

Rhino[®] 48:1 Screw Together Pump with EPDM O-Rings

Customer Product Manual

Part 1041259B

Issued 2/06



NORDSON CORPORATION • AMHERST, OHIO • USA

Table of Contents

Safety	1	Parts	11
Qualified Personnel	1	Pump Assembly	11
Intended Use	1	48:1 Hydraulic Section	12
Regulations and Approvals	1	Standard Cast Drum Follower Plate Assembly ..	13
Personal Safety	1	Spun Drum Follower Plate Assembly	13
High-Pressure Fluids	1	Drum Follower Plates	13
Fire Safety	2	Drum Follower Plate Seals	13
Halogenated Hydrocarbon Solvent Hazards ..	2	Pail Follower Plate Assembly	14
Action in the Event of a Malfunction	2	Pail Follower Plates	14
Disposal	2	Pail Follower Plate Seals	14
Specifications	2		
Description	3		
Theory of Operation	3		
Installation	4		
Operation	4		
How to Bleed the Pump	4		
Maintenance	4		
Troubleshooting	5		
Repair	5		
Consumable Items	5		
Packing Gland Replacement	6		
Remove the Packing Gland	6		
Install the Packing Gland	7		
Remove the Hydraulic Section	8		
Plunger and Piston Replacement	8		
Remove the Plunger and Piston	8		
Install the Plunger and Piston	9		
Install the Hydraulic Section	9		
Follower Plate Seal Replacement	10		
Roll-On Seals	10		
Heat Shrink, Adjustable Clamp-Type Seals ..	10		

Contact Us

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>.

Address all correspondence to:

Nordson Corporation
Attn: Customer Service
555 Jackson Street
Amherst, OH 44001

Notice

This is a Nordson Corporation publication which is protected by copyright. Original copyright date 2003. No part of this document may be photocopied, reproduced, or translated to another language without the prior written consent of Nordson Corporation. The information contained in this publication is subject to change without notice.

Trademarks

Nordson and the Nordson logo are registered trademarks of Nordson Corporation.

All other trademarks are the property of their respective owners.

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. 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.

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.

Specifications

See Figure 1.

Pump Output: 131 cubic cm/stroke (8 cubic in./stroke)

Maximum Intermittent Stroke Rate: 1 per 2 sec (30 per min.)

Maximum Continuous Stroke Rate: 1 per 4 sec (15 per min.)

Viscosity Range: 30,000–3 million centipoise

Note: Maximum pump output depends upon application temperature, filters, material viscosities, and system configuration.

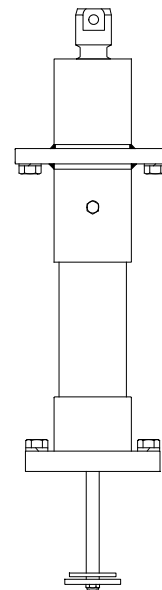


Figure 1 Specifications

Description

This manual provides basic information about the Rhino 48:1 screw together pump with EPDM O-rings.

NOTE:

- Throughout this manual, the Rhino 48:1 screw together pump with EPDM O-rings is referred to as the pump.
- Refer to your unloader controls manual for specific information about operating your pump as part of an unloader assembly.

Theory of Operation

An air motor, located directly above the pump, drives the hydraulic section. A four-way air valve mounted to the air motor controls the direction of the air motor shaft movement. As the air motor piston moves up and down, it shifts the air valve spool, which exhausts air on one side of the piston and directs air pressure to the opposite side of the piston.

See Figure 2. The shovel (12) moves up and down with the plunger (1) and forces material into the hydraulic section. The hydraulic section pressurizes the material and forces it out of the pump.

During the upward pump stroke, the plunger and shovel are pulled upward and the upper check valve (6) closes. The lower check (10) raises off the lower check seat (11). The lower check valve (9) opens and allows material to pass into the lower pump chamber, below the upper check. As the plunger and piston (7) move upward, material from the upper pump chamber is forced out of the pump outlet port (5).

When the plunger strokes downward, the upper check valve (6) opens, and the lower check valve (9) closes. Material between the upper check seat (8) and lower check (10) is forced upward through the piston (7), which pressurizes the material above the upper check and forces it out of the pump.

The solvent chamber (2) at the top of the pump contains fluid that lubricates the plunger and packing gland (3) seals and prevents material from hardening on the shaft. A bleed valve (4) on the side of the pump body allows the operator to bleed air from the material being pumped.

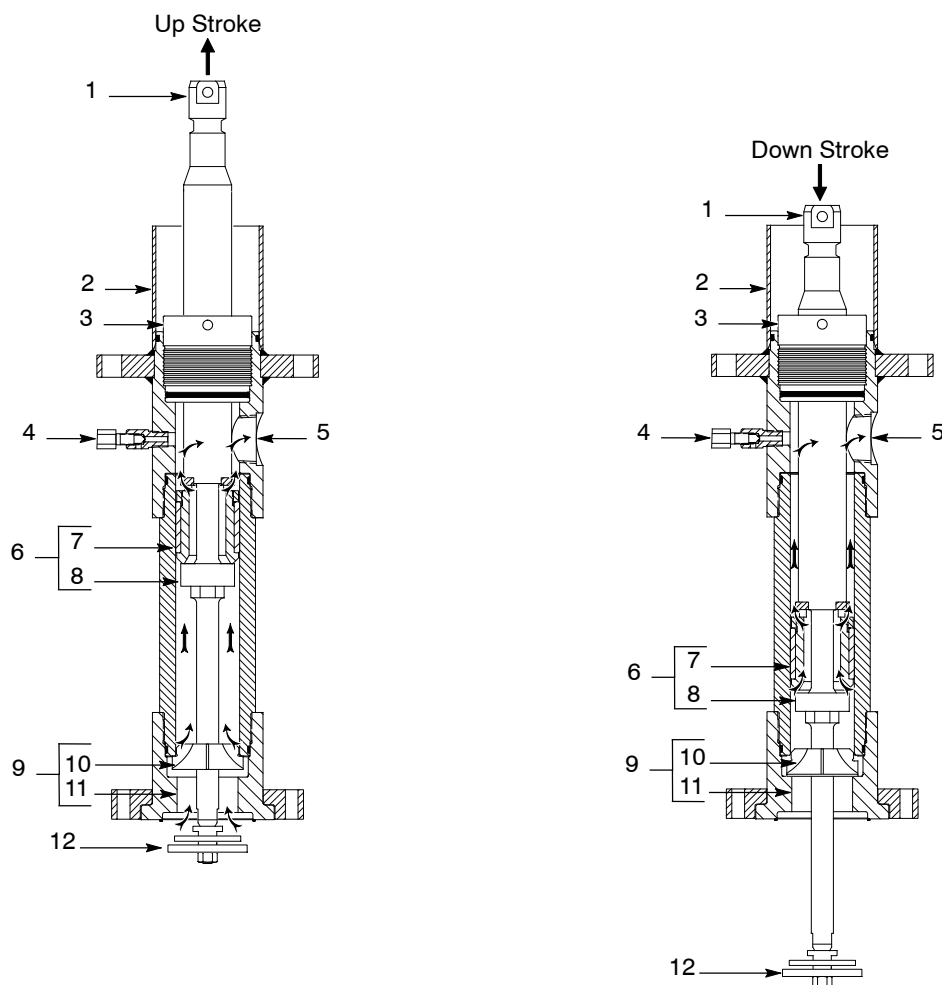


Figure 2 48:1 Pump

**WARNING**

- Allow only qualified personnel to perform the following tasks. Follow the safety instructions in this document and all other related documentation.
- To prevent serious injury, relieve system and material pressure before disconnecting any hydraulic connections or servicing this equipment.

Installation

Installation is dependent upon the system configuration. Refer to the system documentation provided or contact a Nordson representative for more information.

Operation

Daily operation is dependent upon the system configuration. Refer to the Rhino unloader controls manual provided with the system for more information.

How to Bleed the Pump

1. Reduce pressure to 0 bar/psi.

**WARNING**

Do not open the bleed valve more than three turns. The bleed valve and material may be forced from the valve body if loosened more than three turns. Personal injury could result.

2. See Figure 3. Place a small waste container beneath the bleed valve (1). Make sure that the small bleed port is pointed down. Carefully loosen the bleed valve only two or three turns.
3. Initiate a purge from the unloader controller or push the purge button on your unloader. Gradually increase the pressure to an acceptable stroke rate for the pump or acceptable material bleed volume.
4. Leave the bleed valve open until the material flows continuously, without spitting.
5. Tighten the bleed valve. Remove the waste container. Further bleeding should not be necessary unless the hydraulic section is completely empty or after changing material containers.

Maintenance

Refer to Table 1.

Table 1 Maintenance Schedule

Item	Daily	Weekly
Check the level of the solvent chamber. Make sure that the fluid level is 4 cm (1.5 in.) from the top of the chamber	X	
Inspect the follower plate seals for damage or signs of excessive material leakage. Replace the seals if necessary.		X

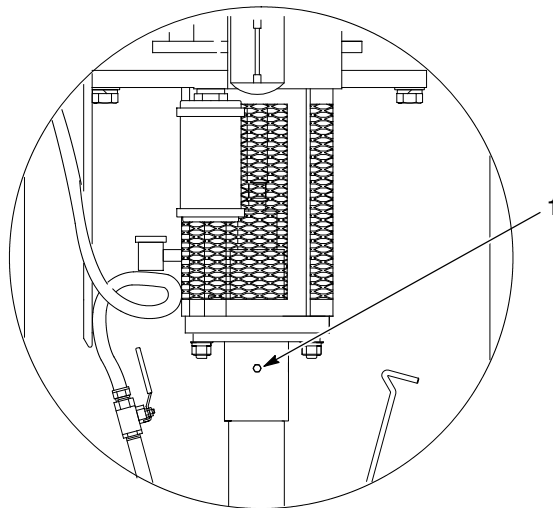


Figure 3 Bleed Valve Location

Troubleshooting

These procedures cover only the most common problems that you may encounter. If you cannot solve the problem with the information given here, contact your local Nordson representative for help.

Problem	Possible Cause	Corrective Action
Pump is not delivering material	Insufficient air pressure to pump air motor Follower plate not in contact with material Air pocket in pump Blocked hydraulic system or follower plate.	Increase air pressure to the air motor. Make sure that the follower plate is lowered and making contact with the material. Bleed the pump. Refer to <i>How to Bleed the Pump</i> in the <i>Operation</i> section. Perform the following steps: 1. Cycle the pump. Slowly open the bleed valve only two or three turns. <ul style="list-style-type: none"> If material exits the valve, close the valve and go to step 2. If no material exits the valve, close the valve, shut down the system, and relieve system pressure. Remove and rebuild the pump. 2. Shut down the pump. Relieve system pressure. Disconnect the hose from the pump. Check the hose for blockage. <ul style="list-style-type: none"> If the hose is not blocked, go to step 3. If the hose is blocked, clean or replace the hose. 3. Remove the gun from the hose. Check the gun for blockage. <ul style="list-style-type: none"> If the gun is blocked, clean it. If the gun is damaged, rebuild or replace the gun as necessary.

Repair

The following paragraphs provide repair procedures for the pump.

NOTE:

- Unless otherwise noted, the illustrations in this section show drum unloader follower plates and seals. You may have a pail unloader, which has different follower plates and seals.
- Refer to the *7- and 10- Inch Air Motors with Air Valve*, manual 334607, to repair the air motor and air valve.

Consumable Items

Keep the following on hand when repairing the pump.

Item	Part	Application
Never-Seez	900344	Apply to threads of applicable parts.
Threadlock Adhesive	900464	
Pipe/Thread Sealant	900481	
TFE Grease	900349	Lubricate pump body O-rings.

Packing Gland Replacement

Packing glands can be replaced without removing the pump from the unloader frame. If you need to remove the hydraulic section from the unloader frame, refer to the *Remove the Hydraulic Section* procedure.

Remove the Packing Gland

1. Place several blocks of wood on the frame base, to prevent the follower plate from contacting the drum hold down assembly. Lower the follower plate to the wood blocks.



WARNING

To avoid injury, place the unloader in neutral until noted otherwise in this procedure. To avoid injury, you must leave the unloader in this position until otherwise directed.

2. See Figure 4. Shut off the compressed air supply at the air motor lockout valve (1).

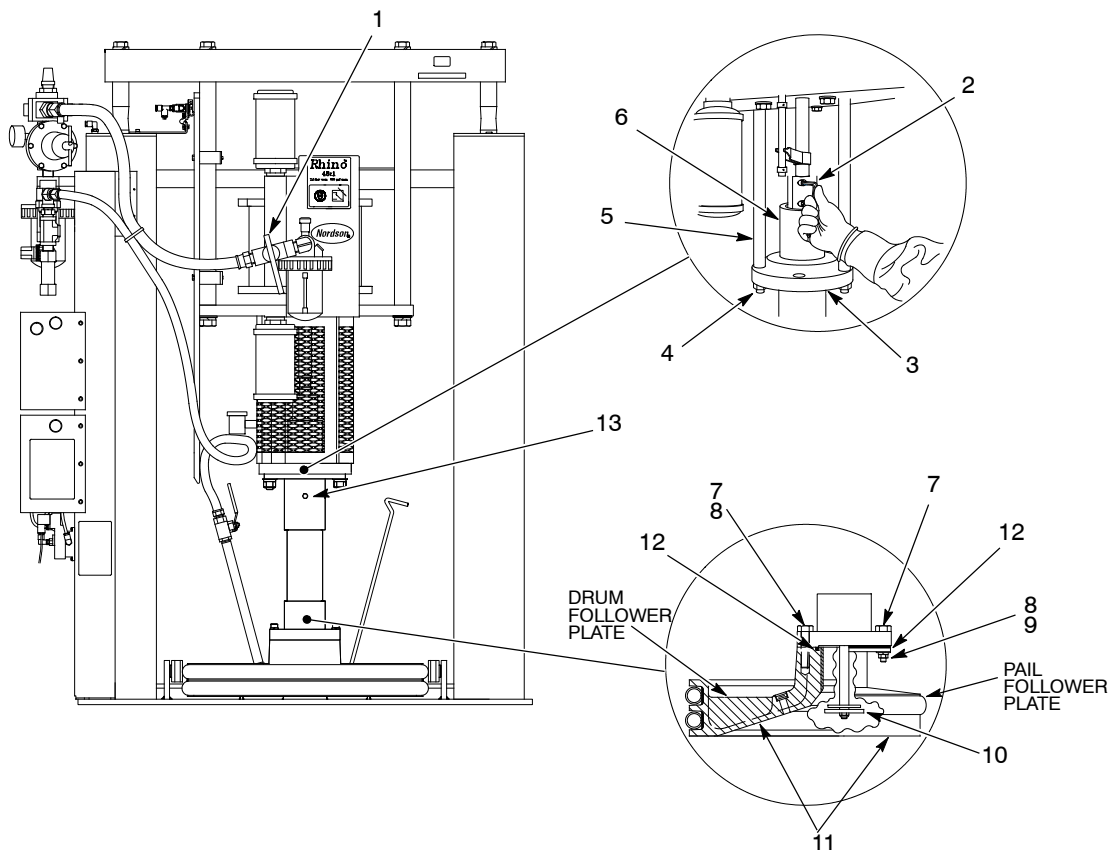


Figure 4 Removing the Hydraulic Section

Note: Refer to your controls manual to determine your air motor lockout valve location.



WARNING



Do not open the bleed valve more than three turns. The bleed valve and material may be forced from the valve body if loosened more than three turns. Personal injury could result.

3. Bleed the hydraulic pressure through the bleed valve (13) and guns. Leave the valve open.
4. Remove the coupling (2) from the plunger. Drain the solvent chamber (6).
5. Push the pump rod down with the air motor shaft, then raise the air motor shaft. Shut off the compressed air supply at the air motor lockout valve.
6. Remove the solvent chamber.
7. See Figure 5. Fit a pin spanner wrench (1) or the optional gland removal tool into one of the four holes (2) in the circumference of the packing gland. Unscrew the packing gland (5) counterclockwise out of the pump body.

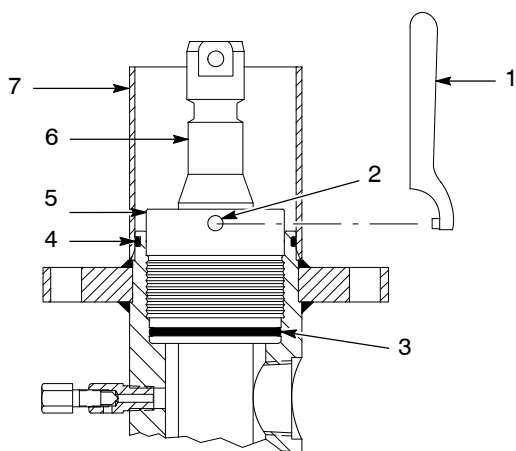


Figure 5 Replacing the Packing Gland

8. Clean and inspect the visible portions of the plunger (6) for scoring. Replace the plunger, if necessary. Refer to the *Plunger and Piston Replacement* procedure.
9. Before installing the new packing gland, clean the mating surfaces of the mounting flange, packing gland, and plunger. Lubricate all seals and O-rings (3 and 4) with a compatible lubricant.

Install the Packing Gland

1. See Figure 5. Coat the threads of the packing gland (5) with Never-Seez lubricant. Taking care not to pinch the O-ring (3) when inserting the packing gland, screw the packing gland into the pump body clockwise.
2. Install the coupling over the air motor shaft and plunger. You may have to pull the plunger up through the packing gland. If the plunger (6) has stalled in the bottom of the hydraulic section, retrieve it using the procedure in Table 2.

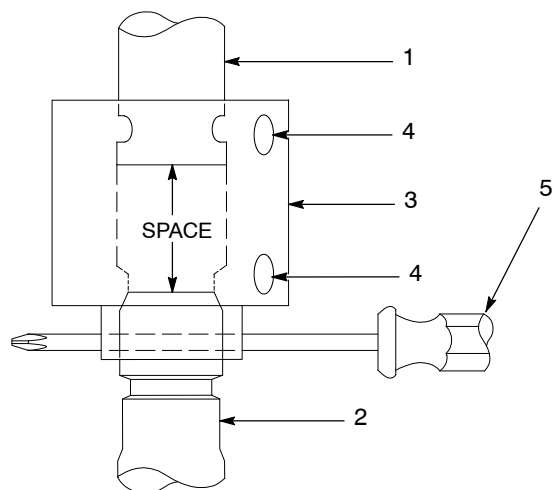


Figure 6 Raising the Plunger

Table 2 Raising the Plunger and Installing the Coupling

Air Motor Lockout Valve Position	Procedure
ON	<ol style="list-style-type: none"> 1. Adjust the air motor regulator to 0 bar/psi and turn the air motor lockout valve on. 2. Increase air pressure at the air motor regulator until the air motor just starts to cycle. When the air motor shaft just begins its UP stroke, turn the air motor regulator to 0 bar/psi.
OFF	<ol style="list-style-type: none"> 3. Turn the air motor lockout valve off. 4. See Figure 6. Position both halves of the coupling (3) over the plunger (2) and air motor shaft (1). Align the holes on the side of the coupling with the hole running through the plunger. 5. Secure the coupling halves together with the four coupling screws (4) and insert a screwdriver (5) through the coupling and plunger. <p>NOTE: Make sure that the bleed valve on the pump is open and not plugged.</p>
ON	<ol style="list-style-type: none"> 6. Turn the air motor lockout valve on. 7. Increase air pressure at the air motor regulator until the air motor draws the plunger up from within the pump body. Apply air pressure until the plunger has been raised high enough to install the coupling properly. Turn the air motor regulator to 0 bar/psi.
OFF	<ol style="list-style-type: none"> 8. Turn the air motor lockout valve off and remove the screwdriver and coupling. 9. See Figure 5. Install the solvent chamber (7) taking care not to pinch the O-ring (4).
ON	<ol style="list-style-type: none"> 10. Turn the air motor lockout valve on. Using minimal air pressure at the air motor regulator, cycle the air motor just until the air motor shaft touches the plunger rod.
OFF	<ol style="list-style-type: none"> 11. Turn the air motor lockout valve off and reinstall the coupling using appropriate threadlocking compound on the coupling screws. Tighten the screws evenly. 12. See Figure 5. Fill the solvent chamber (7) with appropriate solvent to approximately 4 cm (1.5 in.) from the top and close the pump bleed valve.

Remove the Hydraulic Section

1. See Figure 4. If the pump is operable, flush the system before disassembly. Refer to the applicable *Rhino Bulk Unloader Controls* manual for procedures.
2. Place several blocks of wood on the frame base, to prevent the follower plate from contacting the drum hold down assembly. Lower the follower plate (11) to the wood blocks.



To avoid injury, place the unloader in neutral until noted otherwise in this procedure. To avoid injury, you must leave the unloader in this position until otherwise directed.

3. Operate the pump until the coupling (2) is accessible. Shut off the pump.
4. Shut off the compressed air supply at the air motor lockout valve (1).
5. Relieve the hydraulic pressure through the bleed valve and gun(s). Leave the bleed valve open. Bleed the air pressure to the air motor.
6. Disconnect and remove the coupling from the plunger. Drain the solvent chamber (6).
7. Open the air motor lockout valve. Gradually increase the air pressure to the air motor. Close the air motor lockout valve after the plunger has been pushed to its lowest point and the air motor shaft is at the top of its range.
8. Remove the solvent chamber.
9. Disconnect the material supply hose from the pump.
10. Perform one of the following:

Drum Units: Remove the hex head screws (7) and lock washers (8) securing the hydraulic section to the follower plate.

Pail Units: Remove the hex head screws (7), lock washers (8), and nuts (9) securing the hydraulic section to the follower plate.

11. Remove the self-locking nuts (4) from the support rods (5). Discard the self-locking nuts.
12. Raise the elevator until the ends of the support rods clear the mounting flange (3) and the elevator is in the full UP position.
13. Place the elevator in the NEUTRAL position. Place a prop beneath the elevator so it does not drift down.

14. Lift the hydraulic section until the shovel (10) is exposed. Remove the hydraulic section from the unloader and the follower plate.

15. Perform one of the following:

Drum Units: Remove the follower plate O-ring (12) and replace if damaged.

Pail Units: Remove the follower plate gasket (12) and replace if damaged.

Plunger and Piston Replacement

Use the following procedures to replace the piston and plunger.

Remove the Plunger and Piston

1. See Figure 7. Unscrew the bottom pump cover (3) from the pump body (2).
2. Remove the self-locking nut (7) from the bottom of the shovel assembly. Discard the self-locking nut.
3. Unscrew the shovel (8) then remove the plate washer (6) and washer retainer (9) from the upper check rod (10).
4. Install a strap wrench on the bottom pump cover and unscrew it counter-clockwise from the body.
5. Remove the O-ring (5) from the pump body. Slide the lower check (13) off the upper check rod.

NOTE:

You have to push from the top of the plunger to remove the following assembly from the pump body.

6. Using either an arbor press or a hydraulic press, push the plunger (1), piston (15) and upper check rod assembly out of the pump body.
7. Secure the flats (14) of the upper check rod in a vise. Use a wrench to grip the flats on the plunger and unscrew it from the upper check rod.
8. Remove the piston and spacer (16).
9. Thoroughly clean and inspect all components. Replace any of them if they are worn, scored, or distorted. You must replace the piston when you remove it from the pump.
10. See Figure 5. Fit a pin spanner wrench (1) or the optional gland removal tool into one of the four holes (2) in the circumference of the packing gland. Unscrew the packing gland (5) counterclockwise out of the pump body.

Install the Plunger and Piston

1. See Figure 7. Install the piston (15) and spacer (16) on the upper check rod (10). Place removable threadlocking compound on the threads of the upper check rod and install it on the plunger (1). Tighten the check rod to approximately 108 N•m (80 ft-lb).
2. Install a new O-ring (5) on the pump body (2).
3. Lubricate the pump body bore and the outer diameter of the piston with an O-ring grease.
4. Using either an arbor press or a hydraulic press, carefully press the plunger, piston, and upper check rod, as an assembly, into the pump body.
5. Install the lower check (13) on the upper check rod.
6. Slide the follower plate cover (4) over the bottom pump cover (3) and screw the bottom pump cover onto the pump body. Torque the bottom pump cover to 240–291 N•m (177–215 ft-lb).
7. Install the packing gland. Refer to the *Install the Packing Gland* procedure.
8. Verify that the elevator prop is still securely in place and the elevator control valve is in the NEUTRAL position.



WARNING

To prevent personal injury and damage to equipment, use new self-locking nuts in the following step.

9. Install the washer retainer (9), plate washer (6), shovel (8), and a new self-locking nut (7) onto the upper check rod.

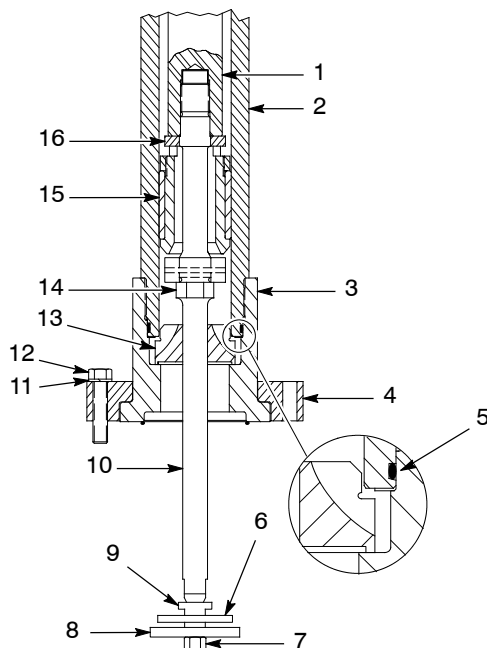


Figure 7 Plunger and Piston Replacement

Install the Hydraulic Section

Verify that the elevator prop is still securely in place and the elevator control is in the NEUTRAL position before installing the hydraulic section on the unloader frame.

1. See Figure 4. Carefully insert the shovel (10) through follower plate (9) and install the hydraulic section onto the follower plate.
2. Perform one of the following:

Drum Units: Secure the hydraulic section to the follower plate with the hex head screws (5), lock washers (6).

Pail Units: Secure the hydraulic section to the follower plate with the hex head screws (5), lock washers (6), and nuts (7).

Tighten two hex head screws and lock washers opposite each other, then two others, until all are tightened securely to 34–41 N•m (25–30 ft-lb).



WARNING



The elevator must be in the UP position when you remove the prop from beneath the elevator. Failure to observe this warning could result in personal injury.

3. Place the elevator in the UP position and raise the elevator. Remove the prop from beneath the elevator.
4. Lower the elevator until the threaded ends of the support rods (5) project through the mounting flange (3).



WARNING



To prevent personal injury and damage to equipment, use new self-locking nuts in the following step.

5. Loosely install new self-locking nuts (4) on the support rods. If the self-locking nuts are tightened at this time, the motor and pump may be mis-aligned; this may cause binding and excessive wear to moving parts and contact surfaces.
6. Install the coupling. If the plunger has stalled in the bottom of the hydraulic section, retrieve it using the procedure in Table 2, in the *Install the Packing Gland* procedure.
7. Tighten the self-locking nuts to 204–210 N•m (150–155 ft-lb).
8. Fill the solvent chamber (6) to 4 cm (1.5 in.) from the top with either vitalizer oil (certain high viscosity materials only) or solvent chamber fluid. Close the bleed valve (13).
9. Before starting the system, bleed the pump as described in the *How to Bleed the Pump* procedure.

Follower Plate Seal Replacement

Use the following procedures to replace follower plate seals.

! CAUTION !

- Do not damage the follower plate seal groove with sharp tools. Leakage at the seals may result if either follower plate seal groove is damaged. Replace the follower plate if either groove is damaged.
- You must use an approved Nordson seal or you may experience leaking from around the follower plate.

Roll-On Seals

Use this procedure for roll-on follower plate seals.

1. Remove the container of material from the unloader as noted in your unloader manual.
2. Turn the air motor lockout valve off.
3. Place the elevator control valve in the NEUTRAL position.
4. Turn the elevator control regulator to 0 bar/psi.
5. Remove the old seals from the grooves in the follower plate. Clean all foreign material from the follower plate grooves.
6. Coat the new seals with an O-ring grease that is compatible both with the material you wish to dispense and with the seals used. Install the new seals.

Heat Shrink, Adjustable Clamp-Type Seals

Use this procedure for heat shrink, adjustable clamp-type, non-TES seals.

Removal

1. If a container is installed on the unit, remove the follower plate from the container. Refer to your system controls manual for all specific operating procedures for your particular unloader.
2. Turn off the air motor supply valve.
3. Remove the container of material from the unloader.
4. Place several blocks of wood on the frame base to prevent the follower plate from contacting the drum hold down assembly. Lower the follower plate to the wood blocks.
5. Place the unloader in the NEUTRAL position and turn the elevator control regulator to 0 bar/psi.
6. Place the elevator in the UP position to relieve pressure in the upper portion of the cylinder.
7. Place the elevator in the DOWN position. The follower plate should rest on the blocks.

8. Place the elevator in the NEUTRAL position.
9. See Figure 8. Follow these procedures to remove the seal:
 - a. Carefully cut the heat shrink tubing (1) at both seal joints.
 - b. Loosen the worm clamp (2) at each seal.
 - c. Remove the seals (3).
10. Clean the follower plate seal groove.

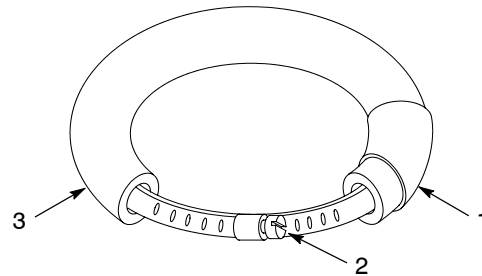


Figure 8 Follower Plate Seal

Installation

1. Follow these procedures to install replacement seals:

NOTE:

To adjust the positioning of the worm clamp, flex the end of the seal, then insert a screwdriver into the seal to loosen or tighten the clamp.

- a. Place the new seal in its groove on the follower plate.
- b. Tighten the worm clamps.
- c. Center the heat shrink tubing over the seal seams.

! CAUTION !

To prevent leakage, make sure that the seal seams are at the opposite sides of the follower plate (180 degrees apart) and that the seal gap is no more than 3 mm (0.12 in.).

NOTE:

Use a rubber mallet, if necessary, to eliminate the gap at the seal seam. Start tapping the seal 180 degrees from the seam. Tap in such a direction as to close the gap at the seal seam.

2. Use a flameless electric heat gun to heat the shrink tubing at the seal seams.
3. Coat the new seal(s) with an O-ring grease that is compatible both with the material you wish to dispense and with the seal(s) used. Install the new seal(s).
4. Replace the material container. Refer to the container changing procedures in your unloader control manual for more information.

Parts

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

Pump Assembly

See Figure 9 and refer to the following parts list.

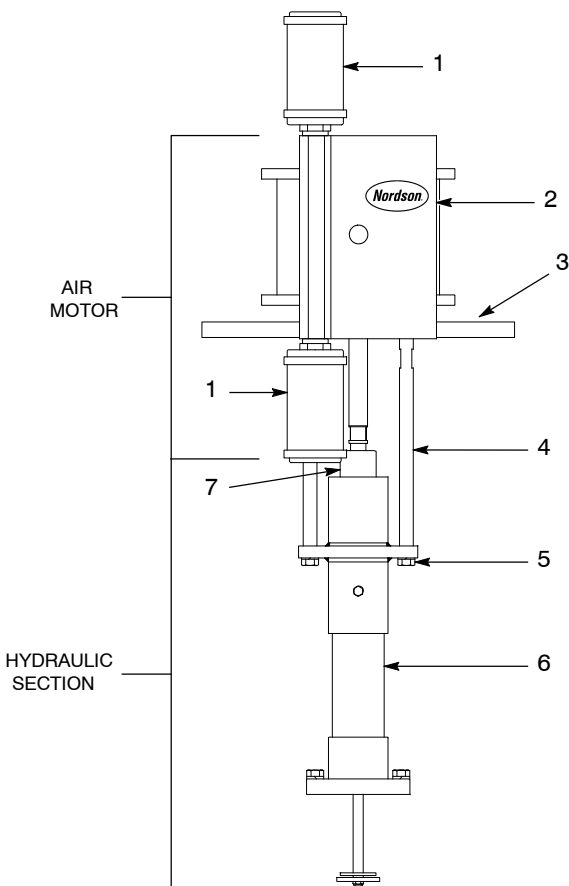
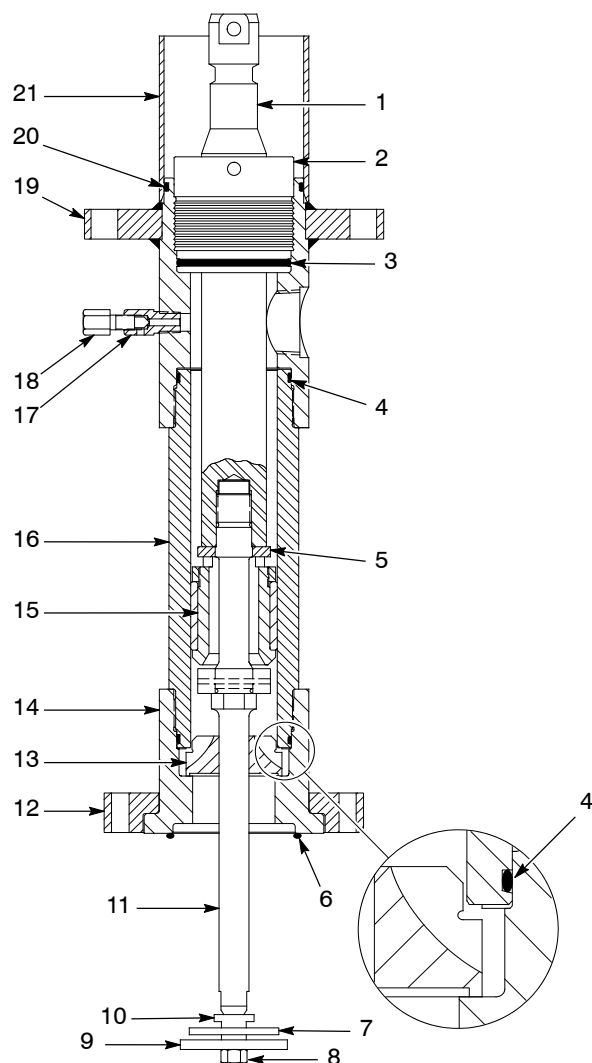


Figure 9 48:1 Pump Assembly

Item	Part	Description	Qty	Note
—	-----	Pump Assembly, 48:1 ratio		
1	249144	• Muffler, 1 ¹ / ₄ NPT	2	
2	-----	• Motor, air	1	A
3	230668	• Plate, mounting, motor	1	
4	227586	• Rod, connecting, pump/motor	3	
5	984260	• Nut, hex, lock, torque	3	
6	-----	• Pump, hydraulic	1	B
7	126896	• Coupling, kit	1	
	126895	• • Coupling, rod plunger/air motor	1	
	982160	• • Screw, socket, M8 x 25, zinc	4	
	900424	• • Compound, threadlocking, VC-3	1	
NS	295796	Muffler, reclassifier, 1 NPT	2	C
NS	900256	Fluid, solvent chamber, 1-gal, standard	AR	D
NS	900216	Fluid, solvent chamber, 1-gal, vitalizer oil	AR	E
NS	900302	Grease, high temperature	AR	E
NOTE A: Refer to the <i>7- and 10- Inch Air Motor with Air Valve</i> , manual 334607, for parts information. B: Refer to the <i>Hydraulic Section</i> parts list for parts information. C: Reclassifiers are an option that may be installed on your unit. If you need assistance in determining which part to order for your unit, contact your Nordson representative. D: This kit includes two reclassifiers and the fittings needed to mount the reclassifiers to the air motor. E: Contact your Nordson representative to determine the proper solvent chamber fluid for your application. AR: As Required NS: Not Shown				

48:1 Hydraulic Section

See Figure 10 and refer to the following parts list.

**LUBRICATION POINTS**

Item 4: Apply PTFE grease (part 900349).

Item 11: Apply threadlocking adhesive (part 900464) to threads.

Item 17: Apply pipe/thread sealant (part 900481) to threads.

Items 1, 15, 16: Apply Never-Seez lubricant (part 900344) to threads.

Figure 10 Hydraulic Assembly

Item	Part	Description	Qty	Note
—	1041087	Pump, hydraulic section, 48:1, EPDM	1	
1	225804	• Rod, plunger 48:1	1	
2	1041144	• Gland assembly, 48:1	1	A
3	1041151	• O-ring, EPR, 2.625 x 2.875 x 0.139	1	
4	1041085	• O-ring, EPR, 2.688 x 2.875 x 0.103	2	A
5	126856	• Spacer, 1.81 OD x 0.93 ID	1	
6	1041084	• O-ring, EPR, 3.00 x 3.125 x 0.070	1	
7	803740	• Washer, 0.656 ID x 2.250 OD	1	
8	984159	• Nut, hex, lock, 3/8-24 UNJF 3B	1	
9	126829	• Disc shovel	1	
10	803743	• Retainer, washer	1	
11	126857	• Rod, upper check, assembly, 48:1	1	
12	225800	• Plate, cover, follower	1	
13	126908	• Plate, lower check, 48:1	1	
14	225794	• Cover, bottom pump, 48:1	1	
15	329589	• Piston, assembly 48:1, heated	1	A
16	225797	• Body, pump 48:1	1	
17	124698	• Body, bleeder, valve	1	
18	124697	• Poppet, screw, adj		
19	225795	• Cover, upper, pump		
20	1041086	• O-ring, EPR, 3.250 x 3.500 x 0.139		

NOTE A: Recommended spare. Keep these parts on hand to reduce downtime.

Service Kits and Accessories

48:1 Shovel Kit:

Part 306262—Includes items 7, 8, 9, and 10.

Spanner Wrench:

Part 233554

Packing Gland Removal Kit:

Part 1001689

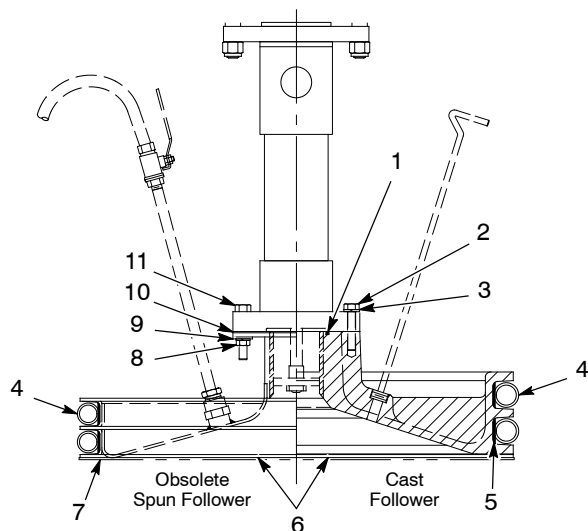


Figure 11 Drum Follower Plate Assembly

Standard Cast Drum Follower Plate Assembly

See Figure 11 and the following parts list.

Item	Part	Description	Qty	Note
1	1041084	O-ring, EPR, 3.00 x 3.125 x 0.070	1	
2	982452	Screw, hex head, M10 x 50 mm long	4	
3	983423	Washer, flat M10	4	
4	-----	Seal, follower plate	2	A
5	-----	Ring, Neoprene	2	A
6	-----	Plate, follower, drum	1	A
NOTE A: Refer to the following parts lists for a listing of available drum follower plates, seals, and rings.				

Spun Drum Follower Plate Assembly

See Figure 11 and the following parts list.

Item	Part	Description	Qty	Note
4	-----	Seal, follower plate	2	A
6	-----	Plate, follower, drum	1	A
8	984152	Nut, $\frac{3}{8}$ -16	4	
9	983061	Washer, lock, $\frac{3}{8}$	4	
10	124690	Gasket	1	
11	981407	Screw, $\frac{3}{8}$ -16 x 2 in. long	4	
NOTE A: Refer to the following parts lists for a listing of available drum follower plates, seals, and rings.				

Drum Follower Plates

See Figure 11 and the following parts list.

Item	Part	Description	Qty	Note
6	281770	Plate, follower, 457 mm drum, 30-gal.	1	
6	186126	Plate, follower, 571 mm drum, 55-gal.	1	

Drum Follower Plate Seals

See Figure 11 and the following parts list.

Item	Part	Description	Qty	Note
4	183553	Kit, seal, 571 mm drum	1	A
4	124706	Seal, follower plate, 571 mm drum	1	B
4	165215	Seal, follower plate, 457 mm drum	2	
5	308796	Ring, Neoprene 571 mm drum	2	B
7	282846	Ring, follower plate, 571 mm drum	1	C
NOTE A: This kit includes two seals, two Neoprene rings, and lubricant for the seals. B: The follower seal and Neoprene ring are used together on the 571 mm drum cast followers only. C: Follower plate rings are used with urethane material pre-packaged in aluminum or plastic bags.				

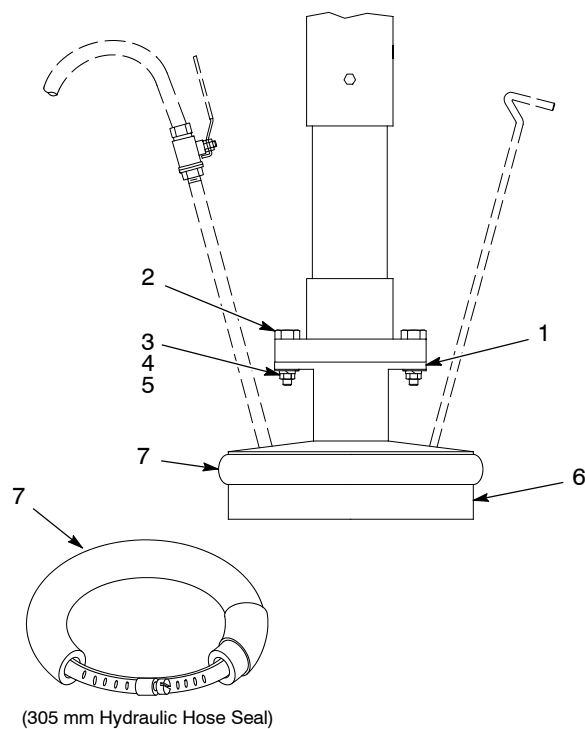


Figure 12 Pail Follower Plate Assembly

Pail Follower Plate Assembly

See Figure 12 and refer to the following parts list

Item	Part	Description	Qty	Note
1	124690	Gasket, follower	1	
2	981624	Screw, hex head, $\frac{3}{8}$ -16 x 2.5 in. long	4	
3	983061	Washer, flat	4	
4	983160	Washer, lock, split $\frac{3}{8}$ nickel-plated	4	
5	984152	Nut, $\frac{3}{8}$ -16	4	
6	-----	Plate, follower, pail	1	A
7	-----	Seal, follower plate	1	A
NOTE A: Refer to the following parts lists for a listing of available follower plates and seals.				

Pail Follower Plates

See Figure 12 and the following parts list.

Item	Part	Description	Qty	Note
6	124807	Plate, follower, 280 mm	1	
6	124778	Plate, follower, 286 mm	1	
6	124860	Plate, follower, 305 mm	1	
6	335706	Plate, follower, 286 mm, TFE	1	

Pail Follower Plate Seals

See Figure 12 and the following parts list.

Item	Part	Description	Qty	Note
7	274379	Seal, follower, pail, 280 mm, molded silicone, 1 piece	1	
7	274378	Seal, follower, pail, 286 mm, molded silicone, 1 piece	1	
7	274380	Seal, follower, pail, 286 mm, PTFE encapsulated silicone, 1 piece	1	
7	124863	Seal, follower, pail, 305 mm, hydraulic hose, 3 pieces	1	