

SERVICE MANUAL SUPPLEMENT

Upending Roll Clamps

Manual Number 6844925

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corporation**

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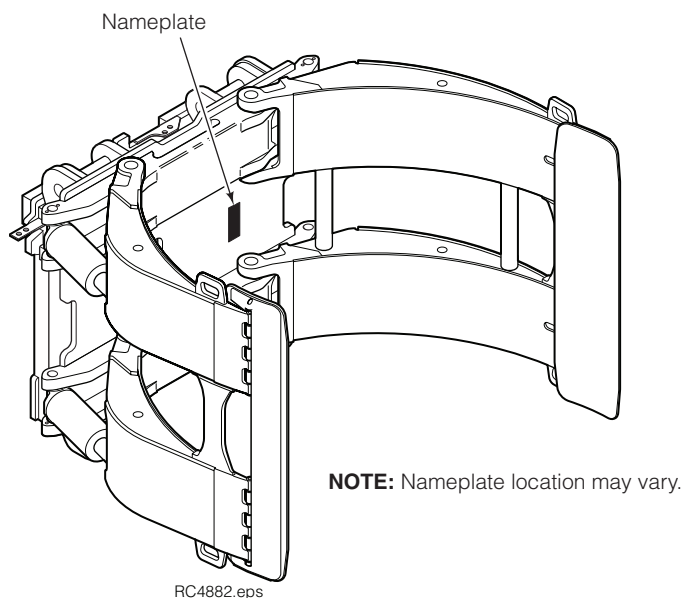
1.1 Introduction

This manual provides the Periodic Maintenance, Troubleshooting, Service and Specifications for Cascade Upending Roll Clamps.

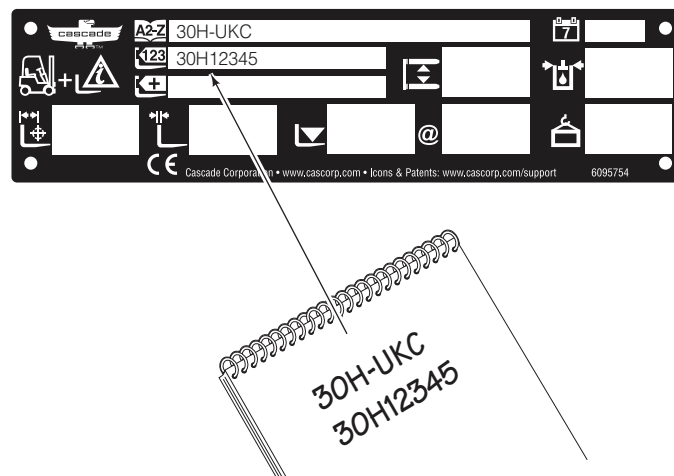
In any communication about the attachment, refer to the product catalog and serial numbers stamped on the nameplate, as shown. If the nameplate is missing, the numbers can be found stamped on the front of the faceplate. **NOTE:** Nameplate location may vary.

IMPORTANT: Cascade Upending Roll Clamps are custom built and size of connecting supply fittings on the attachment will vary. Consult Cascade if fitting size and type can not be determined.

NOTE: Specifications are shown in both inch and (Metric) units. All fasteners have a torque value range of $\pm 10\%$ of stated value.



NOTE: Nameplate location may vary.



1.2 Special Definitions

The statements shown appear throughout this manual where special emphasis is required. Read all **WARNINGS** and **CAUTIONS** before proceeding with any work. Statements labeled **IMPORTANT** and **NOTE** are provided as additional information of special significance or to make your job easier.



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.

2.1 100-Hour Maintenance

Every time the lift truck is serviced or every 100 hours of truck operation, whichever comes first, complete the following maintenance procedures:

- Check for loose or missing bolts, worn or damaged hoses and hydraulic leaks.
- Check edges of contact pads for wear or sharp nicks that could damage or tear paper rolls. Grind edges smooth.
- Check that load-holding hydraulic system is functioning properly. Cascade Clamp Force Indicators 830141 and 832442 are available for this test.
- Check decals and nameplate for legibility.

2.2 500-Hour Maintenance

After each 500 hours of truck operation, in addition to the 100-hour maintenance, perform the following procedures:

- **Revolving Attachments** – Check sample of baseplate capscrews for proper torque value. See Technical Bulletin TB183 or Service section 4.12-1 for checking and replacement procedures.
- **Revolving Attachments** – Check sample of rotation bearing capscrews for proper torque value. See Technical Bulletin TB183 or Service section 4.12-1 for checking and replacement procedures.



WARNING: A sampling of baseplate and bearing capscrews must be checked for proper torque at 500 hours (see TB183). A complete inspection is required every 2000 hours. Failure to keep the capscrews tightened can result in attachment damage and serious injury.

- Tighten lower mounting hook capscrews to:

F-Series:

CL II & III – 110 ft.-lbs. (150 Nm)

60F, 66F, 77F CL IV – 200 ft.-lbs. (270 Nm)

90F and greater CL IV – 265 ft.-lbs. (360 Nm)

G-Series:

Class II/III – 125 ft.-lbs. (165 Nm)

CL IV – 250 ft.-lbs. (340 Nm)

H-Series:

Class II/III – 125 ft.-lbs. (165 Nm)

CL IV – 265 ft.-lbs. (360 Nm)

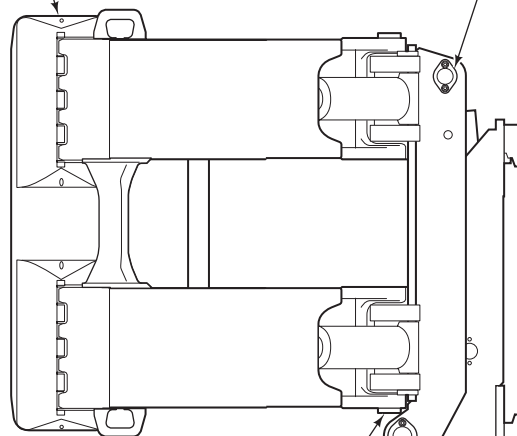
- **Revolving Attachments** – Lubricate rotator bearing assembly with multi-purpose extreme-pressure NLGI 2 grease (Whitmore 'OmniTask' or equivalent). Rotate attachment in 90° increments and grease in each position.
- **Revolving Attachments** – Check rotator drive gearcase lubricant level. Lubricant should be filled up to end cover hole. Add lubricant through the end cover hole. If necessary, fill with Cascade Rotator Drive Lubricant, Part No. 656300 or SAE 90 wt. gear lube (AGMA 'mild' 6 EP Gear Oil). Replace the plug.



WARNING: After completing any service procedure, always test the clamp through five complete cycles. First test the clamp empty, then test with a load to make sure the attachment operates correctly before returning to the job.

Contact Pad Edges

Upending
Pivot Joints



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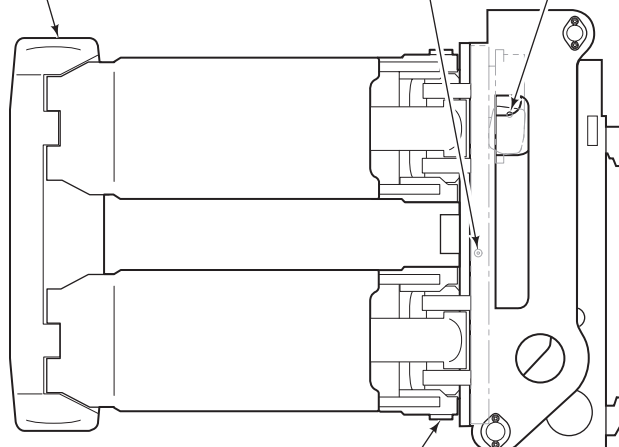
Arm, Cylinder
Pivot Joints

**Non-Revolving Attachments
Side View**

Contact
Pad Edges

Rotator Bearing
Assembly
Grease Fitting

Rotator Drive
Fill Plug



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Arm, Cylinder
Pivot Joints

Upending
Pivot Joints

**Revolving Attachments
Side View**

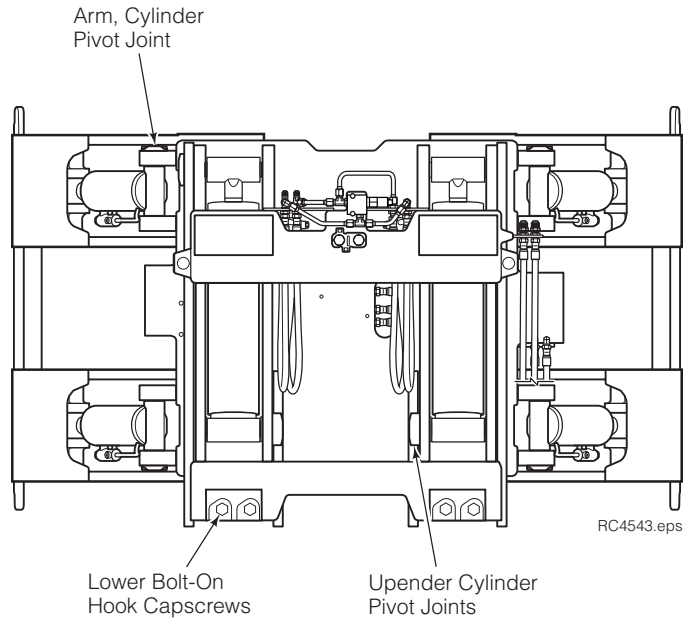
2.2 **500-Hour Maintenance** (Continued)

- Inspect all arm, frame and cylinder pivot bushings for wear. Replace if necessary.
- Inspect all load-bearing structural welds on arms, arm pivots and cylinder pivot areas for visual cracks. Replace components as required.
- Inspect wear tile, arm tips and contact pads for wear and damage. Replace or repair, as needed.

2.3 **2000-Hour Maintenance**

After each 2000 hours of truck operation, in addition to the 100 and 500-hour maintenance, perform the following procedures:

- **Revolving Attachments** – Check **all** rotation bearing capscrews for proper torque value. See Technical Bulletin TB183 or Service section 4.12-1 for checking and replacement procedures.
- Inspect all arm and cylinder pivot pins for wear and replace if necessary.

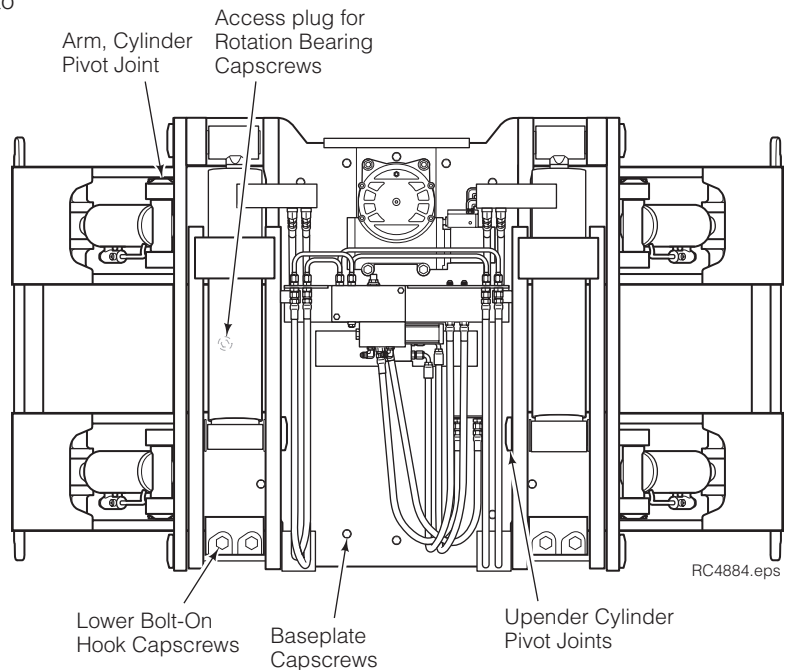


**Non-Revolving Attachments
Back (Driver's) View**

2.4 **4000-Hour Maintenance**

After each 4000 hours of truck operation, in addition to the 100, 500 and 2000-hour maintenance, perform the following procedures:

- Due to normal mechanical wear and component service life, cylinder seals should be replaced to maintain performance and safe operation.



**Revolving Attachments
Back (Diver's) View**

3.1 General Procedures

3.1-1 Truck System Requirements

- Truck hydraulic pressure should be within the range shown in Specifications, Section 5.1. **Pressure to the attachment must not exceed 2300 psi (160 bar).**
- Hydraulic flow should be within the volume range as shown in Specifications, Section 5.1.
- Hydraulic fluid supplied to the attachment must meet the requirements as shown in Specifications, Section 5.1.

3.1-2 Tools Required

In addition to a normal selection of hand tools, the following will be required:

- Inline Flow Meter Kit:
20 GPM (75 L/min.) - Cascade Part No. 671477.
- Pressure Gauge Kit:
5000 psi (345 bar) - Cascade Part No. 671212. Two kits are required.

OR

Wireless Pressure Monitor Kit:

Pressure transducers monitor the hydraulic pressure and wirelessly transmit the data to the receiver display.

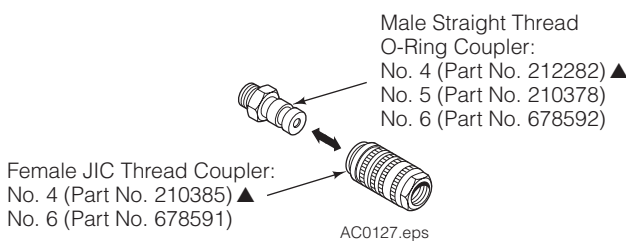
Two Pressure Transducers	
Voltage	Kit Part No.
12V	6803615, 6815673 ★
24-48V	6803618, 6815676 ★

Four Pressure Transducers	
Voltage	Kit Part No.
12V	6803616, 6815674 ★
24-48V	6803619, 6815677 ★

★ Includes alarm assembly 6815696.

- Assorted fittings and hoses to adapt the gauges and flow meter to the components being tested.

Diagnostic Quick-Disconnects



▲ Included in Diagnostics Kit 394382.

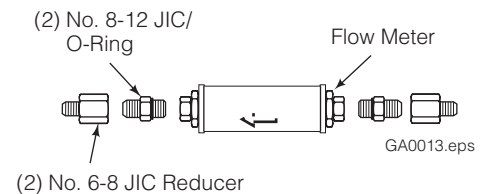


WARNING: Before servicing any hydraulic component, relieve pressure in the system. Turn the truck off and move the truck auxiliary control valves several times in both directions.

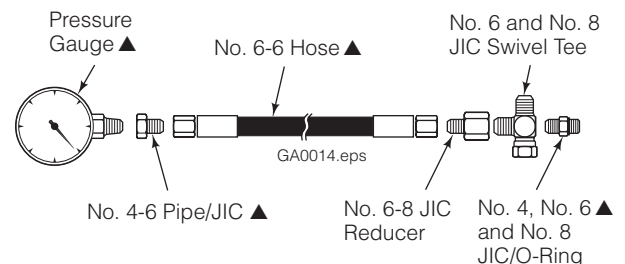
After completing any service procedure, test the attachment through several cycles. First test the attachment empty to bleed any air trapped in the system to the truck tank. Then test the attachment with a load to be sure it operates correctly before returning to the job.

Stay clear of the load while testing. Do not raise the load more than 4 in. (10 cm) off the floor while testing.

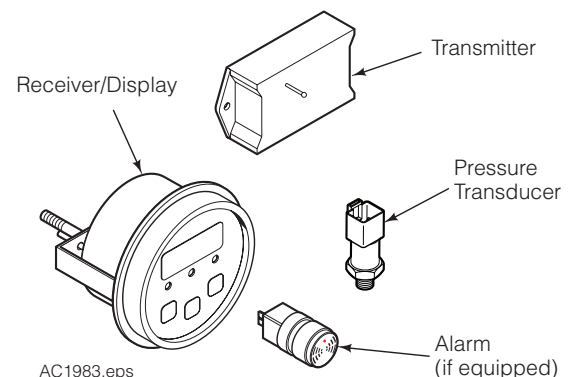
Flow Meter Kit 671477



Pressure Gauge Kit 671212



Wireless Pressure Monitor Kits



3.1-3 Troubleshooting Chart

Determine All The Facts – It is important that all the facts regarding the problem are gathered before beginning service procedures. The first step is to talk to the equipment operator. Ask for a complete description of the malfunction. The following guidelines can then be used as a starting point to begin troubleshooting procedures:

Upending Circuit

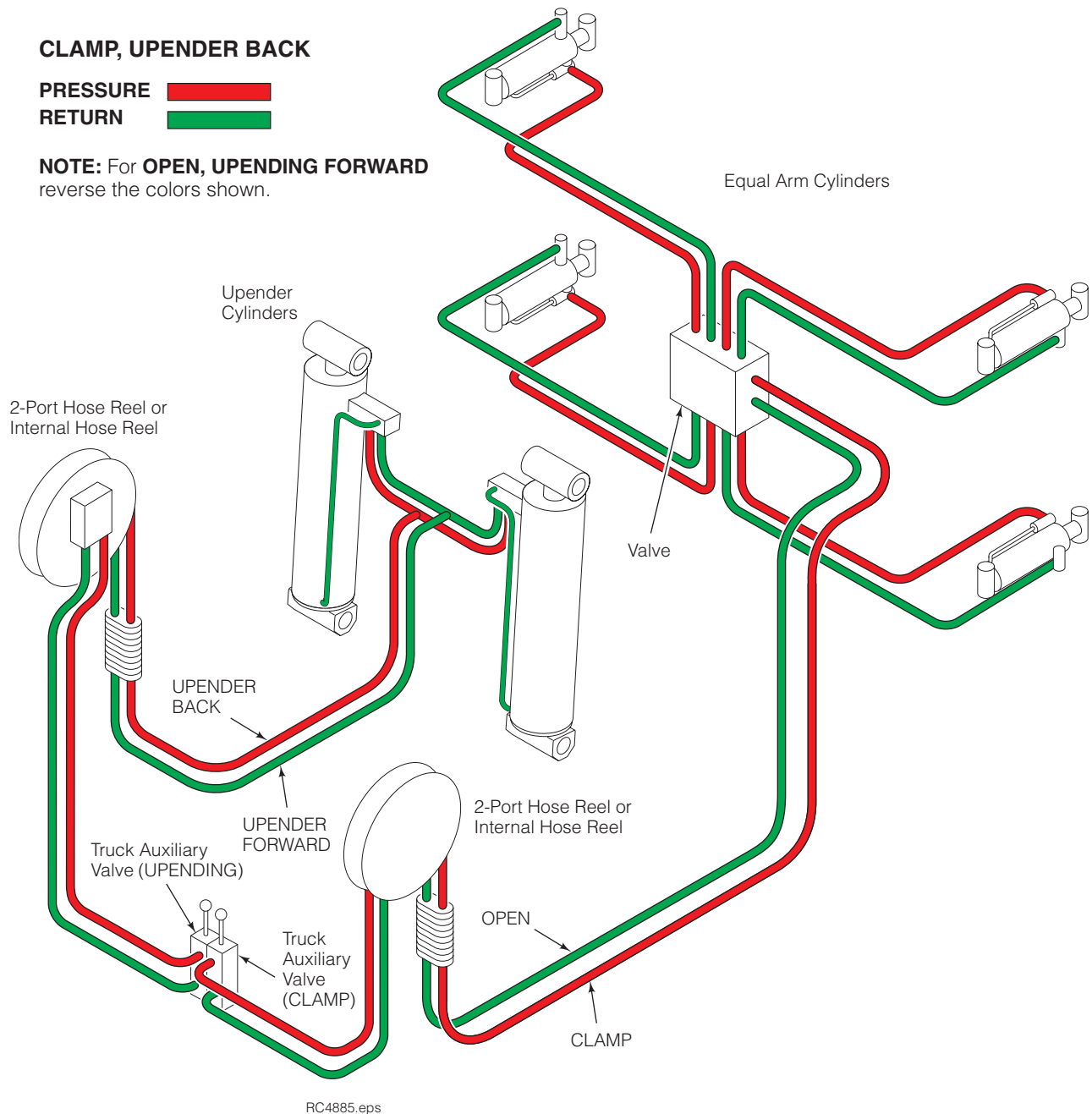
- Attachment does not upend forward or backward. To correct this problem, see Section 3.3.

IMPORTANT: Troubleshooting the CLAMP or ROTATE circuits can be found in one of the following service manuals based on the nameplate model number and/or serial number:

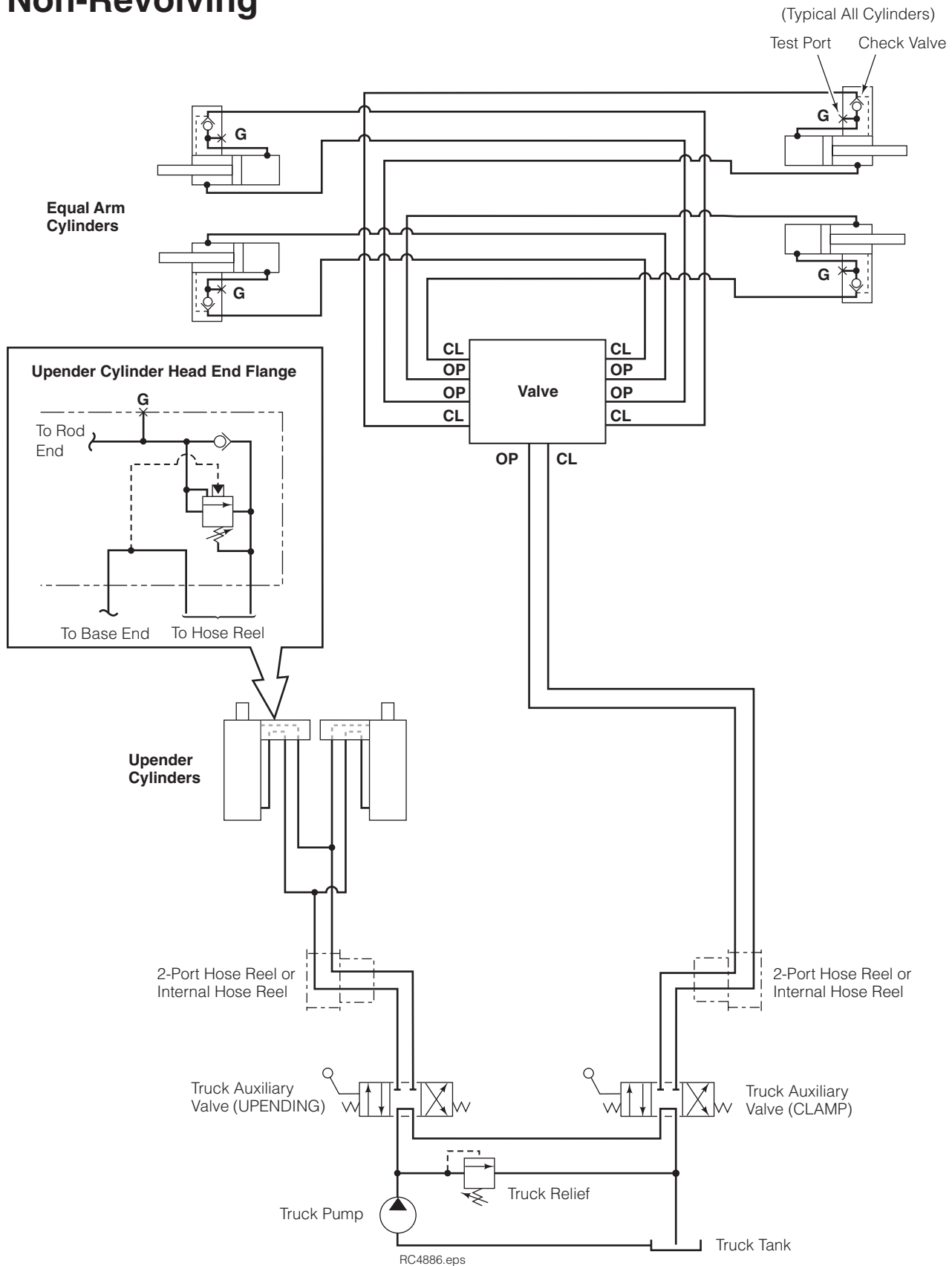
- F-Series Fixed & Swing Frame Paper Roll Clamp Service Manual 674512.
- G-Series Fixed Frame Paper Roll Clamp Service Manual 213744.
- H-Series Fixed Frame Pivot Arm Paper Roll Clamp Service Manual 6078255.

3.2 Plumbing

3.2-1 Hosing Diagram – Non-Revolving



3.2-2 Hydraulic Schematic – Non-Revolving



3.2-3 Hosing Diagram – Revolving

CLAMP, UPENDER BACK

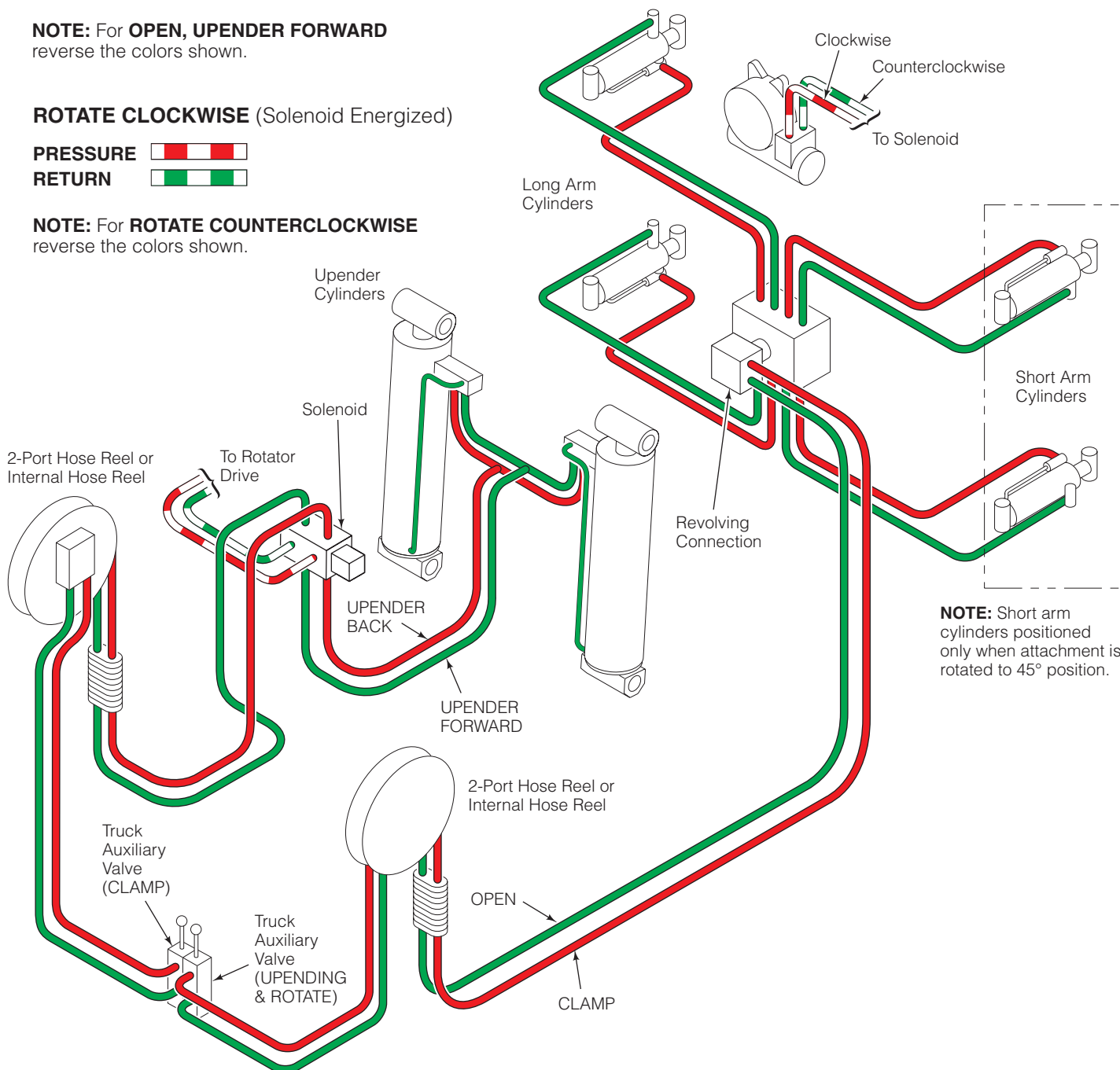
PRESSURE 
RETURN 

NOTE: For **OPEN, UPENDER FORWARD**
 reverse the colors shown.

ROTATE CLOCKWISE (Solenoid Energized)

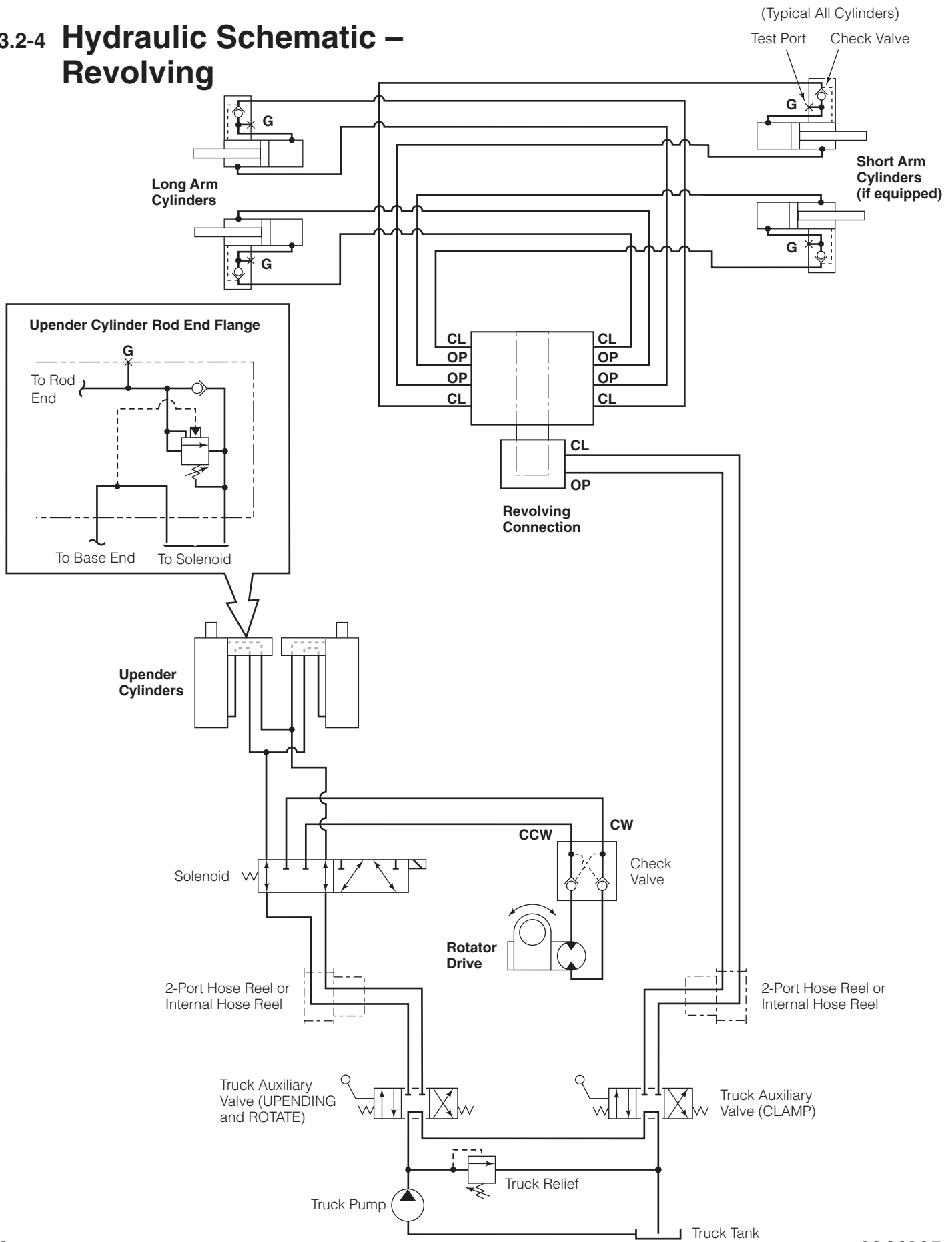
PRESSURE 
RETURN 

NOTE: For **ROTATE COUNTERCLOCKWISE**
 reverse the colors shown.



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3.2-4 Hydraulic Schematic – Revolving



3.3 Upending Function

There are five potential problem areas that can affect the rotation function:

- Operator may be handling roll incorrectly. Loads may be too heavy or rotated off-center, exceeding capacity of attachment. Refer to Operator's Guide (Cascade part no. 210135) for suggested handling procedures.
- Low hydraulic pressure or flow from lift truck.
- External leaks.
- **Solenoid Equipped** – Defective solenoid coil or valve.
- Defective cylinder counterbalance valve or cylinder seals.



WARNING: Before removing hydraulic lines, relieve pressure in the hydraulic system. Turn the truck off and open the truck auxiliary control valves several times in both directions.

3.3-1 Supply Circuit Test

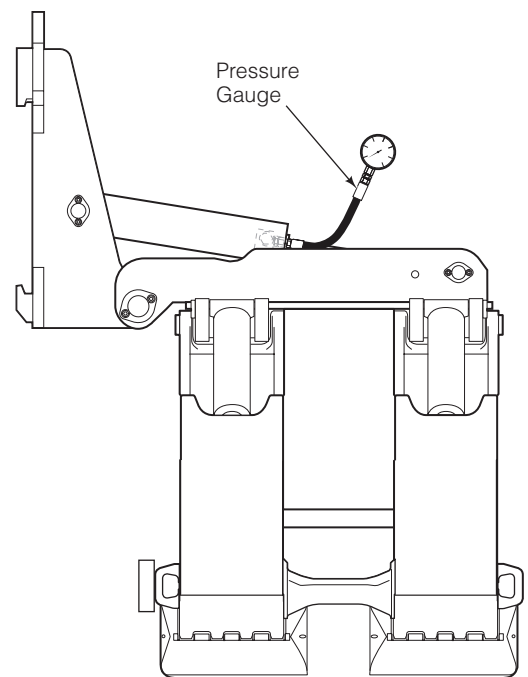
- 1 Check for external leaks.
- 2 Check the pressure delivered by the truck. Refer to the truck Service Manual. The pressure must be within 100 psi (7 bar) of specified truck pressure. **Pressure to the attachment must not exceed 2300 psi (160 bar),** measured at the carriage hose terminal.
- 3 Check the flow volume at the carriage hose terminal. See Section 5.1-1 for recommended flow volumes. If the truck pressure and flow are correct, proceed with the upending circuit pressure test.

3.3-2 Upending Circuit Test

- 1 **Solenoid equipped** – Press the solenoid button. Listen for a 'click' at the solenoid valve. If no sound is heard, check the fuse, wiring and coil. Refer to Section 3.4.

IMPORTANT: Solenoid operated valves must be plumbed so that the solenoid is **not energized** during the upending function.

- 2 Install a pressure gauge to the cylinder rod flange.
- 3 Tilt the attachment FORWARD until the upending cylinders are bottomed out and build up pressure. Note the gauge reading.
- 4 Release the lever and watch the pressure gauge:
 - If the pressure drop **is less** than 150 psi (10 bar) initially, and additional drop does not exceed 30 psi (2 bar) per minute, the problem is not hydraulic. Refer to Section 3.3, above.
 - If the pressure drop **is more** than 150 psi (10 bar) initially, and additional drop exceeds 30 psi (2 bar) per minute, the counterbalance cartridge may be faulty. Replace the cartridge. Refer to Section 4.7-1.
- 5 Tilt the attachment BACK and hold the lever in this position for a few seconds. If the pressure still drops, after replacing counterbalance valve cartridge, one of the cylinders is faulty and must be serviced. Refer to Section 4.6.

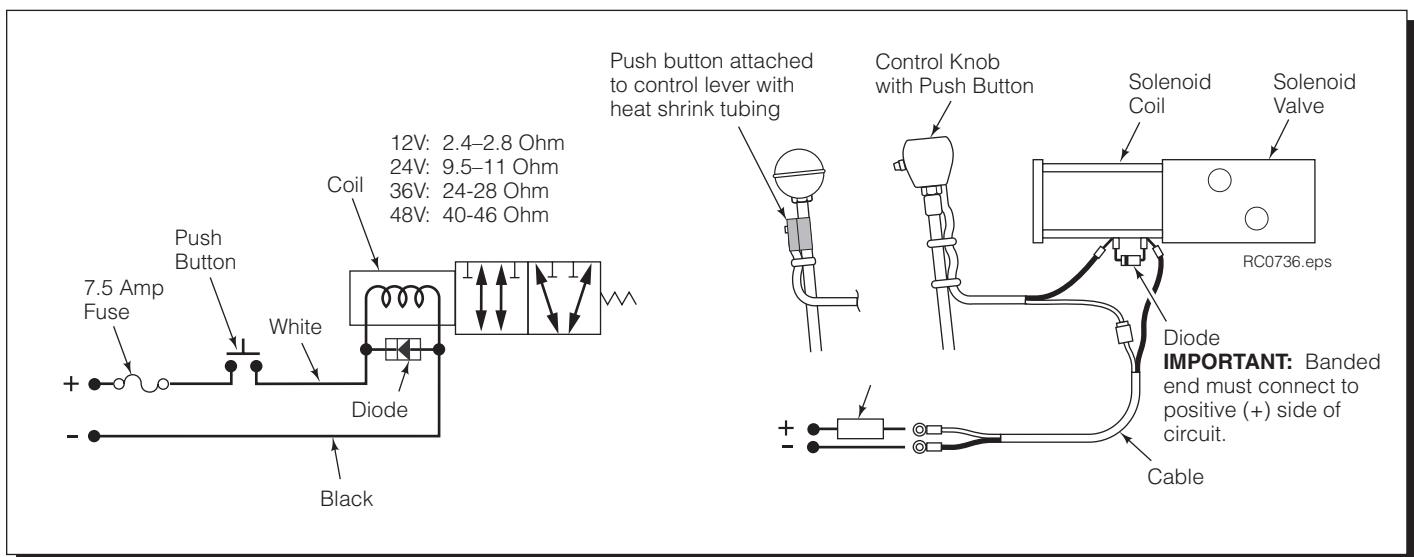


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3.4 Electrical Circuit (Solenoid-equipped attachments)

Use the schematic shown and follow the steps below.

- 1 Check the control knob circuit fuse. Replace as necessary.
- 2 Check for loose electrical connections at the truck ignition switch, control knob button, solenoid coil terminals and diode.
- 3 Remove the diode from the solenoid coil terminal. Test with an ohmmeter for high resistance in one direction and no resistance in the other direction. If there is no resistance in both directions, replace the diode.
NOTE: When replacing the diode, the banded end must be connected to the coil and wiring as shown.
- 4 Use a voltmeter to determine if correct voltage is present at the electrical leads when the button is pressed.
 - If there is no voltage at the solenoid, troubleshoot the electrical circuit for shorts or open circuits.
 - If there is insufficient voltage to the solenoid, check the circuit for excessive voltage drop.
 - If there is sufficient voltage to the solenoid, test for coil continuity. Continue to Step 5.
- 5 Test for coil continuity by placing an ohmmeter test lead on each solenoid coil terminal (ohmmeter on Rx1 scale).
 - If there is an ohmmeter reading, and the coil matches the values below for the truck voltage, the coil is good.
 - If the coil is good, but the solenoid does not 'click' when the control knob button is depressed, the solenoid cartridge may be jammed. Refer to Section 4.7-2.
 - If there is no ohmmeter reading, the coil is defective and should be replaced. Refer to Section 4.7-2.



4.1 Attachment Removal

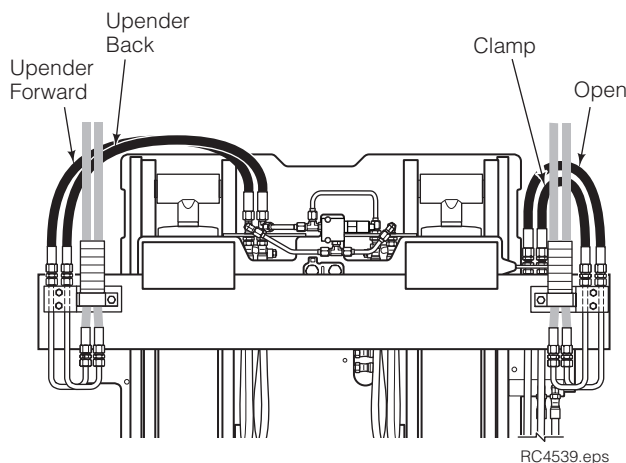
1 Non-Revolving Attachments – Extend the arms outside the frame width.

Revolving Attachments – Rotate the attachment to the vertical roll handling position. Extend the arms outside the frame width.

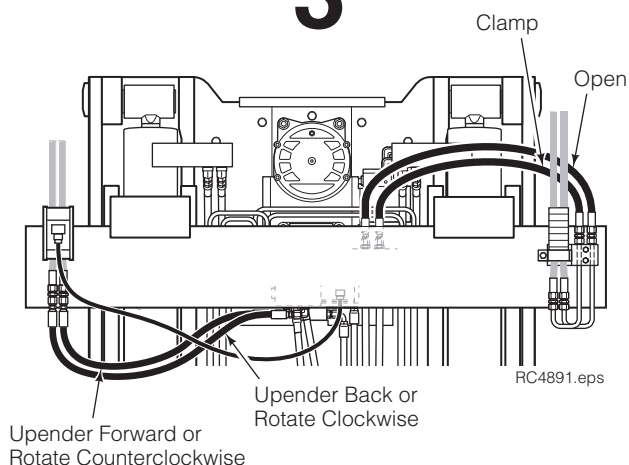
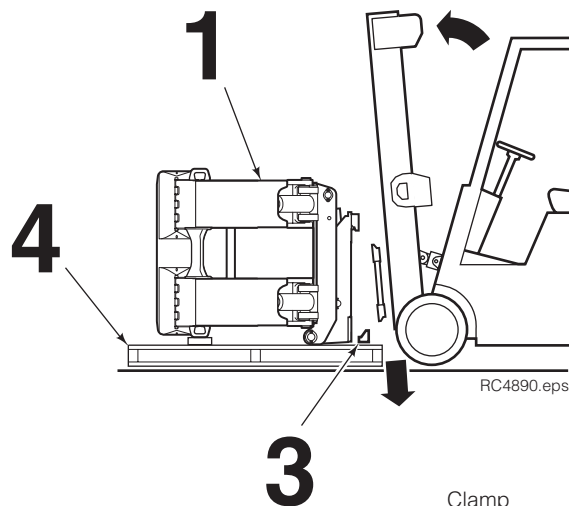


WARNING: Before removing hydraulic lines, relieve pressure in the hydraulic system. Turn the truck off and open the truck auxiliary control valves several times in both directions.

2 Disconnect and plug the hydraulic supply hoses to the attachment. Tag hoses for reassembly.



**Non-Revolving Attachments
Back (Driver's) View**



**Revolving Attachments
Back (Driver's) View**

3 Disconnect the lower hooks. Remove the lower mounting hooks. For reassembly, tighten the capscrews to:

F-Series:

CL II & III – 110 ft.-lbs. (150 Nm)

60F, 66F, 77F CL IV – 200 ft.-lbs. (270 Nm)

90F and greater CL IV – 265 ft.-lbs. (360 Nm)

G-Series:

Class II/III – 125 ft.-lbs. (165 Nm)

CL IV – 250 ft.-lbs. (340 Nm)

H-Series:

Class II/III – 125 ft.-lbs. (165 Nm)

CL IV – 265 ft.-lbs. (360 Nm)

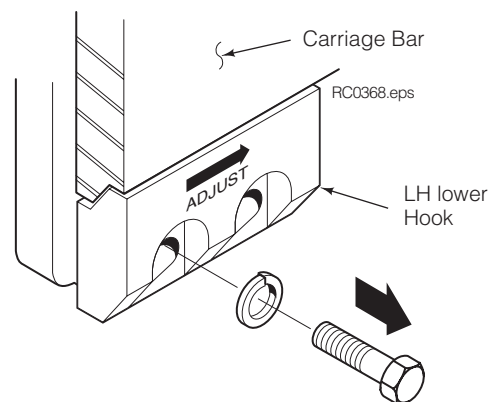
4 Set the attachment on a pallet. Tilt the mast forward and lower the carriage to remove the attachment from the truck.

5 For installation, reverse the above procedures with the following exceptions:

- Refer to Installation Instructions 6837771, for complete installation procedure.

3

BOLT-ON HOOKS



NOTE: Manuals are available at www.cascorp.com under the support tab, "Technical Support Manuals" link.

4.2 Arms

To remove and service arms, contact pads, wear tiles, arm tip repair, pad protectors and arm bushings (if equipped), refer to one of the following service manuals based on nameplate model number and/or serial number:

- F-Series Fixed & Swing Frame Paper Roll Clamp Service Manual 674512.
- G-Series Fixed Frame Paper Roll Clamp Service Manual 213744.
- H-Series Fixed Frame Pivot Arm Paper Roll Clamp Service Manual 6078255.

4.3 Clamp Cylinders

To remove and service clamp cylinders, refer to one of the following service manuals based on nameplate model number and/or serial number:

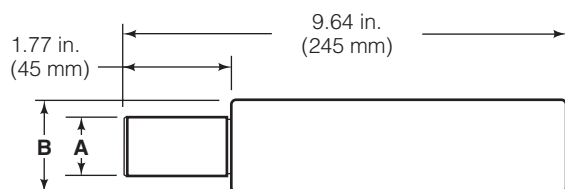
- F-Series Fixed & Swing Frame Paper Roll Clamp Service Manual 674512.
- G-Series Fixed Frame Paper Roll Clamp Service Manual 213744.
- H-Series Fixed Frame Pivot Arm Paper Roll Clamp Service Manual 6078255.

4.4 Frame Bushing Service

- 1 Remove the arms from the attachment as described in Section 4.2.
 - 2 Remove the arm pivot bushings from the frame (or revolving base unit faceplate) using a bushing driver.
- NOTE:** Bushing drivers can be machined using the dimensions shown in the chart below.
- 3 For reassembly, reverse the above procedures with the following exceptions:
 - Install new arm pivot bushings and spacer.
- CAUTION:** Bushings may be damaged if installed without a proper bushing driver.

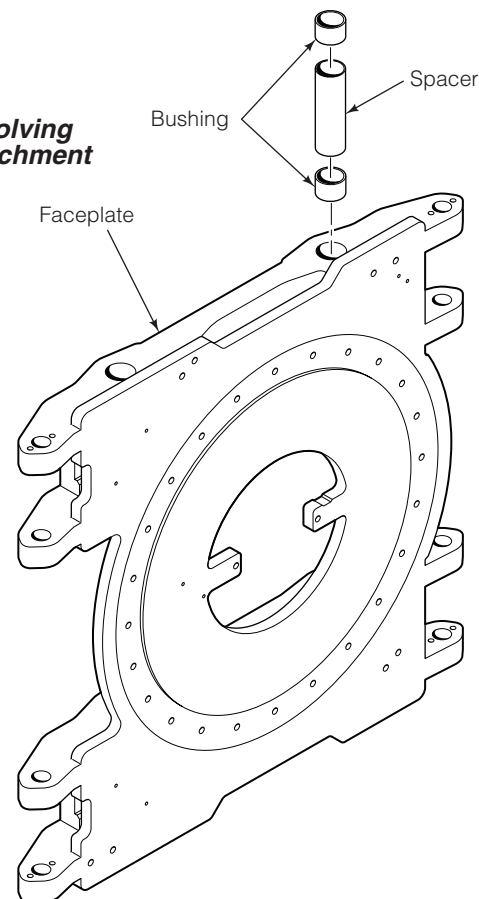
Bushing Driver Dimensions

	A Bearing ID	B Driver OD
20H	1.18 in. (30.0 mm)	1.38 in. (35.0 mm)
22H, 24H	1.38 in. (35.0 mm)	1.57 in. (40.0 mm)
25H, 30H, 33H	1.57 in. (40.0 mm)	1.77 in. (45.0 mm)
38F, 45F	1.23 in. (31.2 mm)	1.48 in. (37.6 mm)
60G, 66G, 72G	1.56 in. (39.8 mm)	1.75 in. (44.5 mm)
77F, 90F, 100F and larger	1.75 in. (43.9 mm)	1.98 in. (50.3 mm)



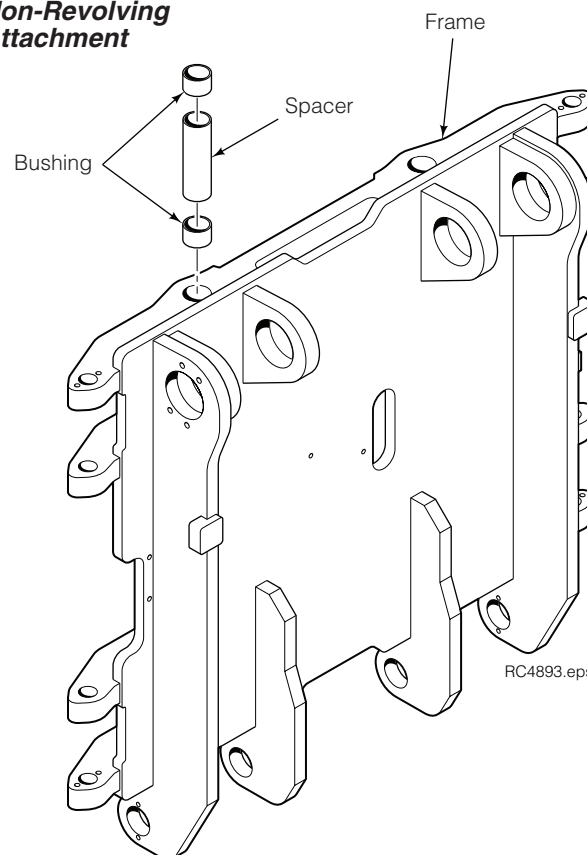
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Revolving Attachment



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Non-Revolving Attachment



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4.5 Back Frame

4.5-1 Removal and Installation

- 1 Remove the attachment from the lift truck as described in Section 4.1.



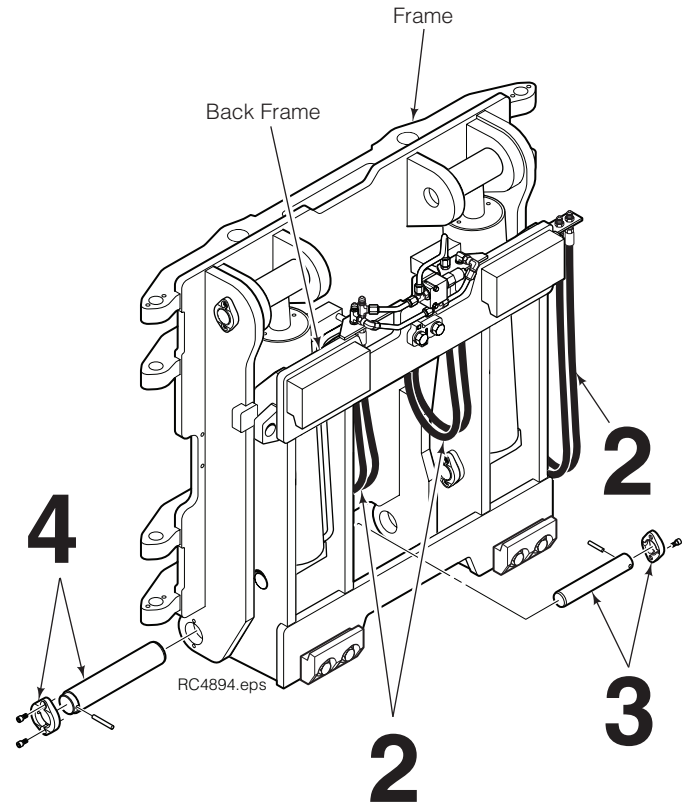
WARNING: Before removing any hoses, relieve pressure in the hydraulic system. With the truck off, open the truck auxiliary control valve(s) several times in both directions.

- 2 Disconnect and plug supply hoses at the back frame. Disconnect and plug any hoses connecting the frame to the back frame. Tag hoses for reassembly.
- 3 Remove base end cylinder pivot pins. For reassembly, tighten capscrews to:
M8 Capscrew – 14 ft.-lbs. (19 Nm)
M10 Capscrew – 28 ft.-lbs. (38 Nm)
- 4 Remove frame (or revolving base unit baseplate) pivot pins and spacers. For reassembly, tighten capscrews to:
M8 Capscrew – 14 ft.-lbs. (19 Nm)
M10 Capscrew – 28 ft.-lbs. (38 Nm)



WARNING: Verify that the overhead hoist and chains or straps are rated for the weight of the attachment. Refer to nameplate for attachment weight.

- 5 Attach an overhead hoist to back frame and take up the slack with chains or straps. Lift away back frame.
- 6 For reassembly, reverse the above procedures with the following exceptions:
 - Install new bushings in back frame.
 - Replace pivot pins if they show wear.

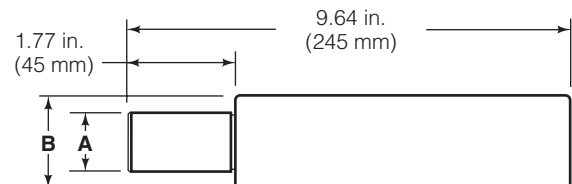


4.5-2 Bushing Service

- 1 Remove the back frame as described in 4.5-1.
- 2 Remove the pivot bushings from back frame using a bushing driver.
NOTE: Bushing drivers can be machined using the dimensions shown below.
- 3 Install new bushings in the cylinder. Replace with the same number of bushings removed.
CAUTION: Bushings may be damaged if installed without a proper bushing driver.

Bushing Driver Dimensions

A Bearing ID	B Driver OD
2.000 in. (50.8 mm)	2.188 in. (55.6 mm)



4.6 Upender Cylinder

4.6-1 Removal and Installation

- 1 Remove the attachment from the lift truck as described in Section 4.1.



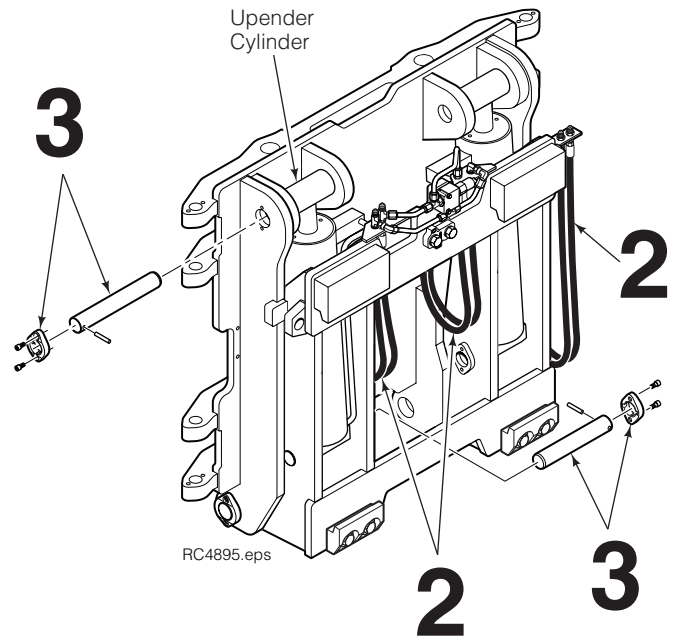
WARNING: Before removing any hoses, relieve pressure in the hydraulic system. With the truck off, open the truck auxiliary control valve(s) several times in both directions.

- 2 Disconnect and plug hoses from the cylinder flange. Tag hoses for reassembly.
- 3 To remove upender cylinder, remove the cylinder pivot pins. Note location of shims. For reassembly, tighten pin retainers capscrews to:

M8 Capscrew – 14 ft.-lbs. (19 Nm)

M10 Capscrew – 28 ft.-lbs. (38 Nm)

- 4 Service cylinder as described in Section 4.6-3, 4.6-4, and 4.6-5.



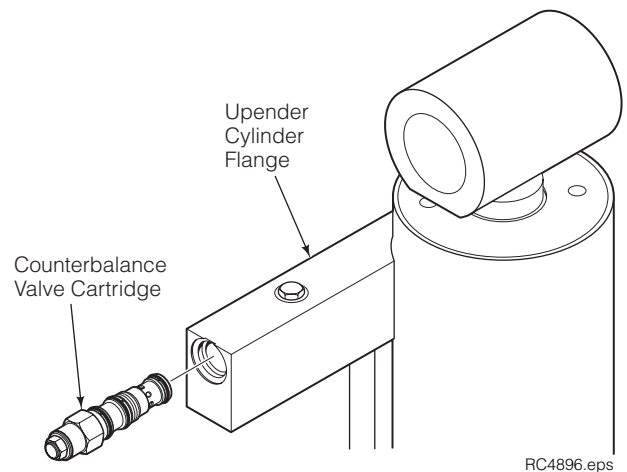
4.6-2 Counterbalance Valve Service

- 1 Position the cylinders to gain access to the cylinder counterbalance valve.

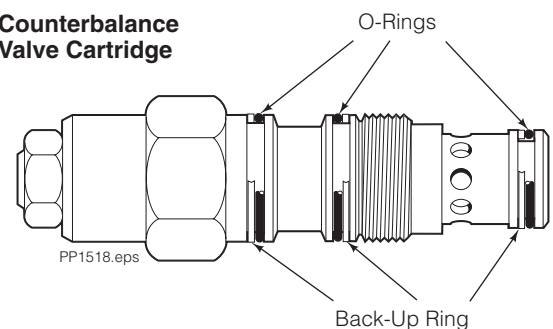


WARNING: Before removing any hoses, relieve pressure in the hydraulic system. With the truck off, open the truck auxiliary control valve(s) several times in both directions.

- 2 Remove counterbalance valve cartridge from cylinder flange.
- 3 Remove O-rings and back-up rings. Clean the counterbalance valve cartridge with solvent.
- 4 Install new O-rings and back-up rings, as shown.
- 5 Lubricate the counterbalance valve cartridge with petroleum jelly prior to reassembly.



Counterbalance Valve Cartridge



4.6-3 Cylinder Disassembly

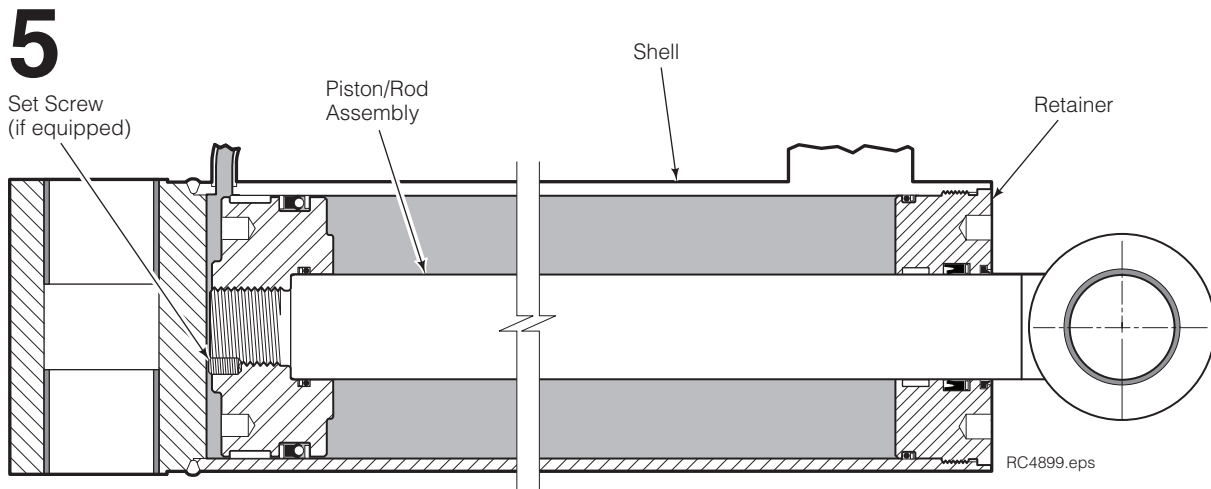
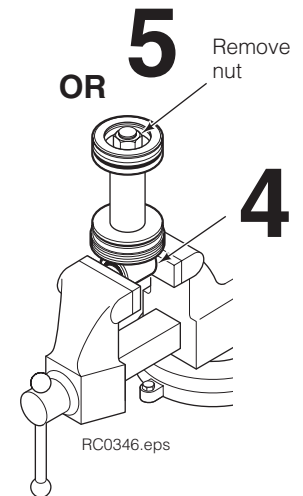
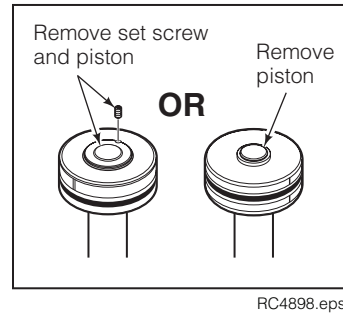
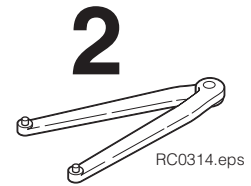
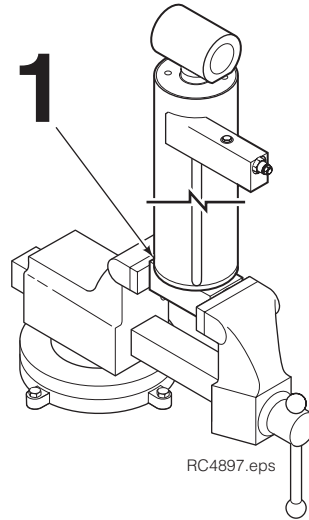
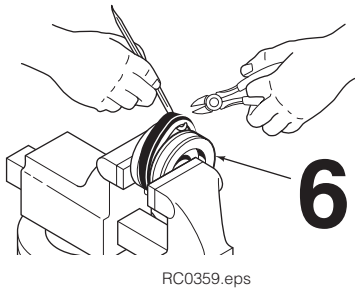
- 1 Clamp the cylinder so that the vise jaws contact only the extreme end of the cylinder base.

NOTE: Use a soft-jawed vise for all cylinder disassembly and assembly procedures.

- 2 Remove the cylinder retainer by unscrewing it with a pin-type spanner wrench.
- 3 Remove the piston/rod/retainer as an assembly from the cylinder shell.
- 4 Clamp the piston/rod/retainer assembly across the rod end. Never clamp directly on the rod sealing surface.
- 5 If equipped, remove the piston nut or set screw from the rod. Remove the piston from the rod.

- 6 Clamp the piston on the top and bottom in a soft-jawed vise. Pry seals up with a dental tool and cut to remove.

CAUTION: Do not scratch the seal grooves.



4.6-4 Cylinder Inspection

- Inspect the rod, piston and retainer for nicks or burrs. Minor nicks or burrs may be removed with emery cloth. If they cannot be removed, replace the part.
- Inspect the cylinder shell bore and remove any minor nicks or burrs with a butterfly. If the nicks or burrs cannot be removed, replaced the part.
- Inspect the outside of the shell for any deformities or cuts that could impair performance or cause leaks under pressure. If necessary, replace the part.

4.6-5 Cylinder Reassembly

- 1 Lubricate all new seals and O-rings with petroleum jelly.
- 2 Note the direction of the U-cup seals. Pressure seals must always be installed with the lip toward the high pressure side of the cylinder.
- 3 Polish the piston and retainer chamfer angle with emery cloth to facilitate seal installation.
- 4 Install new seals on the piston and retainer. Hook one side of the seal in the groove and carefully work it over the piston or retainer. See seal details on next page.
- 5 Install the retainer and then the piston on the cylinder rod.

Piston with Nut – Tighten to the following torque:

0.875-14 UNF Thread – 258 ft.-lbs. (350 Nm)

1.000-14 UNF Thread – 350 ft.-lbs. (475 Nm)

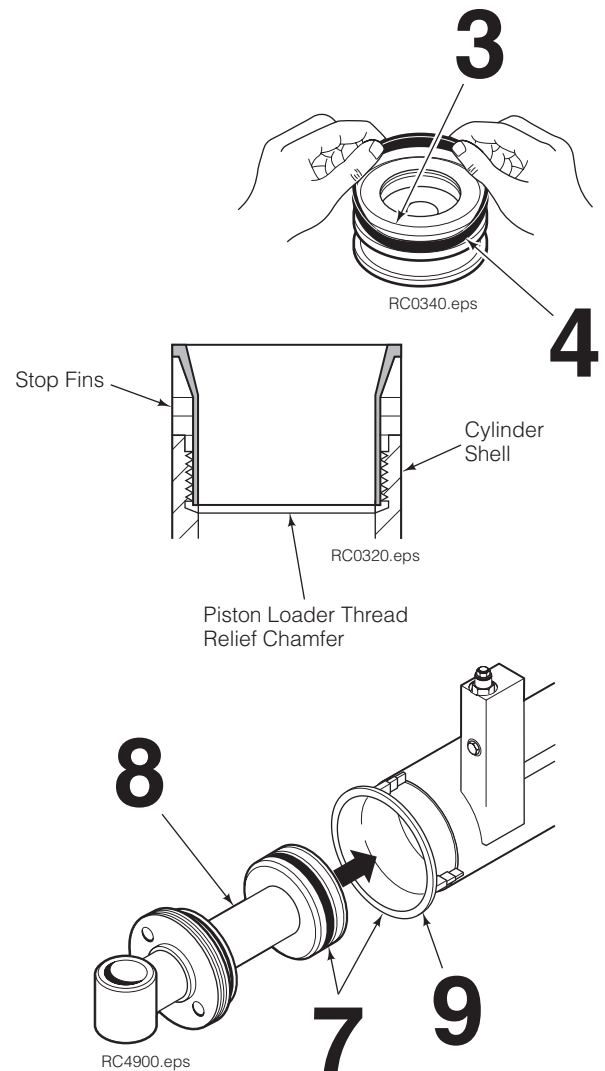
Piston with Setscrew – Install piston to rod until the rod and piston seat are flush and setscrew hole is aligned. Install setscrew.

Piston/Rod Assembly only – Apply Loctite 277 (red) to threads of rod. Install the piston to the rod and tighten to a torque of 495 ft.-lbs. (670 Nm).

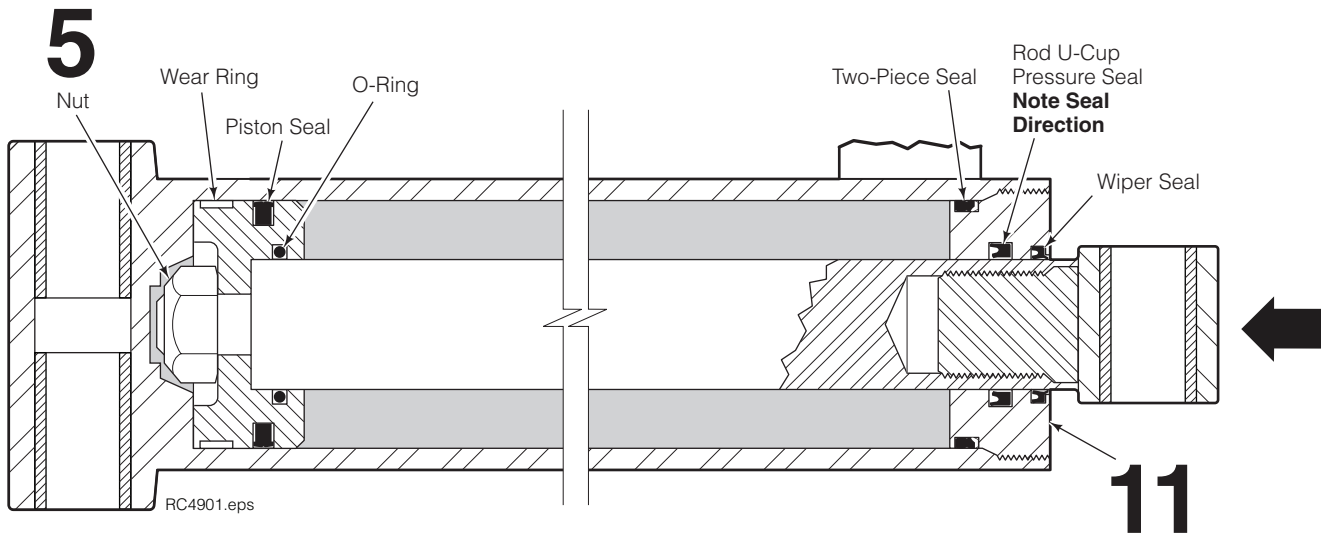
- 6 Place the piston loader furnished with the seal kit into the cylinder shell. Make sure that the loader covers all the cylinder shell threads but does not contact the thread relief chamfer. Trim the loader stop fins if more engagement is needed.

CAUTION: The piston will not enter the cylinder shell properly if the loader contacts the thread relief chamfer.

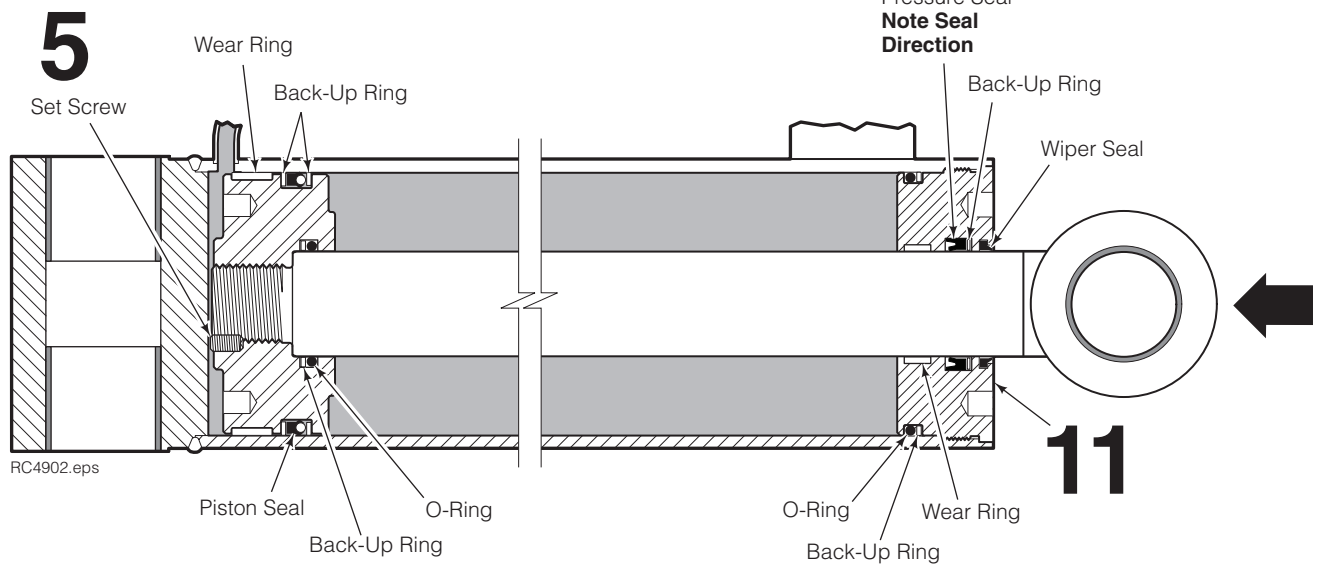
- 7 Apply a thick film of petroleum jelly to the inside of the cylinder shell, piston loader and piston seals.
 - 8 Using a rubber mallet, tap the piston/rod assembly through the loader into the cylinder shell.
 - 9 Remove the loader by cutting down one side and pulling it out of the cylinder bore.
 - 10 Apply a thick film of petroleum jelly to the inside of the cylinder shell, and to the retainer and seal.
 - 11 Screw the retainer into the cylinder shell. Tighten the retainer to a torque of 258 ft.-lbs. (350 Nm).
- NOTE:** If equipped with a 5.7 in. (145 mm) diameter retainer, tighten to a torque of 553 ft.-lbs. (750 Nm).



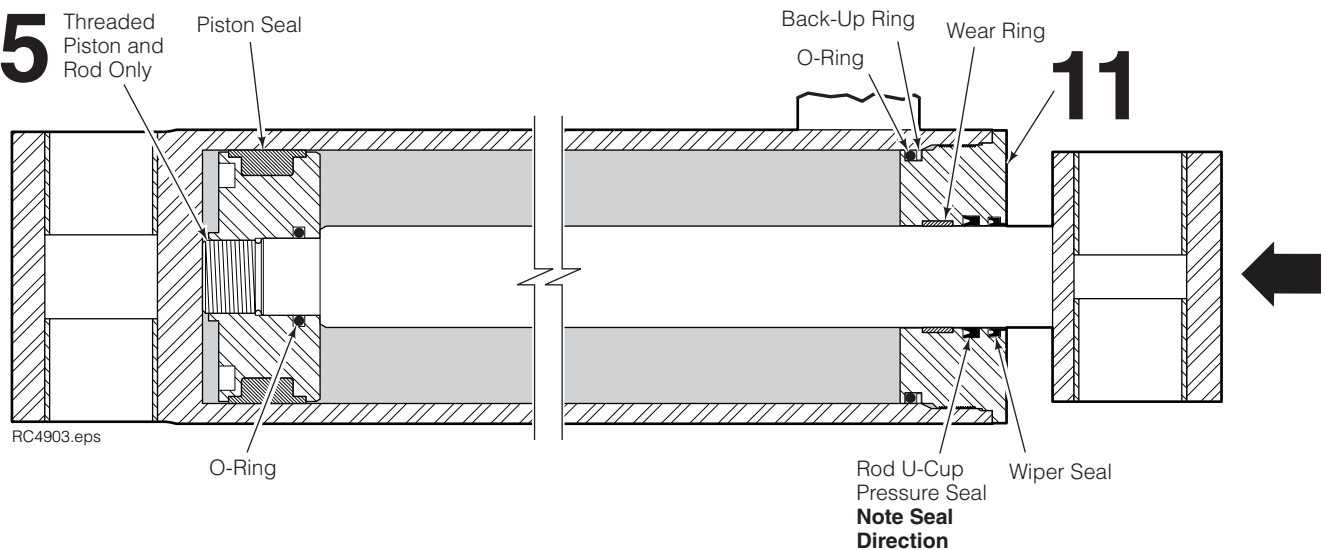
Type 1



Type 2



Type 3



4.7 Valves

4.7-1 Valve with Solenoid Service (if equipped)

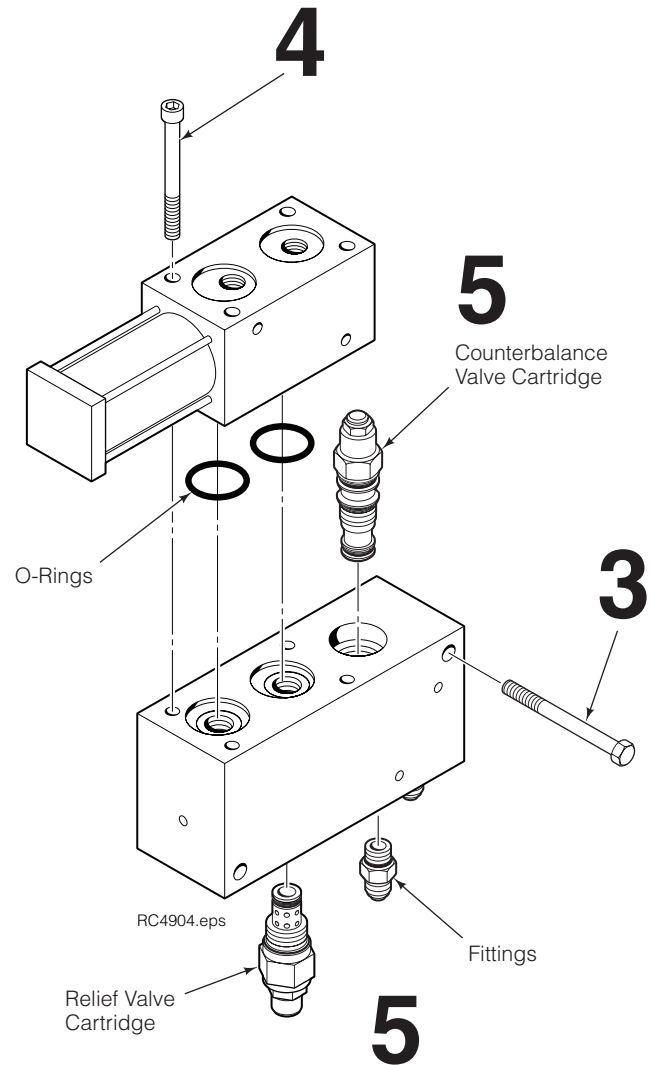
The following procedure can be performed with the attachment mounted on the truck.

- 1 Raise the attachment so that the valve is accessible.

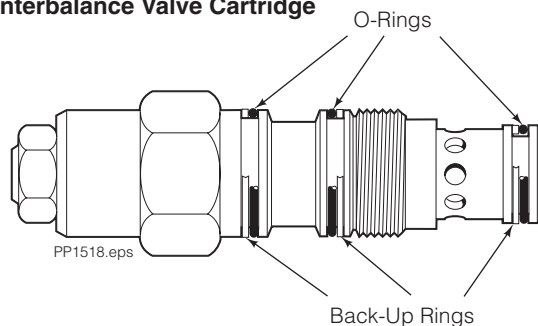


WARNING: Before removing any hoses, relieve pressure in the hydraulic system. With the truck off, open the truck auxiliary control valve(s) several times in both directions.

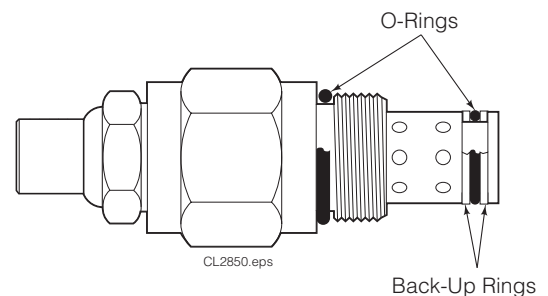
- 2 Disconnect all hydraulic supply hoses and tubing (if equipped) at the valve. Plug hoses and tag for reassembly.
- 3 Remove capscrews fastening the valve to the attachment. For reassembly, tighten capscrews to 60 ft.-lbs. (80 Nm).
- 4 Remove the capscrews and separate the solenoid valve from the valve body. Keep track of the O-rings in between the valves. For reassembly, tighten capscrews to 60 ft.-lbs. (80 Nm).
- 5 Remove the fittings and cartridges from valve.
- 6 Remove O-rings and back-up rings from the cartridges.
- 7 Clean all parts with clean solvent.
- 8 For reassembly, reverse the above procedures with the following exceptions:
 - The cartridge O-rings and back-up rings must be installed as shown for proper hydraulic operation.
 - Lubricate the cartridges and seals with petroleum jelly prior to reassembly.
 - Service the solenoid, if required, as described in Section 4.7-2.



Counterbalance Valve Cartridge

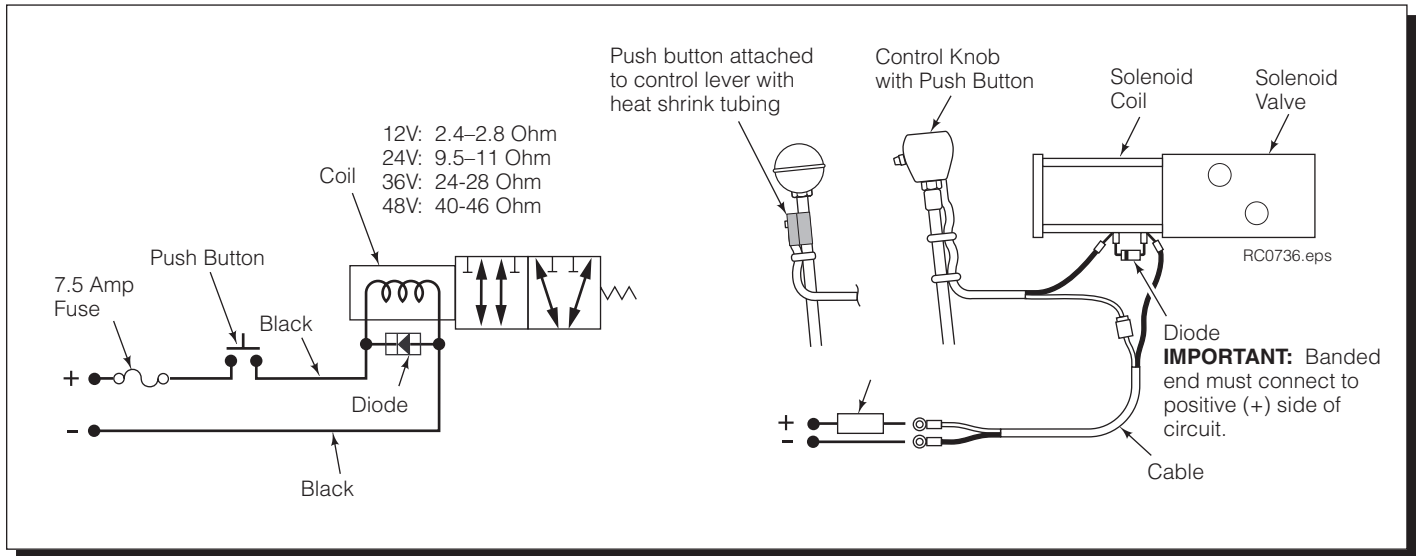
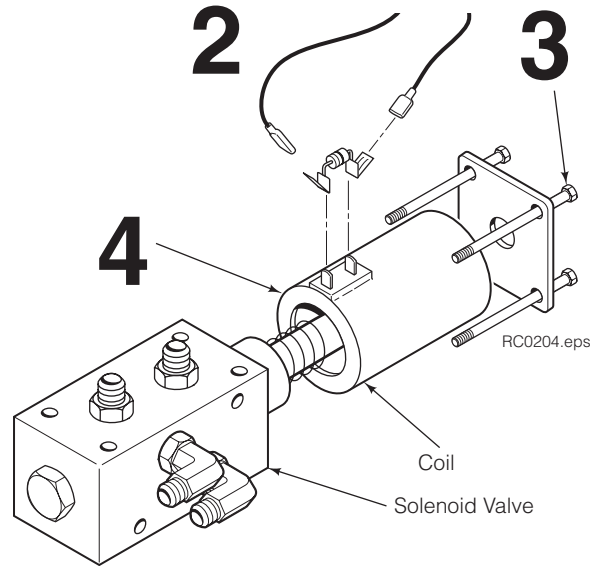


Relief Valve Cartridge



4.7-2 Solenoid Valve Coil Service

- 1 Disconnect the wires and diode from the coil terminals.
- 2 Remove the end cover capscrews and remove the end cover and coil. Note the position of the coil terminals.
- 3 Install the new coil and end cover. Verify that the terminals are positioned correctly.
- 4 Check the plunger within the valve body for freedom of movement. Press end button on coil to check that the valve is not jammed or damaged. If problems are found, replace solenoid valve as a complete assembly.
- 5 For reassembly, reverse the above procedures except as follows:
 - Refer to electrical schematic, below, for correct wire and diode installation.



4.7-3 Relief Valve Service (if equipped)

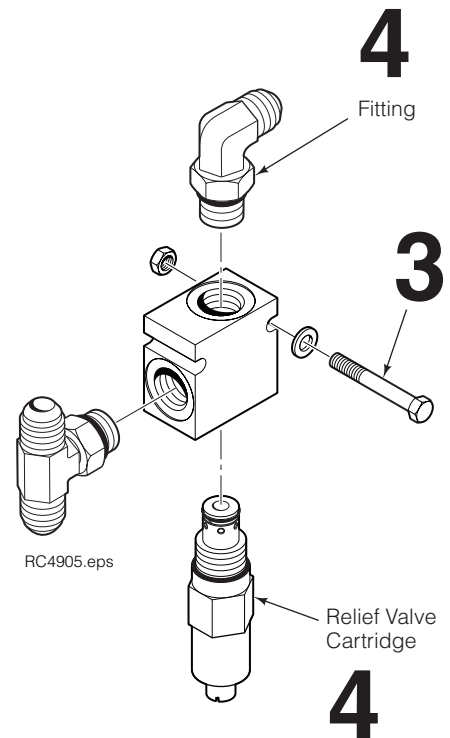
The following procedure can be performed with the attachment mounted on the truck.

- 1 Raise the attachment so that the valve is accessible.

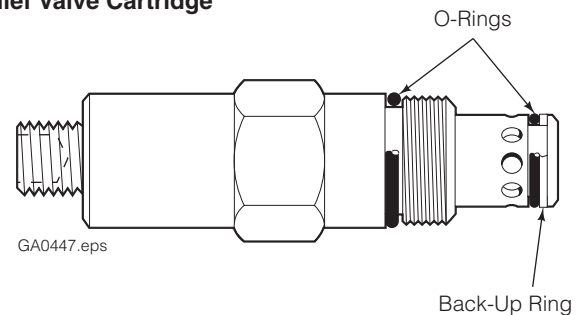


WARNING: Before removing any hoses, relieve pressure in the hydraulic system. With the truck off, open the truck auxiliary control valve(s) several times in both directions.

- 2 Disconnect all hydraulic supply hoses and tubing (if equipped) at the valve. Plug hoses and tag for reassembly.
- 3 Remove capscrews fastening the valve to the attachment. For reassembly, tighten capscrews to 14 ft.-lbs. (19 Nm).
- 4 Remove fittings and cartridge from valve.
- 5 Remove O-rings and back-up ring from the relief cartridge.
- 6 Clean all parts with clean solvent.
- 7 For reassembly, reverse the above procedures with the following exceptions:
 - The cartridge O-rings and back-up rings must be installed as shown for proper hydraulic operation.
 - Lubricate the cartridges and seals with petroleum jelly prior to reassembly.



Relief Valve Cartridge



4.7-4 Non-Revolving Valve Service

Removal and Installation:

The following procedure can be performed with the attachment mounted on the truck.

- 1 Raise the attachment so that the valve is accessible.

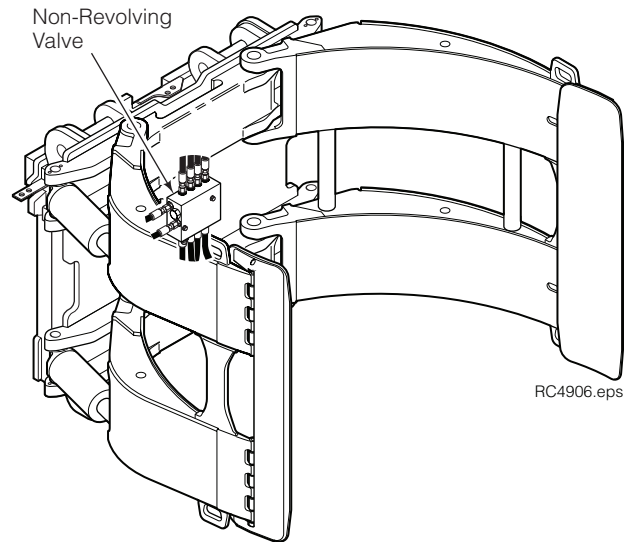
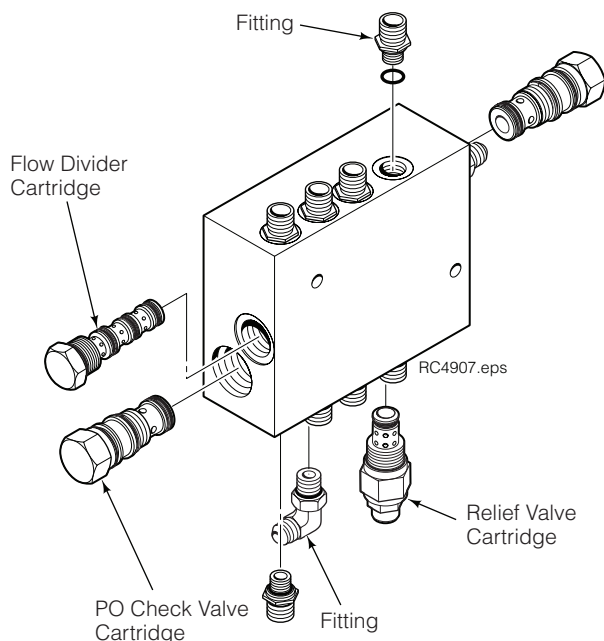


WARNING: Before removing any hoses, relieve pressure in the hydraulic system. With the truck off, open the truck auxiliary control valve(s) several times in both directions.

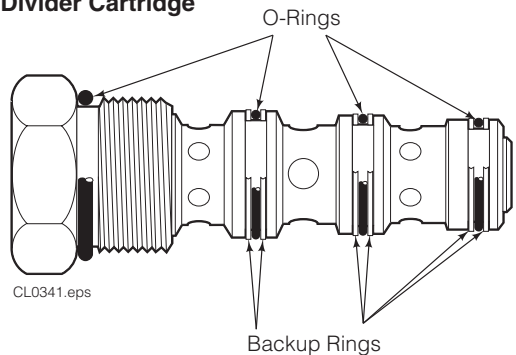
- 2 Disconnect all hydraulic supply hoses and tubing (if equipped) at the valve. Plug hoses and tag for reassembly.
- 3 Remove capscrews fastening the valve to the attachment. For reassembly, tighten capscrews to 14 ft.-lbs. (19 Nm).
- 4 For reassembly, reverse the above procedures with the following exceptions:
 - Service the valve as described below.

Valve Service:

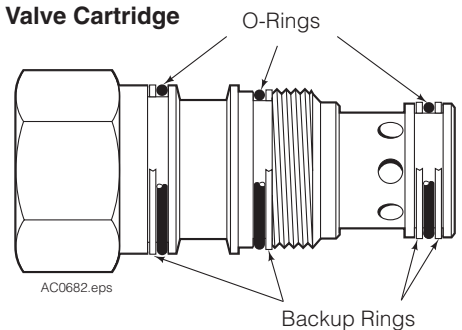
- 1 Remove the valve as described as above.
- 2 Remove cartridges from the valve.
- 3 Remove the remaining fittings and plugs.
- 4 Remove O-rings and back-up rings from the cartridges.
- 5 Clean all parts with clean solvent.
- 6 For reassembly, reverse the above procedures with the following exceptions:
 - The cartridge O-rings and back-up rings must be installed as shown for proper hydraulic operation.
 - Lubricate the cartridges and seals with petroleum jelly prior to reassembly.



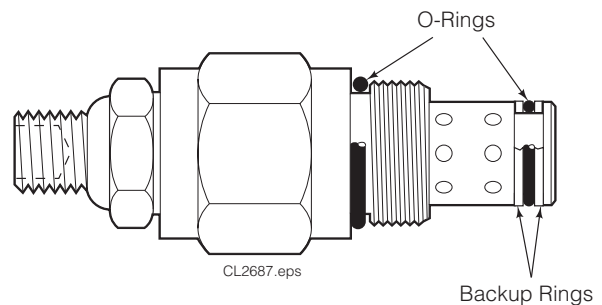
Flow Divider Cartridge



PO Check Valve Cartridge



Relief Valve Cartridge



NOTE: Manuals are available at www.cascorp.com under the support tab, "Technical Support Manuals" link.

4.8 Rotator Drive Group

To service the drive group, refer to one of the following service manuals based on nameplate model number and/or serial number:

- F-Series Fixed & Swing Frame Paper Roll Clamp Service Manual 674512.
- G-Series Fixed Frame Paper Roll Clamp Service Manual 213744.
- H-Series Fixed Frame Pivot Arm Paper Roll Clamp Service Manual 6078255.

4.9 Rotator Drive Motor

To service the drive motor, refer to one of the following service manuals based on nameplate model number and/or serial number:

- F-Series Fixed & Swing Frame Paper Roll Clamp Service Manual 674512.
- G-Series Fixed Frame Paper Roll Clamp Service Manual 213744.
- H-Series Fixed Frame Pivot Arm Paper Roll Clamp Service Manual 6078255.

4.10 Rotator Drive Check Valve

To service the rotator drive check valve, refer to one of the following service manuals based on nameplate model number and/or serial number:

- F-Series Fixed & Swing Frame Paper Roll Clamp Service Manual 674512.
- G-Series Fixed Frame Paper Roll Clamp Service Manual 213744.
- H-Series Fixed Frame Pivot Arm Paper Roll Clamp Service Manual 6078255.

4.11 Revolving Connection

To service the revolving connection, refer to one of the following service manuals based on nameplate model number and/or serial number:

- F-Series Fixed & Swing Frame Paper Roll Clamp Service Manual 674512.
- G-Series Fixed Frame Paper Roll Clamp Service Manual 213744.
- H-Series Fixed Frame Pivot Arm Paper Roll Clamp Service Manual 6078255.

4.12 Revolving Base Unit

4.12-1 Rotation Bearing Assembly – Capscrew Torque Inspection

500-Hour Inspection

Every 500 hours perform the following inspection:

- 1 Check the accessible baseplate capscrews above upper mounting hooks for an initial torque of:

20H-24H – 66 ft.-lbs. (90 Nm)

25H-33H Socket Capscrews – 80 ft.-lbs. (110 Nm)

25H-33H Hex Capscrews – 66 ft.-lbs. (90 Nm)

F & G-Series – 75 ft.-lbs. (100 Nm)

Tighten capscrews to 10 ft.-lbs. (14 Nm) above initial torque. Mark each capscrew after checking.

- If any baseplate capscrews are loose, rotate or broken, replace all baseplate fasteners as described in Section 4.12-2.
- If capscrews do not rotate, continue with faceplate capscrew inspection in Step 2.

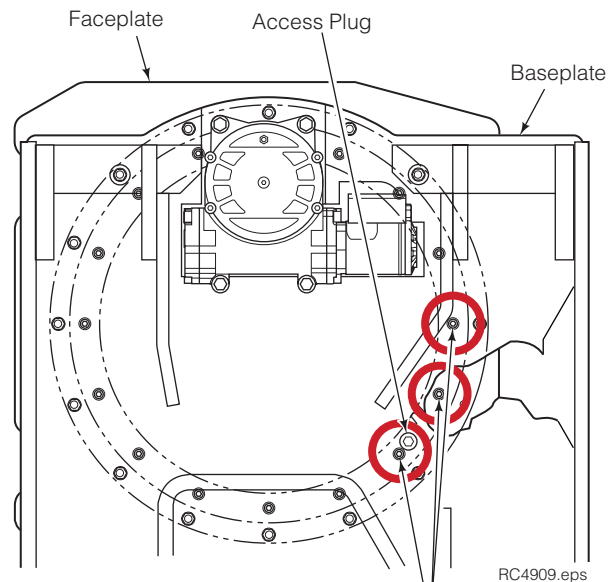
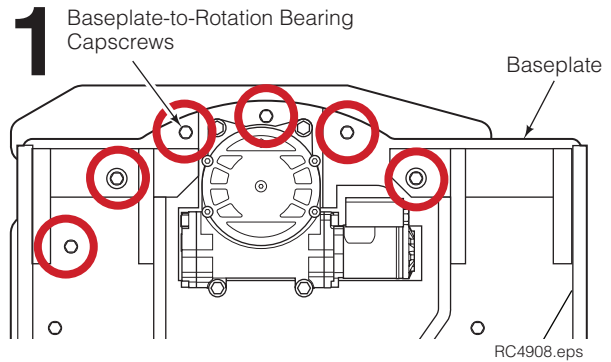
- 2 Remove the access plug from the back of the baseplate and rotate the attachment to the horizontal (bilge) roll handling position with the long arm up. Check three capscrews closest to the access hole for an initial torque of:

F-Series – 75 ft.-lbs. (100 Nm)

H & G-Series – 80 ft.-lbs. (110 Nm)

Tighten capscrews 10 ft.-lbs. (14 Nm) above initial torque. Mark each capscrew after checking.

- If any bearing capscrews are loose, rotate or broken, replace all capscrews as described in Section 4.12-2.
- If capscrews do not rotate, inspection is complete.



2 Rotation Bearing-to-Faceplate Capscrews

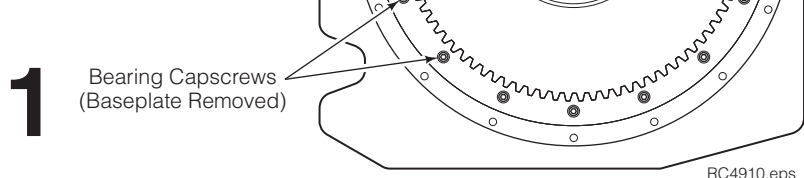
2000-Hour Inspection

Every 2000 hours perform the following inspection:

- 1 Check **all** baseplate and bearing capscrews and tighten until torque is 10 ft.-lbs. (14 Nm) above torque values listed above. Mark each capscrew after checking.

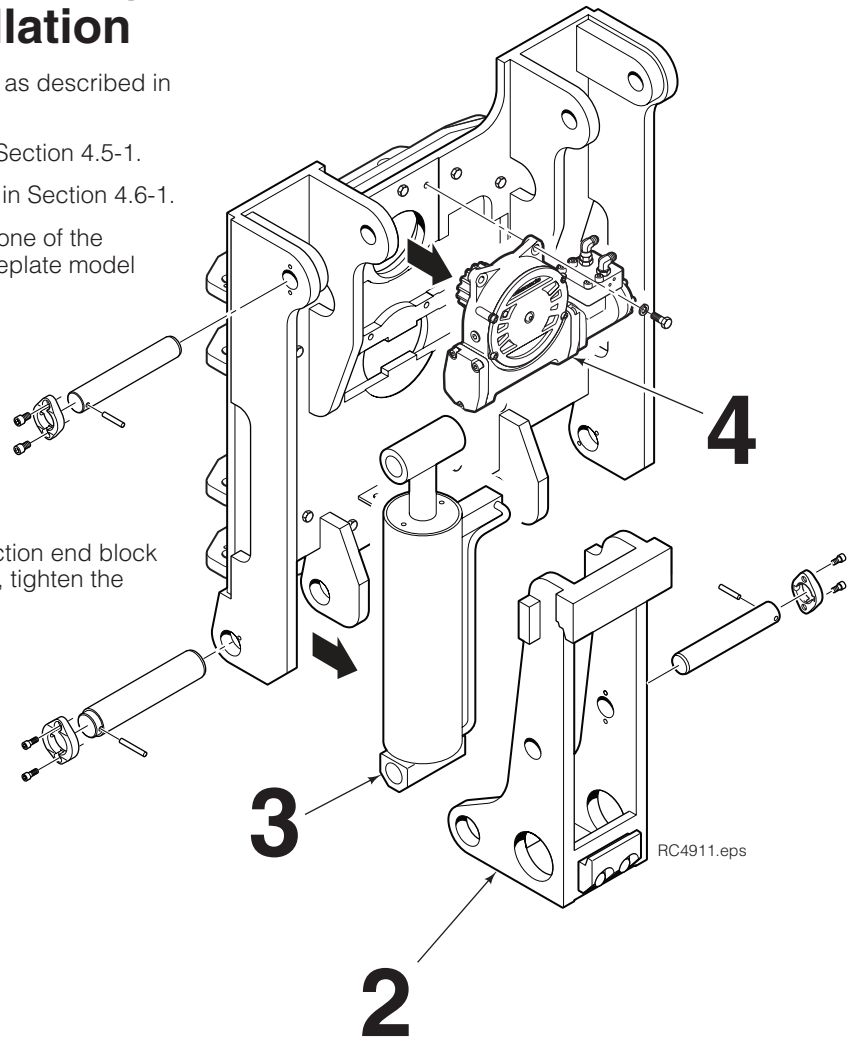
- If any capscrews are loose, rotate or broken, replace all capscrews as described in Section 4.12-2.
- If capscrews do not rotate, inspection is complete.

NOTE: The attachment must be removed from truck to provide access to all baseplate capscrews. Remove baseplate (shown) or use access hole to provide access to all bearing capscrews. Refer to Section 4.12-2.



4.12-2 Rotation Bearing Assembly – Removal and Installation

- 1** Remove the attachment from the lift truck as described in Section 4.1.
- 2** Remove the back frame as described in Section 4.5-1.
- 3** Remove upender cylinders as described in Section 4.6-1.
- 4** Remove the drive group as described in one of the following service manuals based on nameplate model number and/or serial number:
 - F-Series Fixed & Swing Frame Paper Roll Clamp Service Manual 674512.
 - G-Series Fixed Frame Paper Roll Clamp Service Manual 213744.
 - H-Series Fixed Frame Pivot Arm Paper Roll Clamp Service Manual 6078255.
- 5** If equipped, remove the revolving connection end block support yoke or bracket. For reassembly, tighten the capscrew to 30 ft.-lbs. (40 Nm).



4.12-2 Rotation Bearing Assembly – Removal and Installation (Continued)

- 6 Baseplate Capscrews** – Remove the capscrews fastening the baseplate to the bearing assembly. For reassembly, tighten the capscrews using the following technique:



WARNING: Install short capscrews in counterbored holes only. Use lockwashers if supplied in kit.

- Clean and dry capscrews. Apply Loctite 242 (Blue) to capscrew threads and threaded holes in the faceplate. Threads must be clean and dry for new Loctite to cure properly.
- Tighten using the alternating cross pattern shown to one-half the final torque value shown below.
- Tighten using the alternating cross pattern to the final torque value, then double-torque by backing off one-half turn and immediately retightening to a final torque of:

20H-24H – 66 ft.-lbs. (90 Nm)

25H-33H Socket Capscrews – 80 ft.-lbs. (110 Nm)

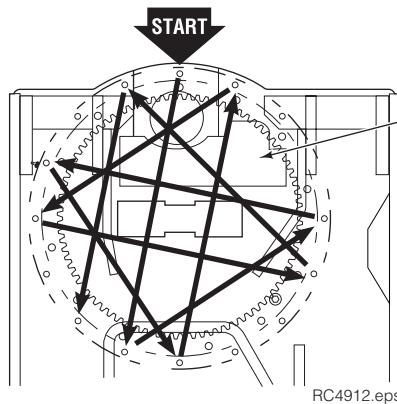
25H-33H Hex Capscrews – 66 ft.-lbs. (90 Nm)

F & G-Series – 75 ft.-lbs. (100 Nm)

CAUTION: Do not reuse old capscrews or washers. Use new hardware kit when installing a new bearing assembly.

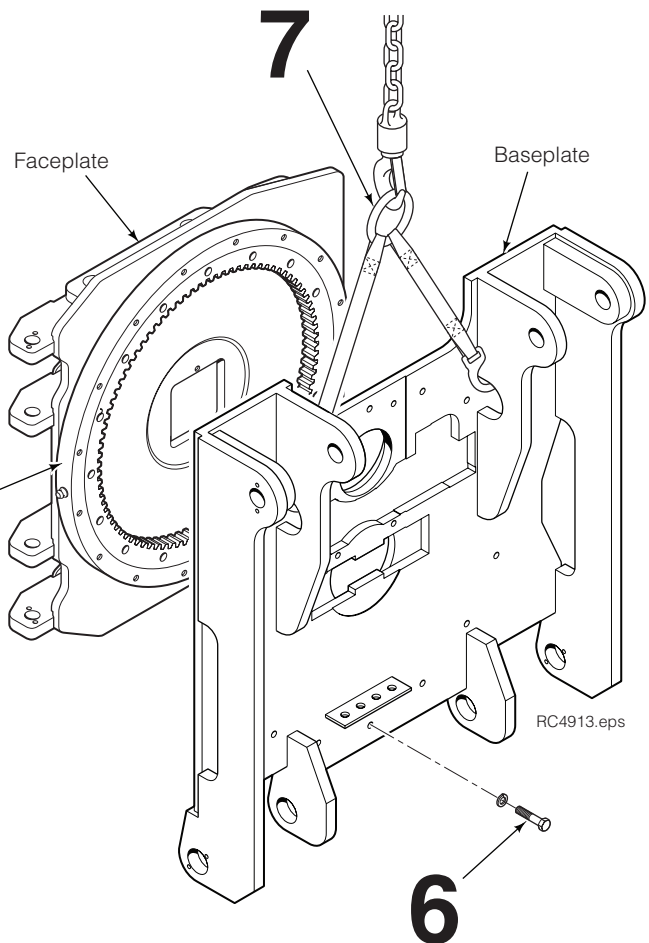


WARNING: Verify that the overhead hoist and chains or straps are rated for the weight of the attachment. Refer to nameplate for attachment weight.



Alternating cross pattern tightening sequence.

Bearing Assembly



- 7** Attach an overhead hoist and lift the baseplate away from the faceplate/bearing assembly. If required, attach two eyebolts to the baseplate to aid with lifting the baseplate away.

4.12-2 Rotation Bearing Assembly – Removal and Installation (Continued)

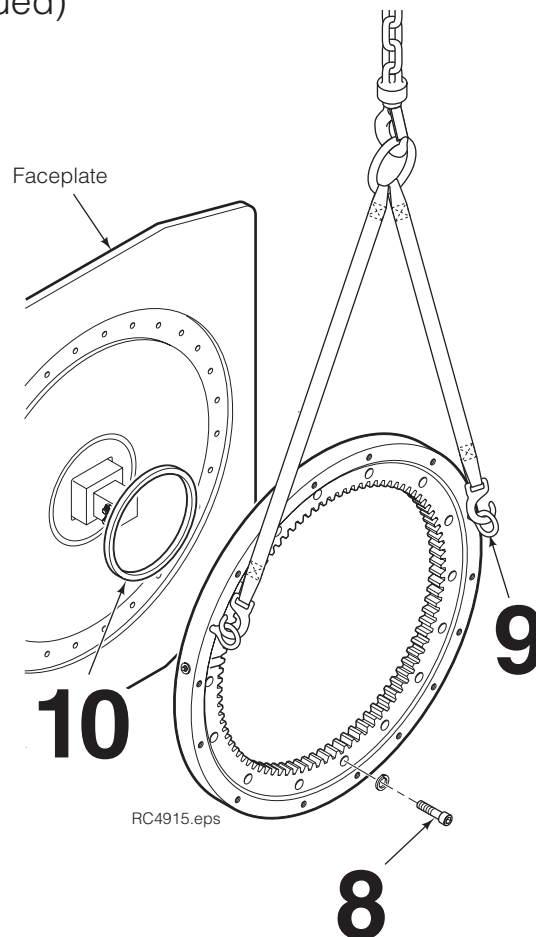
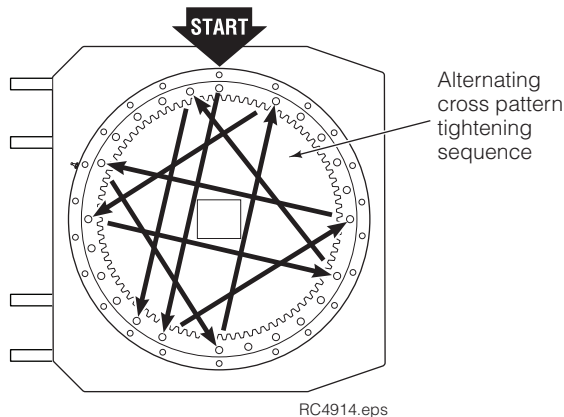
8 Bearing Capscrews – Remove the capscrews fastening the bearing assembly to the faceplate. For reassembly, apply threadlocker and tighten the capscrews using the following technique:

- Clean and dry capscrews. Apply Loctite 242 (Blue) to capscrew threads and threaded holes in the faceplate. Threads must be clean and dry for new Loctite to cure properly.
- Tighten using the alternating cross pattern shown to one-half the final torque value below.
- Tighten using the alternating cross pattern to the final torque value, then double-torque by backing off one-half turn and immediately retightening to a final torque of:

F-Series – 75 ft.-lbs. (100 Nm)

H & G-Series – 80 ft.-lbs. (110 Nm)

CAUTION: Do not reuse old capscrews or washers. Use new hardware kit when installing a new bearing assembly.



9 Attach two eyebolts to the bearing assembly as shown. Attach an overhead hoist and lift the bearing assembly away from the faceplate.

10 If equipped, check the condition of the felt seal for the center hole. Replace if necessary.

11 For reassembly, reverse the above procedures with the following exceptions:

- When installing the rotation bearing assembly on the faceplate, align and position the heat-treated overlap zone 'R' on the ring gear with the outer race grease fitting, as shown:

45F-66F – 34° above horizontal

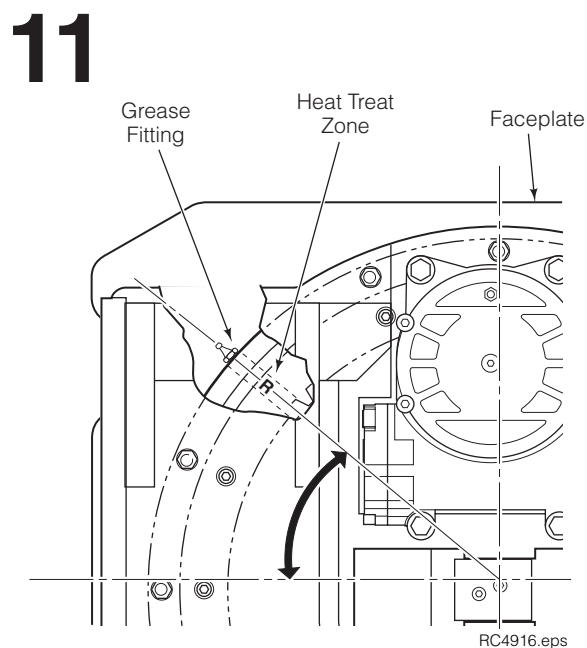
77F-90F – 38° above horizontal

60G – 30° above horizontal

66G-72G – 15° below horizontal

H-Series – 45° above horizontal

- Check the condition of the faceplate center hole seal. Replace if necessary.
- Apply NLGI No. 0 grease to the teeth of the bearing assembly ring gear.
- After remounting the attachment, apply chassis grease to the bearing assembly grease fitting. Rotate the attachment slowly during the procedure.



5.1 Specifications

5.1-1 Hydraulics

Truck Relief Setting

2300 psi (160 bar) Maximum

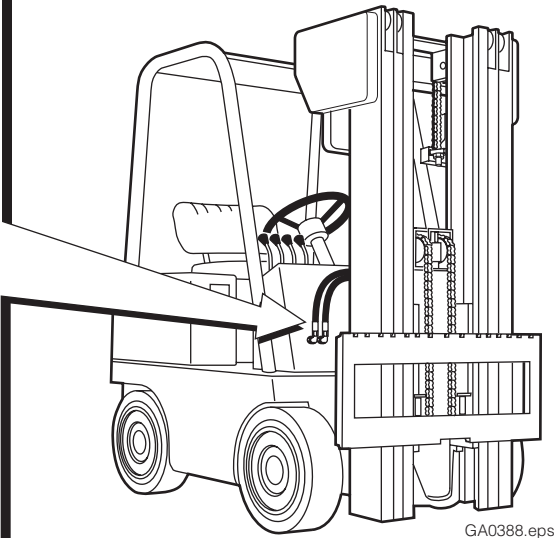
Truck Flow Volume ^①

	Min. ^②	Recommended	Max. ^③
Upending Roll Clamps	5 GPM (18 L/min.)	10 GPM (37 L/min.)	15 GPM (56 L/min.)

- ① Cascade attachments are compatible with SAE 10W petroleum base hydraulic fluid meeting Mil. Spec. MIL-O-5606 or MIL-O-2104B. Use of synthetic or aqueous base hydraulic fluid is not recommended. If fire resistant hydraulic fluid is required, special seals must be used. Contact Cascade.
- ② Flow less than recommended will result in reduced system performance.
- ③ Flow greater than maximum can result in excessive heating, reduced system performance and short hydraulic system life.

Hoses and Fittings

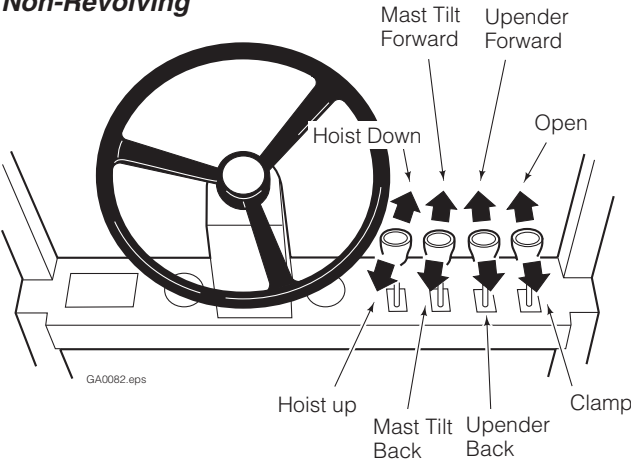
All hoses and fittings must be No. 8 minimum with an orifice size of 13/32 in. (10 mm) minimum.



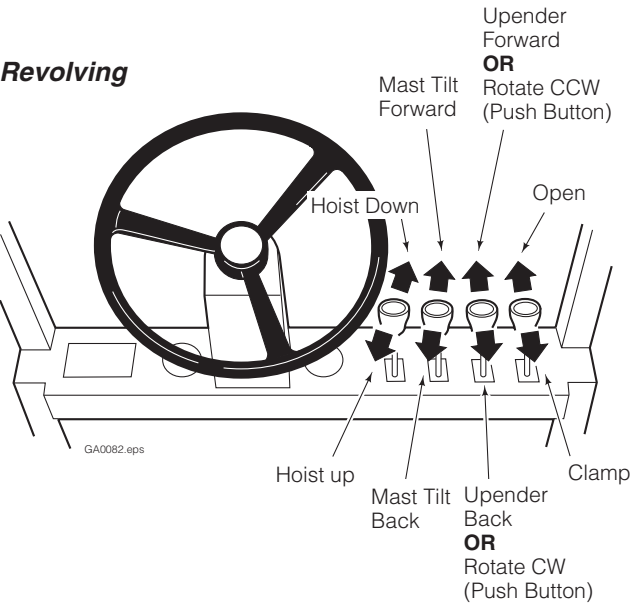
5.1-2 Auxiliary Valve Functions

Check for compliance with ANSI (ISO) standards:


Non-Revolving

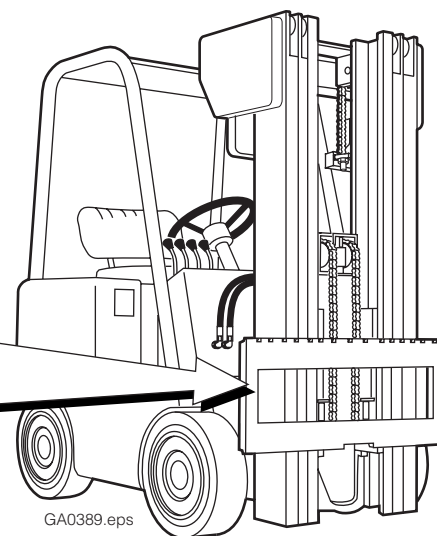


Revolving



5.1-3 Truck Carriage

	Carriage Mount Dimension (A) ITA (ISO)	
	Minimum	Maximum
Class II	14.94 in. (380.0 mm)	15.00 in. (381.0 mm)
Class III	18.68 in. (474.5 mm)	18.74 in. (476.0 mm)
Class IV	23.44 in. (595.5 mm)	23.50 in. (597.0 mm)



5.1-4 Torque Values

Fastener torque values for the upending attachments are shown in the table below in both US and Metric units. All torque values are also called out in each specific service procedure throughout this manual.

NOTE: All fasteners have a torque value range of $\pm 10\%$ of stated value.

NOTE: For additional torque values related roll clamp components, refer to one of the following service manuals based on nameplate model number and/or serial number:

- F-Series Fixed & Swing Frame Paper Roll Clamp Service Manual 674512.
- G-Series Fixed Frame Paper Roll Clamp Service Manual 213744
- H-Series Fixed Frame Pivot Arm Paper Roll Clamp Service Manual 6078255

Manuals are available at www.cascorp.com under the support tab, "Technical Support Manuals" link.

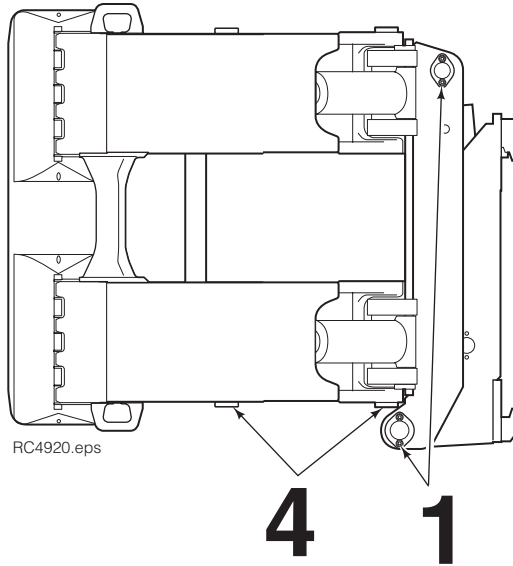
All Attachments

Ref.	Fastener Location		Size	Ft.-lbs.	Nm
1	Uprinder Retainer Capscrews		M8	14	19
			M10	28	38
2	Center Key Capscrews		M16	236	320
3	Valve Capscrews		M6	14	19
			M8	60	80
4	Arm Retainer Capscrews	F-Series	3/8	35	45
		H-Series	M10	28	38
5	Lower Hook Capscrews	F-Series CL II & III	M16	110	150
		60F, 66F, 77F CL IV	M20	200	270
		90F & greater CL IV	M20	265	360
		G & H-Series CL II & III	M16	125	165
		G-Series CL IV	M20	250	340
		H-Series CL IV	M20	265	360

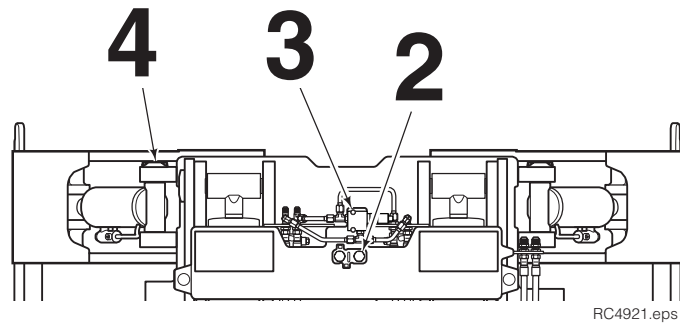
Revolving Attachments Only

Ref.	Fastener Location		Size	Ft.-lbs.	Nm
6	Rotator Drive Capscrews	F & G-Series	M12	75	105
		20H, 22H, 24H ●	M12	48	66
		25H, 30H, 33H ✕	M12	66	90
7	Baseplate Capscrews ■ ▲	F & G-Series	M12	75	100
		20H-24H	M12	80	108
		25H-33H (Socket)	M12	66	90
		25H-33H (Hex)	M12	75	100
8	Bearing Capscrews (Access Plug) ■ ▲	F-Series	M12	75	100
		G & H-Series	M12	80	110

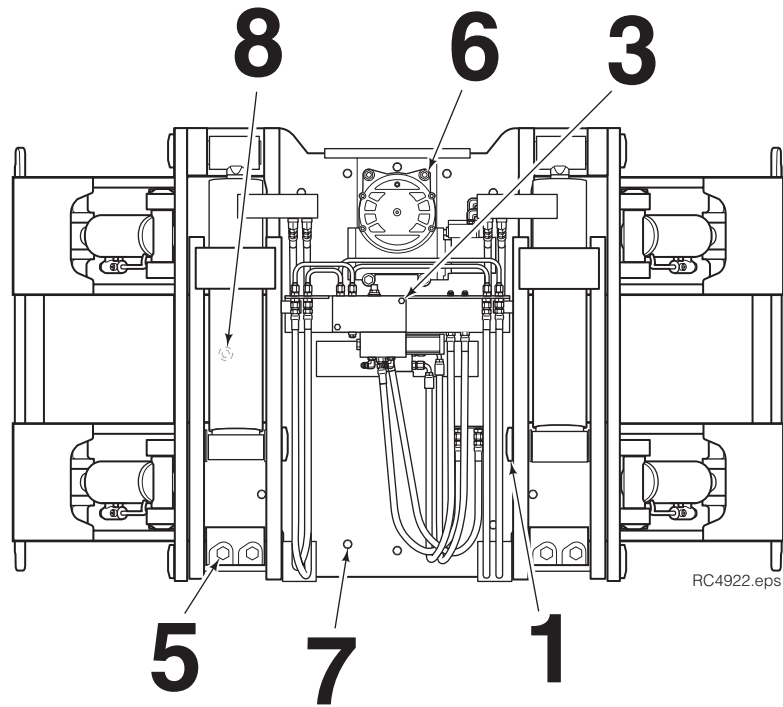
- Use Loctite 271 (Red)
- ✕ Use Loctite 262 (Purple)
- Use Loctite 242 (Blue)
- ▲ Double-Torque (tighten, loosen 1/2 turn, retighten)



Left Side View



Non-Revolving Attachment
Back (Driver's) View



Revolving Attachment
Back (Driver's) View

Do you have questions you need

answered right now? Call your nearest Cascade Service Department.

Visit us online at www.cascorp.com

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