Standard A- and B-Unit Rhino® Bulk Unloader Controls

Customer Product Manual
Part 187688-02
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NORDSON CORPORATION • AMHERST, OHIO • USA

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

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Section 1
Safety

Introduction

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.

Safety Labels

Safety labels are provided to help you operate and maintain your equipment safely. Observe all safety labels and symbols on this equipment. Always keep safety labels visible and in good condition. Contact Nordson Corporation if you must replace these labels.

Safety Label Warning Symbols

See Figure 1-1, which portrays the safety labels and the safety label warnings they indicate. The safety labels installed on Rhino bulk unloaders portray standard international warning symbols. Be sure that you understand the meaning of the symbols before beginning operation of this equipment.

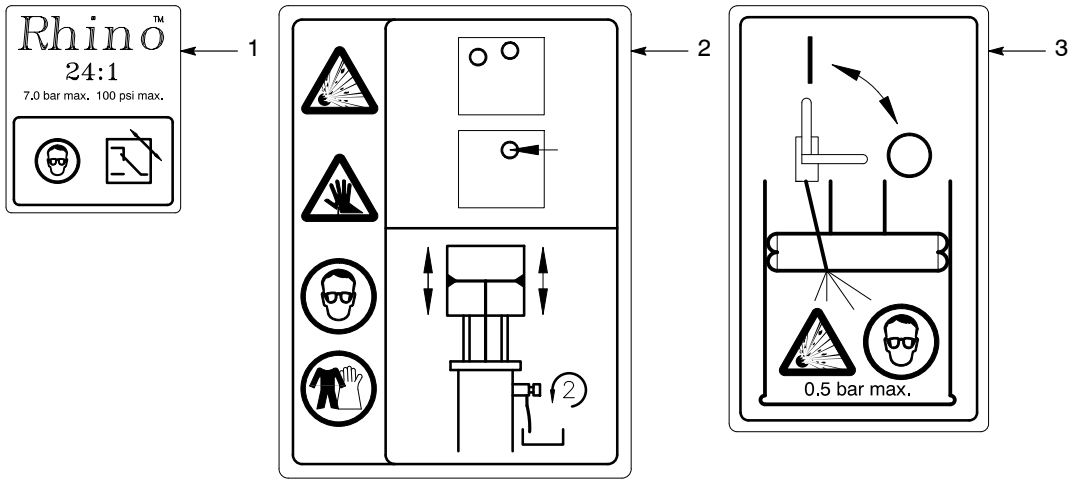

Figure 1-1 Rhino Unloader Safety Labels

1. Eye protection and auto-changeover safety label (label will reflect actual pump ratio of your unloader)
2. Multiple warning safety label
3. Eye protection and explosion warning safety label

Safety Label Locations

See Figure 1-2, which indicates the location of the safety labels installed on European version (CE) Rhino drum and pail bulk unloaders.

NOTE: Auto-shutdown units have safety labels 1 and 3 only.

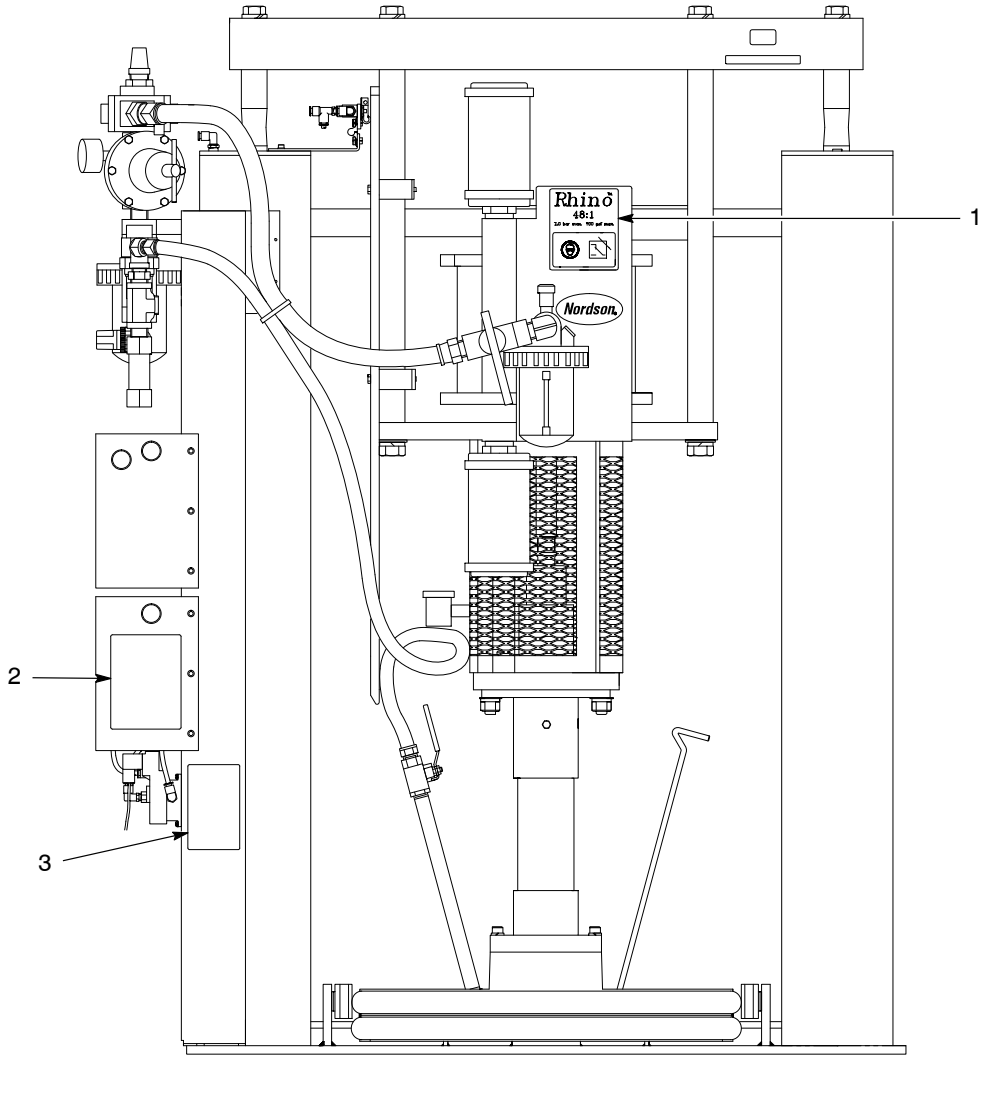

Figure 1-2 Two-Hand Down Elevator Control Drum Unloader Safety Label Locations

1. Eye protection and auto-changeover safety label
2. Multiple warning safety label
3. Eye protection and explosion warning safety label

Note: Safety label locations on the pail unloaders are comparable to their location on the drum unloaders.

Section 2
Description

About This Manual

This manual contains general information about the operation of standard auto-changeover (A- and B-Unit) Rhino bulk unloaders. Unless otherwise noted, the information provided applies to both drum- and pail-sized unloaders. Differences in operation between unloaders with two-hand down elevator control and those with rotary elevator control will be noted.

The bulk unloaders detailed in this manual will be identified by type of elevator control: two-hand down elevator control and rotary elevator control. Large frame units will be referred to as drum unloaders and small frame units as pail unloaders. The illustrations in this manual show two-hand down elevator control drum unloaders and rotary elevator control pail unloaders. The illustrations may not precisely match your bulk unloader due to product modifications or improvements. Some illustrations may show their protective guards removed, as would occur for servicing. Contact your Nordson representative with questions about any differences between the unloaders shown and your model.

Auto-Changeover Bulk Unloaders

See Figure 2-1.

Rhino bulk unloaders are available in a variety of configurations with either a two-hand down elevator control (1) or a rotary elevator control (2) to control operation. The Rhino pail and drum unloaders pump Nordson-approved adhesives and sealant materials at room temperature from containers ranging in size from 20-liter to 200-liter (5-gallon to 55-gallon).

CAUTION: If the material is too abrasive or generally not compatible, equipment may wear out prematurely and components may be damaged. Contact your Nordson representative to verify that the material you wish to pump is compatible with your equipment and setup.

An unloader normally pumps a constant supply of material to dispensing guns or process applicators. The hydraulic section of the unloader is a dual-acting, positive-displacement, demand-type operation pump. This pump can handle high-viscosity materials, some of which may be abrasive. It is often used in applications that require rapid delivery of material to dispensing guns.

Auto-Changeover Bulk Unloaders *(contd)*

Both the pail and drum unloaders are available with the following pump options:

- 24:1 (with 7-inch air motor)
- 32:1 (with 7-inch air motor)
- 48:1 (with 10-inch air motor)
- 65:1 (with 10-inch air motor)

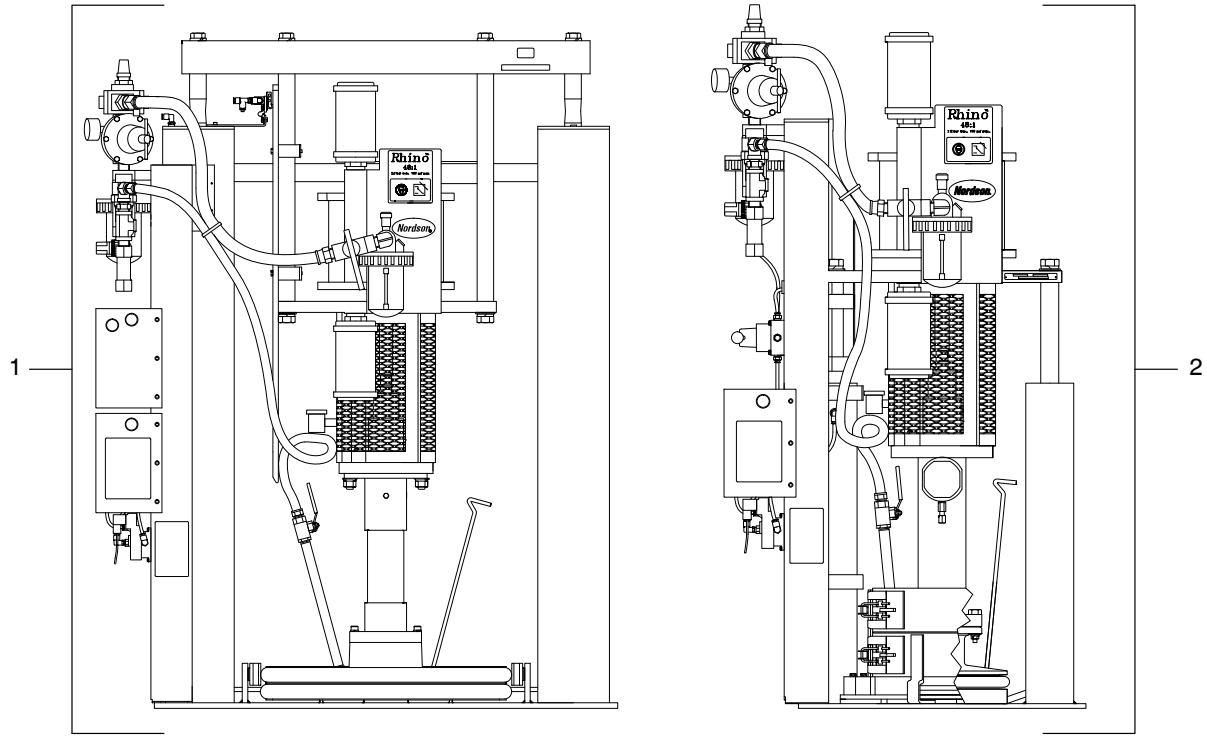

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Figure 2-1 Rhino Series Bulk Unloaders

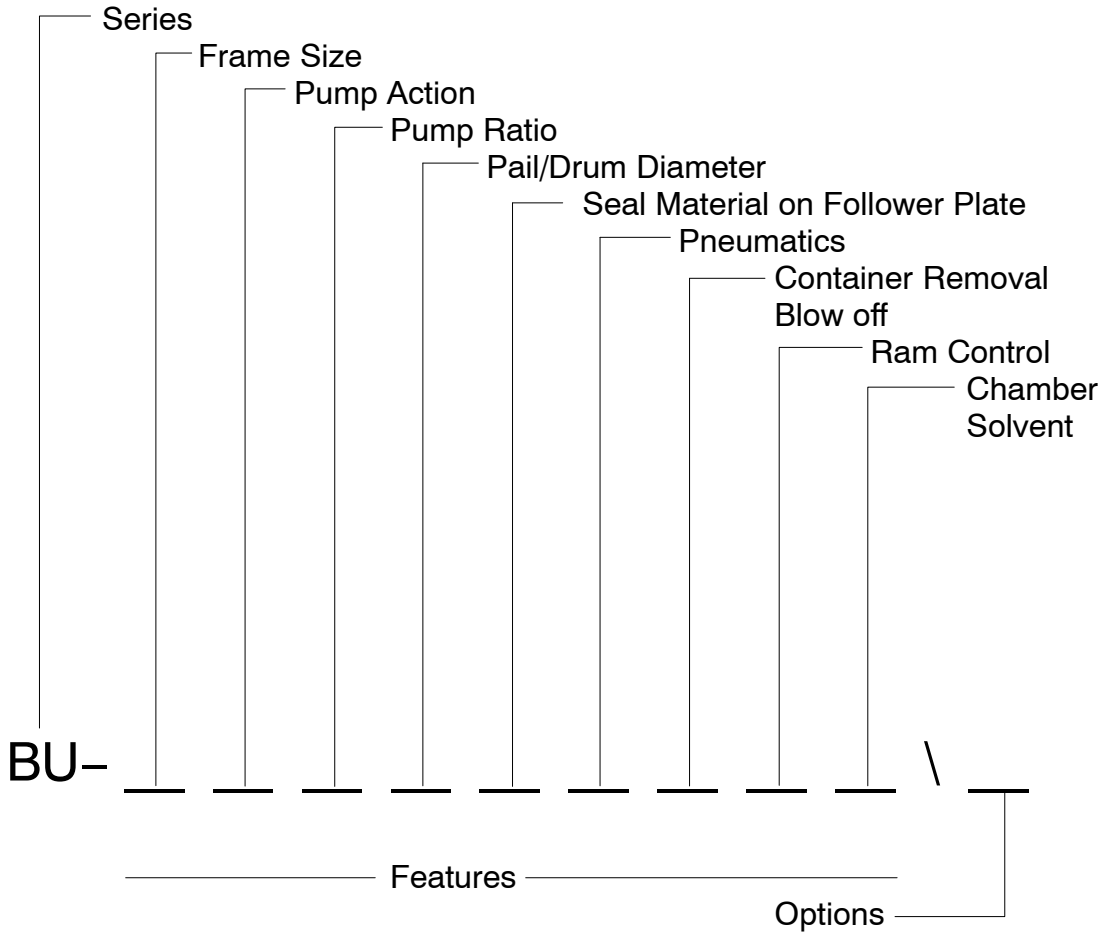
1. Two-hand down elevator control drum unloader
2. Rotary elevator control pail unloader

Configuration Information

Rhino unloaders are configured products that are equipped with customer-specified features and options. Each unloader is given a configuration code based upon the features and options it possesses. The configuration code indicates the features included in your bulk unloader. It appears on the ID plate installed on your unloader. Refer to this code when contacting Nordson to order services or parts.

How to Read the Configuration Code

The following diagram shows a configuration code for the Rhino series bulk unloaders. Each space is a place marker for the characters in the code marked on your unloader. A sample Rhino series configuration code would be [B U – C D N S S A 15 H V \ B]. Refer to Tables 2-1 and 2-2 for information regarding the meaning of each letter in the code.



Configuration Features

Refer to Table 2-1, which lists the features available for bulk unloaders and the corresponding letter code as found on your unloader ID plate.

Table 2-1 Configuration Features

Component	Code	Choices
Frame size	A	Small — intended for use with 20 liter (5 gallon) pails with a maximum pail size of 305 mm (12.0 in.).
	C	Large with 6-in. elevator — intended for use with 200 liter (55 gallon) drums with a maximum drum size of 571.5 mm (22.5 in.).
Pump action	D	Double-acting
Pump ratio	L	24:1
	M	48:1
	N	65:1
	K	24:1 (with a special piston to reduce surface area)
	R	32:1
Pail/Drum diameter	S	US standard, 11.25 in. (286 mm), 5 gal pail
	M	European standard, 280 mm, 20 l pail
	F	Metric, 305 mm
	D	Drum, 22.5 in. (571 mm), 200 l (55 gal)
	E	30 gallon, 18 inches
Seal material on follower plate	S	Standard on 571 mm and 305 mm unloaders
	M	Molded silicone — available on 280-mm and 286-mm pail diameters only
	X	Disc — available for use with 571-mm drums only; recommended for urethane supplied in bags
Pneumatics	B	Basic
	A	Auto-shutdown
	P	Primary for auto-changeover (A-Unit)
	S	Secondary for auto-changeover (B-Unit)
Container removal blow-off	07	7.5 psi, manual
	15	15 psi, manual — standard
	00	None — available only when discs are used as seal material
Elevator (ram) control	H	Two-hand down elevator control
	R	Rotary elevator control — standard
Chamber solvent	K	K-solvent — standard
	V	Vitalizer oil — recommended for urethane applications

Configuration Options

Refer to Table 2-2, which lists the options that your unloader may be equipped with and their corresponding letter codes. Many options can also be retrofit to your unloader. Refer to the *Options* section for more information regarding ordering any of these options.

Table 2-2 Configuration Options

Component	Code	Choices
Pinch point guards	G	Guards
Output check valve	V	Output check valve — recommended to assist with maintenance or reduce pump wink
Container hold down	B	Bottom shoe clamp — available for 571-mm drum unloaders only
	L	Clam shell — available for 280-, 286-, 292-mm pail unloaders only
		No container hold down is standard
Electric pump control	N	Electric solenoid on/off 24 Vdc — available with primary or auto-shutdown only
	S	Electric solenoid on/off 120 Vac — available with primary or auto-shutdown only
Pneumatic shut off	T	E-stop lockout valve, manual
Anti-run away	A	Anti-run away — available with primary or auto-shutdown only
European version (TUV/CE approved)	C	If the CE mark is required, you must have: 1. two-hand down elevator control 2. pinch point guards 3. either a 7.5 psi blow-off or no blow-off with disc seal.

Basic Operation

See Figures 2-2 and 2-3.

To operate the unloader, the operator centers an open, non-tapered, undamaged container of adhesive or sealant material on the unloader frame. When DOWN movement is initiated, a pair of air-driven pistons lowers the follower plate (5), and air-operated piston pump into the container of material. For two-hand down elevator control unloaders, once the follower plate is in the container, the follower-in-drum/pail switch takes over operation. Continuous down pressure is exerted by the elevator (1).

Most applications are equipped with rubber seals around the outer edge of the follower plate to create a sealed compartment below the follower plate. The downward movement of the follower plate forces material into the hydraulic section (pump) (4). Once air pressure to the air motor (2) is turned on, the hydraulic section strokes and pumps material from the container.

When the container is empty, the operator raises the follower plate, replaces the empty container with a full one, and lowers the follower plate into the new container. For most applications, a blow-off assembly (6) is used to introduce air pressure under the follower plate. Then the operator can remove the follower plate from the container of material.

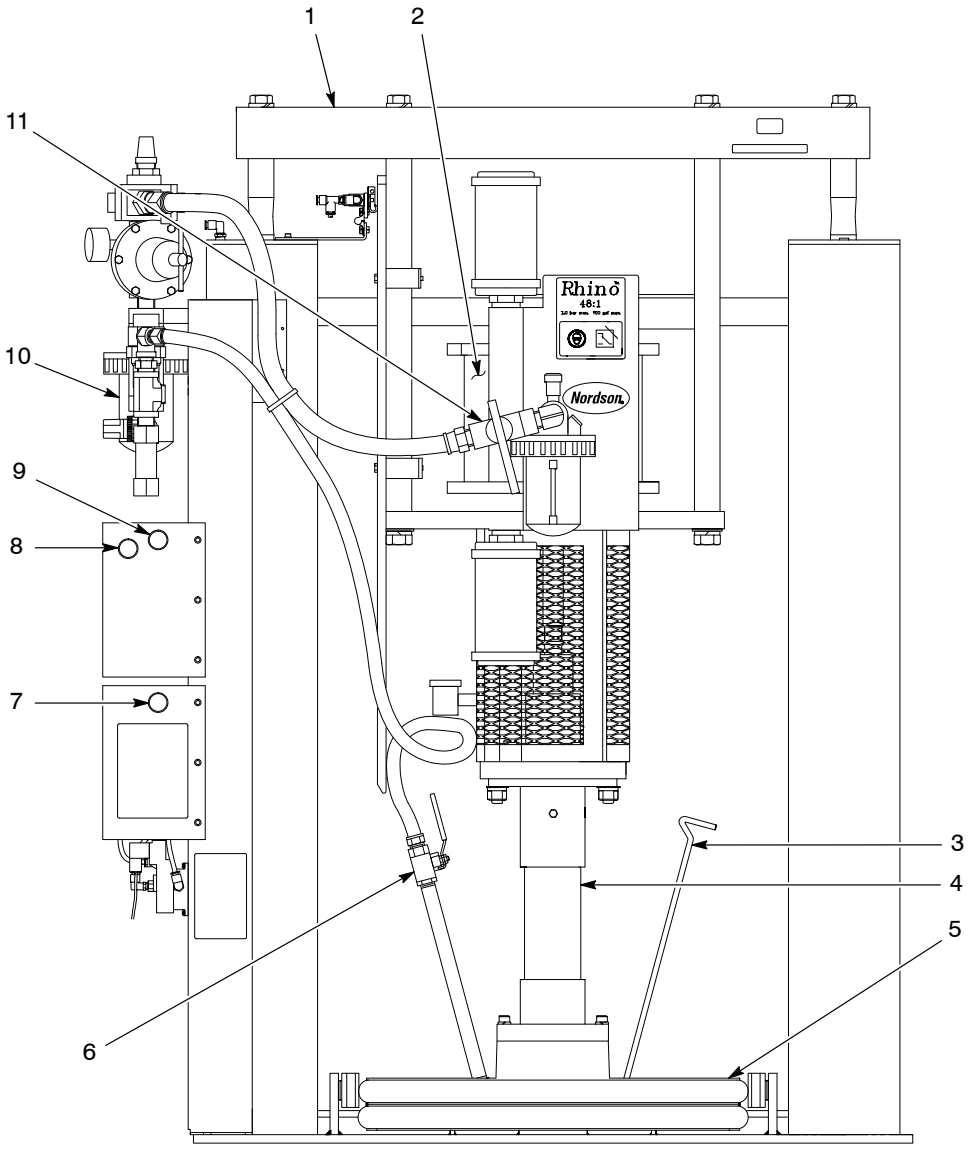


Figure 2-2 Two-Hand Down Elevator Control Drum Unloader

1. Elevator
2. Air motor
3. Bleeder stem
4. Hydraulic section
5. Follower plate
6. Blow-off assembly
7. Purge push button
8. Down push buttons
9. Up push button
10. Filter
11. Air motor lockout valve

Basic Operation *(contd)*

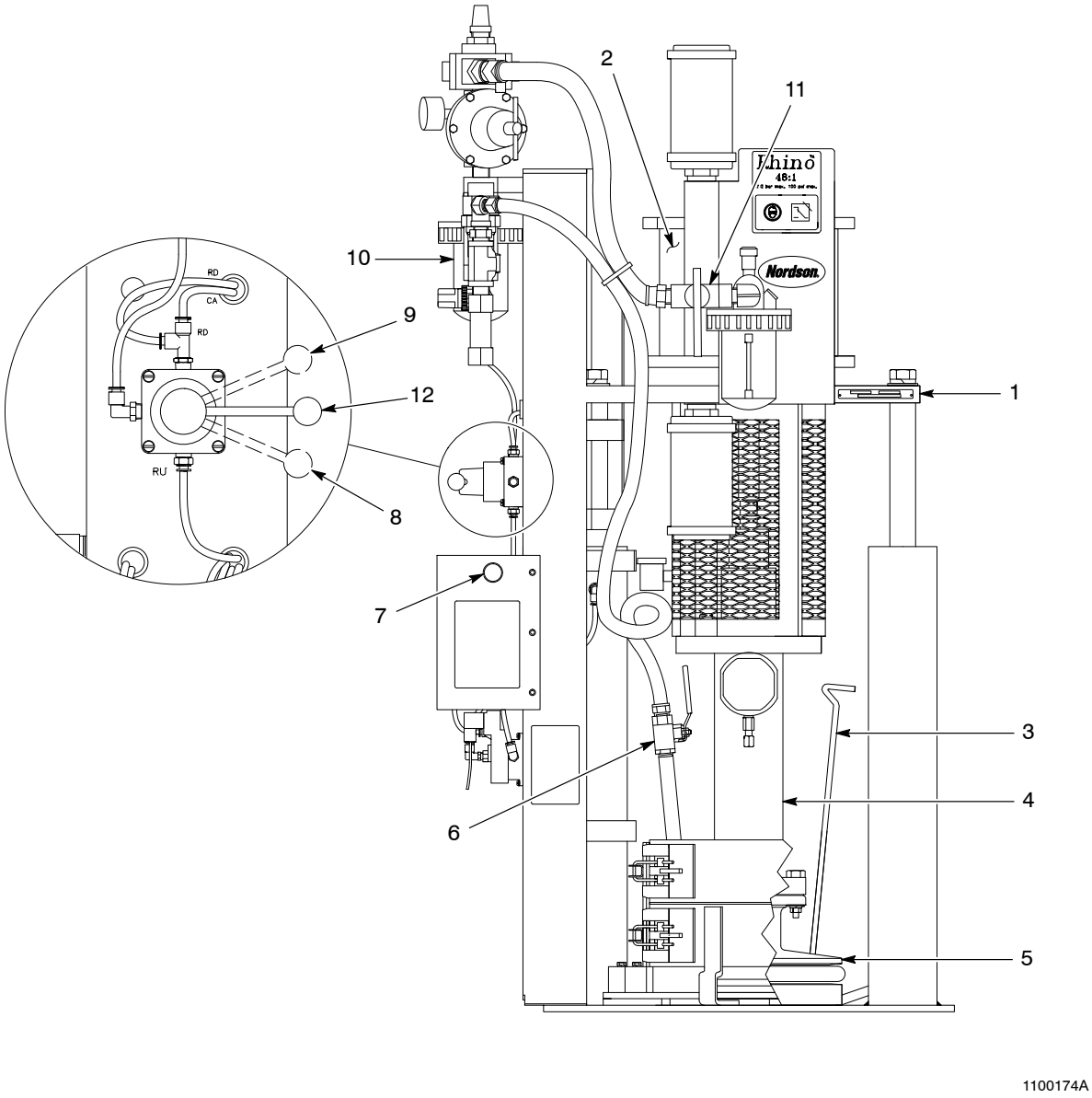


Figure 2-3 Rotary Elevator Control Pail Unloader

1. Elevator
2. Air motor
3. Bleeder stem
4. Hydraulic section
5. Follower plate
6. Blow-off assembly
7. Purge push button
8. Elevator control valve — DOWN position
9. Elevator control valve — UP position
10. Filter
11. Air motor lockout valve
12. Elevator control valve — NEUTRAL position

Theory of Operation

The following information details the operation of your bulk unloader.

Pneumatic Controls

See Figures 2-2 and 2-3.

The operating controls for the Rhino unloader are pneumatic. Because of the potential power in a pressurized unloader, an unloader under pressure from the air supply is considered active even if it is not pumping. Only a non-pressurized pump is considered inactive. The unloader frame can stay under pressure even when the unloader is disconnected. Be cautious and aware that air remains in the cylinders.

The air supply to the unloader(s) passes through a filter that removes most contaminants and moisture. Then the air enters three pressure regulators:

- an adjustable regulator for the pump air motor
- an adjustable regulator to control elevator force
- a non-adjustable regulator for the blow-off (if applicable)

The unloader is also equipped with an air motor lockout valve (11).

Some unloaders are used in pairs and feature an auto-changeover option. This feature allows the operator to change the empty container of one unloader while the other unloader is in operation.

Two-Hand Down Elevator Control

See Figure 2-2.

Two opposing down push buttons (8) lower the follower plate (5). A single up push button (9) raises the follower plate. For dual unloaders with the auto-changeover option, the purge push button (7) cycles the pump only if the pump is inactive and the bleeder valve is open — for bleeding the pump when a container is changed.

Rotary Elevator Control

See Figure 2-3.

The rotary elevator control unloader has an elevator control valve that initiates elevator movement. Placing the elevator control valve in the UP position (9) raises the elevator and placing it in the DOWN position (8) lowers the elevator and follower plate assembly into the container of coating material. Placing the elevator control valve in the NEUTRAL position (12) halts elevator movement. The rotary elevator control unloader has a purge push button (7) that cycles the pump only if the pump is inactive and the bleeder valve is open — for bleeding the pump when a container is changed.

Air Motor Air Supply

See Figures 2-2 and 2-3.

The air supply for the air motor passes through the filter (10) and separator, a regulator, and a lubricator. As air passes through the lubricator, it mixes with a small amount of vitalizer oil. This minimizes wear on the air motor piston and cylinder.

Blow-Off Air Supply

See Figures 2-2 and 2-3.

Bulk unloaders are available with two different blow-off assemblies (6) — with a maximum pressure rating of 0.5 bar (7.5 psi) or 1 bar (15 psi) — as well as no blow-off.

If an unloader is equipped with the optional blow-off air supply, the blow-off assembly is used to relieve vacuum and as an aid to push the follower plate (5) out of the container. The blow-off assembly provides air flow into the container beneath the follower plate. The blow-off air supply passes through a filter/separator, a pre-set non-adjustable regulator, a ball valve, and the follower plate. Refer to the *Operation* section for specific operating instructions.

Elevator Air Supply

See Figures 2-2 and 2-3.

Air from the regulator flows to a control module (two-hand down elevator control unloaders) or to the elevator control valve (rotary elevator control unloaders). The unloader elevator has three types of movement: DOWN, UP, and NEUTRAL.

Down

DOWN elevator movement is initiated by pressing and holding the down push buttons (8) (two-hand down elevator control unloaders) or placing the elevator control valve in the DOWN position (8) (rotary elevator control unloaders).

Air enters the top of the left cylinder and flows through the upper crossover tube to the top of the right cylinder. Air below the pistons is vented. The air pressure forces the cylinder pistons downward, which lowers the follower plate and pump. Once the follower plate is inside the container, the elevator will continue downward and exert force onto the material in the container. For two-hand down elevator control unloaders, the pump will not operate unless the elevator is inside the container.

Up

UP elevator movement is initiated by pressing and holding the up push button (9) (two-hand down elevator control unloaders) or placing the elevator control valve in the UP position (9) (rotary elevator control unloaders).

Air enters the bottom of the left cylinder and flows through the lower crossover tube to the right cylinder. Air above the pistons is vented. The air pressure forces the cylinder pistons upward, which raises the follower plate and pump.

Neutral

WARNING: Do not treat the neutral position as a secure or locked position. Personal injury or equipment damage could result.

An unloader is placed in the NEUTRAL position by pressing the up push button (9) momentarily (two-hand down elevator control unloaders) or placing the elevator control valve in the NEUTRAL position (12) (rotary elevator control unloaders). The NEUTRAL position holds the elevator in place.

In the NEUTRAL position, the frame cylinders do not release pressure. The follower plate should remain stationary, since the air pressure to both sides of the piston is sealed.

Specifications

NOTE: Because of technological or quality improvements, equipment specifications are subject to change without notice.

Air Supply

The customer must supply a single source of 4.8–6.9 bar (70–100 psi) air pressure to power the unloader(s). Options may depend on customer requirements. Contact your Nordson Corporation representative for additional details.

Overall Dimensions

	Pail		Drum	
Weight/Mass	**US (lb)**	**Metric (kg)**	**US (lb)**	**Metric (kg)**
Weight (approximate)	408	185	790	359

	Pail		Drum	
Physical Dimensions	**US (in.)**	**Metric (cm)**	**US (in.)**	**Metric (cm)**
Height (elevator down)	56	142	62	157
Height (elevator up)	79	201	105	268
Depth	23	58	30	76
Width	27	69	49	124

Baseplate Mounting Holes (on Center)

	Pail		Drum	
Dimensions	**US (in.)**	**Metric (cm)**	**US (in.)**	**Metric (cm)**
Width	20.25	51	39	99
Depth	22.75	58	20.5	52

Section 3
Installation

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

General

Perform the following steps to install the unloader:

NOTE: If your floor is not level, be sure to level your unloader before anchoring it to the floor. Operating your unloader on a surface that is not level can affect elevator operation.

1. Position the unloader(s) to allow access to the controls and follower plate area. For automatic changeover unloaders, make sure that the air hoses are protected and can reach between the A-Unit (primary unit) and B-Unit (secondary unit).
2. Anchor the unloader to the floor.
3. See Figures 3-3 and 3-4. Set the elevator control regulator (5) and the air motor regulator (2) to 0 bar/0 psi. Make sure that the main air supply valve is closed.
4. Connect the air supply line to the $^{3}/_{4}$-in. NPT inlet valve. Maximum supply air pressure is 7 bar (100 psi). A $^{3}/_{4}$-in. air line with a minimum flow of 200 scfm is required.
5. The pump outlet fitting on the hydraulic section is a female $1^{1}/_{4}$ NPTF pipe threads.

CAUTION: Use a hose support to prevent hose damage in applications where the hose is suspended by an overhead tool balancer or similar device. Route the hose in a manner that prevents kinking and abrasion. Do not bend the hoses less than the minimum bend radius of the hoses.

6. Make sure that the fluid level in the pump solvent chamber is 38 mm (1.5 in.) from the top of the chamber. Add fluid to the solvent chamber fill cup (16) as necessary. Refer to the *Parts* section for ordering solvent chamber fluid.
7. Fill the air motor lubricator (4) with vitalizer oil. The lubricator capacity is 500 ml (16 fluid ounces). Refer to the *Parts* section for ordering vitalizer oil.
8. Verify that all guards are installed and secure before operating this equipment.

Unloaders with Automatic Changeover

When two unloaders are used together with an automatic changeover (auto-changeover) feature, they must be connected together by several air lines. The primary unit is the A-Unit and the secondary unit is the B-Unit. The main air supply is connected to the A-Unit.

Two-Hand Down Elevator Control Unloader Connections

Refer to Table 3-1 and see Figure 3-1. The table item numbers correspond with the item numbers in the illustration. Make the A-Unit connections; B-Unit connections are pre-assembled at the factory and supplied bundled in a canvas cover.

Table 3-1 Two-Hand Down Elevator Control Unloader Air Line Connections

Item	To Primary Unit — A-Unit		Connector Description	From Secondary Unit — B-Unit	
	Location and Designator			Designator and Location	
1	Lower module, changeover	EB	1/4-in. tube	EB	Empty-container valve
2	Upper left solenoid	BB	3/4-in. hose (37-deg JIC fittings)	BB	90-deg elbow at air motor lubricator
3	Elbow at manifold	S	1/2-in. tube	S	Air supply connection at tee
4	Tee of blow-off air supply (pipe thread)	Y	3/4-in. hose — special fitting at A-Unit with gasket	Y	Blow-off valve at follower
5	Main air supply valve	3/4 NPTF	Shop air — 3/4-in. NPTF fitting at valve	None	None
6	Lower module, changeover	E1B CB	1/4-in. tube	E1 C	Upper module, ram
7	Lower module, changeover or Lower module shuttle valve — when using electric solenoid (connects to bottom of (6))	PB SB	1/4-in. tube	PB	Purge push button valve

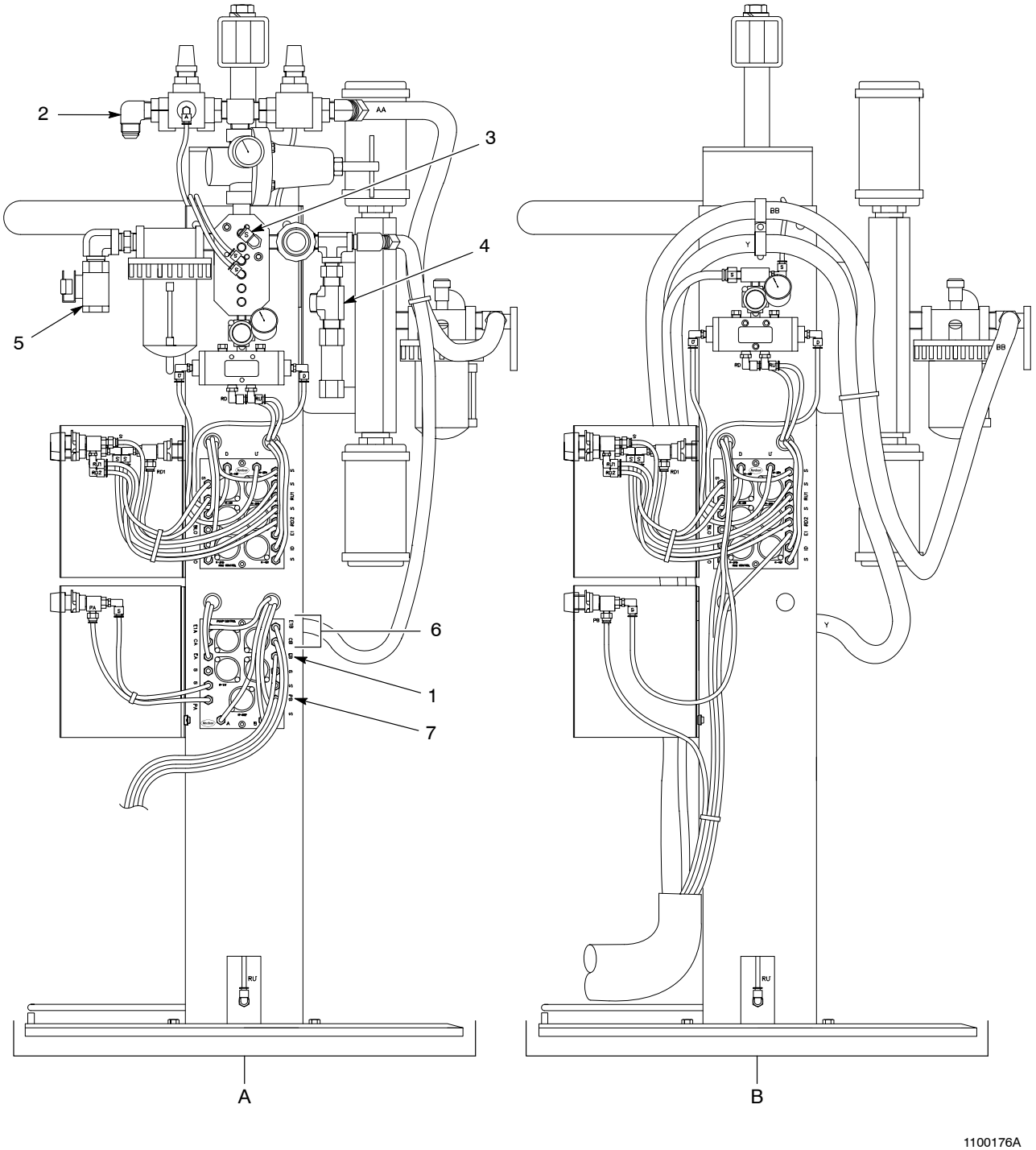


Figure 3-1 Two-Hand Down Elevator Control Drum Unloaders Auto-Changeover Connections

A. Primary B. Secondary

Rotary Elevator Control Unloader Connections

Refer to Table 3-2 and see Figure 3-2. The item numbers in the table correspond with item numbers in Figure 3-2. Make the A-Unit connections; B-Unit connections are pre-assembled at the factory and supplied bundled in a canvas cover.

Table 3-2 Rotary Elevator Control Unloader Air Line Connections

Item	To Primary Unit — A-Unit		Connector Description	From Secondary Unit — B-Unit	
	Location and Designator			Designator and Location	
1	Lower module, changeover	EB	1/4-in. tube	EB	Empty-container valve
2	Upper left solenoid	BB	3/4-in. hose (37-deg JIC fittings)	BB	90-deg elbow at air motor lubricator
3	Elbow at manifold	S	1/2-in. tube	S	Air supply connection at tee
4	Tee of blow-off air supply (pipe thread)	Y	3/4-in. hose — special fitting at A-Unit with gasket	Y	Blow-off valve at follower
5	Main air supply valve	3/4 NPTF	Shop air — 3/4-in. NPTF fitting at valve	None	None
6	Lower module, changeover	CB	1/4-in. tube	RD	Tee at rotary valve
7	Lower module, changeover or Lower module shuttle valve — when using electric solenoid (connects to bottom of (6))	PB SB	1/4-in. tube	PB	Purge push button valve

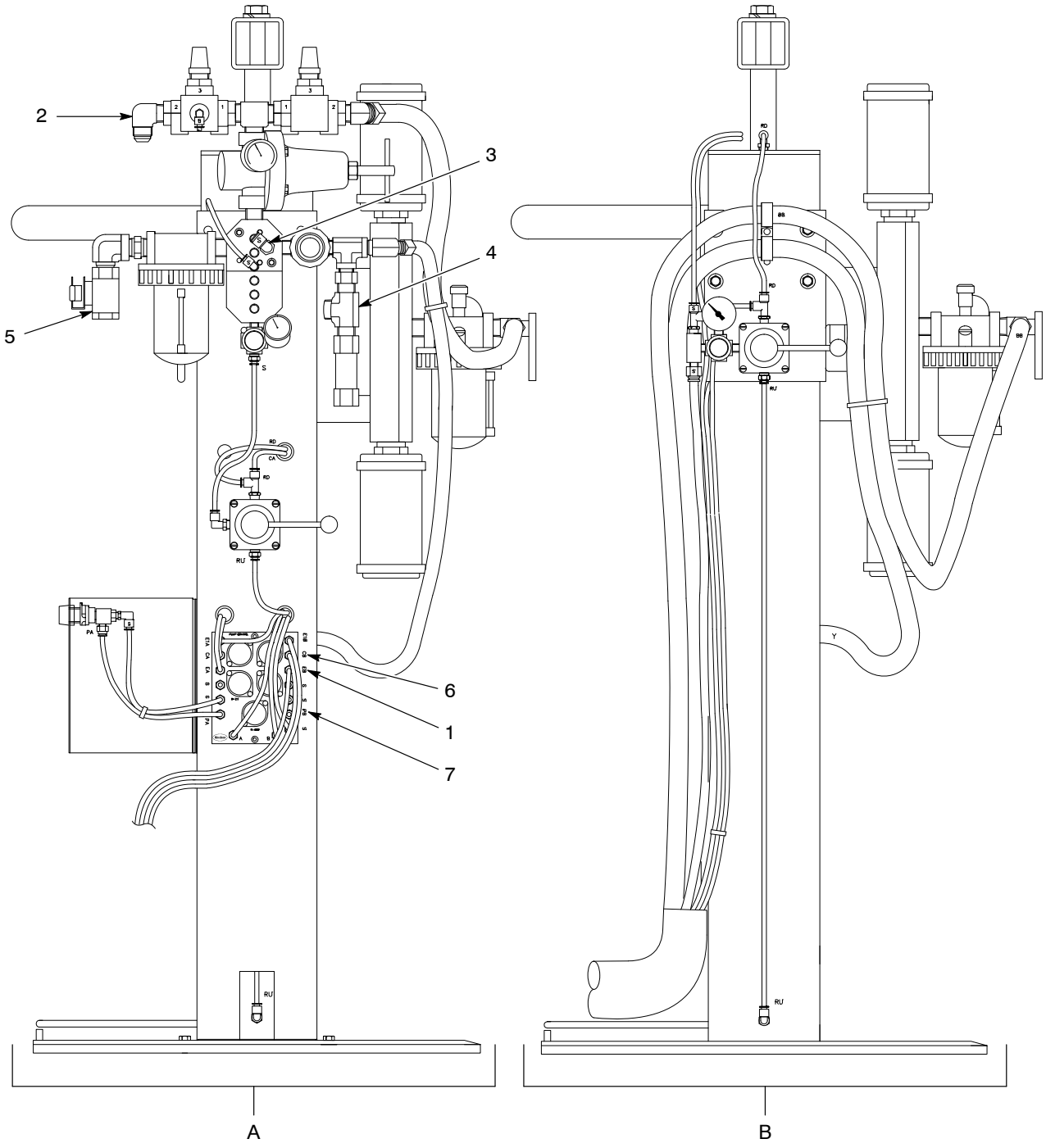


Figure 3-2 Rotary Elevator Control Drum Unloader Auto-Changeover Connections

A. Primary B. Secondary

New Equipment Installation

NOTE: This procedure applies only to the first-time startup of a new system.

See Figures 3-3 and 3-4.

1. Verify that all pneumatic connections have been made at the pneumatic pump control box (17).
2. Make sure that the air motor lubricator (4) and solvent chamber are filled with the proper fluids. Add solvent chamber fluid to the solvent chamber fill cup (16) as needed. Refer to the *Parts* section for ordering solvent chamber fluid.
3. Lubricate the follower plate seal(s) (13) with a lubricant that is compatible both with the seal(s) and with the material dispensed.
4. Verify that the air motor lockout valve (20) is closed.
5. Open the main air supply valve (7) to power the unloader.
6. Adjust the air motor regulator (2) setting until the air motor pressure gauge (1) reads 0 bar/psi.
7. Adjust the elevator control regulator (5) setting until the elevator control gauge (6) reads 1.5–4.0 bar (20–60 psi). Adjust the elevator control regulator for the minimum air pressure necessary to raise the elevator (9).

   NOTE: You may need to increase this setting when using high-viscosity material and to apply sufficient down pressure to force material into the pump.

8. Press the up push button (19) momentarily and release it (two-hand down elevator control unloaders). Or place the elevator control valve in the UP position (19) to raise the elevator to the top of its travel range (rotary elevator control unloaders).
9. If your unloader is equipped with a blow-off, open the blow-off ball valve (14). Listen for air flow to make sure that the adapter tube is not clogged. Close the ball valve.
10. Make sure that the air hoses and material delivery hose are not kinked or pinched.
11. Connect your Programmable Logic Controller (PLC) cable from your system PLC to the Primary Unit (A-Unit) electric pump control (15).

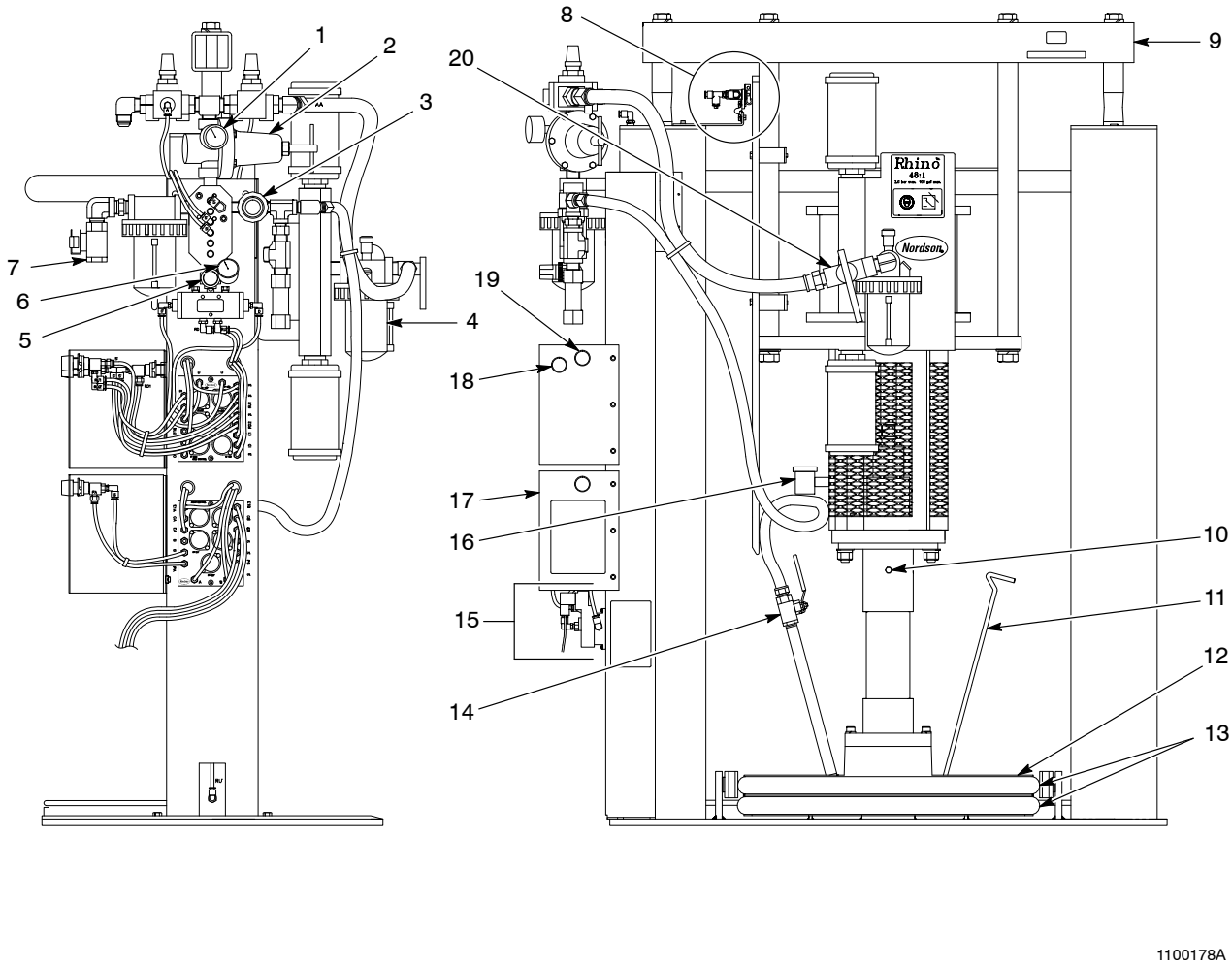


Figure 3-3 Two-Hand Down Elevator Control Drum Unloader Components

1. Air motor pressure gauge
2. Air motor regulator
3. Blow-off pre-set regulator
4. Air motor lubricator
5. Elevator control regulator
6. Elevator control gauge
7. Main air supply valve
8. Empty-/In-container valve reference point
9. Elevator
10. Bleed valve
11. Bleeder stem
12. Follower plate
13. Follower plate seals
14. Blow-off ball valve
15. Electric pump control
16. Solvent chamber fill cup
17. Pneumatic pump control
18. Down push buttons
19. Up push button
20. Air motor lockout valve

New Equipment Installation *(contd)*

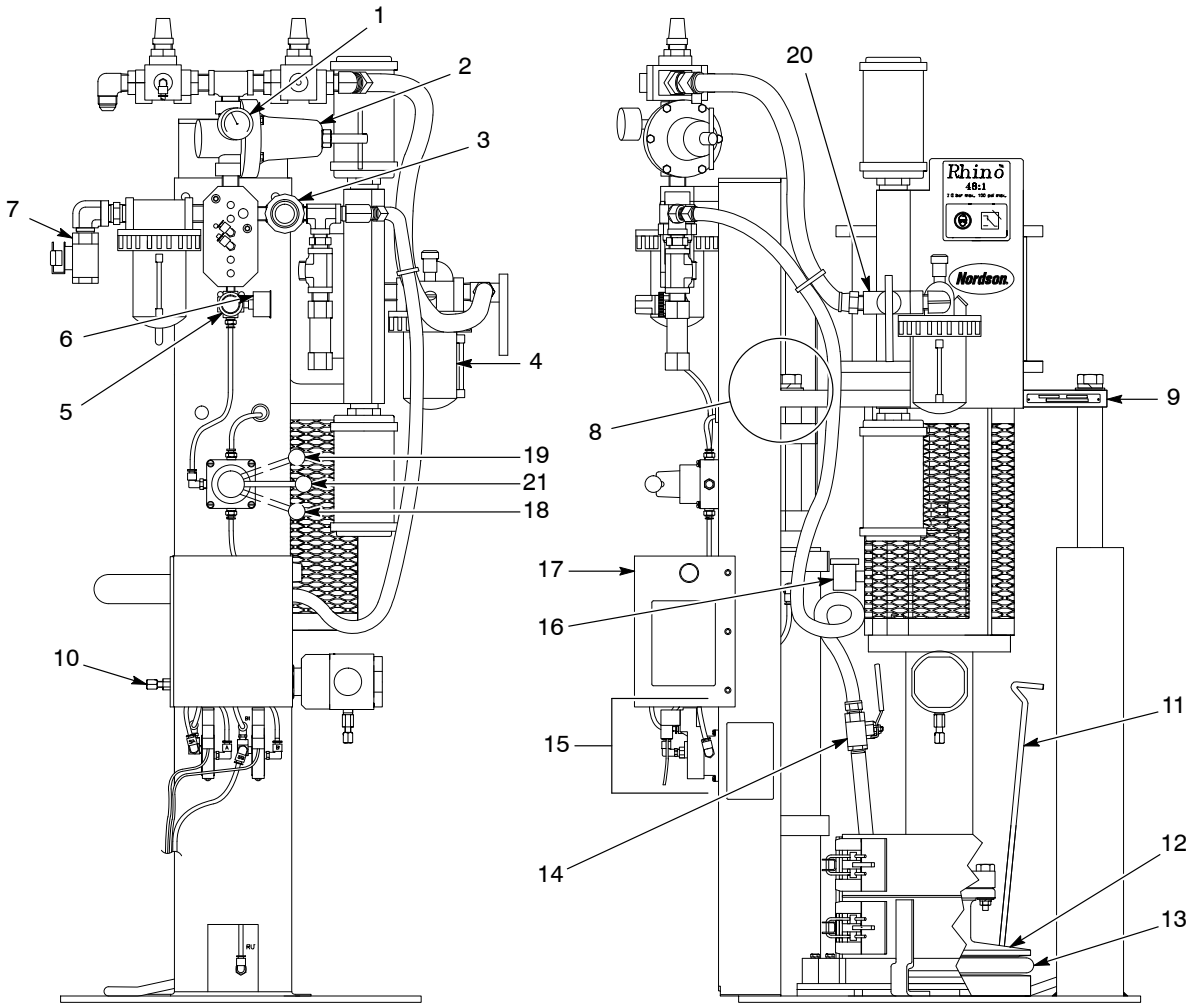


Figure 3-4 Rotary Elevator Control Pail Unloader Components

1. Air motor pressure gauge
2. Air motor regulator
3. Blow-off pre-set regulator
4. Air motor lubricator
5. Elevator control regulator
6. Elevator control gauge
7. Main air supply valve
8. Empty-/In-container valve reference point
9. Elevator
10. Bleed valve
11. Bleeder stem
12. Follower plate
13. Follower plate seal
14. Blow-off ball valve
15. Electric pump control
16. Solvent chamber fill cup
17. Pneumatic pump control
18. DOWN position
19. UP position
20. Air motor lockout valve
21. NEUTRAL position

Verifying the Factory-Made Settings

Rhino bulk unloaders with two-hand down elevator control are shipped with the follower-in-container and the empty-container settings already set. Rotary elevator control unloaders only have the empty-container setting. You should not have to adjust these settings. However, as a safety precaution, it is important to verify these settings before beginning normal operation of your unloader. Use extreme caution if you adjust the setting.

Locate the empty-/in-container valve reference point (See Figures 3-3 and 3-4, (8)). This will help you to locate the areas shown in detail in Figures 3-5 and 3-6. These areas show the brackets and hardware that are adjusted to make the in-container and empty-container settings.

Follower-In Container

See Figure 3-3.

Two-hand down elevator control unloaders are shipped with the follower-in-container adjustment already set. The unloaders are set to the approximate height of a standard 55-gallon drum or 5-gallon pail, accordingly. This setting allows you to stop the follower plate (12) from descending at any point until the plate enters the container of material.

Releasing one or both of the down push buttons (18) stops the movement. Once the follower plate enters the container, you can release the down push buttons and the follower plate will continue its downward motion.

To verify the follower-in-container setting, perform the following procedure:

1. Press and hold the up push button (19). Raise the elevator (9) to its maximum height.
2. Measure the height of the container to be used. Visually note where the top of the container is located within the unloader frame.
3. Lower the follower plate to the point at which the container top will sit. If the follower plate continues independent downward motion once it passes the location of the container top, then the setting is verified.
4. If the follower plate-in-container setting for your unloader is not exact, adjust the maximum height of the follower plate travel. Refer to the following procedures to adjust the follower-in-container setting for your drum or pail unloader.

Large Frame (Drum) Unloaders

See Figure 3-5.

The follower-in-container setting is set at a distance of 3.8 cm (1.50 in.) from the in-container bracket (2) to the elevator crossover (4). If you require a different setting, perform the following steps to adjust the maximum height of the follower plate travel:

a. Lower the in-container bracket if the follower plate is too low, or raise the in-container bracket if the follower plate is too high.

b. Mark the pump support rod (3) for the distance you wish to move the in-container bracket.

c. Slightly loosen the hex head screws (5) that secure the in-container bracket to the pump support rod.

d. Move the in-container bracket so that it remains perpendicular to the in-container valve (6). Tighten the hex head screws.

Raise and lower the unloader several times to make sure that the in-container bracket in is the desired position. Retest the unloader operation and repeat steps b–d, as needed.

Small Frame (Pail) Unloaders

See Figure 3-6.

The follower-in-container setting is set at a distance of 2.5 cm (1.00 in.) from the in-container bracket (2) to the air motor mounting plate (4). If you require a different setting, perform the following steps to adjust the maximum height of the follower plate travel:

a. Lower the in-container bracket if the follower plate is too low, or raise the in-container bracket if the follower plate is too high.

b. Mark the elevator rod (3) for the distance you wish to move the in-container bracket.

c. Slightly loosen the hex head screws (10) that secure the in-container bracket to the elevator rod.

d. Move the in-container bracket so that it remains perpendicular to the in-container valve (8). Tighten the hex head screws.

Raise and lower the unloader several times to make sure that the in-container bracket is in the proper position. Retest the unloader operation and repeat steps b–d as required.

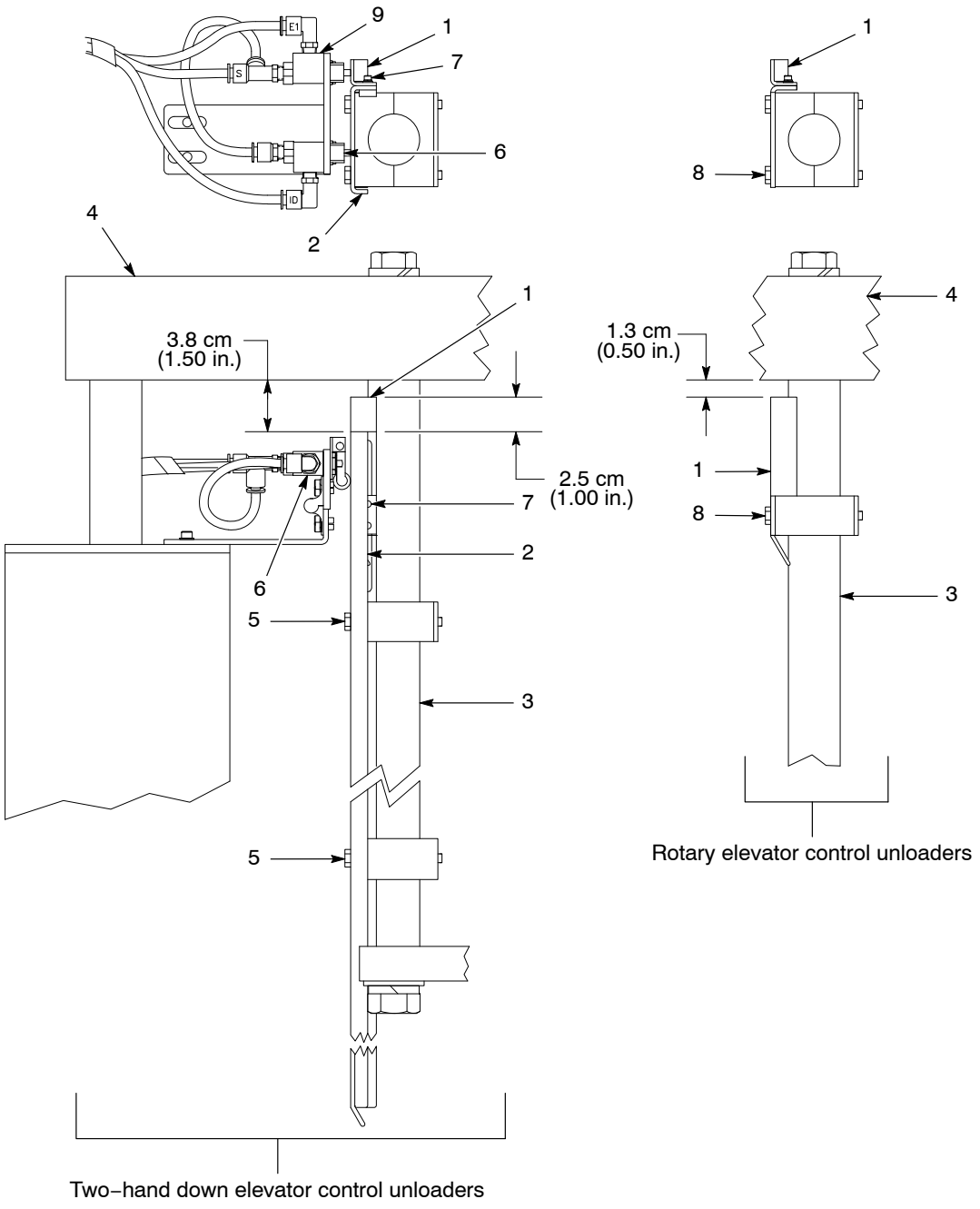


Figure 3-5 Drum Unloader Settings

1. Empty-container bracket
2. In-container bracket
3. Pump support rod
4. Elevator crossover
5. Hex head screws
6. In-container valve
7. Screws
8. Bolts
9. Empty-container valve

Verifying the Empty-Container Setting

During initial startup, you must also verify the empty-container setting of your unloader. The empty-container setting is factory-set to stop the follower plate approximately 1.5-in. from the bottom of the container. Based on your application needs, you can adjust this setting to stop the follower plate closer or farther from the bottom of the container.

To verify the pre-set empty-container setting, perform the following procedure:

See Figures 3-3 and 3-4.

1. Check the empty-container setting of your unloader:
   a. Lower the follower plate (12) by initiating and maintaining down elevator movement.
   b. When the follower plate reaches the bottom and shuts down the unloader, carefully check the distance between the base rail and the bottom of the follower plate.

See Figures 3-5 and 3-6.

   c. If you need to adjust the shutdown point, find the proper stop height for your container and raise or lower the empty-container bracket (1). Refer to the following procedures to adjust the empty-container setting for your unloader.
2. Raise and lower the unloader several times to make sure the empty-container bracket (1) is in the proper location, and makes contact with the empty-container valve (9). Retest the unloader operation and repeat step c as required.

Two-Hand Down Elevator Control Drum Unloaders

See Figure 3-5.

For two-hand down elevator control drum unloaders, the empty-container bracket (1) is set so that it extends 2.5 cm (1.00 in.) above the top of the in-container bracket (2). To adjust the placement of the empty-container bracket:

a. Loosen the screws (7) that secure the empty-container bracket to the pump support rod (3).
b. Raise the bracket to make the follower plate stop lower in the container. Lower the bracket to make the follower plate stop higher in the container.
c. Tighten the screws.

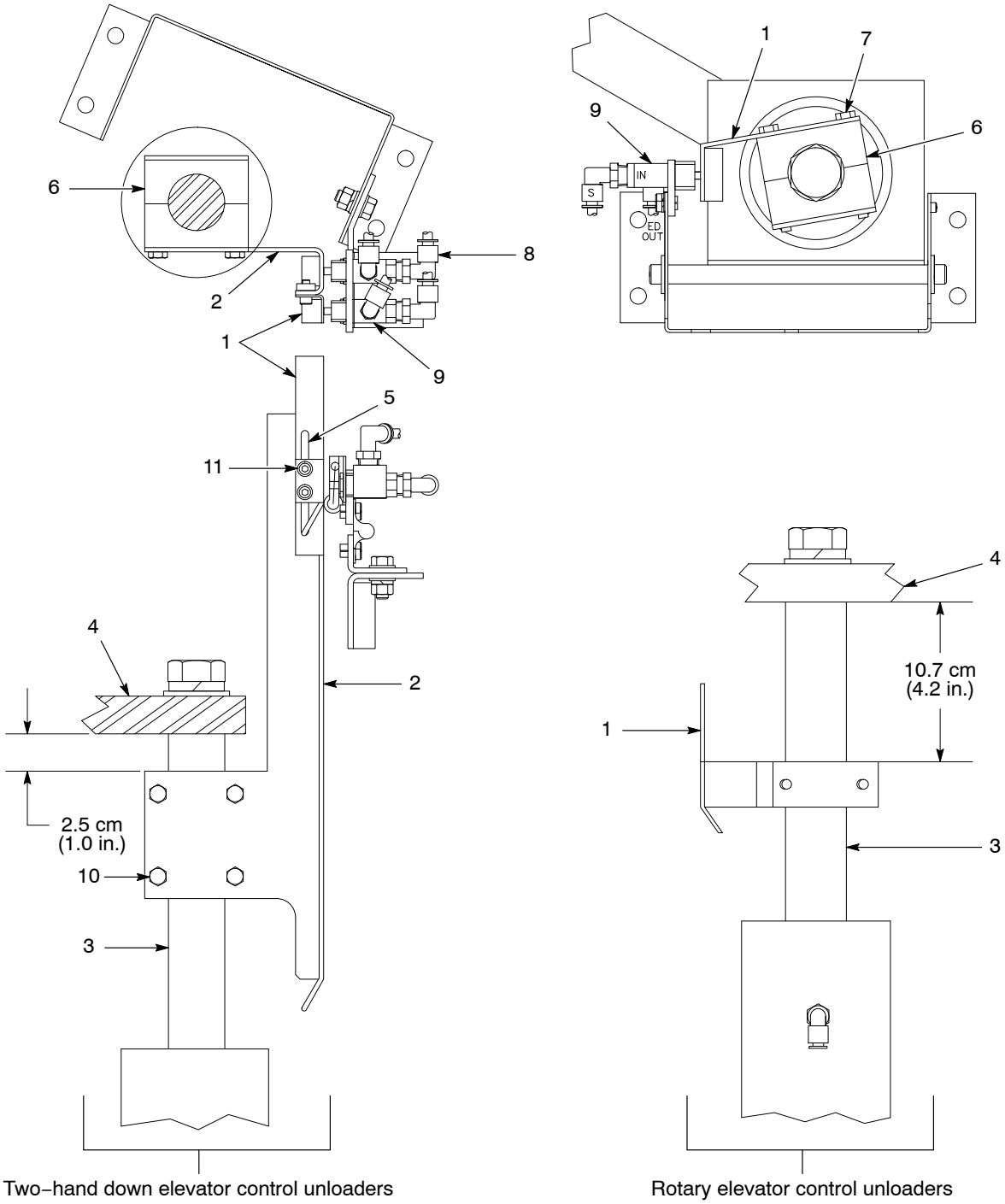


Figure 3-6 Pail Unloader Settings

1. Empty-container bracket
2. In-container bracket
3. Elevator rod
4. Air motor mounting plate
5. Adjustable slot
6. Clamps
7. Bolts
8. In-container valve
9. Empty-container valve
10. Hex head screws
11. Screws

Rotary Elevator Control Drum Unloaders

See Figure 3-5.

For rotary elevator control drum unloaders, the top of the empty-container bracket (1) is set 1.3 cm (0.50 in.) below the elevator crossover (4). To adjust the placement of the empty-container bracket:

a. Loosen the bolts (8) that secure the empty-container bracket to the pump support rod (3).

b. Raise the bracket to make the follower plate stop lower in the container. Lower the bracket to make the follower plate stop higher in the container.

c. Tighten the bolts.

Two-Hand Down Elevator Control Pail Unloaders

See Figure 3-6.

For two-hand down elevator control pail unloaders, the empty-container bracket (1) is set and adjusted in relation to the in-container bracket (2). To adjust the placement of the empty-container bracket:

a. Loosen the screws (11) that secure the empty-container bracket to the in-container bracket.

b. Slide the empty-container bracket along the adjustable slot (5) as needed to achieve the desired empty-container setting. Raise the bracket to make the follower plate stop lower in the container. Lower the bracket to make the follower plate stop higher in the container.

c. Tighten the screws

Rotary Elevator Control Pail Unloaders

See Figure 3-6.

For rotary elevator control pail unloaders, the empty-container bracket (1) is set 10.7 cm (4.2 in.) below the air motor mounting plate (4). To adjust the placement of the empty-container bracket:

a. Loosen the bolts (7) that secure the empty-container bracket to the elevator rod.

b. Slide the empty-container bracket up or down as needed to achieve the desired empty-container setting. Raise the bracket to make the follower plate stop lower in the container. Lower the bracket to make the follower plate stop higher in the container.

c. Tighten the bolts.

Section 4
Operation

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

WARNING: Wear protective clothing, goggles, and gloves when operating this equipment.

WARNING: The pump can start cycling the air motor at any time that the air motor lockout valve is not closed.

This section describes elevator movement, new equipment startup, and routine operating procedures.

Elevator Movement

See Figures 4-1 and 4-2 as indicated.

To operate your Rhino bulk unloader, you will initiate UP and DOWN elevator movement and place the elevator in the NEUTRAL position. The following table provides specific directions for initiating these movements.

WARNING: Do not treat the neutral position as a secure or locked position. Personal injury or equipment damage could result.

Type of Elevator Movement	How to Initiate	
	Two-Hand Down Elevator Control Unloaders See Figure 4-1.	**Rotary Elevator Control Unloaders** See Figure 4-2.
DOWN	Press and hold the down push buttons (16)	Place the elevator control valve in the DOWN position (16)
UP	Press and hold the up push button (17)	Place the elevator control valve in the UP position (17)
NEUTRAL	Press (tap) the up push button (17) momentarily	Place the elevator control valve in the NEUTRAL position (19)

New Equipment Startup

This procedure applies only to the first-time startup of operation of a new system.

See Figures 4-1 and 4-2.

CAUTION: Do not use a damaged container. It may damage the follower plate, follower plate seal(s), or sealing device when the follower plate is lowered into the container.

1. Carefully inspect the new material container for dents or other damage. Do not use a damaged container.
2. Perform the following to prepare the follower plate (10) for operation:
   a. If your follower plate has seal(s) (11), coat the seal(s) with an O-ring grease that is compatible both with the seal(s) and with the dispensing material.
   b. If your unloader uses a seal ring or similar device, place it in the open container.
   c. If your unloader does not use a seal ring, use only materials that are shipped in bags within the container.
3. Place the container of material on the base of the unloader, and center it under the follower plate.
4. Adjust the elevator control regulator (4) until the elevator control gauge (5) reads at least 2.1 bar (30 psi).
5. If your unloader is equipped with a blow-off assembly, make sure the blow-off ball valve (13) is closed. Unscrew the bleeder stem (9) from the follower plate to allow any air trapped under the follower plate to escape.

WARNING: Severe personal injury could result if your hands or fingers are caught between the follower plate and container. Keep your hands clear of this area.

6. **Two-hand down elevator control unloaders:** See Figure 4-1. Press and hold the two down push buttons (16) to lower the follower plate into the open container of material. To stop the follower plate, press the up push button (17) momentarily. Once the follower plate is in the container, release the down push buttons. The follower-in-container switch activates and continues downward movement independent of the operator.

   Rotary elevator control unloaders: See Figure 4-2. Place the elevator control valve in the DOWN position (16) and slowly lower the follower plate into the open container of material. To stop the follower plate, place the elevator control valve in the NEUTRAL position (19).

See Figures 4-1 and 4-2.

7. Continue lowering the follower plate until material begins to flow from the bleeder stem fitting. Place the elevator in the NEUTRAL position. Tighten the bleeder stem securely.
8. Initiate DOWN elevator movement to force material into the pump section.
9. Before continuing, make sure the hose and gun are secured firmly and that the gun is not pointing at any personnel in the area.
10. Open the air motor lockout valve (18).
11. Adjust the air motor regulator (2) until the pump begins to operate. Do not increase the pressure beyond the minimum required to cycle the pump. Check the air motor pressure gauge (1) and note the minimum required pressure.
12. Bleed the pump. Refer to *Bleeding the Pump* for procedures.
13. Bleed all air from the system. Trigger the gun(s) to allow air in the lines to bleed off.

    NOTE: If air is not bled from the gun, the gun may pop and spit when dispensing material.

14. Raise pressure to operating levels. When you reach normal operating pressure, the gun dispenses material smoothly, continuously, and without air bubbles.
15. Adjust the drip rate of the air motor lubricator (3) to one drip for every fifteen pump strokes.

New Equipment Startup *(contd)*

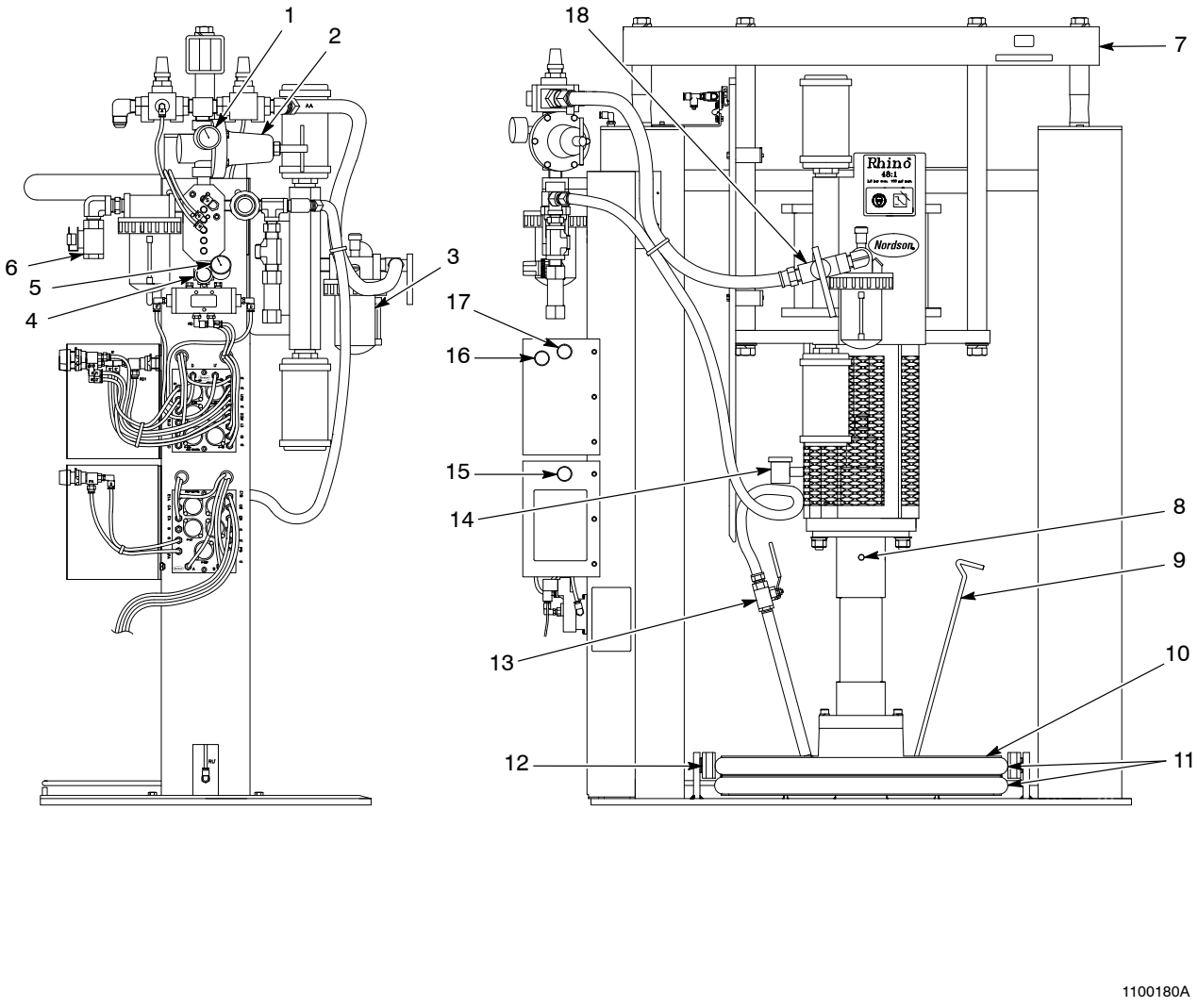


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Figure 4-1 Two-Hand Down Elevator Control Drum Unloader Daily Operation Controls

1. Air motor pressure gauge
2. Air motor regulator
3. Air motor lubricator
4. Elevator control regulator
5. Elevator control gauge
6. Main air supply valve
7. Elevator
8. Bleed valve
9. Bleeder stem
10. Follower plate
11. Follower plate seals
12. Container hold down
13. Blow-off ball valve
14. Solvent chamber fill cup
15. Purge button
16. Down push buttons
17. Up push button
18. Air motor lockout valve

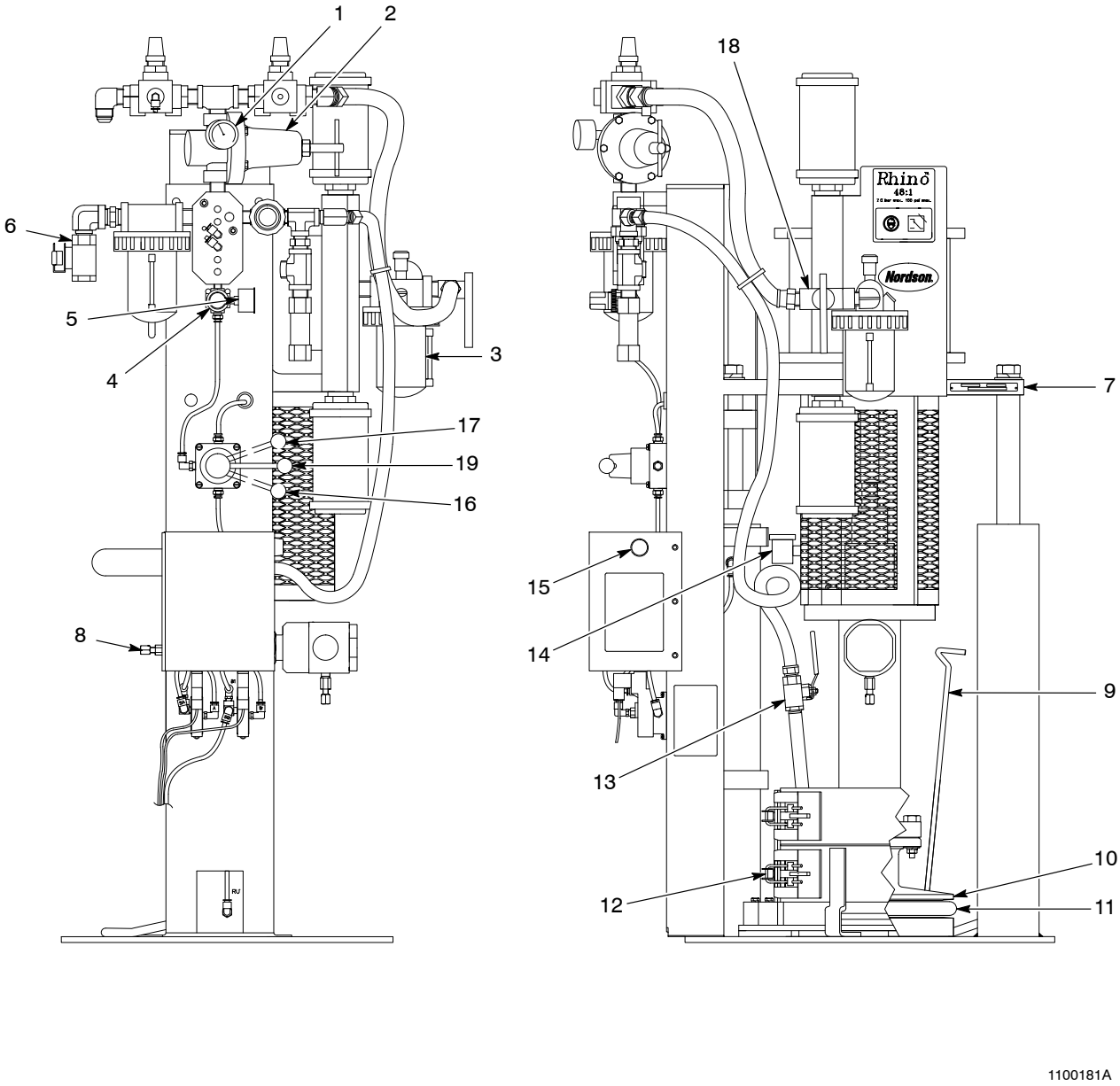

Figure 4-2 Rotary Elevator Control Pail Unloader Daily Operation Controls

1. Air motor pressure gauge
2. Air motor regulator
3. Air motor lubricator
4. Elevator control regulator
5. Elevator control gauge
6. Main air supply valve
7. Elevator
8. Bleed valve
9. Bleeder stem
10. Follower plate
11. Follower plate seal
12. Container hold down
13. Blow-off ball valve
14. Solvent chamber fill cup
15. Purge push button
16. Elevator control valve — DOWN position
17. Elevator control valve — UP position
18. Air motor lockout valve
19. Elevator control valve — NEUTRAL position

Routine Operating Procedures

The following paragraphs provide information about the various routine operating procedures for Rhino bulk unloaders. Routine operating procedures include

- daily startup
- forced changeover
- temporary shutdown
- restart after temporary shutdown
- container change
- extended shutdown
- restart after extended shutdown
- bleeding the pump

Daily Startup

See Figures 4-1 and 4-2.

1. Make sure that air pressure to the system is off. Make sure that the unloader is in the NEUTRAL position.
2. Perform the following steps:
   a. For most applications, check for material leaking past the follower plate seal(s) (11). If you need to replace the seals, refer to your pump component manual.
   b. If the container is empty, refer to the *Container Change* procedure in this section.
3. Check the solvent chamber fill cup (14) fluid level. Refer to the *Installation* section for filling instructions.
4. Check the air motor lubricator (3) fluid levels. Turn on the main air supply valve (6) to the unloader.
5. Verify that the air motor lockout valve (18) is open.
6. Initiate DOWN elevator movement at the designated unit.

   NOTE: If the pump does not pump or the wrong pump is pumping, perform the *Forced Changeover* procedures in this section until the right pump is pumping.
7. Check the air motor lubricator for the desired flow rate (one drop of lubricant for every fifteen strokes of the pump). Adjust the air motor lubricator, if necessary.
8. Check the unloader for proper pump operation. Adjust the air motor regulator (2) as necessary for the material you are pumping.
9. Refer to the *Container Change* procedures in this section to replace an empty container with a full one.

Forced Changeover

To switch operation from the active unloader when the material container is not empty, perform a forced changeover to start the inactive unloader.

Once *New Equipment Startup* has been performed, the inactive unloader must be ready for operation and the following conditions must be met at the inactive unloader. The follower plate must be

- in place,
- under downward pressure, and
- in any position other than the empty drum position.

NOTE: The inactive unloader will start if in any position other than empty drum.

To perform a forced changeover, press the empty container switch down on the unloader that is pumping. Operation will transfer to the inactive unloader. The *Installation* section details the location of the empty-container switch.

Temporary Shutdown

See Figures 4-1 or 4-2.

Any shutdown intended to last one hour or less is termed a temporary shutdown. Follow the steps below to perform a temporary shutdown.

1. Place the unloader in the NEUTRAL position.

WARNING: When you shut off the main air supply valve, the elevator is not in a locked state. The elevator and follower plate could drift downward and cause personal injury.

2. Turn off the main air supply valve (6).

NOTE: When you shut off the air supply to the unloader, air pressure to the controls is vented to atmosphere. The unloader remains in a neutral state until you turn on the main air supply valve and initiate UP or DOWN elevator movement.

Restart after Temporary Shutdown

See Figures 4-1 or 4-2.

1. Open the main air supply valve (6).
2. Initiate DOWN elevator movement until the unloader begins pumping.
3. Refer to the *Container Change* procedures in this section to replace an empty container with a full one.

Container Change

Follow these procedures to change the container of material for your Rhino bulk unloader.

See Figures 4-1 or 4-2, as indicated.

NOTE: You must bleed the pump every time that you change containers. This section contains procedures that detail how to bleed the pump.

NOTE: Not all adhesives and sealants are compatible with each other. If you are switching from dispensing one material to another, contact your Nordson representative for direction and/or assistance.

1. Place the unloader in the NEUTRAL position.
2. For unloaders that have a blow-off assembly, open the blow-off ball valve (13).
3. Close the air motor lockout valve (18).
4. Initiate elevator UP elevator movement. Air enters below the follower plate (10) and helps you to remove the follower plate from the container.

   NOTE: For unloaders with a blow-off assembly, if the container begins to rise off the unloader frame, place the elevator in the NEUTRAL position for a moment to allow the container to return to the frame. Then, resume UP elevator movement.

5. Continue UP elevator movement until the follower plate is clear of the container and the elevator (7) is raised to its maximum height. (Two-hand down elevator control unloaders shut off automatically.)

CAUTION: Be careful to watch for material spitting from the container when the follower plate is removed from the container. Failure to observe this precaution can result in personal injury.

6. For unloaders with a blow-off assembly, close the blow-off ball valve.
7. For unloaders with a container hold down (12), unlatch or disengage the hold down.
8. Remove the empty container from the unloader. For unloaders that use a special seal ring, remove the ring from the container (or from the base of the follower). Clean the ring if necessary.
9. Inspect the blow-off port and clean as necessary. This is especially important if you use your unloader for urethane applications.

CAUTION: Do not use a damaged container. A damaged container can damage the follower plate, follower plate seals, or sealing device when the follower plate is lowered.

10. Carefully inspect the new container for dents or other damage. Do not use a damaged container.
11. For unloaders that use follower plate seal(s) (11), coat the seal(s) with O-ring lubricant. Make sure that the lubricant is compatible both with the dispensing material and with the seal(s).

WARNING: Severe personal injury could result if your hands or fingers are caught between the follower plate and container. Keep your hands clear of this area.

12. Center the container under the follower plate.
13. For unloaders with a container hold down, latch or engage the hold down.
14. For unloaders with a blow-off assembly, remove the bleeder stem (9).
15. Initiate DOWN elevator movement and slowly lower the follower plate into the container. To stop the elevator, release the down push buttons, and press and release the up push button (17) (two-hand down elevator control unloaders) or place the elevator control valve in the NEUTRAL position (19).
16. For unloaders with a blow-off assembly, perform the following steps:
    a. When you see a continuous flow of material flowing from the bleeder stem fitting, stop DOWN elevator movement by placing the elevator in the NEUTRAL position.
    b. Tighten the bleeder stem.
17. Initiate DOWN elevator movement at the designated unit (for single unloaders).
18. Two-hand down elevator control auto-changeover unloaders: Press the down push buttons (16) only momentarily. Auto-changeover unloaders will not pump until a changeover is performed.
19. Bleed the pump. Refer to *Bleeding the Pump* for procedures.

Extended Shutdown

See Figures 4-1 and 4-2.

Any shutdown intended to last longer than one hour is termed an extended shutdown. Follow the steps below to perform an extended shutdown.

WARNING: When you shut off the main air supply valve the elevator is not in a locked state. The elevator and follower plate could drift downward and cause personal injury.

NOTE: When you shut off the air supply to the unloader, air pressure to the controls is vented to the atmosphere. The unloader remains in a neutral state until you turn on the main air supply valve and initiate UP or DOWN elevator movement.

1. Place the unloader in the NEUTRAL position.
2. Shut off the main air supply valve (6).
3. Trigger the gun(s) to relieve material pressure.

Restart after Extended Shutdown

To restart operation after an extended shutdown, perform the *Daily Startup* procedures in this section.

Bleeding the Pump

See Figures 4-1 and 4-2.

At low pressure, bleed the pump until all air has been removed from the pump. 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. Place a waste container beneath the bleed valve (8). Make sure that the small bleed port is pointed down. Carefully loosen the bleed valve only two or three turns.
3. Push the purge button (15) 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 every time you change containers of material.

Purge Button Locations

Some purge buttons are located in places other than where the typical unloader illustrations portray. See Figure 4-3 and refer to the following paragraphs for specific information about the purge button location and procedure for your unloader configuration.

Unloader Type	Purge Button Location
Primary Units	The purge button for all primary drum and pail unloaders is located on the pump control box (1 and 2). The purge button will activate the pump at any time. Figure 4-3 shows two-hand down elevator control primary drum unloaders and rotary elevator control primary pail unloaders, but all primary unloaders have the purge button location in common.
Secondary Units	Two-hand down elevator control secondary unloaders (drum and pail) have purge buttons located on the pump control box (1). The purge button for rotary elevator control secondary pail unloaders is located on the side of the unit, on the bracket holding the elevator control (top left corner) (3). The purge button on rotary elevator control secondary drum unloaders is located on the front of the unit, on the bracket holding the elevator control (4).
Auto-Shutdown Units	Two-hand down elevator control auto-shutdown unloaders without electric shut-off modules do not have a purge button. To purge these unloaders: 1. Make sure that the elevator is under downward pressure and the follower plate is in the container of material. 2. Then, open the bleed valve. Refer to the procedures for bleeding the pump in this section. The purge button for two-hand down elevator control auto-shutdown unloaders with electric shut-off modules is located on the side of the pump control box. Rotary elevator control auto-shutdown unloaders do not have a purge button. Raise the follower plate to de-activate the empty-container switch.

Purge Button Locations *(contd)*

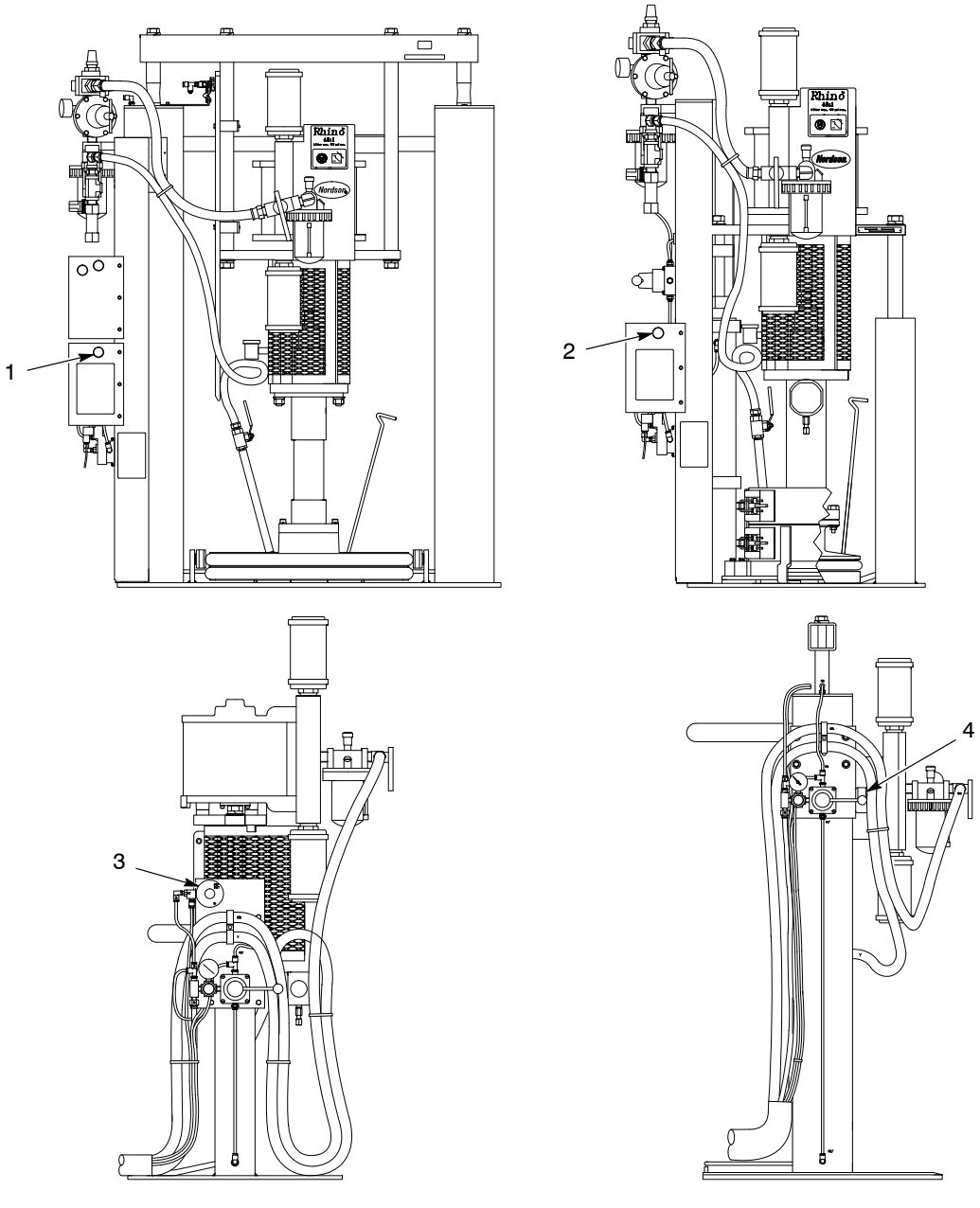

Figure 4-3 Purge Button Locations

1. Two-hand down elevator control drum primary and secondary unloaders (pail primary and secondary unloaders are common)
2. Rotary elevator control pail primary unloaders (drum primary unloaders are common)
3. Rotary elevator control pail secondary unloaders
4. Rotary elevator control drum secondary unloaders

Section 5
Maintenance

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

Introduction

Table 5-1 details the recommended preventive maintenance procedures for the unloader. Additional maintenance procedures are found in the individual component manuals for the pump, air motor, frame, and additional components.

Table 5-1 Recommended Maintenance Procedures

Frequency	Component	Maintenance Task
Daily	Unloader	Visually inspect the unit. Check all hydraulic and pneumatic connections and tighten them if required. Inspect all pneumatic tubing for bends or kinks.
Weekly	Filter stand	If you have a material filter installed in your system, check and change the filter element, as needed. Refer to the *Filter Element Change* operator's card.
	Unloader	Inspect the unloader. Clean any material from the top of the follower plate and around the follower plate seals. Clean the top of each unloader cylinder.

Section 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.

Troubleshooting specific to the pump and dispensing gun can be found in their separate component manuals.

Problem	Possible Cause	Corrective Action
1. Elevator not working	Malfunctioning elevator control regulator, or damaged push buttons or valves	Use your system pneumatic schematics to complete pneumatic troubleshooting. Contact your Nordson representative if you need additional information or assistance.
	Elevator air cylinder seals worn or damaged, or piston binding in cylinder	If problem was not solved in pneumatic troubleshooting, rebuild air cylinders.
2. Blow-off assembly not working	Failed relief valve (air leaking from valve)	Replace relief valve
	No supply air pressure present	**Two-hand down elevator control unloaders:** Check air supply. Open blow-off ball valve. Press and hold up push button when operating blow-off assembly. Release push button so that air can gather under follower plate.
		Rotary elevator control unloaders: Check air supply. Make sure that blow-off ball valve is open. Place elevator control valve in UP position. When the container rises from the base, place the elevator control valve in NEUTRAL position so that air can gather under follower plate.
		If no air flow, proceed to the next step.
	Clogged adapter tube of follower plate	Shut off air to the system. Remove blow-off hose and clean adapter tube.

Continued...

Problem	Possible Cause	Corrective Action
3. Pump not delivering material	Insufficient air pressure to pump	Increase air pressure to pump air motor.
	Follower plate not in contact with material	**Two-hand down elevator control unloaders:** Press and hold two down push buttons simultaneously. Do not release push buttons until the pump starts. **Rotary elevator control unloaders:** Make sure you have placed elevator control valve in the DOWN position. The unloader should begin to pump material.
	Air pocket in pump	Carefully bleed pump as noted in *Operation* section of this manual.
	Blocked hydraulic system or follower plate	Perform the following steps: 1. Cycle pump. Slowly open bleed valve only two or three turns. If material exits valve, close valve and go to step 2. If no material exits valve, close valve; shut down system; relieve system pressure. Remove and rebuild pump. 2. Shut down pump. Relieve system pressure. Disconnect hose from pump. Check hose for blockage. If hose is not blocked, go to step 3. If hose is blocked, clean or replace hose. 3. Remove gun from hose. Check gun for blockage. If gun is blocked, clean it. If gun is damaged, rebuild or replace gun as necessary.

Section 7
Repair

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

WARNING: Standard A- and B-Unit Rhino unloaders operate in a dual unloader configuration. You must be aware of the air/hydraulic pressures in both unloaders when servicing. Shut off and lock out various components as directed. Failure to observe this warning may result in serious personal injury or death.

Introduction

Specific operating instructions for the unloader controls are in the *Operation* section. This section covers basic repair guidelines for the standard A- and B-Unit Rhino unloaders as well as specific procedures for preparing Rhino unloaders for further repair. For dispensing gun, air valve, air motor, pump, and frame repair information, refer to the specific component manuals.

NOTE: Faulty hoses are not field-repairable. You must replace them if they are damaged.

Removing the Hydraulic Section

WARNING: Your system should be idle before attempting to prepare the unloader for hydraulic section removal. Failure to observe this warning can result in serious personal injury or death.

See Figures 7-1 and 7-2.

To perform the repair procedures in the pump manual, you must remove the pump (hydraulic section) from the unloader frame. Follow these procedures to prepare the system for pump removal:

Removing the Hydraulic Section *(contd)*

NOTE: Follow the procedures in the pump manual to remove the follower and the hydraulic section from the air motor.

1. Close the air motor lockout valve (6).
2. Close the material valve input to filter/mastic manifold stand.

   NOTE: The bleed stem must be in place when depressurizing the pump.

3. Depressurize the pump with the pump bleed valve (1).
4. Remove the container of material. Refer to the *Container Change* procedures in the *Operation* section.
5. Place wooden blocks on the unloader frame. Make sure that the blocks will not tip over and are high enough to keep the follower plate from contacting the container hold down shoes (13) (drum unloaders).
6. Lower the follower plate (2) until it is firmly settled on the wooden blocks.
7. Place and leave the elevator in the NEUTRAL position.
8. Turn on low pressure at the air motor lockout valve to stroke the pump and to gain access to the coupling. You may need to use the purge feature if the air logic is controlling the opposite unloader (in a dual unloader configuration).
9. Turn off the valve when you can access the coupling.
10. Turn off the main air supply valve (11).

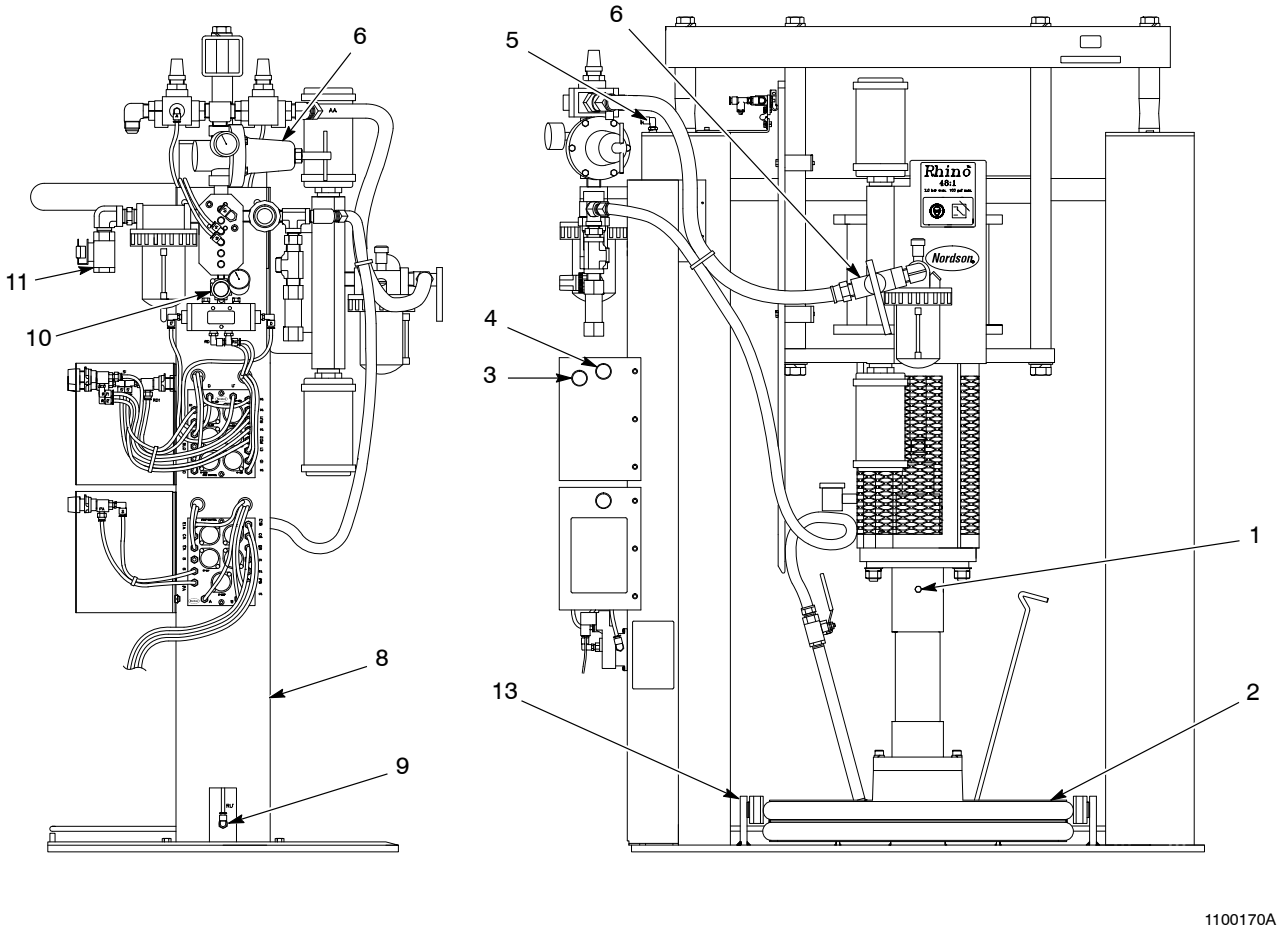

Figure 7-1 Drum Unloader Components

1. Bleed valve
2. Follower plate
3. Down push buttons
4. Up push button
5. Elbow
6. Air motor lockout valve
7. Air motor regulator
8. Left air cylinder
9. Elbow
10. Elevator control regulator
11. Main air supply valve
12. (Not used)
13. Container hold down (shoe)

Removing the Hydraulic Section *(contd)*

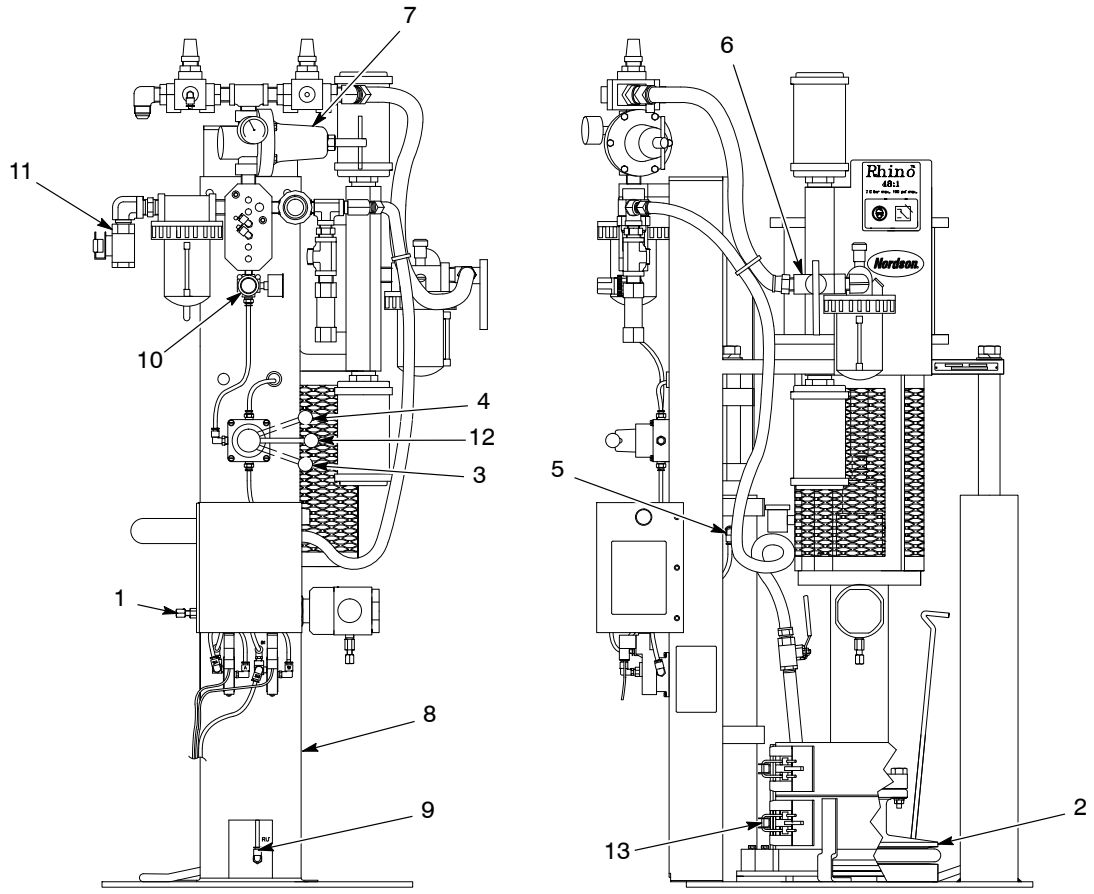

Figure 7-2 Pail Unloader Components

1. Bleed valve
2. Follower plate
3. DOWN position
4. UP position
5. Elbow
6. Air motor lockout valve
7. Air motor regulator
8. Left air cylinder
9. Elbow
10. Elevator control regulator
11. Main air supply valve
12. NEUTRAL position
13. Container hold down (clap)

Bleeding Air Pressure from the Air Cylinders

To prepare the air cylinders for the rebuild procedures located in the frame manual, you must relieve all the air pressure in the cylinders.

WARNING: The unloader frame can stay under pressure even when the unloader is disconnected. Be cautious and aware that air remains in the cylinders until it is bled. Otherwise, serious personal injury can result.

See Figures 7-1 and 7-2.

Follow these procedures to isolate the air cylinders from all air pressure.

1. Shut off air motor lockout valve (6).
2. **Pail Unloaders**: Open the container hold down clap (13).
3. Remove the container of material from the unit. Refer to the *Container Change* procedures in the *Operation* section.
4. Place wood blocks on the base of the frame beneath the follower plate (2). Lower the elevator until the follower plate makes contact with the wood blocks.

   Drum Unloaders: The blocks should be high enough to keep the follower plate from contacting the hold down shoes.
5. Use the directional valve (elevator control valve or push buttons) to bleed all air from both the top and bottom of the elevator pistons. To do this,

   NOTE: For future reference, note the settings of the pneumatic controls regulator and the air motor regulator and the orientation of the cylinder heads.

   a. Set the elevator control regulator (10) and the air motor regulator (7) to 0 bar/psi and disconnect the main air supply.

   b. Place the elevator control valve in the UP position (4) or press the up push button (4) until any remaining air bleeds from below the air cylinder piston.

   c. Place the elevator control valve in the DOWN position (3) or press the down push button (3) until all air bleeds from above the air cylinder piston.

   NOTE: The elevator should not rise at this point when in the UP position.

WARNING: Secure the air tubing from movement when disconnected to bleed air from the air cylinders. Failure to observe this warning can result in personal injury.

6. Disconnect the push-lock air tubing from the elbows at the bottom (9) and top (5) of the left air cylinder (8). Bleed air from the cylinder separately and wait for the pressure to escape.
7. **Pail Unloaders**: Remove any device or bracket attached to the top of the air cylinder head.

Reinstating Air Pressure to the Cylinders

See Figures 7-1 and 7-2.

Follow these procedures to reinstate air pressure to the air cylinders and return your unloader to operation.

Follow these procedures to reassemble the air cylinders.

1. Reinstall the air tubing on the bottom elbow (9) and top elbow (5) in the left air cylinder (8).
2. **Pail Unloaders**: Install any device or bracket that was removed from the top of the air cylinder head.
3. Place the unloader in the NEUTRAL position. Reconnect the main air supply.
4. Turn the elevator control regulator (10) and the air motor regulator (7) to the settings you noted in step 4 of *Air Cylinder Disassembly*.
5. Remove the wood blocks from beneath the follower plate.
6. Replace the container of material. Refer to the *Container Change* procedures in the *Operation* section.

Section 8
Parts

Introduction

To order parts, call the Nordson Customer Service Center or your local Nordson representative. Use this five-column 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
—	0000000	Assembly	1	
1	000000	• Subassembly	2	A
2	000000	• • 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.

Two-Hand Down Elevator Control Pneumatic Components

See Figures 8-1 and 8-2.

Item	Part	Description	Quantity	Note
1	164636	Valve, three-way, normally-closed	2	
2	901379	Follower, cam	1	
3	186549	Stop, empty drum	1	
4	282784	Channel	1	
5	282785	Clamps, channel, 1.50 ID	2	
6	182193	Guard, manifold-to-air valve	1	A
7	249148	Cover, air valve	1	A
8	124799	Lubricator, air motor, $^3/_4$	1	
9	282792	Guard, coupling	1	A
10	282796	Filler cup	1	
11	- - - - - -	Channel, support	1	B
12	282781	Cover, three hole	2	
13	223325	Module, pump control, changeover	AR	C
14	282790	Push-button	4	
15	282789	Adapter, push-button-to-valve	4	
16	164636	Valve, three-way, normally-closed	4	
NS	900464	Adhesive, threadlocking, 50 ml	AR	
NS	900481	Sealant, pipe/thread/hydraulic, PST, 50 ml	AR	
NS	900214	Oil, vitalizer, 1 pint	AR	

NOTE A: These parts optional for two-hand down elevator control unloaders sold within the United States.

B: See Figure 8-5 through 8-6 and their accompanying parts lists to determine the appropriate channel support for your unloader.

C: This part available for use with dual unloader assemblies only.

AR: As Required

NS: Not Shown

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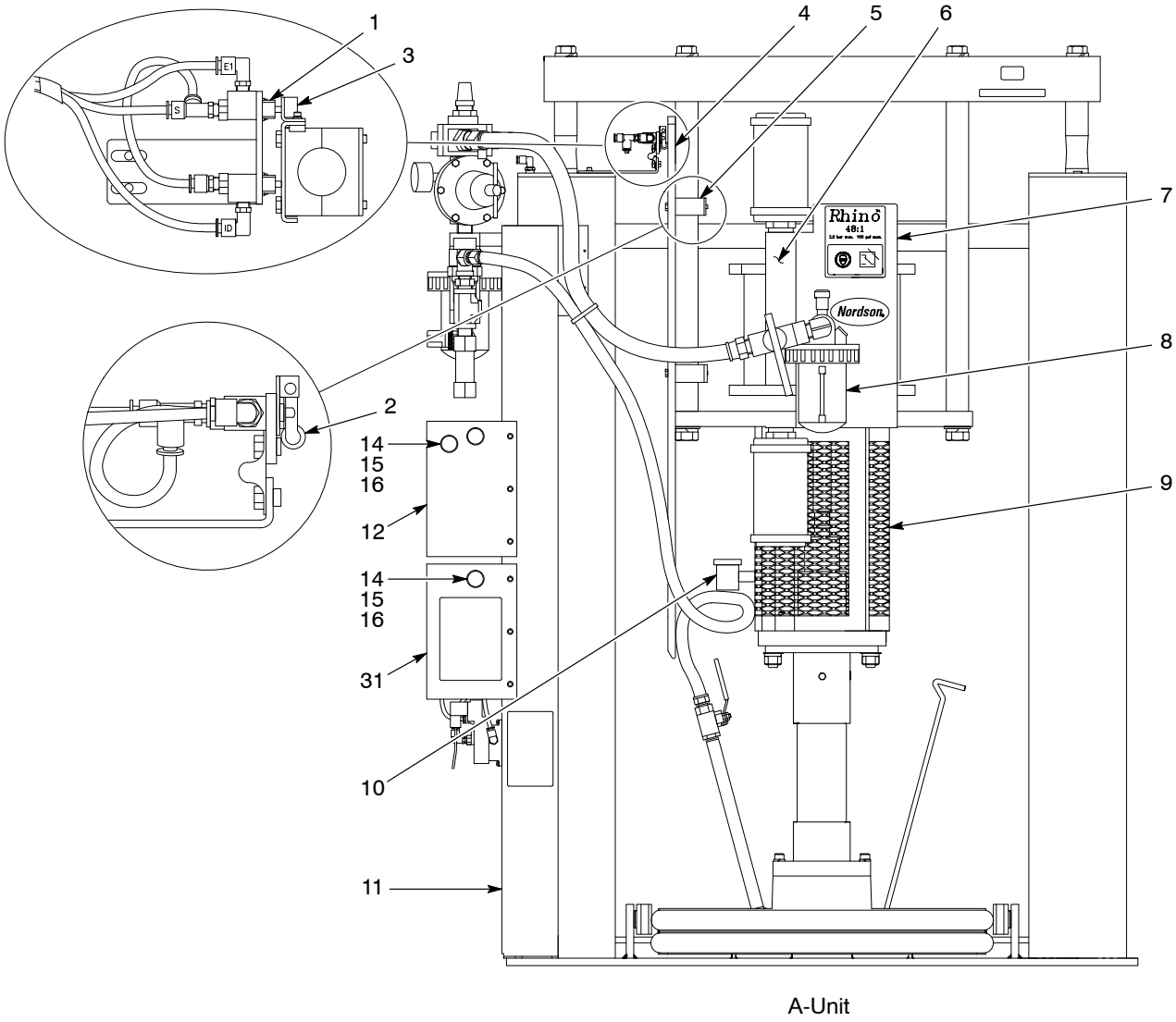

Figure 8-1 Two-Hand Down Elevator Control Pneumatic Components, Front View

Two-Hand Down Elevator Control Pneumatic Components *(contd)*

See Figures 8-1 and 8-2.

Item	Part	Description	Quantity	Note
17	223324	Module, ram control	1	
18	164643	Valve, relief, $^3/_4$ NPT, 20 psi	AR	D
19	282791	Valve, four-way	1	
20	272556	Muffler, low profile, $^1/_4$ NPT	2	
21	127767	Regulator, 0–60 psi, $^1/_8$ NPT	1	
22	901245	Gauge, 0–100 psi, $^1/_8$ NPT	1	
23	282776	Valve, $^3/_4$-in. NPT, lockout	AR	
24	124798	Filter, $^3/_4$-in. NPT	1	
25	282777	Manifold, pneumatic	AR	C
26	296383	Regulator, preset, $^3/_8$ NPT, 7.5 psi	AR	A, D
26	164637	Regulator, preset, $^3/_8$ NPT, 15 psi	1	E
27	124800	Regulator, air motor, $^3/_4$ NPT	1	
28	124791	Gauge, 0–160, $^1/_4$ NPT	1	
29	186466	Valve, three-way, $^3/_4$ NPT	AR	
30	124851	Muffler, $^3/_4$ NPT	AR	
31	186495	Cover, one-hole	1	

NOTE A: These parts optional for two-hand down elevator control unloaders sold within the United States.
C: This part available for use with dual unloader assemblies only.
D: This part available for use only with unloaders equipped with a blow-off assembly.
E: This part available for two-hand down elevator control unloaders sold within the United States only.

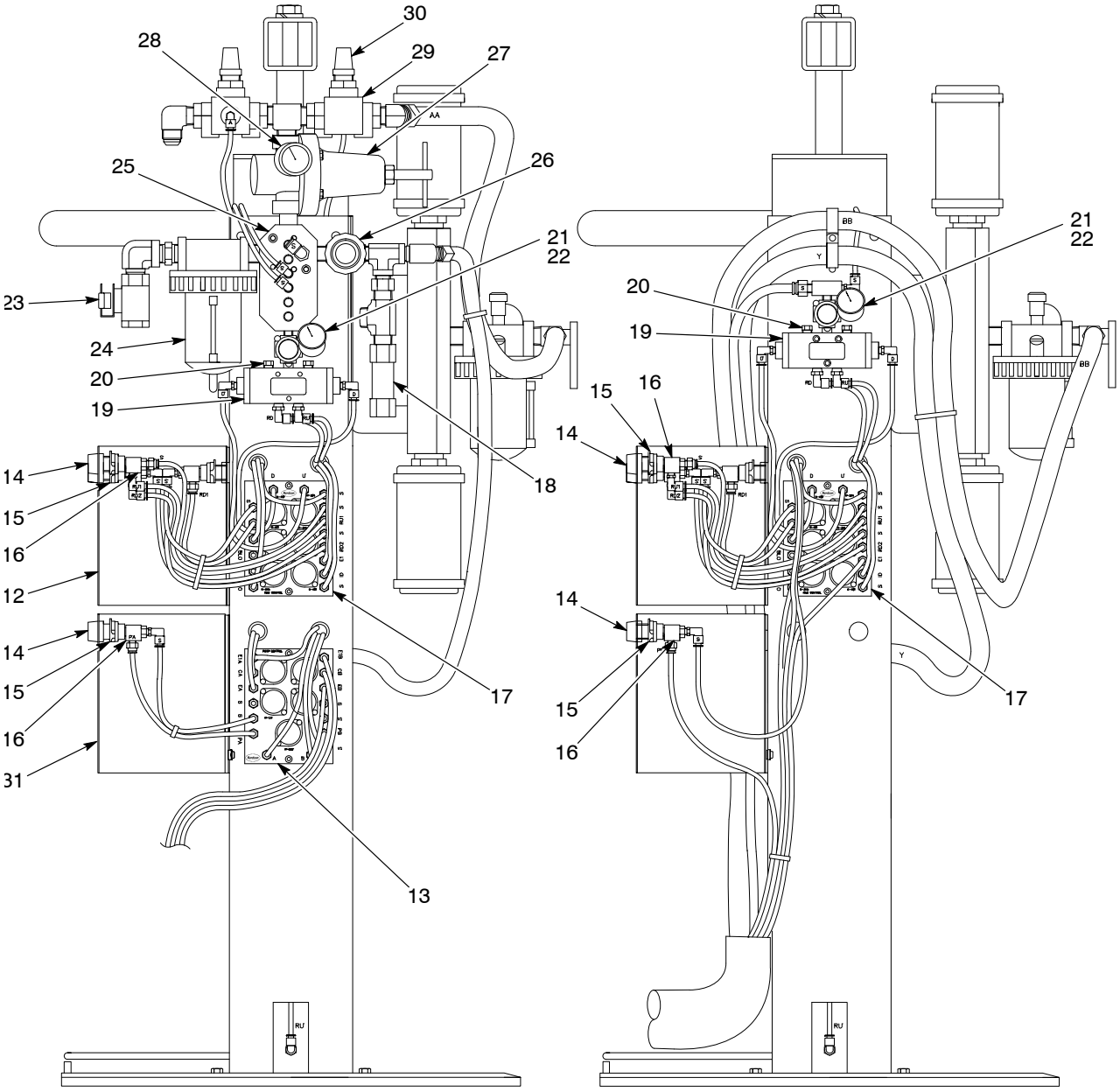

Figure 8-2 Two-Hand Down Elevator Control Pneumatic Components, Side View

Rotary Elevator Control Pneumatic Components

See Figures 8-3 through 8-4.

Item	Part	Description	Quantity	Note
1	164636	Valve, three-way, normally-closed	2	
2	901379	Follower, cam	1	
3	186549	Stop, empty drum — for drum	1	
3	221698	Stop, empty drum — for pail	1	
4	230566	Bracket, rotary, drum, limit switch	1	
4	221698	Stop, limit switch, pail	1	A
5	282785	Clamps, channel, 1.50 ID	2	
6	182193	Guard, manifold-to-air valve	1	
7	249148	Cover, air valve	1	
8	124799	Lubricator, air motor, $^{3}/_{4}$	1	
9	282792	Guard, coupling	1	
10	282796	Filler cup	1	
11	- - - - - -	Channel, support	1	B
12	124797	Valve, rotary, 3 position, $^{1}/_{4}$ ports	1	
13	223325	Module, pump control, changeover	AR	C
14	282790	Push-button	4	
15	282789	Adapter, push-button-to-valve	4	
16	164636	Valve, three-way, normally-closed	4	
NS	900464	Adhesive, threadlocking, 50 ml	AR	
NS	900481	Sealant, pipe/thread/hydraulic, PST, 50 ml	AR	
NS	900214	Oil, vitalizer, 1 pint	AR	

NOTE A: Illustration is for reference only. See Figure 3-6, item 1, for the exact location of this part.

B: See Figure 8-5 through 8-6 and their accompanying parts lists to determine the appropriate channel support for your unloader.

C: This part available for use with dual unloader assemblies only.

AR: As Required

NS: Not Shown

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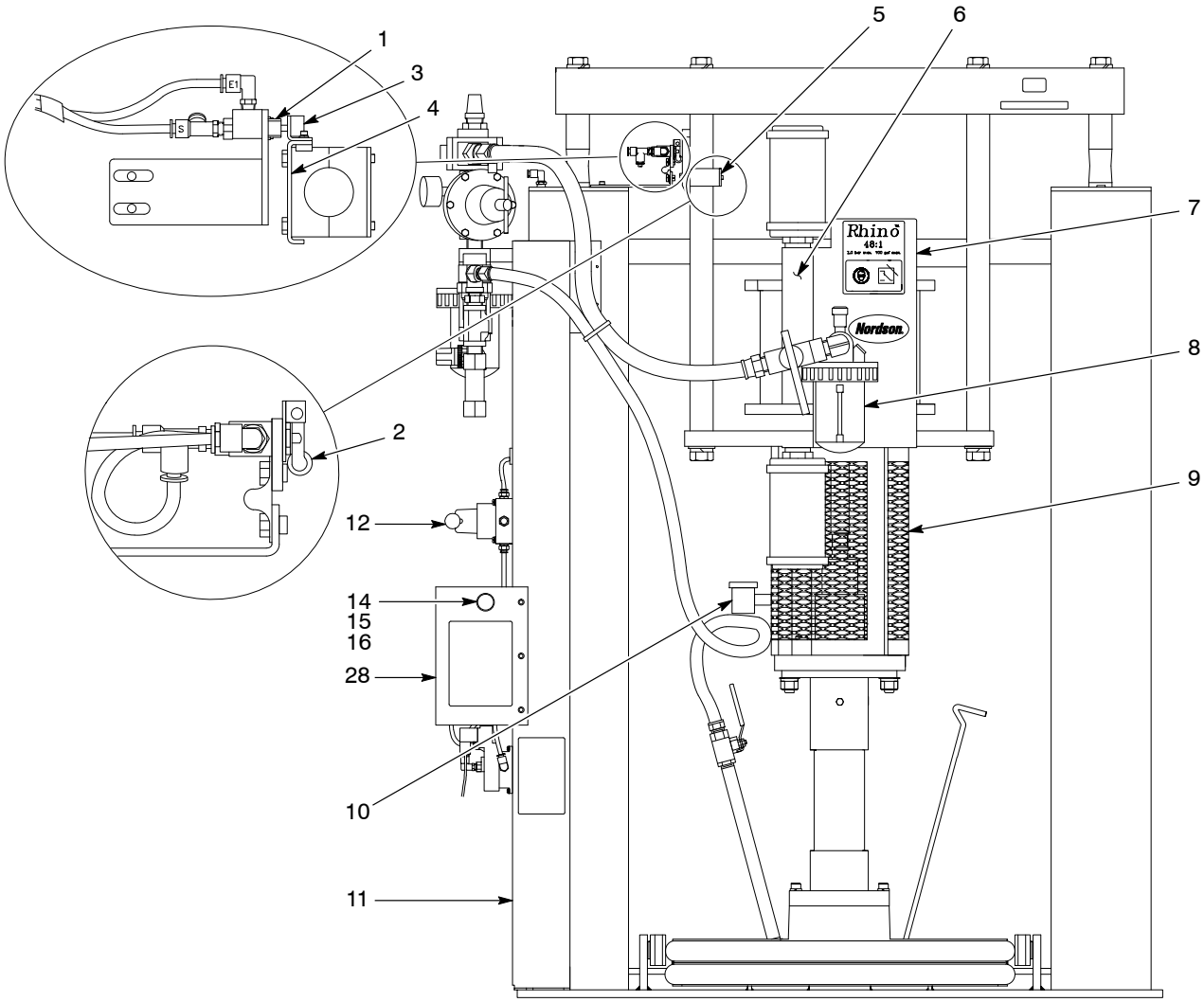


Figure 8-3 Rotary Elevator Control Pneumatic Components, Front View

Rotary Elevator Control Pneumatic Components *(contd)*

See Figures 8-3 through 8-4.

Item	Part	Description	Quantity	Note
17	164643	Valve, relief, $^3/_4$ NPT, 20 psi	AR	D
18	127767	Regulator, 0–60 psi, $^1/_8$ NPT	2	
19	901245	Gauge, 0–100 psi, $^1/_8$ NPT	2	
20	282776	Valve, $^3/_4$-in. NPT, lockout	AR	
21	124798	Filter, $^3/_4$-in. NPT	1	
22	282777	Manifold, pneumatic	AR	C
23	296383	Regulator, preset, $^3/_8$ NPT, 7.5 psi	AR	D
23	164637	Regulator, preset, $^3/_8$ NPT, 15 psi	1	
24	124800	Regulator, air motor, $^3/_4$ NPT	1	
25	124791	Gauge, 0–160, $^1/_4$ NPT	1	
26	186466	Valve, three-way, $^3/_4$ NPT	AR	
27	124851	Muffler, $^3/_4$ NPT	AR	
28	186495	Cover, one-hole	1	

NOTE C: This part available for use with dual unloader assemblies only.
D: This part available for use only with unloaders equipped with a blow-off assembly.
AR: As Required

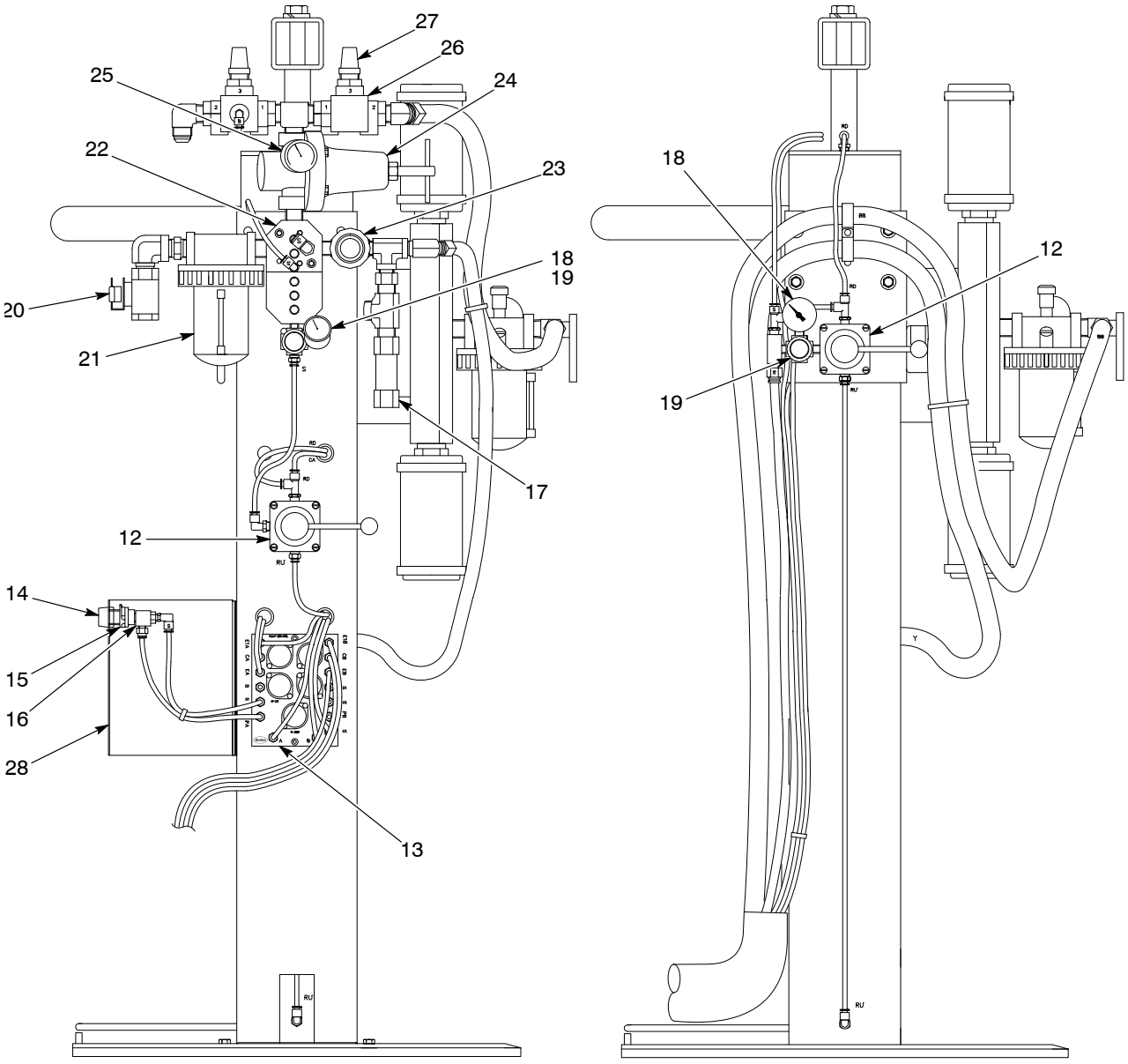


Figure 8-4 Rotary Elevator Control Pneumatic Components, Side View

Channel Support Assemblies (Drum)

See Figure 8-5.

The following channel support assembly is used for two-hand down elevator control drum unloaders (basic, auto-shutdown, primary, and secondary units), and for rotary elevator control drum unloaders (basic, auto-shutdown, and primary units).

Item	Part	Description	Quantity	Note
—	186706	Module, support, pneumatic, drum	1	
1	981402	• Screw, hex head, $^3/_8$-16 x 0.75, large	6	A
2	983061	• Washer, $^3/_8$	6	A
3	282775	• Support, channel	1	
4	983160	• Washer, lock, $^3/_8$	4	
NS	900464	• Threadlocking adhesive, removable	AR	

NOTE A: Coat this part with removable threadlocking adhesive, part 900464, when assembling.
AR: As Required
NS: Not Shown

See Figure 8-5.

The following channel support assembly is used for rotary elevator control drum unloaders (secondary units).

Item	Part	Description	Quantity	Note
—	186707	Module, support, rotary, drum-B	1	
1	983061	• Washer, $^3/_8$	4	A
2	983160	• Washer, lock, $^3/_8$	4	A
3	221697	• Support, bracket	1	
NS	900464	• Threadlocking adhesive, removable	AR	

NOTE A: Coat this part with removable threadlocking adhesive, part 900464, when assembling.
AR: As Required
NS: Not Shown

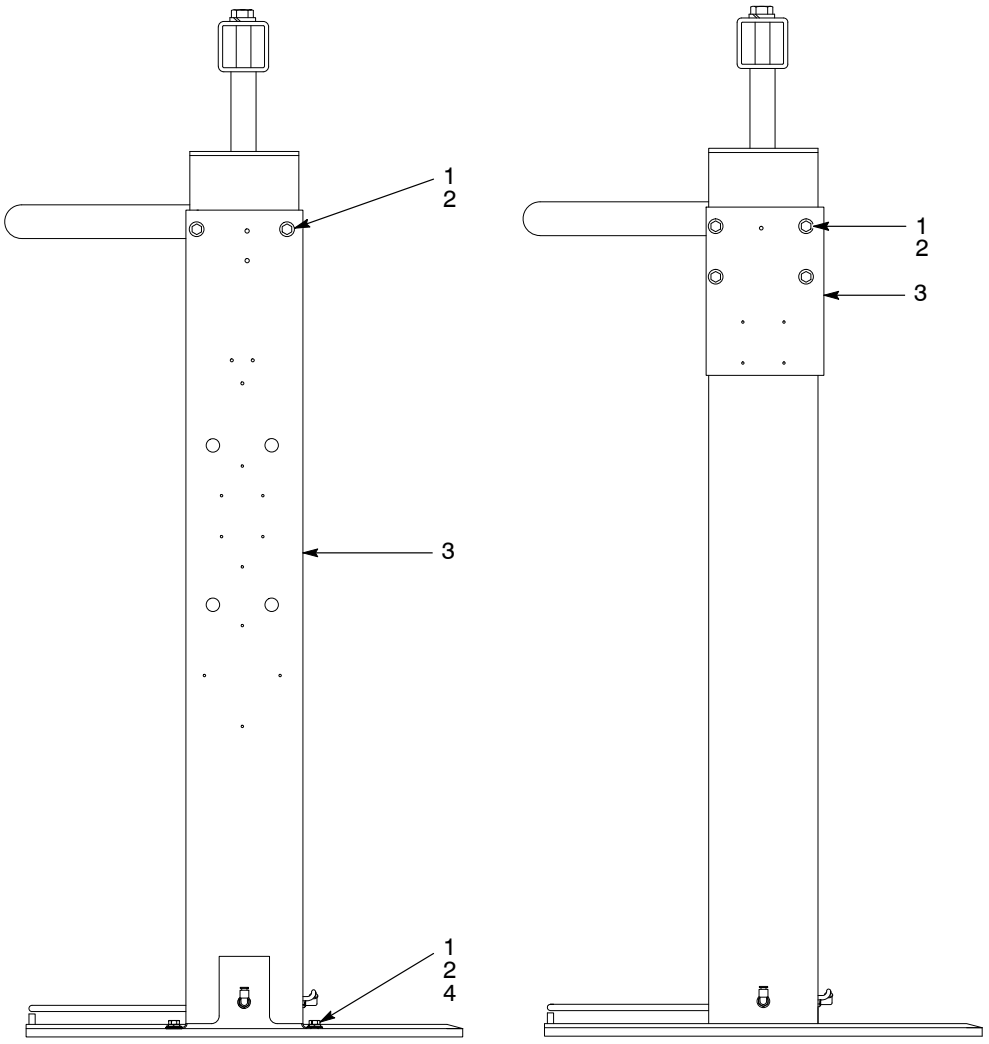


Figure 8-5 Channel Support Assembly (1 of 2)

Channel Support Assemblies (Pail)

See Figure 8-6.

The following channel support assembly is used for two-hand down elevator control pail unloaders (basic, auto-shutdown, primary, and secondary units), and for rotary elevator control pail unloaders (basic, auto-shutdown, and primary units).

Item	Part	Description	Quantity	Note
—	221794	Module, support, pneumatic, pail	1	
1	186545	• Clamp, 4 ID, rework	2	
2	983013	• Washer, flat, M8	4	A
3	982035	• Screw, socket head, cap, M8 x 16, large	4	A
4	982429	• Screw, flat head, M6 x 14, large	6	B
5	186548	• Bracket, clamp, pneumatic support	2	
6	186740	• Support, channel	1	
NS	900464	• Threadlocking adhesive, removable	AR	
NS	900439	• Threadlocking adhesive	AR	

NOTE A: Coat this part with removable threadlocking adhesive, part 900464, when assembling.
B: Coat this part with threadlocking adhesive, part 900439, when assembling.
AR: As Required
NS: Not Shown

See Figure 8-6.

The following channel support assembly is used for rotary elevator control pail unloaders (secondary units).

Item	Part	Description	Quantity	Note
—	186741	Module, support, rotary pail, B-Unit	1	
1	186545	• Clamp, 4 ID, plate support	2	
2	186740	• Bracket, pneumatic, rotary pail, B	1	

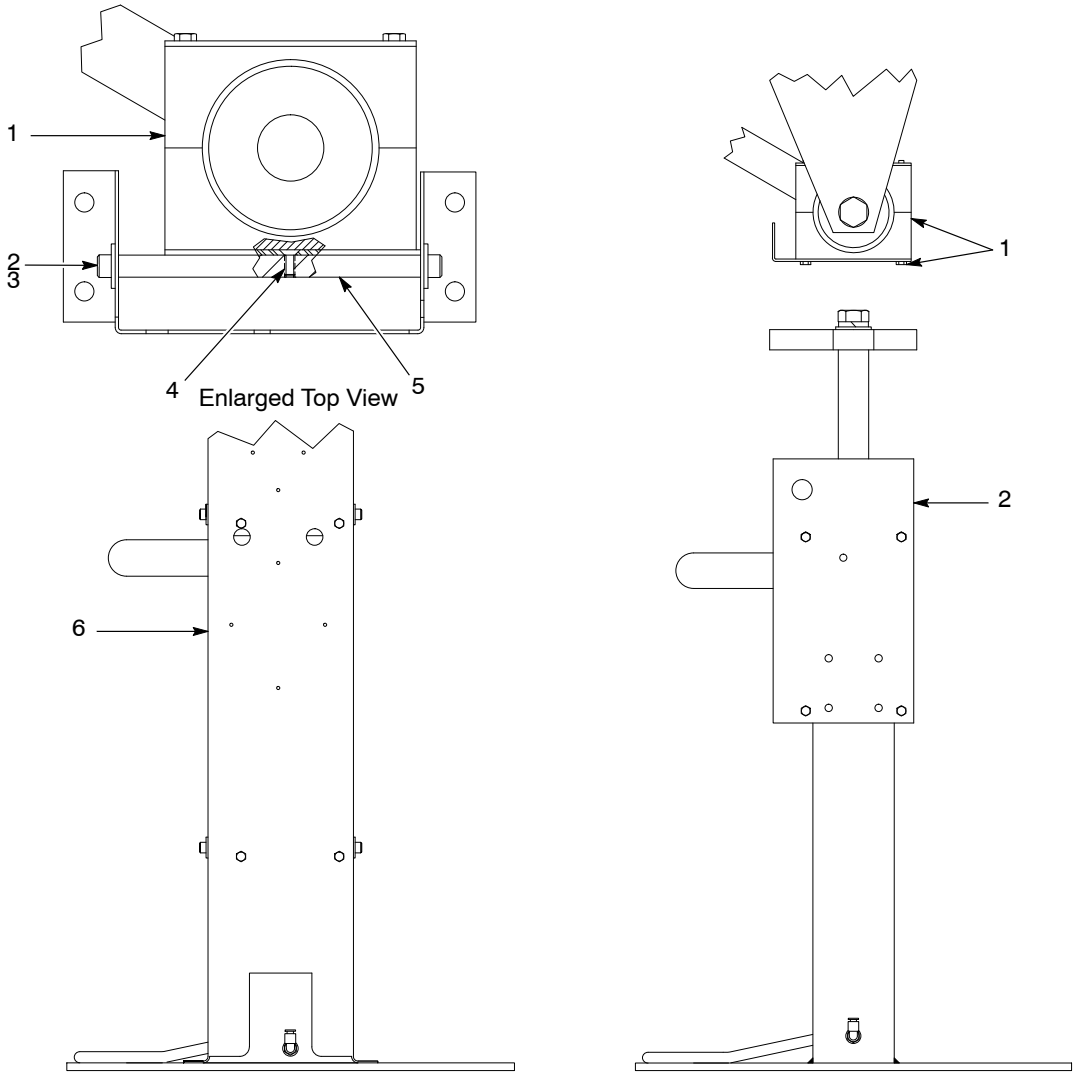


Figure 8-6 Channel Support Assembly (2 of 2)

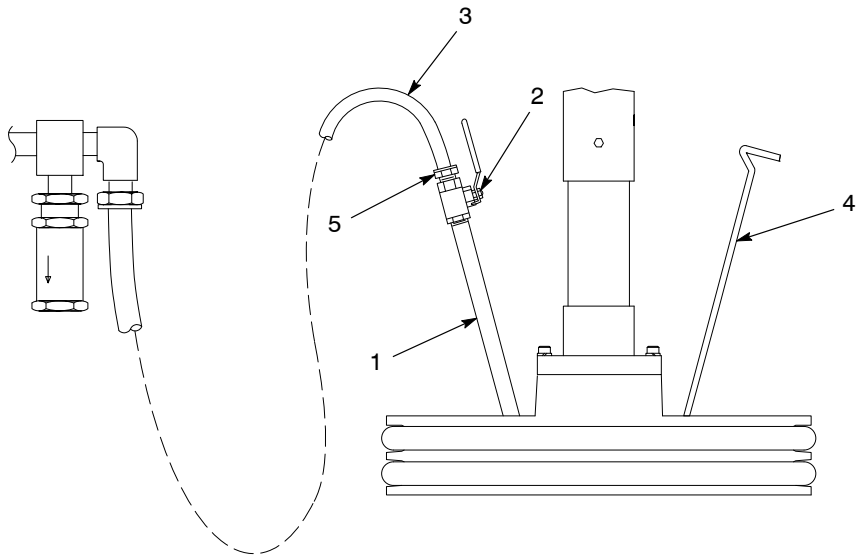
Blow-Off Assembly and Bleeder Stem Components

See Figure 8-7.

This illustration is for all standard unloaders that use a blow-off assembly.

Item	Part	Description	Quantity	Note
1	973453	Nipple, $^1/_2$ NPT x 12 long	1	
2	901151	Valve, $^1/_2$ NPT ball	1	
3	281858	Hose, $^1/_2$ OD, Push-Lok, (per foot)	AR	A
3	124792	Hose, $^3/_4$ OD, Push-Lok, (per foot)	AR	B
4	124786	Stem, bleeder	1	
5	972852	Fitting, barbed, $^3/_4$ in.	1	
NS	972708	Fitting, $^1/_2$ NPT, $^1/_2$ hose — primary	1	
NS	972366	Adapter, $^3/_4$ to $^1/_2$ in..	1	C
NS	900341	Lubricant, Never-Seez, 16-oz can	AR	

NOTE A: This hose is used with primary units.
B: This hose is used with secondary units.
C: This adapter connects the hose to the ball valve in secondary units only.
AR: As Required
NS: Not Shown



1100193A

Figure 8-7 Blow-Off Assembly

Section 9
Options

Introduction

This section contains part numbers and ordering information for the various options available for the unloader assembly. Check your unloader configuration code to determine the options installed on your unloader. Refer to the *Description* section in Part A of this manual for configuration information. Use the parts lists to order parts only if you already have them installed on your unloader. If you want to add an option that was not originally part of your unloader configuration, contact your Nordson Corporation representative for assistance.

Filter Kits

Certain Rhino unloaders are installed with a material filter mounted on a separate stand. This filter contains an element that must be changed periodically. Select the proper gauge mesh from the parts list below when ordering filter replacement kits.

Part	Description	Note
169015	Kit, element, with O-rings, 20 mesh	
149160	Kit, element, with O-rings, 30 mesh	
178491	Kit, element, with O-rings, 60 mesh	
1607906	Kit, element, with O-rings, 0.40 stab point	

Container Hold Down Kits

Container hold down brackets hold the container (drum or pail) in place during elevator UP movement.

Drum Hold Down Kit

See Figure 9-1. Only one side of the frame assembly is shown.

Item	Part	Description	Quantity	Note
—	282774	Kit, drum hold down	1	A
1	230607	• Screw, shoulder	4	
2	807230	• Spring	4	
3	807231	• Holder, drum	2	
4	807232	• Cover	2	
5	981014	• Screw, pan head, #4-40 x 0.250	4	
6	- - - - - -	Flange, frame assembly	2	B

NOTE A: If your old drum hold down kit used washers, discard them before installing the new hold down kit.
B: The flanges are part of the frame assembly. Only one flange is shown in Figure 9-1.

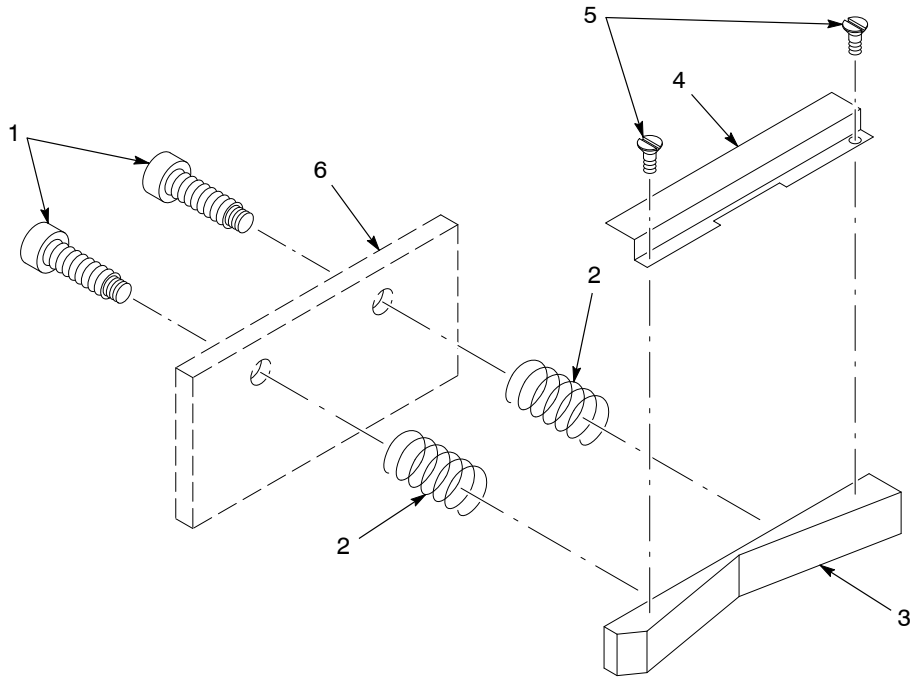


Figure 9-1 Drum Hold Down Kit

Pail Hold Down Kits

See Figures 9-2 or 9-3.

Refer to Table 9-1 and to the Parts Cluster A and Parts Cluster B parts lists for ordering information. Order your hold down kit according to the size of your follower plate, the elevator control type, and the frame size of the unloader frame.

Table 9-1 Pail Hold Down Kit Selection

Part	Size and Type of Hold Down Kit	Hold Down	Parts Cluster A	Parts Cluster B
223389	Clam, 280 mm, small, rotary elevator control	X		
223364	Clam, 280 mm, large, rotary elevator control	X		X
186536	Clam, 280 mm, small, two-hand down elevator control	X	X	
223360	Clam, 280 mm, large, two-hand down elevator control	X	X	X
221985	Clam, 286 mm, small, rotary elevator control	X		
221984	Clam, 286 mm, large, rotary elevator control	X		X
223387	Clam, 286 mm, small, two-hand down elevator control	X	X	
221973	Clam, 286 mm, large, two-hand down elevator control	X	X	X
223390	Clam, 305 mm, small, rotary elevator control	X		
223363	Clam, 305 mm, large, rotary elevator control	X		X
223388	Clam, 305 mm, small, two-hand down elevator control	X	X	
223358	Clam, 305 mm, large, two-hand down elevator control	X	X	X

Hold Down Parts

See Figures 9-2 or 9-3.

Kits that include a hold down only are intended for use with rotary elevator control unloaders.

Item	Part	Description	Quantity	Note
1	- - - - - -	Hold down	1	A
NOTE A: Hold downs are different based on the follower plate size. Refer to Table 9-1 to order the proper kit for your application and you will receive the correct hold down.				

Parts Cluster A

See Figure 9-2. Pail hold down kits that include these parts are used with two-hand down elevator control unloaders.

Item	Part	Description	Quantity	Note
2	972119	Elbow, male, $^1/_4$ tube x $^1/_8$ NPT	2	
3	164636	Switch, limit, $^1/_8$ NPT	1	
4	186534	Bracket, valve, pail hold down	1	
5	984706	Nut, hex, m5, steel, zinc	2	
6	983401	Washer, lock, m, split, m5, steel, zinc	2	
7	983408	Washer, flat, m, narrow, m5, steel, zinc	6	
8	982495	Screw, flat, socket, m5 x 12, bl	2	
9	901379	Actuator, cam follower 11925	1	

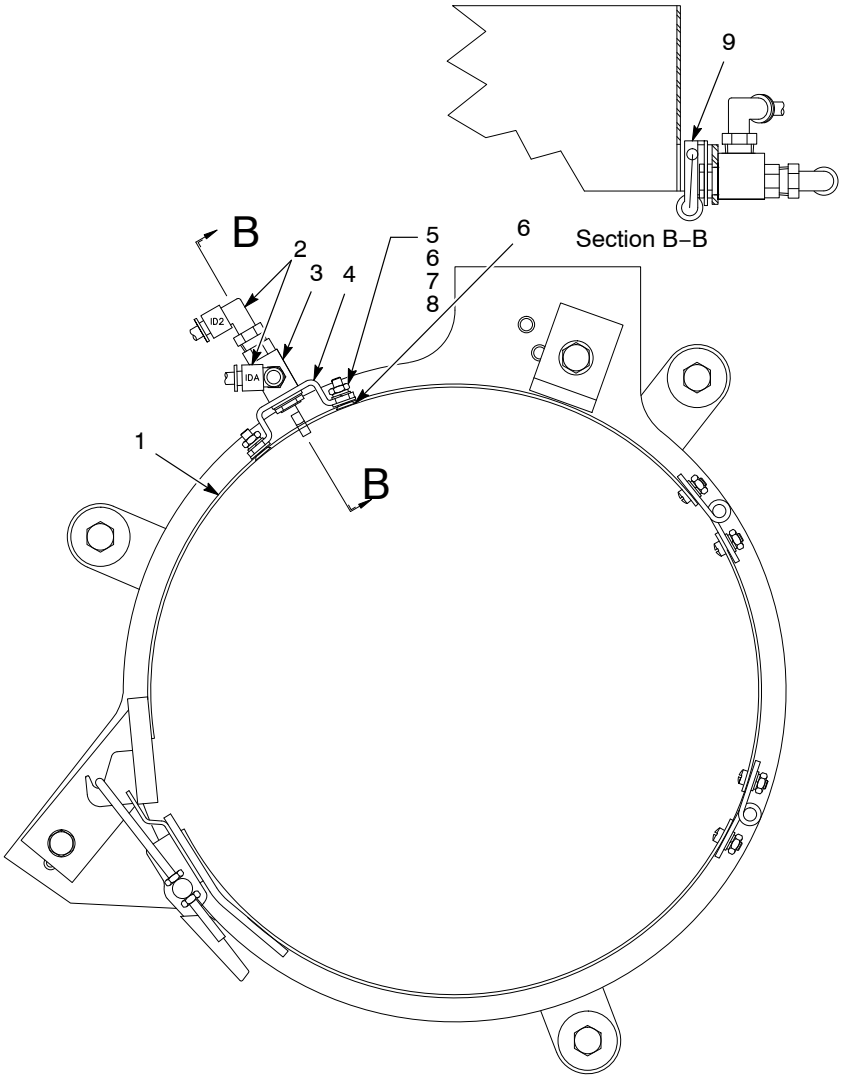


Figure 9-2 Parts Cluster A Components (and Hold Down)

Parts Cluster B

See Figure 9-3.

Pail hold down kits that include these parts are used when attaching a small (pail-size) container to a large (drum-size) frame.

Item	Part	Description	Quantity	Note
2	981482	Screw, hex, $^5/_8$-18 x 1.500, zinc, g8	4	
3	983440	Washer, lock, e, split, $^5/_8$, steel, nickel	4	
4	983090	Washer, flat, e, 0.656 x 1.312 x 0.095, z	4	
5	144815	Spacer, 1.50 OD x 0.687 ID x 0.38 thick	4	
6	144772	Plate, pail hold-down, 55 rhino	1	

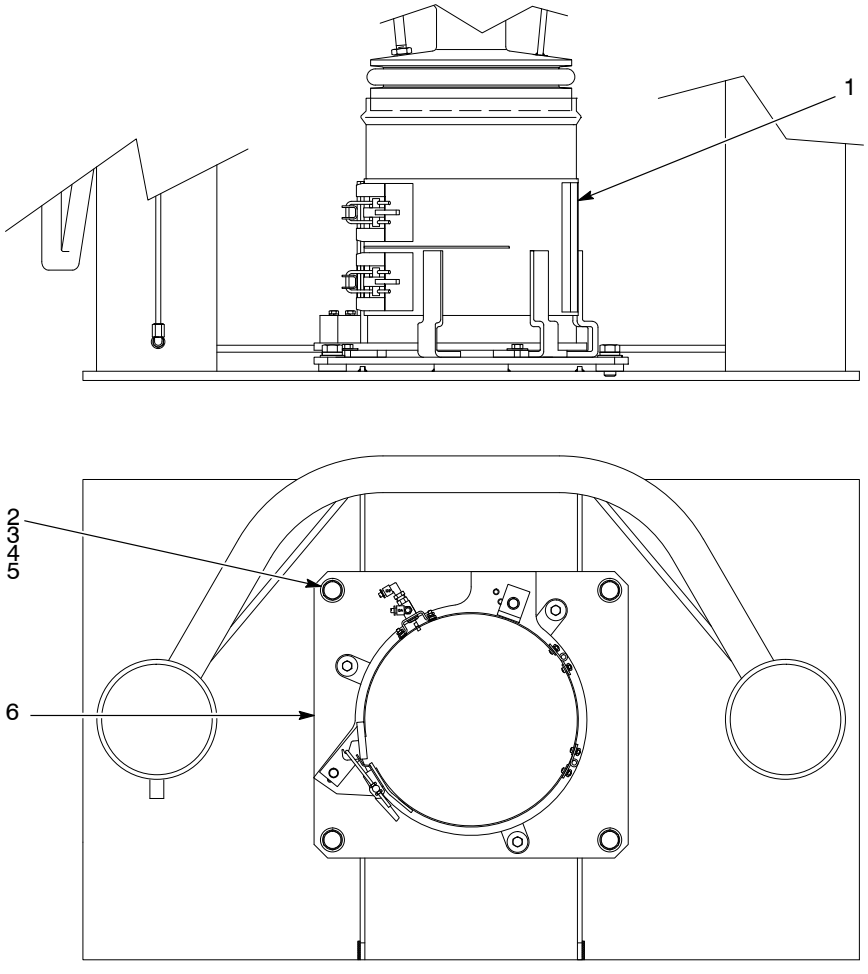


Figure 9-3 Parts Cluster B Components (and Hold Down)

Check Valves

See Figure 9-4.

Output check valves prevent the pump from pumping without material present.

Item	Part	Description	Quantity	Note
—	221941	Valve, check $1^1/_4$ (male input, female output)	1	A, B
1	973092	Nipple, hex, $1^1/_4$	1	
2	973184	Coupling, pipe hyd, $1^1/_4$ x $1^1/_4$	1	
3	900481	Thread sealant	1	

NOTE A: This check valve can be used with either the drum or pail unloader assemblies.
B: Use thread sealant, part 900481, when installing the check valve.

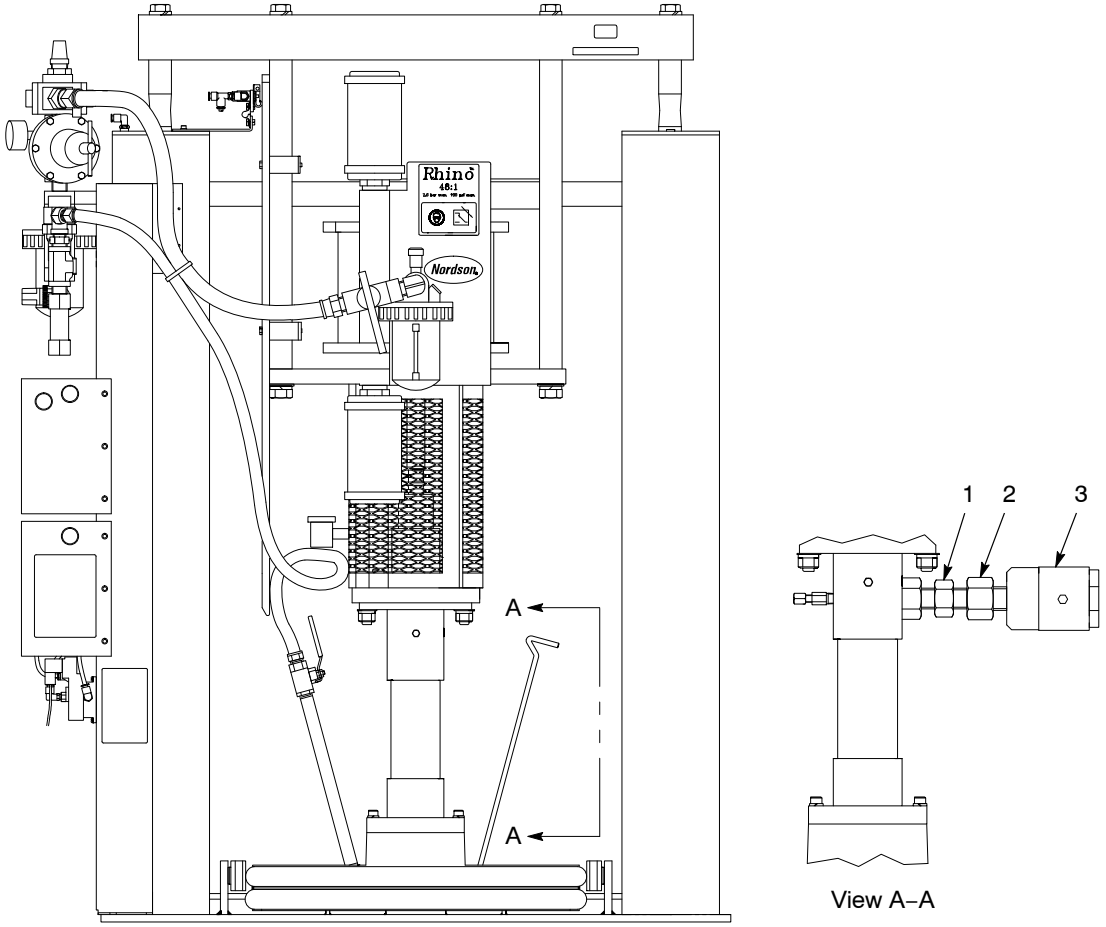


Figure 9-4 Check Valve

Runaway Valve

See Figure 9-5.

Runaway valves are used only on primary or auto-shutdown units. Runaway valves prevent the pump from cycling faster when air flow increases; and they measure air flow to the pump and close if the flow exceeds a pre-determined rate.

Item	Part	Description	Quantity	Note
1	119744	Valve, runaway	1	

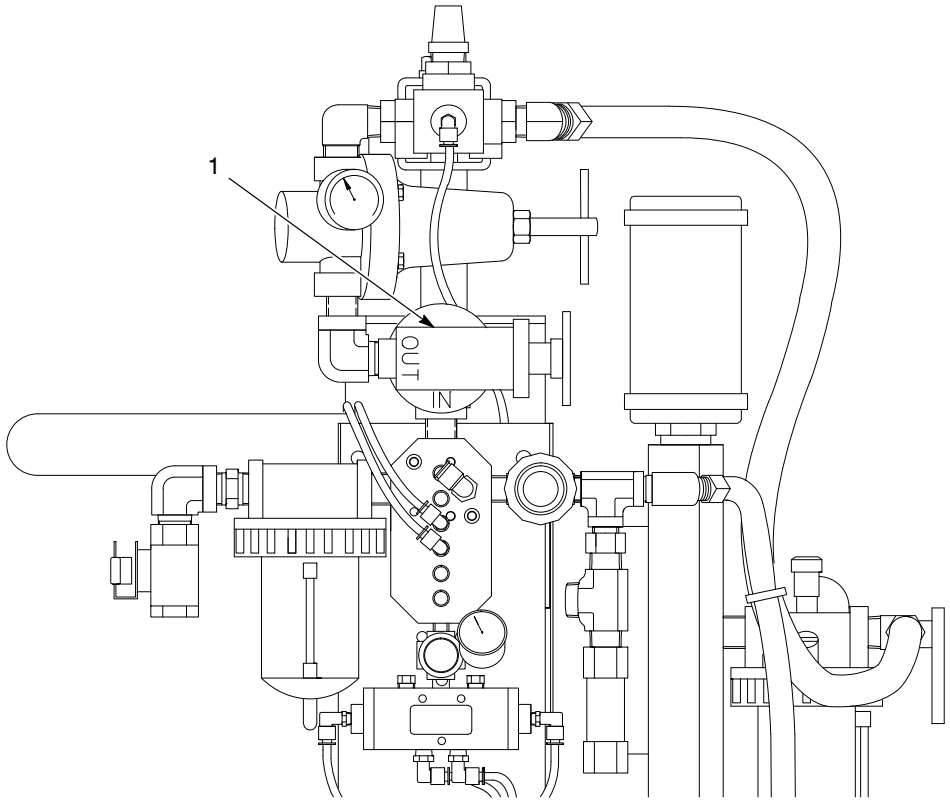


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Figure 9-5 Runaway Valve

Electric Solenoid

See Figure 9-6.

Electric solenoids are used only on primary or auto-shutdown units. They send output signals to a controller, which takes the information and shuts down or adjusts system operation as needed. Order 120 Vac or 24 Vdc as needed for your application.

Part	Description	Quantity
186519	Valve, solenoid, 24 Vdc	1
186517	Connector, cable	1
223273	Valve, solenoid, 120 Vac	1
186517	Connector, cable	1

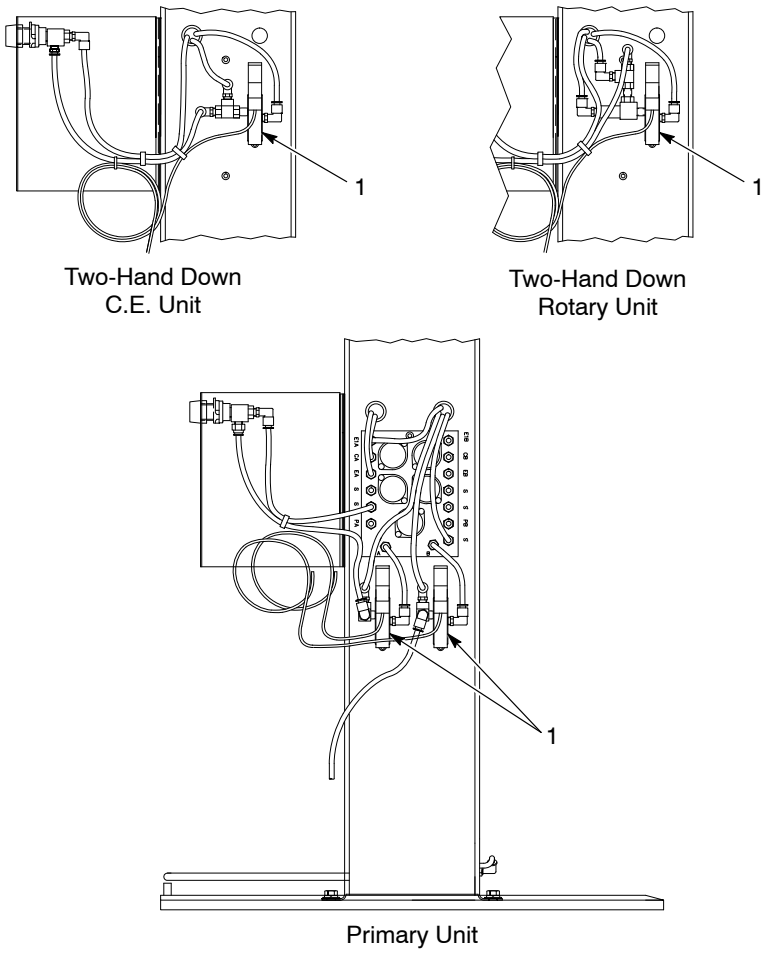

Figure 9-6 Electric Solenoid

Emergency Stop Lockout Valve

See Figure 9-7.

Emergency stop lockout valves are used to cut off air to the entire system.

Item	Part	Description	Quantity	Note
1	146223	Valve, manual, e-stop	1	A
NOTE A: Use thread sealant, part 900481, when installing the emergency stop valve.				

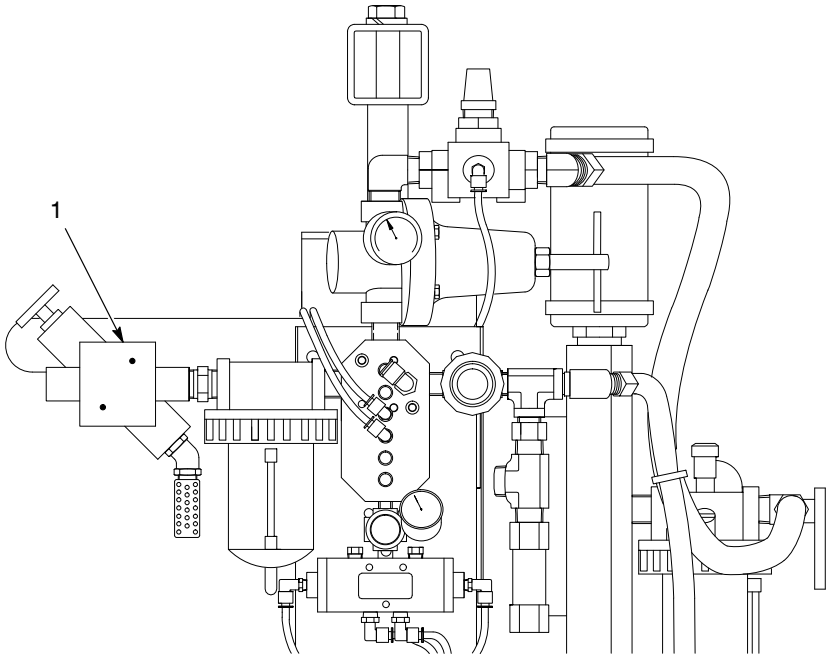

Figure 9-7 Emergency Stop Valve

Guards

See Figure 9-8.

Guards are required for all two-hand down actuator units sold in Europe. However, they may be installed on rotary actuator units and on two-hand down actuator units sold in the United States.

Item	Part	Description	Quantity	Note
—	282771	Module, guard, air motor/pump	1	
1	282792	• Guard, CE, rhino	1	
2	282786	• Cup, solvent filler	1	A
3	282793	• Screw, captive, large	3	
4	282794	• Retainer, captive screw	3	
5	282795	• Receptacle, clip on	3	
6	282796	• Solvent cup	1	
NOTE A: Use thread sealant, part 900481, when installing the solvent filler cup.				

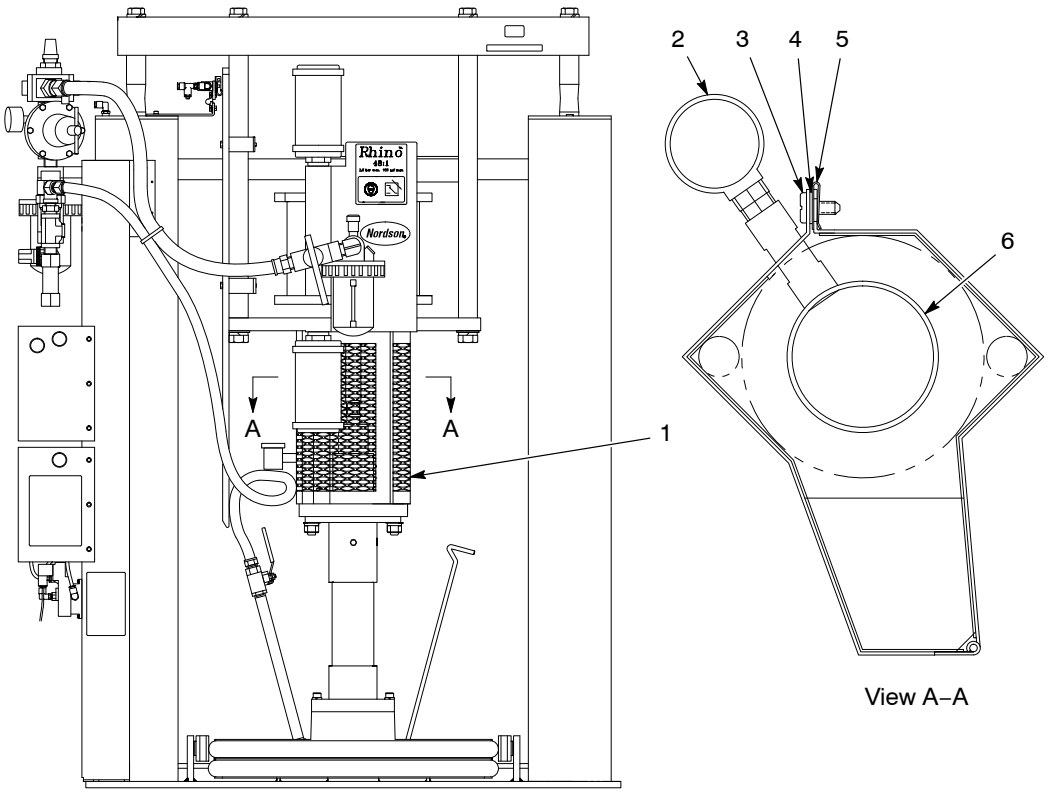

Figure 9-8 Guard Components

Reclassifiers

See Figure 9-9.

Reclassifiers filter and capture vitalizer oil, preventing it from atomizing into the work environment during unloader operation. Order the appropriate number of reclassifiers to replace the air motor mufflers on your unit(s).

Item	Part	Description	Quantity	Note
—	295788	Module, exhaust, reclassifier	1	
1	295796	Muffler, reclassifier	1	
2	295797	Elbow, male, 37, $1^5/_8$-12 x 1 NPTF	1	
3	295798	Swivel, 37, $1^5/_8$-12 x $1^1/_4$ zinc	1	

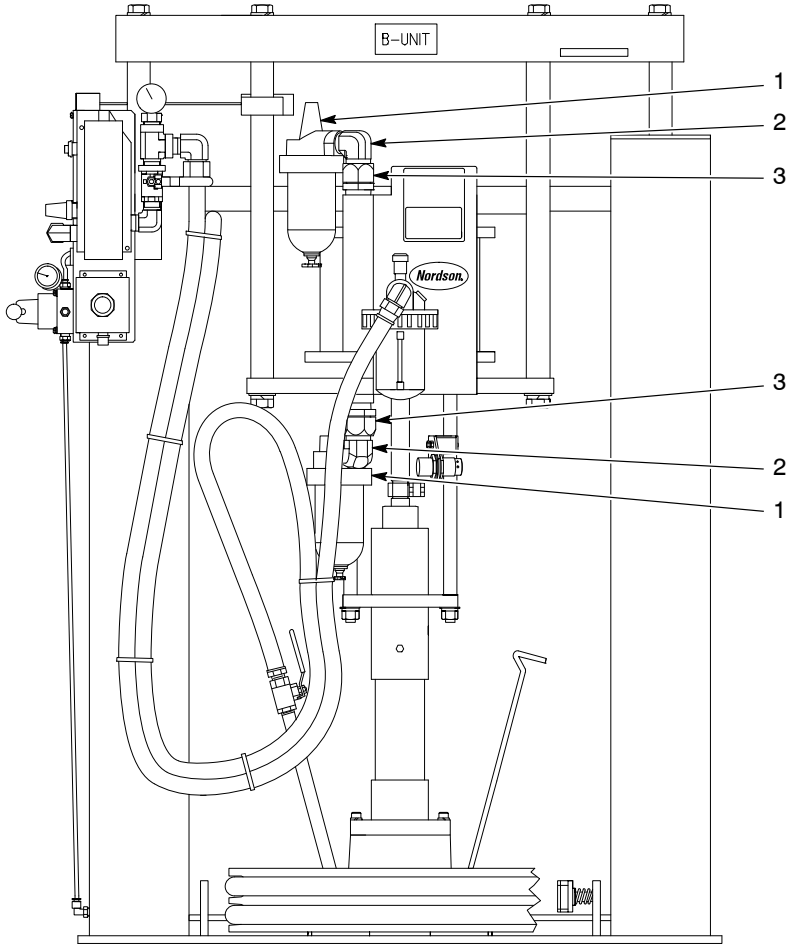

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Figure 9-9 Reclassifiers