

SERVICE MANUAL

J-Series

***Carton Clamps
(includes White Goods Clamps)***

Manual Number 6883648

**cascade[®]
corporation**

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C ONTENTS

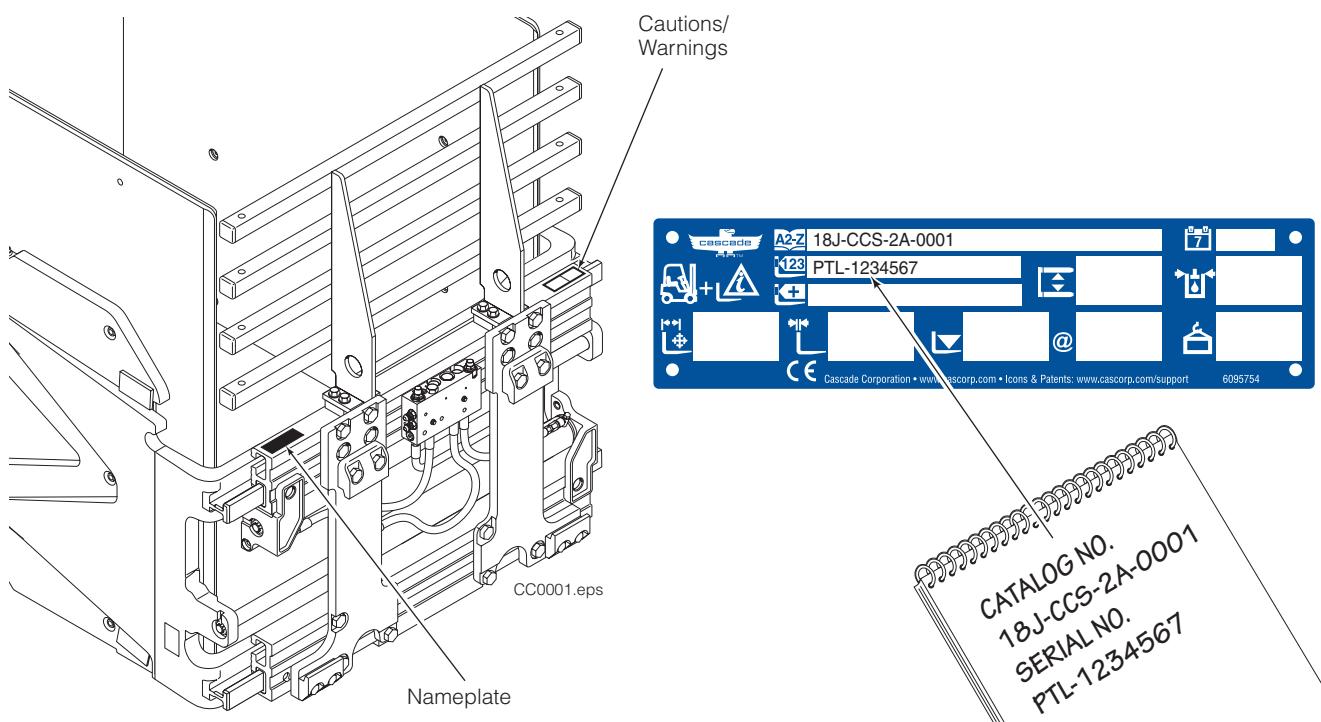
	Page
INTRODUCTION, Section 1	
Introduction	1
Special Definitions	1
PERIODIC MAINTENANCE, Section 2	
100-Hour Maintenance	2
500-Hour Maintenance	2
1000-Hour Maintenance	3
4000-Hour Maintenance	3
Attachments with External Sideshift	4
500-Hour Maintenance	4
1000-Hour Maintenance	4
TROUBLESHOOTING, Section 3	
General Procedures	5
Truck System Requirements	5
Tools Required	5
Troubleshooting Chart	6
Carton Clamp Loads	7
Plumbing	9
Hosing Diagram	9
Hydraulic Circuit	10
Hosing Diagram – External Sideshift Equipped	11
Hydraulic Circuit – External Sideshift Equipped	12
Clamp Function	13
Supply Circuit Test	13
Clamp Circuit Test	13
Sideshift Function	15
Supply Circuit Test	15
Internal Sideshift Circuit Test	16
External Sideshift Circuit Test	17
Electrical Circuit	18
SERVICE, Section 4	
Attachment Removal	19
Arms	20
Arm Assemblies – Removal and Installation	20
Carton Clamp Arm Contact Pad – Replacement or Rotation	21
SERVICE, Section 4 (Continued)	
Arms (Continued)	—
Carton Clamp Arm Contact Pad and Stabilizer Repair	22
Standard (Shimmed) Design – Contact Pad Camber Adjustment	24
Flexible (ADJUSTA-BLOCK) Design – Contact Pad Camber Adjustment	26
Arm Bearings – Removal and Installation	28
Valve	29
Valve Removal and Installation	29
Valve Service	30
Relief Adjustments	34
Clamp Cylinder	36
Cylinder Removal and Installation	36
Cylinder Disassembly	37
Cylinder Inspection	37
Cylinder Reassembly	38
External Sideshift Cylinder – Servicing on the Attachment	39
Cylinder Disassembly and Inspection	39
Cylinder Reassembly	40
Base Unit	41
Frames and Mounting Plates – Disassembly and Reassembly	41
External Sideshift Group – Removal and Replacement	44
Solenoid Valve	45
Coil Service	45
Valve Service	45
SPECIFICATIONS, Section 5	
Specifications	46
Hydraulics	46
Auxiliary Valve Functions	46
Truck Carriage	47
Torque Values	48

1.1 Introduction

This manual provides the Periodic Maintenance, Troubleshooting, Service and Specifications for Cascade J-Series Carton Clamps.

In any communication about the attachment, refer to the product catalog and serial numbers stamped on the nameplate. If the nameplate is missing, the numbers can be found stamped on the frame where the plate was mounted.

IMPORTANT: Tubing connection and supply fitting types vary depending on end-user. Specifications are shown in US and (metric) units. All fasteners have a torque value range of $\pm 10\%$ of stated value.



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 the 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.

—P ERIODIC MAINTENANCE



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

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 supply hoses and hydraulic leaks.
- Inspect the cylinder rod anchor joint for lubrication and correct hold. Anchor joint operates with a loose clearance and requires no lubrication.
- Check for equal movement of arms.
- Check decals and nameplate for legibility.

2.2 500-Hour Maintenance

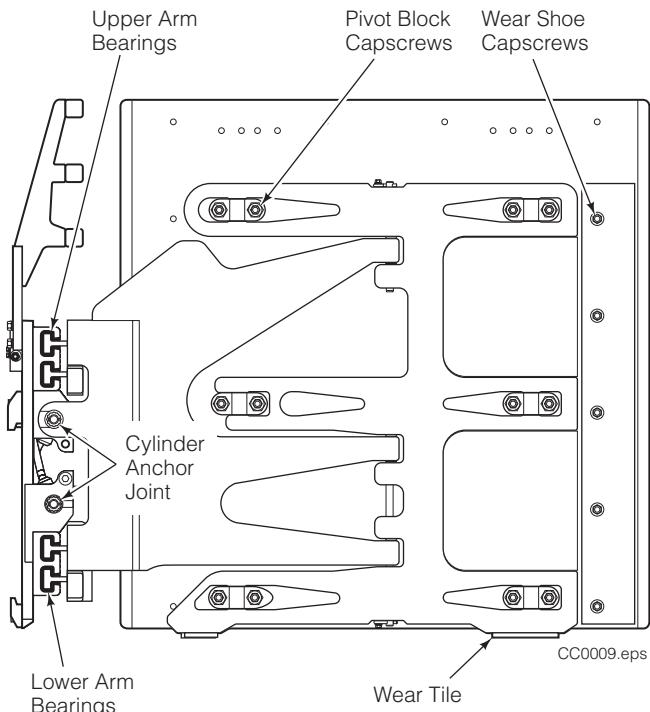
After each 500 hours of truck operation, in addition to the 100-hour maintenance, perform the following procedures:

- Inspect arm bearings for wear or damage. If bearings are worn in any area to less than 0.06 in. (1.5 mm) thickness, replace bearings.
- Check lower mounting hooks for engagement clearance:

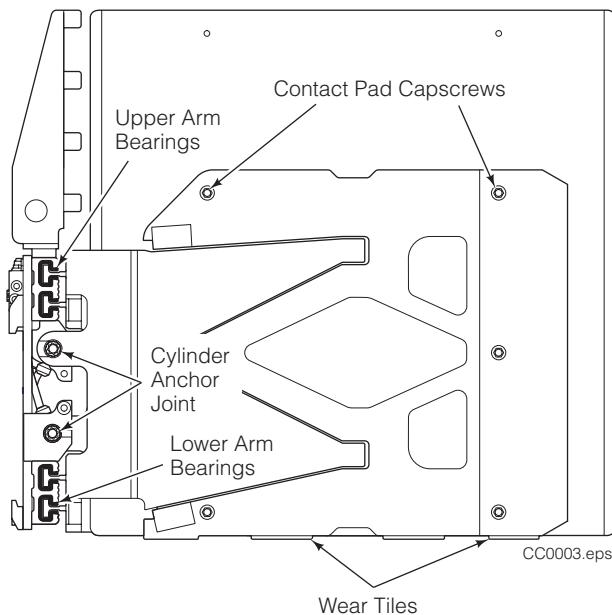
Quick-Change Hooks – 0.20 in. (5 mm) maximum
Bolt-on Hooks – Tight against lower carriage bar

If adjustment is necessary, refer to Installation Instructions 6871082, Step 6.

- Tighten lower hook capscrews:
Bolt-on Hooks, CL II/III – 120 ft.-lbs. (165 Nm)
Quick-Change Hooks, CL II/III – 165 ft.-lbs.
(225 Nm)
- Inspect stabilizer wear tiles for wear and damage. Replace or repair, as needed.



**Flexible (ADJUSTA-BLOCK) Design
RH Side**



**Standard (Shimmed) Design
RH Side**

2.3 1000-Hour Maintenance

After each 1000 hours of truck operation, in addition to the 100 and 500-hour maintenance, perform the following procedures:

- Tighten accessible mounting capscrews. Double-torque capscrews by tightening to the final torque value (shown below), loosen 1/2 turn, then retighten.

8J-22J – 200 ft.-lbs. (270 Nm)

26J – 384 ft.-lbs. (520 Nm)

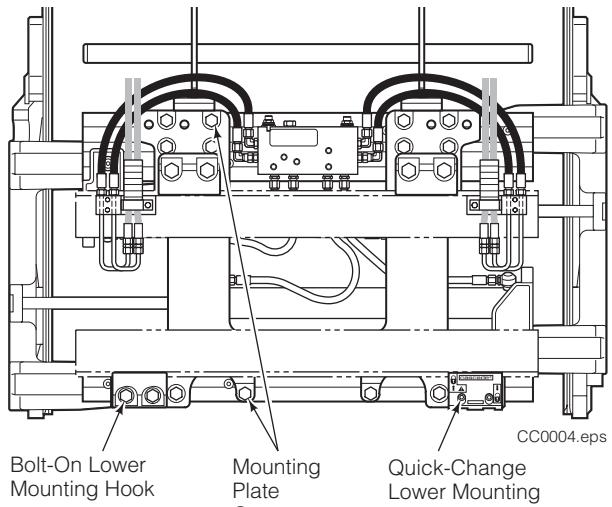
IMPORTANT: If any capscrews are found loose, remove attachment from truck and check all mounting capscrews for proper torque values.

- Tighten contact pad capscrews to:

Standard (Shimmed) Design – 48 ft.-lbs. (65 Nm)

Flexible (ADJUSTA-BLOCK) Design – 66 ft.-lbs.

(90 Nm)



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

2.4 4000-Hour Maintenance

After each 4000 hours of truck operation, in addition to the 100, 500 and 1000-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.

2.5 Attachments with External Sideshift

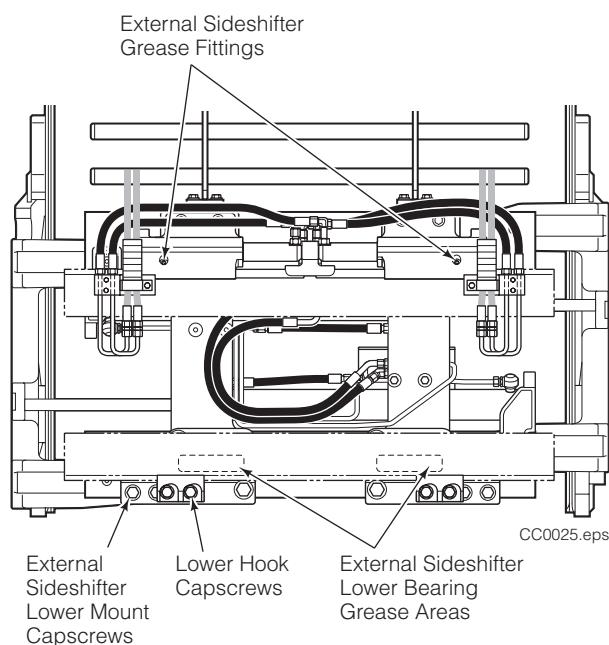
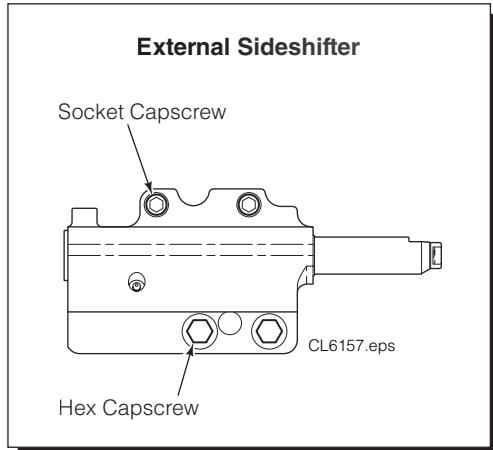
For attachments equipped with external sideshift, perform these additional periodic maintenance procedures.

2.5-1 500-Hour Maintenance

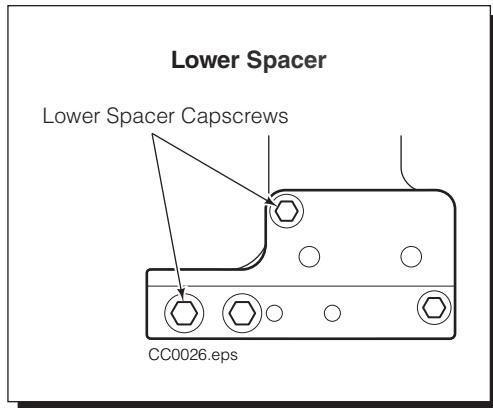
- Inspect external sideshifter bearings for wear or damage. If upper bearings are worn to less than 0.06 in. (1.5 mm) thickness, replace bearings. If lower bearings are worn to less than 0.06 in. (1.5 mm) exposed thickness, replace bearings.
- Apply general-purpose chassis grease to external sideshifter upper bearing grease fittings and lower bearing areas.
- Check lower mounting hooks for engagement clearance of 0.06 to 0.2 in. (1.5 to 5 mm).

2.5-2 1000-Hour Maintenance

- Tighten external sideshift cylinder mounting capscrews:
Socket Capscrew (Upper) – 210 ft.-lbs. (285 Nm)
Hex Capscrew (Lower) – 173 ft.-lbs. (235 Nm)
- IMPORTANT:** If any capscrews are found loose, remove attachment from truck and check all sideshifter mount capscrews for proper torque values.
- Tighten lower spacer capscrews. Double-torque capscrews by tightening to final torque of 200 ft.-lbs. (270 Nm), loosen 1/2 turn, then retighten.



Attachments with External Sideshift
Back (Driver's View)



TROUBLESHOOTING

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:**

Low Pressure

2740 psi (189 bar)

High Pressure

3625 psi (250 bar)

- Truck hydraulic flow should be within the range shown in Specifications, Section 5.1.
- Hydraulic fluid supplied to the attachment must meet the requirements shown in Specifications, Section 5.1.

3.1-2 Tools Required

In addition to a normal selection of mechanic's hand tools, the following are required:

- In-line Flow Meter Kit:
 - 10 GPM (37 L/min) – Cascade Part No. 671476
OR
 - 20 GPM (75 L/min) – Cascade Part No. 671477
- Pressure Gauge Kit:
 - 5000 psi (345 bar) – Cascade Part No. 671212
- Arm Bearing Retainer Tool – Cascade Part No. 6042633
- Assorted fittings, hoses, and quick-disconnect couplers as required.

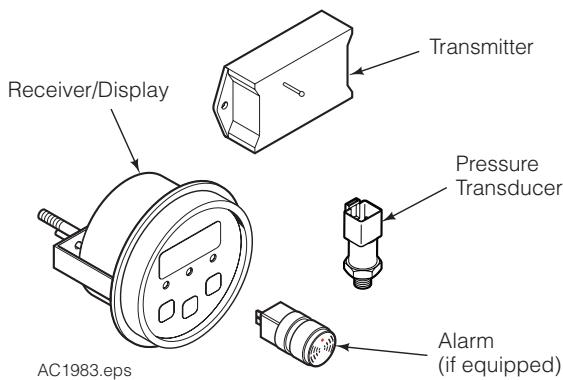
Wireless Pressure Monitor Kits (with One Pressure Transducer)

6803614 – 12V Kit

6815672 – 12V Kit, includes alarm

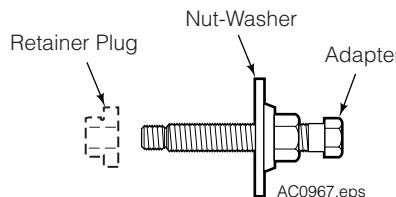
6803617 – 24V-48V Kit

6815675 – 24V-48V Kit, includes alarm



Arm Bearing Retainer Removal/Installation Tool:

6042633



6883648



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.

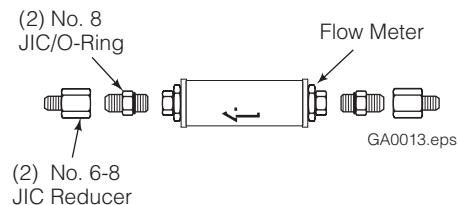
After completing any service procedure, test the attachment through several cycles. First test the attachment empty to bleed any air trapped in the system to the truck tank. Then test the attachment with a load to be sure it operates correctly before returning to the job.

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 Kits:

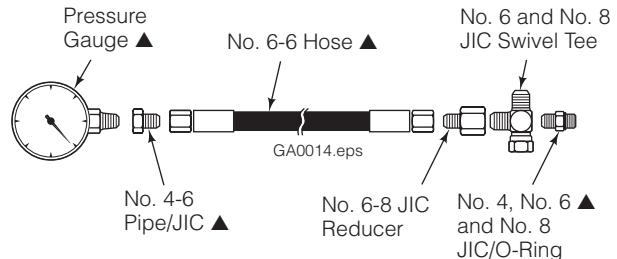
671476 – 10 GPM (37 L/min)

671477 – 20 GPM (75 L/min)



Pressure Gauge Kit:

671212



Quick-Disconnect Couplers

Male Straight Thread O-Ring Coupler:

No. 4 (Part No. 212282) ▲

No. 5 (Part No. 210378)

No. 6 (Part No. 678592)



Female JIC Thread Coupler:

No. 4 (Part No. 210385) ▲ AC0127.eps

No. 6 (Part No. 678591)

▲ NOTE: Diagnostics Kit 394382 includes items marked.

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. Guidelines below and on the following pages can then be used as a starting point to begin troubleshooting.

Clamp Circuit

- Attachment drops load after it has been picked up.
- Attachment will not carry load up to its rated capacity.
- Attachment arms have uneven travel.
- Attachment arms travel slowly.
- Attachment arms will not move.

To correct these problems, see Section 3.3.

Sideshift Circuit

- Attachment drops load while sideshifting.
- Attachment drops load at end of sideshift stroke.
- Attachment sideshifts left and right at different speeds.
- Attachment will not sideshift.

To correct these problems, see Section 3.4.

Carton Clamp Loads

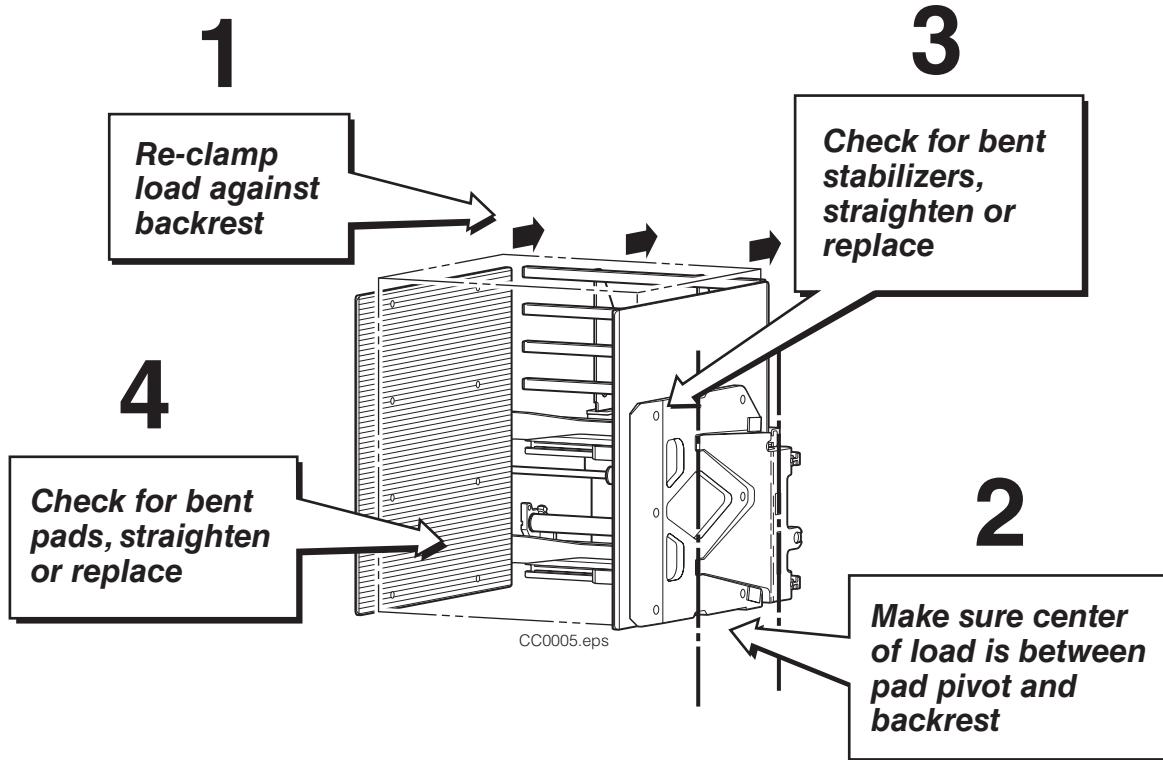
- Front stack of load tilts out.
- Lower tier of load bridges down or slides out.
- Lower tier of load is creased.

To correct these problems, see Section 3.1-4.

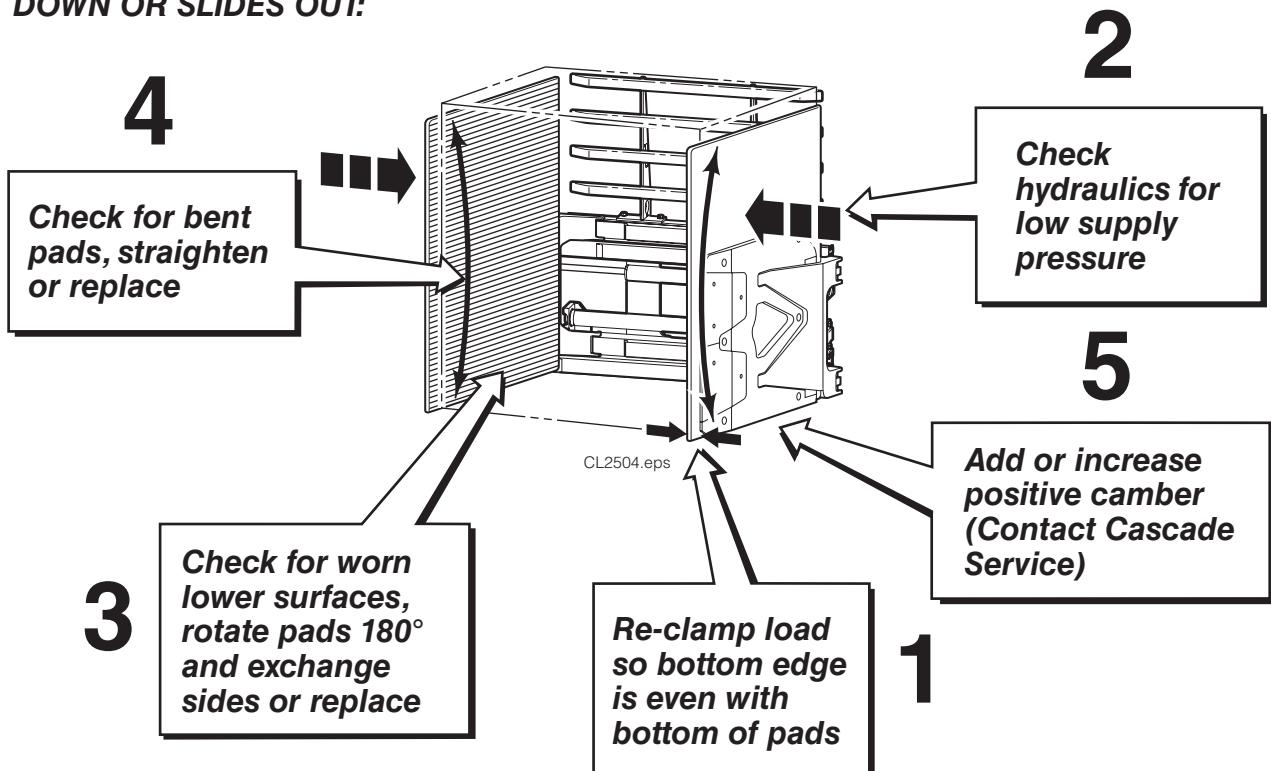
TROUBLESHOOTING

3.1-4 Carton Clamp Loads

IF FRONT STACK OF LOAD TILTS OUT:



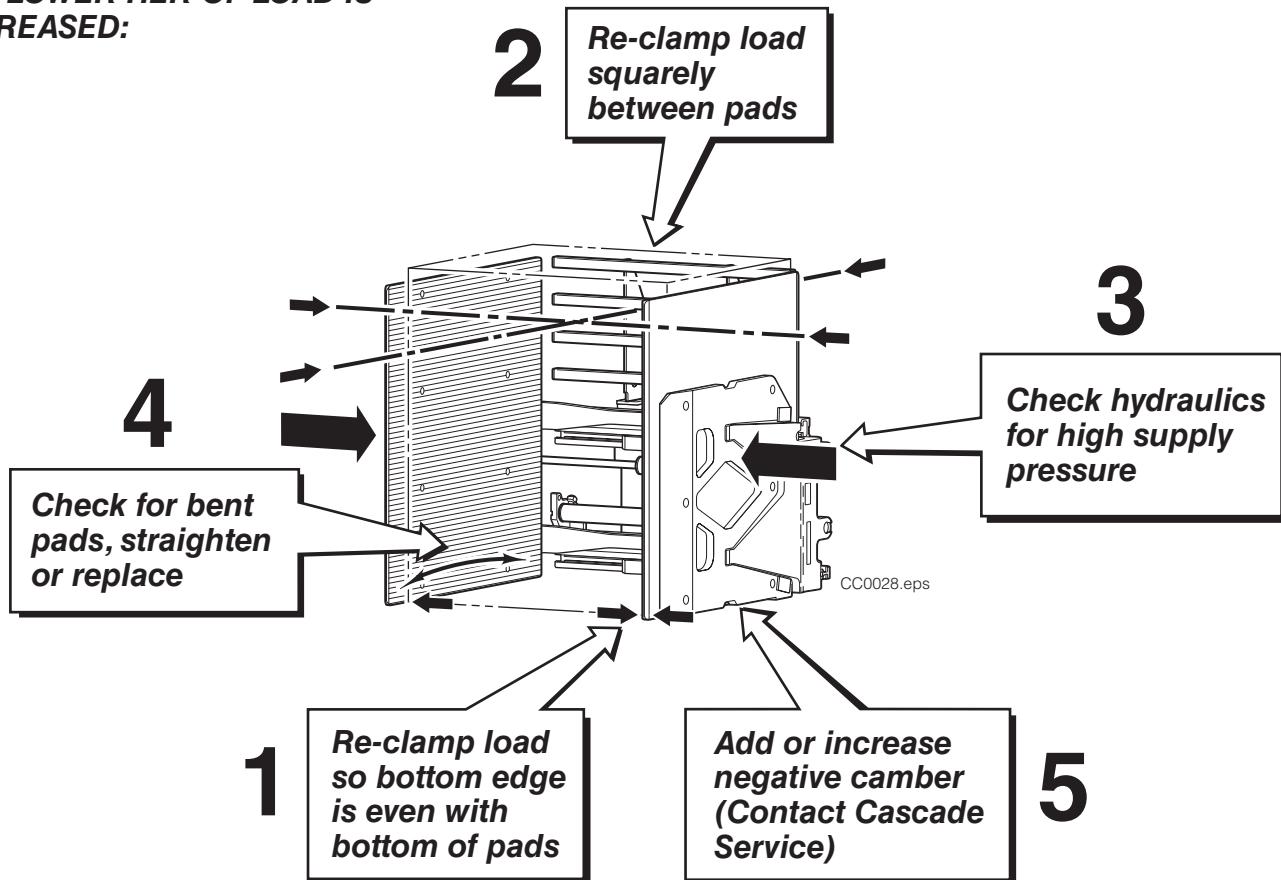
IF LOWER TIER OF LOAD BRIDGES DOWN OR SLIDES OUT:



TROUBLESHOOTING

3.1-4 Carton Clamp Loads (continued)

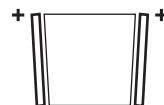
**IF LOWER TIER OF LOAD IS
CREASED:**



TYPICAL PAD CAMBER FOR HANDLING CARTON CASE LOADS

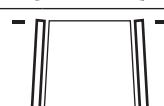
CANNED / BOTTLED / DENSE CASE GOODS

Neutral-to-positive



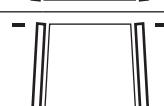
SOFT CASE GOODS

Neutral-to-Negative



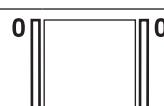
APPLIANCE / LARGE CASE GOODS

Neutral-to-Negative



UNKNOWN LOADS

Start with neutral, look for creases and adjust camber as required



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TROUBLESHOOTING

3.2 Plumbing

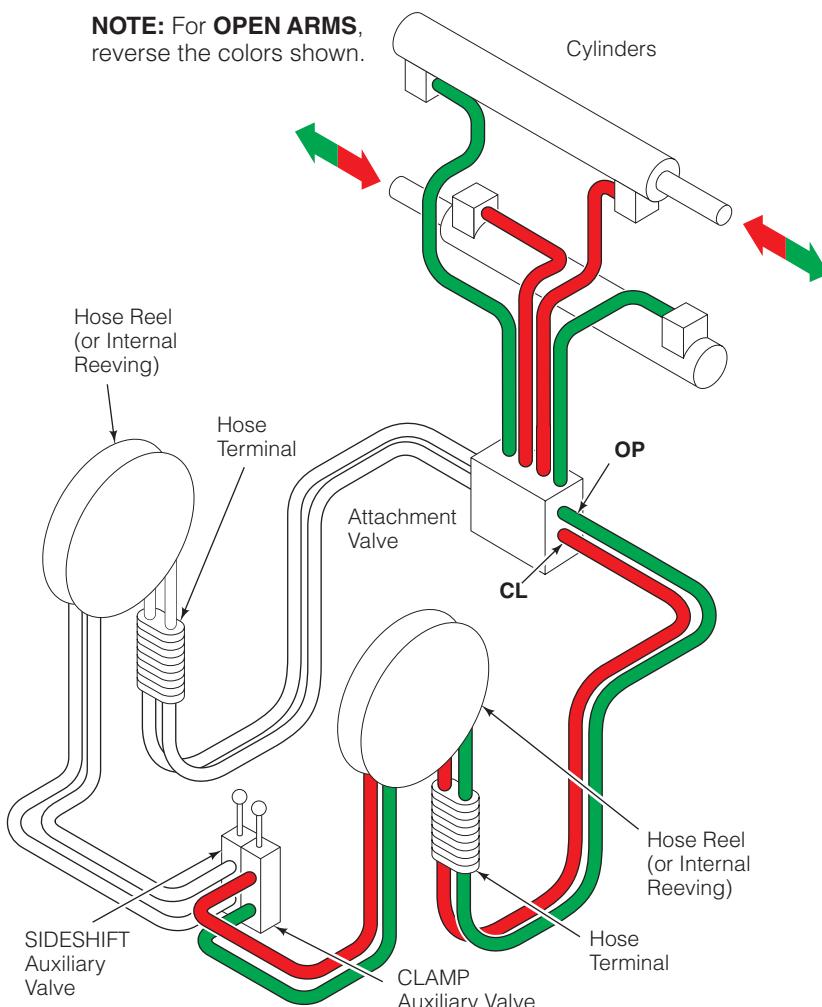
3.2-1 Hosing Diagram

CLAMP CIRCUIT

CLAMP ARMS

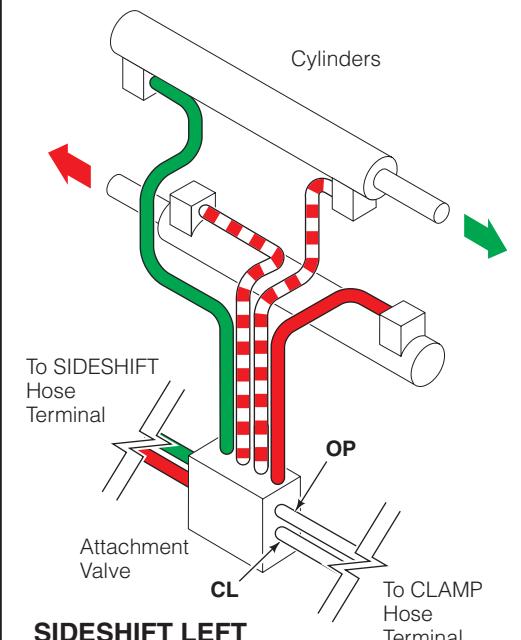
PRESSURE
RETURN

NOTE: For **OPEN ARMS**, reverse the colors shown.



CC0035.eps

SIDESHIFT CIRCUIT (if equipped)

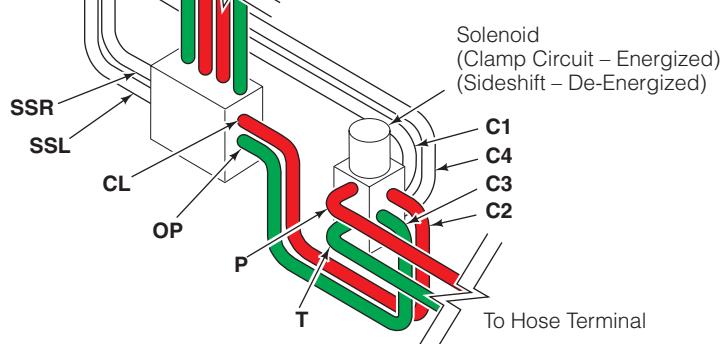


SIDESHIFT LEFT

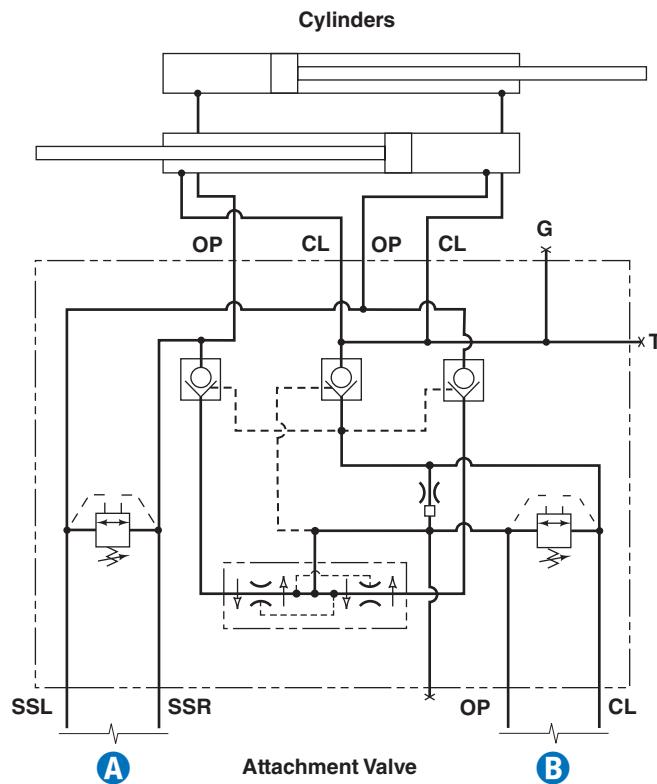
PRESSURE
RETURN
SLAVE

NOTE: For **SIDESHIFT RIGHT**, reverse the colors shown.

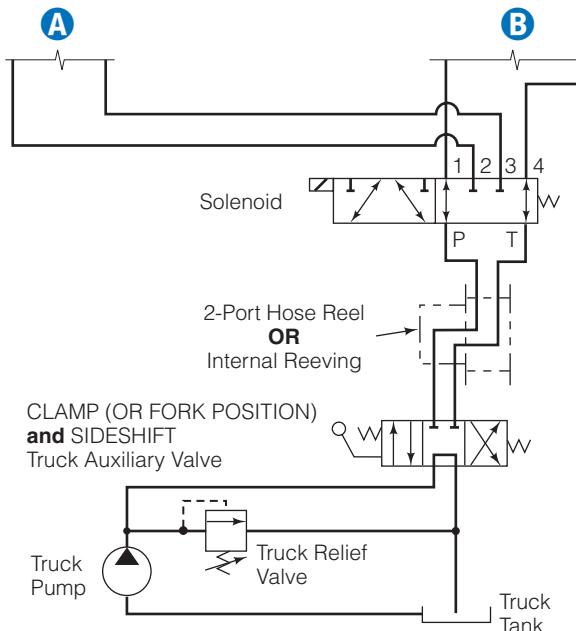
CLAMP CIRCUIT, SOLENOID EQUIPPED



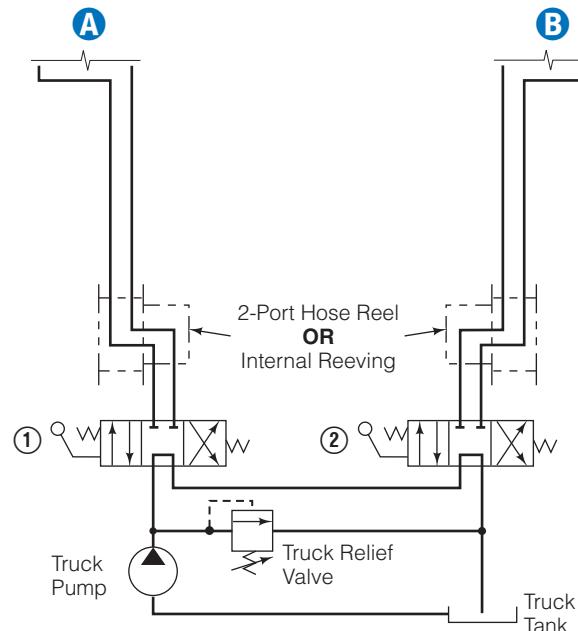
3.2-2 Hydraulic Circuit



One Truck Auxiliary Valve (Solenoid Equipped)



Two Truck Auxiliary Valves



Truck Auxiliary Valve:

- ① SIDESHIFT
- ② CLAMP (OR FORK POSITION)

TROUBLESHOOTING

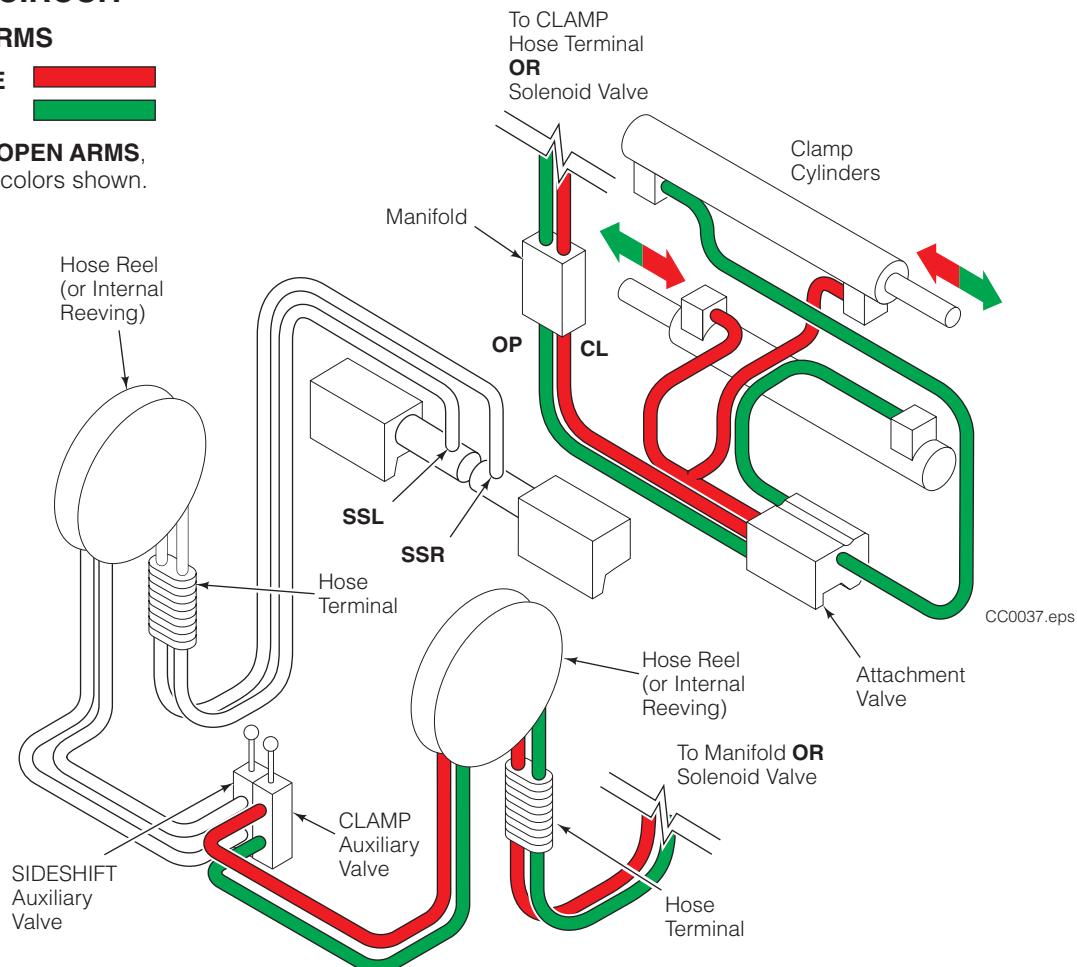
3.2-3 Hosing Diagram – External Sideshift Equipped

CLAMP CIRCUIT

CLAMP ARMS

PRESSURE 
RETURN 

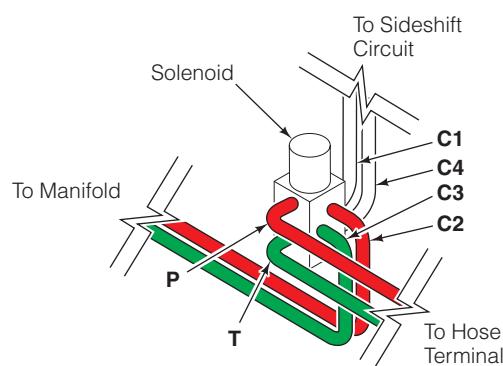
NOTE: For OPEN ARMS, reverse the colors shown.



CLAMP CIRCUIT, SOLENOID EQUIPPED

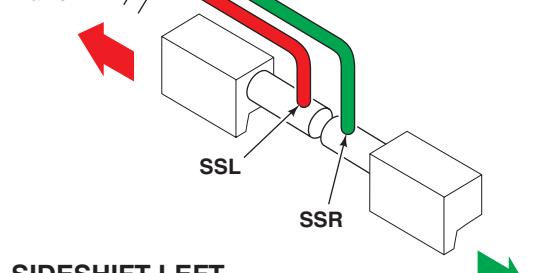
Solenoid:

Clamp Circuit – Energized
Sideshift Circuit – De-Energized



SIDESHIFT CIRCUIT

To SIDESHIFT Hose Terminal
OR
Solenoid Valve

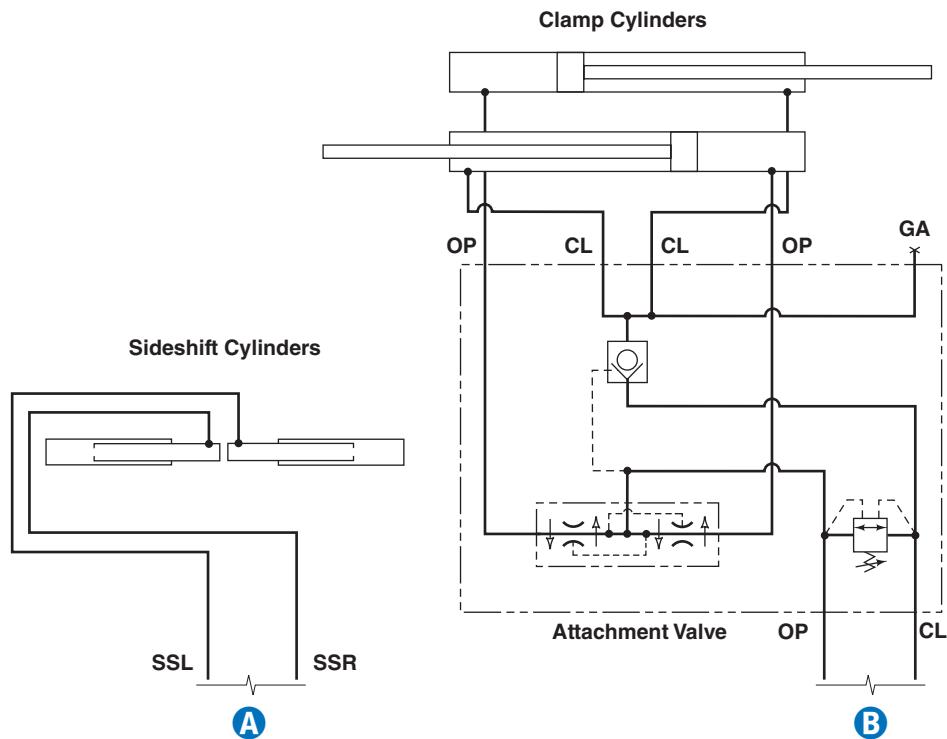


SIDESHIFT LEFT

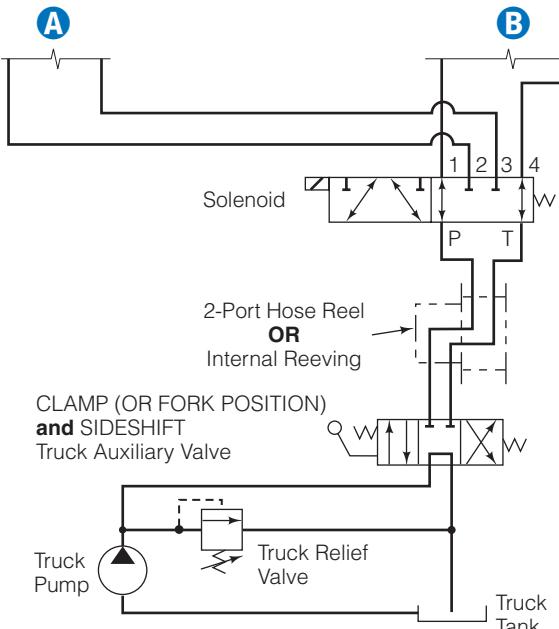
PRESSURE 
RETURN 

NOTE: For SIDESHIFT RIGHT, reverse the colors shown.

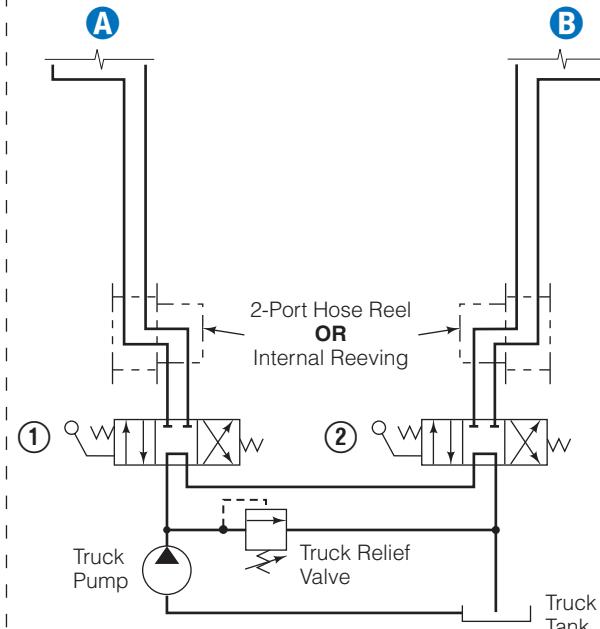
3.2-4 Hydraulic Circuit – External Sideshift Equipped



One Truck Auxiliary Valve (Solenoid Equipped)



Two Truck Auxiliary Valves



Truck Auxiliary Valve:

- (1) SIDESHIFT
- (2) CLAMP (OR FORK POSITION)

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TROUBLESHOOTING

3.3 Clamp Function

There are five potential problems that could affect the CLAMP function:

- Incorrect load handling. Refer to the Operator's Guide for suggested procedures.
- Incorrect hydraulic pressure or flow from the lift truck.
- External leaks.
- Defective solenoid coil or valve (if equipped).
- Worn or defective cartridge valves or cylinder seals.

3.3-1 Supply Circuit Test

- 1** Check the pressure supplied by the truck at the carriage hose terminal. Pressure must be within the range shown in Specifications, Section 5.1. See nameplate on the attachment and sticker on valve. **PRESSURE TO THE ATTACHMENT MUST NOT EXCEED:**

Low Pressure

2740 psi (189 bar)

High Pressure

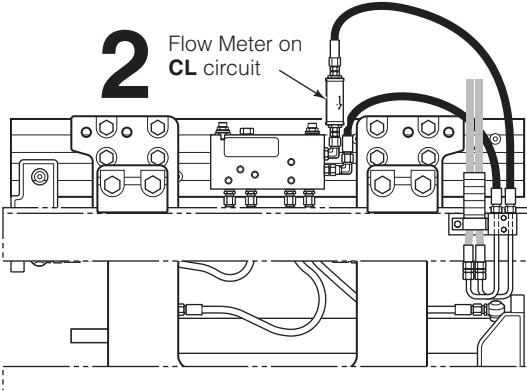
3625 psi (250 bar)

- 2** Check the flow volume at the carriage hose terminal. Flow must be within the range shown in Specifications, Section 5.1.
- 3** Fully close the arms, holding the lever in the CLAMP position for a few seconds. Release the lever and check for external leaks at fittings, hoses and valve.



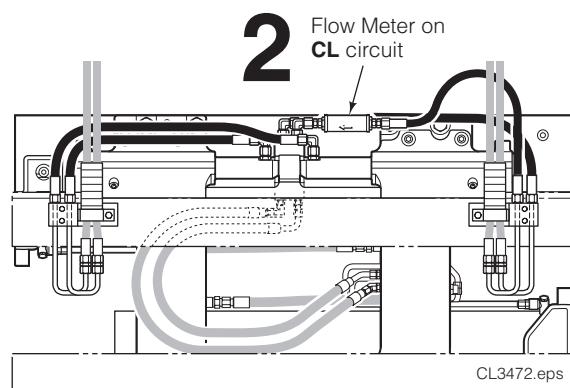
WARNING: Before removing hydraulic lines or components, relieve pressure in the hydraulic system. Turn truck off and open the truck auxiliary control valve(s) several times in both directions.

2



Rear Mounted Valve
Back (Driver's View)

2



Front Mounted Valve
Back (Driver's View)

3.3-2 Clamp Circuit Test

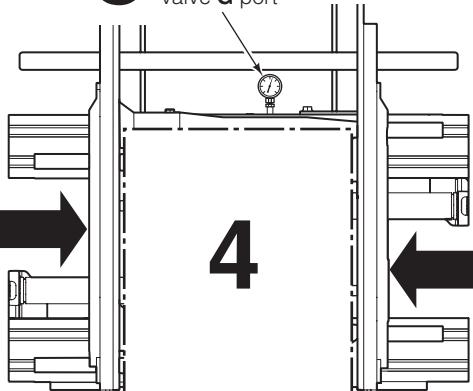
- 1 Solenoid equipped** – Press the solenoid button. Listen for a 'click' at the solenoid valve. If no sound is heard, first check the fuse, wiring and coil. Make sure that the valve is not jammed. Refer to Section 4.7.

IMPORTANT: Solenoid-operated valves must be plumbed so that the solenoid is **energized** during the CLAMP/OPEN function.

- 2** Fully open and close the arms. If the arms move slowly or not at all, the CLAMP relief cartridge may be faulty or need adjustment. Refer to the next page for cartridge location. Replace or adjust the cartridge. If the arms move unequally, the flow divider cartridge may be faulty. Replace the cartridge. Refer to Section 4.3-2.
- 3** Position the arms to mid-stroke. Turn the truck off and connect a pressure gauge or pressure transducer to the **G** port on the valve.
- 4** Start the truck and clamp on a rigid load or clamp force indicator. Hold the lever in the CLAMP position for a few seconds.

3

Connect pressure gauge or pressure transducer on valve **G** port



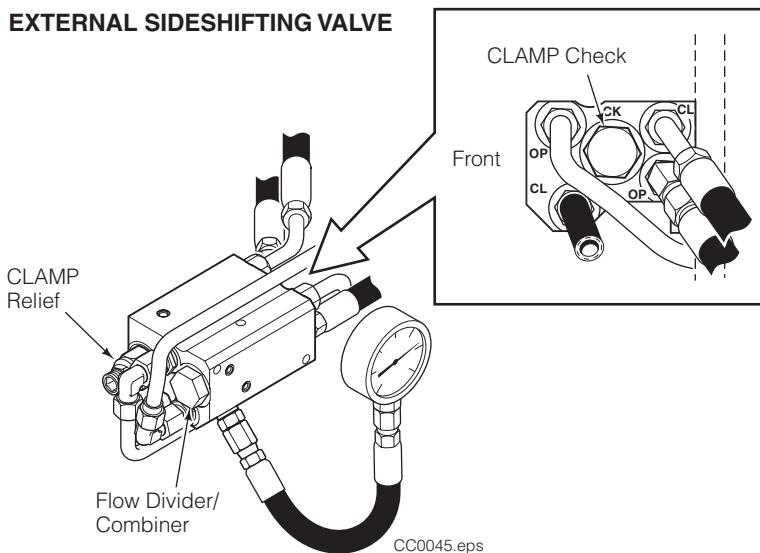
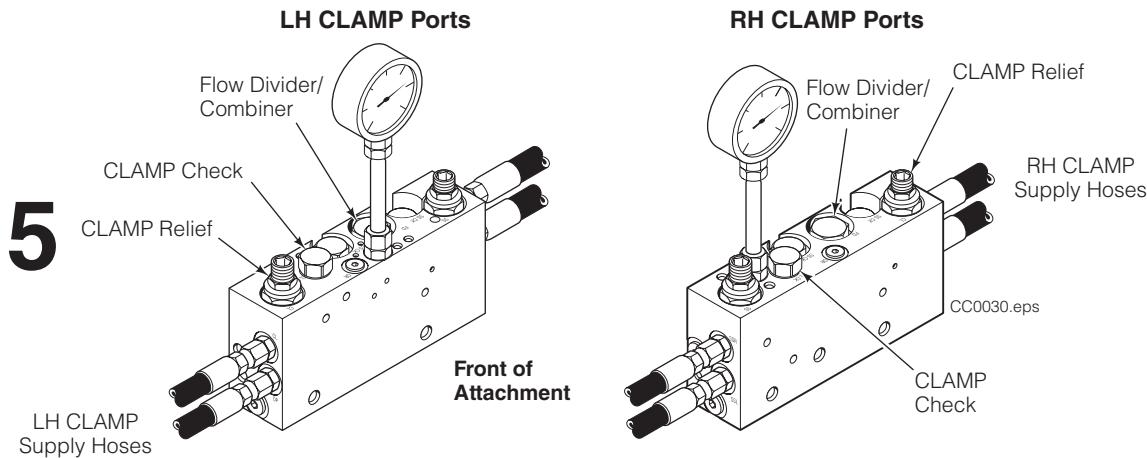
4

TROUBLESHOOTING

3.3-2 Clamp Circuit Test (Continued)

- 5** Release the lever and watch the pressure gauge or pressure transducer display:
- If the pressure drop is **less** than 145 psi (10 bar) initially, and additional drop does not exceed 29 psi (2 bar) per minute, the problem is not hydraulic. Refer to the list of potential problems, Section 3.3.
 - If the pressure drop is **more** than 145 psi (10 bar) initially, and additional drop exceeds 29 psi (2 bar) per minute, the CLAMP check valve cartridge may be faulty. Replace the cartridge. Refer to Section 4.3-2.

- 6** Fully close the arms. Hold the lever in the CLAMP position for a few seconds. If the pressure still drops as before, one of the cylinders is faulty and must be serviced. Refer to Section 4.4 for cylinder service.



3.4 Sideshift Function

There are six potential problems that could affect the sideshift function:

- Incorrect load handling. Refer to the Operator's Guide for suggested procedures.
- Incorrect hydraulic pressure or flow from the lift truck.
- External leaks.
- Defective solenoid coil or valve (if equipped).
- Worn or defective cartridge valves or cylinder seals.
- Bent or damaged arms, frames or bearing.

3.4-1 Supply Circuit Test

- 1 Check the pressure supplied by the truck at the carriage hose terminal. Pressure must be within the range shown in Specifications, Section 5.1. **PRESSURE TO THE ATTACHMENT MUST NOT EXCEED:**

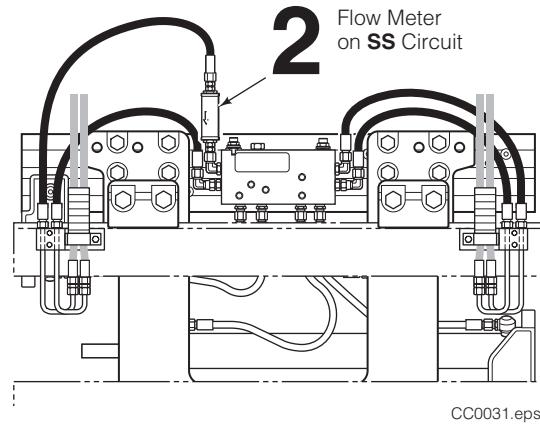
Low Pressure
2740 psi (189 bar)

High Pressure
3625 psi (250 bar)

- 2 Check the flow volume at the carriage hose terminal. Flow must be within the range shown in Specifications, Section 5.1.
- 3 Fully sideshift left or right. Hold the lever in the SIDESHIFT position for a few seconds. Release the lever. Check for external leaks at fittings, hoses, and valve.

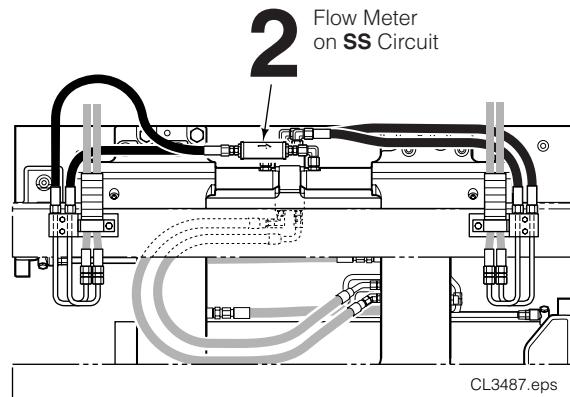


WARNING: Before removing hydraulic lines or components, relieve pressure in the hydraulic system. Turn truck off and open the truck auxiliary control valve(s) several times in both directions.



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Rear Mounted Valve
Back (Driver's) View



CL3487.eps

Front Mounted Valve
Back (Driver's) View

TROUBLESHOOTING

3.4-2 Internal Sideshift Circuit Test

NOTE: Perform CLAMP circuit test first to make sure cylinders are operating properly. Refer to Section 3.3-2.

1 Solenoid equipped – Press the solenoid button. Listen for a 'click' at the solenoid valve. If no sound is heard, check fuse, wiring and coil. Make sure that the valve is not jammed. Refer to Section 4.7.

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

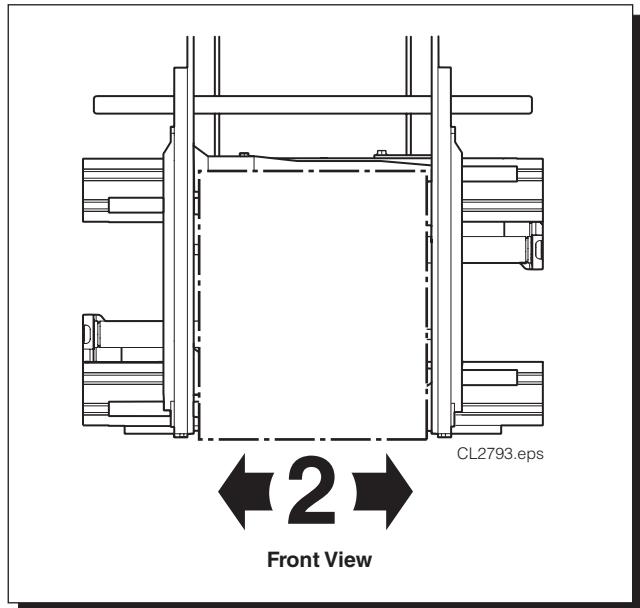
2 Clamp a maximum load. Sideshift LEFT and RIGHT observing sideshifting movement:

- If the attachment will not sideshift or sideshifts slowly, adjust SIDESHIFT relief cartridge clockwise (CW) until the attachment sideshifts, then go to Step 4.
- If the attachment will not sideshift after attempted relief adjustment, go to Step 3.

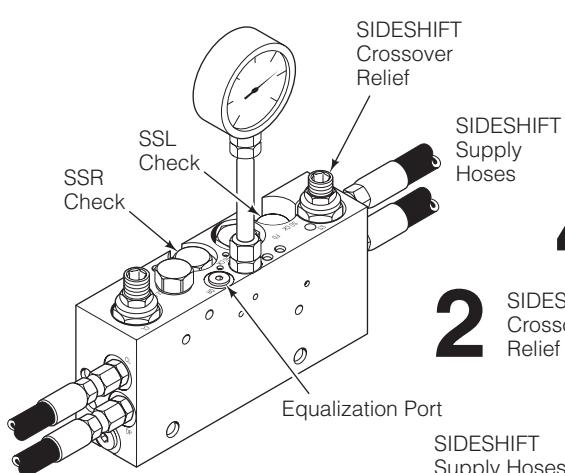
3 Remove the plug from the port 'OR' on top of the valve. Remove the interior setscrew plug (5/32 in., 4 mm allen socket). Re-adjust SS relief per Step 2.

4 If the attachment sideshifts at the proper speed in one direction but not the other, the SS relief setting can be assumed working properly, but the SSL or SSR check valve may be faulty. Swap or replace check valve cartridge(s).

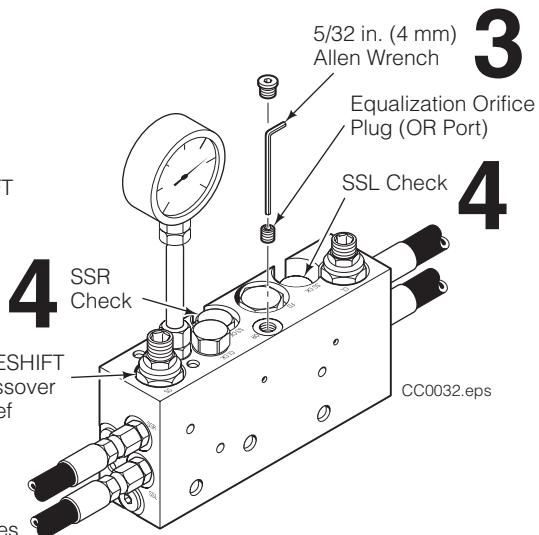
- If the attachment still sideshifts improperly in one or both directions, problem is not hydraulic. Refer to the list of potential problems, Section 3.4.



RH SIDESHIFT Ports



LH SIDESHIFT Ports



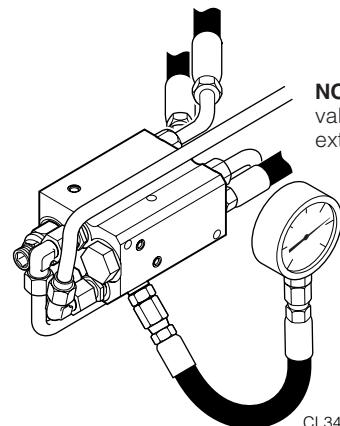
TROUBLESHOOTING

3.4-3 External Sideshift Circuit Test

NOTE: The attachment valve is not part of the external sideshift circuit.

- 1 Sideshift fully to the LEFT or RIGHT. Hold the lever for five seconds:

- If there is **little or no movement**, the flow restrictor(s) may be plugged in the cylinder(s). Remove end plug from the cylinder head end. Inspect cylinders and flow restrictors for debris. Service cylinders if required. Refer to Section 4.5.
- If there is **any hydraulic leakage** at the cylinder rod seals, the sideshift cylinder assemblies require service. Refer to Section 4.5.
- If there is **no hydraulic leakage** at the cylinder rod seals, the problem is not hydraulic. Refer to the list of potential problems, Section 3.4.



NOTE: The attachment valve is not part of the external sideshift circuit.

CL3482.eps

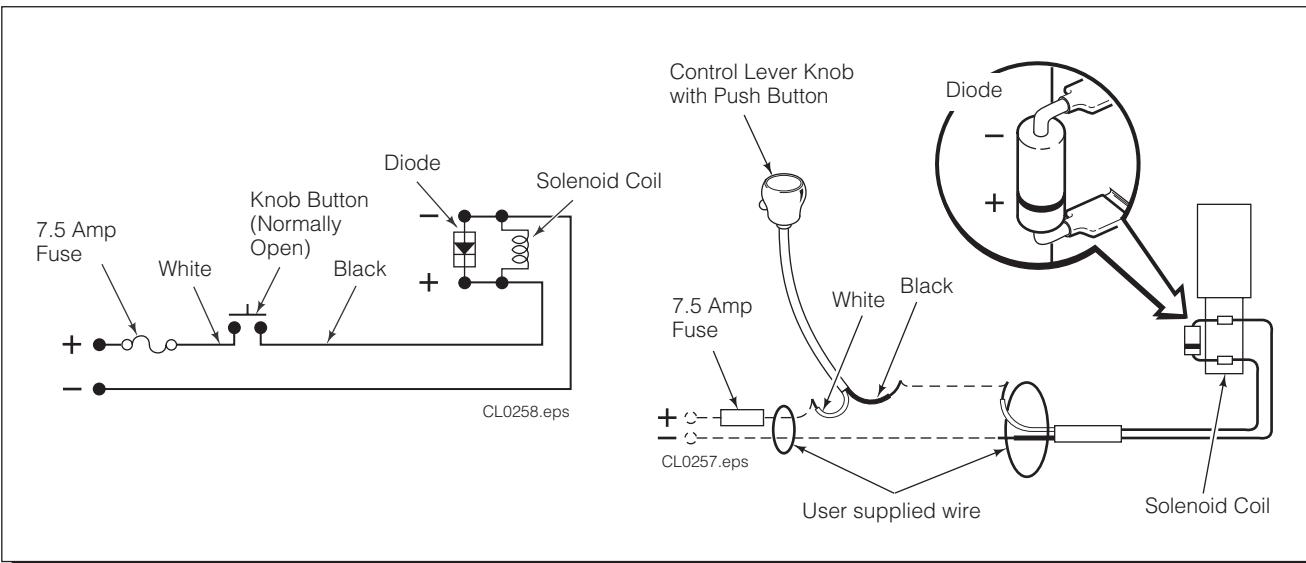
3.5 Electrical Circuit (Solenoid-equipped attachments)

Use the electrical schematic and diagram shown and follow the steps below:

- 1 Check the control knob circuit fuse. Replace if 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 to 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 the coil continuity by placing an ohmmeter test lead on each solenoid coil terminal (ohmmeter on Rx1 scale).
 - If there is an ohmmeter reading, the coil is good.
 - If the coil is good, but the solenoid does not 'click' when the control knob button is pressed, the solenoid cartridge may be jammed. Refer to Section 4.7.
 - If there is no ohmmeter reading, the coil is defective and should be replaced. Refer to Section 4.7.



4.1 Attachment Removal

- 1 Position the attachment arms to 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.

- 3 Disconnect the lower hooks:

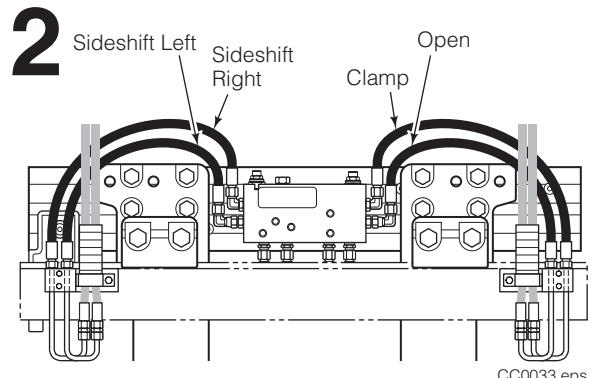
Quick-Change Hooks – Remove the locking pins and drop the hooks into the unlocked position. Replace the pins in the lower holes. For reassembly, remove the pins and slide the hooks up to the locked position. Replace the pins in the top holes.

Bolt-On Hooks – Remove the capscrews and mounting hooks. For reassembly, tap the hooks tight against the carriage bar and tighten the capscrews to 120 ft.-lbs. (165 Nm).

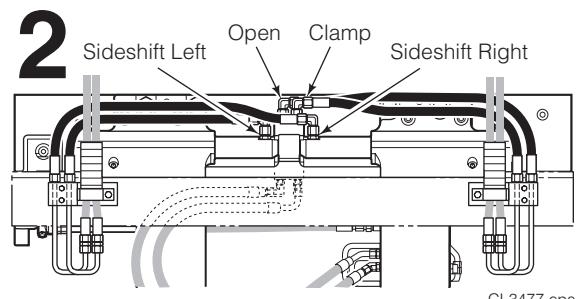
- 4 Lower the attachment onto a pallet. Tilt the mast forward and lower the carriage to disengage the upper hooks.

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

- For complete installation procedure, refer to Installation Instructions 6871082.
- **External Sideshifting Attachments** – Make sure upper bearings and anchor plate are properly installed and secured before mounting attachment on truck. Refer to Sections 4.5-2 and 4.6-2.



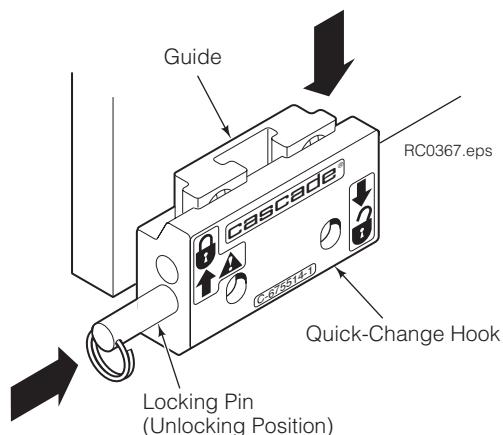
**Internal Sideshifting Attachments
Back (Driver's) View**



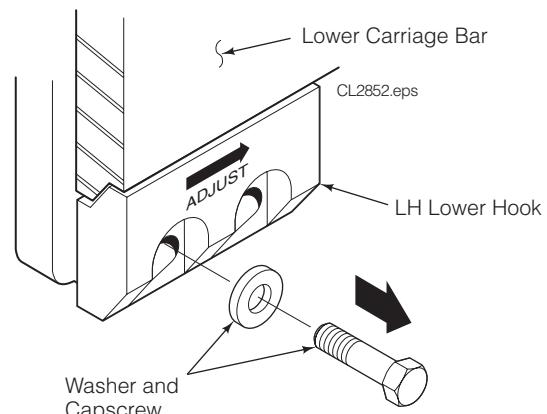
**External Sideshifting Attachments
Back (Driver's) View**

3

Quick-Change Lower Hook



Bolt-On Lower Hooks



4.2 Arms

4.2-1 Arm Assemblies – Removal and Installation

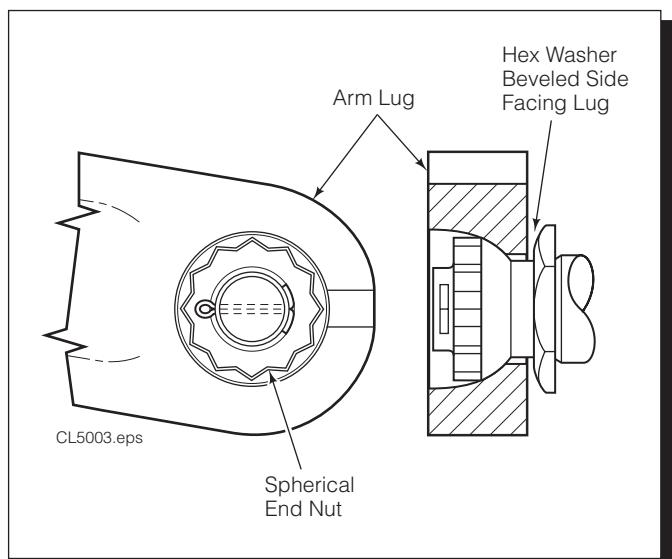
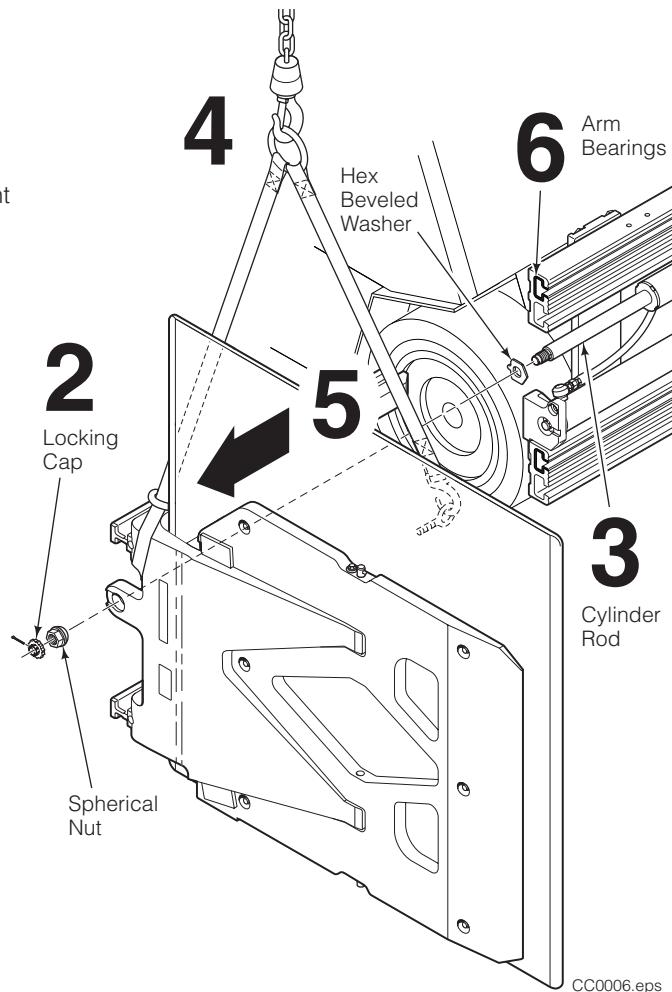
The following procedures can be performed with the attachment mounted on the truck.

- 1** Position the arms to frame width and lower the attachment contact pads to 0.5 in. (13 mm) above the floor.
- 2** Remove the cotter pin, locking cap and spherical nut retaining the cylinder rod from the arm lug.
- 3** Fully retract the cylinder rods.



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

- 4** Attach an overhead hoist to the arm assembly. Position the chain clear of the arm bearing surfaces.
- CAUTION:** Use a second chain and eyebolt or C-clamp on the contact pads to stabilize the arms.
- 5** Slide the arm assembly out of the frame. Do not damage the bearings when removing the arm.
- 6** For reassembly, reverse the above procedures with the following exceptions:
 - Inspect the upper and lower bearings for wear. Bearing thickness should not be less than 0.06 in. (1.5 mm) on any part of the bearing. Install new bearings as a complete set as required.
 - Inspect the arm bar bearing area and chamfered areas for nicks or damage. Break any sharp edges and polish with 400-grit emery paper as necessary.
 - Lubricate the cylinder rod threads, nut threads and spherical portion of the nut with wheel bearing grease.
 - Install hex beveled washer on cylinder rod end. Beveled side faces the lug, as shown.
 - Tighten spherical nut to the following torque:
 - 8J-22J** – 85 ft.-lbs. (115 Nm)
 - 26J** – 232 ft.-lbs. (315 Nm)
 Tighten against hex washer. Nut will not be tight against the arm lug.
 - Install locking caps with new cotter pins.

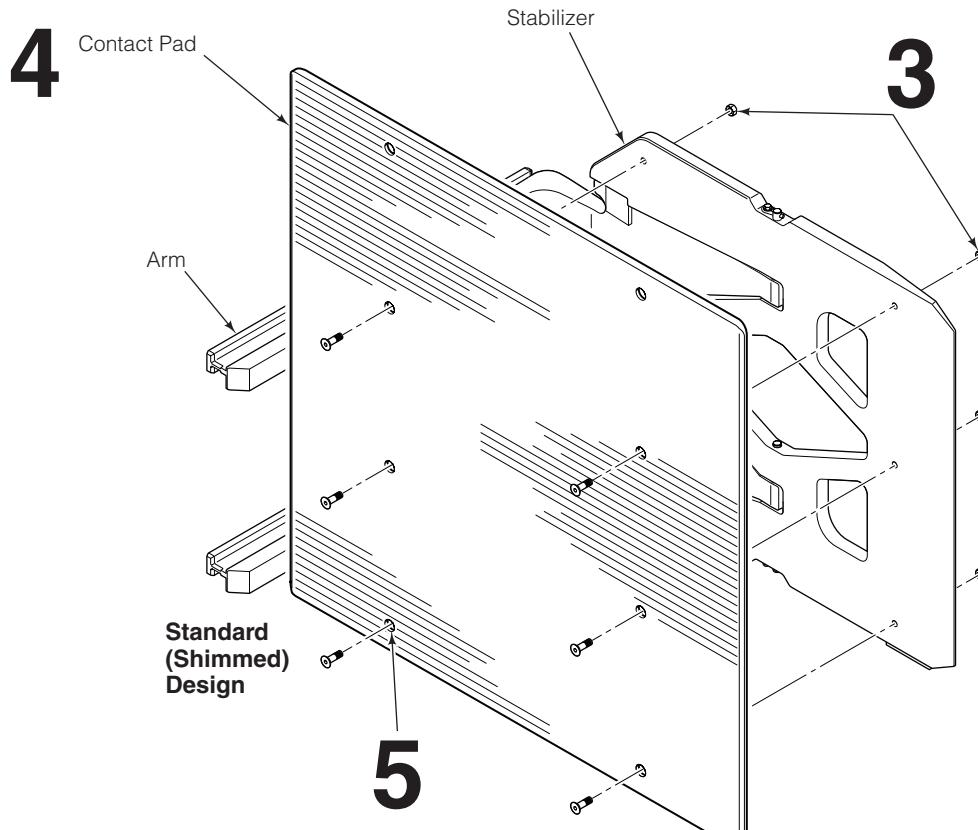
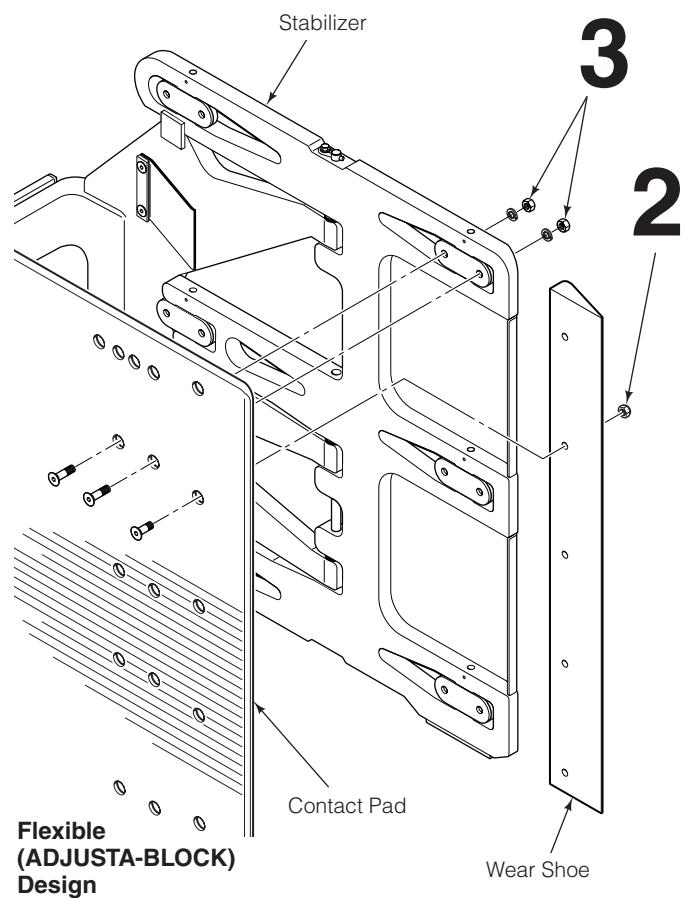


4.2-2 Carton Clamp Arm Contact Pad – Replacement or Rotation

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

NOTE: Contact pad surfaces that are worn or damaged over the entire pad area will require pad replacement. If only the lower surface is worn, the pads can be rotated 180° and swapped side-for-side.

- 1 Extend the arms to frame width. Lower the attachment so that the contact pads just touch the floor.
- 2 **Flexible (ADJUSTA-BLOCK) Design** – Remove the wear shoe. For reassembly, tighten the capscrews to 66 ft.-lbs. (90 Nm).
- 3 Remove the capscrews and nuts fastening the contact pad to the stabilizer. Remove the contact pads. For reassembly, tighten the capscrews to:
 - Standard (Shimmed) Design** – 48 ft.-lbs. (65 Nm)
 - Flexible (ADJUSTA-BLOCK) Design** – 66 ft.-lbs. (90 Nm)
- 4 Install new pads, or rotate the pads 180° and swap side-for-side and reinstall.
- 5 For reassembly, reverse the above procedures with the following exceptions:
 - Inspect contact pad mounting holes for wear or elongation. Repair using Hole Service Kit 676841.



4.2-3 Carton Clamp Contact Pad and Stabilizer Repair

The following procedures can be performed with the arms in place and the attachment mounted on the truck.

- 1 Extend the arms to frame width. Lower the contact pads so that they just touch the floor.
- 2 Remove the contact pad from the attachment as described in Section 4.2-2.
- 3 Inspect the contact pad for flatness. Replace or straighten as required. Inspect the contact pad mounting holes for wear or elongation. Repair using Hole Service Kit 676841.
- 4 Remove the stabilizer from the arm by removing the two pin retainers and pivot pins. For reassembly:

Standard (Shimmed) Design – Tighten each retainer capscrew to 15 ft.-lb. (20 Nm).

Flexible (ADJUSTA-BLOCK) Design – Apply Loctite 242 (blue) to each capscrew thread and tighten to 15 ft.-lb. (20 Nm).

- 5 Inspect the stabilizer pivot pin, bushings and shims for wear and replace as necessary.

CAUTION: Use a bushing driver to replace the bushings in the arm. Do not damage the bushing ID.

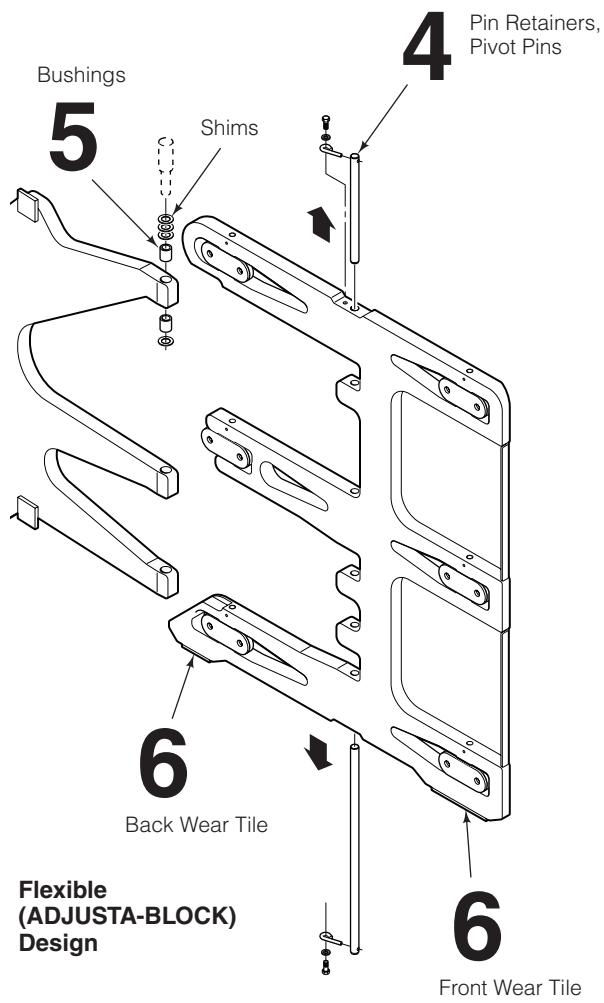
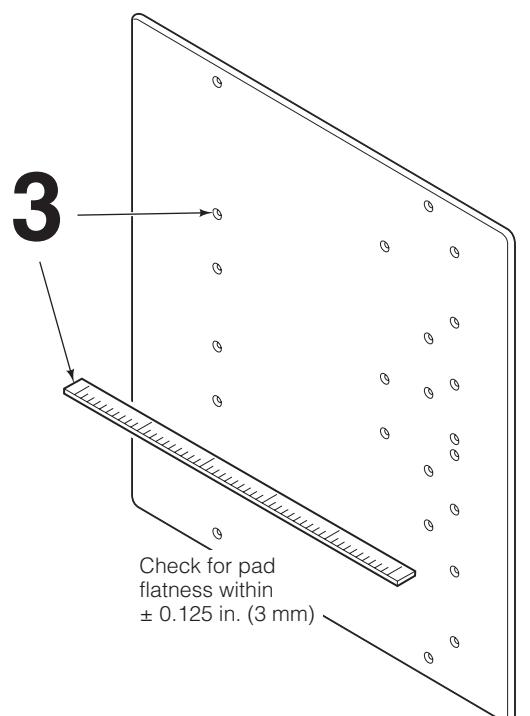
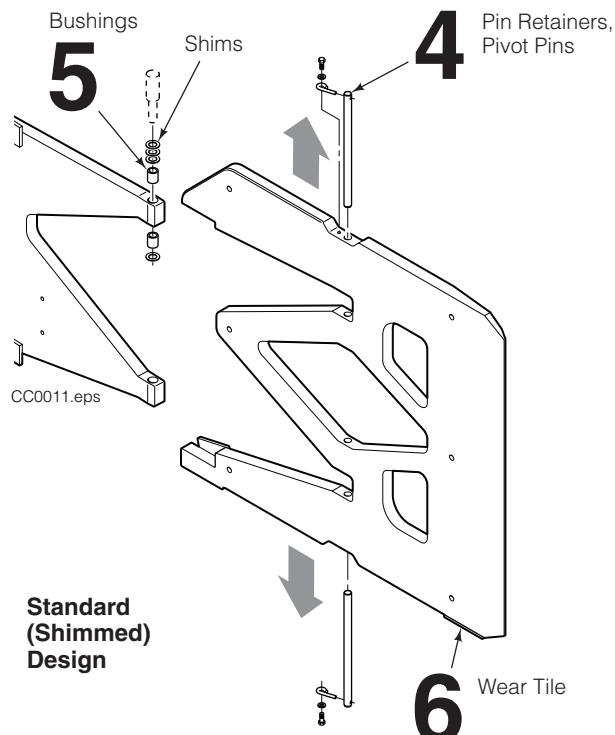
- 6 Inspect the wear tile(s) of each stabilizer for wear. Replace as necessary. Location(s) are as follows:

Standard (Shimmed) Design – Bottom front surface

Flexible (ADJUSTA-BLOCK) Design – Bottom front and back surfaces

IMPORTANT: If wear extends into the stabilizer bottom surface, build up with weld and grind flat to within 0.06 in. (1.5 mm) along the full length of the stabilizer.

Procedure continued on the following page



4.2-3 Carton Clamp Contact Pad and Stabilizer Repair (continued)

7 Weld the new wear tile(s) onto the stabilizers, as follows:

- **Standard (Shimmed) Design** – Preheat weld area (through stabilizer thickness and minimum length of 3.5 in., 75 mm) to 50° F (10° C) minimum to 118° F (48° C) maximum before welding. Maximum interpass temperature should not exceed 217° F (103° C).

Weld new wear tile to the **bottom front surface of each stabilizer** using GMAW (Gas Metal Arc Welding). Weld using ER70S-3, ER70S-4, ER70S-6 and gas 92% Ar/ 8% CO₂. Weld with a 0.25 in. (6 mm) fillet weld only in the areas shown. Cool wear tile at normal air cool.

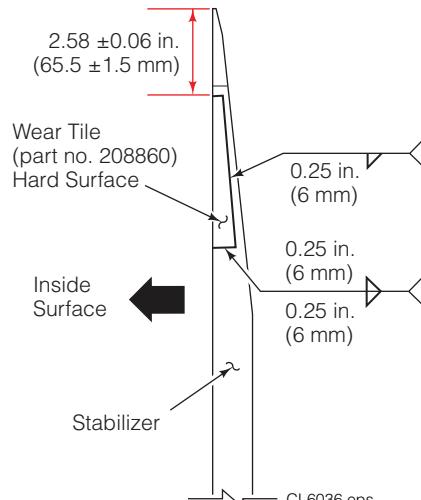
NOTE: Weld only to the steel backing of the wear tile. Weld will not stick to the wear tile hard surfacing.

- **Flexible (ADJUSTA-BLOCK) Design** – Preheat weld area (through stabilizer thickness and minimum length of 3.5 in., 75 mm) to 250° F (121° C) minimum to 318° F (159° C) maximum before welding. Maximum interpass temperature should not exceed 417° F (214° C).

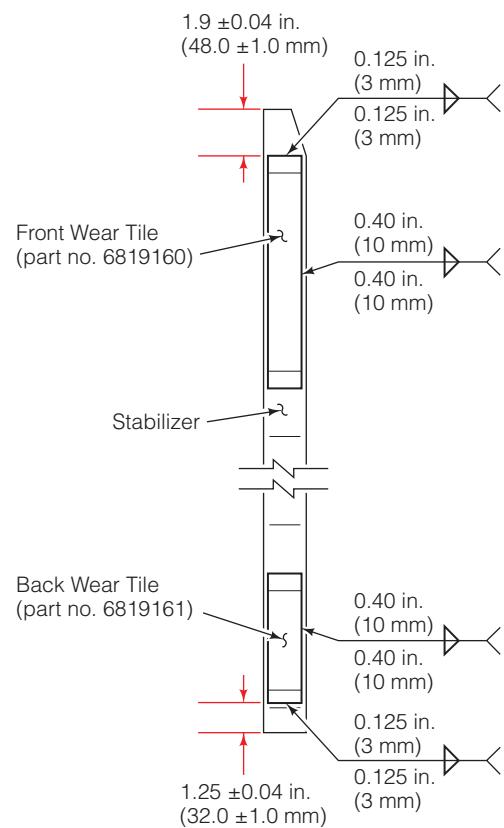
Weld new wear tile to the **bottom front and back surface of each stabilizer** using FCAW (Flux-Cored Arc Welding). Attach ground wire to stabilizer. Weld using E70T-1 and shield gas per manufacturer's recommendation. Set welding amps per the manufacturer's recommendation with polarity DCRP. Completely remove slag between passes. Fillet weld, with size indicated, only the areas shown. Cool wear tiles slowly by covering with a blanket.

8 If required, grind the weld along the inside edge of the stabilizer flush with the inside surface. The contact pads must bolt up flat against the stabilizer without interference from the welds.

9 For reassembly, reverse Steps 1–5.



Standard (Shimmed) Design



Flexible (ADJUSTA-BLOCK) Design

4.2-4 Standard (Shimmed) Design – Contact Pad Camber Adjustment

The following procedure is performed on attachments with standard (shimmed) design for contact pad and stabilizer. There are two methods to determine camber required: *Measure Method* or *4-Point Force Distribution Tester Method*. The *Measure Method* measures width between pads in two places. The *4-Point Force Distribution Tester Method* measures the clamp force at four locations on the contact pads.

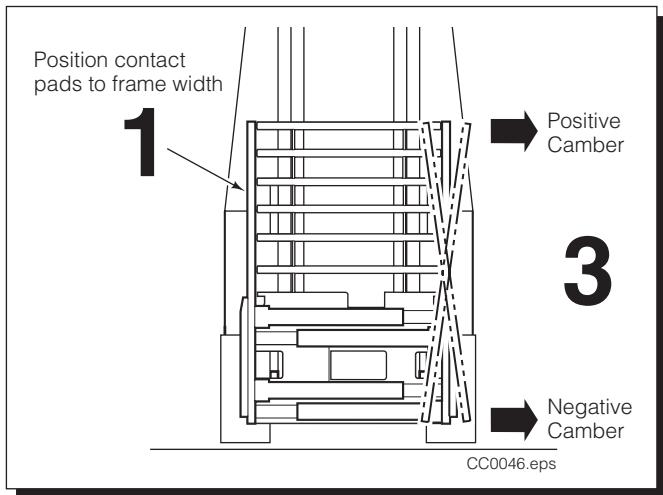
1 Extend the arms to frame width.

Measure Method – Lower the contact pads so that they just touch the floor.

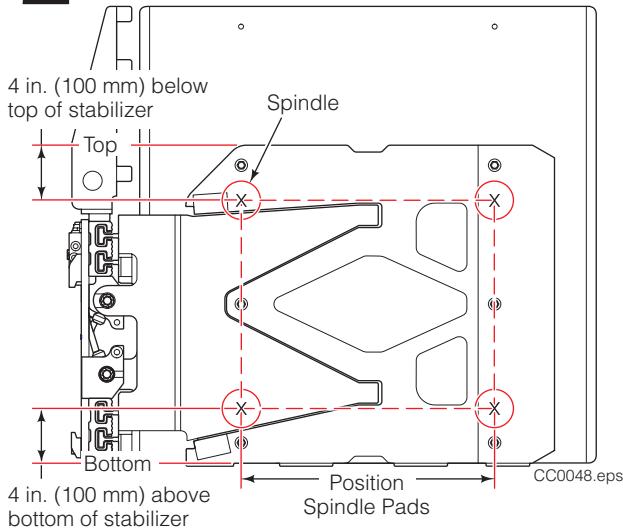
4-Point Force Distribution Tester Method – Lower the contact pads to just above the floor.

2 Determine the contact pad's current camber layout.

Measure Method – Measure the distance between the pads in two places, at the bottom (in-line with the pivot pins) and 29 in. (73 cm) above the pad bottom, as shown. The difference between the two measurements is the pad camber.



2 4-Point Force Distribution Tester Method



2 (Continued)

4-Point Force Distribution Tester Method – Perform the following steps:

A) Position the tester between the contact pads with the spindles perpendicular to the contact pad surfaces. Position the spindles vertically aligned with the contact pad capscrews. The upper spindles should be 4 in. (100 mm) below top of stabilizer. The lower spindles should be 4 in. (100 mm) above bottom of stabilizer.

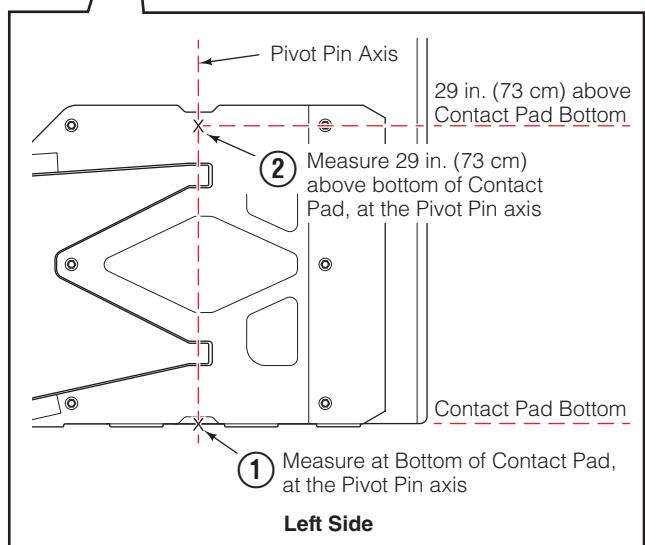
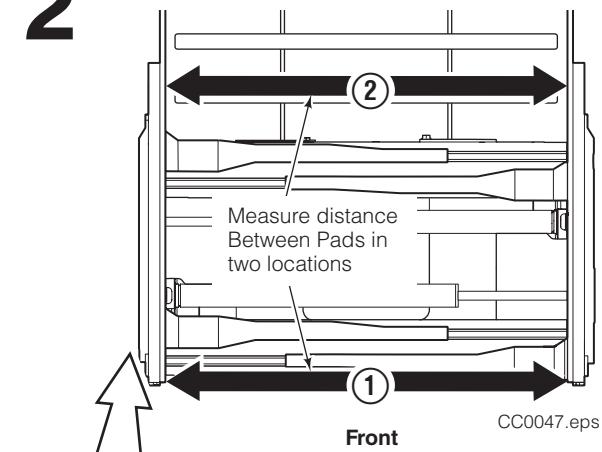
B) Clamp on the tester and hold activated for 5 seconds.

C) Note the distribution of the percentages of each spindle. Sum the upper values together and the lower values together.

3 Determine the camber required for the product being handled. Refer to the Pad Camber Chart found in Section 3.1-4.

Procedure continued on the following page

2 Measure Method



4.2-4 Standard (Shimmed) Design – Contact Pad Camber Adjustment (Continued)

- 4** Loosen the contact pad capscrews and nuts.

NOTE: It is not necessary to remove the capscrews and nuts to insert the shims.

- 5** Install shims as required.

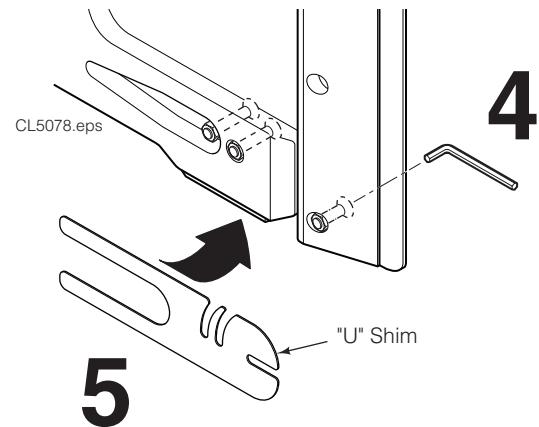
- Install shims at the bottom and middle of the pad to provide positive camber and to increase clamp force at the bottom of the load.

NOTE: This will increase the clamp force percentages on the lower spindles readout of the 4-Point Force Distribution Tester.

- Install shims at the top and middle of the pad to provide negative camber and to decrease clamp force at the bottom of the load.

NOTE: This will increase the clamp force percentages on the upper spindles readout of the 4-Point Force Distribution Tester.

CAUTION: Use an equal number of shims on each contact pad. Pad camber must be the same on both sides of the attachment for proper load handling.



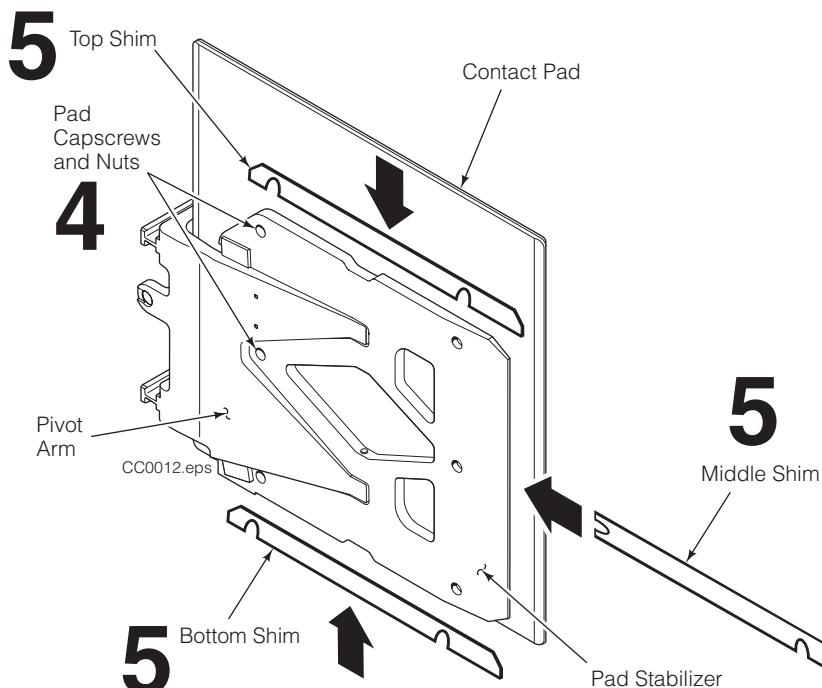
4-Point Force Distribution Tester:

Camber	Percentage Change After Shimming		Example	
	Upper Total	Lower Total	Upper Total	Lower Total
Neutral ▲	—	—	30%	70%
Negative ◆	+13%	-13%	43%	57%
Positive ■	-13%	+13%	17%	83%

▲ Shimmed equally in all locations.

◆ Bottom shims total 0.25 in. (6 mm) per contact pad.

■ Top shims total 0.25 in. (6 mm) per contact pad.



+ FOR MINIMUM POSITIVE CAMBER:

Middle Shim:
Long Shim – One Each
0.06 in. (1.6 mm)

"U" Shim –
One Each, 2 Places
0.04 in. (1 mm)

Bottom Shim:
Long Shim – One Each
0.125 in. (3.2 mm)
"U" Shim –
One Each, 2 Places
0.08 in. (2 mm)

+ FOR MAXIMUM POSITIVE CAMBER:

Middle Shim:
Long Shim – Two Each
0.06 in. (1.6 mm)
"U" Shim –
Two Each, 2 Places
0.04 in. (1 mm)

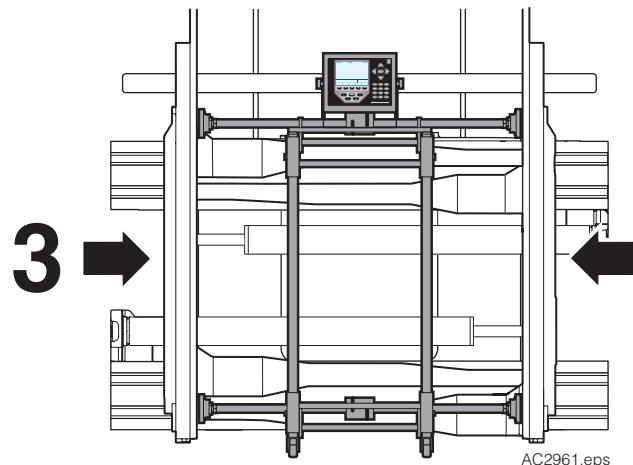
Bottom Shim:
Long Shim – Two Each
0.125 in. (3.2 mm)
"U" Shim –
Two Each, 2 Places
0.08 in. (2 mm)

4.2-5 Flexible (ADJUSTA-BLOCK) Design – Contact Pad Camber Adjustment

The following procedure is performed on attachments with flexible (ADJUSTA-BLOCK) design for contact pad and stabilizer. This procedure can be performed with the arms in place and the attachment mounted on the truck. A Cascade 4-Point Force Distribution Tester is required for this procedure.

IMPORTANT: Clamp circuit pressure should be adjusted, if required, prior to adjusting the pad camber. Refer to Section 4.3-3.

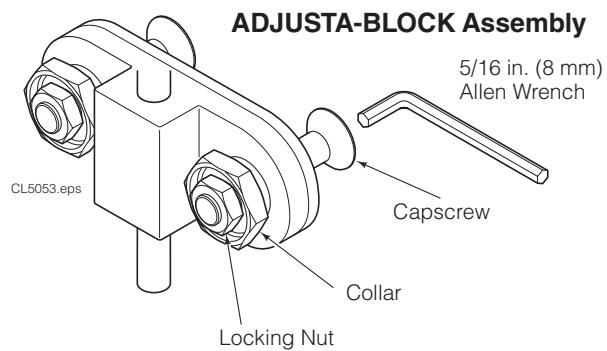
- 1 Extend the arms to the most common load width. Lower the contact pads to just above the floor.
- 2 Position the tester between the contact pads. Adjust the tester spindle locations to be perpendicular to the contact pad surfaces and to the desired position based on the type of product being handled.
- 3 Clamp on the tester and hold activated for 5 seconds.
- 4 Note the distribution of the percentages of each spindle.
- 5 Determine if the percentage of the clamp force values are within the desired distributed percentages. If clamp force percentages require adjusting, the contact pads require pivot block adjustment. Continue to Step 6 for adjustment.



- 6 Clamp force distribution can be changed at the ADJUSTA-BLOCK locations on the right hand contact pad. Tune as follows:
 - Loosen the locking nuts 3 turns. Use an 5/16 in. (8 mm) allen wrench to hold the capscrews.
 - Adjust the collar using a 1.25 in. (32 mm) socket. Turn the collar **CW** to **increase** clamp force, **CCW** to **decrease** clamp force. One full turn of the collar is approximately 0.08 in. (2 mm) linear travel or 10% of force.

Follow adjustment sequence, Step 7.

Procedure continued on the following page



4.2-5 Flexible (ADJUSTA-BLOCK) Design – Contact Pad Camber Adjustment (Continued)

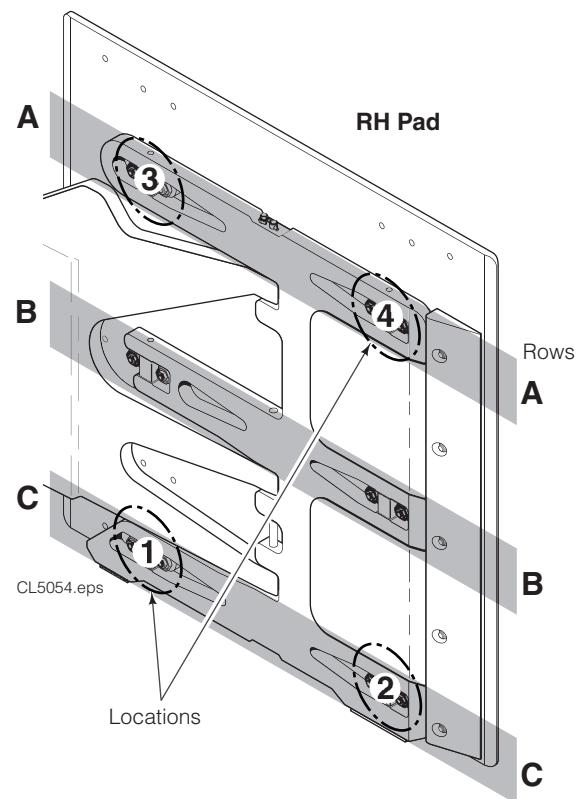
7 Adjustment Sequence –

- Adjust force at location **2** to the desired specification. Validate clamp force with tester and adjust as required.
- Adjust force at location **4** to the desired specification. Validate clamp force with tester and adjust as required.
- Adjust force at location **1** to the desired specification. Validate clamp force with tester and adjust as required.
- Adjust force at location **3** to the desired specification. Validate clamp force with tester and adjust as required.

IMPORTANT: When adjustments are made in Rows **A** or **C**, Row **B** must be adjusted by 1/2.

Example 1: If location **2** in row **C** is increased by 0.08 in. (2 mm), the location above **2** in row **B** must be increased by 0.04 in. (1 mm).

Example 2: If location **3** in row **A** is decreased by 0.08 in. (2 mm), the location below **3** in row **B** must be decreased by 0.04 in. (1 mm).



4.2-6 Arm Bearings – Removal and Installation

NOTE: Replace all arm bearings if wear exceeds 0.6 in. (1.5 mm) thickness on any surface. Arms must be removed to install new bearings as follows:

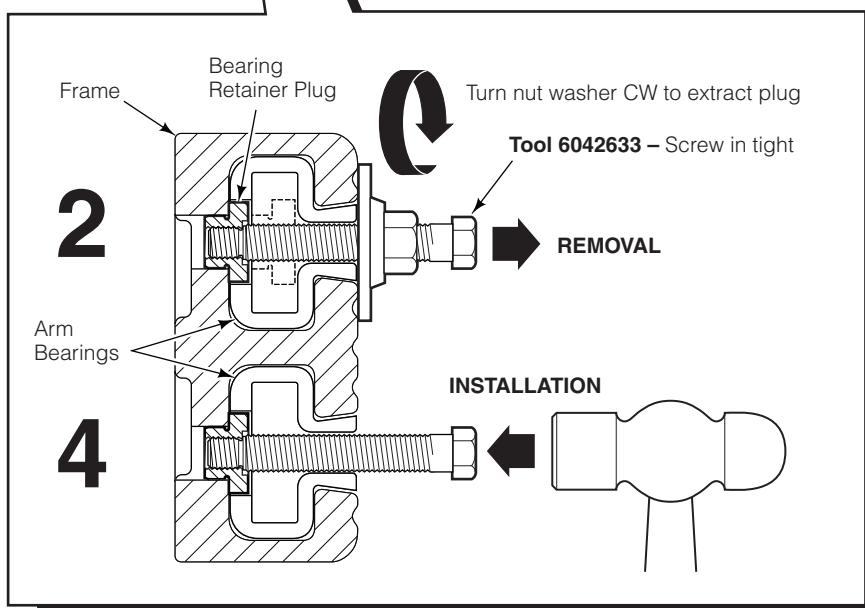
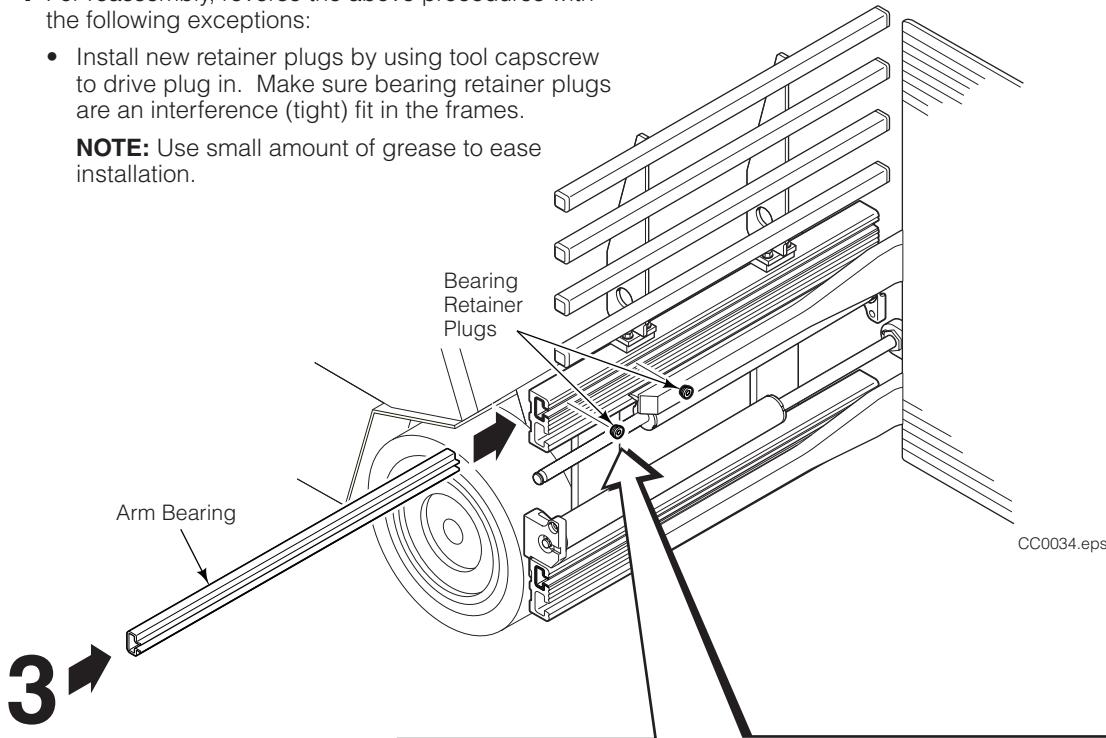
- 1 Remove attachment arms as shown in Section 4.2-1.
- 2 Remove the bearing retainer plugs using Cascade Tool 6042633, as shown.

NOTE: M10 x 1.25 x 80L capscrew and 40 mm OD large washer may also be used.

- 3 Drive a new bearing into the frame, displacing the old bearing.
- 4 For reassembly, reverse the above procedures with the following exceptions:

- Install new retainer plugs by using tool capscrew to drive plug in. Make sure bearing retainer plugs are an interference (tight) fit in the frames.

NOTE: Use small amount of grease to ease installation.



4.3 Valve

4.3-1 Valve Removal and Installation

The following procedures can be performed with the attachment mounted on the truck:

1 Rear Mounted – Raise the attachment 2 ft. (60 cm) so the valve is accessible from behind. Do not reach or work through the mast.

Front Mounted – Position the arms fully open so that the valve is accessible from the front.

2 Remove valve guards or bumpers (if equipped).



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

3 Disconnect all hydraulic supply hoses and cylinder tubing at the valve. Plug the hose/tubing ends and tag for reassembly.

4 Remove the capscrews fastening the valve to the attachment. Remove the valve and spacer plate (if equipped). For reassembly, tighten the capscrews to the following:

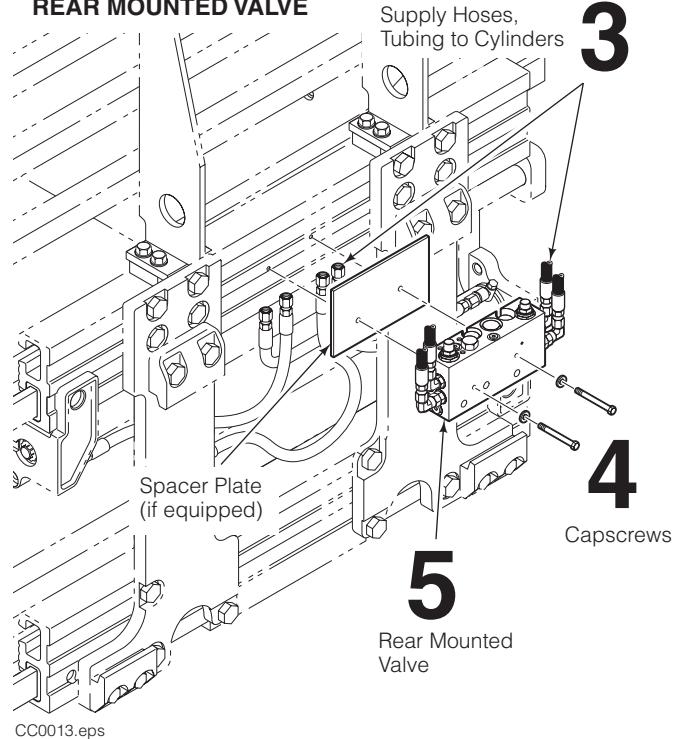
Rear Mounted Valve – 6 ft.-lbs. (8 Nm)

Front Mounted Valve – 28 ft.-lbs. (38 Nm)

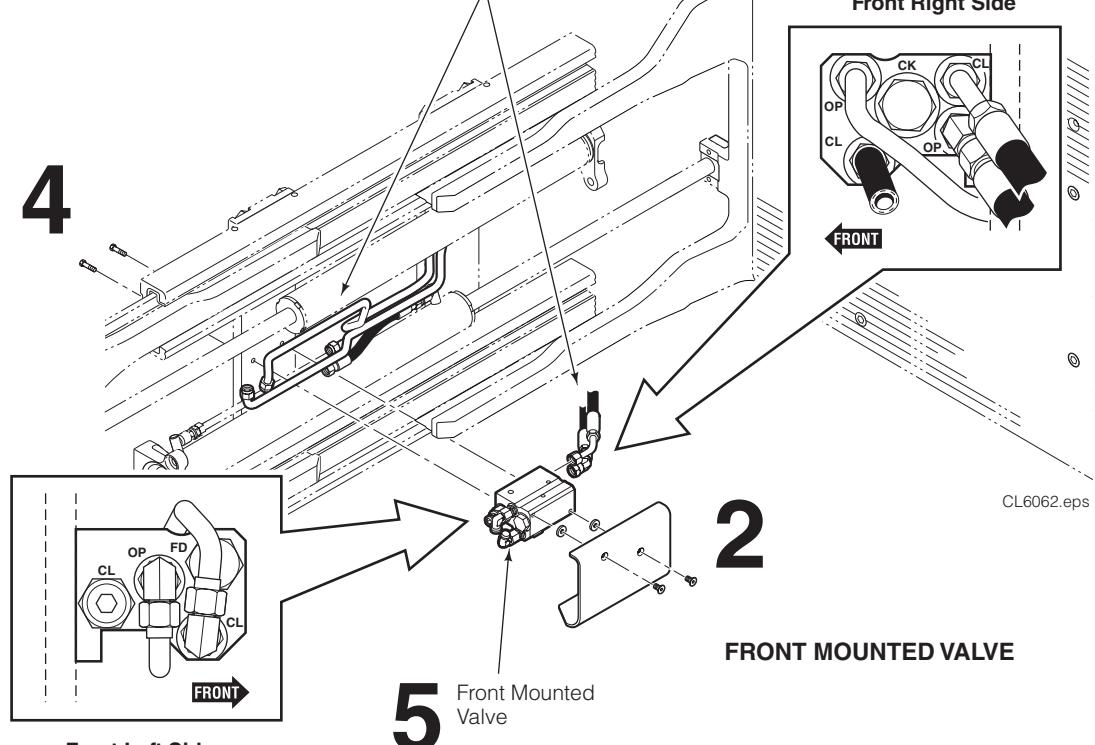
5 For reassembly, reverse the above procedures with the following exceptions:

- Service the valve as described in Section 4.3-2.
- Make sure all flareless hydraulic connections are assembled using new seals.
- If required, adjust relief cartridges as described in Section 4.3-3.

REAR MOUNTED VALVE



3 Supply Hoses, Tubing to Cylinders



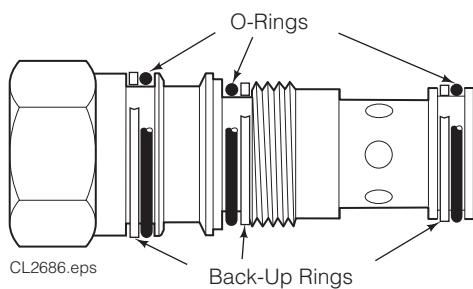
4.3-2 Valve Service

J-Series Carton Clamps use various valves depending on high or low flow, LH or RH supply porting, and external sideshifting. Refer to the attachment nameplate and pressure/flow decal on the valve or top of the attachment.

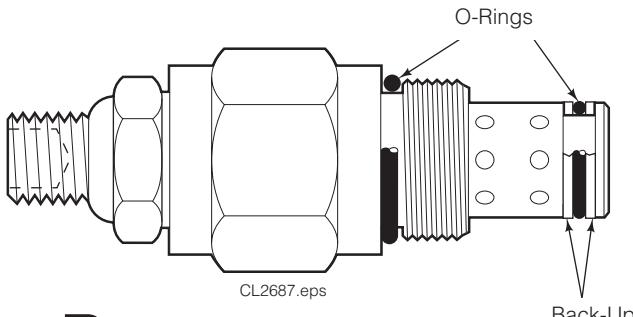
IMPORTANT: Service the valve in a clean work area. Service procedures are the same for all valves:

- 1 Remove the valve from the attachment as described in Section 4.3-1.
- 2 Remove the cartridges from the valve.
- 3 Remove the remaining threaded plugs and fittings. Valve body must be completely stripped for proper cleaning.
- 4 Remove the O-rings and back-up rings from the cartridges.
- 5 Clean all parts with cleaning solvent.
- 6 For reassembly, reverse the above procedures with the following exceptions:
 - Replace O-rings and back-up rings on cartridges as shown.
 - Lubricate cartridges, fittings and plugs with O-ring lube or petroleum jelly prior to installation.

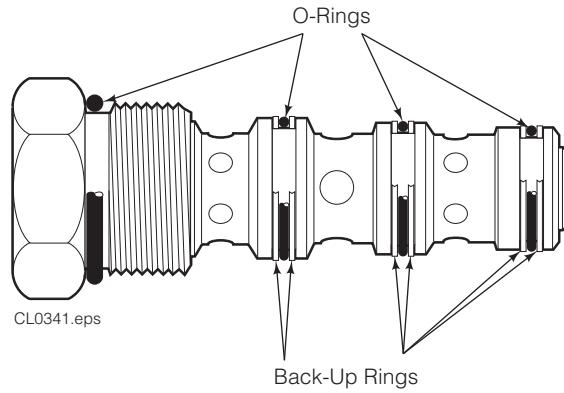
CAUTION: Make sure cartridges are installed in correct port location in valve body. Refer to the illustrations on following pages and stampings on valve body.



A Check Valve Cartridge



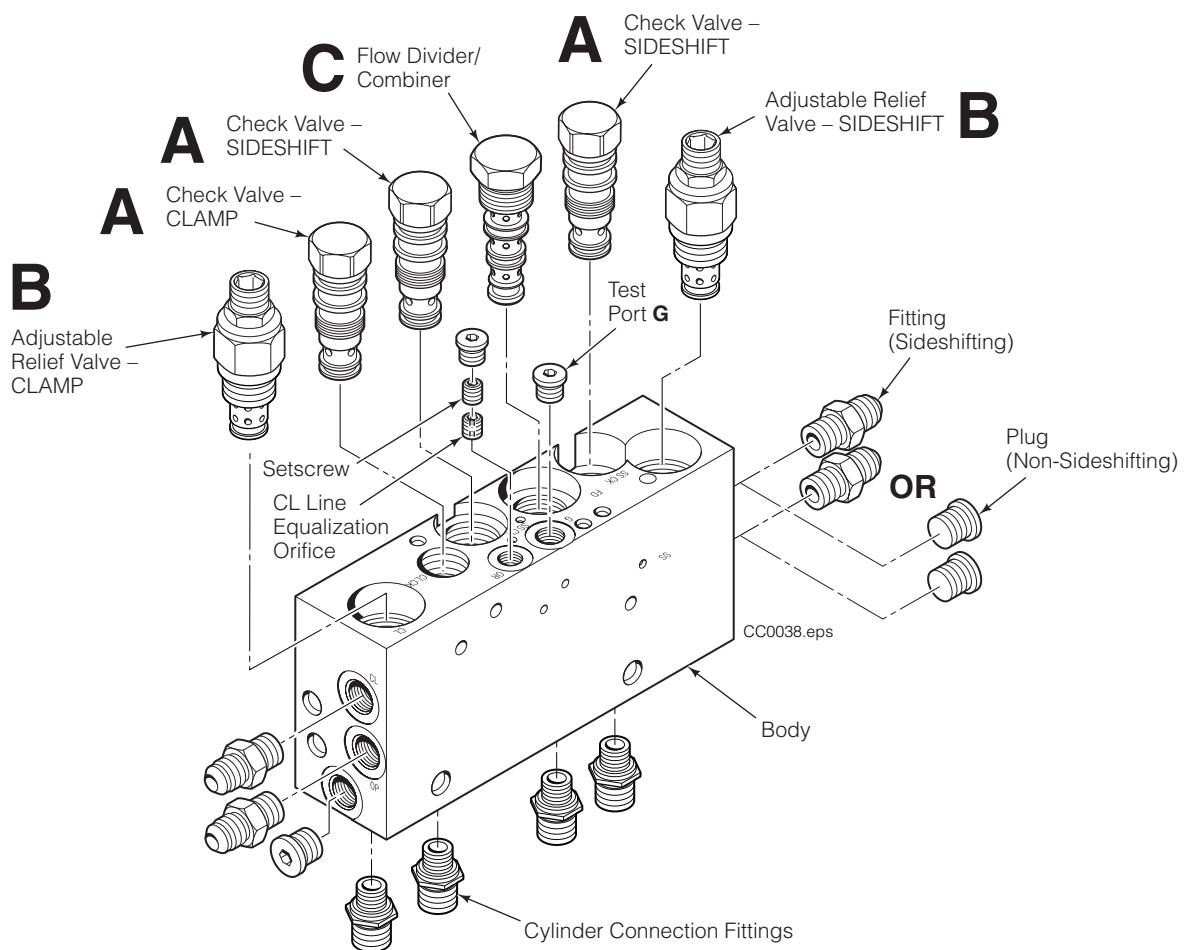
B Adjustable Relief Cartridge



C Flow Divider / Combiner Cartridge

4.3-2 Valve Service (Continued)

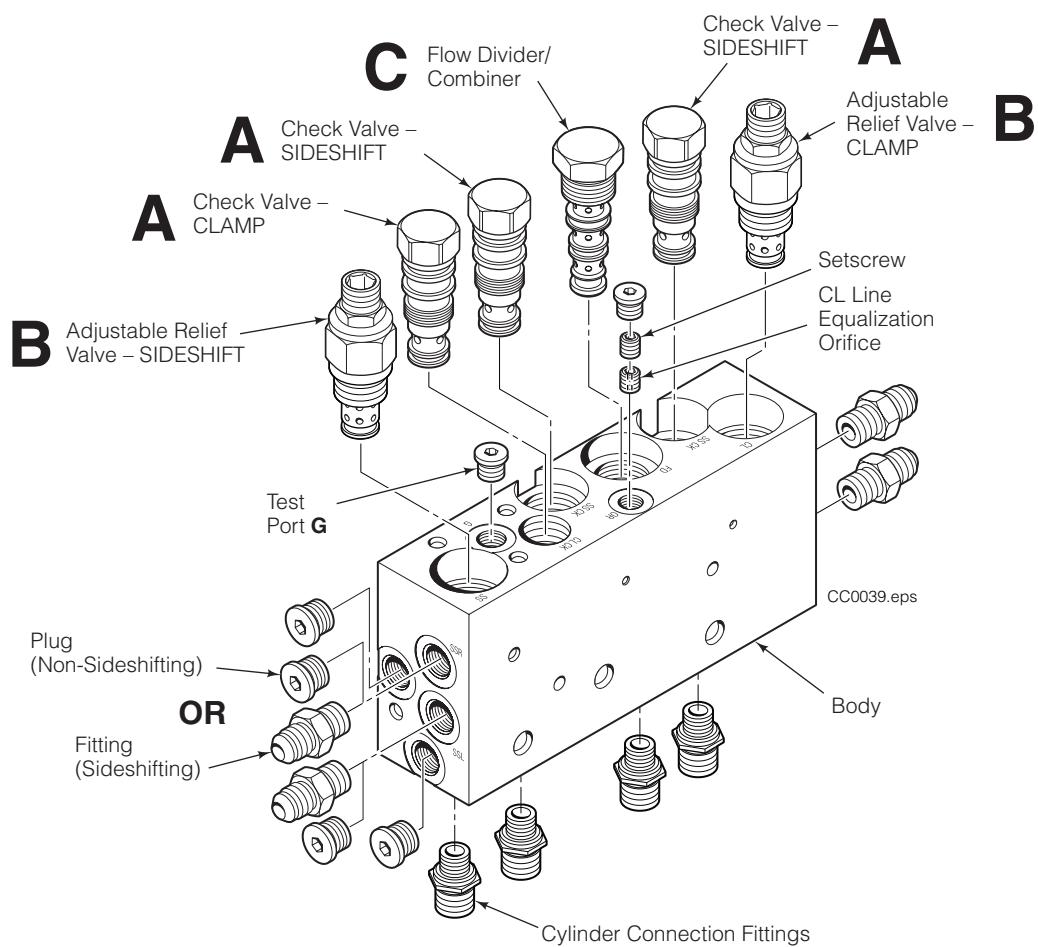
LH CLAMP Port Valve



Back (Driver's) View

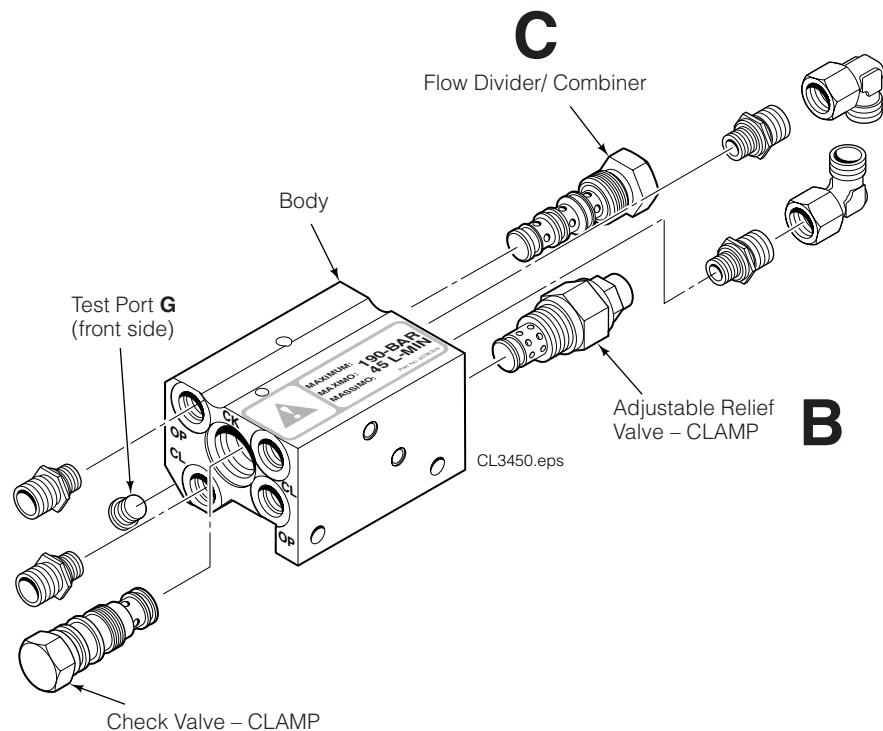
4.3-2 Valve Service (Continued)

RH CLAMP Port Valve



4.3-2 Valve Service (Continued)

Clamp Valve – External Sideshifting



Back (Driver's) View

4.3-3 Relief Adjustments

The valve is equipped with relief valve cartridges in both the sideshift and clamp circuits. Adjustment of these reliefs is recommended to optimize clamp performance.

NOTE: External Sideshift function has no relief adjustment.



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

Clamp Relief Adjustment – Pressure Gauge Method

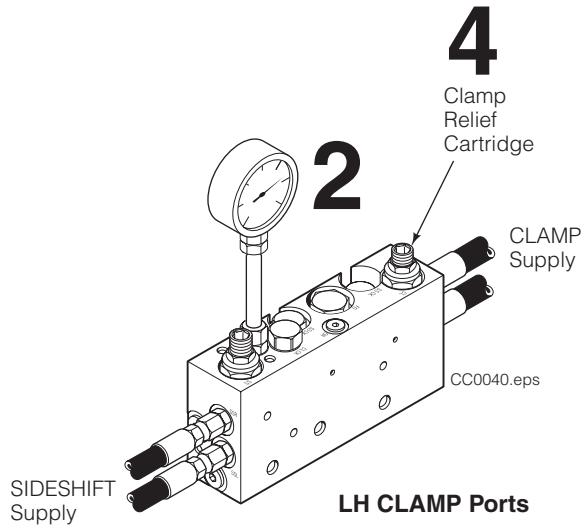
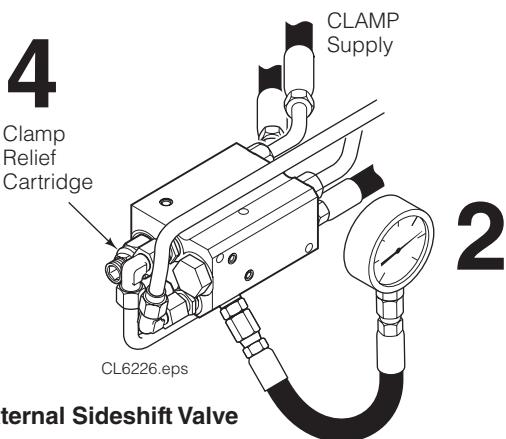
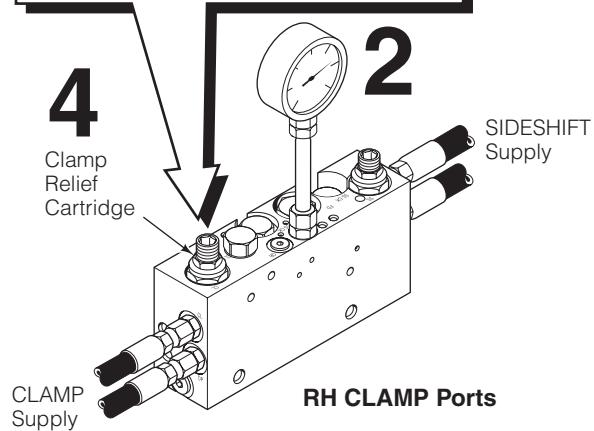
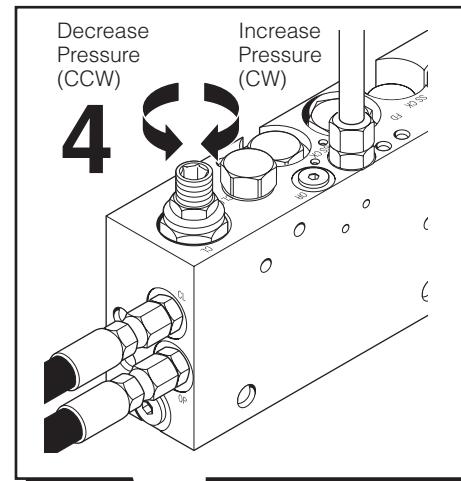
The clamp relief cartridge is set at the factory per the pressure specified on the label on the back of the valve.

The clamp relief cartridge is set at the factory with a system back pressure of 350 psi (24 bar). Actual back pressure with the attachment connected to the truck will vary. It is recommended to verify the clamp pressure as an initial starting point.

- 1 Confirm that TRUCK pressure delivered to the attachment valve is within the range shown on the attachment nameplate.
- 2 Install a 5000 psi (345 bar) pressure gauge (with a No. 4 O-ring fitting) to the valve gauge 'G' port.
- 3 From fully open, close the arms at normal speed to clamp a rigid load, clamp force indicator or fully bottom cylinders. Release truck handle and read pressure gauge. Compare gauge pressure with valve label pressure.
- 4 Adjust the CLAMP relief cartridge to correct pressure. Open arms to release clamp pressure. Turn clockwise (CW) to increase pressure, counterclockwise (CCW) to decrease pressure.
- 5 Repeat Step 3 to confirm setting. Tighten jam nut.

NOTE: When adjusting a clamp equipped with a three position regulator valve, Volumetric Force Control (VFC) or Hydraulic Force Control (HFC), the clamp relief must be adjusted to maximum pressure. Refer to Step 4 to increase pressure. Adjust the cartridge to the maximum position.

NOTE: Adjustment of clamp relief pressure according to load requirements for secure handling and damage reduction is recommended. Adjust the relief cartridge per Steps 1–5 to obtain a desired pressure setting. Pressure is not to exceed the maximum pressure setting on the clamp nameplate. If multiple pressure settings are desired, contact Cascade for options.

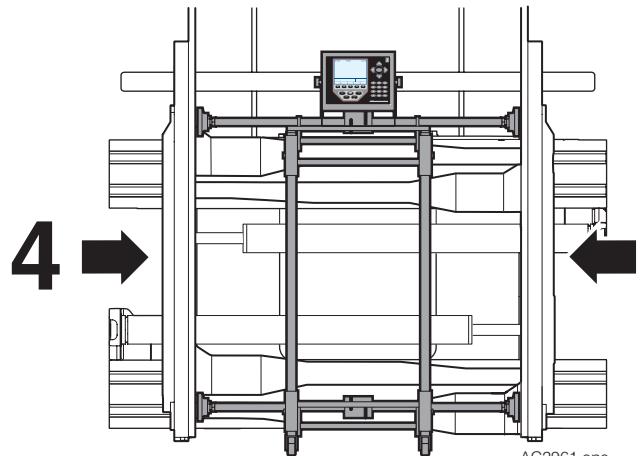


4.3-3 Relief Adjustments (Continued)

Clamp Relief Adjustment – Clamp Force Method

A Clamp Force Indicator or Cascade 4-Point Force Distribution Tester is required for this procedure.

- 1 Extend the arms to the most common load width. Lower the contact pads to just above the floor.
- 2 Position the tester between the contact pads. Adjust the tester's spindle locations to be perpendicular to the contact pad surfaces and to the desired position based on the type of product being handled.
- 3 Set the truck CLAMP circuit to the approximate pressure for the required clamp force on the load.
- 4 Clamp on the tester and hold activated for 5 seconds.
- 5 The tester will display **clamp force** and **percentage of clamp force** for each spindle location and **total clamp force** (sum of force of the four spindles).
- 6 Adjust the truck CLAMP circuit pressure to the required total clamp force for the load.



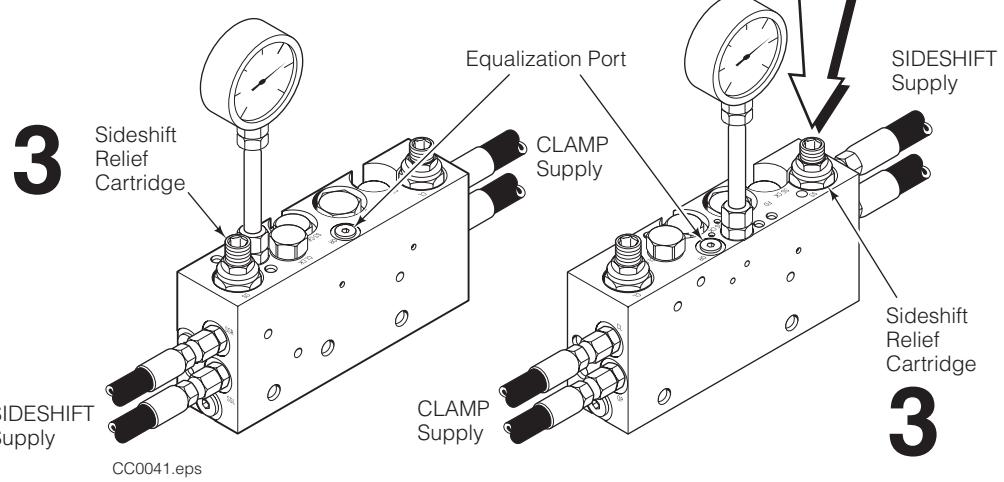
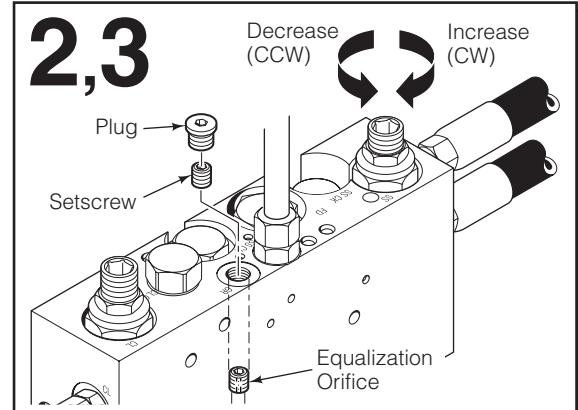
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Sideshift Relief Adjustment (internal SS only)

- 1 Clamp a maximum load and sideshift LEFT and RIGHT observing sideshifting movement:
 - If attachment will not sideshift or sideshifts slowly, adjust SIDESHIFT relief clockwise (CW) until the attachment sideshifts, then go to Step 4.
 - If attachment will not sideshift after attempted relief adjustment, proceed to following Step 2.
- 2 Remove the plug from port 'OR' on top of valve. Remove the interior setscrew plug (5/32 in. or 4 mm Allen socket). This allows flow through the equalization orifice to turn on the clamp line equalization circuit. Reinstall the port plug.
- 3 Adjust the SIDESHIFT relief cartridge counterclockwise (CCW) 1/4 turn increments until sideshift speed slows (relief opening). Finish by adjusting cartridge clockwise (CW) 1/4 turn. Tighten jam nut.



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



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LH SIDESHIFT Ports

RH SIDESHIFT Ports

4.4 Clamp Cylinder

4.4-1 Cylinder Removal and Installation

NOTE: The following procedures can be performed with the attachment mounted on the truck and the arms remaining on the attachment.

- 1 Extend the arms outside the width of the frame.
- 2 If equipped, remove the bumper capscrews and remove the bumper.
- 3 Remove the cotter pin, locking cap and spherical nut retaining the cylinder rod to the arm lug.



WARNING: Before disconnecting hydraulic lines, relieve pressure in the attachment hydraulic system. Turn the truck off and move the auxiliary control levers several times in both directions.

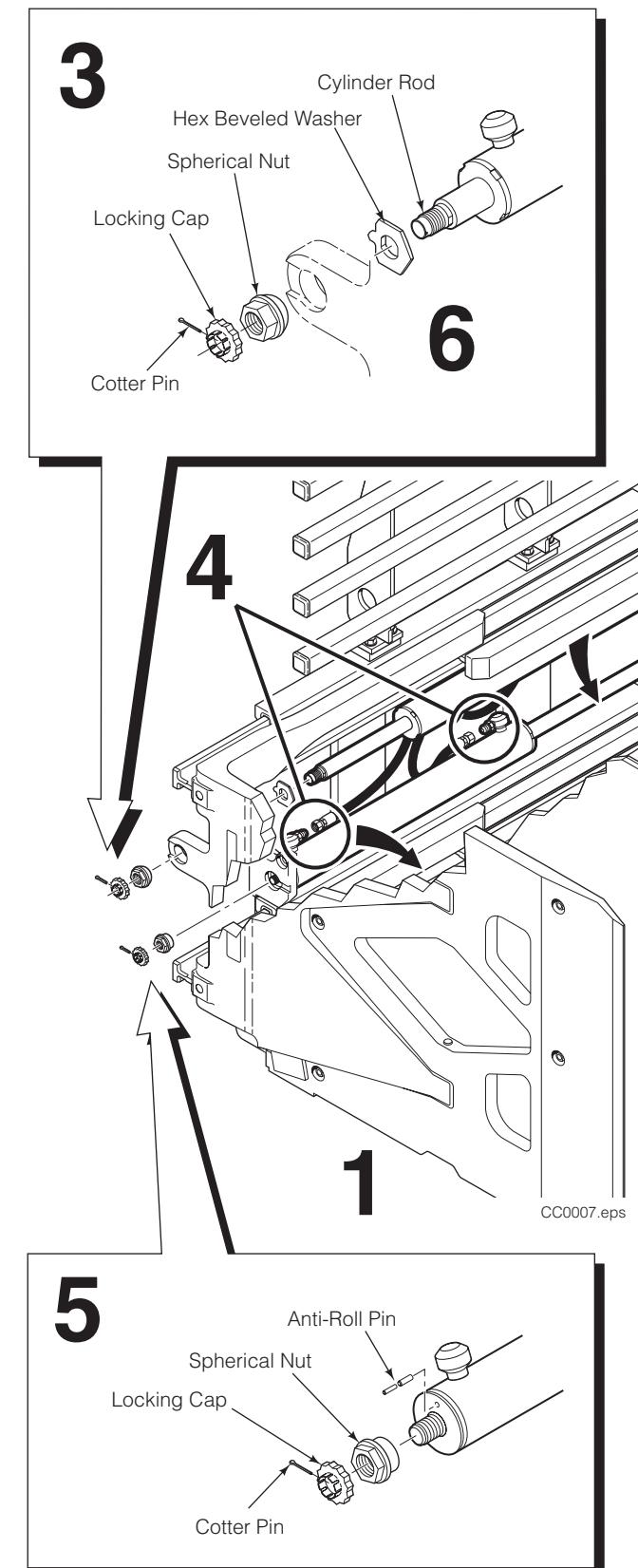
- 4 Loosen the brackets and disconnect the hydraulic lines from the cylinder ports. Keep tubing bends to a minimum. Plug the lines and cap the cylinder ports. Tag lines for reassembly.
 - 5 Disconnect the cylinder base end. Remove the cotter pin, locking cap and nut retaining the cylinder base end to the base unit. Disengage the cylinder from its mounting boss and lift away from the frame. For reassembly, tighten the nut to 200 ft.-lbs. (270 Nm).
 - 6 For reassembly, reverse the above procedures with the following exceptions:
- Lubricate the cylinder rod threads, nut threads and spherical portion of the nut with wheel bearing grease.
 - Install hex beveled washer on the rod end with the beveled side facing the arm lug.
 - Tighten spherical nut to the following torque:

8J-22J – 85 ft.-lbs. (115 Nm)

26J – 232 ft.-lbs. (315 Nm)

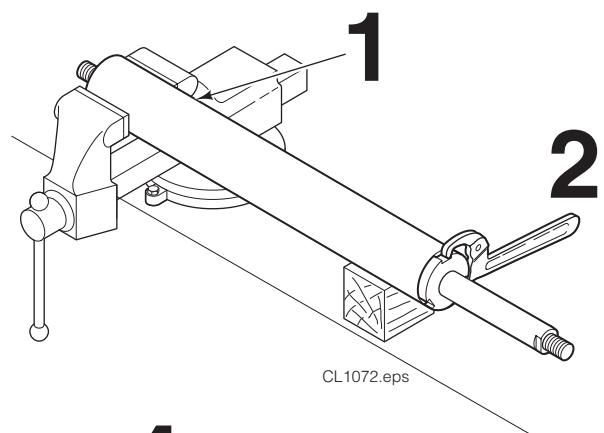
Tighten against hex washer. Nut will not be tight against the arm lug.

- Install locking caps with new cotter pins.
- Make sure anti-roll pin is installed in cylinder base end.
- Cycle attachment through 5 complete cycles to remove trapped air from cylinders.



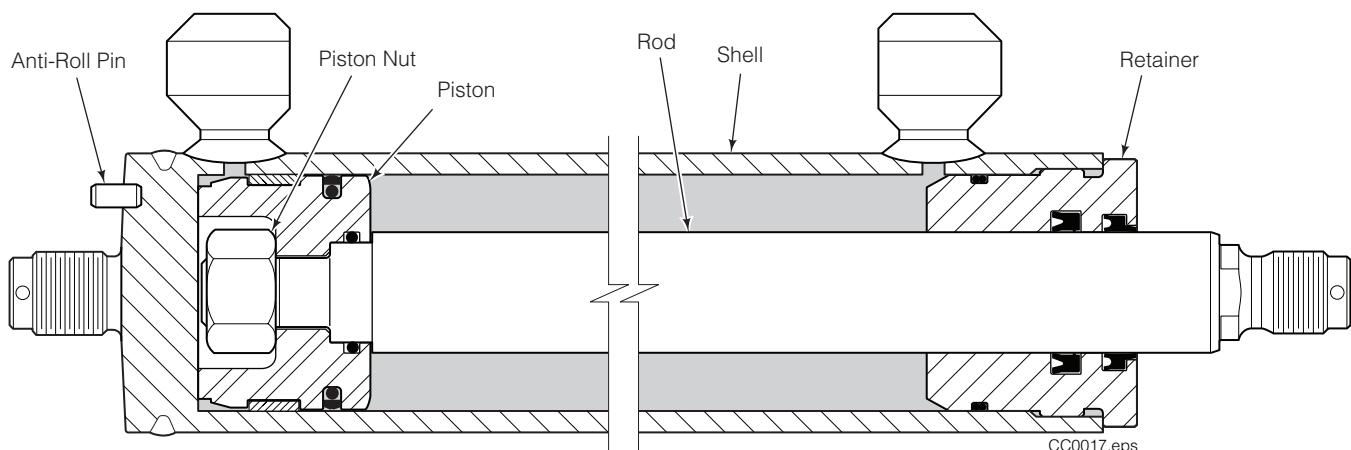
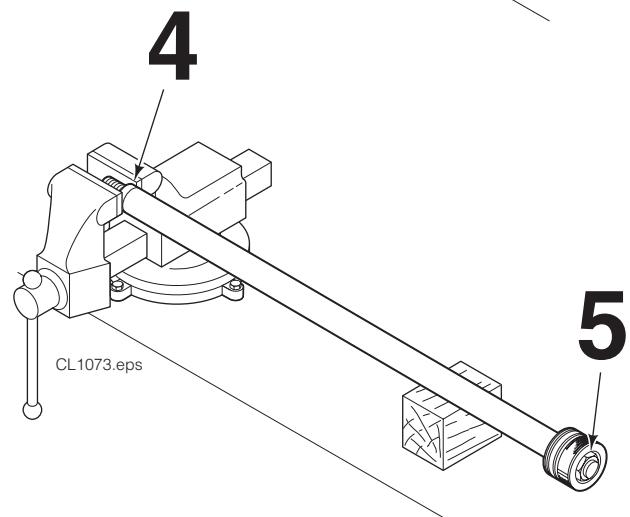
4.4-2 Cylinder Disassembly

- 1 Clamp the cylinder in a soft-jawed vise at the extreme base end only. Do not clamp on the shell.
- 2 Unscrew and remove the retainer using a claw-type spanner wrench as shown. (Cascade Part No. 678598)
- 3 Remove the piston/rod assembly from the cylinder.
- 4 To remove piston, clamp the rod assembly in a vise on the wrench flats, as shown. **CAUTION:** Do not clamp on the cylinder rod sealing surface.
- 5 Remove the piston nut and remove the piston from the cylinder rod.
- 6 Place the piston or retainer in a soft-jawed vise to remove the seals. Pry the seals or O-rings up with a brass seal removal tool (Cascade Part No. 674424) and cut the seals to remove them. **CAUTION:** Do no scratch seal grooves.



4.4-3 Cylinder Inspection

- Inspect the rod, piston and retainer for nicks or burrs. Minor nicks or burrs may be removed with 400-grit emery cloth. If they cannot be removed, replace the parts.
- Inspect the cylinder bore and remove any minor nicks or burrs with a butterfly hone. If they cannot be removed, replace the part.
- Inspect the outside of the shell for any deformities or damage that could impair performance or cause leaks under pressure. If necessary, replace the part.
- Inspect the rod-end anchor parts for wear and replace as necessary.
- Inspect anti-roll pin for wear or looseness and replace as necessary.



4.4-4 Cylinder Reassembly

- 1** Using 400-grit emery cloth, polish the piston and retainer chamfer angles. Remove sharp edges on internal threads in cylinder shell. Clean all parts thoroughly.
- 2** Lubricate all new seals and O-rings with O-ring lube or petroleum jelly.
- 3** Install a new O-ring in the piston ID and the two-piece seal on the piston OD. Make sure that the inner O-ring (round section) is installed in the bottom of the groove, and the composite outer ring is installed on top. Install seals from the rod end side of the piston by hooking one side into the groove and carefully working the seal over the piston, as shown.
- 4** Install the composite wear ring on the piston OD.
- 5** Install a new rod seal and wiper seal in the retainer ID, and a new dual seal on the retainer OD, as shown.
- 6** Apply petroleum jelly to the piston internal O-ring and install the piston on the rod. Tighten the nut as follows:

8J-14J – 220 ft.-lbs. (300 Nm)
18J – 243 ft.-lbs. (330 Nm)
22J – 265 ft.-lbs. (360 Nm)
26J – 310 ft.-lbs. (420 Nm)

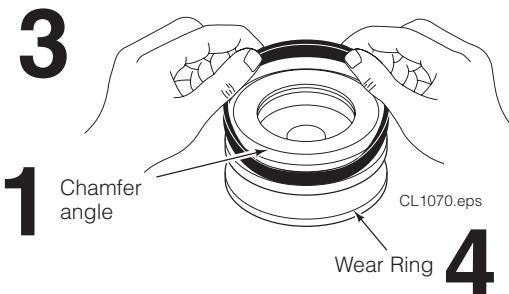
- 7** Apply O-ring lube or petroleum jelly to the piston and shell. Carefully center the piston into the cylinder shell and using a soft-faced hammer drive the piston/rod assembly into the shell.

IMPORTANT: Prior to loading the piston into the shell, make sure that no sharp edges exist on the internal threads within the shell.

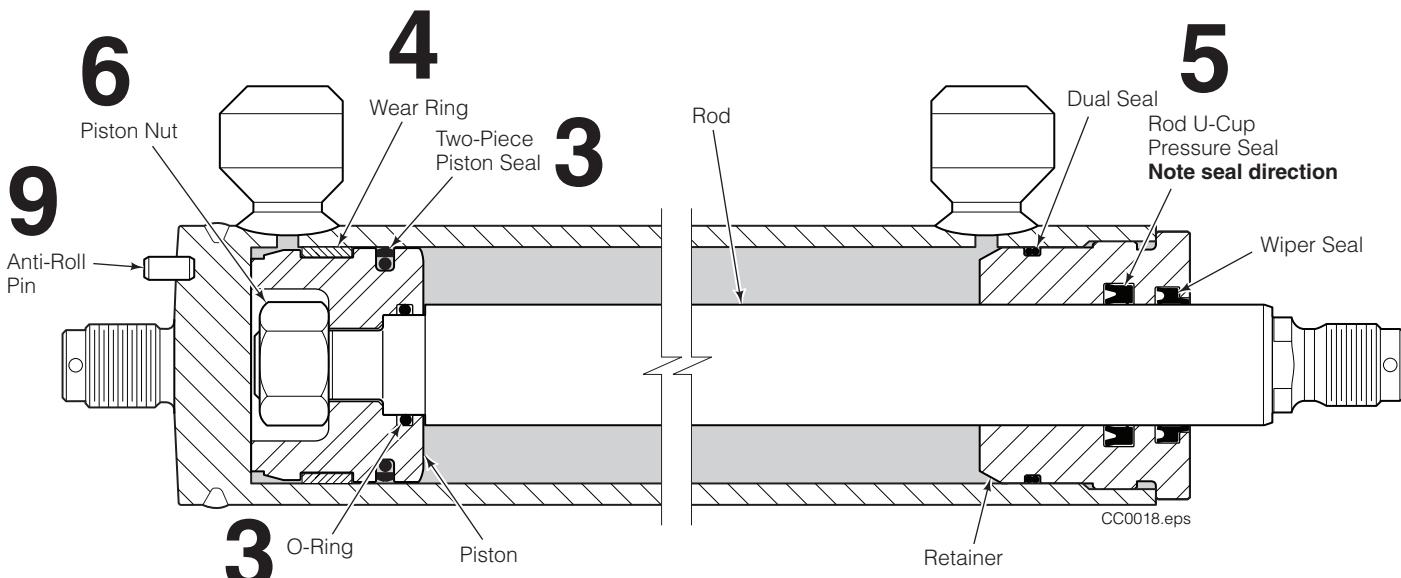
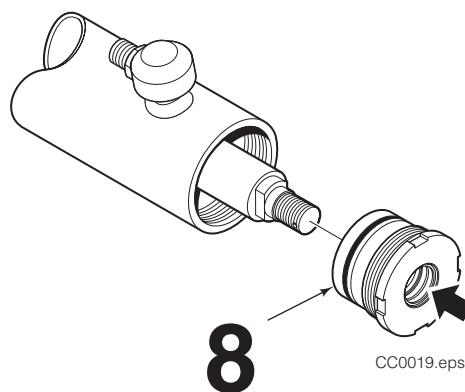
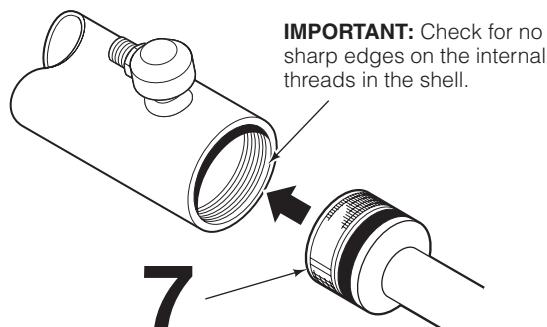
- 8** Apply petroleum jelly to the retainer ID and carefully slide onto the rod. Screw the retainer into the shell. Use a claw-type spanner wrench, tighten the retainer to:

8J-22J – 130 ft.-lbs. (175 Nm)
26J – 243 ft.-lbs. (330 Nm)

- 9** Make sure anti-roll pin fits tightly in place at cylinder base end. Replace if necessary (pin size: M6 x 20).



NOTE: Use internal seal installation tool (Cascade Part No. 599512) to ease installation. If installing by hand, form seal into 'kidney' shape and position into internal groove. Use finger pressure to smooth into groove.

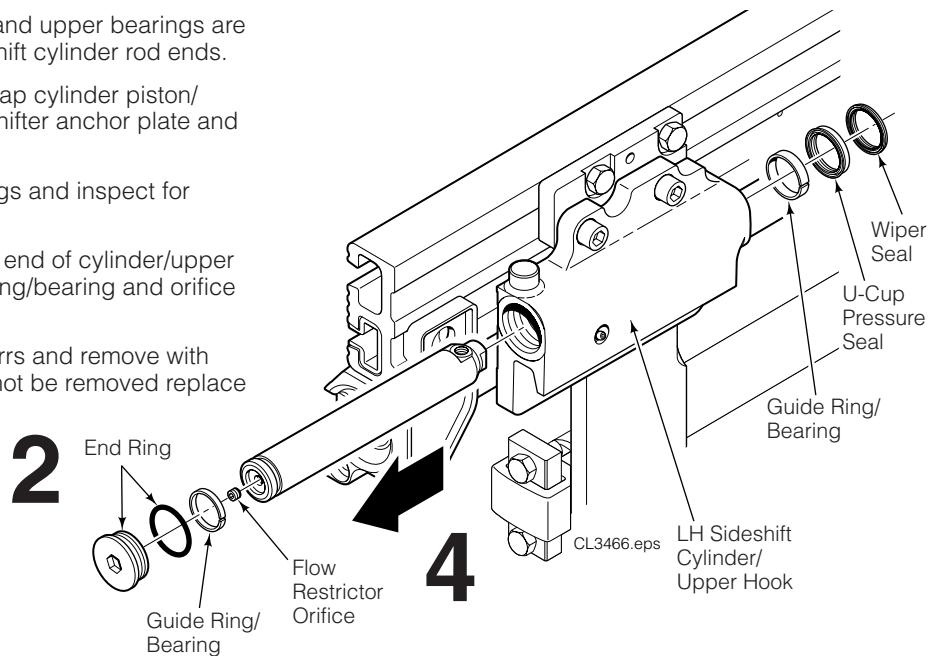


4.5 External Sideshift Cylinder – Servicing on the Attachment

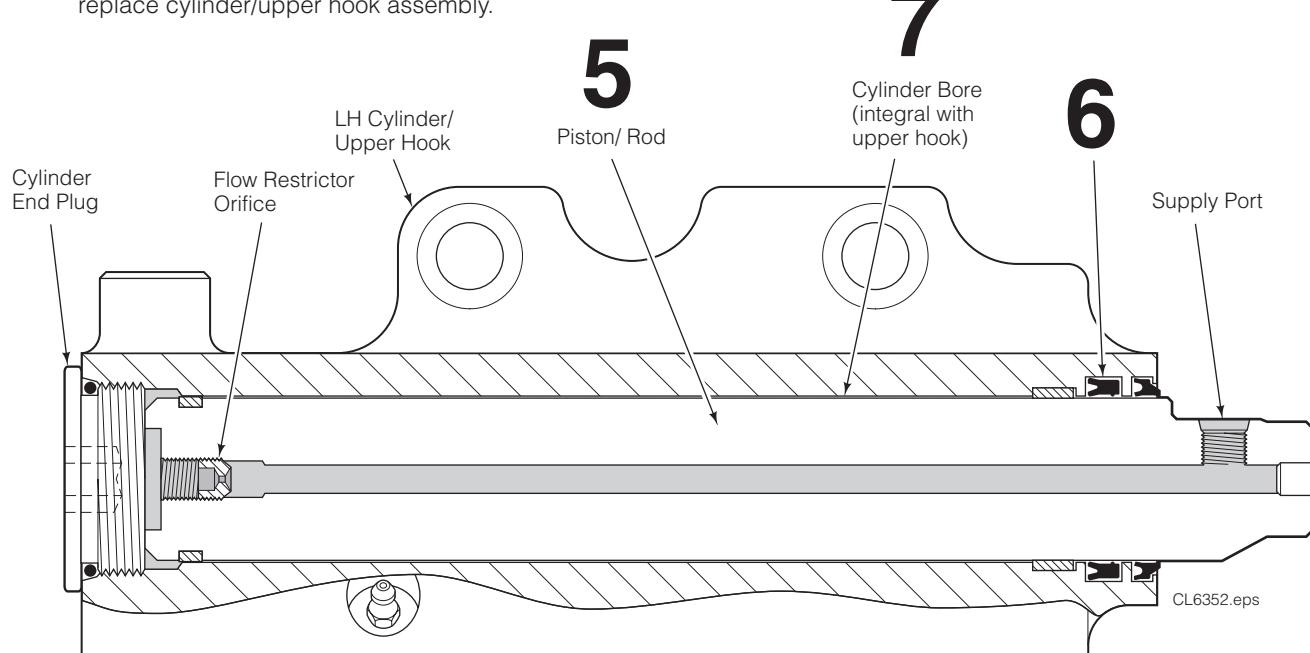
NOTE: Remove attachment from truck to service external sideshift cylinder/upper hook assemblies.

4.5-1 Cylinder Disassembly and Inspection

- 1 Remove attachment as described in Section 4.1.
- NOTE:** Sideshifter anchor plate and upper bearings are retained in upper hooks by sideshift cylinder rod ends.
- 2 Remove cylinder end plugs and tap cylinder piston/rods outward to disengage sideshifter anchor plate and bearings.
- 3 Remove anchor plate and bearings and inspect for wear as shown on next page.
- 4 Drive piston/rod out through plug end of cylinder/upper hook assembly. Remove guide ring/bearing and orifice from head end of piston/rod.
- 5 Inspect piston/rod for nicks or burrs and remove with 400-grit emery cloth. If they cannot be removed replace part.



- 6 Use brass seal extraction tools (Cascade Part No. 674424) and remove wiper seal, pressure seal, guide ring/bearing from cylinder bore in upper hook.
- 7 Inspect cylinder bore and remove any minor nicks or burrs with a butterfly hone. If they cannot be removed, replace cylinder/upper hook assembly.

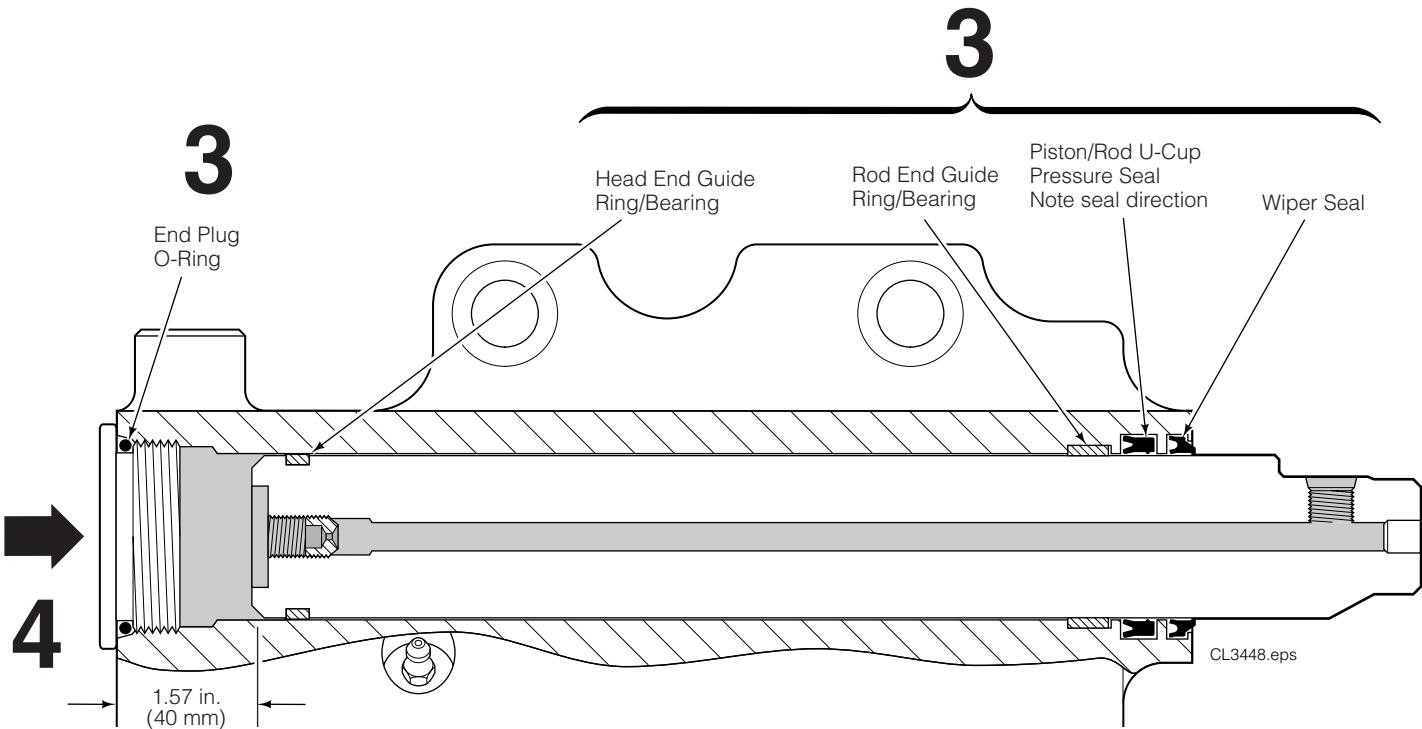
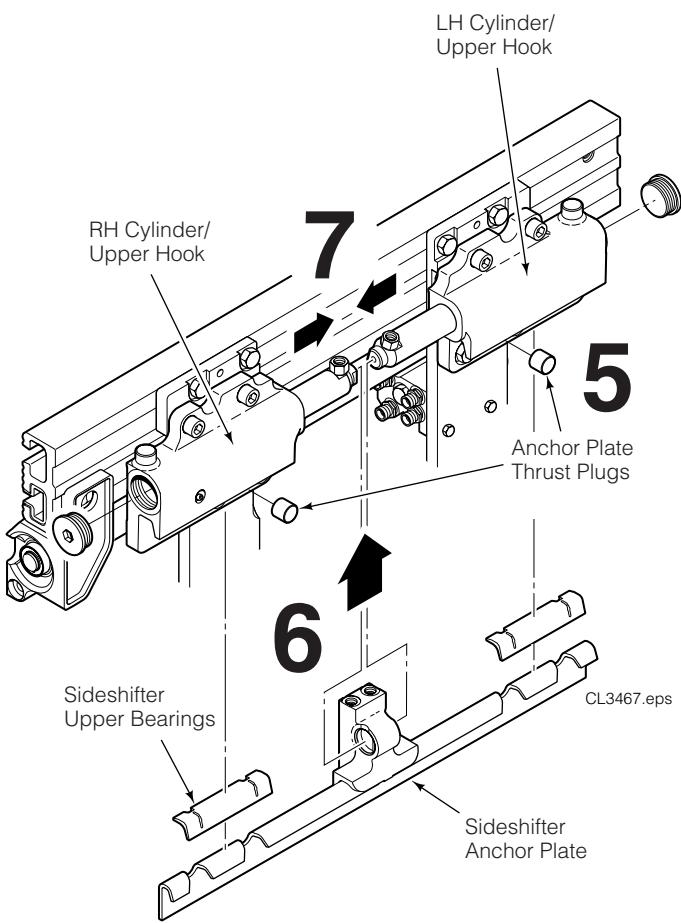


4.5-2 Cylinder Reassembly

- 1 Polish piston/rod chamfer angles if necessary using 400-grit emery cloth. Clean all parts thoroughly with solvent.
 - 2 Lubricate new guide rings/bearings, seals and O-rings with O-ring lube or petroleum jelly.
 - 3 Install new guide rings/bearings, seals and O-rings as shown below. Use brass seal installation tools (Cascade Part No. 674424) to avoid scratches in cylinder bore grooves.
 - 4 Lubricate piston/rod assembly with a thick film of petroleum jelly and drive into cylinder bore from outside, plug end.
- IMPORTANT:** Install piston/rod at least 1.57 in. (40 mm) into cylinder bore to fully engage seals.
- 5 Install anchor plate thrust plugs in upper hooks.
 - 6 Position sideshifter anchor plate and upper bearings into upper hooks.
 - 7 Drive piston/rods into anchor plate center to hold anchor plate and bearings in place.
 - 8 Install new O-rings and install end plugs into cylinders. Tighten end plug to 185 ft.-lbs. (250 Nm).



WARNING: Do not pressurize sideshift cylinders unless installed on mounting frames with anchor plate in place. Sideshifter piston/rod is not retained in cylinder bore.



4.6 Base Unit

4.6-1 Frames and Mounting Plates – Disassembly and Reassembly

NOTE: Some base units have welded mounting plates.

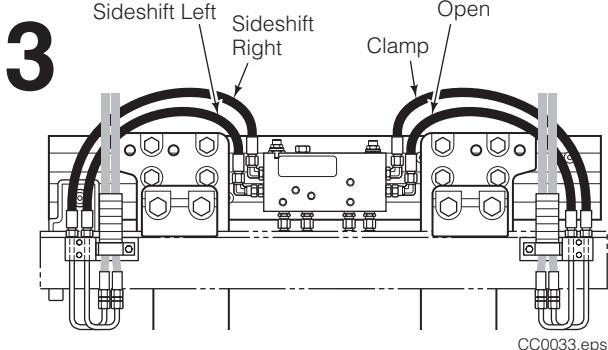
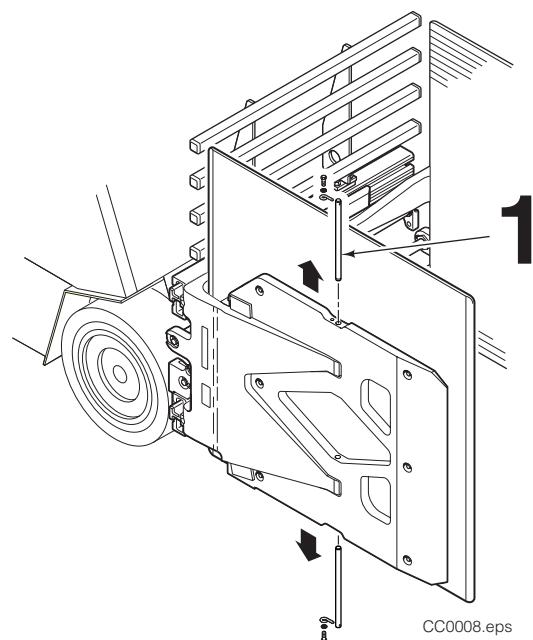
- 1 Remove the arms as described in Section 4.2-1.

NOTE: The contact pad and stabilizer may be removed as an assembly by removing the pivot pins as shown.

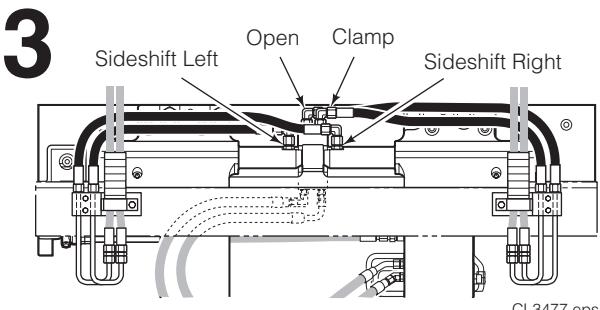
- 2 Remove the cylinders as described in Section 4.4-1.
- 3 Disconnect the supply hoses and remove the valve and hoses as described in Section 4.3-1.
- 4 Disconnect the lower hooks:

Quick-Change Hooks – Remove the locking pins and drop the hooks into the unlocked position. Replace the pins in the lower holes. For reassembly, remove the pins and slide the hooks up to the locked position. Replace pins in the top holes.

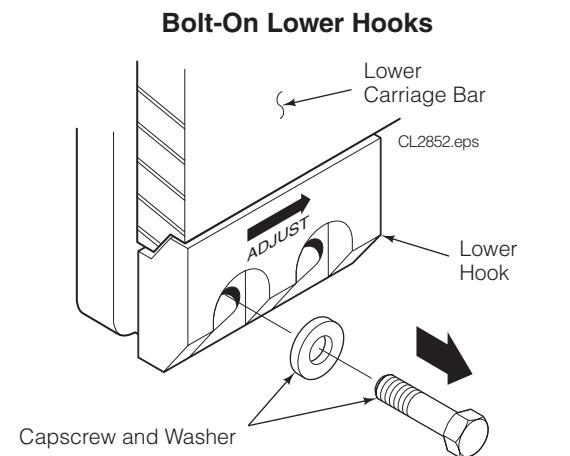
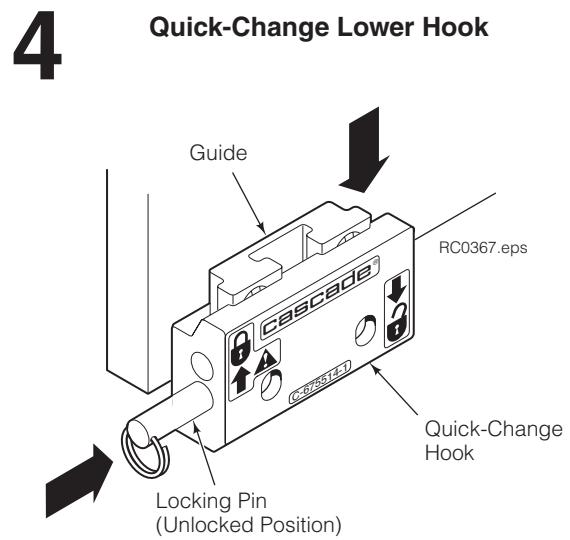
Bolt-On Hooks – Remove the capscrews and mounting hooks. For reassembly, tap the hooks tight against the carriage bar and tighten capscrews to 122 ft.-lbs. (165 Nm).



Internal Sideshifting Attachments
Back (Driver's) View

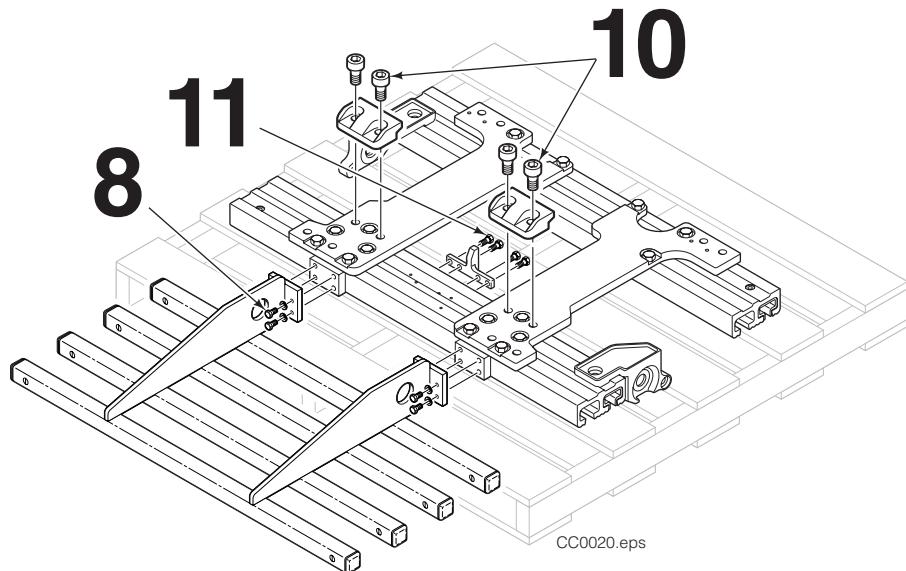
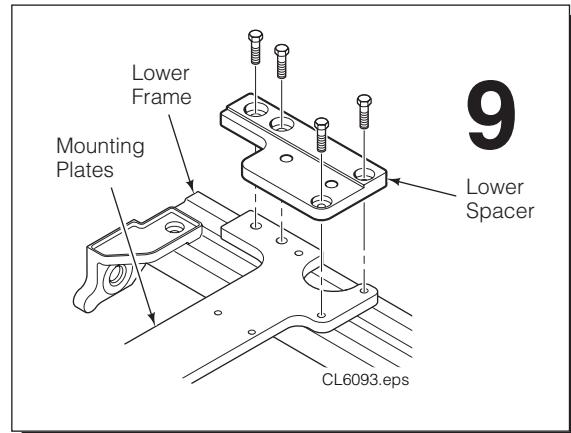
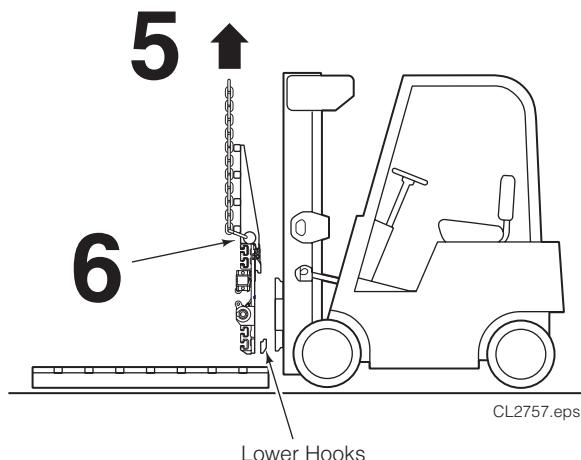


External Sideshifting Attachments
Back (Driver's) View



4.6-1 Frames and Mounting Plates – Disassembly and Reassembly (Continued)

- 5 Attach an overhead hoist to the backrest cutout holes as shown and remove the attachment from the truck.
- 6 Set the attachment frame on a smooth-top pallet or workbench with the mounting plates up.
- 7 If equipped, remove the valve guard. For reassembly, tighten capscrews to a torque of 66 ft.-lbs. (90 Nm).
- 8 If equipped, remove the backrest. For reassembly, tighten the backrest capscrews to 75 ft.-lbs. (100 Nm).
- 9 If equipped, remove the lower spacer from the mounting plates. For reassembly, tighten the mounting plate capscrews to 200 ft.-lbs. (270 Nm).
- 10 Remove the upper mounting hooks, or external sideshifter group. Refer to Section 4.6-2 for external sideshifter removal. For reassembly, tighten capscrews to the following torque value:
 - Class II Hook** – 321 ft.-lbs. (435 Nm)
 - Class III Hook** – 394 ft.-lbs. (535 Nm)
 - External Sideshift Hook (Socket)** – 210 ft.-lbs. (285 Nm)
 - External Sideshift Hook (Hex)** – 173 ft.-lbs. (235 Nm)
- 11 Remove the center key from the upper frame. For reassembly, tighten capscrews to the following torque value:
 - Class II** – 38 ft.-lbs. (52 Nm)
 - Class III** – 66 ft.-lbs. (90 Nm)



4.6-1 Frames and Mounting Plates – Disassembly and Reassembly (Continued)

- 12** Remove the capscrews fastening the mounting plates to the frames and remove the mounting plates.

IMPORTANT: Keep track of shorter capscrew locations (used to avoid damaging arm bearings).

For reassembly tighten capscrews to the following torque:

8J-22J – 200 ft.-lbs. (270 Nm)
26J – 384 ft.-lbs. (520 Nm)

- 13** Inspect arm bar bearings for wear. Replace if any bearing cross-section is worn to less than 0.04 in. (1 mm) thickness. Refer to Section 4.2-6.

- 14** For reassembly, reverse the previous procedures, with the following exception for tightening capscrews:

- Tighten mounting plate capscrews as follows:

A Tighten upper mounting plate capscrews in the sequence shown to 50 percent of final torque value. Make sure upper frame is perpendicular to mounting plates within 0.03 in. (0.8 mm).

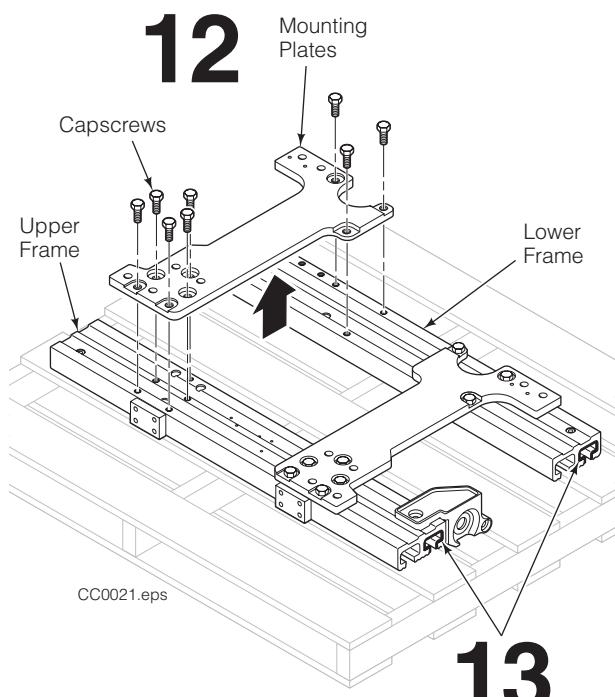
B Double-torque upper mounting plate capscrews by tightening to the final torque value, backing off capscrew one-half turn, and retightening to final value.

C Tighten lower mounting plate capscrews in the sequence shown to 50 percent of final torque value. Make sure lower frame is parallel to edge of mounting plates within 0.03 in. (0.8 mm).

D Trial-fit arms into frames and make sure that arms move free manually and have unrestricted travel. Adjust lower frame as required.

E Double-torque lower mounting plate (and lower spacer, if equipped) capscrews by tightening to the final torque value (shown below), backing off capscrew one-half turn, and retightening to final torque value of:

8J-22J – 200 ft.-lbs. (270 Nm)
26J – 384 ft.-lbs. (520 Nm)

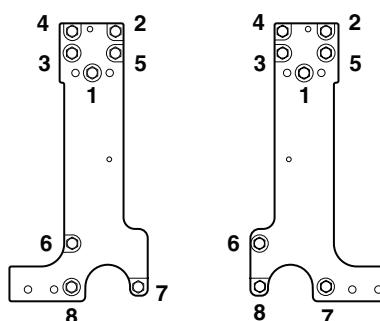


13

Arm Bearings

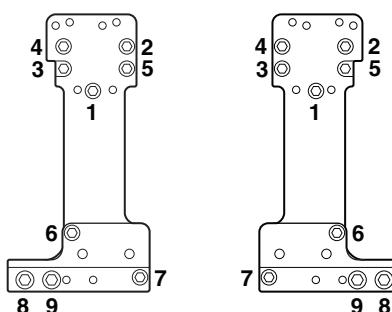
14 Mounting Plate Tightening Sequence

Standard Attachments



CL2783.eps

Attachments with External Sideshift



CC0022.eps

4.6-2 External Sideshifter Group – Removal and Replacement

- 1** Remove attachment from truck as described in Section 4.1.
- 2** Disconnect CLAMP hoses at bottom of manifold on anchor plate. Cap hoses and tag for reassembly.
- 3** Remove cylinder end plugs and drive cylinder rods outward to release sideshifter anchor plate and bearings. For reassembly, drive rods inward to engage anchor plate as shown in Section 4.5-2. Tighten end plugs to 185 ft.-lbs. (250 Nm).
- 4** Inspect sideshifter upper bearings for wear. If any bearing is worn to less than 0.10 in. (2.5 mm) thickness on the back surface, replace all bearings.
- 5** Inspect lower sideshifter bearings for wear. If any bearing is worn to less than 0.10 in. (2.5 mm) thickness on the back surface, replace all bearings. Pry old bearings from lower bearing adapter plates and install new bearings.

NOTE: Bearing adapter plates do not need to be removed unless attachment mounting plates or frames require replacement. Refer to Section 4.6-1.

- 6** Remove cylinder/upper hook assemblies from attachment. Service cylinders as described in Section 4.5. For reassembly, tighten capscrews to the following torque values:

Socket Capscrews (Upper) – 210 ft.-lbs. (285 Nm)
Hex Capscrews (Lower) – 173 ft.-lbs. (235 Nm)

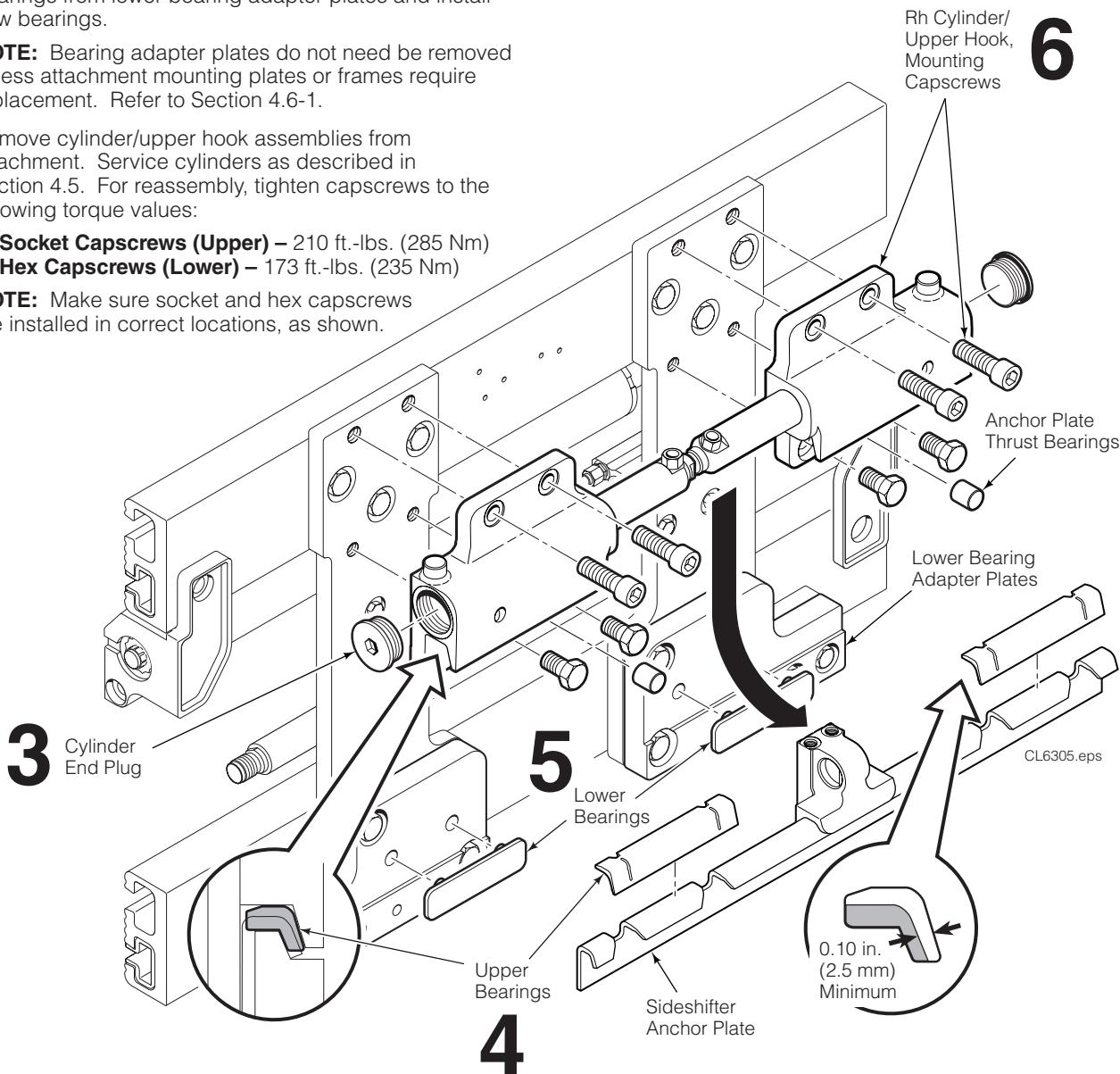
NOTE: Make sure socket and hex capscrews are installed in correct locations, as shown.

- 7** For reassembly, reverse the above procedures with the following exceptions:

- Clean upper and lower sideshifter bearing contact surfaces and bearings (if reused).
- Locate upper bearings in anchor plate cutouts as shown in the detail below.

CAUTION: Make sure bearings are not installed backwards. Bearings must be installed properly in anchor plate for correct lower hook clearance adjustment.

- Apply general-purpose chassis grease to upper bearing grease fittings and lower bearing contact surfaces.



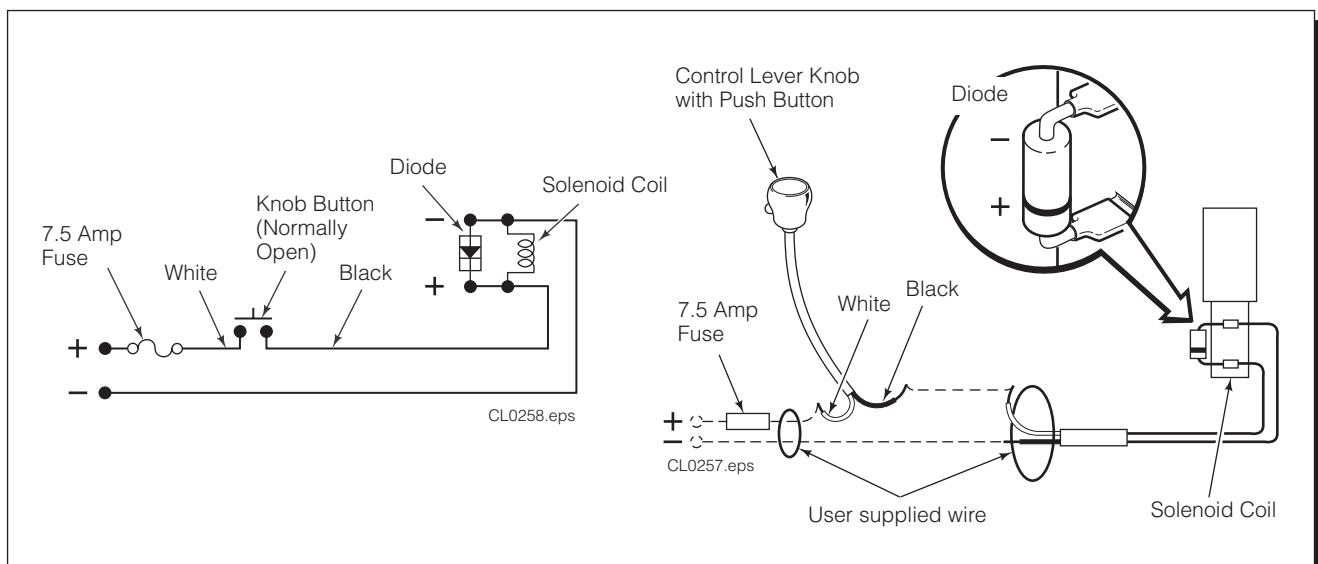
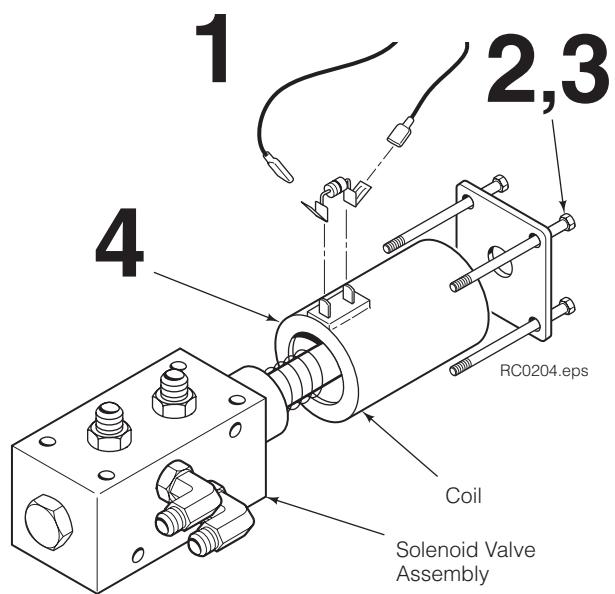
4.7 Solenoid Valve

4.7-1 Coil Service

- 1 Disconnect the wires and diode from the coil terminals.
- 2 Remove the end cover capscrews. Remove the end cover and coil.
- 3 Install the new coil and end cover. Make sure that the terminals are positioned correctly.
- 4 For reassembly, reverse the above procedures except as follows:
 - Refer to the electrical schematic below for correct wire and diode installation.

4.7-2 Valve Service

- Check the plunger within the valve body for freedom of movement. Press end button on coil to assure that valve is not jammed or damaged. If problems are found, replace the solenoid valve as a complete assembly.



5.1 Specifications

5.1-1 Hydraulics

Truck Relief Setting (see attachment nameplate)

Low Pressure	High Pressure	
2245 psi (155 bar)	2755 psi (190 bar)	Recommended
2740 psi (189 bar)	3625 psi (250 bar)	Maximum

NOTE: The attachment valve has separate pressure relief control for the CLAMP and SIDESHIFT functions.

Truck Flow Volume^①

8J thru 26J	Min. ^②	Recommended	Max. ^③
SIDESHIFT Circuit	1 GPM (4 L/min.)	2 GPM (8 L/min.)	3 GPM (12 L/min.)
CLAMP Circuit	5 GPM (19 L/min.)	12 GPM (45 L/min.)	17 GPM (65 L/min.)

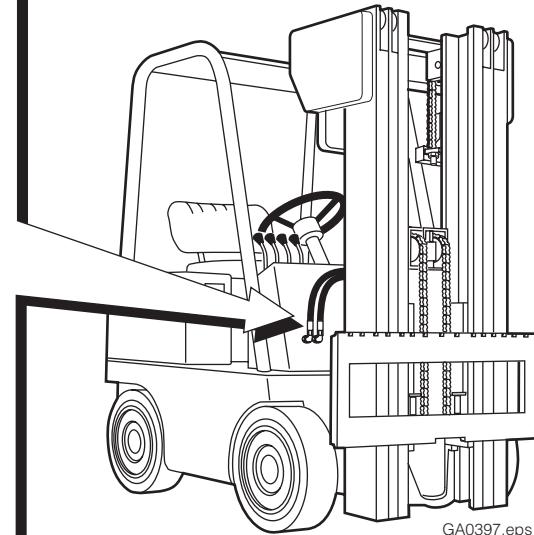
^① Cascade J-Series Carton Clamps are compatible with SAE 10W petroleum base hydraulic fluid meeting Mil. Spec. MIL-0-5606 or MIL-0-2104B. Use of synthetic or aqueous base hydraulic fluid is not recommended. If fire resistant hydraulic fluid is required, special seals must be used. Contact Cascade.

^② Flow less than recommended will result in reduced system performance.

^③ Flow greater than maximum can result in excessive heating, reduced system performance and short hydraulic system life.

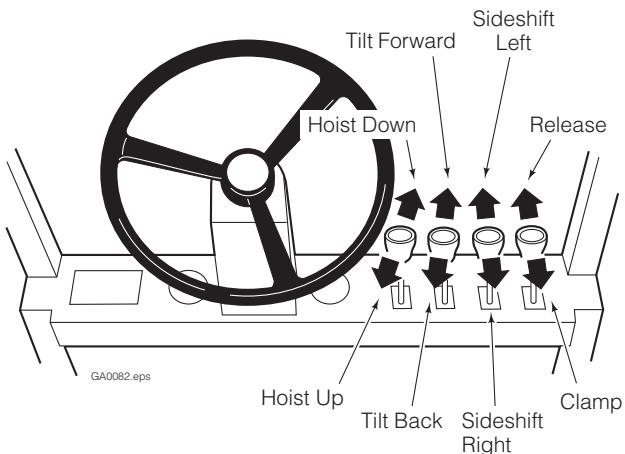
Hoses and Fittings

All supply hoses and fittings must be No. 6 minimum with an orifice size of 7 mm minimum.



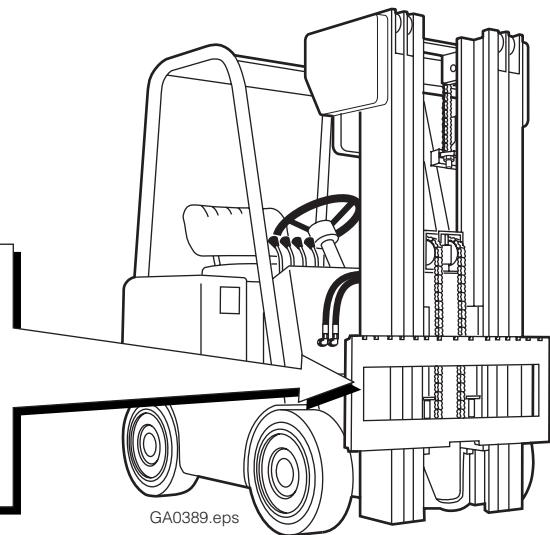
5.1-2 Auxiliary Valve Functions

Check for compliance with ANSI/ITSDF (ISO) standards:



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)



SPECIFICATIONS

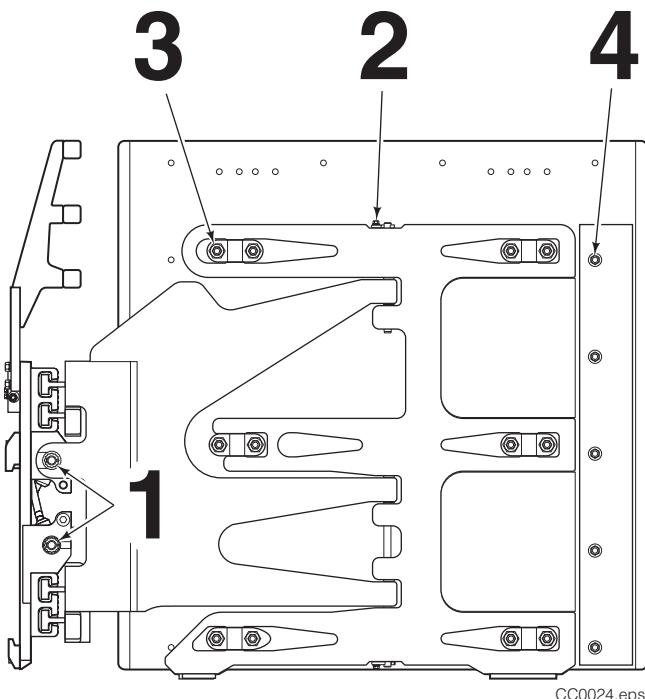
5.1-4 Torque Values

Fastener torque values for J-Series Carton Clamps are shown in the table below in US and metric units. All torque values are also called out in each specific service procedure section through out the manual.

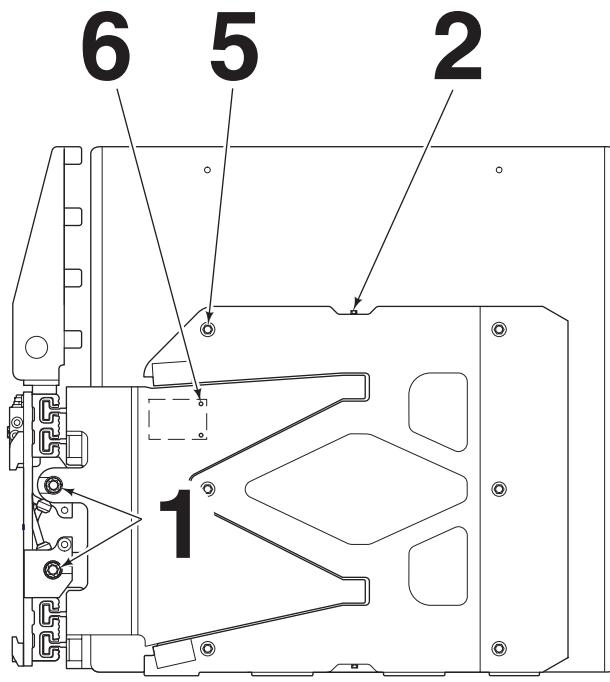
NOTE: All fasteners have a torque value range of $\pm 10\%$ of stated value.

Ref.	Fastener Location	Size	ft.-lbs.	Nm
1	Rod and Base End Nuts	8J-22J	—	85 115
		26J	—	232 315
2	Pivot Pin Capscrews ■	M8	15	20
3	ADJUSTA-BLOCK Nut	M12	66	90
4	Shoe Capscrews	M12	66	90
5	Contact Pad Capscrews	M12	48	65
6	Spring Plate Capscrews ■	M10	30	40

■ Use Loctite 242 (Blue)



Flexible (ADJUSTA-BLOCK) Attachments
(Side View)



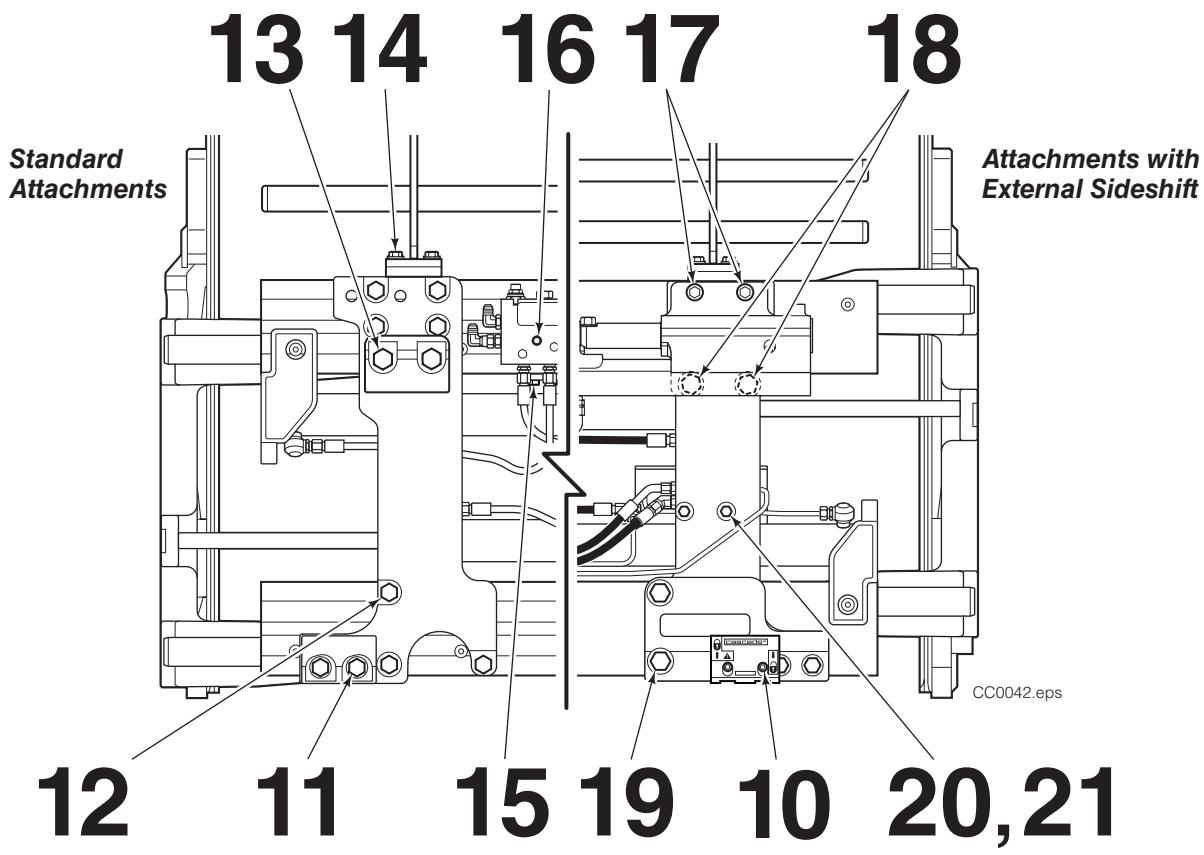
Standard Pad Attachments
(Side View)

5.1-4 Torque Values (continued)

Ref.	Fastener Location	Size	ft.-lbs.	Nm
10	QD Guide Capscrews	M16	122	165
11	Lower Hook Capscrews	M16	122	165
12	Mounting Plate ▲	8J-22J	M16	200
		26J	M20	384
13	Upper Hook Capscrews	Class II	M20	321
		Class III	M20	395
14	Backrest Capscrews	M12	75	100
15	Centering Tab Capscrew	Class II	M10	38
		Class III	M12	66
16	Valve Capscrews	M6	6	8
17	Sideshifter Upper Hook Socket Capscrews ▲	M16	285	210
18	Sideshifter Upper Hook Hex Capscrews ▲	M16	235	173
19	Sideshift Lower Bearing Plate Capscrews ▲	M16	270	200
20	Valve Mounting Capscrews ■	M10	38	28
21	Valve Bracket Capscrews	M8	26	19

■ Use Loctite 242 (Blue)

▲ Double-Torque (tighten, loosen 1/2 turn, retighten)



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**AMERICAS**

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