Rhino® Bulk Unloader Frames

Customer Product Manual
Part 334 608B

NORDSON CORPORATION • AMHERST, OHIO • USA

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Nordson Corporation welcomes requests for information, comments and inquiries about its products. General information about Nordson can be found on the Internet using the following address: http://www.nordson.com.

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Notice

Trademarks

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Rhino Bulk Unloader Frames

1. 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

Make sure all equipment is 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.

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 Material Safety Data Sheets (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.

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.

Fire Safety

To avoid a fire or explosion, follow these instructions.

- Ground all conductive equipment in the spray area. 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 while 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.

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:

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

Check your material MSDS 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.

Action 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.

Disposal

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

2. Description

The following components are mounted on a pail- or drum-sized Rhino bulk unloader frame, according to customer requirements:

- hydraulic section
- air valve
- air motor
- pneumatic, electrical, and/or other controls

Use this manual to repair and order spare parts for your Rhino bulk unloader frame. Refer to your specific unloader controls manual for complete operation information, including safety information and the locations of and procedures for operating pneumatic and hydraulic control equipment.

3. Repair

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

WARNING: System or material pressurized. Relieve pressure. Failure to observe this warning may result in serious injury or death.

WARNING: Serious personal injury can result if air has not been relieved from the cylinder before disassembling. You must refer to the controls manual for specific procedures for depressurizing your air cylinders before rebuilding your air cylinders.

This section contains detailed instructions for repairing or replacing drum and pail unloader frame components.

Rebuilding Air Cylinders on a Drum Frame

Nordson Corporation recommends that the technician should rebuild both air cylinders at the same time.

WARNING: The air cylinders are pressurized and can hold latent air pressure even when system air is shut off. Be sure to relieve all air pressure from the air cylinders before rebuilding them. Failure to observe this warning may result in serious personal injury or death.

Air Cylinder Disassembly (Drum)

Before disassembling the air cylinders, be sure that you do the following:

- Block the follower plate high enough to keep the follower plate from contacting the drum hold down shoes.
- Verify that all pressure has been bled from the air cylinder pistons. Refer to your controls manual for instructions specific to your unloader controls configuration.
- Verify that the pump, follower plate, and air motor assembly will be secure (will not wobble or tip) when you remove the air cylinder components from the frame.
- Note the orientation of the cylinder heads for future reference.

See Figure 1.

1. Remove each cylinder shaft (6) separately:

   a. Remove the hex head screws (2), lock washers (3), and flat washers (4) that secure the crossover (1) to each cylinder shaft (6) and frame tube (23).

   b. Remove the hex head screws (9), flat washers (4), and lock washers (3), then remove the crossover.

   c. Remove the cap screws (5) from the top of each cylinder (8).

   NOTE: Use a lifting device with a 227-kg (500-lb) capacity for the next step.

   d. Thread $^{7}/_{8}$-14 eye bolts into the tops of the cylinder shafts and lift each shaft out of the cylinder separately.

Air Cylinder Disassembly (Drum) (contd)

2. Remove the following from each cylinder shaft:
   - shaft screw (22)
   - lock washers (3)
   - flat washers (4)
   - bottom piston spacer (21)
   - piston guide disk (20)
   - piston back-up plates (17)
   - gaskets (18)
   - piston seal (19)
   - piston stop (7)
3. Slide the cylinder head (11) off each shaft.
4. Remove the following from each cylinder head:
   - internal retaining ring (16)
   - wiper scraper (15)
   - bearing (14)
   - shaft seal (13)
   - external O-ring (12)

Cleaning Air Cylinders (Drum)

See Figure 1.

Follow these procedures to clean your air cylinders.

1. Clean the inside walls of the cylinders. Immediately apply a coating of O-ring lubricant to prevent corrosion.
2. Clean the piston seals (19), cylinder heads (11), and shafts (6).

NOTE: Whenever you disassemble the cylinders, you should replace the seals (13 and 19), wiper scrapers (15), bearings (14), and O-rings (12). You must install new gaskets (18).

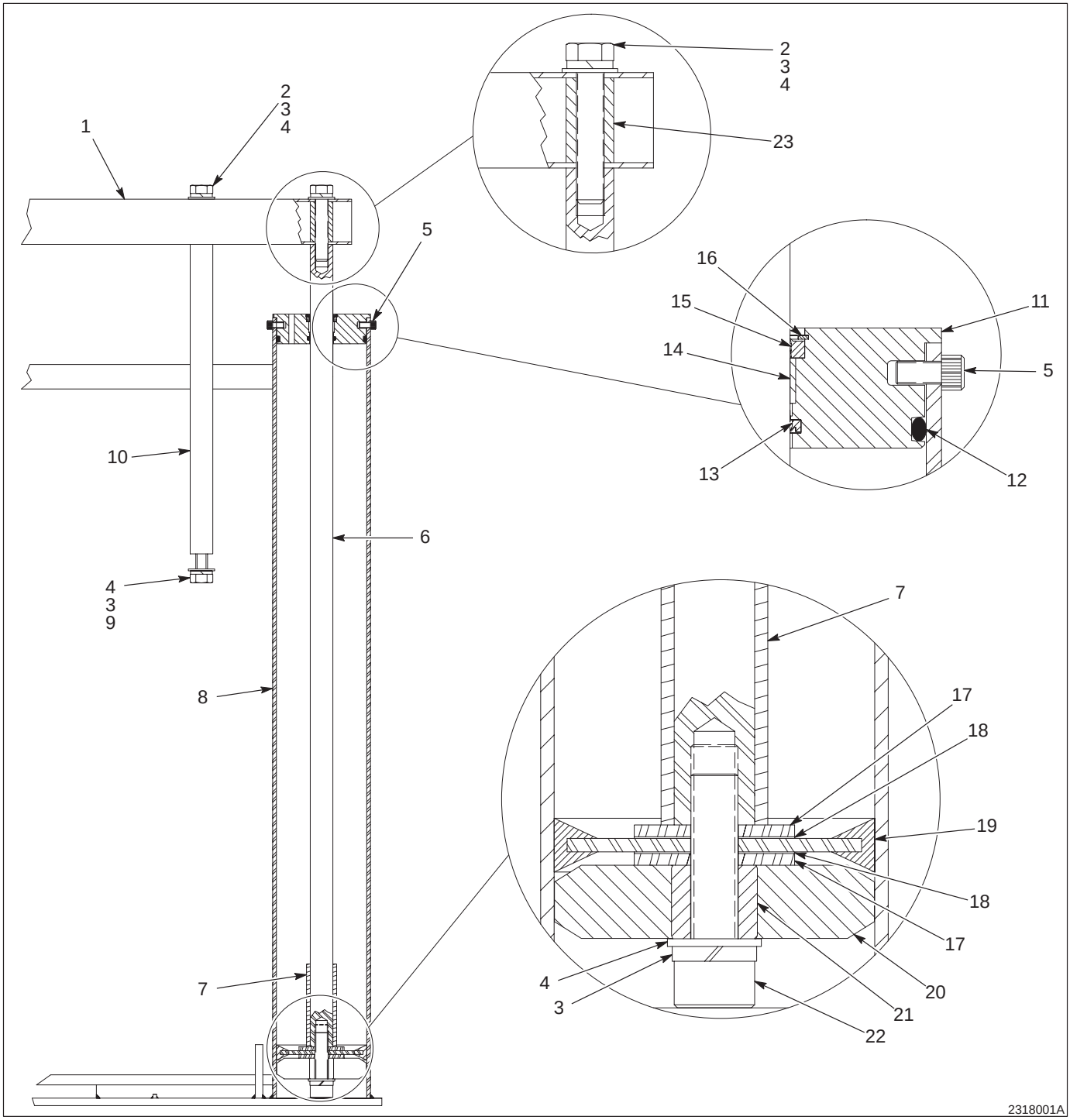

Fig. 1 Elevator Cutaway (Drum Frame)

1. Crossover
2. Hex head screws
3. Lock washers
4. Flat washers
5. Cap screws
6. Cylinder shaft
7. Piston stop
8. Cylinders
9. Hex head screws
10. Mounting rods
11. Cylinder head
12. O-ring
13. Shaft seal
14. Bearing
15. Wiper scraper
16. Retaining ring
17. Piston back-up plates
18. Gaskets
19. Piston seal
20. Piston guide disk
21. Bottom piston spacer
22. Shaft screw
23. Frame tube

Air Cylinder Assembly (Drum)

See Figure 1.

Follow these procedures to rebuild your air cylinder with new parts.

1. Lubricate the following new items with petroleum jelly and install them along with the retaining ring (16) into each cylinder head (11):
   - shaft seal (13)
   - bearing (14)
   - wiper scraper (15)
2. Lubricate two new O-rings (12) with O-ring lubricant. Install an O-ring onto each cylinder head.
3. Place a light coating of petroleum jelly on the cylinder shafts (6). Slide the cylinder heads onto the shafts.
4. Slide the piston stop (7) onto each cylinder shaft. Apply non-removable threadlocking adhesive to the shaft screws (22). Immediately install the following components (in order) on each cylinder shaft:
   - piston back-up plate (17)
   - gasket (18)
   - piston seal (19)
   - gasket (18)
   - piston back-up plate (17)
   - piston guide disk (20)
   - bottom piston spacer (21)
   - flat washers (4)
   - lock washers (3)
   - shaft screw (22)
5. Tighten each screw (22) securely with an impact wrench to 339 N•m (250 ft-lb).
6. Lubricate the piston seal with O-ring lubricant.
7. Install the shaft, head assembly, and piston assembly into the air cylinder.
8. Orient the cylinder heads as noted during removal.

9. Install each cylinder head into the cylinder, then perform the following steps:

   a. Apply removable threadlocking adhesive to the cap screw (5).

   b. Install the cap screws into each cylinder (8). Tighten each screw to 14–15 N•m (10–15 ft-lb).

   c. Install any device or bracket that was removed from the top of the cylinder head. Install the air tubes to the left cylinder head, and bottom tube fitting.

10. Install the crossover (1) and frame tube (23) to the cylinder shaft with the hex head screws (2), lock washers (3) and flat washers (4). Do not tighten the hex head screws until you have reinstalled both cylinders so that you can properly center the crossover. Tighten the screws to 203–210 N•m (150–155 ft-lb).

11. Align the mounting plate (for the pump/air motor/follower assembly) to the mounting rods (10). Apply removable threadlocking adhesive to the hex head screws (9). Install the flat washers (4), lock washers (3), and hex head screws to secure the plate to the mounting rods. Tighten the screws securely to 258–264 N•m (190–195 ft-lb).

12. Reinstate air pressure to your air cylinders. Refer to your system controls manual for specific information.

Rebuilding Air Cylinders on a Pail Frame

Nordson Corporation recommends that the technician should rebuild both air cylinders at the same time.

WARNING: The air cylinders are pressurized and can hold latent air pressure even when system air is shut off. Be sure to relieve all air pressure from the air cylinders before rebuilding them. Failure to observe this warning may result in serious personal injury or death.

Air Cylinder Disassembly (Pail)

Before disassembling the air cylinders, be sure that you do the following:

- Lower the follower plate to the base of the frame.
- Verify that all air motor pressure and hydraulic pump pressure has been bled from the air cylinder pistons. Refer to your controls manual for instructions specific to your unloader controls configuration.
- Verify that the pump, follower plate, and air motor assembly will be secure (will not wobble or tip) when you remove the air cylinder components from the frame. If you wish to remove the air motor, pump, and follower plate assembly from the frame, refer to your controls manual for removal procedures.
- Note the orientation of the cylinder heads for future reference.

See Figure 2.

1. Remove any device or bracket attached to the top of the cylinder head. Refer to your controls manual for specific procedures.
2. Remove the hex head screw (1), lock washer (2), and flat washers (3) from the top of each cylinder shaft (4).
3. Use snap ring pliers to remove the retaining ring (5) from the top of each cylinder head (11).

NOTE: Use a lifting device with a 227-kg (500-lb) capacity for the next step.

4. Thread a $^{7}/_{8}$-14 eye bolt into the top of each cylinder shaft. Attach a lifting device to the eye bolt. Remove the air fitting at the bottom of the left cylinder. Slowly lift each cylinder shaft straight up out of the cylinder.
5. Remove the eye bolt from each cylinder shaft. Slide the cylinder head off each cylinder shaft. Remove the hex head screw (1), lock washer (2), and flat washer (3) from the bottom of each cylinder shaft. Remove the piston (7) and spacer (6).
6. Remove the wiper scraper (14), packing (13), and O-ring (12) from each cylinder head.
7. Remove the wear ring (8), piston seal (9), and O-ring (10) from the piston.

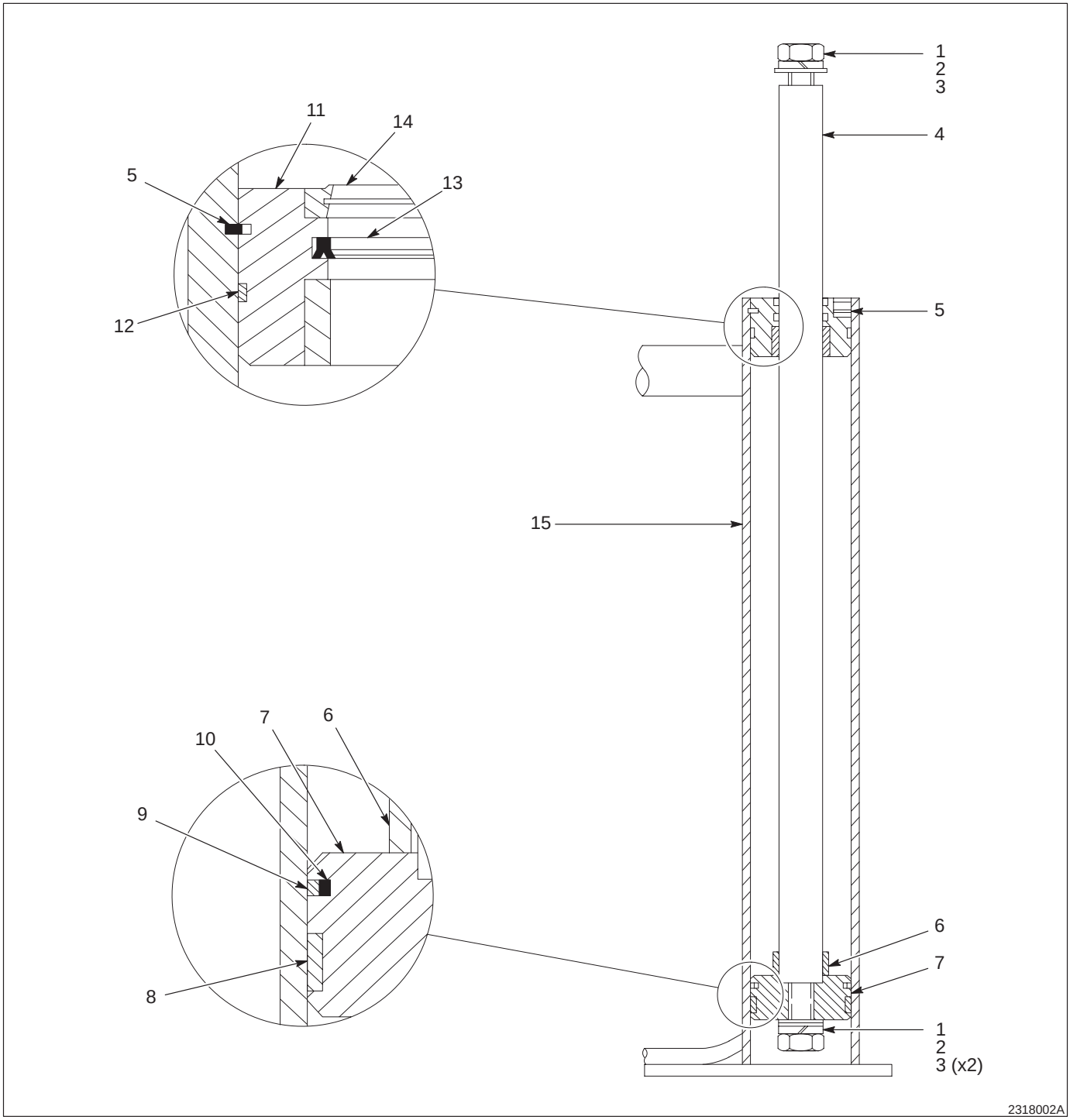

Fig. 2 Elevator Cutaway (Pail Frame)

1. Hex head screws
2. Lock washers
3. Flat washers
4. Cylinder shaft
5. Retaining ring
6. Spacer
7. Piston
8. Wear ring
9. Piston seal
10. O-ring
11. Cylinder head
12. O-ring
13. Packing
14. Wiper scraper
15. Frame

Cleaning Air Cylinders (Pail)

See Figure 2.

Follow these procedures to clean your air cylinders.

1. Clean the inside walls of the cylinders. Immediately apply a coating of O-ring lubricant to prevent corrosion.

2. Clean the pistons (7), cylinder heads (11), and shafts (4).

NOTE: Whenever you disassemble the cylinders, you should replace the seals (9), wiper scrapers (14), wear rings (8), and O-rings (10 and 12).

NOTE: If your cylinder head bearing is damaged, you must replace the cylinder head. The bearing is machined with the head.

Air Cylinder Assembly (Pail)

See Figure 2.

Follow these procedures to rebuild you air cylinder with new parts.

1. Lubricate the new packing (13) and new wiper scraper (14) with petroleum jelly and install them into each cylinder head (11).

2. Lubricate a new O-ring (12) with O-ring lubricant. Install the O-ring onto each cylinder head.

3. Place a light coating of petroleum jelly on each cylinder shaft (4). With the retaining ring groove of each cylinder head at the top, slide each cylinder head onto its shaft.

4. Slide the spacer (6) onto each cylinder shaft.

5. Using O-ring lubricant, lubricate and install the O-ring (10), piston seal (9), and wear ring (8) on each piston (7).

6. Apply threadlocking adhesive on each piston hex head screw (1). Immediately install and tighten the screw, lock washer (2), flat washer (3) and fasten the piston to the shaft. Tighten the screws to 258–264 N•m (190–195 ft-lb).

7. Perform the following steps to install the piston/shaft assembly:

   a. Install the eye bolt on the top of each cylinder shaft. Lift each cylinder shaft and carefully guide the piston back into its respective cylinder.

   b. As you slowly lower each shaft assembly, rotate the cylinder head until it is in its original position with respect to the unloader frame.

   c. Continue lowering each shaft assembly until it reaches the bottom of its travel.

8. To install each cylinder head, perform the following steps:

   a. Install the retaining ring (5)—sharp side up—on the cylinder head.

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.

   b. Use ID snap ring pliers to compress the retaining ring on the cylinder head. Press the head into place until the retaining ring seats in the cylinder groove.

   c. Remove the eye bolt from the shaft.

9. Align the mounting plate of the pump assembly to the cylinder shafts. Apply removable threadlocking adhesive to the mounting plate hex head screws (1). Install and tighten the flat washers (3), lock washers (2), and hex head screws to 258–264 N•m (190–195 ft-lb).

10. Replace any brackets or devices removed from the cylinder heads.

11. Replace all air fittings and hoses as directed in the controls manual for your unloader.

4. Parts

To order parts, call the Nordson Customer Service Center or your local Nordson representative. Use the parts list, and the accompanying illustration, to describe and locate parts correctly.

Using the Illustrated Parts List

Numbers in the Item column correspond to numbers that identify parts in illustrations following each parts list. The code NS (not shown) indicates that a listed part is not illustrated. A dash (—) is used when the part number applies to all parts in the illustration.

The number in the Part column is the Nordson Corporation part number. A series of dashes in this column (- - - - - -) means the part cannot be ordered separately.

The Description column gives the part name, as well as its dimensions and other characteristics when appropriate. Indentions show the relationships between assemblies, subassemblies, and parts.

Item	Part	Description	Quantity	Note
—	000 0000	Assembly	1	
1	000 000	• Subassembly	2	A
2	000 000	• • Part	1	

- If you order the assembly, items 1 and 2 will be included.
- If you order item 1, item 2 will be included.
- If you order item 2, you will receive item 2 only.

The number in the Quantity column is the quantity required per unit, assembly, or subassembly. The code AR (As Required) is used if the part number is a bulk item ordered in quantities or if the quantity per assembly depends on the product version or model.

Letters in the Note column refer to notes at the end of each parts list. Notes contain important information about usage and ordering. Special attention should be given to notes.

55-Gallon and 30-Gallon Drum Frame Components

See Figure 1.

The difference between 55-gallon and 30-gallon drum frames is the location of the hold down components on the frame assembly. Refer to the following parts list for specific part numbers so that you can order the parts appropriate to your frame assembly.

Item	Part	Description	Quantity	Note
—	230 593	Frame, bulk unloader, 55 gallon	1	
—	100 2957	Frame, bulk unloader, 30 gallon	1	
1	- - - - -	• Crossover, frame, drum	1	A
2	981 664	• Screw, hex, $^{7}/_{8}$-14 x 4.500, zinc, g8	4	
3	983 501	• Washer, lock, e, split, $^{7}/_{8}$, steel, zinc	8	
4	983 254	• Washer, flat, e, 0.938 x 1.750 x 0.134, zinc	8	
5	981 663	• Screw, socket, $^{3}/_{8}$-24 UNF x $^{3}/_{4}$ large, zinc	16	
6	230 592	• Shaft, air cylinder, frame, drum	2	
7	126 752	• Stop, piston	2	
8	126 746	• Frame drum, bulk unloader, 55-gal	1	A
8	100 2953	• Frame, drum, bulk unloader, 30-gal	1	A
9	981 552	• Screw, hex, $^{7}/_{8}$-14 x 2.250, cap, zinc	2	
10	126 751	• Rod, mounting pump drum	2	
11	126 749	• Head, cylinder, frame drum	2	
12	944 330	• O ring, Buna-N, 5.500 x 6.000 x 0.250	2	B
13	124 789	• Seal, rod, 1.50 diameter	2	B
14	126 748	• Bushing, 1.504/1.503 ID	2	B
15	272 443	• Scraper, wiper, 1.5 ID	2	B

NOTE A: If you need to order a replacement frame assembly, contact your Nordson representative for assistance.

B: These parts included in the bulk unloader elevator cap seal kit, part 100 1414.

Continued on next page

55-Gallon and 30-Gallon Drum Frame Components

(contd)

Item	Part	Description	Quantity	Note
16	986 807	• Retaining ring, internal, 200, basic	2	B
17	126 758	• Plate, backup, piston	4	
18	126 755	• Gasket, piston	4	C
19	126 753	• Seal, piston, double acting	2	C
20	230 563	• Disk, guide, piston, 55-ex	2	
21	230 562	• Spacer, bottom, piston, 55-ex	2	
22	982 731	• Screw, socket, $^{7}/_{8}$-14 x 3.50, bl	2	
23	230 652	• Tube, frame	2	
NS	900 464	• Adhesive, threadlocking 50 ml, removable	AR	
NS	900 439	• Adhesive, threadlocking 50 ml, non-removable	AR	
NS	- - - - - -	• Jelly, petroleum	AR	
NS	900 223	• Lubricant, O-ring, Parker 4 oz	AR	
NS	900 302	Grease, high temperature, O-ring, 14.5-oz cartridge	AR	
NS	900 216	Oil, vitalizer, 1 gallon	AR	

NOTE B: These parts included in the bulk unloader elevator cap seal kit, part 100 1414.
C: These parts included in the bulk unloader elevator piston seal kit, part 100 1413.
AR: As Required
NS: Not Shown

Pail Frame Components

See Figure 2.

Item	Part	Description	Quantity	Note
—	124 822	Frame, bulk unloader, 5-gallon	1	
1	981 623	• Screw, hex head, $^{7}/_{8}$-14 x 2.50 in.	4	
2	983 501	• Washer, lock, split, $^{7}/_{8}$ in.	4	
3	983 254	• Washer, flat, $^{7}/_{8}$ in.	6	
4	324 223	• Shaft	2	
5	986 309	• Ring, retaining, internal	2	
6	272 459	• Spacer, 1.90 OD x 1.62 ID x 1.00 in.	2	
7	272 456	• Piston	2	
8	272 458	• Ring, wear, 3.50 in. ID	2	
9	272 457	• Seal, piston	2	
10	941 510	• O-ring, Buna-N, 3.000 x 3.188 x 0.094 in.	2	
11	272 441	• Head, cylinder	2	
12	942 360	• • O-ring, Buna-N, 3.25 x 3.50 x 0.13 in.	1	
13	272 444	• • Packing, V-block, 1.50 ID	1	
14	272 443	• • Scraper, wiper	1	
15	- - - - - -	• Frame assembly	1	A
NS	900 464	• Adhesive, threadlocking, removable, 50-ml	1	
NS	900 439	• Adhesive, threadlocking, 50-cc	1	
NS	- - - - - -	• Jelly, petroleum	AR	
NS	900 223	• Lubricant, O-ring, 4-oz	1	
NS	109 526	• Accessory group, ship with	1	
NS	900 302	• • Grease, high temperature, O-ring, 14.5-oz cartridge	1	
NS	900 216	• • Oil, vitalizer, 1 gallon	1	

NOTE A: If you need to order a replacement frame assembly, contact your Nordson representative for assistance.

AR: As Required

NS: Not Shown