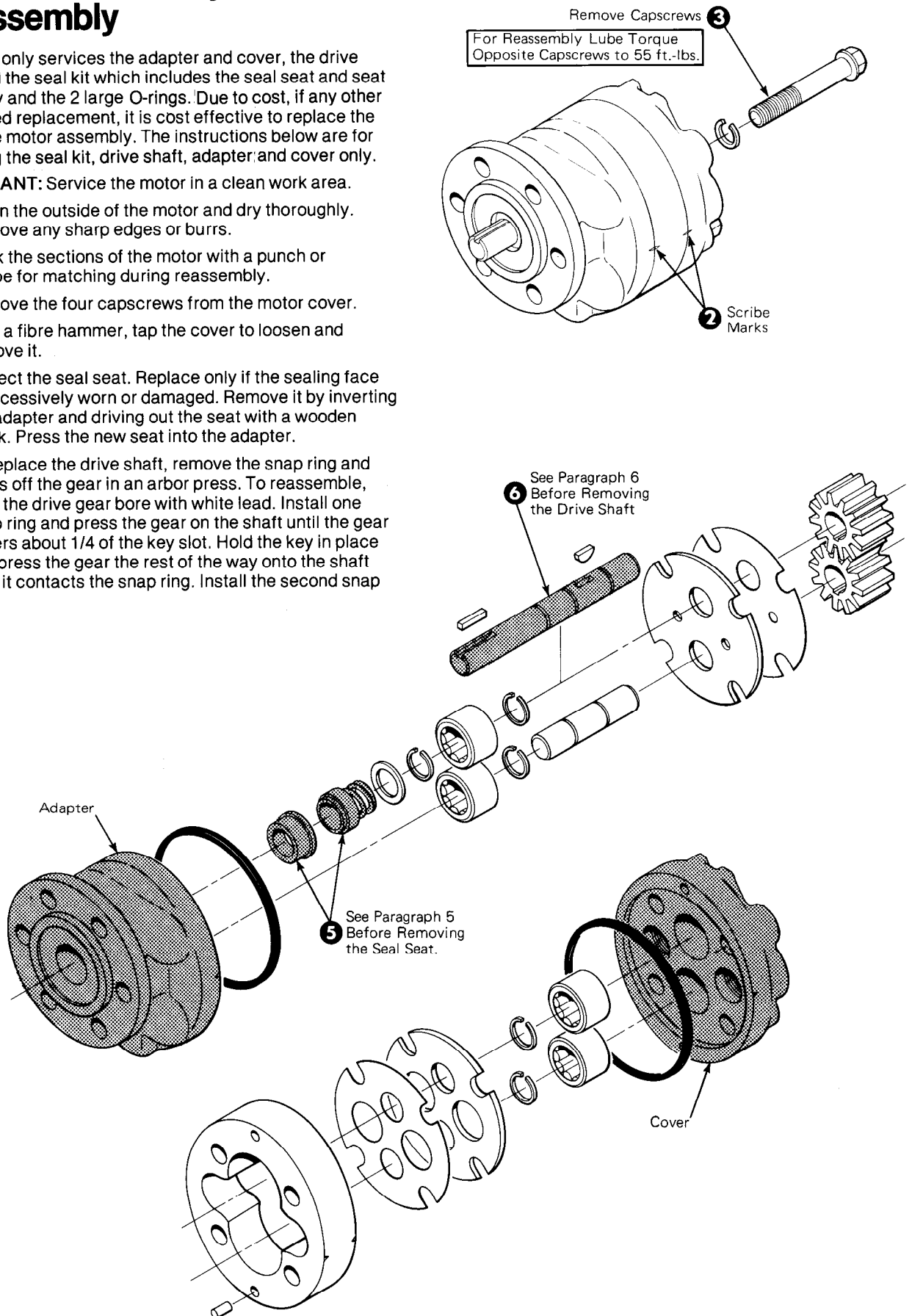


## 5.3-2 Motor Disassembly and Reassembly

Cascade only services the adapter and cover, the drive shaft and the seal kit which includes the seal seat and seat assembly and the 2 large O-rings. Due to cost, if any other parts need replacement, it is cost effective to replace the complete motor assembly. The instructions below are for replacing the seal kit, drive shaft, adapter and cover only.

**IMPORTANT:** Service the motor in a clean work area.

- 1 Clean the outside of the motor and dry thoroughly. Remove any sharp edges or burrs.
- 2 Mark the sections of the motor with a punch or scribe for matching during reassembly.
- 3 Remove the four capscrews from the motor cover.
- 4 With a fibre hammer, tap the cover to loosen and remove it.
- 5 Inspect the seal seat. Replace only if the sealing face is excessively worn or damaged. Remove it by inverting the adapter and driving out the seat with a wooden block. Press the new seat into the adapter.
- 6 To replace the drive shaft, remove the snap ring and press off the gear in an arbor press. To reassemble, coat the drive gear bore with white lead. Install one snap ring and press the gear on the shaft until the gear covers about 1/4 of the key slot. Hold the key in place and press the gear the rest of the way onto the shaft until it contacts the snap ring. Install the second snap ring.



## 5.4

## Frame Assembly

## J.4-1

### Baseplate Removal

- 1 Remove the attachment as described in Paragraph 5.1.
- 2 Remove the rotator drive group, Paragraph 5.2-1.
- 3 Remove the upper mounting hooks.
- 4 Remove the two baseplate retaining capscrews closest to each upper mounting hook bolt pattern. Replace the two capscrews with eyebolts. Attach a hoist chain to each eyebolt. Lift the hoist chains to take out the slack.



**WARNING:** Make sure your hoist has a rated capacity of at least 1000 pounds.

- 5 Remove the remaining baseplate retaining capscrews. Lift off the baseplate.
- 6 Remove the hub seal from the rotator hub.

## 5.4-2

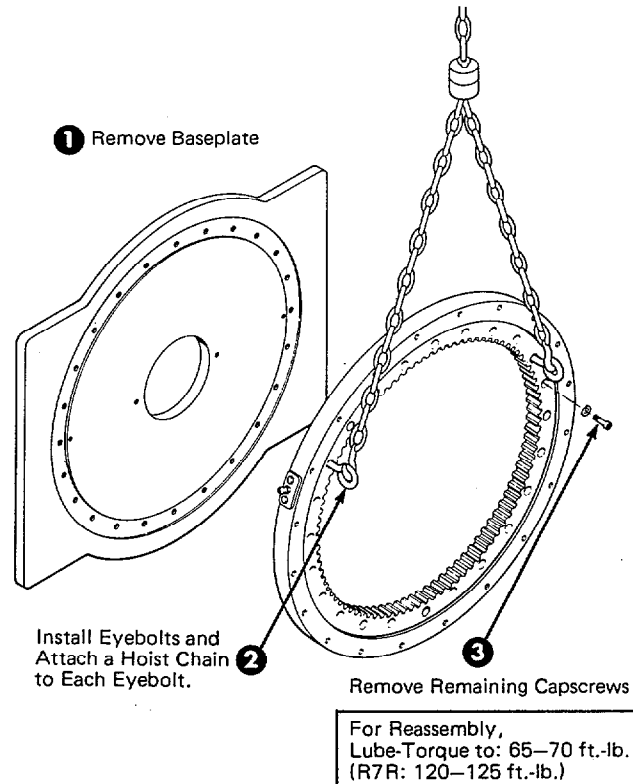
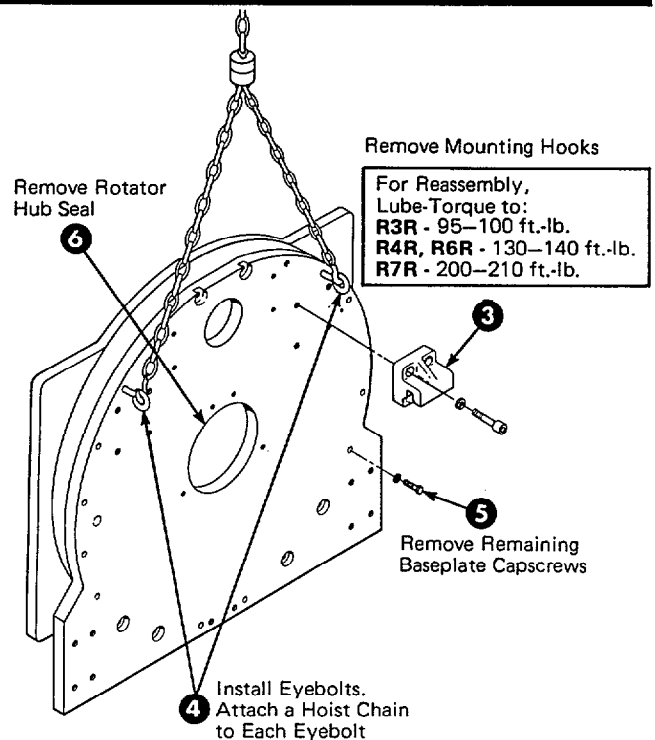
### Ring Gear/Bearing Assembly Removal

- 1 Remove the baseplate assembly as described in Paragraph 5.4-1.
- 2 Replace two ring gear retaining capscrews with eyebolts. Attach a hoist chain to each eyebolt. Lift the hoist chains to take out the slack.



**WARNING:** Make sure your hoist has a rated capacity of at least 1000 pounds.

- 3 Remove the remaining capscrews and lift the ring gear/bearing assembly from the attachment.

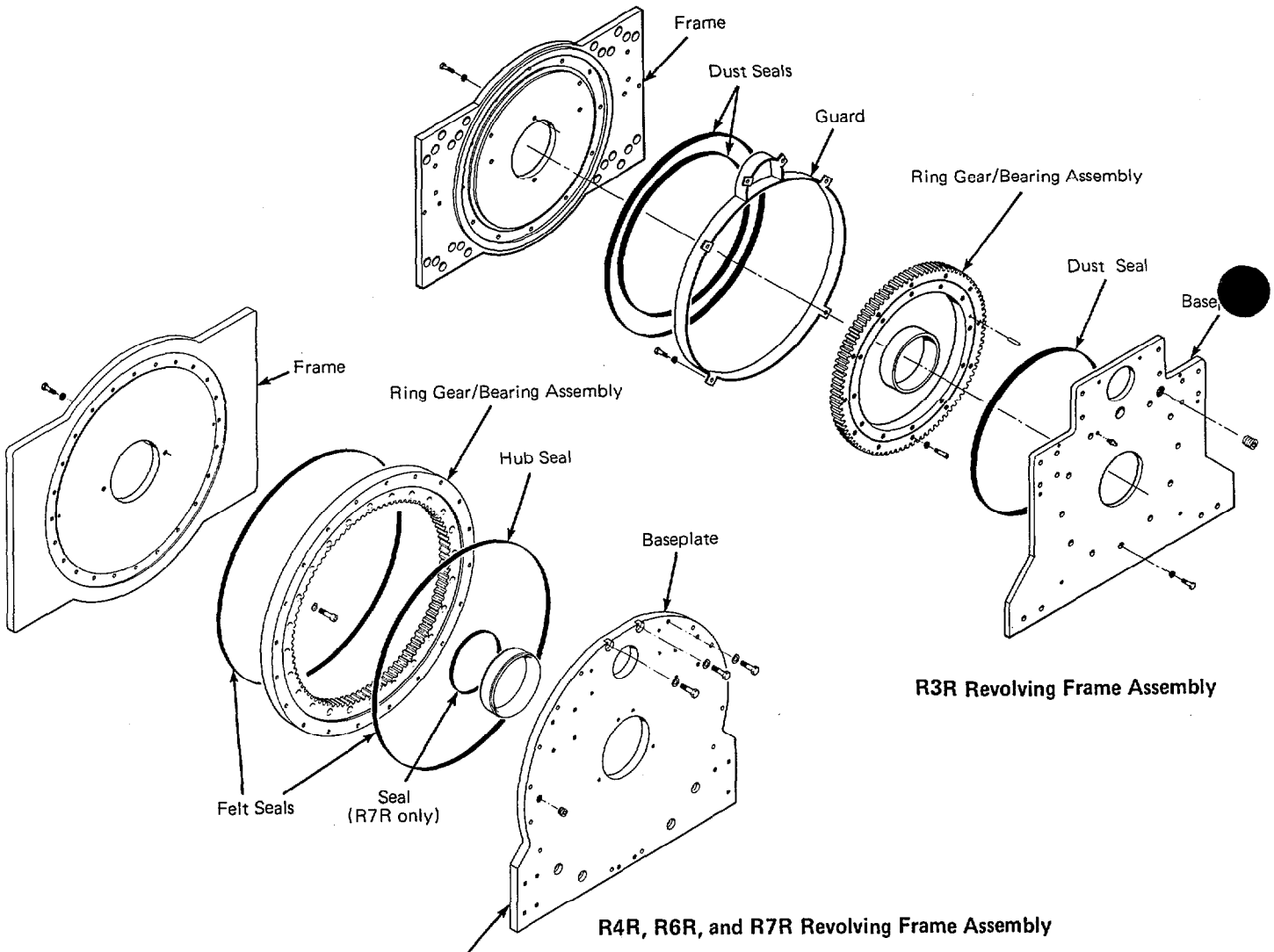
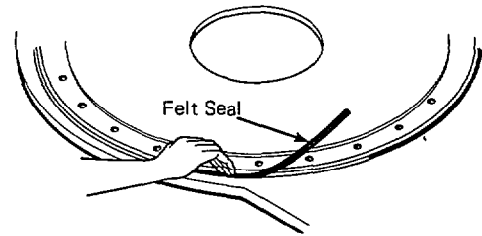


# Section 5 Service

## 5.4-3 Frame Assembly Service

The ring gear and bearing are matched components and must be replaced as an assembly. Whenever the frame assembly is disassembled, the felt seals must be replaced with new ones as follows.

- 1 Remove the old felt seals and clean the grooves.
- 2 To install a new seal, start one end of the seal strip in the groove.
- 3 Push the seal to the bottom of the groove all the way around the groove. If the seal is too short, stretch it evenly around the groove to lengthen it.
- 4 Cut the two ends of the seal so they meet squarely.
- 5 Bond the ends of the seal with 3M-brand weatherstrip adhesive No. 8001 or equivalent. After the adhesive dries, lubricate the seal with SAE30 motor oil to swell the seal into the groove.



NOTE: Configuration of baseplate varies with rotator model.

## 4-4 Frame Reassembly

- 1 Attach the hoist chain to the ring gear eyebolts and lift the ring gear/bearing assembly into position.

**CAUTION:** All ring gear/bearing assemblies have a "heat treat overlap" zone. This zone is designated by a stamped letter on the outer ring of the assembly. When installing the ring gear/bearing assembly, the "heat treat overlap" zone must be located in one of the four locations shown.

- 2 Lube-torque the capscrews to 65-70 ft.-lb. (R7R—120-125 ft.-lb.) in the order shown.

**NOTE:** Some units have fewer than the 24 capscrews shown here. On those units, lube-torque using a similar pattern.


**IMPORTANT:** Apply a liberal quantity of NLGI consistency No. 0 grease to the teeth of the ring gear before continued assembly.

- 3 Using the hoist chain, lift the baseplate into position on the bearing race.
- 4 Lube-torque the capscrews in the order shown (some units may have a different quantity of capscrews). Use torque values as follows:

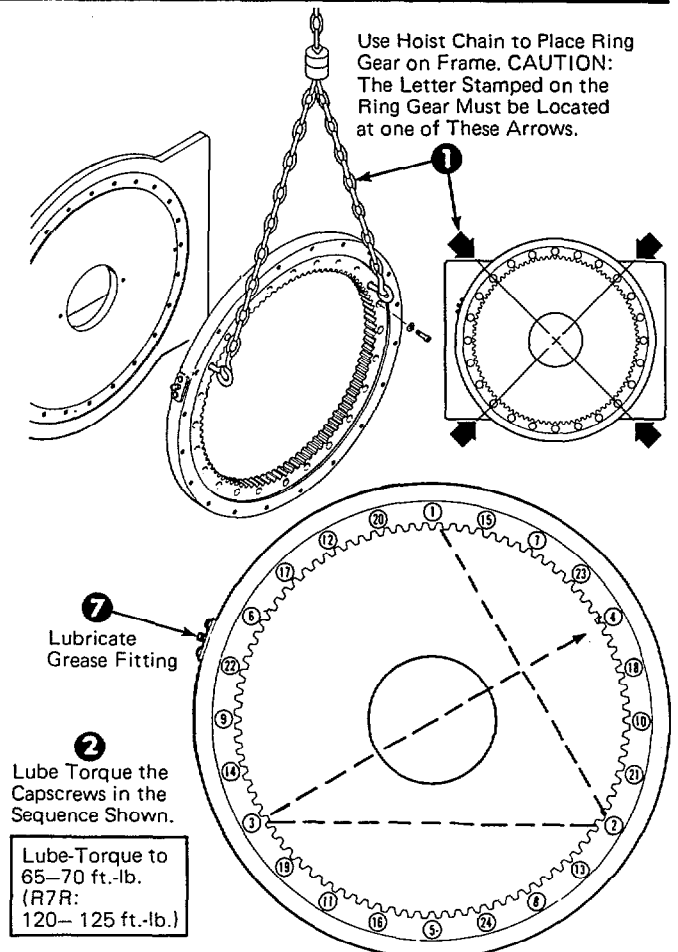
**R3R, R4R**—65-70 ft.-lb.

**R6R**—55-60 ft.-lb.

**R7R**—200-205 ft.-lb.



**WARNING:** The capscrews that secure the baseplate to the bearing race must be grade 5 minimum.



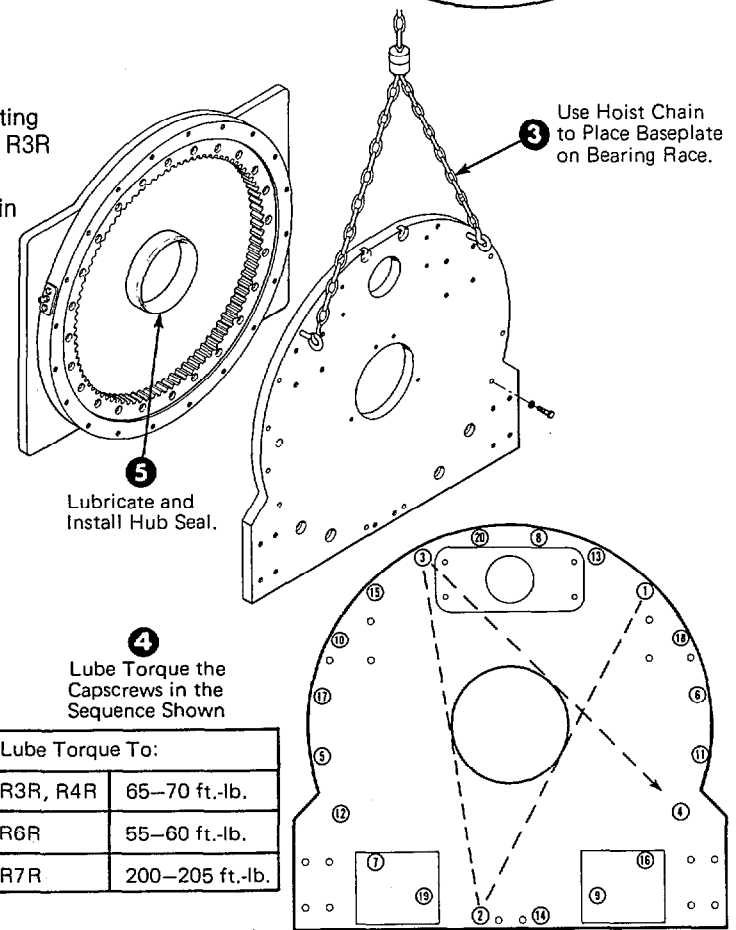
Use Hoist Chain to Place Ring Gear on Frame. **CAUTION:** The Letter Stamped on the Ring Gear Must be Located at one of These Arrows.

7 Lubricate Grease Fitting

2 Lube Torque the Capscrews in the Sequence Shown.

Lube-Torque to 65-70 ft.-lb. (R7R: 120-125 ft.-lb.)

- 5 Lubricate and install the hub seal.
- 6 Reinstall the rotator drive group. See Paragraph 5.2-1.
- 7 Lubricate the bearing race through the grease fitting on the ring gear/bearing assembly (baseplate on R3R clamps).
- 8 Install the attachment on the truck as described in Section 2.



3 Use Hoist Chain to Place Baseplate on Bearing Race.

5 Lubricate and Install Hub Seal.

4 Lube Torque the Capscrews in the Sequence Shown

Lube Torque To:	
R3R, R4R	65-70 ft.-lb.
R6R	55-60 ft.-lb.
R7R	200-205 ft.-lb.

- 6.1** Standard Labor Time is the average time required to perform each operation described in Section 5, Service. Each Standard Labor Time is identified by the Service Section paragraph number and title that corresponds to that operation.

The Standard Labor Times are based on the assumption a qualified serviceman is working on a reasonably clean attachment with adequate tools. We realize the actual time required to perform an operation may occasionally be greater than that listed, especially if a "first time" serviceman lacks the needed tools, or if a bolt is frozen. But considering all factors that can affect the job, Cascade can only honor warranty labor claims based on these carefully evaluated averages.

We strongly urge servicemen to read the applicable Service Sections of the manual before repairs are initiated. If problem diagnosis is difficult, call the Cascade Service Department at 1-800-547-5266 (toll free), or, in Oregon, call 666-1511.

To arrive at the total Standard Labor Time for a job, list each operation and add the times. As an example, to replace bushings, your list should look something like this:

5.1	Attachment Removal and Installation	0.8
5.2-1	Rotator Drive Group Removal and Installation	0.5
5.2-2	Rotator Drive Group Disassembly and Service	<u>1.5</u>
	Total Standard Labor Time	2.8

## 6.2 Standard Labor Times

Paragraph Number	Times
5.1	Attachment Removal and Installation . . . . . 0.8
5.2-1	Rotator Drive Group Removal and Installation 0.5
5.2-2	Rotator Drive Group Disassembly and Service 1.5
5.2-3	Rotator Drive Group Reassembly . . . . . 1.5
5.3-1	Motor Removal and Installation . . . . . 0.8
5.3-2	Motor Disassembly, Service, and Reassembly 1.0
5.4-1	Baseplate Removal . . . . . 1.0
5.4-2	Ring Gear/Bearing Assembly Removal . . . . . 1.0
5.4-3	Frame Assembly Service . . . . . 1.0
5.4-4	Frame Reassembly . . . . . 2.0



**Do you have questions you need answered right now?** Call your nearest Cascade Service Department.

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