



# Instructions – Parts List

# Cart-Mounted, Heated Electrostatic Air-Assisted Package

308694 rev.H

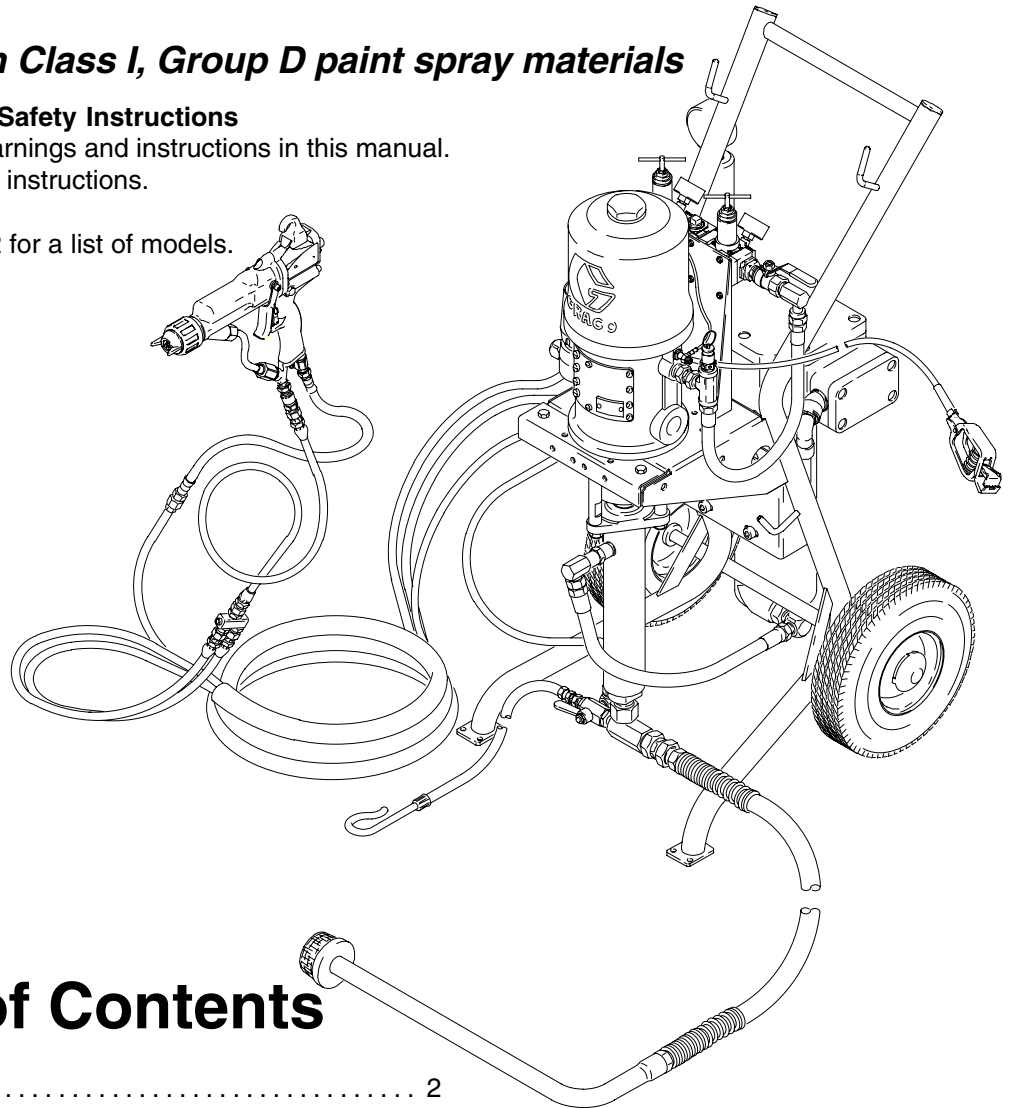
***For use with Class I, Group D paint spray materials***



## **Important Safety Instructions**

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

See page 2 for a list of models.



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**Model 231983 Shown**

TI1588A

PROVEN QUALITY. LEADING TECHNOLOGY.



II 2 G

# List of Models

Package Part No.	Series	Pump Model	Ratio	Maximum Fluid Working Pressure	Maximum Air Input Pressure	Voltage/ Amps
231983	B	President®, carbon steel	30:1	3000 psi (21 MPa, 210 bar)	100 psi (0.7 MPa, 7 bar)	120/19.2
231984	B	President®, carbon steel	30:1	3000 psi (21 MPa, 210 bar)	100 psi (0.7 MPa, 7 bar)	240/16.7
231986	B	President®, carbon steel	30:1	3000 psi (21 MPa, 210 bar)	100 psi (0.7 MPa, 7 bar)	240/16.7
232019	B	President®, carbon steel	15:1	1500 psi (10 MPa, 100 bar)	100 psi (0.7 MPa, 7 bar)	120/19.2
232020	B	President®, carbon steel	15:1	1500 psi (10 MPa, 100 bar)	100 psi (0.7 MPa, 7 bar)	240/16.7
232038	B	President®, stainless steel	30:1	3000 psi (21 MPa, 210 bar)	100 psi (0.7 MPa, 7 bar)	120/19.2
232039	B	President®, stainless steel	30:1	3000 psi (21 MPa, 210 bar)	100 psi (0.7 MPa, 7 bar)	240/16.7

# 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.

## WARNING



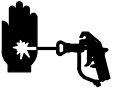
INSTRUCTIONS

### 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 24 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 use hoses to pull equipment.
- Route hoses away from traffic areas, sharp edges, moving parts, and hot surfaces. Do not expose Graco hoses to temperatures above 180°F (82°C) or below -40°F (-40°C).
- Wear hearing protection when operating this equipment.
- Do not lift pressurized equipment.
- Comply with all applicable local, state, and national fire, electrical, and safety regulations.

# WARNING



## SKIN INJECTION HAZARD

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



- Fluid injected into the skin might look like just a cut, but it is a serious injury. **Get immediate surgical treatment.**
- Do not point the gun at anyone or at any part of the body.
- Do not put your hand or fingers over the spray tip.
- Do not stop or deflect leaks with your hand, body, glove or rag.
- Do not “blow back” fluid; this is not an air spray system.
- Always have the tip guard and the trigger guard on the gun when spraying.
- Check the gun diffuser operation weekly. Refer to the gun manual.
- Be sure the gun trigger safety operates before spraying.
- Lock the gun trigger safety when you stop spraying.
- Follow the **Pressure Relief Procedure** on page 11 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 11 to prevent the equipment from starting unexpectedly.

# **WARNING**



## **FIRE, EXPLOSION, AND ELECTRIC SHOCK HAZARD**

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

- Electrostatic equipment must be used only by trained, qualified personnel who understand the requirements stated in this instruction manual.
- Ground the equipment, personnel in or close to the spray area, the object being sprayed, and all other electrically conductive objects in the spray area. Refer to **Grounding** on page 6.
- Check the spray gun resistance daily. See **Test Gun Resistance** in your separate gun manual.
- If there is any static sparking while using the equipment, **stop spraying immediately**. Identify and correct the problem.
- Provide fresh air ventilation to avoid the buildup of flammable or toxic vapors. Interlock the gun turbine air supply to prevent operation of the power supply unless the ventilating fans are on. See **Ventilate the Spray Booth** on page 6.
- When flushing or purging electrostatic equipment, use solvents with a flash point equal to or greater than that of the fluid being sprayed.
- To clean the exterior of the electrostatic equipment, use solvents with a flash point higher than 100°F (38°C).
- Use only non-sparking tools to clean residue from the booth and hangers.
- Do not flush the system with the gun electrostatics turned on.
- Do not turn on the gun electrostatics until all solvent is removed from the system.
- Extinguish all open flames or pilot lights in the spray area.
- Keep the spray area free of debris, including solvent, rags, and gasoline.
- Do not store any flammable fluids 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 smoke in the spray area.
- 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.

# Setup

## General Information

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

**NOTE:** Always use Genuine Graco Parts and Accessories, available from your Graco distributor. If you supply your own accessories, be sure they are adequately sized and pressure-rated for your system.

Fig. 3 is only a guide for selecting and installing system components and accessories. Contact your Graco distributor for assistance in designing a system to suit your particular needs.

## Prepare the Operator

All persons who operate the equipment must be trained in the safe, efficient operation of all system components as well as the proper handling of all fluids. All operators must thoroughly read all instruction manuals, tags, and labels before operating the equipment.

## Prepare the Site

**NOTE:** The compressed air supply to the gun must be clean and dry, to prevent damage to the finish. Use a coalescing air filter in the main air supply line.

Ensure that you have an adequate compressed air supply. Refer to the performance charts on page 25 to find the air consumption of your sprayer.




Refer to Fig. 3. Bring a compressed air supply line (A) from the air compressor to the pump location. Be sure all air hoses are properly sized and pressure-rated for your system. Use only electrically conductive hoses. The air hose should have a 3/8 npsm(m) thread.

Install a bleed-type shutoff valve (B) in the air line to isolate the air line components for servicing. Install an air line filter (J) and a moisture trap and drain valve (C) to help remove moisture and contaminants from the compressed air supply.

Keep the site clear of any obstacles or debris that could interfere with the operator's movement.

Have a grounded, metal pail available for use when flushing the system.




## Ventilate the Spray Booth

 <b>WARNING</b>	
	<b>FLAMMABLE OR TOXIC VAPOR HAZARD</b>
	Provide fresh air ventilation to avoid the buildup of flammable or toxic vapors. Do not operate the gun unless ventilation fans are operating.

Electrically interlock the gun air supply with the ventilators to prevent gun operation without ventilating fans operating. Check and follow all National, State, and Local codes regarding air exhaust velocity requirements.

**NOTE:** High velocity air exhaust will decrease the operating efficiency of the electrostatic system. Air exhaust velocity of 100 ft/min (31 linear meters/minute) should be sufficient.

## Grounding

 <b>WARNING</b>	
	<b>FIRE, EXPLOSION, AND ELECTRIC SHOCK HAZARD</b>
	Installing and servicing this equipment requires access to parts which may cause electric shock or other serious injury if work is not performed properly.
	<ul style="list-style-type: none"><li>• Do not install or service this equipment unless you are trained and qualified.</li></ul>
	<ul style="list-style-type: none"><li>• Be sure your installation complies with National, State and Local codes for the installation of electrical apparatus in a Class I, Group D Hazardous Location.</li></ul>
	<ul style="list-style-type: none"><li>• Check and follow all local safety and fire codes, NFPA 33, NEC 504 and 516, and OSHA standard 1910.107.</li></ul>

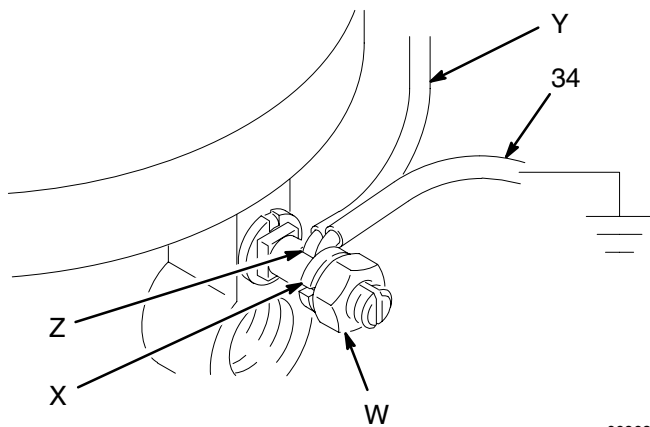
*Continued on page 7.*

# Setup

## Grounding (continued)

The following are minimum requirements for grounding a basic electrostatic system. Your system may include other equipment or objects which must also be grounded. Always check your local electrical code for detailed grounding instructions. Be sure your system is connected to a true earth ground.

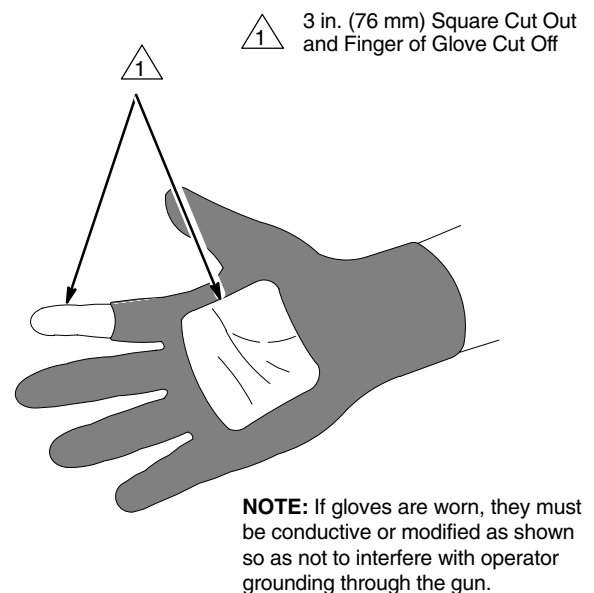
1. **Pump:** use the ground wire and clamp (supplied). See Fig. 1. Loosen the grounding lug locknut (W) and washer (X). Insert one end of the ground wire (34) into the slot in lug (Z) and tighten the locknut securely. Connect the other end of the wire to a true earth ground.
2. **Electrostatic Spray Gun:** obtain grounding through connection to a properly grounded air supply hose. Use only the Graco Electrically Conductive Air Supply Hose (supplied). Connect the air hose ground wire (Y) and the pump ground wire (34) to the grounding lug as shown in Fig. 1, then connect the other end of the pump ground wire to a true earth ground.



**Fig. 1**

3. **Air compressor:** follow manufacturer's recommendations.
4. **Viscon HP Heater:** refer to the heater manual, supplied.
5. **All air and fluid lines** must be properly grounded. Use only grounded hoses with a maximum of 500 feet (150 m) combined hose length to ensure grounding continuity.

6. **All electric cables** must be properly grounded.
7. **Object being sprayed:** keep the workpiece hangers clean and grounded at all times. Contact points must be sharp points or knife edges.
8. **All electrically conductive objects or devices** in the spray area, including paint containers and wash cans, must be properly grounded.
9. **All persons entering the spray area:** shoes must have conductive soles, such as leather, or personal grounding straps must be worn. Rubber or plastic soles are not conductive. The operator must not wear gloves that insulate the hand from the spray gun. The gloves must be conductive or modified as shown in Fig. 2.



**Fig. 2**

10. **The floor of the spray area** must be electrically conductive and grounded. Do not cover the floor with cardboard or any non-conductive material which would interrupt grounding continuity.
11. **Flammable liquids** in the spray area must be kept in approved, grounded containers. Do not store more than the quantity needed for one shift.
12. **All solvent pails:** use only grounded metal pails, which are conductive. Do not place the pail on any non-conductive surface, such as cardboard or paper, which would interrupt grounding continuity.

# Setup

## Supplied Components

Refer to Fig. 3.

### **WARNING**

A red-handled bleed-type master air valve (E) and a fluid drain valve (D) are supplied. These components help reduce the risk of serious injury, including fluid injection and splashing of fluid in the eyes or on the skin, and injury from moving parts if you are adjusting or repairing the pump.

The bleed-type master air valve relieves air trapped between this valve and the pump after the air is shut off. Trapped air can cause the pump to cycle unexpectedly. Locate the valve close to the pump.

The fluid drain valve assists in relieving fluid pressure in the displacement pump, hose, and gun. Triggering the gun to relieve pressure may not be sufficient.

- **The red-handled bleed-type master air valve (E)** is required in your system to relieve air trapped between it and the air motor when the valve is closed (see the **WARNING** above). Be sure the bleed valve is easily accessible from the pump, and is located **downstream** from the pump air regulator (F).
- **The pump air regulator (F)** controls pump speed and outlet pressure by adjusting the air pressure to the pump. Locate close to the pump, but **upstream** from the bleed-type master air valve (E).
- **The air relief valve (41)** opens automatically to prevent overpressurization of the pump.
- **The gun air filter/regulator (G)** adjusts the air pressure to the electrostatic air-assisted spray gun (106).
- **The air manifold (H)** directs incoming air to the pump and to the gun. It includes an air inlet swivel fitting.
- **The fluid filter (16)** includes a 60 mesh (250 micron) stainless steel element to filter particles from the fluid as it leaves the pump. It also includes the **fluid drain valve (D)**, which is required in your system to relieve fluid pressure in the hose and gun (see the **WARNING** at left).
- **The suction hose (25) and tube (26)** allow the pump to draw fluid from a 5 gallon (19 liter) pail (K). The strainer at the end of the suction tube keeps large particles from entering the pump.
- **The back pressure regulator (40)** controls back pressure to the gun and maintains proper circulation pressure.
- **The 3-way valve (45)** allows you to circulate fluid back to the pump or return it to the fluid container.



# Setup

## KEY

### SUPPLIED WITH THE SPRAYER

- 1 Cart
- 13 Pump
- 16 Fluid Filter (includes fluid drain valve D)
- 25 Suction Hose
- 26 Suction Tube
- 34 Ground Wire (required; see page 6 for installation instructions)
- 40 Back Pressure Regulator
- 41 Air Relief Valve
- 45 3-Way Valve
- 51 Fluid Heater
- 101 Electrically Conductive, Heated Air and Fluid Supply/Return Hose (air hose includes ground wire Y)

### SUPPLIED WITH THE SPRAYER

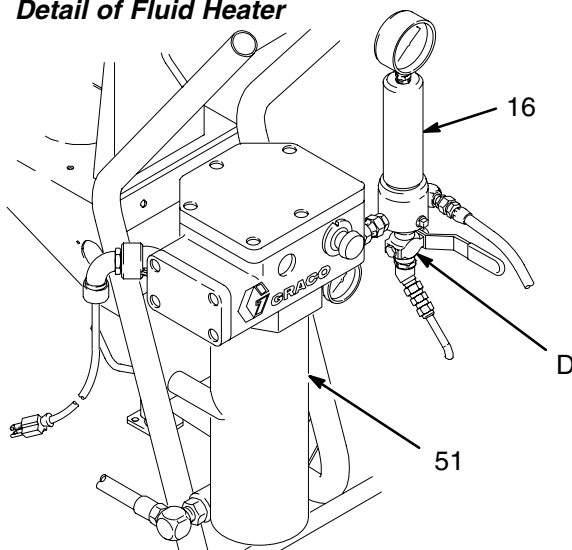
- 103 Fluid Whip Hose
- 104 Gun Swivel
- 106 Electrostatic Air-Assisted Spray Gun
- D Fluid Drain Valve
- E\* Red-Handled Bleed-Type Master Air Valve (required, for pump)
- F\* Pump Air Regulator
- G\* Gun Air Filter/Regulator
- H\* Air Manifold
- Y Gun Air Hose Ground Wire (required; see page 6 for installation instructions)

\* Included in Air Regulation Kit (19).

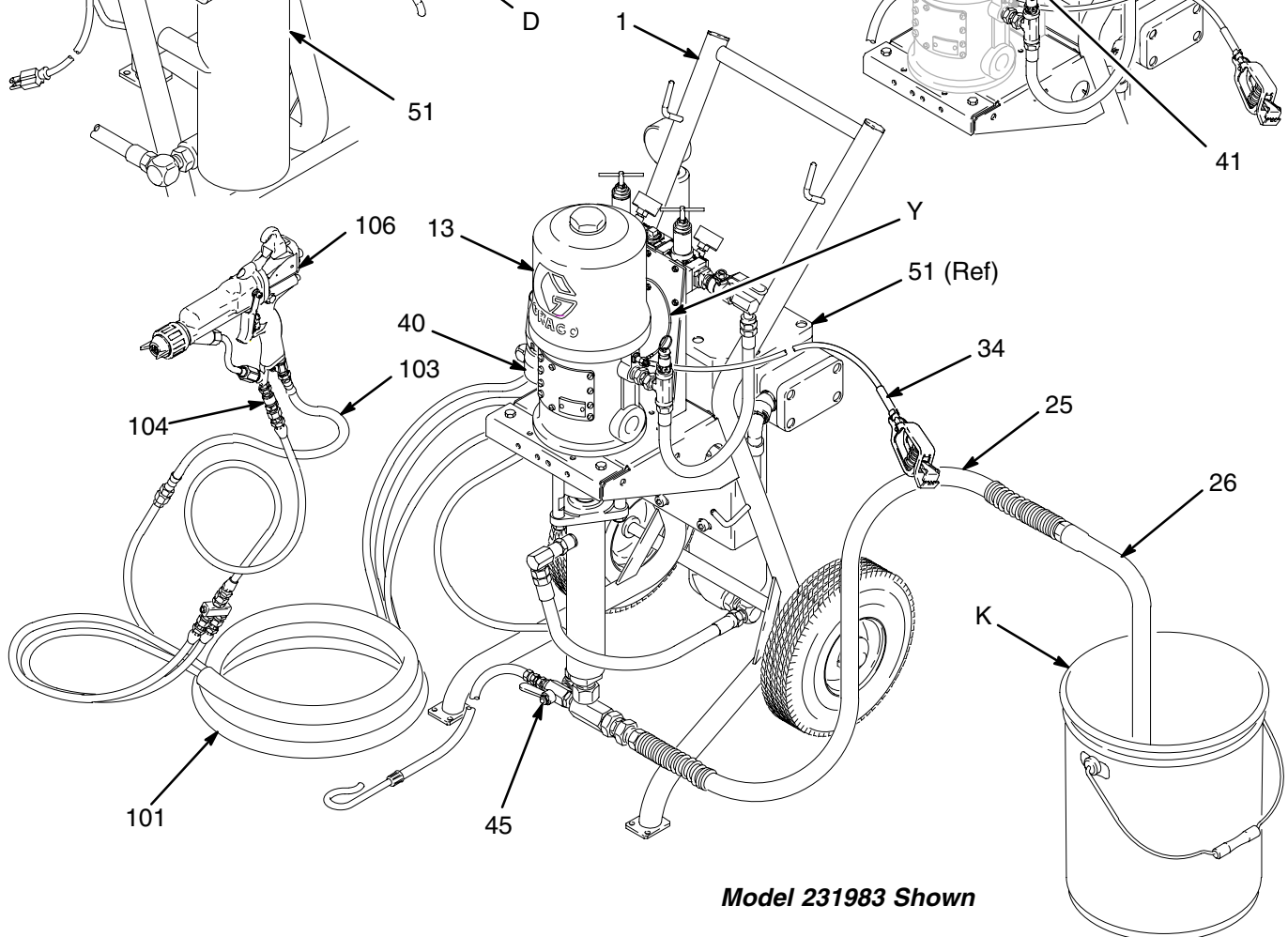
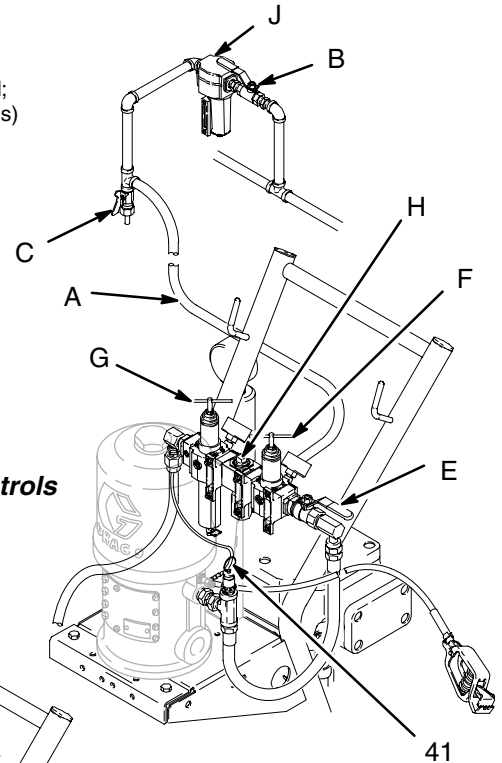
### COMPONENTS YOU MUST SUPPLY

- A Electrically Conductive Air Supply Hose
- B Bleed-Type Master Air Valve (for accessories)
- C Air Line Moisture Trap and Drain Valve
- J Air Line Filter
- K Grounded 5 Gallon (19 Liter) Pail

### Detail of Fluid Heater



### Detail of Air Controls



Model 231983 Shown

Fig. 3

TI1589A

# Setup

## Fluid Heater

The fluid heater (51) heats the fluid as it passes through, to maintain the correct spraying viscosity.

Read and understand all instructions in the supplied heater manual 309524 before operating the heater.

### WARNING



#### FIRE, EXPLOSION, AND ELECTRIC SHOCK HAZARD

The Viscon HP 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.



Refer to the **Technical Data** and to the supplied Viscon HP Heater manual

309524 for information on heater power supply requirements.

**Do not** plug in or unplug the power cord in any area containing flammable fluids or fumes, to avoid fire or explosion resulting in serious injury.

**Do not** put all flammable materials and debris on or near the heater. Keep the work area clean.

### WARNING

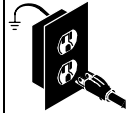
#### COMPONENT RUPTURE HAZARD



Heat causes fluid to expand. If the heated fluid is trapped with nowhere to expand, it can cause component rupture.

**Be sure** to keep the heated fluid circulating (turn 3-way valve to CIRC). **Do not** install a fluid shutoff device between the heater and the gun.

### WARNING



#### FIRE, EXPLOSION, AND ELECTRIC SHOCK HAZARD

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

# Operation

## Pressure Relief Procedure

### WARNING



#### SKIN INJECTION HAZARD

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

- are instructed to relieve the pressure,
- stop spraying,
- check or service any of the system equipment,
- or install or clean the spray tip.

### WARNING



#### HOT SURFACE HAZARD

Do not touch the heater while it is operating. Allow the heater to cool for at least 10 minutes before flushing or servicing it.

### WARNING



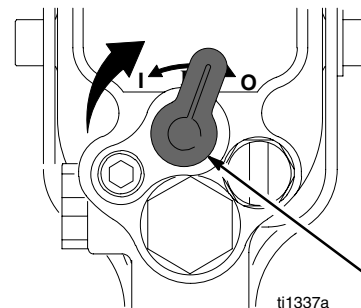
#### FIRE AND EXPLOSION HAZARD

**Do not** plug in or unplug the power cord in any area containing flammable fluids or fumes, to avoid fire or explosion resulting in serious injury.

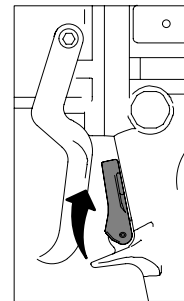
1. Lock the gun trigger safety. See Fig. 4.
2. Turn the gun's ES ON-OFF lever to the OFF position.
3. Unplug the heater power cord.
4. Circulate the fluid for at least 10 minutes to cool the heated fluid and the heater.

5. Close the red-handled bleed-type master air valve (E, required in your system). See Fig. 5.
6. Turn the 3-way valve (45) to DRAIN. Hook the drain hose (46) onto a waste container.
7. Unlock the gun trigger safety.
8. Trigger the gun into a grounded metal waste container to relieve fluid and air pressure.
9. Lock the gun trigger safety.
10. Open the drain valve (D, required in your system), having a container ready to catch the drainage.
11. Leave the drain valve open until you are ready to spray again.

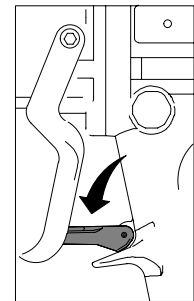
*If you suspect that the spray tip or hose is completely clogged, or that pressure has not been fully relieved after following the steps above, **very slowly** loosen the tip guard retaining nut or hose end coupling and relieve pressure gradually, then loosen completely. Now clear the tip or hose.*



ES ON-OFF Lever



Trigger Safety Latch Unlocked



Trigger Safety Latch Locked

Fig. 4

[illegible]

# Operation

## Packing Nut

Before starting, fill the packing nut (L) 1/3 full with Graco Throat Seal Liquid (TSL) or compatible solvent. See Fig. 5.

### WARNING

To reduce the risk of serious injury whenever you are instructed to relieve pressure, always follow the **Pressure Relief Procedure** on page 11.

The packing nut is torqued at the factory and is ready for operation. If it becomes loose and there is leaking from the throat packings, relieve pressure, then torque the nut as specified in your separate pump manual. Do this whenever necessary. Do not overtighten the packing nut.

## Flush the Pump Before First Use

The pump is tested with lightweight oil, which is left in to protect the pump parts. If the fluid you are using may be contaminated by the oil, flush it out with a compatible solvent. See **Flushing** on page 17.

## Using the Electrostatic Air-Assisted Spray Gun

### WARNING



#### **FIRE, EXPLOSION, AND ELECTRIC SHOCK HAZARD**

Proper electrical grounding of every part of your system is essential. For your safety, read the warning section, **FIRE, EXPLOSION, AND ELECTRIC SHOCK HAZARD**, on page 5 and **Grounding** on page 6. Ground the system as explained there. Then check the gun resistance as explained in your separate gun manual.

Check the spray gun resistance daily. See **Test Gun Resistance** in your separate gun manual.

The gun air filter/regulator (G, see Fig. 5) controls the air pressure to the spray gun. Air is supplied to the gun through a special electrically conductive air hose.

Adjust the air pressure to the pump to control the fluid pressure at the gun. For more precise fluid pressure control, install a fluid regulator.

Spray some test patterns before doing any finished work. Refer to the gun manual for detailed information on gun setup, operation, correct spraying technique, troubleshooting, maintenance, and repair. To change pattern width, a new tip size must be used. Refer to the separate gun manual for available tip sizes.

# Operation

## CAUTION

To avoid tip-over, the cart must be on a flat and level surface. Failure to follow this caution could result in injury or equipment damage.

### Prime the Pump

## WARNING



### FIRE AND EXPLOSION HAZARD

**Do not** plug in or unplug the power cord in any area containing flammable fluids or fumes, to avoid fire or explosion resulting in serious injury.

1. See Fig. 5. Unplug the heater power cord before priming the pump.
2. Turn the gun's ES ON-OFF lever to the OFF position.
3. Remove the tip guard and spray tip from the gun (106). See the gun manual.
4. See Fig. 5. Close the gun air filter/regulator (G), pump air regulator (F), and bleed-type air valves (B, E).
5. Close the fluid drain valve (D).
6. Connect the air line (A) to the swivel of the air manifold (H).
7. Check that all fittings throughout the system are tightened securely.

8. Turn the 3-way valve (45) to CIRC. Hook the drain hose (46) onto a waste container.
9. Place the pump suction tube (26) into the fluid supply container.
10. Open the back pressure regulator (40) (fully counterclockwise).
11. Open the bleed-type air valves (B, E) and the gun air filter/regulator (G).
12. Hold a metal part of the gun (106) firmly to the side of a grounded metal pail and hold the trigger open.
13. Slowly open the pump air regulator (F) until the pump starts.

**NOTE:** To open the air regulator, turn the T-handle in (clockwise). To close the regulator, turn the handle counterclockwise. To lock the regulator setting, tighten the jam nut.


14. Cycle the pump slowly until all air is pushed out and the pump and hoses are fully primed.
15. Release the gun trigger and lock the trigger safety. The pump will continue to cycle as long as air is supplied and the back pressure regulator is open.
16. If the pump fails to prime properly, open the drain valve (D). Use the drain valve as a priming valve until the fluid flows from the valve. Close the valve.

**NOTE:** When changing fluid containers with the hose and gun already primed, open the drain valve (D) to help prime the pump and vent air before it enters the hose. Close the drain valve when all air is eliminated.

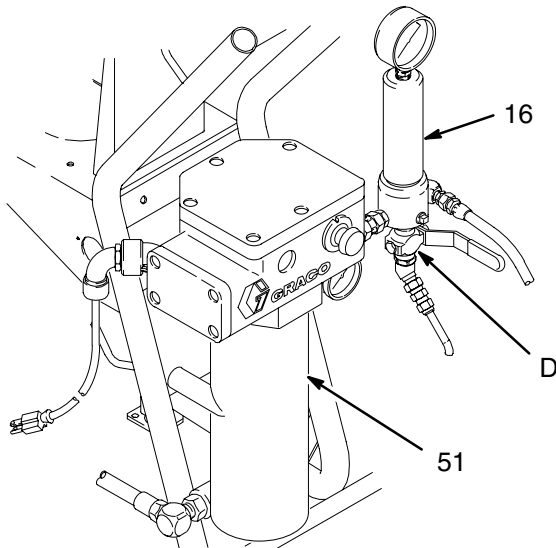
# Operation

## KEY

16	Fluid Filter (includes fluid drain valve D)	101	Electrically Conductive, Heated Air and Fluid Supply/Return Hose	D	Fluid Drain Valve
25	Suction Hose	103	Fluid Whip Hose	E	Red-Handled Bleed-Type Master Air Valve (required, for pump)
26	Suction Tube	106	Electrostatic Air-Assisted Spray Gun	F	Pump Air Regulator
40	Back Pressure Regulator	A	Electrically Conductive Air Supply Hose	G	Gun Air Filter/Regulator
45	3-Way Valve	B	Bleed-Type Master Air Valve (for accessories)	H	Air Manifold
46	Fluid Return Drain Hose			L	Packing Nut/Wet-Cup (partially hidden)
51	Fluid Heater				

 Torque as specified in your separate pump manual.

### Detail of Fluid Heater



### Detail of Air Controls

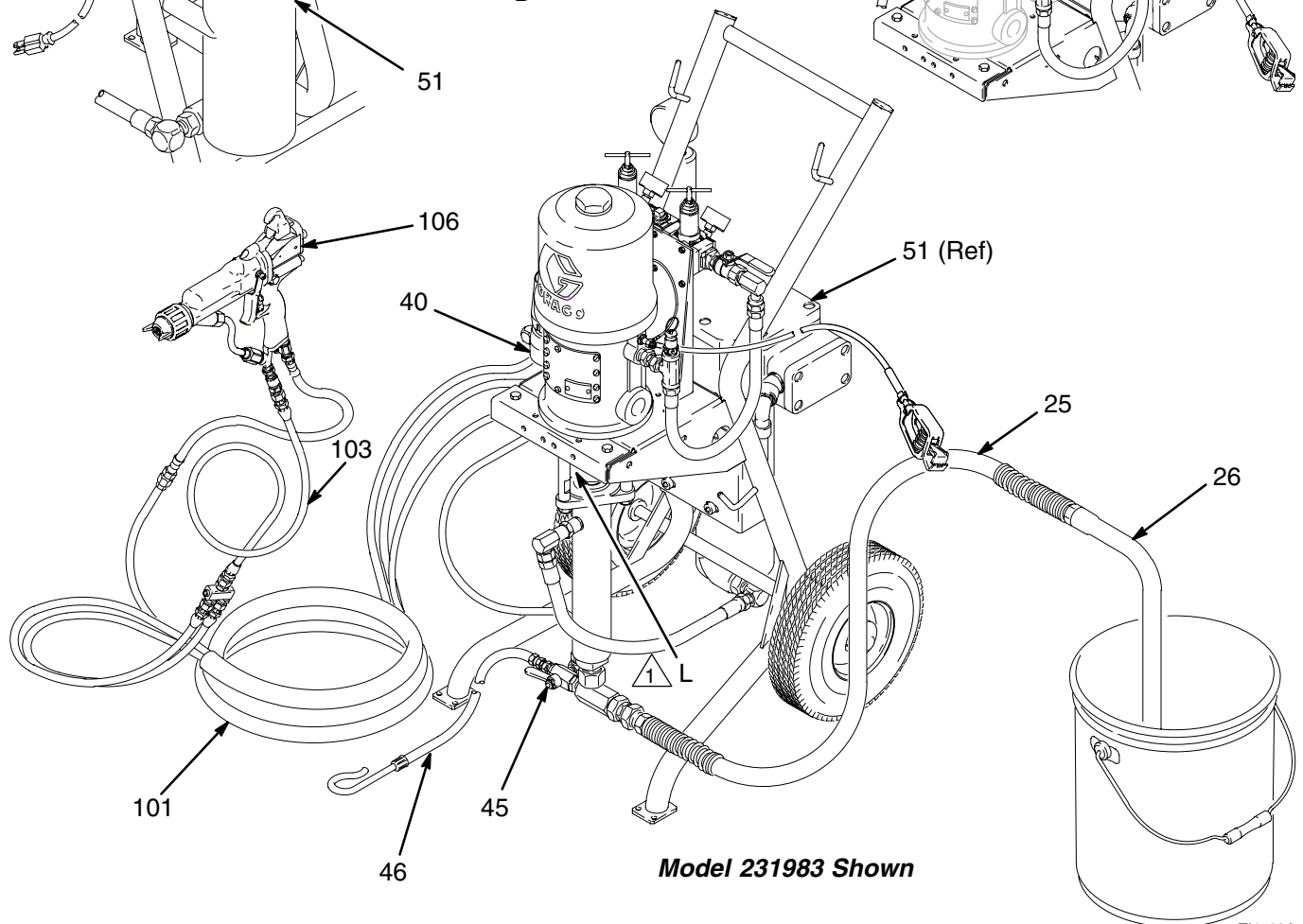
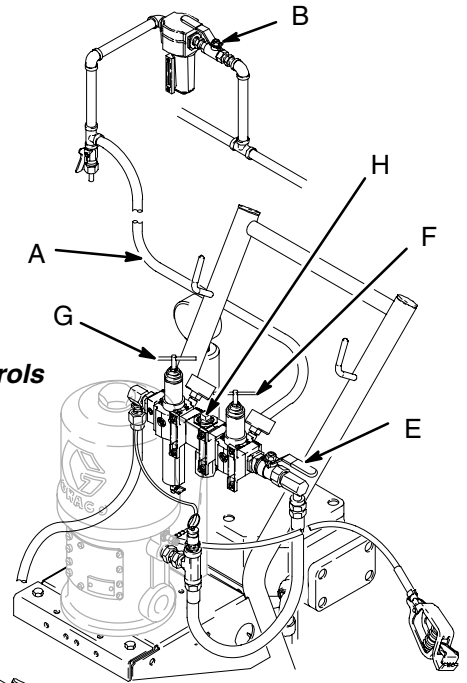


Fig. 5

TI1589A

# Operation

## Install the Spray Tip

### WARNING

To reduce the risk of serious injury whenever you are instructed to relieve pressure, always follow the **Pressure Relief Procedure** on page 11.

Relieve the pressure. Install the spray tip and tip guard as explained in your separate gun manual, supplied. Be careful not to bend the electrode wire.

The fluid output and pattern width depend on the size of the spray tip, the fluid viscosity, and the fluid pressure. Use the **Spray Tip Selection Chart** in your gun instruction manual as a guide for selecting an appropriate spray tip for your application.

## Adjust the Spray Pattern

### WARNING



#### FIRE AND EXPLOSION HAZARD

**Do not** plug in or unplug the power cord in any area containing flammable fluids or fumes, to avoid fire or explosion resulting in serious injury.

1. Start the pump. Plug in the heater power cord. Turn the 3-way valve (45) to CIRC.
2. Set the heater control to a trial point (4 or 5).
3. Circulate fluid through the pump for at least 10 minutes, at very low pressure. Check the temperature on the heater thermometer.
4. Adjust the fluid pressure and temperature to the lowest settings necessary to get the desired results. Use the air regulator (F) to adjust the pump speed and fluid pressure until the spray is completely atomized. Refer to the back pressure valve and heater manuals (supplied) for adjustment procedures. Higher pressures and temperatures may not improve the spray pattern and will cause premature component wear.

### WARNING

#### COMPONENT RUPTURE HAZARD



To reduce the risk of overpressurizing your package, which could cause component rupture and serious injury, *never exceed 100 psi (0.7 MPa, 7 bar) air input pressure to the package. Never exceed 100 psi (0.7 MPa, 7 bar) air input pressure to the spray gun.* Also refer to the **Technical Data** on page 24 and to your separate component manuals.

Heat causes fluid to expand. If the heated fluid is trapped with nowhere to expand, it can cause component rupture. **Be sure** to keep the heated fluid circulating (turn the 3-way valve to CIRC). **Do not** install a fluid shutoff device between the heater and the gun.

5. To adjust the spray pattern, follow the complete instructions in your gun manual, supplied.
6. With the pump and lines primed, and with adequate air pressure and volume supplied, the pump will start and stop as you open and close the gun.

### CAUTION

Do not allow the pump to run dry. It will quickly accelerate to a high speed, causing damage. If your pump is running too fast, stop it immediately and check the fluid supply. If the container is empty and air has been pumped into the lines, refill the container and prime the pump and the lines, or flush and leave it filled with a compatible solvent. Eliminate all air from the fluid system.

## Shutdown and Care of the Pump

### WARNING

To reduce the risk of serious injury whenever you are instructed to relieve pressure, always follow the **Pressure Relief Procedure** on page 11.


For overnight shutdown, stop the pump at the bottom of its stroke to prevent fluid from drying on the exposed displacement rod and damaging the throat packings. Relieve the pressure.


Always flush the pump before the fluid dries on the displacement rod. See **Flushing** on page 17.



# Operation

## Flushing


**WARNING**

**FIRE AND EXPLOSION HAZARD**  
Before flushing, read the section **FIRE, EXPLOSION, AND ELECTRIC SHOCK HAZARD** on page 5. Be sure the entire system and flushing pails are properly grounded. Refer to **Grounding** on page 6.


Flush the pump:


- Before the first use
- When changing colors or fluids
- Before fluid can dry or settle out in a dormant pump (check the pot life of catalyzed fluids)
- Before storing the pump.


Flush with a fluid that is compatible with the fluid you are pumping and with the wetted parts in your system. Check with your fluid manufacturer or supplier for recommended flushing fluids and flushing frequency.


**WARNING**

To reduce the risk of serious injury whenever you are instructed to relieve pressure, always follow the **Pressure Relief Procedure** on page 11.

**WARNING**

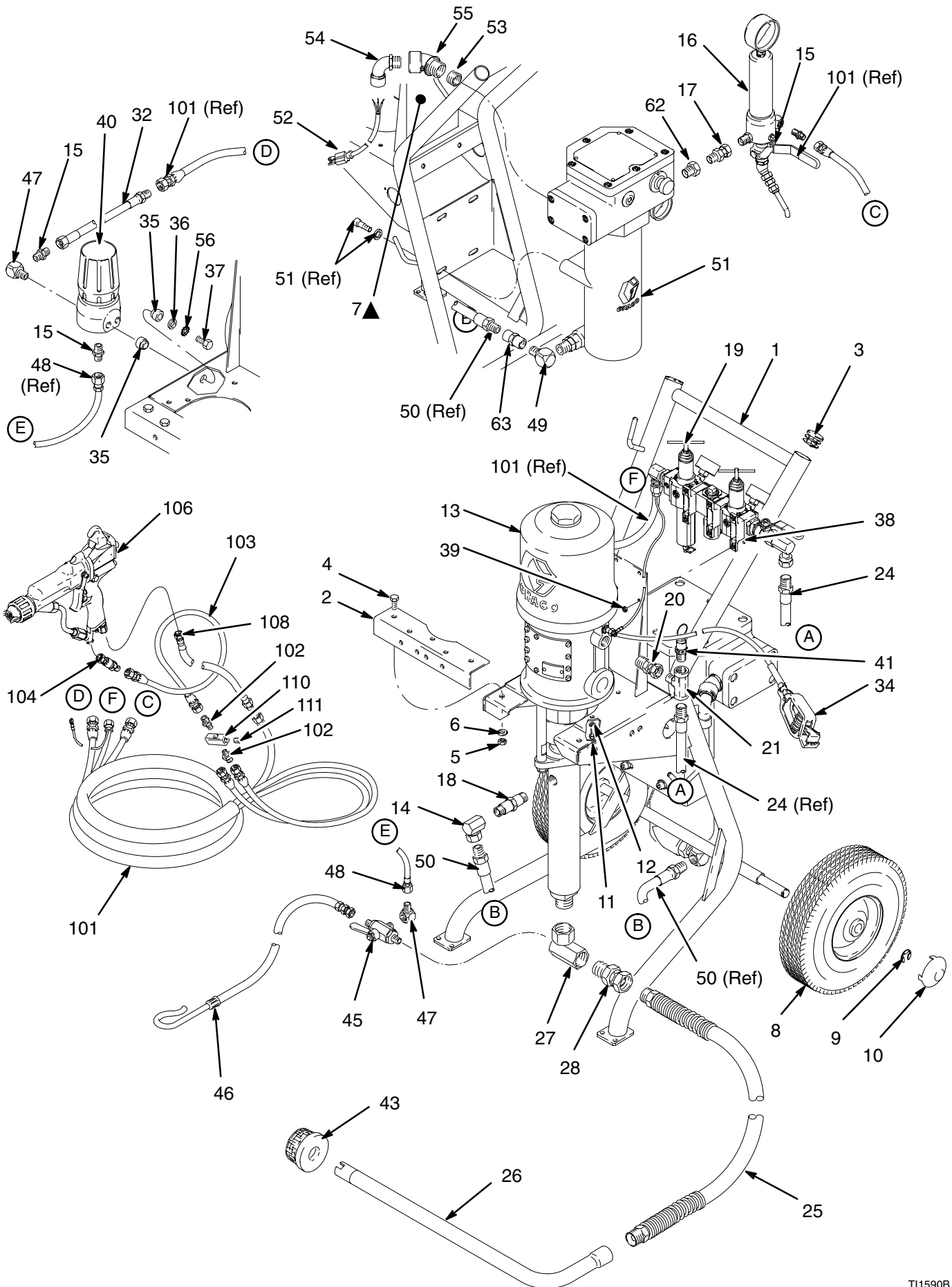
**HOT SURFACE HAZARD**  
Do not touch the heater while it is operating. Allow the heater to cool for at least 10 minutes before flushing or servicing it.

**WARNING**

**FIRE AND EXPLOSION HAZARD**  
Do not plug in or unplug the power cord in any area containing flammable fluids or fumes, to avoid fire or explosion resulting in serious injury.

1. Unplug the heater power cord and circulate the fluid for at least 10 minutes to cool the heated fluid and the heater.
2. Relieve the pressure. Be sure to turn the gun's ES ON-OFF lever to the OFF position.
3. Remove the tip guard and spray tip from the gun. See the gun manual.
4. Remove the filter element from the fluid filter (16). Reinstall the filter bowl.
5. Open the back pressure regulator (40). Set the 3-way valve (45) to CIRC.
6. Place the suction tube (26) in a container of solvent.
7. Point the gun down into a grounded *metal* pail.
8. Start the pump. Always use the lowest possible fluid pressure when flushing.
9. Trigger the gun. Flush the system until clear solvent flows from the gun.
10. Release the gun trigger and lock the trigger safety. The pump will continue to cycle as long as air is supplied and the back pressure regulator is open.
11. Set the 3-way valve (45) to DRAIN. Hook the drain hose (46) onto a waste container and continue flushing until clear fluid comes from the hose.
12. Relieve the pressure.
13. Clean the tip guard, spray tip, and fluid filter element separately, then reinstall them.
14. Clean the inside and outside of the suction tube (26).

# Parts



# Parts

**NOTE:** Part numbers vary by package. To find the part number used in your package, read down the chart to find the desired ref. no., then read left to right to find the part number for your package.

Ref. No.	Description	Packages			Qty
		CST 231983, 231984, 231986	SST 232038, 232039	CST 232019, 232020	
1	CART, portable; includes replaceable items 2–10	238938	238938	238938	1
2	. BRACKET, front	191902	191902	191902	1
3	. CAP	112853	112853	112853	2
4	. CAPSCREW, hex hd; M8 x 1.25; 16 mm (5/8 in.)	108768	108768	108768	2
5	. NUT, keps, hex; M8	113761	113761	113761	2
6	. WASHER, flat; 8 mm	108788	108788	108788	2
7▲	. LABEL, warning	290331	290331	290331	1
8	. WHEEL	106062	106062	106062	2
9	. RING, retaining	101242	101242	101242	2
10	. HUBCAP	104811	104811	104811	2
11	CAPSCREW, hex hd; 1/4–20 x 5/8 in. (16 mm)	100270	100270	100270	2
12	LOCKWASHER, spring; 1/4 in.	100016	100016	100016	2
13	PUMP, 30:1 President; cst; <i>see manual 306981</i>	223586			1
	PUMP, 30:1 President; sst; <i>see manual 308106</i>		223843		1
	PUMP, 15:1 President; cst; <i>see manual 306936</i>			217580	1
14	UNION, swivel, 90°; cst; 3/8 npt(f) x 1/2 npsm(f)	159801		159801	1
	UNION, swivel, 90°; sst; 1/2 npt(fbe)		113934		1
15	NIPPLE; cst; 1/4 npt x 1/4 npsm	162453		162453	3
	NIPPLE; sst; 1/4 npt x 1/4 npsm		166846		3
16	FLUID FILTER; cst; <i>see manual 307273</i>	239244		239244	1
	FLUID FILTER; sst; <i>see manual 307273</i>		239300		1
17	UNION, swivel; cst; 3/8 npt(m) x 3/8 npsm(f)	155665		155665	1
	UNION, swivel; sst; 3/8 npt(m) x 3/8 npsm(f)		235207		1
18	NIPPLE; cst; 3/8 npt	156850			1
	NIPPLE; sst; 3/8 npt x 1/2 npt		112027		1
	NIPPLE; cst; 3/8 npt x 1/2 npt			188577	1
19	AIR REGULATOR KIT; <i>see manual 308686</i>	238939	238939	238939	1
20	UNION, swivel; cst; 1/2 npt(m) x 3/8 npsm(f)	158256	158256	158256	1
21	TEE; 3/8 npt(f) run x 3/8 npt(m) branch	113777	113777	113777	1
24	HOSE, air; 3/8 in. (10 mm) ID; 3/8 npt(mbe); 22 in. (559 mm) long	239061	239061	239061	1
25	HOSE, suction; 3/4 in. (19 mm) ID; 3/4 npt (mbe) cst fittings; 3.5 ft (1 m) long	214960		214960	1
	HOSE, suction; 3/4 in. (19 mm) ID; 3/4 npt (mbe) sst fittings; 3.5 ft (1 m) long		236075		1
26	TUBE, suction; aluminum	192121		192121	1
	TUBE, suction; sst		112191		1
27	MANIFOLD, inlet; cst; 1/4 npt(f) x 3/4 npt(f) x 3/4 npsm(f)	166998		166998	1
	MANIFOLD, inlet; sst; 1/4 npt(f) x 3/4 npt(f) x 3/4 npsm(f)		113927		1

▲ Replacement Danger and Warning labels, tags and cards are available at no cost.  
 This label is also available in the following languages:  
 German (Part No. 290396)  
 French (Part No. 290397)  
 Spanish (Part No. 290398).

# Parts

**NOTE:** Part numbers vary by package. To find the part number used in your package, read down the chart to find the desired ref. no., then read left to right to find the part number for your package.

Ref. No.	Description	Packages			Qty
		CST 231983, 231984, 231986	SST 232038, 232039	CST 232019, 232020	
28	UNION, swivel; cst; 3/4 npt(m) x 3/4 npsm(f)	157785		157785	1
	UNION, swivel; sst; 3/4 npt(m) x 3/4 npsm(f)		112268		1
32	HOSE, fluid; nylon; 1/4 in. (6 mm) ID; 1/4 npt(m) x 1/4 npsm(f); 10 in. (0.25 m) long; cst fittings	239368		239368	1
	HOSE, fluid; nylon; 1/4 in. (6 mm) ID; 1/4 npt(m) x 1/4 npsm(f); 10 in. (0.25 m) long; sst fittings		239373		1
33	THROAT SEAL LIQUID; 1 pint (0.5 liter); not shown	206994	206994	206994	1
34	GROUND WIRE AND CLAMP	238909	238909	238909	1
35	INSULATOR, heat	167002	167002	167002	4
36	WASHER; 1/4 in.	100527	100527	100527	2
37	CAPSCREW, hex hd; 1/4–20 x 3/4 in. (19 mm)	100022	100022	100022	2
38	SCREW, socket; M5 x 0.8; 16 mm (5/8 in.)	113768	113768	113768	6
39	NUT, hex, self-locking; M5 x 0.8	105332	105332	105332	6
40	REGULATOR, back pressure; cst; <i>see manual 306860</i>	206819		206819	1
	REGULATOR, back pressure; sst; <i>see manual 306860</i>		238926		1
41	VALVE, relief; 125 psi (8.6 bar, 0.86 MPa)	113769	113769	113769	1
43	STRAINER, suction tube; 1/2 npt(f); sst	181073		181073	1
	STRAINER, suction tube; 3/4 npt(f); sst		183770		1
45	VALVE, 3-way; 1/4 npt(m); cst	214711		214711	1
	VALVE, 3-way; 1/4 npt(m); sst		113834		1
46	HOSE, drain; nylon; cst fittings; 1/4" (6 mm) ID; 1/4 npsm(f)	206965		206965	1
	HOSE, drain; nylon; sst fittings; 1/4" (6 mm) ID; 1/4 npsm(f)		239062		1
47	ELBOW; 1/4 npt (m x f); cst	100840		100840	2
	ELBOW; 1/4 npt (m x f); sst		166866		2
48	HOSE, fluid; nylon; cst fittings; 0.25 in. (6 mm) ID; 1/4 npsm (fbe); 3 ft (0.9 m) long	H42503			1
	HOSE, fluid; nylon; sst fittings; 0.15 in. (4 mm) ID; 1/4 npsm (fbe); 14 in. (0.36 m) long		239109		1
	HOSE, fluid; nylon; cst fittings; 0.25 in. (6 mm) ID; 1/4 npsm (fbe); 3 ft (0.9 m) long			H42503	1
49	ELBOW, 90°; cst; 1/2 npt (m x f)	158683		158683	1
	ELBOW, 90°; sst; 1/2 npt (m x f)		166242		1
50	HOSE, fluid; nylon; cst fittings; 1/2 in. (13 mm) ID; 1/2 npt (mbe); 19.5 in. (0.5 m) long	239148		239148	1
	HOSE, fluid; nylon; sst fittings; 1/2 in. (13 mm) ID; 1/2 npt (mbe); 19.5 in. (0.5 m) long		239153		1
56	LOCKWASHER, external tooth; 1/4 in.	100985	100985	100985	2
62	BUSHING, reducer, pipe	502265	502265	502265	1
63	FITTING, coupler	117627	117627	117627	1

# Hose and Gun Parts

**NOTE:** Part numbers vary by package. To find the part number used in your package, read down the chart to find the desired ref. no., then read left to right to find the part number for your package.

Ref. No.	Description	Packages			Qty
		CST 231983, 231984, 231986	SST 232038, 232039	CST 232019, 232020	
101	HOSE, triple, air/fluid, with ground wire; nylon; 1/4 in. (6 mm) ID; 1/4 npsm (fbe); air hose is left-hand thread; 24.6 ft (7.5 m) long; cst fluid fittings	239357		239357	1
	HOSE, triple, air/fluid, with ground wire; nylon; 1/4 in. (6 mm) ID; 1/4 npsm (fbe); air hose is left-hand thread; 24.6 ft (7.5 m) long; sst fluid fittings		239352		1
102	NIPPLE; 1/4 npsm x 1/8 npt; cst	191872		191872	3
	NIPPLE; 1/4 npsm x 1/8 npt; sst		191929		3
103	HOSE, whip, fluid; nylon; cst; 3/16 in. (5 mm) ID; 1/4 npsm (fbe); 23.6 in. (0.6 m) long	238708		238708	1
	HOSE, whip, fluid; nylon; sst; 3/16 in. (5 mm) ID; 1/4 npsm (fbe); 23.6 in. (0.6 m) long		239069		1
104	SWIVEL, gun	189018	189018	189018	1
106	ELECTROSTATIC AIR-ASSISTED SPRAY GUN; with GG3413 tip; <i>see manuals 309295 and 309296</i>	244573	244573	244573	1
107	SPRAY TIP; customer's choice; not shown	GG3xxx	GG3xxx	GG3xxx	1
108	HOSE, air; 1/4 npsm (m x f) left-hand thread; 3 ft (0.9 m) long	236130	236130	236130	1
110	MANIFOLD, hose; cst; 1/8 npt(f)	169795		169795	1
	MANIFOLD, hose; sst; 1/8 npt(f)		191923		1
111	PLUG; cst; 1/8 npt	100139		100139	1
	PLUG; sst; 1/8 npt		107570		1

# Heater Parts

**NOTE:** This chart includes the heater and related parts which vary by package. The packages are grouped by heater voltage, so they are in different columns from the preceding charts. To find the part number used in your package, read down the chart to find the desired ref. no., then read left to right to find the correct part number.

Ref. No.	Description	Packages		Qty
		120V PACKAGES: 231983, 232019, 232038	240V PACKAGES: 231984, 232020, 232039, 232986	
51	HEATER, fluid, 120V; <i>see manual 309524</i>	245848		1
	HEATER, fluid, 240V; <i>see manual 309524</i>		245863	1
52	CORD, electrical; with plug; 12 AWG; 600V; 20 AMP; 221 °F (105°C); 6.5 ft (2 m) long	110160	110160	1
	CORD electrical; without plug; 12 AWG; 600V; 20 AMP; 221 °F (105°C); 6.5 ft (2 m) long		113922	1
53	BUSHING; 3/4 npt(m) x 1/2 npt(f)	107219	107219	1
54	STRAIN RELIEF, 90°	112408	112408	1
	STRAIN RELIEF, clamp		113162	1
55	ELBOW, conduit, 45°; 3/4 npt (m x f)	113778	113778	1

[illegible]

# Technical Data

Category	Data
Maximum fluid working pressure	<i>Part Nos. 231983, 231984, 231986, 232038, 232039:</i> 3000 psi (21 MPa, 210 bar) <i>Part Nos. 232019, 232020:</i> 1500 psi (10 MPa, 100 bar)
Maximum air input pressure	100 psi (0.7 MPa, 7 bar)
Maximum gun air input pressure	100 psi (0.7 MPa, 7 bar)
Ratio	<i>Part Nos. 231983, 231984, 231986, 232038, 232039:</i> 30:1 <i>Part Nos. 232019, 232020:</i> 15:1
Maximum Heater Voltage and Amperage	<i>Part Nos. 231983, 232019, 232038:</i> 120V, 19.2 Amp <i>Part Nos. 231984, 232020, 231986, 232039:</i> 240V, 16.7 Amp
Maximum operating temperature	120°F (50°C)
Wetted parts	<i>Pump:</i> See applicable pump manual <i>Spray Gun:</i> See gun manuals 309295 and 309296 <i>Fluid Filter:</i> See filter manual 307273 <i>Fluid Hoses:</i> Nylon

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

Air Motor	Input Air Pressures at 15 cycles per minute		
	40 psi (0.28 MPa, 2.8 bar)	70 psi (0.48 MPa, 4.8 bar)	100 psi (0.7 MPa, 7 bar)
President	73.6 dB(A)	78.34 dB(A)	80.85 dB(A)

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

Air Motor	Input Air Pressures at 15 cycles per minute		
	40 psi (0.28 MPa, 2.8 bar)	70 psi (0.48 MPa, 4.8 bar)	100 psi (0.7 MPa, 7 bar)
President	87.4 dB(A)	92.09 dB(A)	94.62 dB(A)



# Technical Data

## Performance Charts

**To find Fluid Outlet Pressure** (psi/MPa/bar) at a specific fluid flow (lpm/gpm) and operating air pressure (psi/MPa/bar):

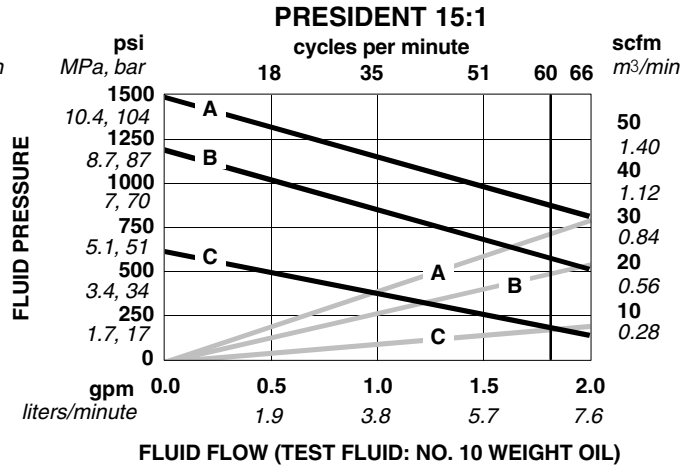
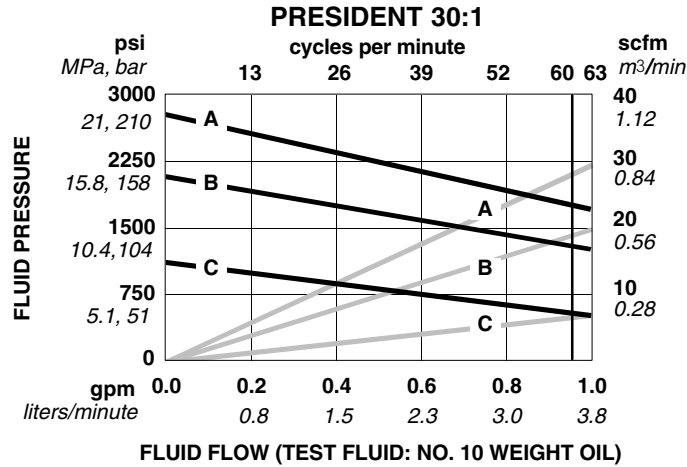
1. Locate desired flow along bottom of chart.
2. Follow vertical line up to intersection with selected fluid outlet pressure curve (black). Follow left to scale to read fluid outlet pressure.

**KEY:** Fluid Outlet Pressure – Black Curves  
Air Consumption – Gray Curves

**To find Pump Air Consumption** (m<sup>3</sup>/min or scfm) at a specific fluid flow (lpm/gpm) and air pressure (psi/MPa/bar):

1. Locate desired flow along bottom of chart.
2. Read vertical line up to intersection with selected air consumption curve (gray). Follow right to scale to read air consumption.

**A** 100 psi (0.7 MPa, 7 bar) air pressure  
**B** 70 psi (0.49 MPa, 4.9 bar) air pressure  
**C** 40 psi (0.28 MPa, 2.8 bar) air pressure

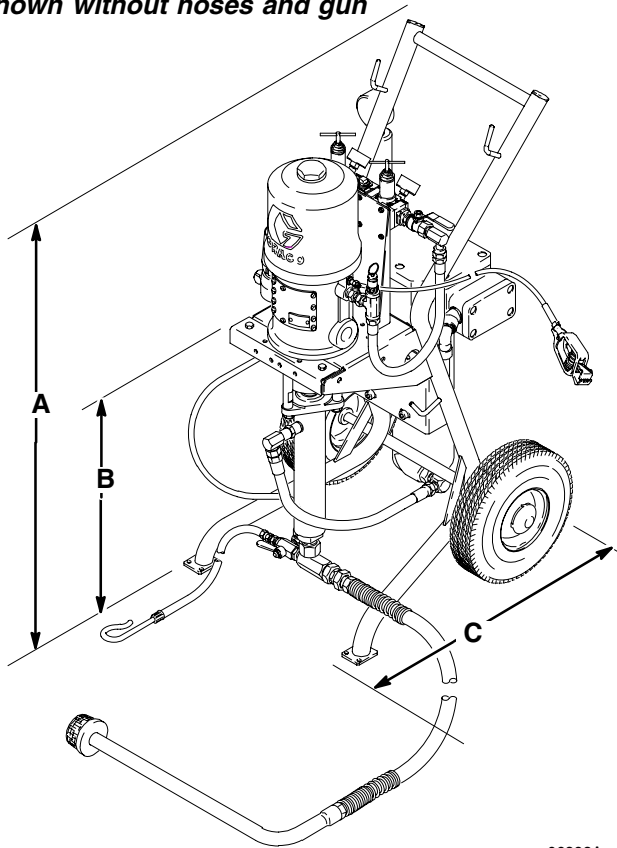


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# Dimensions

*Shown without hoses and gun*

**All Packages**



A	B	C	Width Across Wheels	Weight
38.5 in. (978 mm)	22.5 in. (572 mm)	21 in. (534 mm)	20 in. (508 mm)	145 lb (66 kg)

06898A

# 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 by an authorized Graco distributor 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**

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MM 308694

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