PERIODIC MAINTENANCE

F-Series
Fixed & Swing Frame
Paper Roll Clamps

Manual Number 6045734
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1.1 Introduction

This Manual provides periodic maintenance requirements, troubleshooting procedures and service procedures for the Cascade F-Series Paper Roll Clamps.

In any communication about the Roll Clamp refer to the product I.D. number stamped on the nameplate. If the nameplate is missing, the numbers can be found stamped on the front of the faceplate top or side.

**IMPORTANT:** All hoses, tubes and fittings on F-Series Roll Clamps are JIC.

**NOTE:** Specifications are shown in both U.S. and (Metric) units.

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**Nameplate Locations**

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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 special information that is useful when servicing the attachment.

**WARNING** - A statement preceded by a 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 the 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 the edges of the contact pads for wear or sharp nicks that could damage or tear paper rolls. Grind the edges smooth.
- Check the contact pad pivot joints for wear and replace or repair as necessary. See Section 4.1.
- Lubricate plungers on 180° stop valve (if fitted).
- Check that load-holding hydraulic system is functioning properly. Clamp Force Indicators 831887, 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:

- Tighten baseplate-to-rotation bearing assembly capscrews to 75 ft.-lbs. (105 Nm). See Section 4.5.
- Tighten faceplate-to-rotation bearing assembly capscrews to 75 ft.-lbs. (105 Nm). See Section 4.5.
- Tighten mounting hook capscrews. See torque specs for specific Roll Clamp Models in Section 5.4.
- Tighten rotator drive assembly capscrews to 75 ft.-lbs. (105 Nm).
- Lubricate rotator bearing assembly with wheel bearing grease. Rotate Clamp one full turn during procedure.
- Check rotator drive gearcase lubricant level. Lubricant should be up to bottom of fill plug 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 plug.
- Inspect all arm, frame and cylinder pivot bushings for wear and replace if necessary. See Sections 4.2 and 4.4 for wear limits.
- Inspect all load-bearing structural welds on arms, swing frame pivots, arm pivots and cylinder pivot areas for visual cracks. Replace components as required.

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:

- Inspect all arm and cylinder pivot pins for wear and replace if necessary. See Sections 4.2 and 4.4.
- Perform clamp circuit hydraulic pressure check. See Section 3.3.
3.1 Clamp Function

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

- Clamping roll improperly, or handling rolls that exceed capacity of Clamp. Refer to Operator’s Guide for suggested procedures.
- Low hydraulic pressure or flow from lift truck.
- External leaks.
- Defective solenoid coil or valve (if equipped).
- Worn/defective revolving connection shaft seals, counterbalance valves, cylinder seals or check valves.

3.2 Supply Circuit Test

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

1. 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 Clamp must not exceed 2300 psi (160 bar),** measured at the carriage hose terminal.

2. Check the flow volume at the carriage hose terminal. See Section 5.1 for recommended flow volumes. If the truck pressure and flow are correct, proceed with the Clamp circuit pressure test.

3.3 Clamp Circuit Test

**WARNING:** Before removing hydraulic lines, position both arms at midstroke to relieve cylinder pressure. Turn the truck off and move the truck auxiliary control valves several times in both directions.

1. Check for external leaks at the cylinders and revolving connection.

2. **Long Arm Cylinders** – Install a pressure gauge to each long arm cylinder’s test port. Close the long arm fully and hold the handle in the CLAMP position a few seconds to develop full truck system pressure. Watch the gauge pressure readings.

   **Short Arm Cylinders** – Install a pressure gauge to each short arm cylinder’s gauge port. Rotate the Clamp to the 45-degree position. Close the short arm fully and hold the handle in the CLAMP position a few seconds to develop full truck system pressure. Watch the gauge pressure readings.

   - If one of the gauge pressures drops more than 150 psi (10 bar) initially, and additional drop exceeds 25 psi (2 bar) per minute, the cylinder check valve cartridge or piston seals may be faulty. Continue troubleshooting.
   - If both gauge pressures do not drop more than 150 psi (10 bar) initially, and additional drop does not exceed 25 psi (2 bar) per minute, the problem is not hydraulic. See Section 3.1.

3 Position both arms at midstroke to relieve cylinder pressure. Remove, swap and reinstall the cylinder check valve cartridges.

4 Long Arm Cylinders – Close the long arm fully and hold the handle in the CLAMP position a few seconds to develop full truck system pressure. Watch the gauge pressure readings.

   **Short Arm Cylinders** – Rotate the Roll Clamp to the 45-degree position. Close the short arm fully and hold the handle in the CLAMP position a few seconds to develop full truck system pressure. Watch the gauge pressure readings.

   - If the gauge pressure on the cylinder continues to drop more than 150 psi (10 bar) initially, and additional drop exceeds 25 psi (2 bar) per minute, the cylinder piston seals are faulty.
   - If the gauge pressure on the cylinder does not drop more than 150 psi (10 bar) initially, and additional drop does not exceed 25 psi (2 bar) per minute, the check valve (now in the other cylinder) is faulty and requires replacement.

**WARNING:** Before removing hydraulic lines, position both arms at midstroke to relieve cylinder pressure. Turn the truck off and move the truck auxiliary control valves several times in both directions.
3.4 Swing Circuit Test
(Swing-Frame Clamp Only)

1. Clamp a vertical roll of the approximate weight capacity of the Clamp. Rotate 90 degrees to position the short arm down. Extend the swing cylinder fully to swing the frame upward.
   - If the roll drifts downward, the revolving connection counterbalance valve may require.
   - If the roll does not drift down, continue troubleshooting.

2. Retract the swing cylinder to lower the roll:
   - If the roll drops suddenly, the counterbalance valve requires adjustment.

3. Raise the roll and rotate 180° to position the long arm down. Retract the swing cylinder fully to swing the frame upward.
   - If the roll drifts downward, the revolving connection counterbalance valve may require service.
   - If the roll does not drift down, continue troubleshooting.

4. Extend the swing cylinder to lower the roll:
   - If the roll drops suddenly, the counterbalance valve requires adjustment.
4.1 Contact Pads

1 Rotate the Clamp to the vertical roll handling position. Lower the unit until the contact pads lightly touch the ground.

**NOTE:** If bolt-on pad surfaces are to be replaced, remove and replace at this point. Tighten capscrews to 15 ft.-lbs. (20 Nm).

2 Remove the clevis pins fastening the links to the contact pad.

3 Remove the pipe plug retainers from the contact pad pivot points and drive out the pivot pins.

4 Remove the contact pad. Links can be removed from the arm by rotating 90 degrees and pulling out.

5 For reassembly, reverse the above procedures with the following exceptions:
   - Inspect the arm tips and pivot pins for wear and repair/replace as necessary.

4.2 Cylinder Bushing Service

**NOTE:** Bushings require replacement if bushing-to-pin clearance exceeds 1/16 in. (1.6 mm).

1 Remove the cylinder from the Clamp.

2 Remove the bushings from the cylinder using a bushing driver. **NOTE:** Bushing drivers can be machined using the dimensions shown below.

3 Install new bushings in the cylinder.

**CAUTION:** Bushings may be damaged if installed without a proper bushing driver.

### Bushing Driver Dimensions

<table>
<thead>
<tr>
<th>A Bearing I.D.</th>
<th>B Driver O.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td>45F</td>
<td>1.11 in. (28.2 mm) 1.36 in. (34.5 mm)</td>
</tr>
<tr>
<td>60F, 66F</td>
<td>1.23 in. (31.2 mm) 1.48 in. (37.6 mm)</td>
</tr>
<tr>
<td>77F, 90F and larger</td>
<td>1.23 in. (31.2 mm) 1.48 in. (37.6 mm)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>B 1.5 in. (38 mm)</th>
<th>A 7 in. (178 mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>A</td>
</tr>
</tbody>
</table>

RC0312.ill

RC0362.ill

RC034.ill
4.3 Swing Frame Service

1. Rotate the Clamp to the vertical roll handling position.
2. Remove the arms from the Clamp.
3. Remove the clamp and swing cylinders.
4. Remove the pin connecting the swing casting and rollers to the swing frames. For reassembly, tighten the retainer capscrews to 35 ft.-lbs. (45 Nm).
5. Remove the swing frame pivot pins and spacers (see note below). Note the location and quantity of shims removed. For reassembly, tighten the retainer capscrews to 35 ft.-lbs. (45 Nm).

**NOTE:** It is recommended that all Clamps be equipped with spacers at the swing frame pivot points as shown. Kits listed below include spacers for the swing frame, arms and cylinder base pivots:

<table>
<thead>
<tr>
<th>Clamp Model</th>
<th>Spacer Kit</th>
</tr>
</thead>
<tbody>
<tr>
<td>45F</td>
<td>681774</td>
</tr>
<tr>
<td>60F, 66F</td>
<td>681775</td>
</tr>
<tr>
<td>77F, 90F, 100F and larger</td>
<td>681776</td>
</tr>
</tbody>
</table>

6. For reassembly, reverse the above procedures.

4.4 Frame Bushing Service

**NOTE:** Bushings require replacement if bushing-to-pin clearance exceeds 1/16 in. (1.6 mm).

1. **Swing Frame Clamps** – Remove the swing frames from the faceplate.
2. **Fixed Frame Clamps** – Remove the arms from the Clamp.
3. Remove the bushings from the frames using a bushing driver. **NOTE:** Bushing drivers can be machined using the dimensions shown in the chart below.
4. Install new bushings in the frames (see chart below).

**CAUTION:** Bushings may be damaged if installed without a proper bushing driver.

### Bushing Driver Dimensions

<table>
<thead>
<tr>
<th>A</th>
<th>Bushing I.D.</th>
<th>B</th>
<th>Driver O.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Bushing ①</td>
<td>Bushing ②</td>
<td>Bushing ①</td>
</tr>
<tr>
<td>45F</td>
<td>1.23 in. (31.2 mm)</td>
<td>1.11 in. (28.2 mm)</td>
<td>1.48 in. (37.6 mm)</td>
</tr>
<tr>
<td>60F, 66F</td>
<td>1.48 in. (37.6 mm)</td>
<td>1.23 in. (31.2 mm)</td>
<td>1.73 in. (43.9 mm)</td>
</tr>
<tr>
<td>77F, 90F, 100F and larger</td>
<td>1.73 in. (43.9 mm)</td>
<td>1.23 in. (31.2 mm)</td>
<td>1.98 in. (50.3 in.)</td>
</tr>
</tbody>
</table>

6. For reassembly, reverse the above procedures.
4.5 Rotate Bearing Assembly – Removal and Installation

1. Remove the Clamp from the lift truck.
2. Remove the drive group.
3. Remove the upper mounting hooks. For reassembly, tighten the capscrews as follows:
   - 45F – 110 ft.-lbs. (150 Nm).
   - 60F, 66F, 77F, CLIII – 110 ft.-lbs. (150 Nm).
   - 90F, 100F, 120F – 260 ft.-lbs. (360 Nm).

4. 45F Clamps – Remove the revolving connection keeper bracket. For reassembly, tighten the capscrews to 8 ft.-lbs. (10 Nm).

5. Remove the capscrews fastening the baseplate to the bearing assembly. For reassembly, tighten the capscrews using the following technique:
   A) Tighten using the alternating cross-pattern shown to 35 ft.-lbs. (50 Nm).
   B) Tighten to the final torque of 75 ft.-lbs. (100 Nm) using the alternating cross-pattern, then double-torque by backing off 1/2 turn and immediately retightening to 75 ft.-lbs. (100 Nm).

CAUTION: Do not reuse the old capscrews. Use the new capscrews supplied with the kit when installing a new bearing assembly.

WARNING: Make sure the hoist used to remove the baseplate has a rated capacity of at least 1000 lbs. (450 kg).

NOTE: If Clamp is equipped with a center lower mounting spacer, it must be removed to gain access to the rotation bearing capscrews. For reassembly, tighten the capscrews to:
   - 60F, 66F, 77F – 15 ft.-lbs. (20 Nm).
   - 90F, 100F, 120F – 30 ft.-lbs. (40 Nm).

6. Attach two eyebolts to the baseplate. Attach an overhead hoist and lift the baseplate away from the faceplate/bearing assembly.
4.5 Rotation Bearing Assembly – Removal and Installation (Continued)

7 Remove the capscrews fastening the bearing assembly to the faceplate. For reassembly, tighten the capscrews using the following technique:

A) Apply Loctite 242 (blue) and tighten using the alternating cross-pattern shown to 35 ft.-lbs. (50 Nm).

B) Tighten to the final torque of 75 ft.-lbs. (105 Nm) using the alternating cross-pattern, then double-torque by backing off 1/2 turn and immediately retightening to 75 ft.-lbs. (105 Nm).

CAUTION: Do not reuse the old capscrews. Use the new capscrews supplied with the kit when installing a new bearing assembly.

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

9 Check the condition of the felt seal for the center hole. Replace if necessary.

10 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, 60F, 66F – 34 degrees above horizontal.
  - 77F, 90F, 100F, 120F – 38 degrees above horizontal.
- Apply NLGI No. 0 grease to the teeth of the bearing assembly ring gear.
- After remounting the Clamp, apply chassis grease to the bearing assembly grease fitting. Rotate the Clamp slowly during the procedure.
5.1 Hydraulics

**Truck Relief Setting**

2000 psi (140 bar) Recommended  
2300 psi (160 bar) Maximum

**Truck Flow Volume**

<table>
<thead>
<tr>
<th></th>
<th>Min.</th>
<th>Recommended</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>45F, 60F, 66F</td>
<td>5 GPM (18 L/min.)</td>
<td>10 GPM (37 L/min.)</td>
<td>15 GPM (56 L/min.)</td>
</tr>
<tr>
<td>77F, 90F, 100F, 120F</td>
<td>10 GPM (37 L/min.)</td>
<td>15 GPM (56 L/min.)</td>
<td>20 GPM (75 L/min.)</td>
</tr>
<tr>
<td>130F, 150F, 160F</td>
<td>15 GPM (56 L/min.)</td>
<td>20 GPM (75 L/min.)</td>
<td>25 GPM (95 L/min.)</td>
</tr>
</tbody>
</table>

① Cascade Roll Clamps are compatible with SAE 10W petroleum base hydraulic fluid meeting Mil. Spec. MIL-0-5606 or MIL-0-2104B. 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 a rotate speed less than 2 RPM.  
③ Flow greater than maximum can result in excessive heating, reduced system performance and short hydraulic system life.

**Hoses and Fittings**

45F – No. 6, 9/32 in. (7 mm) minimum I.D.  
60F and up – No. 8, 13/32 in. (10 mm) minimum I.D.

5.2 Auxiliary Valve Functions

Check for compliance with ITA (ISO) standards:

- **Hoist up**  
- **Hoist down**  
- **Tilt forward**  
- **Tilt back**  
- **Rotate CCW (Swing Extend)**  
- **Rotate CW (Swing Retract)**  
- **Release**  
- **Clamp**

5.3 Truck Carriage

**Carriage Mount Dimension (A) ITA (ISO)**

<table>
<thead>
<tr>
<th></th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class II</td>
<td>14.94 in. (380.0 mm)</td>
<td>15.00 in. (381.0 mm)</td>
</tr>
<tr>
<td>Class III</td>
<td>18.68 in. (474.5 mm)</td>
<td>18.74 in. (476.0 mm)</td>
</tr>
<tr>
<td>Class IV</td>
<td>23.44 in. (595.5 mm)</td>
<td>23.50 in. (597.0 mm)</td>
</tr>
</tbody>
</table>
### Torque Values

Fastener torque values for the F-Series Roll Clamp are shown in the table below in both U.S. and Metric units. All torque values are also called out in each specific service procedure throughout the Manual.

<table>
<thead>
<tr>
<th>Ref.</th>
<th>Fastener</th>
<th>Size</th>
<th>Ft.-lbs.</th>
<th>Nm</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Upper hook-to-baseplate (8)</td>
<td>5/8 (M16)</td>
<td>110</td>
<td>150</td>
</tr>
<tr>
<td></td>
<td>Lower hook-to-baseplate (4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Spacer, lower hook (4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Index block-to-baseplate (4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Bearing assy.-to-faceplate (24)</td>
<td>1/2 (M12)</td>
<td>75</td>
<td>105</td>
</tr>
<tr>
<td></td>
<td>Baseplate-to-bearing assy. (24)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Rotator drive-to-baseplate (4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Index block-to-baseplate (2)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Rotator drive cover plate (4)</td>
<td>5/16 (M8)</td>
<td>15</td>
<td>20</td>
</tr>
<tr>
<td>4</td>
<td>Upper &amp; lower hook-to-baseplate (8)</td>
<td>3/4 (M20)</td>
<td>195</td>
<td>265</td>
</tr>
<tr>
<td>5</td>
<td>Valve-to-rotator motor (4)</td>
<td>5/16 (M8)</td>
<td>20</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>Swing Cylinder Pin</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Rotator motor-to-drive box (4)</td>
<td>3/8 (M10)</td>
<td>40</td>
<td>50</td>
</tr>
<tr>
<td>7</td>
<td>Rotator drive end plate (4)</td>
<td>7/16 (M12)</td>
<td>60</td>
<td>80</td>
</tr>
<tr>
<td>8</td>
<td>Shaft end block bracket (4)</td>
<td>3/8 (M10)</td>
<td>8</td>
<td>10</td>
</tr>
<tr>
<td>9</td>
<td>180° stop valve-to-baseplate (4)</td>
<td>3/8 (M10)</td>
<td>35</td>
<td>45</td>
</tr>
<tr>
<td>10</td>
<td>Pivot pin retainers (12)</td>
<td>3/8 (M10)</td>
<td>35</td>
<td>45</td>
</tr>
<tr>
<td>11</td>
<td>Spacer, lower hook (4)</td>
<td>5/8 (M16)</td>
<td>70</td>
<td>95</td>
</tr>
<tr>
<td>12</td>
<td>Upper &amp; lower hook-to-baseplate (12)</td>
<td>M20</td>
<td>260</td>
<td>360</td>
</tr>
<tr>
<td>13</td>
<td>Index block-to-baseplate (2)</td>
<td>3/8 (M10)</td>
<td>15</td>
<td>20</td>
</tr>
<tr>
<td>14</td>
<td>End block-to-shaft (2 or 3)</td>
<td>3/8 (M10)</td>
<td>15</td>
<td>20</td>
</tr>
<tr>
<td>15</td>
<td>Index block-to-baseplate (2)</td>
<td>M20</td>
<td>30</td>
<td>40</td>
</tr>
</tbody>
</table>

- ■ Use Loctite 242 (Blue)
- ▲ Double-torque (tighten, loosen 1/2-turn, retighten)
- ✗ Use Loctite 271 (Red)

**NOTE:** All lower hooks shown as 0-degree mounting.
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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