Instructions–Parts List

Uni-Drum™ Supply System

309028

Bulk Supply System for 300 Gallon (1200 Liter) Magnadrums

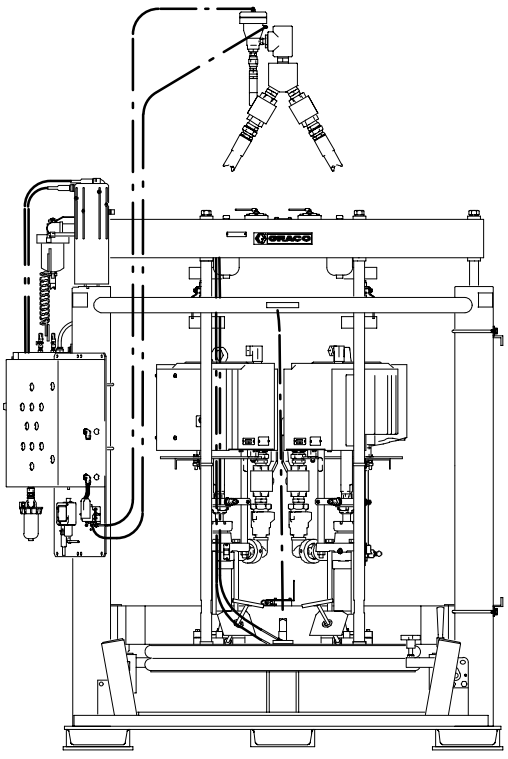
rev. V

The Uni-Drum supply system evacuates 300 gallon (1200 liter) magnadrums or other tote drums of the same size and capacity. The Uni-Drum pumps and transfers flowable and highly viscous materials such as sealant, adhesives, and sound deadeners from bulk drums with maximum efficiency.

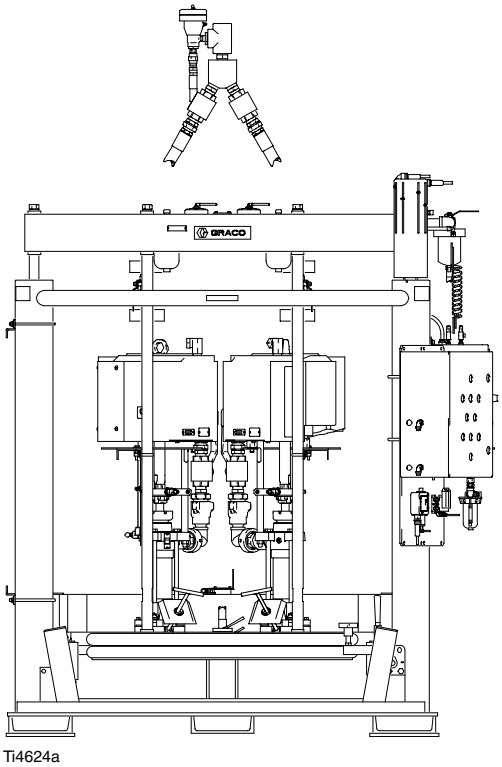
The Uni-Drum is built to work with other high pressure equipment to optimize material use.

Important Safety Instructions
Read all warnings and instructions in this manual.
Save these instructions.

See page 2 for List of Models, Maximum Outlet Pressure, and Maximum Fluid Flow. See page 3 for Table of Contents.



Uni-Drum Left Hand Supply Unit



Ti4624a

Uni-Drum Right Hand Supply Unit

GRACO INC. P.O. BOX 1441 MINNEAPOLIS, MN 55440–1441 PROVEN QUALITY. LEADING TECHNOLOGY.

List of Models

The Uni-Drum supply units listed below are covered in this manual. For specific pump information, refer to the chart in **Servicing the Pumps** on page 51.

Supply Unit Part No.	Pump	Ratio	Max. Outlet Pressure	Max. Fluid Flow @ 60 cpm	Pump Manual
246981 (Left Hand)	Premier, SST, silicone nitride, ceramic	45:1	4500 psi (31.0 MPa, 310 bar)	6.9 gpm (26 lpm)	308148
246982 (Right Hand)	Premier, SST, silicone nitride, ceramic	45:1	4500 psi (31.0 MPa, 310 bar)	6.9 gpm (26 lpm)	308148
248306 (Left Hand)	Premier, SST, silicone nitride	45:1	4500 psi (31.0 MPa, 310 bar)	6.9 gpm (26 lpm)	308148
248307 (Right Hand)	Premier, SST, silicone nitride	45:1	4500 psi (31.0 MPa, 310 bar)	6.9 gpm (26 lpm)	308148
249339 (Left Hand)	Premier, SST, silicone nitride (24V)	45:1	4500 psi (31.0 MPa, 310 bar)	6.9 gpm (26 lpm)	308148
249340 (Right Hand)	Premier, SST, silicone nitride (24V)	45:1	4500 psi (31.0 MPa, 310 bar)	6.9 gpm (26 lpm)	308148
232729 (Left Hand)	Premier, carbon steel	45:1	4500 psi (31.0 MPa, 310 bar)	6.9 gpm (26 lpm)	308147
232730 (Right Hand)	Premier, carbon steel	45:1	4500 psi (31.0 MPa, 310 bar)	6.9 gpm (26 lpm)	308147
232839 (Left Hand)	Premier, stainless steel	45:1	4500 psi (31.0 MPa, 310 bar)	6.9 gpm (26 lpm)	308148
232840 (Right Hand)	Premier, stainless steel	45:1	4500 psi (31.0 MPa, 310 bar)	6.9 gpm (26 lpm)	308148
246921 (Left Hand)	Premier, stainless steel	45:1	4500 psi (31.0 MPa, 310 bar)	6.9 gpm (26 lpm)	308148
246922 (Right Hand)	Premier, stainless steel	45:1	4500 psi (31.0 MPa, 310 bar)	6.9 gpm (26 lpm)	308148
253676 (Left Hand)	Premier, stainless steel	45:1	4500 psi (31.0 MPa, 310 bar)	6.9 gpm (26 lpm)	308148
253677 (Left Hand)	Premier, stainless steel	45:1	4500 psi (31.0 MPa, 310 bar)	6.9 gpm (26 lpm)	308148
249152 (Left Hand)	Premier, stainless steel	34:1	3400 psi (23.1 MPa, 231 bar)	9.2 gpm (34.8 lpm)	308152
249153 (Right Hand)	Premier, stainless steel	34:1	3400 psi (23.1 MPa, 231 bar)	9.2 gpm (34.8 lpm)	308152
*234972 (Left Hand)	Premier, stainless steel	34:1	3400 psi (23.1 MPa, 231 bar)	9.2 gpm (34.8 lpm)	308152
*234973 (Right Hand)	Premier, stainless steel	34:1	3400 psi (23.1 MPa, 231 bar)	9.2 gpm (34.8 lpm)	308152
249341 (Left Hand)	Premier, stainless steel (24V)	34:1	3400 psi (23.1 MPa, 231 bar)	9.2 gpm (34.8 lpm)	308152
249342 (Right Hand)	Premier, stainless steel (24V)	34:1	3400 psi (23.1 MPa, 231 bar)	9.2 gpm (34.8 lpm)	308152

*For LASD applications, sst fittings are outlet.

Table of Contents

Symbols

Warning Symbol

⚠ WARNING

This symbol alerts you to the possibility of serious injury or death if you do not follow the instructions.

Caution Symbol

⚠ CAUTION

This symbol alerts you to the possibility of damage to or destruction of equipment if you do not follow the instructions.

⚠ WARNING

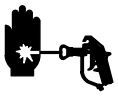
INSTRUCTIONS

EQUIPMENT MISUSE HAZARD

Equipment misuse can cause the equipment to rupture or malfunction and result in serious injury.

- This equipment is for professional use only.
- Read all instruction manuals, tags, and labels before operating the equipment.
- Use the equipment only for its intended purpose. If you are uncertain about usage, call your Graco distributor.
- Do not alter or modify this equipment. Use only genuine Graco parts and accessories.
- Check equipment daily. Repair or replace worn or damaged parts immediately.
- Do not exceed the maximum working pressure stated on the equipment or in the **Technical Data** for your equipment. Do not exceed the maximum working pressure of the lowest rated component in your system.
- Use fluids and solvents which are compatible with the equipment wetted parts. Refer to the **Technical Data** section of all equipment manuals. Read the fluid and solvent manufacturer's warnings.
- Do not kink or overbend hoses or use hoses to pull equipment.
- Route hoses away from traffic areas, sharp edges, moving parts, and hot surfaces. Do not expose Graco hoses to temperatures above 180°F (82°C) or below –40°F (–40°C).
- Wear hearing protection when operating this equipment.
- Do not lift pressurized equipment.
- Do not lift the equipment by the air motor lift ring if the total weight of the equipment exceeds 550 lb (250 kg).
- Comply with all applicable local, state, and national fire, electrical, and safety regulations.

⚠ WARNING



SKIN INJECTION HAZARD

Spray from the gun, hose leaks, or ruptured components can inject fluid into your body and cause extremely serious injury, including the need for amputation. Fluid splashed in the eyes or on the skin can also cause serious injury.

- Fluid injected into the skin might look like just a cut, but it is a serious injury. **Get immediate surgical treatment.**
- Do not point the gun at anyone or at any part of the body.
- Do not put your hand or fingers over the spray tip.
- Do not stop or deflect leaks with your hand, body, glove or rag.
- Do not “blow back” fluid; this is not an air spray system.
- Always have the tip guard and the trigger guard on the gun when spraying.
- Check the gun diffuser operation weekly. Refer to the gun manual.
- Be sure the gun trigger safety operates before spraying.
- Lock the gun trigger safety when you stop spraying.
- Follow the **Pressure Relief Procedure** on page 31 whenever you: are instructed to relieve pressure; stop spraying; clean, check, or service the equipment; and install or clean the spray tip.
- Tighten all fluid connections before operating the equipment.
- Check the hoses, tubes, and couplings daily. Replace worn, damaged, or loose parts immediately. Permanently coupled hoses cannot be repaired; replace the entire hose.
- 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.

MOVING PARTS HAZARD

Moving parts, such as the pump rod, follower plate and ram assembly, can pinch or amputate your fingers.

- Keep clear of all moving parts when starting or operating the pump.
- 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.
- Before servicing the equipment, follow the **Pressure Relief Procedure** on page 31 to prevent the equipment from starting unexpectedly.

⚠ WARNING

FIRE AND EXPLOSION HAZARD

Improper grounding, poor ventilation, open flames or sparks can cause a hazardous condition and result in a fire or explosion and serious injury.

- Ground the equipment and the container where the material is deposited. Refer to **Grounding the System** on page 16.
- If there is any static sparking or you feel an electric shock while using this equipment, **stop the pumps immediately.** Do not use the equipment until you identify and correct the problem.
- Provide fresh air ventilation to avoid the buildup of flammable fumes from solvents or the fluid being sprayed.
- Keep the spray area free of debris, including solvent, rags, and gasoline.
- Electrically disconnect all equipment in the spray area.
- Extinguish all open flames or pilot lights in the spray area.
- Do not smoke in the spray area.
- Do not turn on or off any light switch in the spray area while operating or if fumes are present.
- Do not operate a gasoline engine in the spray area.
- Keep a fire extinguisher in the work area.

TOXIC FLUID HAZARD

Hazardous fluid or toxic fumes can cause serious injury or death if splashed in the eyes or on the skin, inhaled, or swallowed.

- Know the specific hazards of the fluid you are using.
- Store hazardous fluid in an approved container. Dispose of hazardous fluid according to all local, state and national guidelines.
- Always wear protective eyewear, gloves, clothing and respirator as recommended by the fluid and solvent manufacturer.

Uncrating the System

The Uni-Drum supply system was carefully packaged for shipment by Graco. When the system arrives, perform the following procedure to uncrate the system.

⚠ WARNING

EQUIPMENT MOVING HAZARD
Removing the unit off the pallet without following the uncrating procedure will damage the equipment.

To uncrate the system, do the following:

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 Uni-Drum to the pallet.

NOTE: The Uni-Drum is ready for installation. Before installing the system, read the “General Description” section to become familiar with the system components.

Overview

Installation Overview

The location of the Uni-Drum should allow for easy loading and unloading of the 300 gallon (1200 liter) magnadrum or other tote drums with either a forklift truck or pallet-jack hand truck.

The Uni-Drum supply system must be leveled and mounted on a horizontal floor. An unleveled condition can keep the Uni-Drum 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 Uni-Drum is a supply system that evacuates fluids from a 300 gallon (1200 liter) magnadrum or other tote drums.

Each Uni-Drum includes two Graco air motors and displacement pumps, a ram assembly with a follower plate, a pneumatic layout panel that controls the air components and a junction box panel that connects with an electrical controller (supplied by the customer).

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 pneumatic layout panel. Remotely, the system can be operated using signals through the junction box 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.

General Description

System Components

A general description of the Uni-Drum 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.

Fig. 1 shows the typical Uni-Drum supply system equipped with Premier™ air motors. The following list identifies the Uni-Drum system components:

Ref.	Description
A	Left hand (LH) supply unit
B	Right hand (RH) supply unit
C	Dura-Flo™ 1800 pumps with Premier™ air motors (2 units)
D	Ram assembly and follower plate
E	Main air inlet
F	3/8 npt air filter
G	Pneumatic layout panel
H	Junction box panel
J	Drum lid holders

- **Uni-Drum System** (A) 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 robotic software programming (provided by others) and manual operators. Drum changeovers occur after the follower plate 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 pump supply unit (A) accommodates one 300 gallon (1200 liter) drum. The LH supply unit has a local pneumatic layout panel and junction box panel.
  - RH pump supply unit (B) accommodates one 300 gallon (1200 liter) drum. The RH supply unit has a local pneumatic layout panel and junction box panel.

General Description

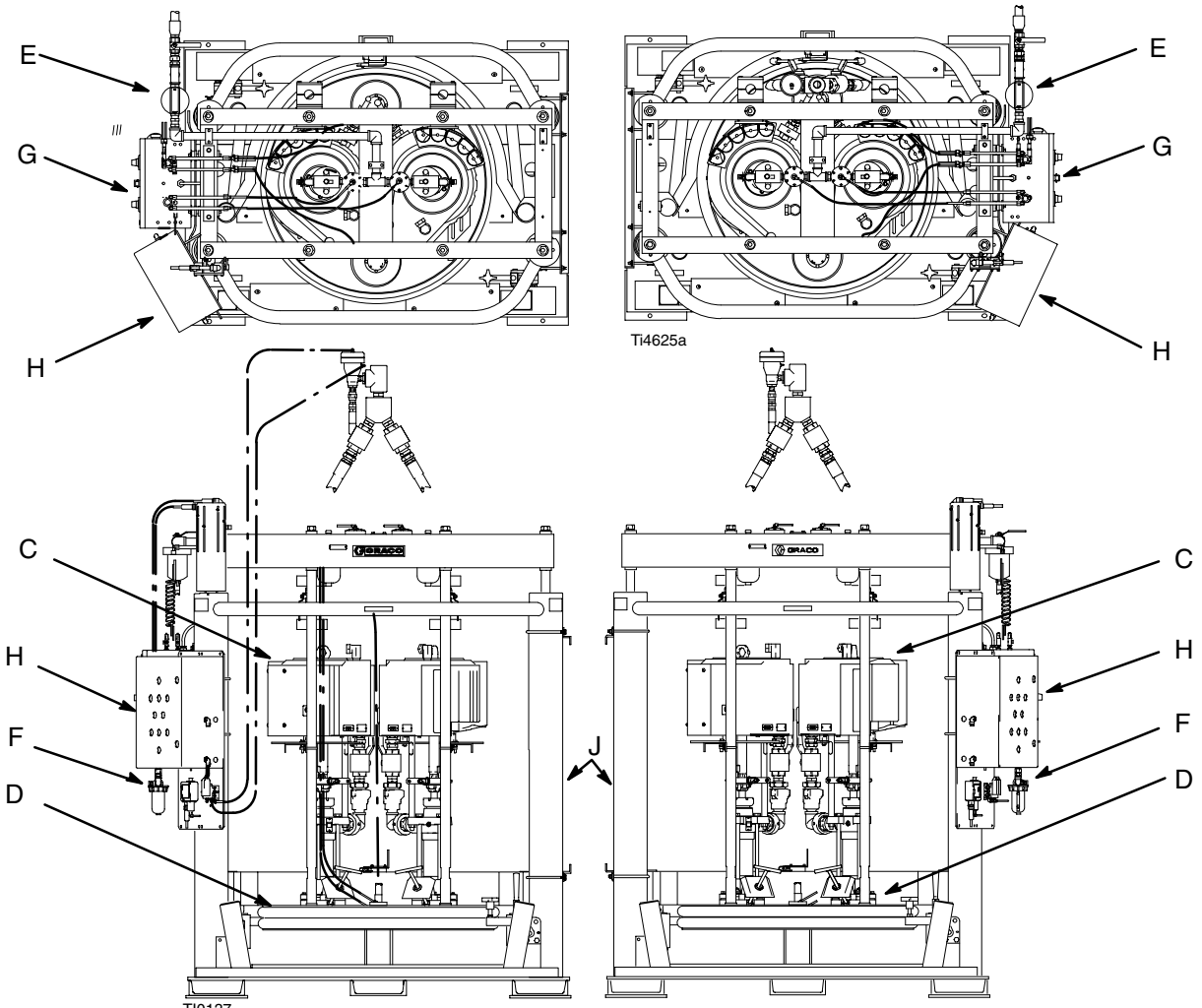
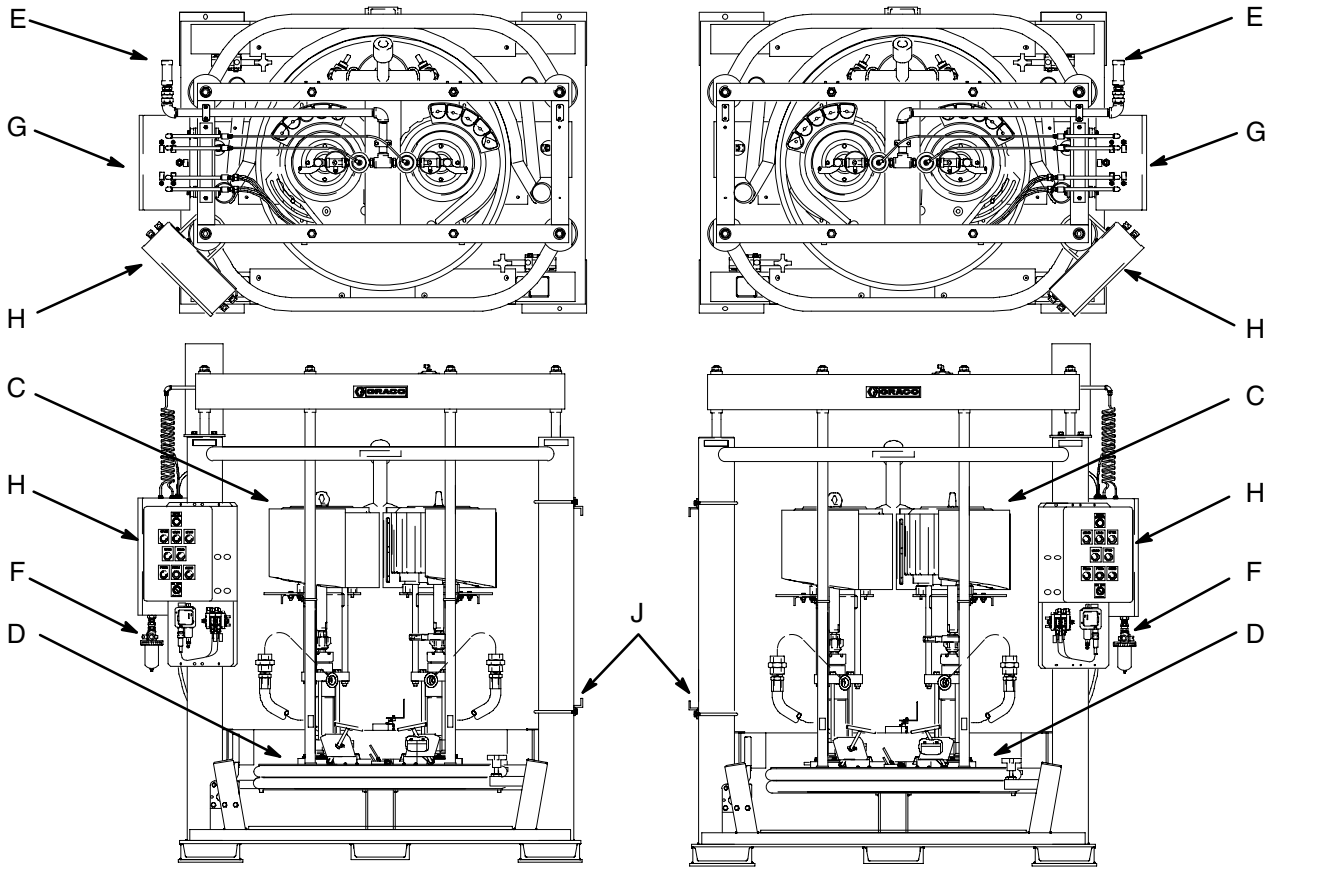


Fig. 1

Left Hand Models	Right Hand Models
246981	246982
248306	248307
249339	249340

General Description



A – Left Hand Unit **B – Right Hand Unit** TI013

Fig. 2

Left Hand Models	Right Hand Models
232729	232730
232839	232840
246921	246922
249152	249153
249341	249342
234972	234973
253676	253677

General Description

System Components *(continued)*

NOTE: The paragraphs that follow describe the components for the LH pump supply unit only. The descriptions are the same for the RH pump supply unit.

- The two Dura-Flo™ 1800 **Pumps** (C) have Premier™ air motors. The pumps evacuate material from the drum.

- 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, removes the empty drum. The process is repeated when another drum is ready to be unloaded.

- **3/8 in. npt air filter** (F) filters air to the pneumatic layout panel. The 5 micron filter removes particles, such as dust, moisture, foreign matter and other contaminants from the compressed air.

Pneumatic Layout Panel (G)

The pneumatic layout panel includes the following system components. For more information, refer to the **Pneumatic Diagram** on page 76.

- Main Air Inlet Valve (at E) is used to open or shutoff the air supply to the entire supply unit.

- Pump No. 1 Air Regulator controls pump speed and outlet pressure for pump no. 1 by adjusting the air pressure to the pump.

- Pump No. 1 Pressure Gauge displays the amount of air pressure supplied to pump no. 1.

- Pump No. 2 Air Regulator controls pump speed and outlet pressure for pump no. 2 by adjusting the air pressure to the pump.

- Pump No. 2 Pressure Gauge displays the amount of air pressure supplied to pump no. 2.

- Follower Vent Open Valve switch is activated to open the vent to relieve container pressure.

- Ram Up pushbutton turns on air pressure to raise the follower plate.

- The Ram Position Switch performs the following three functions:
  - Place the switch in the RAISE position to raise the follower plate.
  - Place the switch in the HOLD position to hold the follower plate in the current position.
  - Place the switch in the LOWER position to lower the follower plate.

Junction Box Panel (H)

The junction box panel includes the following system components. For additional information, refer to the **Electrical Diagram** on page 75.

- System Pressurized lamp is lit when air pressure is supplied to the system; the lamp is extinguished when the air supply is depressurized. This occurs after the Pump On button has been pushed and the pumps turned on.

- Pump Active lamp is lit when the air supply is turned on to the pumps; the lamp is extinguished when the pumps are inactive, thus turned off. This is activated by the Pump On pushbutton.

- Air Pressure On lamp is lit when air pressure to the system is turned on; the lamp is extinguished when air pressure to the system is shutoff.

- Ram Ready lamp is lit when the drum is in position; the lamp is extinguished when the drum is not in position.

- Pump Ready lamp is lit when the pumps are primed and ready for operation; the lamp is extinguished when the pumps are not ready for operation.

- Prime Pump pushbutton turns on the pumps, for priming. When the pumps are primed, the Pump Ready lamp turns on. The switch is not used when the Pump Ready lamp is lit. The Pump Active light will blink.

- Pump Reset pushbutton resets the pumps to an active state. When the pumps are reset, the Pump Active lamp turns off. The switch is not used when the Pump Active lamp is lit. The Pump Ready light is on.

- Pump On pushbutton turns the pumps on and off. When the pumps are turned on, the Pump Active lamp also turns on. When the pumps are turned off, the Pump Active lamp also turns off.

- Bulk Supply Depressurization button opens the depressurization valve to lower the fluid pressure.

- Auto Mode On/Off switch puts the system into or out of automatic operation.

Installation

The installation procedures in this section are intended to serve as a guide for installing the Uni-Drum system. If you need more information, contact your Graco distributor.

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

The installation procedure includes:

- Preparing the site
- Selecting a location for the Uni-Drum
- Preparing to install the Uni-Drum
- Installing the Uni-Drum
- Connecting power to the junction box
- Grounding the system
- Checking resistance between the junction box and the true earth ground
- Connecting air supply lines to Uni-Drum

Preparing the Site

Ensure that you have an adequate compressed air supply. Refer to the applicable instruction manual listed in **Related Publications** on page 81 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 Uni-Drum

Refer to **Technical Data** on page 77 for ram mounting and clearance dimensions.

When selecting a location for the Uni-Drum, 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 for the pumps and follower plate are fully accessible.
    - Make sure the air source for the PLC 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 control panel.
2. Make sure that you will be able to level the base of the ram using metal shims.

Preparing to Install the System

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.

Installation

Installing the Uni-Drum

To install the Uni-Drum, follow the procedure below. Refer to **Technical Data** on page 77 for ram mounting and clearance dimensions.

1. Using equipment such as a forklift or handtruck, move the Uni-Drum into place on the floor. Remove the shipping pallet.

2. Level the Uni-Drum, 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 Uni-Drum to the floor using anchors that are long enough to prevent the unit from tipping. Refer to page 77 for more information.

⚠ WARNING

EQUIPMENT MISUSE HAZARD

The Uni-Drum system is shipped with every major component already attached and weighs approx. 3950 lb (1792 kg). The Uni-Drum system should never be moved or lifted by one person. To prevent equipment damage or personal injury, engage an adequate number of personnel and use a forklift, hand truck, and support devices, such as a hoist when moving and installing the Uni-Drum system.

⚠ CAUTION

Be sure to use as many people as needed when the frame is being lifted or moved. Exercise care to avoid jarring, dropping, or tilting the frame while it is being moved to its installed location to prevent injury or property damage.

Installation

Connecting Power to the Junction Box

Perform the following procedure to connect the power to the junction box panel.

⚠ WARNING

ELECTRIC SHOCK HAZARD
Do not connect the junction box panel to a power source unless you are a trained electrician. Failure to follow standard procedures or to observe the necessary precautions could result in serious bodily injury or equipment damage.

⚠ CAUTION

If power and grounding connections are not done properly, the equipment may be damaged and the warranty will be voided.

NOTE: Have a qualified electrician connect the junction box to a grounded electrical source that has the following required service ratings:

Description	Requirements
Vac:	120
Hz:	50/60
Phase:	1
Circuit Breaker	5 Amp

To connect the junction box panel to the electrical source, do the following:

⚠ WARNING

ELECTROCUTION HAZARD
Installing and servicing this equipment requires access to parts which could cause an electric shock or other serious injury. Have only qualified electricians access the control assembly.

1. Shut off system power at the main circuit breaker.
2. Remove the cover from the junction box panel.
3. Locate the PLC power terminals KS102 and KS100 on the terminal strip inside the junction box panel. See Fig. 3. For more information, refer to **Electrical Diagram** on page 75 .
4. Using the upper wire duct on the left-hand side of the junction box panel, string two 14 AWG wires inside the box from the electrical power source.
5. Connect the two 14 AWG wires to power terminals KS102 (L1, hot) and KS100 (L2, neutral) in the junction box panel.
6. Seal the area where wires entered the junction box panel.
7. Replace the cover on the junction box panel.

Installation

Connecting Power to the Junction Box *(continued)*

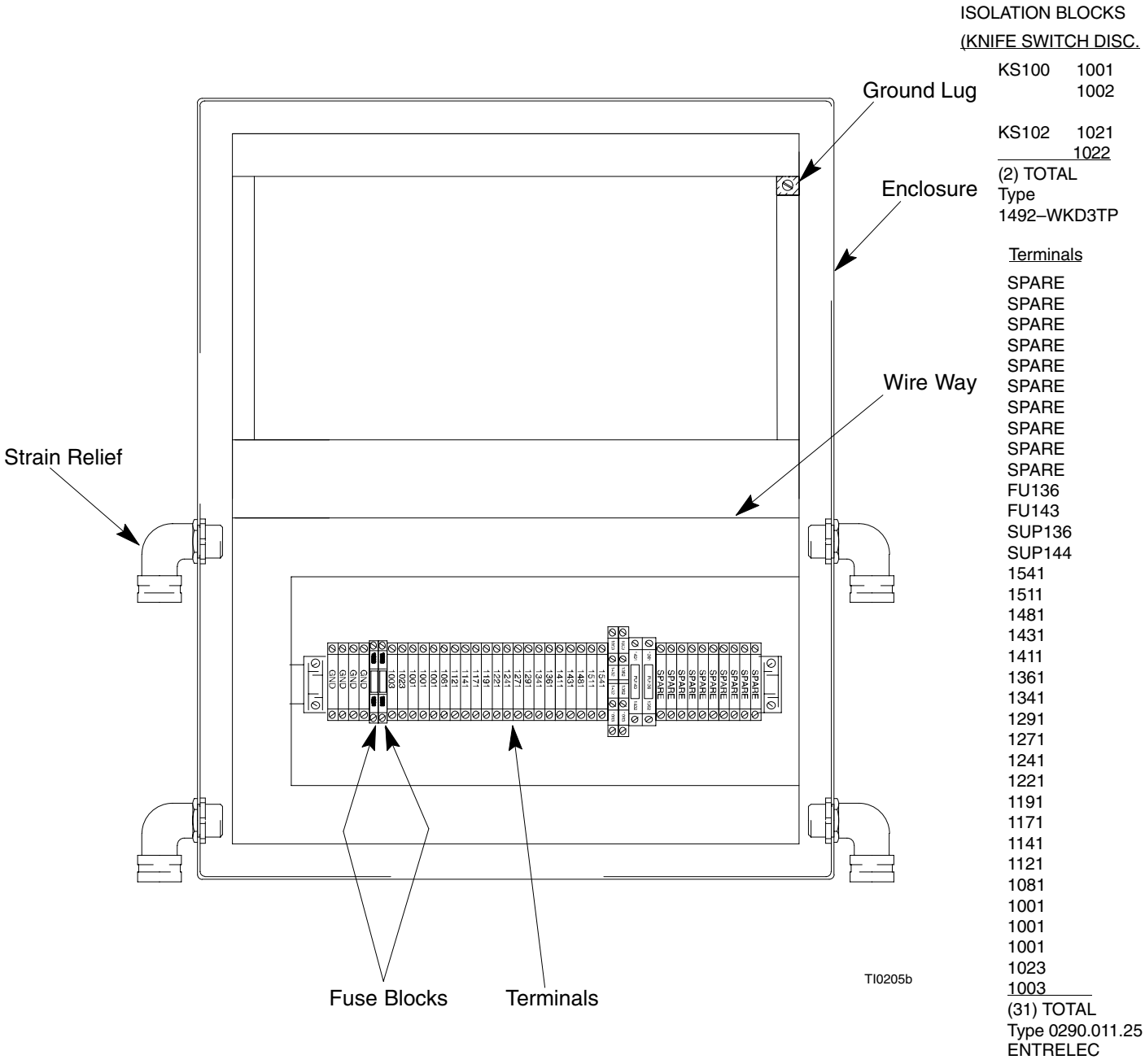


Fig. 3

Installation

Grounding the System

⚠ WARNING

FIRE AND EXPLOSION HAZARD
Before operating the pump, ground the system as explained below. Also read the section **FIRE AND EXPLOSION HAZARD** on page 6.

1. *Pump:* use a ground wire and clamp. See Fig. 4. Loosen the grounding lug locknut (W) and washer (X). Insert one end of a 12 ga (1.5 mm^2) minimum ground wire (Y) into the slot in lug (Z) and tighten the locknut securely. Connect the other end of the wire to a true earth ground. For a ground wire and clamp, order Part No. 237569.

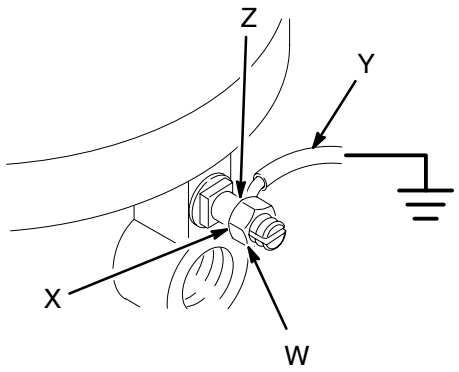


Fig. 4

2. *Air and fluid hoses:* Use only electrically conductive hoses.

3. *Air compressor:* follow manufacturer's recommendations.

4. *Spray gun or dispensing valve:* ground through connection to a properly grounded fluid hose and pump.

5. *Object being sprayed:* follow your local code.

6. *Fluid supply drum:* follow your local code.

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

8. *To maintain grounding continuity when flushing or relieving pressure*, hold a 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

Have a qualified electrician check the resistance between the each pump and the true earth ground. The resistance must be less than 29 megohms. If the resistance is greater than 0.25 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.

⚠ WARNING

FIRE, EXPLOSION, AND ELECTRIC SHOCK HAZARD
To reduce the risk of fire, explosion, or electric shock the resistance between the supply unit components and true earth ground must be less than 0.25 ohms.

Installation

Connecting the Air Supply Lines to the Uni-Drum

Perform the following procedure to connect the input air supply lines to the Uni-Drum system.

Connecting Air Supply Lines to the Supply Units

To connect the main air supply line to the LH and RH supply units, do the following:

⚠ WARNING

To reduce the risk of overpressurizing your system, which could result in component rupture and cause serious injury, never exceed the specified maximum incoming air pressure to the pumps (see the **Technical Data** on page 77).

NOTE: 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.

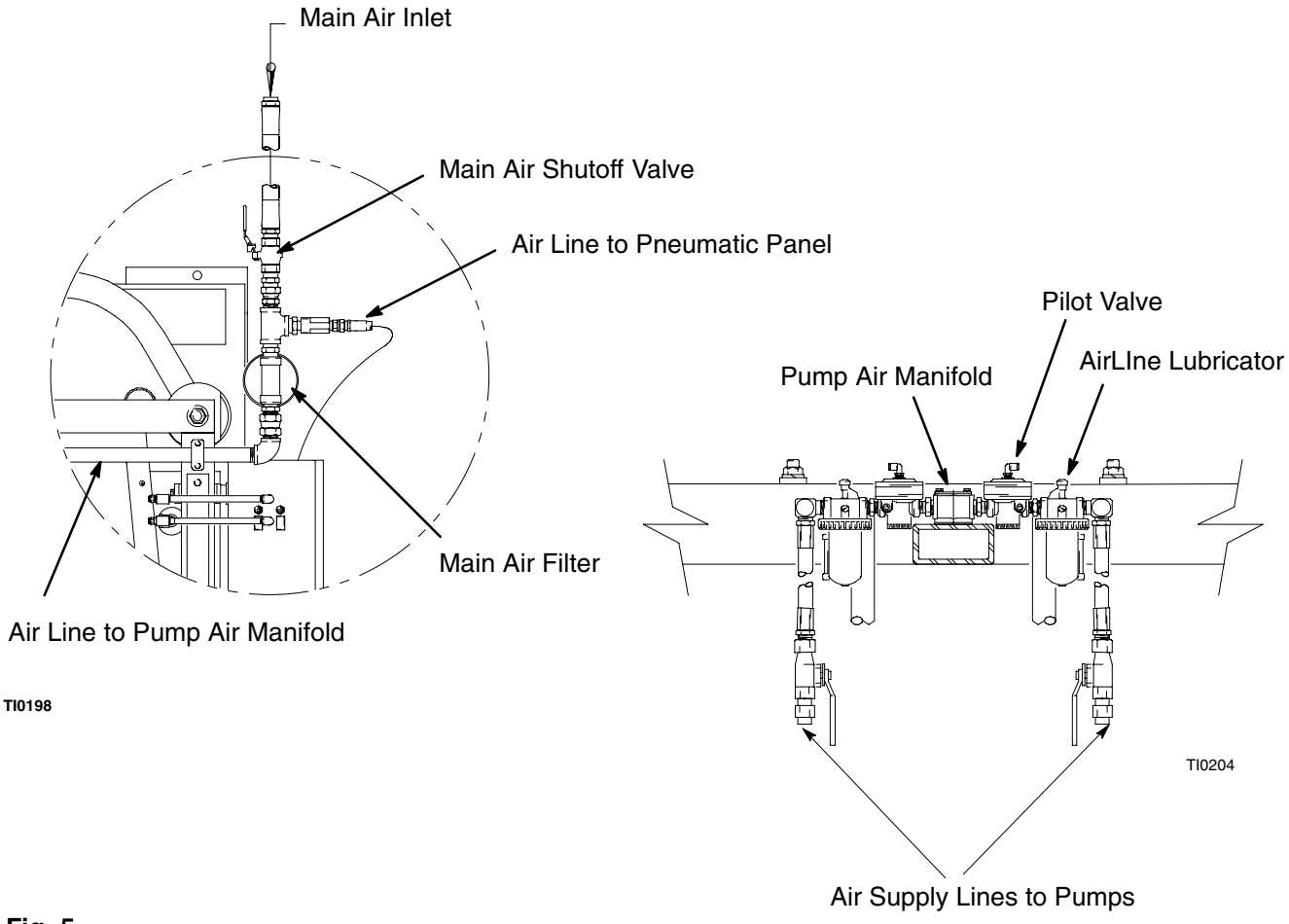


Fig. 5

Installation

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 Publications** on page 81 for the pump instruction manuals.

⚠ CAUTION

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.

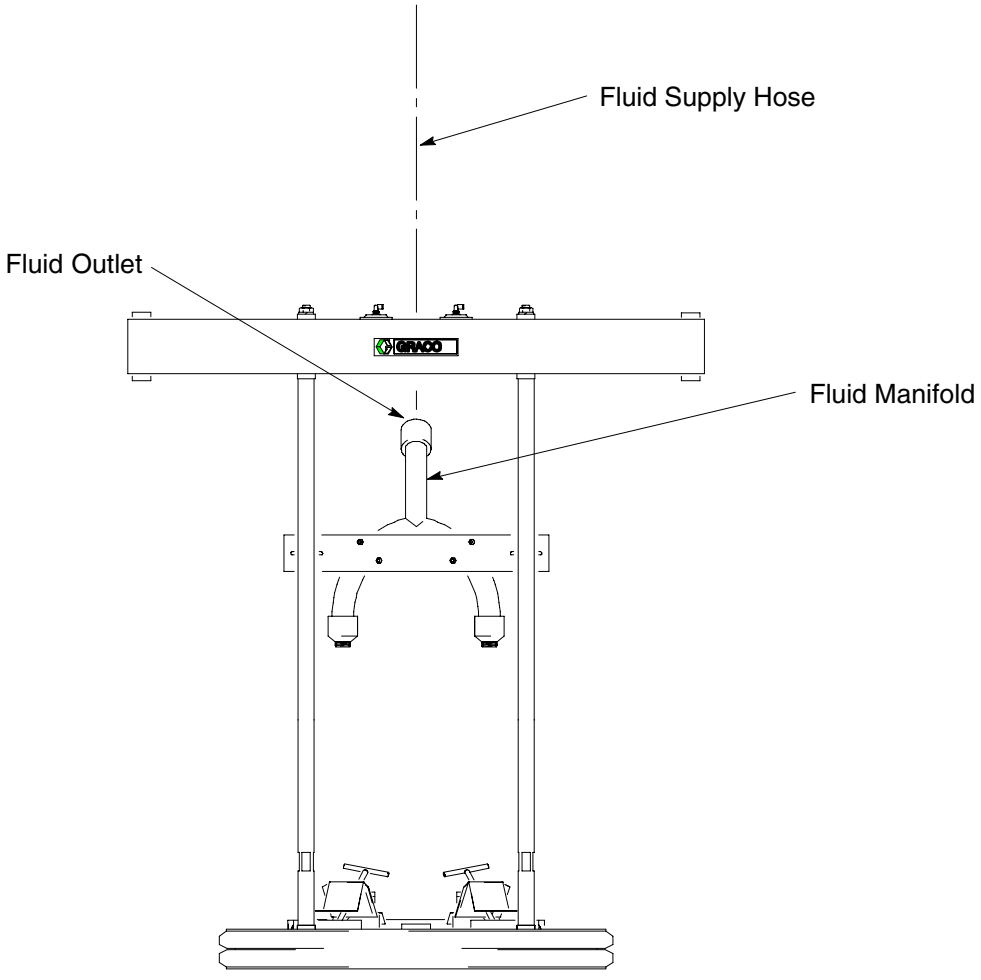


Fig. 6

Operation

The operation procedures include:

- Prepare the operator
- Overview
- Junction box panel switches and indicators
- Pneumatic layout panel switches and indicators
- Initial system startup procedure
- Daily system startup
- System shutdown
- Operation modes for the pumps
- Pressure relief procedure
- Air motor icing
- Preventive maintenance schedule
- System operation procedures

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 Uni-Drum supply system uses two air driven reciprocating pumps on the LH supply unit and two air driven reciprocating pumps on the RH supply unit. Each supply unit pumps material from a 300 gallon (1200 liter) drum.

General Functional Description

The LH and RH supply units can operate at the same time or as independent units. Generally, the Uni-Drum system is setup to operate as redundant units. This means that the RH unit is held in reserve on standby until the drum underneath the LH 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.
- Stop the pumps and relieve ram pressure at the RH supply unit.
- Shutdown the system.

At the supply unit, the follower plate must be raised to load the drum into the supply unit. The follower plate is lowered by the operator directly into the drum. The pumps are turned on, the follower plate 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 Uni-Drum 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 Uni-Drum supply system allows the operator to load the material drum into the RH supply unit while the LH supply unit drum is being emptied. When the supply unit changeover occurs, the operator unloads the empty drum at the LH supply unit while the RH supply unit drum is being emptied. The cycle is repeated as many times as needed.

System Shutdown

For system shutdown, the operator turns off the pumps and depressurizes the system. Depending upon the type of material, the operator may choose to raise the follower plate from the drum or keep the follower plate 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.

Operation

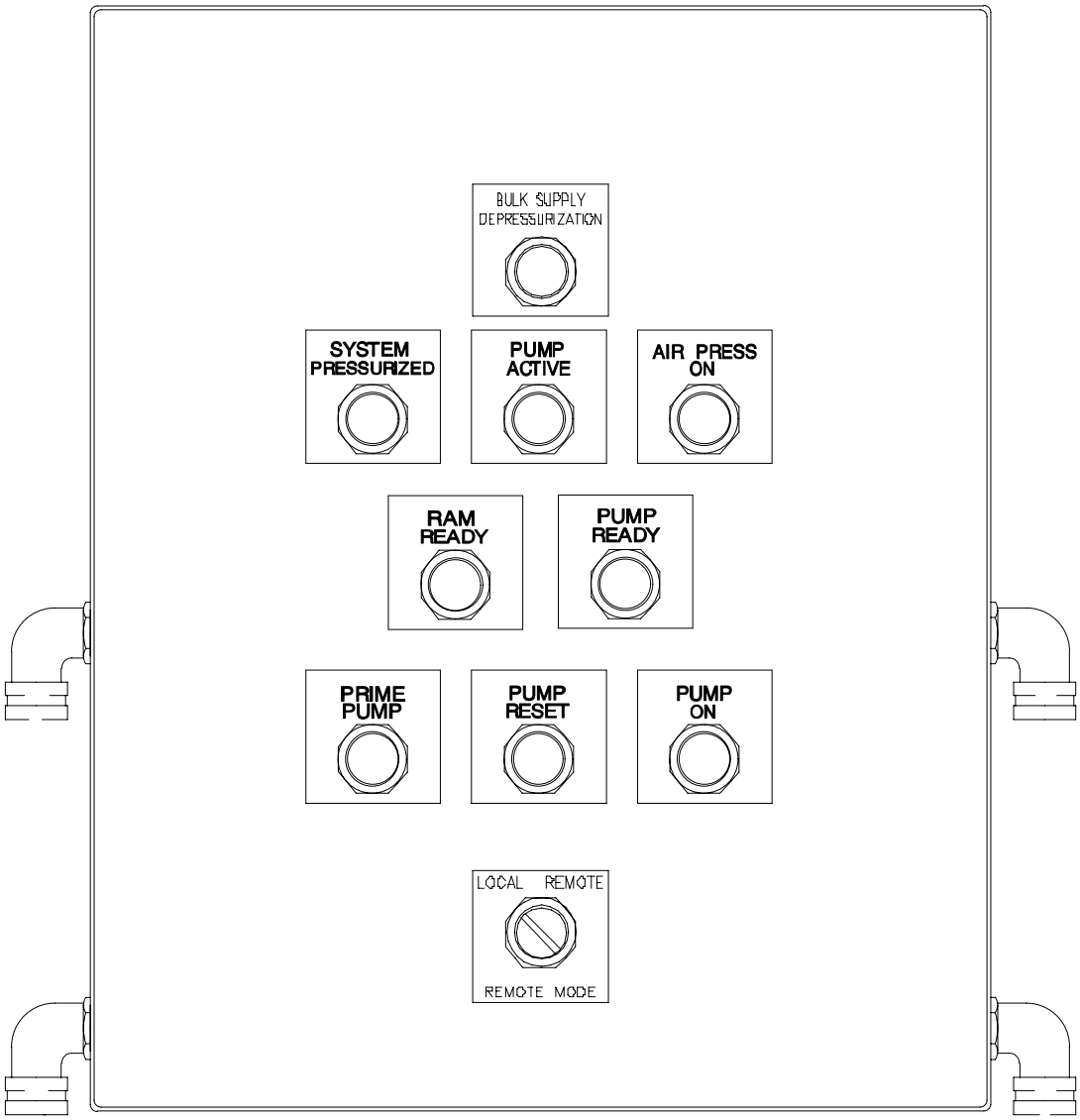
Junction Box Panel Switches and Indicators

Use the table and Fig. 7 when operating the switches and reading the indicator on the junction box panel.

Button/Switch	What it Does
PRIME PUMP pushbutton	• Primes both displacement pumps with material, making the pumps ready to operate. • Lights PUMP READY light.
PUMP RESET pushbutton	• Restarts the pumps after the pumps were turned off. • Lights PUMP ACTIVE light
PUMP ON pushbutton	• Activates the pumps. • Deactivates the pumps.
Bulk Supply Depressurization pushbutton	• Opens the depressurization valve to lower the fluid supply pressure.
AUTO MODE ON/OFF switch	• Places fluid dispensing system into Automatic or Manual mode.

Indicator	Indicator Light is	Meaning
SYSTEM PRESSURIZED light	ON	System is pressurized.
	OFF	System is depressurized.
PUMP ACTIVE light	ON	Pumps are active; air is available to the pumps.
	OFF	Pumps are inactive; air is unavailable to the pumps.
AIR PRESSURE ON light	ON	Air pressure is available to the pumps for use.
	OFF	Air pressure is not available to the pumps for use.
RAM READY light	ON	Follower plate is ready for use.
	OFF	Follower plate is not ready for use.
PUMP READY light	ON	Pumps are primed and ready to use.
	OFF	Pumps are not ready to use.

Junction Box Panel Switches and Indicators *(continued)*



195320 and 119773 Panel Shown

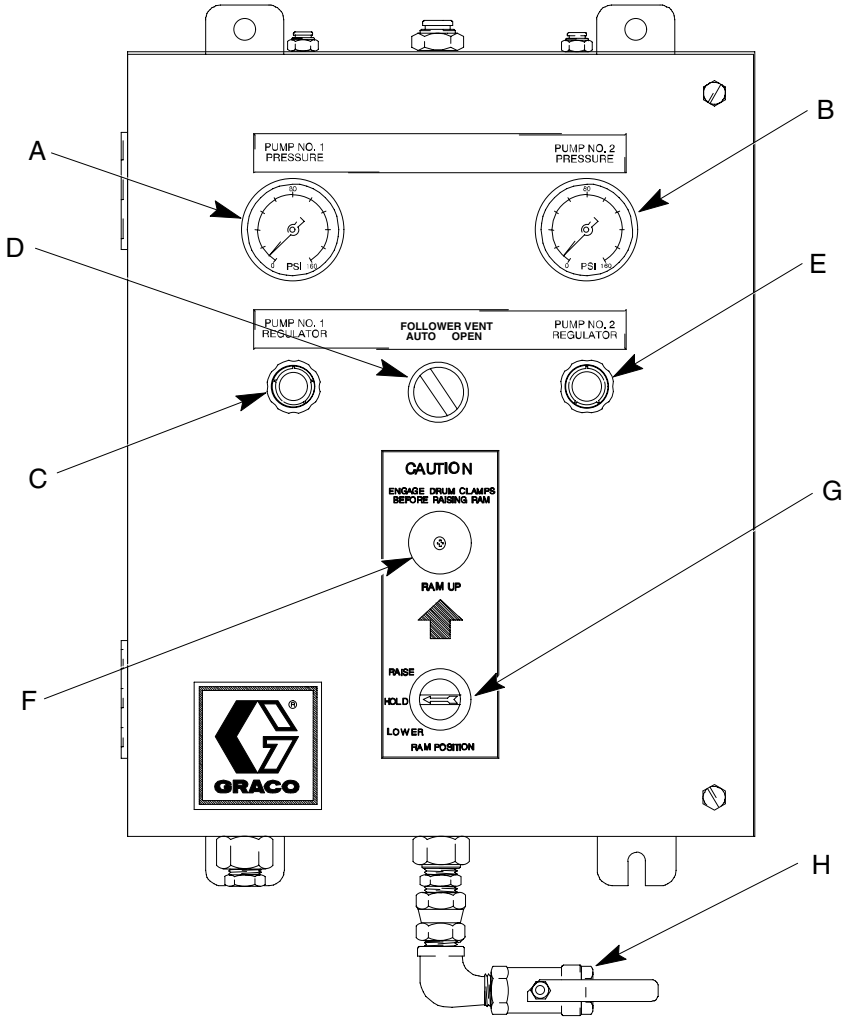
Fig. 7

Operation

Pneumatic Layout Panel Switches and Indicators

Use the table and Fig. 8 when operating the switches and reading the indicators on the pneumatic layout panel.

Ref	Button/Switch/Gauge		What it Does
A	PUMP NO. 1 PRESSURE Air Gauge		Indicates the air outlet pressure setting from pump no. 1.
B	PUMP NO. 2 PRESSURE Air Gauge		Indicates the air outlet pressure setting from pump no. 2.
C	PUMP NO. 1 REGULATOR Control Knob		Controls pump speed and outlet pressure by adjusting the air pressure to pump no. 1.
D	FOLLOWER VENT Directional Valve		Opens and closes the vent that relieves air pressure from the follower plate assembly.
E	PUMP NO. 2 REGULATOR Control Knob		Controls pump speed and outlet pressure by adjusting the air pressure to pump no. 2.
F	RAM UP Pushbutton		Raises the follower plate.
G	RAM POSITION Switch	RAISE	Allows the follower plate to raise.
		HOLD	Holds the follower plate in the current position.
		LOWER	Lowers the follower plate.
H	Air Inlet Valve		Opens air supply line to the unit.



195319 Panel Shown

Fig. 8

Operation

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.

⚠ CAUTION

Flush the system before performing the initial material loading procedure. The system was factory-tested using a light soluble oil, a soybean oil, or some other oil as tagged. Flush the system to avoid contaminating the material that has been designated for initial material loading.

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 25.
   b. If the two substances are incompatible, perform the remaining steps in this procedure to flush the system.

⚠ WARNING

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

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 **Ground the System**, on page 16.
5. Perform steps 8 through 14 of the **Initial System Startup Procedure** on page 25 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.

Adjusting the Lid Holder Before Initial Use

1. Adjust the lower lid holder channel as low as it will go on the side of the ram post. The channel should be 1 in. (25 mm) higher from the floor in the front compared to the back.
2. Loosen the upper lid holder channel. place the lid in the center of the lower channel. Lower the upper channel until it contacts the lid. Tilt the rear of the upper channel down 1/2 to 1 in. (13 to 25 mm) and tighten all bolts.
3. The lid should roll in and out from the front and not roll out the rear.

Operation

Initial System Startup Procedure

⚠ WARNING

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

MOVING PARTS HAZARD
Moving equipment parts can cause personal injury, including severing of hands or fingers. Make sure all personnel are clear of moving parts before operating the equipment.

⚠ CAUTION

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.

⚠ WARNING

PRESSURIZED EQUIPMENT HAZARD
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 first. Then, repeat the startup procedure for the RH supply unit.

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 instruction manual 308147 or 308148 for details.
4. At the pneumatic layout panel, open the main air inlet valve at the LH supply unit, making air pressure available to the unit. See Fig. 5.
5. Adjust both pump main air regulators to 0 psi.
6. Follower Vent switch should be in AUTO position.
7. Set the RAM POSITION switch to RAISE.
8. Press the RAM UP valve switch to raise the follower plate above the height of the material drum to be used.
9. Set the RAM POSITION switch to HOLD.

Operation

Initial System Startup Procedure *(continued)*

Load Material

10. Roll a drum into the supply unit under the elevated follower plate.

NOTE: Whenever a drum change is required, remove the cover from the drum of new material by holding it level and lifting it straight up. Tipping the cover may allow accumulated dirt to spill into the drum, which may result in damage to the material and equipment.

11. ***IMPORTANT:*** Lubricate the follower plate wiper with a lubricant that is compatible with the material to be pumped. Check with your material supplier for compatibility.

NOTE: Before lowering the follower plate assembly into the drum, make sure that nothing is between the follower plate and the drum, or between the ram tie bar and the top of the ram posts.

12. Remove bleed sticks at the base of each pump.
13. Lower the follower plate as follows:
    a. Set the Ram Position selector to LOWER.
    b. Lower the follower plate until the material is evident in the bleedstick ports.
    c. Set the Ram Position selector to HOLD.
    d. Replace the bleedsticks.
    e. Set the Ram Position selector to LOWER.
14. Close both pump #1 and pump #2 inlet valves (located on top of air motor).
15. To prime the pump, press the PRIME PUMP button.
16. Set the pump air pressure to 30 psi.
17. Check that the AIR PRESS. ON indicator is lit.
18. Use a catch device to bleed the pump. Slowly open Pump No. 1 bleeder valve. Back off the adjustment screw several turns; do not remove the screw.
19. Slowly open the bleed-type air valve to the air motor. Allow the pump to cycle slowly until all air escapes and material flows free of air from the bleeder valve.
20. Close the bleed-type air valve and pump bleeder valve.
21. Repeat these steps for Pump No. 2.

NOTE:

- If the pump does not prime properly, which may occur with heavier, high viscosity fluids, increase the air pressure to the ram.
- If fluid is forced out around the top wiper, ram pressure is too high; decrease the air pressure to the ram.
- Ram pressure adjustments may be carried out using the dual regulator ***inside*** the pneumatic panel, where the upper regulator knob controls the downward pressure of the ram, and the lower regulator knob controls the upward pressure of the ram.

22. After closing the bleed valve, return Pump No. 1 and 2 regulator to its normal pump pressure setting.
23. Open the air motor ball valves.
24. Open the ball valve in the outlet manifold from Pump No. 1 and 2.
25. Remove the waste containers, clean up any spilled material, and dispose of the waste material properly.
26. Press the PUMP RESET button to restore the system to operation.
27. Check that the following indicators are lit:
    - SYSTEM PRESSURIZED
    - AIR PRESS. ON
    - RAM READY
    - PUMP READY

Initial System Startup Procedure *(continued)*

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 as indicated on the chart on page 2).

28. Run the system under normal conditions. Adjust the PUMP NO. 1 REGULATOR to the desired setting as follows:

    a. Turn the knob clockwise to increase air pressure or counterclockwise to decrease air pressure (see Fig. 8).

    b. Check the air gauge to verify the air pressure setting.

29. Repeat step 28 to adjust the air regulator for the PUMP NO. 2 REGULATOR.

Adjusting the Ram-Up and Ram-Down Regulators

30. At the pneumatic layout panel (see Fig. 7), open the hinged cover.

31. Set the RAM POSITION switch to RAISE and push the RAM UP pushbutton. Verify that the follower plate (5) elevates at the desired speed. If not, do the following:

    a. Adjust the RAM–UP REGULATOR. Turn the knob clockwise to increase the amount of air pressure. Check the air gauge to verify that air pressure was increased. See Fig. 8.

    b. Verify that regulator R3 is set to 5 to 10 psi (.035 to .07 MPa, 0.35 to 0.7 bar).

⚠ CAUTION

Improper setting of the Regulator R3 while the selector is in the HOLD position, can cause the plate to drop and operator injury.

    c. Repeat step 31.a until the ram raises at the desired speed.

32. Set the RAM POSITION switch to DOWN while observing the air gauge inside the panel.

33. Adjust the RAM–DOWN REGULATOR to 50 psi (0.34 MPa, 3.4 bar) as follows (see Fig. 8):

    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.

34. 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 35 when there is pump cavitation. If cavitation is not occurring, omit step 35 and proceed to step 36.

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

    a. Press the PRIME PUMP switch to prime the pumps and fill the material passages.

    b. Verify that the PUMP READY light turns on.

    c. Lower the air motor air pressure until cavitation stops.

    d. Increase the ram down pressure.

Operation

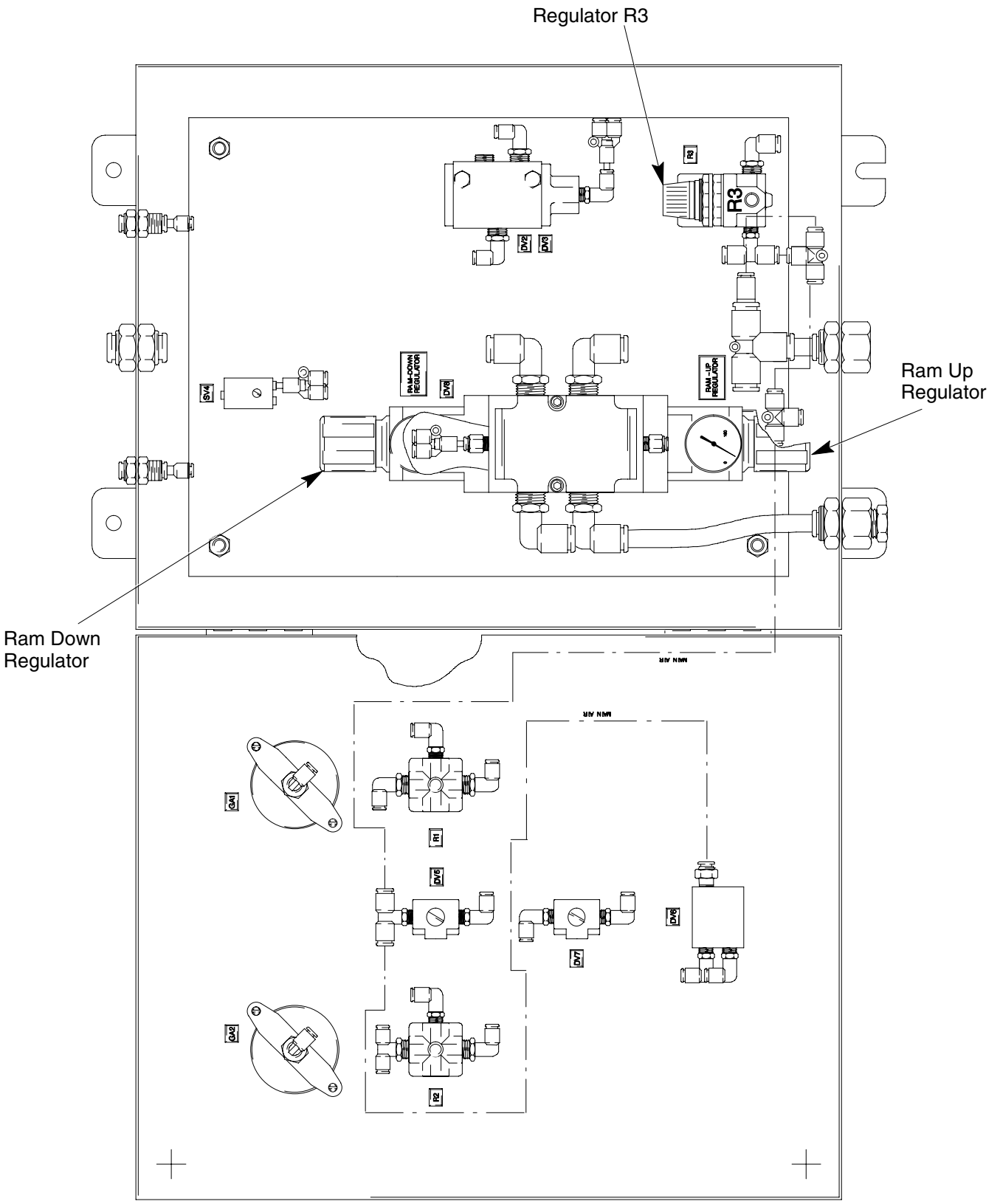


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Fig. 9

Initial System Startup Procedure *(continued)*

Adjusting the Low Limit Switch

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.

36. Adjust the low limit switch as follows:
    a. At the junction box panel (see Fig. 7), set the RAM POSITION switch to LOWER, allowing the follower plate to activate the lower limit switch.
    b. Verify that the follower plate lowers to the limit set point: a level between 1–4 in. (25.4–101.6 mm) from the bottom of the drum.
    c. Adjust the low limit switch to activate at the level defined in step 36.b See Fig. 10.

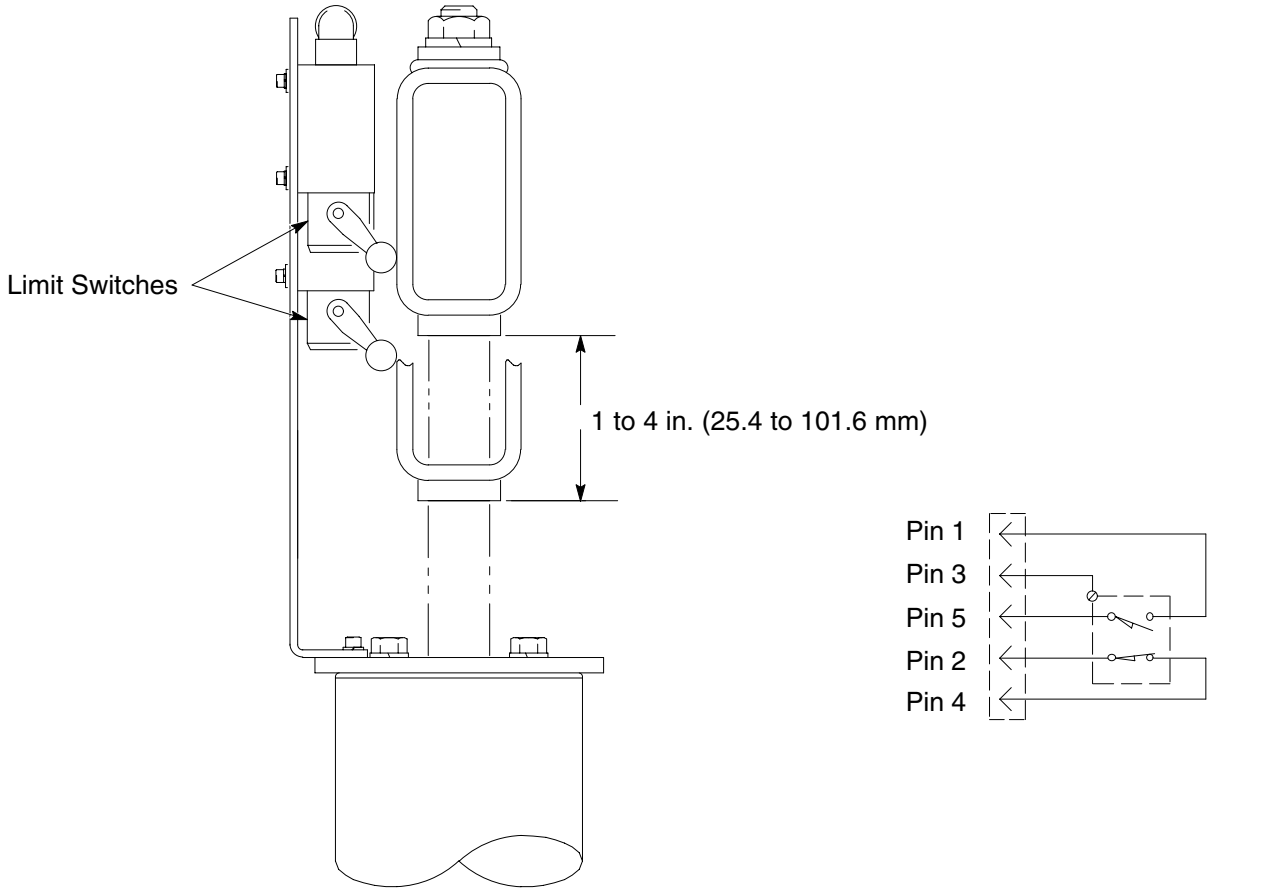


Fig. 10

Operation

Daily System Startup

This procedure is normally provided by the integrator.

System Shutdown

This procedure is normally provided by the integrator.

Emergency Stop

When an emergency stop is required, do the following:

Stopping the System

1. To stop the system, close the main air inlet supply (see Fig. 11) to the supply unit.

Restarting the System

2. To restart the system, do the following:
   a. Open the main air valve to the supply unit (see Fig. 11).
   b. At the junction box panel, press the PUMP RESET switch which restarts the pumps after the pumps were turned off (refer to Fig. 7).

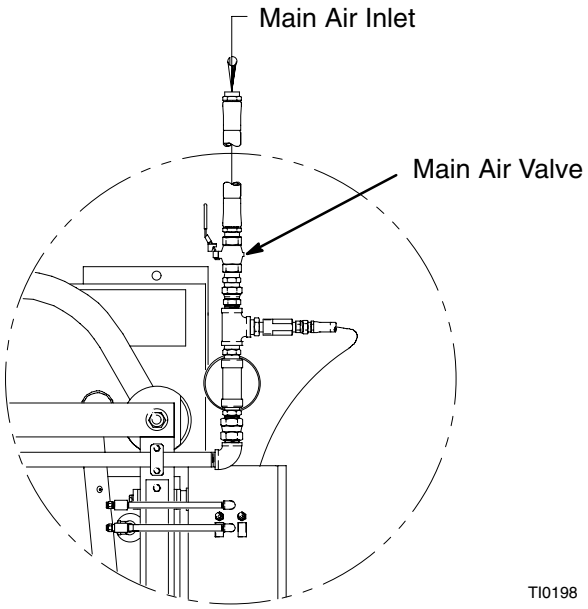


Fig. 11

Operation

Pressure Relief Procedure

This procedure describes how to relieve pressure from the system. Use this procedure whenever you shutoff the pumps and before checking or adjusting any part of the system, to reduce the risk of serious injury.

⚠ WARNING

MOVING PARTS HAZARD
Follow the **Pressure Relief Procedure** below before checking or repairing the follower plate or any other part of the system and when shutting down the system. 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.

During operation, also keep hands and fingers away from limit switches to reduce the risk of pinching or amputating hands or fingers.

⚠ WARNING

SKIN INJECTION HAZARD
The system pressure must be manually relieved to prevent the system from starting or spraying accidentally. Material under high pressure can be injected through the skin and cause serious injury. To reduce the risk of an injury from injection, splashing fluid, moving parts, follow the **Pressure Relief Procedure** whenever you:

- are instructed to relieve the pressure
- stop dispensing material
- check or service any of the system equipment
- install or clean the follower plate wipers.

To relieve pressure on the follower plate and in the pumps, perform the following procedure:

At the pneumatic layout panel, do the following:

1. Close the main air inlet valve (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.
3. Press the depressurization button on the electrical panel.
4. After the pressure is relieved from the follower plate, raise the follower plate by setting the RAM POSITION switch to the RAISE position.

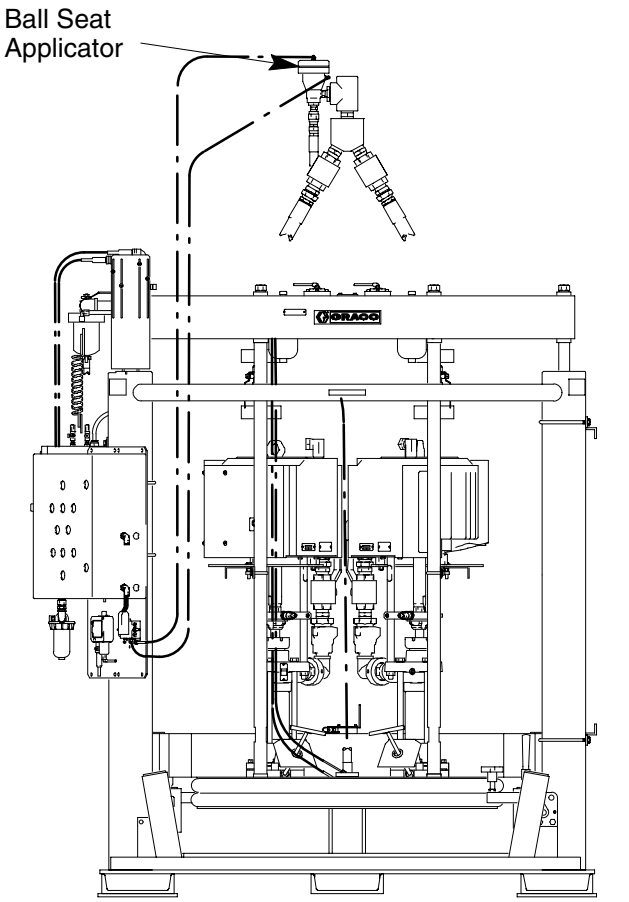


Fig. 12

Preventive 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.

Operation

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. Verify that the two front and rear drum clamps are engaged on the Uni-Drum ram base.
2. Check that the pump air is turned off. On the junction box panel the PUMP ACTIVE and PUMP READY indicators are not lit.
3. Check that the RAM UP air regulator is set to 60 psi (maximum).
4. Close the two ball valves at the outlet manifold at the rear of the Uni-Drums.
5. To raise the follower plate:
    a. Set the RAM POSITION control to RAISE, then wait 5 seconds.

NOTE: If RAM UP button is pushed within 5 seconds, the vent valves may open before the pressure under the follower plate is relieved causing the material to bleed past the vents.

    b. Push and hold the RAM UP button as the follower plate slowly rises.

6. With the ram raised and the RAM POSITION control set to RAISE, pull the drum clamps back and remove the empty drum, using a suitable lifting device.

⚠ WARNING

MOVING PARTS HAZARD
Use a long-handled flat-bladed ice scraper if it is necessary to scrape the bottom of the follower plate. Do not put your hands between the plate and the drum.

7. ***IMPORTANT:*** Being careful not to damage the follower plate wipers, wipe or scrape any material buildup from the follower plate and wipers, and properly dispose of the waste material.

NOTE: When you open 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. Check that the RAM READY indicator is lit.
10. ***IMPORTANT:*** Lubricate the follower plate wipers with a lubricant approved by the material manufacturer.
11. Push the two front and rear drum clamps forward until engaged.

Operation

⚠ WARNING

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

MOVING PARTS HAZARD
Moving equipment parts can cause personal injury, including severing of hands or fingers. Make sure all personnel are clear of moving parts before operating the equipment.

⚠ CAUTION

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.

⚠ WARNING

PRESSURIZED EQUIPMENT HAZARD
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.

12. Remove the bleed sticks from the follower plate.

NOTE: Before lowering the ram into the drum, make certain that nothing is between the follower plate and the drum, or between the ram tie bar and the top of the ram posts.

13. Lower the follower plate as follows:
    a. Set the Ram Position selector to LOWER.
    b. Lower the follower plate until the material is evident in the bleedstick ports.
    c. Set the Ram Position selector to HOLD.
    d. Replace the bleedsticks.
    e. Set the Ram Position selector to LOWER.
14. Close both pump #1 and pump #2 inlet valves (located on top of the air motor).
15. To prime the pump, press the PRIME PUMP button.
16. Set the pump air pressure to 30 psi.
17. Check that the AIR PRESS. ON indicator is lit.
18. Use a catch device to bleed the pump. Slowly open Pump No. 1 bleeder valve. Back off the adjustment screw several turns; do not remove the screw.
19. Slowly open the bleed-type air valve to the air motor. Allow the pump to cycle slowly until all air escapes and material flows free of air from the bleeder valve.
20. Close the bleed-type air valve and pump bleeder valve.
21. Repeat these steps for Pump No. 2.

NOTE:

- If the pump does not prime properly, which may occur with heavier, high viscosity fluids, increase the air pressure to the ram.
- If fluid is forced out around the top wiper, ram pressure is too high; decrease the air pressure to the ram.
- Ram pressure adjustments may be carried out using the dual regulator ***inside*** the pneumatic panel, where the upper regulator knob controls the downward pressure of the ram, and the lower regulator knob controls the upward pressure of the ram.

22. After closing the bleed valve, return Pump No. 1 and 2 regulator to its normal pump pressure setting.

23. Open the air motor ball valves.

24. Open the ball valve in the outlet manifold from Pump No. 1 and 2.

25. Remove the waste containers, clean up any spilled material, and dispose of the waste material properly.

26. Press the PUMP RESET button to restore the system to operation.

27. Check that the following indicators are lit:

    - SYSTEM PRESSURIZED
    - AIR PRESS. ON
    - RAM READY
    - PUMP READY

Ram Assembly Troubleshooting

Problem	Cause(s)	Solution(s)
Ram won't raise or lower	Closed main air 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 procedure on page 49.
Ram raises or lowers too fast	Ram air pressure too high	Decrease ram air pressure
Fluid squeezes past follower plate wipers	Ram air pressure too high	Decrease ram air pressure
	Worn or damaged wipers	Replace wipers. See procedure on page 52.
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 procedure on page 49.
	Bent drum has stopped follower plate	Replace drum

Pump Troubleshooting

For additional information about the displacement pump, refer to **Related Publications** on page 81 to find the applicable instruction manual.

Problem	Cause(s)	Solution(s)
Rapid downstroke or upstroke (pump cavitation)	Air is trapped in pump.	Bleed air from the pump using this procedure: 1. Place a waste container under the pump bleed port. 2. Press the PRIME PUMP button to turn on air to the pump. 3. Allow material to flow from the bleed port until it is air-free. 4. Release the PRIME PUMP button to shut off air to the pump. Close the bleed port. 5. Turn air on to the pump and set the pump air regulator for normal operation.
	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	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 37.
	Foreign object lodged in pump.	Remove object and rebuild pump assembly. **⚠ WARNING** To reduce the risk of serious injury whenever you are instructed to relieve pressure, always follow the **Pressure Relief Procedure** (page 31). Before attempting to dislodge a foreign object: 1. Relieve system pressure. 2. Remove the pump from the air motor.
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 Publications** on page 81 to find the applicable instruction manual.

Problem	Cause(s)	Solution(s)
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.

Junction Box Panel Troubleshooting

Problem	Cause(s)	Solution(s)
Power from PLC control panel is ON, but no indicator lights are lit at junction box panel.	The knife switch disconnect contacts (KS100 and KS102) are open.	Check the PLC power connections at customer's site.
	One or more fuses blown.	Replace the blown fuse(s). Check FU136 and FU143 located inside the knife switch disconnect blocks.
	Voltage limit to circuits in junction box panel was exceeded.	Check the surge suppressors SUP136 and SUP144. Replace if required. Reset power to unit.

Pneumatic Layout Panel Troubleshooting

Problem	Cause(s)	Solution(s)
Ram will not move up or down.	Main air valve on box is not open.	Open valve.
	Air supply to unit is not on.	Turn on air supply.
Ram will not move up.	Direction valve is not in the UP position.	Set direction valve to the UP position.
	RAM UP button is not pushed.	Push RAM UP button.
	Resistance in drum is too great.	Turn air pressure up to 60 psi. The ram may take a few minutes to withdraw from the container.
	Insufficient lubrication of the follower plate seal.	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.

Routine Maintenance

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.

⚠ WARNING

FIRE AND EXPLOSION HAZARD
Before flushing, read the section **FIRE AND EXPLOSION HAZARD** on page 6. Be sure the entire system and flushing pails are properly grounded. Refer to **Grounding** on page 16.

To flush the system, perform the following procedure:

1. Place a drum of compatible flush material under the follower plate.
2. Run the pumps and circulate 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.
4. Return the system to current readiness condition.

Cleaning the System

⚠ CAUTION

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:

⚠ WARNING

MOVING PARTS HAZARD
Use a long-handled flat-bladed ice scraper if it is necessary to scrape the bottom of the follower plate. Do not put your hands between the plate and the drum.

1. ***IMPORTANT:*** Being careful not to damage the follower plate wipers, wipe or scrape any material buildup from the follower plate and wipers, and properly dispose of the waste material.
2. Apply a generous amount of lubricant to the follower plate wipers.
3. To clean vent valve:
   a. Put FOLLOWER VENT switch to ON position. This opens valve to allow you to clean out dried material.
   b. When vent is clean, put switch to AUTO position.
4. Return the system to current readiness condition.

Wiper Lubrication

It is extremely important that the follower plate wipers be thoroughly lubricated between drum changes. The follower plate may stick without lubrication.

Junction Box Panel Service

This part of the manual provides information about the following junction box panel components:

- Indicator light and pushbutton switch replacement
- Light bulb replacement
- Fuse replacement
- Surge suppressor replacement

NOTE: Refer to **Junction Box Parts** on page 71 while servicing the junction box panel.

Indicator Light and Pushbutton Switch Removal

⚠ WARNING

ELECTROCUTION HAZARD
Installing and servicing this equipment requires access to parts which could cause an electric shock or other serious injury. Have only qualified electricians access the control assembly.

1. Shut off power to the junction box panel.
2. At the junction box panel, remove the cover from the junction box panel.
3. Disconnect the lead wires from the terminals on the switch. For wiring information, refer to the **Electrical Diagram** on page 75. If necessary, label the wires to facilitate reconnection after replacing the component.
4. Loosen two screws which clamp the fixture to the cover. Rotate and remove the outer ring on the defective component counterclockwise to remove the light lens or switch. Separate the parts and remove them from the cover.

Indicator Light and Pushbutton Switch Replacement

1. Reverse steps 2 through 4 in the previous paragraph.
2. For wiring information, refer to the **Electrical Diagram** on page 75.
3. Reapply power to the junction box panel.
4. Verify that the replaced component operates correctly.
5. Return the system to current readiness condition.

Light Bulb Removal

Remove the light bulb as follows:

⚠ WARNING

ELECTROCUTION HAZARD
Installing and servicing this equipment requires access to parts which could cause an electric shock or other serious injury. Have only qualified electricians access the control assembly.

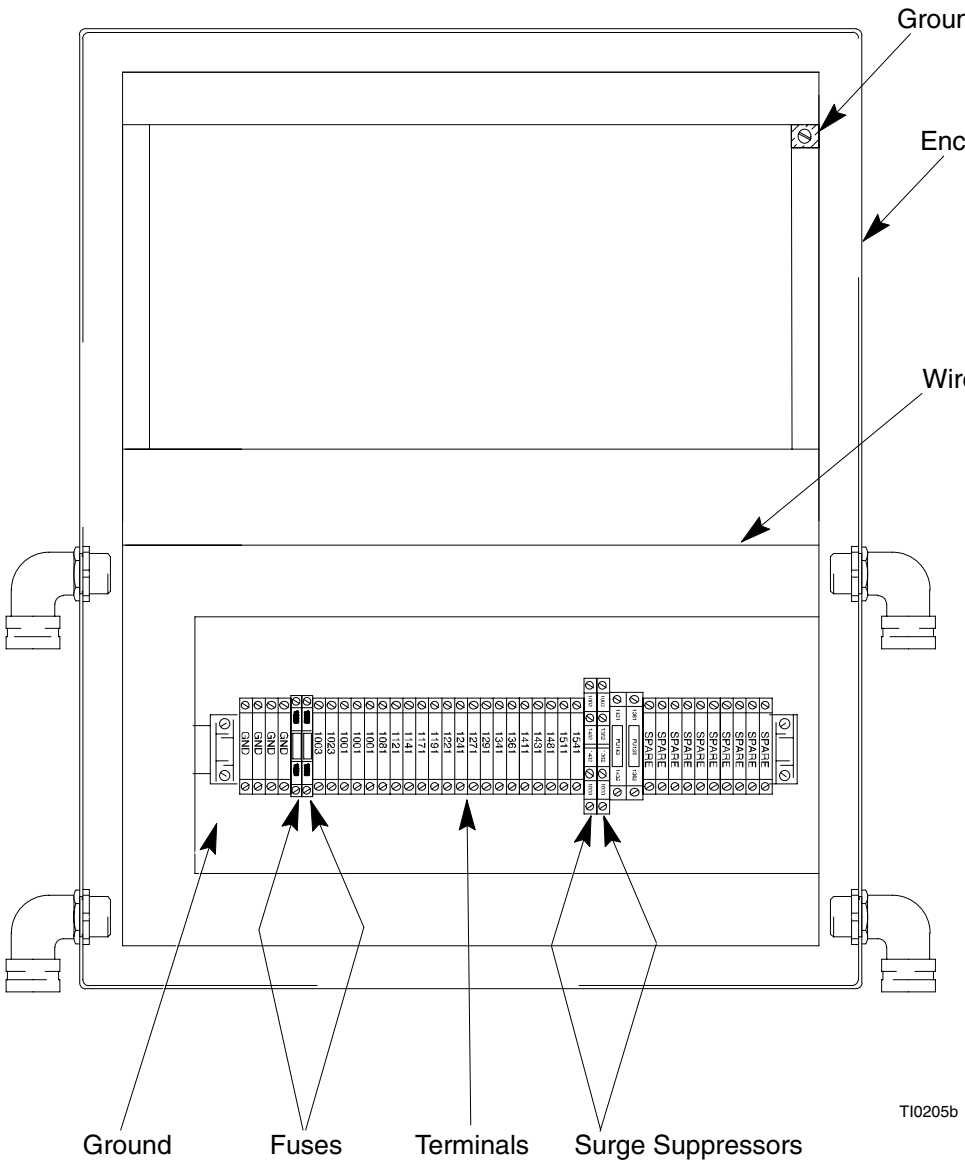
1. Shut off power to the junction box panel.
2. Unscrew and remove the indicator light lens.
3. Gently press and rotate the bulb counterclockwise, 1/4-in. of a turn, unlocking the bulb from its socket. Remove the bulb from the socket.

Light Bulb Replacement

Replace the light bulb as follows:

1. Insert the light bulb in the socket.
2. Gently press and rotate the bulb clockwise, 1/4-in. of a turn to lock the bulb in its socket.
3. Replace the lens.
4. Reapply power to the junction box panel.
5. Verify that the light bulb operates correctly.
6. Return the system to current readiness condition.

Junction Box Panel Service



KS100 1001
1002

KS102 1021
1022

(2) TOTAL
Type
1492–WKD3TP

Terminals

SPARE
SPARE
SPARE
SPARE
SPARE
SPARE
SPARE
SPARE
SPARE
SPARE
SPARE
FU136
FU143
SUP136
SUP144
1541
1511
1481
1431
1411
1361
1341
1291
1271
1241
1221
1191
1171
1141
1121
1081
1001
1001
1001
1023
1003

(31) TOTAL
Type 0290.011.25
ENTRELEC

Fig. 13

Junction Box Panel Service

Fuse Removal

Remove the fuse as follows:

⚠ WARNING

ELECTROCUTION HAZARD
Installing and servicing this equipment requires access to parts which could cause an electric shock or other serious injury. Have only qualified electricians access the control assembly.

1. Shut off power to the junction box panel.
2. At the junction box panel, remove the cover from the junction box panel.
3. Locate the failed fuse on the terminal strip. Reference Fig. 13 for the fuse terminal identification.
4. Carefully remove the fuse from the fuse holder.

Fuse Replacement

Replace the fuse as follows:

NOTE: Check the new fuse to ensure that it matches the amp rating of the failed fuse.

1. Press both ends of the new fuse evenly into place in the fuse holder. See Fig. 13.
2. Reinstall the cover on the junction box panel.
3. Reapply power to the junction box panel.
4. Verify that the fuse operates correctly.
5. Return the system to current readiness condition.

Junction Box Panel Service

Surge Suppressor Removal

Remove the surge suppressor as follows:

⚠ WARNING

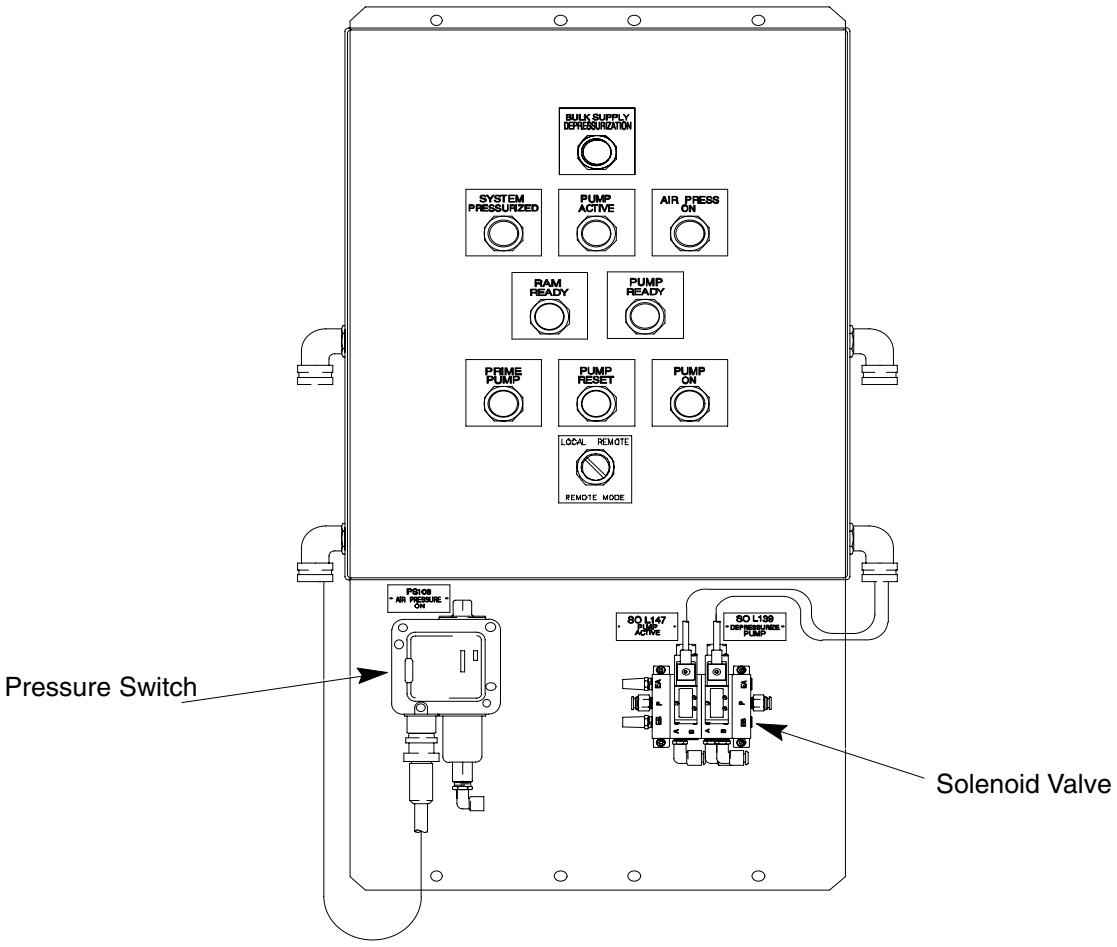
ELECTROCUTION HAZARD
Installing and servicing this equipment requires access to parts which could cause an electric shock or other serious injury. Have only qualified electricians access the control assembly.

1. Shut off power to the junction box panel.
2. At the junction box panel, remove the cover off the junction box panel.
3. Locate the failed surge suppressor on the terminal strip. Reference Fig. 13 for the surge suppressor terminal identification.
4. Remove the two screws and surge suppressor from the terminal strip.

Surge Suppressor Replacement

Replace the surge suppressor as follows:

1. Install the new surge suppressor into place on the terminal strip using the two screws. See Fig. 13.
2. Reinstall the cover on the junction box panel.
3. Reapply power to the junction box panel.
4. Verify that the new surge suppressor operates correctly.
5. Return the system to current readiness condition.



T10196

Fig. 14

PLC Interface Accessory Kit Service

This part of the manual provides information about the following PLC interface accessory kit components:

- Valve assembly bank replacement
- Pressure switch assembly replacement

Valve Assembly Bank Replacement

Remove the valve assembly bank that is mounted below the junction box panel as follows:

NOTE: The valve assembly bank has two solenoids (SOL139 and SOL147) that are used as switches to control pump operation. SOL139 depressurizes the pumps. SOL147 turns air on to the pumps.

⚠ WARNING

ELECTROCUTION HAZARD
Installing and servicing this equipment requires access to parts which could cause an electric shock or other serious injury. Have only qualified electricians access the control assembly.

1. Shut off power to the junction box panel.

Valve Assembly Removal

2. At the junction box panel, remove the cover off the junction box panel.

3. Locate the valve assembly (203) that is attached to the mounting plate (201) below the junction box panel (217). See Fig. 14.

4. Disconnect the two cables (216) from the terminal strip inside the junction box panel (217) for the valve assembly (203) bank. For wiring information, refer to the **Electrical Diagram** on page 75.

5. Remove four cap screws (205), the lock washers (206), and the valve assembly (203) from the mounting plate (201).

Valve Assembly Replacement

6. Install the new valve assembly (203) on the mounting plate (201) using the four cap screws (205) and lock washers (206). See Fig. 14.

7. Reconnect the two cables (216) on the terminal strip inside the junction box panel (217) for the valve assembly (203) bank. For wiring information, refer to the **Electrical Diagram** on page 75.

8. Reinstall the cover on the junction box panel.

9. Reapply power to the junction box panel.

10. Perform the **Daily System Startup** procedure on page 30 at the applicable supply unit (LH or RH).

11. Verify that the valve assembly (203) bank operates correctly.

12. Return the system to current readiness condition.

Pressure Switch Assembly Replacement

Remove the pressure switch assembly that is mounted below the junction box panel as follows:

NOTE: The pressure switch (PS108) turns air pressure on the system.

⚠ WARNING

ELECTROCUTION HAZARD
Installing and servicing this equipment requires access to parts which could cause an electric shock or other serious injury. Have only qualified electricians access the control assembly.

1. Shut off power to the junction box panel.

Switch Removal

2. Remove the cover from the junction box panel.

3. Locate the pressure switch assembly (202) that is attached to the mounting plate (201) below the junction box panel (217). See Fig. 14.

4. Disconnect the 5-pin cord (211) from the pressure switch assembly (202). For wiring information, refer to the **Electrical Diagram** on page 75.

5. Disconnect the end of the lead wire from the pressure switch assembly (202). Leave the other end of the lead wire connected to the valve assembly bank (203).

6. Remove the two cap screws, the lock washers, and the pressure switch assembly (202) from the mounting plate (201).

Switch Replacement

To replace the switch, follow the switch removal steps in reverse order.

PLC Interface Accessory Kit Service

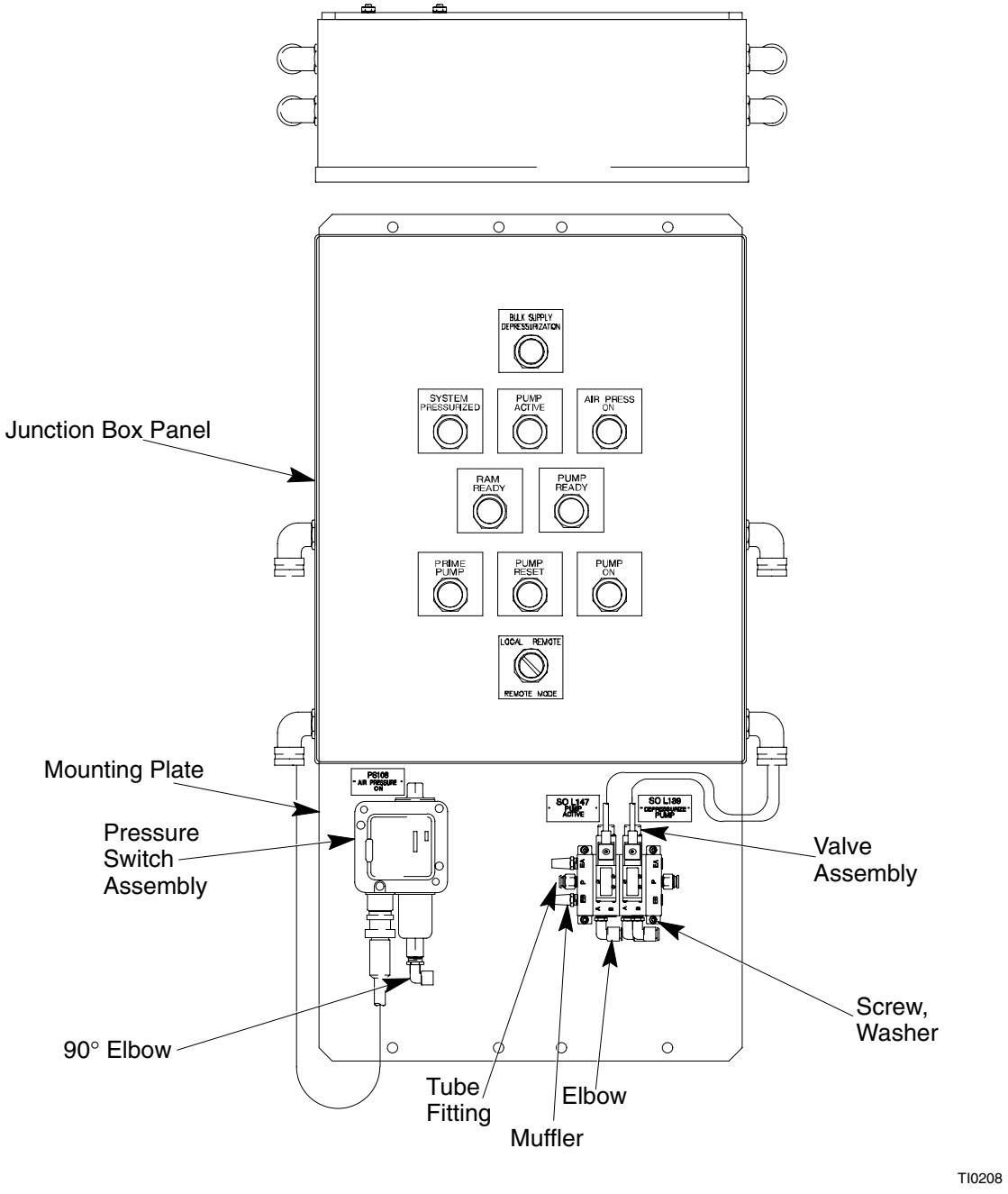


Fig. 15

Pneumatic Layout Panel Service

The pneumatic layout panel service procedures include:

- Filter/element replacement

Filter/Element Replacement

Listed below are the filters used with the ram assembly on the Uni-Drum supply system.

- The air filter between the air supply source and both air motors. See Fig. .
- The air filter between the air supply source and the pneumatic layout panel. See Fig. 17.

To replace an air filter/element, do the following:

1. At the pneumatic layout panel, do the following:
   a. Press the PUMP AIR OFF to shutoff the air supply at both pumps.
   b. Close the main air inlet valve.
   c. Turn the shutoff valve under the panel to the off position.
2. At the junction box panel, do the following:
   a. Press the PUMP OFF switch, turning off air to both pumps (see Fig. 7).
   b. Verify that the PUMP ACTIVE and AIR PRESS ON lights turn off.

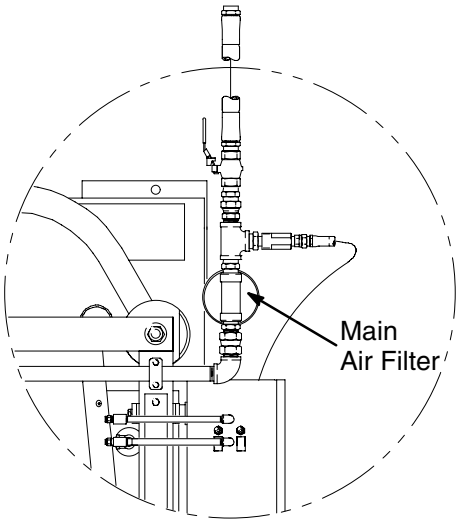


Fig. 16

⚠ WARNING

To reduce the risk of serious injury whenever you are instructed to relieve pressure, always follow the **Pressure Relief Procedure** on page 31.

3. Relieve the pressure.
4. At the junction box panel, verify that the SYSTEM PRESSURIZED and RAM READY lights turn off.

Filter Removal

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

Filter/Element Replacement

6. Replace the old air filter element with a new filter element.
7. Clean the sight glass, if necessary. Reinstall the sight glass back on its threaded mounting. Tighten the sight glass.
8. Perform the **Daily System Startup** procedure on page 30.
9. Check for air leakage around the filter.
10. Return the system to current readiness condition.

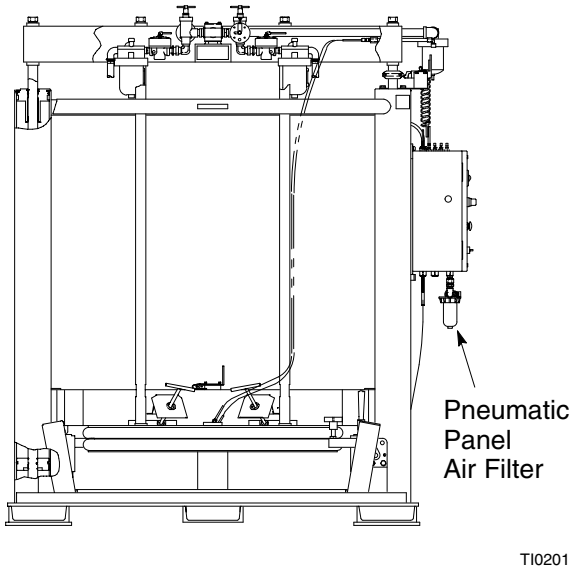


Fig. 17

Filter/Element Replacement *(continued)*

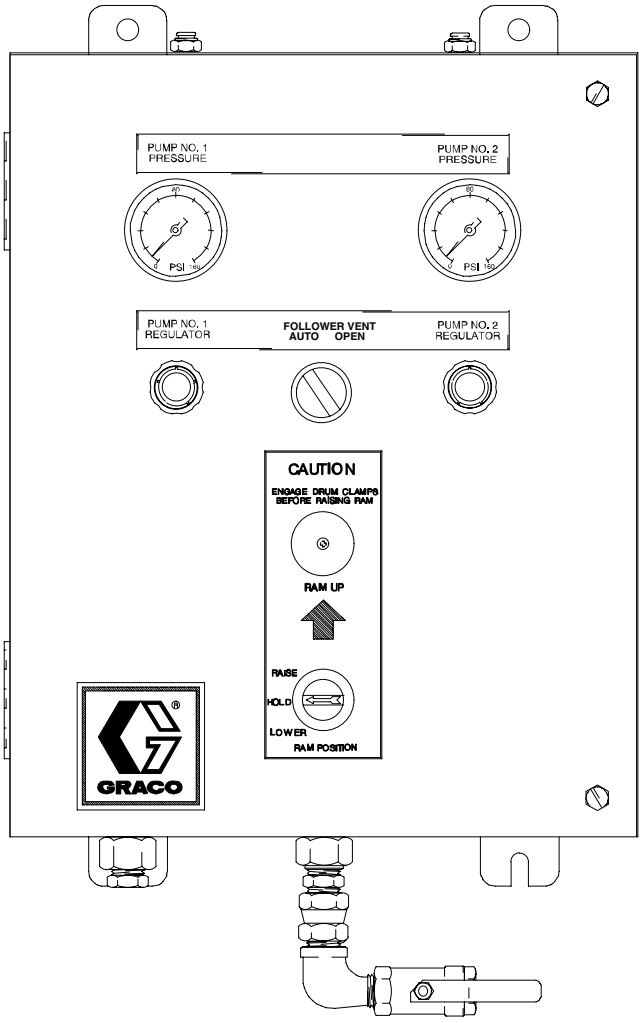


Fig. 18 TI0202

Ram Assembly Service

Piston Rod Seal Service (Fig. 19)

⚠ WARNING

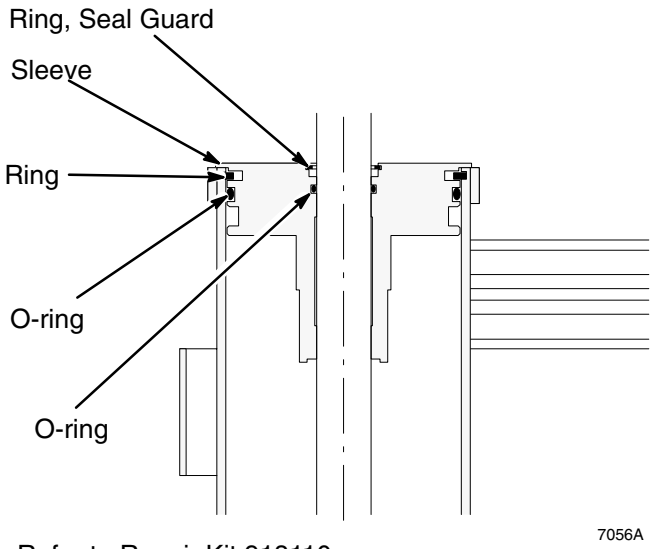
To reduce the risk of serious injury whenever you are instructed to relieve pressure, always follow the **Pressure Relief Procedure** on page 31.

1. **Relieve the air pressure.**
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.

⚠ WARNING

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.

Fig. 19

Ram Assembly Service

Ram Piston Service (Fig. 20)

⚠ WARNING

To reduce the risk of serious injury, whenever you are instructed to relieve pressure, always follow the **Pressure Relief Procedure** on page 31.

1. **Relieve the air pressure.**
2. Remove the tie bar as explained under **Piston Rod Seal Service.**
3. Remove the guide sleeve and slide it off of the piston rod.

⚠ WARNING

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.**

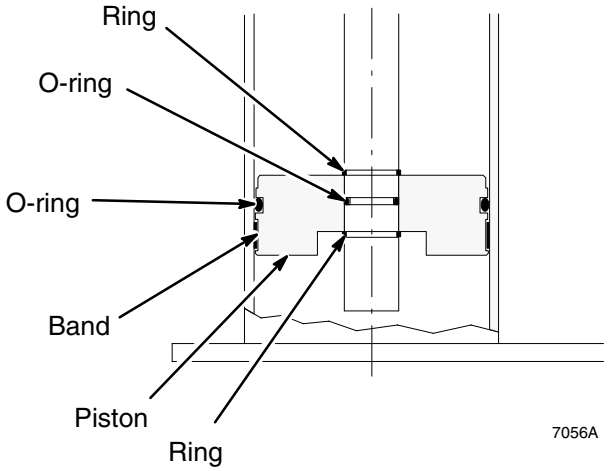


Fig. 20

Ram Assembly Service

The ram assembly service procedures include:

- Low/Empty limit switch replacement
- Ball seat applicator repair procedure
- Servicing the pumps

Low/Empty Limit Switch Replacement

To replace the lower limit switch, do the following:

1. Perform the **System Shutdown** procedure provided by the integrator at the applicable supply unit (LH or RH).

⚠ WARNING

ELECTROCUTION HAZARD
Installing and servicing this equipment requires access to parts which could cause an electric shock or other serious injury. Have only qualified electricians access the control assembly.

2. Shut off power to the junction box panel.

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

NOTE: The first limit switch closes when the follower plate reaches the preset low limit level in the drum. The second limit switch closes when the follower plate reaches the preset empty level in the drum. Both limit switches provide inputs to the PLC interface.

Switch Removal

3. Between the two limit switches (305), locate the faulty switch. See Fig. 21.

4. Disconnect the wiring (301) for the limit switch at its power source. For reference, use the wiring diagram shown in Fig. 21.

5. 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.

6. 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.

7. Remove three cap screws (302), the lock washers (303), the plain washers (304), and the limit switch (305) from the limit bracket (306). See Fig. 21.

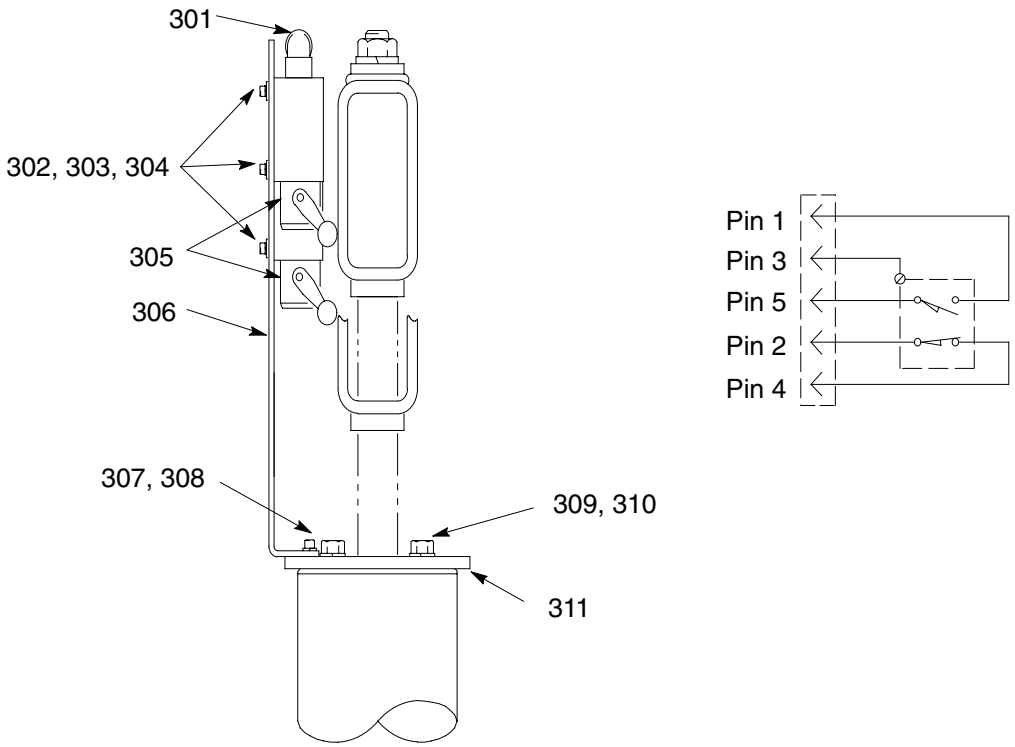


Fig. 21

Ram Assembly Service

Low/Empty Limit Switch Replacement *(continued)*

Switch Replacement

8. Install the new limit switch (305) on the limit bracket (306) using the three cap screws (302), lock washers (303), and plain washers (304). See Fig. 21.

9. Reconnect the wiring (301) for the limit switch at its power source. For reference, use the wiring diagram shown in Fig. 21.

10. Make sure that the limit switch roller is positioned in the same location per the measurement in step 6. See Fig. 21.

11. Reinstall the cover on the junction box panel.

12. Reapply power to the junction box panel.

13. Perform the **Daily System Startup** procedure provided by the integrator at the applicable supply unit (LH or RH).

14. Verify that the limit switch operates correctly.

15. Return the system to current readiness condition.

Depressurization Valve (Ball Seat Applicator) Repair Procedure

Refer to instruction manual 310550 for the ball seat applicator (918537) service procedures and parts information.

Servicing the Pumps

When the pumps and air motors require service, refer to the applicable instruction manual, listed below, for detailed information.

Form	Description	P/N
308147	*Carbon Steel Dura-Flo™ Pump 1800 with Premier™ Air Motor*	237555
308148	*Stainless Steel Dura-Flo™ Pump 1800 with Premier™ Air Motor*	241957
308213	*Premier™ Air Motor*	222800

Ram Assembly Service

Replacing Wipers (Fig. 22)

1. Perform the **System Shutdown** procedure provided by the integrator.

2. To replace worn or damaged wipers (412), raise the follower plate up out of the drum. Remove the drum from the base. Wipe the fluid off the follower plate. Refer to the **Drum Changing** procedure on page 32.

3. Separate the wiper joint (A) and bend back the strapping (413) covering the clamp setscrew (415). See Detail A of Fig. 22. Loosen the setscrew, pull the end of the strapping through the clamp (414) and remove the wiper.

4. Slide the strapping (413) through the new wiper (412). Slide the clamp (414) 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. 22.

5. Install the wipers on the follower plate. Position the wipers so that their joints (A) are 180° apart.

NOTE: You will need the special banding tool (C) shown in Detail C of Fig. 22 to tighten the strapping. Order Part No. 168092 Banding Tool.

6. Grip the strapping (413) with the tool (C) as shown. With your thumb on the gripper lever (E), turn the tool handle (F) clockwise to apply tension.

NOTE: Be careful not to pull the cutting handle (D) 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 (414). Stop turning the handle.

8. Tighten the setscrew (B) with a wrench (G). Pull the cutting handle (D) to cut. Remove the tool (C). Bend the strapping back over the clamp (414).

9. Pound the wiper all the way around with a rubber mallet until the joints (A) are butted tightly together.

10. Return the system to current readiness condition. Refer to the **Drum Changing** procedure on page 32.

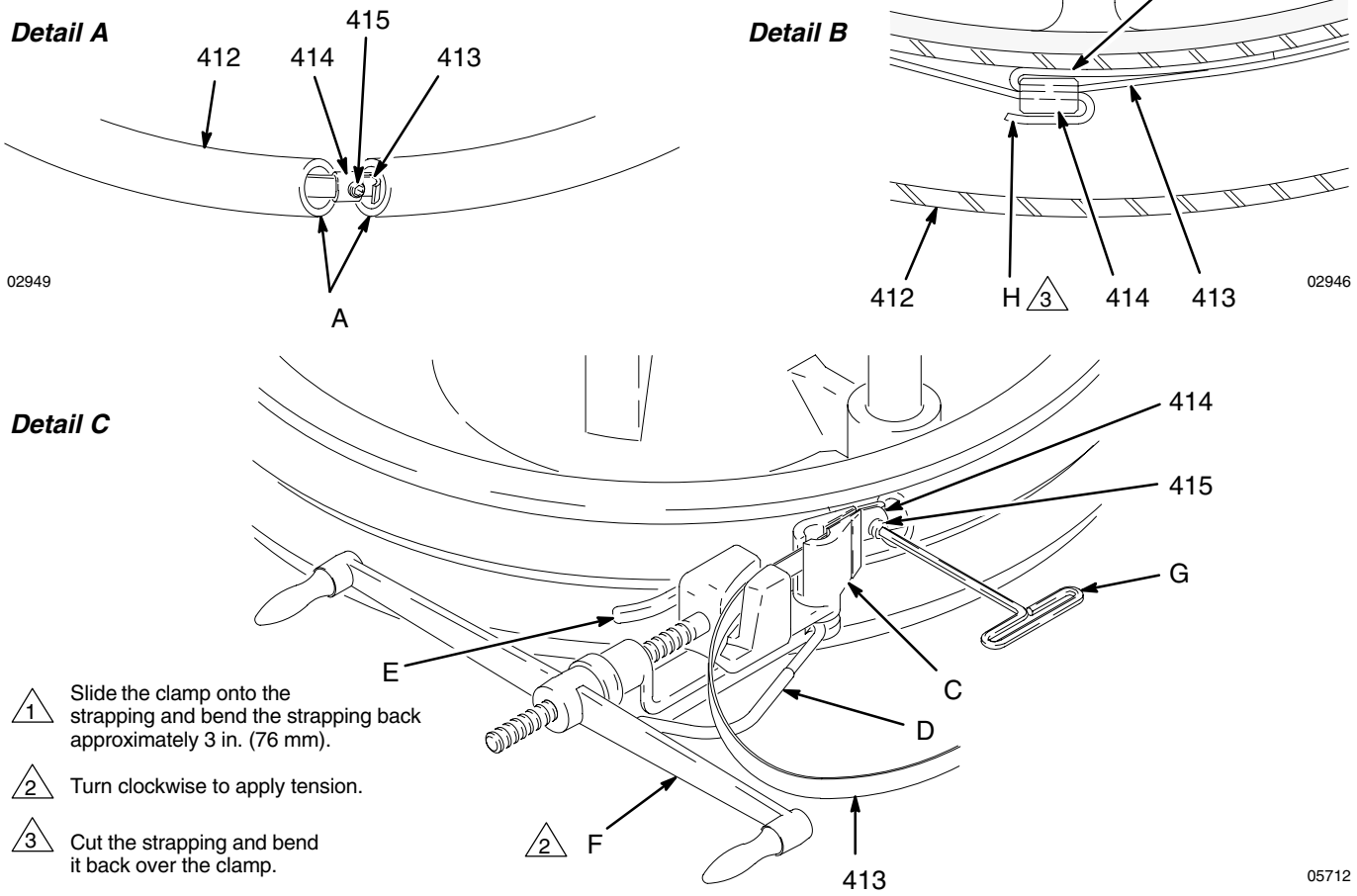


Fig. 22

Pump Assembly Service

Pump Removal

(Refer to System Parts Diagram; page 54.)

⚠ WARNING

To reduce the risk of serious injury, whenever you are instructed to relieve pressure, always follow the **Pressure Relief Procedure** on page 31.

1. Relieve the air pressure from the air motors and ram assembly to be serviced.

2. Move the RAM POSITION switch to HOLD.

3. 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.

4. 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 Data page in the separate pump manual to find the weight of the pump being serviced. For example, Graco Premier 45:1 SST Pump (222939) weighs 240 lb (109 kg) per Form 308148.

5. Detach the air hose from the air motor.

6. Detach the fluid supply hose at the pump outlet.

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

7. On the follower plate adapter, loosen and rotate or remove four lugs and hex bolts holding the flange of the pump lower .

8. 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.

9. 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 step below, ensure the lifting chain does not damage the air controls mounted at the top of the ram cross-members.

10. 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.

11. 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.

12. Remove the gasket and o-ring (items 32 and 33) from the pump adapter. They should be discarded and replaced when the pump is reinstalled.

13. Clean excess and hardened material from the pump adapter on the follower plate.

14. Ensure that material is not rising through the pump adapter in the follower plate. If material is flowing upward, move the RAM POSITION switch to RAISE until the flow stops, then move the switch back to HOLD.

15. Move the pump assembly to a suitable work area and repair the pump using the appropriate Graco Instruction Manual.

Pump Installation

(Refer to System Parts Diagram; page 54.)

1. When the pump is serviced and tested and ready to be replaced in the Uni-Drum Ram, 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. Follow the Pump Instruction Form and the pump material bleeding procedure from the Drum Changing Procedure on page 32 .

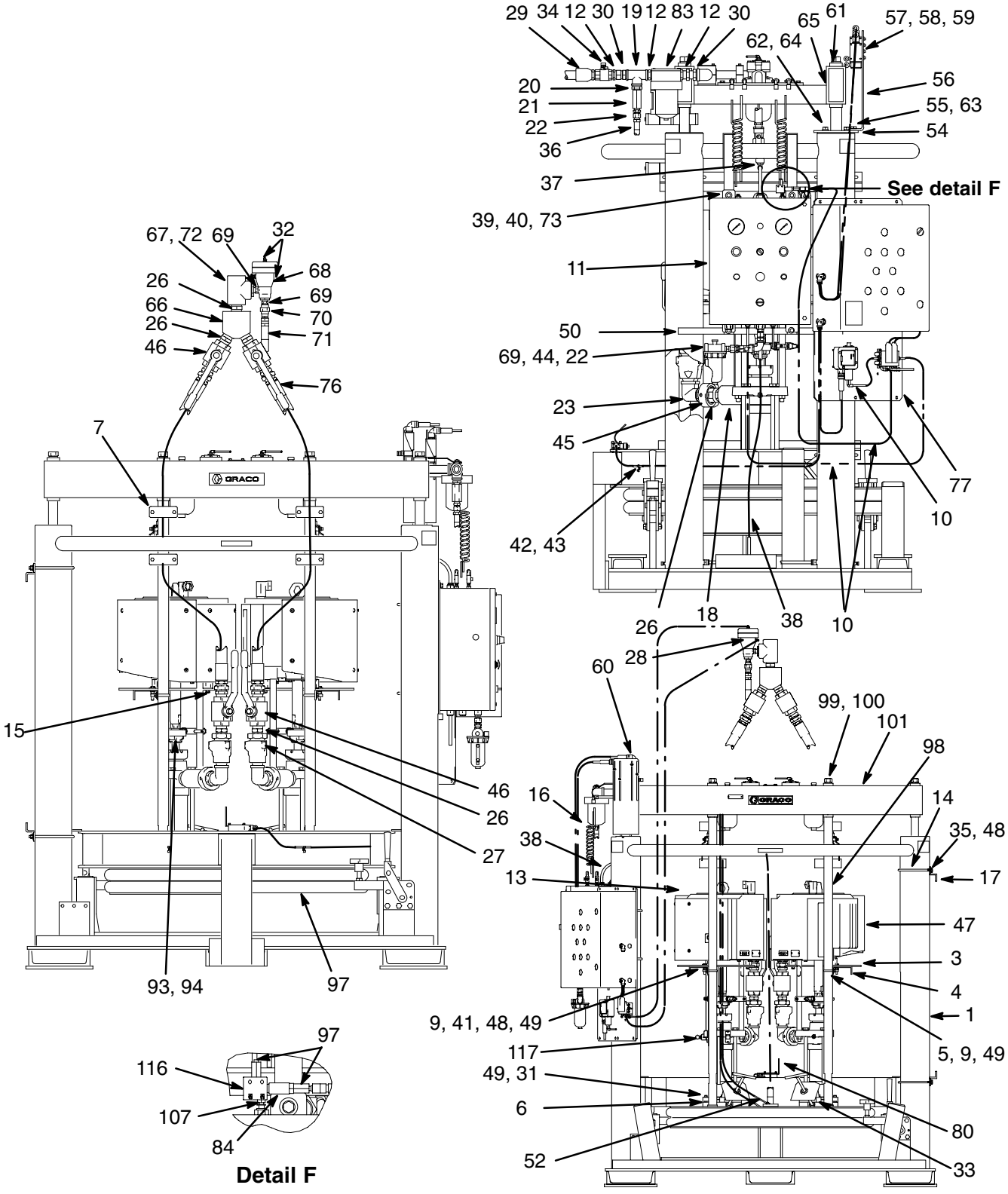
Parts

246981, 248306, 249339, and 253676 45:1 Left Hand Supply Unit

246982, 248307, 249340, and 253677 45:1 Right Hand Supply Unit

249152, 249341, and 234972 34:1 Left Hand Supply Unit

249153, 249342, and 234973 34:1 Right Hand Supply Unit



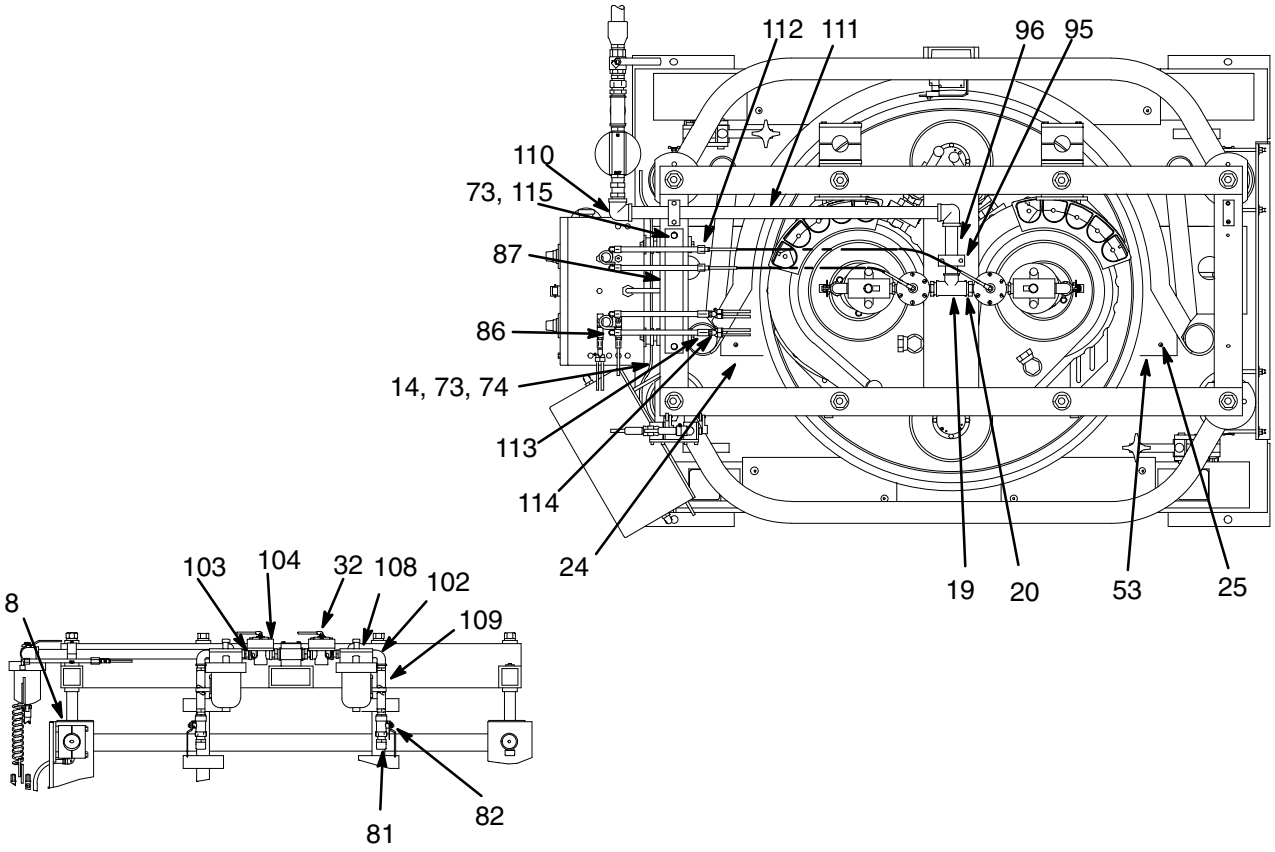
Parts

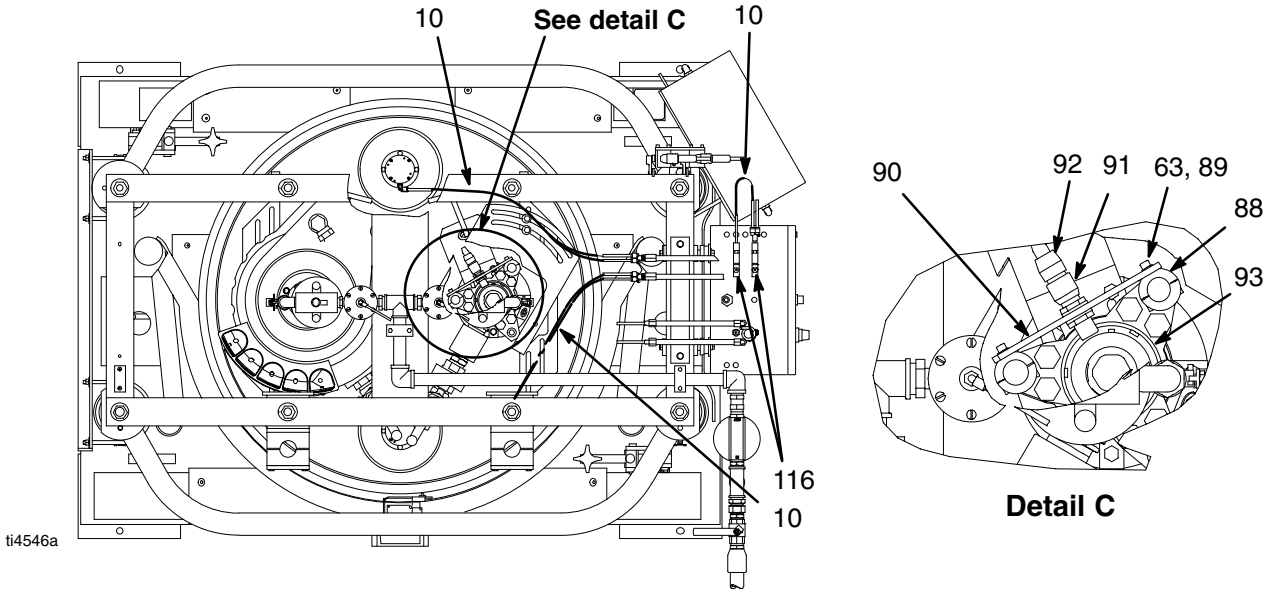
246981, 248306, 249339, and 253676 45:1 Left Hand Supply Unit

246982, 248307, 249340, and 253677 45:1 Right Hand Supply Unit

249152, 349341, and 234972 34:1 Left Hand Supply Unit

249153, 349342, and 234973 34:1 Right Hand Supply Unit





Parts

246981, 248306, 249339, and 253676 45:1 Left Hand Supply Unit

246982, 248307, 249340, and 253677 45:1 Right Hand Supply Unit

249152, 249341, and 234972 34:1 Left Hand Supply Unit

249153, 249342, and 234973 34:1 Right Hand Supply Unit

Ref No.	Part No.	Description	Qty
1	**241902**	**ELEVATOR, assembly 300 gallon**	1
3	C58306	PLATE, adjuster	2
4	C58361	BRACKET, support	2
5	C20450	U–BOLT	4
6	196073	CLAMP	8
7	15D133	CLAMP, support	4
8	517272	CLAMP, support	2
9	100132	WASHER, flat	12
10	C12509	TUBE, nylon	64 ft.
11	195319	PANEL, pneumatic layout	1
12	158585	NIPPLE	3
13	246989	PUMP, 45:1 stainless steel (Models 248306, 248307, 249339, 249340, 253676, and 253677 only)	1
	248992	PUMP, 45:1 stainless steel (Models 246981 and 248982 only)	1
	249157	PUMP, 34:1 stainless steel (Models 249152, 249153, 249341, 249342, 234972, and 234973 only)	1
14	C51238	U–BOLT	6
15	101566	NUT, lock	6
16	517288	TUBE, coiled	2
17	241844	BRACKET, mounting	2
18	C38457	COUPLING, reducing	2
19	106464	TEE, pipe	2
20	C20463	NIPPLE, reducing, hex	3
21	C57799	VALVE, check 1/2 in.	1
22	C19019	UNION, swivel	3
23	C38324	ELBOW, street	2
	119900	ELBOW, street (234972, 234973, 253676, and 253677 only)	2
24	196085	COVER, left	1
25	C20811	SCREW, socket head, flat	12
26	C20490	NIPPLE, hex	7
	119893	NIPPLE, hex (234972, 234973, 253676, and 253677 only)	7
27	246929	VALVE, check	2
	234960	VALVE, check (234972, 234973, 253676, and 253677 only)	2
28	C19254	PLUG, pipe, plug, 1/4 in.	2
29	C12039	HOSE, air	1
30	C19032	UNION, swivel	2
31	111803	SCREW, cap, hex	8
32	C19391	ELBOW	4
33	109495	O–RING	2
34	115438	VALVE, ball	1
35	109570	WASHER	8
36	214656	HOSE, coupled, 10 ft.	1
37	C19381	ELBOW, tube, (m)	1
38	C12194	TUBE, nylon	4
39	C19200	WASHER	4
40	C19124	SCREW, cap, hex	4
41	C19126	SCREW, cap, hex	4
42	517254	CLIP, tube	3
43	110299	RIVET, blind	3
44	106149	FILTER, air, 1/2 npt	1
45	521975	UNION, pipe	2
	234963	UNION, pipe (234972, 234973, 253676, and 253677 only)	2
46	118854	VALVE, ball	4
47	246990	PUMP, 45:1 stainless steel (Models 248306, 248307, 249339, 249340, 253676, and 253677 only)	1
	246991	PUMP, 45:1 stainless steel (Models 246981 and 248982 only)	1
	249158	PUMP, 34:1 stainless steel (Models 249152, 249153, 249341, 249342, 234972, and 234973 only)	1
48	100307	NUT, hex	12
49	100133	WASHER, lock	20
50	617200	BRACKET, support	1
52	112698	SWIVEL, elbow (m)	4
53	196084	COVER, right	1
54	C52751	PLATE, limit switch	1
55	C19810	SCREW, cap	2
56	195454	BRACKET, limit	1
57	C19197	WASHER	4
58	C19204	WASHER, lock	4
59	C20003	SCREW, cap	4
60	C07431	CONNECTOR, sealed	2
61	104227	NUT, lock	2
62	C19138	SCREW, cap, hex	2
63	100016	WASHER, lock	6
64	100018	WASHER, lock spring	2
65	C07560	SWITCH, limit, with arm	2
66	15D140	MANIFOLD, three–way	1
	15G091	MANIFOLD, three–way (234972, 234973 only)	1
67	C19491	TEE, fitting, 1–1/4 npt(f)	1
	119901	TEE, fitting, 1–1/4 npt(f) (234972, 234973 only)	1
68	918537	APPLICATOR, ball seat, 1/2 in.	1
69	C20485	NIPPLE, hex	3
	114373	NIPPLE, hex (234972, 234973, 253676, and 253677 only)	3
70	158566	COUPLING, hex pipe	1
	15G092	COUPLING, hex pipe (234972, 234973 only)	1
71	234558	HOSE, coupled	1
	234962	HOSE, coupled (234972, 234973, 253676, and 253677 only)	1

Continued on next page.

Parts (Continued from previous page)

246981, 248306, 249339, and 253676 45:1 Left Hand Supply Unit

246982, 248307, 249340, and 253677 45:1 Right Hand Supply Unit

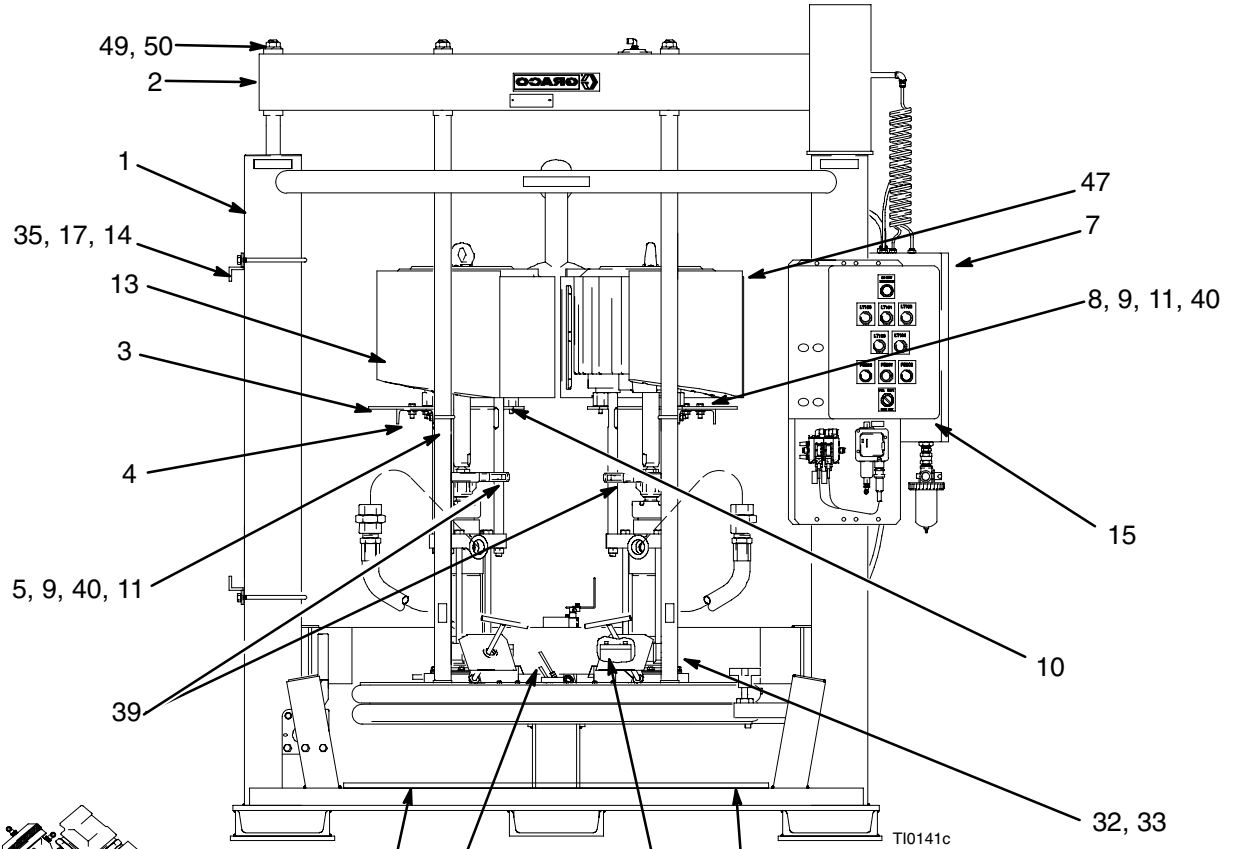
249152, 249341, and 234972 34:1 Left Hand Supply Unit

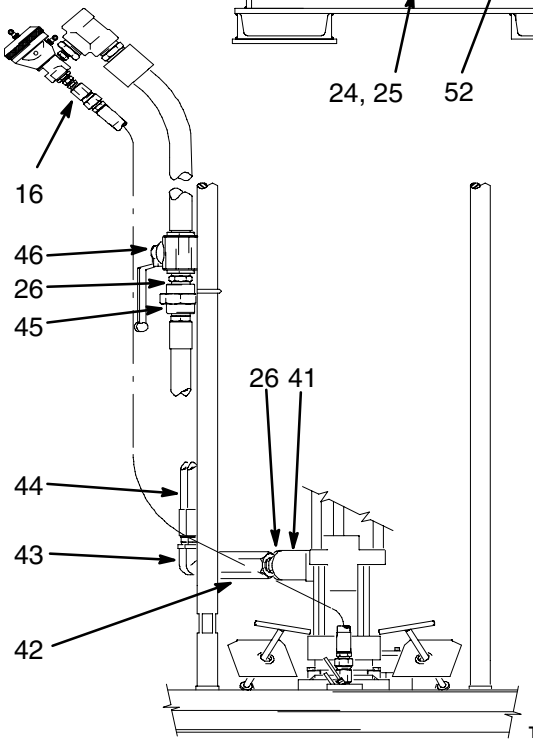
249153, 249342, and 234973 34:1 Right Hand Supply Unit

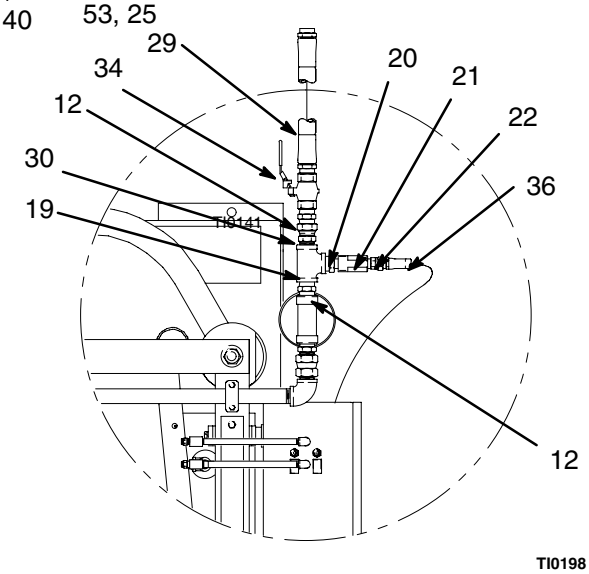
Ref No.	Part No.	Description	Qty
72	C19660	FITTING, 1–1/4 x 1/2 in.	1
	119896	FITTING, 1–1/4 x 1/2 in. (234972, 234973 only)	1
73	C19213	WASHER, lock	10
74	C19185	NUT, jam hex	4
76	234428	HOSE, coupled	2
	234961	HOSE, coupled (234972, 234973, 253676, and 253677 only)	2
77	234255	KIT, accessory, PLC interface (Models 246981, 246982, 248306, 248307, 249152, 249153, 234972, 234973, 253676, and 253677 only)	1
	249343	KIT, accessory, PLC interface (Models 249339, 249340, 249341, and 249342 only)	1
79	114158	ADAPTER, fitting	1
80	195356	KIT, accessory	1
81	158555	NIPPLE, reducing	2
82	113332	VALVE, ball	2
90	617338	BRACKET, mounting	2
91	517455	SWITCH	2
92	C56572	CABLE	2
93	196510	COUPLING, housing	2
94	119417	SCREW	2
95	516102	CLAMP, pipe	1
96	114508	NIPPLE	1
97	233041	PLATE, ram, Neoprene	4
98	617180	ROD, connecting	8
99	101535	NUT	8
100	101533	WASHER, spring lock	1
101	617204	CARRIAGE, weldment, 300 gallon	2
102	100549	ELBOW, street	2
103	C20461	NIPPLE, reducing, hex	2
104	515147	REGULATOR, air, 1/2p	2
107	115419	ADAPTER, fitting	2
108	214849	LUBRICATOR	2
109	517290	HOSE	2
110	C19438	ELBOW, fitting, 90°	2
111	C19630	NIPPLE, fitting, 1npt	1
112	114112	CONNECTOR, fitting (f)	2
113	113093	CONNECTOR, pipe	2
114	C20378	BRANCH, fitting	2
115	100469	SCREW, cap, hex	2
116	502526	VALVE, air three–way	2
117	246997	VALVE, pressure, bleed	1
118	120163	KIT, safety, lockout (not shown) (Models 234972, 234973, 253676, and 253677 only)	1

Parts

232729, 45:1 Left Hand Supply Unit, with carbon steel pump
232839, 45:1 Left Hand Supply Unit, with stainless steel and ceramic pump
232730, 45:1 Right Hand Supply Unit, with carbon steel pump (shown)
232840, 45:1 Right Hand Supply Unit, with stainless steel and ceramic pump
246921, 45:1 Right Hand Supply Unit, with stainless steel pump
246922, 45:1 Left Hand Supply Unit, with stainless steel pump







System Parts

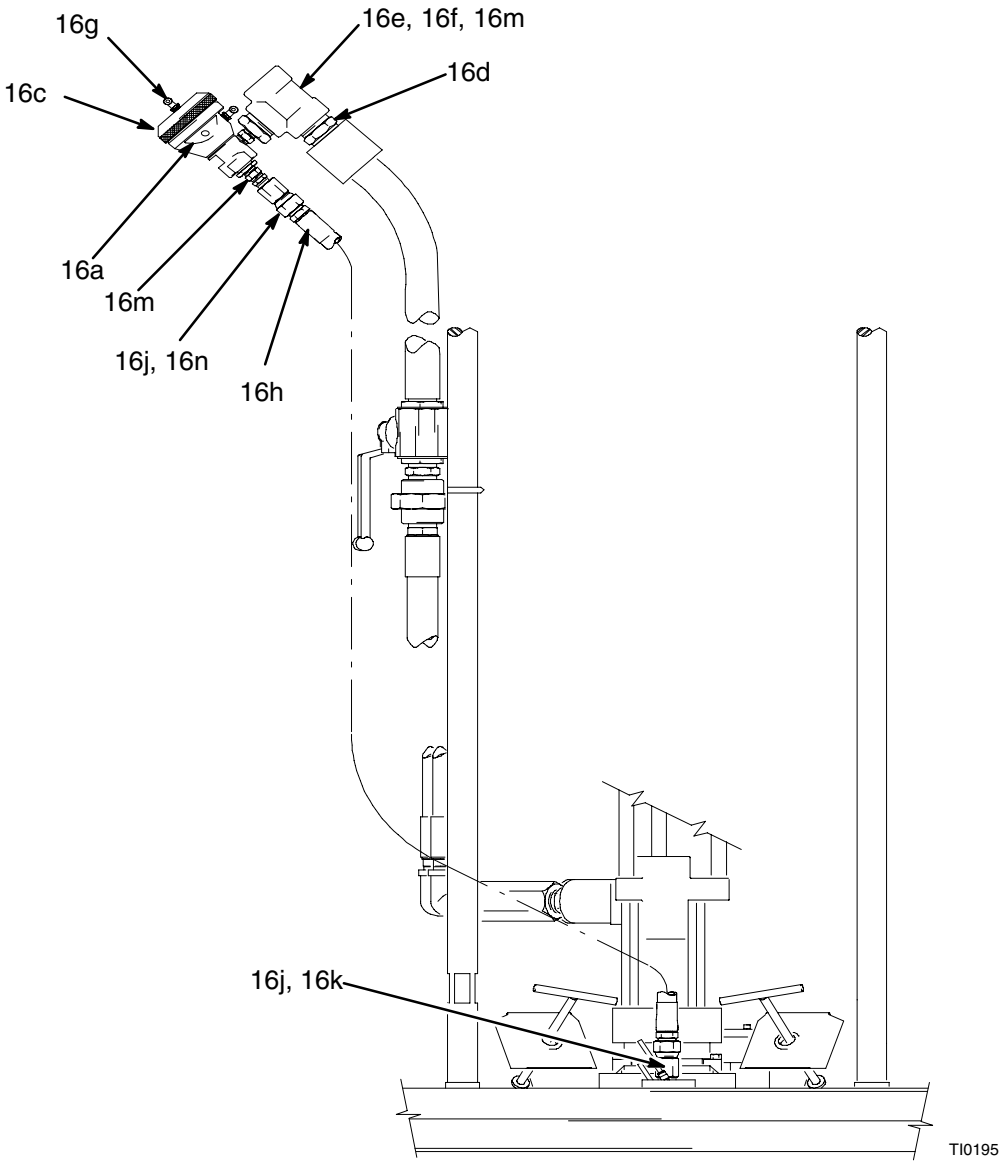
232729, 45:1 Left Hand Supply Unit, with carbon steel pump
232839, 45:1 Left Hand Supply Unit, with stainless steel and ceramic pump
232730, 45:1 Right Hand Supply Unit, with carbon steel pump (shown)
232840, 45:1 Right Hand Supply Unit, with stainless steel and ceramic pump
246921, 45:1 Right Hand Supply Unit, with stainless steel pump
246922, 45:1 Left Hand Supply Unit, with stainless steel pump

Ref No.	Part No.	Description	Qty
1	241902	ELEVATOR, assembly 300 gallon; see page 73	1
2	241891	FOLLOWER PLATE ASSY;	
	243510	see page 64	1
3	C58360	PLATE, adjuster, Uni-Drum	2
4	C58361	BRACKET, pump support	2
5	C20450	U-BOLT	4
6	196073	CLAMP	8
7	241837	KIT, accessory, pneumatic; see page 61	1
8	C19126	SCREW, cap hex head	4
9	100132	WASHER, flat	16
10	101566	NUT, lock	6
11	100307	NUT, hex; 3/8-16	12
12	158585	NIPPLE	2
13	233127	PUMP, 45:1; carbon steel; used on Model 232729 only; see manual 308147	2
	241957	PUMP, 45:1; stainless steel and ceramic; used on Model 232839 only; see manual 308148	2
	246923	PUMP, 45:1; stainless steel; used on Model 246921 only; see manual 308148	2
14	C51238	U-BOLT; 6 in. tube x 1/2-13un	4
15	241838	KIT, accessory, PLC interface; see page 69	1
16	241840	KIT, accessory, depressurization; see page 60	1
17	241844	BRACKET, mounting	2
19	106464	TEE, pipe; 1 in. npt	1
20	C20463	NIPPLE, fitting hex reducing; 1 in.	1
21	C57799	VALVE, check; 1/2 npt (fbe)	1
22	C19019	FITTING, union, swivel	2
24	196085	COVER, left	1
25	C20811	SCREW, socket, flat head	12
26	C20490	FITTING, nipple, hex	2
29	C12039	HOSE, air; 1 in. ID	1
30	C19032	SWIVEL, adapter, union	1
31	111803	SCREW, cap, hex head	8
32	184086	GASKET	2
33	109495	O-RING	1
34	115438	VALVE, ball; 1 in. locking	1
35	109570	WASHER, plain	8
36	214656	HOSE; 1/2 in ID; 10 ft long	2
39	243488	KIT, accessory; see page 63	2
40	100133	LOCKWASHER, spring; 3/8 in.	20
41	C38457	COUPLING, reducing	2
42	521850	VALVE, check	2
43	C38324	ELBOW, street	2
44	233058	HOSE, coupled	2
45	521975	UNION, pipe	2
46	118854	VALVE, ball	2
47	233128	PUMP, 45:1; carbon steel; used on model 232729 only; see manual 308147	1
	243689	PUMP, 45:1; stainless steel and ceramic; used on model 232839 only; see manual 308148	1
	246924	PUMP, 45:1; stainless steel; used on model 246922 only; see manual 308148	1
49	101535	NUT, hex; 7/8 in.	4
50	101533	LOCKWASHER, spring; 7/8 in.	4
52	112698	ELBOW, swivel; 1/8 npt	4
53	196084	COVER, right	1

System Parts

Part No. 241840, Depressurization Kit

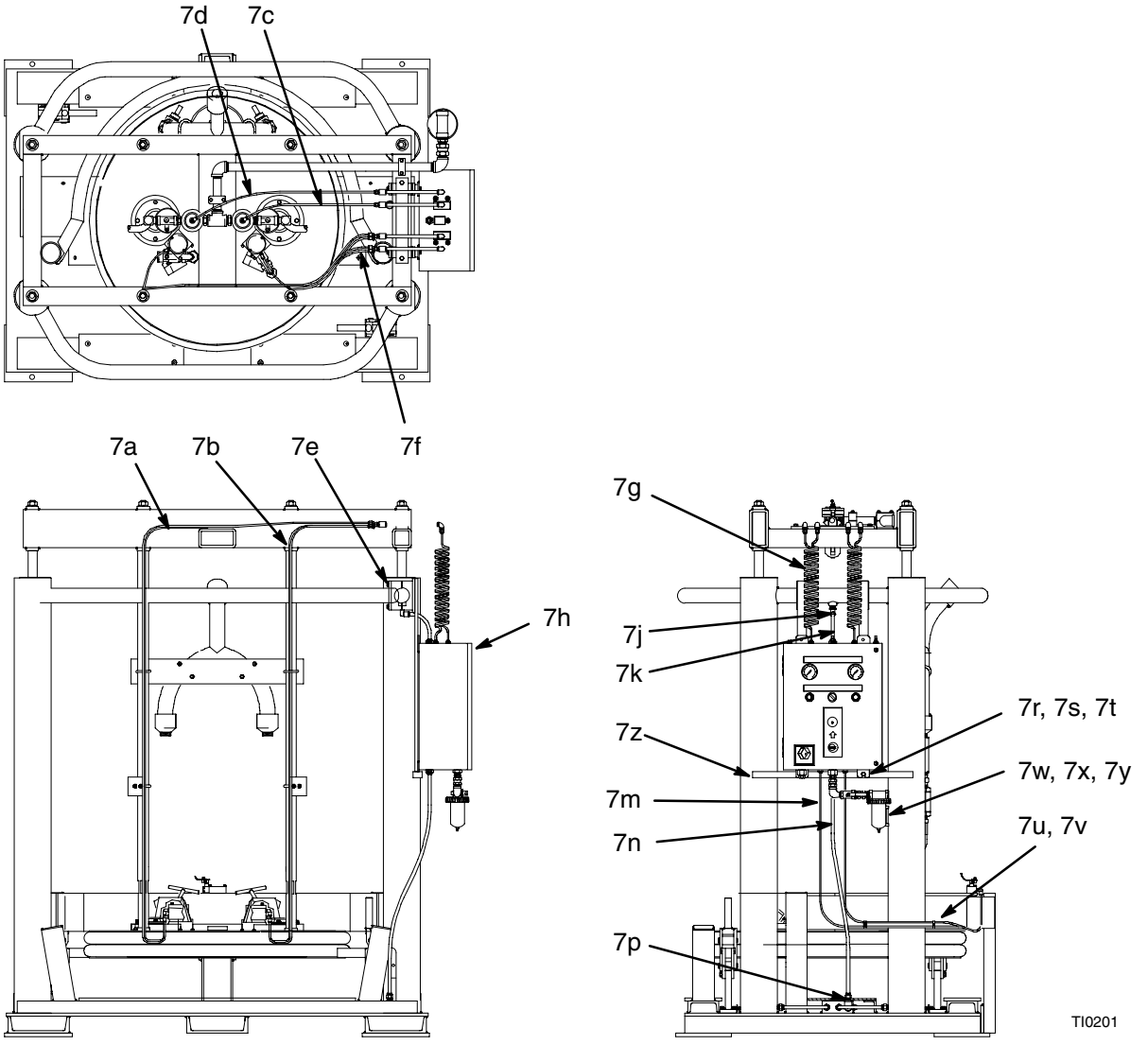
Ref No.	Part No.	Description	Qty	Ref No.	Part No.	Description	Qty
16a	C19254	PLUG, pipe	2	16g	C19391	ELBOW, swivel	2
16c	918537	APPLICATOR, ball seat;		16h	215241	HOSE	1
		see 310550 for parts	1	16j	156172	UNION	2
16d	C20490	NIPPLE	1	16k	157129	NIPPLE	1
16e	C19660	BUSHING	1	16m	C20485	NIPPLE	2
16f	C19491	TEE	1	16n	C19685	BUSHING	1



System Parts

Part No. 241837, Pneumatic Accessory Kit

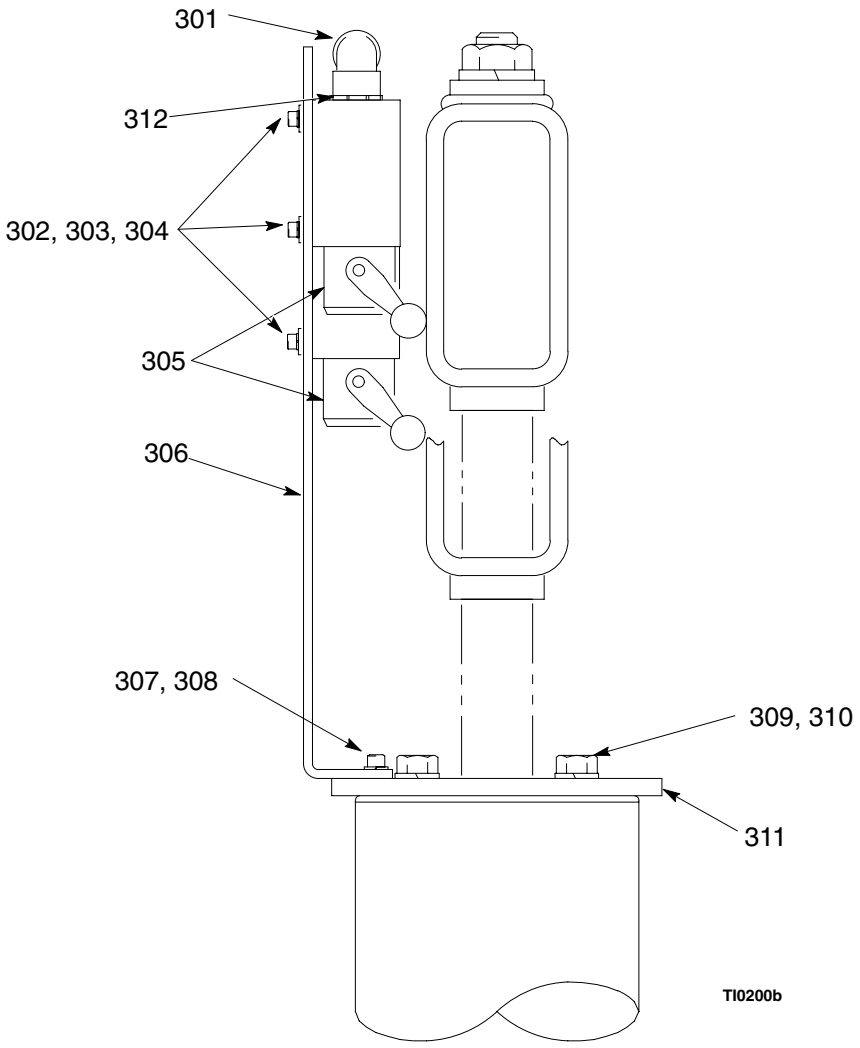
Ref No.	Part No.	Description	Qty
7a	C12509	TUBE; nylon	248 in.
7b	C12509	TUBE; nylon	200 in.
7c	C12509	TUBE; nylon	23 in.
7d	C12509	TUBE; nylon	31 in.
7e	517272	CLAMP, support	2
7f	C20378	FITTING, Y-branch	2
7g	517288	TUBE; 1/4 in.	2
7h	195319	PANEL, pneumatic layout; see page 66	1
7j	C19381	CONNECTOR; 1/2 npt x 1/2 in. tube	1
7k	C12194	TUBE; 1/2 in.	8 in.
7m	C12509	TUBE; nylon	120 in.
7n	C12194	TUBE; 1/2 in.	40 in.
7p	C19399	CONNECTOR; 1/2 npt x 1/2 in. tube	1
7r	C19200	WASHER, plain	4
7s	C19124	SCREW, cap, hex hd	4
7t	C19213	WASHER, lock	4
7u	517254	CLIP, tube	3
7v	110299	RIVET	3
7w	106149	FILTER, air; 1/2 npt	1
7x	C20485	FITTING; 1/2 npt	1
7y	C19019	UNION, swivel	1
7z	617200	SUPPORT, bracket	1



Parts

Part No. 241839, Low/Empty Limit Kit (For Uni-Drum Use)

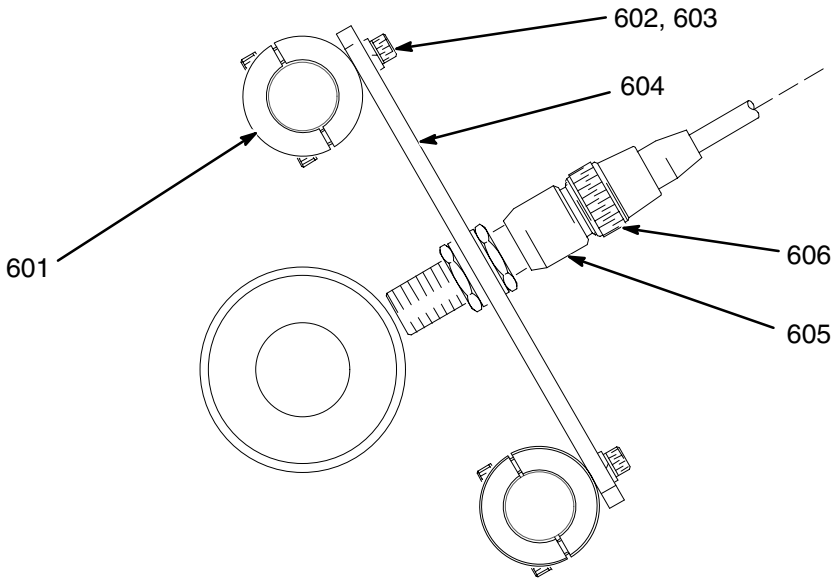
Ref No.	Part No.	Description	Qty	Ref No.	Part No.	Description	Qty
301	C07431	CONNECTOR, sealed	2	307	C19810	CAPSCREW, socket head	2
302	C20003	CAPSCREW, socket head	4	308	100016	WASHER, spring lock; 1/4 in.	2
303	C19204	WASHER, lock #10 bolt	4	309	C19138	SCREW, cap, hex head	2
304	C19197	WASHER, plain	4	310	100018	LOCKWASHER, spring; 1/2 in.	2
305	C07560	SWITCH, limit	2	311	C52751	PLATE, limit switch	1
306	195454	BRACKET, limit, low-level, Uni-Drum	1	312	104227	NUT, lock	2



Parts

Part No. 243488 Proximity Switch Accessory Kit

Ref No.	Part No.	Description	Qty	Ref No.	Part No.	Description	Qty
601	617337	COLLAR, clamp	2	605	517455	SWITCH, proximity; 18 mm	1
602	100016	WASHER, lock; 1/4 in.	2	606	C56572	CABLE, proximity; 2 m long	1
603	C19800	SCREW, socket hd; 1/4–20 x 1/2 in.	2	611	196510	HOUSING, coupling nut	1
604	617338	BRACKET, proximity switch mounting	1	612	C19363	SCREW, cup point set; 1/4–20 x 1/2 in.	1



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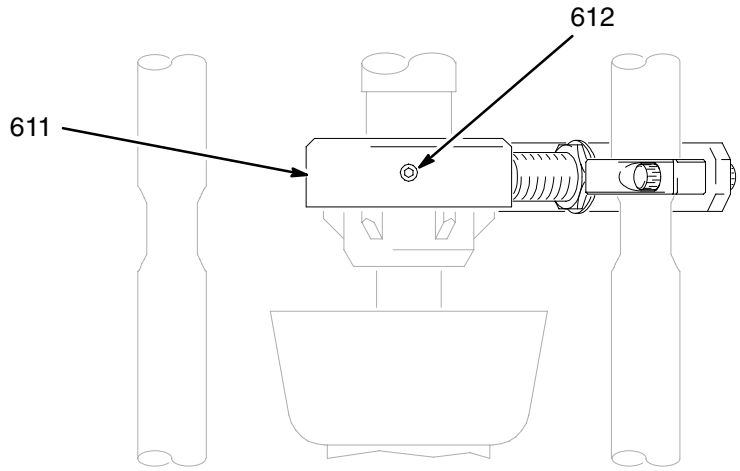

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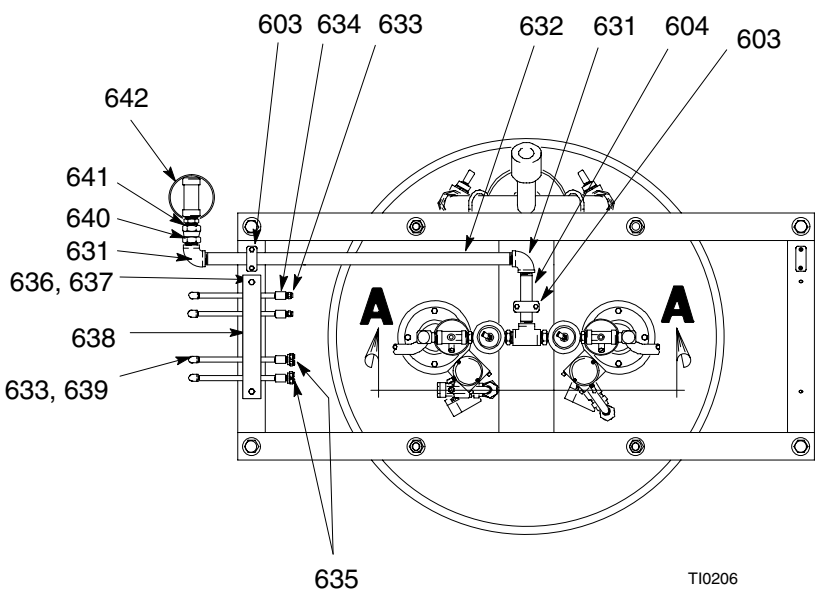
Parts

Part Nos. 241891 and 243510, Follower Plate Assembly



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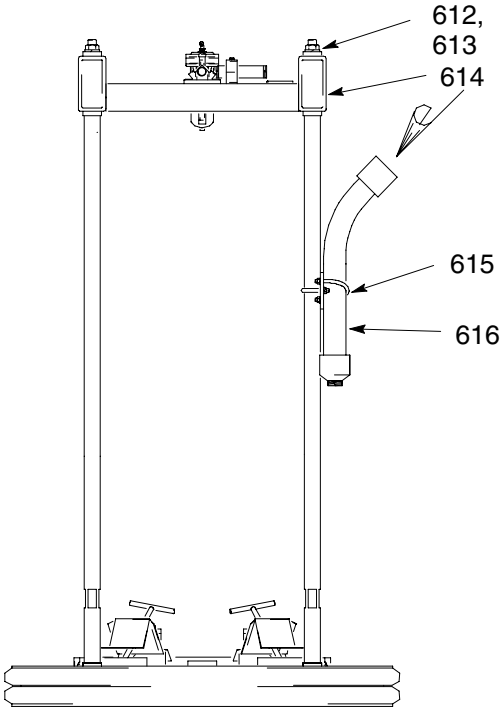

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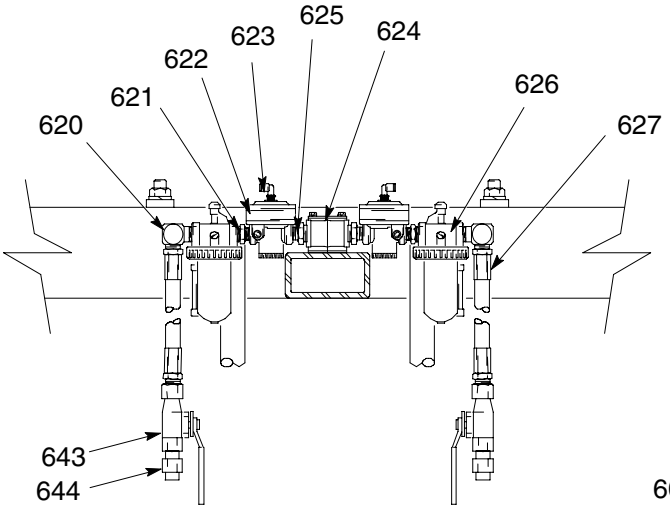

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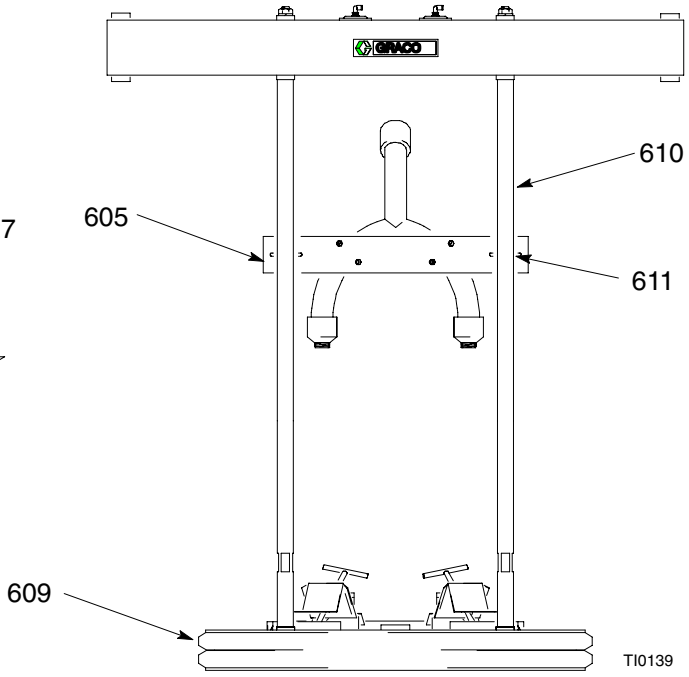


TI0139

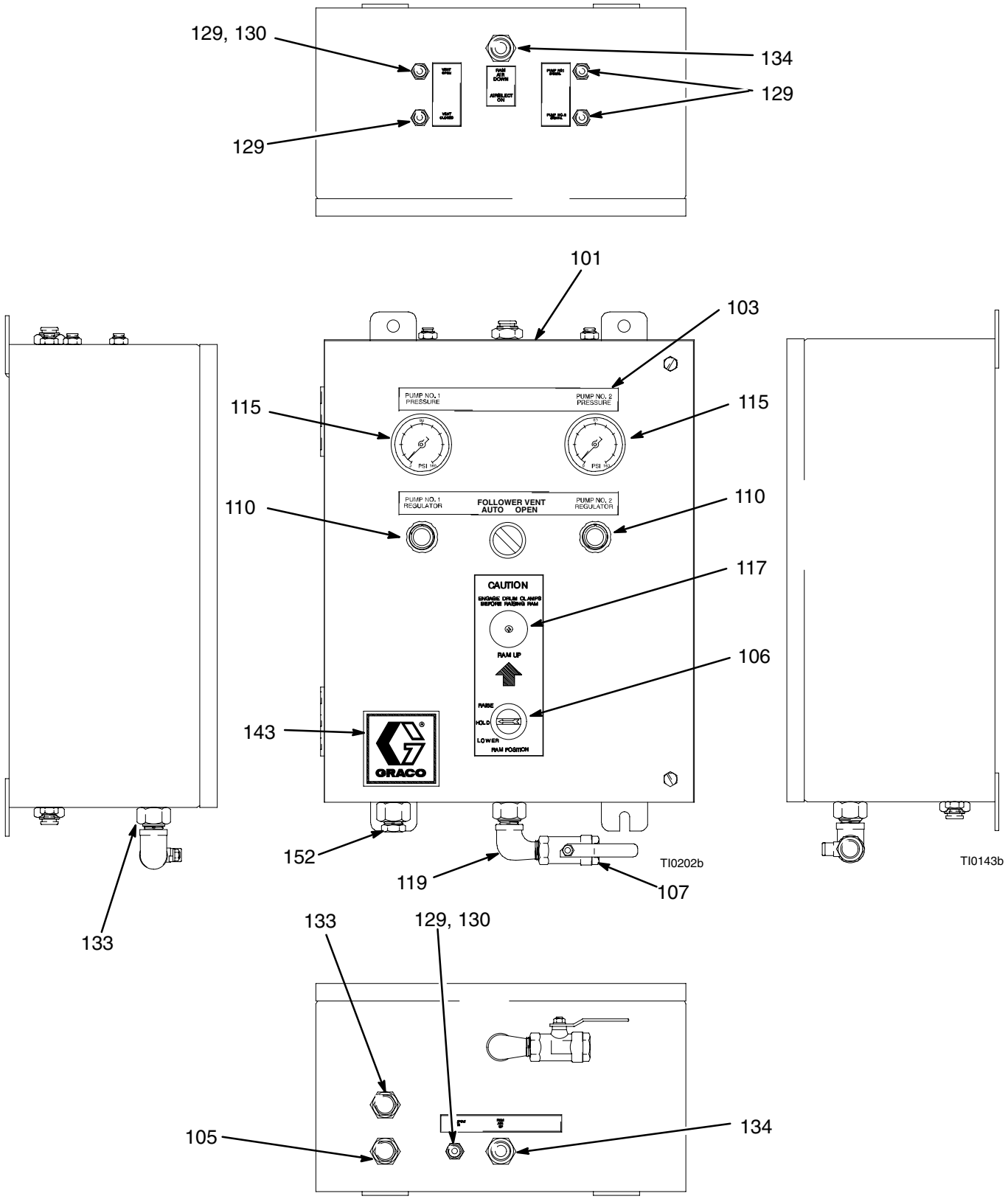
Parts

Part Nos. 241891 and 243510, Follower Plate Assembly

Ref No.	Part No.	Description	Qty	Ref No.	Part No.	Description	Qty
603	516102	CLAMP, pipe	2	626	214849	LUBRICATOR, air line	2
604	114508	NIPPLE	1	627	517290	HOSE	2
605	617203	BAR, support	1	631	C19438	ELBOW; 1 in. npt	2
609	233041	PLATE, follower; see page 72	1	632	C19630	NIPPLE	1
610	617180	ROD, connecting	4	633	114112	CONNECTOR, female	6
611	C20450	U-BOLT	2	634	113093	CONNECTOR, pipe	4
612	101535	NUT, hex	4	635	C20378	FITTING, tube, Y-branch;	
613	101533	LOCKWASHER, spring; 7/8 in.	4			1/4 npt(m) x 1/4 OD tube	2
614	617204	CARRIAGE	1	636	100469	SCREW, cap, hex hd	2
615	C20449	U-BOLT; 3/8–16	2	637	C19213	WASHER, lock	2
616	517284	DISCHARGE MANIFOLD	1	638	617202	MANIFOLD, air	1
620	100549	ELBOW, street	2	639	113532	ELBOW; 1/4 npt	4
621	C20461	NIPPLE, reducing	2	640	C19032	SWIVEL, union	1
622	515147	REGULATOR	2	641	158585	NIPPLE	2
623	C19391	ELBOW	2	642	112859	FILTER, air; 1 in. npt	1
624	106464	TEE	1	643	113332	VALVE, ball	2
625	C20463	NIPPLE, reducing	2	644	158555	NIPPLE, reducing	2

Parts

195319, PLC Pneumatic Layout Panel

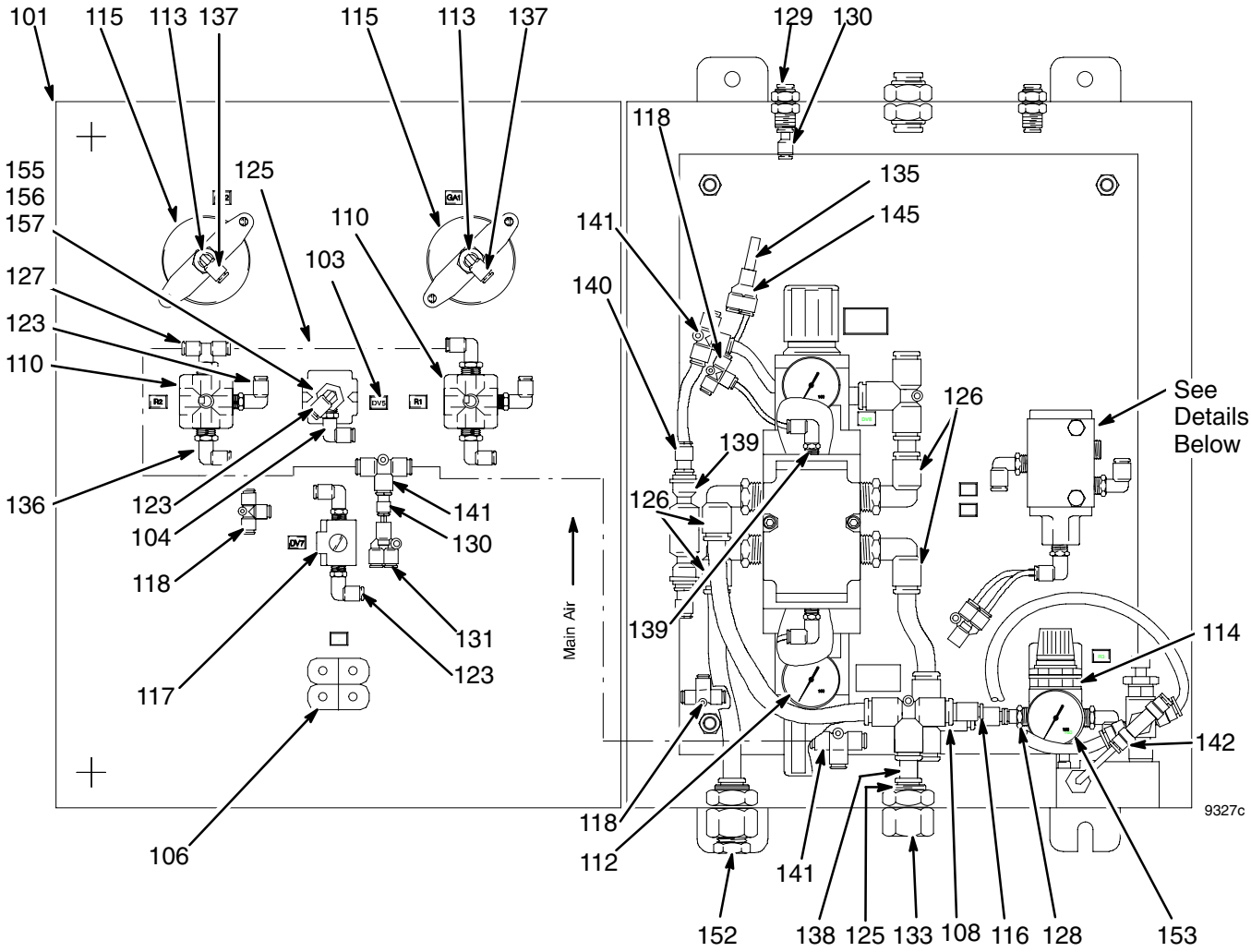


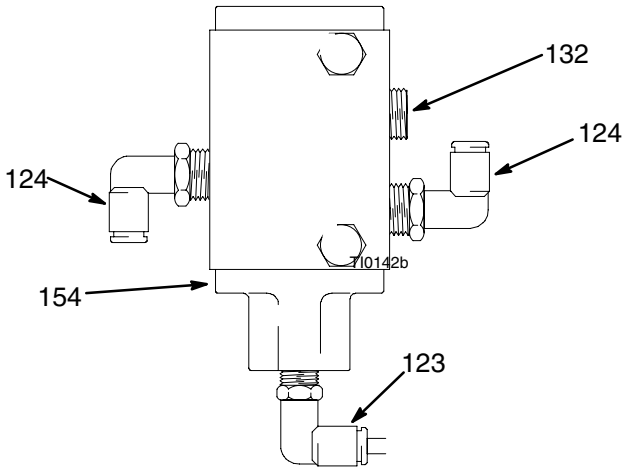
195319, PLC Pneumatic Layout Panel

Ref No.	Graco Part No.	Manufacturer Part No.	Description	Qty
101		A–20	HOFFMAN ENCLOSURE	1
102		A–20P16	HOFFMAN BACK PANEL	1
103	195321			1
104		6522–53–32	CAMOZZI SWL M ELB	1
105		BV–4	UCI MUFFLER	1
106		NVM151–N01–35	SMC	1
107		SEL–4–RED	UCI BALL VALVE	1
108		6540–08–00	CAMOZZI UNION T	3
109		RO5X51P	WATTS PANEL NUT	2
1		R35–01C	WATTS QUBE REGULATOR	2
1				
0				
111		RO5X51P	WATTS PANEL NUT	2
112a		6532B–241RA	MAC	1
112b		PR65C–35HA	MAC	1
113		2543–04–04	CAMOZZI COUPLING	2
114		R35–02A	WATTS QUBE REGULATOR	1
115		CDS–1P–010–B	DYNAMIC FLUID GAUGE	2
116		6800–04–08	CAMOZZI REDUCER	3
117	517313			1
118		6540–53–00	CAMOZZI UNION T	3
119		PC125B–8	POLLYCON MALE ELBOW	1
120		PCU–156F–2	POLLYCON TUBING	50 ft
121		PCU–500F–2	POLLYCON TUBING	5 ft
122		PCU–250F–2BLK	POLLYCON TUBING	20 ft
123		P6520–53–02	CAMOZZI SWL M–ELB	9
124		P6520–04–04	CAMOZZI SWLM–ELB	5
125		6510–08–08	CAMOZZI MALE CON	2
126		P6520–08–08	CAMOZZI SWT M–ELB	4
127		P6430–04–02	CAMOZZI M–BR T–SWL	1
128		P6510–04–04	CAMOZZI MALE CONN	1
129		6590–04–00	CAMOZZI BULKHEAD	5
130		6800–53–04	CAMOZZI REDUCER	2
131		6560–53–00	CAMOZZI UNION Y	2
132	C19254			2
133		PC68BH–8	POLLYCON BULKHEAD CON	3
134		6590–08–00	CAMOZZI BULKHEAD	2
135		6580–53–00	CAMOZZI UNION	1
136		6520–04–02	CAMOZZI SWL M–ELB	3
137		P6520–53–04	CAMOZZI SWL M–ELB	2
138		6950–08–00	CAMOZZI DBL UNION	1
139		PCSCV–6	POLLYCON CHECK VALVE	1
140		PC42G–64	POLLYCON REDUCER	2
141		6540–04–00	CAMOZZI UNION T	3
142	115826			1
143	168491			1
145		81–540–001	CROUZET ELEMENT	1
152		PC121B–8	POLLYCON (NOTE: DRILL 0.125 IN. HOLE IN CENTER OF PLUG)	1
153		SAD–1501–0–30	UCI GAUGE	1
154	115793			2
155		SEL–301–2	PNEUMADYNE 2 POSITION SELECTOR	1
156		AOT	PNEUMADYNE MOUNT	1
157		AO–30–4	PNEUMADYNE VALVE	1

Parts

195319, PLC Pneumatic Layout Panel



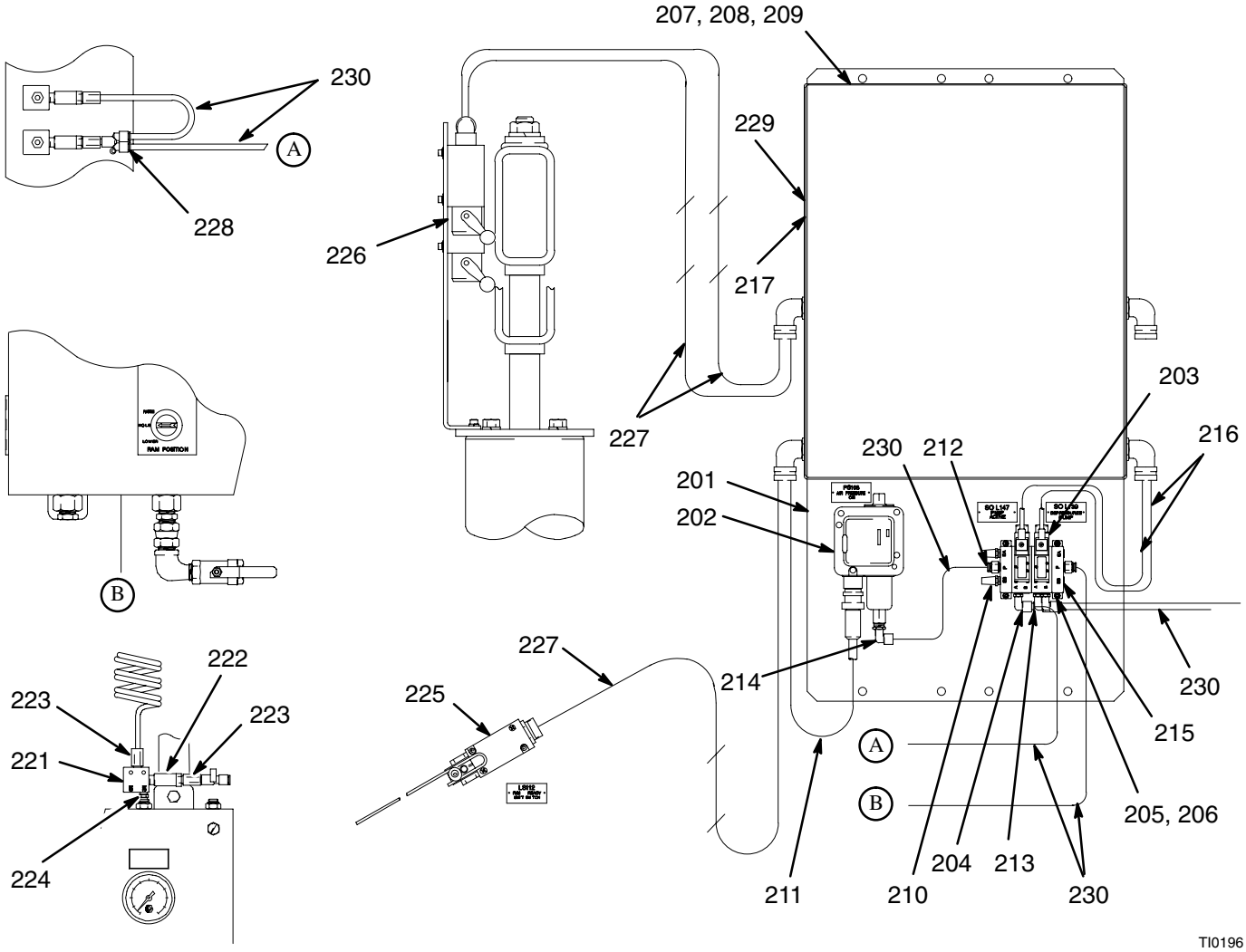


Parts

241838 and 249343, PLC Interface Accessory Kit

Ref No.	Part No.	Description	Qty
201	195330	PLATE, mounting	1
202	C55568	SWITCH, pressure; 1/4 in. npt (241838 only)	1
	119776	SWITCH, pressure; 1/4 in. npt (249343 only)	1
203	115440	VALVE, assembly (241838 only)	1
	119777	VALVE, assembly (249343 only)	1
204	597151	ELBOW, male	3
205	111714	SCREW, S.H.C.; CS PL #4-40x 5/8	4
206	103739	WASHER, lock; CS PL #4	4
207	102313	SCREW, S.H.C.; CS PL #4-20x1.75L	2
208	101345	NUT, hex; CS PL 1/4-20	2
209	100016	WASHER, lock; CS PL 1/4	2
210	517449	MUFFLER	2
211	C07434	CORD, 5–pin; 6 ft long	1
212	C19407	FITTING, tube; 1/4T x 1/8P	2

Ref No.	Part No.	Description	Qty
213	103219	PLUG, pipe; 1/8 npt	1
214	C19391	ELBOW, 90 degree, tube; 1/4P x 1/4T	1
215	C19264	PLUG, pipe; 1/4 npt	2
216	C20536	CABLE, 2 cond.	96 in.
217	195320	PANEL, junction box; see page 70	1
218	C51238	V-BOLT; 6 in. x 3/8-16 (not shown)	2
219	C19185	JAM NUT (not shown)	4
220	C19213	WASHER, lock; 3/8 (not shown)	4
221	502526	VALVE, air	2
222	501014	ACTUATOR, air	2
223	104172	FITTING, tube	4
224	115419	FITTING, adapter	2
225	195356	KIT, accessory	1
226	241839	KIT, low/empty limit;	1
227	C07435	CORD, 5–pin; 12 ft long	3
228	114158	FITTING, adapter, Y	1
229	C19047	SCREW; 10-32 X 0.38	4
230	C12509	TUBE; 1/4 in.; nylon	144 in.



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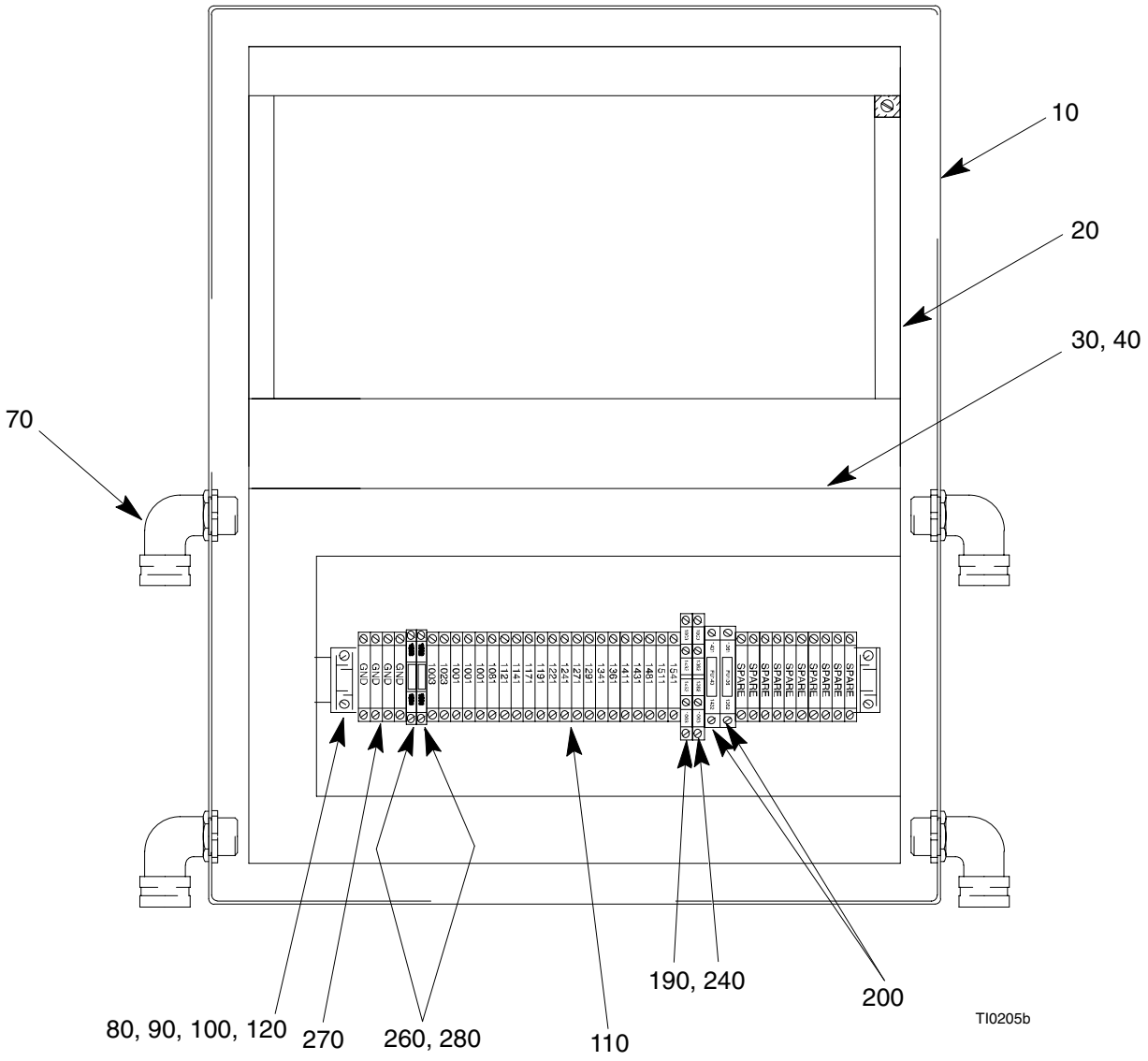
Parts

Part No. 195320 and 119773, Junction Box Panel



Parts

Part No. 195320 and 119773, Junction Box Panel

Ref No.	Symbol	Description	Remark	U.L. File No.	Qty
290		P–N 90 DEG. CORD GRIP DB–1090			4
280		A–B PB 800T–XD2			1
270	PB	A–B PB 800T FX 9A1			1
260	SS	A–B SS 800T–H2A			1
250		BARRIER ENTRELEC 02910.422.10			1
240					
230	FU	BUSS FUSS GDC–250 MA 5 X 20 mm			2
220		GND ENTRELEC 0290.019.05		E160646	4
210	DISC	ENTRELEC 0290.041.03	K5100, 102	E40735	2
200	FU	ENTRELEC FUSE BLOCK 0115.662.22	FU136, 143	E40735	2
190	SUP	A–B SUPPRESSOR 1492-WD4SS	SUP136, 144	E40735	2
180	PB	A–B PB #800T-A2D1 (BLACK)	PB119, 122		2
170	PB	A–B PB #800T-A2D1 (GREEN)	PB124		1
160	LT	A–B LIGHT WHITE #800T-PT16W (195320 only)	LT148	E14840-NKCR	1
	LT	A–B LIGHT WHITE #800T-QT24W (119773 only)	LT148	E14840-NKCR	1
150	LT	A–B LIGHT BLUE #800T-PT16B (195320 only)	LT110	E14840-NKCR	1
	LT	A–B LIGHT BLUE #800T-8T24B (119773 only)	LT110	E14840-NKCR	1
140	LT	A–B LIGHT AMBER #800T-PT16A (195320 only)	LT141	E14840-NKCR	1
	LT	A–B LIGHT AMBER #800T-QT24A (119773 only)	LT141	E14840-NKCR	1
130	LT	A–B LIGHT GREEN #800T-PT16G (195320 only)	LT134, 106	E14840-NKCR	2
	LT	A–B LIGHT GREEN #800T-QT24G (119773 only)	LT134, 106	E14840-NKCR	2
120		A–B JUMPER 0291.103.24			AR
110		TERMINAL ENTRELEC 0290.011.25		E40735	31
100		ENTRELEC END BARRIER 0291.041.20			1
90		ENTRELEC END ANCHOR 0103.002.06			2
80		A–B MOUNTING CHANNEL 1492-N44			12 in.
70		T & B SEAL RING 5262			8
60		T & B LOCKNUT 141			8
50		P-N 90 DEG. CORD GRIP DB-890			4
40		TAYLOR DUCT COVER			29 in.
30		TAYLOR WIRE DUCT (1.5 X 2)			29 in.
20		HOFF PANEL #C-P2016			1
10		HOFF ENCLOSURE #C-SD20168			1

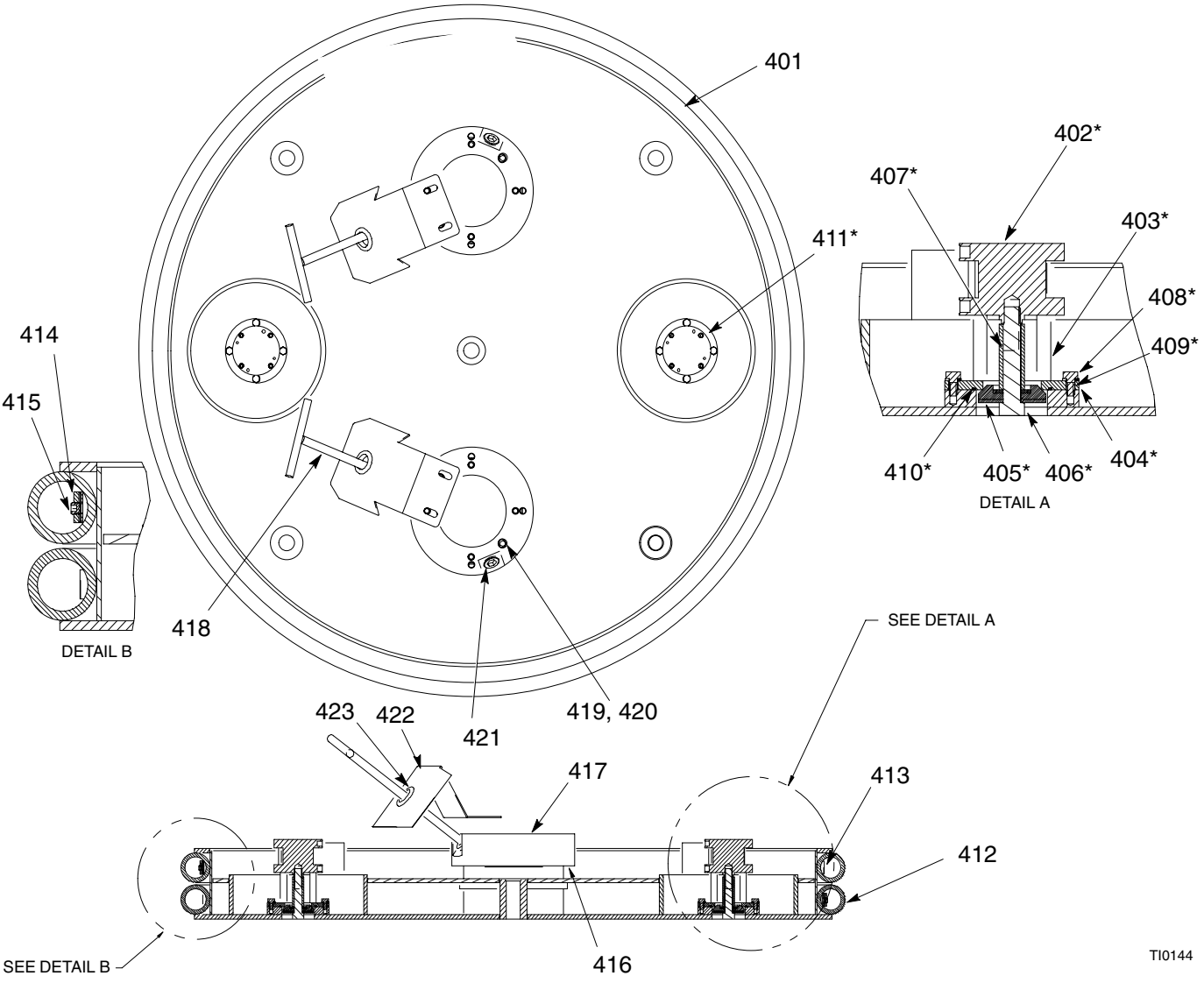
Parts

Part No. 233041 Follower Plate

Ref No.	Part No.	Description	Qty
401	233040	PLATE, ram	1
402*	115782	CYLINDER, air	2
403*	196052	SPACER	8
404*	196053	PLATE	2
405	517286	PLUNGER	2
406*	115783	BOLT, hex hd	2
407*	196051	SPACER	2
408*	100333	SCREW, cap, hex hd	8
409*	100016	WASHER, lock; 1/4 in.	8
410*	112245	O-RING	2
411*	115784	SCREW, cap, socket hd	8
412**	617195	WIPER	2
413**	068104	STRAPPING; steel	288 in.
414**	101817	CLAMP, banding	2
415**	115785	SCREW, set	2
416	617230	GASKET	2
417	196072	RING, adapter	2
418	233044	PLUG, vent	2
419	C19843	CAPSCREW	4
420	C19280	LOCKWASHER	4
421	102726	PLUG, pipe	2
422	196122	SHIELD	2
423	114269	GROMMET	2

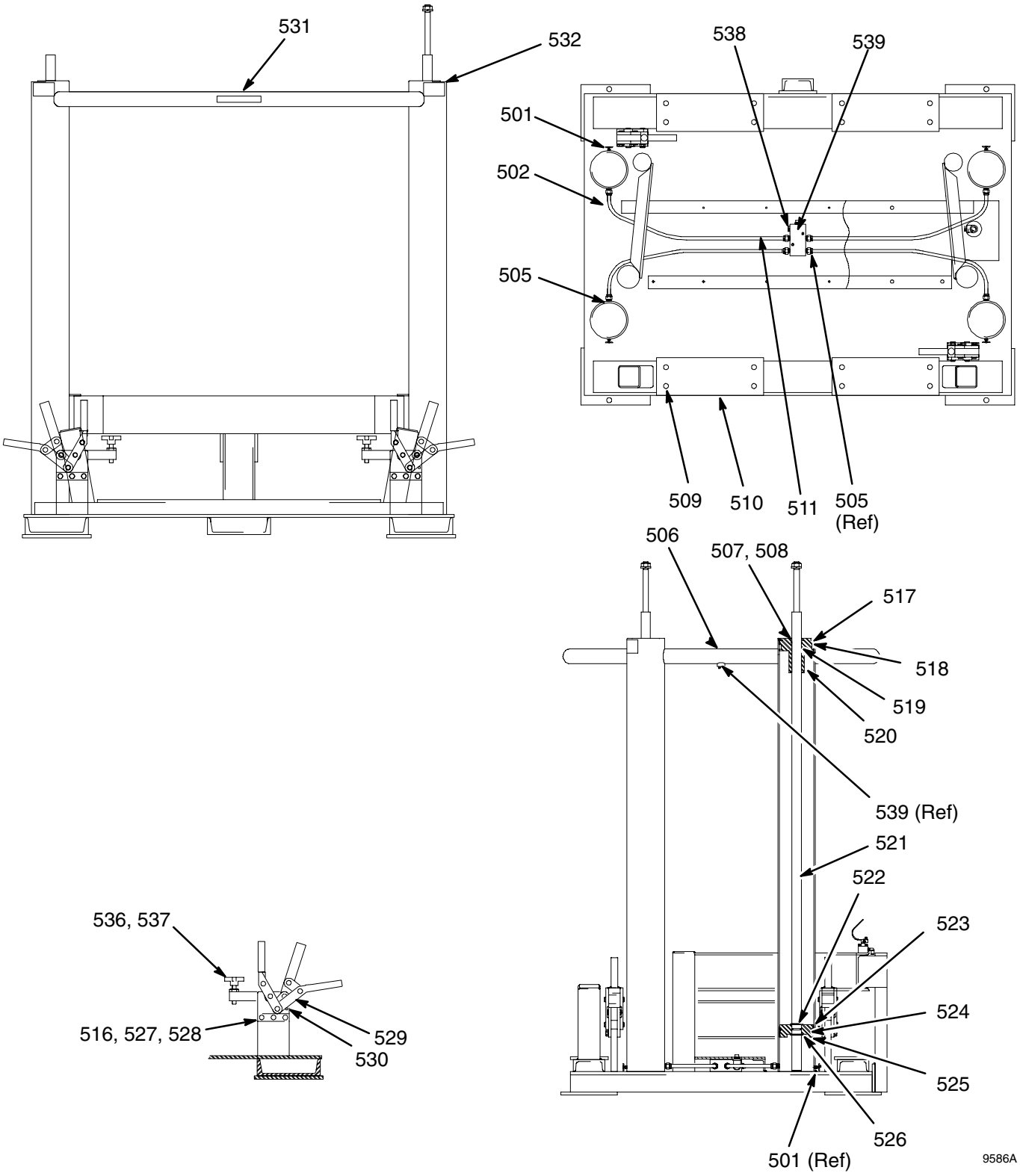
*These items may be purchase separately or in Kit 234958

**These items may be purchased separately or in Wiper Kit, 91824.



Parts

Part No. 241902 Elevator Assembly



Parts

Part No. 241902 Elevator Assembly

Ref No.	Part No.	Description	Qty
501	517269	DRAIN COCK	4
502	C12194	TUBE; 1/2 in.	136 in.
505	114129	CONNECTOR, male	8
506	617206	FRAME, elevator	1
507*	C31001	WIPER, rod	4
508	C03043	RING, snap	4
509	C20808	SCREW, socket, flat-head	16
510	617179	PAD, rest	4
516	100321	NUT	6
517	C03042	RING, lock	4
518*	116325	O-RING	4
519*	156593	O-RING	4
520	C31000	SLEEVE	4
521	617176	ROD, lift	4
522	C20417	RING, retaining	8
523	C03046	PISTON, elevator	4
524*	C20280	O-RING	4
525*	C03047	GUIDE, band	4
526*	158776	O-RING	4
527	C19130	SCREW, cap, hex hd	6
528	100018	WASHER, lock	6
529	194968	CLAMP	2
530	517281	PIN, spring	2
531	C14022	LABEL, warning	2
532	C14007	LABEL, warning	4
536	100681	NUT, jam, hex	2
537	517411	KNOB	2
538	114111	CONNECTOR, male	1
539	100361	PLUG, pipe	3

* These items may be purchased separately or in Repair Kit 918110

Recommended Spare Parts

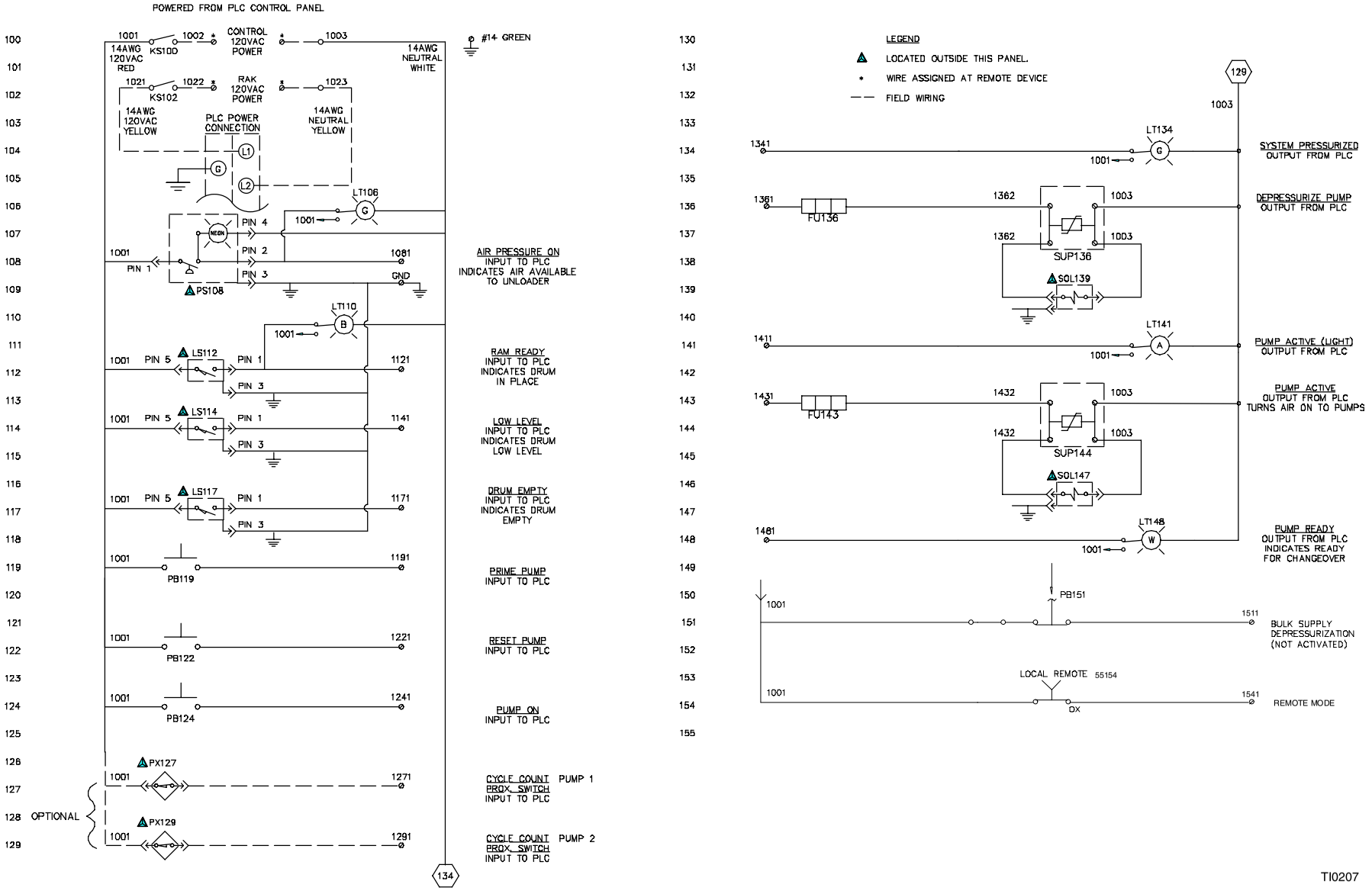
Spare Parts for 45:1 and 34:1 Uni-Drum Supply Units

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

CST Units	SST Units	Description	Qty.
222555	222845	PUMP KIT (45:1 models only)	2
222881	222875	PUMP KIT (34:1 models only)	2
222958	222958	PREMIER AIR MOTOR KIT	2
222959	222959	AIR VALVE KIT	2
222982	222982	DETENT KIT	2
222981	222981	TRIP ROD KIT	2
515147	515147	AIR REGULATOR	1
918537	918538	RECIRCULATING VALVE KIT	2
115440	115440	VALVE, solenoid	1
C55568	C55568	SWITCH, pressure	1
C07560	C07560	SWITCH, limit	1
102774	102774	LUBRICATOR KIT	1
517285	517285	AIR CYLINDER	1
C20247	C20247	O-RING	2
517286	517286	PLUNGER	2
C03039	C03039	UNI-DRUM ELEVATOR KIT	2
162440	162440	BOWL SEAL	1
502526	502526	PILOT VALVE	1
501014	501014	ACTUATOR	1
918110	918110	AIR CYLINDER KIT	1
918241	918241	WIPER KIT	1
234958	234958	FOLLOWER PLATE VENT VALVE KIT	1

Electrical Diagram

Junction Box Panel



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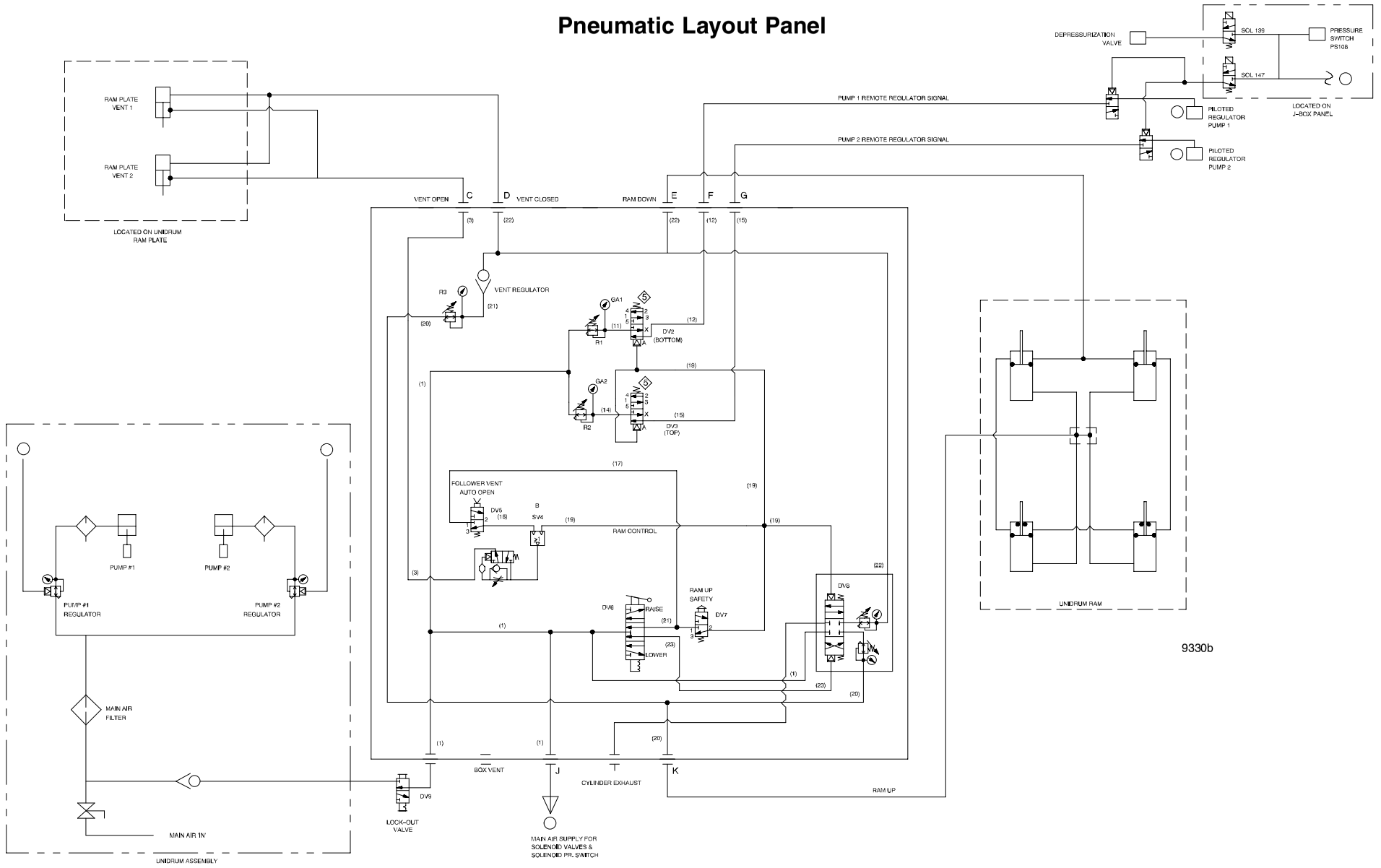
Pneumatic Diagram

Pneumatic Layout Panel



Technical Data

Unit	Description	Specification
Uni-Drum System 246981, 246982	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)
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	Approximately 3950 lb (1792 kg)
Pumps (1/unit) 246991, 246992	Ratio	45:1 fluid to air power ratio
	Maximum fluid working pressure	4500 psi (310 bar, 31.0 MPa)
	Maximum air input pressure	100 psi (7 bar, 0.7 MPa)
	Pump cycles	8.7 per 1 gal. (3.8 liters)
	Recommended pump speed for continuous operation	60 cycles per min
	Maximum flow rate	6.9 gpm (26.1 liters/min) at 60 cycles/min
	Air motor piston effective area	124 $in.^2$ (800 cm^2)
	Stroke length	4.75 in. (120 mm)
	Displacement pump effective area	2.79 $in.^2$ (18 cm^2)
	Pump operating temperature	150° F (65.5° C) maximum temperature
	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	Chrome, zinc, and electroless nickel plating; 304, 440 and 17–4 PH Grades of stainless steel; silicone nitride, ceramic, acetal, leather, and UHMWP
	Weight	Approx. 240 lbs. (109 kg) per pump

Technical Data

Unit	Description	Specification
Uni-Drum System 248306, 248307, 249339, 249340	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)
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	Approximately 3950 lb (1792 kg)
Pumps (1/unit) 246988, 246989	Ratio	45:1 fluid to air power ratio
	Maximum fluid working pressure	4500 psi (310 bar, 31.0 MPa)
	Maximum air input pressure	100 psi (7 bar, 0.7 MPa)
	Pump cycles	8.7 per 1 gal. (3.8 liters)
	Recommended pump speed for continuous operation	60 cycles per min
	Maximum flow rate	6.9 gpm (26.1 liters/min) at 60 cycles/min
	Air motor piston effective area	124 $in.^2$ (800 cm^2)
	Stroke length	4.75 in. (120 mm)
	Displacement pump effective area	2.79 $in.^2$ (18 cm^2)
	Pump operating temperature	150° F (65.5° C) maximum temperature
	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	304, 329, and 17–4 PH Grades of stainless steel; silicone nitride; acetal; Ultra-high molecular weight polyethylene, and leather
	Weight	Approx. 240 lbs. (109 kg) per pump

Technical Data

Unit	Description	Specification
Uni-Drum System 249152, 249153 249341, 249342 234972, 234973 253676, 253677	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)
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	Approximately 3950 lb (1792 kg)
Pumps (1/unit) 246988, 246989	Ratio	34:1 fluid to air power ratio
	Maximum fluid working pressure	3400 psi (231 bar, 23.1 MPa)
	Maximum air input pressure	100 psi (7 bar, 0.7 MPa)
	Pump cycles	6.5 per 1 gal. (3.8 liters)
	Recommended pump speed for continuous operation	60 cycles per min
	Maximum flow rate	9.2 gpm (34.6 liters/min) at 60 cycles/min
	Air motor piston effective area	124 $in.^2$ (800 cm^2)
	Stroke length	4.75 in. (120 mm)
	Displacement pump effective area	3.72 $in.^2$ (24 cm^2)
	Pump operating temperature	150° F (65.5° C) maximum temperature
	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	304, 329, and 17–4 PH Grades of stainless steel; silicone nitride; acetal; Ultra-high molecular weight polyethylene, and leather
	Weight	Approx. 240 lbs. (109 kg) per pump

Technical Data

Unit	Description	Specification
Uni-Drum System 232729, 232730, 232839, 232840, 232921, 232922	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)
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	Approximately 3950 lb (1792 kg)
Pumps (2) (237555)	Ratio	45:1 fluid to air power ratio
	Maximum fluid working pressure	4500 psi (310 bar, 31.0 MPa)
	Maximum air input pressure	100 psi (7 bar, 0.7 MPa)
	Pump cycles	8.7 per 1 gal. (3.8 liters)
	Recommended pump speed for continuous operation	60 cycles per min
	Maximum flow rate	6.9 gpm (26.1 liters/min) at 60 cycles/min
	Air motor piston effective area	124 $in.^2$ (800 cm^2)
	Stroke length	4.75 in. (120 mm)
	Displacement pump effective area	2.79 $in.^2$ (18 cm^2)
	Pump operating temperature	150° F (65.5° C) maximum temperature
	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; tungsten carbide; ductile iron; acetal; PTFE, leather
	Weight	Approx. 240 lbs. (109 kg) per pump

Technical Data

Unit	Description	Specification
Pumps (2) (241957)	Ratio	45:1 fluid to air power ratio
	Maximum fluid working pressure	4500 psi (310 bar, 31.0 MPa)
	Maximum air input pressure	100 psi (7 bar, 0.7 MPa)
	Pump cycles	8.7 per 1 gal. (3.8 liters)
	Recommended pump speed for continuous operation	60 cycles per min
	Maximum flow rate	6.9 gpm (26.1 liters/min) at 60 cycles/min
	Air motor piston effective area	124 $in.^2$ (800 cm^2)
	Stroke length	4.75 in. (120 mm)
	Displacement pump effective area	2.79 $in.^2$ (18 cm^2)
	Pump operating temperature	150° F (65.5° C) maximum temperature
	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	304, 329 and 17–4 PH Grades of stainless steel; tungsten carbide; acetal; PTFE, Ultra-high molecular weight polyethylene, leather
	Weight	Approx. 240 lbs. (109 kg) per pump

Related Publications

Product	Form#
Carbon Steel Dura-Flo™ Pump 1800 with Premier™ Air Motor	308147
Stainless Steel Dura-Flo™ Pump 1800 with Premier™ Air Motor	308148
Stainless Steel Dura-Flo™ Pump 2400 with Premier™ Air Motor	308152
Premier™ Air Motor	308213
60:1, 1/2 in. Fluid Port Ball Seat Applicator	310550

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