



Service Manual

Load Push
Load Push/Pull

Manual Number 667450

cascade[®]
corporation

P.O. Box 20187 • Portland, Oregon 97220 • (503)666-1511

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Introduction and Description

This manual includes service instructions for the load push and load push/pull. These two attachments have the following common components: carrier assembly, forks or platens, pantograph mechanism and cylinders. The load push uses a relief valve. The load push/pull valve includes a sequence plunger along with relief valve. The load push/pull also has a gripper assembly incorporated into the faceplate.

Both attachments are designed to handle palletless loads. The cylinders power the pantograph mechanism and faceplate which pushes a load off the forks. The load pull faceplate includes a gripper assembly which grips a slip sheet under the load so the cylinders can pull a load onto the forks.

Frame Service

The load push, push/pull frame includes a carrier assembly which mounts to the truck carriage and carries the forks or platens and a pantograph mechanism which pushes and/or pulls

the load. Sideshifting and non-sideshifting carriers are available for either attachment. The sideshifting carrier is serviced like the "L" series sideshift.

Pantograph Mechanism Service

Adjustments to the pantograph mechanism can be made without removing the attachment from the truck. Realignment of the faceplate by bleeding the push/pull cylinders is covered on the installation forms 5130, or 5138 (non-sideshifting).

DISASSEMBLY and INSPECTION

Faceplate and Secondary Arms (See Fig. 1)

1. Extend the faceplate.
2. Unpin the stabilizer bar and swing it away from the faceplate.
3. Remove the center pivot pin where the two secondary arms cross. Note the location of the shims and washers.
4. Remove the pins joining the secondary and primary arms. Pull the secondary arms and faceplate away from the primary arms. Note the location of the shims.
5. Swing the secondary arms parallel to the faceplate and lift the arms to free them from the roller channels in the faceplate.

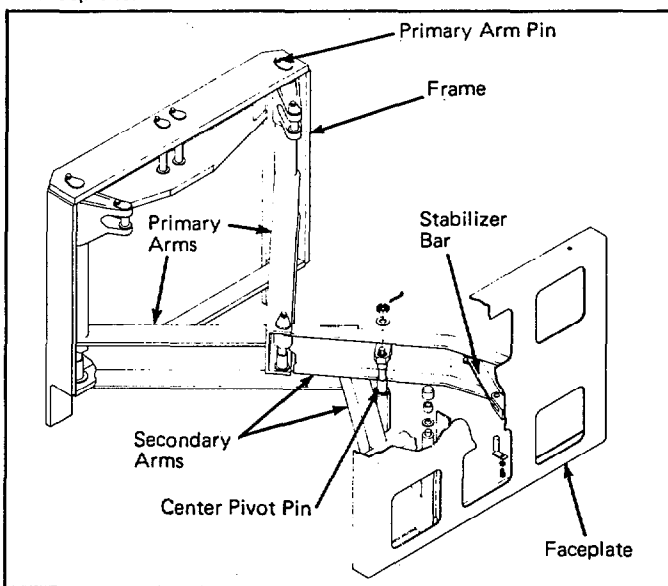


Figure 1. Pantograph Mechanism

Gripper Assembly Removal (See Fig. 2)

1. Remove the gripper cylinder rod retainment.
2. Let the jaw drop and rest on the channel.
3. Remove the capscrews holding the channel to the faceplate.
4. Remove the gripper jaw and channel.

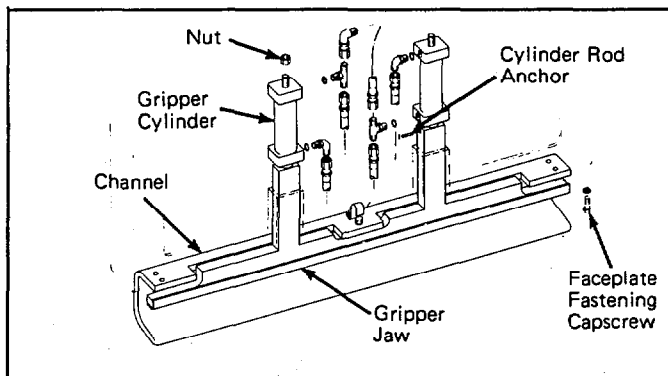


Figure 2. Gripper Assembly

Algrip Pad Replacement (See Fig. 3)

1. Grind off the skip welds and remove the Algrip surface. Grind the gripper jaw smooth. Skip weld the new Algrip surface in place. Use welding rod E-7018. See Figure 3(Algrip Pad).

Bolt-on Pad Replacement (See Fig. 3)

1. Remove old pad. Replace with new pad and torque the capscrews to 9-12 ft.-lbs., see Figure 3(Bolt-on Pad).

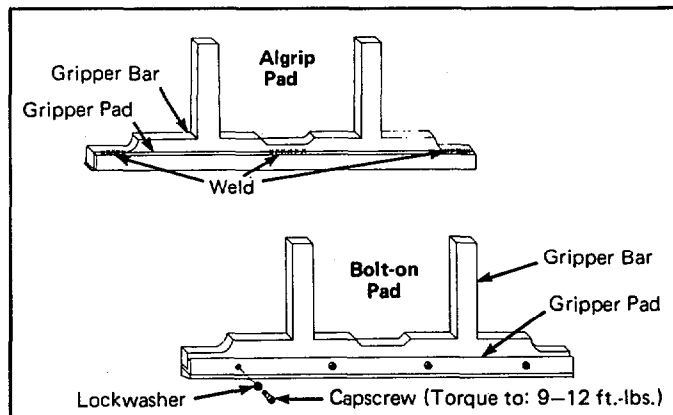


Figure 3. Gripper Pad Replacement.

Primary Arms

To complete the disassembly of the pantograph mechanism the primary arms must be removed. The primary arms can also be disconnected to remove the complete pantograph mechanism and faceplate from the attachment frame.

1. Remove the pins from the rod end of the two push/pull cylinders.

- Each arm pivots on a pin running the height of the frame. Remove the capscrews from the ears on top of the frame and pull the pin out of the frame. **Do not pry on the ear.** If the pin sticks use a soft punch to drive the pin out from the bottom. Inspect the brass washers for wear. Replace the washers if they are scored or if they are worn unevenly.

ASSEMBLY

Assembly of the pantograph mechanism is the direct reversal of disassembly with the following exceptions:

- Inspect all shims and washers and replace any that are scored or worn unevenly.
- Inspect the teflon bushings for wear and replace if the coating is scored or worn through. **NOTE:** Cascade recommends lubricating the bushings.
- The following tolerances must be met on reassembly by properly shimming the primary pivot points. See Figure 4.

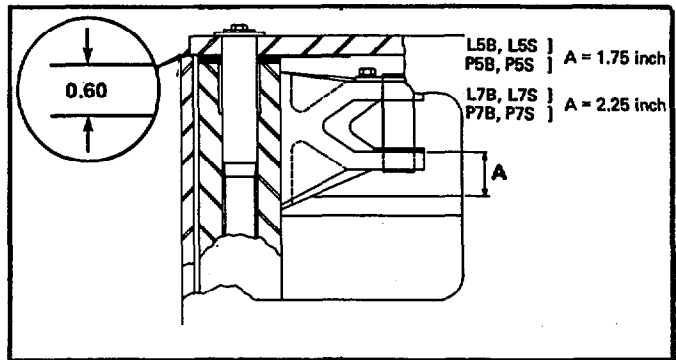


Figure 4. Pantograph Tolerances

- Shim the primary arms at the bottom to achieve dimension "A".
- When dimension "A" is met there must be .060 inch clearance at the top of the primary arm.

Cylinder Service

CYLINDER REMOVAL

Push/Pull Cylinder

- Extend the faceplate.
- Remove the hoses to each cylinder. Tag and cap the hoses and ports.
- Remove the rod and shell end anchor pin and lift the cylinder out of the frame.
- The cylinders are not interchangeable. They have identical outside dimensions but the right hand cylinder has a larger inside diameter. Mark the cylinders before removing.

Gripper Cylinder (Load Pull Only)

- Remove the hoses at the cylinder and cap the hoses and ports.

- Remove the retainment that fastens the gripper jaw to the cylinder rod. The gripper jaw must be up to expose the retainment.
- Remove the self-locking nut securing the cylinder base to the faceplate. Remove the cylinder.

CYLINDER DISASSEMBLY

Push/Pull Cylinder (See Figure 5 and 6)

- Service the cylinder in a clean work area with adequate room to lay out the cylinder components.
- Place the cylinder pivot end in a soft-jawed vise. **Do Not clamp the cylinder shell in the vise.**
- Use a socket wrench to loosen the setscrew (found only on older cylinder) from the threaded washer. See Figure 5.

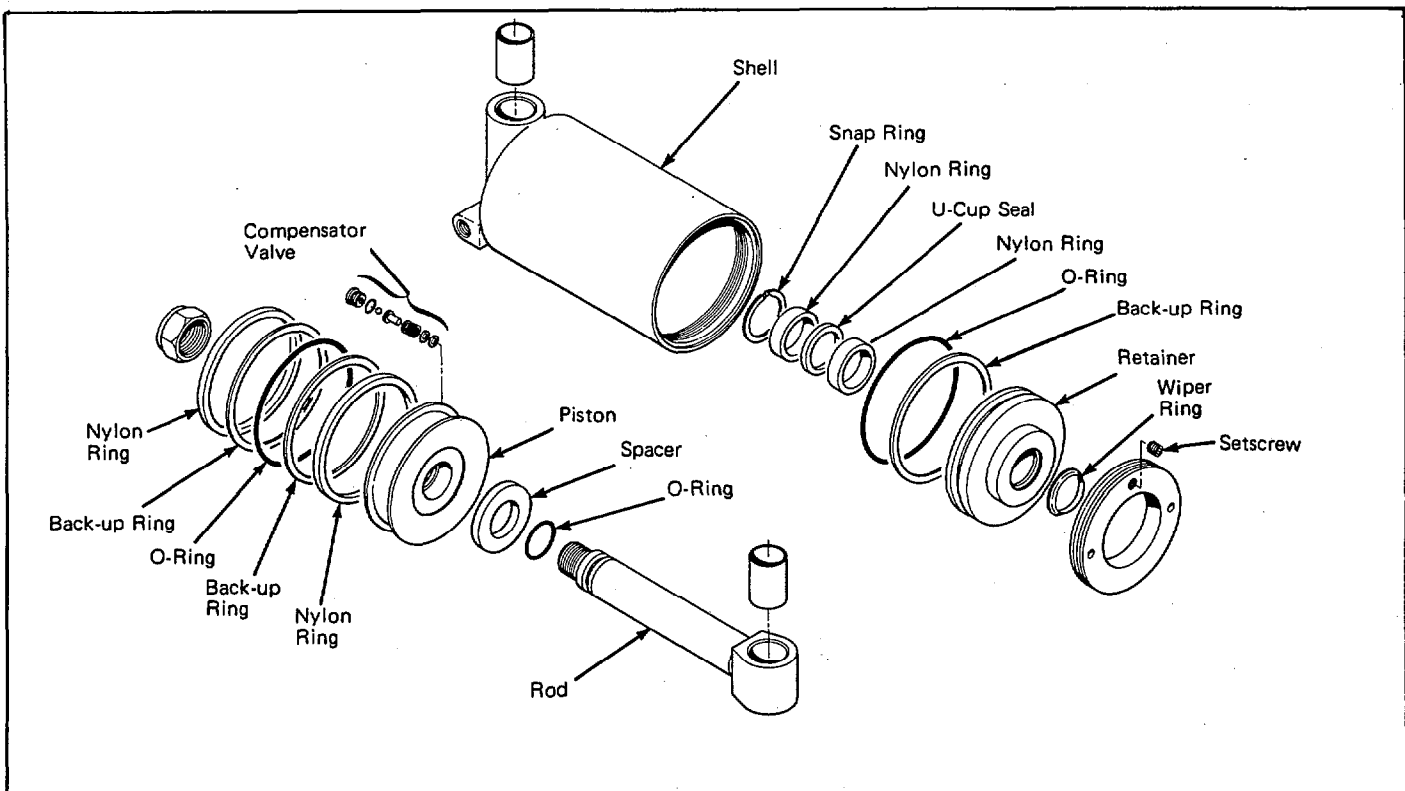


Figure 5. Push/Pull Cylinder-Two Piece Retainer

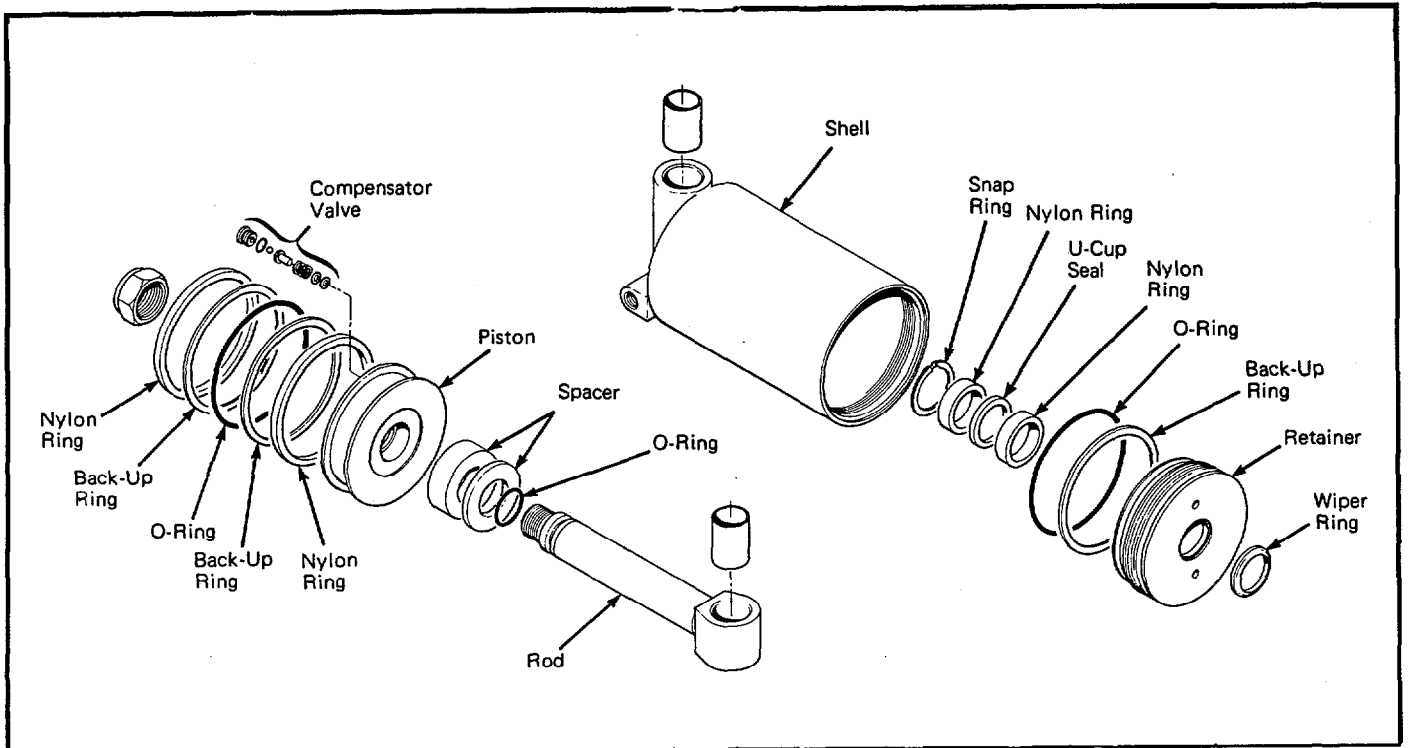


Figure 6. Push/Pull Cylinder-One Piece Retainer

4. Use a pin type spanner wrench to remove the threaded washer/retainer from the shell.

NOTE: Do not use a hammer and punch to loosen the retainer. The proper spanner wrench is shown in Figure 7.

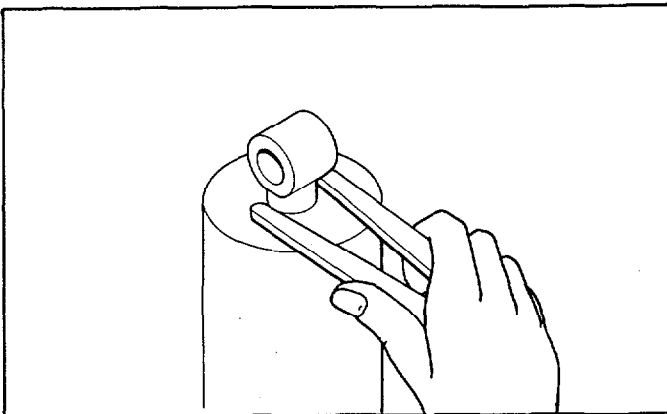


Figure 7. Use a Pin Type Spanner Wrench

5. Pull the rod and piston assembly straight out of the shell. Inspect the shell for scoring. A scored shell must be replaced.
6. Inspect the rod for nicks or scratches. Nicked or scratched rods must be replaced.
7. To remove the piston nut clamp the cylinder rod end flat in a vise. Remove the piston nut. Slide the piston off the rod.
8. Remove the compensator valve from the piston. Inspect the ball and seat for wear. The free length of the spring should be 1 inch.
9. Slide the retainer off the rod and remove the snap ring from the inside bore of the retainer.

Gripper Cylinder (See Fig. 8)

1. Service the cylinder in a clean work area with adequate room to lay out the cylinder components.
2. Place the retainer in a vise using brass jaws or wood blocks to prevent cylinder damage.
3. Remove the four retaining capscrews and separate the head, retainer, tube, and plunger

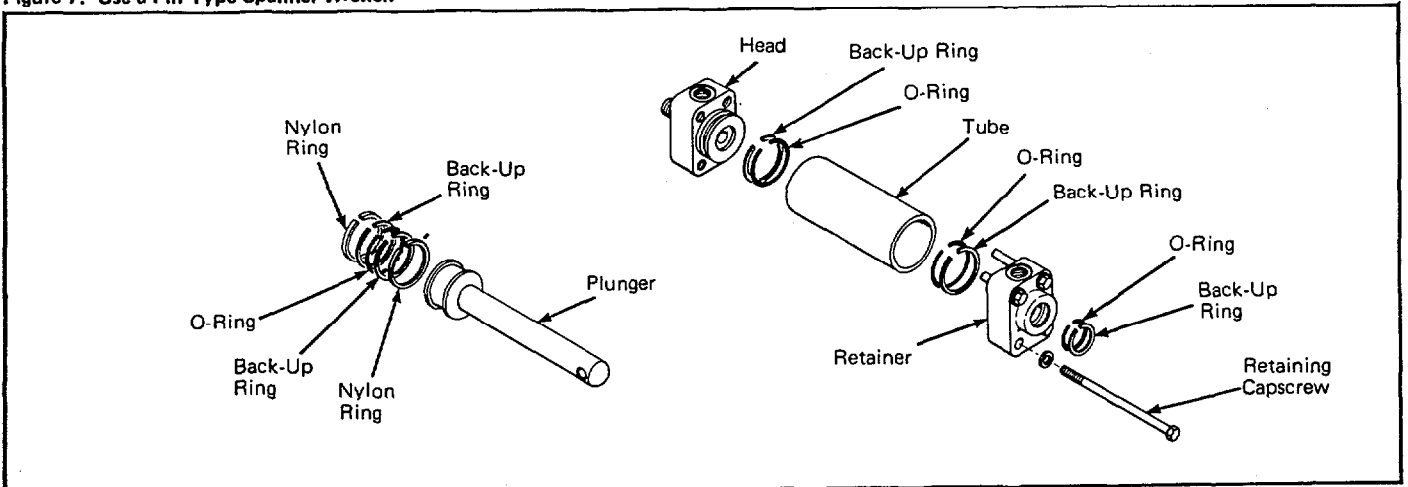


Figure 8. Gripper Cylinder

SEAL REPLACEMENT (See Figures 10, 11 and 12)

Both the push/pull and gripper cylinders use O-ring piston seals. The push/pull uses a U-cup rod seal.

1. Piston seals can be pried out of their groove with a dull screwdriver. See Figure 9.

NOTE: Do not scratch the machined groove or leakage will result

2. Push/pull rod seals slide out of the groove with the snap ring removed. Gripper cylinder rod seals can be carefully pried out of their groove with a dull screwdriver.

3. Replace all soft parts, (O-rings, seals, etc.) after lubricating seals with STP.

NOTE: The open side of the retainer cup seal in the push/pull cylinder must face the piston end of the cylinder. Use STP for assembly lubrication. See Figure 11 or 12.

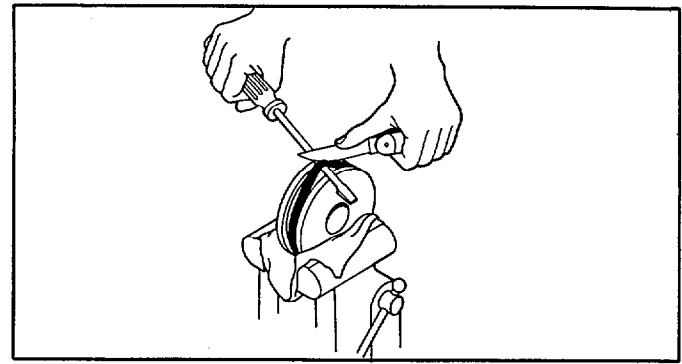


Figure 9. Remove Seal With Dull Screwdriver

CYLINDER ASSEMBLY AND INSTALLATION

Assembly and installation is a direct reversal of the removal and disassembly procedure with the following exceptions:

1. Coat all seals with STP.
2. When reassembling the gripper assembly tighten the self-locking nut securely then back off one half turn to allow the cylinder to align during gripper jaw operation.

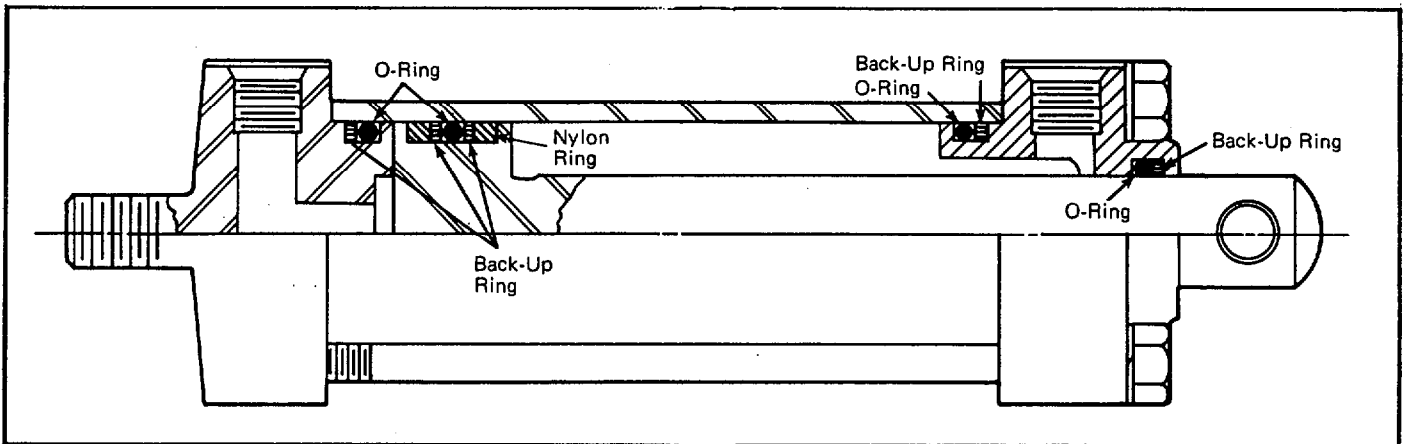


Figure 10. Gripper Cylinder Seal Cutaway

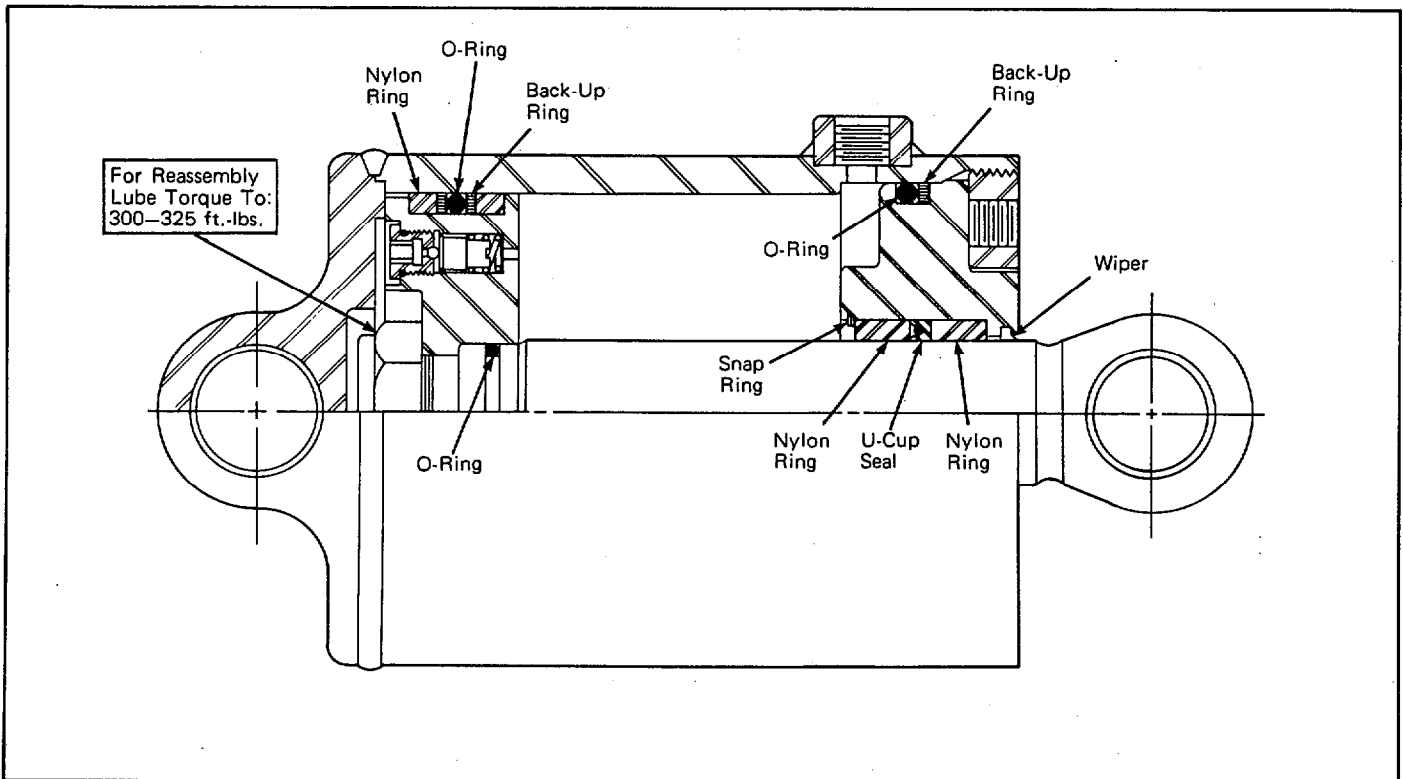


Figure 11. Push/Pull Cylinder Seal Cutaway-Two Piece Retainer

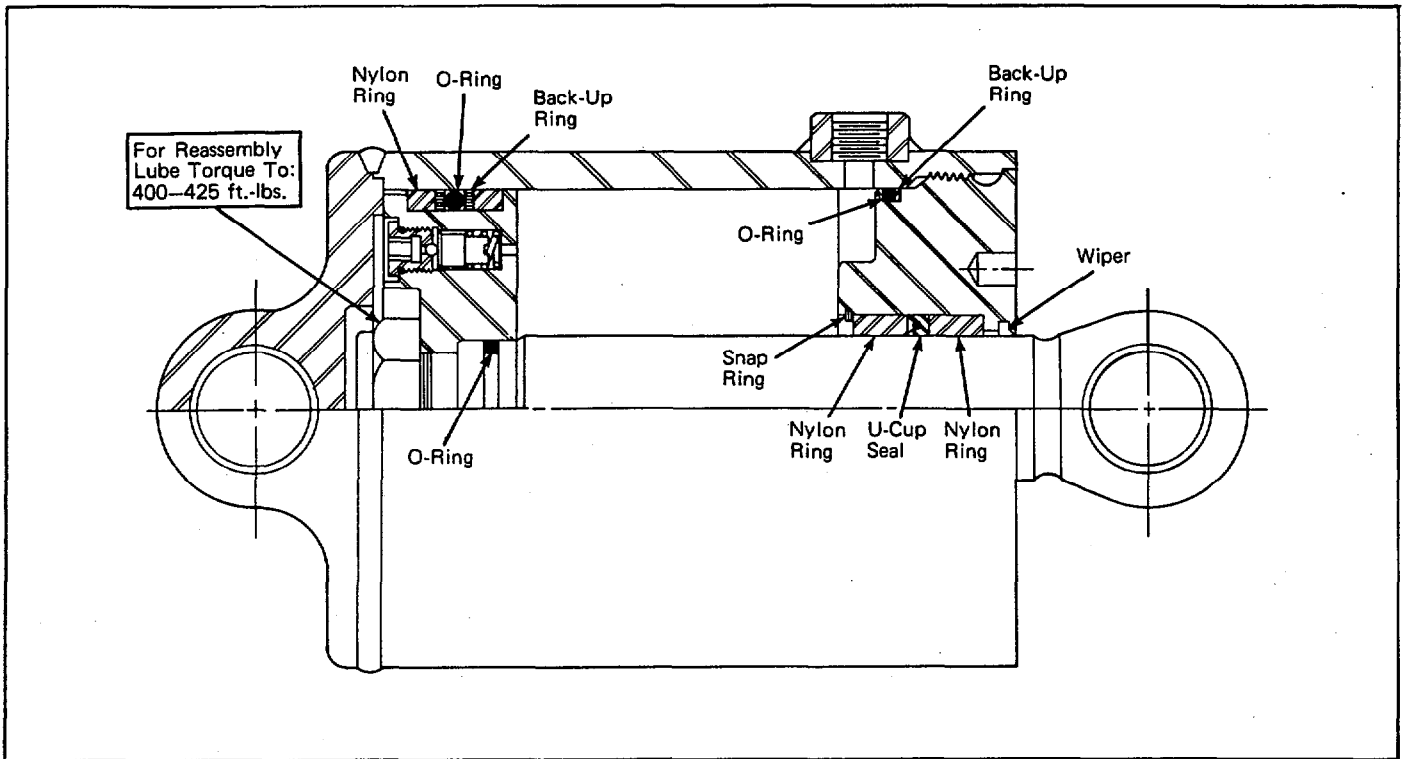


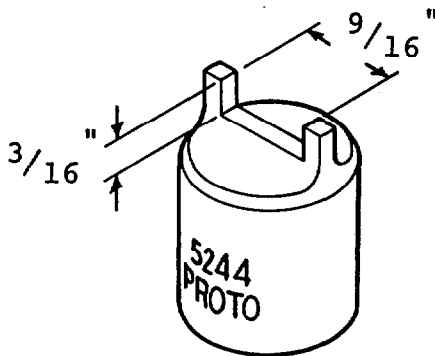
Figure 12. Push/Pull Cylinder Seal Cutaway-One Piece Retainer

Equalizer Valve Service

INSTALLATION

1. Using the special tool provided with the Equalizer Valve Kit, unthread the plug and remove the old valve from the piston.

NOTE: If necessary, a tool may be fabricated from a 3/8" drive screwdriver socket (Proto part no. 5244) using the dimensions shown below.



2. Thoroughly clean the valve port in the piston.
3. Install the new equalizer valve as shown in Figure 13, using two spacers behind the spring.

NOTE: Some kits include a washer to be placed on the plug behind the O-ring. If the kit does not contain a washer, the plug has been machined to self-seal with the O-ring.

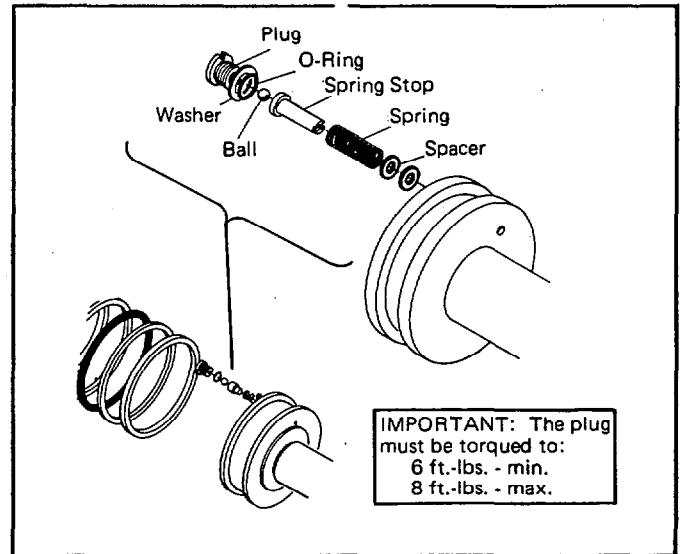


Figure 13. Equalizer Valve

4. Reassemble the cylinder. Reinstall the cylinder in the frame but do not connect the cylinder rod to the pantograph mechanism.

NOTE: All soft parts (O-rings, seals, etc.) must be replaced when reassembling the cylinder.

5. Connect all hoses and complete the equalizer valve test on page 6.
6. After both cylinders have been tested and adjusted, connect the rods to the pantograph mechanism. Bleed the cylinder according to instructions on page 6.

EQUALIZER VALVE TEST PROCEDURE

(See Figure 14)

1. Hydraulically extend the cylinders.
2. Tee a pressure gauge into the pressure line feeding the base-end of the right hand cylinder.
3. Disconnect the right hand cylinder rod end hose at fitting (A).
4. Place the hose in a container.
5. Feather the truck valve to extend the cylinders. When oil begins flowing from the open hose into the container, note the pressure reading on the gauge. This is the equalizer valve's relief pressure and it should read between 1400 and 1700 PSI.
6. If the equalizer valve is not relieving within this range disassemble the cylinder and change the number of spacers behind the spring according to the following guidelines:

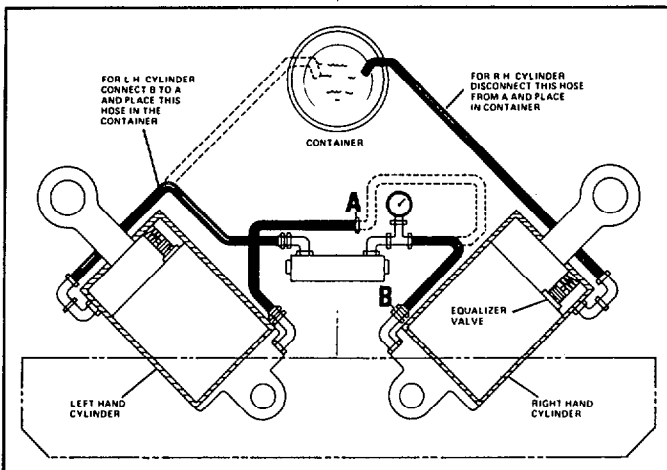


Figure 14. Equalizer Valve Test Procedure

- Each spacer adjusts the relief pressure approximately 100 PSI.
- Subtracting spacers will decrease the relief pressure.

- Adding spacers will increase the relief pressure.

NOTE: For proper operation, no more than four spacers should be used.

7. To test the left hand cylinder equalizer valve, remove the base-end pressure line from the right hand cylinder at point (B) and connect it to the open end at point (A).
8. Disconnect the left hand cylinder rod end hose from the valve and place the hose in a container.
9. Feather the truck valve to extend the push cylinders. When oil flows from the rod end hose note the pressure reading on the gauge. The valve should relieve at 1400-1700 PSI.
10. If the valve's relief pressure is not within this range, repeat step 6 on the left hand cylinder.

BLEED INSTRUCTIONS

Before operating the attachment, make sure the truck reservoir contains a sufficient supply of hydraulic oil as recommended by the truck manufacturer.

1. Power the faceplate to the fully extended position. Don't be alarmed if, on the first cycle or two, the faceplate extends irregularly or at an angle.
2. After the faceplate is fully extended, keep the control handle to the "Extend" position for about 20 seconds. This action circulates oil throughout the attachment hydraulic system and forces any air in the system to the truck reservoir.
3. Retract the faceplate fully, then repeat Step 2. In most cases, two cycles of faceplate extension followed by 20 seconds of continued control handle actuation will be sufficient to bleed all the air from the system.

NOTE: As a check, while the faceplate is extended, manually grab the faceplate and shove it from side to side while watching both push cylinders. The cylinder rods should not move. If either cylinder rod is "spongy", the system still contains some air. Repeat the above procedures as required.

Sequence Valve Service

The valve is located below the push/pull cylinders. The older load push valve contains a needle and relief valve plus two checks for the push cylinders. The older load push/pull valve contains a needle and relief valve, three ball checks, and a sequence plunger to properly time the gripper and push/pull functions. A newer push/pull sequence valve contains two additional ball checks for the gripper cylinders plus an adjustable sequence plunger to vary the timing of the push-grip-pull sequence.

VALVE REMOVAL

1. Remove the single capscrew holding the valve to the attachment frame. A roll pin prevents the valve from turning.
2. Remove the hoses from the valve. Cap and label the hoses. Lay the valve in a clean working area for disassembly.

SEQUENCE VALVE DISASSEMBLY AND INSPECTION (Figure 15 and 16)

1. Remove the allen head plugs from the top of the valve body.
2. Remove the spring, spacer, and ball from the bore. Examine the ball and ball seat for nicks and wear. Replace

the sequence valve if the seat is nicked or scored. Replace a nicked ball. The free length of the springs should measure ½ inch.

3. If there is leakage reseal the ball by sharply tapping it into its seat with a brass punch.
4. Remove the two hex head plugs from each end of the valve which retain the plunger. The valve has a spring and a stop that contact each end of the plunger. The plunger springs should measure 1½ inch free length. **NOTE:** Change both springs at the same time.
5. Remove the allen head plug from the side of the valve. This is the relief valve which contains a spring, ball, and spacer that should be removed, examined, and resealed if required.

NOTE: All components should be cleaned in solvent and inspected for wear. If any valve bore or seat is nicked or scored, replace the sequence valve. A nicked or scored ball must be replaced.

6. Remove and inspect the needle valve. Check the O-ring and back-up ring and replace if visible wear or damage is apparent.

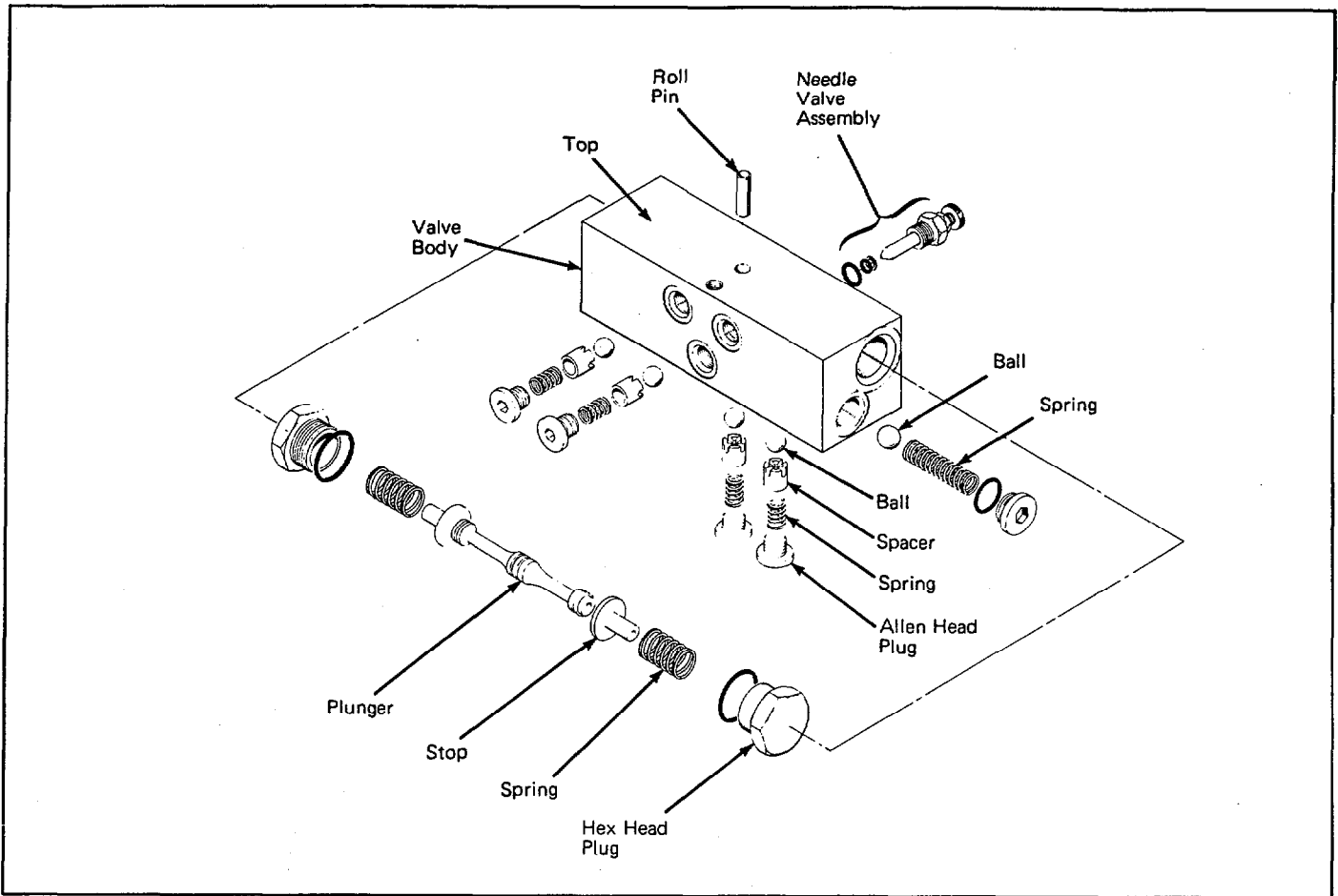


Figure 15. Load Push/Pull Sequence Valve with Needle Valve Assembly.

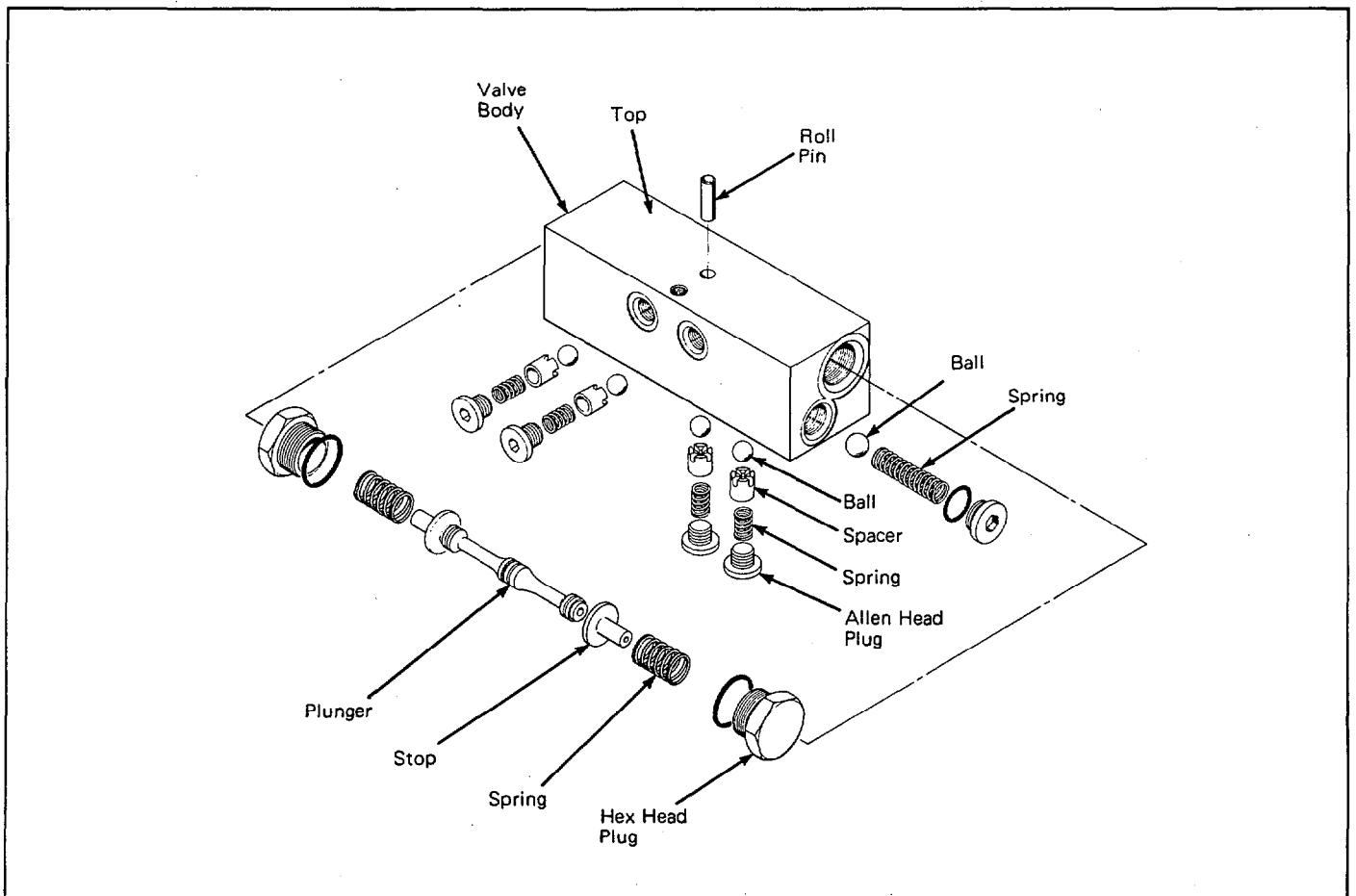


Figure 16. Load Push/Pull Sequence Valve

NEEDLE AND RELIEF VALVE DISASSEMBLY (See Figures 17 and 18)

1. Remove the allen head plugs from the top of the valve body.
2. Remove the ball, spacer, and spring from the right hand bore. Inspect the seat and replace the valve if the seat is nicked or scored. Inspect the ball and replace if it is nicked.
3. If there is leakage reseal the ball by sharply tapping it into its seat with a brass punch.
4. Remove the allen head O-ring plugs from each end of the

valve. Inspect the ball and ball seat and reseal the ball as described above. Inspect the plunger and plunger bore. The valve body must be replaced if the bore is scored. Replace the plunger if it is scored.

5. Remove and inspect the needle valve. Check the O-ring and back-up ring and replace if visible wear or damage is apparent.

VALVE ASSEMBLY

Assembly of the sequence valve, adjustable sequence valve, and the needle and relief valve is the direct reversal of disassembly.

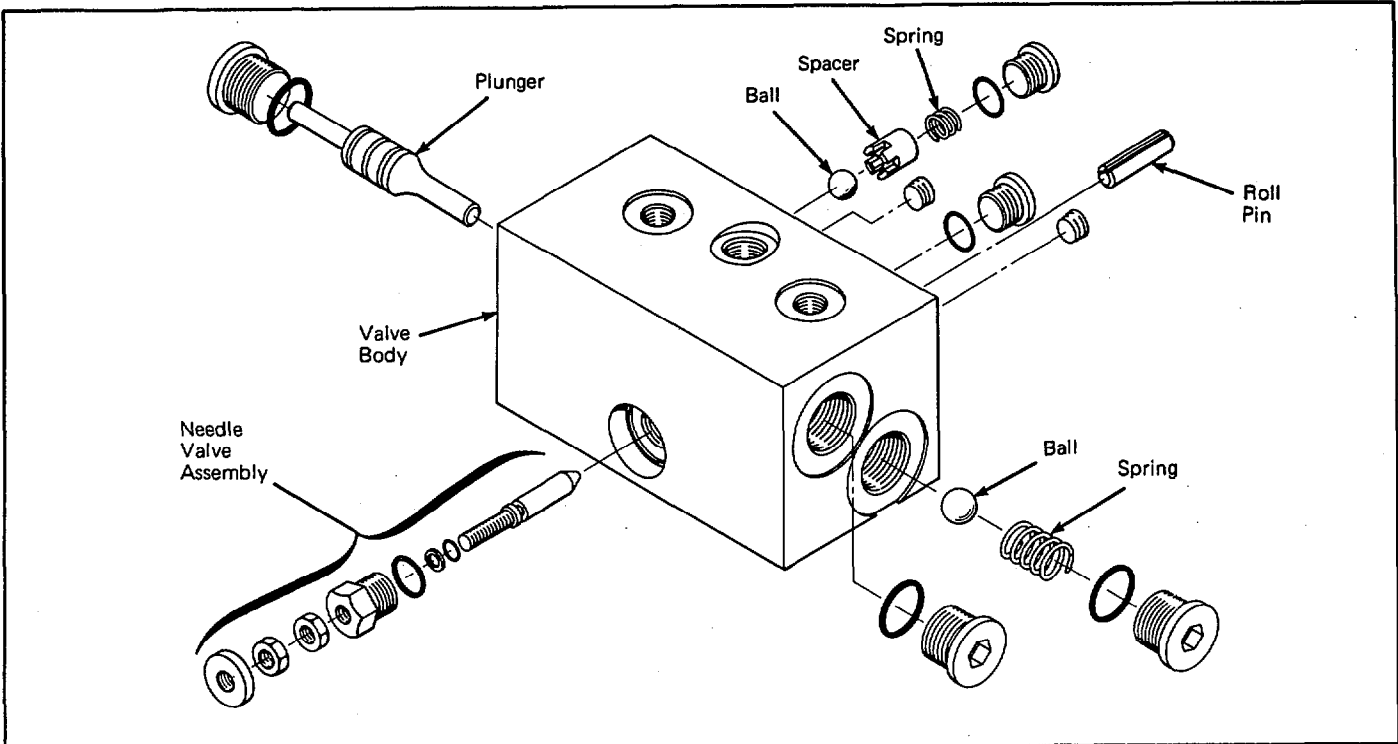


Figure 17. Load Push Needle and Relief Valve

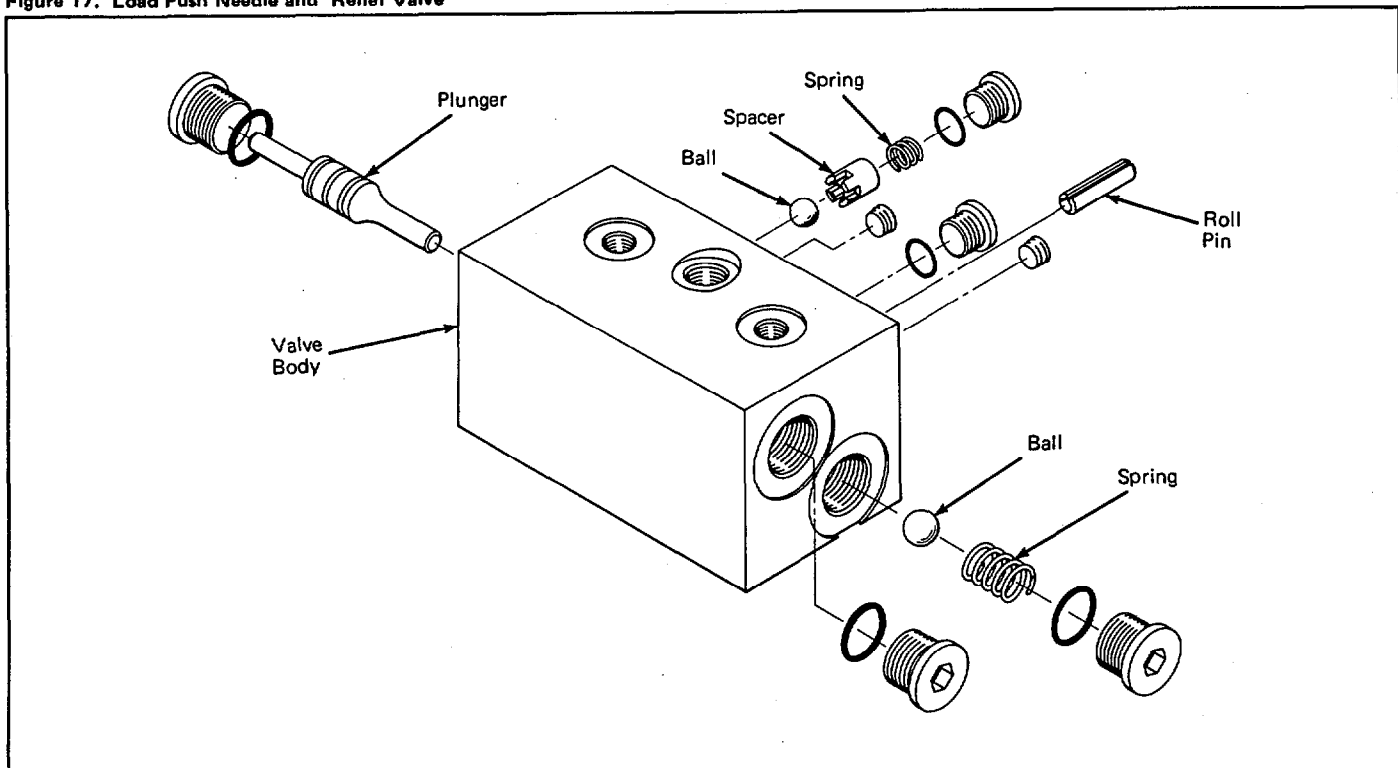
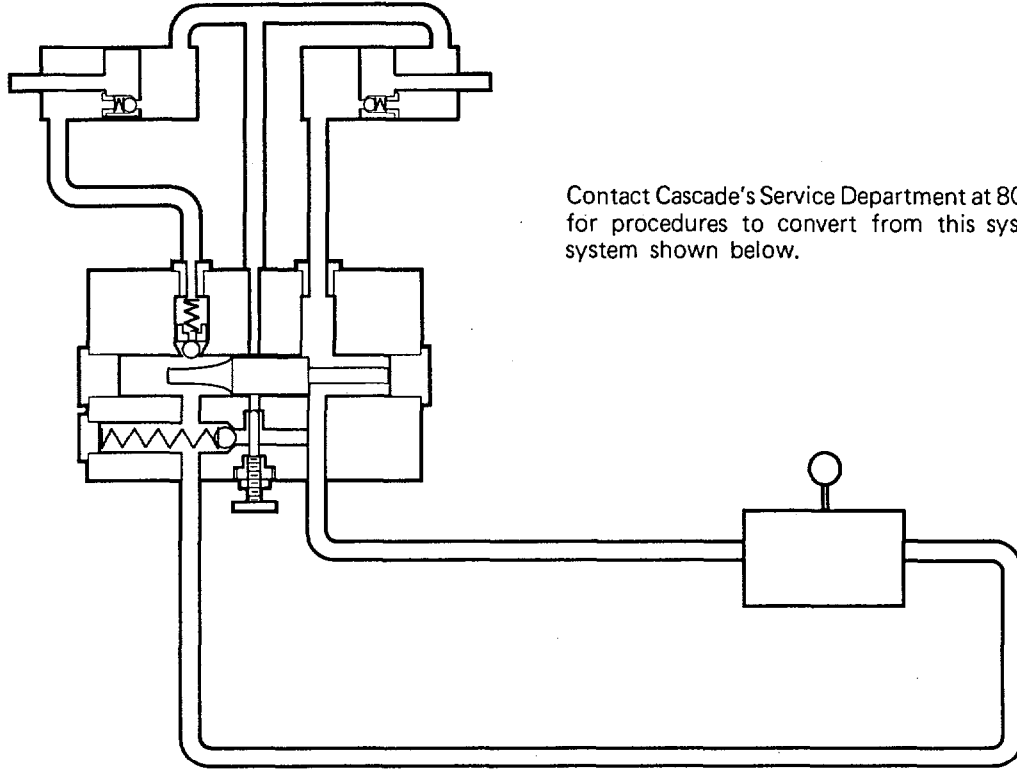


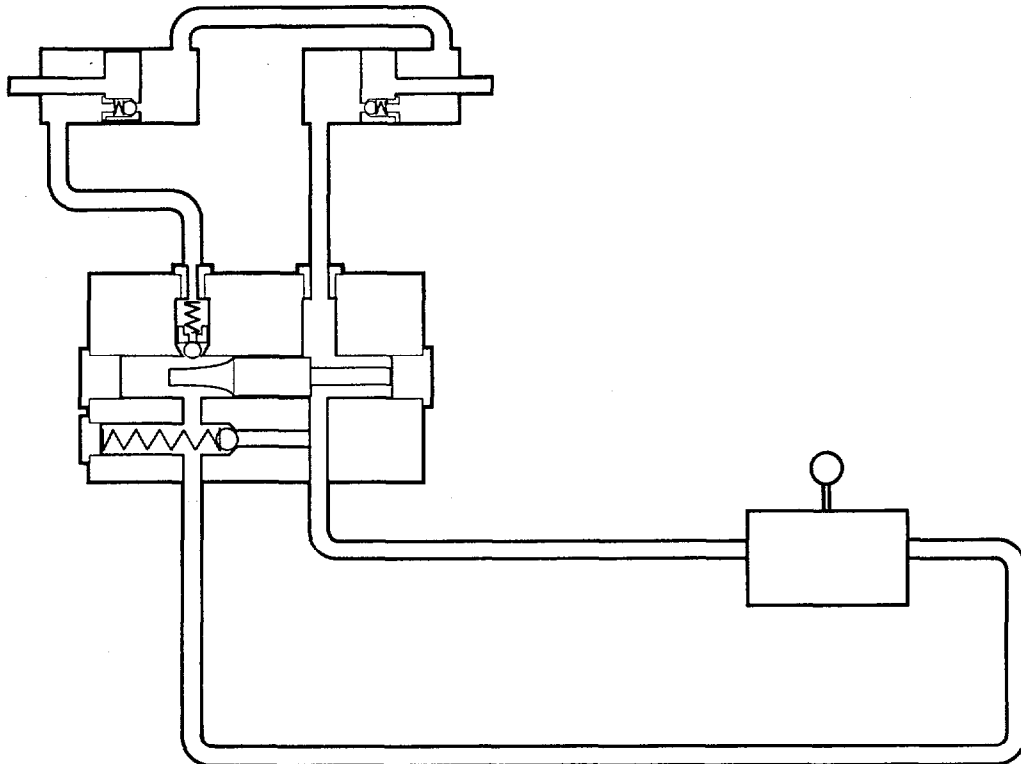
Figure 18. Load Push Relief Valve without Needle

Hydraulic Schematics

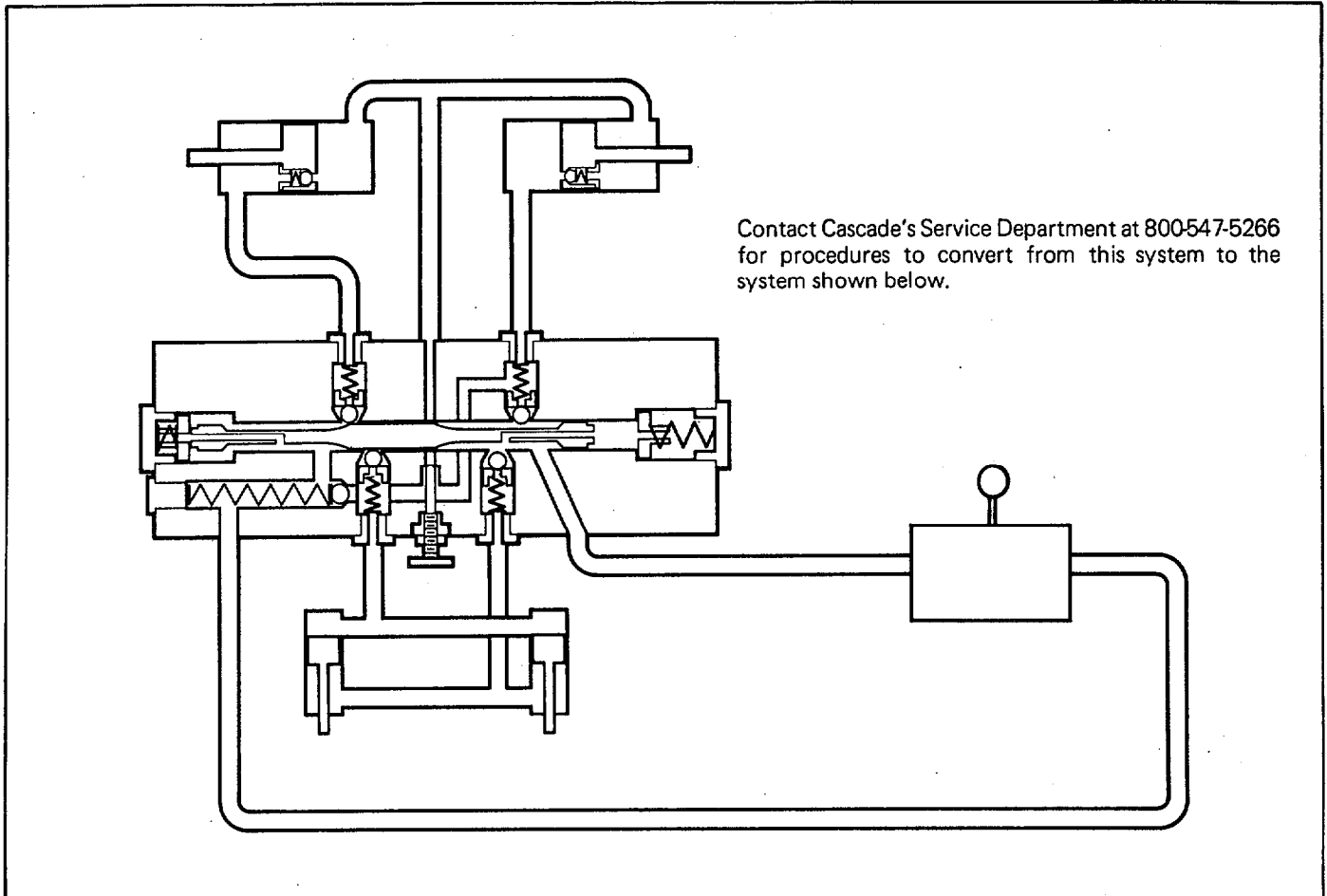


Contact Cascade's Service Department at 800-547-5266 for procedures to convert from this system to the system shown below.

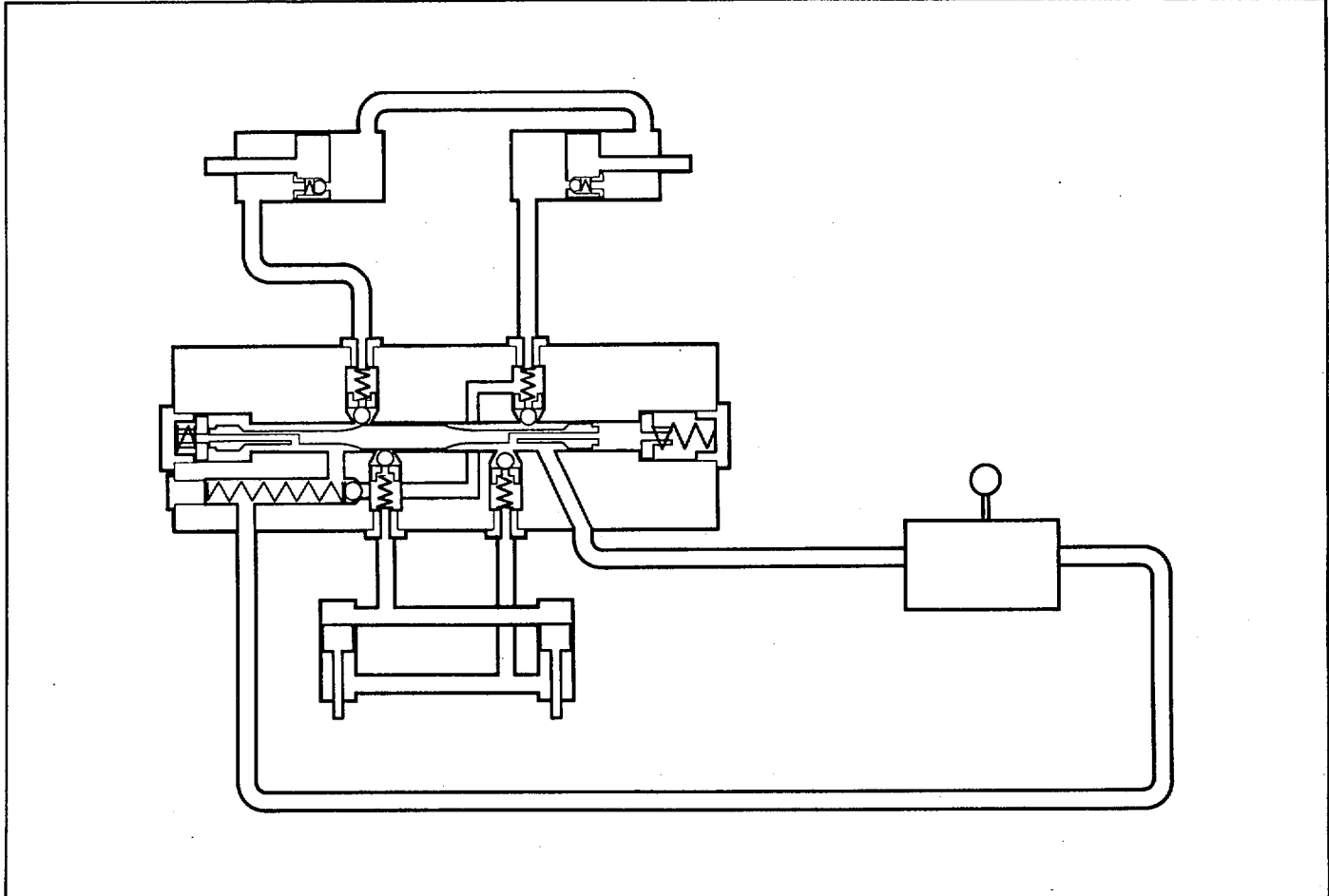
Load Push Hydraulic Schematic with Needle Valve.



Load Push Hydraulic Schematic without Needle Valve



Load Push/Pull Hydraulic Schematic with Needle Valve.



Load Push/Pull Hydraulic Schematic without Needle Valve

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

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**Cascade Corporation
U.S. Headquarters**
2201 NE 201st
Fairview, OR 97024-9718
Tel: 800-CASCADE (227-2233)
Fax: 888-329-8207

Cascade Canada Inc.
5570 Timberlea Blvd.
Mississauga, Ontario
Canada L4W-4M6
Tel: 905-629-7777
Fax: 905-629-7785

Cascade do Brasil
Rua João Guerra, 134
Macuco, Santos - SP
Brasil 11015-130
Tel: 55-13-2105-8800
Fax: 55-13-2105-8899

EUROPE-AFRICA

**Cascade Italia S.R.L.
European Headquarters**
Via Dell'Artigianato 1
37030 Vago di Lavagno (VR)
Italy
Tel: 39-045-8989111
Fax: 39-045-8989160

Cascade (Africa) Pty. Ltd.
PO Box 625, Isando 1600
60A Steel Road
Sparton, Kempton Park
South Africa
Tel: 27-11-975-9240
Fax: 27-11-394-1147

ASIA-PACIFIC

Cascade Japan Ltd.
2-23, 2-Chome,
Kukuchi Nishimachi
Amagasaki, Hyogo
Japan, 661-0978
Tel: 81-6-6420-9771
Fax: 81-6-6420-9777

Cascade Korea
121B 9L Namdong Ind.
Complex, 691-8 Gojan-Dong
Namdong-Ku
Inchon, Korea
Tel: +82-32-821-2051
Fax: +82-32-821-2055

Cascade-Xiamen
No. 668 Yangguang Rd.
Xinyang Industrial Zone
Haicang, Xiamen City
Fujian Province
P.R. China 361026
Tel: 86-592-651-2500
Fax: 86-592-651-2571

**Cascade India Material
Handling Private Limited**
No 34, Global Trade Centre
1/1 Rambaugh Colony
Lal Bahadur Shastri Road,
Navi Peth, Pune 411 030
(Maharashtra) India
Phone: +91 020 2432 5490
Fax: +91 020 2433 0881

Cascade Australia Pty. Ltd.
1445 Ipswich Road
Rocklea, QLD 4107
Australia
Tel: 1-800-227-223
Fax: +61 7 3373-7333

Cascade New Zealand
15 Ra Ora Drive
East Tamaki, Auckland
New Zealand
Tel: +64-9-273-9136
Fax: +64-9-273-9137

**Sunstream Industries
Pte. Ltd.**
18 Tuas South Street 5
Singapore 637796
Tel: +65-6795-7555
Fax: +65-6863-1368