Rhino® Bulk Unloader Controls for GM Applications

Customer Product Manual
Part 1007364C
Issued 8/02

NORDSON CORPORATION • AMHERST, OHIO • USA

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

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Rhino Bulk Unloader Controls for GM Applications

Safety

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

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

Qualified Personnel

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

Intended Use

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

Some examples of unintended use of equipment include

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

Regulations and Approvals

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

Personal Safety

To prevent injury follow these instructions.

- Do not operate or service equipment unless you are qualified.
- Do not operate equipment unless safety guards, doors, or covers are intact and automatic interlocks are operating properly. Do not bypass or disarm any safety devices.
- Keep clear of moving equipment. Before adjusting or servicing moving equipment, shut off the power supply and wait until the equipment comes to a complete stop. Lock out power and secure the equipment to prevent unexpected movement.
- Relieve (bleed off) hydraulic and pneumatic pressure before adjusting or servicing pressurized systems or components. Disconnect, lock out, and tag switches before servicing electrical equipment.
- While operating manual spray guns, make sure you are grounded. Wear electrically conductive gloves or a grounding strap connected to the gun handle or other true earth ground. Do not wear or carry metallic objects such as jewelry or tools.
- If you receive even a slight electrical shock, shut down all electrical or electrostatic equipment immediately. Do not restart the equipment until the problem has been identified and corrected.

Personal Safety *(contd)*

- 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.

Description

Rhino bulk unloaders are available in a variety of configurations, with various hydraulic sections and controls. Rhino drum unloaders pump Nordson-approved adhesives and sealant materials at room temperature from 200-liter (55-gallon) containers.

Contact your Nordson Corporation representative

- if you have a question about your unloader configuration.
- if you require more information about the other configurations available for Rhino bulk unloaders.
- to verify that the material you wish to pump is compatible with your equipment and setup

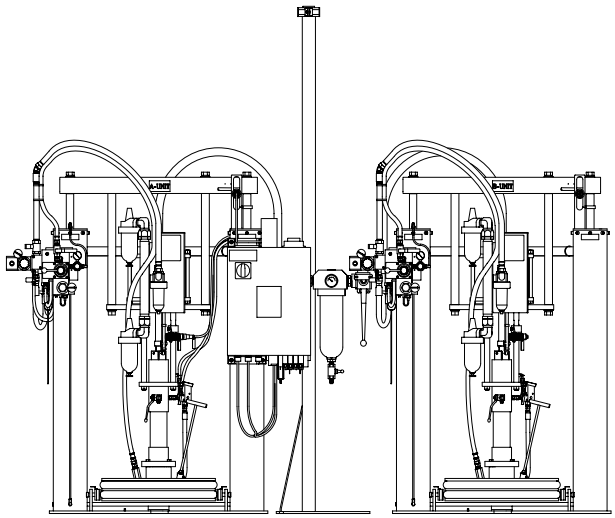
CAUTION: If the material is too abrasive or generally not compatible, equipment may wear out prematurely and components may be damaged.

See Figure 1.

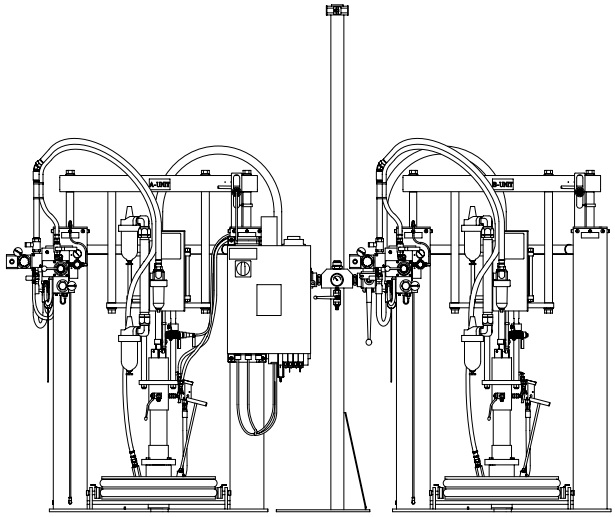
The bulk unloaders are available with two unloaders (an A-Unit and a B-Unit) and a filter for use with adhesive materials (A); or two unloaders (an A-Unit and a B-Unit) with a stand for use with mastic materials (B). Operation switches between A- and B-Units automatically (via the controller program) or manually (via operator intervention).

The bulk unloaders are shipped with

- rotary elevator control.
- 65:1 dual-acting, positive-displacement, demand-type pump with a 10-inch air motor.
- drum (55-gallon) follower plate. A pail (5-gallon) follower plate is available as a replacement part.



A. Dual unloaders with filter



B. Dual unloaders with mastic stand

Figure 1 Rhino Bulk Unloaders A- and B-Units

Theory of Operation

An unloader typically pumps a constant supply of material to dispensing guns or process applicators. The 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.

Hydraulic and Electrical Components

See Figure 2.

The operator places a full, open, non-tapered, undamaged container of material under the unloader frame. The operator turns on the unloader air supply and lowers the elevator, which lowers the follower plate (8) and hydraulic section (9) into the drum of material. The operator then starts the pump, allowing the downward pressure of the follower plate to force material into the hydraulic section. Material is pumped through the material output hoses and to the applicator or gun. The follower plate seals (7) create a sealed compartment below the follower plate and prevent material from leaking past the follower plate. The bleed valve (10) enables the operator to remove air from the pump body. The bleeder stem (6) enables the operator to remove air from beneath the follower plate to ensure proper contact with the material in the container. The output check valve (5) prevents backward material flow into the pump.

The operator interfaces with unloader operation via the pump controller (2) and keypad (3). Depressurization intervals and pump runaway parameters can be programmed into the pump controller. (Specific pump controller operation and programming information is located in the *Operation* section of this manual.) The runaway sensor (4) stops pump operation if too many pump strokes occur within a set period of time.

When a material container is emptied during unloader operation,

- the empty drum sensor (11) causes the light (1) on the pump controller to go on, indicating that a material container change is necessary;
- the pump controller automatically switches operation to the inactive unloader; and
- the operator is able to change material containers at the inactive unloader by raising the follower plate, replacing the empty container with a full one, and lowering the follower plate into the new container.

The unloaders can be purged through the programmable logic controller (PLC). The PLC is pre-wired to provide the following output signals:

- dirty filter
- drum A empty
- drum B empty
- runaway A
- runaway B

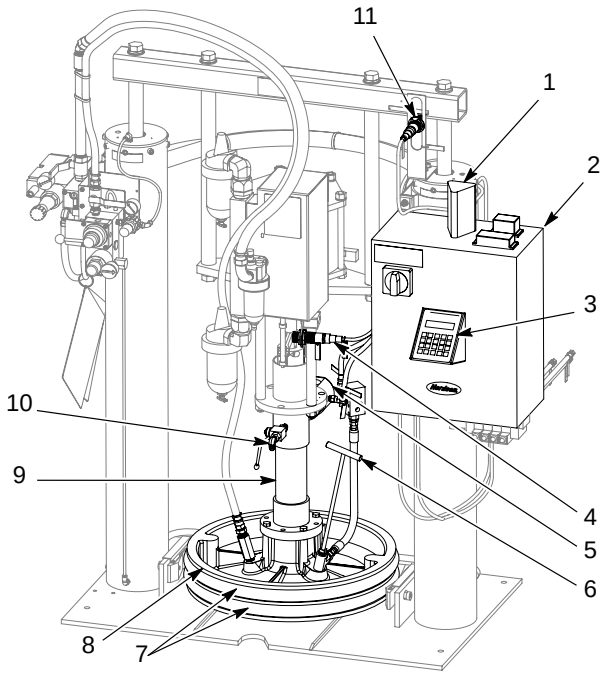


Figure 2 Hydraulic and Electrical Connections

1. Light
2. Pump controller
3. Keypad
4. Runaway sensor
5. Output check valve
6. Bleeder stem
7. Follower plate seals
8. Follower plate
9. Hydraulic section
10. Bleed valve
11. Empty drum sensor

Pneumatic Controls

See Figure 3 and refer to Table 1.

The controls that initiate elevator movement and operate the unloaders are pneumatic.

Because of the latent (potential) power in a pressurized unloader, an unloader under pressure from the air supply is considered active even if it is not pumping.

NOTE: Only a non-pressurized pump is considered inactive.

Table 1 Pneumatic Controls Components

Item	Function
1	Air motor—Generates power to cycle the pump; includes a lubricator that mixes the air with a small amount of vitalizer oil. This minimizes wear on the air motor and air cylinder.
2	Depressurization module—Circulates material from downstream from the pump to the pump output check valve. Using an Auto-Flo gun attached to the output check valve and connected by hose to the follower plate, the depressurization module purges material under the follower plate into the material container.
3	Elevator control regulator—Controls downward elevator force only. This regulator is adjustable.
4	Elevator control valve—Controls elevator movement. Placing the valve in the UP position raises the elevator and follower plate. Placing it in the DOWN position lowers the elevator and follower plate. Placing the valve in the NEUTRAL position halts elevator movement. Refer to the *Operation* section for specific operating instructions. The elevator control valve is mounted on the elevator/blow-off control module (6). UP air pressure is preset and non-adjustable. DOWN air pressure is regulated by the elevator control regulator (3).
5	Air motor regulator—Controls the amount of air pressure supplied to the air motor. This regulator is adjustable.
6	Elevator/blow-off control module—Provides air to the blow-off valve (7) when the elevator control valve (4) is in the UP position. This module is non-adjustable. Incorporates a button stamped C/O (clean/out) that, when pressed, provides a high-pressure, low-volume blast of air to help remove clogged material from the material check valve in the follower plate.
7	Blow-off valve—Introduces air pressure under the follower plate when the elevator control valve (4) is in the UP position, to help the operator remove the follower plate from a container of material. Provides manual shut off for the blow-off air circuit, which operates at a pressure range of 1.4–1.7 bar (20–25 psi).
8	Air motor lockout valve—Allows air pressure to the air motor, causing the pump to stroke, when open and the pump is active. Locks out pressure to the air motor, preventing pump operation, when closed.
9	Filter—Removes contaminants and moisture from supply air.
10	Main air supply valve—Controls the supply of standard shop air to the unloader. When the valve is closed, the only air in the unloader is the latent pressure built up during operation.
11	Elevator—Raises and lowers the follower plate when the elevator is pressurized; exerts pressure on the material when the elevator control valve (4) is in the DOWN position. The elevator is connected to both cylinders by a crossover bar.

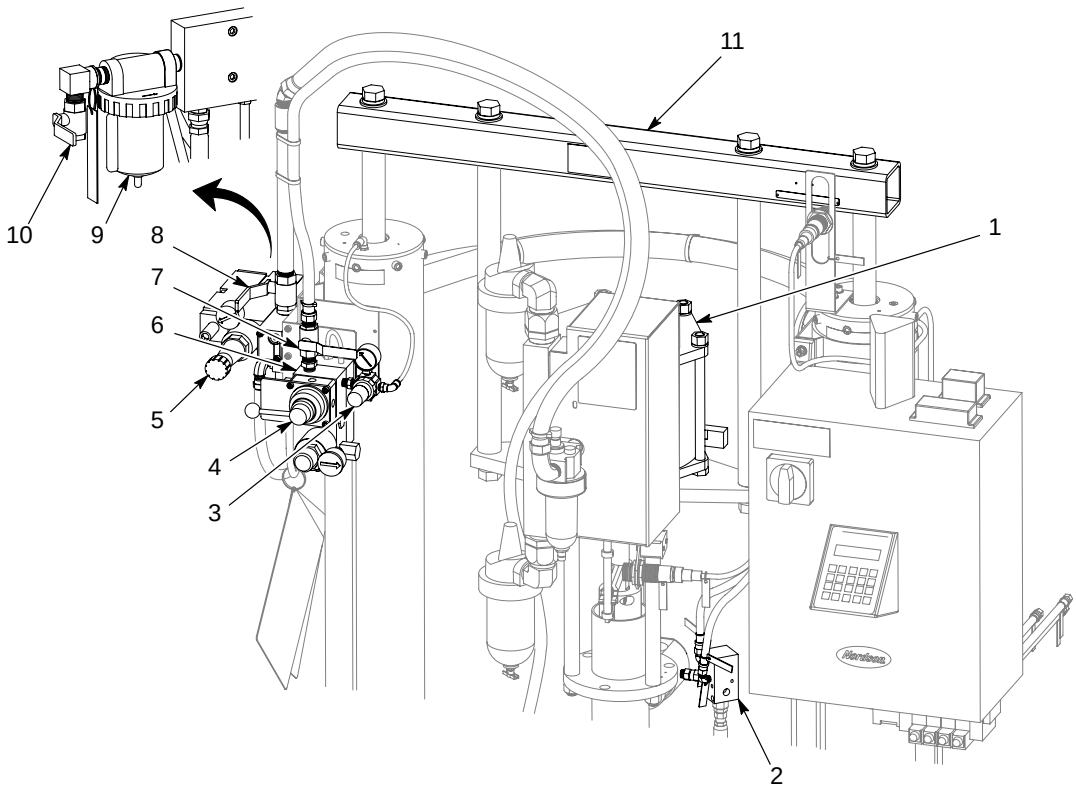


Figure 3 Pneumatic Components

1. Air motor
2. Depressurization module
3. Elevator control regulator
4. Elevator control valve
5. Air motor regulator
6. Elevator/blow-off control module
7. Blow-off valve
8. Air motor lockout valve
9. Filter
10. Main air supply valve
11. Elevator

Installation

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

1. Position the unloaders to allow access to the controls and follower plate area. Make sure that the air hoses and electrical cables are protected and can reach between the A-Unit (primary) and the B-Unit (secondary). Refer to your system drawings for the layout patterns and dimensions of your dual unloaders.

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

2. Level the unloaders and anchor them to the floor. Unloaders must be level for proper operation.
3. See Figure 4. Turn the elevator control regulator (11) and the air motor regulator (13) all the way counter-clockwise to 0 bar/psi. Make sure that the main air supply valve (16) is closed.
4. Connect the air supply lines to the $^{3}/_{4}$-in. NPT inlet valves at both the A-Unit and B-Unit. Maximum supply air pressure is 7 bar (100 psi).

Installation *(contd)*

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 their minimum bend radius.

5. The pump outlet fitting on the hydraulic section is a female $1^1/_4$ NPTF pipe threads. The check valve connects to this fitting. The check valve has a $1^1/_4$ NPTF female to $1^1/_2$ JIC male connector. The $1^1/_2$-in. material hose connects to the check valve. Unloaders are shipped with the material hoses already connected to the pump outlets. Connect the material hoses to the fittings on the manifold of the hose/filter stand.

Automatic Changeover

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

Pneumatic Connections

Table 2 lists the pneumatic air lines are factory-installed on the A-Unit and must be connected to the B-Unit.

Table 2 Pneumatic Connections

Connect Air Line . . .	To Fitting . . .
B-Unit Pump Air	B-Unit Pump Air
B-Unit Open Depressure	B-Unit Open Depressure
B-Unit Close Depressure	B-Unit Close Depressure

Electrical Connections

Table 3 lists the electrical cables are factory–installed on the A–Unit and must be connected to the Pro–Flo Controller, A–Unit, B–Unit, or filter stand, as specified.

Table 3 Electrical Connections

Connect Air Line . . .	To Connector. . .
B-Unit Empty Sensor (4-pin)	B-Unit Empty Sensor
B-Unit Sensor Runaway (4-pin)	B-Unit Sensor Runaway
Filter Switch (5-pin)	Connector on Filter (on filter stand)
A-Unit Empty Sensor (4-pin)	A-Unit Empty Sensor
A-Unit Sensor Runaway (4-pin)	A-Unit Sensor Runaway
Pump/Pro-Flo interface cable	Pro-Flo II Control (on A-Unit) and to Pump Stand (on Pro-Flo Controller)

New Equipment Preparation

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

See Figure 4.

1. Refer to Tables 2 and 3. Verify that all pneumatic and electrical connections have been made at the appropriate locations.
2. Make sure that the fluid level in the pump solvent chamber (5) is 38 mm (1.5 in.) from the top of the chamber. Add fluid as necessary. Refer to the *Parts* section of the *Rhino Screw Together 24:1/48:1 & 32:1/65:1 Pumps* manual to order solvent chamber fluid.
3. Make sure that the air motor lubricator (3) is filled with vitalizer oil. Refer to the *Parts* section in your pump manual to order vitalizer oil.
4. Lubricate the follower plate seals (7) with a lubricant that is compatible both with the seals and with the material dispensed.
5. Verify that the air motor lockout valve (15) is closed.
6. Open the main air supply valve (16) to supply air to the unloader.
7. Adjust the setting on the air motor regulator (13) until the air motor pressure gauge (14) reads 0 bar/psi.
8. Adjust the elevator control regulator (11) setting until the elevator control gauge (9) reads 1.7–4.0 bar (25–60 psi).

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

9. Place the blow-off valve (10) in the closed position.
10. Place the elevator control valve (12) in the UP position to raise the elevator (1) to the top of its travel range.
11. Open the blow-off ball valve. Listen for air flowing from the bottom of the follower plate. Close the ball valve.
12. Make sure that the air hoses and material delivery hose are not kinked or pinched.
13. Connect your pump/Pro-Flo interface cable from the A-Unit connector labeled Pro-Flo II Control to the Pro-Flo controller connector labeled Pump Stand.

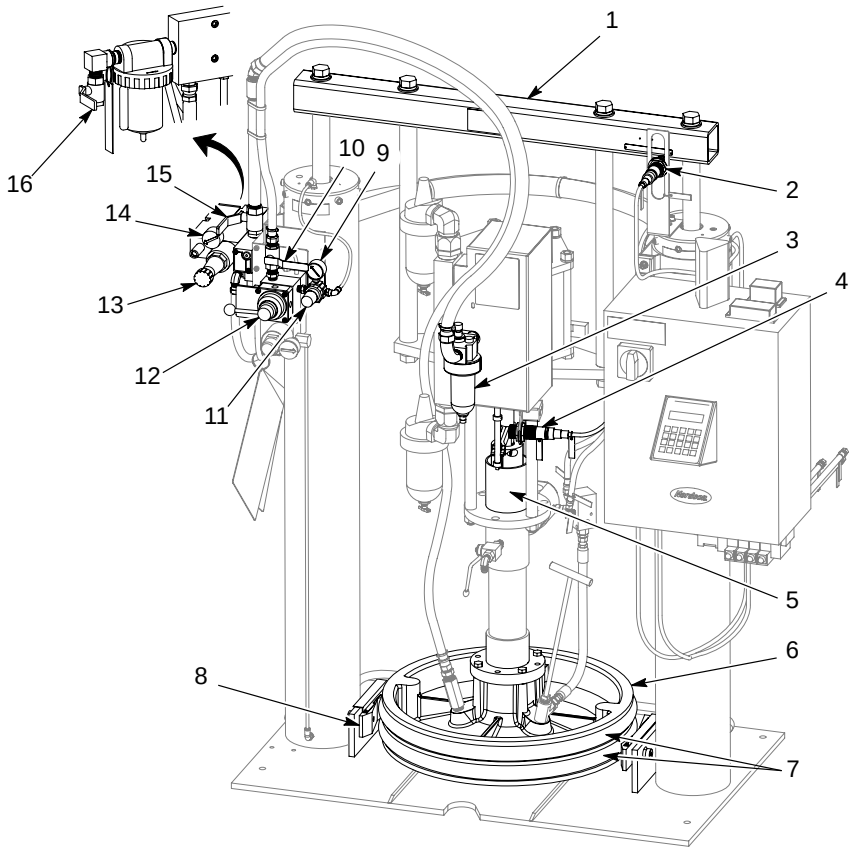


Figure 4 Installation Components

1. Elevator
2. Empty-drum sensor
3. Air motor lubricator
4. Runaway sensor
5. Solvent chamber
6. Follower plate
7. Follower plate seals
8. Drum hold down shoes and brackets
9. Elevator control gauge
10. Blow-off valve
11. Elevator control regulator
12. Elevator control valve
13. Air motor regulator
14. Air motor pressure gauge
15. Air motor lockout valve
16. Main air supply valve

Adjusting the Empty-Drum Setting

Rhino bulk unloaders with automatic changeover are shipped with the empty-drum setting already set. As a safety precaution, verify the empty-drum setting before beginning normal operation of your unloader. For most applications, you should not have to adjust this setting. However, you can adjust the setting to stop the follower plate closer or farther from the bottom of the drum. Use extreme caution if you adjust the setting.

See Figure 4.

The empty-drum sensor (2) is fastened to the elevator (1). The sensor sends a signal to the PLC which stops the follower plate (6) approximately $1^1/_2$ inches from the bottom of the drum. The sensor is adjusted within the slot it is mounted to.

Follow this procedure to adjust the empty-drum setting of your unloader:

1. Remove the drum hold down shoes and brackets (8).
2. Lower the follower plate to the desired position. This is best done by using gauge blocks between the base and the bottom of the follower plate.
3. Once the follower plate is resting on the gauge blocks at the required height/position, adjust the empty-drum sensor so that it is activated at this position:
   a. Loosen the sensor jam nuts on the sensor.
   b. Raise the sensor to make the follower plate stop higher in the container. Lower the sensor to make the follower plate stop lower in the container.
   c. Tighten the sensor jam nuts.
4. Reinstall the drum hold down shoes and brackets.

Adjusting the Runaway Sensor

See Figure 4.

If you have to remove or adjust the placement of the runaway sensor (4) for any reason, make sure it is positioned at the middle of the pump stroke.

Operation

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

This section describes new equipment startup, routine operating procedures, and procedures for changing to a different material.

Table 4 describes the various controllers involved in the operation of the unloaders.

Table 4 Controller Operation

The . . .	Does This . . .
Robot controller	• Communicates with the pump controller through a Pro-Flo controller • Provides operator access to pressurize and depressurize the pumps • Takes precedence over the **MANUAL** mode at the pump controller
Pro-Flo controller	• Receives signals from the robot controller; relays them to the pump controller • Does not allow pump operation or programming
A–Unit Pump controller	• Provides operator interface to perform pump purges, forced changeovers, and manually operate the pumps **NOTE:** If the pump controller is receiving any signals from the Pro-Flo controller, you cannot operate the pump controller in **MANUAL** mode. You must reset all of the outputs at the Pro-Flo controller.

New Equipment Startup

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

See Figure 5.

1. Load a new container of material. Refer to the *Container Change* procedures in this section.
2. Ensure that the pump you are loading with material is active through the pump controller (2). Refer to *Controller Operation*, in this section, for instructions on how to activate and purge pumps.
3. Adjust the air motor regulator (13) 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 (14) and note the minimum required pressure.
4. At low pressure, bleed the pump through the bleed valve (8) until all air has been removed from the pump. It will begin spitting. Follow the procedures in *Bleeding the Pump*, in this section.
5. Bleed all air from the system. Trigger the dispense gun(s) to allow air in the lines to bleed off.

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

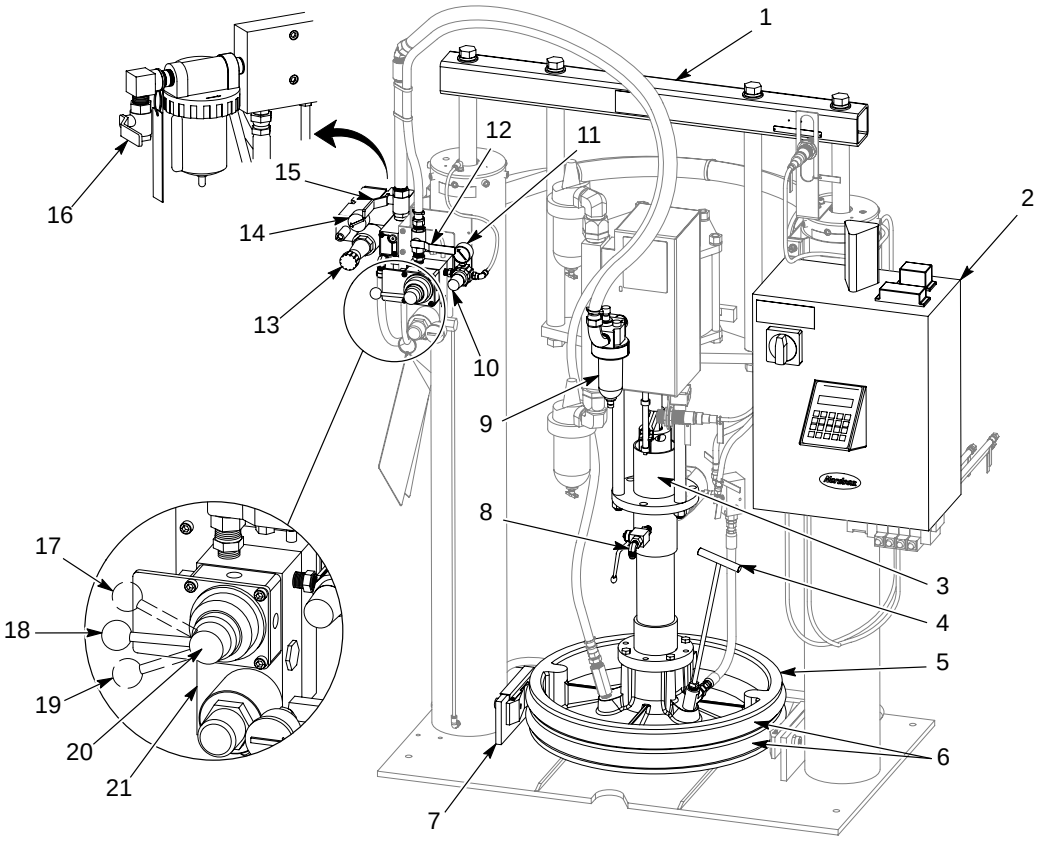


Figure 5 Unloader Operation

1. Elevator
2. Pump controller
3. Solvent chamber
4. Bleeder stem
5. Follower plate
6. Follower plate seals
7. Hold down
8. Bleed valve
9. Air motor lubricator
10. Elevator control regulator
11. Elevator control pressure gauge
12. Blow-off valve
13. Air motor regulator
14. Air motor pressure gauge
15. Air motor lockout valve
16. Main air supply valve
17. UP position
18. NEUTRAL position
19. DOWN position
20. Elevator control valve
21. Elevator/blow-off control module

New Equipment Startup (contd)

6. After the system is purged, the depressurization circuit must be purged with material. The depressurization circuit is filled with air from shipping and must be filled with material before first time startup. Through the pump controller, depressurize the pump that has been purged. Refer to *Controller Operation* for instructions. Repeat the *Bleeding the Pump* procedures, as needed, to purge air that was introduced under the platen assembly while priming the depressurization circuit.

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

7. Raise air pressure to operating levels. At normal operating pressure, the gun should dispense material smoothly, continuously, and without air bubbles.
8. Adjust the air motor lubricator (9) for the correct flow rate. Set the Parker brand lubricator to dispense one drop of oil for every other pump stroke. Most of the oil that drops in the sight glass returns to the reservoir.

Routine Operating Procedures

Routine operating procedures include

- elevator movement
- daily startup
- container change
- bleeding the pump
- shutdown
- restart after shutdown
- Elevator Movement

Elevator Movement

See Figure 5.

Elevator movement is controlled by the elevator control valve (20).

- To start UP elevator movement, place the elevator control valve in the UP position (17).
- To start DOWN elevator movement, place the elevator control valve in the DOWN position (19).

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

- To place the elevator in NEUTRAL, place the elevator control valve in the NEUTRAL position (18).

Daily Startup

See Figure 5.

1. Make sure that air pressure to the system is off. Make sure that the elevator control valve (20) is in the NEUTRAL position (18).
2. Check for material leaking past the follower plate seals (6). If you need to replace the seals, refer to the *Repair* section of this manual for instructions.
3. If the container is empty, refer to the *Container Change* procedure in this section.
4. Check the solvent chamber (3) fluid level. Refer to the *Installation* section for filling instructions.
5. Check the air motor lubricator (9) fluid level.
6. Turn on the main air supply valve (16) to the unloader.
7. Verify that the air motor lockout valve (15) is open.
8. Start DOWN elevator movement (19) at the unit you wish to operate.
9. Make sure that the hose and dispense gun are secured firmly and that the dispense gun is not pointing at any personnel in the area.

NOTE: If the pump does not pump, pressurize the pump via the robot controller. Remember that the robot always takes precedence. If you correct the problem at the robot, it will override any other commands from the other controllers. If the wrong pump is pumping, perform the *Forced Changeover* procedures from the **CHANGE** screen at the pump controller until the right pump is pumping.

10. Check the air motor lubricator for the desired flow rate (one drop of oil for every other pump stroke). Adjust the air motor lubricator, if necessary.
11. Make sure that the pump is operating properly. Adjust the air motor regulator (13) as necessary for the material you are pumping.

Follow these procedures to change a container of material.

Container Change

NOTE: You must bleed the pump every time that you change containers. This section includes pump bleeding procedures.

Remove the Empty Container

See Figure 5.

1. Move the elevator control valve (20) to the NEUTRAL (18) position.
2. Turn the air motor lockout valve (15) to the OFF position.
3. Open the blow-off valve (12).
4. Press the C/O (clean/out) button on the elevator/blow-off control module (21) 3–4 times before you raise the follower.
5. Move the elevator control valve to the UP position (17).
6. Press the C/O button until the follower plate begins to move. Continue raising the elevator until the follower plate is at the top of the container.

NOTE: If the container begins to rise off the unloader frame, press the C/O button on the elevator/blow-off control module to release the container from the follower plate and allow the container to return to the frame. Release the button and the elevator will continue upward movement on its own.

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.

7. Close the blow-off valve and the elevator (1) will continue to rise to its maximum height.
8. Disengage or unlatch the container hold down (7).
9. Remove the empty container from the unloader.
10. Inspect the blow-off port in the follower plate and clean it as necessary.

Install a New Container

See Figure 5.

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

1. Carefully inspect the new container for dents or other damage. Do not use a damaged container.
2. Coat the follower plate seals (6) with an O-ring lubricant compatible with the dispensing material and with the seals.

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.

3. Place the container of material on the base of the unloader and center it under the follower plate (5).
4. Adjust the elevator control regulator (10) until the elevator control pressure gauge (11) reads at least 2.1 bar (30 psi).
5. Engage or latch the container hold down (7), if applicable.
6. Make sure that the blow-off valve (12) is closed.
7. Unscrew the bleeder stem (4) from the follower plate to allow any air trapped under the follower plate to escape.

Install a New Container (contd)

WARNING: Do not lower the follower plate into the container without wearing goggles, gloves, and long sleeved protective clothing. The air expelled when you bleed air from under the follower plate may contain material that could cause injury.

8. Place the elevator control valve (20) in the DOWN position (19) and slowly lower the follower plate into the open container of material. Continue lowering the follower plate until material begins to flow from the bleeder stem. Perform the following steps:
   a. When you see a continuous flow of material flowing from the bleeder stem fitting, place the elevator control valve in the NEUTRAL position (18).
   b. Tighten the bleeder stem securely.
9. Start DOWN elevator movement at the designated unit (A-Unit or B-Unit). DOWN elevator movement will force material into the pump section.

Bleeding the Pump

See Figure 5.

1. Reduce air pressure to 0 bar/psi.
2. Place a waste container beneath the bleed valve (8). Carefully open the bleed valve.
3. Purge the pump. Refer to *Controller Operation* for procedures.
4. Leave the bleed valve open until the material flows continuously.
5. Gradually increase the pressure to an acceptable stroke rate for the pump or acceptable material bleed volume.
6. Close the bleed valve. Remove the waste container. Further bleeding should not be necessary unless the hydraulic section is completely empty or until the next container change.

Shutdown

During shutdown, the active pump will automatically depressurize if no pump stroke is detected within a set time or if the depressurization signal is received from the Pro-Flo controller via the robot controller. The operator can also manually start depressurization at the keypad of the pump controller.

NOTE: If the pump controller is receiving any signals from the Pro-Flo controller, you cannot operate the pump controller in **MANUAL** mode. You must reset all of the outputs at the Pro-Flo controller.

WARNING: When you shut off the main air supply valve, air pressure is no longer maintained on both sides of the elevator pistons. 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. Because of trapped air in the air cylinders, the unloader remains in a neutral and unlocked state until you turn on the main air supply valve and start UP or DOWN elevator movement.

See Figure 5.

Follow the steps below to initiate a shutdown:

1. Place the unloader in the NEUTRAL position (18).
2. Shut off the main air supply valve (16).
3. Relieve material pressure through the bleed valve (8) or by triggering the gun(s).

Restart after Shutdown

NOTE: When the pump controller is powered up, it will be in the state that it was left in during the last power down. Upon power up, the controller will tell which pump is defaulted to (active) and whether there are any unresolved faults. For example, the controller might read: `Pump "A" Active, Depressurized`. All pumps will be depressurized. Activate (pressurize) the pumps through the robot interface or from the pump controller in manual mode.

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

Changing to a Different Material

Not all adhesives and sealants are compatible with each other. Consult the manufacturer of both the old and new materials to determine compatibility.

If you switch materials, make sure that the lubricant for the follower plate seals is compatible with the new material to be dispensed.

If the old and new materials are not compatible, clean the entire system before using the new material. If the old and new materials are compatible, refer to the *Container Change* procedure in this section.

Controller Operation

The following paragraphs describe the operation of the pump controller.

NOTE: Read this entire section before performing any procedures.

Keypad

Figure 6 and Table 5 describe the controller interface.

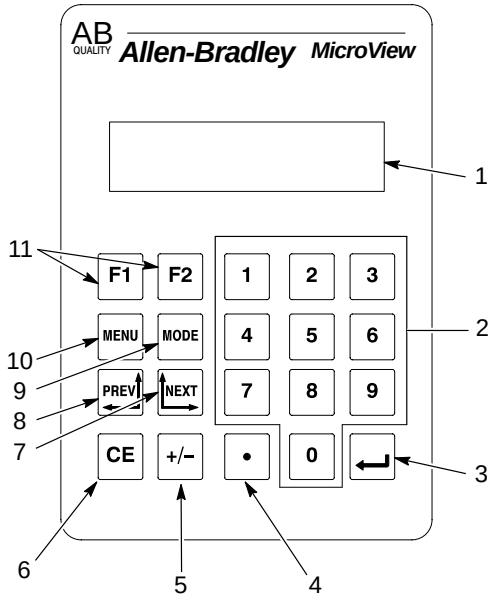


Figure 6 Controller Keypad

Table 5 Keypad Functions

Item	Key	Function
1	Display panel	Displays menu options and pump information readouts
2	[**0–9**]	Enters numbers `0–9` during data entry or selects a numbered item shown on the display
3	[↵]	ENTER key sends data to the controller. Data can be either default values or data entered at the keypad
4	[**.**]	Enters a decimal point
5	[**+/–**]	Toggles a data entry value between positive or negative
6	[**CE**]	Clears an entire value during data entry
7	[**NEXT**]	Steps forward through a series of linked screens
8	[**PREV**]	Steps back through a sequence of linked screens
9	[**MODE**]	Accesses special features and configuration of operating parameters
10	[**MENU**]	Returns to the main menu of an application
11	[**F1**] – [**F2**]	Displays any application screen assigned to the key

Controller Menus

See Figure 7.

When you turn the controller on, the **MAIN MENU** appears.

NOTE: You may have to press the **MENU** key to view the **MAIN MENU**.

The four main menu selections are:

- **PURGE**
- **CHANGE**
- **SETUP**
- **MANUAL**

```
MAIN MENU
  1. PURGE
     1. PURGE PUMP A
     2. PURGE PUMP B
  2. CHANGE
  3. SETUP
     1. TIMER SETUP
        1. DEPRESSURIZE
           1. AUTO DEPRESSURIZE
           2. DEPRESSURIZATION TIME
        2. RUNAWAY
     2. COUNTER SETUP
        1. RUNAWAY COUNTER
        2. MAINTENANCE COUNTER
           1. PUMP A MAINTENANCE COUNTER
           2. PUMP B MAINTENANCE COUNTER
  4. MANUAL
```

Figure 7 Pump Controller Menu Tree

PURGE Screen

Refer to Table 6.

Table 6 **PURGE** Screen Functions

Press . . .	To. . .
[**1**]	Access the **PURGE PUMP A** screen
[**2**]	Access the **PURGE PUMP B** screen
[**F1**]	Start purging at selected pump
[**F2**]	Stop purging at selected pump
[**MENU**]	Return to **MAIN MENU**

CHANGE Screen

Refer to Table 7.

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

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.

Table 7 **CHANGE** Screen Functions

Press . . .	To . . .
[**F1**]	Change to pump A
[**F2**]	Change to pump B
[**MENU**]	Return to **MAIN MENU**

SETUP Menu

Refer to Table 8.

NOTE: You must enter a valid access code to perform functions in the **SETUP** menu. Contact your Nordson Corporation representative if you do not have the proper access code.

Use the **SETUP** menu to adjust the various operation settings of the pump controller.

Those settings include

- the number of strokes the counter must see in a certain period of time until it considers the pump in runaway mode.
- the interval of time the counter monitors pump strokes to determine runaway status.
- the time elapsed until the pump will automatically depressurize if no pump strokes are detected.
- the time allotted for the process of depressurization.
- the number of pump strokes until maintenance required is signalled.
- the number of pump strokes counted since maintenance was last performed.

If you access a screen and the value shown is acceptable and you do not want/need to change it, press the [**ENTER**] key to go back to the **TIMER SETUP / COUNTER SETUP** menu.

Table 8 **SETUP** Menu Navigation

When:	You Will See This Message:	Then:
NOTE: X indicates a variable number.		
You enter the **SETUP** menu	LIMITED ACCESS CODE	Enter your **access code** and hit **[ENTER]** to continue.
Your access code is accepted	Valid Code Access Permitted Then, you will see this menu: 1. TIMER SETUP 2. COUNTER SETUP	Press the corresponding number to enter the desired menu.
You enter the **TIMER SETUP** menu	1. DEPRESSURIZE 2. RUNAWAY	Press the corresponding number to enter the desired menu.
You select **DEPRESSURIZE** from the **TIMER SETUP** menu	1. AUTO DEPRESSUR 2. DEPRESSUR TIME	Press the corresponding number to enter the desired menu.
You select **AUTO DEPRESSURIZE** from the **DEPRESSURIZE** menu	AUTO DEPRESSURIZ XXX MIN NEW=	Enter the new value (length of time until the pump auto depressurizes if no pump strokes are detected). **[ENTER]** or **[NEXT]** returns you to the **TIMER SETUP / COUNTER SETUP** menu.
You select **DEPRESSURIZATION TIME** from the **DEPRESSURIZE** menu	DEPRESSURIZ TIME XXX MIN NEW=	Enter the new value (length of time that the pump will depressurize). **[ENTER]** or **[NEXT]** returns you to the **TIMER SETUP / COUNTER SETUP** menu.
You select **RUNAWAY** from the **TIMER SETUP** menu	RUNAWAY TIMER XX.XX SEC	Enter the new value (length of time that the sensor will count pump strokes to determine runaway). **[ENTER]** or **[NEXT]** returns you to the **TIMER SETUP / COUNTER SETUP** menu.

Continued...

SETUP Menu *(contd)*

Table 8 **SETUP** Menu Navigation *(contd)*

When:	You Will See This Message:	Then:
NOTE: X indicates a variable number.		
You enter the **COUNTER SETUP** menu	1. RUNAWAY COUNTER 2. MAINTENANCE COUNTER	Press the corresponding number to enter the desired menu.
You select **RUNAWAY COUNTER** from the **COUNTER SETUP** menu	RUNAWAY COUNTER XX COUNTS NEW=	Enter the new value (number of pump strokes within the runaway timer parameters). The display returns to the **TIMER SETUP / COUNTER SETUP** menu.
You select **MAINTENANCE COUNTER** from the **COUNTER SETUP** menu	MAINTENANCE CNTR XXXX * 1000	The **MAINTENANCE COUNTER** counts the number of pump strokes (multiplied by 1000) until a preset alert indicates it is time for preventative maintenance. Use the keypad to change the number of pump strokes until the alert activates. Once you change the value, you directly enter the **MAINTENANCE COUNTER** sub menus. Use the **[PREV]** and **[NEXT]** keys to go back and forth between screens.
You enter the **MAINTENANCE COUNTER** sub menus	PUMP A MAINT. CNTR X, XXX RESET or PUMP B MAINT. CNTR X, XXX RESET	Check the number of strokes that the pump (A or B) has stroked since the last time it was reset during routine preventative maintenance. Reset this value only after you have performed the required maintenance on the pump. To reset, enter zero (0) at the keypad and press **[ENTER]**. The reset only resets numbers in 1,000 range. It does not reset values of 999 or lower. Use the **[PREV]** and **[NEXT]** keys to go back and forth between screens.

MANUAL Screen

Refer to Table 9.

Table 9 **MANUAL** Screen Functions

Press	To
[**F1**]	Pressurize the active pump
[**F2**]	Depressurize the active pump
[**MENU**]	Return to **MAIN MENU**

Maintenance

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

WARNING: Never use halogenated hydrocarbon solvents to clean aluminum parts or to flush any system. Cleaning agents, coatings, and paints or adhesives may contain halogenated hydrocarbon solvents. Obtain and read MSDS for each material and solvent being used.

WARNING: Relieve air and fluid pressures before servicing equipment. Follow the specific instructions in this manual.

Table 10 details the recommended preventive maintenance procedures for the unloader. The frequency of periodic system cleaning depends on your facility's operating conditions and shop environment.

Table 10 Maintenance Schedule

Frequency	Task
Daily	1. Check the pump controller light tower. The bulb should light when the empty-drum sensor is tripped. 2. Visually inspect the unit. Check all hydraulic and pneumatic connections and tighten them if required. Inspect all pneumatic tubing for bends or kinks. 3. Drain the accumulated water from the filter/separator (near the air supply inlet) as required. 4. If you have a material filter installed in your system (filter stand), check the filter dial. If the dial reads "dirty", change the filter element. Refer to the *Filter Element Change* instruction sheet to replace the filter element.
Weekly	1. Inspect the unloader. 2. Clean any materials from the top of the follower plate and around the follower plate seals. 3. Clean the top of each elevator air cylinder.

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 *(contd)*

Problem	Possible Cause	Corrective Action
1. Elevator not working	Malfunctioning elevator control regulator, or damaged valves	Contact your Nordson Corporation representative for assistance.
	Elevator air cylinder seals worn or damaged, or piston binding in cylinder	If you are unable to solve the problem via pneumatic troubleshooting with the pneumatic schematics, rebuild the air cylinders. Refer to the *Rhino Bulk Unloader Frames* manual for more information.
2. Blow-off assembly not working	No air supply present	Follow these procedures to check the blow-off assembly: 1. Check the air supply. Make sure that the blow-off ball valve is open. 2. Place the elevator control valve in the UP position. 3. Press and hold the C/O (clean/out) button in. 4. If the container rises from the base, there is little or no air flow from the blow-off assembly. Proceed to the next possible cause and corrective action.
	Clogged check valve, follower plate, or blow-off hose	Follow these procedures to check for material blockages: 1. Shut off air to the system. 2. Remove the blow-off hose and check valve. 3. Clean the follower plate hole, check valve, and blow-off hose.
3. Light tower does not illuminate (when drum is empty)	Light burned out	Disconnect the leads and apply 24 V to the light. If the light is burned out, replace it.
	Faulty proximity switch	Verify proper operation of the proximity switch. Replace faulty switch.
	All other problems	Check to make sure the empty-drum sensor bracket is not broken, or out of adjustment. If the light is still not working, contact your Nordson Corporation representative.

Continued...

Problem	Possible Cause	Corrective Action
4. Pump not delivering material	Insufficient air pressure to pump	Increase air pressure to the air motor so that it is within application range.
	Follower plate not in contact with material	Make sure you have placed the elevator control valve in the DOWN position. The unloader should begin to pump material. Make sure that the elevator control regulator is within its application range.
	Air pocket in pump	Carefully bleed pump as noted in the *Operation* section of this manual.
	Blocked hydraulic system or follower plate	Perform the following steps: 1. Raise the follower plate from the container. Check the follower plate for blockage. If the plate is blocked, clean it. If the plate is not blocked, go to step 2. 2. Remove the gun from the hose. Check the gun for blockage. If the gun is blocked, clean it. If the gun is damaged, rebuild or replace the gun as necessary. If the gun is not blocked, go to step 3. 3. Shut down the pump. Relieve system pressure. Disconnect the hose from the pump. Check the hose for blockage. If the hose is not blocked, go to step 4. If the hose is blocked, clean or replace the hose. 4. Cycle pump. Slowly open the bleed valve $^1/_4$ turn. If no material exits the valve, close the valve; shut down system; relieve system pressure. Remove and rebuild the pump.
5. Depressurization module not working	Pneumatic control valve on pump controller not functioning	Verify that the control valve is getting electrical signal. Verify that the valve is functioning pneumatically.
	Auto-Flo valve attached to output check valve not functioning or clogged	Disconnect the discharge hose from the valve. Manually cycle the depressurization function and look for material flow from the valve discharge. If no flow is present, bleed system pressure and clean or replace the gun cartridge.
	Clogged discharge hose from Auto-Flo gun to the follower plate or follower plate port	Clean or replace the discharge hose and follower port.

Repair

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

WARNING: When performing repair or maintenance on either unit, turn off the main material valve at the hose/filter stand and trigger the depressurization of the unit you are working on at the pump controller keypad. Otherwise, serious personal injury could result.

WARNING: 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 heed this warning may result in serious personal injury or death.

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

This section covers basic repair guidelines for the 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.

Guidelines

See Figure 8 and refer to Table 11.

Table 11 lists general guidelines that must be followed when servicing various components on the unloaders. It provides information about which controls and valves to shut off or be aware of so that you can safely service your dual unloaders.

Table 11 Servicing Components

If You Need to Service This Component:	At This Location:	Perform the Following:
Valves on the bottom of the pump controller (2)	A-Unit	Shut off the main air supply valve (11) at the A-Unit before servicing. **NOTE**: The B-Unit will go off-line, out of production because the pump controller will lose its source air.
Depressurization module (3)	A-Unit	Shut off the main material valve at the hose/filter stand. Use the keypad (1) or robot controller to bleed the material pressure. Shut off the main air supply valve (11) at the A-Unit before servicing. If the depressurization module is not working, bleed material pressure through the bleed valve on the hose/filter stand. **NOTE**: There is always air pressure on one side of the lines in the depressurization module unless the main air supply valve on the A-Unit is off.
	B-Unit	Shut off the main material valve at the hose/filter stand. Using the keypad (1) or the robot controller, bleed the material pressure. Shut off the main air supply valves (11) at the A-Unit and the B-Unit before servicing. If the depressurization module is not working, bleed material pressure through the bleed valve on the hose/filter stand. **NOTE**: There is always air pressure on one side of the lines in the depressurization module unless the main air supply valve on the A-Unit is off.
Blow-off check valves (5) located on follower plate (4)	A-Unit	Remove the follower plate (4) from the container. Do not perform service on these valves with a material container in place. Shut off the main air supply (11) and blow-off valve (8) at the A-Unit before servicing.
	B-Unit	Remove the follower plate (4) from the container. Do not perform service on these valves with a material container in place. Shut off the main air supply (11) and blow-off air valve (8) at the B-Unit before servicing.
Elevator/blow-off control module (14)	A-Unit	Shut off the main air supply valve (11) on the A-Unit before servicing. **NOTE**: The B-Unit will go off-line, out of production because the pump controller will lose its source air.
	B-Unit	Shut off the main air supply valve (11) on the B-Unit before servicing.
Pneumatic solenoid (10)	A-Unit	Shut off the main air supply valve (11) on the A-Unit before servicing. **NOTE**: The B-Unit will go off-line, out of production because the pump controller will lose its source air.
	B-Unit	Shut off the main air supply valve (11) on the B-Unit before servicing.
Bleed valve (6)	A-Unit	If the bleed valve (6) on the pump body is plugged and won't bleed material, shut off the air motor supply valve (11) at the A-Unit. Using the keypad (1), trigger the depressurization module (3) to relieve system pressure at the A-Unit. Unscrew the bleed valve from the pump body. Clean or replace the valve.
	B-Unit	If the bleed valve (6) on the pump body is plugged and won't bleed material, shut off the air motor supply valve at the B-Unit. Using the keypad (1), trigger the depressurization module (3) to relieve system pressure at the B-Unit. Unscrew the bleed valve from the pump body and clean or replace the valve.

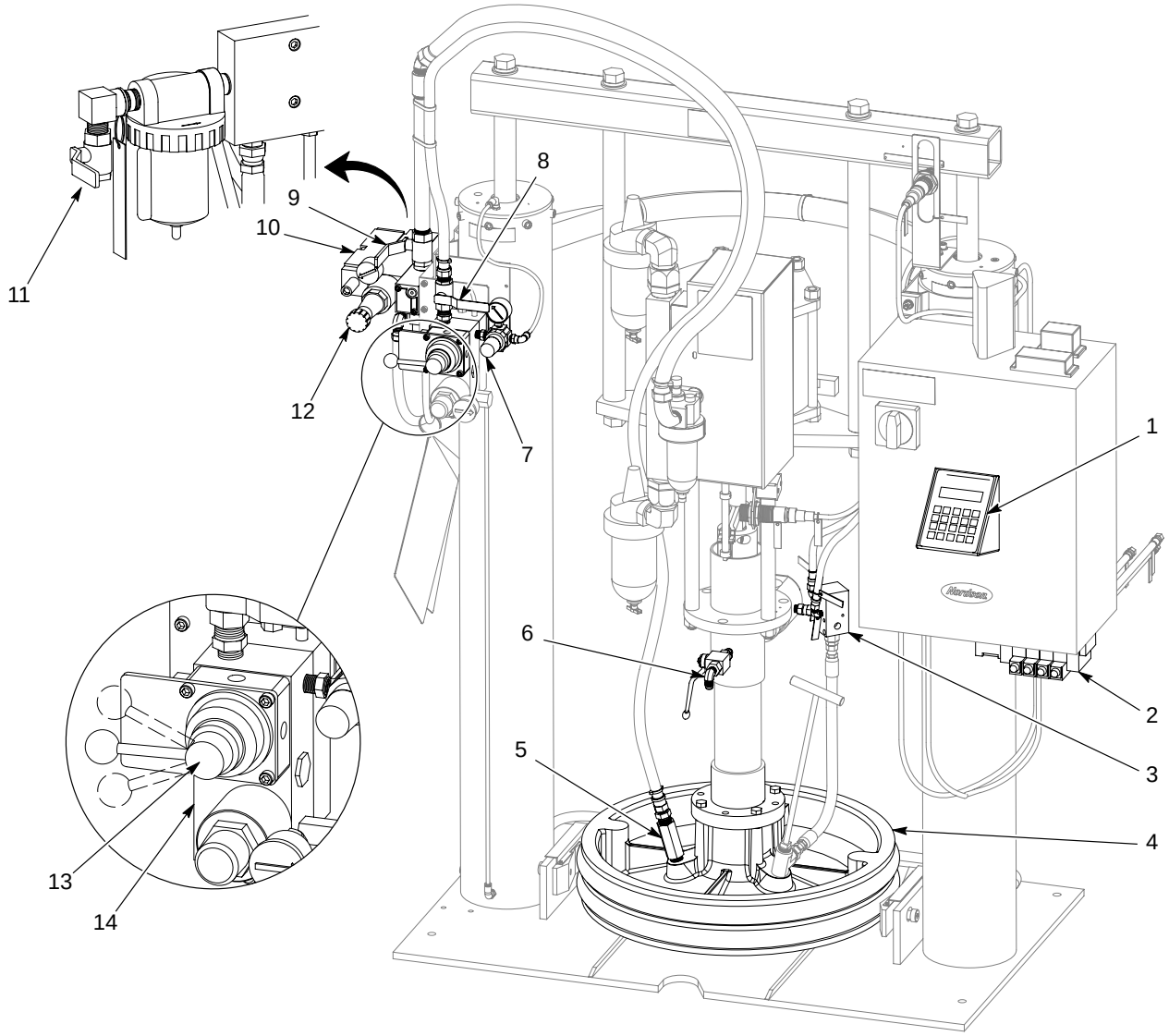


Figure 8 Unloader Components

1. Keypad
2. Valves
3. Depressurization module
4. Follower plate
5. Blow-off check valve
6. Bleed valve
7. Elevator control regulator
8. Blow-off valve
9. Air motor lockout valve
10. Pneumatic solenoid
11. Main air supply valve
12. Air motor regulator
13. Elevator control valve
14. Elevator/blow-off control module

Preparing to Remove the Hydraulic Section

See Figure 8.

To perform pump repair procedures (located 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:

NOTE: Follow the procedures in the *Rhino Screw Together 24:1/48:1 & 32:1/65:1 Pumps* manual to remove the follower and the hydraulic section from the air motor.

1. Turn off the air motor lockout valve (9).
2. Shut off the main material valve at the hose/filter stand.
3. Bleed the pump. Refer to the *Bleeding the Pump* procedures in the *Operation* section.

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

4. Depressurize the pump via the pump controller keypad (1).
5. Raise the follower plate out of the container and remove the container. Refer to the *Container Change* procedures in the *Operation* section.
6. Block the follower plate (4) to prevent damage to the seals from the container hold down shoes. To do this:
   a. Make sure that you have raised the follower plate and removed the material container.
   b. 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.
   c. Lower the follower plate until it is firmly settled on the wooden blocks.
7. Turn on low pressure at the air motor valve to stroke the pump and to gain access to the coupling. Turn off the valve when you can access the coupling above the solvent chamber.
8. Turn off the main air supply valve (11).
9. Place and leave the elevator control valve (13) in the NEUTRAL position.

Preparing the Elevator AIr Cylinders for Rebuild

WARNING: The elevator air cylinders can remain under pressure even when the main air supply to the unloader is shut off. Be cautious and aware that air remains in the cylinders until you bleed it. Otherwise seriuos injury can result.

Follow these procedures to bleed air pressure from the elevator air cylinders before rebuilding them. Refer to the *Rhino Unloader Frame* manual for rebuild procedures.

Bleeding Air from the Cylinders

See Figure 8.

1. Shut off the air motor lockout valve (9).
2. Raise the follower plate (4) out of the container. Remove the material container from beneath the raised follower plate. Refer to the *Container Change* procedures in the *Operation* section for more information.
3. Block the follower plate to prevent damage to the seals from the container hold down shoes. To do this:
   a. Make sure that you have raised the follower plate and removed the material container.
   b. 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.
   c. Lower the follower plate until it is firmly settled on the wooden blocks.
4. Place the unloader control valve (13) in the NEUTRAL position.
5. Shut off the main air supply valve (11).
6. Shut off the disconnect switch at the pump controller cabinet.

See Figure 9.

WARNING: Turn the fitting away from you to prevent the escaping air from being aimed at your face in the next steps. Failure to observe this warning can result in personal injury.

7. Disconnect the input air supply tubing (4) from the push-lock air fitting labeled RU (5) at the bottom of the left air cylinder (3). This will bleed the air pressure from below the piston.
8. Disconnect the input air supply tubing (2) from the push-lock air fitting labeled RD (1) at the top of the left air cylinder.

Restoring Air to Elevator Air Cylinders

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

See Figure 8.

1. Place the elevator control valve (13) in the NEUTRAL position.

See Figure 9.

2. Connect the input air supply tubing (2) to the fitting labeled RD (1) and the air supply tubing (4) to the fitting labeled RU (5).

See Figure 8.

3. Raise the follower plate (4) and remove the wood blocks from beneath the follower plate.
4. Replace the material container. Refer to the *Container Change* procedures in the *Operation* section for more information.
5. Turn the elevator control regulator (7) and the air motor regulator (12) to their standard operating levels.
6. Turn on the air motor lockout valve (9).

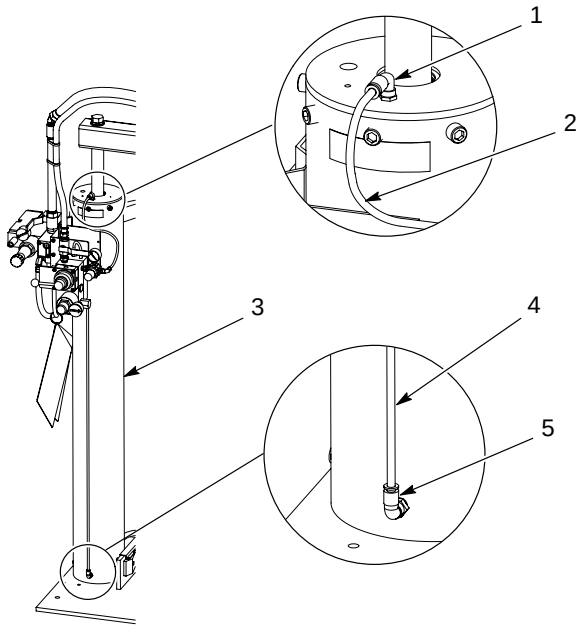


Figure 9 Bleeding Residual Air from the Air Cylinders

1. Push-lock air fitting (RD)
2. Input air supply tubing
3. Air cylinder
4. Input air supply tubing
5. Push-lock air fitting (RU)

Adjusting the Runaway Sensor.

If you have to remove or adjust the placement of the runaway sensor (See Figure 4, (4)) for any reason, make sure it is positioned at the middle of the pump stroke.

Parts

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.

- 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.

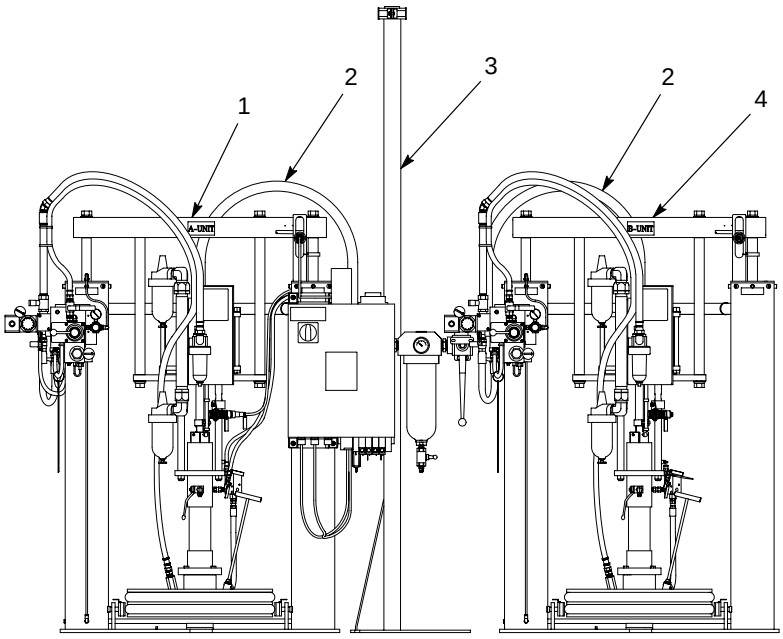
The number in the Quantity column is the quantity required per unit, assembly, or subassembly. The code AR (As Required) is used if the part number is a bulk item ordered in quantities or if the quantity per assembly depends on the product version or model.

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.

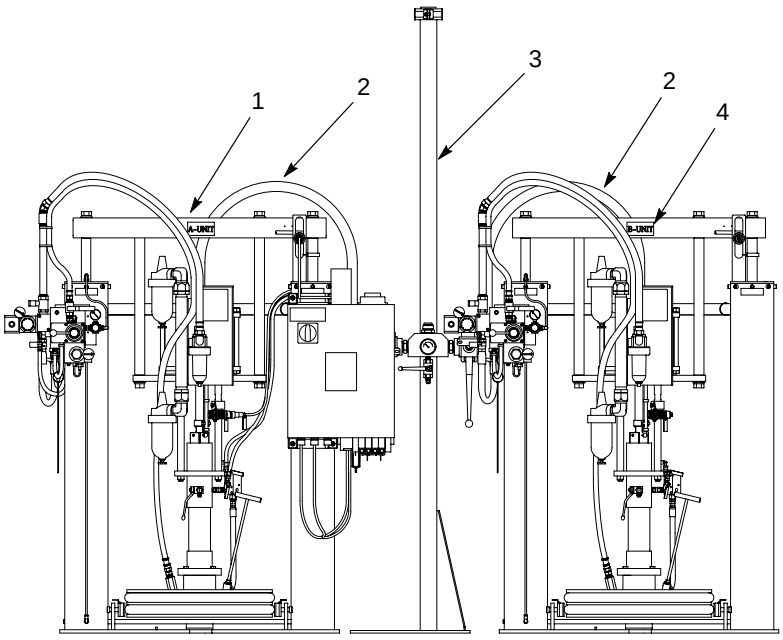
Item	Part	Description	Quantity	Note
—	0000000	Assembly	1	
1	000000	• Subassembly	2	A
2	000000	• • Part	1	

Dual Unloader Parts

See Figure 10 and refer to the following parts list.



A. Dual unloaders with filter



B. Dual unloaders with mastic stand

Figure 10 Dual Unloaders

Note that one column lists the A-Unit components and the other column lists the B-Unit components. Quantities of items are the same for both the A- and B-Units unless otherwise noted.

Item	Part	Part	Description	Quantity	Note
—	1004453		Dual unloaders, drum, GM, 65:1, with filter	1	
—		1004454	Dual unloaders, drum, GM, 65:1	1	
1	1004511		• Bulk unloader, 65:1 A-Unit, GM with filter	1	
1		1004479	• Bulk unloader, 65:1 A-Unit, GM	1	
2	329584	329584	• Hose, $1^{1}/_{2}$-in. x 6.00-in., 4000 psi, $1^{7}/_{8}$	2	
3	329837		• Stand, hose, adhesive	1	
3		329659	• Stand, hose, mastic	1	
4	1004500	1004500	• Bulk unloader, 65:1, B-Unit, GM	1	
NS	329765	329765	• Tube fitting, male, 1.5 tube x 1.25 NPT	2	A
NS	900481	900481	• Adhesive, pipe/thread/hydraulic sealant	AR	A

NOTE A: This part connects to the output check valve on the rear view of each unloader.

B: Apply pipe/thread/hydraulic adhesive on all pipe threads.

AR: As Required

NS: Not Shown

Pneumatic Components

See Figures 11, 12 and 13. Refer to the following parts lists.

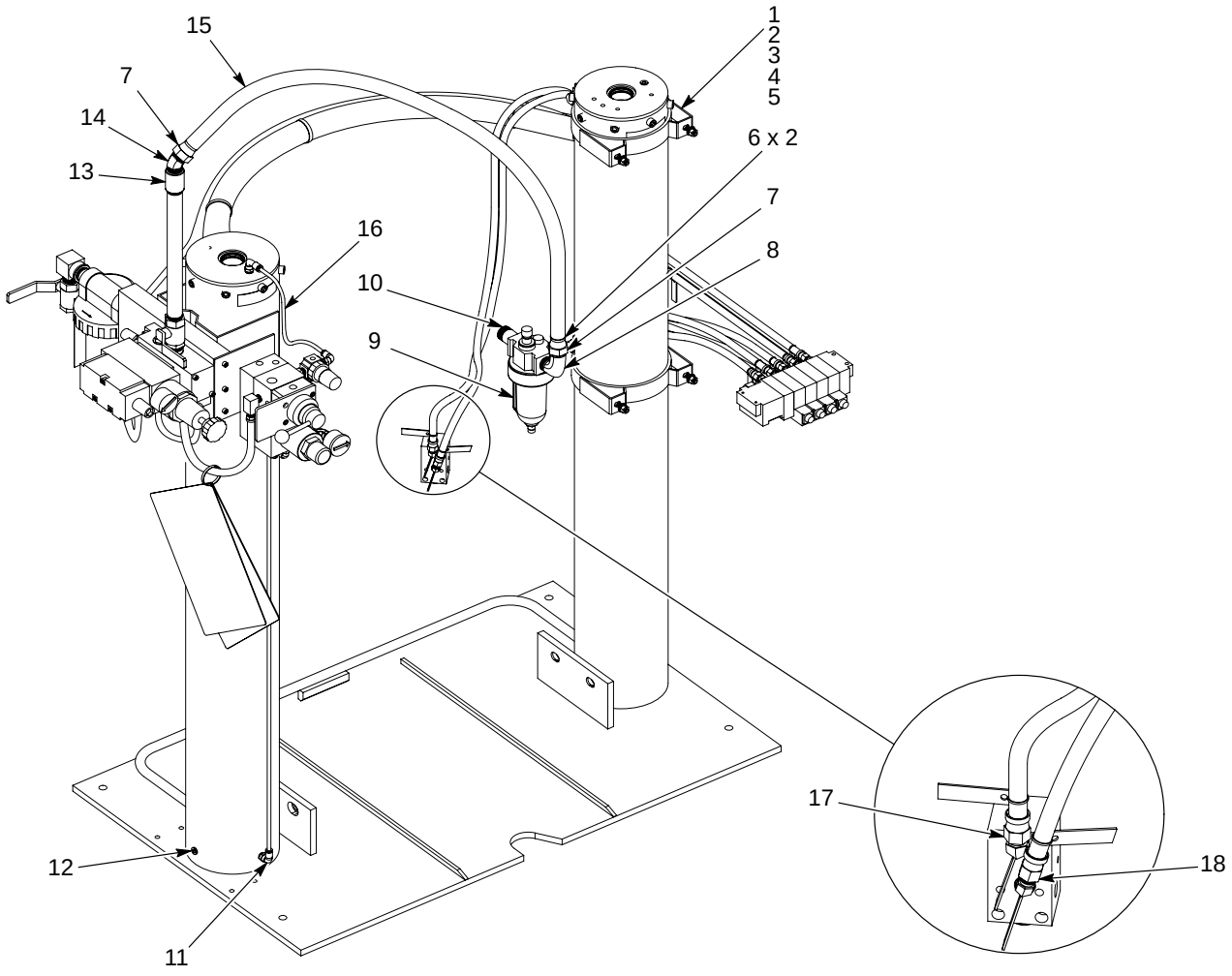


Figure 11 Pneumatic Components

Note that one column lists the A-Unit components and the other column lists the B-Unit components. Quantities of items are the same for both the A- and B-Units unless otherwise noted.

Item	Part	Part	Description	Quantity	Note
—	1004501		Module, pneumatic, A-Unit, GM	1	
—		1004507	Module, pneumatic, B-Unit, GM	1	
1	329500		• Clamp, accumulator, 160–172 mm diameter	2	
2	981353		• Screw, hex, $^{5}/_{16}$-18 x 1.250, cap, zinc	4	
3	983051		• Washer, flat, e, 0.344 x 0.688 x 0.065, zinc	8	
4	983150		• Washer, lock, e, split, $^{5}/_{16}$, steel, nickel	4	
5	984140		• Nut, hex, reg, $^{5}/_{16}$-18, steel, zinc	4	
6	1004377	1004377	• Clamp, hose, 1.125, crimp, double ear	4	
7	124795	124795	• Fitting, hose, $^{3}/_{4}$ barb x $1^{1}/_{16}$	4	
8	972583	972583	• Elbow, male, 37, $^{1}/_{16}$-12 x $^{3}/_{4}$, steel	1	
9	303956	303956	• Lubricator, micro mist, $^{3}/_{4}$ NPT	1	
10	- - - - - -	- - - - - -	• Nipple, steel, schedule 40, $^{3}/_{4}$ x 2, plain	1	
11	971266	971266	• Elbow, male, 0.25 tube x 0.25 NPT	2	
12	973410	973410	• Plug, pipe, socket, standard, $^{1}/_{4}$, zinc	2/3	
13	- - - - - -	- - - - - -	• Coupling, pipe, cl150, $^{3}/_{4}$, plain	1	
14	973140	973140	• Elbow, male, 45 d, $^{3}/_{4}$ NPT x 1 1	2	
15	124792	124792	• Hose, 0.75 ID, 200 psi	AR	
16	900730		• Tubing, polyurethane, 0.250 x 0.040	AR	
17	329830	900730	• Connector, female, $^{1}/_{4}$ hose, $^{1}/_{2}$-20 barbed	5	
18	329829		• Connector, female, $^{1}/_{4}$ hose, $^{7}/_{16}$-20 barbed	8	
AR: As Required					

Pneumatic Components *(contd)*

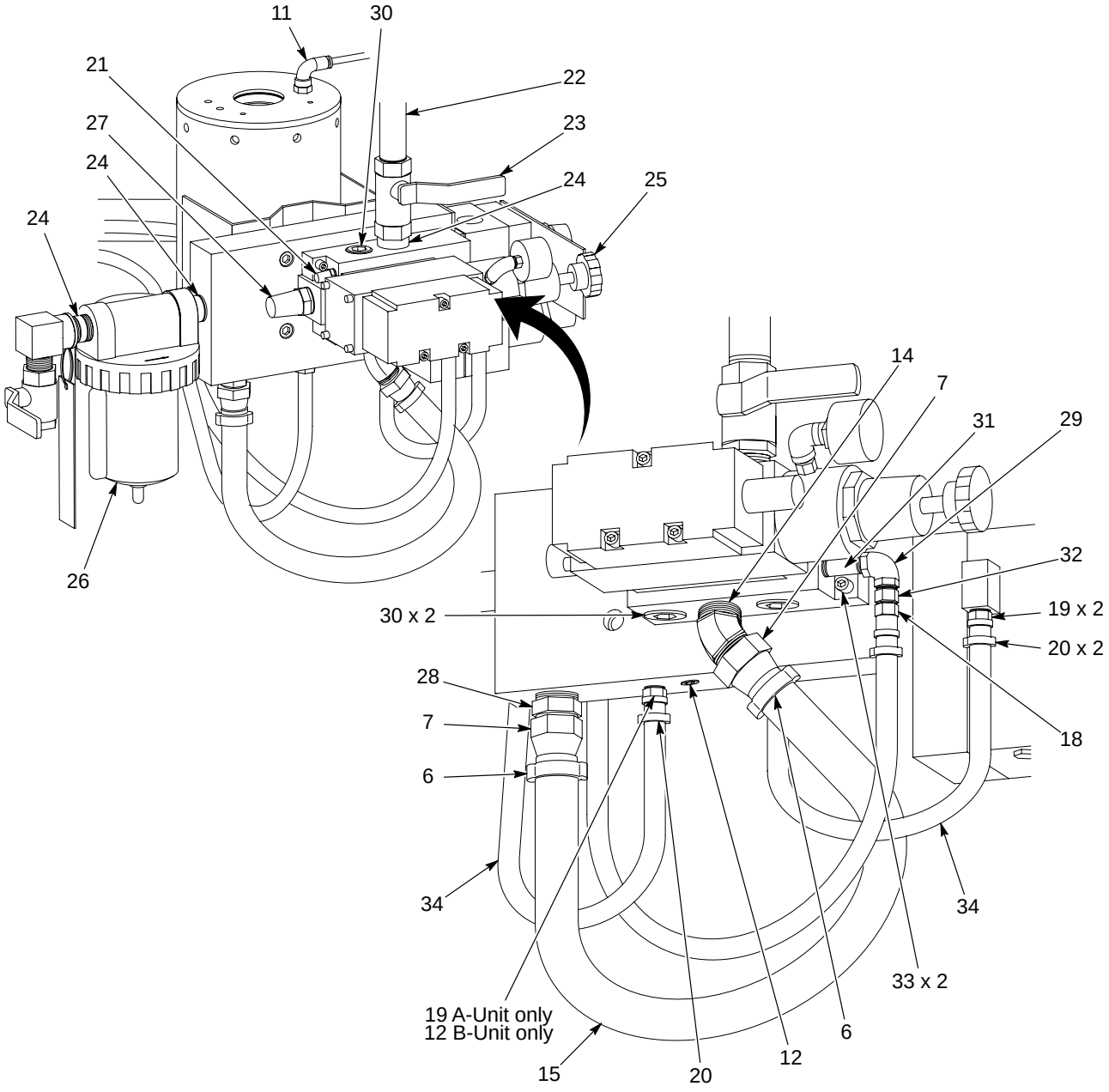


Figure 12 Pneumatic Components *(contd)*

Note that one column lists the A-Unit components and the other column lists the B-Unit components. Quantities of items are the same for both the A- and B-Units unless otherwise noted.

Item	Part	Part	Description	Quantity	Note
19	- - - - - -	- - - - - -	• Connector, male sw, $^1/_4$ hose, $^1/_4$ NPT barbed	3/2	
20	1004375	1004375	• Clamp, hose, $^9/_{16}$, crimp, double ear	16/2	
21	170269	170269	• Muffler, exhaust, $^1/_8$-in. NPT	1	
22	1003452	1003452	• Pipe fitting, schedule 40, nipple, male, $^3/_4$, 12-in. long, steel	1	
23	329498	329498	• Valve, ball, lock, closed, exhaust	1	
24	- - - - - -	- - - - - -	• Nipple, steel, schedule 40, $^3/_4$, close	3	
25	1004386	1004386	• Valve, reg, man, 4-way, 2-position, pilot-operated	1	
26	1003453	1003453	• Filter, $^3/_4$ NPT, 16-oz, 250 psi, 5 micron	1	
27	124851	124851	• Muffler, $^3/_4$ NPT, 40 micron	1	
28	972105	972105	• Connector, male, 37, $1^1/_{16}$-12 x $^3/_4$, steel	1	
29	973130	973130	• Elbow, pipe, hydraulic, 90, $^1/_8$, steel, zinc	1	
30	973442	973442	• Plug, pipe, socket, flush, $^3/_4$, zinc	3	
31	973514	973514	• Nipple, brass, $^1/_8$ NPT x 1.50 long	1	
32	972215	972215	• Connector, male, 37, $^7/_{16}$-20 x $^1/_8$ NPT, steel	1	
33	982032	982032	• Screw, socket, M6 x 30, black	2	A
34	805652	805652	• Hose, air $^1/_4$ ID	AR	
NS	900464	900464	• Adhesive, threadlocking	AR	

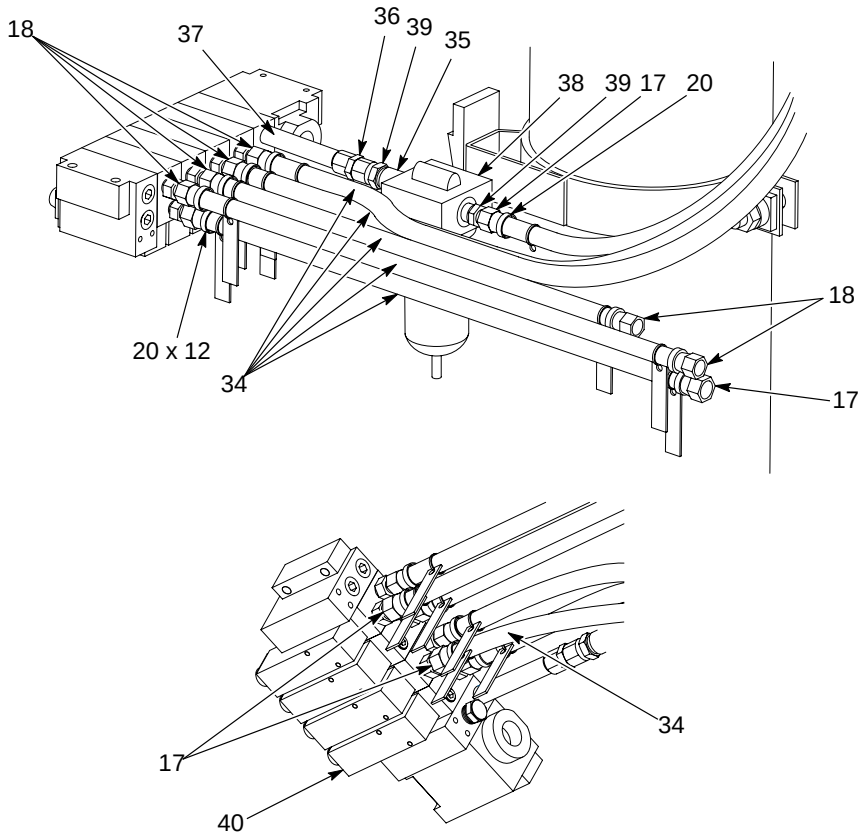
NOTE A: Coat these parts with threadlocking adhesive, part 900464.

AR: As Required

NS: Not Shown

Pneumatic Components *(contd)*

Note that one column lists the A-Unit components and the other column lists the B-Unit components. Quantities of items are the same for both the A- and B-Units unless otherwise noted.



(looking up at bottom of valve pack)

Figure 13 Pneumatic Components *(contd)*

Item	Part	Part	Description	Quantity	Note
35	1006225		• 37-degree flare connector, swivel, $^{5}/_{16}$ T x $^{1}/_{4}$ NPT	1	
36	973551		• Coupling, pipe, hydraulic, $^{1}/_{4}$ NPT, brass	1	
37	1006250		• Nipple, brass, schedule 40, $^{1}/_{4}$-in. x 3.50	1	
38	1006223		• Filter, coalescing, $^{1}/_{2}$-in. NPT, with automatic drain	1	
39	1006226		• 37-degree flare connector, male, $^{5}/_{16}$ T x $^{1}/_{4}$ NPT	2	
40	335652		Valve, 4-way, $^{1}/_{8}$ NPT, DC	AR	A
NOTE A: This part is shipped as part of the controller assembly. AR: As Required					

Empty/Limit Bracket

See Figure 14 and refer to the following parts list.

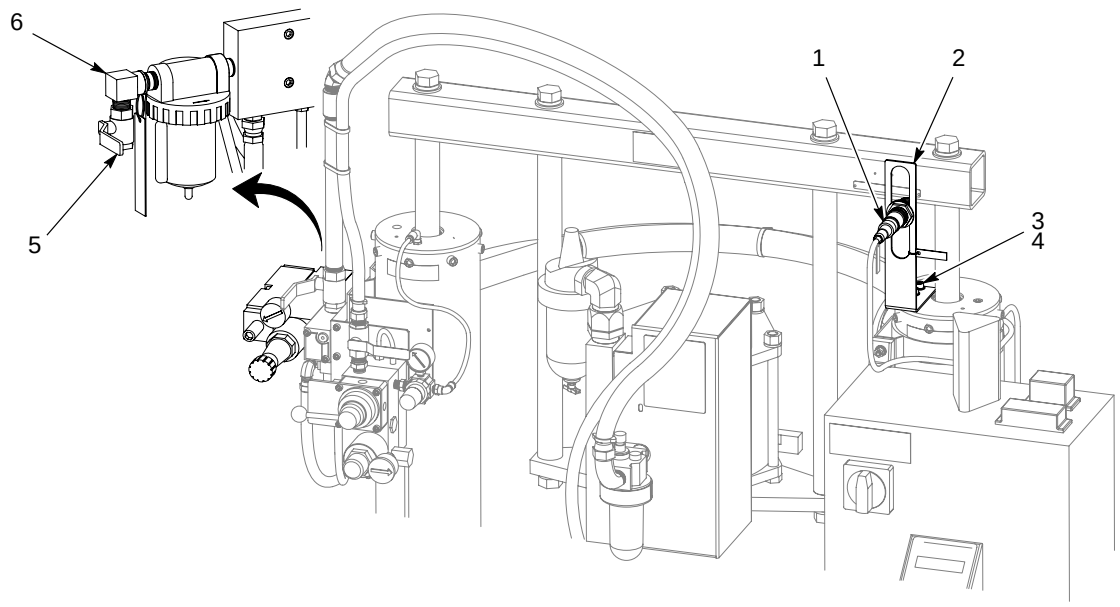


Figure 14 Manual Shut-Off and Empty/Limit Bracket

Item	Part	Description	Quantity	Note
1	332947	Switch, proximity, 4-pin Euro, PNP	1	
2	329508	Bracket, sensor proximity, GMT 360	1	
3	982035	Screw, socket, M8 x 16, black	2	
4	983013	Washer, flat, M, reg, 8, steel, zinc	2	
NS	900439	Adhesive, threadlocking	AR	

NOTE A: Apply threadlocking adhesive, part 900439, to this part.
AR: As Required
NS: Not Shown

Manual Shut-Off

See Figure 14 and refer to the following parts list.

Item	Part	Description	Quantity	Note
5	329498	Valve, ball, lock, closed, exhaust	1	
6	973226	Elbow, pipe, hydraulic, 90, $^3/_4$, steel, zinc	1	A
NS	900481	Adhesive, pipe/thread/hydraulic sealant	AR	

NOTE A: Apply pipe/thread/hydraulic adhesive, part 900481, to this part.
AR: As Required
NS: Not Shown

Elevator/Blow-Off Control Module

See Figure 15 and refer to the following parts list.

NOTE: The bracket and hose are not shown in Figure 15.

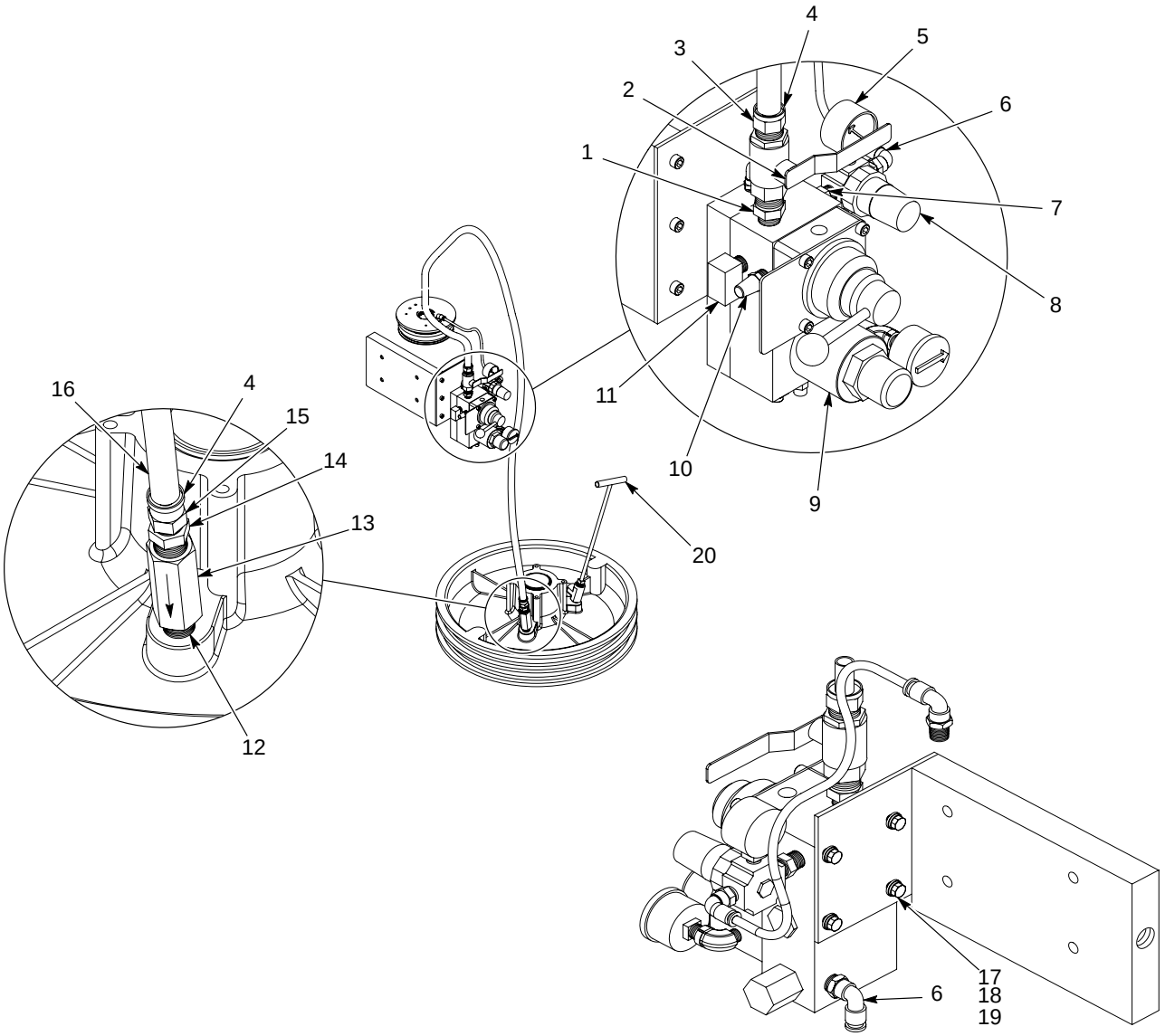


Figure 15 Elevator/Blow-Off Control Module

Item	Part	Description	Quantity	Note
—	- - - - - -	Module, elevator/blow-off control	1	
1	973973	• Nipple, hex, $^1/_2$ x $^3/_8$ x 1.625, brass	1	
2	901151	• Valve, ball, $^1/_2$ NPT	1	
3	972708	• Connector, male, $^1/_2$ hose, $^1/_2$ NPT, barbed	1	
4	1004376	• Clamp, hose, 13/16, crimp, double ear	2	
5	124790	• Gage, 0–160 psig, $^1/_8$ NPT	1	
6	971266	• Elbow, male, 0.25 tube x 0.25 NPT	2	
7	973037	• Nipple, hex, $^1/_4$ x $^1/_4$ x 1.45, steel, zinc	1	
8	126767	• Regulator, air, 0–60, $^1/_4$ NPT	1	
9	1002934	• Control unit, pneumatic, RUBOD II	1	
10	972903	• Muffler, exhaust, $^1/_4$ NPTF	1	
11	973151	• Elbow, pipe, hydraulic, 90, $^1/_4$, steel, zinc	1	
12	973076	• Nipple, steel, sched 40, $^1/_2$, 1.12	1	
13	332925	• Valve, check, 1.5 psi, $^1/_2$-in. NPT	1	
14	972108	• Connector, male, 37, $^3/_4$-16 x $^1/_2$, steel	1	
15	972024	• Connector, female, $^1/_2$ hose, $^3/_4$-16, barbed	1	
16	281858	• Hose, air, $^1/_2$ ID pushlock	AR	
17	324833	• Screw, hex, cap, M6 x 16, zinc	4	
18	983409	• Washer, lock, m, split, M6, steel, zinc	4	
19	983410	• Washer, flat, m, narrow, M6, steel, zinc	4	
NS	900481	• Adhesive, pipe/thread/hydraulic sealant	AR	A
NS	900439	Adhesive, threadlocking	AR	B
20	320859	Stem, bleeder, follower, long	1	C

NOTE A: Apply pipe/thread/hydraulic sealant on the check valve (13) and all pipe threads during assembly.

B: Apply threadlocking adhesive to the follower plate when installing elevator/blow-off control module components.

C: This part is included in the follower plate module for the unloaders.

AR: As Required

NS: Not Shown

Pump Controllers

See Figure 16 and refer to the following parts list.

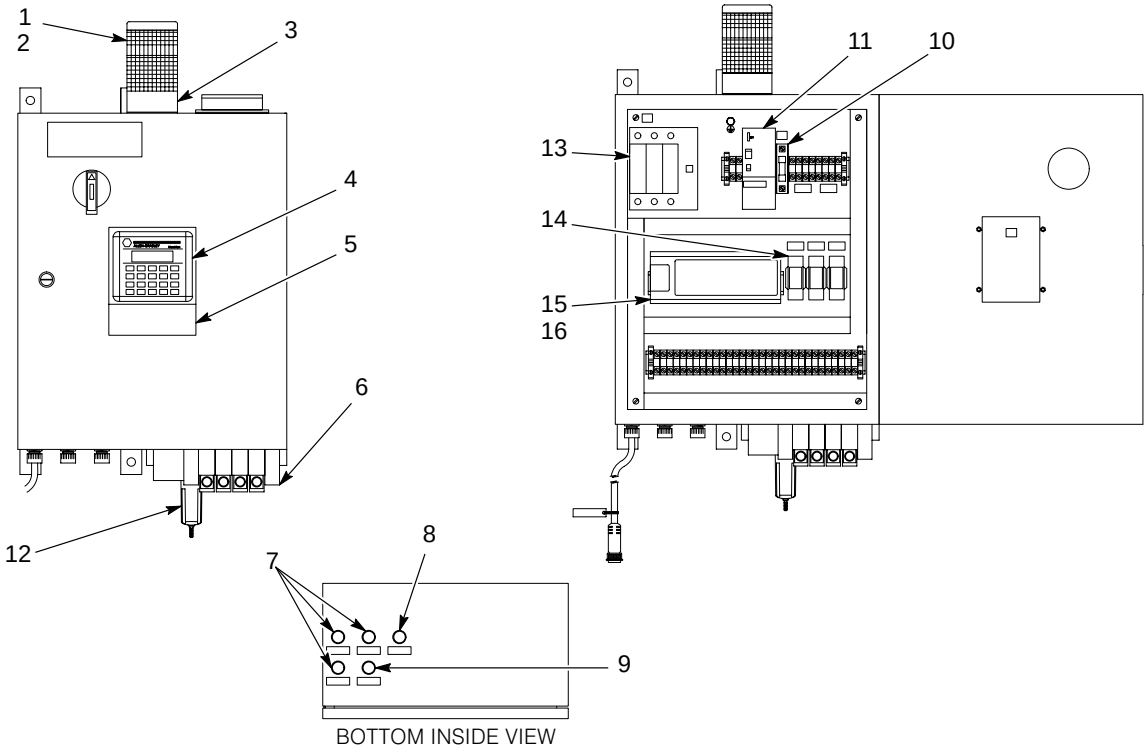


Figure 16 Pump Controllers

Item	Part	Description	Quantity	Note
—	327177	Controller, dual unloader, with filter	1	
—	327345	Controller, dual unloader	1	
1	327387	• Light source, amber LED light tower	1	
2	327385	• Lens, amber for light tower	1	
3	335503	• Base unit, mini direct panel mount	1	
4	341371	• Display, operator panel, with software	1	
5	341377	• Sloped mounting bracket for display	1	
6	341378	• Station 1–4, with terminal strip	1	
NS	335652	• • Valve, 4-way, $^1/_8$ NPT, DC	4	A
7	341374	• Cable, 4-pin micro, 6-m	3	
8	341376	• Cable, 5-pin mini, 20-ft, filter	1	B
9	341375	• Cable, 4-pin micro, 4-m	1	
10	341385	• Fuse, time delay, 2 amp	1	
11	341372	• Power supply, 24 Vdc at 2 amp	1	
12	341384	• Fuse, class CC, time delay, 2 amp	1	
13	282446	• Relay, DPDT 10A	1	
14	341359	• Programmable logic controller, with software	3	
15	235935	• Cable, communication	1	

NOTE A: This part is shown in Figure 12. You can order individual spare valves or the 4-valve assembly with the terminal strip.

B: This part is only used with the dual unloader pump controller with filter, part 327177.

NS: Not Shown

Support Assembly

See Figure 17 and refer to the following parts list.

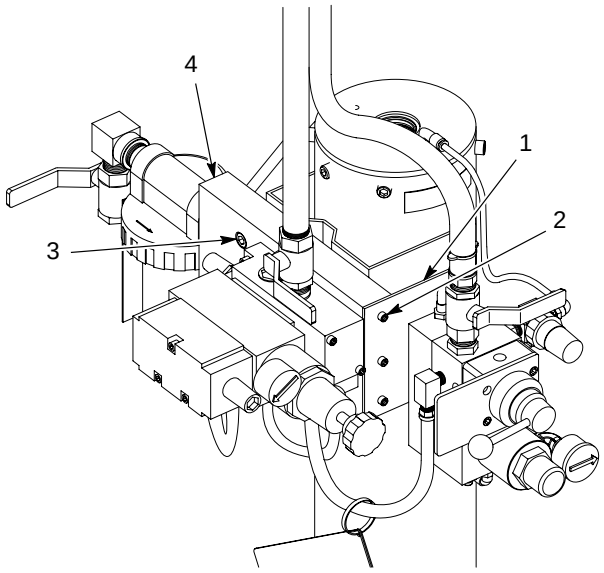


Figure 17 Support Assembly

Item	Part	Description	Quantity	Note
—	1004508	Module, support, pneumatic drum, GM	1	
1	1003423	• Plate, mount, RUBOD	1	
2	982030	• Screw, socket, M6 x 20, black	3	
3	981936	• Screw, socket, $^{3}/_{8}$ -16 x 1.500, zinc	4	
4	- - - - - -	• Manifold, air, main, bulk unloader	1	
NS	900464	• Adhesive, threadlocking	AR	

AR: As Required
NS: Not Shown

Drum Hold Down Kit

See Figure 18 and refer to the following parts list.

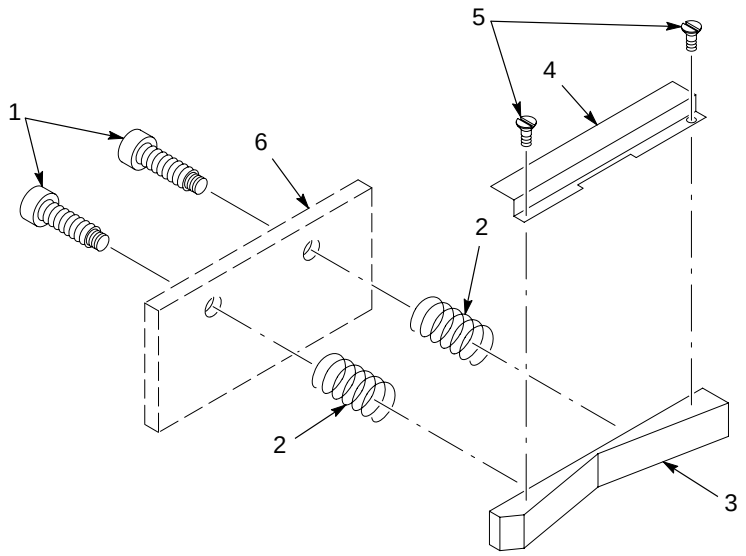


Figure 18 Drum Hold Down Kit

Item	Part	Description	Quantity	Note
—	282774	Kit, drum hold down	1	A
1	230607	• Screw, socket head, shoulder	4	B
2	807230	• Spring	4	
3	807231	• Holder, drum	2	
4	807232	• Cover	2	
5	981014	• Screw, pan head, #4-40 x 0.250, steel, zinc	4	
NS	900464	• Adhesive, threadlocking	AR	
6	- - - - - -	Flange, frame assembly	2	C

NOTE A: If your old drum hold down kit used washers, discard them before installing the new hold down kit.

B: Apply threadlocking adhesive to this part during reassembly.

C: The flanges are part of the frame assembly and are shown for reference purposes only. Only one flange is shown in the figure.

AR: As Required

NS: Not Shown

Depressurization Module

See Figure 19 and refer to the following parts list.

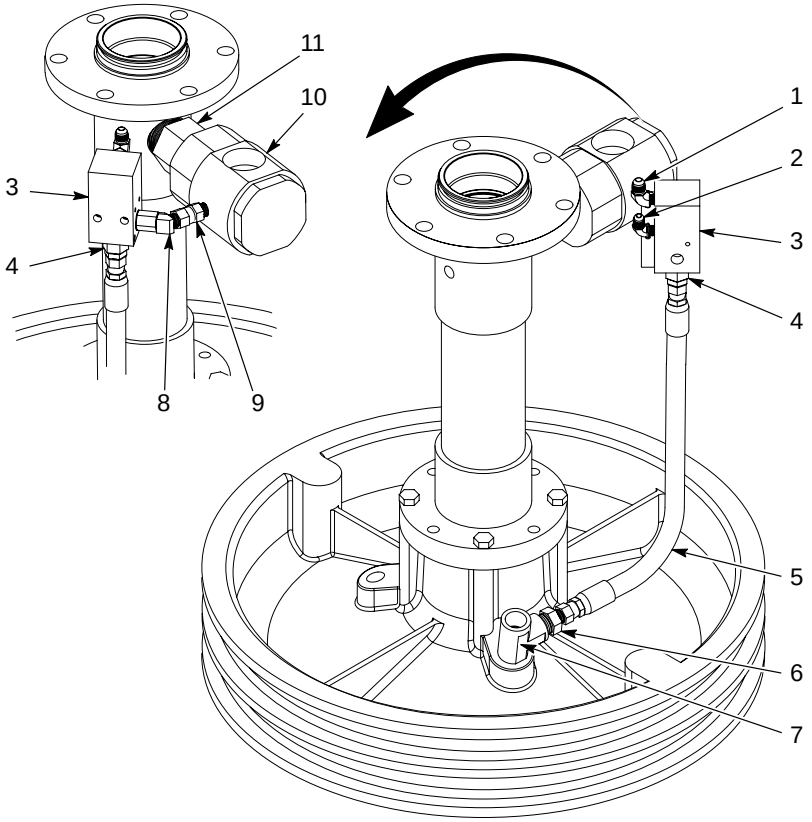


Figure 19 Check Valve and Depressurization Components

Item	Part	Description	Quantity	Note
—	329561	Module, depressurization	1	
1	329740	• Elbow, male, 37, $^{1}/_{2}$-20 x $^{1}/_{8}$ NPT, steel	1	A
2	972151	• Elbow, male, 37, $^{7}/_{16}$-20 x $^{1}/_{8}$, steel	1	A
3	238418	• Gun, Auto-Flo, standalone, polymyte	1	B
4	281334	• Adapter, $^{9}/_{16}$-18 JIC, $^{3}/_{8}$ NPSM	1	
5	329565	• Hose, -6 JIC 37, $^{3}/_{8}$ x 18-in.	1	
6	972771	• Connector, male, 37, $^{9}/_{16}$-18 x $^{1}/_{2}$, steel	1	A
7	973547	• Tee, street, s, $^{1}/_{2}$ NPT	1	
8	329588	• Connector, 45, hose, $^{9}/_{16}$-18 x $^{9}/_{16}$-18	1	
9	973560	• Swivel, 37, $^{9}/_{16}$-18 x $^{1}/_{4}$, zinc	1	A
NS	900439	• Adhesive, threadlocking	AR	C
NS	900481	• Adhesive, pipe/thread/hydraulic sealant	AR	

NOTE A: Coat these parts with pipe/thread/hydraulic adhesive, part 900481.

B: Order the packing cartridge rebuild kit, part 239788, if you need to replace the packing cartridge instead of ordering a new gun.

C: Use this adhesive to coat the pipe thread that threads into the follower plate.

AR: As Required

NS: Not Shown

Check Valve

See Figure 19 and refer to the following parts list.

Output check valves are used to make sure that the pump does not stroke without material present.

Item	Part	Description	Quantity	Note
—	1004509	Module, check valve, $1^1/_4$ NPT, GM	1	
10	124935	• Valve, check, ball, $1^1/_4$ NPTF	1	A
11	322822	• Pipe fitting, $1^1/_4$ m x $1^1/_4$ f, steel, zinc	1	A
NS	900481	• Adhesive, pipe/thread/hydraulic sealant	AR	

NOTE A: Coat these parts with pipe/thread/hydraulic sealant, part 900481.
AR: As Required
NS: Not Shown

Exhaust Module

Each unloader includes two exhaust modules. Order spare parts accordingly.

See Figure 20 and refer to the following parts list.

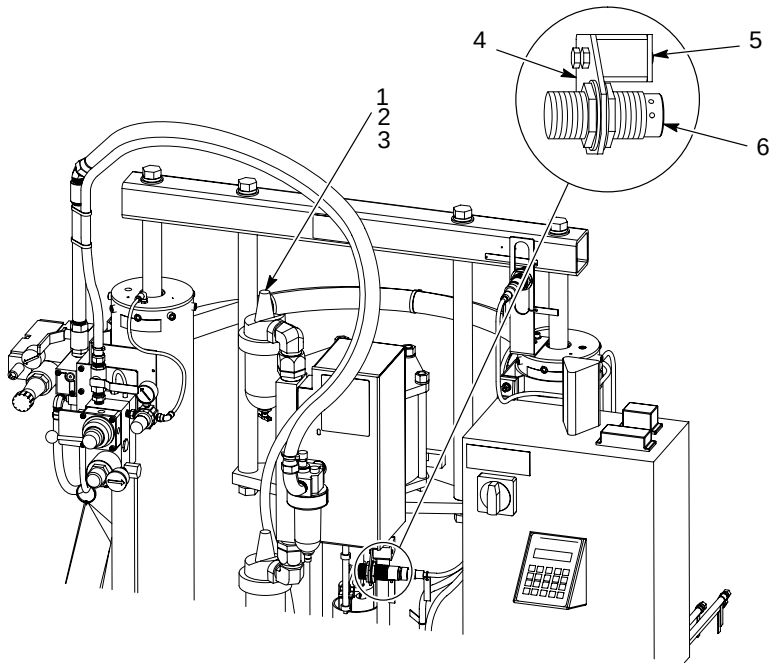


Figure 20 Runaway Sensor and Exhaust Components

Item	Part	Description	Quantity	Note
—	295788	Module, exhaust, reclassifier	2	
1	295796	• Muffler, reclassifier, 1 NPT	1	
2	295797	• Connector, swivel, $1^1/_4$ FJIC x $1^1/_4$ m	1	
3	295798	• Elbow, male, 37, $1^5/_8$-12 x 1 NPTF-16	1	

Runaway Sensor

See Figure 20 and refer to the following parts list.

Item	Part	Description	Quantity	Note
—	329557	Module, runaway	1	
4	239729	• Bracket, sensor, runaway	1	
5	295803	• Clamp, 1-in. tube, stauff, special	1	
6	332947	• Switch, proximity, 4-pin, Euro, PNP	1	

Accessory Kit

This kit is shIpped with the unloaders.

Item	Part	Description	Quantity	Note
—	124747	Accessory group, ship with kit	1	
NS	900216	• Oil, vitalizer, 1-gal	1	A
NS	900256	• Fluid, type K, pump chamber, 1-gal	1	B
NS	900302	• Grease, high temperature	1	
NS	900215	Oil, vitalizer, 1-qt	AR	A
NS	900255	Fluid, type K, pump chamber, 1-qt	AR	B

NOTE A: Vitalizer oil is used in the air motor lubricator. You can purchase vitalizer oil by the quart or the gallon.

B: Type K solvent chamber fluid is used in the solvent chamber of the pump. You can purchase Type K solvent chamber fluid by the quart or the gallon.

AR: As Required

NS: Not Shown

Specifications

Refer to Table 12.

Table 12 Specifications

Item	Specification
Electrical Supply	120 Vac, 3.0 amps (normal operation)
Air Supply	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. Refer to the air consumption data in the *7- and 10-Inch Air Motors with Air Valve* manual for more information.
Weight	790 lb (359 kg)
Dimensions	Height (elevator down): 94 in. (157 cm) with stand Height (elevator up): 103 in. (268 cm) Depth: 31 in. (79 cm) Width: 56 in. (142 cm)
Baseplate Mounting Holes	Depth on center: 20.5 in. (52 cm) Width on center: 39 in. (99 cm)