Parts

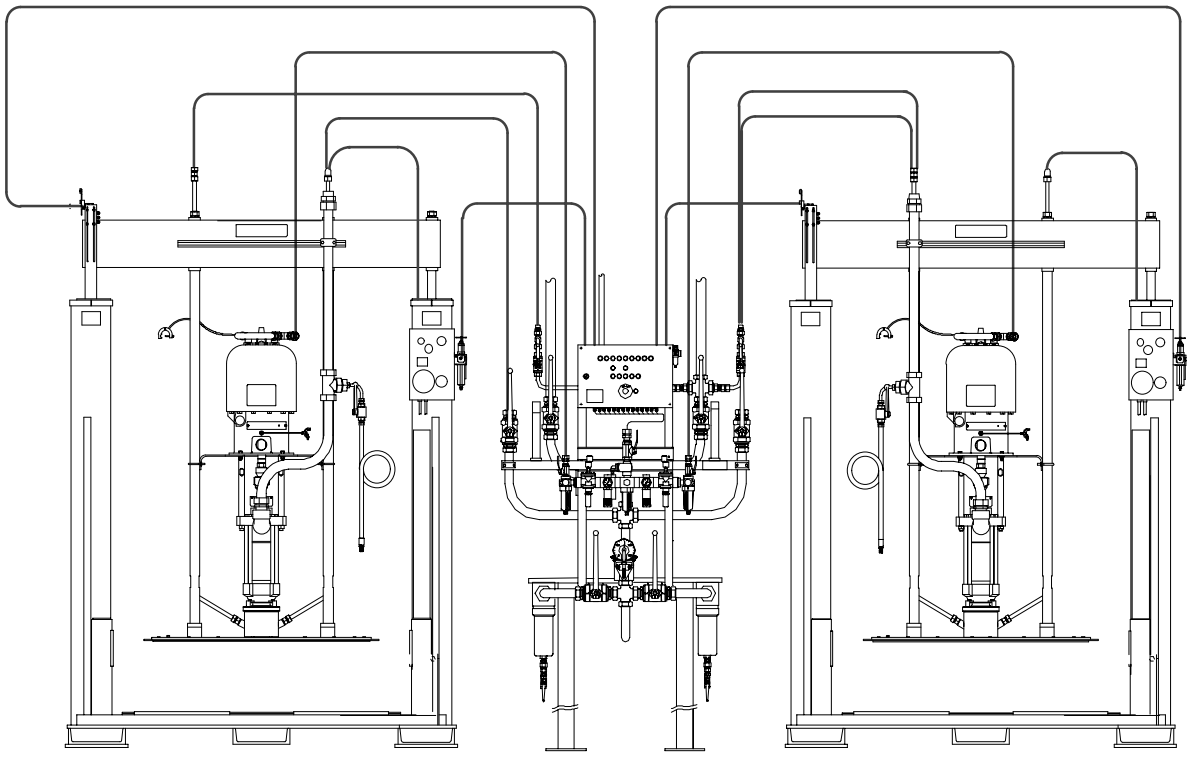
Instructions – Parts List

200 LITER AND 1000 LITER

Dual Ram Packages and Single Ram Supply Modules

308971
Rev.H

Read warnings and instructions.
See page 2 for **Table of Contents** and **List of Models.**



8949D

Model 970252 Shown

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Table of Contents

List of Models

DUAL RAM PACKAGES

CE The Dual Ram Packages are CE certified.

Part No.	Pump Model	Displacement Pump Model	Ratio	Maximum Fluid Working Pressure	Maximum Pump Air Input Pressure	Parts Page
970259	Quiet King, 200 liter size	Dura-Flo™ 900	56:1	310 bar, 31 MPa (4500 psi)	5.5 bar, 0.5 MPa (80 psi)	20
970252	Quiet King™, 1000 liter size	Dura-Flo™ 2400	20:1	140 bar, 14 MPa (2000 psi)	7 bar, 0.7 MPa (100 psi)	24
970253	Quiet King™, 1000 liter size	Severe Duty™ Displacement Pump	10:1	70 bar, 7 MPa (1000 psi)	7 bar, 0.7 MPa (100 psi)	25
970254	Premier™, 1000 liter size	Dura-Flo™ 2400	34:1	231 bar, 23 MPa (3400 psi)	7 bar, 0.7 MPa (100 psi)	26

SINGLE RAM SUPPLY MODULES

Part No.	Pump Model	Displace-ment Pump Model	Ratio	Maximum Fluid Working Pressure	Maximum Pump Air Input Pressure	Parts Page
241203 (left outlet) and 241216 (right outlet)	Quiet King, 200 liter size	Dura-Flo™ 900	56:1	310 bar, 31 MPa (4500 psi)	5.5 bar, 0.5 MPa (80 psi)	22
241608 (left outlet) and 241607 (right outlet)	Quiet King™, 1000 liter size	Dura-Flo™ 2400	20:1	140 bar, 14 MPa (2000 psi)	7 bar, 0.7 MPa (100 psi)	28
241606 (center outlet)	Quiet King™, 1000 liter size	Severe Duty™ Displace-ment Pump	10:1	70 bar, 7 MPa (1000 psi)	7 bar, 0.7 MPa (100 psi)	30
241598 (left outlet) and 241498 (right outlet)	Premier™, 1000 liter size	Dura-Flo™ 2400	34:1	231 bar, 23 MPa (3400 psi)	7 bar, 0.7 MPa (100 psi)	32

Warnings

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

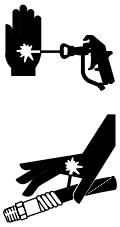
INSTRUCTIONS

EQUIPMENT MISUSE HAZARD

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

- This equipment is for professional use only.
- Read all instruction manuals, warnings, 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 the equipment daily. Repair or replace worn or damaged parts immediately.
- Never exceed the recommended working pressure or the maximum air inlet pressure stated on your pump or in the **Technical Data** on page 36.
- Be sure that all spray/dispensing equipment and accessories are rated to withstand the maximum working pressure of the pump. Do not exceed the maximum working pressure of any component or accessory used in the system.
- Route the hoses away from the traffic areas, sharp edges, moving parts, and hot surfaces. Do not expose Graco hoses to temperatures above 82° C (180° F) or below -40° C (-40° F).
- Do not use the hoses to pull the equipment.
- Use fluids and solvents that are chemically compatible with the equipment wetted parts. Refer to the **Technical Data** sections of all the equipment manuals. Always read the material manufacturer's literature before using fluid or solvent in this pump.
- Always wear protective eyewear, gloves, clothing, and respirator as recommended by the fluid and solvent manufacturers.
- Wear hearing protection when operating this equipment.
- Comply with all applicable local, state and national fire, electrical and other safety regulations.

⚠ WARNING



INJECTION HAZARD

Spray from the spray gun, hose leaks, or ruptured components can inject fluid into your body and cause extremely serious injury, including the need for amputation. Splashing fluid 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 medical attention**.
- Do not point the gun/valve at anyone or at any part of the body.
- Do not put your hand or fingers over the spray tip/nozzle.
- Do not stop or deflect fluid leaks with your hand, body, glove, or rag.
- Always have the trigger guard on the gun when dispensing.
- Check the gun diffuser operation weekly. Refer to the gun manual.
- Be sure the gun/valve trigger safety operates before dispensing.
- Lock the gun/valve trigger safety when you stop dispensing.
- Follow the **Pressure Relief Procedure** on page 13 if the nozzle clogs, and before cleaning, checking or servicing the equipment.
- Tighten all fluid connections before operating the equipment.
- Check the hoses, tubes, and couplings daily. Replace worn, damaged, or loose parts immediately. Do not repair high pressure couplings; you must replace the entire hose.
- Fluid hoses must have spring guards on both ends, to help protect them from rupture caused by kinks or bends near the couplings.

FIRE, EXPLOSION AND ELECTRIC SHOCK HAZARD

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

- Ground the equipment, the object being dispensed, and all other electrically conductive objects in the dispense area. Proper grounding dissipates static electricity generated in the equipment. Refer to **System Grounding** on page 12.
- Provide fresh air ventilation to avoid the buildup of flammable fumes from solvent or material.
- Extinguish all open flames or pilot lights in the dispense area.
- Do not turn on or off any light switch in the dispense area.
- Do not use this equipment with flammable liquids.
- Do not stop or deflect fluid leaks with your hand, body, glove, or rag.
- Keep the dispense area free of debris, including solvent, rags, and gasoline.
- Do not smoke in the dispense area.
- If there is any static sparking or you feel an electric shock while using the equipment, **stop dispensing immediately**. Do not use the equipment until you have identified and corrected the problem.

⚠ WARNING

MOVING PARTS HAZARD

Moving parts, such as the ram plate/pump inlet can pinch fingers.

- Keep clear of all moving parts when starting or operating the equipment.
- Keep clear of the ram plate, pump fluid inlet, and lip of the fluid container when raising or lowering the ram.
- Before checking or servicing the ram or pump, follow the **Pressure Relief Procedure** on page 13.

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.
- Avoid exposure to heated material fumes.
- Provide adequate ventilation.

System Information

System Description

These systems consist of two supply modules with a pneumatic crossover filter module for continuous material supply. See Fig. 1.

Each air-powered ram (B) pushes a plate (N) into a drum of material, while the pump (A) removes material from the drum and pushes it through a supply hose and fluid manifold (F) to the point of application.

⚠ WARNING

A main air bleed valve (D), pump air bleed valves (H), and fluid drain valves (E) are required. These accessories help reduce the risk of serious injury, including fluid injection and splashing of fluid in the eyes or on the skin, and injury from moving parts if you are adjusting or repairing the pump.

The main air bleed valve (D) shuts off and relieves the air to the pump and ram. The ram will hold pressure if the ram director valve (L) is in the center position. To relieve air pressure in the ram, close the main air bleed valve (D) and move the director valve (L) to DOWN. The ram will slowly drop.

The pump air bleed valves (H) relieve air trapped between them and the pump after the air is shut off. Trapped air can cause the pump to cycle unexpectedly.

The fluid drain valves (E) assist in relieving fluid pressure in the displacement pump, hose, and gun. Triggering the gun to relieve pressure may not be sufficient.

System Accessories and Modules

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

NOTE: Reference numbers and letters in parentheses in the text refer to the callouts in the figures and the parts drawing.

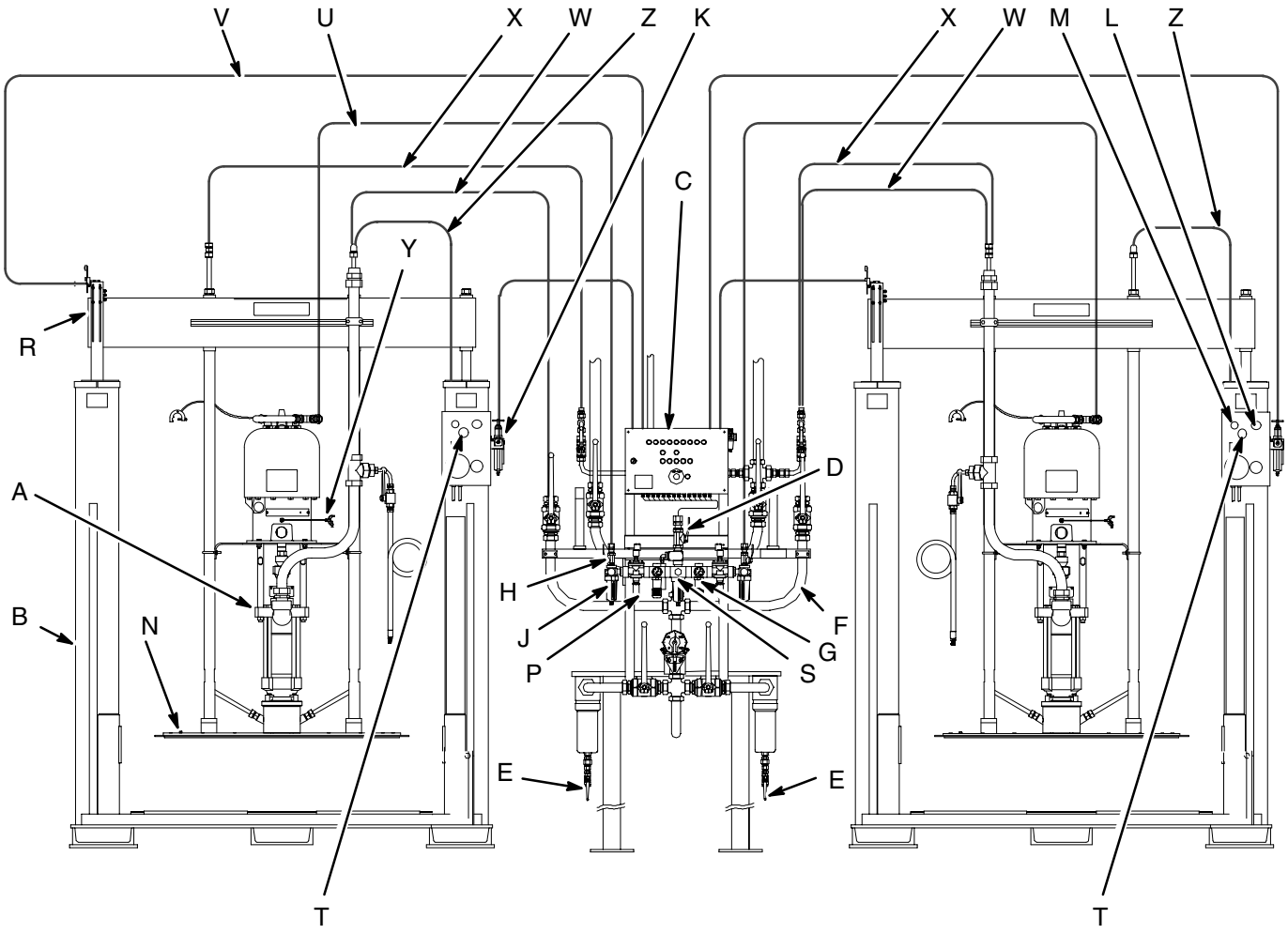
- **Main air bleed valve (D)** is required in your system to shut off the air supply to the entire system (refer to the preceding **WARNING**). When closed, the valve bleeds off all air in the ram, pump, and crossover, and the ram slowly lowers. Be sure the valve is easily accessible from the pump, and is located **upstream** from the air manifold (S). See Fig. 2.
- **Pump air bleed valves (H)** are required in your system to relieve air trapped between the valves and the pumps when the valves are closed (refer to the preceding **WARNING**). Be sure the valves are easily accessible from the pumps, and located **downstream** from the air manifold (S). See Fig. 2.
- **Pump air regulators (G)** control pump speed and outlet pressure by adjusting the air pressure to the pumps. Locate the regulators close to the pump, but **upstream** from the pump air bleed valves (H). See Fig. 2.
- **Air filters (J)** remove harmful dirt and moisture from the compressed air supply. See Fig. 2.
- **Pneumatic crossover (C)** provides switching between supply modules to provide a constant supply of material to the system. The crossover controls the air supply to each of the supply modules.
- **Ram air regulators (K)** control the air pressure to the rams. See Fig. 1.
- **Ram director valves (L)** control the raising and lowering of the ram. See Fig. 1.
- **Ram plate blowoff valves (M)** open and close the flow of air to assist raising the ram plate (N) out of an empty drum, by forcing air under the ram plate. See Fig. 1.

Component Identification and Function

KEY

- **A** Supply Module Pump
- **B** Ram
- **C** Pneumatic Crossover
- **D** Main Air Bleed Valve (required, for pump and ram)
- **E** Fluid Drain Valves
- **F** Fluid Manifold
- **G** Pump Air Regulators
- **H** Pump Air Bleed Valves (required, for pump)
- **J** Air Filters
- **K** Ram Air Regulators
- **L** Ram Director Valves
- **M** Ram Plate Blowoff Valve
- **N** Ram Plate
- **P** Pilot Valves
- **R** Low Level Sensors
- **S** Air Manifold
- **T** Pump Start Button
- **U** Air line from air manifold to air motor
- **V** Air line from low level sensor to crossover
- **W** Fluid Supply Line
- **X** Fluid Return Line
- **Y** Ground Wire
- **Z** Air Blowoff Line

Model 970252 Shown



Supply Module, Right Outlet **Filter Module** **Supply Module, Left Outlet**

8949D

Fig. 1

Component Identification and Function

Filter Module

NOTE: During system operation, as the ram approaches the drum bottom, the top of the ram contacts the low level sensor (R, Fig. 1). The switch initiates the pneumatic crossover control to shut off air to the respective ram's air motor, and initiates the start of the other supply module's pump. As the valve stops air to one supply module, it starts air to the other supply module. This allows constant material flow and changing out of material drums.

NOTE: The position of the low level sensor (R) on the ram determines when the air motor is turned on and off. During operation, this position can be adjusted as desired. See Fig. 2.

The ram director valve must be in the DOWN position for the pump to start.

KEY

- **C** Pneumatic Crossover
- **D** Main Air Bleed Valve (required, for pump and ram)
- **E** Fluid Drain Valves
- **G** Pump Air Regulators
- **H** Pump Air Bleed Valves (required, for pumps)
- **J** Air Filters
- **P** Pilot Valves
- **R** Air Valve on Ram Changeover Box

1 Valves are shown open. To close valve, move handle to horizontal position. When open, valve handle is in line with pipe.

2 Valves are shown closed. To open valves, move handle to horizontal position. When open, handle is in line with pipe.

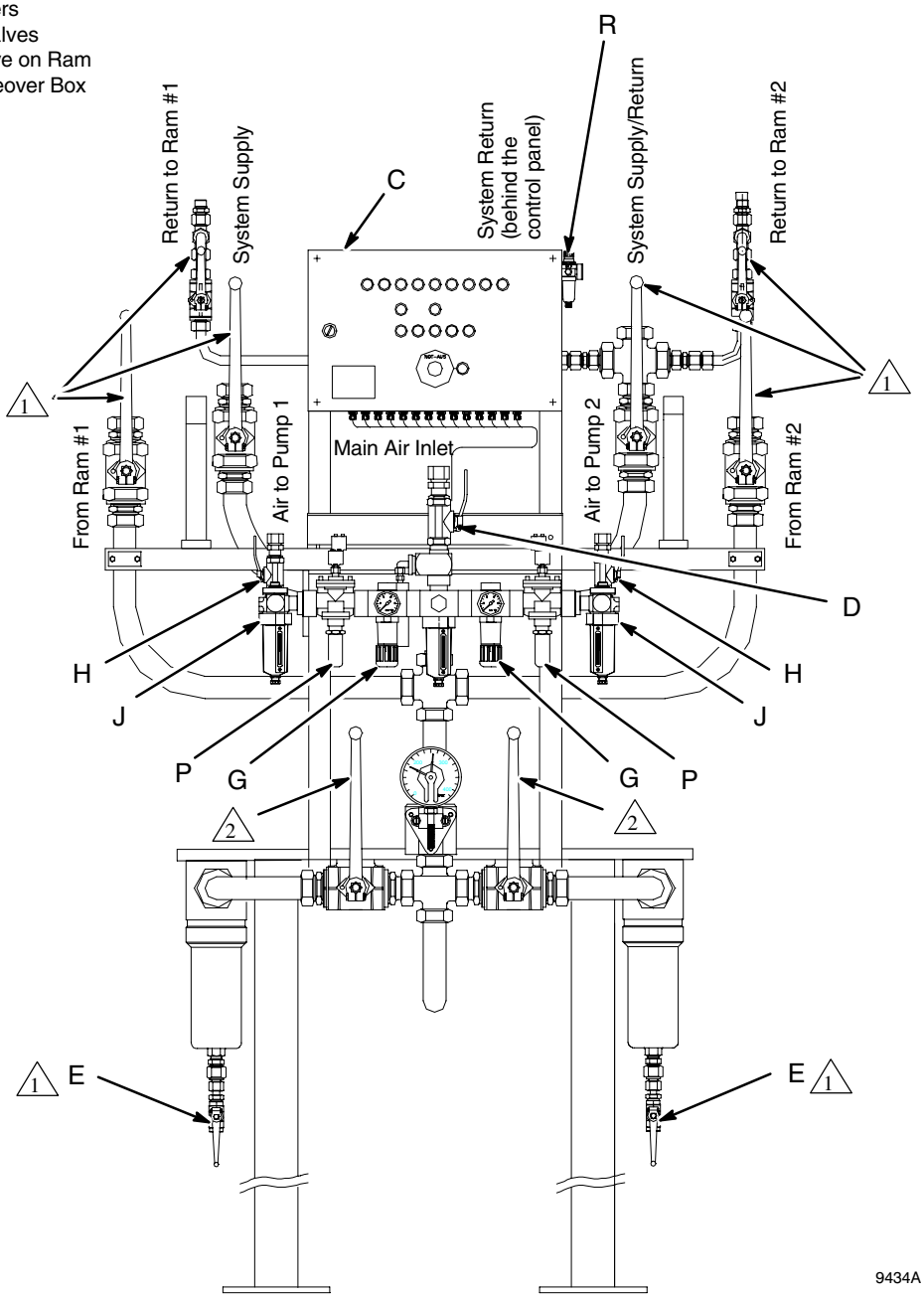


Fig. 2

System Setup

System Setup

The following typical system installation is only a guide for selecting and installing system components and accessories. Contact your Graco distributor for help in designing a system to suit your particular needs.

Air-powered ram extruder systems force high viscosity fluids into the intake valve of the fluid pump. Make certain all accessories are adequately sized and pressure-rated to meet your system's requirements.

Ram Air Controls

Fig. 3 shows the ram air control for single ram units.

Fig. 4 shows the ram air control for dual ram packages.

Air and Fluid Hoses

Be sure all air hoses and fluid hoses are properly sized and pressure-rated for your system. Use only electrically conductive hoses.

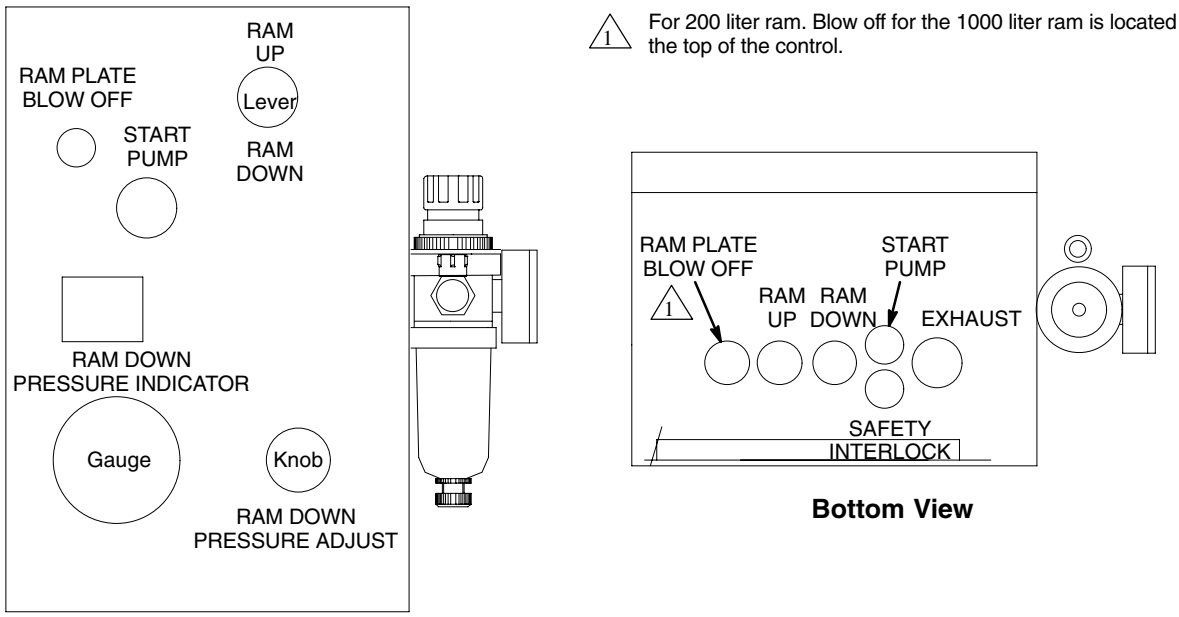
Installing the Ram

1. Install the ram at a suitable location, ensuring that the surface is horizontal and flat. Leave sufficient room above the ram so that it can be fully raised. Make sure that the ram and pump air regulators are fully accessible. Refer to the separate ram manual for further information.
2. Level the base of the ram, using metal shims if necessary.
3. Use anchors to fix the ram in the drilled holes.
4. Mount the pump onto the ram, as described under **Installing the Pump in the Ram.**

Installing the Pump in the Ram

1. Use the screws, plates, and nut to mount the pump onto the mounting plate. Refer to the parts drawing for your model.
2. Lower the pump with the mounting plate on the connection rods down to the ram plate.
3. Fasten the pump onto the ram plate with screws and plates. Refer to the parts drawing for your model.
4. Connect the air line from the air manifold to the air motor.
5. Install the air line supplying air to the ram plate from the ram control to the air supply pipe.

System Setup

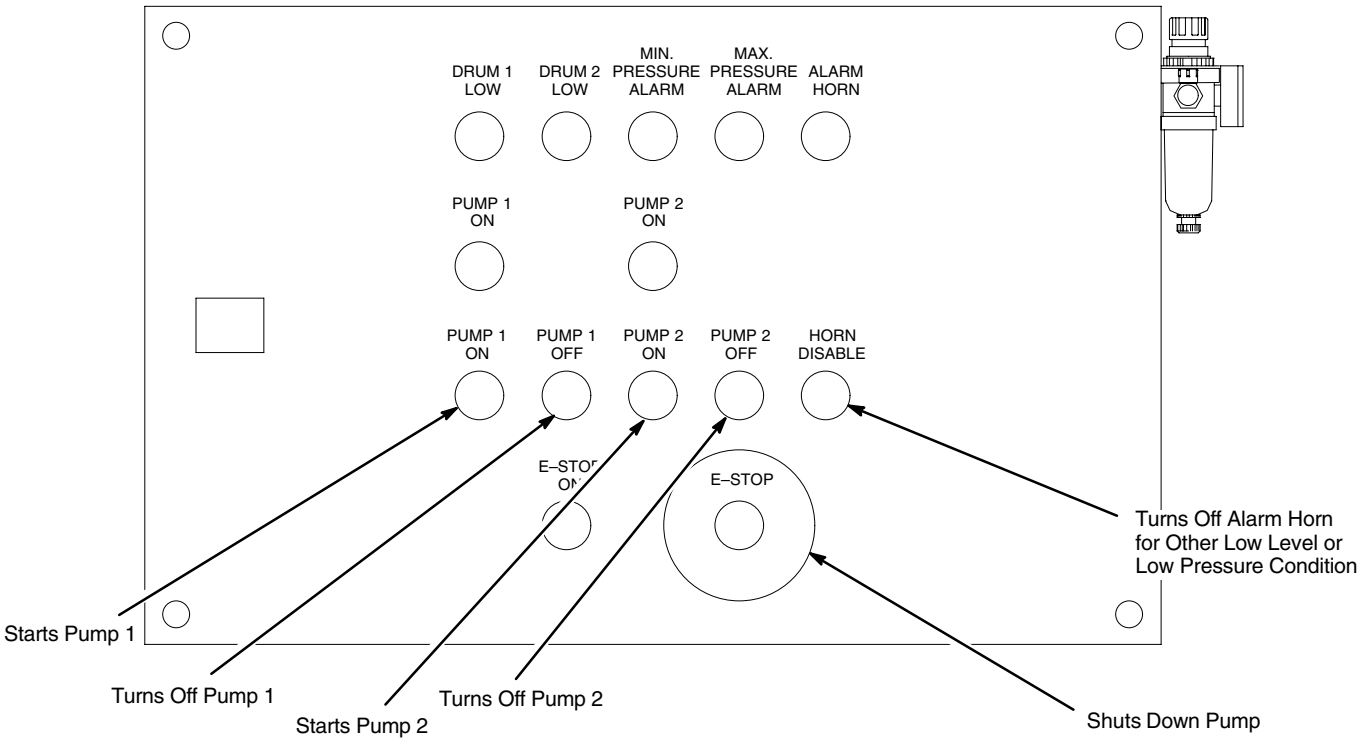


PART NO. 194273 RAM CONTROL

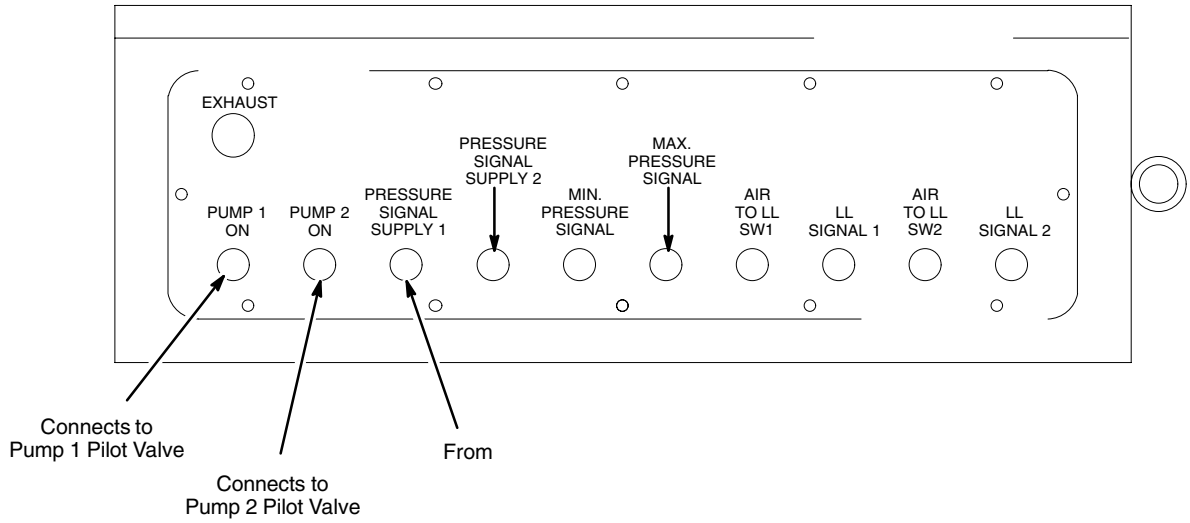
9437A

Fig. 3

System Setup



Air Line Connections



PART NO. 194272 DOUBLE RAM CHANGEOVER CONTROL

9435A

Fig. 4

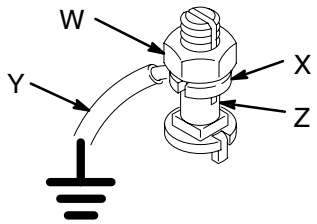
System Setup

System Grounding

⚠ WARNING

FIRE AND EXPLOSION HAZARD
Before operating the pump, ground the system as explained below. Also read the section **FIRE, EXPLOSION AND ELECTRIC SHOCK HAZARD** on page 4.

1. ***Ram Pumps:*** check ground wire and clamp. See Fig. 5. To install, loosen grounding lug locknut (W) and washer (X). Insert one end of 1.5 mm^2 (12 ga) minimum ground wire (Y) into slot in lug (Z) and tighten locknut securely. Connect other end of wire to true earth ground.



Pump Ground

0864

Fig. 5

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

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

4. ***Dispense gun:*** ground through connection to properly grounded fluid hose and pump.

5. ***Material supply container:*** follow your local code.

6. ***Object material is applied to:*** follow your local code.

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

8. ***To maintain grounding continuity when flushing or relieving pressure***, hold metal part of dispense gun firmly to side of grounded **metal** pail, then trigger gun.

Operation

Pressure Relief Procedure

⚠ WARNING

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

- are instructed to relieve the pressure,
- stop dispensing,
- check or service any of the system equipment,
- or install or clean the dispense ball valve.

1. Lock the gun/valve trigger safety.
2. Close pump air bleed valves (H, required in your system).
3. Shut off the main air bleed valve (D, required in your system).
4. Unlock the gun/valve trigger safety.
5. Hold a metal part of the gun/valve firmly to the side of a grounded metal pail, and trigger the gun/valve to relieve pressure.
6. Lock the gun/valve trigger safety.
7. Open the drain valve (required in your system) and/or the pump bleeder valve, having a container ready to catch the drainage.
8. Leave the drain valve open until you are ready to spray/dispense again.

If you suspect that the spray tip/nozzle or hose is completely clogged, or that pressure has not been fully relieved after following the steps above, very slowly loosen the tip guard retaining nut, nozzle, or hose end coupling and relieve pressure gradually, then loosen completely. Now clear the tip/nozzle or hose.

Operation

Before Starting to Pump Material

1. Drain/clean the air filters (J).
2. Check the grounding of the system. See page 12.
3. Check the tightness of the pump packing nut. Fill the wet-cup 1/3 full of a compatible solvent, or Graco Throat Seal Lubricant.
4. Check the material, including the expiration date.
5. Flush the system (see below).

Flushing the System

Flush the system before initial use to prevent material contamination.

⚠ CAUTION

Flush the system before performing the initial material loading procedure. The system was factory-tested using a light oil. 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 material to be used.

⚠ WARNING

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

2. Verify that factory-test oil and material are compatible:
   a. If substances are compatible, omit following step b and proceed to step 4.
   b. If substances are incompatible, perform remaining steps to flush system.
3. Select drum of solvent that dissolves, cleans, and eliminates factory-test oil from system. If necessary, check with Graco Distributor or material supplier for recommended solvent.
4. Before flushing, be sure entire system and flushing drums are properly grounded. Refer to **System Grounding**, on page 12.
5. Using compatible solvent, perform the startup procedures on pages 15 and 16.
6. Flush solvent through system for 1 to 2 minutes.
7. Remove drum containing solvent.

Operation

Starting Up After Setting Up the Ram

⚠ WARNING

PRESSURIZED EQUIPMENT HAZARD
To reduce risk of injury or equipment damage:

- Make sure all material hose connections are secure.
- Check that all routing of air lines will not interfere with any moving components within the fixture.
- Do not pressurize the system until you have verified the system is ready and it is safe to do so.

⚠ WARNING

MOVING PARTS HAZARD
Moving parts can pinch or amputate your fingers. During container changeover or when servicing the pump or supply unit, be sure to close the pump air valve (H). Failure to do this may allow the pump to start if the other supply unit receives a low level signal.

1. Close **all** air regulators and air valves on the supply module being started.

2. Open main air bleed valve (D) and set ram air regulator (K) to 3 bar, 0.3 MPa (40 psi). Set the ram pressure adjust knob to 2 bar, 0.2 MPa (30 psi). Move director valve (L) handle to UP, and let ram rise to full height.

3. Remove drum cover. To prevent air from being trapped under the ram plate, scoop material from the center of the container to the sides, to make the surface concave.

4. Set full drum of fluid on ram base, slide drum back against tube stop, and center under ram plate (N).

⚠ WARNING

MOVING PARTS HAZARD
Moving parts can pinch or amputate your fingers. When the pump is operating and when raising or lowering the ram, keep your fingers and hands away from the pump intake, ram plate, and lip of the drum.

⚠ CAUTION

To help avoid damage to equipment, *do not* use drums that have side bungs or large dents with this ram. Rough bung openings or large dents will damage the wipers or stop the ram plate, resulting in a runaway pump.

5. Move director valve handle to the DOWN position. Lower ram until ram plate is just above drum, then move the director valve to the center position. Reposition drum as necessary so wipers do not hit drum lip.

6. Set director valve to DOWN position and lower ram until the ram plate rests on the material. Set director valve to center position. On the 1000 liter ram, open the air vent valve located next to the ram control box. The air underneath the ram plate may escape via the ball valve or the vent valve. Close the air vent valve when air under the ram plate stops escaping.

Operation

Replacing the Material Drum

1. Close the pump air bleed valve (H).

2. Set the director valve handle to UP to raise the ram from the drum. At the same time, press the ram plate blowoff valve (M) to direct air under the ram plate to help raise the plate out of the drum.

NOTE: If the ram pulls the drum upward, stop raising the ram plate until sufficient air has been directed under the plate.

3. When the ram reaches the top position, replace the empty drum with a full one.

4. Inspect the ram plate and, if necessary, remove any remaining material or material build-up.

Starting the Pump and Supplying Material

1. Set the ram pressure adjustment of the first ram to approximately 2 bar. Set the director valve (L) to DOWN. Open the air valve (H) to the air motor. Press the START PUMP button (T) to start the pump. Run the pump until material emerges from the venting valve of the riser pipe. Continue this until all air entrapment is eliminated. Then close the vent valve.

2. Move the director valve (L) to the DOWN position.

3. Set the ram pressure adjustment of the second ram to approximately 2 bar. Set the director valve (L) to DOWN. Open the air valve (H) to the air motor. Press the START PUMP button (T) to start the pump. Run the pump until material emerges from the venting valve of the riser pipe.

4. Move the director valve (L) to the DOWN position.

5. Both supply modules are now operational, however only module no. 1 can be used. When a low level sensor is reached, the system automatically switches to module no. 2. The ram for module no. 1 can then be reloaded.

6. Open both pump air valves (H). See Fig. 2.

7. Open the air valve (R) on the ram changeover box. This will enable changeover and pressure control.

8. Push the start button for pump 1 or 2 ON. This will enable the respective pump to supply material to the filler module.

9. Open the respective supply and return ball valves.

10. The system is now fully operational.

Operation

Pneumatic Changeover Control Function

This system includes a pneumatically operated control system that controls a number of different functions for this dual pump fluid handling system. All controls are pneumatically operated, and thus are inherently intrinsically safe for use in hazardous areas.

1. ***Automatic Changeover.*** This control provides an automatic changeover from the operating unit to the standby unit when the following happens:

   - A low level signal is received from the currently operating unit.

   - A system low pressure signal is detected from the unit's pressure monitoring switch.

   The pneumatic indicator on the control panel stays on as long as there is a low level or low pressure condition. When the condition is eliminated, the indicator light will go off. The audible alarm will stay on. To shut off the audible alarm, use the silence button on the control panel. This button allows the operator to turn off the audio alarm prior to the low level or low pressure condition being eliminated.

2. ***High Pressure Shutdown.*** This control completely shuts down both pumps if the system fluid pressure exceeds the high pressure setting of the system pressure monitoring switch.

   When the high pressure condition is relieved, the pumps will restart in their previous.

3. ***Emergency Stop.*** When pushed, this button shuts down all pumps. None are reactivated with this button. Reactivation or elimination of emergency stop by twisting the button clockwise eliminates the 9–step condition. All pumps and rams must then be restarted manually.

4. ***Pneumatic Ram Control (one for each ram).*** This control operates the UP/DOWN movement of the ram and air blowoff assist when removing the ram plate from the empty container. It also regulates air pressure to the ram itself.

   This control allows a manual pump run operation when the ram is connected to a pneumatic double ram changeover control. This function allows pump operation when initially priming the system or when changing drums.

Troubleshooting

⚠ WARNING

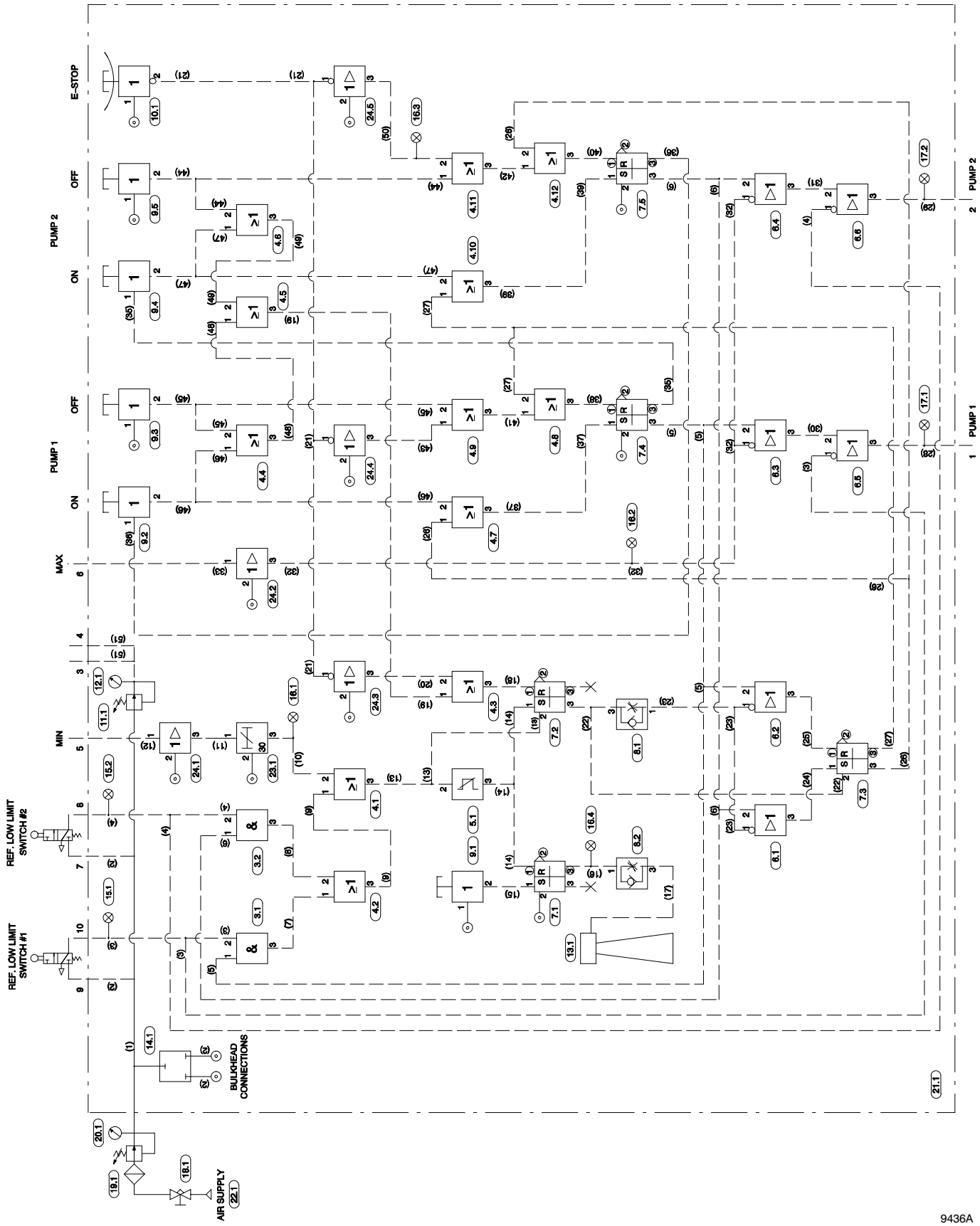
To reduce the risk of serious injury whenever you are instructed to relieve pressure, always follow the **Pressure Relief Procedure** on page 13.

1. **Relieve the pressure.**
2. Check all possible causes and problems before disassembling the pump.

Problem	Cause	Solution
Ram will not raise or lower.	Closed air valve or clogged air line.	Open, clear.
	Not enough air pressure.	Increase pressure.
	Worn or damaged piston.	Replace. See ram manual.
	Air control valve closed or clogged.	Open, clear.
Ram raises or lowers too fast.	Air pressure is too high.	Decrease.
Air leaks around the cylinder.	Damaged seal.	Replace. See ram manual.
Material squeezes past the seal ring.	Air pressure is too high.	Decrease.
	Damaged or worn wipers.	Replace. See ram manual.
Pump will not operate properly or pumps air.	Closed air valve or clogged air line.	Open, clear.
	Pumps not primed properly.	Open venting valve and reprime pumps.
	Drum is empty.	Check low level control for operation or proper height setting.
	Not enough air pressure.	Increase pressure.
	Worn or damaged piston.	Replace. See ram manual.
	Air control valve closed or clogged.	Open, clear.
	Air control valve is dirty, damaged, or worn.	Clean, service.
Air control valve fails to hold drum down and pushes the ram plate up.	Closed air valve or clogged air line.	Open, clear.
	Not enough air pressure.	Increase.
	Valve passage clogged.	Clean.
	Director valve not in DOWN position.	Set director valve to DOWN position.

Schematic

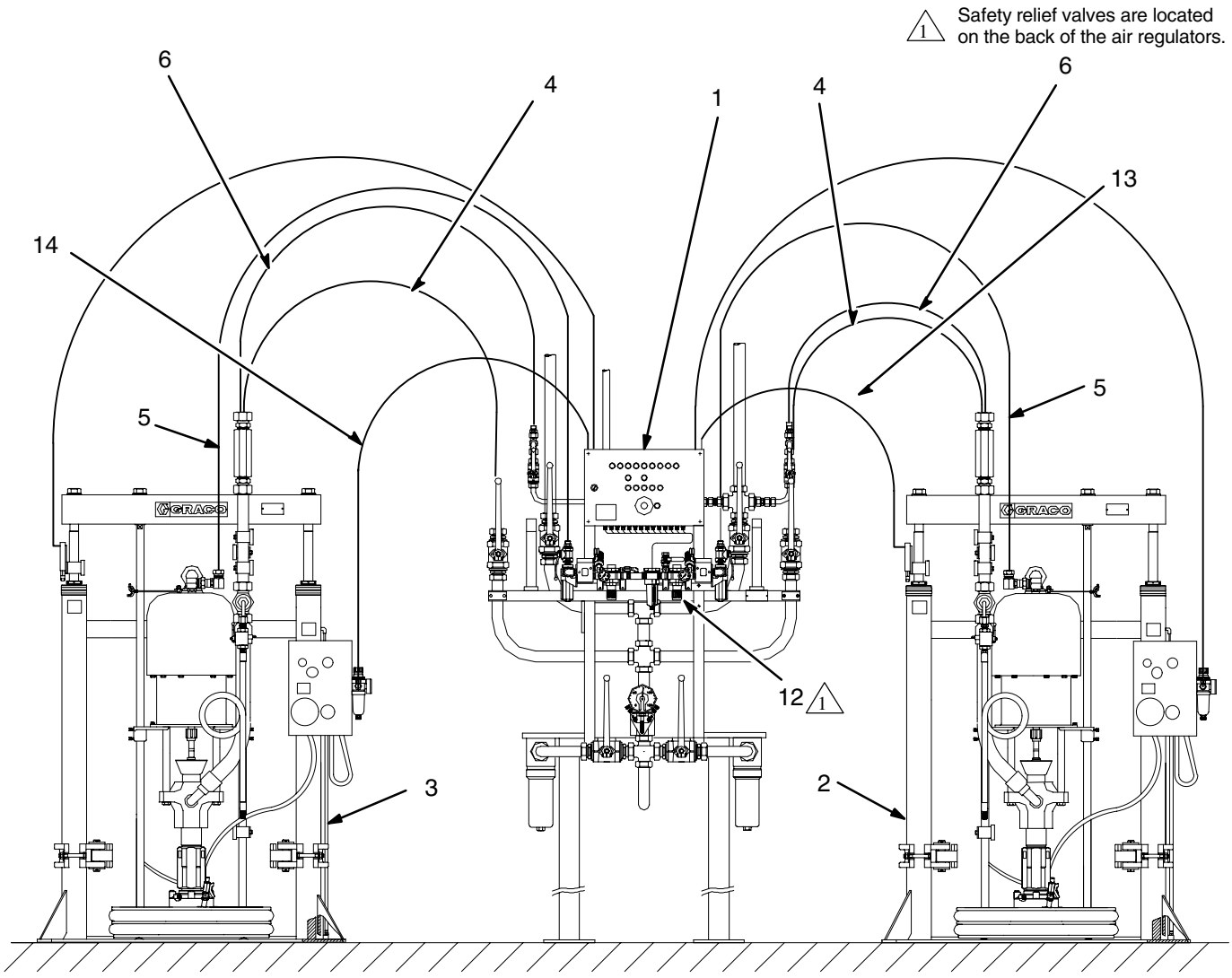
PART NO. 194272 DOUBLE RAM CHANGEOVER CONTROL



Parts

Model 970259, Series A
200 Liter Tandem with Pneumatic Crossover, 56:1 Ratio King Pump

Ref No.	Part No.	Description	Qty
1	241496	MODULE, filter; see page 34 for parts	1
2	241203	MODULE, supply, left outlet; see page 22 for parts	1
3	241216	MODULE, supply, right outlet; see page 22 for parts	1
4	114948	HOSE; 1–1/4 in. ID x 9 ft (2.7 m)	2
5	205548	HOSE; 3/4 in. ID x 15 ft (4.5 m)	2
6	114989	HOSE; 1/2 in. ID x 13 ft (4 m)	2
12	C06322	VALVE, safety relief	2
13	598095	TUBE; 4 mm OD	20 ft (6.1 m)
14	114888	TUBE; 10 mm OD	80 ft (24.4 m)



8930A

Notes

Parts

Model 241203, Series A
200 Liter Left Outlet Supply Module, 56:1 Ratio King Pump

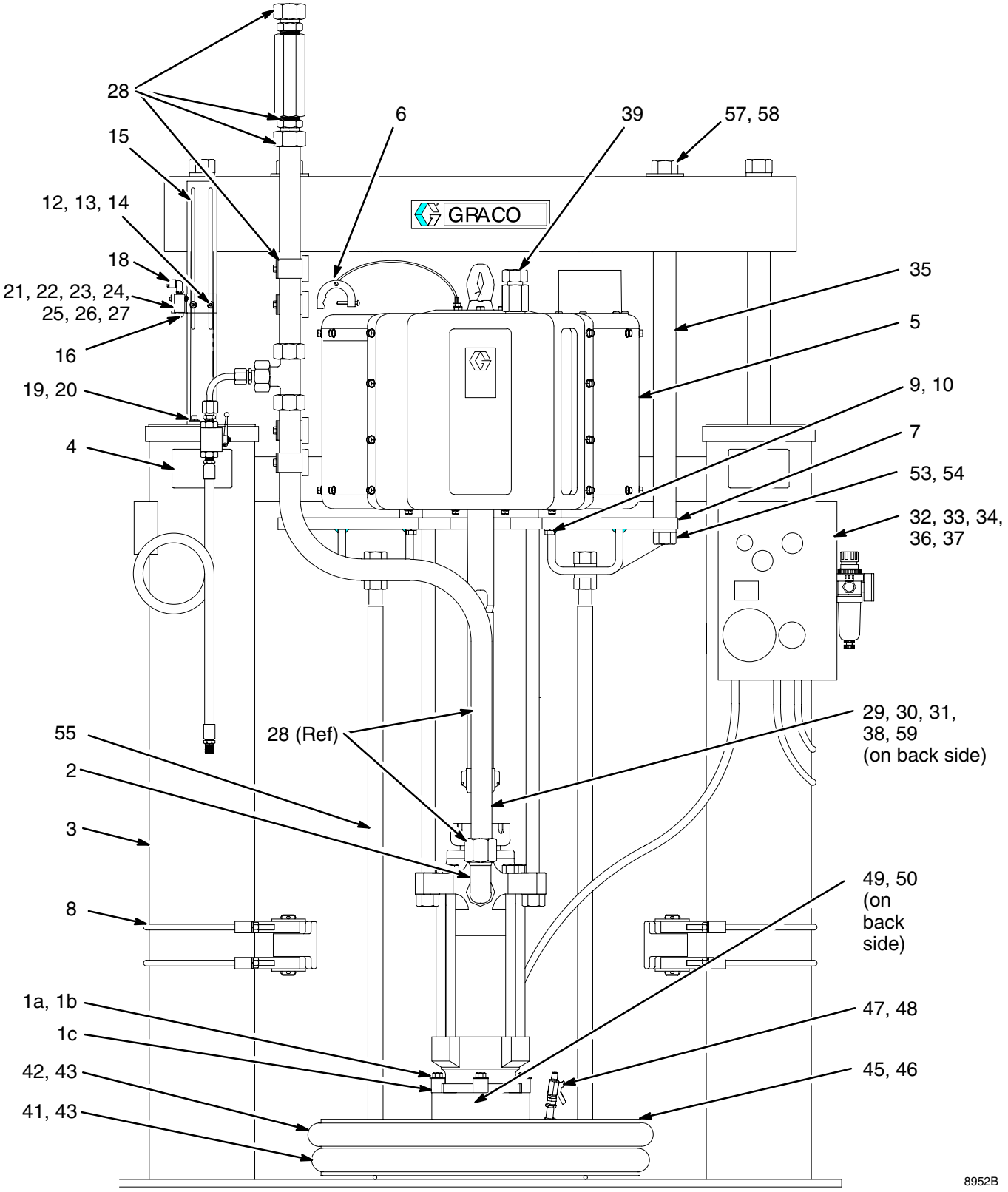
Model 241216, Series A
200 Liter Right Outlet Supply Module, 56:1 Ratio King Pump

Ref. No.	Part No.	Description	Qty.
1	245173	PUMP, Quiet King motor and DF900 assy See 308354 and 309348 for parts	1
2	206537	CLAMP, drum (set of two)	1
3	189559	CAP, end	2
4	114867	CLAMP, tube; 35 mm OD	1
5	102637	SCREW, cap, hex hd	4
7	100101	SCREW, cap	4
8	100133	WASHER, lock	4
9	100672	SCREW, set	4
10	100132	WASHER, flat	4
11	100464	SCREW, lag	4
12	101533	WASHER, lock	4
13	101535	NUT, hex	4
14	114888	TUBE, air; 10 mm OD 15 ft (4.6 m)	
15	158979	NIPPLE, reducing; 1/2 x 3/8 npt	1
16	276025	LUG	4
17	161822	PLATE, mounting	2
20	167652	ROD, tie, ram	2
21	238928	PISTON ASSY, ram	2
22	208391	VALVE, ball; 3/8 npt (m x f)	1
23	215335	BASE, ram	1
24	167646	BEAM, support, ram	1
25	166552	CAP, cylinder	2
27	164362	WASHER	2
28	238929	PLATE, ram	1
29	109495	O-RING	1
30	237569	GROUND WIRE ASSY	1
31	192171	FITTING, union adapter, 90°	1
32	114243	VALVE, check	1
33	156849	NIPPLE; 3/8 npt	1
34	194273	CONTROL, ram, pneumatic	1
35	100896	BUSHING	1
36	114877	CONNECTOR, male	1
37	194276	TUBE, bent; carbon steel	1
38	114864	CLAMP, dual pipe; 1” x 16 mm	2
39	114873	FITTING, tube; 16 mm	1
40	241256	MODULE, pump outlet kit	1
41	162803	UNION	1
42	114991	FITTING; 1/4 bsp–t	2
43	C14043	LABEL, pinch point	4
44	194278	PLATE, mounting	1
46	114876	VALVE, limit, air	1
47	206994	THROAT SEAL LIQUID; 8 oz	1
48	C19965	SCREW, socket hd	4
49	100813	WASHER, flat	4
51	100072	NUT, hex	4
52	190166	CYLINDER, intake	1
53	114868	ADAPTER; 1–1/4 JIC(m) x 1 npt(m)	1
54	194273	CONTROL, ram, pneumatic	2
55	115165	SCREW, cap, hex hd	4

Parts

Model 241203, Series A (Shown)
200 Liter Left Outlet Supply Module, 56:1 Ratio King Pump

Model 241216, Series A
200 Liter Right Outlet Supply Module, 56:1 Ratio King Pump



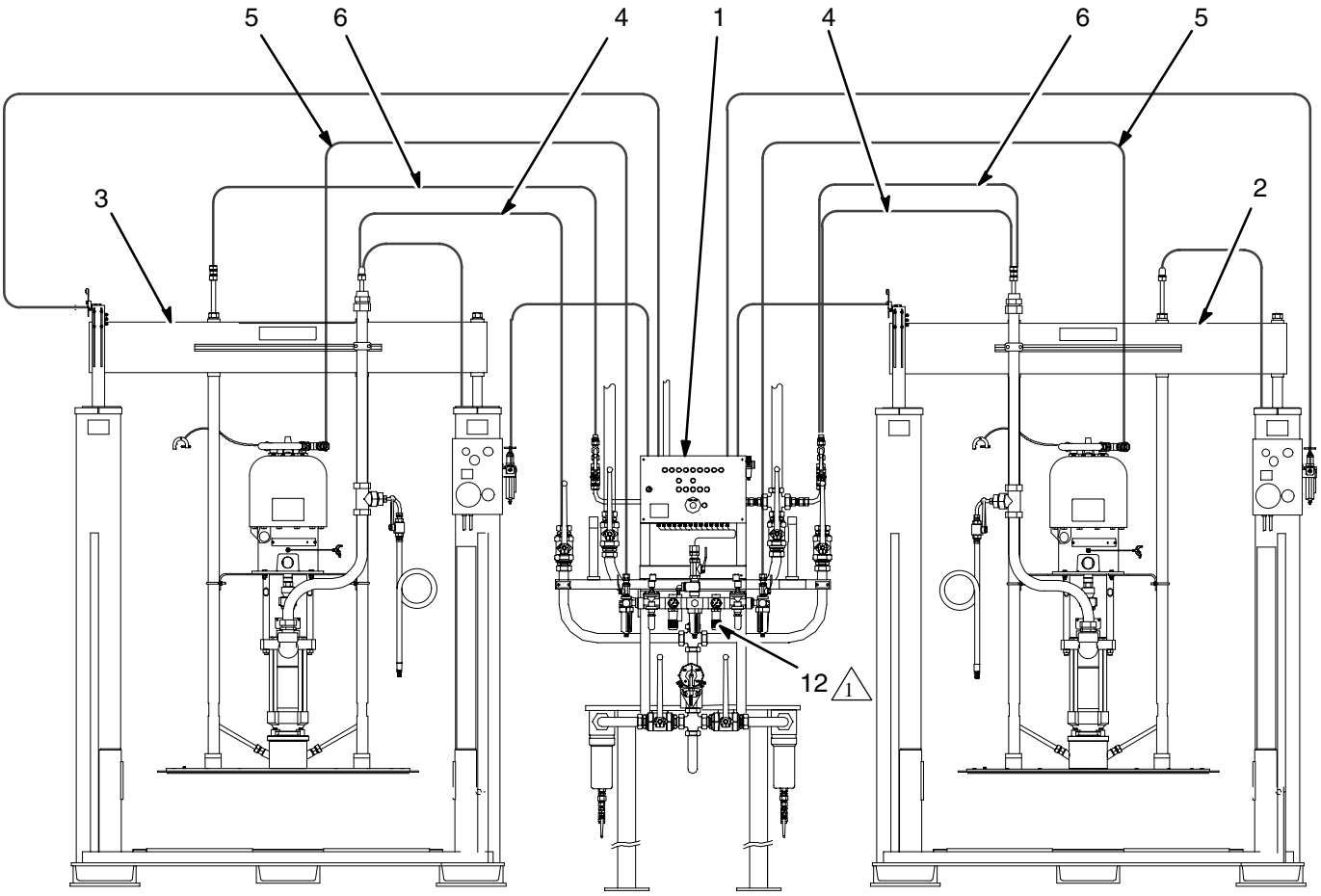
8952B

Parts

Model 970252, Series A
1000 Liter Tandem with Pneumatic Crossover, 20:1 Ratio King Pump

Ref No.	Part No.	Description	Qty
1	241596	MODULE, filter; see page 34 for parts	1
2	241608	MODULE, supply, left outlet; see page 28 for parts	1
3	241607	MODULE, supply, right outlet; see page 28 for parts	1
4	115315	HOSE; 1–1/4 in. ID x 9 ft (2.7 m)	2
5	205548	HOSE; 3/4 in. ID x 15 ft (4.5 m)	2
6	115314	HOSE; 1/2 in. ID x 13 ft (4 m)	2
12	103347	VALVE, safety relief	2

△1 Safety relief valves are located on the back of the air regulators.

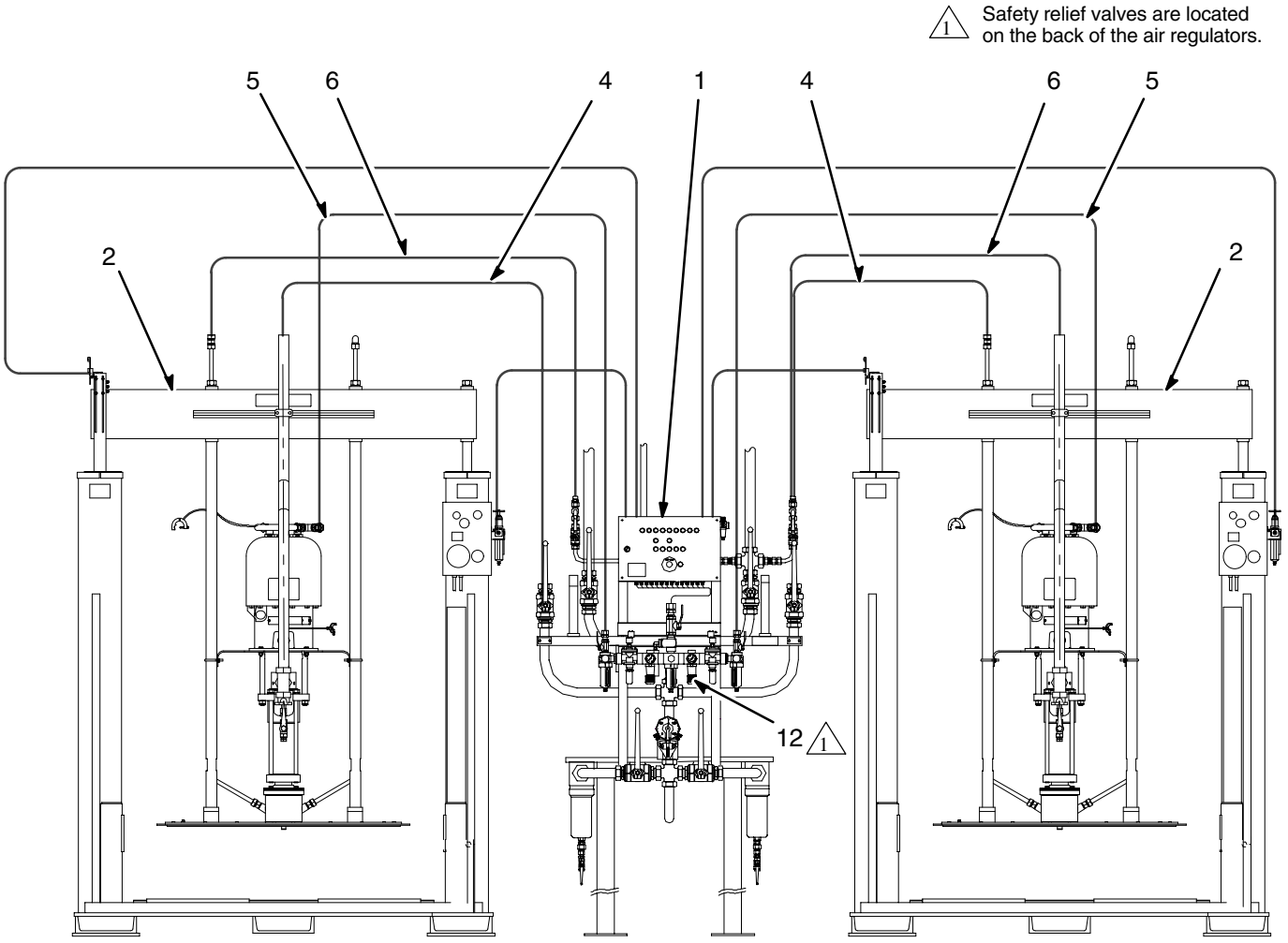


8949D

Parts

Model 970253, Series A
1000 Liter Tandem with Pneumatic Crossover, 10:1 Ratio King Pump

Ref No.	Part No.	Description	Qty
1	241596	MODULE, filter; see page 34 for parts	1
2	241606	MODULE, supply, center outlet; see page 30 for parts	2
4	115315	HOSE; 1–1/4 in. ID x 9 ft (2.7 m)	2
5	205548	HOSE; 3/4 in. ID x 15 ft (4.5 m)	2
6	115314	HOSE; 1/2 in. ID x 13 ft (4 m)	2
12	103347	VALVE, safety relief	2



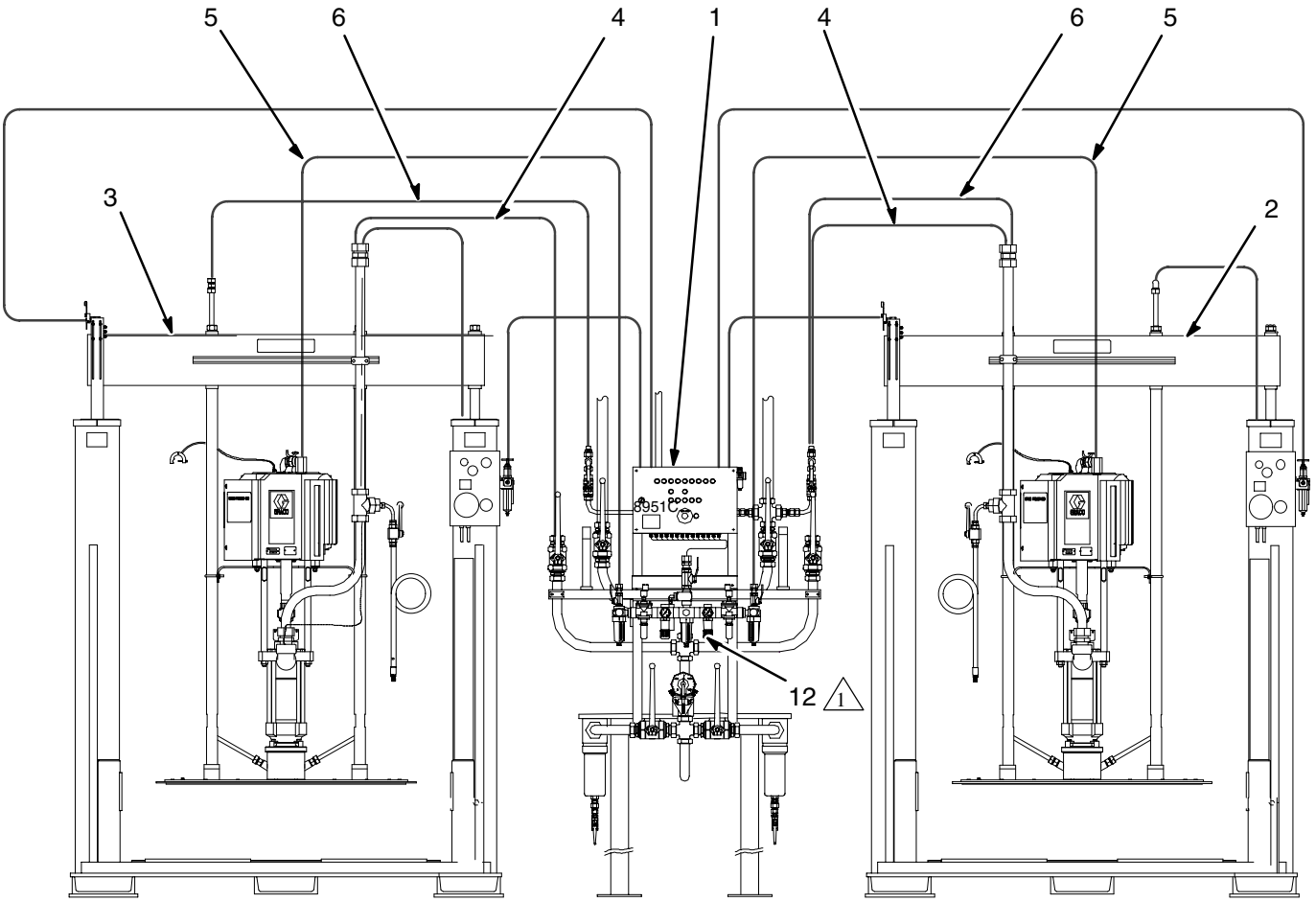
8950D

Parts

Model 970254, Series A
1000 Liter Tandem with Pneumatic Crossover, 34:1 Ratio Premier Pump

Ref No.	Part No.	Description	Qty
1	241496	MODULE, filter; see page 34 for parts	1
2	241598	MODULE, supply, left outlet; see page 32 for parts	1
3	241498	MODULE, supply, right outlet; see page 32 for parts	1
4	115315	HOSE; 1–1/4 in. ID x 9 ft (2.7 m)	2
5	205548	HOSE; 3/4 in. ID x 15 ft (4.5 m)	2
6	115314	HOSE; 1/2 in. ID x 13 ft (4 m)	2
12	103347	VALVE, safety relief	2

△1 Safety relief valves are located on the back of the air regulators.



Notes

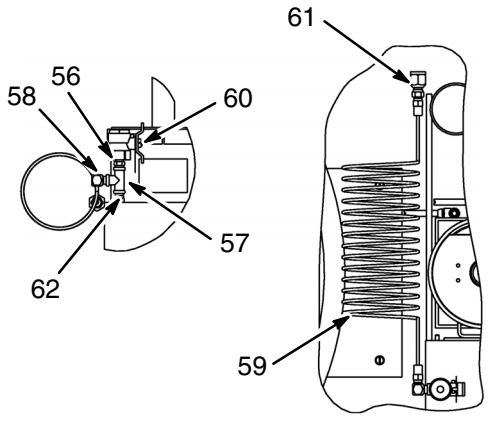
Parts

Model 241608, Series A
1000 Liter Left Outlet Supply Module, 20:1 Ratio King Pump

Model 241607, Series A
1000 Liter Right Outlet Supply Module, 20:1 Ratio King Pump

Ref. No.	Part No.	Description	Qty.
1	241373	RAM, 1000 liter; see manual 308976	1
2	194474	BRACKET, mounting, pump	1
3	115013	U-BOLT	2
4	222833	PUMP, Quiet King motor and DF900 assy See 308151 and 309348 for parts	1
5	115135	MODULE, pump outlet	1
6	109495	O-RING	1
7	184086	GASKET	1
8	102637	SCREW, cap, hex hd	4
9	276025	LUG	4
10	115129	ELBOW; 1–1/2 npt	1
16	115190	CLAMP, tube; 16 mm OD	2
18	114877	CONNECTOR, male	2
19	194754	TUBE; 25 mm	1
20	114873	FITTING, tube; 16 mm	1
21	115189	CLAMP, tube; 42 mm OD	1
22	100004	SCREW, cap; module no. 1	4
23	100133	WASHER, lock; module no. 1	4
31	100643	SCREW, cap	2
32	100016	WASHER, lock	2
34	194893	BRACKET, mounting, limit switch	1
35	110420	SCREW, cap, socket hd	4
36	100020	WASHER, lock	4
37	100179	NUT, hex	4
39	237569	GROUND WIRE ASSY	1
45	195231	TUBE; 16 mm	1
46	C06019	VALVE	1
47	597151	ELBOW, swivel; 1/8 npt	3
48	115337	ELBOW, male	1
49	100307	NUT, hex	4
50	241369	PLATE, ram	1
51	115230	ELBOW, fitting, 90°	4
52	114888	TUBE, air	35ft.
53	115231	TEE	2
54	194273	CONTROL, ram	1
55	115336	ELBOW, fitting	4
56	156971	NIPPLE	1
57	104984	TEE	1
58	100840	ELBOW, street	1
59	115425	HOSE, coupled	1
60	110223	VALVE	1
61	155653	UNION, swivel	1
62	115726	FITTING	1
63	112123	GAUGE, air pressure	1

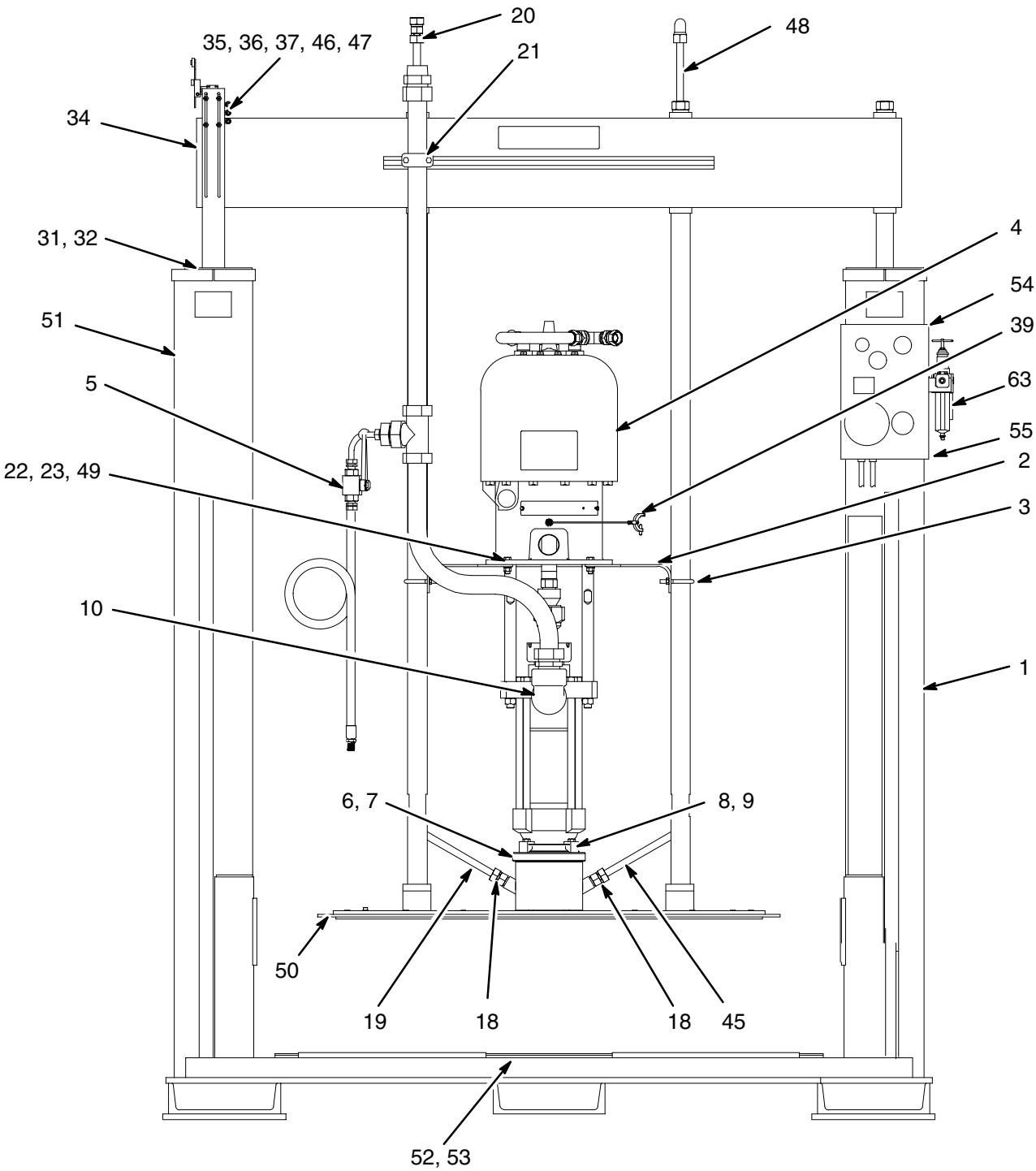
Model 241608, Series A (Shown)



Parts

Model 241608, Series A (Shown)
1000 Liter Left Outlet Supply Module, 20:1 Ratio King Pump

Model 241607, Series A
1000 Liter Right Outlet Supply Module, 20:1 Ratio King Pump

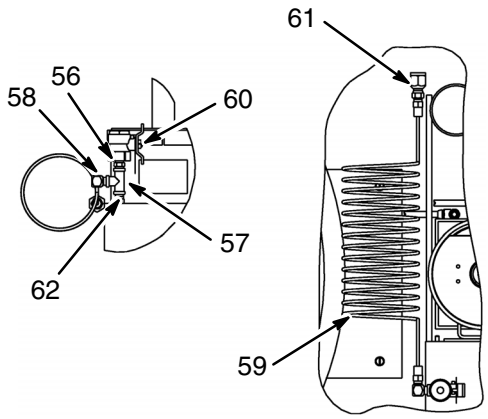


Parts

Model 241606, Series A
1000 Liter Center Outlet Supply Module, 10:1 Ratio King Pump

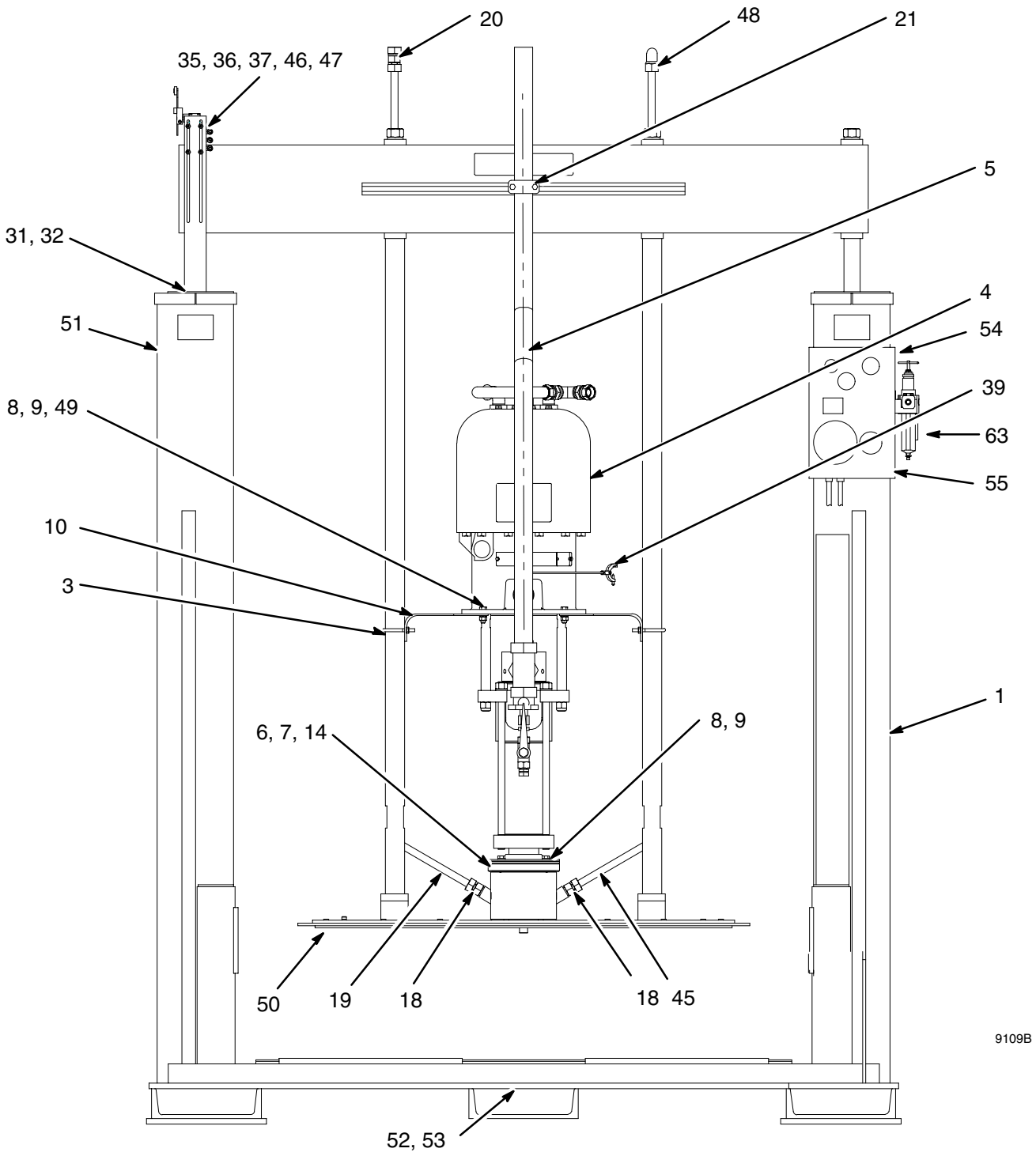
Ref. No.	Part No.	Description	Qty.
1	241373	RAM, 1000 liter; see manual 308976	1
3	115013	U-BOLT	2
4	241518	PUMP, Quiet King motor and Severe Duty pump See 308043 and 309348 for parts	1
5	241520	MODULE, pump outlet	1
6	162788	GASKET	1
7	108048	PLATE, seal	2
8	100004	SCREW, cap	8
9	100133	WASHER, lock	8
10	194474	BRACKET, pump	1
14	180748	PLATE, seal	1
16	115190	CLAMP, tube; 16 mm OD	2
18	114877	CONNECTOR, male	2
19	194754	TUBE; 25 mm	1
20	114873	FITTING, tube; 16 mm	1
21	115189	CLAMP, tube; 42 mm OD	1
31	100643	SCREW, cap	2
32	100016	WASHER, lock	2
34	194893	BRACKET, mounting, limit switch	1
35	110420	SCREW, cap, socket hd	4
36	100020	WASHER, lock	4
37	100179	NUT, hex	4
39	237569	GROUND WIRE ASSY	1
45	195231	TUBE; 16 mm	1
46	C06019	VALVE	1
47	597151	ELBOW, swivel; 1/8 npt	3
48	115337	ELBOW, male	1
49	100307	NUT, hex	4
50	241369	PLATE, ram 1000 liter	1
51	115230	ELBOW, 90°	4
52	114888	TUBE, air, 35 ft.	1
53	115231	TEE,	2
54	194273	CONTROL, ram	1
55	115336	ELBOW, fitting	4
56	156971	NIPPLE	1
57	104984	TEE, pipe	1
58	100840	ELBOW, street	1
59	115425	HOSE	1
60	110223	BUSHING, cord	1
61	155653	UNION, swivel	1
62	115726	FITTING	1
63	112123	GAUGE, pressure air	1

Model 241606, Series A (Shown)



Parts

Model 241606, Series A
1000 Liter Center Outlet Supply Module, 10:1 Ratio King Pump



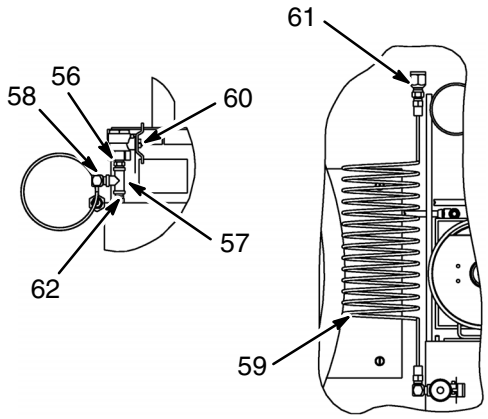
Parts

Model 241598, Series A
1000 Liter Left Outlet Supply Module, 34:1 Ratio Premier Pump

Model 241498, Series A
1000 Liter Right Outlet Supply Module, 34:1 Ratio Premier Pump

Ref. No.	Part No.	Description	Qty.
1	241373	RAM, 1000 liter; see manual 308976	1
2	194468	BRACKET, mounting, pump	1
3	115013	U-BOLT	2
4	222942	PUMP, Premier motor and DF2400 assy See 308151 and 308213 for parts	1
5	194913	MODULE, pump outlet	1
6	109495	O-RING	1
7	184086	GASKET	1
8	102637	SCREW, cap, hex hd	4
9	276025	LUG	4
10	115129	ELBOW; 1–1/2 npt	1
16	115190	CLAMP, tube; 16 mm OD	2
18	114877	CONNECTOR, male	2
19	194754	TUBE; 16 mm	1
20	114873	FITTING, tube; 16 mm	1
21	115221	CLAMP, tube	1
22	101566	NUT, lock	3
23	100023	WASHER, flat	3
31	100643	SCREW, cap	2
32	100016	WASHER, lock	2
34	194893	BRACKET, mounting, limit switch	1
35	110420	SCREW, cap, socket hd	4
36	100020	WASHER, lock	4
37	100179	NUT, hex	4
38	158586	BUSHING	1
39	237569	GROUND WIRE ASSY	1
45	195231	TUBE; 16 mm	1
46	C06019	VALVE	1
47	597151	ELBOW, swivel; 1/8 npt	3
48	115337	ELBOW, male	1
50	241369	PLATE, ram 1000 liter	1
51	115230	ELBOW, 90°	4
52	114888	TUBE, air, 35 ft.	1
53	115231	TEE,	2
54	194273	CONTROL, ram	1
55	115336	ELBOW, fitting	4
56	156971	NIPPLE	1
57	104984	TEE, pipe	1
58	100840	ELBOW, street	1
59	115425	HOSE	1
60	110223	BUSHING, cord	1
61	155653	UNION, swivel	1
62	115726	FITTING	1
63	112123	GAUGE, pressure air	1

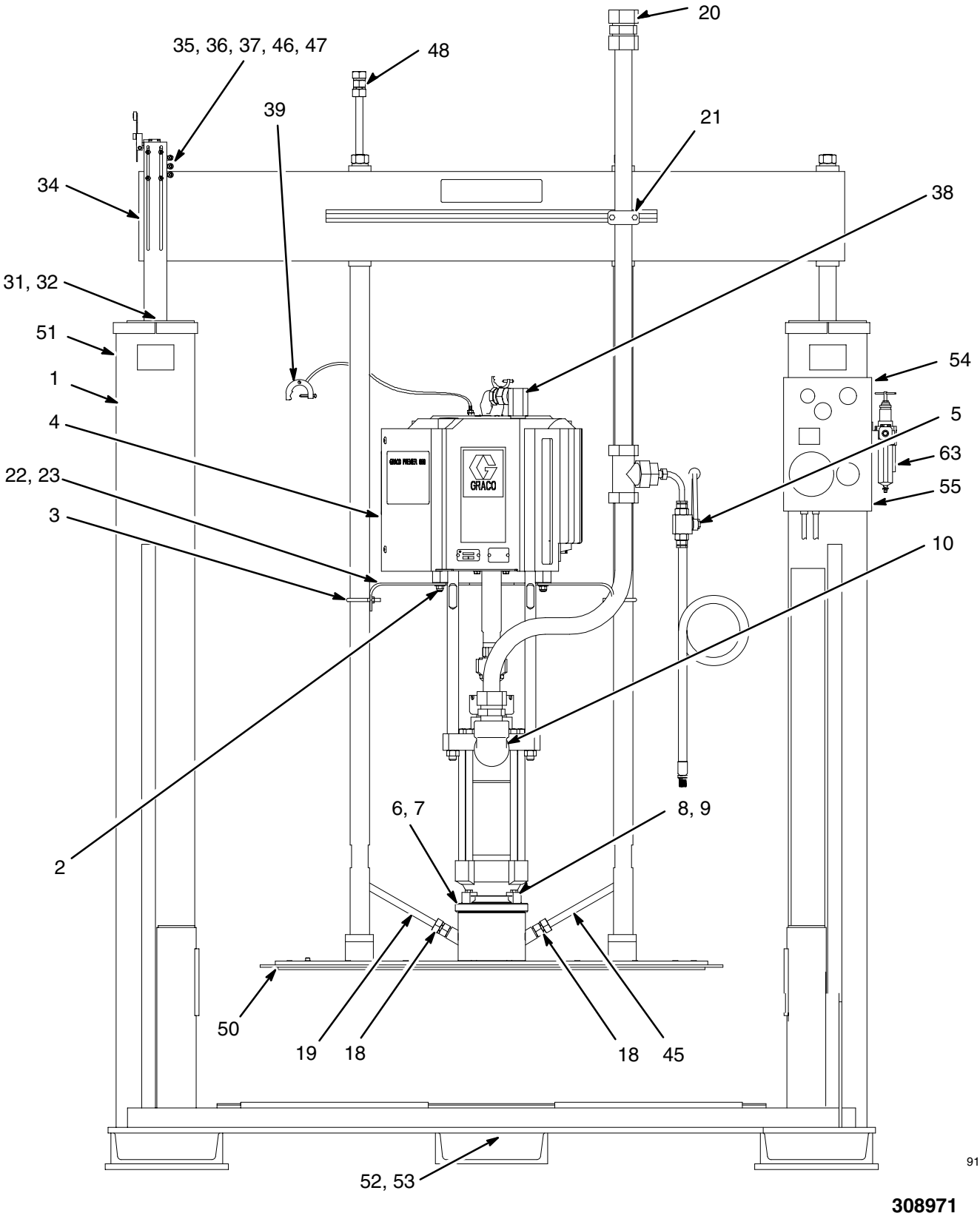
Model 241498, Series A (Shown)



Parts

Model 241598, Series A
1000 Liter Left Supply Module, 34:1 Ratio Premier Pump

Model 241498, Series A (Shown)
1000 Liter Right Supply Module, 34:1 Ratio Premier Pump



Parts

Model 241496, Series A (Shown)
38 mm Filter Module

Model 241596, Series A
42 mm Filter Module

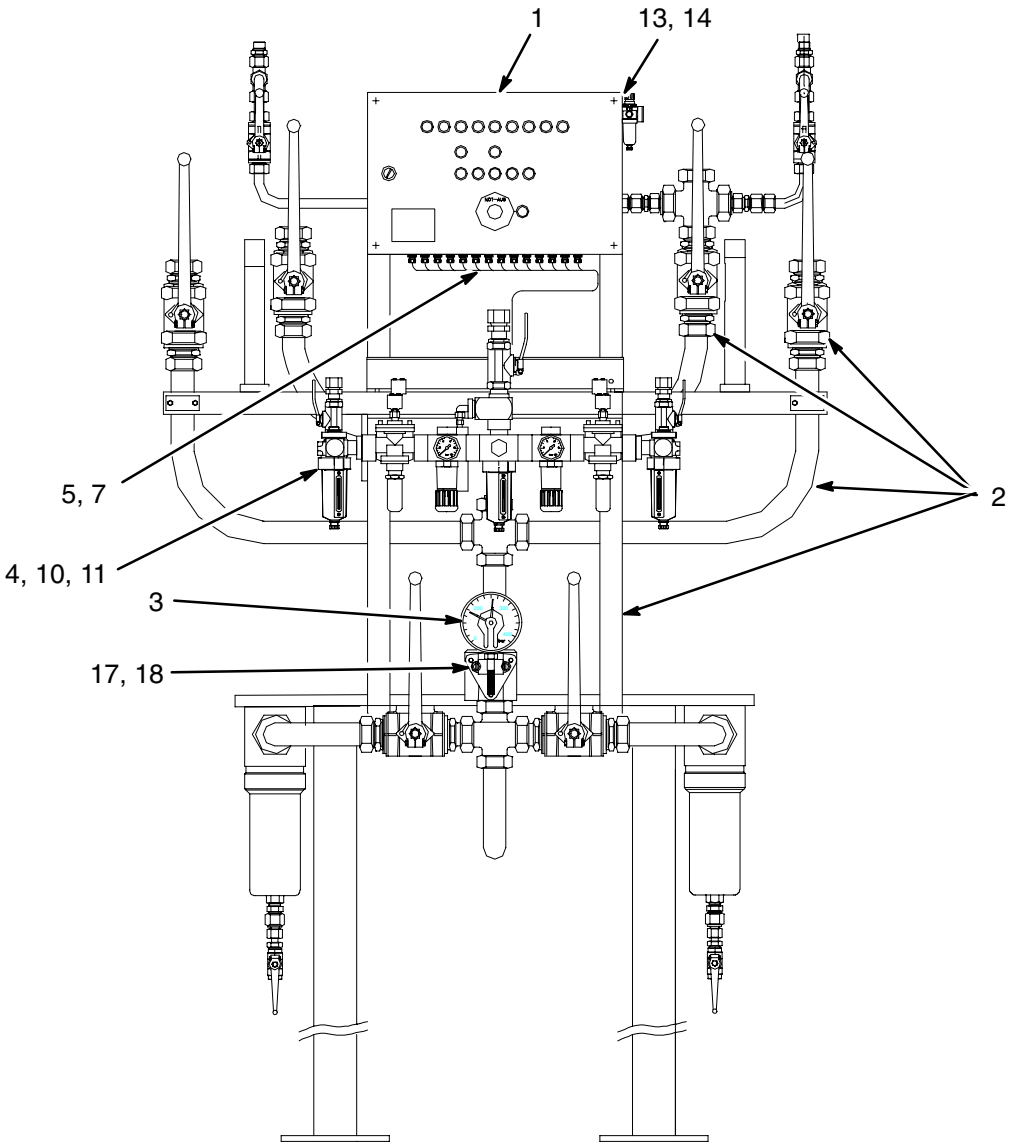
Ref. No.	Part No.	Description	Qty.
1	194272	CONTROL, double ram	1
2	194274	MODULE, filter, 38 mm; used on Model 241496 only	1
	194539	MODULE, filter, 42 mm; used on Model 241596 only	1
3	114875	GAUGE, pressure, fluid	1
4	114878	ASSEMBLY, air regulation	1
5	598095	TUBE; nylon; 5/32 in. (4 mm) OD	1
7	114888	TUBE, air; 10 mm OD	1
10	113428	SCREW, machine, hex hd	8
11	102040	NUT, lock	8
13	113708	SCREW, cap, hex hd	4
14	107541	WASHER, lock, spring	4
15	107539	NUT, hex	4
17	100014	SCREW, cap, hex hd	*
18	100015	NUT, hex	*
19	110610	ELBOW, tube; 1/8 npt(m) x 5/32 in. OD tube	1
20	112189	UNION, tube, Y; 5/32 in. OD tube	1
50	241369	PLATE, ram 1000 liter	1
51	115230	ELBOW, 90°	4
52	114888	TUBE, air, 35 ft.	1
53	115231	TEE,	2
54	194273	CONTROL, ram	1
55	115336	ELBOW, fitting	4
56	156971	NIPPLE	1
57	104984	TEE, pipe	1
58	100840	ELBOW, street	1
59	115425	HOSE	1
60	110223	BUSHING, cord	1
61	155653	UNION, swivel	1
62	115726	FITTING	1
63	112123	GAUGE, pressure air	1

* *Quantity is 3 on 241496, and 4 on Model 241596.*

Parts

Model 241496, Series A (Shown)
38 mm Filter Module

Model 241596, Series A
42 mm Filter Module



Technical Data

Dual Ram Packages

Part No.	Pump Model	Displacement Pump Model	Ratio	Maximum Fluid Working Pressure	Maximum Pump Air Input Pressure
970259	Quiet King, 200 liter size	Dura-Flo™ 900	56:1	310 bar, 31 MPa (4500 psi)	5.5 bar, 0.5 MPa (80 psi)
970252	Quiet King™, 1000 liter size	Dura-Flo™ 2400	20:1	140 bar, 14 MPa (2000 psi)	7 bar, 0.7 MPa (100 psi)
970253	Quiet King™, 1000 liter size	Severe Duty™ Displacement Pump	10:1	70 bar, 7 MPa (1000 psi)	7 bar, 0.7 MPa (100 psi)
970254	Premier™, 1000 liter size	Dura-Flo™ 2400	34:1	231 bar, 23 MPa (3400 psi)	7 bar, 0.7 MPa (100 psi)

Single Ram Supply Modules

Part No.	Pump Model	Displacement Pump Model	Ratio	Maximum Fluid Working Pressure	Maximum Pump Air Input Pressure	Parts Page
241203 (left outlet) and 241216 (right outlet)	Quiet King, 200 liter size	Dura-Flo™ 900	56:1	310 bar, 31 MPa (4500 psi)	5.5 bar, 0.5 MPa (80 psi)	22
241608 (left outlet) and 241607 (right outlet)	Quiet King™, 1000 liter size	Dura-Flo™ 2400	20:1	140 bar, 14 MPa (2000 psi)	7 bar, 0.7 MPa (100 psi)	28
241606 (center outlet)	Quiet King™, 1000 liter size	Severe Duty™ Displacement Pump	10:1	70 bar, 7 MPa (1000 psi)	7 bar, 0.7 MPa (100 psi)	30
241598 (left outlet) and 241498 (right outlet)	Premier™, 1000 liter size	Dura-Flo™ 2400	34:1	231 bar, 23 MPa (3400 psi)	7 bar, 0.7 MPa (100 psi)	32

Sound Pressure Levels (dBa)
(measured at 1 meter from unit)

Air Motor	Input Air Pressures at 15 cycles per minute			
	0.28 MPa, 2.8 bar (40 psi)	0.48 MPa, 4.8 bar (70 psi)	0.6 MPa, 6.1 bar (90 psi)	0.7 MPa, 7 bar (100 psi)
Quiet King	77.9	79.2	87.5	n/a
Premier	82.5	82.4	83.2	83.0

Sound Power Levels (dBa)
(tested in accordance with ISO 9614–2)

Air Motor	Input Air Pressures at 15 cycles per minute			
	0.28 MPa, 2.8 bar (40 psi)	0.48 MPa, 4.8 bar (70 psi)	0.6 MPa, 6.1 bar (90 psi)	0.7 MPa, 7 bar (100 psi)
Quiet King	85.2	86.6	95.2	n/a
Premier	90.6	90.6	93.0	95.9

Notes

Graco Standard Warranty

Graco warrants all equipment manufactured by Graco and bearing its name to be free from defects in material and workmanship on the date of sale to the original purchaser for use. With the exception of any special, extended, or limited warranty published by Graco, Graco will, for a period of twelve months from the date of sale, repair or replace any part of the equipment determined by Graco to be defective. This warranty applies only when the equipment is installed, operated and maintained in accordance with Graco's written recommendations.

This warranty does not cover, and Graco shall not be liable for general wear and tear, or any malfunction, damage or wear caused by faulty installation, misapplication, abrasion, corrosion, inadequate or improper maintenance, negligence, accident, tampering, or substitution of non–Graco component parts. Nor shall Graco be liable for malfunction, damage or wear caused by the incompatibility of Graco equipment with structures, accessories, equipment or materials not supplied by Graco, or the improper design, manufacture, installation, operation or maintenance of structures, accessories, equipment or materials not supplied by Graco.

This warranty is conditioned upon the prepaid return of the equipment claimed to be defective to an authorized Graco distributor for verification of the claimed defect. If the claimed defect is verified, Graco will repair or replace free of charge any defective parts. The equipment will be returned to the original purchaser transportation prepaid. If inspection of the equipment does not disclose any defect in material or workmanship, repairs will be made at a reasonable charge, which charges may include the costs of parts, labor, and transportation.

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