Instructions – Parts List

55 Gallon, 20:1 King
Module Supply Units

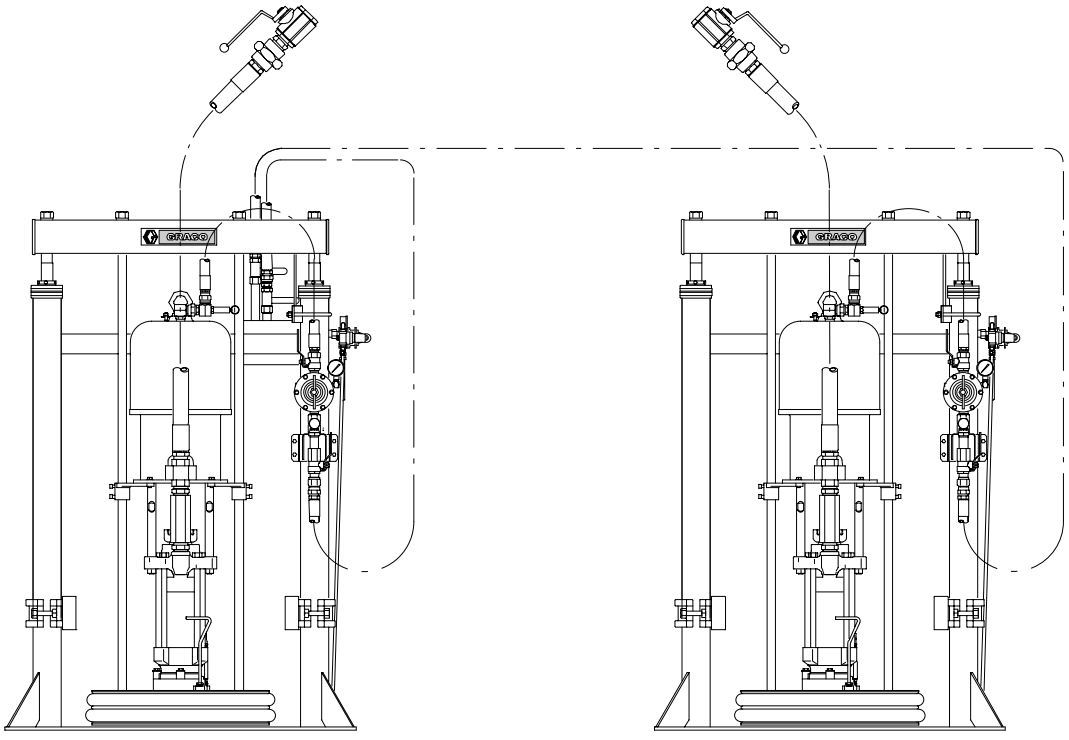
310334 rev.D

1800 psi (124 bar) Maximum Working Pressure

*** Model 970159, Tandem with Pneumatic Crossover (carbon steel pump)**
*** Model 288649, Tanden with Pneumatic Crossover (stainless steel pump)**
Model 970160, Tandem with Electric Crossover
*** Model 970163, Pneumatic Low Level Shutoff**

* These models are CE certified.

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



Model 970159 Tandem Shown

PROVEN QUALITY. LEADING TECHNOLOGY.

GRACO INC. P.O. BOX 1441 MINNEAPOLIS, MN 55440-1441

CE

Table of Contents

List of Models

Part No.	Pump Model	Displacement Pump Model	Ratio	Maximum Fluid Working Pressure	Maximum Pump Air Input Pressure	Parts Page
* 970159	Quiet King™	Dura–Flow™ 2400 (carbon steel)	20:1	125 bar, 13 MPa (1800 psi)	6 bar, 0.6 MPa (90 psi)	16
* 288649	Quiet King™	Dura–Flow™ 2400 (stainless steel)	20:1	125 bar, 13 MPa (1800 psi)	6 bar, 0.6 MPa (90 psi)	16
970160	Quiet King™	Dura–Flow™ 2400	20:1	125 bar, 13 MPa (1800 psi)	6 bar, 0.6 MPa (90 psi)	17
* 970163	Quiet King™	Dura–Flow™ 2400	20:1	125 bar, 13 MPa (1800 psi)	6 bar, 0.6 MPa (90 psi)	18

* These models are CE certified.

Related Manuals

Manual	No.
Ram–Mounted Pumps (Models C59769 and 288648)	308027
Pneumatic Crossover (Model 918468)	310293
Low–Level Shutoff (Model 918478)	310294
Electrical Crossover (Model C59519)	310295

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

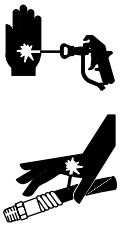
INSTRUCTIONS

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.
- Do not exceed 75 psi (5.1 bar) maximum inbound air pressure to the air–powered ram.
- Never exceed the recommended working pressure or the maximum air inlet pressure stated on your pump or in the **Technical Data** on page 21.
- 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



SKIN 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 surgical treatment**.
- 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 12 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 electrostatic 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 8.
- 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 and corrected the problem.

⚠ WARNING

MOVING PARTS HAZARD

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

- Do not operate the equipment with the guard removed.
- Keep clear of all moving parts when starting or operating the equipment.
- Keep hands and fingers away from the priming piston during operation and whenever the pump is charged with air.
- Keep clear of the follower 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 12.

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

System 970159 includes a dual 55 gallon supply unit with pneumatic crossover for continuous material supply. System 970160 includes a dual 55 gallon supply unit with electric crossover for continuous material supply. System 970163 is a single 55 gallon supply unit with a low–level shutoff. See Fig. 1.

Each system air–powered ram pushes a follower plate (C) into a drum of material, while the pump (A) removes material from the drum and pushes it through a supply hose to a customer–supplied header. Material flows through the header to individual dispense drops.

⚠ WARNING

A main air bleed valve (E) and pump air bleed valve (H), are required. These accessories help reduce the risk of serious injury, including skin 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 (E) shuts off and relieves the air to the pump and ram. The ram will hold pressure if the ram director valve (U) is in the horizontal (neutral) position. To relieve air pressure in the ram, close the main air bleed valve (E) and move the director valve (U) to DOWN. The ram will slowly drop.

The pump air bleed valve (H) relieves air trapped between it and the pump after the air is shut off. Trapped air can cause the pump to cycle unexpectedly. Locate the valve close to the pump.

The fluid drain valve assists 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 (E)** is required in your system to shut off the air supply to the pump and ram (Refer to the preceding **WARNING**). When closed, the valve bleeds off all air in the ram and pump, and the ram slowly lowers. Be sure the valve is easily accessible from the pump, and is located **upstream** from the air manifold (F).
- **Pump air bleed valve (H)** is required in your system to relieve air trapped between it and the air motor when the valve is closed (Refer to the preceding **WARNING**). Be sure the valve is easily accessible from the pump, and is located **downstream** from the air regulator (G).
- **Air regulator (G)** controls pump speed and outlet pressure by adjusting the air pressure to the pump. Locate the regulator close to the pump, but **upstream** from the pump air bleed valve.
- **Air manifold (F)** has a swivel air inlet. It mounts to the ram, and provides ports for connecting lines to air-powered accessories.
- **Air line filter (J)** removes harmful dirt and moisture from the compressed air supply.
- **Second bleed-type air valve (K)** isolates the air line accessories for servicing. Locate upstream from all other air line accessories.
- **Pneumatic (Model 970159) or electrical (Model 970160) crossover (L)** provides switching between dual rams to provide a constant supply of material to the system. The crossover controls the air supply to each of the ram air motors. **A low–level shutoff (L) (Model 970163)** provides automatic shutdown of a single ram system when only a small amount of material remains. The shutoff controls the air supply to the ram air motor.
- **Ram air regulator (T)** controls the air pressure to the ram.
- **Ram director valve (U)** controls the raising and lowering of the ram.
- **Air release valve (V)** opens and closes the flow of air to assist raising the ram plate (C) out of an empty drum.
- **Bleed handle (CC)** bleeds air from under the ram plate (C) to assist in priming the pump and lowering the ram plate into the drum.

Component Identification and Function

KEY

- **A** Pump
- **B** Ram (two used on 970159 and 970160, one used on 970163)
- **C** Ram Plate
- **D** Electrically Conductive Air Supply Hose
- **E** Main Air Bleed Valve (required, for pump and ram)
- **F** Air Manifold
- **G** Pump Air Regulator
- **H** Pump Air Bleed Valve (required, for pump)
- **J** Air Line Filter
- **K** Bleed-Type Air Valve (for accessories)
- **L** Pneumatic Crossover (for 970159), Electrical Crossover (for 970160), Low–level Shutoff (for 970163)
- **N** Electrically Conductive Fluid Hose
- **S** Ball Valve
- **T** Ram Air Regulator
- **U** Ram Director Valve
- **V** Air Release Valve
- **W** Air Line Drain Valve
- **Y** Ground Wire (required; Refer to page 8 for setup)
- **AA** Safety Valve
- **CC** Bleed Handle

Model 970159 Tandem Shown

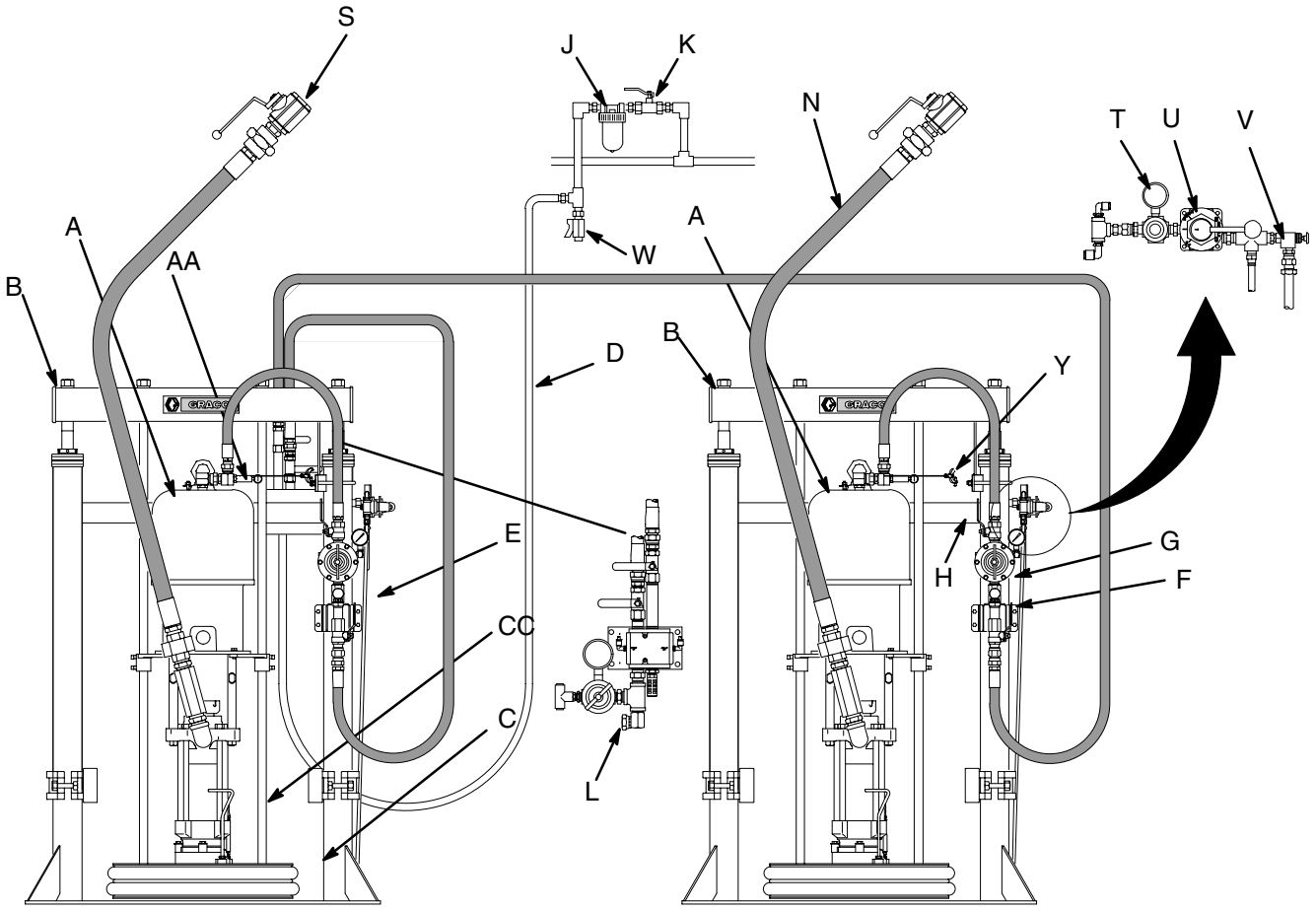


Fig. 1

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.

Air and Fluid Hoses

Be sure all air hoses (D) and fluid hoses (N) are properly sized and pressure-rated for your system. Use only electrically conductive hoses. See Fig. 1.

Selecting System Ram Locations

System rams are to be positioned so that air regulator controls for pumps and rams are easily accessible. Make sure there is overhead clearance for rams when fully raised. Refer to Dimensional Drawing on page 19 and separate ram manual 306934 (supplied) for additional setup data.

Use holes in ram base as a guide, drill holes for 13 mm (1/2 in.) anchors.

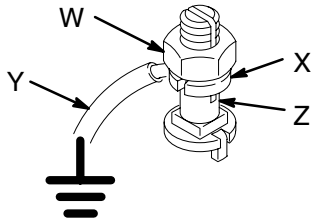
Check that ram base is level in all directions. If necessary, level base using metal shims. Secure base to floor using 13 mm (1/2 in.) anchors to prevent ram from tipping.

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. 2. 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. 2

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.

System Setup

Pneumatic Crossover Setup (Model 970159)

Install the pneumatic crossover as shown in Fig. 3. Also See Schematic, Fig. 8, page 23.

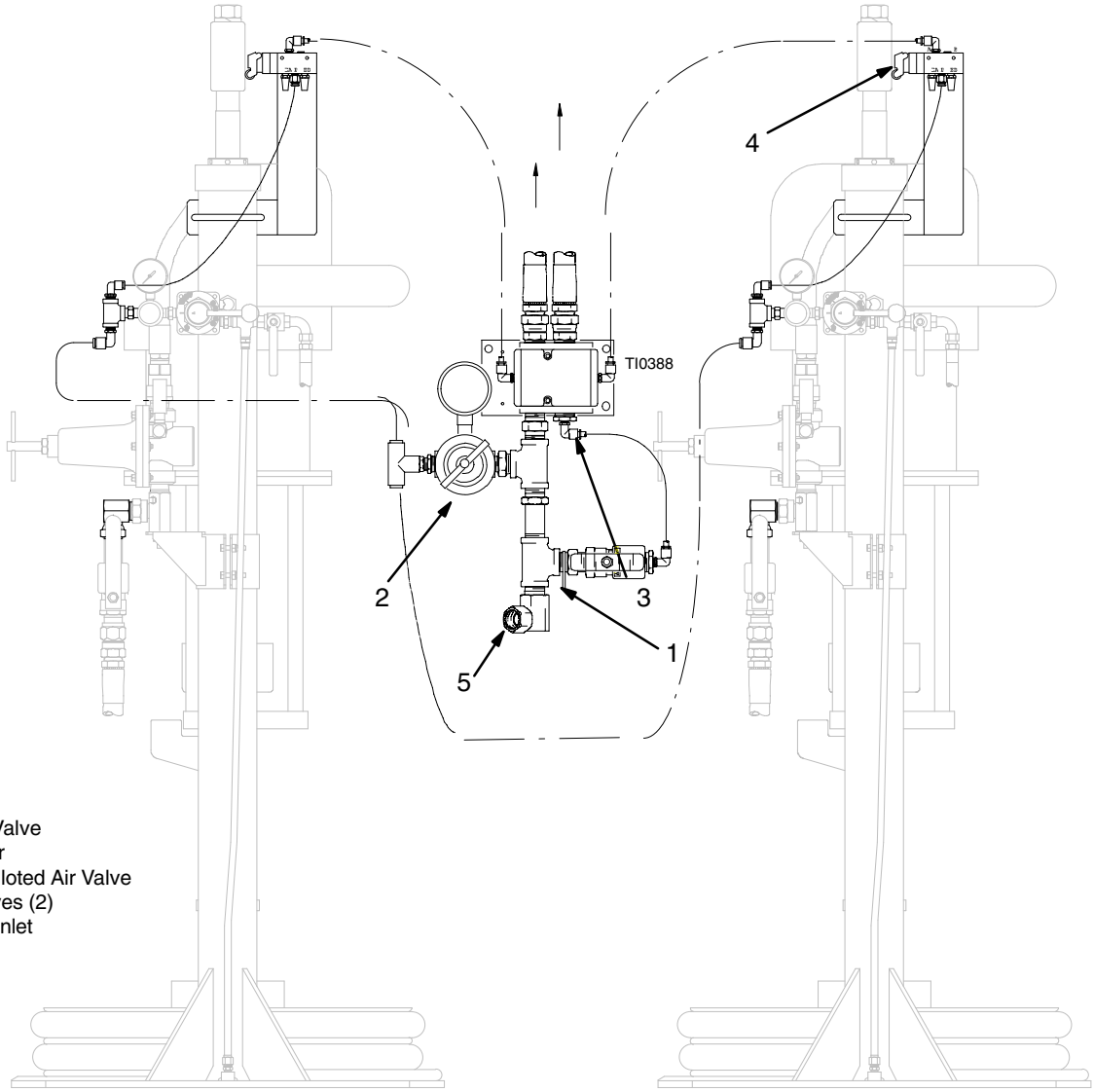
NOTE: During system operation, as the ram approaches the drum bottom, the top of the ram contacts the limit valve switch. The switch shuts off air to the ram air motor via a 4–way piloted air valve (3). As the valve stops air to one ram, it starts air to the other ram. This allows constant material flow and changing out of material drums.

After empty drum is replaced, open the primary valve to allow the preparation of the full container

NOTE: The primary valve should only be used to prime the off side pump. After the air has been removed via the bleed stick, close the primary valve immediately after priming is accomplished.

NOTE: The position of the limit valve (4) on the ram determines when the ram air motor is turned on and off. During operation, this position can be adjusted as desired. See Fig. 3.

Pneumatic Crossover Setup (Model 970159)



KEY

1 Primary Valve
2 Regulator
3 4–Way Piloted Air Valve
4 Limit Valves (2)
5 Main Air Inlet

8582A

Fig. 3

System Setup

Electrical Crossover Setup (Model 970160)

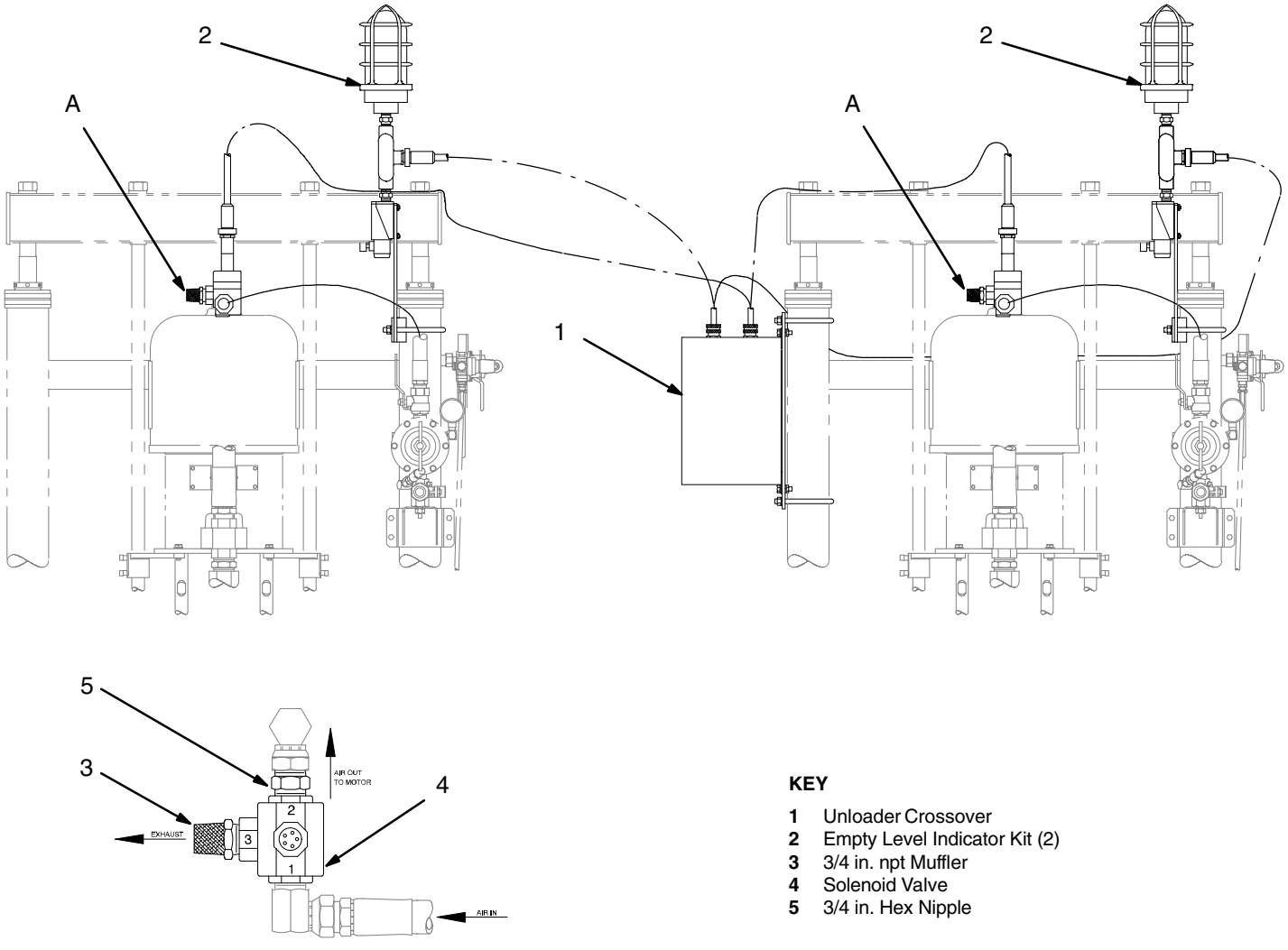
The electrical crossover is setup as shown in Fig. 4 and the Unloader Crossover (1) must be connected to a 120 Volt, 60 Hz supply.

During system operation, as the ram approaches the drum bottom, the top of the ram contacts the limit valve switch. The switch shuts off the air to one ram, and starts the other ram. This allows constant material flow and changing out of material drums.

The position of the empty level indicator kit (2) on the ram determines when the ram air motor is turned on and off. During operation, this position can be adjusted as desired. See Fig. 4.

The crossover panel has a Prime Empty Pump button. When making a change of material barrels, this button must be pushed after the ram is in the new drum of material and the majority of air has been removed via the follower bleed stick. After pushing the button, open the pump bleed valve **slowly** until all air escapes and only material flows (minimum of 4 pump cycles). The standby pump air shuts off automatically after 5 minutes.

Electrical Crossover Setup (Model 970160)



Detail A

KEY

1 Unloader Crossover
2 Empty Level Indicator Kit (2)
3 3/4 in. npt Muffler
4 Solenoid Valve
5 3/4 in. Hex Nipple

8584A

Fig. 4

System Setup

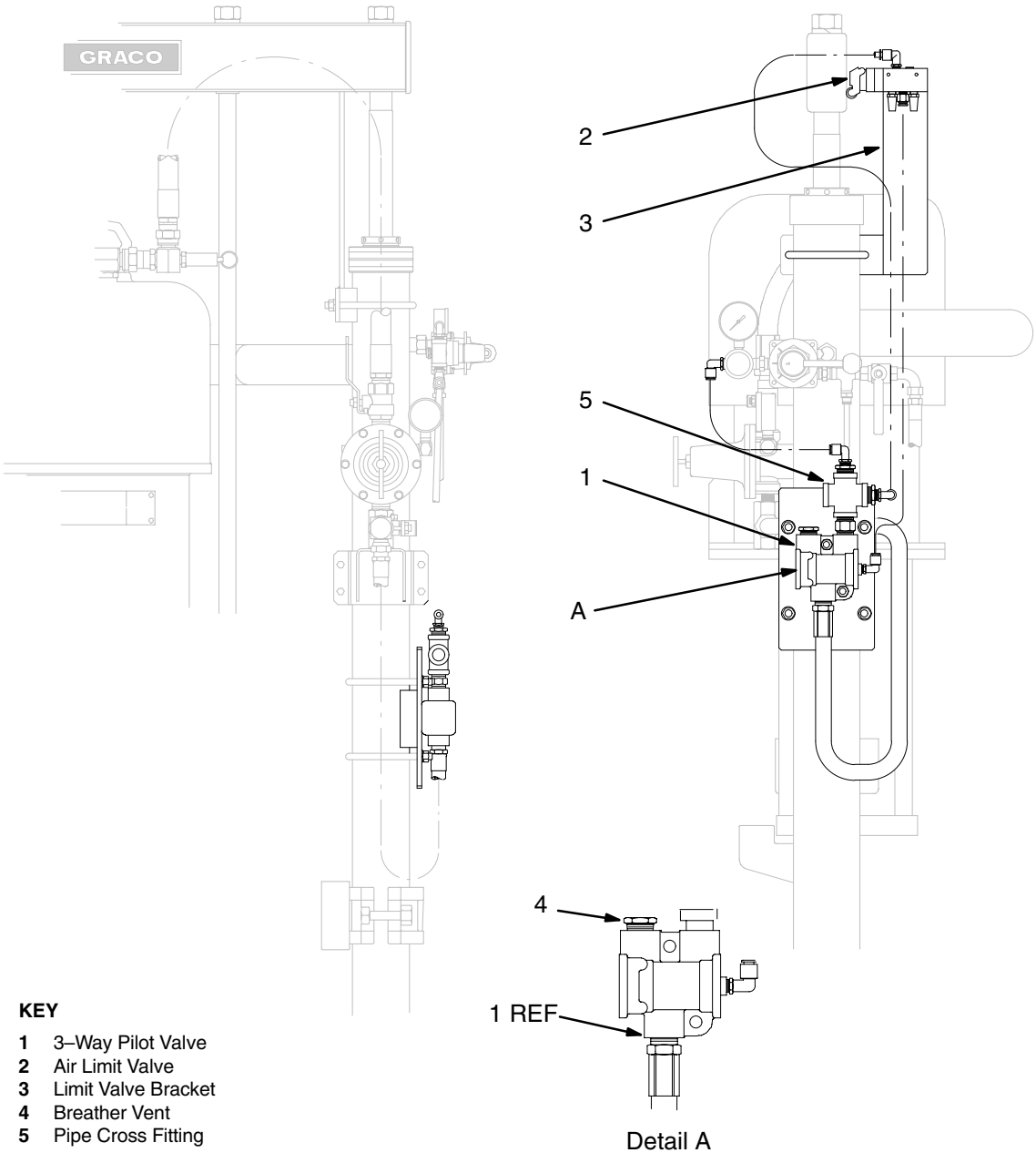
Low–Level Shutoff Setup (Model 970163)

Setup the low–level shutoff as shown in Fig. 5.

During system operation, as the ram approaches the drum bottom, the top of the ram contacts the limit switch. The switch shuts off the air to the pump.

NOTE: The position of the air limit valve (2) on the ram determines when the ram air motor is turned on and off. During operation, this position can be adjusted as desired. See Fig. 5.

Low–Level Shutoff Setup (Model 970163)



KEY

1 3–Way Pilot Valve
2 Air Limit Valve
3 Limit Valve Bracket
4 Breather Vent
5 Pipe Cross Fitting

Fig. 6

Operation

Pressure Relief Procedure

⚠ WARNING

SKIN 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. Relieve system pressure to which Graco module supply units are attached.
2. Close dispenser ball valves (S). Unhook ball valves from system. See Fig. 1.
3. Close pump air bleed valve (H, required in your system). See Fig. 1 or Fig. 7.
4. Shut off main air bleed valve (E, required in your system). Set ram director valve (U) to DOWN. Ram will slowly drop.
5. Hold metal part of dispenser ball valve firmly to side of grounded metal pail, and open ball valve to relieve pressure.
6. Close dispenser ball valve.
7. Repeat procedure for each ram (for models 970159 and 970160 only).

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 soluble oil, a soybean oil, or 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 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 8.
5. Using compatible solvent, perform **Starting and Adjusting System Rams** procedure and **Starting and Adjusting the Pump** procedure on page 14.
6. Flush solvent through system for 1 to 2 minutes.
7. Remove drum containing solvent.

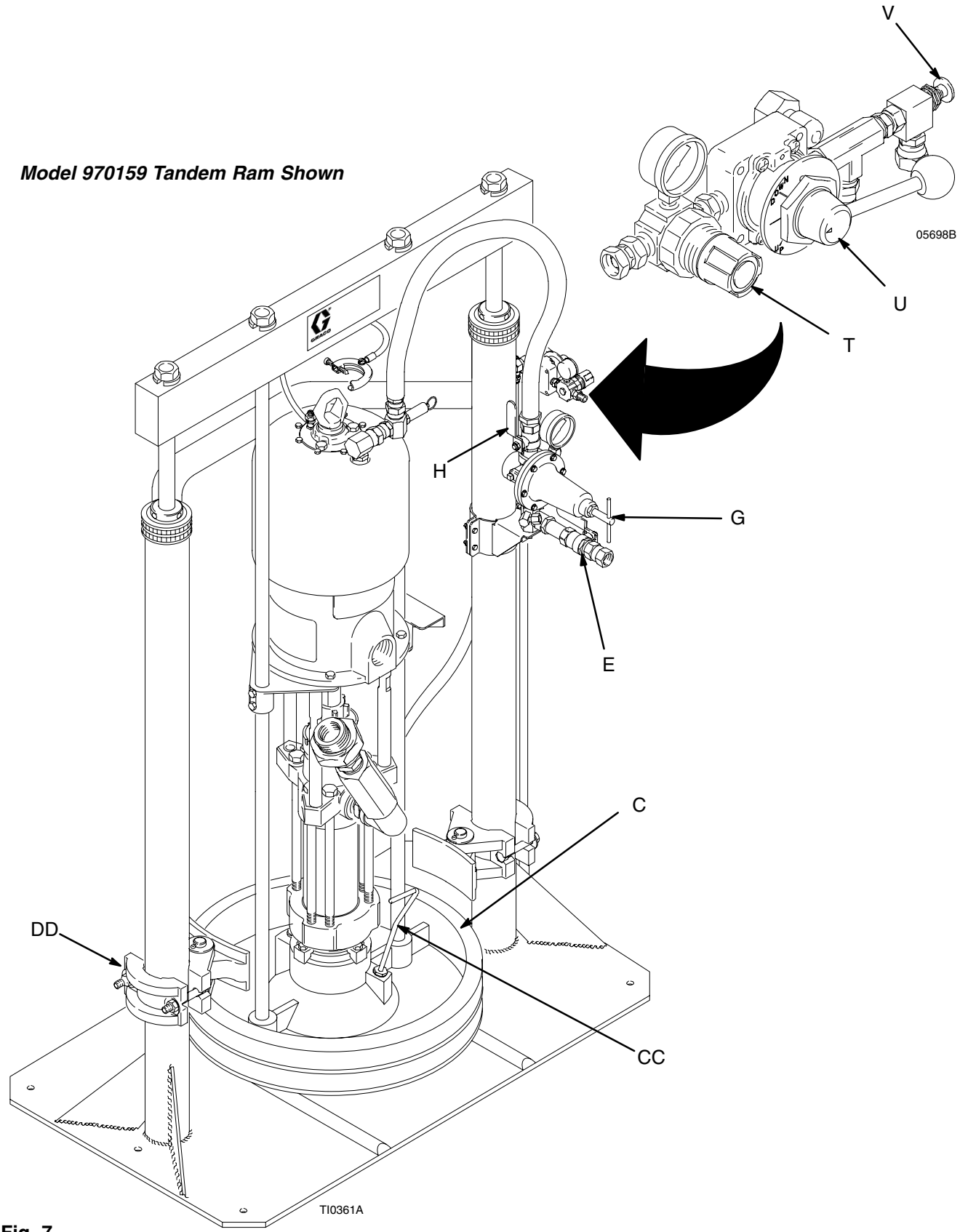


Fig. 7

Operation

Starting and Adjusting System Rams

⚠ 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.

1. Use following instructions to start and adjust system rams.
2. Close all air regulators and air valves. See Fig. 7.
3. Open main air bleed valve (E) and set ram air regulator (T) to 2.8 bar, 0.26 MPa (40 psi). Move director valve (U) handle so arrow points to UP, and let ram rise to full height.
4. Set full drum of fluid on ram base, slide drum back against tube stop, and center under ram plate (C). Use drum clamps (DD) to center, hold, and properly align drum with ram.
5. Ensure drum cover is free from debris and remove drum cover. Smooth material surface with straightedge.

⚠ 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.

6. Lubricate wipers with material compatible lubricant. Contact material supplier for lubricant recommendations.
7. Move director valve handle to DOWN position to lower ram. Lower ram until ram plate is just above drum, then set valve to neutral position. Reposition drum as necessary so wipers do not hit drum lip. Open vent valve (CC) on ram plate.
8. Set director valve to DOWN position and lower ram until fluid appears at vent valve (CC). Set director valve to neutral and close vent valve.

Starting and Adjusting the Pump

1. Be sure pump air regulator (G) is closed. Set ram air regulator (T) to 3.5 bar, 0.35 MPa (50 psi). Set director valve (U) to DOWN. See Fig. 7.
2. Start pump as explained in separate pump instruction manual.
3. Keep director valve (U) set to DOWN while pump is operating.

NOTE: Increase air pressure to the ram if the pump does not prime properly with heavier fluids. If fluid is forced out around the top wiper, ram pressure is too high and the air pressure should be decreased.

Operation

Changing Drums

⚠ 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.

1. Stop pump. Close pump air bleed valve (H). See Fig. 7.
2. Before raising wiper plate, locate push button on air release valve (V).
3. Set director valve (U) to UP to raise wiper plate. At the same time, carefully equalize pressure in drum by operating air release valve.
4. Raise wiper plate until it is completely out of drum.
5. Remove empty drum.
6. Inspect wiper plate and, if necessary, remove any remaining material or material build–up.
7. Place full drum on ram base.
8. Lower ram and adjust position of drum relative to ram plate, as explained under **Starting and Adjusting Ram** on page 14.

Shutdown and Care of the Pump

1. Set director valve (U) to neutral. See Fig. 7.

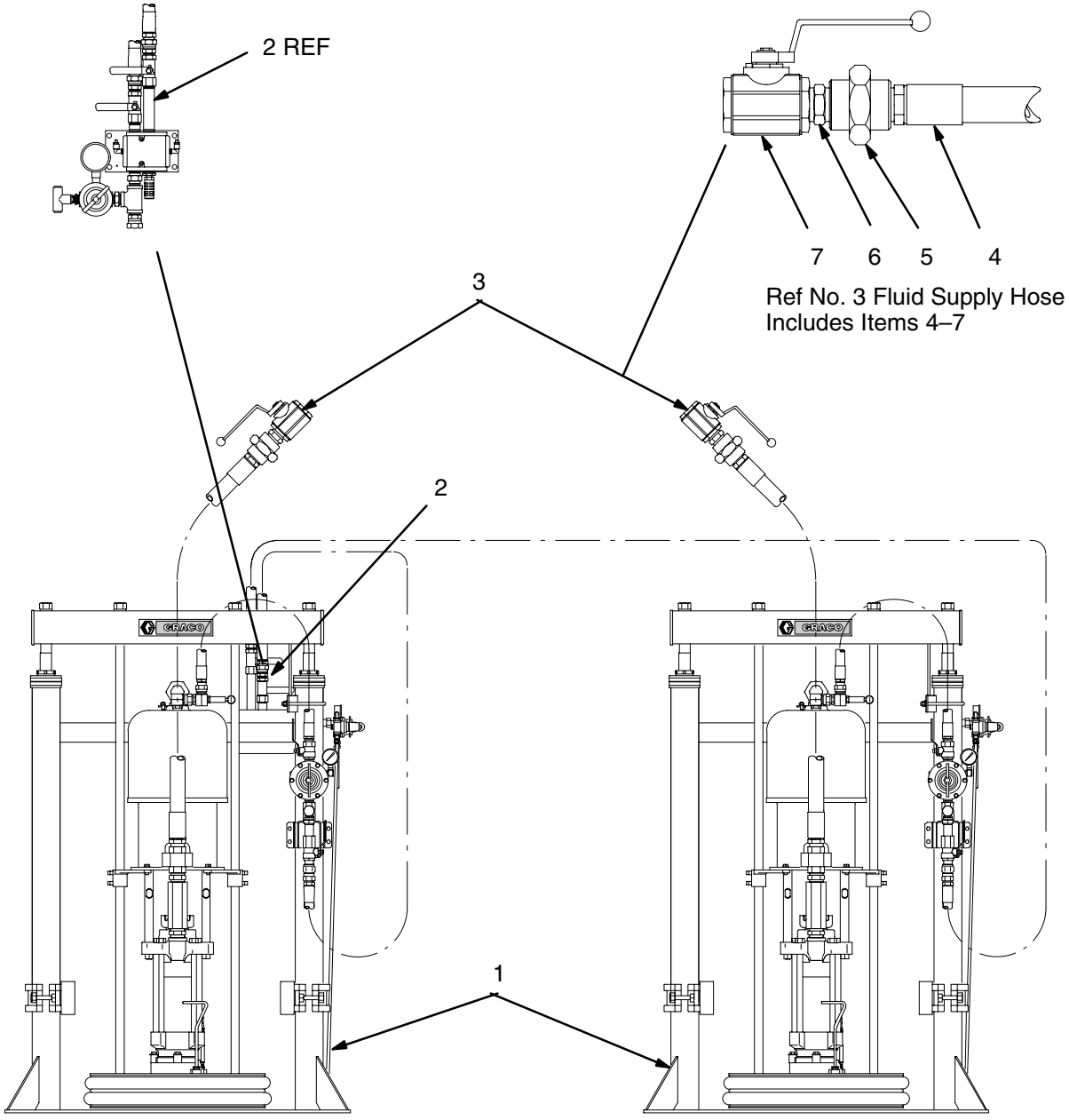
⚠ WARNING

To reduce the risk of serious injury whenever you are instructed to relieve pressure, always follow the **Pressure Relief Procedure** on page 12.

2. **Relieve pressure.**
3. Follow pump shutdown instructions in your separate pump manual.

Parts

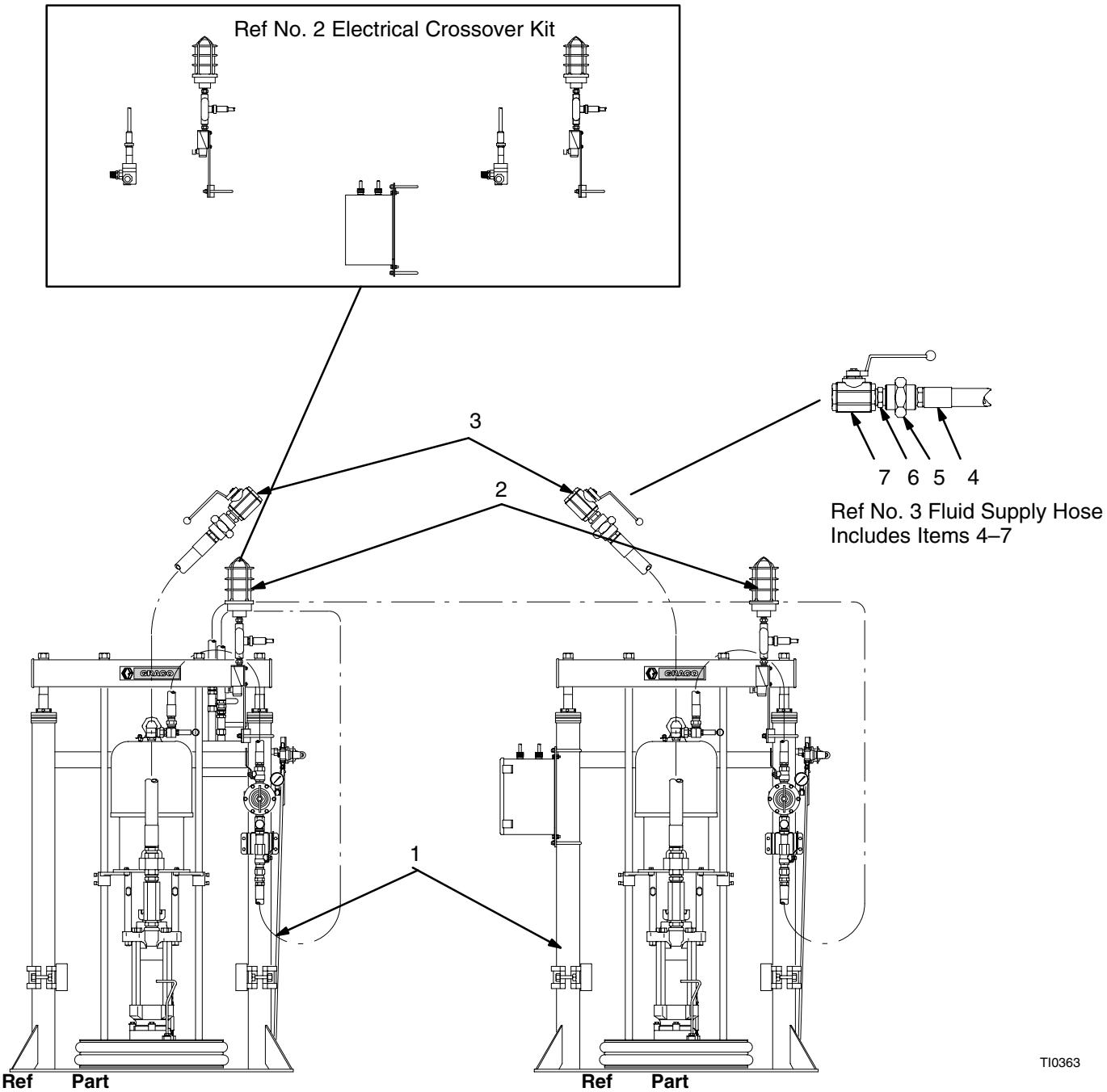
Models 970159 and 288649
Tandem with Pneumatic Crossover, 20:1 Ratio Quiet King Pump
Includes items 1–7



Ref No.	Part No.	Description	Qty
1	C59769	PUMP, ram–mounted 200 liter (55 gal.) for model 970159 See 308027 for parts	2
	288648	PUMP, ram–mounted 200 liter (55 gal.) for model 288649 See 308027 for parts	2
2	918468	KIT, pneumatic crossover See 310293 for parts	1
3	C56995	HOSE ASSEMBLY, fluid supply; Includes items 4–7	2
4	521973	. HOSE	1
5	521975	. UNION, pipe	1
6	C20490	. NIPPLE, hex	1
7	118854	. VALVE, ball	1

Parts

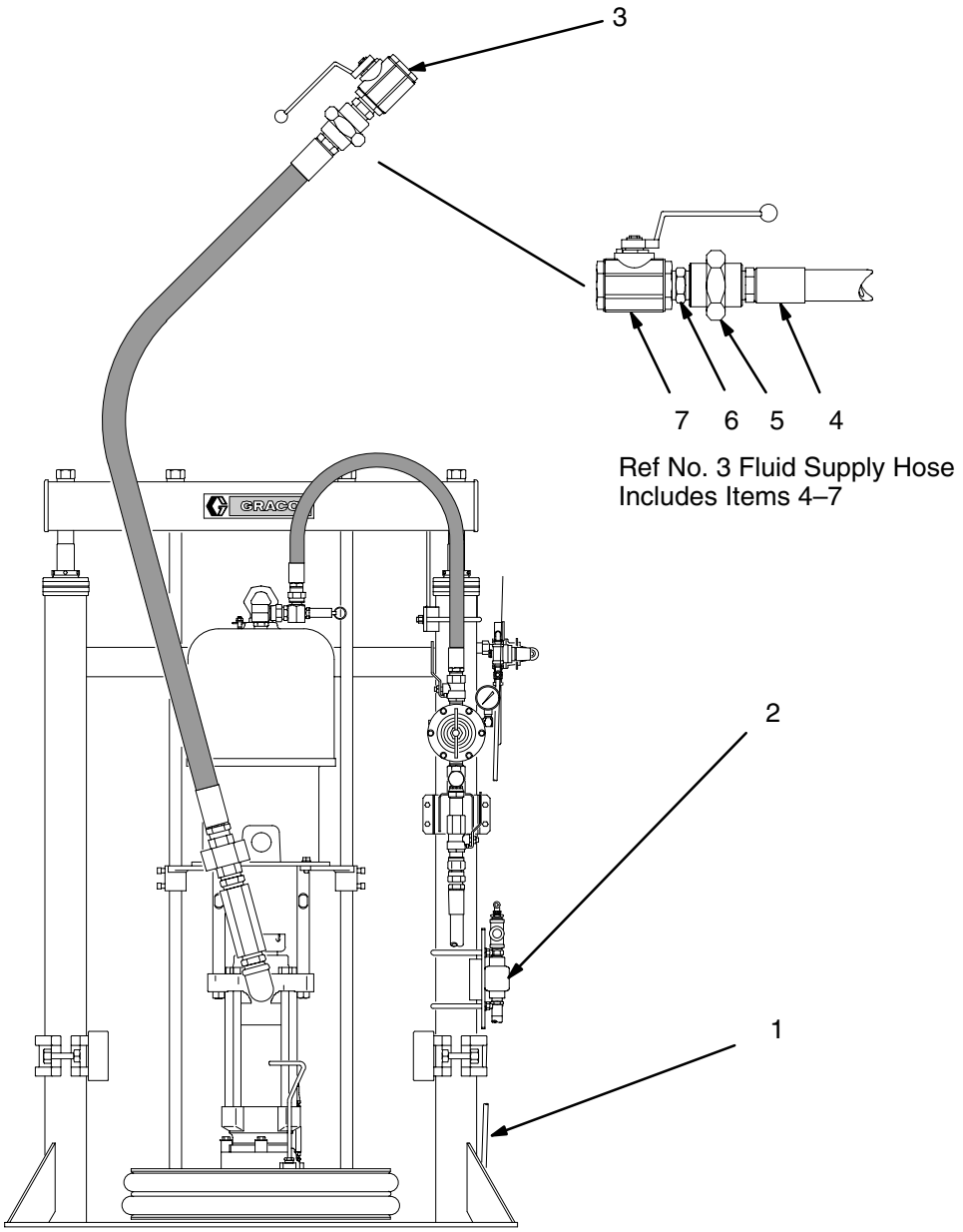
Model 970160
Tandem with Electrical Crossover, 20:1 Ratio Quiet King Pump
Includes items 1–7



Ref No.	Part No.	Description	Qty
1	C59769	PUMP, ram–mounted 200 liter (55 gal.) See 308027 for parts	2
2	C59519	KIT, electrical crossover See 310295 for parts	1
3	C56995	HOSE, fluid supply; Includes items 4–7	2
4	521973	. HOSE ASSEMBLY	1
5	521975	. UNION, pipe	1
6	C20490	. NIPPLE, hex	1
7	118854	. VALVE, ball	1

Parts

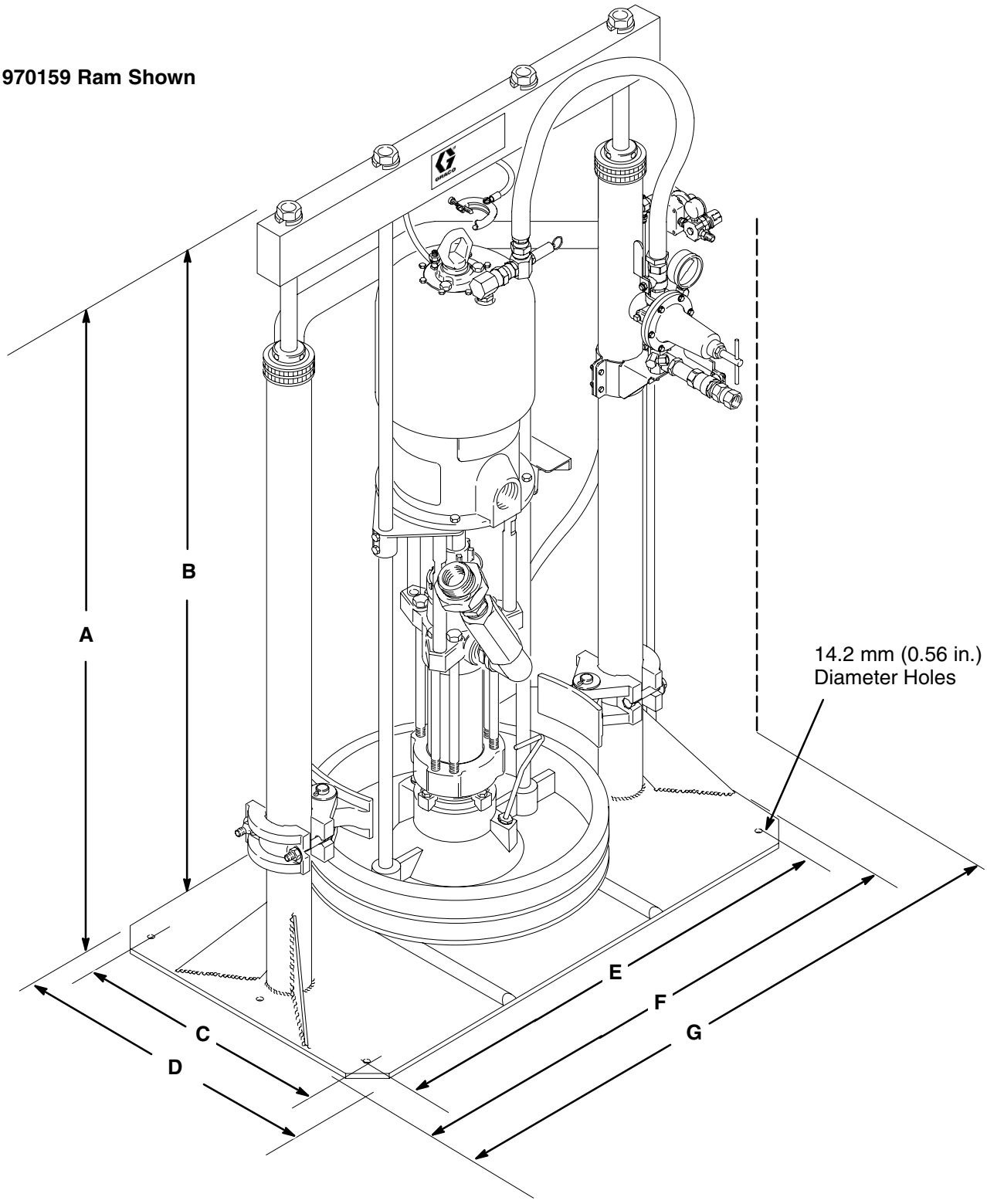
Model 970163
Supply Unit with Pneumatic Low Level Shut–Off, 20:1 Ratio Quiet King Pump
Includes items 1–7



Ref No.	Part No.	Description	Qty
1	C59769	PUMP, ram–mounted 200 liter (55 gal.)	
		See 308027 for parts	2
2	918478	KIT, shut–off, low level, pneumatic	
		See 310294 for parts	1
3	C56995	HOSE, fluid supply; Includes items 4–7	1
4	521973	. HOSE ASSEMBLY	1
5	521975	. UNION, pipe	1
6	C20490	. NIPPLE, hex	1
7	118854	. VALVE, ball	1

Ram Mounted Pump Clearance Dimensions

Model 970159 Ram Shown



Model	A (Raised)	B (Lowered)	C	D	E	F	G
All	2578 mm (101.5 in.)	1575 mm (62 in.)	533 mm (21 in.)	635 mm (25 in.)	965 mm (38 in.)	1067 mm (42 in.)	1111 mm (43.74 in.)

Notes

Technical Data

Model	Pump Model	Displacement Pump Model	Ratio	Maximum Fluid Working Pressure	Maximum Pump Air Input Pressure
970159	Quiet King™	Dura–Flow™ 2400	20:1	345 bar, 34 MPa (5000 psi)	6 bar, 0.6 MPa (90 psi)
970160	Quiet King™	Dura–Flow™ 2400	20:1	345 bar, 34 MPa (5000 psi)	6 bar, 0.6 MPa (90 psi)
970163	Quiet King™	Dura–Flow™ 2400	20:1	345 bar, 34 MPa (5000 psi)	6 bar, 0.6 MPa (90 psi)

Sound Data

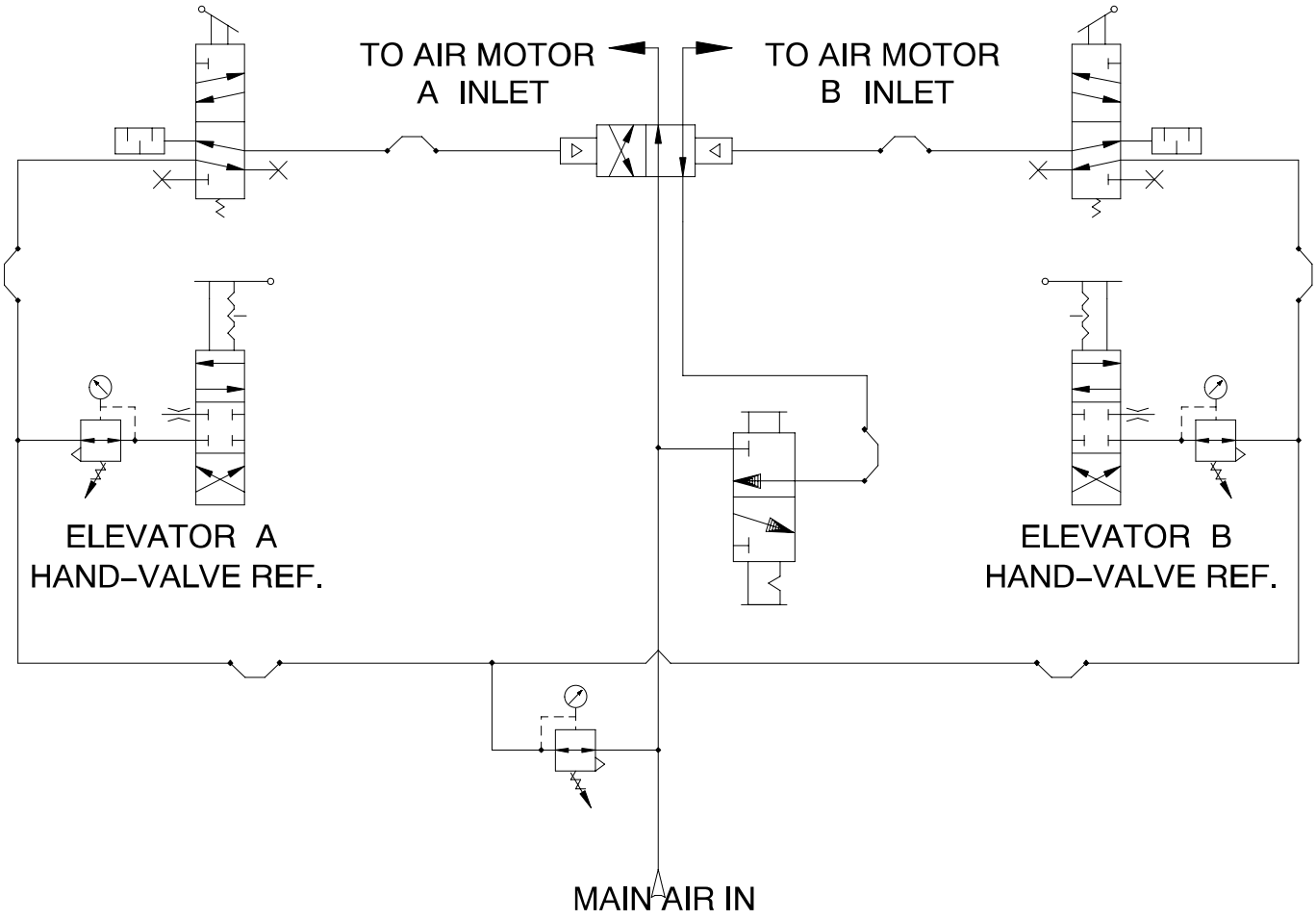
Part No.	Pump Model	Air Pressure of Sound Tests (25 cycles/min)	* Sound Pressure Level	** Sound Power Level
970159	Quiet King™	6 bar, 0.6 MPa (90 psi)	88 dBa	103 dBa
970160	Quiet King™	6 bar, 0.6 MPa (90 psi)	88 dBa	103 dBa
970163	Quiet King™	6 bar, 0.6 MPa (90 psi)	88 dBa	103 dBa

* Sound pressure was measured in accordance with Cagi Pneurop, 1969.
** Sound power was measured in accordance with ISO 3744, 1981.

Main air inlets [for 970159 (1) and 970160 (2)] . . . . . 3/4 in. npsm(f)
Main air inlet (for 970163) . . . . . 1/2 in. npt(f)
Material outlets [for 970159 (2), 970160 (2), and 970163 (1)] . . . . . 1–1/4 in. npt(f)
Maximum fluid flow (at 60 cpm) . . . . . 9 gpm (35 lpm)
Air consumption (at 75 psi and 60 cpm) . . . . . 3.8 scfm (2.8 m^3/min)
Wetted parts . . . . . *Fluid outlet fittings:* zinc or cadmium–plated carbon steel

Notes

Schematic



Pneumatic Crossover Schematic Diagram (Model 970159 only)

TI0389

Fig. 8

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.

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