

# Instructions – Parts List



PORTABLE, AIR-ASSISTED AIRLESS

## 10:1 Ratio Monark®

# Hydra-Spray® Pumps

307929J

*95 psi (0.66 MPa, 6.6 bar) MAXIMUM AIR INLET PRESSURE*  
*950 psi (6.6 MPa, 66 bar) MAXIMUM FLUID WORKING PRESSURE*

### Model 231158

For cold spray applications. Includes pump, cart, hose, gun and tip

### Model 231162, Series B

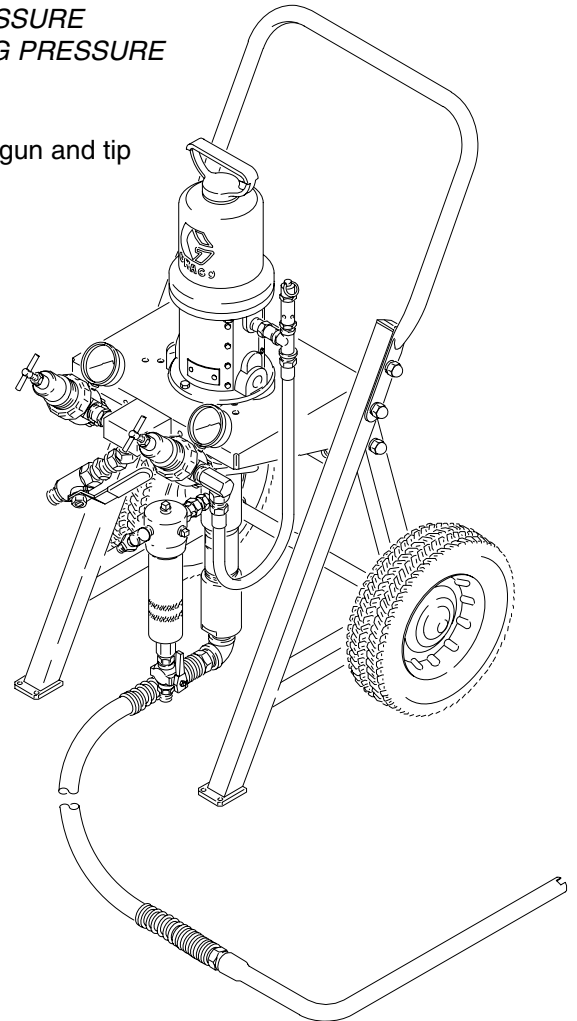
For cold spray applications. Includes pump, cart, fluid regulation kit 222564, hose, gun and tip

### Model 224629, Series A

For heated spray applications. Includes pump, cart, Viscon<sup>2</sup> heater, heater mounting kit 222262, and circulating kit 222436

### Model 231161

For heated spray applications. Includes pump, cart, Viscon<sup>2</sup> heater, heater mounting kit 222262, circulating kit 222436, hose, gun and tip



Model 231158 Shown



**Read warnings and instructions.**  
See page 2 for table of contents.

PROVEN QUALITY. LEADING TECHNOLOGY.



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# Symbols

## Warning Symbol



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

## Caution Symbol



This symbol alerts you to the possibility of damage to or destruction of equipment if you do not follow the corresponding 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 of the lowest rated system component. Refer to the **Technical Data** on page 23 for the maximum working pressure of this equipment.
- 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 exceed the maximum working pressure of the lowest rated system component. This equipment has a **950 psi (6.6 MPa, 66 bar) maximum working pressure**.
- Do not 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 82°C (180°F) or below -40°C (-40°F).
- Wear hearing protection when operating this equipment.
- Do not lift pressurized equipment.
- Comply with all applicable local, state, and national fire, electrical, and safety regulations.

# ⚠ WARNING



## 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 medical attention.**
- 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 14 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 air motor piston, can pinch or amputate your fingers.

- Keep clear of all moving parts when starting or operating the pump.
- Before servicing the equipment, follow the **Pressure Relief Procedure** on page 14 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 object being sprayed. Refer to **Grounding** on page 5.
- If there is any static sparking or you feel an electric shock while using this equipment, **stop spraying 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.



## 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.

# Installation

## General

Be sure that all operators read and understand this entire manual and the separate manuals supplied with components and accessories before using this equipment.

Reference numbers and letters in parentheses refer to the illustrations and the parts lists on pages 16–23.

Accessories mentioned in the text are available from your Graco distributor. If you supply your own accessories, be sure they are adequately sized to meet your system's requirements.

The Typical Installation shown in Fig. 2 is only an example. For assistance in designing a system to meet your particular needs, contact your Graco distributor.

## System Accessories

Refer to Fig. 2. Install an air line filter (A) in the main air line (B), to remove harmful dirt and moisture from the compressed air supply. To provide automatic lubrication of the air motor, install an air line lubricator (C) downstream from the pump air regulator (31). Install a second bleed valve (G) in the main air line, to isolate the accessories for servicing.

## Grounding

To reduce the risk of static sparking, ground the pump, object being sprayed, and all other spray equipment used or located in the spray area. Check your local electrical code for detailed grounding instructions for your area and type of equipment. Be sure to ground all of this spray equipment.

1. *Pump*: loosen the grounding lug locknut (W) and washer (X). Insert one end of a 1.5 mm<sup>2</sup> (12 ga) minimum ground wire (Y) into the slot in lug (Z) and tighten the locknut securely. See Fig. 1. Connect the other end of the wire to a true earth ground.

2. *Air hoses*: use only electrically conductive air hoses.
3. *Fluid hoses*: use only electrically conductive fluid hoses.
4. *Heater, if used*: refer to the Viscon<sup>2</sup> Heater manual, 307805.
5. *Air compressor*: follow manufacturer's recommendations.
6. *Spray gun*: grounding is obtained through connection to a properly grounded fluid hose and pump.
7. *Fluid supply container*: according to your local code.
8. *Object being sprayed*: according to your local code.
9. *All solvent pails used when flushing*, according to local code. Use only metal pails, which are conductive, placed on a grounded surface. Do not place the pail on a non-conductive surface, such as paper or cardboard, which interrupts the grounding continuity.
10. *To maintain grounding continuity when flushing or relieving pressure*, always hold a metal part of the spray gun firmly to the side of a grounded metal pail, then trigger the spray gun.

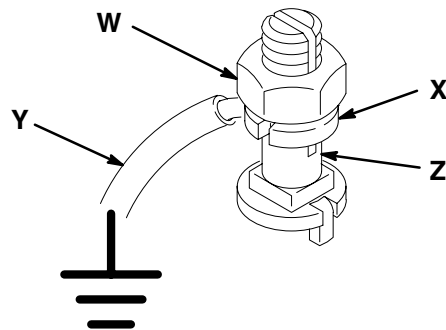
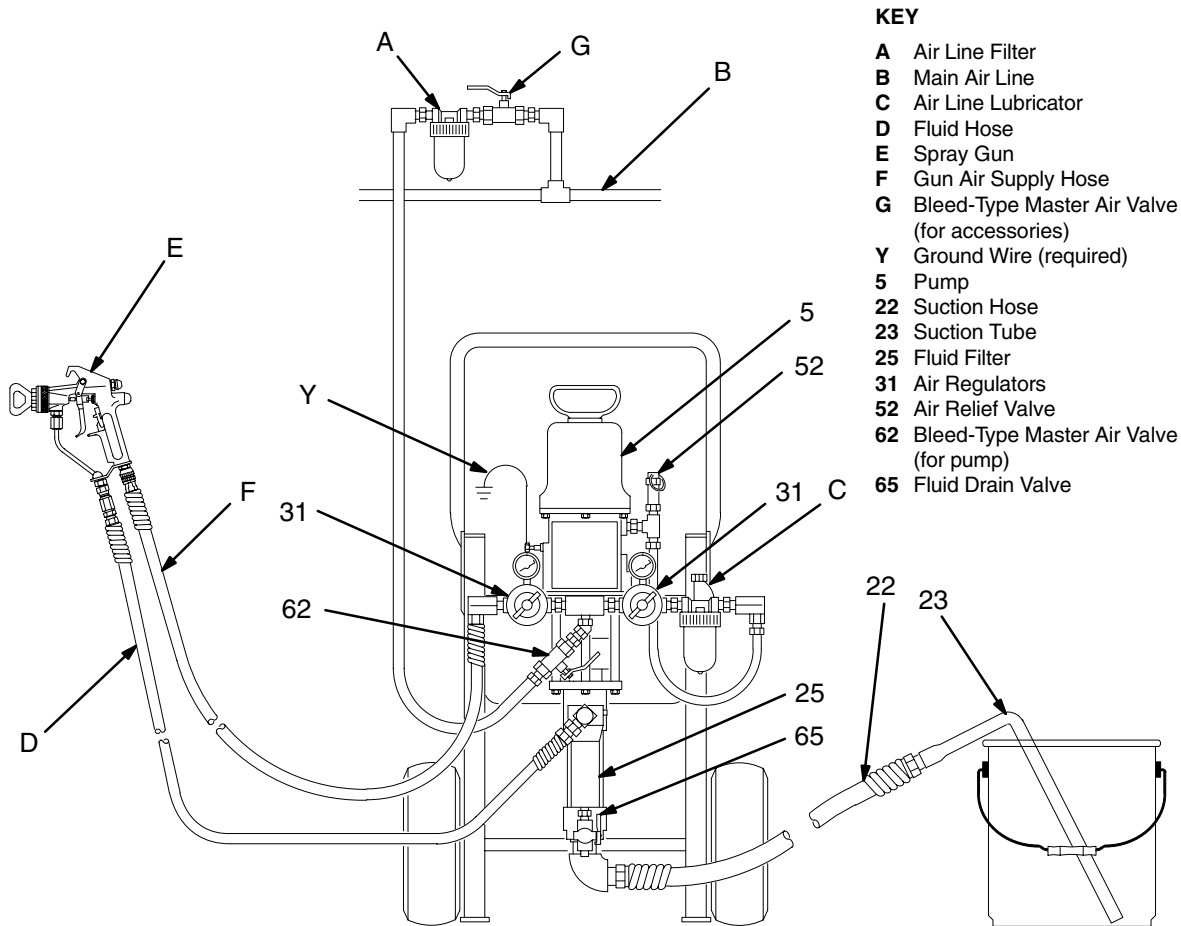


Fig. 1

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# Installation



## KEY

- A Air Line Filter
- B Main Air Line
- C Air Line Lubricator
- D Fluid Hose
- E Spray Gun
- F Gun Air Supply Hose
- G Bleed-Type Master Air Valve (for accessories)
- Y Ground Wire (required)
- 5 Pump
- 22 Suction Hose
- 23 Suction Tube
- 25 Fluid Filter
- 31 Air Regulators
- 52 Air Relief Valve
- 62 Bleed-Type Master Air Valve (for pump)
- 65 Fluid Drain Valve

Fig. 2

0972A

## ⚠ WARNING

Three required components are supplied in your system, to help reduce the risk of serious injury including fluid injection, splashing in the eyes or on the skin, overpressurization, or injury from moving parts if you are adjusting or repairing the pump.

The bleed-type master air valve (62) relieves air tapped between this valve and the pump. Trapped air can cause the pump to cycle unexpectedly. To bleed air from the pump, the pump air regulator must be open when you close this valve.

The air relief valve (52) opens automatically to relieve air pressure to the pump if the pressure exceeds a preset level. This valve prevents overpressurization of the spray gun.

The fluid drain valve (65) assists in relieving fluid pressure in the displacement pump, hose, and gun; triggering the gun to relieve pressure may not be sufficient.

## Hose and Gun Connections

Refer to the Typical Installation drawing (Fig. 2). Connect one end of the fluid hose (D) to the filter (25) outlet and the other to the fluid inlet of the gun (E). **Do not** install the spray tip in the gun yet. To use a second gun with the sprayer, refer to pages 11–13.

Close the bleed-type master air valve (62) and both the air regulators (31). Connect the main air line (B) to the bleed valve. Connect an air supply hose (F) to the outlet nipple of the gun (left) air regulator. Connect the other end of the hose to the gun's air inlet.

# Installation

## Installing Fluid Regulation Kit 222564 (Pump Model 231162)

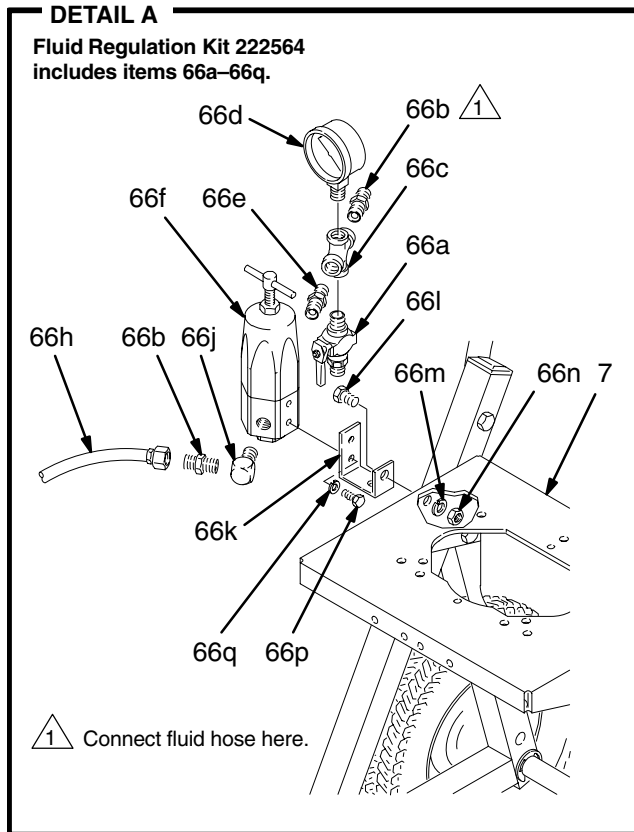
### **⚠ WARNING**

Before installing the fluid regulation kit, follow the **Pressure Relief Procedure** on page 14. Disconnect all hoses from the pump.

Assemble the fluid regulation kit (66) as shown in Detail A of Fig. 3. (Refer to the parts list on page 19.) Install the mounting bracket (66k) on the regulator (66f) using the two screws (66p) and lockwashers (66q). Connect the fluid regulator and bracket to the side of the cart (7) using the screw (66l), lockwasher (66m) and nut (66n). Connect the 22" (560 mm) hose (66h) to the outlet of the fluid filter (25).

Connect the gun air supply hose (F) between the air inlet of the gun (E) and the outlet nipple of the gun (left) air regulator. See Fig. 2.

Connect the fluid hose (D) between the gun fluid inlet and the outlet nipple (66b) of the fluid regulation kit.



66h (REF)  
(SEE DETAIL A)

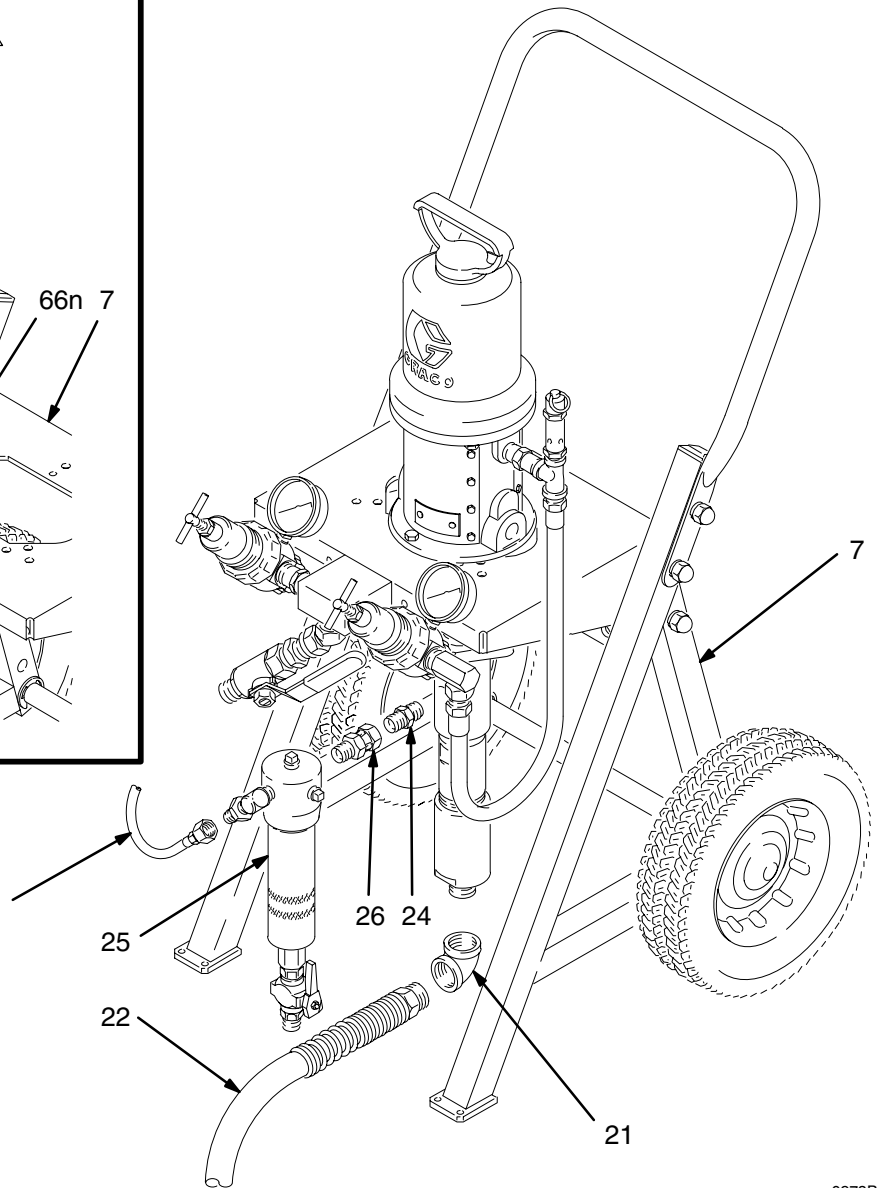


Fig. 3

# Installation

## Converting the Pump to a Heated Circulating System

To convert pump Model 231162 to a heated circulating unit, order the following:

- Viscon<sup>2</sup> Fluid Heater, Model 220522
- Heater Mounting Kit 222262
- Circulating Kit 222436
- Hose Kit 222264

### **⚠ WARNING**

The Viscon<sup>2</sup> Heater must be installed by a qualified electrician in compliance with all state and local codes and regulations, to reduce the risk of electric shock or other serious injury during installation or operation.

The heater requires a 120 VAC, single-phase, 16.7 Amp power supply. Refer to the Viscon<sup>2</sup> Heater Manual 307805 for further information.

Do not plug or unplug the power cord in any area containing flammable materials or fumes to avoid fire or explosion, which can result in serious injury.

**NOTE:** Reference numbers marked with an asterisk (for example, 68\*) are included in kit 222262.

Apply 110110 pipe sealant (included in the kit) to all male threads, except at swiveling connections.

1. Remove the cover from the electrical box (H) at the back of the heater (67). Screw the bushing (74\*) into the inlet of the electrical box. Install the cord grip elbow (75\*) in the bushing. See Fig. 4.
2. Thread the cord (76\*) through the elbow (75\*) and into the electrical box. Attach the black lead to the leftmost terminal, the white lead to the center terminal, and the green ground wire to the rightmost terminal. Tighten all terminal nuts to 30 in-lb (3.4 N.m). Tighten the nut on the cord grip elbow (75\*) to secure the cord. See Fig. 4.

### **⚠ WARNING**

The electrical cord (76\*) is rated for 105 °C (221 °F). Do not substitute a lower temperature rated, generally available cord.

**NOTE:** Mount the heater (67) on the back of the cart as follows. Two people are required to perform this operation.

3. Align the heater (67) mounting posts with the four holes at the back of the cart's pump support bracket (J). See Fig. 5. Secure the heater to the bracket with the M8 x 1.25 screws and lockwashers supplied with the heater.
4. Unscrew the swivel adapter (26) and remove the fluid filter (25) from the pump (5). Remove the adapter from the filter, and remove the 3/8 npt nipple (24) from the pump fluid outlet. See Fig. 3.

## Installing Heater Mounting Kit 222262

### **⚠ WARNING**

Before installing the heater, heater mounting kit and circulating kit, follow the **Pressure Relief Procedure** on page 14. Disconnect all hoses from the pump.

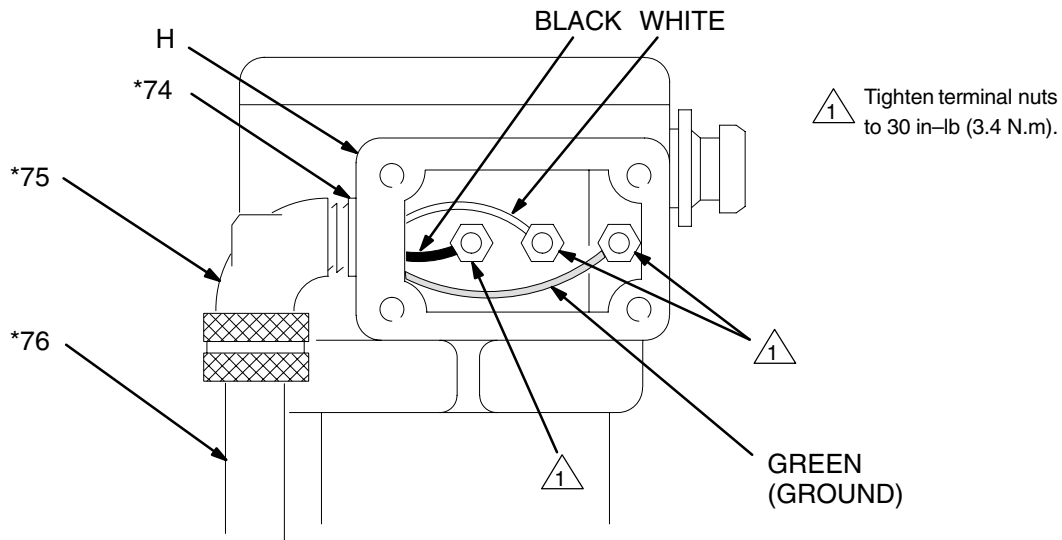


Fig. 4



# Installation

5. Screw the check valve (70\*) into the pump's fluid outlet, making certain that the arrow on the check valve points away from the pump. Screw the rigid end of the adapter (71\*) onto the check valve. See Fig. 5.
6. Install the 3/8 npt nipple (63\*) in the heater outlet. Screw the male end of the 90° swivel (19\*) into the inlet of the fluid filter (25). Screw the female end of the swivel (19\*) onto the nipple (63\*) at the heater outlet, and tighten securely.
7. Screw the elbow (72\*) into the heater's inlet. Attach the 1/2" x 3' (0.9 m) hose (73\*) to the elbow. Attach the other end of the hose to the swivel of the adapter (71\*) at the pump outlet.

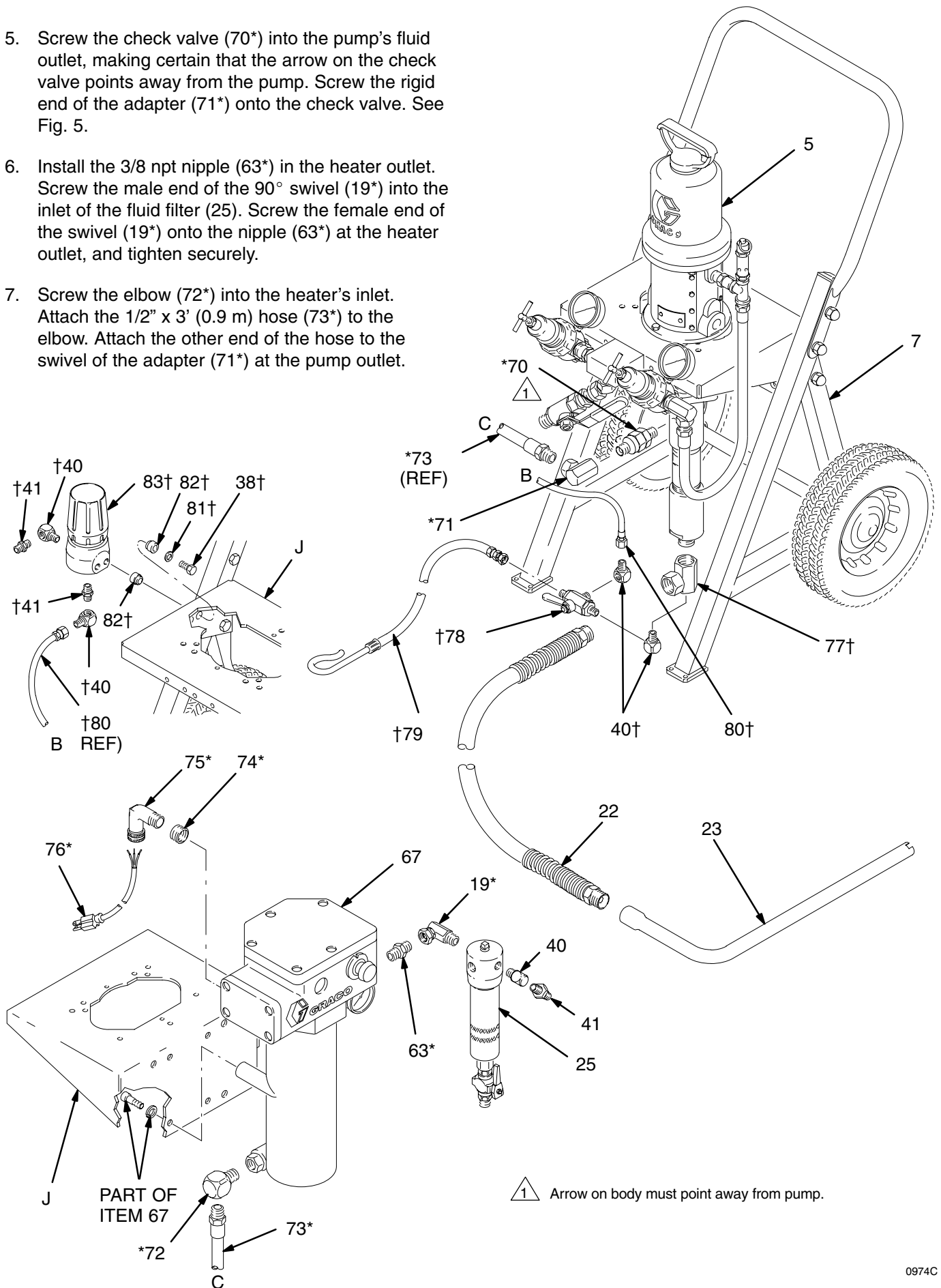


Fig. 5

# Installation

## Installing Circulating Kit 222436

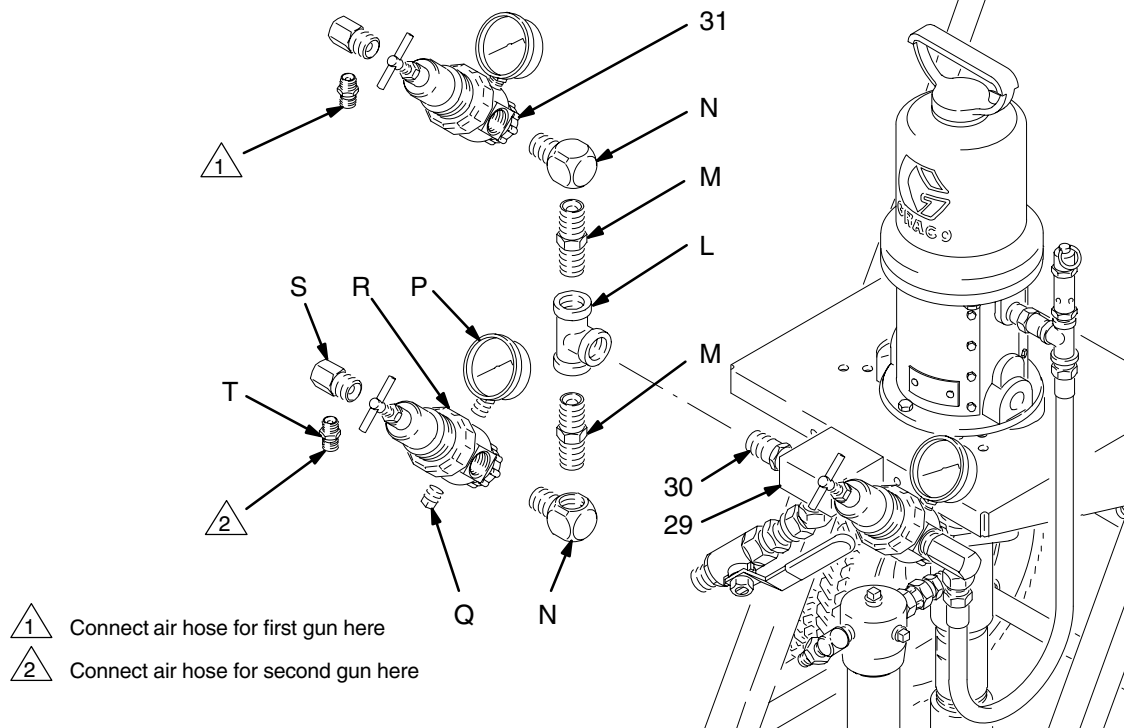
### **⚠ WARNING**

Before installing the heater, heater mounting kit and circulating kit, follow the **Pressure Relief Procedure** on page 14. Disconnect all hoses from the pump.

**NOTE:** Reference numbers marked with a symbol (for example, 77†), are included in kit 222436.

Apply 110110 pipe sealant (included in the kit) to all male threads, except at swiveling connections.

1. Unscrew the suction hose (22) from the pump intake elbow (21) and set the hose aside. Remove the elbow (21) from the pump intake and discard. See Fig. 3.
2. Screw the rigid end of the manifold (77†) onto the pump intake, and attach the suction hose (22) to the swivel end of the manifold. See Fig. 5.
3. Place a washer (81†) and insulator (82†) on each of the screws (38†). Insert the screws through the mounting holes on the left side of the pump support bracket (J), working from the inside. Place another insulator (82†) on each of the screws on the outside of the bracket. Use the screws to attach the back pressure regulator (83†) to the pump support bracket.
4. Screw one of the nipples (41†) into the outlet in the base of the back pressure regulator (83†), then screw one of the elbows (40†) onto the nipple so the male end of the elbow faces forward. Install another elbow (40†) in the inlet of the back pressure regulator, then install the other nipple (41†) in the elbow. Install plugs in the other regulator ports.
5. Screw an elbow (40†) into the open port of the pump fluid intake manifold (77†), so the female end of the elbow faces left. Install the CIRC end of the three-way ball valve (78†) in the elbow, so the valve handle is at the front.
6. Screw a second elbow (40†) onto the IN branch of the three-way valve (78†), so the elbow points upward. Connect one end of the hose (80†) to this elbow, and the other end to the nipple (41†) at the outlet of the back pressure regulator.
7. Connect the drain hose (79†) to the DRAIN end of the three-way valve (78†).
8. Connect the fluid return line to the nipple (41†) at the inlet of the back pressure regulator.
9. Connect the air and fluid hoses and gun as explained on page 6.



**Fig. 6** Air Regulator Connections for a Two-Gun System (All Models)

0975B

# Installation

## Converting to a Two-Gun System

To convert your sprayer to a two-gun system, refer to the following applicable paragraph for your model (refer to page 12 for Models 231162, 224629 and 231161). Order the parts listed, and perform the assembly procedure.

**Model 231158 (Refer to Figs. 6 and 7, and the Parts Drawing on page 16)**

### WARNING

Before performing this procedure, follow the **Pressure Relief Procedure** on page 14. Disconnect all hoses from the pump.

**NOTE:** Model 231158 includes a hose and gun set, so you should order only one additional gun, air hose and fluid hose.

Part No.	Description	Qty
156877	NIPPLE; 1/2 npt; 2.5" long	2
158683	ELBOW, 90°; 1/2 npt (m x f)	2
103475	TEE; 1/2 npt(f) run; 1/2 npt(f) branch	1
104267	AIR REGULATOR	1
101180	GAUGE, pressure, air	1
100509	PLUG, pipe; 1/4 npt	1
166999	ELBOW, street, reducing; 1/2 npt(m) x 1/4 npt(f)	1
162453	NIPPLE; 1/4 npt x 1/4 npsm	2
100840	ELBOW, street, 90°; 1/4 npt (m x f)	1
238852	GUN, spray, air-assisted airless	2
216069	HOSE, air; nylon; 1/4" ID; cpld 1/4 npsm (fbe) swivel; 26 ft (7.9 m) long	2
214698	HOSE, fluid; nylon; 3/16" ID; cpld 1/4 npsm(f) swivel x 1/4 npt(m); 25 ft (7.6 m) long	2

1. Remove the gun air regulator (31) from the nipple (30) coming off the air manifold (29). Do not remove any parts from the regulator. Save the regulator for use in step 4. See Fig. 6.
2. Install a 101180 Gauge (P) and 100509 Plug (Q) on a 104267 Air Regulator (R). Screw a 166999 Elbow (S) into the outlet port of this air regulator, and screw a 162453 Nipple (T) into the elbow.
3. Screw the branch of the 103475 Tee (L) onto the nipple (30) at the air manifold (29). Install a 156877 Nipple (M) in each open port of the tee. Screw a 158683 Elbow (N) onto each nipple.
4. Install the air regulator removed in step 1 onto one of the elbows (N). This is the air control for the first gun. Install the air regulator assembled in step 2 onto the other elbow (N), so both regulators are facing the same way. This is the air control for the second gun.
5. Remove the plug (27) from the optional outlet port of the fluid filter (25). Install a 100840 Elbow (V) and 162453 Nipple (T) in its place. See Detail A of Fig. 7. This is the fluid connection for the second gun.
6. Connect the fluid and air hoses to the guns as explained on page 6 (see Detail D of Fig. 7).

# Installation

**Model 231162 (Refer to Figs. 6 and 7, and the Parts Drawing on page 18)**

## ⚠ WARNING

Before performing this procedure, follow the **Pressure Relief Procedure** on page 14. Disconnect all hoses from the pump.

**NOTE:** Model 231162 includes a hose and gun set, so you should order only one 238852 Gun, 216069 Air Hose, and 214698 Fluid Hose.

Part No.	Description	Qty
156877	NIPPLE; 1/2 npt; 2.5" long	2
158683	ELBOW, 90°; 1/2 npt (m x f)	2
103475	TEE; 1/2 npt(f) run; 1/2 npt(f) branch	1
104267	AIR REGULATOR	1
101180	GAUGE, pressure, air	1
100509	PLUG, pipe; 1/4 npt	1
166999	ELBOW, street, reducing; 1/2 npt(m) x 1/4 npt(f)	1
103048	TEE, street; 1/4 npt(f) branch; 1/4 npt(f) x 1/4 npt(m) run	1
162453	NIPPLE; 1/4 npt x 1/4 npsm	2
238852	GUN, spray, air-assisted airless	1
216069	HOSE, air; nylon; 1/4" ID; cpld 1/4 npsm (fbe) swivel; 26 ft (7.9 m) long	1
214698	HOSE, fluid; nylon; 3/16" ID; cpld 1/4 npsm(f) swivel x 1/4 npt(m); 25 ft (7.6 m) long	1

1. Perform steps 1–4 of the procedure for Model 231158 (see page 11).
2. Unscrew the gauge (66d) from the cross (66c) of the fluid regulation kit. Install the 103048 Tee (U) in the cross (see Detail B of Fig. 7). Screw a 162453 Nipple (T) in the branch of the tee (U). Screw the gauge (66d) in the open port of the tee. This is the fluid connection for the second gun.
3. Connect the fluid and air hoses to the guns as explained on page 6 (see Detail D of Fig. 7).

**Models 224629 and 231161 (Refer to Figs. 6 and 7, and the Parts Drawing on page 20)**

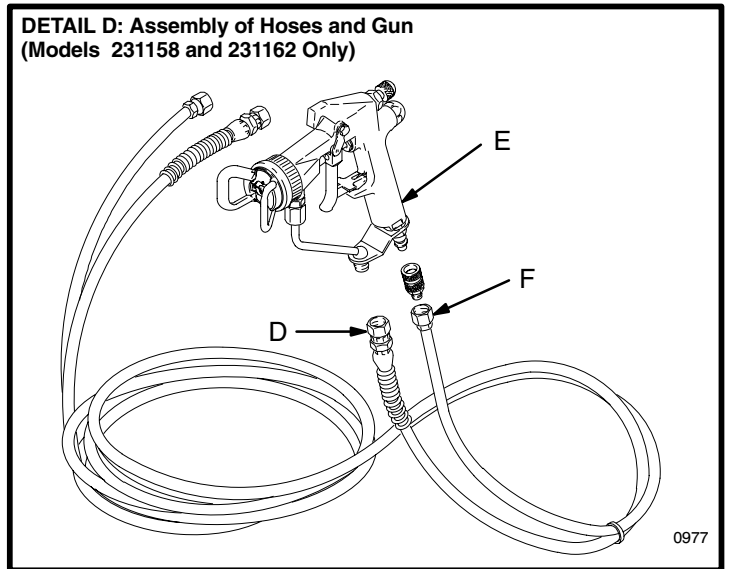
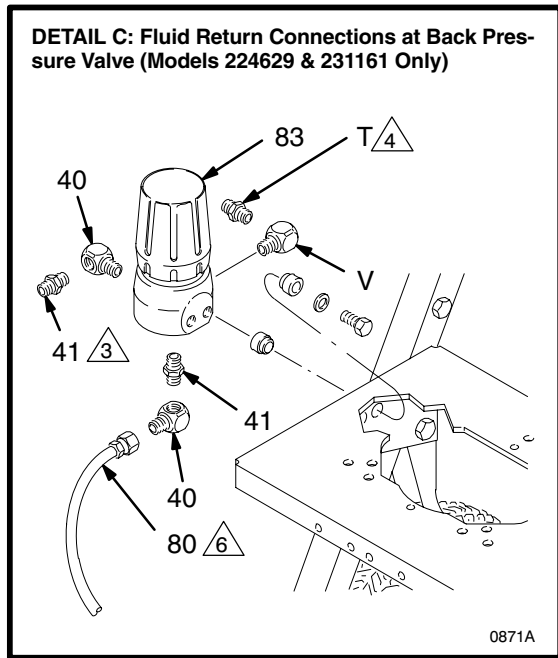
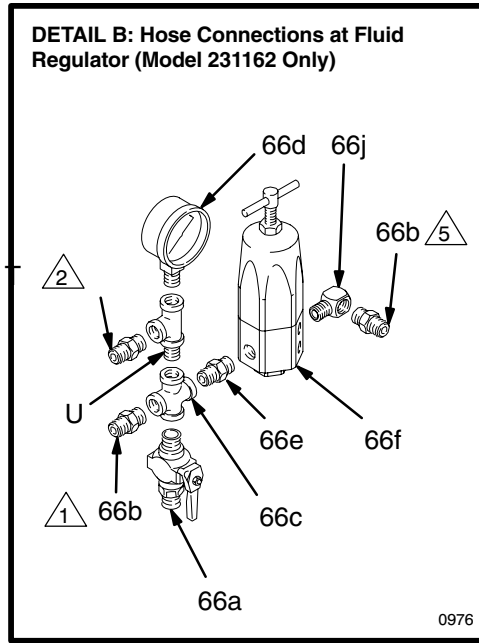
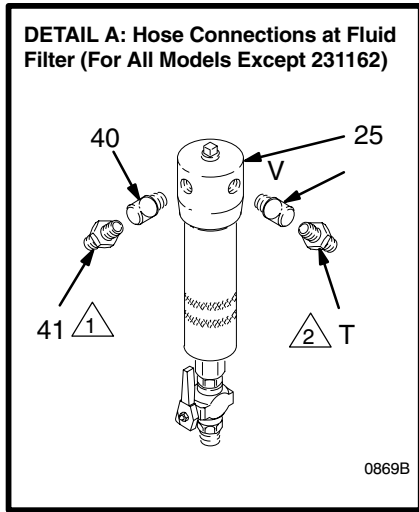
## ⚠ WARNING

Before performing this procedure, follow the **Pressure Relief Procedure** on page 14. Disconnect all hoses from the pump.

**NOTE:** For Model 224629, order two 238852 Guns and two 222264 Hose Kits. Model 231161 includes a gun and a hose kit, so you should order only one additional gun and hose kit.

Part No.	Description	Qty
156877	NIPPLE; 1/2 npt; 2.5" long	2
158683	ELBOW, 90°; 1/2 npt (m x f)	2
103475	TEE; 1/2 npt(f) run; 1/2 npt(f) branch	1
104267	AIR REGULATOR	1
101180	GAUGE, pressure, air	1
100509	PLUG, pipe; 1/4 npt	1
166999	ELBOW, street, reducing; 1/2 npt(m) x 1/4 npt(f)	1
162453	NIPPLE; 1/4 npt x 1/4 npsm	3
100840	ELBOW, street, 90°; 1/4 npt (m x f)	3
238852	GUN, spray, air-assisted airless	2
222264	HOSE KIT, insulated; nylon; two fluid lines, one air line; 1/4" ID; cpld 1/4 npsm (fbe) swivel; 25 ft (7.6 m) long	2

1. Perform steps 1–5 of the procedure for Model 231158 (see page 11).
2. Install the 100840 Elbow (V) in the optional inlet of the back pressure valve (83). Screw a 162453 Nipple (T) into the elbow (V). See Detail C of Fig. 7. This is the return line connection for the second gun.
3. Connect the fluid and air lines of one of the insulated hose kits (AA) to the fluid and air inlets of one of the guns (E). Repeat for the other hose kit and gun. See Detail E of Fig. 7.
4. Connect the air line of one of the hose kits (see Detail E) to the outlet nipple of one of the air regulators (see Fig. 6). Connect the air line of the second hose kit to the outlet nipple of the other air regulator.
5. Connect the fluid supply line of the first hose kit (AA) to the outlet elbow (40) of the fluid filter (25). Connect the fluid supply line of the second hose kit to the other outlet elbow (V). See Detail A of Fig. 7. Similarly, connect the fluid return lines of the two hose kits to the inlet nipples (41 and T) of the back pressure regulator (83). See Detail C.



- △1 To first gun
- △2 To second gun
- △3 From first gun
- △4 From second gun
- △5 From fluid filter
- △6 To 3-way valve
- △7 Fluid line
- △8 Air line
- △9 Fluid return line

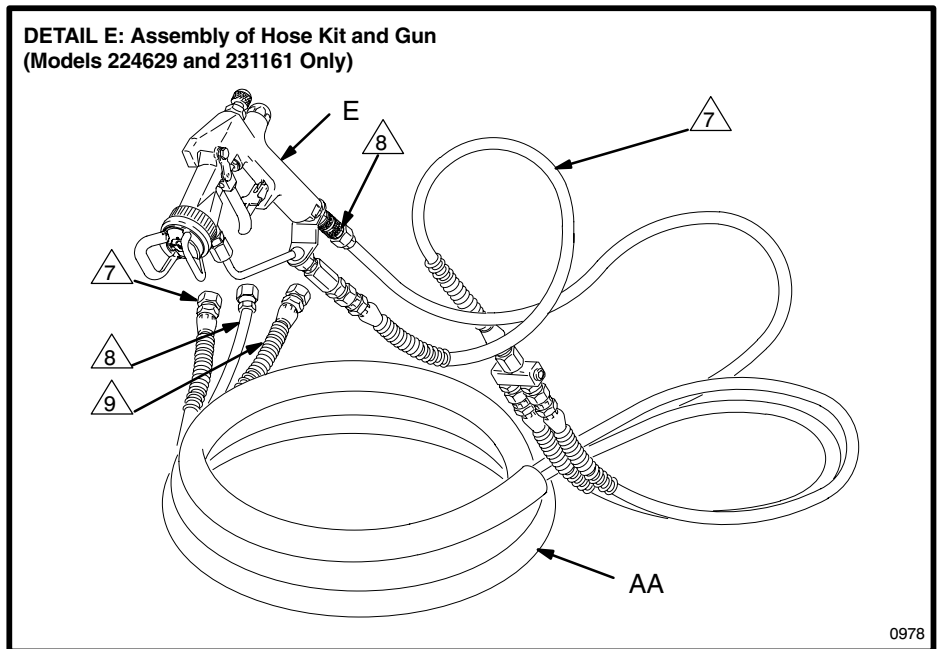
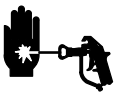


Fig. 7

# Operation

## Pressure Relief Procedure

### WARNING



#### INJECTION HAZARD

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 spraying,
- check or service any of the system equipment,
- or install or clean the spray tip.

1. Lock the spray gun trigger safety.
2. Shut off the main power to the heater, if used. Circulate the fluid for at least 10 minutes to allow it and the heater to cool.
3. Close the bleed-type master air valve (supplied in your system).
4. Shut off the air regulators.
5. Unlock the spray gun trigger safety.
6. Hold a metal part of the spray gun firmly to the side of a grounded metal pail, and trigger the spray gun to relieve pressure.
7. Lock the spray gun trigger safety.
8. Open the drain valve (supplied in your system), having a container ready to catch the drainage.
9. Leave the drain valve open until you are ready to spray again.

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

### WARNING

For your safety, before operating the equipment be sure all operators have read and fully understand all the warnings, cautions, and instructions in this manual and all manuals supplied with each component or accessory.

## Flush the Pump Before Using

Pumps are tested with lightweight oil which is left in to protect the pump parts. To prevent contamination of the fluid, flush the pump with a compatible solvent before using it.

### WARNING

Before flushing, be sure the entire system and flushing pails are properly grounded. Refer to **Grounding** on page 5. Follow the **Pressure Relief Procedure** at left, and remove the spray tip from the gun. Always use the lowest possible fluid pressure, and maintain firm metal-to-metal contact between the gun and the pail during flushing to reduce the risk of fluid injection, static sparking, and splashing in the eyes or on the skin.

## Starting and Adjusting the Pump

Be sure the air regulators (31) and bleed-type master air valve (62) are closed. **Do not install the spray tip yet!**

Place the suction tube (23) in the fluid pail. Open the drain valve (65) for priming. Open the bleed-type master air valve and the gun air regulator (clockwise). Hold a metal part of the spray gun firmly to the side of a grounded metal pail and trigger the gun. Slowly open the pump air regulator (clockwise) until the pump starts. Allow the pump to cycle slowly until all the air is pushed out of the fluid lines. Release the gun trigger and engage the safety latch; the pump will stall against the pressure.

With the pump and lines primed, and with adequate air pressure and volume supplied, the pump will start and stop as the spray gun is triggered and released.

Follow the **Pressure Relief Procedure Warning** at left, then install the spray tip in the gun.

# Operation

Use the pump air regulator to control the pump speed and fluid pressure. Always use the lowest pressure necessary to achieve the desired results. Higher pressures waste fluid and cause premature wear of the pump packings and spray tip.

The fluid regulator (66f) used on model 231162 is a fluid pressure type. It allows you to run the pump at an “efficient” air pressure (above 30 psi [2.1 bar]) while adjusting fluid pressure with the regulator. The back pressure regulator (83) used on models 224629 and 231161 does the same by requiring a minimum flow rate and also setting the minimum circulating rate needed to prevent fluid from settling.

Keep the wet-cup filled with Graco Throat Seal Liquid (TSL) or other compatible solvent, to help prolong the packing life.

Never allow the pump to run dry of the fluid being pumped. A dry pump will quickly accelerate to a high speed, possibly damaging itself. If your pump accelerates quickly, or is running too fast, stop it immediately and check the fluid supply. If the supply container is empty and air has been pumped into the lines, refill the supply container and prime the pump and lines with fluid, being sure to eliminate all air from the fluid system, or flush the pump as described in **Shutdown and Care**, at right.

## Heated Systems

Operating instructions for a heated circulating system are provided in the Viscon<sup>2</sup> Heater manual, 307805. Read and understand all warnings and instructions in the heater manual before operating a heated system.

The three-way ball valve (78) can be set for either fluid circulation or draining. To circulate fluid back to the pump, turn the handle toward the CIRC end of the valve. To drain fluid, turn the handle toward the DRAIN end.

## Shutdown and Care

### **WARNING**

To reduce the risk of serious injury whenever you are instructed to relieve pressure, always follow the **Pressure Relief Procedure** on page 14.

Always **relieve the pressure** whenever you shut off the pump. Stop the pump at the bottom of its stroke to keep fluid from drying on the exposed displacement rod and damaging throat packings.

Always flush the pump with a compatible solvent before the fluid can dry on the displacement rod, and at the end of each day. If you are pumping water-based fluid, flush first with water and then with mineral spirits to protect the pump parts. If you are pumping oil-based fluids, flush with mineral spirits only.

Relieve pressure and leave the mineral spirits in the pump to prevent corrosion.





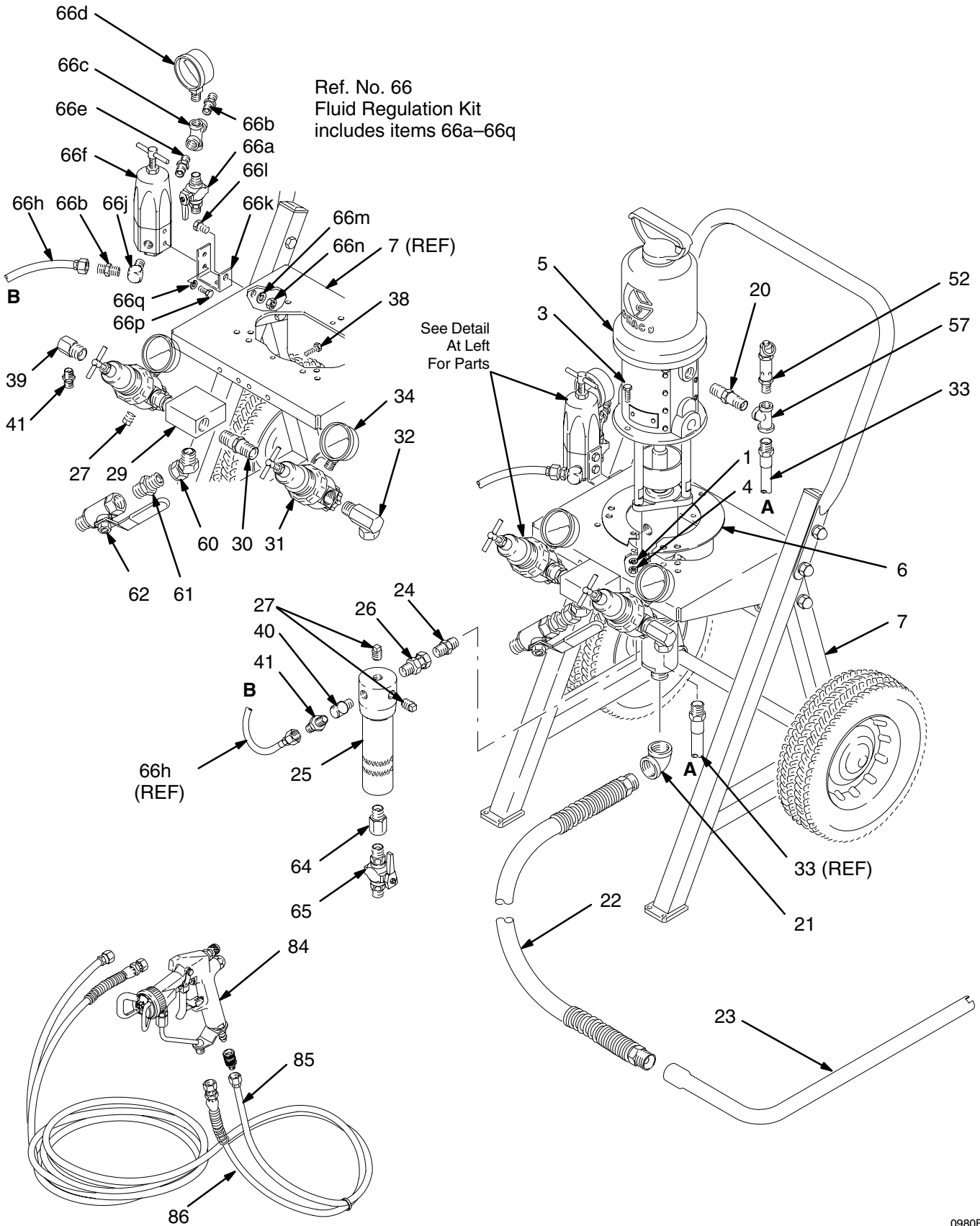
# Parts

## Model 231158

Ref No.	Part No.	Description	Qty	Ref No.	Part No.	Description	Qty
1	100016	LOCKWASHER, spring;1/4"	2	34	101180	GAUGE, pressure, air;	
3	100022	CAPSCREW, hex hd;				0–200 psi (0–14 bar)	2
		1/4–20 x 3/4" long	2	38	102254	SCREW, hex hd; 1/4–20 x 7/8" long	2
4	100015	NUT, hex; 1/4–20	2	39	166999	ELBOW, street, reducing;	
5	217523	10:1 MONARK PUMP				1/2 npt(m) x 1/4 npt(f)	1
		See 307595 for parts	1	40	100840	ELBOW, street, 90°; 1/4 npt (mxf)	1
6	188595	MOUNTING PLATE, pump	1	41	162453	NIPPLE; 1/4 npt x 1/4 npsm	2
7	224044	CART, universal		42	206994	THROAT SEAL LIQUID;	
		See 308136 for parts	1			8 oz (not shown)	1
20	160790	NIPPLE; 3/8 npt	1	52	103347	VALVE, relief, air	1
21	100349	ELBOW, 90°; 3/4 npt (fbe)	1	57	171987	TEE; 3/8 npt x 1/4 npt run;	
22	214960	HOSE, suction; 3/4" ID; nylon;				3/8 npt branch	1
		coupled 3/4 npt (mbe);		60	222297	UNION, adapter, 45°;	
		3.5' (1 m) long, w/spring guard	1			1/2 npt(m) x 1/2 npsm(f) swivel	1
23	165767	SUCTION TUBE; 3/8 npt;		61	158491	NIPPLE; 1/2 npt; 1–5/8" long	1
		18" (457 mm) long	1	62	107142	VALVE, air, bleed-type; 1/2 npt (m x f)	1
24	156849	NIPPLE; 3/8 npt; 1.5" long	1	64	150286	ADAPTER; 3/8 npt (m x f)	1
25	218029	FLUID FILTER		65	210658	DRAIN VALVE; 3/8 npt(mbe)	
		See 307273 for parts	1			See 306861 for parts	1
26	155665	UNION, adapter, straight;		84	238852	AIR-ASSISTED AIRLESS	
		3/8 npt(m) x 3/8 npsm(f) swivel	1			SPRAY GUN	
27	100509	PLUG, pipe, sq hd;1/4 npt	4			See 308640 for parts	1
29	179749	MANIFOLD, air; 1/2 npt inlet;		85	216069	HOSE, air; nylon; 1/4" ID;	
		two 1/2 npt outlets	1			cpld 1/4 npsm (fbe) swivel;	
30	156877	NIPPLE; 1/2 npt; 2.5" long	2			26 ft (7.9 m) long	1
31	104267	AIR REGULATOR		86	214698	HOSE, fluid; nylon; 3/16" ID;	
		0–125 psi (0–9 bar) range				cpld 1/4 npsm(f) swivel x	
		See 308167 for parts	2			1/4 npt(m); 25 ft (7.6 m) long;	
32	161037	UNION, adapter, 90°;				spring guards both ends	1
		1/2 npt(m) x 3/8 npsm(f) swivel	1	93	GG4XXX	SPRAY TIP, customer choice	1
33	204560	HOSE, air; buna-N; 3/8" ID;					
		cpld 3/8 npt (mbe); 18" (457 mm) long	1				

# Parts

## Model 231162, Series B



# Parts

## Model 231162, Series B

Ref No.	Part No.	Description	Qty	Ref No.	Part No.	Description	Qty
1	100016	LOCKWASHER, spring; 1/4"	2	61	158491	NIPPLE; 1/2 npt; 1–5/8" long	1
3	100022	CAPSCREW, hex hd; 1/4–20 x 3/4" long	2	62	107142	VALVE, air, bleed-type; 1/2 npt (m x f)	1
4	100015	NUT, hex; 1/4–20	2	64	150286	ADAPTER; 3/8 npt (m x f)	1
5	217523	10:1 MONARK PUMP See 307595 for parts	1	65	210658	DRAIN VALVE; 3/8 npt(mbe) See 306861 for parts	1
6	188595	MOUNTING PLATE, pump	1	66	222564	FLUID REGULATION KIT Includes items 66a–66q	1
7	224044	CART, universal See 308136 for parts	1	66a	210657	. VALVE, ball; 1/4 npt (mbe)	1
20	160790	NIPPLE; 3/8 npt	1	66b	162453	. NIPPLE; 1/4 npt x 1/4 npsm (only 2 used with this sprayer)	3
21	100349	ELBOW, 90°; 3/4 npt (fbe)	1	66c	102959	. CROSS, pipe; 1/4 npt(f)	1
22	214960	HOSE, suction; 3/4" ID; nylon; coupled 3/4 npt (mbe); 3.5' (1 m) long, w/spring guard	1	66d	101696	. GAUGE, pressure, fluid; 0–1000 psi (0–69 bar) range	1
23	165767	SUCTION TUBE; 3/8 npt; 18" (457 mm) long	1	66e	156971	. NIPPLE; 1/4 npt	1
24	156849	NIPPLE; 3/8 npt; 1.5" long	1	66f	222121	. FLUID PRESSURE REGULATOR See 307886 for parts	1
25	218029	FLUID FILTER See 307273 for parts	1	66g☆	110220	. ADAPTER, 45°; 1/4 npt(m) x 1/4 npsm(f) swivel	1
26	155665	UNION, adapter, straight; 3/8 npt(m) x 3/8 npsm(f) swivel	1	66h	110192	. HOSE; PTFE; 0.20" ID; cpld 1/4 npsm (fbe) swivel; 22" (560 mm) long	1
27	100509	PLUG, pipe, sq hd; 1/4 npt	4	66j	100840	. ELBOW, street, 90°; 1/4 npt (m x f) (only 1 used with this sprayer)	2
29	179749	MANIFOLD, air; 1/2 npt inlet; two 1/2 npt outlets	1	66k	185251	. BRACKET, regulator	1
30	156877	NIPPLE; 1/2 npt; 2.5" long	2	66l	100469	. SCREW, cap, hex hd; 3/816 x 3/4" long	1
31	104267	AIR REGULATOR 0–125 psi (0–9 bar) range See 308167 for parts	2	66m	100133	. LOCKWASHER; 3/8"	1
32	161037	UNION, adapter, 90°; 1/2 npt(m) x 3/8 npsm(f) swivel	1	66n	100307	. NUT, hex; 3/8–16 unc	1
33	204560	HOSE, air; buna-N; 3/8" ID; cpld 3/8 npt (mbe); 18" (457 mm) long	1	66p	100270	. SCREW, cap, hex hd; 1/4–20 x 5/8" long	2
34	101180	GAUGE, pressure, air; 0–200 psi (0–14 bar)	2	66q	100016	. LOCKWASHER; 1/4"	2
38	102254	SCREW, hex hd; 1/4–20 x 7/8" long	2	84	238852	AIR-ASSISTED AIRLESS SPRAY GUN See 308640 for parts	1
39	166999	ELBOW, street, reducing; 1/2 npt(m) x 1/4 npt(f)	1	85	216069	HOSE, air; nylon; 1/4" ID; cpld 1/4 npsm (fbe) swivel; 26 ft (7.9 m) long	1
40	100840	ELBOW, street, 90°; 1/4 npt (mx f)	1	86	214698	HOSE, fluid; nylon; 3/16" ID; cpld 1/4 npsm(f) swivel x 1/4 npt(m); 25 ft (7.6 m) long; spring guards both ends	1
41	162453	NIPPLE; 1/4 npt x 1/4 npsm	2				
42	206994	THROAT SEAL LIQUID; 8 oz (not shown)	1				
52	103347	VALVE, relief, air	1				
57	171987	TEE; 3/8 npt x 1/4 npt run; 3/8 npt branch	1	93	GG4XXX	SPRAY TIP, customer choice	1
60	222297	UNION, adapter, 45°; 1/2 npt(m) x 1/2 npsm(f) swivel	1				

☆ This part of the Fluid Regulation Kit is not pictured as it is not used on this sprayer.

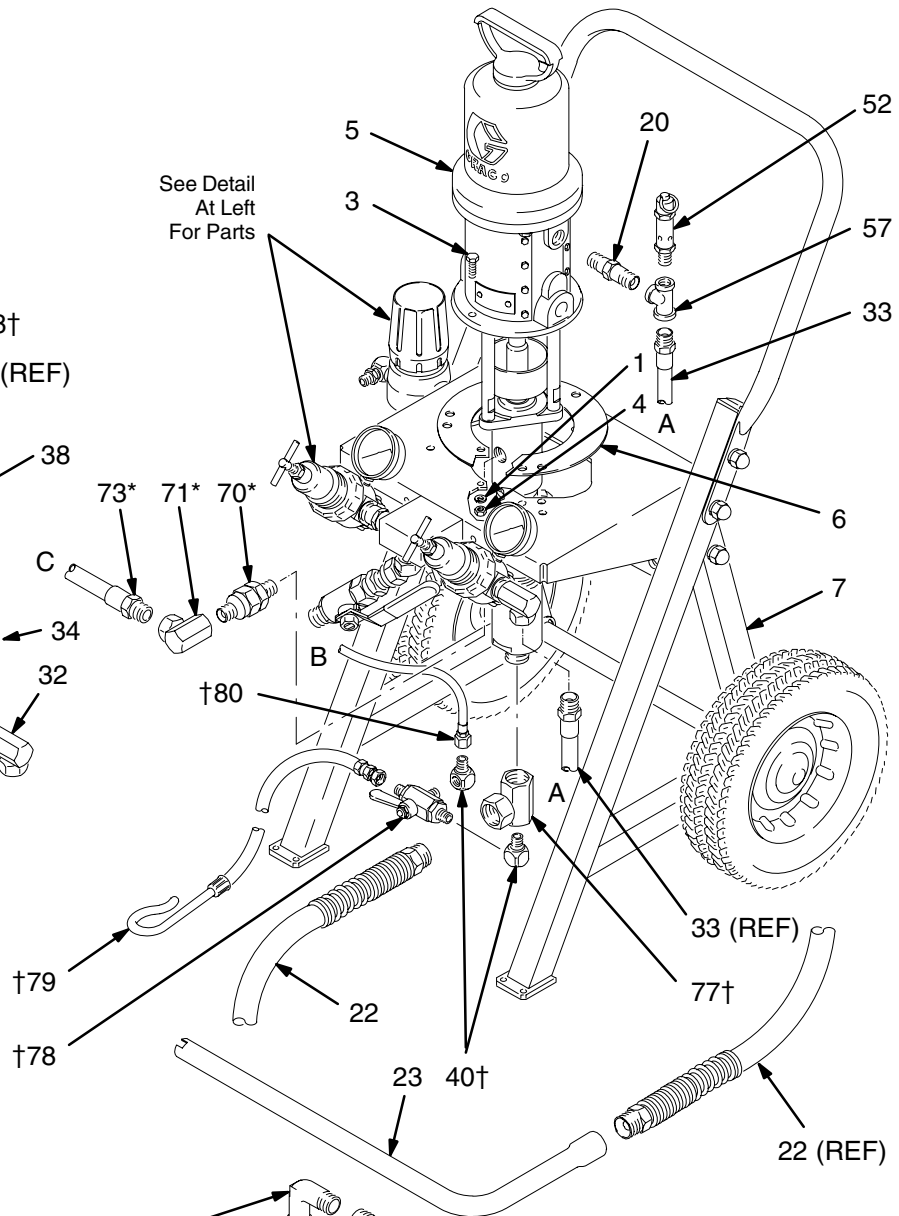
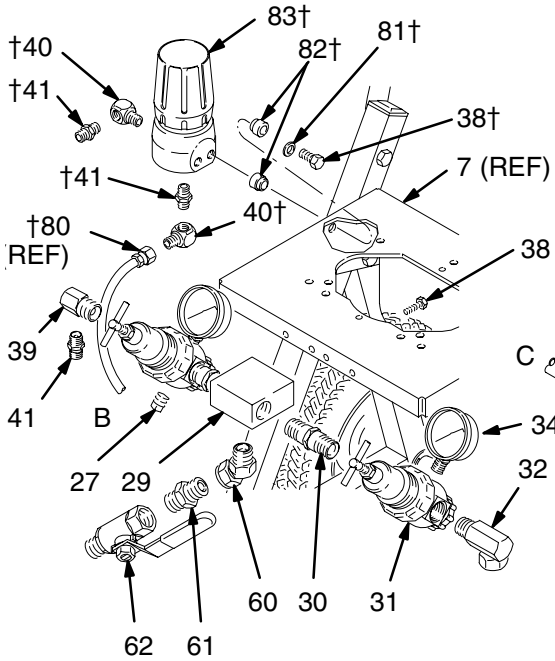
# Parts

## Model 224629, Series A

Includes items 1-83

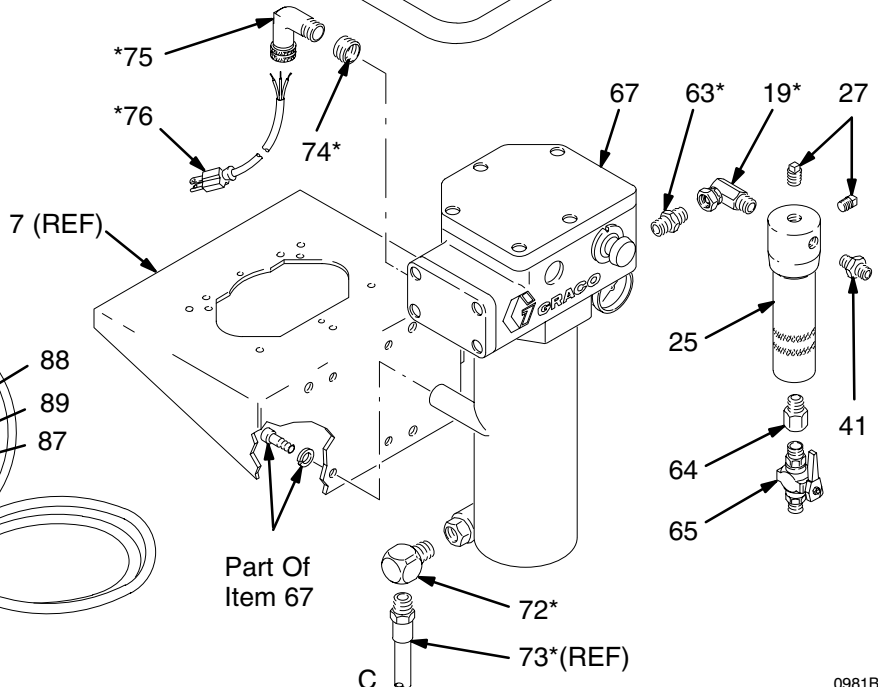
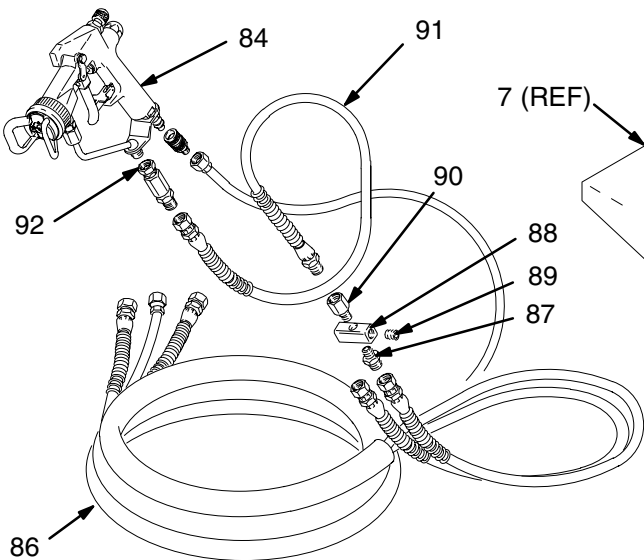
## Model 231161

Includes items 1-92



## Ref. No. 85 Hose Kit

Includes Items 86-92



# Parts

## Model 224629, Series A

Includes items 1–83

## Model 231161

Includes items 1–92

Ref No.	Part No.	Description	Qty	Ref No.	Part No.	Description	Qty
1	100016	LOCKWASHER, spring; 1/4"	2	71*	159801	UNION, adapter, 90°;	
3	100022	CAPSCREW, hex hd; 1/4–20 x 3/4" long	2	72*	158683	3/8 npt(f) x 1/2 npsm(f) swivel	1
4	100015	NUT, hex; 1/4–20	2	73*	235022	ELBOW, 90°; 1/2 npt (m x f)	1
5	217523	10:1 MONARK PUMP See 307595 for parts	1	74*	107219	HOSE, fluid; nylon; 1/2" ID; cpld 1/2 npt (mbe); 3' (0.9 m) long	1
6	188595	MOUNTING PLATE, pump	1	75*	102363	BUSHING; 3/4 npt(m) x 1/2 npt(f)	1
7	224044	CART, universal See 308136 for parts	1			ELBOW, cord grip, 90°; 1/2 npt(m); includes nut, washer, and grommet	1
19*	155494	ADAPTER, union, 90°; 3/8 npt(m) x 3/8 npt(f) swivel	1	76*	110160	CORD ASSY, heater; 12 AWG; 600V; 20 AMP; 105°C (221°F); 6.5 ft (2 m) long	1
20	160790	NIPPLE; 3/8 npt	1				
22	214960	HOSE, suction; 3/4" ID; nylon; coupled 3/4 npt (mbe); 3.5' (1 m) long, w/spring guard	1	77†	166998	MANIFOLD, inlet; 1/4 npt(f) x 3/4 npt(f) x 3/4 npsm(f) swivel	1
23	165767	SUCTION TUBE; 3/8 npt; 18" (457 mm) long	1	78†	214711	BALL VALVE, three-way; 1/4 npt(m); See 306861 for parts	1
25	218029	FLUID FILTER See 307273 for parts	1	79†	206965	HOSE, drain; nylon; 1/4" ID; cpld 1/4 npsm(f)	1
27	100509	PLUG, pipe, sq hd; 1/4 npt	4	80†	206966	HOSE; PTFE; 1/4" ID; cpld 1/4 npsm (fbe) swivel;	
29	179749	MANIFOLD, air; 1/2 npt inlet; two 1/2 npt outlets	1	81†	100527	18" (457 mm) long	1
30	156877	NIPPLE; 1/2 npt; 2.5" long	2	82†	167002	WASHER, wrought; 1/4"	2
31	104267	AIR REGULATOR 0–125 psi (0–9 bar) range See 308167 for parts	2	83†	222405	INSULATOR, heat	4
32	161037	UNION, adapter, 90°; 1/2 npt(m) x 3/8 npsm(f) swivel	1	84	238852	REGULATOR, back pressure See 306860 for parts	1
33	204560	HOSE, air; buna-N; 3/8" ID; cpld 3/8 npt (mbe); 18" (457 mm) long	1	85	222264	AIR-ASSISTED AIRLESS SPRAY GUN See 308640 for parts	1
34	101180	GAUGE, pressure, air; 0–200 psi (0–14 bar)	2	86	222407	HOSE KIT Includes items 86–92	1
38†	102254	SCREW, hex hd; 1/4–20 x 7/8" long	4			. HOSE, insulated; two fluid lines, one air line; nylon; 1/4" ID; cpld 1/4 npsm (fbe)	
39	166999	ELBOW, street, reducing; 1/2 npt(m) x 1/4 npt(f)	1	87	169797	swivel; 25 ft (7.6 m) long	1
40†	100840	ELBOW, street, 90°; 1/4 npt (m x f)	4	88	169795	. NIPPLE; 1/4 npsm x 1/8 npt	2
41†	162453	NIPPLE; 1/4 npt x 1/4 npsm	4	89	100139	. MANIFOLD; 1/8 npt(f)	1
52	103347	VALVE, relief, air	1	90	159840	. PLUG, hex socket; 1/8 npt	1
57	171987	TEE; 3/8 npt x 1/4 npt run; 3/8 npt branch	1	91	214701	. ADAPTER; 1/8 npt(m) x 1/4 npt(f)	1
60	222297	UNION, adapter, 45°; 1/2 npt(m) x 1/2 npsm(f) swivel	1			. HOSE, fluid; nylon; 3/16" ID; cpld 1/4 npt(m) x 1/4 npsm(f)	1
61	158491	NIPPLE; 1/2 npt; 15–/8" long	1	92	210500	swivel; 3 ft (0.9 m) long	
62	107142	VALVE, air, bleed-type; 1/2 npt (m x f)	1			. FILTER, fluid, in-line; 100 mesh; 1/4 npsm(m) x 1/4 npsm(f) swivel	1
63*	156849	NIPPLE; 3/8 npt	1				
64	150286	ADAPTER; 3/8 npt (m x f)	1	93	GG4XXX	SPRAY TIP, customer choice	1
65	210658	DRAIN VALVE; 3/8 npt(mbe) See 306861 for parts	1				
67	220522	VISCON <sup>2</sup> HEATER (120V) See 307805 for parts	1				
70*	206962	CHECK VALVE; 3/8 npt (mbe)	1				

\* These parts are included in Heater Mounting Kit 222262, which may be purchased separately. See page 23.

† These parts are included in Circulating Kit 222436, which may be purchased separately. See page 23.



# Conversion Kits

## Heater Mounting Kit 222262

Required to convert Model 231158 to a heated unit.  
Consists of:

Ref. No.	Qty	Ref. No.	Qty
19	1	73	1
63	1	74	1
70	1	75	1
71	1	76	1
72	1		

Also includes 6 ml supply of sst pipe sealant 110110.

## Circulating Kit 222436

Required to convert Model 231158 to a circulating unit.  
Consists of:

Ref. No.	Qty	Ref. No.	Qty
38	2	79	1
40	4	80	1
41	2	81	2
77	1	82	4
78	1	83	1

Also includes 6 ml supply of sst pipe sealant 110110.

Kit 222436 includes some parts not required for this pump: 156953 Mounting Stud, 100639 Lockwashers, 100023 Washer, 100307 Nut, and 102814 Gauge.

# Manual Change Summary

This manual was revised to include the changes from PCN H.

## Technical Data

Maximum working pressure .....	950 psi (6.6 MPa, 66 bar)
Maximum incoming air pressure .....	95 psi (0.66 MPa, 6.6 bar)
Ratio .....	10:1
Maximum recommended pump speed .....	60 cpm (1.0 gpm [3.8 liters/min]) at continuous operation
Air consumption .....	approx. 15 scfm (0.43 m <sup>3</sup> /min) at 1.0 gpm (3.8 liter/min) flow rate at 95 psi (0.66 MPa, 6.6 bar) air pressure
Wetted parts .....	See separate component instruction manuals

# 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.

**THIS WARRANTY IS EXCLUSIVE, AND IS IN LIEU OF ANY OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO WARRANTY OF MERCHANTABILITY OR WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE.**

Graco's sole obligation and buyer's sole remedy for any breach of warranty shall be as set forth above. The buyer agrees that no other remedy (including, but not limited to, incidental or consequential damages for lost profits, lost sales, injury to person or property, or any other incidental or consequential loss) shall be available. Any action for breach of warranty must be brought within two (2) years of the date of sale.

Graco makes no warranty, and disclaims all implied warranties of merchantability and fitness for a particular purpose in connection with accessories, equipment, materials or components sold but not manufactured by Graco. These items sold, but not manufactured by Graco (such as electric motors, switches, hose, etc.), are subject to the warranty, if any, of their manufacturer. Graco will provide purchaser with reasonable assistance in making any claim for breach of these warranties.

In no event will Graco be liable for indirect, incidental, special or consequential damages resulting from Graco supplying equipment hereunder, or the furnishing, performance, or use of any products or other goods sold hereto, whether due to a breach of contract, breach of warranty, the negligence of Graco, or otherwise.

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## Graco Information

**TO PLACE AN ORDER**, contact your Graco distributor, or call one of the following numbers to identify the distributor closest to you:

**1-800-367-4023 Toll Free**

**612-623-6921**

**612-378-3505 Fax**

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