

# Instructions – Parts List



## AIR OPERATED, TWO COMPONENT DISPENSE VALVE

# 2K Ultra-Lite™

309000H

*For use with disposable mixers to dispense a variety of sealants and adhesives.*

*3000 psi (20.7 MPa, 207 bar) Maximum Fluid Working Pressure*

*120 psi (0.84 MPa, 8.4 bar) Maximum Air Inlet Pressure*

### Machine Mount Valves

Part No. 570145, Aluminum Wide Ratio

Part No. 570151, For P-Dose 1/2 G mixers

Part No. 965533, Aluminum Wetted

Part No. 965534, Stainless Steel Wetted

### Hand Held Valves with Internal Air Trigger

Part No. 570182, Aluminum Wide Ratio

Part No. 965535, Aluminum Wetted

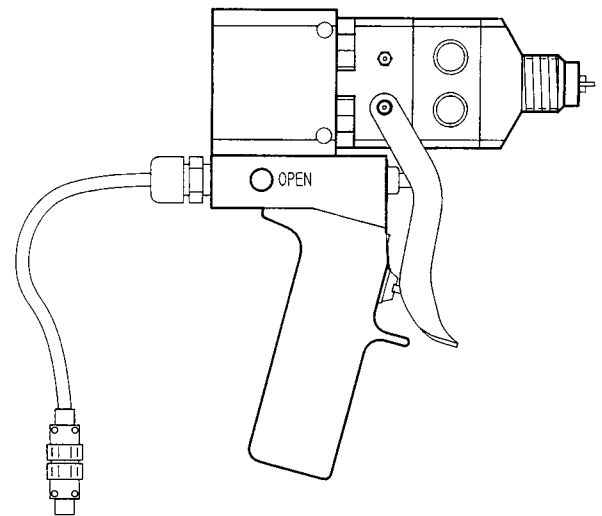
Part No. 249591, Aluminum Wetted,  
Bare Valve Without Outlet Manifold

Part No. 965536, Stainless Steel Wetted

### Hand Held Valves with Electric Switch for Remote Operation

Part No. 965537, Aluminum Wetted

Part No. 965538, Stainless Steel Wetted



**Hand Held Valve Shown**



### Important Safety Instructions

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

See page 2 for Table of Contents.

# Table of Contents

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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 instructions.

# Warnings

## ! WARNING

### HAZARD OF USING FLUIDS CONTAINING HALOGENATED HYDROCARBONS

Never use 1, 1, 1-trichloroethane, methylene chloride, and other halogenated hydrocarbon solvents of fluids containing such solvents in this equipment. Such use could result in a serious chemical reaction, with the possibility of explosion, which could cause death, serious bodily injury and/or substantial property damage.

Consult your fluid suppliers to ensure that the fluids being used are compatible with aluminum and zinc parts.

## ! WARNING

### PLURAL COMPONENT MATERIALS HAZARD

Graco Inc. does not manufacture or supply any of the reactive chemical components that are used in this equipment and is not responsible for their effects. Because of the vast number of chemicals that could be used and their varying chemical reactions, the buyer and user of this equipment should determine all facts relating to the materials used, including any of the potential hazards involved. Particular inquiry and investigation should be made into potential dangers relating to toxic fumes, fires, explosions, reaction times and exposure of human beings to the individual components or their resultant mixtures.

Graco assumes no responsibility for loss, damage, expense or claims for bodily injury or property damage, direct or consequential, arising from use of such chemical components.

# ⚠ WARNING



## SKIN INJECTION HAZARD

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



- Fluid injected into the skin might look like just a cut, but it is a serious injury. **Get immediate surgical treatment.**
- Do not point the valve at anyone or at any part of the body.
- Do not stop or deflect leaks with your hand, body, glove or rag.
- Be sure the valve trigger safety operates before dispensing.
- Lock the valve trigger safety when you stop dispensing.
- If the nozzle clogs while dispensing, fully release the trigger immediately.
- Follow the **Pressure Relief Procedure** on page 13 whenever you: are instructed to relieve pressure; stop dispensing; clean, check, or service the equipment; and install or clean the nozzle.
- 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.



INSTRUCTIONS

## EQUIPMENT MISUSE HAZARD

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

- This equipment is for professional use only.
- Read all instruction manuals, tags, and labels before operating the equipment.
- Use the equipment only for its intended purpose. If you are uncertain about usage, call your Graco distributor.
- Do not alter or modify this equipment. Use only genuine Graco parts and accessories.
- Check equipment daily. Repair or replace worn or damaged parts immediately.
- Do not exceed the maximum working pressure stated on the equipment or in the **Technical Data** for your equipment. Do not exceed the maximum working pressure of the lowest rated component in your system.
- Use fluids and solvents which are compatible with the equipment wetted parts. Refer to the **Technical Data** section of all equipment manuals. Read the fluid and solvent manufacturer's warnings.
- Do not use hoses to pull equipment.
- Route hoses away from traffic areas, sharp edges, moving parts, and hot surfaces. Do not expose Graco hoses to temperatures above 180°F (82°C) or below -40°F (-40°C).
- Comply with all applicable local, state, and national fire, electrical, and safety regulations.
- Never use 1,1,1-trichloroethane, methylene chloride, other halogenated hydrocarbon solvents or fluids containing such solvents in this equipment. Such use could result in a serious chemical reaction, with the possibility of explosion, which could cause death, serious injury, and/or substantial property damage.

# 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 10.
- If there is any static sparking or you feel an electric shock while using this equipment, **stop dispensing 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 dispensed.
- Keep the dispense area free of debris, including solvent, rags, and gasoline.
- Extinguish all open flames or pilot lights in the dispense area.
- Do not smoke in the dispense area.
- Do not turn on or off any light switch in the dispense area while operating or if fumes are present.
- Do not operate a gasoline engine in the dispense area.

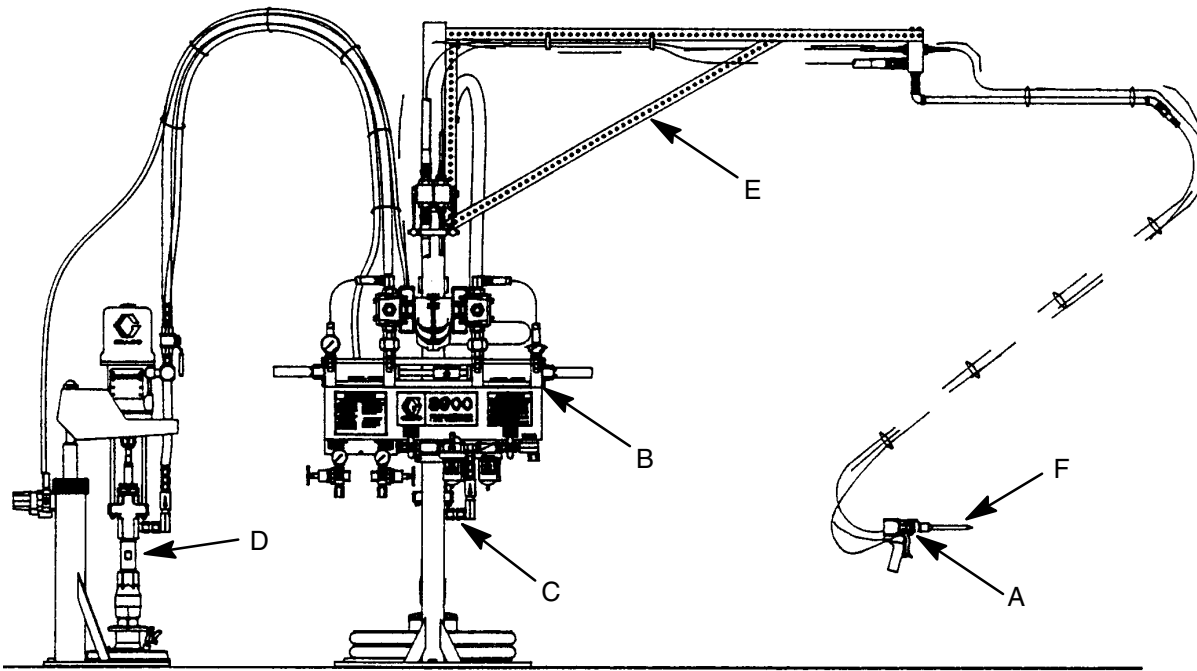


## TOXIC FLUID HAZARD

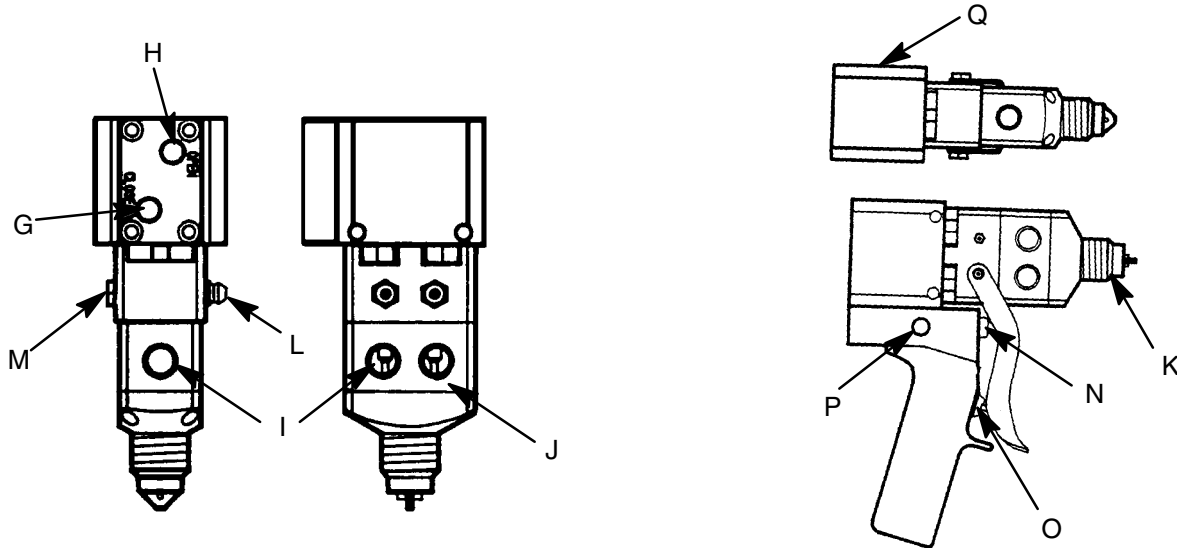
Hazardous fluid or toxic fumes can cause serious injury or death if splashed in the eyes or on the skin, inhaled, or swallowed.

- 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.

# Typical Installation



Shown on a Graco 8900 proportioning system



## KEY

- A 2K Ultra-Lite valve
- B 8900 Proportioner
- C "A" side pump
- D "B" side pump
- E Boom kit
- F Disposable mixer
- G 1/8 in. npt (f) air to close

- H 1/4 in. npt (f) air to open
- I 1/4 in. npt (f) "A" fluid inlet (3 places)
- J 1/4 in. npt (f) "B" fluid inlet (3 places)
- L Zirk grease fitting
- M Flush grease fitting
- N 4-way trigger valve or electric switch
- O Trigger lock

- P 1/8 in. npt(f) hand gun air inlet.  
NOTE: The electric switch model has 1/8 in. npt(f) ports "OPEN" on the side and "CLOSE" on the other side.
- Q There is a 1/8 in. npt(f) port on air manifold which can be used to send an "ON" signal back to a pump pilot or control.

# Features

## Model Selection

The following table provides a summary of the 2K Ultra-Lite™ dispense valves that are described in this manual.

<b>Type</b>	<b>Description</b>
Wetted parts	Aluminum wetted 2K-UL valves are lightweight and inexpensive, but have less chemical compatibility than stainless steel wetted valves.
Hand held valves with internal air trigger	The internal air trigger controls the air piston that operates the 2K-UL valve. A pilot port can be used to control a pump motor.
Hand held valve with electric switch	The switch signals the customer's controller to open and close the ports on the 2K-UL valve using a remote 4-way air control valve which is not included.
Hand held, wide ratio valves	The wide ratio 2K-UL valve has two features: a center inject nozzle in the nosepiece and a "shower head" tip. The features are helpful in applications when the mix ratio volume is greater than 10:1, specifically when minor volume is a lower viscosity than major volume. Frequent cleaning intervals are required to maintain the center inject nozzle and shower head tip.

# Features

## Electric Switch Valve

Figure 2 shows the electric switch valve and provides useful installation information.

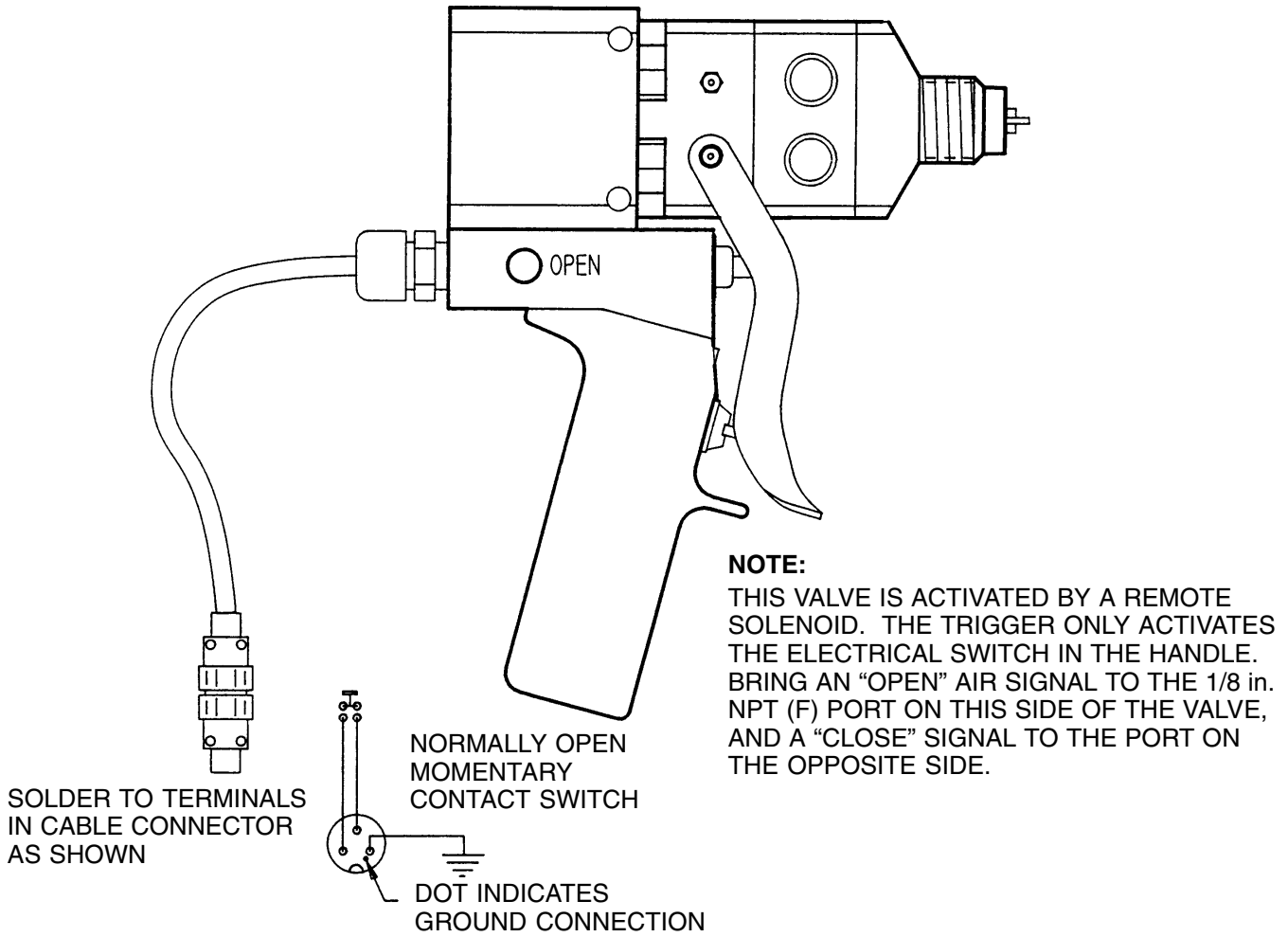


Fig. 2

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# Features

## 2K Ultra-Lite Disposable Mixer Dispense Valve

Figure 3 shows the features of the 2K Ultra-Lite valve, which is used for dispensing a wide variety of two component sealant and adhesives through disposable static mixers.

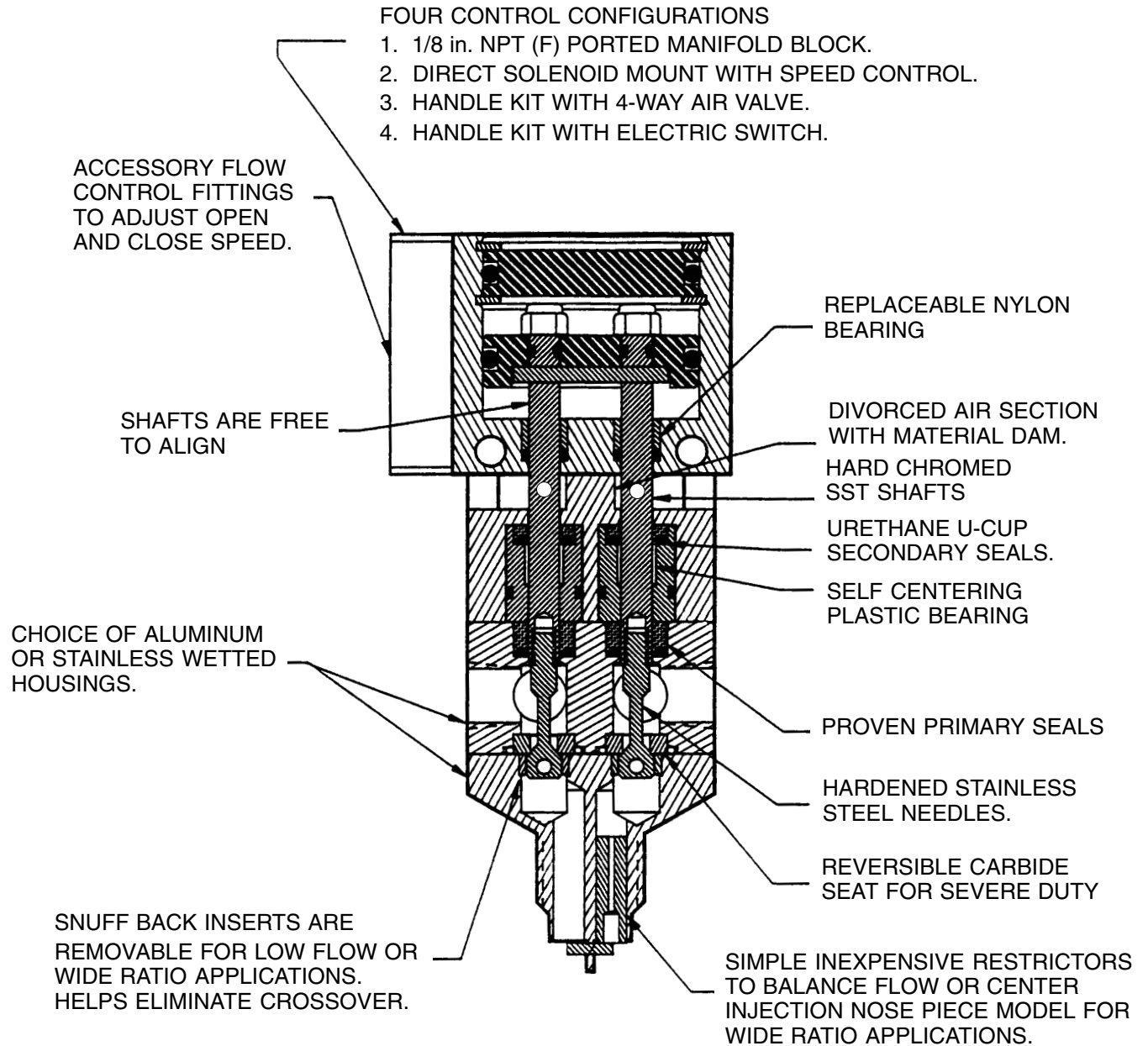


Fig. 3

# Installation

## NOTES:

- Reference numbers and letters in parentheses in the text refer to the callouts in the figures and drawings.
- Accessories are available from your Graco representative. If you supply your own accessories, be sure they are adequately sized and pressure-rated to meet the system's requirements.

## Grounding

**⚠ WARNING**

**FIRE AND EXPLOSION HAZARD**

To reduce the risk of fire, explosion, and serious injury, proper electrical grounding of every part of your system is essential. Read the warning section **Fire and Explosion Hazard** on page 5, and follow the grounding instructions below.

The following grounding instructions are minimum requirements for a basic dispensing system. Your system may include other equipment or objects which must be grounded. Check your local electrical code for detailed grounding instructions for your area and type of equipment. Your system must be connected to a true-earth ground.

- *Pump*: ground the pump by connecting ground wire and clamp as described in your separate pump instruction manual.
- *Air compressors and hydraulic power supplies*: ground the equipment according to the manufacturer's recommendations.
- *Fluid hoses*: use only grounded fluid hoses with a maximum of 500 feet (150 m) combined hose length to ensure grounding continuity. Check the electrical resistance of your fluid hoses at least once a week. If your hose does not have a tag on it which specifies the maximum electrical resistance, contact the hose supplier or manufacturer for the maximum electrical resistance limits, replace the hose immediately.
- *Dispensing valve*: ground the valve by connecting it to a properly grounded fluid hose and pump.

- *Fluid supply container*: ground according to your local code.
- *Flammable liquids in the dispense area*: must be in approved, grounded containers. Do not store more than the quantity needed for one shift.
- *All solvent pails used when flushing*: ground according to local code. Use only metal pails, which are conductive. Do not place the pail on a non-conductive surface, such as paper or cardboard, which interrupts the grounding continuity.
- *To maintain grounding continuity when flushing or relieving pressure*, hold a metal part of the valve firmly to the side of a grounded metal pail, then trigger the valve.

## How to Use the Valve Trigger Safety

**⚠ WARNING**

**SKIN INJECTION HAZARD**

To prevent accidental triggering of the gun and reduce the risk of a serious injury, including fluid injection or splashing in the eyes or on the skin, lock the gun trigger safety when you stop dispensing.

1. If you are using one of the hand-held versions of the valve, lock the valve trigger safety by turning the latch to a right angle with the gun body. See Fig. 4.
2. To unlock the valve trigger safety, push the latch out and turn it parallel with the gun body.

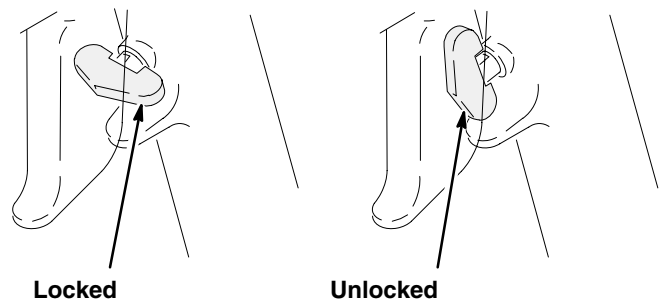


Fig. 4

8459A

# System Setup

## Fluid and Air Connections

### 1/4 npt(f) Fluid Inlets

There are three fluid inlets on the A-side and three fluid inlets on the B-side. The fluid inlets are located on the front, side, and back of the valve to permit various mounting and hose configurations.

### 1/8 npt(f) Air Inlets

The machine mount valves and the electric switch hand-held valves have an “open” port and “close” port, which are operated by a remote 4-way air control valve.

The air switch hand-held valves have a single air inlet. This valve also has an internal 4-way spool which operates the air piston.

See **Accessories**, page 27, to order air control valves and tubing.

## Inlet Check Valves

Inlet check valves are recommended on the fluid inlets where viscosity allows. An inlet check valve prevents back-flow or crossover when the mixer is plugged or one fluid is much lighter in viscosity than the other. When required, a high crack pressure check valve is installed to maintain back-pressure on low viscosity fluids.

See **Accessories**, page 27, for a list of check valves.

## Balancing the System

A proportioner is used to feed the two-component dispense valve. The system must be pressure balanced to avoid “lead-lag” ratio errors when starting and stopping the flow.

Balancing is done by hose sizing, inlet check restriction, and nose piece restrictors. A properly balanced system has near equal back-pressure on the gauges when flowing without a mixer installed.

The 2K-UL valve is supplied with 1/8 I.D. and 3/64 I.D. restrictors (32 and 33) which can be installed in the nose piece to help balance the system. A special nose piece outlet that accepts a wide variety of restrictors with filter screens is available. See application kits manual 311230.

See **Accessories**, page 27, for a list of restrictive catalyst injectors.

## Selecting Hoses

Hoses between your proportioner and the 2K-UL valve should be selected carefully. Many factors effect hose selection.

1. **Fluid Compatibility:** Fluid must not degrade the core material or end fittings of the hose. Nylon or PTFE cores are commonly used for chemical compatibility. If your fluid is moisture sensitive you should use PTFE or Moisture-Lok hoses.
2. **Pressure Rating:** Be sure hoses have a working pressure rating above the pressure capability of the system.
3. **Compressibility:** Hoses, especially nylon paint hoses, expand with an increase in pressure. A pressure change in the system may cause a volume change, which can appear as a ratio error with wide mix ratios. Compressible hoses absorb pressure spikes which is helpful to the operator during an application, such as trying to lay a bead.
4. **Internal Diameter:** Small I.D.'s create higher back pressures, lower flows, and small retained volume. Typically hose I.D.'s are selected for:
  - a. System Pressure Balance. "A" pressure drop vs. "B" pressure drop.
  - b. Volume Balance. A:B volume ratio vs. Hose retained volume.
  - c. Flexibility and weight for operator or robot.
  - d. Overall Pressure Drop. Pressure drop should be minimum possible within the above guidelines.
5. **Length:** Hoses normally are kept as short as practical to minimize pressure drop and compressible volume. 10 ft (3.1 m) is recommended for reciprocating pump systems.

## System Start-up

When initially loading the fluids through the system, leave the mixer off until both fluids flow freely from the nose piece without any air. This prevents cross contamination from having fluid on one side pushing back up the other side.

# System Setup

## Mixer Selection

Disposable mixers are available from 3/16 in. I.D. to 1/2 in. I.D. in lengths from 12 elements to 36 elements. In general, wide viscosity or mix ratios require more mix elements. Small I.D. mixers produce lower flow, higher back-pressure, and waste little material. Large I.D. mixers produce higher flow, lower back-pressure, and fewer lead-lag ratio errors. Different mixers can have differing “snuff-back” characteristics.

## Setting the Amount of Snuff Back

The 2K-UL valve uses two “snuff back” restrictor rings (13) to set the amount of snuff-back. These two rings are trapped between the main valve body and the nose piece. When the fluid valve pulls back to close, it enters the restrictions, stops flow, and pulls the fluid back until the needle reaches its carbide seat.

Maximum snuff-back results when both restrictors are used. Some snuff-back is still achieved without the restrictors because of the pull-back action of the needles.

When dispensing wide mix ratios, it is best to use a snuff-back restrictor only on the high volume side. This keeps the high volume side from being pulled back into the low volume side.

In general, use only as much snuff-back as necessary to give a good cut-off of flow. Too much snuff-back pulls an air bubble into the mixer. This can cause a drip, or cause the mixer to spit when the valve is re-opened.

# Operation

## WARNING

### COMPONENT RUPTURE HAZARD



To reduce the risk of over-pressurization, which can cause component rupture and serious injury, never exceed 3000 psi (21 MPa, 207 bar) fluid pressure, or 120 psi (0.84 MPa, 8.4 bar) air pressure to the valve.

## 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
- install or clean the nozzle

1. Shut off the air to the dispense valve, if applicable.
2. Shut off the air to the supply pumps.
3. Close the bleed-type master air valve (required in your system).
4. Hold a metal part of the valve firmly to the side of a grounded metal pail, and trigger the dispense valve to relieve pressure.
5. Open the fluid drain valve (required in your system), having a grounded metal container ready to catch the drainage.
6. Leave the fluid drain valve open until you are ready to dispense again.

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

## Electric Switch Hand Held Valve

- Be sure the air supply lines are connected correctly to the OPEN and CLOSE valve air ports.
- To open or close the valve and maintain the open or closed status, a minimum of 40 psi (280 kPa, 2.8 bar) air pressure must be supplied and maintained at the OPEN or CLOSE port.
- The trigger only activates the electrical switch in the handle, which turns the remote solenoid on and off.
- Trigger the gun to turn the solenoid on. Release the trigger to turn the solenoid off.

## Machine Mount Valve

- Be sure the air supply lines are connected correctly to the OPEN and CLOSE valve air ports.
- To open or close the valve and maintain the open or closed status, a minimum of 40 psi (280 kPa, 2.8 bar) air pressure must be supplied and maintained at the OPEN or CLOSE port.

### To open the valve:

1. Apply air pressure to the OPEN air port on the valve, and remove air pressure from the CLOSE air port on the valve.
2. Maintain air pressure on the OPEN air port to keep the valve open.

### To close the valve:

1. Apply air pressure to the CLOSE air port on the valve, and remove air pressure from the OPEN air port on the valve.
2. Maintain air pressure to the CLOSE air port to keep the valve closed.

# Operation

## Air Switch Hand Held Valve

The valve operation is such that there are only two valve conditions: either fully open or fully closed.

The valve is opened and closed by the internal air control valve. Trigger the gun to open the valve. Release the trigger to close the valve.

## Ratio Checking

The output mix ratio of your proportioner can be checked by dispensing the two fluids separately out of the nosepiece into tared cups. The cups can then be weighed and the weights divided to get the mix ratio by weight.

A divided outlet accessory (Part no. 626611) is available to make regular ratio checking easier. This accessory fits the non-wide ratio valves and uses a 512292 retainer nut.

Ratio checks provide information on the ratio of an overall sample. Transient problems (soft spots) caused by starting and stopping the flow (lead-lag) may not show up in this kind of ratio check. Physical tests of the mixed fluid are the best check of correct ratio and mix quality.

# Maintenance

## Daily Shut-down

When you are through using the 2K-UL valve, the outlet to the mixer should be cleaned and protected from drying or crystallization.

### **WARNING**

#### **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.

Read **TOXIC FLUID HAZARD** on page 5.

1. Remove and properly dispose of the mixer tube.

**NOTE:** If using the wide ratio valve, remove and clean the dispersing tip on the outlet nozzle.

2. Dispense a shot of material into a waste container to clear any cross-over in the nosepiece.
3. Partially fill a plastic disposable night cap (Part No. 551327) with a moisture free oil (217374 pint) or grease (106565, 14.6 oz. cartridge).
4. Push the plastic cap over the valve outlet to protect it from air and moisture.

## Preventative Maintenance

There is a grease filled secondary seal/bearing area on each valve shaft. Every 10,000 cycles, or twice each month, new grease should be flushed across this area. Each valve has two flush grease fittings. A small grease gun is provided with each valve.

#### **To grease the valve:**

1. Remove the grease fitting from one side of the gun.
2. Pump grease (Part No. 115982) across the valve until grease comes out of the other side.
3. Reinstall the outlet grease fitting.

# Troubleshooting

## **WARNING**



### **SKIN INJECTION HAZARD**

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

Before performing any troubleshooting procedure, perform the procedure to **relieve the pressure**.

<b>PROBLEM</b>	<b>CAUSE</b>	<b>SOLUTION</b>
Valve does not open	Insufficient air pressure	Turn on or turn up air pressure.
	Air not exhausted from behind air cylinder piston	Use four-way, relieving-type air valve operator.
Valve does not close (leaks)	Insufficient air pressure	Turn on or turn up air pressure.
	Air not exhausted from behind air cylinder piston	Use four-way, relieving-type air valve operator.
	Blockage between needle and seat	Remove and clean needle and seat.
	Bad or missing gasket between seat and housing	Replace gasket (38).
	Needle worn out	Replace needle and seat.
Higher than normal back pressure	Nose piece plugging up	Remove and clean.
Soft spots in mixed material.	Nose piece plugging up on one side.	Remove and clean.
	System not properly balanced.	Balance system with hoses, check valves, restrictors.
	High static pressures build when valve shuts off.	Turn off proportioner pump when valve closes.
Low flow rate	Mixer is curing	Replace mixer.
	Snuff back rings (13) are installed.	Remove snuff back rings if they are not required for maximum snuff back.



# Service

## **WARNING**



### **SKIN INJECTION HAZARD**

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

## **Disassembly**

1. **Relieve all air and fluid pressure.**
2. Disconnect the valve from the system.
3. Remove the four nosepiece screws (40), and pull the nosepiece (31) away from the valve. Remove the snuff-back ring (13) and restrictors (32 and 33) if used. See Fig. 5, page 20.
4. Use a 3/32 in. pin punch in the needle hole to unscrew the needle (27). If the shaft (3) spins, insert a dowel pin in the shaft hole to hold it steady, then unscrew the needle.
5. Remove the seat (25), gaskets (36), and o-rings (14).
6. Remove the two fluid housing screws (23) and remove the fluid housing (26). Remove the primary fluid seals (22) from the fluid housing (26).
7. Pull the bearing/lube housing (19) from the air cylinder (1). Remove the bearings (21), bearing o-rings (16), and secondary fluid seals (20). Remove the grease fittings (17 and 18).
8. Remove the C-clip (12) from the back of the air cylinder (1). Push the two shafts (3) into the air cylinder to dislodge the air cylinder cap (11). Remove the cap o-ring.
9. Remove the internal C-clip (12). Push the two shafts (3) to dislodge the piston (10) assembly from the air cylinder (1).
10. Remove the adjustment nuts (8), the pin (7), o-rings (9), and piston o-ring (6) from the shaft (3).
11. Remove the pin (7), o-ring (9), and piston o-ring (6).
12. Use a 1/4 in. pin punch to knock out the bearings (5) and o-rings (4).

## **Air Switch Handle (if equipped)**

1. Remove the trigger (59).
2. Loosen the set screw above the trigger safety. Pull off the handle (58).
3. Remove the four retaining screws (15). Pull the manifold (63) and gasket (30) away from the air cylinder (1).

## **Air Valve**

1. Unscrew the stem guide (61).
2. Remove the trigger pin (62), o-ring (60), spool (53), spacers (54, 55), o-rings (50, 52) and spring (51).
3. Remove the bushing (56) from the housing (63) with the screw (57).
4. Remove the screws (65) and lock-washers (66) from the air cylinder (1).

## **Electric Switch Handle (if equipped)**

1. Disconnect the power from the gun.
2. The switch, housing, and cable are not repairable. Replace these parts as a complete assembly.
3. Remove the trigger (59).
4. Loosen the setscrew above the trigger safety. Pull off the handle (58).
5. Remove the four manifold retaining screws (65). Pull the housing (63) and gasket (30) away from the air cylinder (1).
6. Remove the bushing (56) from the housing (63) with the screw (57).
7. Remove the screws (65) and lock-washers (66) from the air cylinder (1).

# Service

## Reassembly

### Air Cylinder Section

1. Lubricate the shaft o-rings (4) and the bearings (5) with grease supplied in the repair kit. Insert o-rings into the air cylinder (1) and air cap (11) cavities. See Fig. 6.
2. Press the bearings (5) flush into the air cylinder housing and air cap, trapping the o-rings (4).
3. Lubricate and reassemble the piston assembly; piston (10), o-rings (9), dowel pin (7), nuts (8), and o-ring (6), and air cylinder shaft (3). Tighten nuts (8) to 15–20 in-lb (1.7–2.2 N•m). The shafts (3) should hang with some play to be self-aligning in the bearing.
4. Lubricate the air cylinder (1) ID with the grease supplied. Push the piston (10) assembly into the air cylinder.
5. Insert “C” clip (12). Orient clip opening in front of air passage way.
6. Lube and assemble an o-ring (16) onto cap (11). Push cap (11) straight into housing (1).
7. Insert outside “C” clip (12).
8. Orient the air inlet manifold (2) (if used) as shown. Match the gasket openings to the air ports.

### Fluid Section

1. Lubricate the bearings (21), o-rings (16) and cup seals (20). Put the o-rings (16) on the bearings. Carefully insert the seals (20) into the bearing recess, with the lips of the o-rings facing into the bearing. Be careful not to damage the seal lips.
2. Push the bearings (21) seal end first into the housing (19). Be sure that the grease holes in the side of the bearings line up with the grease ports in the housing (19).

3. Holding the bearings (21) in place, push the bearing assembly over the shafts (3).
4. Lubricate the main fluid seals (22) and its cavity in the housing (26). Carefully press the seals, lip end first, into the housing.
5. Push the housing (26) and seals (22) over the shafts (3) and up against the bearing housing.
6. Loosely install the fluid housing screw (23) using an anti-seize lubricant such as Loctite® 56765. Do not tighten screws yet.
7. Insert the gaskets (38) and seats (25). The seats are reversible and can be installed in either direction.
8. Use Loctite primer N 7649 and Loctite TL242, 243, or equivalent (“blue” Loctite) when reassembling the needle (27). Screw in the needle (27) and tighten it to 15–20 in-lb (1.7–2.2 N•m).
9. Apply air pressure to the CLOSE port, or to the pneumatic trigger valve if installed. This will align the shaft, seal, and bearing. Tighten the fluid housing screws (23) oppositely and evenly to 40–45 in-lbs (4.5–5 N•m).
10. Install the nosepiece (31) with the PTFE o-rings (14), screws (37), and snuff-back rings (13), if used. The snuff-back rings have an internal bevel on one end which faces into the nosepiece. Tighten the nosepiece screws to 15–20 in-lbs (1.7–2.2 N•m).
11. Install pin (34) and restrictor (32 or 33) if used. Restrictor (33) uses an o-ring (35).
12. After rebuilding the valve or replacing the needles and seats, the cycle the valve 50 times at full air pressure to “seat” the hardened needles to the carbide seats.

# Service

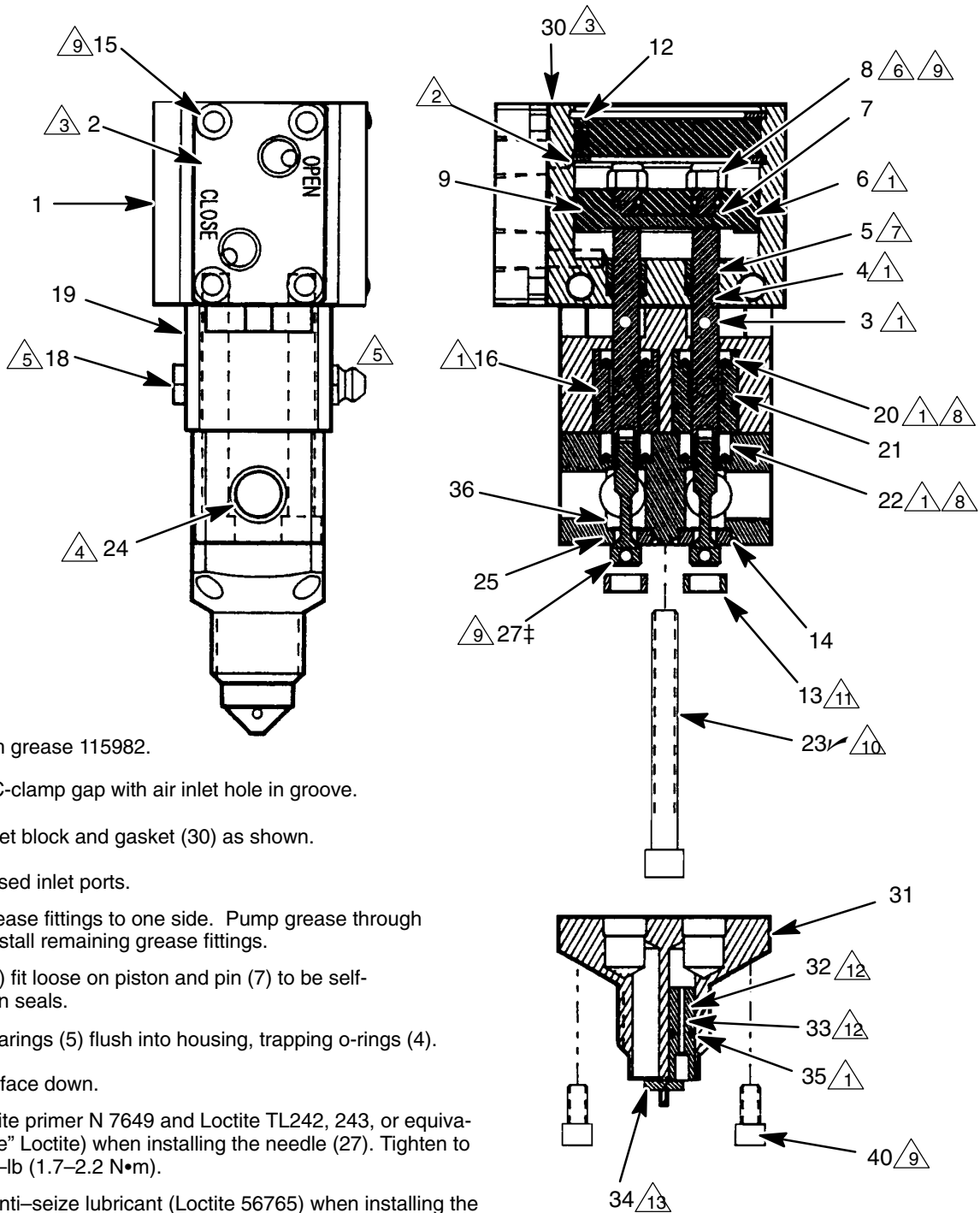
## Air Valve (if equipped)

1. Insert the spring (51) into the housing (63).
2. Lubricate and install an o-ring (50) into the housing.
3. Install a spacer (55), internal bevel first, into the housing.
4. Lubricate and install two o-rings (50) and the “U” spacer (54) as shown.
5. Lubricate and install a spacer (55) with the internal bevel out, and o-ring (50).
6. Lubricate and install o-rings (52) on the spool (53). Insert the spool with the nub facing out.
7. Lubricate the pin (62) and insert it into the guide (61). Screw the guide with o-ring (60) into the housing. Tighten it to 60–70 in-lbs (6.8–7.9 N•m).
8. Orient the gasket (30) to the holes on the air cylinder (1). Screw the air valve assembly to the cylinder with the screws (60) and lock-washers (66). Tighten the screws evenly to 15–20 in-lbs (1.7–2.2 N•m).
9. Screw the bushing (56) to the housing (63) with the screw (57). Tighten the screw to 140–150 in-lbs (15.8–16.9 N•m).
10. Attach the handle (58) with the setscrew.
11. Attach the trigger (59) with the grease fittings (18).
12. Test that the trigger safety works properly.

## Electric Switch

1. The switch, housing, and cable are not repairable. Replace these parts as a complete assembly.
2. The switch, housing, and cable assembly are not user serviceable and must be replaced as an assembly.

# Service



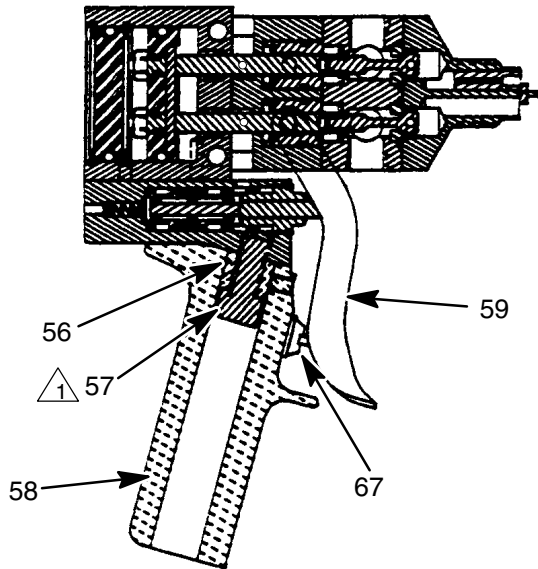
- △1 Lube with grease 115982.
- △2 Line up C-clamp gap with air inlet hole in groove.
- △3 Orient inlet block and gasket (30) as shown.
- △4 Plug unused inlet ports.
- △5 Install grease fittings to one side. Pump grease through valve. Install remaining grease fittings.
- △6 Shafts (3) fit loose on piston and pin (7) to be self-aligning in seals.
- △7 Press bearings (5) flush into housing, trapping o-rings (4).
- △8 Seal lips face down.
- △9 Use Loctite primer N 7649 and Loctite TL242, 243, or equivalent ("blue" Loctite) when installing the needle (27). Tighten to 15–20 in-lb (1.7–2.2 N•m).
- △10 Use an anti-seize lubricant (Loctite 56765) when installing the fluid housing screws. Tighten to 40–45 in-lbs (4.5–5.0 N•m).
- △11 Snuff-back rings (13) (one or both) are used only if required for your application.
- △12 Use restrictor tubes (32 or 33) only if required to balance flow.
- △13 Press in place with or without restrictor tubes in place.

Fig. 5

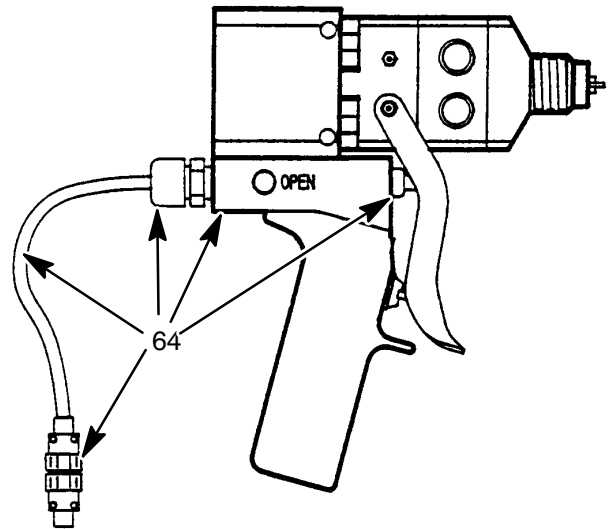
# Service

## Hand Held Valves

Air Trigger Version 965535, 965536, or 249591



Electric Switch Version 965537 or 965538



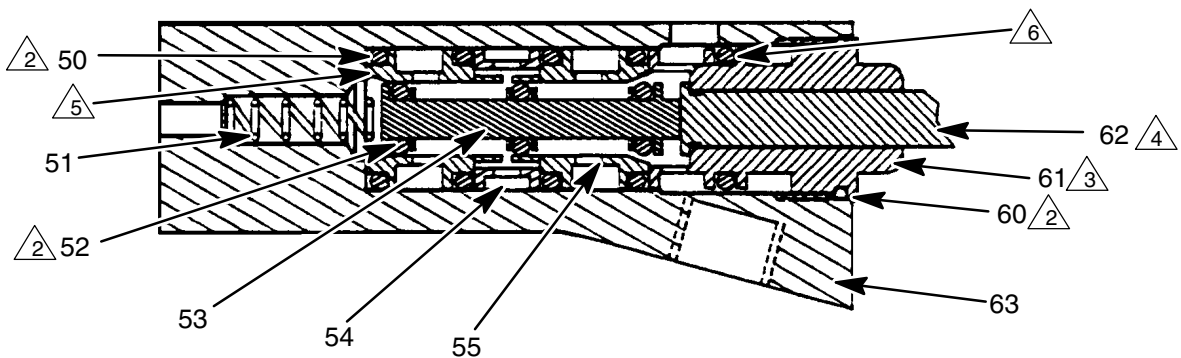
### Assembly Notes:

- △1 Torque to 140-150 in/lbs. (15.8-16.9 N•m)
- △2 Apply grease to o-rings.
- △3 Torque to 60-70 in/lbs. (6.8-7.9 N•m)
- △4 Apply grease to shaft.
- △5 Bevel faces toward spring.
- △6 Bevel faces out of hole

The electric switch and cable assembly are not serviceable and can only be replaced as an assembly.

### Application Note:

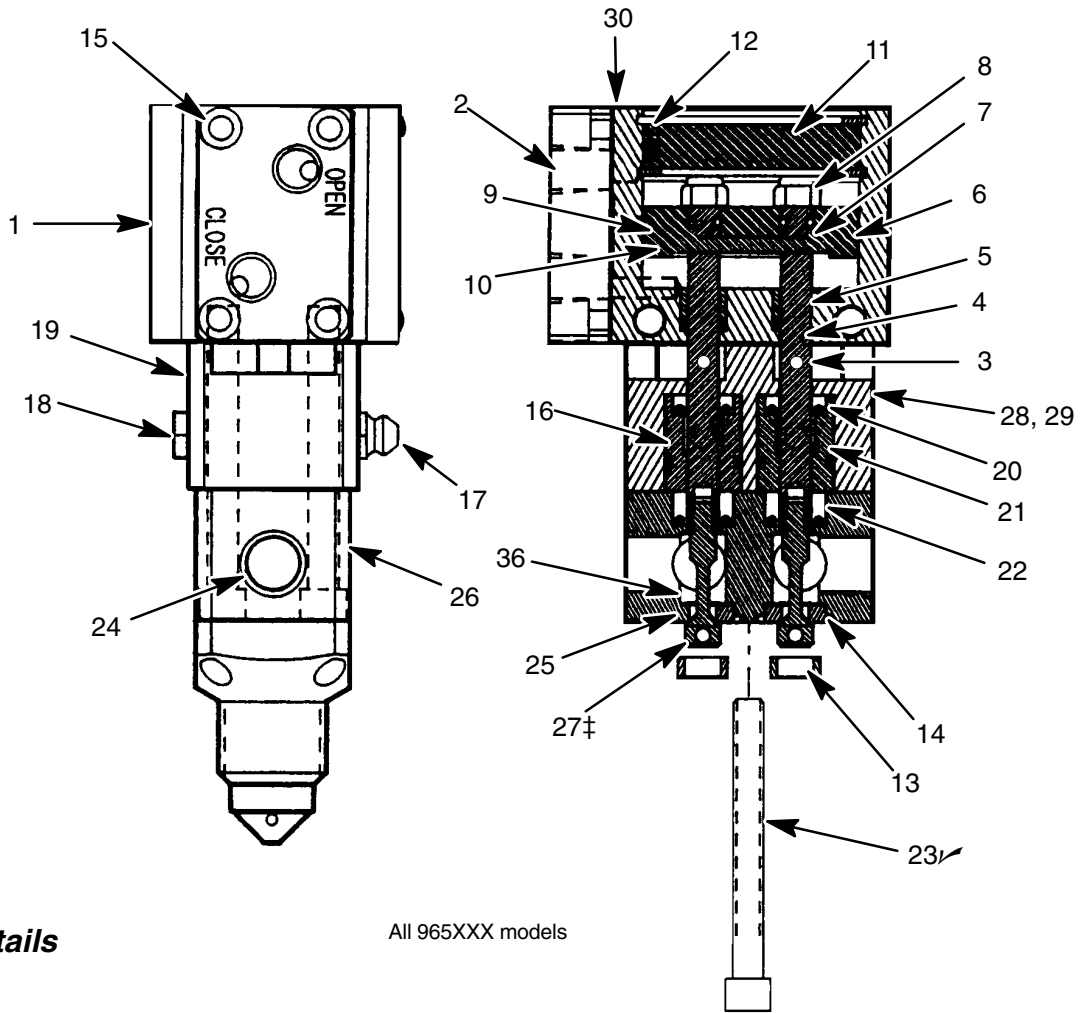
This valve is activated by a remote solenoid. The trigger only activates the electrical switch in the handle. Bring an "OPEN" air signal to the 1/8 in. npt (F) port on this side of the valve and a "CLOSE" signal to the port on the opposite side.



**Air Trigger Version Detail**

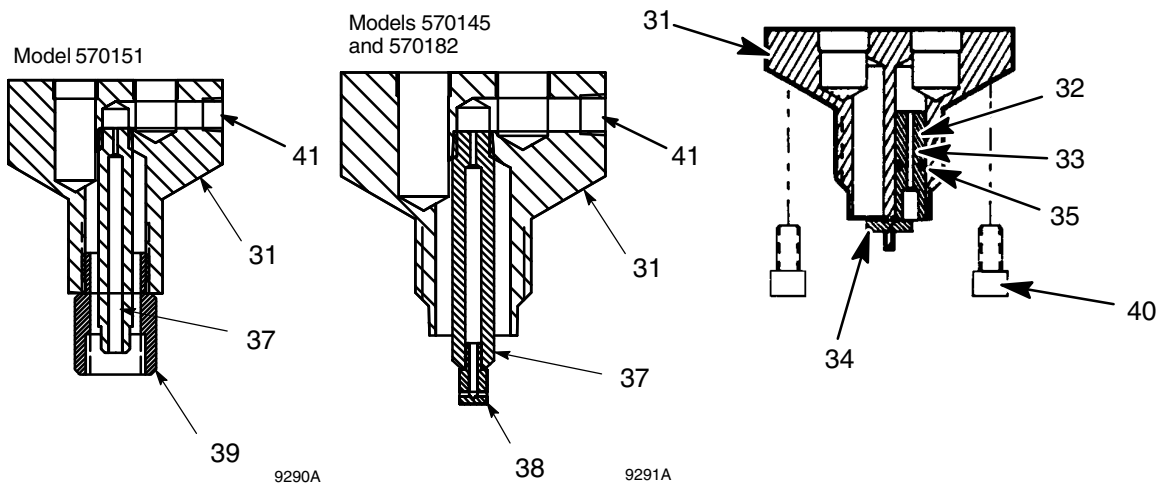
# Parts

## Machine Mount Valves



### Outlet Details

All 965XXX models



# Parts

## Model 570145, 570151, 570182, 965533, 965535, 965537, 249591

### Aluminum Wetted Valves

Ref. No.	Part No.	Description	Qty	Ref. No.	Part No.	Description	Qty
1	626070	HOUSING, air cylinder	1	32*★	626058	RESTRICTOR, 1/8 ID; <i>Used on 965533, 965535, and 965537 only.</i>	3
2★	626069	MANIFOLD, air control	1				
3	626068	SHAFT, air cylinder	2				
4*	156454	O-RING, 010 buna-n	2	33*★	626059	RESTRICTOR, 3/64 ID; <i>Used on 965533, 965535, and 965537 only.</i>	3
5*	551181	BEARING, air cylinder	2				
6*	156593	O-RING, 222 buna-n	2	34*★	551182	DOWEL PIN, sst; <i>Used on 965533, 965535, and 965537 only.</i>	6
7*	551183	DOWEL PIN	1				
8*	102920	NUT, full hex, 10–32	2				
9*	157628	O-RING, 006 buna-n	1	35*★	103154	O-RING, 006 EPR; <i>Used on 965533, 965535, and 965537 only.</i>	3
10	626067	PISTON, air cylinder	1				
11	626066	CAP, air cylinder	1				
12	551184	CLIP, internal 1.75	2	36*†	171860	GASKET, seat	2
13*★	626060	RING, snuff-back	2	37★	626690	TUBE, center inject; <i>Used on 570145, 570182 only.</i>	1
14*†★	104319	O-RING, 014 PTFE	2		626638	TUBE, center inject; <i>Used on 570151 only.</i>	1
15★	104371	SCREW, 10–32 x 0.375	4				
16*†	103610	O-RING, 014 fluoroelastomer	2	38★	626813	NOZZLE, dispense; <i>Used on 570145, 570182 only.</i>	1
17	100846	GREASE FLUSH	2				
18	551188	FLUSH GREASE FITTING	2	39★	626643	ADAPTER, 1/2G thread extension; <i>Used on 570151 only.</i>	1
19	626065	LUBE HOUSING	1				
20*†	551191	U-CUP, urethane/EPR	2	40★	514237	SCREW, 10–32 x 1.5 in.	4
21*	626064	BEARING, lube	2	41	103147	PLUG, 1/16–27 npt; <i>Used on 570151, 570145, 570182 only.</i>	1
22*†	551190	U-CUP, Polymite™/EPR	2		104765	PLUG, headless; 1/8–27; <i>Used on 249591 only.</i>	1
23✓	103926	SCREW, 1/4–20 x 2.25	2				
24	101970	PLUG, 1/4 npt sst	4				
25*	185467	SEAT, C2 carbide	2				
26	626063	HOUSING, fluid; aluminum	1				
27*‡	626062	NEEDLE, hardened stain- less steel	1	Not shown			
28▲	188377	LABEL, skin injection haz- ard	1		115982*	GREASE, 3 oz. tube	1
29▲	188378	LABEL, read instruction manual	1		551189	GUN, grease	1
30*	626057	GASKET, air cylinder	1		551187	COUPLER, flush grease	1
31★	626606	MANIFOLD NOSEPIECE, aluminum; <i>Used on 570145 and 57018 only.</i>	1				
	626631	MANIFOLD NOSEPIECE, aluminum; <i>Used on 570151 only.</i>	1				
	626061	MANIFOLD NOSEPIECE, aluminum; <i>Used on 965533, 965535, and 965537 only.</i>	1				

\* Included in Rebuild Kit 949634.

† Included in Fluid Section Seal Kit 949633.

‡ First prime the needle using Loctite Primer N7649, and then apply Loctite TL242, 243, or equivalent ("blue" Loctite).

★ Not used on model 249591.

✓ Use an anti-seize lubricant such as Loctite 56765 when installing the fluid housing screws.

▲ Replacement Instruction and Warning Labels are available at no cost.

# Parts

## Model 965534, 965536, 965538

Stainless Wetted Valves

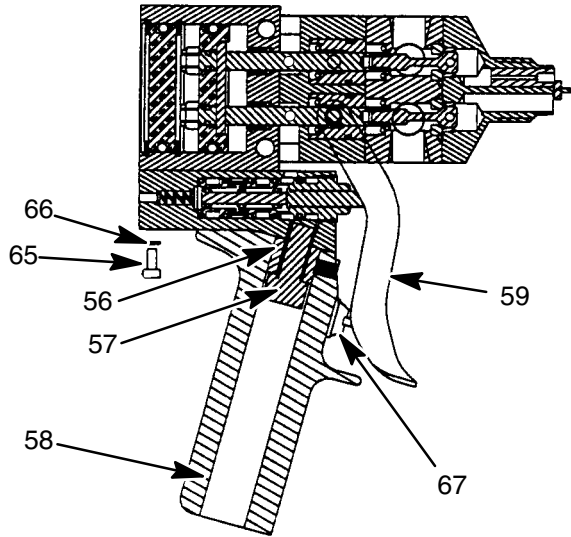
Ref. No.	Part No.	Description	Qty.	Ref. No.	Part No.	Description	Qty.
1	626070	HOUSING, air cylinder	1	29▲	188378	LABEL, read instruction manual	1
2	626069	MANIFOLD, air control	1	30*	626057	GASKET, air cylinder	1
3	626068	SHAFT, air cylinder	2	31	626054	NOSEPIECE, sst	1
4*	156454	O-RING, 010 buna-n	2	32*	626058	RESTRICTOR, 1/8 ID	3
5*	551181	BEARING, air cylinder	2	33*	626059	RESTRICTOR, 3/64 ID	3
6*	156593	O-RING, 222 buna-n	2	34*	551182	DOWEL PIN, sst	6
7*	551183	DOWEL PIN	1	35*	103154	O-RING, 006 EPR	3
8*	102920	NUT, full hex, 10–32	2	36*†	171860	GASKET, seat	2
9*	157628	O-RING, 006 buna-n	1	40	514237	SCREW, 20–443 x 1.5 in.	4
10	626067	PISTON, air cylinder	1	Not shown			
11	626066	CAP, air cylinder	1		115982*	GREASE, 3 oz. tube	1
12	551184	CLIP, internal 1.75	2		551189	GUN, grease	1
13*	626060	RING, snuff-back	2		551187	COUPLER, flush grease	1
14*†	104319	O-RING, 014 PTFE	2	* Included in Rebuild Kit 949634.			
15	104371	SCREW, 10–32 x 0.375	4	† Included in Fluid Section Seal Kit 949633.			
16*†	103610	O-RING, 014 fluoroelastomer	2	▲ Replacement Instruction and Warning Labels are available at not cost.			
17	100846	GREASE FLUSH	2	✓ Use an anti-seize lubricant such as Loctite 56765 when installing the fluid housing screws.			
18	551188	FLUSH GREASE FITTING	2	‡ First prime the needle using Loctite Primer N7649, and then apply Loctite TL242, 243, or equivalent (“blue” Loctite).			
19	626065	LUBE HOUSING	1				
20*†	551191	U-CUP, urethane/EPR	2				
21*	626064	BEARING, lube	2				
22*†	551190	U-CUP, Polymite™/EPR	2				
23✓	103926	SCREW, 1/4–20 x 2.25	2				
24	101970	PLUG, 1/4 npt sst	4				
25*	185467	SEAT, C2 carbide	2				
26	626052	HOUSING, fluid; stainless steel	1				
27*‡	626062	NEEDLE, hardened stainless steel	1				
28▲	188377	LABEL, skin injection hazard	1				



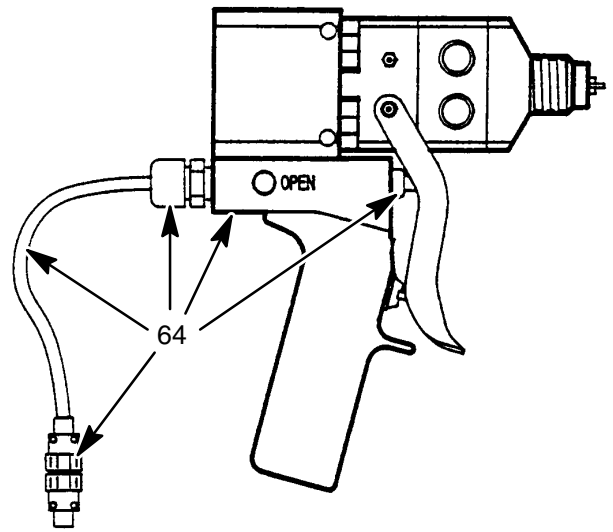
# Parts

## Hand Held Valves

Air Trigger Version 965535, 965536, or 249591

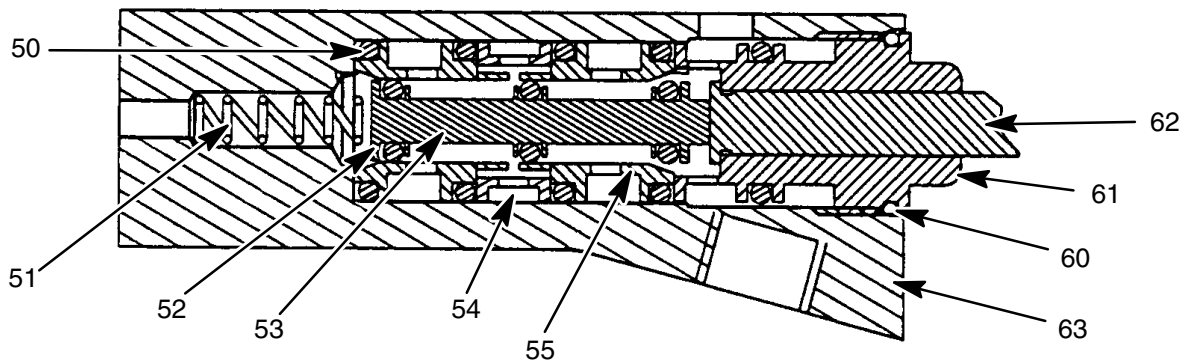


Electric Switch Version 965537 or 965538



### Note:

The electric switch housing, switch, cable, and disconnect are sold and serviced as a complete assembly.



**Air Trigger Version Detail**

# Parts

## Handle Sections of Pneumatic Trigger Valves

### Model 570182, 965535, 965536, 249591

Ref. No.	Part No.	Description	Qty.
	<b>965533</b>	<b>Valve</b>	<b>1</b>
50	106559	O-RING, No. 905 fluoroelastomer	5
51	106561	SPRING	1
52	106560	O-RING, 007 fluoroelastomer	3
53	178651	SPOOL, 4-way	1
54	178652	SPACER, u-shape	1
55	178653	SPACER, air valve	2
56	626055	BUSHING, handle	1
57	551204	SCREW, 3/8-16 x 3/4	1
58	626075	HANDLE	1
59	626083	TRIGGER	1
60	106551	O-RING, 0.5 x 0.6 fluoroelastomer	1
61	178654	GUIDE, stem	1
62	626053	PIN, trigger	1
63	626056	HOUSING, air valve	1
65	104468	SCREW, 4-40 x .375; <i>Used on 249591 only.</i>	4
66	100020	WASHER, lock, #10; <i>Used on 249591 only.</i>	4
67	235468	STOP, trigger; <i>Used on 249591 only.</i>	1

## Handle Sections of Electric Switch Trigger Valves

### Model 965537, 965538

Ref. No.	Part No.	Description	Qty.
	<b>965533</b>	<b>Valve</b>	<b>1</b>
56	626055	BUSHING, handle	1
57	551204	SCREW, 3/8-16 x 3/4	1
58	626075	HANDLE	1
59	626083	TRIGGER	1
64	949706	SWITCH ASSEMBLY	1
65	119156	SCREW, 10-32 x 0.8125	4
66	100020	WASHER, lock, #10	2

# Accessories

## Plastic Tube Fittings to Connect Air Signals

Tube OD	1/8 NPT (M) Straight	1/8 NPT (M) 90° Swivel
5/32 in. 1/4 in.	104172	598140 597151
Tube OD	1/4 NPT (M) Straight	1/4 NPT (M) 90° Swivel
5/32 in. 1/4 in.	598252 104165	598327 C19391

## Inlet Check Valves (3000 psi working pressure)

Part No.	Size	Description
501867	1/4 NPT (M x M)	303 SST with PTFE o-ring poppet (2 psi crack pressure).
501684	3/8 NPT (M x M)	303 SST with PTFE o-ring poppet (2 psi crack pressure).
949709	3/8 NPT (M x M)	Carbon steel carbide seat (50 psi crack pressure).
949710	3/8 NPT (M x M)	Carbon steel carbide seat (100 psi crack pressure).

## Catalyst Injectors

Catalyst injectors are restrictive check valves which are often used to create back pressure on the catalyst side inlet to the 2K-UL valve. Catalyst injectors are also used to balance pressures and flow on wide-ratio, low-viscosity catalyst applications.

Injector No.	Size Code	Bore Dia.	Needle Dia.	Typical Application Viscosity	Typically Used Sealant*
948291	#125	.125 in.	.086 in.	5000 – 50,000 cps	Polysulfide
948258	#35	.110 in.	.086 in.	1000 – 10,000 cps	Silicone
947937	#40	.098 in.	.086 in.	200 – 1500 cps	Urethane
570251	#42	.0935 in.	.086 in.	50 – 800 cps	Urethane

\*Wide ratio applications 8:1 to 13:1 by volume.

\*\*Injectors have a "snout" and must be screwed into a 1/4 npt(f) female coupling. Inlet is 1/4npt(f).

## Plastic Tubing for Air Signal Lines

Part No.	Description
514607	5/32 in. O.D. Nylon
C12509	1/4 in. O.D. Nylon

## Air Signal Accessories

### 104661 Quick Exhaust Valve

1/8 npt(f) inlet and outlet, 1/4 npt(f) exhaust

Used to speed up opening or closing action of the 2K Ultra-Lite Valve (except pneumatic pistol grip)

### 104632 Pump Pilot Valve

1/2 npt (f) line ports, 1/8 npt(f) pilot port

3-way air piloted air valve to turn air powered proportioning pump on with hand gun signal.

## Solenoids

4-Way Air Valves to Operate 2K Ultra-Lite Valve.

### 551350, 24 Volt dc Din Plug

With screw terminals for below solenoids

### 551348, 24 Volt dc Remote Mount Solenoid

1/8 npt(f) air porting.

# Accessories

## Disposable Mixers

Size	Part No. (elem.)	Part No. (elem.)	Part No. (elem.)	Part No. (elem.)
3/16 ID .30 OD	551337 (16)	551338 (24)	551339 (32)	551979 (36)
1/4 ID 3/8 OD	512012 (16)	512013 (24)	512014 (32)	
3/8 ID 1/2 OD		512016 (24)	512017 (30)	
1/2 ID 5/8 OD	512287 (18)	512288 (24)	512289 (30)	

## Retaining Nuts (aluminum nut holds disposable mixer onto valve)

Description	Part Number
Fits up to 3/8 O.D. mixers	512290
Fits 1/2 O.D. mixer	512291
Fits 5/8 O.D. mixer	512292

## Mixer Jackets (replace mixer retaining nuts)

Size	Jacket Part No.	Fits Mixer Part No.	Jacket Part No.	Fits Mixer Part No.	Jacket Part No.	Fits Mixer Part No.
1/2 O.D. Fits 3/8 O.D.		512012	512293	512295	512294	512014
5/8 O.D. Fits 1/2 O.D.					512008	512017
Fits 5/8 O.D. Mixer			512297	512288	512298	512289

## Replacement Nose Piece Restrictors (for valves with 1:1 nose piece)

Size	Part Number
1/8 I.D.	626058
3/64 I.D.	626059 uses o-ring 103154

### 551351 Short Throw Spacer

This spacer can be added under the air piston in the valve to limit how far the fluid needles push open. It reduces the amount of material surge when the valve opens, and reduces the amount of snuff-back available. Used for dispensing low flow small diameter beads.

### 551327 Nightcap

Plastic cap to cover nose piece outlet when valve is not in use. Disposable.

### 626407 Nose Piece with Flush Porting

Has 1/4 npt(f) flush port for non wide ratio valves.

### 626611 Ratio Check Outlet Adapter

Used with non wide ratio valves. Splits flow to collect in individual cups. Uses mixer retainer nut 512292.

# Accessories

## Optional Main Fluid Needle Packings (22)

Part No.	Description
551193	Reinforced PTFE u-cup with 302 stainless steel spreader

## Application Kits for Spray and Joint Fill

249634	Cold Spray Kit <i>for use with Model 249591.</i> For air spray with disposable mixers. See manual 311230.
249635	Joint Fill Kit <i>for use with Model 249591.</i> Extends disposable mixer 24 in. in front of valve. See manual 311230.
249765	Restrictor Kit <i>for use with Cold Spray Kit 249634 and Joint Fill Kit 249635.</i> See manual 311230.

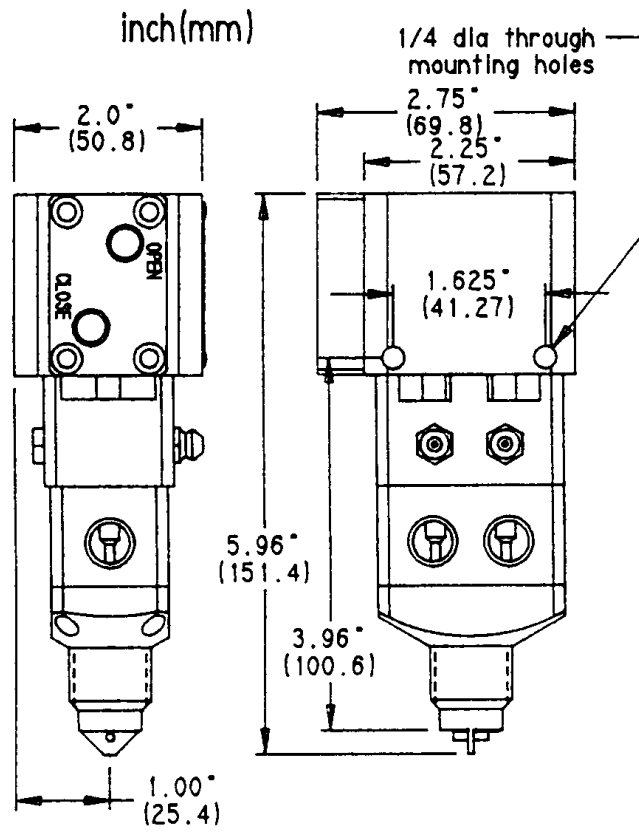
## Conversion Kits

Part No.	Description
949631	Pneumatic 4-way valve with housing, handle, and trigger and other parts necessary to convert any machine mount valve to a hand held valve.
949632	Electric switch style handle kit to convert any machine mount valve to a hand held valve.
949930	Seal kit for fluid section with optional PTFE seals.
949931	Rebuild kit complete with optional PTFE seals.

# Technical Data

Category	Data
Maximum Fluid Pressure	3000 psi (20.7 MPa, 207 bar)
Maximum Cylinder Air Pressure	120 psi (0.84 MPa, 8.4 bar)
Air inlets (open and close ports)	1/8 npt(f)
Fluid Inlet	1/4 npt(f)
Fluid Outlet	7/8–14 Bell outlet
Fluid Viscosity Range	20 cps to 1 million cps
Fluid Section Sealing	Isolation chamber with zerk fittings and dual seals.
Divorced Air Cylinder	Double acting, buna-N o-rings
Weight	
Aluminum Valve	1.43 lb (0.65 kg)
Stainless Steel Valve	2.07 lb (0.94 kg)
Handle Kit	0.77 lb (0.35 kg)
Wetted Parts	
Aluminum Valve	aluminum, 303 stainless steel, 17–4 PH stainless steel, C2 carbide, hard chrome, ethylene propylene, Parker Polymite™, PTFE
Stainless Steel Valve	303 stainless steel, 440–C stainless steel, C2 carbide, hard chrome, ethylene propylene, Parker Polymite™, PTFE
Severe-duty Components	
Shaft	Hard chrome over 303 stainless steel
Snuffer Needle	Hardened 440–C stainless steel
Seat	Reversible, solid C2 carbide inserts
Shaft Seal, standard	High density Parker Polymite™
Shaft Seal, optional	PTFE

# Dimensions



# Graco Standard Warranty

Graco warrants all equipment referenced in this document which is 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.

## **FOR GRACO CANADA CUSTOMERS**

The parties acknowledge that they have required that the present document, as well as all documents, notices and legal proceedings entered into, given or instituted pursuant hereto or relating directly or indirectly hereto, be drawn up in English. Les parties reconnaissent avoir convenu que la rédaction du présente document sera en Anglais, ainsi que tous documents, avis et procédures judiciaires exécutés, donnés ou intentés à la suite de ou en rapport, directement ou indirectement, avec les procédures concernées.

# Graco Information

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

**1-800-328-0211 Toll Free**

**612-623-6921**

**612-378-3505 Fax**

*All written and visual data contained in this document reflects the latest product information available at the time of publication. Graco reserves the right to make changes at any time without notice.*

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