Rhino Stainless Steel 24:1/48:1 Single-Acting Bolt Together Pumps

Customer Product Manual
Part 334605B

NORDSON CORPORATION • AMHERST, OHIO • USA

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Notice

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Table of Contents

Rhino Stainless Steel 24:1/48:1 Single-Acting Bolt Together Pumps

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

This section provides basic operation and specification information about the bolt together pumps.

Theory of Operation

See Figure 1, which shows a cutaway view of a 24:1/48:1 ratio pump. This pump is a single-acting pump that displaces material (pumps) only on the down stroke.

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.

The plunger (2) of the hydraulic section is attached to the air motor rod by a coupling. As the air motor strokes and moves the plunger, the shovel (11) moves up and down, forcing material into the hydraulic section. The hydraulic section pressurizes the material and forces it out of the pump.

During the up stroke (1), the plunger and shovel are pulled upward. The lower check (6) raises off the lower check seat (7). The lower check valve (5) opens and allows material to pass into the lower pump chamber.

During the down stroke (9), the plunger moves downward and the lower check valve closes. Material between the plunger and lower check is forced upward, which pressurizes the material and forces it out of the outlet port (8).

The solvent chamber (3) at the top of the pump contains fluid that lubricates the plunger and packing gland (4) seals and prevents material from hardening on the shaft. A bleed valve (10) on the side of the pump body allows the operator to bleed air from the pump.

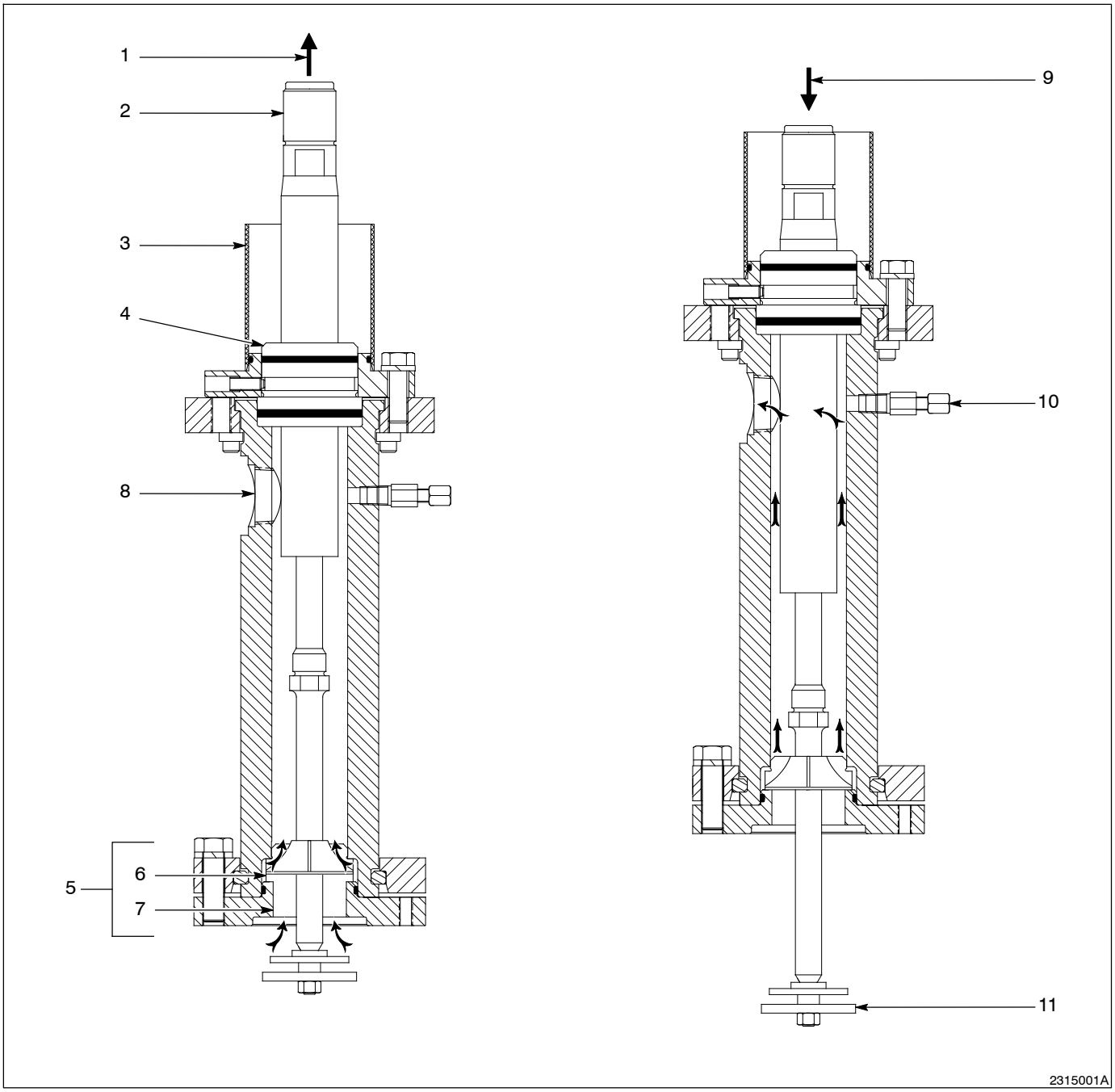

Fig. 1 Pump Operation

1. Up stroke
2. Plunger
3. Solvent chamber
4. Packing gland
5. Lower check valve
6. Lower check
7. Lower check seat
8. Outlet port
9. Down stroke
10. Bleed valve
11. Shovel

Specifications

This section provides information on the operating specifications for the Rhino stainless steel 24:1/48:1 single-acting bolt together pumps.

Maximum Output

Maximum pump output is expressed in volume per stroke and can depend on material viscosity, temperature, filters, and system configuration.

Pump Ratio	US (in.^{3}/stroke)	Metric (cm^3/stroke)
24:1/48:1 Pump	8	131

Maximum Stroke Rate

1 stroke per 2 seconds (30 strokes per minute) — intermittent

1 stroke per 4 seconds (15 strokes per minute) — continuous

Viscosity Range

30,000–3 million centipoise

3. Installation

The installation of the pump is dependent upon the system and unloader to which it is installed during manufacturing. Refer to your system documentation for complete installation information.

4. Operation

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

The operation of the pump is primarily determined by the system in which it is installed. Refer to your Rhino unloader controls manual for more information. Refer to the following procedure if you need to bleed the pump.

Bleeding the Pump

At low pressure, bleed the pump until all air has been removed from the pump. It will begin spitting. Follow these procedures 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 1. Place a waste container beneath the bleed valve (10). Make sure that the small bleed port is pointed down. Carefully loosen the bleed valve three turns.

3. 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.

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.

5. Maintenance

Refer to Table 1 for recommended maintenance procedures:

Table 1 Maintenance Procedures

Frequency	Component	Maintenance Task
Daily	Solvent chamber	Check the fluid level in the solvent chamber. Make sure that the fluid level is 38 mm (1.5 in.) from the top of the chamber. Refer to the *Parts* section for solvent chamber fluid ordering information.
Weekly	Follower plate seals	Inspect the follower plate seals for damage or signs of excessive material leakage. If you must replace the seals, refer to the *Parts* section for ordering information.

6. Troubleshooting

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

This section contains troubleshooting procedures. 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
1. Pump not delivering material	Insufficient air pressure to pump	Increase the air pressure to the pump air motor.
	Follower plate not in contact with material	Make sure that the follower plate is lowered and in contact with the material.
	Air pocket in pump	Carefully bleed the pump as described in the *Operation* section of this manual.
	Blocked hydraulic system or follower plate	Perform the following steps: 1. Cycle the pump. Slowly and carefully open the bleed valve only three turns. If material exits 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. 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. If the gun is blocked, clean it. If the gun is damaged, rebuild or replace the gun as necessary.

7. Repair

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

NOTE: To relieve system pressure, shut off the pump, trigger all guns, and open the pump bleed valve (as described in this section). Make sure that the valve is not plugged with material.

Packing Gland Replacement

Operate the air motor until the coupling between the air motor shaft and the pump plunger is accessible. Two different packing glands are used with the stainless steel bolt together pumps, typically used in two component applications. In two component applications, the V-ring packing glands are used with the catalyst material and the ARW (Aggressive Removal of Weepage) packing glands are used with the base material.

Packing Gland Removal

WARNING: Do not open the bleed valve more than three turns. If you loosen the valve more than two or three turns, you could be injured by the valve or pressurized material being forced from the valve body.

1. See Figure 1. Shut off air pressure to the air motor and bleed the hydraulic pressure at the guns and the pump bleed valve (10). Open the pump bleed valve three turns to drain the pump.

2. See Figure 2. Remove the coupling (13) from the plunger (12). Drain and remove the solvent chamber (2).

3. **Pumps with ARW packing glands**:

   a. See Figure 3. Remove the ARW packing gland fittings (7).

   b. See Figure 2. Unscrew the nipples (14) from the packing gland (7).

4. Remove the O-ring (10) from the gland retainer (5).

WARNING: Before performing the next step, you must make sure that the bulk unloader elevator is in the NEUTRAL position. To avoid injury, you must leave the unloader in this position until noted otherwise in the procedure.

5. Remove eight hex head screws (4) and lock washers (3) that fasten the gland retainer (5) to the mounting flange (6).

6. See Figure 3. Place the ends of two screwdrivers in the chamfers (6) beneath the gland retainer (3). Carefully pry upwards to remove the gland retainer and the packing gland (2).

7. See Figure 2. Loosen, but do not remove the two set screws (9). Remove the packing gland from the gland retainer.

Packing Gland Installation

NOTE: Some O-ring lubricants may react with your dispensing material. Contact your Nordson Corporation representative to determine the correct O-ring lubricant for your application.

1. See Figure 2. Clean the mating surfaces of the mounting flange (6), packing gland (7), and plunger (12). Lubricate both upper and lower packing gland O-rings (8 and 11) with O-ring lubricant.

2. Install the gland retainer (5) over the packing gland. Turn the two set screws (9) clockwise until they just touch the packing gland. Do not tighten. You must be able to rotate the gland retainer around the packing gland.

3. Carefully install the gland retainer and packing gland over the plunger. Do not allow the end of the plunger to damage the packings.

4. Orient the gland retainer and packing gland assembly on the mounting flange as shown.

Packing Gland Installation *(contd)*

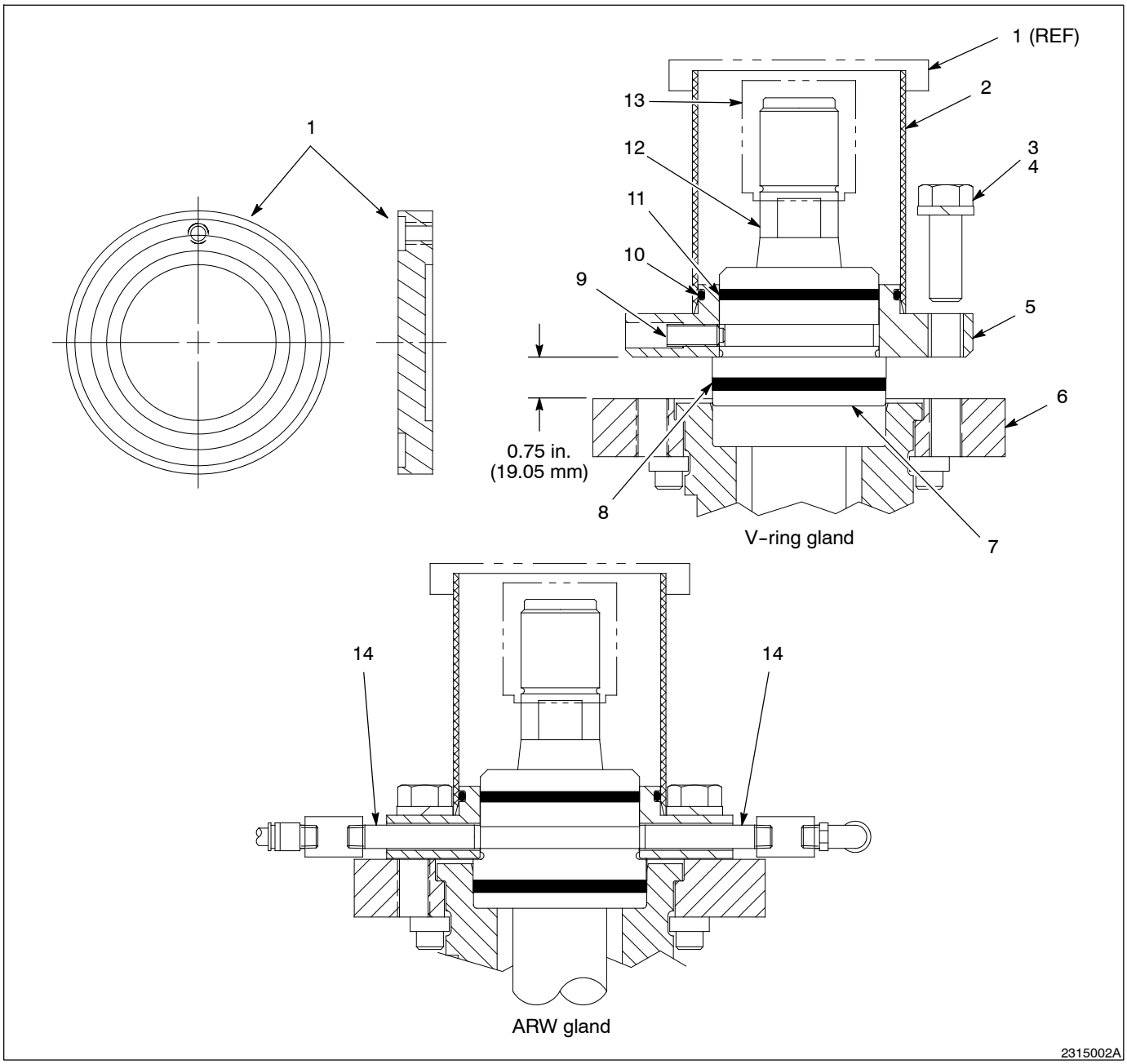

Fig. 2 Replacing the Packing Gland(s)

1. Gland insertion tool
2. Solvent chamber
3. Lock washers
4. Hex head screws
5. Gland retainer
6. Mounting flange
7. Packing gland
8. O-ring
9. Set screws (180-degrees apart)
10. O-ring
11. O-ring
12. Plunger
13. Coupling
14. Nipple

5. Perform the following steps to press the gland retainer into the mounting flange:

   a. Place the solvent chamber (2) on the gland retainer.

   b. Place the gland insertion tool (1) on the top of the solvent chamber.

   c. Use the air motor (set at low air pressure and a slow stroke) to push the assembly until the bottom of the gland retainer is approximately 19.3 mm (0.75 in.) above the mounting flange.

   d. Close the lockout valve to remove air pressure from the air motor.

6. Install the eight lock washers (3) and hex head screws (4) in the gland retainer so they thread into the mounting flange. Tighten the screws evenly to 95 N•m (70 lb-ft) to draw the gland retainer and mounting flange together.

7. Remove the gland insertion tool and solvent chamber.

8. Lubricate and install the O-ring (10) on the gland retainer. Install the solvent chamber.

9. Slowly operate the air motor to bring the shaft and plunger together. Apply removable threadlocking compound to the plunger threads and install the coupling.

10. **Pumps with ARW packing glands**: See Figure 3. Install the ARW packing gland fittings (7); which include the nipples, couplings, and male connector or elbow; into the packing gland (2).

11. See Figure 1. Add appropriate solvent to the solvent chamber (3) so the level is approximately 3.8 cm (1.5 in.) from the top.

12. Close the pump bleed valve (10).

Packing Gland Installation *(contd)*

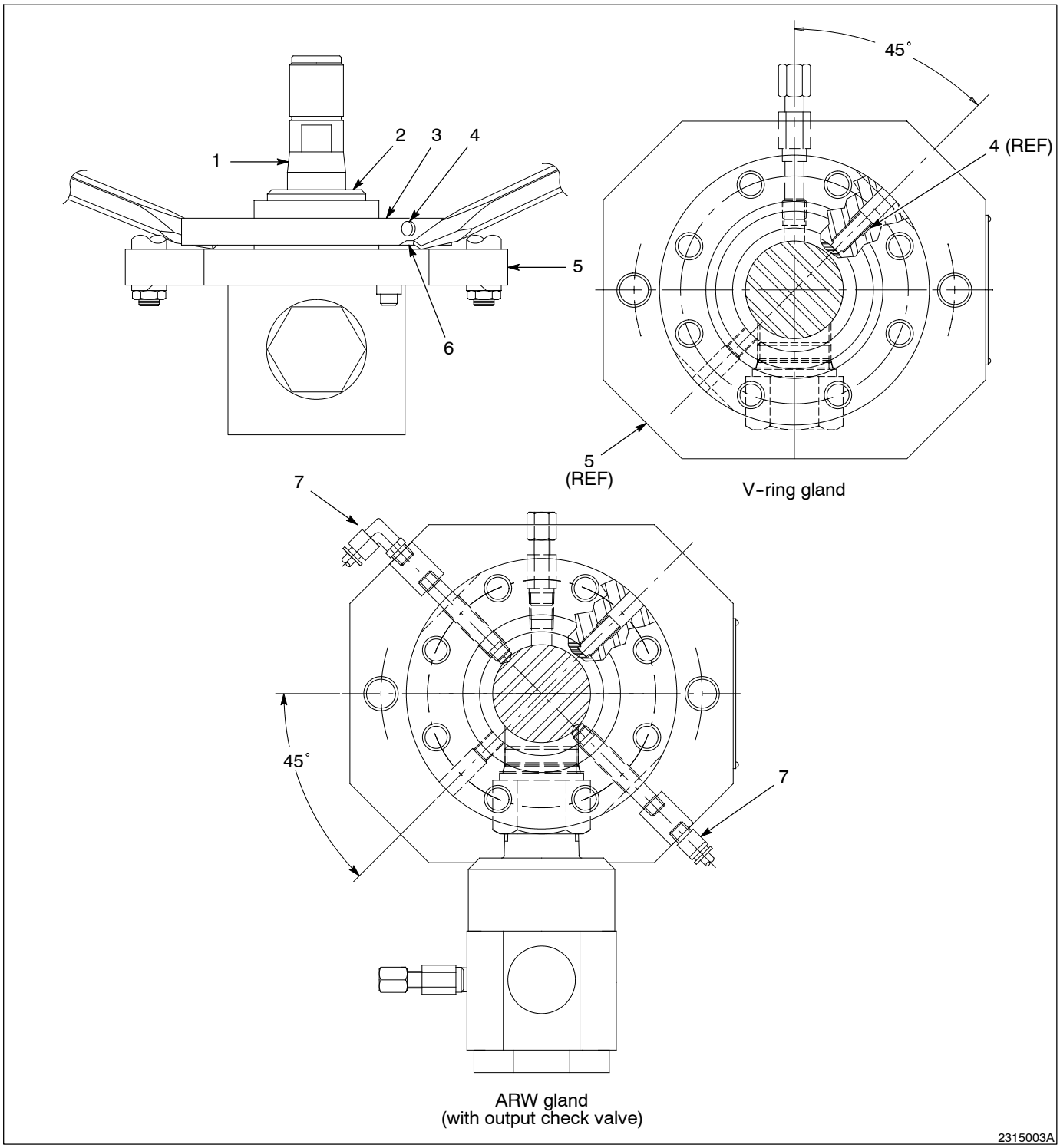

Fig. 3 Replacing the Packing Gland(s)

1. Plunger
2. Packing gland
3. Gland retainer
4. Set screws (180-degrees apart)
5. Mounting flange
6. Chamfer
7. ARW packing gland fittings

Plunger Replacement

If the pump is operable, flush the system before disassembly. Refer to your Rhino bulk unloader controls manual.

CAUTION: The packing gland must always be replaced when the plunger is removed from the pump body. Otherwise, the equipment may become damaged.

CAUTION: Always inspect all parts for signs of damage before reassembly. Replace all damaged or worn parts. Otherwise, the equipment may become damaged.

Plunger Removal

NOTE: Depending on your application, you may be able to replace the plunger without removing the hydraulic section (pump) from the unloader.

1. Lower the follower plate to the frame base. Relieve all hydraulic pressure. Remove the solvent from the solvent chamber.

2. Operate the pump until the coupling joining the air motor shaft and the pump plunger is accessible. Shut off air pressure to the air motor and bleed the hydraulic pressure at the guns and pump bleed valve.

3. Remove the coupling. Turn on the air pressure to the air motor and operate the air motor and shut off the ball valve after the plunger has been pushed to its lowest point. Make sure the shaft and coupling are clear of the plunger.

4. See Figure 4. Loosen, but do not remove the eight hex head screws (12) and lock washers (13).

5. Support the follower plate. Remove the four hex head screws, lock washers, and flat washers that secure the pump body to the follower plate. Remove the follower plate, adapter, and gasket (6) from the bottom of the lower check seat plate (11).

6. Raise the pump assembly until it is fully raised and the shovel (9) is exposed. Prop the elevator so it does not drift.

7. Remove the shovel from the upper check rod (10).

Plunger Removal *(contd)*

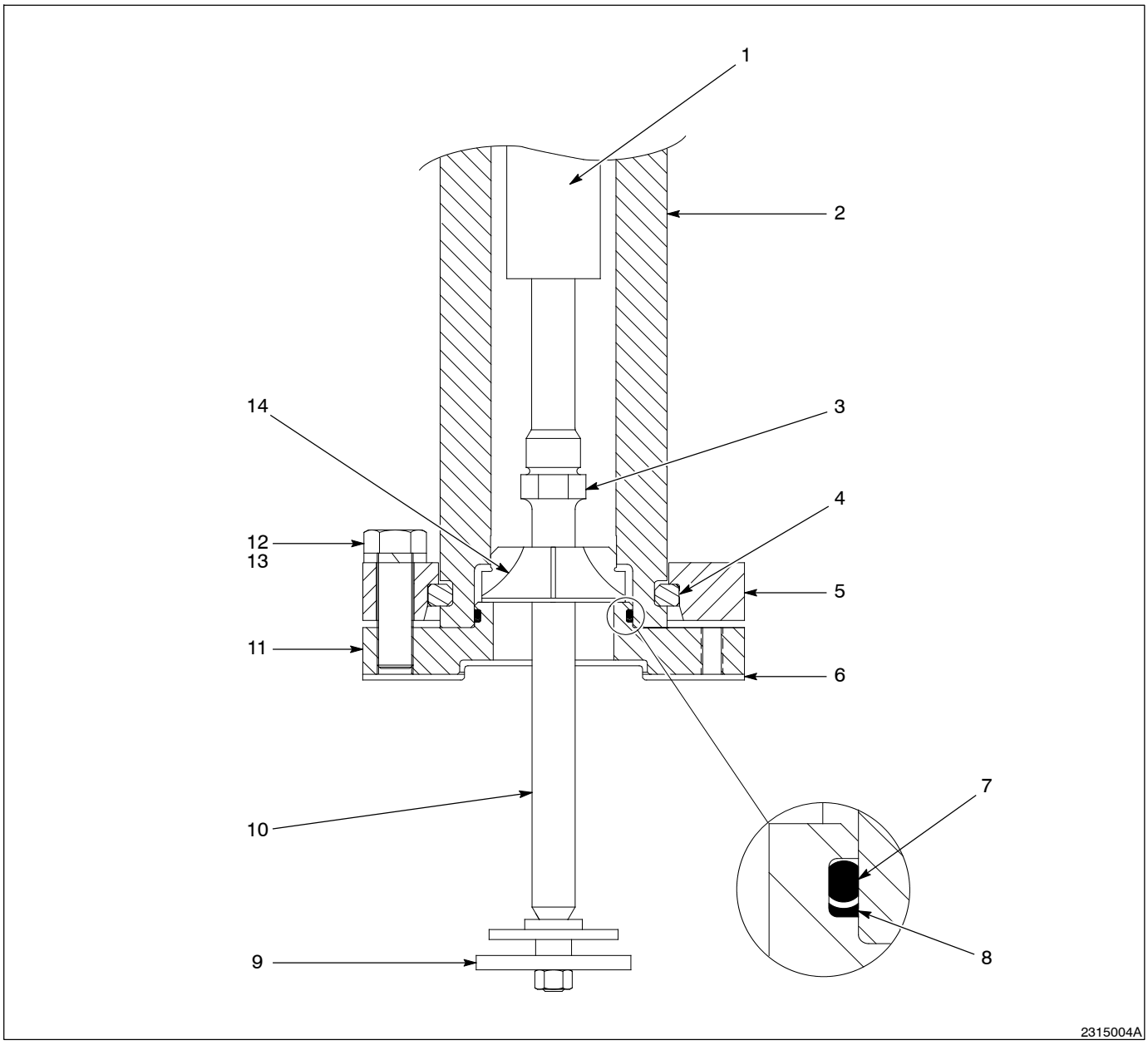

Fig. 4 Replacing the Plunger

1. Plunger
2. Pump body
3. Flats
4. Split ring
5. Split ring retainer
6. Gasket
7. O-ring
8. Back-up ring
9. Shovel
10. Upper check rod
11. Lower check seat plate
12. Hex head screws
13. Lock washers
14. Lower check

8. Remove the eight hex head screws and lock washers. Remove the lower check seat plate, split ring (4), and split ring retainer (5). Remove the O-ring (7) and back-up ring (8) from the lower check seat plate. Slide the lower check (14) off the upper check rod.

9. Grasp the upper check rod and carefully pull the plunger (1) and upper check rod as an assembly from the pump body (2).

NOTE: You may have to push from the top of the plunger to remove this assembly from the pump body.

10. Secure the flats (3) of the upper check rod in a vice. Use a wrench to grip the flats on the plunger and unscrew it from the upper check rod.

11. Thoroughly clean and inspect all components. Replace any of them if they are worn, scored, or distorted.

12. See Figure 3. Remove the packing gland (2). Refer to *Packing Gland Removal* in this section.

Plunger Installation

CAUTION: Replace the packing gland whenever you remove the plunger from the pump body. Otherwise, the equipment can be damaged.

1. See Figure 4. Perform these steps to reassemble the plunger:

   a. Apply threadlocking compound to the threads of the upper check rod (10) and install it to the plunger (1). Tighten securely.

   b. Install the back-up ring (8) and the new O-ring (7) to the lower check seat plate (11).

   c. Carefully install the plunger and upper check rod as an assembly to the pump body (2).

   d. Install the lower check (14) to the upper check rod.

Plunger Installation (contd)

2. Perform these steps to reassemble the pump body:

   a. Slide the split ring retainer (5) onto the pump body (2). Install the split ring (4) in the groove of the pump body, and slide the split ring retainer over the split ring.

   b. See Figure 5. Orient the split ring retainer (4 (ref)), the lower check seat plate (5 (ref)), and the pump body (1) as shown. Loosely install the lock washers (3) and hex head screws (2), but do not tighten the screws at this time.

   c. Securely tighten opposing hex head screws in an alternating fashion.

3. Install the packing gland as described in *Packing Gland Installation*.

4. See Figure 4. Install the shovel (9) to the upper check rod (10). Tighten the shovel nut to 54 N•m (40 ft-lb).

5. See Figure 5. Check the follower plate O-ring (9) and adapter plate gasket (12) and replace if damaged.

6. Secure the adapter (11) to the follower plate using the flat screws (8).

7. Secure the pump body (1) to the follower plate (10) with four hex head screws (7), lock washers (6).

8. See Figure 2. Operate the air motor until the coupling (13) and plunger (12) can be secured tightly. Apply removable threadlocking compound to the plunger threads and install the coupling.

9. Fill the solvent chamber (2) to within 3.8 cm (1.5 in.) of the top with the appropriate solvent.

10. See Figure 1. Close the bleed valve (10) on the side of the pump. Remove the prop from under the elevator.

Follower Plate Seal(s) Replacement

If your unloader has replaceable follower seal(s), perform the following steps to replace the seal(s):

1. Remove the container of material from the unloader as noted in your Rhino bulk unloader manual.

2. Remove the old seal(s) from the groove(s) in the follower plate. Clean the follower plate groove(s) until free of all foreign material.

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).

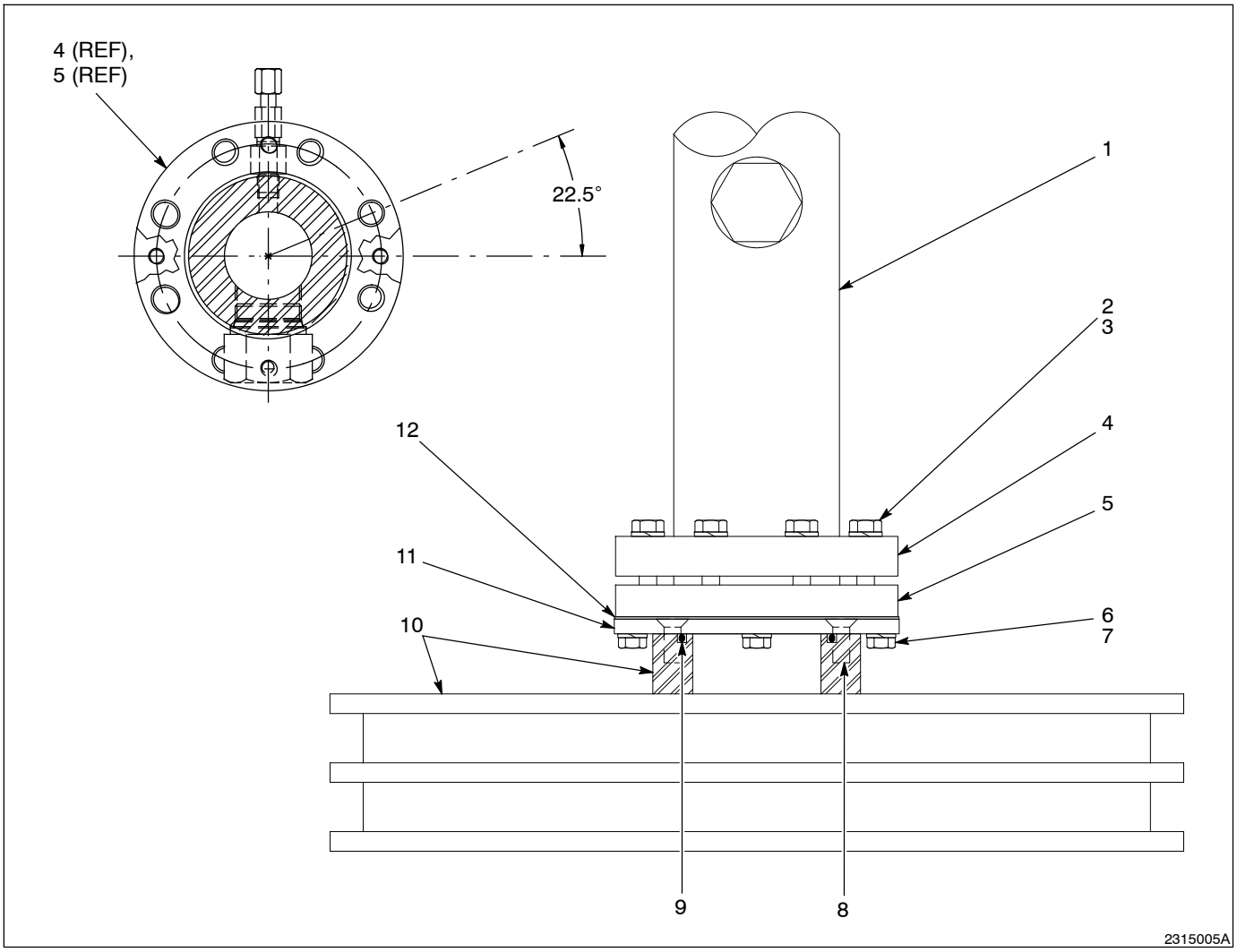

Fig. 5 Replacing the Plunger

1. Pump body
2. Hex head screws
3. Lock washers
4. Split ring retainer
5. Lower check seat plate
6. Lock washer
7. Screw
8. Flat screw
9. O-ring
10. Follower plate
11. Adapter
12. Gasket

8. 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.

Pump Assembly

See Figure 6. The pump assembly for the ARW pumps may differ slightly from the one illustrated. Contact your Nordson representative if you have any questions about your specific pump assembly.

Item	Part	Description	Quantity	Note
—	335 517	Pump, hydraulic to air motor assembly, 24:1, ARW	1	
—	303 659	Pump, hydraulic to air motor assembly, 48:1, ARW	1	
—	303 661	Pump, hydraulic to air motor assembly, 48:1, V-ring	1	
1	249 144	• Muffler, $1^1/_4$ NPT	2	
2	- - - - - -	• Motor, air	1	A
3	124 692	• Shim, motor, 65:1 and 48:1	3	B
3	124 693	• Shim, motor, 24:1	3	B
4	124 694	• Plate, mounting, motor	1	
5	983 419	• Washer, lock, split, M16	3	
6	982 269	• Screw, hex head, cap, M16 x 60	3	
7	124 689	• Rod, support	2	
8	984 229	• Nut, hex, lock, $^5/_8$-18	2	
9	- - - - - -	• Pump, hydraulic	1	C
NS	- - - - - -	• Coupling	1	
NS	156 289	• Lubricant, Mobil SHC 634 (solvent chamber fluid)	AR	

NOTE A: Refer to the *7- and 10-Inch Air Motors with Air Valve* manual for ordering information.

B: Order the proper shim for your pump ratio. Pump ratio is determined by air motor size and the shims are not interchangeable.

C: The pump parts list is found later in this manual.

AR: As Required

NS: Not Shown

Pump Assembly *(contd)*

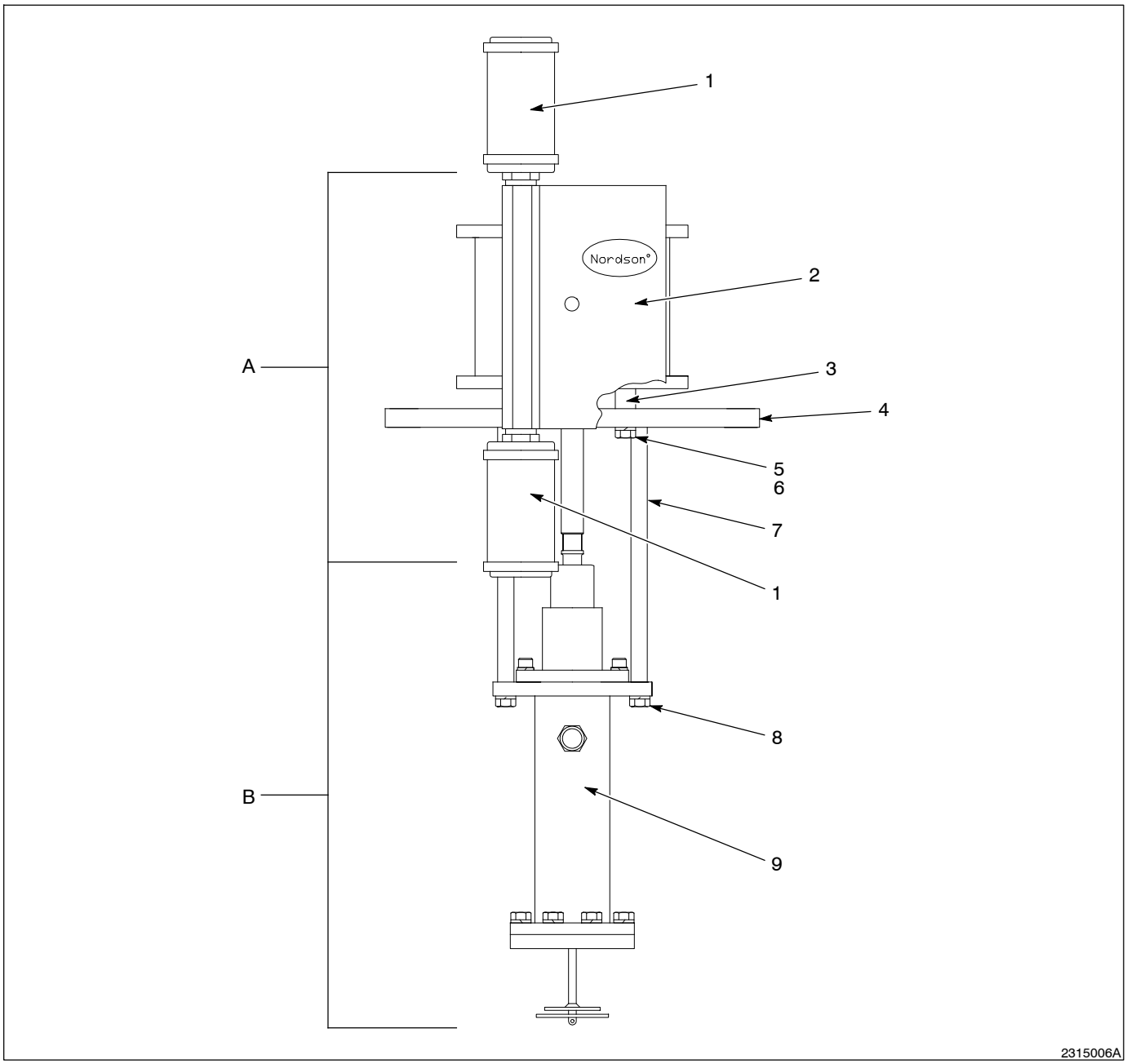

Fig. 6 Pump Assembly

A. Air motor

B. Hydraulic section

24:1/48:1 Pump

See Figure 7.

Item	Part	Part	Description	Quantity	Note
—	303 622		Pump, 48:1, ARW, stainless steel	1	
—		303 631	Pump, 48:1, V-ring, stainless steel	1	
1	124 734	124 734	• Chamber, solvent	1	
2	303 676		• Kit, gland, 48:1, ARW, stainless steel	1	
3		303 678	• Kit, gland, 48:1, V-ring, stainless steel		
4	945 018	945 018	• • O-ring, hotpaint, 2.734 x 0.139	1	
5	954 053	954 053	• • Back-up ring, single, 2 $^{3}/_{4}$	1	
6	942 303	942 303	• • O-ring, Buna-N, 2.484 x 2.762 x 0.13	2	A
NS	156 289	156 289	• • Lubricant, Mobil SHC 634	AR	
7	983 181	983 181	• Washer, lock, E, split, $^{9}/_{16}$, steel, zinc	8	
8	981 296	981 296	• Screw, hex, $^{9}/_{16}$-18 x 1.750, zinc, G8	8	
9	124 679	124 679	• Plate, mounting, pump to motor	1	
10	126 894	126 894	• Retainer, 0.860 OD x 0.31 ID x 0.25	2	
11	981 435	981 435	• Screw, socket, $^{5}/_{16}$-18 x 0.625, black	2	
12	160 560	160 560	• Poppet, screw, adjustable, stainless steel	1	
13	160 559	160 559	• Body, bleeder valve, stainless steel	1	B
14	161 662	161 662	• Rod, plunger, stainless steel	1	
15	303 658	303 658	• Plate, lower check, 48:1, stainless steel	1	
16	126 887	126 887	• Retainer, split ring	1	
17	161 655	161 655	• Rod, upper check, with shovel, stainless steel	1	C
18	160 558	160 558	• Retainer, washer, stainless steel	1	
19	161 664	161 664	• Washer, 0.656 ID x 2.25 OD, stainless steel	1	
20	335 704	335 704	• Disc, shovel, stainless steel	1	

NOTE A: Apply Mobil SHC 634 lubricant, part 156 289, to this part during assembly.
B: Apply pipe/thread/hydraulic sealant, part 900 481, to this part during assembly.
C: Apply threadlocking adhesive, part 900 464, to this part during assembly.

AR: As Required

NS: Not Shown

Continued on next page

24:1/48:1 Pump (contd)

Item	Part	Part	Description	Quantity	Note
21	335 703	335 703	• Nut, hex, lock, thin, $^3/_8$-24 UNJF3	1	
22	161 658	161 658	• Plate, lower check seat, stainless steel	1	
23	954 052	954 052	• Back-up ring, single, 2 $^1/_2$	1	
24	126 888	126 888	• Plate, split ring	2	
25	981 629	981 629	• Screw, hex, $^5/_8$-18 x 2.000, zinc, G8	8	
26	983 440	983 440	• Washer, lock, E, split, 0.625, steel, nickel	8	
27	303 627	303 627	• Body, pump, 48:1, stainless steel	1	
28	161 665	161 665	• Adapter, 1 5/5-12, 1 $^1/_4$ NPT, stainless steel	1	A, C
29	303 606	303 606	• Valve, check, ball, 1 $^1/_4$ P, stainless steel	1	B
30	981 628	981 628	• Screw, set, with nylon locking insert, $^3/_8$-16 x 1.00, B	2	
31	942 360	942 360	• O-ring, Buna-N, 3.250 x 3.500 x 0.125	1	A
32	973 001		• Nipple, steel, schedule 40, $^1/_8$, 2.50	2	
33	972 119	972 119	• Elbow, male, $^1/_4$ tube x $^1/_8$ NPT	1	
34	973 572		• Coupling, pipe, hydraulic, $^1/_8$, steel, zinc	2	
35	972 716		• Connector, male, $^1/_4$ tube x $^1/_8$ NPT	1	
36	303 630	303 630	• Retainer, ring gland, ARW	1	
37	973 402	973 402	• Plug, pipe, socket, flush, $^1/_8$, zinc	1	
NS	900 481	900 481	• Adhesive, pipe/thread/hydraulic sealant	AR	
NS	900 464	900 464	• Adhesive, threadlocking	AR	

NOTE A: Apply Mobil SHC 634 lubricant, part 156 289, to this part during assembly.
B: Apply pipe/thread/hydraulic sealant, part 900 481, to this part during assembly.
C: Apply threadlocking adhesive, part 900 464, to this part during assembly.
AR: As Required
NS: Not Shown

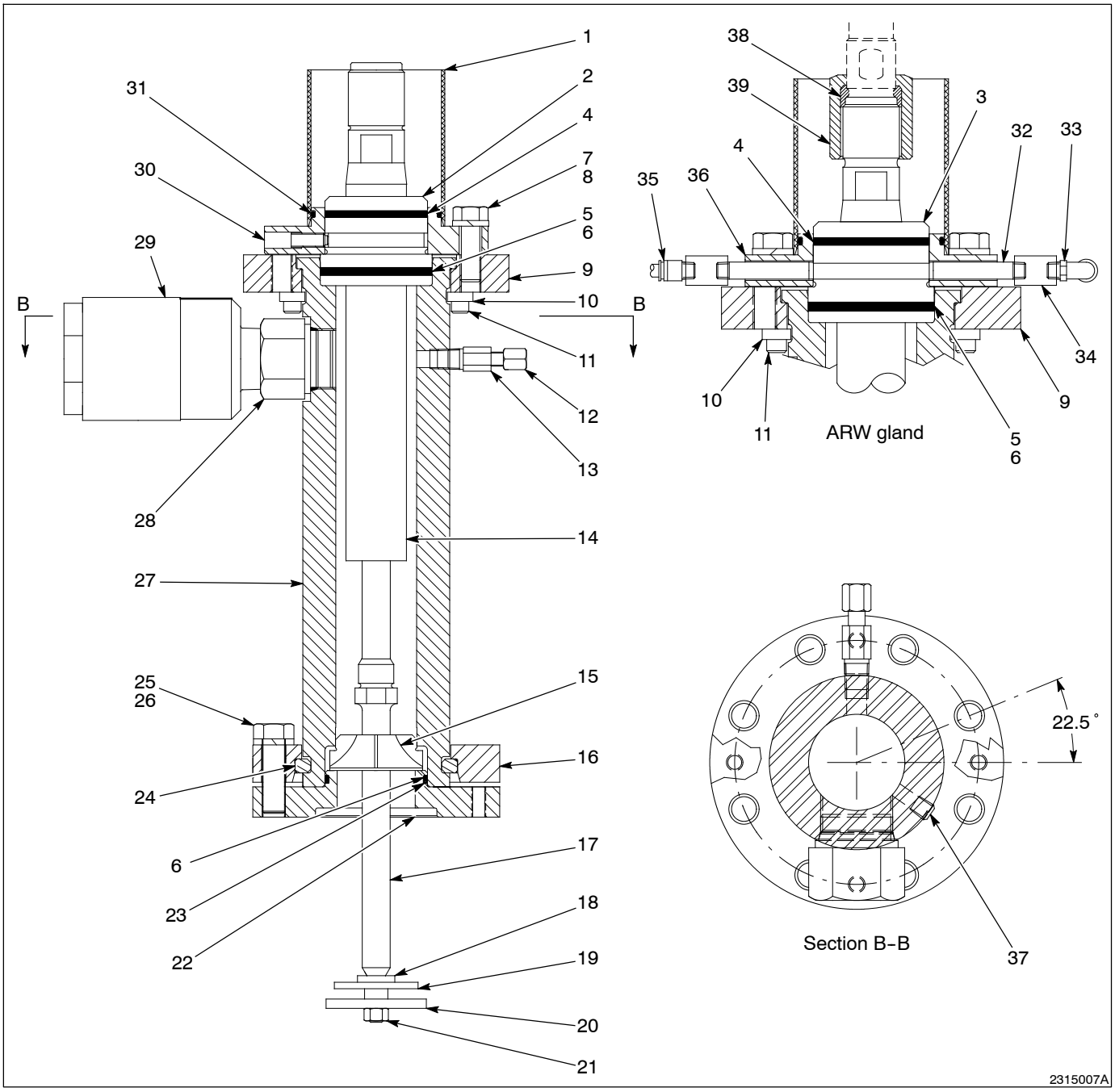

Fig. 7 Hydraulic Section Parts

Coupling

See Figure 7. Use this information to order the hydraulic section to air motor coupling.

Item	Part	Description	Quantity	Note
38	249 115	Collar, rod, connecting	2	
39	249 126	Nut, coupling	1	
NS	900 464	Adhesive, threadlocking	AR	

AR: As Required
NS: Not Shown

Optional Gland Insertion Tool

This tool is recommended for pressing the packing gland and gland retainer into the mounting flange of the pump.

Part	Description	Quantity
124 744	Tool, gland insertion	1

Drum Follower Plate and Seal

See Figure 8.

Item	Part	Description	Quantity	Note
—	320 963	Module, follower plate, 55-gallon, stainless steel	1	
1	322 909	• Stem, bleeder, follower	1	
2	124 690	• Gasket, follower	1	
3	983 160	• Washer, lock, split, $^3/_8$, nickel-plated	4	
4	983 061	• Washer, flat, e, 0.406 x 0.812 x 0.065, zinc	4	
5	981 402	• Screw, hex head, $^3/_8$-16 x 1	4	
6	329 758	• Plate, follower, assembly, 55-gallon, stainless steel	1	
7	236 866	• • Plate, follower, 55-gal, PTFE	1	
8	940 410	• • O-ring, 3.00 x 3.125 x 0.063	1	
9	329 757	• • Adapter, follower, Rhino, stainless steel	1	
10	982 895	• • Screw, flat, socket, M10 x 25 mm	4	
11	124 706	Seal, follower plate, 571-mm drum	2	A
12	308 796	Ring, Neoprene, 571-mm drum	2	A

NOTE A: The follower seal and the Neoprene ring are used together on the 571-mm drum followers only. They must be ordered separately from the follower plate assembly.

Drum Follower Plate and Seal

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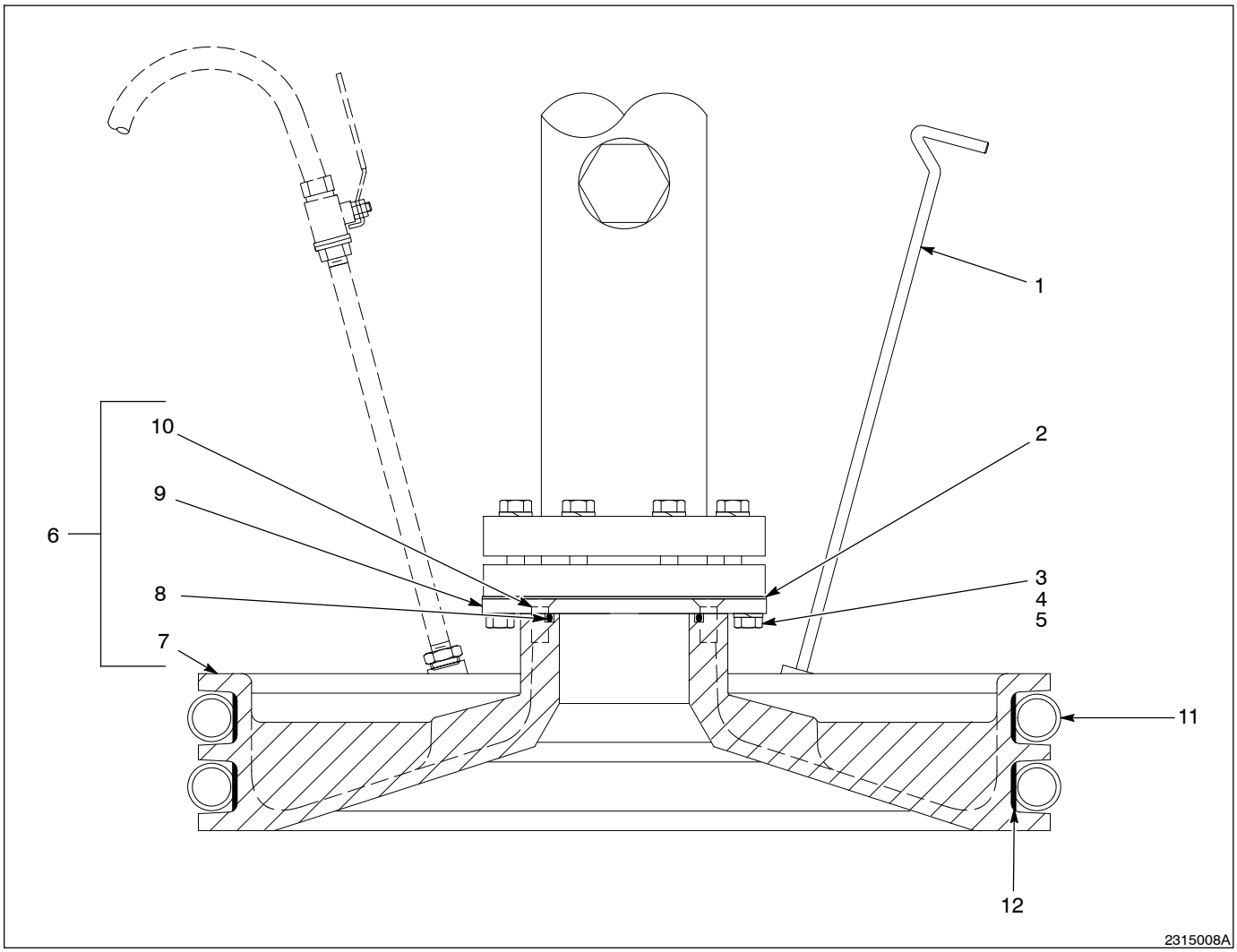

Fig. 8 Drum Follower Plate Assembly

Pail Follower Plate and Seal

See Figure 9.

Item	Part	Description	Quantity	Note
—	335 705	Module, follower, pail, 11.24, PTFE	1	
1	322 909	• Stem, bleeder, follower	1	
2	981 624	• Screw, hex, $^3/_8$-16 x 2.500, cap, zinc	4	
3	983 061	• Washer, flat, e, 0.406 x 0.812 x 0.065, zinc	4	
4	124 690	• Gasket, follower	1	
5	335 706	• Plate, follower, pail, 11.24, PTFE	1	
6	983 160	• Washer, lock, split, $^3/_8$, nickel-plated	4	
7	984 152	• Nut, hex, reg, $^3/_8$-16, steel, plain	4	
8	274 378	Seal, molded, bulk melter, 500	1	A
NOTE A: This part must be ordered separately from the follower plate assembly.				

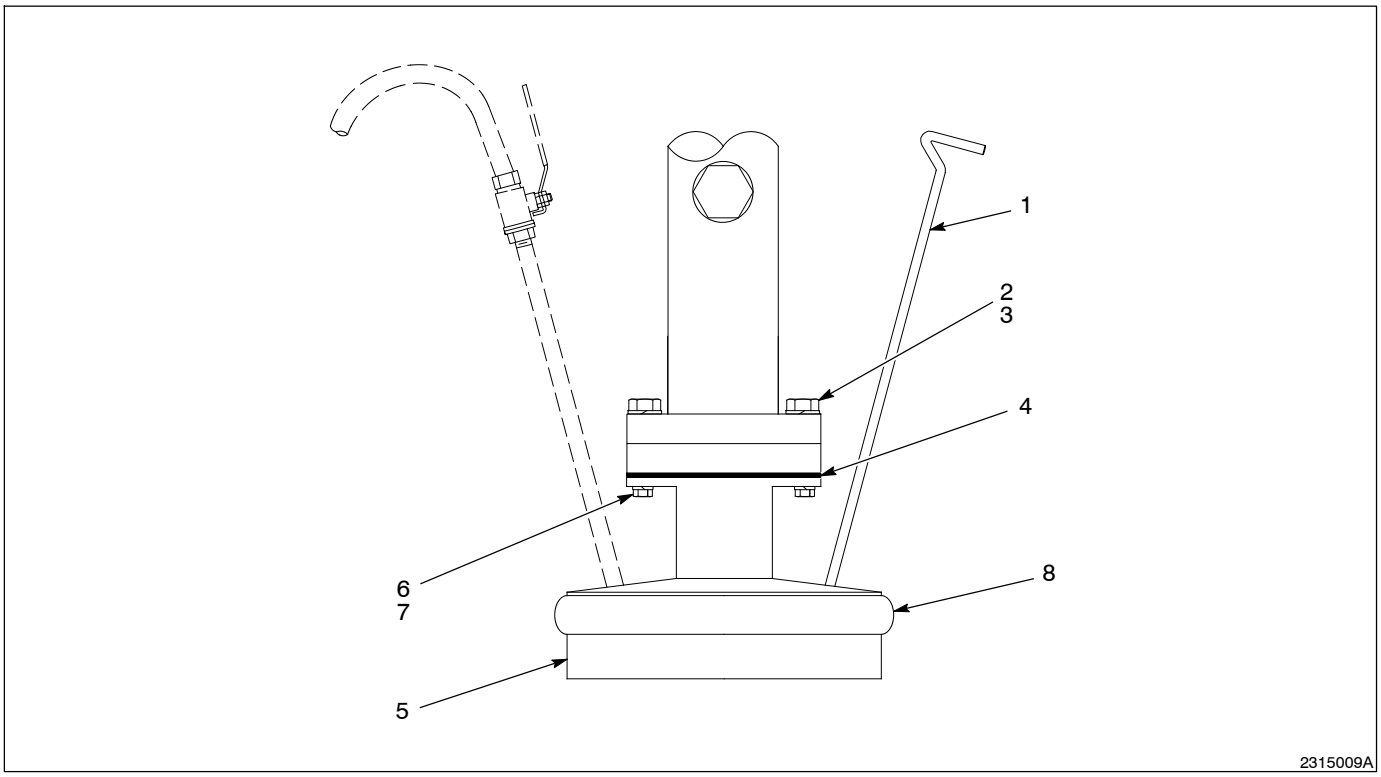

Fig. 9 Pail Follower Plate Assembly