

UniDrumTM Supply System

3A2510R

EN

Bulk Supply System for 1000 Liter Magnadrum. For professional use only.

Not approved for use in explosive atmospheres or hazardous (classified) locations.

The UniDrum Supply System evacuates 1000 liter magnadrum or other tote drums of the same size and capacity. The UniDrum Supply System pumps and transfers flowable and highly viscous materials such as sealant, adhesives, and sound deadeners from bulk drums with maximum efficiency.

The UniDrum Supply System is designed to work with other high pressure equipment to optimize material use.

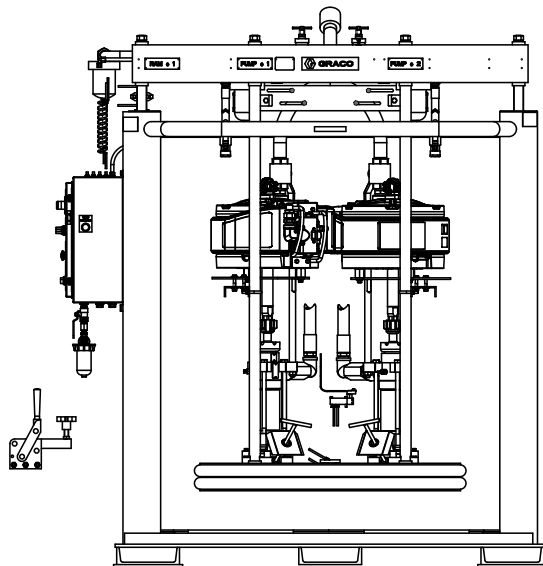
See **Technical Specifications** on page 72 for Maximum Inlet Air Working Pressure

See page 4 for model information.

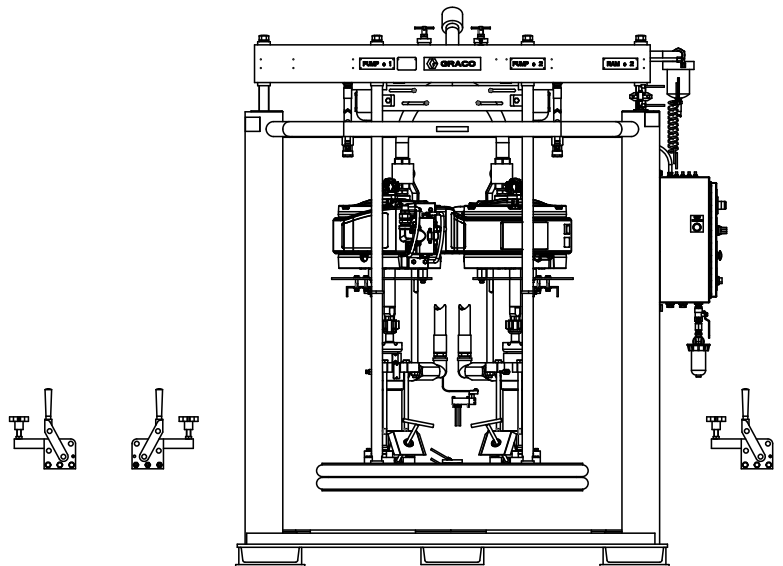


Important Safety Instructions

Read all warnings and instructions in this manual and related manuals before using the equipment. Save these instructions.



UniDrum Left Hand Supply Unit



UniDrum Right Hand Supply Unit

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Related Manuals

Manual in English	Description
308201	Airgard Pump Runaway Valve, Instructions-Parts
308169	Air Filters, Lubricators, and Kits, Instructions-Parts
307375	Noise Reference Guide, Instructions
308151	Dura-Flo® 2400 Pumps, Instructions-Parts List
308812	Dura-Flo® 1200 Pumps, Instructions-Parts List
311717	Carbon Steel 1000cc Lower, Instructions-Parts List

Models

The UniDrum Supply Units listed below are covered in this manual. For specific pump information, refer to the chart in **Servicing the Pumps** on page 36.

Supply Unit Part No.	Pump	Ratio	Max. Outlet Pressure	Max. Fluid Flow @ 60 cpm	Pump Manual	Used in Systems	Platen Material
24M428 (Left Hand)	King, carbon steel	20:1	1800 psi (12.0 MPa, 124 bar)	9.2 gpm (35 lpm)	308151	---	Carbon Steel, Painted
24M708 (Right Hand)							
24M627 (Left Hand)	XL 10000™, stainless steel	71:1	5000 psi (34.0 MPa, 345 bar)	18.2 lpm	308812	24M582	
24M628 (Right Hand)							
24N999 (Left Hand)	NXT, carbon steel	23:1	2270 psi (16.0 MPa, 157 bar)	9.2 gpm (35 lpm)	308151	---	
24P004 (Right Hand)							
24U207 (Left Hand)	King, carbon steel	10:1	1000 psi (7 MPa, 69 bar)	17.4 gpm (66 lpm)	311717	---	
24U208 (Right Hand)							

Warnings

The following warnings are for the setup, use, grounding, maintenance, and repair of this equipment. The exclamation point symbol alerts you to a general warning and the hazard symbols refer to procedure-specific risks. When these symbols appear in the body of this manual or on warning labels, refer back to these Warnings. Product-specific hazard symbols and warnings not covered in this section may appear throughout the body of this manual where applicable.

 WARNING	
   	MOVING PARTS HAZARD Moving parts can pinch, cut or amputate fingers and other body parts. • Keep clear of moving parts. • Keep your hands away from the follower plate and the lip of the drum while the ram is operating. • Keep your hands away from the ram frame while the ram is operating. • Do not operate equipment with protective guards or covers removed. • Equipment can start without warning. Before checking, moving, or servicing equipment, follow the Pressure Relief Procedure and disconnect all power sources.
    	SKIN INJECTION HAZARD High-pressure fluid from gun, hose leaks, or ruptured components will pierce skin. This may look like just a cut, but it is a serious injury that can result in amputation. Get immediate surgical treatment. • Do not spray without tip guard and trigger guard installed. • Engage trigger lock when not spraying. • Do not point gun at anyone or at any part of the body. • Do not put your hand over the spray tip. • Do not stop or deflect leaks with your hand, body, glove, or rag. • Follow the Pressure Relief Procedure when you stop spraying and before cleaning, checking, or servicing equipment. • Tighten all fluid connections before operating the equipment. • Check hoses and couplings daily. Replace worn or damaged parts immediately. • Use only Graco approved hoses. Do not remove any spring guard that is used to help protect the hose from rupture caused by kinks or bends near the couplings.

WARNING



ELECTRIC SHOCK HAZARD

This equipment must be grounded. Improper grounding, setup, or usage of the system can cause electric shock.



- Turn off and disconnect power at main switch before disconnecting any cables and before servicing or installing equipment.
- Connect only to grounded power source.
- All electrical wiring must be done by a qualified electrician and comply with all local codes and regulations.



FIRE AND EXPLOSION HAZARD

Flammable fumes, such as solvent and paint fumes, in **work area** can ignite or explode. Paint or solvent flowing through the equipment can cause static sparking. To help prevent fire and explosion:



- Use equipment only in well-ventilated area.
- Eliminate all ignition sources; such as pilot lights, cigarettes, portable electric lamps, and plastic drop cloths (potential static sparking).
- Ground all equipment in the work area. See **Grounding** instructions.
- Never spray or flush solvent at high pressure.
- Keep work area free of debris, including solvent, rags and gasoline.
- Do not plug or unplug power cords, or turn power or light switches on or off when flammable fumes are present.
- Use only grounded hoses.
- Hold gun firmly to side of grounded pail when triggering into pail. Do not use pail liners unless they are anti-static or conductive.
- **Stop operation immediately** if static sparking occurs or you feel a shock. Do not use equipment until you identify and correct the problem.
- Keep a working fire extinguisher in the work area.



EQUIPMENT MISUSE HAZARD

Misuse can cause death or serious injury.



- Do not operate the unit when fatigued or under the influence of drugs or alcohol.
- Do not exceed the maximum working pressure or temperature rating of the lowest rated system component. See **Technical Specifications** in all equipment manuals.
- Use fluids and solvents that are compatible with equipment wetted parts. See **Technical Specifications** in all equipment manuals. Read fluid and solvent manufacturer's warnings. For complete information about your material, request Safety Data Sheets (SDSs) from distributor or retailer.
- Turn off all equipment and follow the **Pressure Relief Procedure** when equipment is not in use.
- Check equipment daily. Repair or replace worn or damaged parts immediately with genuine manufacturer's replacement parts only.
- Do not alter or modify equipment. Alterations or modifications may void agency approvals and create safety hazards.
- Make sure all equipment is rated and approved for the environment in which you are using it.
- Use equipment only for its intended purpose. Call your distributor for information.
- Route hoses and cables away from traffic areas, sharp edges, moving parts, and hot surfaces.
- Do not kink or over bend hoses or use hoses to pull equipment.
- Keep children and animals away from work area.
- Comply with all applicable safety regulations.

WARNING



SPLATTER HAZARD

Hot or toxic fluid can cause serious injury if splashed in the eyes or on skin. During blow off of platen, splatter may occur.

- Use minimum air pressure when removing platen from drum.



TOXIC FLUID OR FUMES HAZARD

Toxic fluids or fumes can cause serious injury or death if splashed in the eyes or on skin, inhaled, or swallowed.

- Read Safety Data Sheets (SDSs) to know the specific hazards of the fluids you are using.
- Store hazardous fluid in approved containers, and dispose of it according to applicable guidelines.



PERSONAL PROTECTIVE EQUIPMENT

Wear appropriate protective equipment when in the work area to help prevent serious injury, including eye injury, hearing loss, inhalation of toxic fumes, and burns. Protective equipment includes but is not limited to:

- Protective eyewear, and hearing protection.
- Respirators, protective clothing, and gloves as recommended by the fluid and solvent manufacturer.

Uncrating the System

The UniDrum Supply System was carefully packaged for shipment by Graco. When the system arrives, perform the following procedure to uncrate the system.

NOTICE

Moving the unit off of the pallet without following the uncrating procedure can damage the equipment.

To uncrate the system, perform the following steps:

1. Inspect the crate carefully for shipping damage. Contact the carrier promptly if damage is discovered.
2. Remove the plywood sides and top of the crate.
3. Inspect the contents carefully. There should not be any loose or damaged parts.
4. Compare the packing slip against all items included in the crate. Report any shortages or other inspection problems immediately.
5. Remove the band straps that hold the UniDrum to the pallet.
6. The UniDrum is ready for installation. Before installing the system, read the **General Description** section on page 13 to become familiar with the system components.

Overview

Installation Overview

The location of the UniDrum should allow for easy loading and unloading of the 1000 liter magnadrum or other tote drums with either a forklift truck or pallet-jack hand truck.

The UniDrum Supply System must be leveled and mounted on a horizontal floor. An unlevelled condition can keep the UniDrum from operating properly.

Anchor the frame's four foot pads securely to the floor. The anchor bolts should be sized with sufficient safety factor to withstand the downward force of the follower plate and other objects that can push the frame off the floor.

Operation Overview

The UniDrum is a supply system that evacuates fluids from a 1000 liter magnadrum or other tote drums.

Each UniDrum includes two Graco air motors and displacement pumps, a ram assembly with a follower plate, and a pneumatic logic panel that controls the air components.

In short, the operator places the magnadrum inside the frame with the follower plate placed directly on top of the material. Locally, the system can be operated using the pneumatic logic panel.

Two displacement pumps evacuate material out of each magnadrum. After removing the empty drum from the system, the operator repeats the evacuation process when another drum is ready for evacuation.

Component Identification

NOTE: FIG. 1 shows the typical UniDrum Supply System equipped with XL 10000™ air motors.

UniDrum Supply System

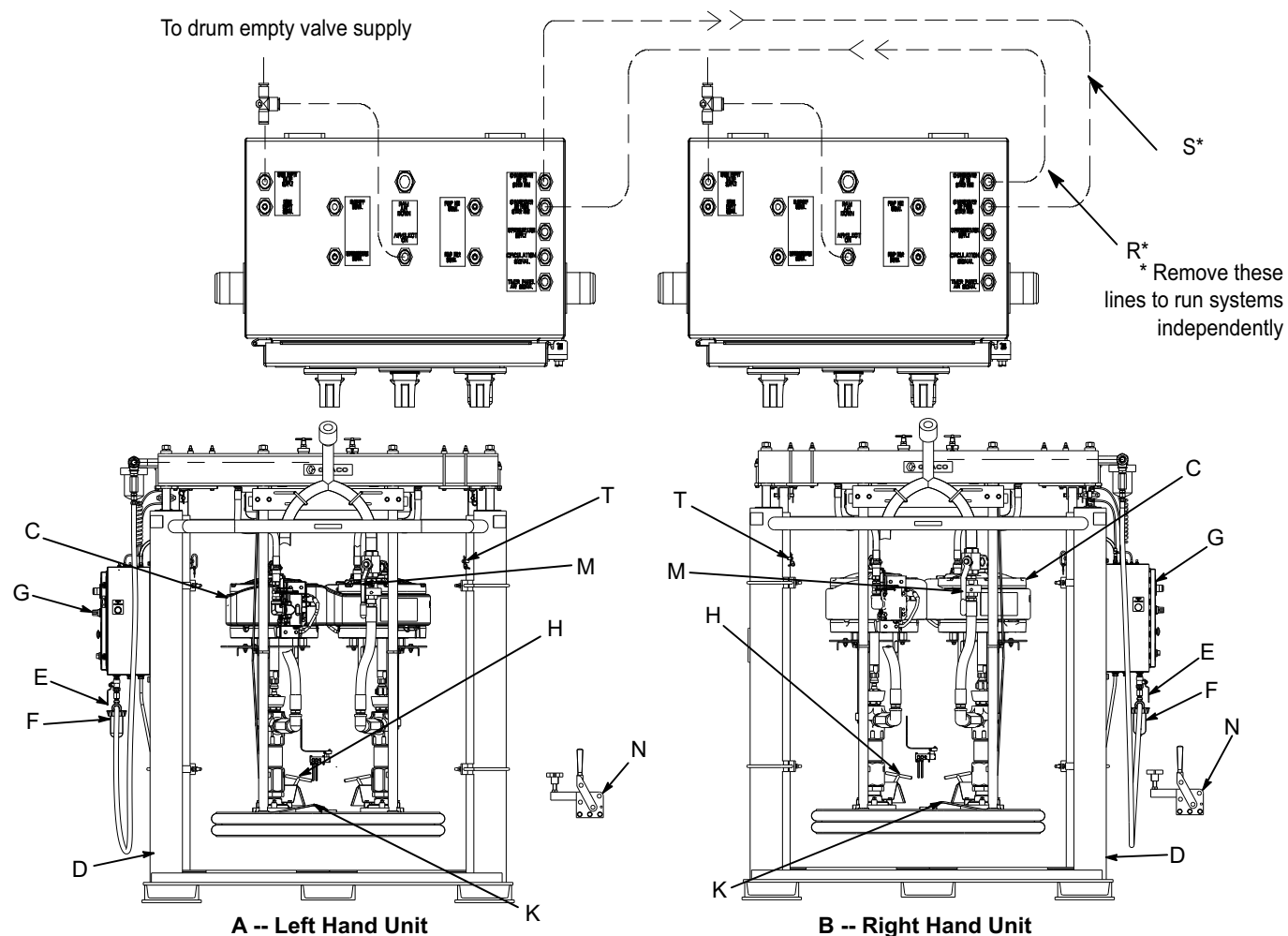
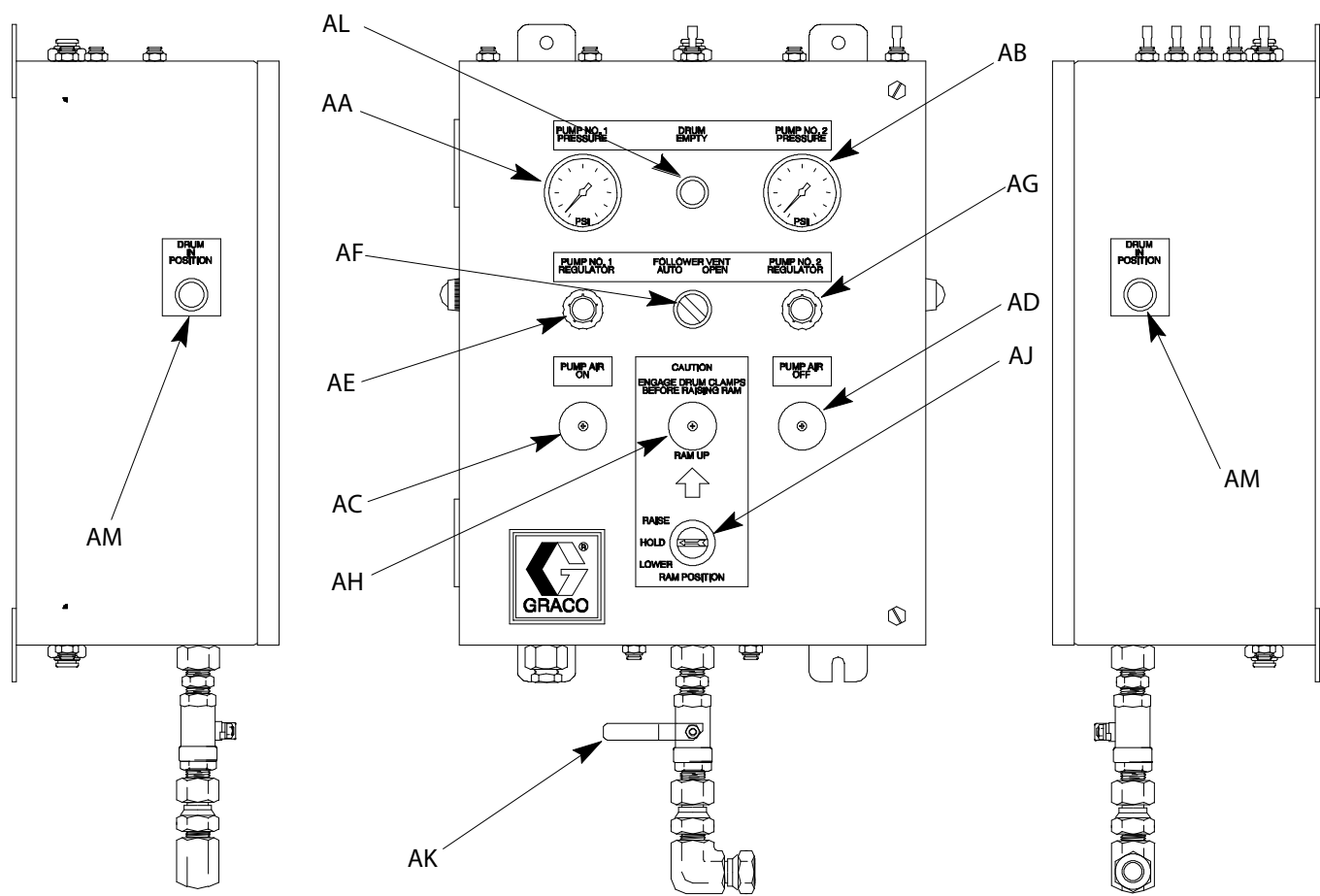


FIG. 1: UniDrum Supply System with XL 10000 Air Motors

Key:

- | | |
|---|---|
| A Left Hand (LH) Supply Unit | N Drum Clamps (installed by end user) |
| B Right Hand (RH) Supply Unit | P Drum In Position Switch (installed by end user) |
| C Pumps and Air Motor (See Models on page 4) | R Changeover Air to Supply Unit 1 (LH) |
| D Follower Plate | S Changeover Air to Supply Unit 2 (RH) |
| E Main Air Inlet Valve | T Safety Pins |
| F Pneumatic Panel Air Filter | |
| G Pneumatic Logic Panel | |
| H Bleed Stick | |
| K Vent Cylinders | |
| M Pump Inlet Valves | |

Pneumatic Logic Panel, 243559



243559 Panel Shown

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FIG. 2: Pneumatic Logic Panel

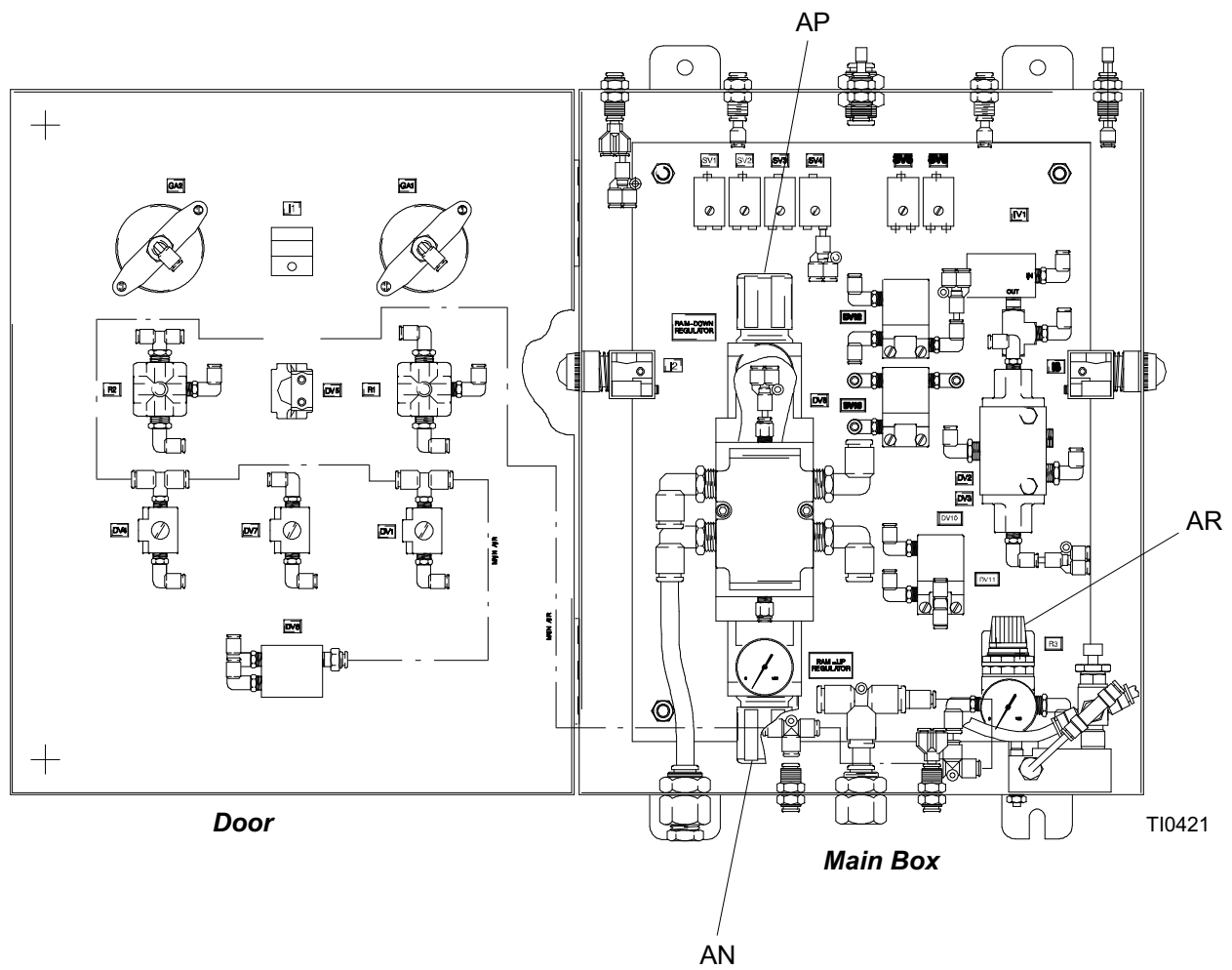


FIG. 3: Pneumatic Logic Panel Interior

Pneumatic Logic Panel Switches and Indicators

Use the table, FIG. 2, and FIG. 3 when operating the switches and reading the indicators on the Pneumatic Logic Panel (G).

Ref.	Button/Switch/Guage		What it Does
AA	PUMP NO. 1 PRESSURE Air Gauge		Indicates the air outlet pressure setting from Pump No. 1.
AB	PUMP NO. 2 PRESSURE Air Gauge		Indicates the air outlet pressure setting from Pump No. 2.
AC	Pump Air On		Starts the pumps.
AD	Pump Air Off		Shuts the pumps off.
AE	PUMP NO. 1 REGULATOR Control Knob		Controls Pump speed and outlet pressure by adjusting the air pressure to Pump No. 1.
AF	FOLLOWER VENT Directional Valve		Opens and closes the vent that relieves air pressure from the Follower Plate (D).
AG	PUMP NO. 2 REGULATOR Control Knob		Controls Pump speed and outlet pressure by adjusting the air pressure to Pump No. 2.
AH	RAM UP Pushbutton		Raises the Follower Plate (D) when the RAM POSITION Switch (AG) is set to RAISE.
AJ	RAM POSITION Switch	RAISE	Allows the Follower Plate (D) to raise.
		HOLD/NEUTRAL	Holds the Follower Plate (D) in the current position.
		LOWER	Lowers the Follower Plate (D).
AK	Panel Air Inlet Valve		Opens air supply line to the Pneumatic Logic Panel (G).
AL	DRUM EMPTY Indicator		Indicates low fluid level in drum. Signals change to other ram in tandem systems.
AM	DRUM IN POSITION Indicator		Indicates presence of Magnadrum under follower plate.
AN	RAM UP Air Regulator		Controls the air pressure used to raise the ram assembly.
AP	RAM DOWN Air Regulator		Controls the air pressure used to lower the ram assembly.
AR	R3 Regulator		Maintains air pressure on top of the ram cylinders to prevent the Follower Plate (D) from raising too quickly out of the drum.

General Description

A general description of the UniDrum Supply System helps the installers and operators become familiar with the system components. Contact your Graco distributor for help in choosing accessories to suit your particular needs.

Before you install the system, you should be familiar with the parts described in the following paragraphs.

System Components

See FIG. 1 on page 9.

- **UniDrum Supply Unit (A,B)** is usually setup to alternate the material supply operation between the left hand (LH) and right hand (RH) Supply Units, which is accomplished using a combination of pneumatic logic and manual operators. Drum changeovers occur after the Follower Plate (D) has reached its preset low limit level in the drum. Alternating between Supply Units eliminates the downtime that is usually expended unloading an empty drum and reloading a full drum.
 - LH Supply Unit (A) accommodates one 1000 liter drum. The LH Supply Unit has a local Pneumatic Logic Panel (G).
 - RH Supply Unit (B) accommodates one 1000 liter drum. The RH Supply Unit has a local Pneumatic Logic Panel (G).
- The **Pumps (C)** evacuate material from the drum. See **Models** on page 4 for available pump models.
- **The Follower Plate (D)** is connected to the ram assembly and is designed to apply an even amount of pressure to the material in the drum. With the Follower Plate in its raised position, the operator moves a drum inside the frame. The Follower Plate is lowered directly on top of the material in the drum. When pressure is applied to the Follower Plate, the material is pumped out of the drum through hoses, which are attached to the Pump outlet ports. When the drum is empty, the operator raises the Follower Plate and removes the empty drum. The process is repeated when another drum is ready to be unloaded.
- **Main Air Inlet Valve (E)** is used to open or shutoff the air supply to the entire Supply Unit.

- **Pneumatic Panel Air Filter (F)** filters air to the Pneumatic Logic Panel (G). The 5 micron filter removes particles, such as dust, moisture, foreign matter and other contaminants from the compressed air.
- The **Safety Pins (T)** are used to keep the ram from lowering while in the fully raised position during drum changes or maintenance of the supply system.
- **The Bleed Stick (H)** is removed to allow air trapped between the top of the material and Follower Plate (D) to be evacuated. Typically, the Bleed Stick is removed and the Follower Plate is lowered until the material can be seen in the bleed port. The Bleed Stick is replaced before pumping begins.
- **Vent Cylinders (K)** open to allow air back under the Follower Plate (D) while it is being removed from an empty drum. Take care to keep these vents clean. If vents become clogged, a vacuum can be created behind the Follower Plate and result in explosive removal of the Follower Plate from the empty drum.

Pneumatic Logic Panel (G)

See FIG. 2 on page 10 and FIG. 3 on page 11.

The Pneumatic Logic Panel (G) includes the following system components. For more information, refer to the **Pneumatic Diagram** on page 71.

- PUMP NO. 1 REGULATOR Control Knob (AE) controls Pump speed and outlet pressure for Pump No. 1 by adjusting the air pressure to the Pump.
- PUMP NO. 1 PRESSURE Air Gauge (AA) displays the amount of air pressure supplied to Pump No. 1.
- PUMP NO. 2 REGULATOR Control Knob (AG) controls Pump speed and outlet pressure for Pump No. 2 by adjusting the air pressure to the Pump.
- PUMP NO. 2 PRESSURE Air Gauge (AB) displays the amount of air pressure supplied to Pump No. 2.
- FOLLOWER VENT Directional Valve (AF) is activated to open the vent to relieve container pressure. The Follower Vent Directional Valve has two settings:

- In the AUTO setting, when the Ram Position switch is placed in the RAISE position, the vent valves open after a short delay. This allows air back under the follower plate, preventing the creation of a vacuum under the plate. The delay ensures that the downward force on the follower plate can be overcome and prevents material from flowing past the vents.
- In the OPEN position the vents open after a short delay and remain open to facilitate cleaning. The selector should be returned to the AUTO setting immediately after cleaning is complete. If the valve is left OPEN the vents may open when the Ram Position switch is placed in the UP position and material may flow past the vents onto the top of the follower plate.
- RAM UP Pushbutton (AH) turns on air pressure to raise the Follower Plate (D) when used in conjunction with the RAM POSITION Switch (AJ).
- The RAM POSITION Switch (AJ) performs the following three functions:
 - Place the switch in the RAISE position to raise the Follower Plate (D).
 - Place the switch in the HOLD/NEUTRAL position to hold the Follower Plate (D) in the current position.
 - Place the switch in the LOWER position to lower the Follower Plate (D).

Installation

				
The UniDrum Supply System is supplied with every major component attached and weighs approximately 3950 lb (1792 kg). The UniDrum Supply System should never be moved or lifted by one person. To avoid serious injury or equipment damage, engage an adequate number of personnel and use a forklift, hand truck, and support devices, such as a hoist when moving and installing the UniDrum.				

NOTICE

Exercise care when the system is being moved to its installed location. Jarring, dropping, or tilting the frame while it is being lifted or moved can result in damage to the system.

The installation procedures in this section are intended to serve as a guide for installing the UniDrum Supply System. If you need more information, contact your Graco distributor.

NOTE: When raising and lowering the Ram, be sure that the unit is unobstructed overhead to avoid interference with other objects.

Preparing the Site

Ensure that you have an adequate compressed air supply. Refer to the applicable instruction manual listed in **Related Manuals** on page 3 to find the air consumption of your Pump. Approximately 450 cfm at 80 psi is required to operate the Pumps at the maximum rate.

Keep the site clear of any obstacles or debris that could interfere with the installer's and operator's movement.

Selecting a Location for the UniDrum

Refer to **Technical Specifications** on page 72 for ram mounting and clearance dimensions.

When selecting a location for the UniDrum, keep the following in mind:

1. There should be sufficient space for installing, servicing, and using the equipment.
 - Select an accessible location for the system. There must be sufficient space around the system for maintenance.
 - Select a convenient location for the equipment. Check that there is sufficient overhead clearance for the Pump and ram when the ram is in the fully raised position. Make sure the Air Regulators (AC, AE) for the Pumps (C) and Follower Plate (D) are fully accessible.
 - Make sure the air source for the control panel and shutoff valves are fully accessible.
 - Make sure there is easy and safe access to an appropriate pneumatic source. Graco recommends a minimum of 3 feet (0.91 m) of open space in front of the Pneumatic Logic Panel (G).
2. Make sure that you will be able to level the base of the ram using metal shims.

Preparing to Install the UniDrum

Before installing the system:

- See component manuals for specific data on component requirements. Data presented here pertains to the system only.
- Have all system and subassembly documentation available during installation.
- Be sure that all non-Graco supplied hoses are adequately sized and pressure-rated to meet the system requirements.

Installing the UniDrum

To install the UniDrum, follow the procedure below. Refer to **Technical Specifications** on page 72 for ram mounting and clearance dimensions.

1. Using equipment such as a forklift or handtruck, move the UniDrum into place on the floor. Remove the shipping pallet.
2. Level the UniDrum, using metal shims.
3. Using the holes in the base as a guide, drill holes for 13 mm (1/2 in.) anchors.
4. Bolt the UniDrum to the floor using anchors that are long enough to prevent the unit from tipping.

Installing Drum Clamps

Two Drum Clamps (K) are provided with the system to be installed prior to system operation. The clamps hold the drum in place while removing the Follower Plate (D). The end user must locate and install the clamps in a manner that will hold the drum to the frame evenly.

Installing Drum In Position Switch

A Drum In Position Switch (P) is provided with the system to be installed prior to system operation. The Drum in Position Switch indicates that the drum is loaded. The end user must locate and install the switch in a location that will indicate the drum is in position. Connect the switch as shown below to the Pneumatic Logic Panel (G).

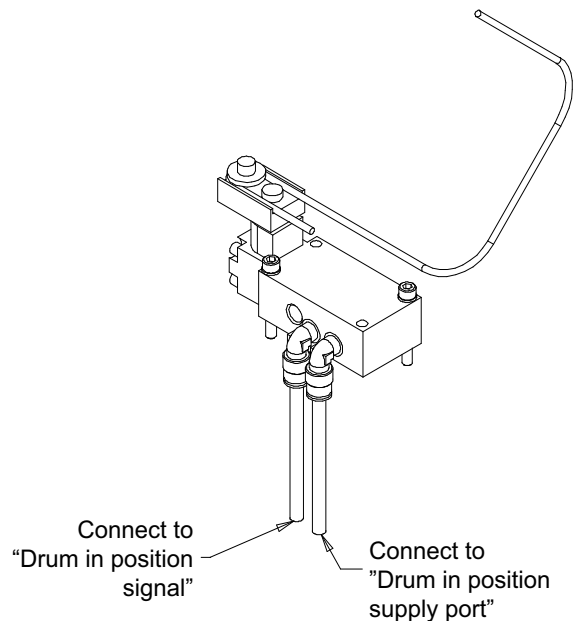
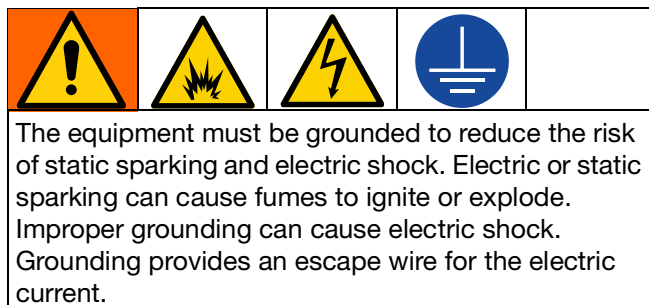


FIG. 4: UniDrum Supply Switch

Grounding the System



Pump: use a ground wire and clamp. Verify that the ground screw (GS) is attached and tightened securely to the air motor. Connect the clamp (U) of the static ground cable assembly to a true earth ground. For a ground wire and clamp, order Part No. 244524.

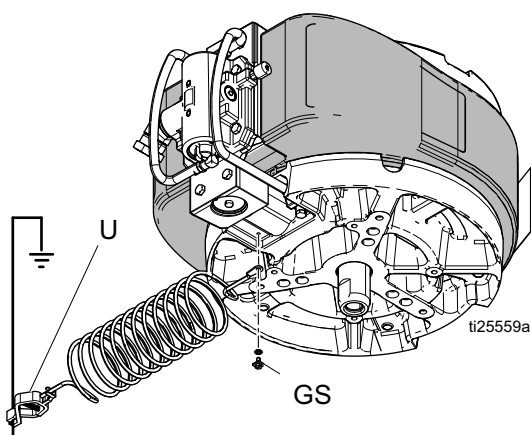


FIG. 5

Air and fluid hoses: use only electrically conductive hoses.

Air compressor: follow manufacturer's recommendations.

Spray gun / Dispense valve: ground through connection to a properly grounded fluid hose and pump.

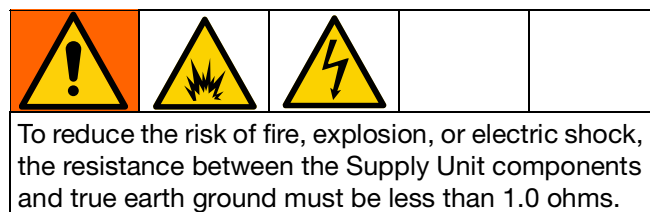
Fluid supply container: follow local codes and regulations.

Object being sprayed: follow local codes and regulations.

Solvent pails used when flushing: follow local codes and regulations. Use only conductive metal pails, placed on a grounded surface. Do not place the pail on a nonconductive surface, such as paper or cardboard, which interrupts grounding continuity.

To maintain grounding continuity when flushing or relieving pressure: hold metal part of the spray gun firmly to the side of a grounded metal pail, then trigger the gun.

Checking the Resistance Between the Pumps and the True Earth Ground



Check the resistance between each Pump and the true earth ground. If the resistance is greater than 1.0 ohms, a different ground site may be required. Do not operate the system until the problem is corrected.

NOTE: Use a meter that is capable of measuring resistance at this level.

Connecting the Air Supply Lines to the UniDrum

Perform the following procedure to connect the input air supply lines to the UniDrum Supply System.

Connecting Air Supply Lines to the Supply Units

To connect the main air supply line to the LH and RH Supply Units (A, B), perform the following steps:



To reduce the risk of overpressurizing your system, which could result in component rupture and cause serious injury due to splashing and skin injection, never exceed the specified maximum incoming air pressure to the Pumps (see the **Technical Specifications** on page 72).

Have a qualified technician connect both Supply Units to an air supply source that has the following required ratings:

Description	Requirements
Inlet Port Size:	1 in. npt(f)
Air Volume:	450 cfm (maximum)
Input Air:	80 psi (5.5 bar, 0.55 MPa)

1. Check the air supply to ensure that it is properly sized and pressure-rated for this system.
2. Connect the air supply line to the 1 in. npt Main Air Inlet (E).

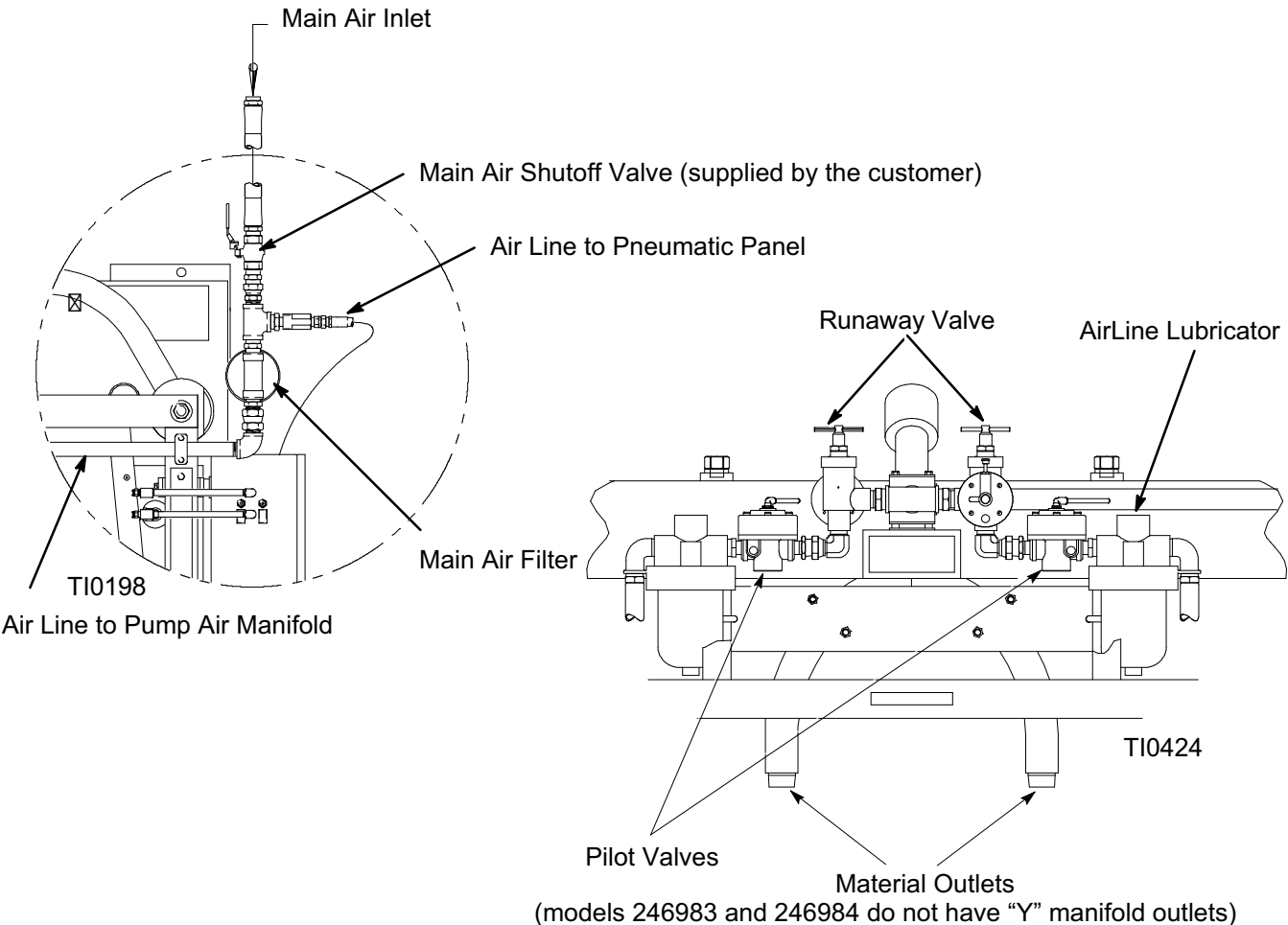


FIG. 6

Connecting Output Hose to the Pumps

This procedure describes how to connect the fluid output hoses to the two Pumps. It is the customer's responsibility to have the fluid supply hose already installed and ready for connection to the Pumps.

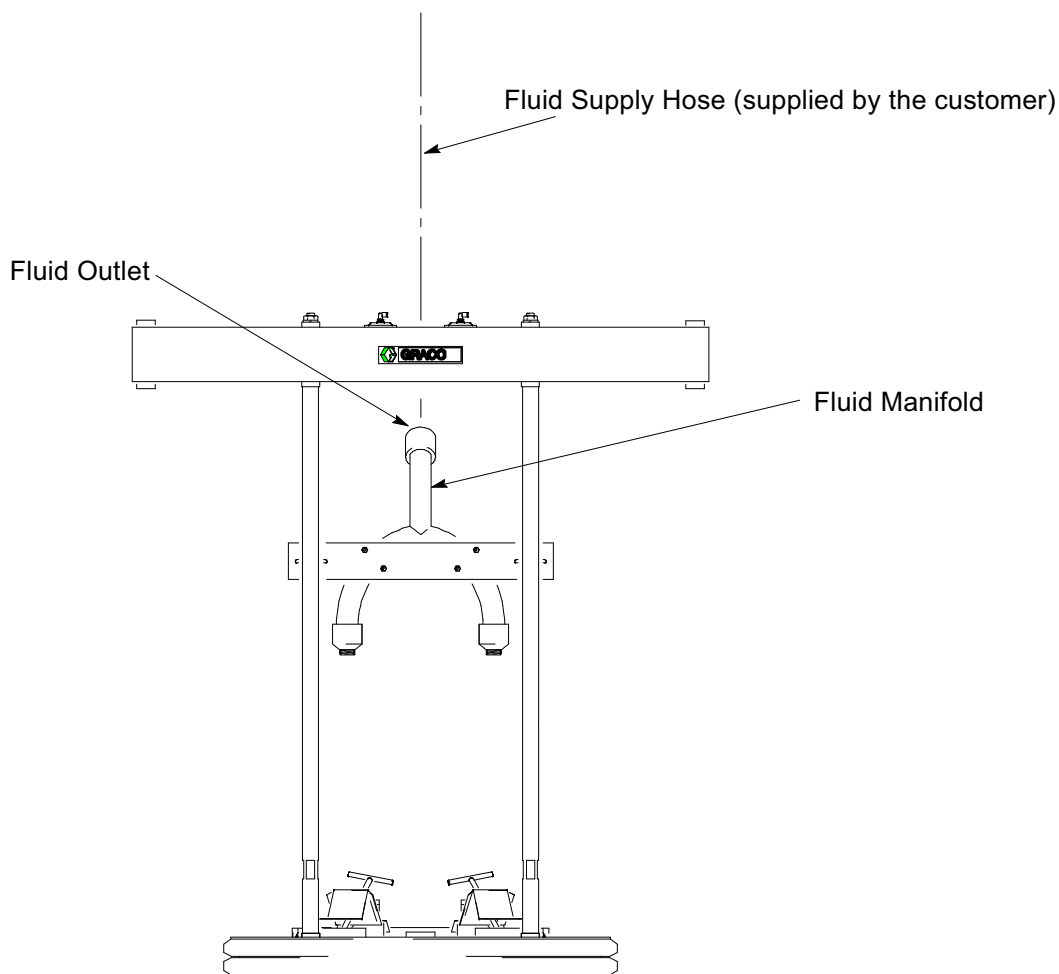
NOTE: For more information about the Pumps, see **Related Manuals** on page 3 for the Pump instruction manuals.

NOTICE

There must be a minimum of 10 feet (3 m) of fluid supply hose on the outlet to prevent damage to the unit.

NOTE: The fluid supply hose must move freely without kinking when the Pumps move up and down.

Check the fluid supply hose to ensure it is properly sized and pressure-rated for this system. Use only electrically conductive hoses. The fluid supply hose should have spring guards on both ends. Connect the fluid supply hose to the fluid manifold outlet.



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FIG. 7

Operation

Prepare the Operator

All persons who operate the equipment must be trained in the safe, efficient operation of all system components as well as the proper handling of all fluids. All operators must thoroughly read all instruction manuals, tags, and labels before operating the equipment.

Overview

The UniDrum Supply System uses two air driven reciprocating Pumps (C) on the LH Supply Unit (A) and two air driven reciprocating Pumps (C) on the RH Supply Unit (B). Each Supply Unit pumps material from a 1000 liter drum.

General Functional Description

The LH and RH Supply Units can operate at the same time or as independent units. Generally, the UniDrum Supply System is setup to operate as redundant units. This means that the RH Supply Unit is held in reserve on standby until the drum underneath the LH Supply Unit has been emptied, and vice versa.

Operating a redundant system allows the operator to maintain a continuous supply of material without interruption. The operator is afforded sufficient time to replace an empty drum at one Supply Unit while the drum at the other Supply Unit is being emptied.

System Startup

There are a series of steps that must be followed in sequential order to startup the system.

System Operation

Depending upon the system setup, at any time during operation, the operator can:

- Stop the Pumps and relieve ram pressure at the LH Supply Unit (A).
- Stop the Pumps and relieve ram pressure at the RH Supply Unit (B).
- Shutdown the system.

At the Supply Unit (A, B), the Follower Plate (D) must be raised and the Bleed Stick (H) removed to load the drum into the Supply Unit. The Follower Plate (D) is lowered by the operator directly into the drum, and the bleed stick is replaced. The Pumps are turned on, the Follower Plate (D) is pressurized, and material is pumped from the drum through the outlet ports on the Pumps via a supply hose to one or more targeted applications.

Supply Unit Operation

The UniDrum Supply System can be setup to alternate between the LH and RH Supply Units. This dual supply system setup (controlled by others) virtually eliminates material replenishment downtime.

The UniDrum Supply System allows the operator to load the material drum into the RH Supply Unit (B) while the LH Supply Unit (A) drum is being emptied. When the Supply Unit changeover occurs, the operator unloads the empty drum at the LH Supply Unit (A) while the RH Supply Unit (B) drum is being emptied. The cycle is repeated as many times as needed.

System Shutdown

For system shutdown, the operator turns off the Pumps (C) and depressurizes the system. Depending upon the type of material, the operator may choose to raise the Follower Plate (D) from the drum or keep the Follower Plate (D) lowered in the drum to prevent the material from being contaminated. Some materials will harden or congeal when exposed to air or used past their shelf life. Material should be kept covered when it is not being used and uncovered when it is ready to use.

Flushing the System Before Initial Use

Flushing the system before its initial use can prevent material contamination, which may cause the material to fail or perform poorly.

The equipment was tested with lightweight oil, which is left in the fluid passages to protect parts. To avoid contaminating your fluid with oil, flush the equipment with a compatible solvent before using the equipment.



NOTICE

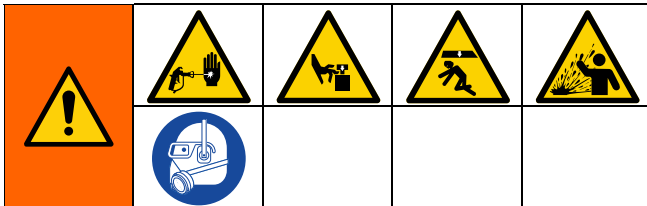
There must be a minimum of 10 feet (3 m) of fluid supply hose on the outlet to prevent damage to the unit.

To flush the system, perform the following procedure:

1. Select the material for the initial material load.
2. Verify whether the factory-test oil and the initial material load are compatible:
 - a. If the two substances are compatible, omit the remaining steps in this procedure and perform the **Initial System Startup Procedure** on page 22.
 - b. If the two substances are incompatible, perform the remaining steps in this procedure to flush the system.
3. Select a drum containing a compatible material that can dissolve, clean, and eliminate the factory test oil from the system. If necessary, check with the material supplier for a recommended flush material.
4. Before flushing, be sure the entire system and flushing drums are properly grounded. Refer to **Grounding the System** on page 17.
5. Perform steps 9 through 15 of the **Initial System Startup Procedure** on page 22 to load the drum containing the solvent.
6. Run the flush material through the system for approximately 1 to 2 minutes.
7. Remove the drum containing the flush material.

NOTE: Use fluids and solvents that are chemically compatible with the equipment wetted parts. See the **Technical Specifications** sections of all the equipment manuals. Always read the material manufacturer's literature before using fluid or solvent in this Pump.

Initial System Startup Procedure



To reduce the risk of serious bodily injury, such as skin injection or splashing fluid in the eyes or on the skin, always wear eye protection and protective clothing when installing, operating, or servicing this equipment.

Moving equipment parts can cause personal injury, including severing of hands or fingers. Keep hands and fingers away from the Follower Plate, Pump inlets, and the drum when raising or lowering the Follower Plate to reduce the risk of pinching or amputating hands or fingers.

NOTICE

The use of a non-compatible lubricant can cause material contamination or inadequate performance. Use only a lubricant compatible with the material to be pumped. Check with the material supplier for a recommended lubricant.

To help avoid damage to equipment, do not use a drum of material that has been dented or otherwise damaged; damage to the Follower Plate wiper may result.



To reduce risk of injury or equipment damage:

- Make sure all material hose connections are secure.
- Do not pressurize the system until you have verified the system is ready and it is safe to do so.

Settings for Initial System Startup

The initial system startup procedure contains the checklist of settings, adjustments, and procedural steps that must be completed before the system is ready for daily operation.

NOTE: Complete the startup procedure for the LH Supply Unit (A) first. Then, repeat the startup procedure for the RH Supply Unit (B).

Perform the initial system startup procedure as follows:

1. Check all material hoses and fittings to ensure tightness and to prevent any material leakage.
2. Check all system air lines. Make sure that all routing of air lines will not interfere with any moving components within the system.
3. Fill the packing nut/wet cup on both Pumps 1/3 full with Graco throat seal liquid (p/n 206995). Refer to your specific pump manual for details.
4. Open the main air shut off valve, making air pressure available to the unit. See FIG. 6 on page 18.
5. At the Pneumatic Logic Panel (G), open the Panel Air Inlet Valve (AH), making air pressure available to the Pneumatic Logic Panel. See FIG. 2 on page 10.
6. Adjust both Pump main air regulators (AC, AE) to 0 psi.
7. Set the RAM POSITION Switch (AG) to RAISE.
8. Press the RAM UP Pushbutton (AF) to raise the Follower Plate (D) to its highest position.
9. Set the RAM POSITION Switch (AG) to LOWER to make sure there is no binding in the Safety Pins (T).
10. Set the RAM POSITION Switch (AG) to RAISE.
11. Press the RAM UP Pushbutton (AF) to raise the Follower Plate (D) to its highest position.
12. Set the RAM POSITION Switch (AG) to HOLD/NEUTRAL.

Adjusting the Pump Regulators

NOTE: Both Pumps must operate at the same cycles per minute rate to prevent the occurrence of uneven drum evacuation.

NOTE: For the maximum air input pressure for each Pump, see the appropriate manual shown in **Related Manuals** on page 3.

13. Run the system under normal conditions. Adjust the PUMP NO. 1 REGULATOR Control Knob (AC) to the desired setting as follows:
 - a. Turn the knob clockwise to increase air pressure or counterclockwise to decrease air pressure. See FIG. 3 on page 11.
 - b. Check the air gauge to verify the air pressure setting.
14. Repeat step 13 to adjust the air regulator for the PUMP NO. 2 REGULATOR Control Knob (AE).

Adjusting the RAM UP and RAM DOWN Air Regulators

15. At the Pneumatic Logic Panel (G) (see FIG. 2 on page 10), open the hinged cover.
16. Set the RAM POSITION Switch (AG) to RAISE and push the RAM UP Pushbutton (AF). Verify that the Follower Plate (D) raises at the desired speed. If not, perform the following steps:
 - a. Adjust the RAM UP Air Regulator (AJ). Turn the knob clockwise to increase the amount of air pressure. Check the air gauge to verify that air pressure was increased. See FIG. 3. The air pressure factory setting is 50 psi, and it is not recommended to exceed 80 psi.
 - b. Verify that the R3 Regulator (AL) is set to 5 to 10 psi (0.035 to 0.07 MPa, 0.35 to 0.7 bar).

				
Do not set the R3 Regulator higher than 5 to 10 psi (0.035 to 0.07 MPa, 0.35 to 0.7 bar). Setting the R3 Regulator pressure higher than recommended can cause the Follower Plate (D) to drop and result in operator injury.				

NOTICE

Failure to adjust the Regulator R3 properly can cause the platen to exit the drum at a high rate of speed, risking damage to the equipment.

- c. Repeat step 16.a until the ram raises at the desired speed.
17. Set the RAM POSITION Switch (AG) to DOWN while observing the air gauge inside the panel.
18. Adjust the RAM DOWN Air Regulator (AK) to 50 psi (0.34 MPa, 3.4 bar) as follows (see FIG. 3):
 - a. Turn the knob clockwise to increase air pressure or counterclockwise to decrease air pressure.
 - b. Check the air gauge to verify the air pressure setting. The air pressure factory setting is 50 psi, and it is not recommended to exceed 80 psi.
19. Close and secure the hinged cover.

Preventing Pump Cavitation

NOTE: Cavitation occurs when the Pump cylinder did not fully load with material on the upstroke, and a cavity forms in the material after the Pump changes to the downstroke. Perform step 20 when there is Pump cavitation. If cavitation is not occurring, omit step 20 and proceed to step 21.

20. To prevent cavitation from occurring, perform the following steps:

- Lower the air motor air pressure until cavitation stops.
- Increase the ram down pressure.
- Set the Runaway Valve to the desired regulated air pressure and cycle rate (See **Related Manuals** on page 3).

Adjusting the Empty/Low Limit Switches

NOTE: When the low limit switch is activated, the Pumps are normally turned off automatically by a customer-supplied control, and a second set of Pumps begin pumping.

21. Adjust the low limit switch as follows:

- At the Pneumatic Logic Panel (G) (FIG. 2 on page 10), set the RAM POSITION Switch (AG) to LOWER, allowing the Follower Plate to activate the low limit switch.
- Verify that the Follower Plate (D) lowers to the limit set point: a level between 1 to 4 in. (25.4 to 101.6 mm) from the bottom of the drum.
- Adjust the actuator to activate the switch at the level defined in step 21.b. See FIG. 8.

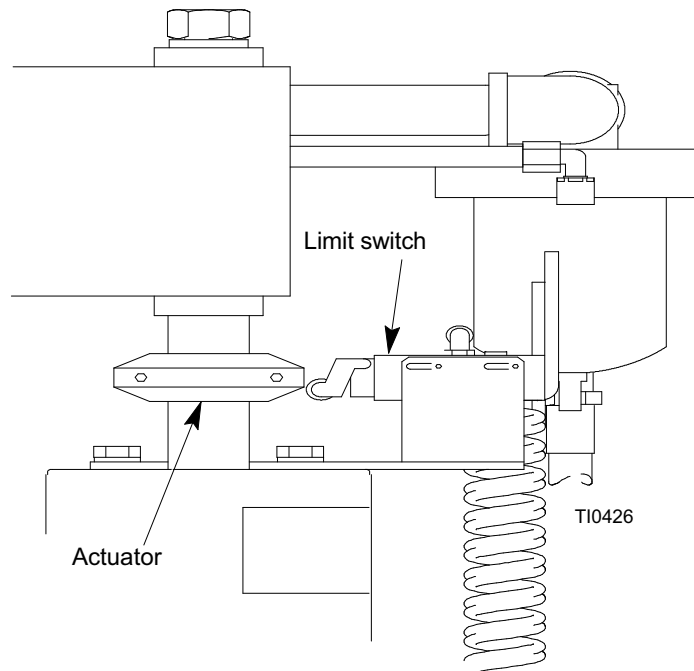


FIG. 8

Changing Empty Drums

NOTE: After the automatic Pump crossover has taken place, immediately replace the empty drum with a new, full drum. If both Uni-Drums become empty at the same time:

- Material will stop being delivered to the dispenser.
- Air may enter the supply hose or pipe header.
- Pump runaway could occur, resulting in damage to the Pumps.

Drum Changing Procedure

To remove an empty drum and load a new, full drum:

1. If used, verify that the two front and rear Drum Clamps (K) are engaged on the UniDrum ram base.
 2. Check that the Pump air is turned off.
 3. Check that the RAM UP Air Regulator (AJ) is set to at least 60 psi. Do not exceed 80 psi.
 4. Close the two ball valves at the outlet manifold at the rear of the Uni-Drums.
 5. To raise the Follower Plate (D):
 - a. Set the RAM POSITION Switch (AG) to RAISE, then wait 5 seconds.
- NOTE:** If RAM UP Pushbutton (AF) is pushed within 5 seconds, the vent valves may open before the pressure under the Follower Plate (D) is relieved causing the material to bleed past the vents.
- b. Push and hold the RAM UP Pushbutton (AF) as the Follower Plate (D) slowly rises.
6. With the ram raised and the RAM POSITION Switch (AG) set to RAISE, pull the Drum Clamps (K) (if used) back and remove the empty drum, using a suitable lifting device.



Use a long-handled flat-bladed ice scraper if it is necessary to scrape the bottom of the Follower Plate (D). To avoid serious injury, do not put your hands between the plate and the drum.

7. Being careful not to damage the Follower Plate (D) wipers, wipe or scrape any material buildup from the Follower Plate (D) and wipers, and properly dispose of the waste material.

Load Material

NOTICE

When opening a new drum, take care to remove the cover by holding it level. Tipping the cover may allow accumulated dirt to spill into the material, which can damage the equipment. Also check that the drum is not damaged or dented.

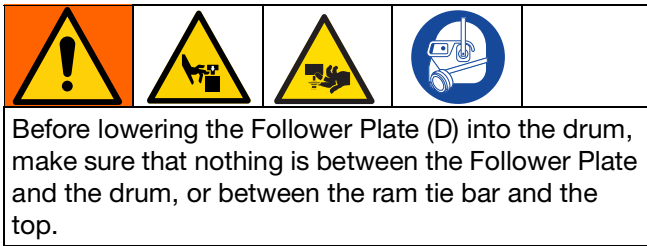
8. Remove the cover from the new drum and remove any other packing from the drum, exposing the material. Make sure there are no foreign objects on the surface of the material.
9. Position the new drum, using a suitable lifting device, under the raised Follower Plate (D). Check that the DRUM IN POSITION Indicator (AM) is lit.
10. It is extremely important to lubricate the Follower Plate wiper with a lubricant that is compatible with the material to be pumped. Check with your material supplier for compatibility.
11. If used, push the two front and rear Drum Clamps (K) forward until engaged.
12. Remove the Safety Pins (T).



To reduce the risk of serious bodily injury, such as splashing fluid in the eyes or on the skin, always wear eye protection and protective clothing when operating this equipment.

The pressure relieved by removing the bleed sticks may cause the Follower Plate (D) to lower unexpectedly. To prevent personal injury from moving parts, such as pinching or amputating hands or fingers, keep hands and fingers away from the Follower Plate (D) when removing the bleed sticks.

13. Remove the bleed sticks from the Follower Plate (D).



14. Lower the Follower Plate (D) as follows:

- Set the RAM POSITION Switch (AG) to LOWER.
- Lower the Follower Plate (D) until the material is evident in the Bleed Ports (Q).
- Set the RAM POSITION Switch (AG) to HOLD/NEUTRAL.
- Replace the bleed sticks.
- Set the RAM POSITION Switch (AG) to LOWER.

15. Close both Pump No. 1 and Pump No. 2 inlet valves (located on top of the air motor).

16. Prime the Pumps as follows:

- Set both the Pump No. 1 REGULATOR Control Knob (AE) and Pump No. 2 REGULATOR Control Knob (AG) to 30 psi.
- Push the Pump Air On button (AC) to open the air supply to the Pumps.

NOTE: Pumps should not start if the inlet valves were closed in step 15.

- Use a catch device to bleed the Pump. Slowly open Pump No. 1 bleed valve. Back off the adjustment screw several turns; do not remove the screw.
- Open the Pump No. 1 inlet valve (M) to start the Pump.
- Allow the Pump to cycle slowly until all air escapes and material flows free of air from the bleed valve.
- Close the Pump No. 1 inlet valve (M) and the bleed valve.
- Wipe any excess material from the Pump bleed valve outlet to prevent material from drying and

curing. Cover the Pump bleed valve outlet with a material-compatible grease.

NOTE: If the Pump bleed valve has a grease zerk, apply a material-compatible grease into the zerk fitting until grease flows from the grease bleed hole.

h. Repeat steps c - g for Pump No. 2.

17. Push the Pump Air Off button (AD) on the Pneumatic Logic Panel (G).

18. Open both Pump No. 1 and Pump No. 2 inlet valves (M) (located on top of the air motor).

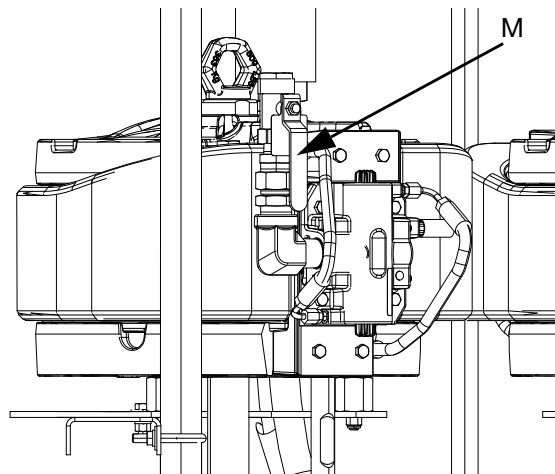


FIG. 9

NOTE: If the Pump does not prime properly, which may occur with heavier, high viscosity fluids, increase the air pressure with the RAM DOWN Air Regulator (AK).

NOTE: If fluid is forced out around the top wiper, ram pressure is too high; decrease the air pressure with the RAM UP Air Regulator (AJ).

NOTE: Ram pressure adjustments are carried out using the dual REGULATOR Control Knobs (AC, AE) inside the Pneumatic Logic Panel (G). The upper regulator knob controls the downward pressure of the ram, and the lower regulator knob controls the upward pressure of the ram. See FIG. 3 on page 11.

Daily System Startup

This procedure is normally provided by the integrator.

System Shutdown

This procedure is normally provided by the integrator.

Stopping the System

To stop the system, close the main air shut off valve (see FIG. 10) to the Supply Unit.

Restarting the System

To restart the system, perform the following steps:

1. Open the main air shut off valve to the Supply Unit (see FIG. 10).

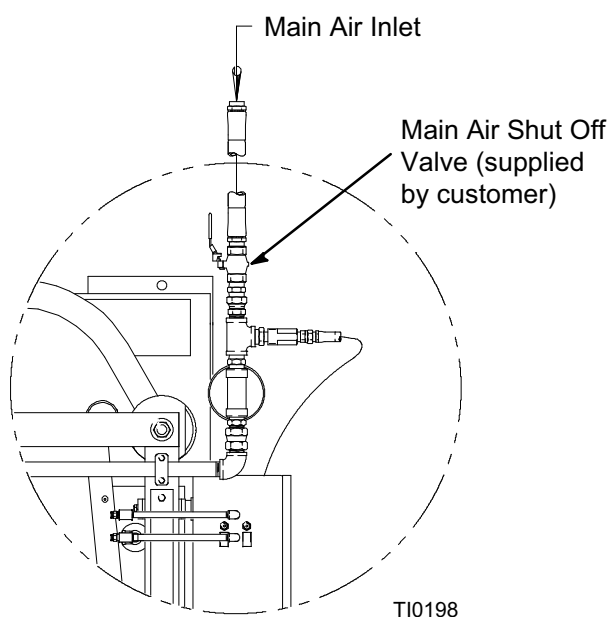


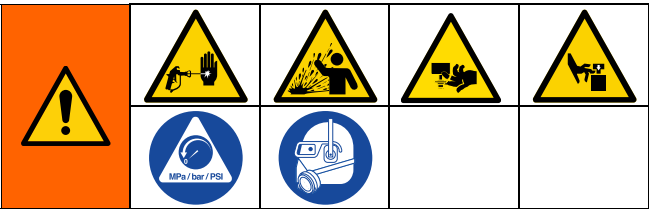
FIG. 10

Pressure Relief Procedures

These procedures describe how to relieve pressure from the system.



Follow the Pressure Relief Procedure whenever you see this symbol.



This equipment stays pressurized until pressure is manually relieved. To help prevent serious injury from pressurized fluid, such as skin injection, splashing fluid and moving parts, follow the Pressure Relief Procedure when you stop spraying and before cleaning, checking, or servicing the equipment.

Fluid Pressure Relief Procedure

This procedure describes how to relieve pressure on the Follower Plate (D) and in the Pumps (C). Use this procedure whenever you shutoff the Pumps and before checking or adjusting any part of the system.

At the Pneumatic Logic Panel (G) (FIG. 11), perform the following steps:

1. Close the Main Air Inlet Valve (E). See FIG. 11.
2. Open any downstream fluid valves, such as the ball seat applicators on the ram assemblies, that may be part of the system.

NOTE: In order to fully relieve system pressure, including ram cylinders, the steps in the **Pneumatic Pressure Relief Procedure** on page 29 must be performed.

Pneumatic Pressure Relief Procedure

This procedure describes how to relieve pressure on the Pneumatic Logic Panel (G) and cylinders. Use this procedure whenever you perform ram assembly service on the piston rod seal or the ram piston.

1. Follow **Fluid Pressure Relief Procedure** on page 28.
2. Fully lower the ram by setting the RAM POSITION Switch (AJ) to LOWER. Leave the switch in the LOWER position.
3. Open the door on the Pneumatic Logic Panel (G).
4. Adjust the air pressure to 0 PSI for the RAM DOWN Air Regulator (AP). Refer to the gauge on the RAM DOWN Air Regulator (AP) and R3 Regulator (AR) to verify the ram has been depressurized. See FIG. 12.
5. Slowly open the drain cock located on the bottom of the air cylinders (CL).
6. After the air pressure has been relieved, remove the Ram Down air line running from the top of the Pneumatic Logic Panel (G) to the ram cross bar (CB).
7. Close the main air inlet on header.
8. Leave the drain cock open and the Ram Down airline removed until service is complete.
9. After service is complete, close drain cocks and make all pneumatic connections and open the Main Air Inlet Valve (E) to header. Perform the **Adjusting the RAM UP and RAM DOWN Air Regulators** procedure, page 23.

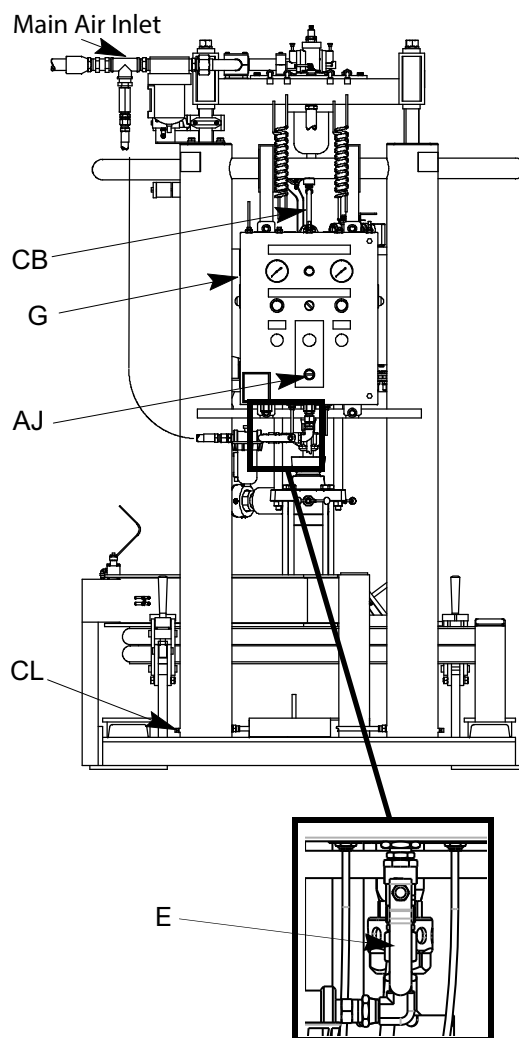


FIG. 11

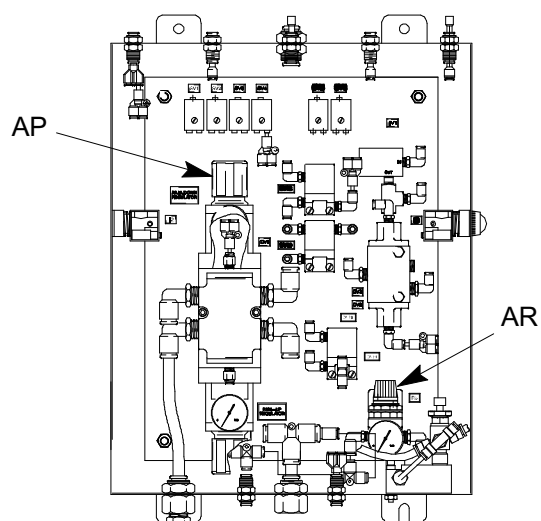


FIG. 12

Maintenance

Preventative Maintenance Schedule

The operating conditions of your particular system determine how often maintenance is required. Establish a preventive maintenance schedule by recording when and what kind of maintenance is needed, and then determine a regular schedule for checking your system.

Flushing the System

Flush the Pump:

- Before the first use
- When changing material or fluid part number or brand
- Before fluid can dry or settle out in a dormant Pump (check the shelf life or pot life of catalyzed fluids)
- Before storing the Pump.

Flush with a fluid that is compatible with the fluid you are pumping and with the wetted parts in your system. Check with your fluid manufacturer or supplier for recommended flushing fluids and flushing frequency.



To avoid fire and explosion, always ground equipment and waste container. To avoid static sparking and injury from splashing, always flush at the lowest possible pressure.

To flush the system, perform the following procedure:

1. Place a drum of compatible flush material under the Follower Plate (D).
2. Run the Pumps to move the flush material through the system for approximately 1 to 2 minutes or until the solution is clean.
3. Remove the drum containing the flush material from under the Follower Plate (D).
4. Return the system to previous operation settings.

Cleaning the System

NOTICE

Cleaning the system after using it can prevent material contamination, which may cause the material to fail or perform poorly. Do not load new material into a contaminated system.

Clean the system to avoid untimely equipment malfunctions and to ensure that system components operate efficiently

To clean the system, perform the following procedure:

1. Turn the RAM POSITION Switch (AJ) to RAISE, then press the RAM UP Pushbutton to move the ram to the fully raised position.
2. There are two (2) maintenance positions, a fully extended ram "TOP" position and a half extended "MID" position. To lock ram, move the RAM POSITION Switch to the HOLD/NEUTRAL position and insert both safety hitch pins (806) into the outer support bar (802) and install both pin lock clips. The safety hitch pins must be installed at the same position on each outer support bar (both either at the "TOP" position or both at the "MID" position).

NOTE: Locks that use 1/4 in. shackles can be used in place of the cotter pins (CP) provided with the safety hitch pins (806).

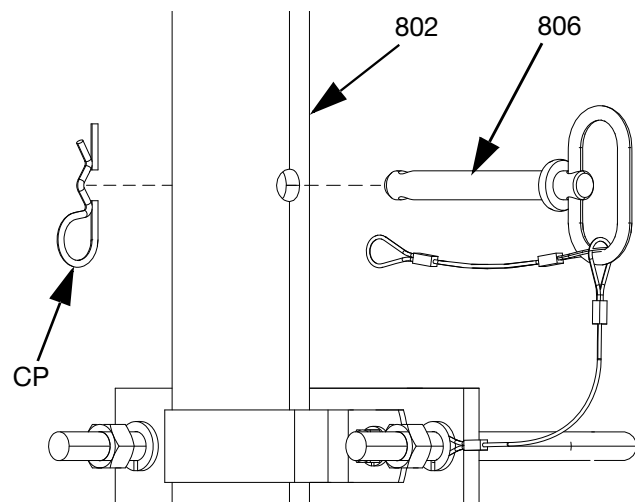


Fig. 13

3. Once both safety hitch pins (806) are secured, adjust the RAM DOWN air regulator to 0 psi and move the RAM POSITION Switch to the LOWER position. Allow time for the ram to lower until it is resting on the safety pins. See FIG. 11 on page 29.
4. Switch the RAM POSITION Switch to the HOLD/NEUTRAL position. Turn off all air to the system by following the pressure relief procedure as outlined in the Unidrum manual 3A2410, and follow your facility's pre-established lock-out/tag-out procedures.

				
Use a long-handled flat-bladed ice scraper if it is necessary to scrape the bottom of the Follower Plate (D). To avoid serious injury, do not put your hands between the plate and the drum.				

5. Being careful not to damage the Follower Plate (D) wipers, wipe or scrape any material buildup from the Follower Plate (D) and wipers, and properly dispose of the waste material.
6. Apply a generous amount of lubricant to the Follower Plate (D) wipers.
7. To place the ram back into operation, verify the RAM POSITION Switch (AJ) is still in the HOLD/NEUTRAL position, and open the Main Air Inlet Valve on the header (E).
8. Turn the RAM POSITION Switch (AJ) to RAISE, then press the RAM UP Pushbutton (AH) to move the ram to the fully raised position.
9. Remove both safety hitch pins (806).
10. Return the system to previous operation settings.

Wiper Lubrication

It is extremely important that the Follower Plate (D) wipers be thoroughly lubricated between drum changes. The Follower Plate (D) may stick without lubrication.

Pneumatic Logic Panel Service

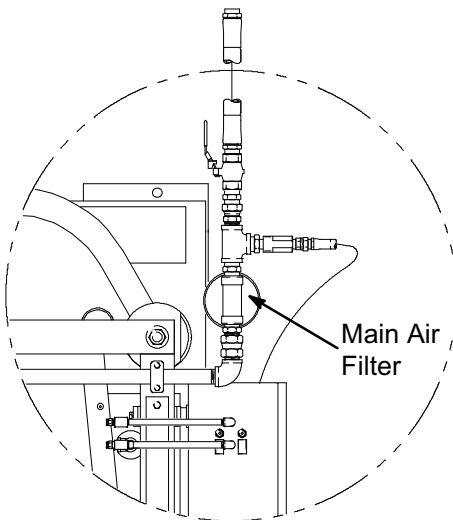
Filter/Element Replacement

The air filter is located between the air supply source and the Pneumatic Logic Panel (G). See FIG. 15.

To replace an air filter/element, perform the following steps:



1. Follow the **Pressure Relief Procedures** on page 28.
2. At the Pneumatic Logic Panel (G), perform the following steps:
 - a. Push the Pump Air Off button (AD) to shut off the air supply at both pumps.
 - b. Close the Main Air Inlet Valve (E).
 - c. Turn the main air shut off valve under the panel to the OFF position.



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FIG. 14

Filter Removal

3. Turn the air filter counterclockwise to unscrew the filter from its mounting.

Filter/Element Replacement

4. Replace the old air filter element with a new filter element.
5. Clean the sight glass, if necessary. Reinstall the sight glass back on its threaded mounting. Tighten the sight glass.
6. Perform the **Daily System Startup** procedure on page 27.
7. Check for air leakage around the filter.
8. Return the system to previous operation settings.

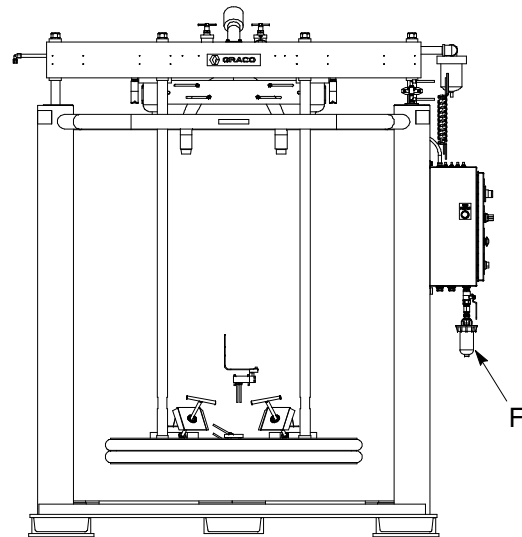


FIG. 15

Ram Assembly Service

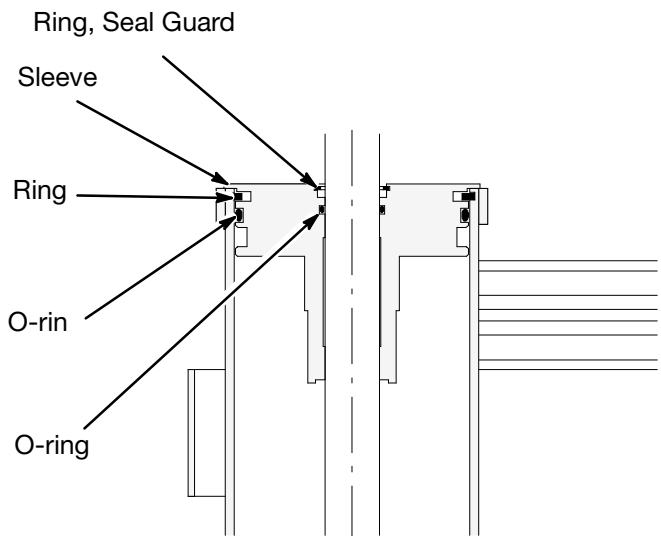
Piston Rod Seal Service



1. Relieve the air pressure. Follow the **Pneumatic Pressure Relief Procedure** on page 29.
2. Remove the four nuts and lockwashers holding the tie bar to the rods. Remove the tie bar.
3. Remove the guide sleeve retaining ring by gripping the ring tab with a pair of pliers and rotating the ring out of its groove.
4. Remove the guide sleeve by sliding it off of the rod. Four 1/4 in. -20 holes are provided to ease removal of the guide sleeve.

Do not use pressurized air to remove the guide sleeve or piston. Failure to follow this instruction may result in personal injury.	

5. Inspect the parts for wear or damage. Replace as necessary.
6. Install new O-rings and seal guard. Lubricate the packings with O-ring lubricant.
7. Slide the guide sleeve onto the rod and push it into the cylinder. Replace the retaining ring by feeding it around the guide sleeve groove.
8. Reinstall the tie bar using the nuts and lockwashers. Torque to 40 ft-lb (54 N•m).



Refer to Repair Kit 918110.

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FIG. 16

Ram Piston Service

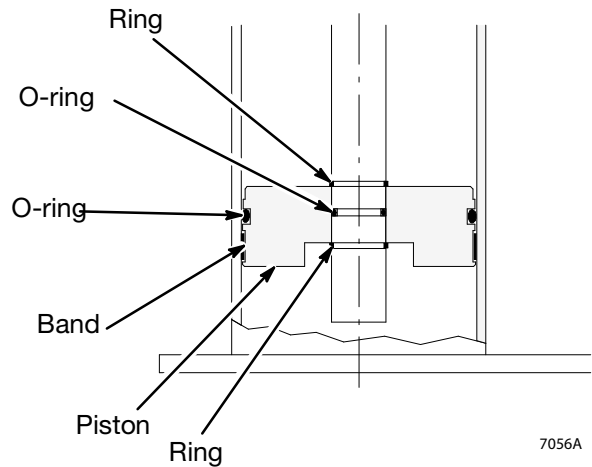


1. Relieve the air pressure. Follow the **Pneumatic Pressure Relief Procedure** on page 29.
2. Remove the tie bar as explained in the **Piston Rod Seal Service** section on page 33.
3. Remove the guide sleeve and slide it off of the piston rod.



Do not use pressurized air to remove the guide sleeve or piston. Failure to follow this instruction may result in personal injury.

4. Carefully pull the piston rod straight up out of the cylinder. If the rod is cocked to one side, the piston or inside surfaces of the cylinder could be damaged.
5. Carefully lay the piston and rod down so the rod will not be damaged or bent. Remove the lower piston retaining ring. Slide the piston off the piston rod.
6. Install new O-ring seals on the piston rod and the piston. Lubricate the piston and seals. Reinstall the piston and retaining ring.
7. Carefully insert the piston into the cylinder and push the rod straight down into the cylinder. Add 3 ounces of lubricant to each cylinder after inserting the piston.
8. Slide the guide sleeve onto the piston rod. Reinstall the retaining ring and tie bar, as explained under **Piston Rod Seal Service** section on page 33.



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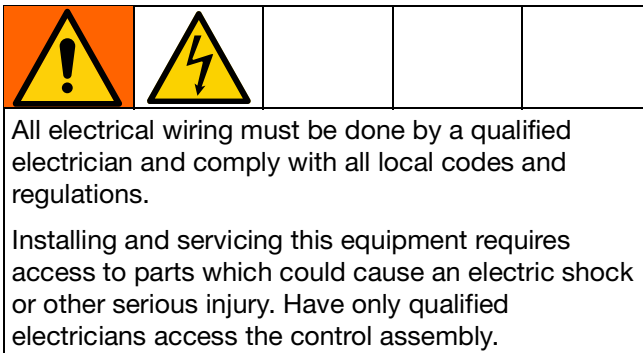
FIG. 17

Low/Empty Limit Switch Replacement



To replace the Low/Empty Limit Switch, perform the following steps:

1. Perform the System Shutdown procedure provided by the integrator at the applicable Supply Unit (LH or RH).



2. Shut off power to the Pneumatic Logic Panel (G).

NOTE: When raising and lowering the Follower Plate (D), make sure the unit is unobstructed overhead to avoid interference with other objects.

Switch Removal

3. Disconnect the air tubing from the switch. Note the tube and fitting relationship to ensure they are reconnected correctly.
4. Mark the surface on the ram limit bracket using a felt-tipped pen to ensure that the new lower limit switch is installed in the same spot.
5. Measure the distance from the mounting bracket (306) to the outer diameter of the limit switch roller to ensure that the new roller is installed in the same position.
6. Remove the fasteners holding the switch to the limit bracket (306). See FIG. 18.

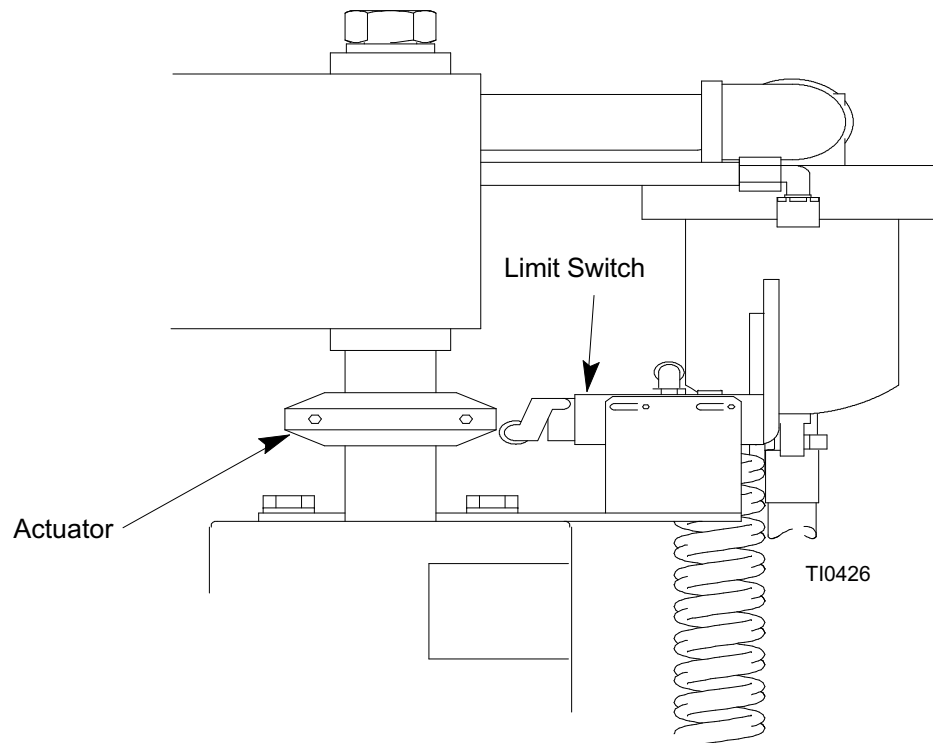


FIG. 18

Switch Replacement

7. Install the new limit switch (305) on the limit bracket (306) using the fasteners.
8. Reconnect the tubing for the limit switch.
9. Make sure that the limit switch roller is positioned in the same location per the measurement in step 5.
10. Reinstall the cover on the control panel.
11. Reapply air to the control panel.
12. Perform the **Daily System Startup** procedure provided by the integrator at the applicable Supply Unit (LH or RH).
13. Verify that the limit switch operates correctly.
14. Return the system to previous operation settings.

Servicing the Pumps

When the Pumps and air motors require service, refer to the applicable instruction manual for detailed information. See **Related Manuals**, page 3.

Replacing Wipers



1. Perform the **Fluid Pressure Relief Procedure** on page 28.
2. To replace worn or damaged wipers (412), raise the Follower Plate (D) up out of the drum. Remove the drum from the base. Wipe the fluid off the Follower Plate (D).



Use a long-handled flat-bladed ice scraper if it is necessary to scrape the bottom of the Follower Plate (D). To avoid serious injury, do not put your hands between the plate and the drum.

3. Separate the wiper joint (WJ) and bend back the strapping (413a) covering the clamp setscrew (413c). See Detail A of FIG. 19. Loosen the

setscrew, pull the end of the strapping through the clamp (413b) and remove the wiper.

4. Slide the strapping (413a) through the new wiper (412). Slide the clamp (413b) onto the new strapping and bend the strapping back approximately 3 in. (76 mm). Insert the strapping through the clamp a second time. See Detail B of FIG. 19.
5. Install the wipers on the Follower Plate (D). Position the wipers so that the wiper joints (WJ) are 180° apart.

NOTE: You will need the special banding tool (BT) shown in Detail C of FIG. 19 to tighten the strapping. Order Part No. 168092 Banding Tool.

6. Grip the strapping (413a) with the bonding tool (BT) as shown. With your thumb on the gripper lever (GL), turn the tool handle (TH) clockwise to apply tension.

NOTE: Be careful not to pull the cutting handle (CH) until you are ready to cut the strapping in step 8.

7. Continue turning the tool handle until you see the strapping stop moving through the clamp (413b). Stop turning the handle.
8. Tighten the setscrew with a wrench (W). Pull the cutting handle (CH) to cut. Remove the bonding tool (BT). Bend the strapping back over the clamp (413b).
9. Pound the wiper all the way around with a rubber mallet until the wiper joints (WJ) are butted tightly together. Check the overall circumference of both wipers. They should measure less than 135 in. (343 cm). Adjust as necessary.
10. Return the system to previous operation settings. Refer to the **Load Material** procedure on page 25.

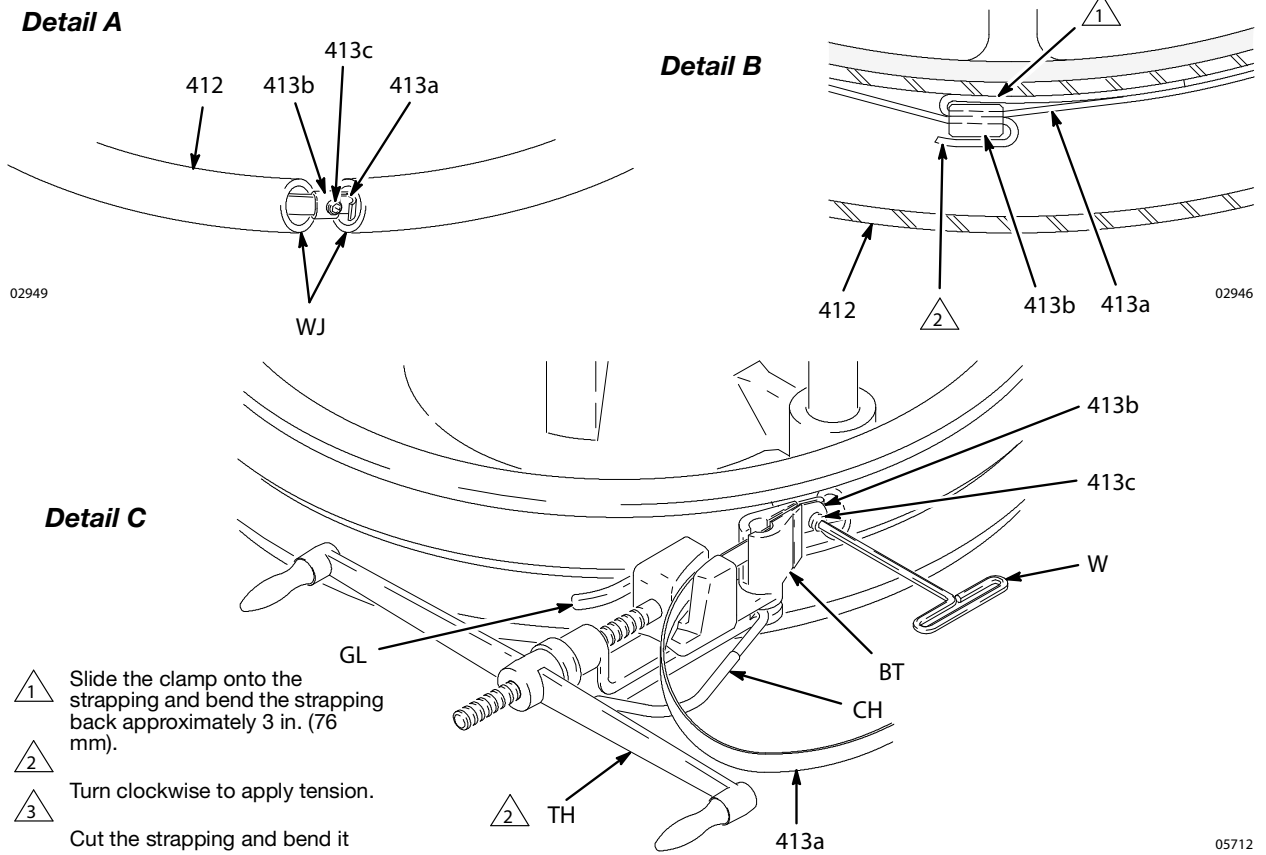


FIG. 19

Pump Removal

NOTE: See **Parts** on page 44.



1. Relieve the air pressure from the air motors and ram assembly to be serviced. Follow the **Fluid Pressure Relief Procedure** on page 28.
2. Disconnect electrical power from the system.
3. Move the RAM POSITION Switch (AJ) to HOLD/NEUTRAL.
4. Close the Pump outlet ball valves and relieve the fluid pressure from the Pumps at the Pump bleed valve on the ram assembly to be serviced.
5. Using an overhead lifting device, attach and secure a chain capable of lifting the weight of the Pump assembly to the eye at the top of the air motor.

NOTE: For effective Pump removal, the lifting point must be directly above the Pump and capable of moving sideways. The lifting action should be the “chain fall” type that allows a slow upward and downward movement.

NOTE: Check the **Technical Specifications** in the separate Pump manual to find the weight of the Pump being serviced. For example, Graco XL 10000™ 47:1 SST Pump (24Y208) weighs 234 lb (106 kg) per manual 308148.

6. Detach the air hose from the air motor.
7. Detach the fluid supply hose at the Pump outlet.

NOTE: When loosening the Pump and the air motor fasteners in steps below, ensure the chain slack is taken up to prevent the Pump assembly from falling.

8. On the Follower Plate adapter, loosen and rotate or remove four lugs and hex bolts holding the flange of the Pump lower.
9. On the underside of the air motor, remove the bolts securing the air motor to the motor support brackets. It may be necessary to move or remove some brackets for effective Pump removal.
10. Detach any other connections to the Pump assembly to ensure the Pump is free of attachments before removal. Possible connections include:

- Air motor exhaust kit
- Pump proximity switch kit
- Pump grounding wire

NOTE: When lifting the Pump in steps below, ensure the lifting chain does not damage the air controls mounted at the top of the ram cross-members.

11. Using a “chain fall” style lifting device, slowly pull the Pump upward a few inches until the base of the Pump clears the Pump mounting adapter and the air motor clears the support brackets.
12. Pull the Pump assembly out of the ram assembly and guide the Pump assembly downward to the floor, placing the base of the Pump on a wood surface and taking care not to damage the seal area of the Pump inlet housing.
13. Remove the gasket and o-ring (32, 33) from the Pump adapter. They should be discarded and replaced when the Pump is reinstalled.
14. Clean excess and hardened material from the Pump adapter on the Follower Plate (D).
15. Ensure that material is not rising through the Pump adapter in the Follower Plate (D). If material is flowing upward, move the RAM POSITION Switch (AG) to RAISE until the flow stops, then move the switch back to HOLD/NEUTRAL.
16. Move the Pump assembly to a suitable work area and repair the Pump using the appropriate Graco Instruction Manual. See **Related Manuals** on page 3.

Pump Installation

1. When the Pump is serviced and tested and ready to be replaced in the UniDrum ram assembly, perform the steps of the **Pump Removal** procedure in reverse order.
2. It is recommended that the Pump be tagged with the type and date of repair and the name of the technician who performed the repair.
3. Before returning the reassembled Pump to production use, it must be primed with material and air removed from the material. See the Starting and Adjusting the Pump section in your appropriate Pump Instruction manual shown in **Related Manuals** on page 3.

Recycling and Disposal

End of Product Life

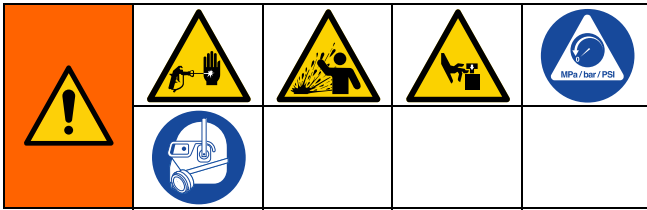
At the end of the product's useful life, dismantle and recycle it in a responsible manner.

- Perform the **Pressure Relief Procedures**.
- Drain and dispose of fluids according to applicable regulations. Refer to the material manufacturer's Safety Data Sheet.
- Remove motors, batteries, circuit boards, LCDs (liquid crystal displays), and other electronic components. Recycle according to applicable regulations.
- Do not dispose of batteries or electronic components with household or commercial waste.



- Deliver remaining product to a recycling facility.

Troubleshooting



Follow **Pressure Relief Procedures**, page 28 and 29, before checking or repairing the UniDrum Supply System.

NOTE: Check all possible problems and causes before disassembling the equipment.

Ram Assembly Troubleshooting

Problem	Cause	Solution
Ram won't raise or lower	Closed main air shut off valve or clogged air line	Open air valve, clear air line
	Not enough air pressure	Increase ram pressure
	Worn or damaged piston	Replace piston. See Ram Piston Service on page 34.
	Safety Pins (T) still in place	Remove pins.
Ram raises or lowers too fast	Ram air pressure too high	Decrease ram air pressure
Ram drops when in the RAISE or HOLD/NEUTRAL position	Regulator R3 pressure set too high	Reset R3 pressure to between 5-7 psi.
Fluid squeezes past Follower Plate wipers	Ram air pressure too high	Decrease ram air pressure
	Worn or damaged wipers	Replace wipers. See Replacing Wipers on page 36.
Pump won't prime properly, or pumps air	Not enough ram air pressure	Increase ram pressure
	Worn or damaged ram piston	Replace ram piston. See Ram Piston Service on page 34.
	Bent drum has stopped Follower Plate	Replace drum

Pump Troubleshooting

For additional information about the displacement Pump, refer to **Related Manuals** on page 3 to find the applicable instruction manual.

Problem	Cause	Solution
Rapid downstroke or upstroke (pump cavitation)	Air is trapped in Pump.	Bleed air from the Pumps and prime using the procedure described in steps 16a - 16h on page 26.
	Downstroke: Lower check in Pump is worn. Upstroke: Upper check in Pump is worn.	Rebuild and replace Pump, as necessary.
Material leaks around Pump outlet	Outlet fitting is loose.	Tighten outlet fitting.
Material leaks around Bleed Port (Q)	Bleed Port fitting is loose.	Tighten Bleed Port fitting.
Pump won't move up or down	Problem with air motor.	See Air Motor Troubleshooting chart on page 42.
	Foreign object lodged in Pump.	Remove object and rebuild Pump assembly.
Wet cup leaks	Worn throat packings.	Tighten wet cup. Replace throat packings.

Air Motor Troubleshooting

For additional information about the air motor, refer to **Related Manuals** on page 3 to find the applicable instruction manual.

Problem	Cause	Solution
Air motor will not shift directions, stalled in DOWN position	Main air valve spool is dirty or damaged	Clean/rebuild main air valve.
Air motor will not shift directions, stalled in UP position		
Air motor stalled halfway between the top and bottom		
Air continually exhausting around air motor shaft.	Air motor shaft seal is damaged	Replace air motor shaft seal.
Air continually exhausting around the air valve/slide valve	Air valve/slide valve gasket is damaged	Replace the valve gasket.
Air continually exhausting from muffler while the motor is idle	Internal seal damage	Rebuild air motor.
Oil leaking from exhaust port	Too much lubricant mixed in with the air supply	Reduce lubricant supply.
Frost build-up on muffler	Air motor operating at high pressure, or high cycle rate	Reduce pressure, cycle rate, or duty cycle of the air motor.

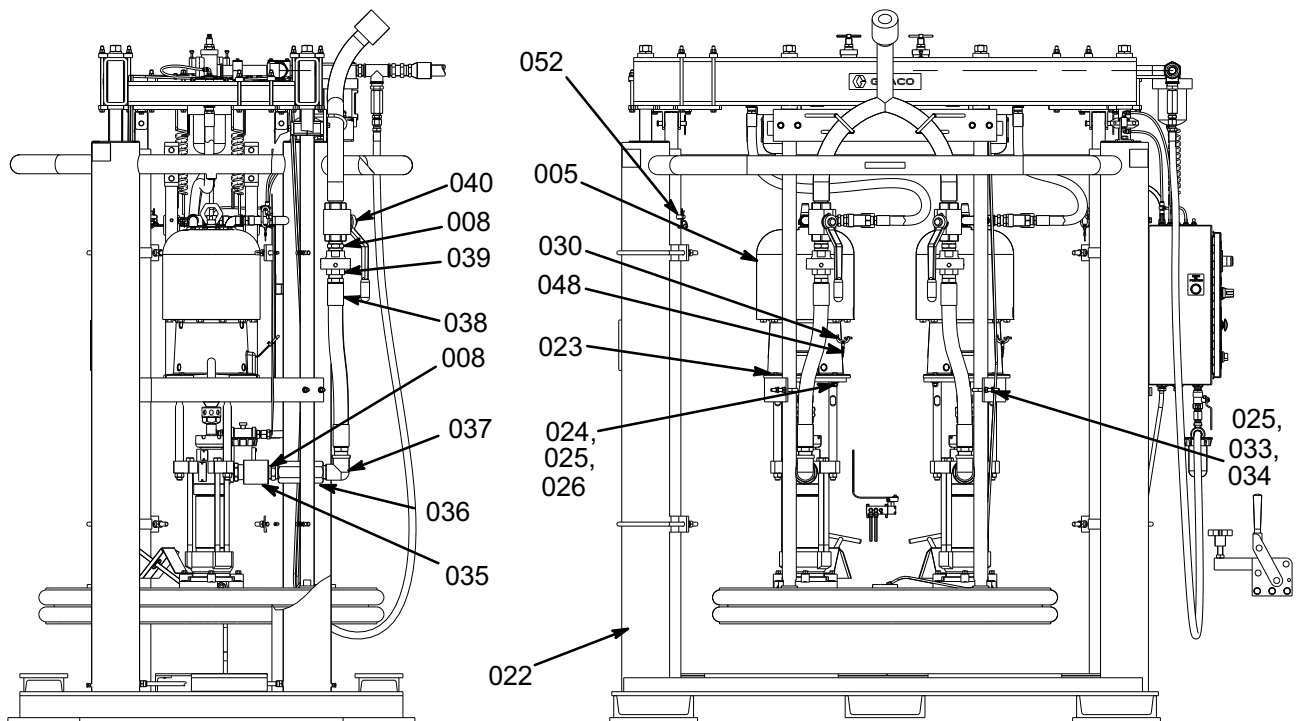
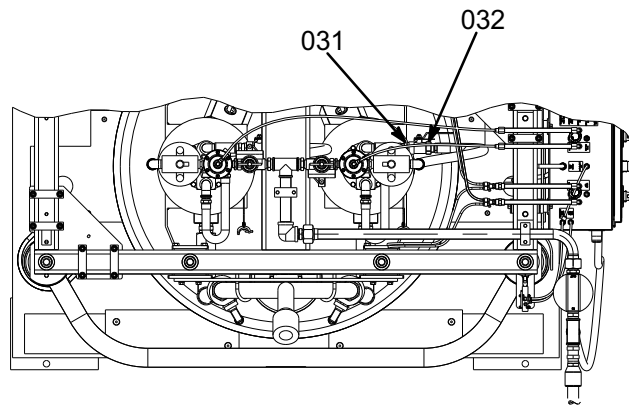
Pneumatic Logic Panel Troubleshooting

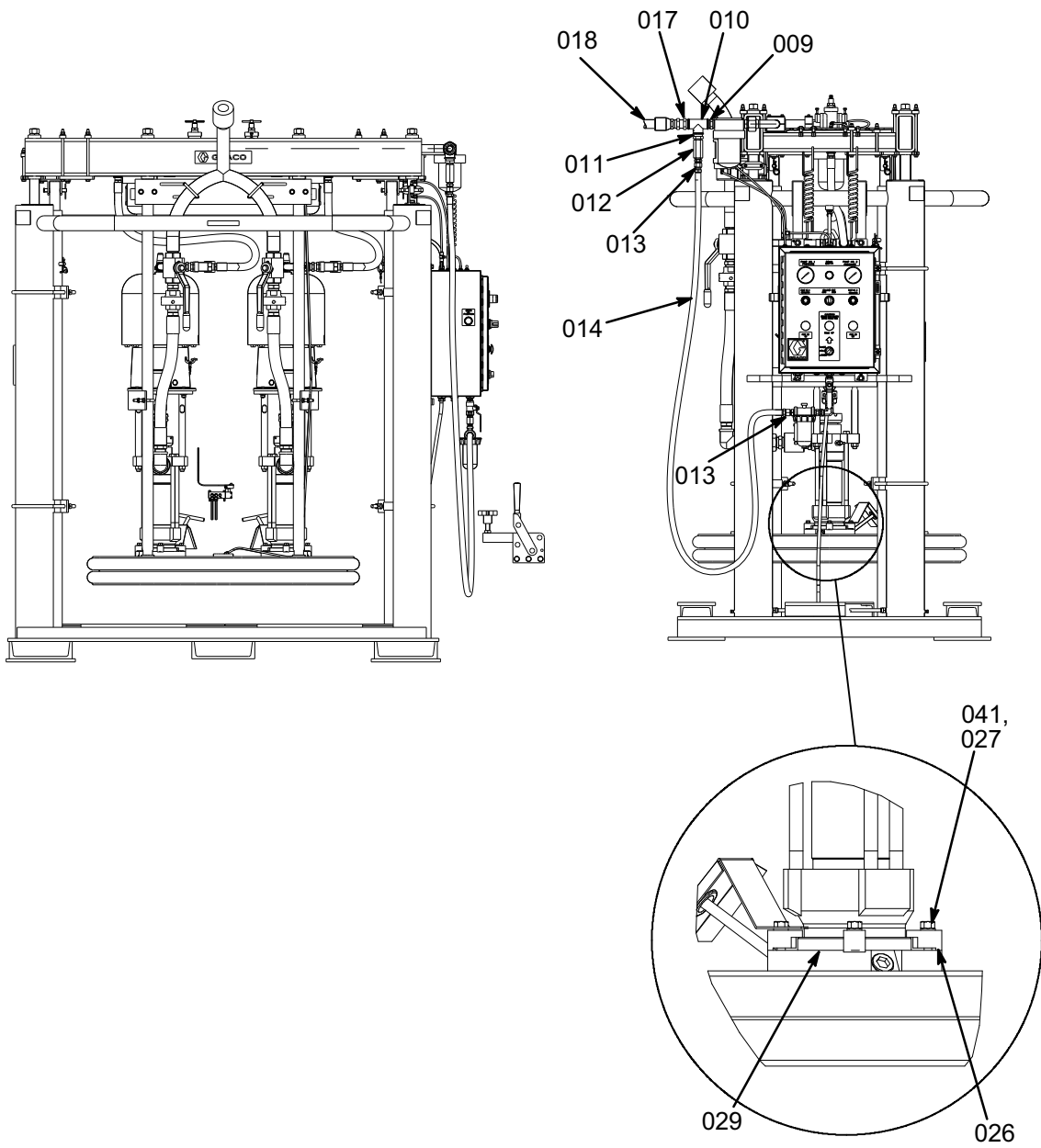
Problem	Cause	Solution
Ram will not move up or down.	Main air valve on box is not open. Air supply to unit is not on.	Open valve. Turn on air supply.
Ram will not move up.	Direction valve is not in the UP position. RAM UP Pushbutton (AF) is not pushed. Resistance in drum is too great. Insufficient lubrication of the Follower Plate seal.	Set direction valve to the UP position. Push RAM UP Pushbutton (AF). Turn air pressure up to 60 psi. The ram may take a few minutes to withdraw from the container. After the plate has been removed from the container, clean the seal and thoroughly lubricate.
Pumps will not operate.	Air regulator is set too low.	Increase air pressure setting.
Vent valve will not open.	FOLLOWER VENT switch is not in AUTO position.	Put FOLLOWER VENT switch in AUTO position.

Parts

24M428 - 20:1 Left Hand Supply Unit, with King carbon steel pump

24M708 - 20:1 Right Hand Supply Unit, with King carbon steel pump



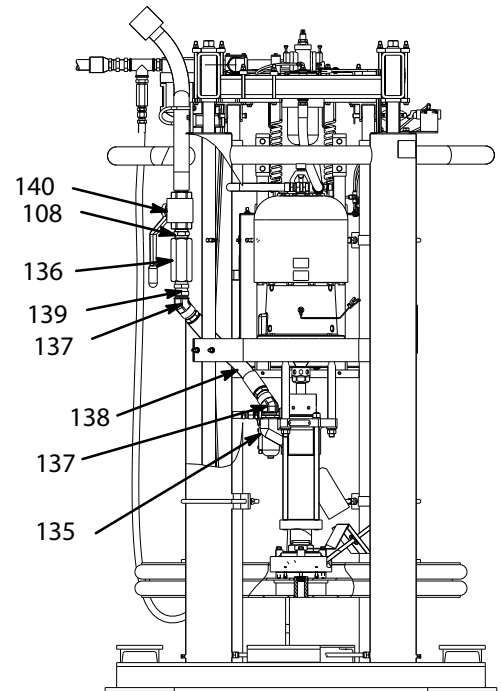
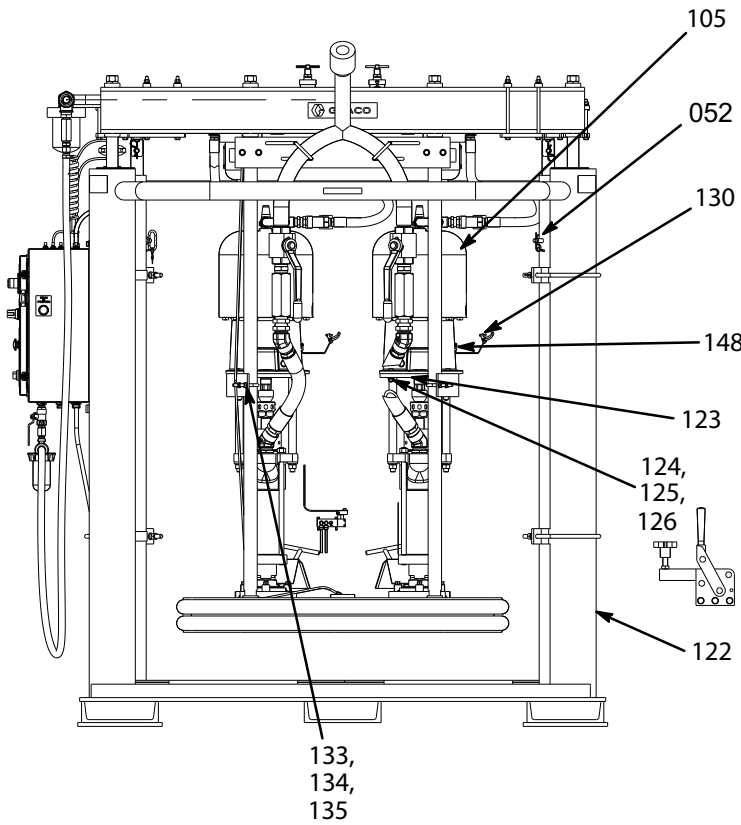
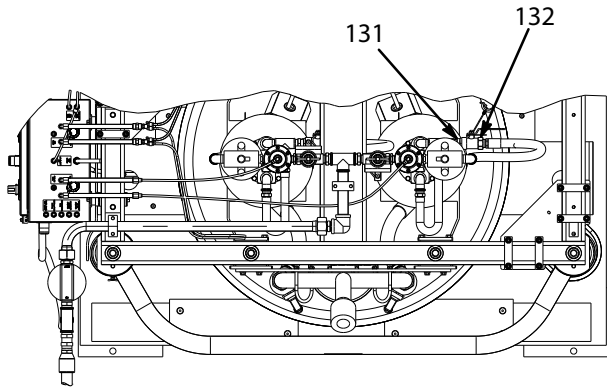


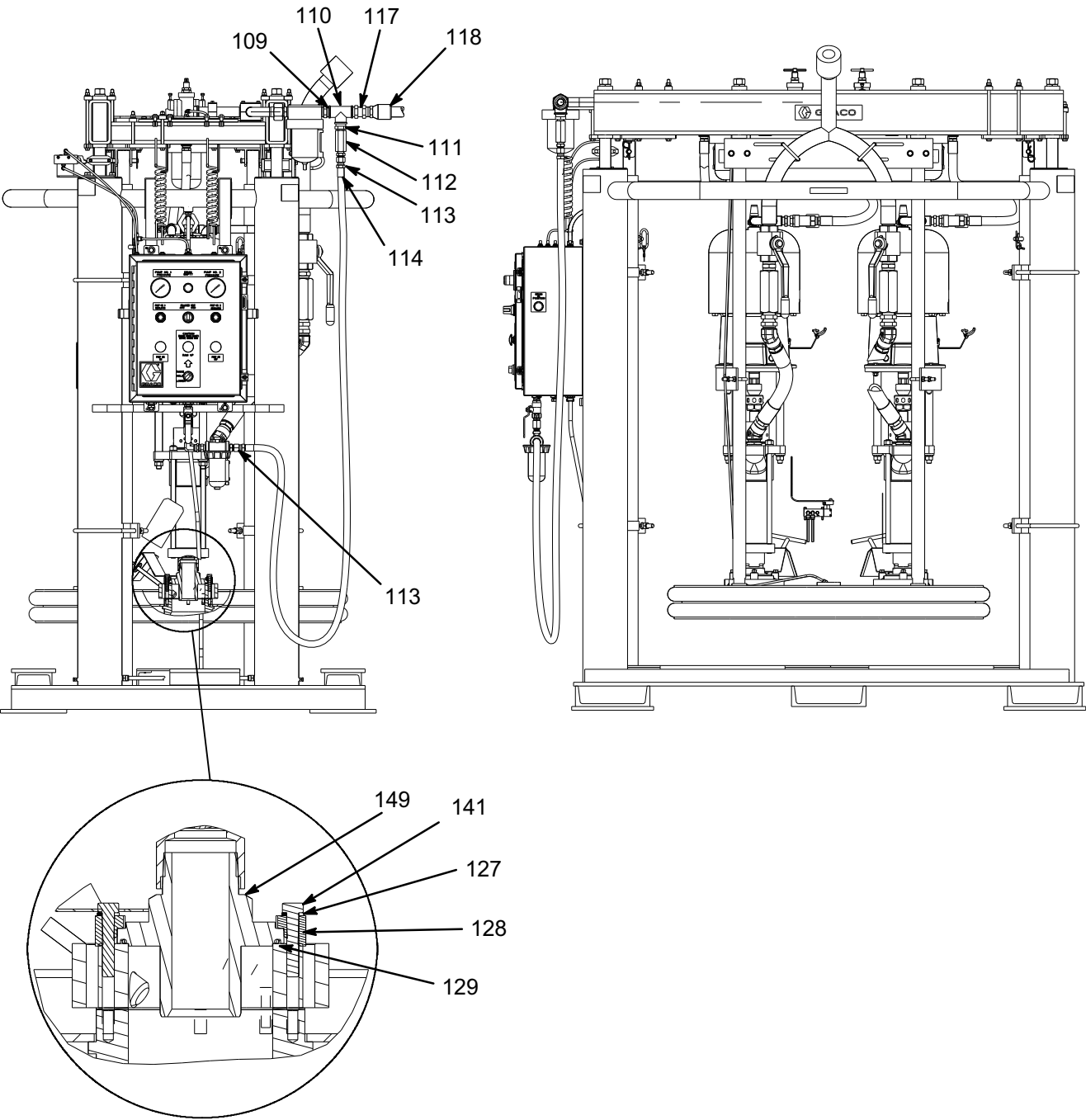
24M428 - 20:1 Left Hand Supply Unit, with King carbon steel pump**24M708 - 20:1 Right Hand Supply Unit, with King carbon steel pump**

Ref.	Part	Description	Qty.
005	222833	PUMP, king, quiet, 20:1	2
008	C20490	FITTING, nipple, hex	4
009	C20489	FITTING, nipple	1
010	106464	FITTING, tee, pipe, 1" NPT	1
011	C20463	FITTING, nipple, reducing, hex	1
012	C57799	VALVE, check, 1/2"	1
013	C19019	FITTING, union swivel	2
014	214656	HOSE, coupled, 61209, 10 FT	1
017	C19032	SWIVEL, swivel union	1
018	C12039	HOSE, air	1
022	24M557	ELEVATOR, ram, 1000L, left hand	1
022	24M630	ELEVATOR, ram 1000 l, right	1
023	102637	SCREW, cap	8
024	C19200	WASHER, plain	8
025	C19213	WASHER, lock	16
026	100307	NUT, hex	8
027	100133	WASHER, lock, 3/8	8
028	196073	CLAMP	8
029	109495	PACKING, o - ring	2
030	237569	WIRE, assy, 25 ft	2
031	175013	NIPPLE, pipe	2
032	113332	VALVE, ball, vented, .750	2
033	C20450	BOLT, U	4
034	617205	BRACKET, pump mounting	2
035	C38457	FITTING, coupling, reducing	2
036	521850	VALVE, check	2
037	C38324	FITTING, elbow, street	2
038	233058	HOSE, coupled, 061367	2
039	521975	FITTING, union, pipe	2
040	118854	VALVE, ball, high pressure	2
041	111803	SCREW, cap, hex head	8
048	104911	TERMINAL, ring	2
052	---	PINS, safety, kit, see page 63	1

24U207 - 10:1 Left Hand Supply Unit, with King carbon steel pump

24U208 - 10:1 Right Hand Supply Unit, with King carbon steel pump

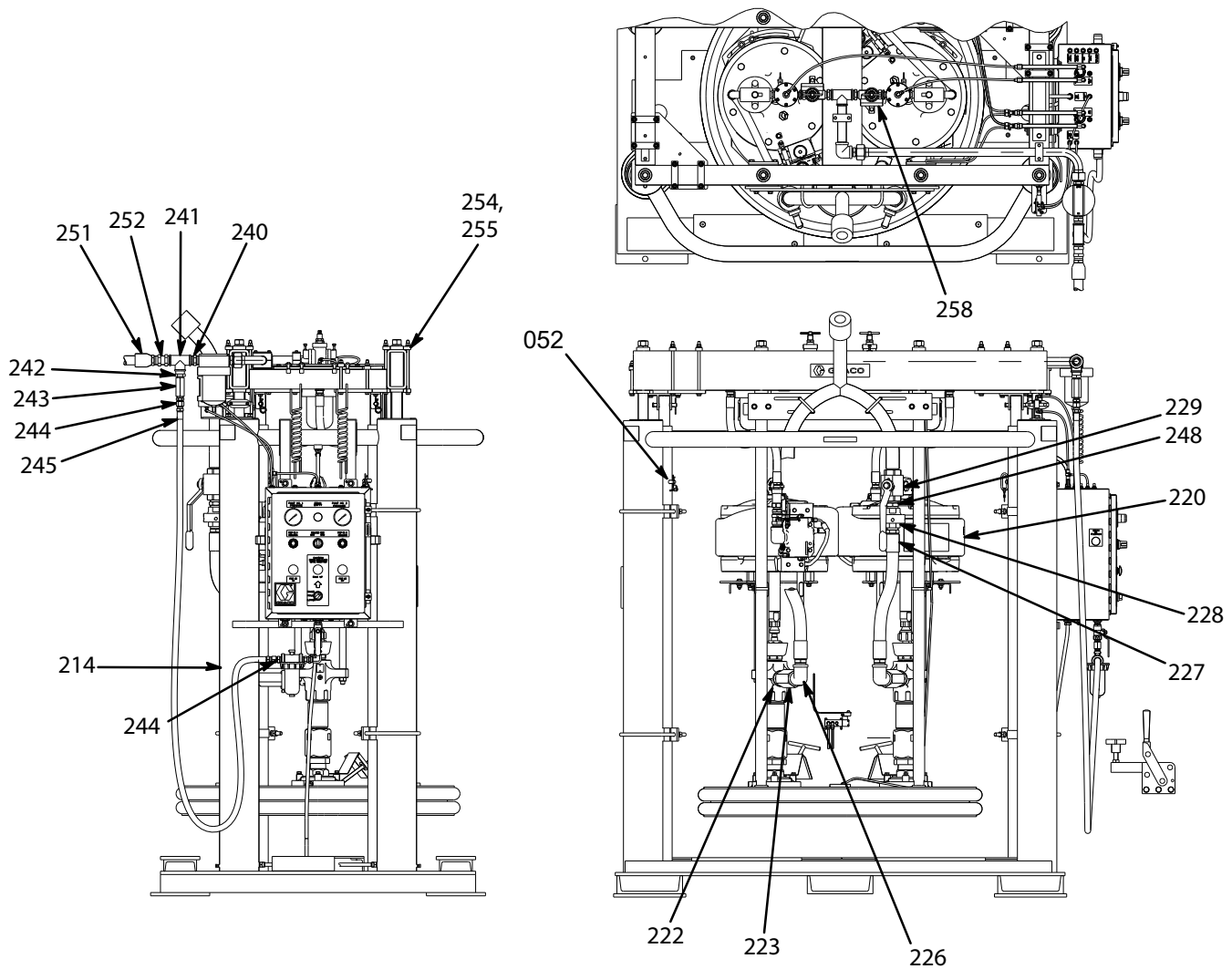


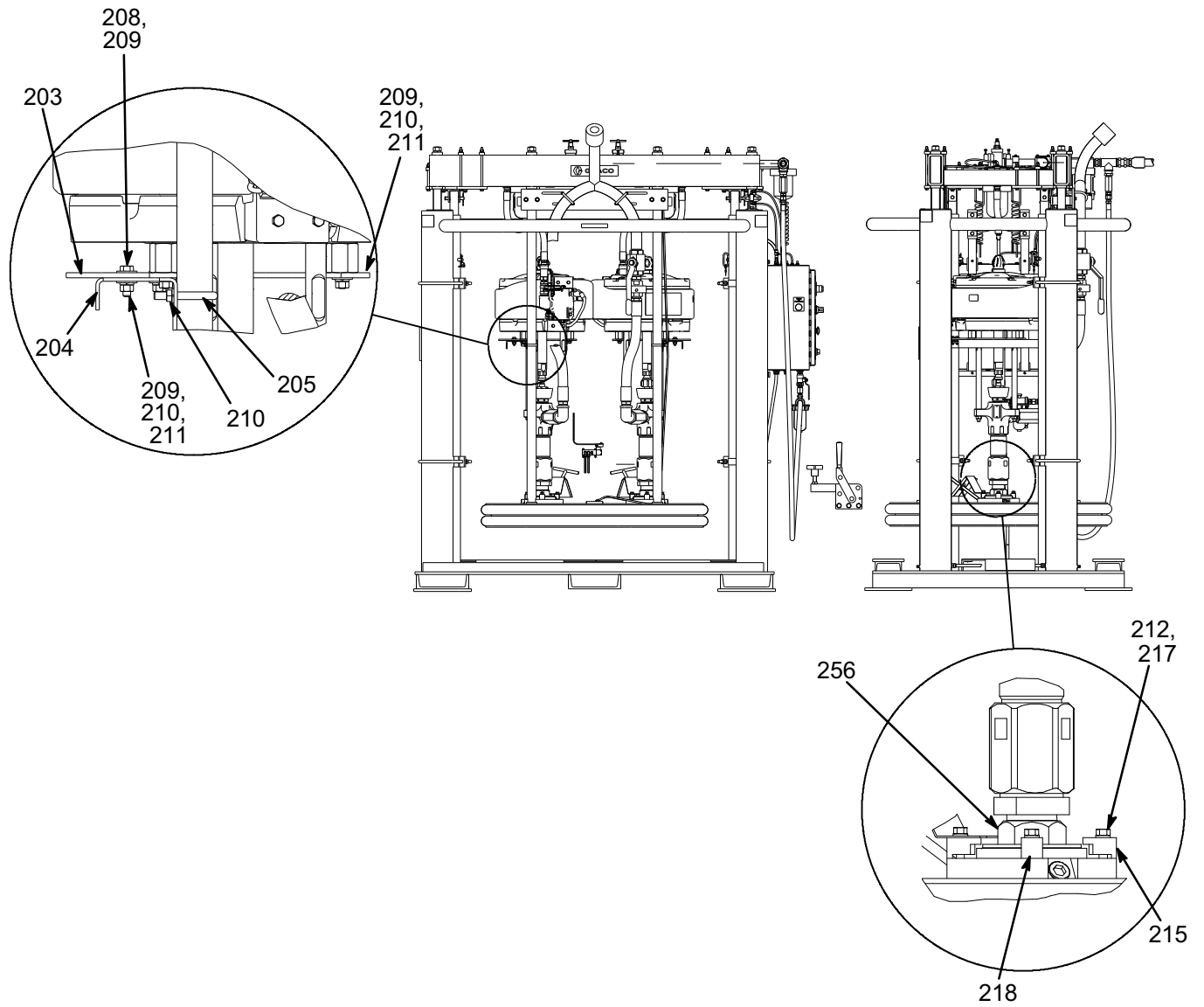


24U207 - 10:1 Left Hand Supply Unit, with King carbon steel pump**24U208 - 10:1 Right Hand Supply Unit, with King carbon steel pump**

Ref.	Part	Description	Qty.
052	---	PINS, safety, kit, see page 63	1
105	24U206	PUMP, king, quiet, 10:1	2
108	C20490	FITTING, nipple, hex	2
109	C20489	FITTING, nipple	1
110	106464	FITTING, tee, pipe, 1" NPT	1
111	C20463	FITTING, nipple, reducing,	1
112	C57799	VALVE, check, 1/2"	1
113	C19019	FITTING, union swivel	2
114	214656	HOSE, coupled, 61209, 10	1
117	C19032	SWIVEL, swivel union	1
118	C12039	HOSE, air	1
122	24M557	ELEVATOR, ram, 1000L, left	1
122	24M630	ELEVATOR, ram 1000 l, right	1
123	102637	SCREW, cap	8
124	C19200	WASHER, plain	8
125	C19213	WASHER, lock	16
126	100307	NUT, hex	8
127	100133	WASHER, lock, 3/8	8
128	276025	CLAMP	8
129	109495	PACKING, o -ring	2
130	237569	WIRE, assy, 25 ft	2
131	175013	NIPPLE, pipe	2
132	113332	VALVE, ball, vented, .750	2
133	C20450	BOLT, U	4
134	617205	BRACKET, pump mounting	2
135	16A999	FITTING, bushing, hex	2
136	521850	VALVE, check	2
137	127120	FITTING, elbow, 45, straight	4
138	233058	HOSE, coupled, 061367	2
139	121447	FITTING, swivel	2
140	118854	VALVE, ball, high pressure	2
141	111803	SCREW, cap, hex head	8
148	104911	TERMINAL, ring	2

24M627, 71:1 Left Hand Supply Unit, with XL 10000 stainless steel pump
24M628, 71:1 Right Hand Supply Unit, with XL 10000 stainless steel pump



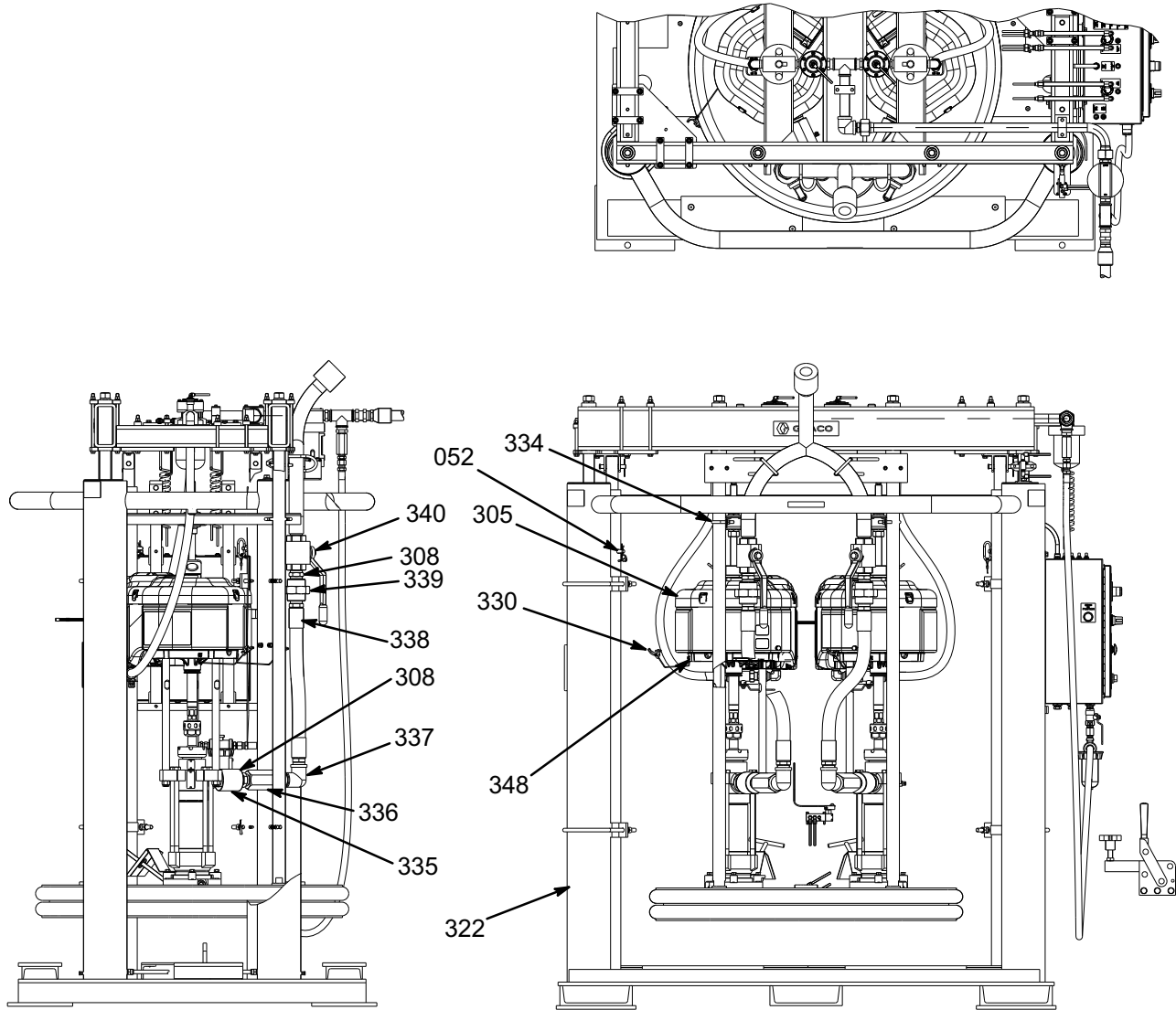


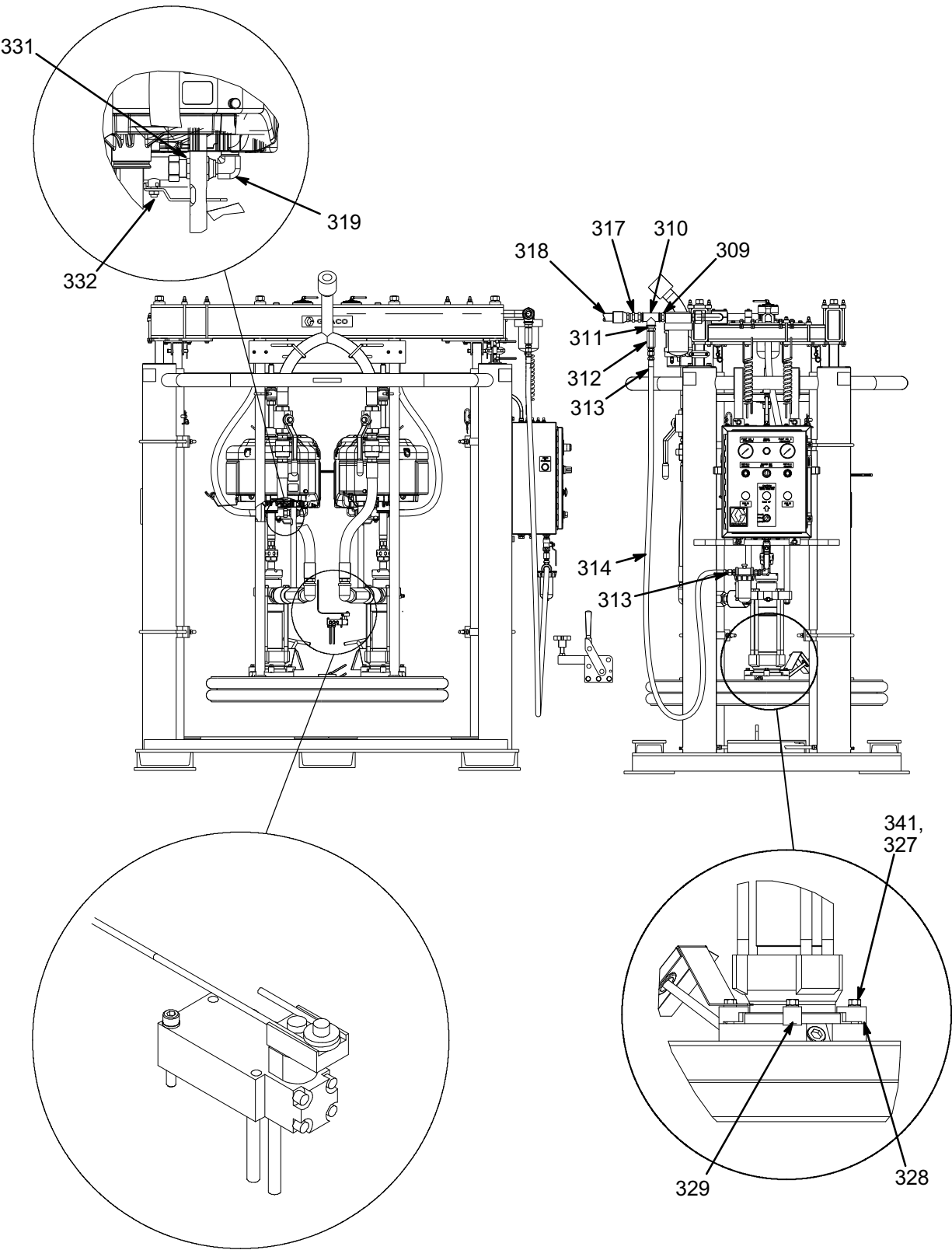
24M627 - 71:1 Left Hand Supply Unit, with XL 10000 stainless steel pump**24M628 - 71:1 Right Hand Supply Unit, with XL 10000 stainless steel pump**

Ref.	Part	Description	Qty.
052	---	PINS, safety, kit, see page 63	1
203	C85360	PLATE, adjuster	2
204	C58361	BRACKET, support	2
205	C20450	BOLT, U	4
208	C19126	SCREW, cap, hex head	4
209	C19200	WASHER, plain	14
210	C19213	WASHER, lock	18
211	100307	NUT, hex	10
212	111803	SCREW, cap, hex head	8
214	24M557	ELEVATOR, ram 1000 l, left	1
214	24M630	ELEVATOR, ram 1000 l, right	1
215	276025	CLAMP	8
216	158555	FITTING, nipple, 1 x 3/4 NPT	2
217	100133	WASHER, lock, 3/8	8
218	109495	PACKING, o-ring	2
220	24Y223	PUMP, XL, 71:1	1
221	24Y224	PUMP, XL, 71:1	1
222	C20465	FITTING, reducing nipple	2
223	521850	VALVE, check	2
226	C38324	FITTING, elbow, street	2
227	233058	HOSE, coupled, 061367	2
228	521975	FITTING, union, pipe	2
229	118854	VALVE, ball, high pressure	2
233	113332	VALVE, ball, vented, .750	2
240	C20489	FITTING, nipple	1
241	106464	FITTING, tee, pipe, 1" NPT	1
242	C20463	FITTING, nipple, reducing,	1
243	C57799	VALVE, check, 1/2"	1
244	C19019	FITTING, union swivel	1
245	214656	HOSE, coupled, 61209, 10 ft	1
248	C20490	FITTING, nipple, hex	2
251	C19032	SWIVEL, swivel union	3
253	94/0398/99	FITTING, 90°, 1" NPT	2
256	190166	CYLINDER, intake	2
258	120306	VALVE, safety, 85 psi	2

24N999 - 23:1 Left Hand Supply Unit, with NXT carbon steel pump

24P004 - 23:1 Right Hand Supply Unit, with NXT carbon steel pump





24N999 - 23:1 Left Hand Supply Unit, with NXT carbon steel pump**24P004 - 23:1 Right Hand Supply Unit, with NXT carbon steel pump**

Ref.	Part	Description	Qty.
052	---	PINS, safety, kit, see page 63	1
305	P23ECD	PUMP, Duraflow, 6500/580	2
308	C20490	FITTING, nipple, hex	4
309	C20489	FITTING, nipple	1
310	106464	FITTING, tee, pipe, 1" NPT	1
311	C20463	FITTING, nipple, reducing,	1
312	C57799	VALVE, check, 1/2"	1
313	C19019	FITTING, union swivel	2
314	214656	HOSE, coupled, 61209, 10	1
317	C19032	SWIVEL, swivel union	1
318	C12039	HOSE, air	1
319	160327	ELBOW, swivel	2
322	24P002	ELEVATOR, ram, 1000L, left	1
322	24P003	ELEVATOR, ram 1000 L, right	1
327	100133	WASHER, lock, 3/8	8
328	196073	CLAMP	8
329	109495	PACKING, o -ring	2
330	237569	WIRE, assy, 25 ft	2
331	175013	NIPPLE, pipe	2
332	113332	VALVE, ball, vented, .750	2
334	24P001	KIT, mounting, NXT, Unidrum	2
335	C38457	FITTING, coupling, reducing	2
336	521850	VALVE, check	2
337	C38324	FITTING, elbow, street	2
338	233058	HOSE, coupled, 061367	2
339	521975	FITTING, union, pipe	2
340	118854	VALVE, ball, high pressure	2
341	111803	SCREW, cap, hex head	8
348	104911	TERMINAL, ring	2

Follower Plate Assembly, 241891 and 243510

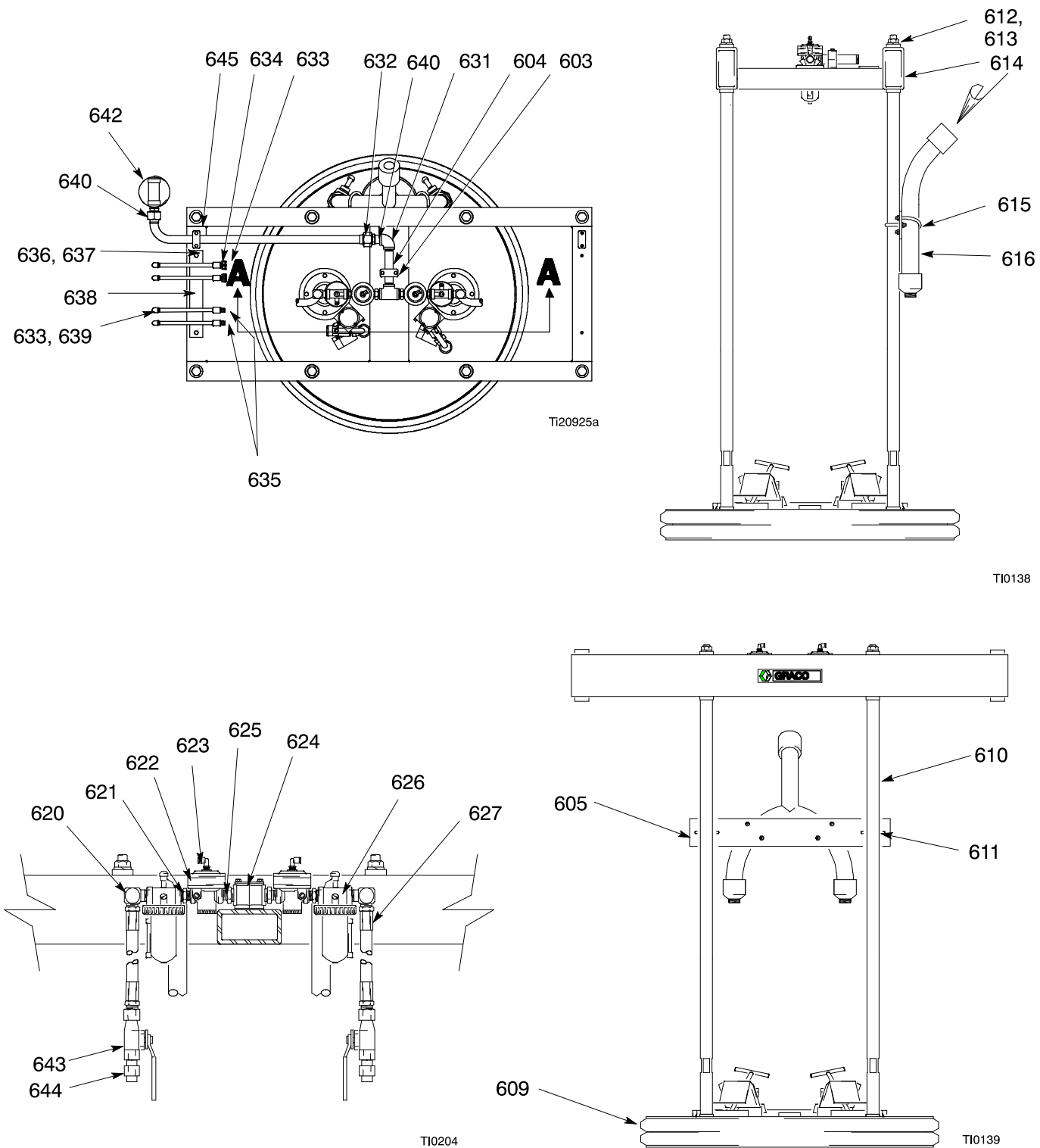


FIG. 20

Follower Plate Assembly, 241891 and 243510

Ref.	Part	Description	Qty.
603	516102	CLAMP, pipe	2
604	114508	NIPPLE	1
605	617203	BAR, support	1
609	233041	PLATE, follower; see page 61	1
610	617180	ROD, connecting	4
611	C20450	U-BOLT	2
612	101535	NUT, hex	4
613	101533	LOCKWASHER, spring; 7/8 in.	4
614	617204	CARRIAGE	1
615	C20449	U-BOLT; 3/8-16	2
616	517284	DISCHARGE MANIFOLD	1
620	100549	ELBOW, street	2
621	C20461	NIPPLE, reducing	2
622	515147	REGULATOR	2
623	C19391	ELBOW	2
624	106464	TEE	1
625	C20463	NIPPLE, reducing	2
626	214849	LUBRICATOR, air line	2
627	517290	HOSE	2
631	C19438	ELBOW; 1 in. npt	1
632	16U204	TUBE, unidrum, air inlet	1
633	114112	CONNECTOR, female	6
634	113093	CONNECTOR, pipe	4
635	C20378	FITTING, tube, Y-branch; 1/4 npt (m) x 1/4 OD tube	2
636	100469	SCREW, cap, hex hd	2
637	C19213	WASHER, lock	2
638	617202	MANIFOLD, air	1
639	113532	ELBOW; 1/4 npt	4
640	15D936	FITTING, male connector	2
641	158585	NIPPLE	1
642	112859	FILTER, air; 1 in. npt	1
643	113332	VALVE, ball	2
644	158555	NIPPLE, reducing	2
645	16U212	CLAMP, 1.25 in. OD, pipe	1

Pneumatic Logic Panel, 243559

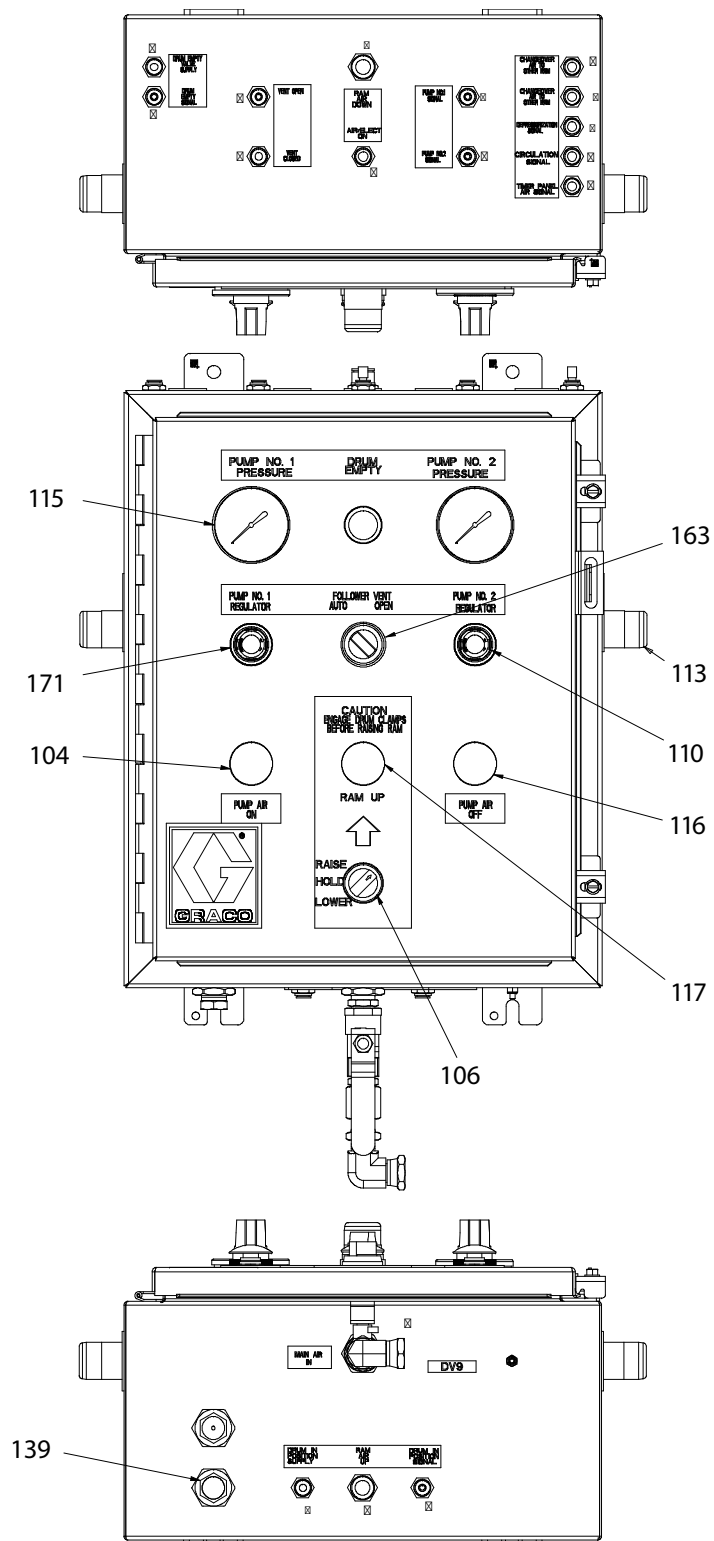


FIG. 21

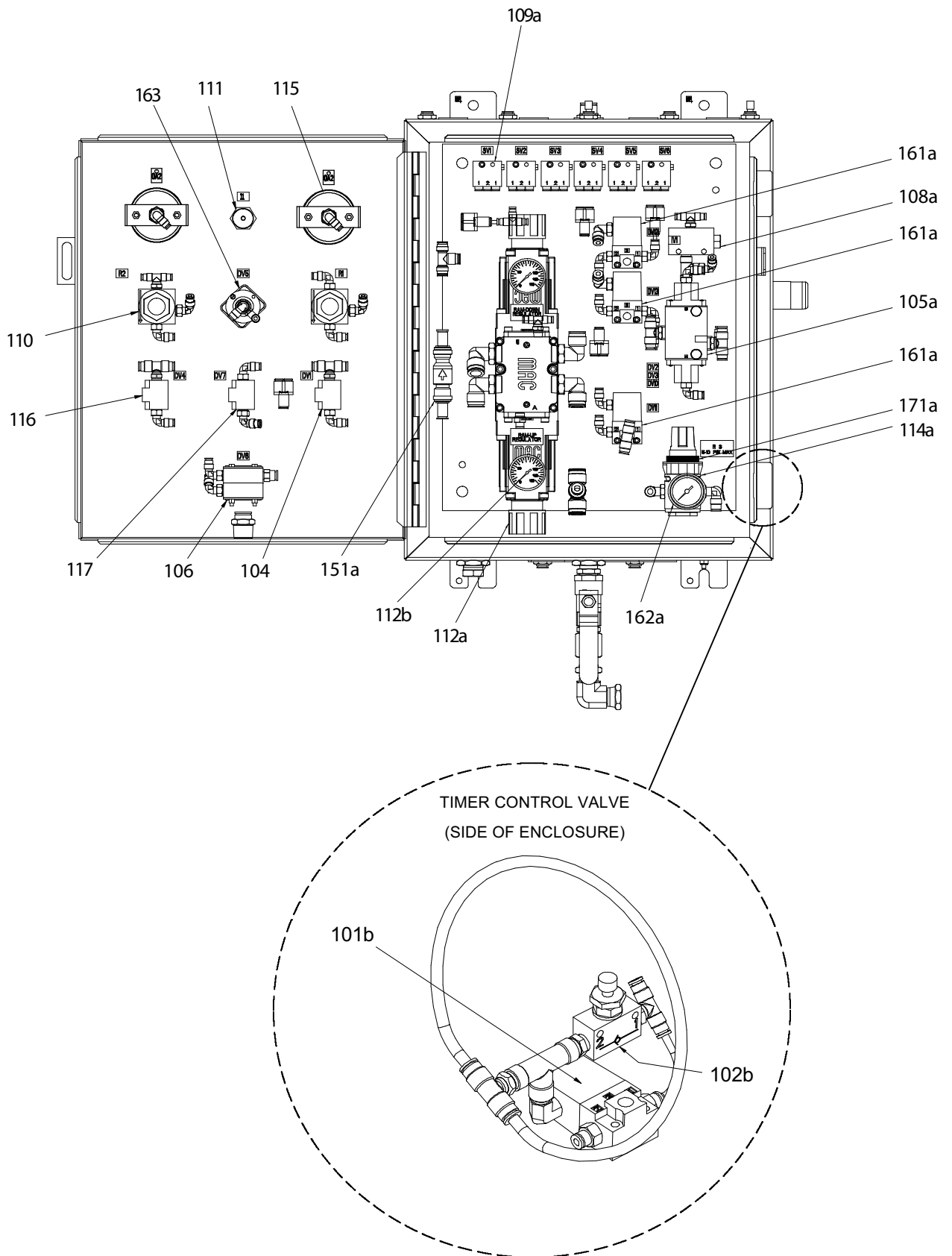


FIG. 22

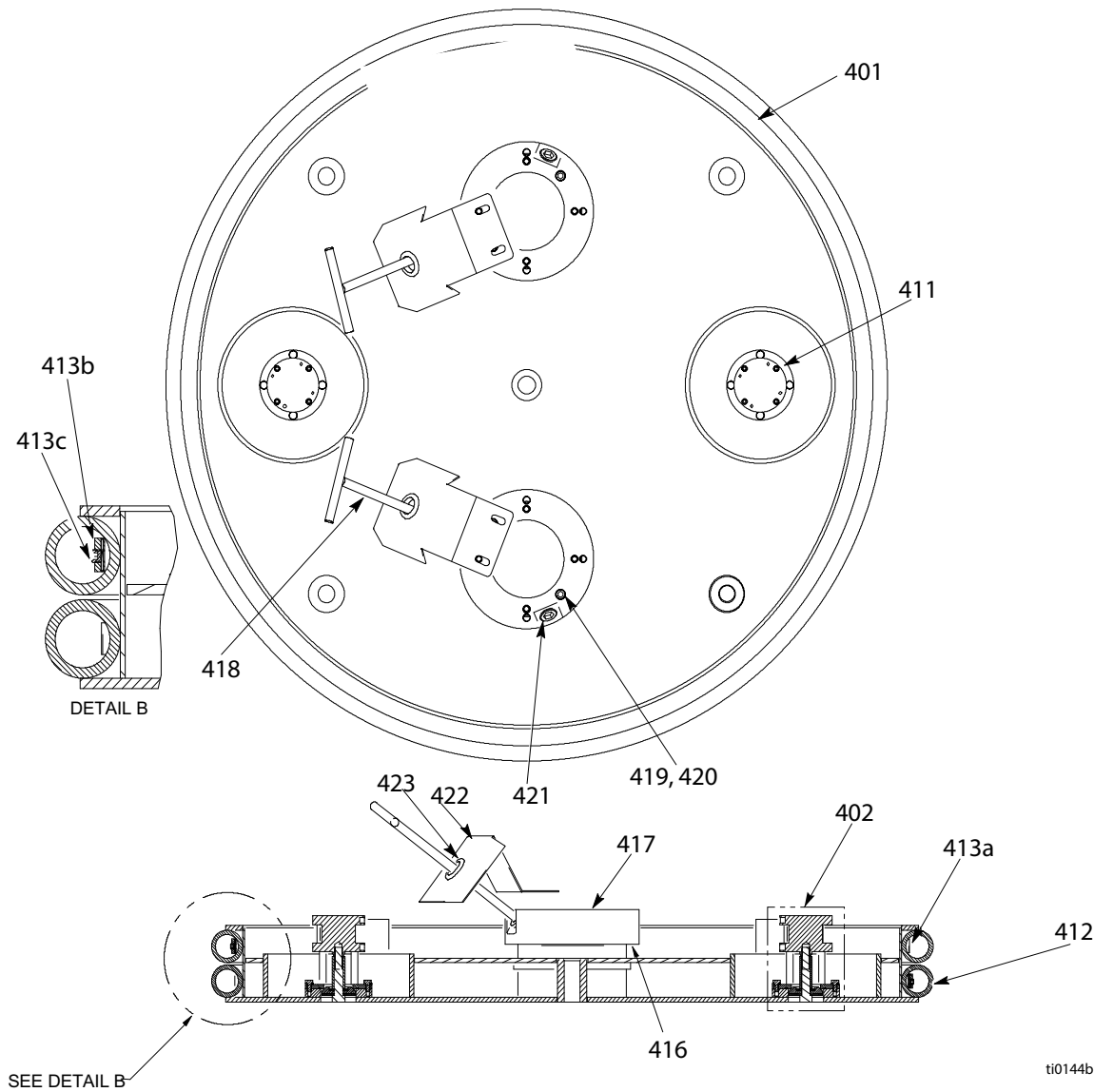
Pneumatic Logic Panel, 243559

Ref.	Part	Description	Qty.
104	517315	VALVE, 3 way, button, palm	1
105a	125441	VALVE, air, pilot, 4 -way, 5 port	3
106	125504	VALVE, pneumatic, 3 position	1
108a	125464	VALVE, impulse, one shot	1
109a	125516	VALVE, pneumatic, logic, OR	6
110	125506	VALVE, pneumatic, regulator	2
111	125510	INDICATOR, pneumatic, red	1
112a	517412	REGULATOR, valve, dual, 4	1
112b	127379	GAUGE, pressure, air, 0 -160	2
113	125459	INDICATOR, pneumatic, green	2
114a	125507	VALVE, pneumatic, regulator	1
115	125452	GAUGE, pressure, air, panel	2
116	517314	VALVE, 3 way, button, palm	1
117	517313	VALVE, 3 way, button, palm	1
139	125502	FITTING, plug, hex, muffler	1
151a	125501	VALVE, pneumatic, check,	1
161a	121265	VALVE, remote, air actuated	3
162a	125511	GAUGE, pressure, air	1
163	24J876	SWITCH, pneumatic,	1
171	125505	NUT, pneumatic, regulator,	2
171a	125505	NUT, pneumatic, regulator,	1

Timer Control Valve

Ref.	Part	Description	Qty.
101b	121265	VALVE, remote, air actuated	1
102b	125409	VALVE, flow controller	1

Follower Plate, 233041



ti0144b

FIG. 23

Follower Plate, 233041

Ref.	Part	Description	Qty.
401	233040	PLATE, ram	1
402	234958	VALVE, VENT, FOLLOWER PLATE, see page 63	2
412	617195	WIPER	2
413	24X821	KIT, banding, seal, UniDrum (1 kit per wiper)	1
413a	---	STRAPPING; steel	144 in.
413b	---	CLAMP, banding	1
413c	---	SCREW, set	1
416	617230	GASKET	2
417	196072	RING, adapter	2
418	233044	PLUG, vent	2
419	C19843	CAPSCREW	4
420	106115	LOCKWASHER	4
421	102726	PLUG, pipe	2
422	196122	SHIELD	2
423	114269	GROMMET	2

234958 VALVE, VENT, FOLLOWER PLATE

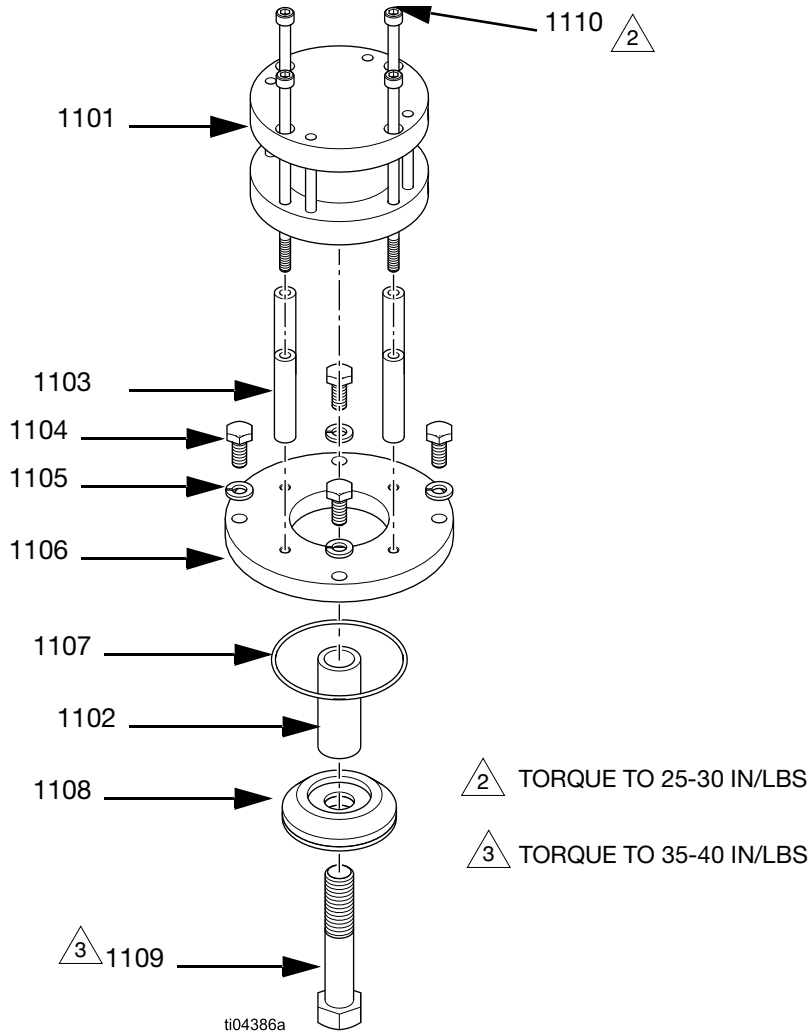


FIG. 24

Ref	Part	Description	Series B Series A	
			Qty	Qty
1101	115782	CYLINDER, AIR	1	1
1102	196051	SPACER	1	1
1103	2006209	SPACER (1-3/4" long)	4	--
1103	196052*	SPACER (1-7/8" long)	--	4
1104	100270*	SCREW, CAP, HEX HD (5/8" long)	4	--
1104	100333*	SCREW, CAP, HEX HD (1/2" long)	--	4
1105	100016	WASHER, LOCK	4	4
1106	2006208	PLATE (3/8" thick)	1	--

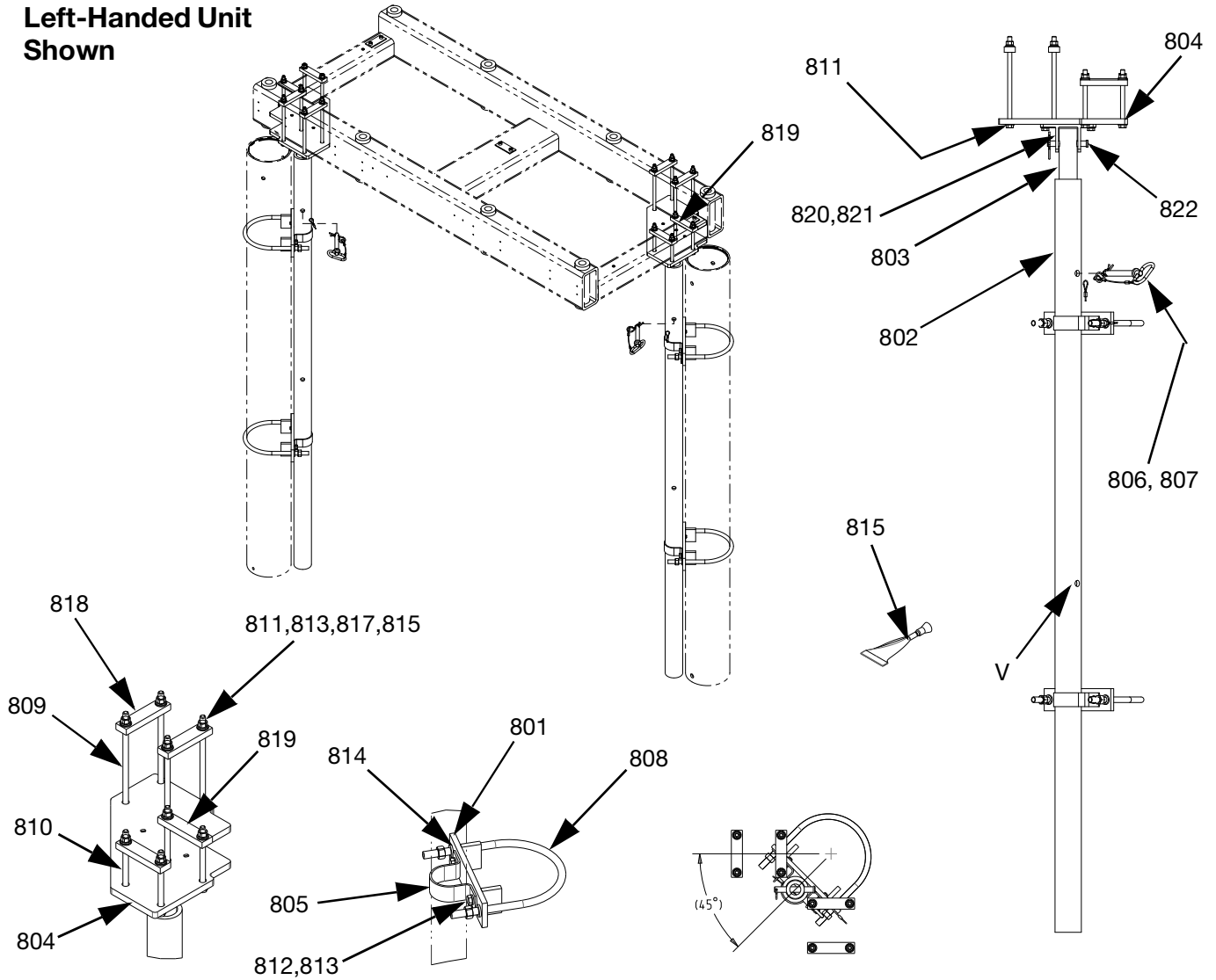
Parts

Ref	Part	Description	Series B	Series A
			Qty	Qty
1106	196053*	PLATE (1/4" thick)	--	1
1107	112245	PACKING, O RING	1	1
1108	517286	PLUNGER, PLUNGER	1	1
1109	115783	BOLT, HEX HEAD	1	1
1110	115784	SCREW, CAP, SOCKET HEAD	4	4

* *Part dimensions vary depending on series. Measure part and match to dimension in part description to identify the correct replacement part.*

Safety Pin Maintenance Kit, 26B772

Left-Handed Unit
Shown



Key:

V Optional Mid maintenance position

FIG. 25

Safety Pins, 26B772

Ref.	Part	Description	Qty.
801	26B769	BRACKET, cylinder support	4
802	18D250	TUBE, support, outer	2
803	18D251	TUBE, support, inner	2
804	18D249	PLATE, base, lock out	2
805	133303	STRAP, pipe, 2 in.	4

Ref.	Part	Description	Qty.
806	16Y456	PIN, safety, hitch	2
807	2010203	CABLE, landyard, 48 in.	2
808	15G946	BOLT, U, 1/2 x 8.375	4
809	133306	SCREW, HHC	8
810	123389	SCREW	8

Ref.	Part	Description	Qty.
811	101971	WASHER, thrust	32
812	123284	SCREW, HHC	8
813	100133	WASHER, lock, 3/8	24
814	100018	WASHER, lock, spring, 1/2	8
815	113500	ADHESIVE, anaerobic	1
817	100307	NUT, hex	16
818	18D253	PLATE, mounting, u-bolt, 3/8	7
819	18D254	PLATE, mounting, u-bolt, 3/8, thk	1
820	18D252	BRACKET, lock out, unidrum	2
821	113802	SCREW, hex head, flanged	4
822	133305	PIN, clevis	2

Elevator Assembly,

24M557, 24M630 Elevator Assembly (Manual runaway valve)

24P002, 24P003 Elevator Assembly (Designed for NXT systems equipped with DataTrak®)

24W300, 24W307 Elevator Assembly (Outlet manifold not included)

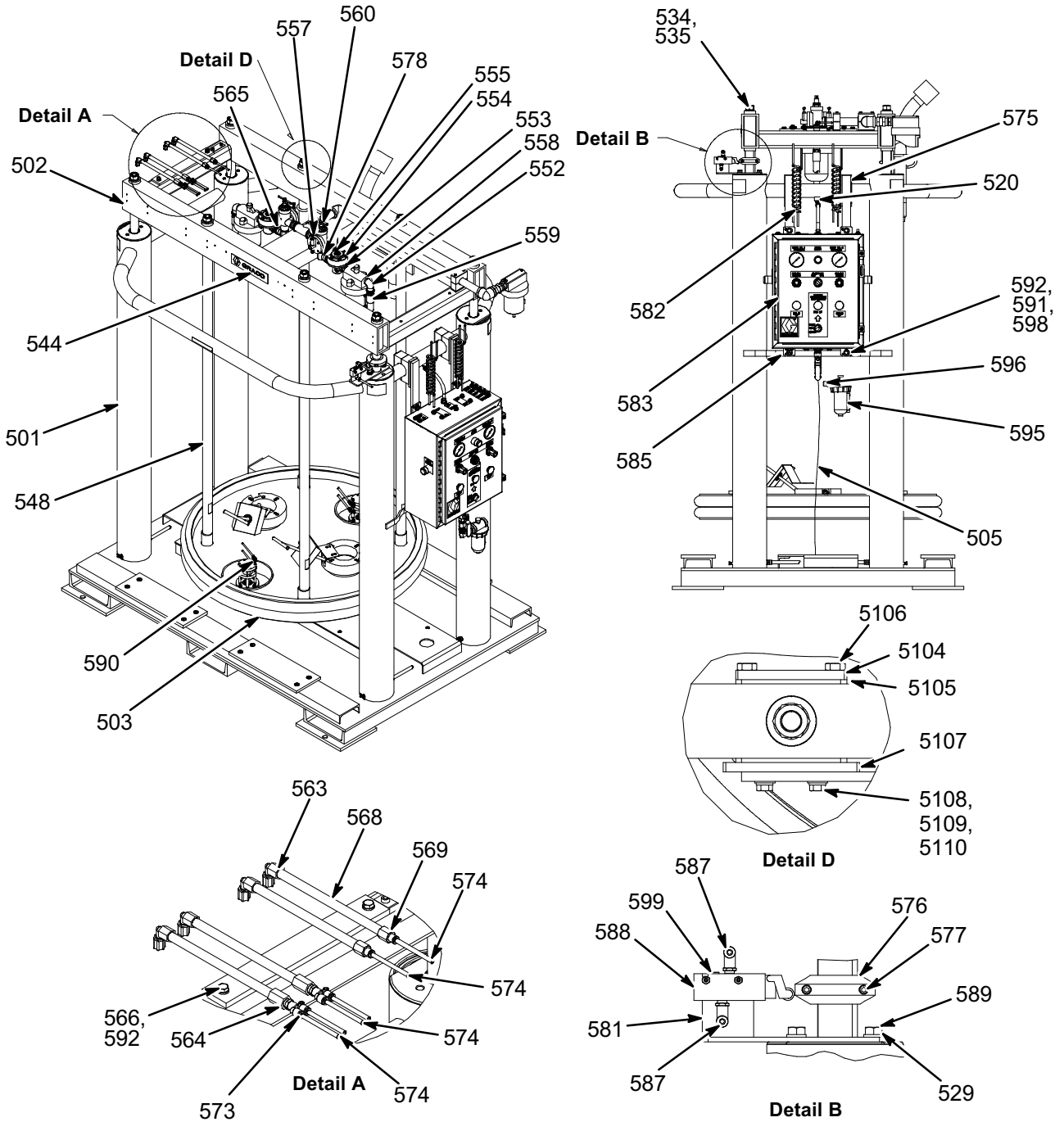


FIG. 26

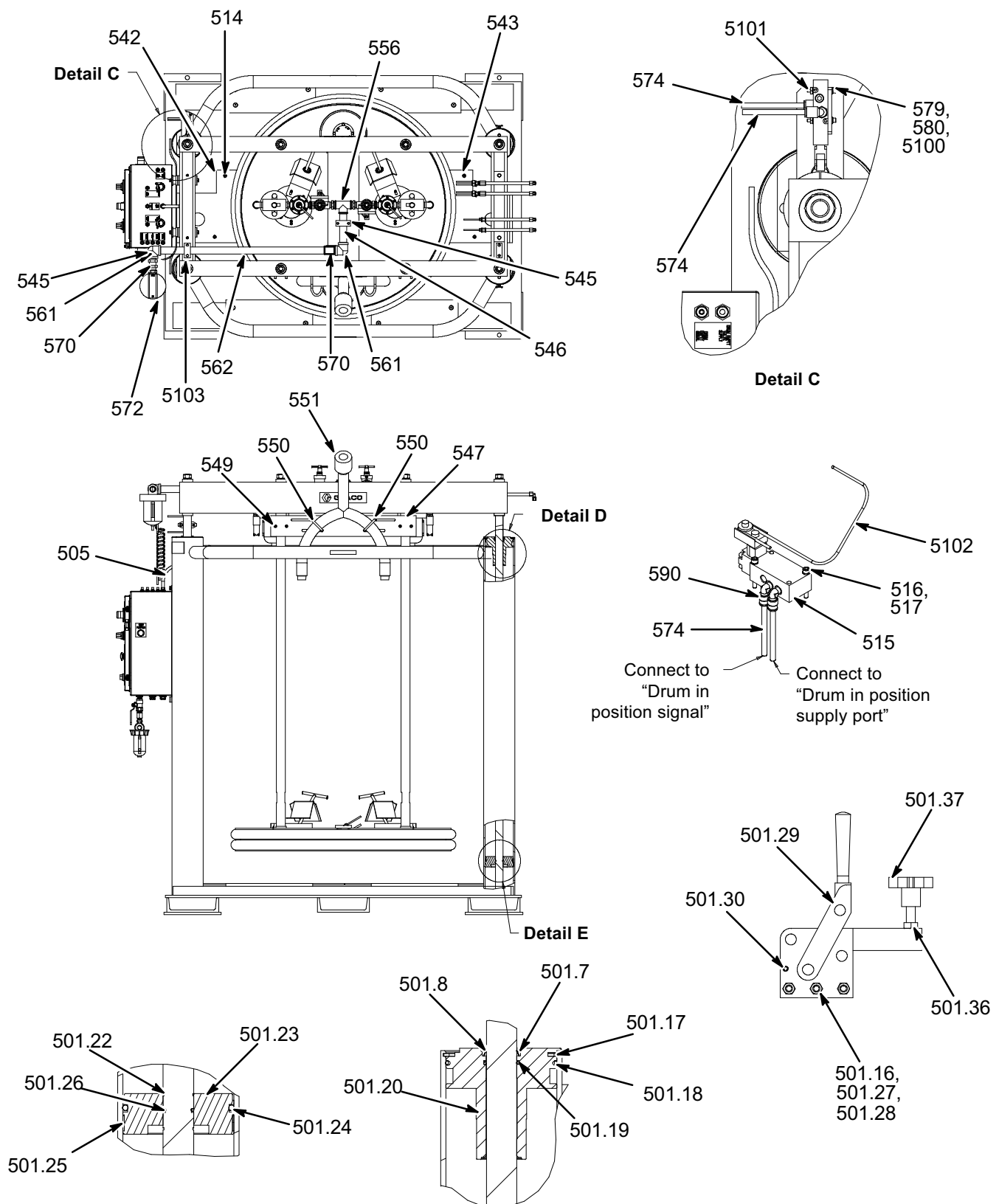


FIG. 27

24M557, 24M630 Elevator Assembly (Manual runaway valve)**24P002, 24P003 Elevator Assembly (Designed for NXT systems equipped with DataTrak®)****24W300, 24W307 Elevator Assembly (Outlet manifold not included)**

Ref.	Part	Description	Qty.
501	24M558	ELEVATOR, assembly, 1000l	1
501.7	C31001	WIPER, rod	4
501.8	C03043	RING, snap	4
501.14	070272	LUBRICANT, grease	1
501.15	070408	SEALANT, pipe, sst	1
501.16	100321	NUT	6
501.17	C03042	700-130-5, spirolox ring	4
501.18	121306	PACKING, o-ring	4
501.19	156593	PACKING, o-ring	4
501.20	C31000	SLEEVE, guide	4
501.22	C20417	RING, retaining	8
501.23	C03046	PISTON, elevator	4
501.24	C20280	O--RING	4
501.25	C03047	GUIDE, band	4
501.26	158776	PACKING, o-ring	4
501.27	C19130	SCREW, cap, hex head	6
501.28	100018	WASHER, lock, spring	6
501.29	194968	CLAMP	2
501.30	517281	PIN, spring	2
501.35	073021	LUBRICANT, oil	1
501.36	100681	NUT, jam, hex	2
501.37	517411	KNOB	2
502	617204	CARRIAGE, weldment, 300 gal	1
503	233041	PLATE, ram, neoprene	1
505	054139	TUBE, nylon, rd	6.5 ft
514	C20811	SCREW, sockethead, flat	12
515	C06019	VALVE, limit, w/adj roller arm	1
516	104472	SCREW, cap	2
517	100020	WASHER, lock	2
520	C19381	FITTING, tube, elbow, male	1
529	100018	WASHER, lock, spring	2
534	101535	NUT, full hex	8
535	101533	WASHER, spring lock	8
539	070272	LUBRICANT, grease	1
540	070408	SEALANT, pipe, sst	1
542	196084	COVER, right	1
543	196085	COVER, left	1
544	165188	EMBLEM, graco	2
545	516102	CLAMP, pipe	1
546	114508	FITTING, nipple	1
547+	617203	BAR, support	1
548	617180	ROD, connecting	4
550+	C20449	BOLT, u w/nuts	2
551+	517284	MANIFOLD, discharge header	1
552	100549	ELBOW, street, pipe, 90°	2
553	C20461	FITTING, nipple, reducing, hex	2
554	515147	REGULATOR, air, 1/2p,	2
555	C19391	FITTING, elbow	2
556	106464	FITTING, tee, pipe, 1" npt	1
557	158555	FITTING, nipple, 1 x 3/4 npt	2
	C20763	(24M557 and 24M630 only) FITTING, nipple, reducing, hex	2
558	214849	(24P002 and 24P003 only) LUBRICATOR, air line	2

Ref.	Part	Description	Qty.
559	517290	HOSE, coupled, 3 ft	2
	110048	(24M557 and 24M630 only) HOSE, coupled, 4 ft	2
560*	224040	(24P002 and 24P003 only) VALVE, runaway	2
561	C19438	FITTING, elbow, 90	2
562	16U204	TUBE, Unidrum, air inlet	1
563	113532	FITTING, elbow, female	4
564	113093	CONNECTOR, pipe	2
565*	157191	FITTING, adapter (1/2npt x	2
566	100469	SCREW, cap, hex hd	2
568	617202	MANIFOLD, air bracket	
569	114112	FITTING, connector, female	2
570	15D936	FITTING, male, connector	2
572	112859	FILTER, air, 1 npt	1
573	C20378	FITTING, branch, y	2
574	C12509	TUBE, nylon, rnd	59 ft
575	517272	CLAMP, support	2
576	617149	ACTUATOR	1
577	C19810	SCREW, cap, socket hd	2
578*	160327	FITTING, union adapter, 90 deg	2
579	C19965	SCREW, cap, socket hd	2
580	C19212	WASHER, lock	2
581	617265	BRACKET, mounting	1
582	517288	TUBE, coiled	2
583	243559	BOX, control, pneumatic	1
585	617200	SUPPORT, bracket	1
587	597151	FITTING, elbow	2
588	C06182	VALVE, limit, air	1
589	100049	SCREW, cap hex hd	2
590	112698	ELBOW, male, swivel	6
591	C19124	SCREW, cap, hex hd	4
592	C19213	WASHER, lock	6
593	517254	CLIP, tube	2
594	110299	RIVET, blind	2
595	106149	FILTER, air, 1/2npt	1
596	C20485	FITTING, nipple, hex	1
597	C19019	FITTING, union swivel	1
598	C19200	WASHER, plain	4
599	104765	PLUG, pipe headless	1
5100	C19725	WASHER	4
5101	100072	NUT, hex	2
5102	115441	ARM, limit switch	1
5103	16U212	CLAMP, 1.25 in. OD, pipe	1
5104	127205	COVER, plate, 1.75 in. OD	2
5105+	127207	CLAMP, pair, 1.75 in. OD	2
5106+	127209	SCREW, cap, hex head	4
5107+	16W198	BASE, 1.75 in. OD, clamp	2
5108+	100133	WASHER, lock, 3/8	4
5109+	100731	WASHER	4
5110+	100680	SCREW, cap, hex head	4

* Not included with 24P002 and 24P003 (Systems with NXT air motors equipped with DataTrak)

+ Not included with 24W300 and 24W307

Recommended Spare Parts

Spare Parts for Pump and Air Motor

Refer to the appropriate manual listed in **Related Manuals** on page 3.

Spare Parts for Follower Plate Assembly

The customer should maintain an inventory of the spare parts (per unit) listed below.

Part	Description	Qty.
918241	WIPER KIT	1
517286*	PLUNGER	2
196053*	PLATE	2
115783*	BOLT	2
196052*	SPACER	8
112245*	O-RING	2
115782*	AIR CYLINDER	2
196051*	SPACER	2
115784*	SCREW	8
617230	GASKET	2
109195	O-RING	4

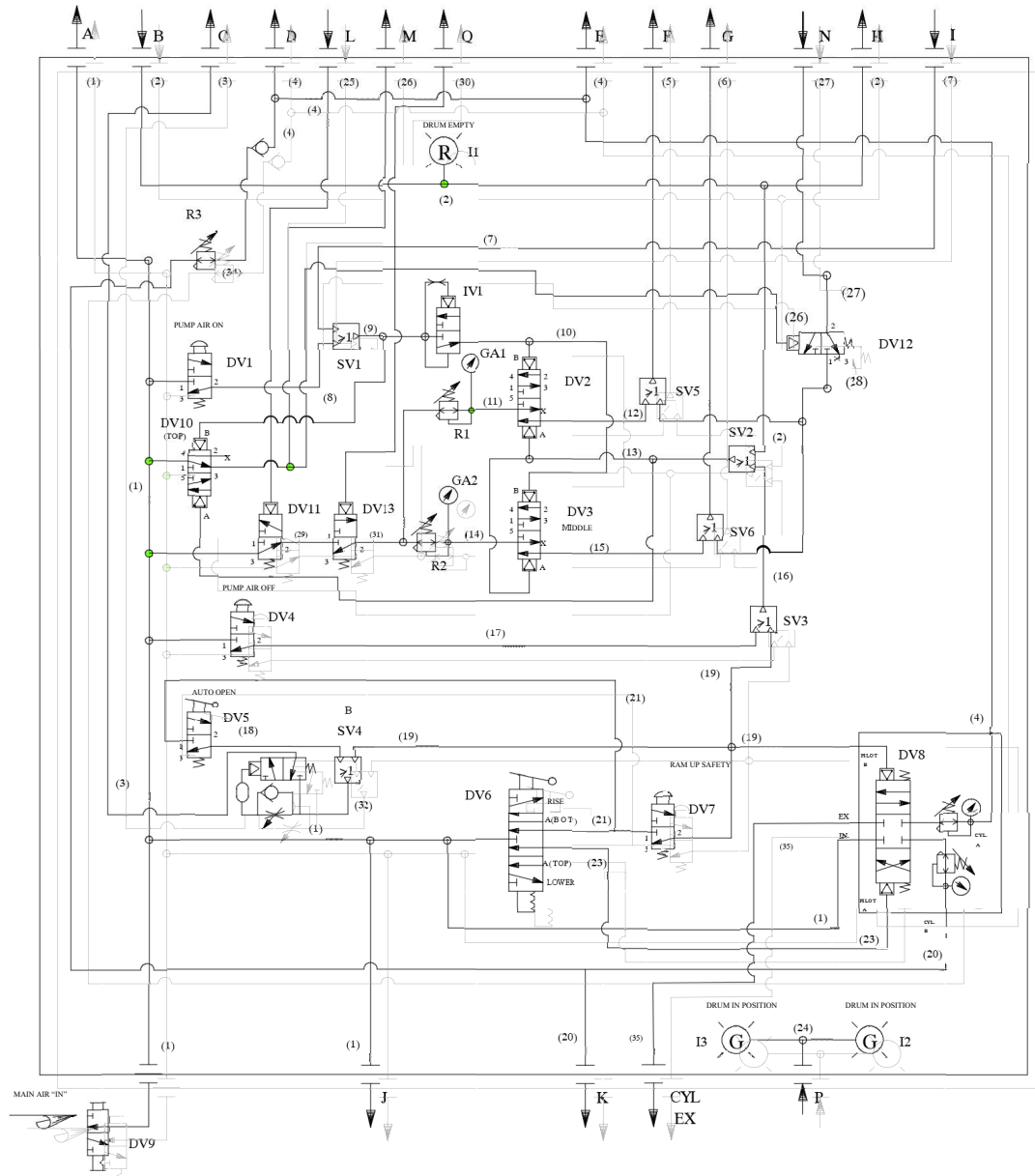
* Parts can be preassembled for a quick replacement of the vent assembly.

Part	Description
918110	REPAIR KIT
108035	FILTER KIT

Optional Long Bleeder Valve

Part	Description
190126	BODY, bleeder
190128	PLUG, valve

Pneumatic Diagram



CONNECTION	DESCRIPTION	TUBING NUMBER
A	AIR SUPPLY FOR DRUM EMPTY	1
B	DRUM EMPTY SIGNAL	2
C	VENT OPEN	3
D	VENT CLOSED	4
L	DEPRESSURIZATION	25
M	SIR TO TIMER PANEL	15
Q	AIR-ELECTRIC ALON	20
E	RAM DOWN	4
F	PUMP #1 REMOTE REGULATOR	5
G	PUMP #2 REMOTE REGULATOR	6
N	CIRCULATION	27
H	TO RAM	2
I	FROM OTHER RAM	7
O	LOCK K-OUT VALVE	1
J	AIR SUPPLY FOR DRUM IN POSITION	1
K	RAM UP	20
R	CYLINDER EXHAUST	35
P	DRUM IN POSITION SIGNAL	24

LEGEND	
DV	DIRECTIONAL VALVE
IV	IMPULSE VALVE
SV	SHUTTLE VALVE
R	REGULATOR
I	INDICATOR
GA	GAUGE

← CHANGEOVER

FIG. 28

Technical Specifications

Models 24M428, 24M708

UniDrum Supply System		
	US	Metric
Supply Units (LH and RH)		
Compressed air requirement	80 psi (maximum) (5.5 bar, 0.55 MPa), 450 cfm	
Main air inlet size	1 in. npt(f)	
Overall weight (approximate)	3950 lb	1792 kg
Quiet King/Dura-Flo 2400-580 Pumps		
Ratio	20:1 fluid to air power ratio	
Maximum fluid working pressure	1800 psi (124 bar, 12.0 MPa)	
Maximum air input pressure	90 psi (6.2 bar, 620 kPa)	
Pump cycles	6.5 per 1 gal.	6.5 per 3.8 liters
Recommended pump speed for continuous operation	50 cycles per min	
Maximum flow rate at 60 cycles/min	9.2 gpm	35.0 liters/min
Air motor piston effective area	78.5 in. ²	506 cm ²
Stroke length	4.75 in.	120 mm
Air motor cylinder inside diameter	13 in.	330 mm
Displacement pump effective area	3.72 in. ²	24 cm ²
Maximum pump operating temperature	180° F	82° C
Air inlet size	3/4 in. npsm(f)	
Fluid inlet size	2 in. npt(f)	
Fluid outlet size	1-1/2 in. npt(m)	
Wetted components	Carbon Steel; Chrome, Zinc, and Electroless Nickel Plating; 304, 440, and 17-4 PH Grades of Stainless Steel; Ductile Iron; Tungsten Carbide; Acetal; PTFE; Leather, baked enamel coated carbon steel	
Weight per pump	Approx. 162 lbs.	Approx. 69 kg
Supply System Overall Dimensions		
Width	69 in.	1753 mm
Depth	51 in.	1295 mm
Height (lowered)	85.2 in.	2164 mm
Height (raised)	141 in.	3581 mm

Models 24U207, 24U208

UniDrum Supply System		
	US	Metric
Supply Units (LH and RH)		
Compressed air requirement	80 psi (maximum) (5.5 bar, 0.55 MPa), 450 cfm	
Main air inlet size	1 in. npt(f)	
Overall weight (approximate)	3950 lb	1792 kg
Quiet King/Dura-Flo 1000 Pumps		
Ratio	10:1 fluid to air power ratio	
Maximum fluid working pressure	1000 psi (69 bar, 7 MPa)	
Maximum air input pressure	90 psi (6.2 bar, 620 kPa)	
Pump cycles	3.8 per 1 gal.	3.8 per 3.8 liters
Recommended pump speed for continuous operation	50 cycles per min	
Maximum flow rate at 60 cycles/min	17.4 gpm	65.8 liters/min
Air motor piston effective area	78.5 in. ²	506 cm ²
Stroke length	4.75 in.	120 mm
Displacement pump effective area	7.09 in. ²	46 cm ²
Maximum pump operating temperature	180° F	82° C
Air inlet size	3/4 in. npsm(f)	
Fluid inlet size	2 in. npt(f)	
Fluid outlet size	1-1/2 in. npt(f)	
Wetted components	Carbon Steel; Chrome, Zinc, and Electroless Nickel Plating; 304, 440, and 17-4 PH Grades of Stainless Steel; Ductile Iron; Tungsten Carbide; Acetal; PTFE; Leather, baked enamel coated carbon steel	
Weight per pump	Approx. 162 lbs.	Approx. 69 kg
Supply System Overall Dimensions		
Width	69 in.	1753 mm
Depth	51 in.	1295 mm
Height (lowered)	85.2 in.	2164 mm
Height (raised)	141 in.	3581 mm

Models 24M628, 24M627

UniDrum Supply System		
	US	Metric
Supply Units (LH and RH)		
Compressed air requirement	80 psi (maximum) (5.5 bar, 0.55 MPa), 450 cfm	
Main air inlet size	1 in. npt(f)	
Overall weight (approximate)	3950 lb	1792 kg
XL 10000/Dura-Flo 1200-290 Pumps		
Ratio	71:1 fluid to air power ratio	
Maximum fluid working pressure	5000 psi (345 bar, 34.5 MPa)	
Maximum air input pressure	75 psi (5.2 bar, 0.5 MPa)	
Pump cycles	12.93 per 1 gal.	12.93 per 3.8 liters
Recommended pump speed for continuous operation	40 cycles per min	
Maximum flow rate at 60 cycles/min	4.8 gpm	18.2 liters/min
Air motor piston effective area	132.7 in. ²	856 cm ²
Stroke length	4.8 in.	122 mm
Air motor cylinder inside diameter	13 in.	330 mm
Displacement pump effective area	1.86 in. ²	12 cm ²
Maximum pump operating temperature	160° F	71° C
Air inlet size	1 in. npt(f)	
Fluid inlet size	2 in. npt(f)	
Fluid outlet size	1-1/2 in. npt(m)	
Wetted components	Carbon steel, chrome, zinc, and electroless nickel plating; 304, 440 and 17-4 PH Grades of stainless steel; ductile iron; tungsten carbide; acetal; PTFE; leather, baked enamel coated carbon steel	
Weight per pump	Approx. 234 lbs.	Approx. 106 kg
Supply System Overall Dimensions		
Width	69 in.	1753 mm
Depth	51 in.	1295 mm
Height (lowered)	85.2 in.	2164 mm
Height (raised)	141 in.	3581 mm

Models 24N999, 24P004

UniDrum Supply System		
	US	Metric
Supply Units (LH and RH)		
Compressed air requirement	80 psi (maximum) (5.5 bar, 0.55 MPa), 450 cfm	
Main air inlet size	1 in. npt(f)	
Overall weight (approximate)	3950 lb	1792 kg
NXT Pumps		
Ratio	23:1 fluid to air power ratio	
Maximum fluid working pressure	2270 psi (157 bar, 16 MPa)	
Maximum air input pressure	100 psi (7 bar, 0.7 MPa)	
Pump cycles	6.5 per 1 gal.	6.5 per 3.8 liters
Recommended pump speed for continuous operation	50 cycles per min	
Maximum flow rate at 60 cycles/min	9.2 gpm	35 liters/min
Air motor piston effective area	84.5 in. ²	545 cm ²
Stroke length	4.75 in.	120 mm
Displacement pump effective area	3.72 in. ²	24 cm ²
Maximum pump operating temperature	150° F	65.5° C
Air inlet size	3/4 in. npt(f)	
Fluid inlet size	2 in. npt(f)	
Fluid outlet size	1-1/2 in. npt(m)	
Wetted components	Carbon Steel; Chrome, Zinc, and Electroless Nickel Plating; 304, 440, and 17-4 PH Grades of Stainless Steel; Ductile Iron; Tungsten Carbide; Acetal; PTFE; Leather, baked enamel coated carbon steel	
Weight per pump	Approx. 149 lbs.	Approx. 67.5 kg
Supply System Overall Dimensions		
Width	69 in.	1753 mm
Depth	51 in.	1295 mm
Height (lowered)	85.2 in.	2164 mm
Height (raised)	141 in.	3581 mm

California Proposition 65

CALIFORNIA RESIDENTS

 **WARNING:** Cancer and reproductive harm – www.P65warnings.ca.gov.

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Original instructions. This manual contains English. MM 3A2510

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