

Rhino[®] SD2/XD2 NAP Frames

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NORDSON CORPORATION • AMHERST, OHIO • USA

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Safety

Read and follow these safety instructions. Task- and equipment-specific warnings, cautions, and instructions are included in equipment documentation where appropriate.

Make sure all equipment documentation, including these instructions, is accessible to persons operating or servicing equipment.

Qualified Personnel

Equipment owners are responsible for making sure that Nordson equipment is installed, operated, and serviced by qualified personnel. Qualified personnel are those employees or contractors who are trained to safely perform their assigned tasks. They are familiar with all relevant safety rules and regulations and are physically capable of performing their assigned tasks.

Intended Use

Use of Nordson equipment in ways other than those described in the documentation supplied with the equipment may result in injury to persons or damage to property.

Some examples of unintended use of equipment include

- using incompatible materials
- making unauthorized modifications
- removing or bypassing safety guards or interlocks
- using incompatible or damaged parts
- using unapproved auxiliary equipment
- operating equipment in excess of maximum ratings

Regulations and Approvals

All equipment must be rated and approved for the environment in which it is used. Any approvals obtained for Nordson equipment will be voided if instructions for installation, operation, and service are not followed.

Halogenated Hydrocarbon Solvent Hazards

Do not use halogenated hydrocarbon solvents in a pressurized system that contains aluminum components. Under pressure, these solvents can react with aluminum and explode, causing injury, death, or property damage. Halogenated hydrocarbon solvents contain one or more of the following elements:

<u>Element</u>	<u>Symbol</u>	<u>Prefix</u>
Fluorine	F	“Fluoro-”
Chlorine	Cl	“Chloro-”
Bromine	Br	“Bromo-”
Iodine	I	“Iodo-”

Check the Material Safety Data Sheets (MSDS) for all materials used or contact your material supplier for more information. If you must use halogenated hydrocarbon solvents, contact your Nordson representative for information about compatible Nordson components.

Personal Safety

To prevent injury follow these instructions.

- Do not operate or service equipment unless you are qualified.
- Do not operate equipment unless safety guards, doors, or covers are intact and automatic interlocks are operating properly. Do not bypass or disarm any safety devices.
- Keep clear of moving equipment. Before adjusting or servicing moving equipment, shut off the power supply and wait until the equipment comes to a complete stop. Lock out power and secure the equipment to prevent unexpected movement.
- Relieve (bleed off) hydraulic and pneumatic pressure before adjusting or servicing pressurized systems or components. Disconnect, lock out, and tag switches before servicing electrical equipment.
- While operating manual spray guns, make sure you are grounded. Wear electrically conductive gloves or a grounding strap connected to the gun handle or other true earth ground. Do not wear or carry metallic objects such as jewelry or tools.
- If you receive even a slight electrical shock, shut down all electrical or electrostatic equipment immediately. Do not restart the equipment until the problem has been identified and corrected.
- Obtain and read each MSDS for all materials used. Follow the manufacturer’s instructions for safe handling and use of materials, and use recommended personal protection devices.
- Make sure the spray area is adequately ventilated.
- To prevent injury, be aware of less-obvious dangers in the workplace that often cannot be completely eliminated, such as hot surfaces, sharp edges, energized electrical circuits, and moving parts that cannot be enclosed or otherwise guarded for practical reasons.

Fire Safety

To avoid a fire or explosion, follow these instructions.

- Ground all conductive equipment. Use only grounded air and fluid hoses. Check equipment and workpiece grounding devices regularly. Resistance to ground must not exceed one megohm.
- Shut down all equipment immediately if you notice static sparking or arcing. Do not restart the equipment until the cause has been identified and corrected.
- Do not smoke, weld, grind, or use open flames where flammable materials are being used or stored.
- Do not heat materials to temperatures above those recommended by the manufacturer. Make sure heat monitoring and limiting devices are working properly.
- Provide adequate ventilation to prevent dangerous concentrations of volatile particles or vapors. Refer to local codes or your material MSDS for guidance.
- Do not disconnect live electrical circuits when working with flammable materials. Shut off power at a disconnect switch first to prevent sparking.
- Know where emergency stop buttons, shutoff valves, and fire extinguishers are located. If a fire starts in a spray booth, immediately shut off the spray system and exhaust fans.
- Shut off electrostatic power and ground the charging system before adjusting, cleaning, or repairing electrostatic equipment.
- Clean, maintain, test, and repair equipment according to the instructions in your equipment documentation.
- Use only replacement parts that are designed for use with original equipment. Contact your Nordson representative for parts information and advice.

In the Event of a Malfunction

If a system or any equipment in a system malfunctions, shut off the system immediately and perform the following steps:

- Disconnect and lock out system electrical power. Close hydraulic and pneumatic shutoff valves and relieve pressures.
- Identify the reason for the malfunction and correct it before restarting the system.

High-Pressure Fluids

High-pressure fluids, unless they are safely contained, are extremely hazardous. Always relieve fluid pressure before adjusting or servicing high pressure equipment. A jet of high-pressure fluid can cut like a knife and cause serious bodily injury, amputation, or death. Fluids penetrating the skin can also cause toxic poisoning.

If you suffer a fluid injection injury, seek medical care immediately. If possible, provide a copy of the MSDS for the injected fluid to the health care provider.

The National Spray Equipment Manufacturers Association has created a wallet card that you should carry when you are operating high-pressure spray equipment. These cards are supplied with your equipment. The following is the text of this card:



WARNING: Any injury caused by high pressure liquid can be serious. If you are injured or even suspect an injury:

- Go to an emergency room immediately.
- Tell the doctor that you suspect an injection injury.
- Show him this card
- Tell him what kind of material you were spraying

MEDICAL ALERT—AIRLESS SPRAY WOUNDS: NOTE TO PHYSICIAN

Injection in the skin is a serious traumatic injury. It is important to treat the injury surgically as soon as possible. Do not delay treatment to research toxicity. Toxicity is a concern with some exotic coatings injected directly into the bloodstream.

Consultation with a plastic surgeon or a reconstructive hand surgeon may be advisable.

The seriousness of the wound depends on where the injury is on the body, whether the substance hit something on its way in and deflected causing more damage, and many other variables including skin microflora residing in the paint or gun which are blasted into the wound. If the injected paint contains acrylic latex and titanium dioxide that damage the tissue's resistance to infection, bacterial growth will flourish. The treatment that doctors recommend for an injection injury to the hand includes immediate decompression of the closed vascular compartments of the hand to release the underlying tissue distended by the injected paint, judicious wound debridement, and immediate antibiotic treatment.

Disposal

Dispose of equipment and materials used in operation and servicing according to local codes.

Introduction

The following paragraphs provide rebuild procedures and information on ordering parts for the Rhino SD2/XD2 NAP large and small frames.



WARNING: Allow only qualified personnel to perform the following tasks. Follow the safety instructions in this document and all other related documentation.

Rebuild the Large Frame Air Cylinders



WARNING: The air cylinders are pressurized and can hold latent air pressure even when the supply air is shut off. To prevent serious injury, relieve all air pressure from the air cylinders before rebuilding them.

NOTE: Rebuild both air cylinders at the same time.

To ensure proper frame operation, rebuild both air cylinders at the same time. The following items are required to rebuild the large frame cylinders:

- Necessary replacement parts
- 500-lb (227-kg) capacity lifting device
- Torque wrench that measures up to 250 ft-lb (339 N•m)
- Two $\frac{7}{8}$ -14 eye bolts
- O-ring lubricant
- Petroleum jelly
- Loctite 242 and 271 adhesive

Block the Follower Plate

1. See Figure 1. Use blocks (2) to block the follower plate (4) high enough to keep it from contacting the drum centering shoes (3). Make sure that the follower plate/air motor assembly is secure to prevent it from tipping.
2. Verify that all pressure is bled from the air cylinder pistons.
3. Remove any device or bracket that is installed to the top of the cylinder heads (1) and mounting rods (5).

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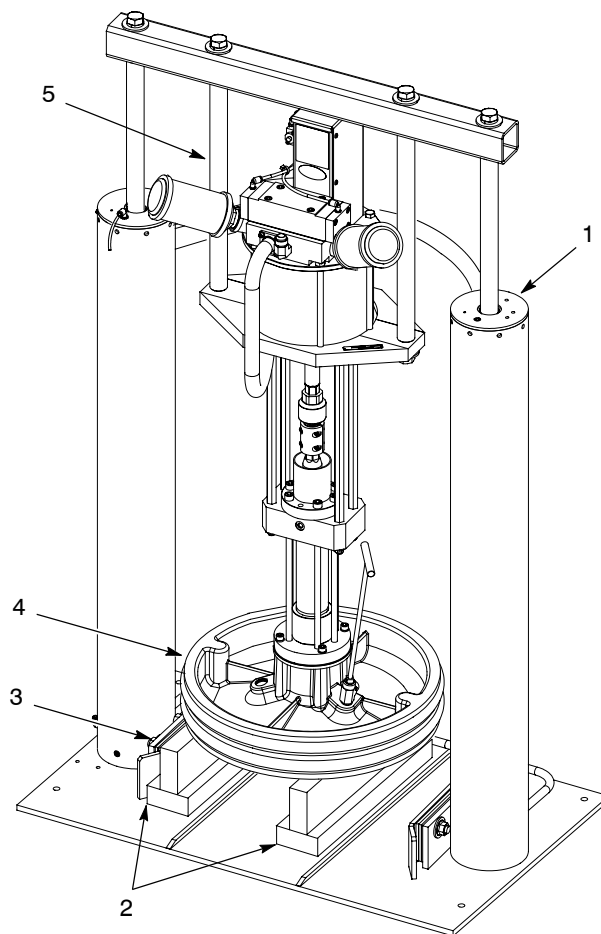


Figure 1 Blocking the Follower Plate

Note: Some parts are not shown for clarity.

Remove the Cylinder Shafts

There are two ways to remove the cylinder shafts; together or separately. Perform the desired procedure.

NOTE: A 500-lb (227-kg) capacity lifting device is required for these procedures.

Remove the Cylinder Shafts Together

1. See Figure 2, Option A. Remove the screws (1), lock washers (2), and flat washers (3) securing the crossover (4) to the mounting rods (5).
2. Disconnect the tubing (10) from the fitting (11).
3. Remove the cap screws (8) and washers (7) from the air cylinders (9). Note the orientation of the cylinder heads (6).
4. Attach the lifting device to the middle section of the crossover (4) and remove both cylinder shafts (12) from the air cylinders (9).

Remove the Cylinder Shafts Separately

1. See Figure 2, Option B. Remove the screws (1), lock washers (2), and flat washers (3) securing the crossover (4) to the mounting rods (12) and cylinder shafts (5).
2. Disconnect the tubing (10) from the fitting (11).
3. Remove the cap screws (8) and washers (7) from the air cylinders (9). Note the orientation of the cylinder heads (6).
4. Thread the $\frac{7}{8}$ -14 eye bolts (13) into each cylinder shaft (12). Attach the lifting device to an eye bolt. Use the lifting device to remove the cylinder shaft from the air cylinder (9). Remove the remaining cylinder shaft in the same manner.

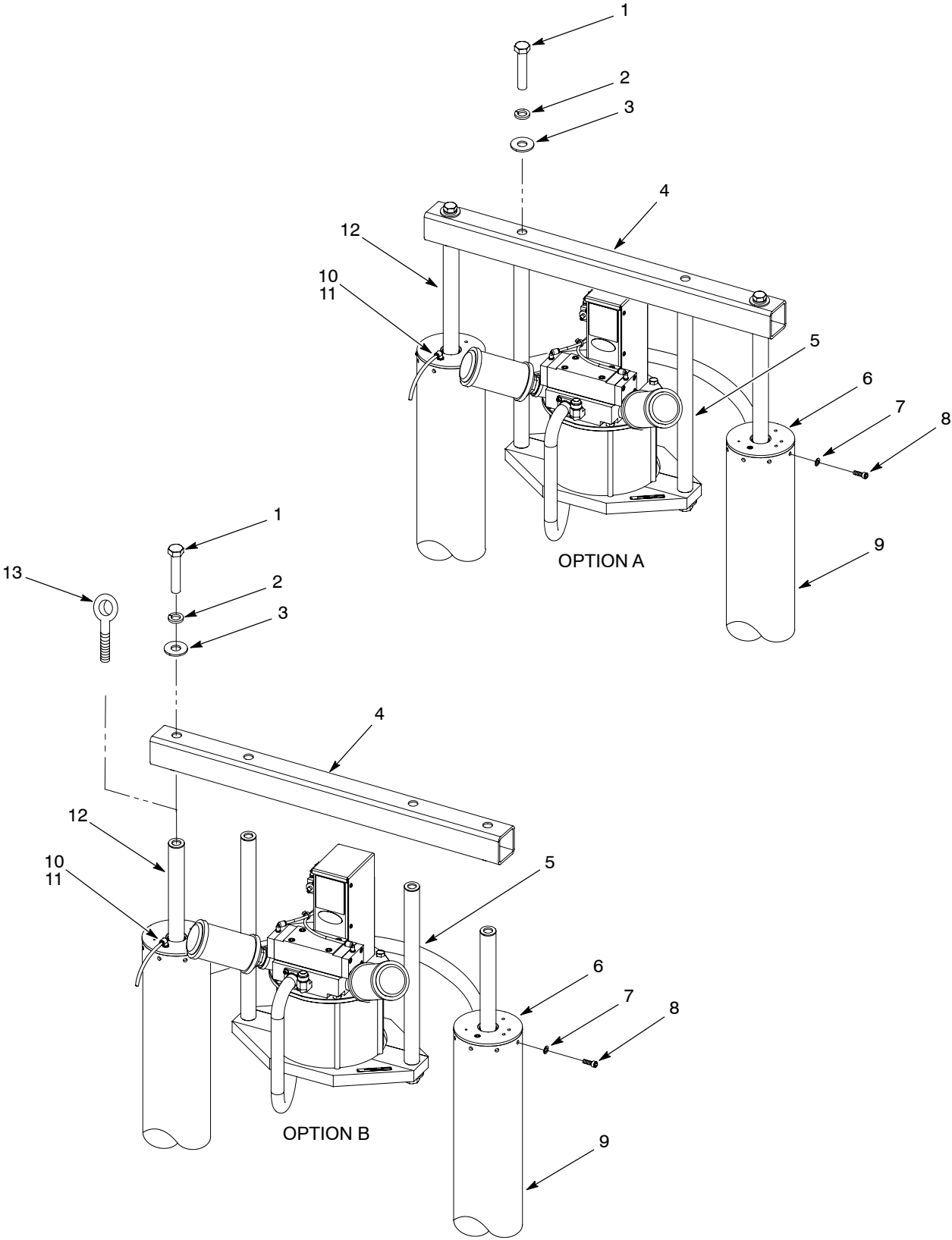


Figure 2 Removing the Cylinder Shafts

Note: Some parts are not shown for clarity.

Disassemble the Cylinder Shafts

1. See Figure 3. Remove the following from each cylinder shaft (7):
 - shaft screw (16)
 - lock washers (15)
 - flat washers (14)
 - bottom piston spacer (13)
 - piston guide disk (12)
 - piston back-up plates (9)
 - gaskets (10)
 - piston seal (11)
 - piston stop (8)
2. Remove the cylinder head (4) from each cylinder shaft (7).
3. Remove the following from each cylinder head (4):
 - internal retaining ring (1)
 - wiper scraper (2)
 - bearing (3)
 - shaft seal (5)
 - external O-ring (6)

Clean and Replace Parts

1. See Figure 3. Clean the inside walls of the air cylinders (19). Immediately apply a coating of O-ring lubricant to prevent corrosion.
2. Clean the cylinder heads (4), and cylinder shafts (7).
3. Replace the seals (5 and 11), wiper scrapers (2), bearings (3), O-rings (6), and gaskets (10).

Assemble and Install the Cylinder Shafts

1. See Figure 3. Lubricate the following new items with petroleum jelly and install them into each cylinder head (4):
 - shaft seal (5)
 - bearing (3)
 - wiper scraper (2)
 Install the retaining ring (1) into the cylinder head (4).
2. Lubricate two new O-rings (6) with O-ring lubricant. Install an O-ring onto each cylinder head (4).

3. Place a light coating of petroleum jelly on the cylinder shafts (7). Install the cylinder heads (4) onto each cylinder shaft.
4. Install a piston stop (8) onto each cylinder shaft (7). Apply Loctite 271 adhesive to the threads of the screws (16). Install the following components onto each cylinder shaft:
 - piston back-up plate (9)
 - gasket (10)
 - piston seal (11)
 - gasket (10)
 - piston back-up plate (9)
 - piston guide disk (12)
 - bottom piston spacer (13)
 - flat washers (14)
 - lock washers (15)
 - shaft screw (16)
5. Tighten each screw (16) to 250 ft-lb (339 N•m).
6. Lubricate the piston seal (11) with O-ring lubricant.
7. Carefully guide the cylinder shaft (7) into the air cylinder (19) until it bottoms out. Install the remaining cylinder shaft in the same manner.
8. Orient the cylinder heads (4) as noted during removal.
9. Install each cylinder head (4) into an air cylinder (19). Install the washers (17) and cap screws (18) into each cylinder. Tighten each screw (16) to 10–15 ft-lb (14–20 N•m).
10. Connect the air tube (20) to the fitting (21).
11. Install any device or bracket that was removed from the top of the cylinder head (4).
12. See Figure 2, Option B. Apply Loctite 242 to the threads of the screws (1). Install the crossover (4) to the cylinder shafts (12) and mounting rods (5) using the screws, lock washers (2), and flat washers (3). Tighten the screws to 250 ft-lb (339 N•m).

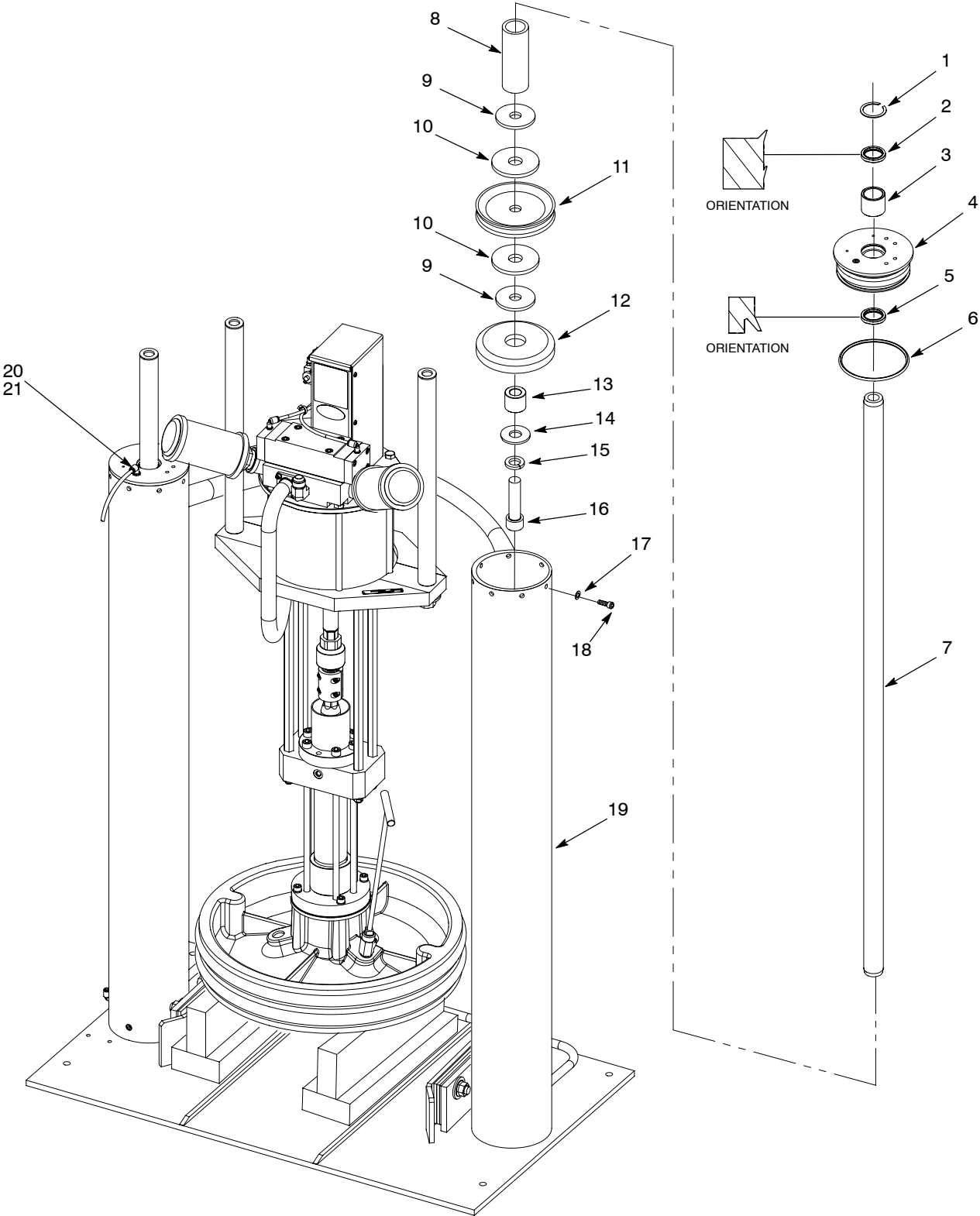


Figure 3 Rebuilding the Large Frame Cylinders
Note: Some parts are not shown for clarity.

Rebuild the Small Frame Air Cylinders



WARNING: The air cylinders are pressureized and can hold latent air pressure even when the supply air is shut off. To prevent serious injury, make sure that all air pressure is relieved from the air cylinders before rebuilding them.

NOTE: Rebuild both air cylinders at the same time.

The following items are required to rebuild the drum frame cylinders:

- Necessary replacement parts
- Torque wrench that can measure up to 200 ft-lb (271 N•m)
- ID snap ring pliers
- Two $\frac{7}{8}$ -14 eye bolts
- Petroleum jelly
- O-ring lubricant
- Loctite 242 and 271 adhesive

Remove the Pump Assembly

1. See Figure 4. Lower the follower plate (12) to the base of the small frame (11).
2. Verify that all pressure is bled from the air cylinder pistons. Disconnect the supply air hose from the air regulator (9).
3. Remove the screws (8) and washers (7) securing the air regulator (9) to the clamps (5).
4. Remove the screws (6) securing the clamps (5) to the cylinder shaft (10).
5. Remove the screws (1), lock washers (2), and flat washers (3) securing the base plate (4) to the cylinder shafts (10).

NOTE: Have an assistant help with removing the pump assembly from the small frame.

6. Remove the pump assembly (13) from the small frame (11). Secure the pump assembly to prevent it from tipping.

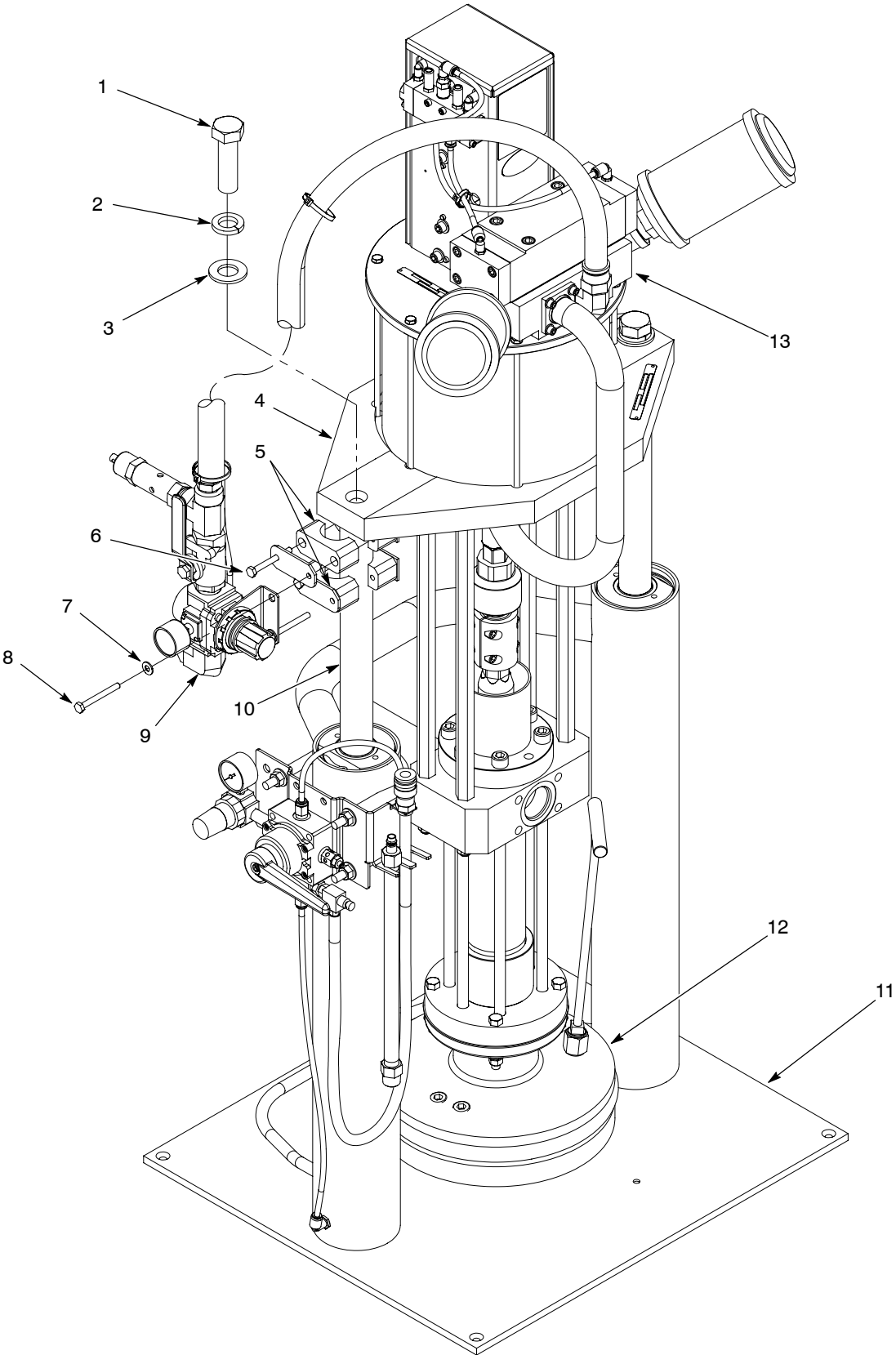


Figure 4 Removing the Pump Assembly

Note: Some parts are not shown for clarity.

Remove the Cylinder Shafts

1. See Figure 5. Thread the $\frac{7}{8}$ -14 eye bolts (16) into each cylinder shaft (10).
2. Attach the lifting device to an eye bolt.
3. Perform the following:
 - a. Note the orientation of the cylinder heads (13).
 - b. Compress the retaining ring (15) using the ID snap ring pliers.
 - c. Keep the retaining ring compressed and use the lifting device to remove the cylinder shaft (10) from the air cylinder (1).
 - d. Remove the remaining cylinder shaft in the same manner.
4. Remove the eye bolts (16) from the cylinder shafts (10).
5. Remove the cylinder heads (13) from the cylinder shafts (10). Remove the wiper scrapers (14), packings (12), and O-rings (11) from each cylinder head (13).
6. Remove the hex head screws (2), lock washers (3), and flat washers (4) from the cylinder shafts (10).
7. Remove the pistons (8) and spacers (9). Remove the wear rings (5), piston seals (7), and O-rings (6) from each piston (8).

Clean and Replace Parts

1. See Figure 5. Clean the inside walls of the air cylinders (1). Immediately apply a coating of O-ring lubricant to prevent corrosion.
2. Clean the pistons (8), cylinder heads (13), and cylinder shafts (10).
3. Inspect the cylinder heads (13) for damage to the cylinder head bearings and replace if necessary. The bearing is machined with the head.
4. Lubricate new packings (12) and new wiper scrapers (14) with petroleum jelly. Install these parts onto each cylinder head (13).
5. Lubricate new O-rings (11) with O-ring lubricant. Install an O-ring onto each cylinder head (13).
6. Inspect the pistons (8) for damage and replace if necessary.

Assemble and Install the Cylinder Shafts

1. See Figure 5. Place a light coating of petroleum jelly on each cylinder shaft (10).
2. Install the spacers (9) onto each cylinder shaft (10).
3. Apply Loctite 271 to the threads of the hex head screws (2). Install the pistons (8) onto the cylinder shafts (10) using the flat washers (4) lock washers (3), and screws. Tighten the screws to 190–195 ft-lb (258–264 N•m).
4. Carefully guide the cylinder shaft (10) into the air cylinder (1) until it bottoms out. Install the remaining cylinder shaft in the same manner.



WARNING: Make sure that the retaining ring is properly seated after performing the next step. Failure to seat the retaining ring properly can result in serious personal injury or death.

5. Install the cylinder heads (13):
 - a. Install the retaining ring (15), sharp side up, onto each cylinder head. Install the cylinder head onto the cylinder shaft (10).
 - b. Compress the retaining ring (15) using the ID snap ring pliers and install the cylinder head into the cylinder shaft (10). Make sure that the retaining ring seats into the groove on the air cylinder (1).
 - c. Install the remaining cylinder head in the same manner.
6. Remove the eye bolts (16) from the cylinder shafts (10).

Install the Pump Assembly

NOTE: Have an assistant help with installing the pump assembly onto the small frame.

1. See Figure 4. Install the pump assembly (13) onto the small frame (11).
2. Apply Loctite 242 to the threads of the screws (1). Secure the base plate (4) to the cylinder shafts (10) using the screws, lock washers (2), and flat washers (3). Tighten the screws to 190–195 ft-lb (258–264 N•m).
3. Install the clamps (5) onto the cylinder shaft (10) using the screws (6). Tighten the screws securely.
4. Install the air regulator (9) to the clamps (5) using the washers (7) and screws (8). Tighten the screws securely.
5. Connect the supply air hose to the air regulator (9).

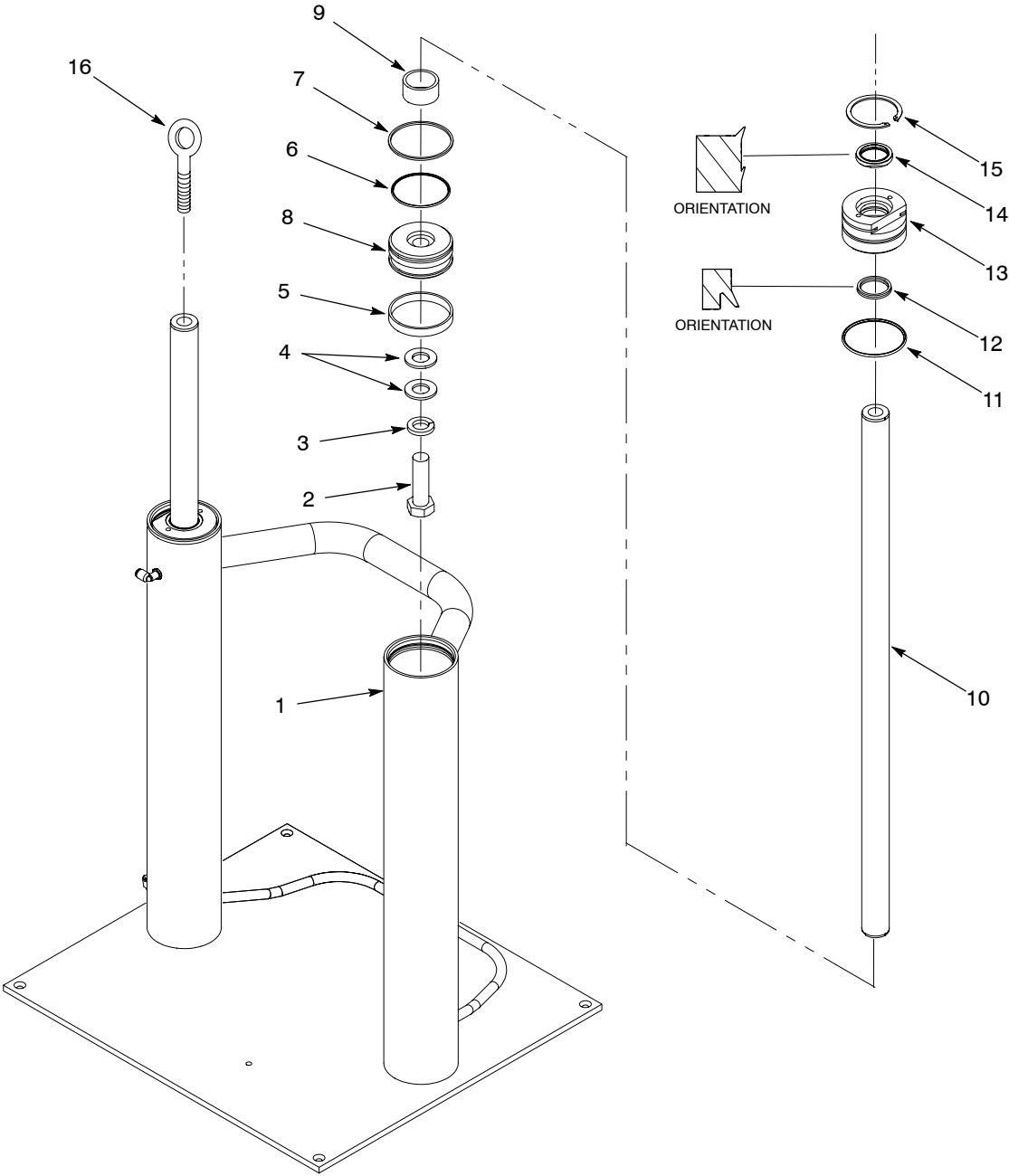
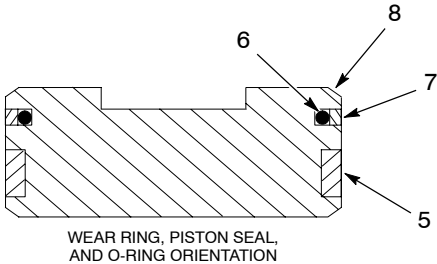


Figure 5 Rebuilding the Small Frame Cylinders
Note: Some parts are not shown for clarity.

Parts

To order parts, call the Nordson Customer Service Center or your local Nordson representative.

Small Frame

See Figure 6 and refer to the following parts list.

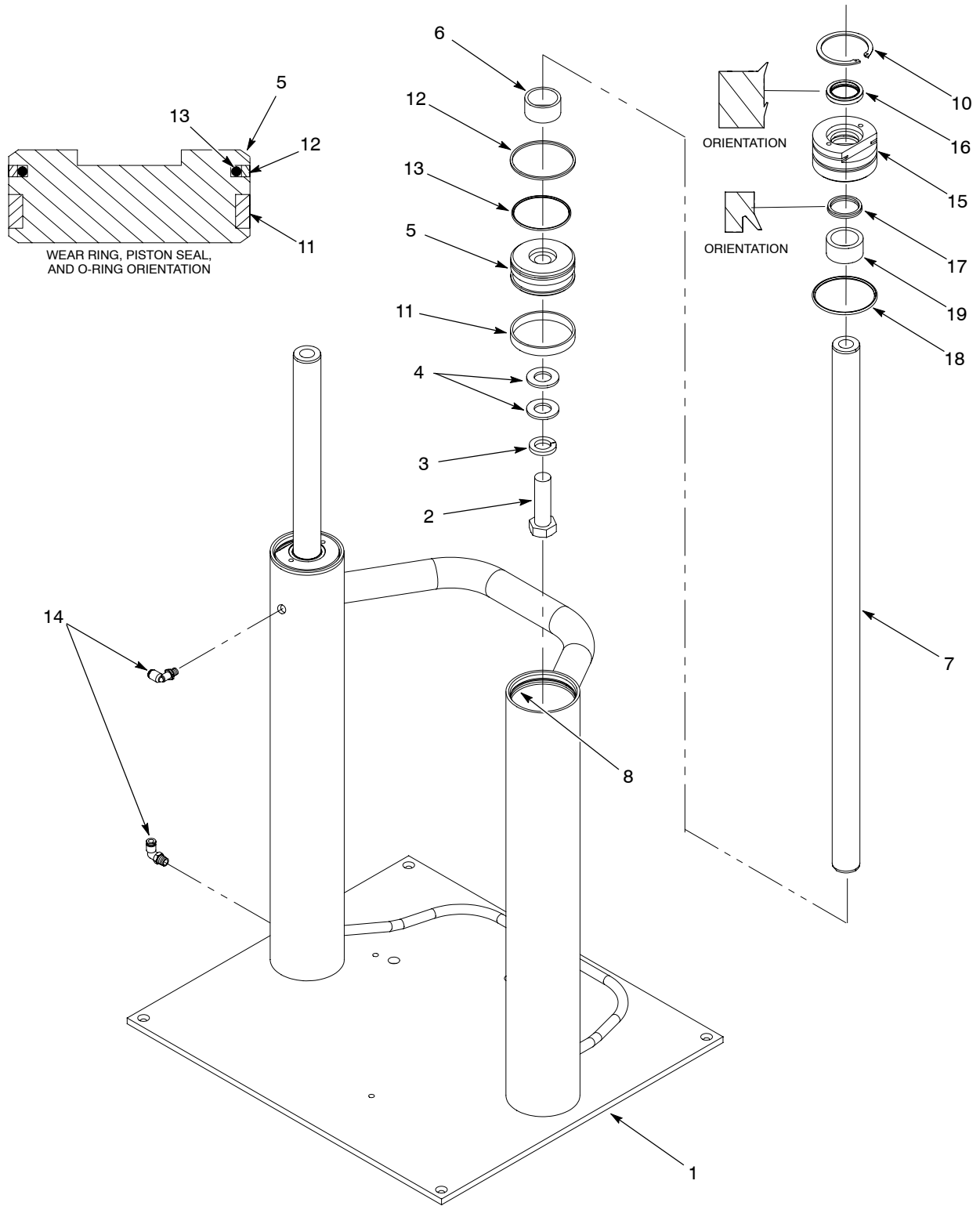


Figure 6 Small Frame Parts

Item	Part	Description	Quantity	Note
—	1072905	Frame assembly, pail, Rhino SD2 NAP	1	
1	124763	• Frame, unloader pail	1	
2	345720	• Screw, hex, 7/8-14 x 3.0	2	
3	983501	• Washer, lock, e, spt, 7/8	2	
4	983254	• Washer, flat, e, 0.938 x1.750 x 0.134,z	4	
5	272456	• Piston, 5-gallon	2	
6	272459	• Spacer, 1.90 OD x 1.62 ID	2	
7	1041539	• Shaft, air cylinder, small frame	2	
8	900223	• Lubricant, o-ring, Parker, 4 oz, 30122-5	1	A
9	- - - - -	• NOT USED ON THIS CONFIGURATION	—	
10	986309	• Retaining Ring, int, 350, basic	2	
11	272458	• Ring, wear, 3.50 OD	2	
12	272457	• Seal, piston, 5-gallon	2	
13	941510	• O-ring, Buna N, 3 x 3.188 x 0.094	2	
14	971266	• Elbow, male, 0.25 tube x 0.25 NPT	2	
15	272441	• Head, cylinder, 5-gallon	2	
16	272443	• • Scraper, wiper, 1.5 ID	2	B
17	272444	• • Packing, block vee, 1.5 ID	2	B
18	942360	• • O-ring, Buna N, 3.25 x 3.50 x 0.125	2	B
19	- - - - -	• • Bushing	2	C
NOTE A: Coat the inside of each air cylinder with this lubricant.				
B: These parts are included with item 15 and can also be ordered separately.				
C: This part is not sold separately. Order item 15 to obtain this part.				

30- and 55-Gallon Large Frames

See Figure 7 and the following parts list.

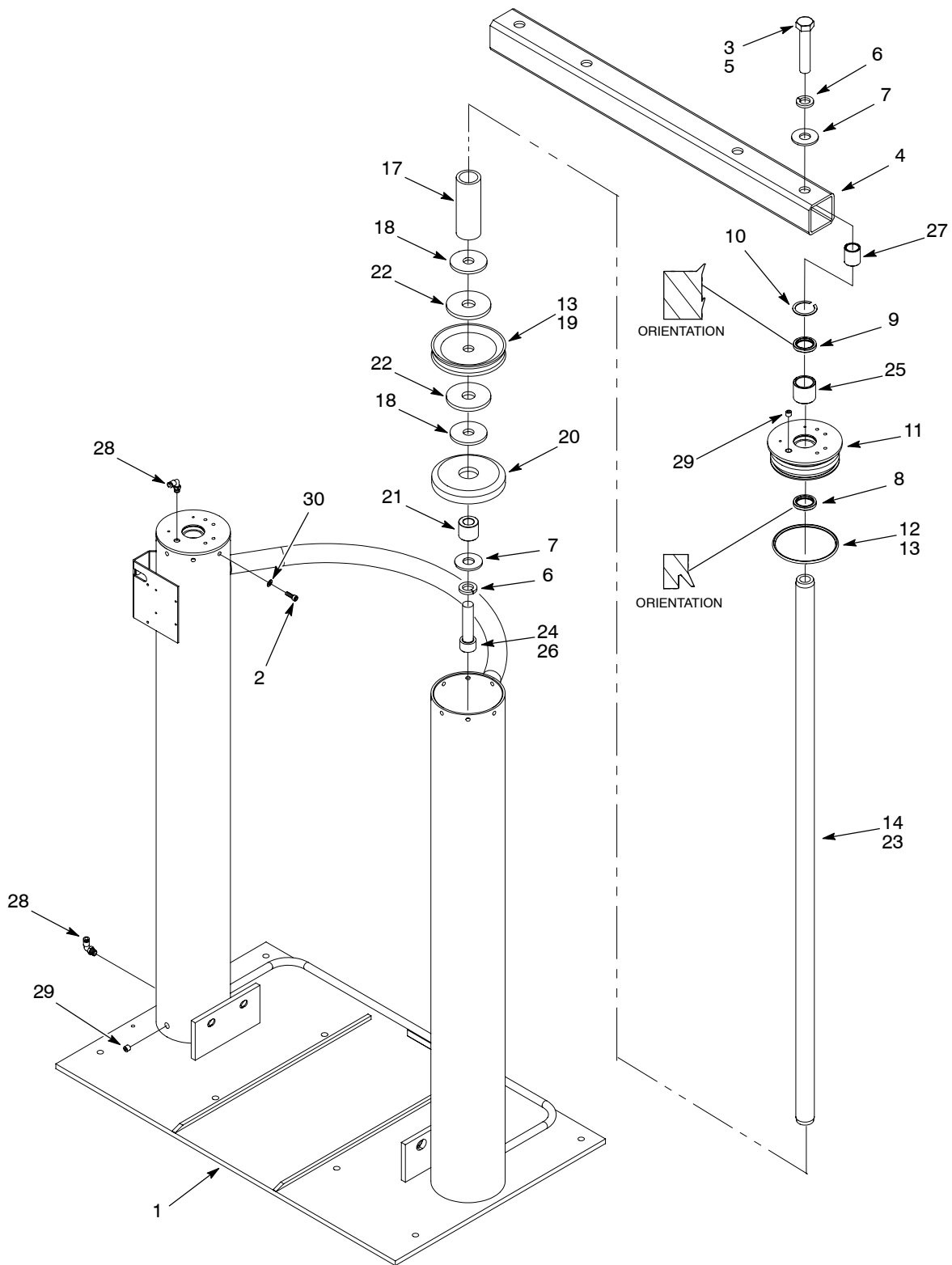


Figure 7 30- and 55-Gallon Frame Parts

Item	Part	Description	Quantity	Note
—	1069890	Module, frame 55-gallon	1	
—	1069834	Module, frame 30-gallon	1	
1	126746	• Frame, drum, unloader, 55-gallon FOR USE ON FRAME MODULE 1069890	1	
1	1002953	• Frame, drum, unloader, 30-gallon FOR USE ON FRAME MODULE 1069834	1	
2	1049067	• Screw, socket, 3/8-24 unf x 3/4	16	
3	900464	• Adhesive, Loctite 242, blue, removable, 50ml	1	
4	126764	• Crossover, frame, drum	1	
5	981664	• Screw, hex, 7/8-14 x 4.5, zn, G8	2	
6	983501	• Washer, lock, e, spt, 7/8, stl, zn	4	
7	983254	• Washer, flat, e, 0.938 x 1.750 x 0.134	4	
8	124789	• Seal, rod, 1.50 dia.	2	
9	272443	• Scraper, wiper, 1.5 id	2	
10	986807	• Retaining ring, int, 200, basic	2	
11	126749	• Head, cylinder, frame drum	2	
12	944330	• O-ring, Buna N, 5.50 x 6.0x 0.250	2	
13	900223	• Lubricant, O-ring, Parker, 4 oz, 30122-5	1	
14	1069838	• Shaft, air cylinder, frame, drum	2	
15	-----	• NOT USED ON THIS CONFIGURATION	—	
16	-----	• NOT USED ON THIS CONFIGURATION	—	
17	126752	• Stop, piston	2	
18	126758	• Plate, backup, piston	4	
19	126753	• Seal, piston, double-acting	2	
20	230563	• Disc, guide, piston, 55-ex	2	
21	230562	• Spacer, bottom, piston, 55-ex	2	
22	126755	• Gasket, piston	4	
23	900291	• Jelly, petroleum	AR	
24	900439	• Adhesive, Loctite 271, red, hi-temp, 50ml	1	
25	126748	• Bushing, Durlon, 1.504/1.503 id	2	
26	982731	• Screw, socket 7/8-14 unf x 3.50	2	
27	230652	• Spacer, tube frame	2	
28	971266	• Elbow, male, 0.25 tube x 0.25 NPT	2	
29	973411	• Plug, pipe, socket, flush, 1/4, zn	2	
30	1049068	• Washer, flat, 0.58 OD x 0.39 ID x 0.08	16	
AR: As Required				

