

This manual contains IMPORTANT
WARNINGS AND INSTRUCTIONS
READ AND RETAIN FOR REFERENCE

PNEUMATIC CART-MOUNTED PUMPS

CHECK-MATE™ 200 STAINLESS STEEL DISPLACEMENT PUMPS

Model 231-170, 23:1 Ratio Monark®

285 bar (4140 psi) MAXIMUM FLUID WORKING PRESSURE

12.5 bar (180 psi) MAXIMUM AIR INPUT PRESSURE

Model 231-171, 23:1 Ratio Monark® with Hose and Gun

276 bar (4000 psi) MAXIMUM FLUID WORKING PRESSURE

11.9 bar (173 psi) MAXIMUM AIR INPUT PRESSURE

Model 231-172, 46:1 Ratio President®

320 bar (4600 psi) MAXIMUM FLUID WORKING PRESSURE

7 bar (100 psi) MAXIMUM AIR INPUT PRESSURE

Model 231-173, 46:1 Ratio President® with Hose and Gun

320 bar (4600 psi) MAXIMUM FLUID WORKING PRESSURE

7 bar (100 psi) MAXIMUM AIR INPUT PRESSURE

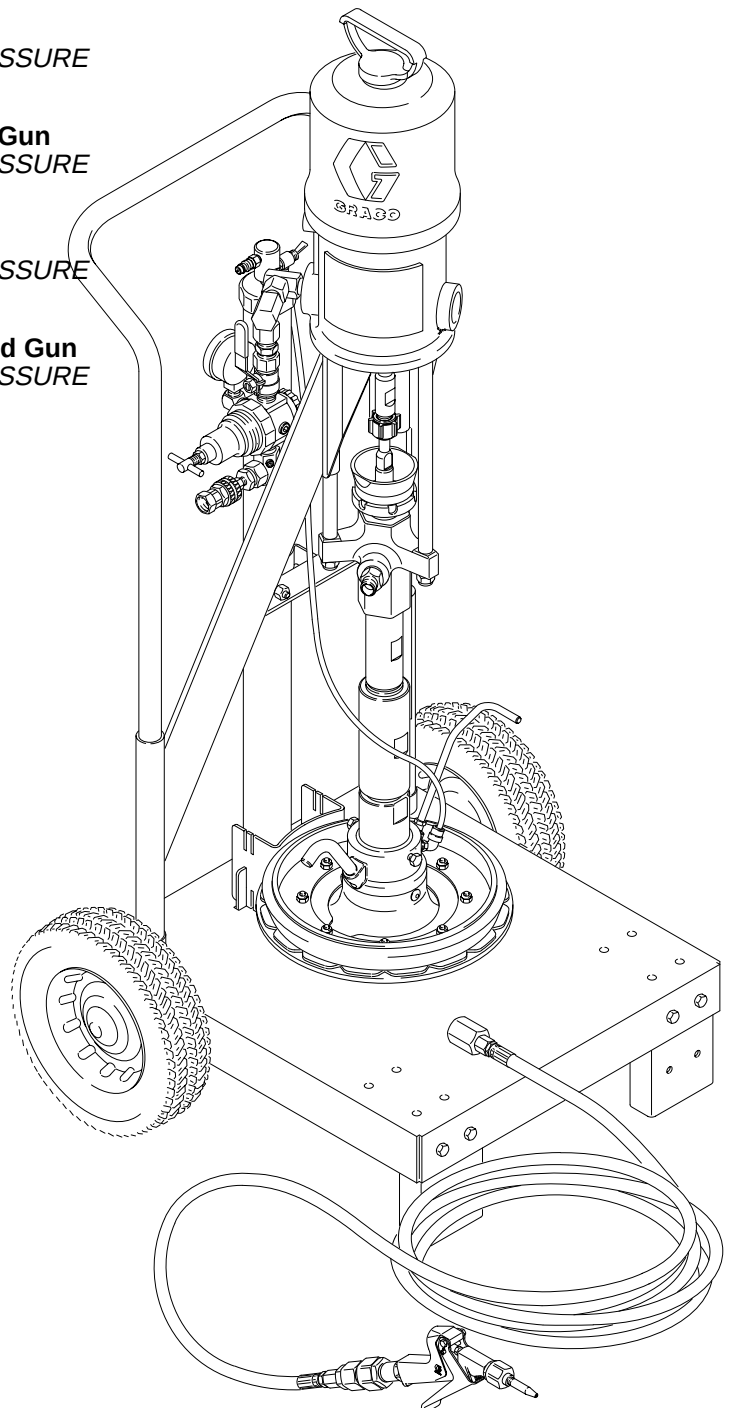


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MODEL 231-173 SHOWN

SAFETY WARNINGS

HIGH PRESSURE FLUID CAN CAUSE SERIOUS INJURY. FOR PROFESSIONAL USE ONLY.
OBSERVE ALL WARNINGS. Read And Understand All Instruction Manuals Before Operating Equipment.

MOVING PARTS HAZARD

KEEP HANDS AND FINGERS AWAY FROM THE PRIMING PISTON DURING OPERATION AND WHENEVER THE PUMP IS CHARGED WITH AIR to reduce the risk of injury! On the pump downstroke the priming piston extends beyond the intake cylinder to pull the material into the pump. The priming piston works under extreme force. During operation and whenever the pump is charged with air, the priming piston can severely injure or amputate a hand or finger, or break a tool, caught between it and the intake cylinder. Always follow the **Pressure Relief Procedure**, below, before checking, clearing, cleaning, flushing or servicing any part of the pump.

The elevator tube and frame slides move up and down when the elevator

is in operation, and can pinch fingers or hands caught between them and the cart frame. Keep your hands away from the elevator tube, frame slides, and the frame of the cart while the elevator is in operation.

The wiper plate moves downward as the elevator is lowered, and can pinch or amputate fingers or hands caught between it and the fluid container. Keep your hands away from the wiper plate and the lip of the fluid container when the elevator is in operation.

The air motor piston (located behind the air motor plates) also moves when air is supplied to the motor. NEVER operate the pump with the air motor plates removed. Before servicing the pump, follow the **Pressure Relief Procedure** below to prevent the pump from starting accidentally.

FLUID INJECTION HAZARD

General Safety

This equipment generates very high fluid pressure. Spray from the spray gun/dispensing valve, leaks or ruptured components can inject fluid through your skin and into your body and cause extremely serious bodily injury, including the need for amputation. Also, fluid injected or splashed into the eyes or on the skin can cause serious damage.

NEVER point the spray gun/dispensing valve at anyone or at any part of the body. NEVER put hand or fingers over the spray tip/nozzle.

ALWAYS have the tip guard in place on the spray gun when spraying.

ALWAYS follow the **Pressure Relief Procedure**, right, before cleaning or removing the spray tip/nozzle or servicing any system equipment.

NEVER try to stop or deflect leaks with your hand or body.

Be sure all equipment safety devices are operating properly before each use.

Medical Alert—Airless Spray Wounds

If any fluid appears to penetrate your skin, get **EMERGENCY MEDICAL CARE AT ONCE. DO NOT TREAT AS A SIMPLE CUT.** Tell the doctor exactly what fluid was injected.

Note to Physician: *Injection in the skin is a traumatic injury. It is important to treat the injury surgically as soon as possible. Do not delay treatment to research toxicity. Toxicity is a concern with some exotic coatings injected directly into the blood stream. Consultation with a plastic surgeon or reconstructive hand surgeon may be advisable.*

Spray Gun/Dispensing Valve Safety Devices

Be sure all spray gun/dispensing valve safety devices are operating properly before each use. Do not remove or modify any part of the gun/valve; this can cause a malfunction and result in serious bodily injury.

Safety Latch

Whenever you stop spraying/dispensing, even for a moment, always set the spray gun/dispensing valve safety latch in the closed or "safe" position, making the gun/valve inoperative. Failure to set the safety latch can result in accidental triggering of the gun/valve.

Trigger Guard (if present)

Never operate the spray gun/dispensing valve with the trigger guard removed. This guard helps prevent the gun/valve from triggering accidentally if it is dropped or bumped.

Diffuser (only on spray guns)

The spray gun diffuser breaks up spray and reduces the risk of fluid injection when the tip is not installed. Check the diffuser operation regularly. Follow the **Pressure Relief Procedure**, to the right, then remove the spray tip. Aim the spray gun into a grounded metal pail, holding the spray gun firmly to the pail. Using the lowest possible pressure, trigger the spray gun. If the fluid emitted is not diffused into an irregular stream, replace the diffuser immediately.

Tip Guard (only on spray guns)

ALWAYS have the tip guard in place on the spray gun while spraying. The tip guard alerts you to the fluid injection hazard and helps reduce, **but does not prevent**, the risk of accidentally placing your fingers or any part of your body close to the spray tip.

Spray Tip/Nozzle Safety

Use extreme caution when cleaning or changing spray tips/nozzles. If the spray tip/nozzle clogs while spraying/dispensing, engage the spray gun/dispensing valve safety latch immediately. ALWAYS follow the **Pressure Relief Procedure** and then remove the spray tip/nozzle to clean it.

NEVER wipe off build-up around the spray tip/nozzle until pressure is fully relieved and the spray gun/dispensing valve safety latch is engaged.

Pressure Relief Procedure

To reduce the risk of serious bodily injury, including fluid injection, splashing in the eyes or on the skin, or injury from moving parts, always follow this procedure whenever you shut off the pump, when checking or servicing any part of the spray/dispensing system, when installing, cleaning or changing spray tips/nozzles, and whenever you stop spraying/dispensing.

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

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

EQUIPMENT MISUSE HAZARD

General Safety

Any misuse of the spray/dispensing equipment or accessories, such as overpressurizing, modifying parts, using incompatible chemicals and fluids, or using worn or damaged parts, can cause them to rupture and result in fluid injection, splashing in the eyes or on the skin, or other serious bodily injury, or fire, explosion or property damage.

NEVER alter or modify any part of this equipment; doing so could cause it to malfunction.

CHECK all spray/dispensing equipment regularly and repair or replace worn or damaged parts immediately.

Always wear protective eyewear, gloves, clothing and respirator as recommended by the fluid and solvent manufacturer.

HOSE SAFETY

High pressure fluid in the hoses can be very dangerous. If the hose develops a leak, split or rupture due to any kind of wear, damage or misuse, the high pressure spray emitted from it can cause a fluid injection injury or other serious bodily injury or property damage.

ALL FLUID HOSES MUST HAVE A BRAIDED STAINLESS STEEL COVER (OR SPRING GUARDS ON BOTH ENDS)! The braided cover/spring guards help protect the hose from kinks or bends at or close to the coupling which can result in hose rupture.

TIGHTEN all fluid connections securely before each use. High pressure fluid can dislodge a loose coupling or allow high pressure spray to be emitted from the coupling.

NEVER use a damaged hose. Before each use, check the entire hose for cuts, leaks, abrasion, bulging cover, or damage or movement of the hose couplings. If any of these conditions exist, replace the hose immediately. DO NOT try to recouple high pressure hose or mend it with tape or any

FIRE OR EXPLOSION HAZARD

Static electricity is created by the high velocity flow of fluid through the pump and hose. If every part of the spray/dispensing equipment is not properly grounded, sparking may occur, and the system may become hazardous. Sparking may also occur when plugging in or unplugging a power supply cord. Sparks can ignite fumes from solvents and the fluid being sprayed/dispensed, dust particles and other flammable substances, whether you are spraying/dispensing indoors or outdoors, and can cause a fire or explosion and serious bodily injury and property damage. Do not plug in or unplug any power supply cords in the spray/dispensing area when there is any chance of igniting fumes still in the air.

If you experience any static sparking or even a slight shock while using this equipment, **STOP SPRAYING/DISPENSING IMMEDIATELY.** Check the entire system for proper grounding. Do not use the system again until the problem has been identified and corrected.

Grounding

To reduce the risk of static sparking, ground the pump, object being sprayed, and all other spray/dispensing equipment used or located in the spray/dispensing area. CHECK your local electrical code for detailed grounding instructions for your area and type of equipment. BE SURE to ground all of this spray/dispensing equipment:

1. *Pump:* use a ground wire and clamp. See Fig 1.
2. *Air hoses:* use only grounded air hoses.
3. *Fluid hoses:* use only grounded fluid hoses.
4. *Air compressor:* follow manufacturer's recommendations.
5. *Spray gun or dispensing valve:* grounding is obtained through connection to a properly grounded fluid hose and pump.
6. *Fluid supply container:* according to your local code.
7. *Object being sprayed:* according to your local code.
8. *All solvent pails used when flushing,* according to your local code. Use only metal pails, which are conductive, placed on a grounded

System Pressure

NEVER exceed the recommended working pressure or the maximum air inlet pressure stated on your pump or in the **TECHNICAL DATA** on the back cover. *Model 231-171 is limited to 276 bar (4000 psi) Maximum Fluid Working Pressure at 11.9 bar (173 psi) Maximum Air Input Pressure, because the hose supplied with that model is rated at 276 bar (4000 psi).*

Be sure that all spray/dispensing equipment and accessories are rated to withstand the maximum working pressure of the pump. DO NOT exceed the maximum working pressure of any component or accessory used in the system.

Fluid Compatibility

BE SURE that all fluids and solvents used are chemically compatible with the wetted parts shown in the **TECHNICAL DATA** in the separate component manuals. Always read the manufacturer's literature before using fluid or solvent in this pump.

other device. A repaired hose cannot safely contain the high pressure fluid.

HANDLE AND ROUTE HOSES CAREFULLY. Do not pull on hoses to move equipment. Do not use fluids which are not compatible with the inner tube and cover of the hose. DO NOT expose Graco hoses to temperatures above 82°C (180°F) or below -40°C (-40°F).

Hose Grounding Continuity

Proper hose grounding continuity is essential to maintaining a grounded spray/dispensing system. Check the electrical resistance of your air and 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 resistance limits. Use a resistance meter in the appropriate range for your hose to check the resistance. If the resistance exceeds the recommended limits, replace it immediately. An ungrounded or poorly grounded hose can make your system hazardous. Also, read **FIRE OR EXPLOSION HAZARD**, below.

surface. Do not place the pail on a nonconductive surface, such as paper or cardboard, which interrupts the grounding continuity.

9. *To maintain grounding continuity when flushing or relieving pressure,* always hold a metal part of the spray gun/dispensing valve firmly to the side of a grounded *metal* pail, then trigger the gun/valve.

To ground the pump:

To ground the pump, loosen the grounding lug locknut (W) and washer (X). Insert one end of a 1.5 mm² (12 ga) minimum ground wire (Y) into the slot in lug (Z) and tighten the locknut securely. See Fig 1. Connect the other end of the wire to a true earth ground. See the ACCESSORIES section to order a ground wire and clamp.

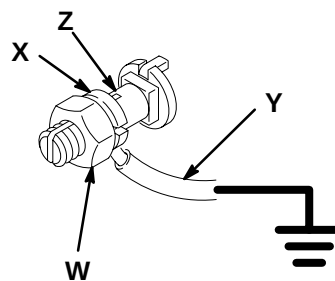


Fig 1

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Flushing Safety

Before flushing, be sure the entire system and flushing pails are properly grounded. Refer to **Grounding**, above. Follow the **Pressure Relief Procedure** on page 2, and remove the spray tip/nozzle from the spray gun/dispensing valve. Always use the lowest possible fluid pressure, and maintain firm metal-to-metal contact between the gun/valve and the pail during flushing to reduce the risk of fluid injection injury, static sparking and splashing.

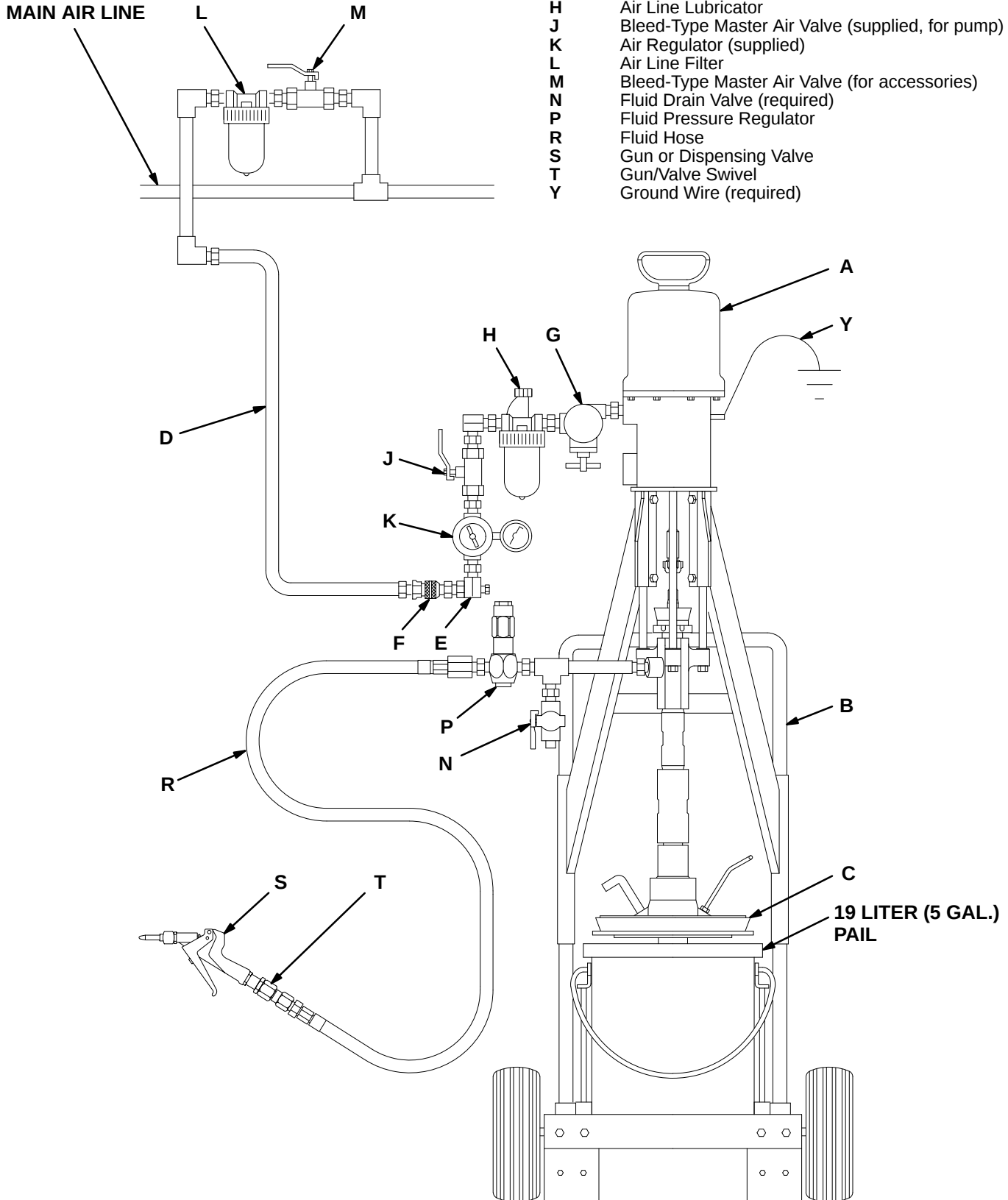
IMPORTANT

United States Government safety standards have been adopted under the Occupational Safety and Health Act. These standards – particularly the General Standards, Part 1910, and the Construction Standards, Part 1926 – should be consulted.

TYPICAL INSTALLATION

KEY

A	Pump (supplied)
B	Pneumatic Elevator Cart (supplied)
C	Wiper Plate (supplied)
D	Air Hose
E	Air Manifold (supplied)
F	Air Line Quick Disconnect Coupler (supplied)
G	Pump Runaway Valve
H	Air Line Lubricator
J	Bleed-Type Master Air Valve (supplied, for pump)
K	Air Regulator (supplied)
L	Air Line Filter
M	Bleed-Type Master Air Valve (for accessories)
N	Fluid Drain Valve (required)
P	Fluid Pressure Regulator
R	Fluid Hose
S	Gun or Dispensing Valve
T	Gun/Valve Swivel
Y	Ground Wire (required)



INSTALLATION

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

See page 14 for accessories available from Graco. If you supply your own accessories, be sure they are adequately sized and pressure-rated to meet the system's requirements.

The Typical Installation shown on page 4 is only a guide for selecting and installing system components and accessories. Contact your Graco representative for assistance in designing a system to suit your particular needs.

ASSEMBLING THE PUMP

The major components of this pump are packed in separate containers. They are:

- Check-Mate Pump (Part No. varies by Model)
- Air Regulation Kit 223-815
- Pneumatic Elevator Cart 224-137
- Cart Accessory Kit 224-376
- Wiper Plate 222-909
- *For Models 231-171 and 231-173 only:*
SST Braided Hose (Part No. varies by Model),
Flo-Gun 207-945, and Gun Swivel 207-947.

Assemble the components as explained on page 6.

SYSTEM ACCESSORIES

Refer to the Typical Installation drawing on page 4.

WARNING

Two accessories are required in your system: a bleed-type master air valve (J) and a fluid drain valve (N). These accessories help reduce the risk of serious bodily injury including fluid injection, splashing 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.

Air and Fluid Hoses

Be sure all air and fluid hoses are properly sized and pressure-rated for your system. Use only grounded air and fluid hoses. Fluid hoses must have a braided stainless steel cover (or spring guards on both ends).

Supplied Air Line Components

The following components are supplied with your pump:

The bleed-type master air valve (J) is required in your system to relieve air trapped between it and the air motor when the valve is closed (see the **WARNING** at left). Be sure the bleed valve is easily accessible from the pump, and is located **downstream** from the air regulator.

The air regulator (K) controls pump speed and outlet pressure by adjusting the air pressure to the pump. Locate the regulator close to the pump, but **upstream** from the bleed-type master air valve.

The air manifold (E) is the air inlet for the pump.

The air line quick disconnect coupler (F) consists of a female coupler and a male pin fitting. The female coupler screws onto the end of the air hose (D). The male fitting is installed at the inlet of the air manifold (E). A second male fitting is included with the pneumatic elevator cart, installed at the cart air inlet.

Air Line Accessories

Install the following accessories in the order shown in the Typical Installation, using adapters as necessary:

A pump runaway valve (G) senses when the pump is running too fast and automatically shuts off the air to the motor. A pump which runs too fast can be seriously damaged. Install closest to the pump air inlet.

An air line lubricator (H) provides automatic air motor lubrication.

An air line filter (L) removes harmful dirt and moisture from the compressed air supply.

A second bleed-type air valve (M) isolates the air line accessories for servicing. Locate upstream from all other air line accessories.

Fluid Line Accessories

Install the following accessories in the positions shown in the Typical Installation, using adapters as necessary:

A fluid drain valve (N) is required in your system to relieve fluid pressure in the hose and gun (see the **WARNING** at left). Screw the drain valve into the open branch of a tee mounted in the fluid line. Install the drain valve pointing down, but so the handle points up when opened.

A fluid regulator (P) controls fluid pressure to the gun/valve, and dampens pressure surges.

A gun or valve (S) dispenses the fluid. The gun shown in the Typical Installation is a dispensing gun for highly viscous fluids.

A gun swivel (T) allows freer gun movement.

GROUNDING

WARNING

Before operating the pump, ground the system as explained under **FIRE OR EXPLOSION HAZARD** and **Grounding** on page 3.

ASSEMBLING THE UNIT

Mounting the Pump on the Cart

Install the pump on the cart as explained in the separate cart manual 308-092.

Assembling the Wiper Plate to the Pump

Install wiper plate 222-909 on the pump as explained in the separate wiper plate manual 308-049.

NOTE: Wiper plate 222-909 is shipped for use with straight-sided pails on a 19 liter (5 gallon) ram. The plate must be modified for use with the pneumatic elevator cart, or for use with tapered pails. Refer to the separate wiper plate manual 308-049 for details.

Installing Cart Accessory Kit 224-376

NOTE: This kit includes some parts which are not used with these pumps.

1. Screw the air inlet adapter into the pump's air inlet. *For Monark pumps*, use the straight swivel adapter (17), which will be oriented as shown in the parts drawing on page 10. *For President pumps*, use the 90° swivel adapter (19). Orient the 90° adapter (19) with the swivel angled forward (see Fig 2).
2. The air regulation kit (4) requires some reconfiguration before it is assembled to the pump. Proceed as follows:
 - a. Remove the 90° swivel adapter (10) from the air regulation kit (4). Attach this adapter to the swivel adapter (17 or 19) installed in step 1. The swivel end of the adapter (10) must face down. See Fig 2 for President pumps, and the parts drawing on page 10 for Monark pumps.
 - b. Rotate the air manifold (5) so its swivel inlet faces the same direction as the T-handle of the air regulator (11). See Fig 2.
 - c. Reorient the pressure gauge (6) and the elbow which attaches it to the air regulator so the gauge is upright and faces backward, toward the handle of the cart. See Fig 2.

- d. Screw the bushing (16) into the swivel inlet of the air manifold (5), and screw the male quick disconnect fitting (15) into the bushing. Screw the female quick disconnect coupler (26) onto the air hose (D, see page 4).

- e. Install the air regulation kit onto the pump by connecting the nipple (9) to the swivel end of the adapter (10). Tighten securely. When properly installed, the pump air inlet fitting (15) will face the same direction and be parallel to the air inlet fitting (U) on the pneumatic elevator.

3. Remove the plug from the air valve housing (V) on the top of the cart's cylinder. Screw the plug into the open port of the air manifold (5), as shown in Fig 2.
4. Screw the air release toggle valve (21) into the open port of the air valve housing (V). Be sure that the hole on the release valve is facing down.
5. Place the gasket (25) on the threaded end of the barbed stud (24). Screw the stud into the air release toggle valve (21). Push one end of the tube (22) onto the barbed stud (24).
6. Route the tube (22) over the crosspiece (AA) of the cart frame and bring it to the tube fitting (BB) on the wiper plate (3). The tube fitting swivels; route the tube to the fitting so the tube will not interfere with the operation of the handles (CC and DD) on the wiper plate.
7. Push the tube into the tube fitting (BB) until it snaps securely in place. Pull on the tube to ensure it is locked.

NOTE: To release the tube (22) from the fitting (BB), press in and hold the button on the fitting, and pull the tube out.

8. If your model is equipped with a hose and gun, connect the female end of the fluid hose (30) to the pump's fluid outlet (EE).
9. Screw the gun swivel (29) into the fluid inlet of the gun (28).
10. Connect the gun swivel (29) to the male end of the hose (30).

**MODEL 231-173 SHOWN
(46:1 Ratio President Pump,
With Check-Mate 200 Stainless Steel Displacement Pump,
Hose, and Gun)**

**CART ACCESSORY KIT 224-376
INCLUDES ITEMS 15-26**

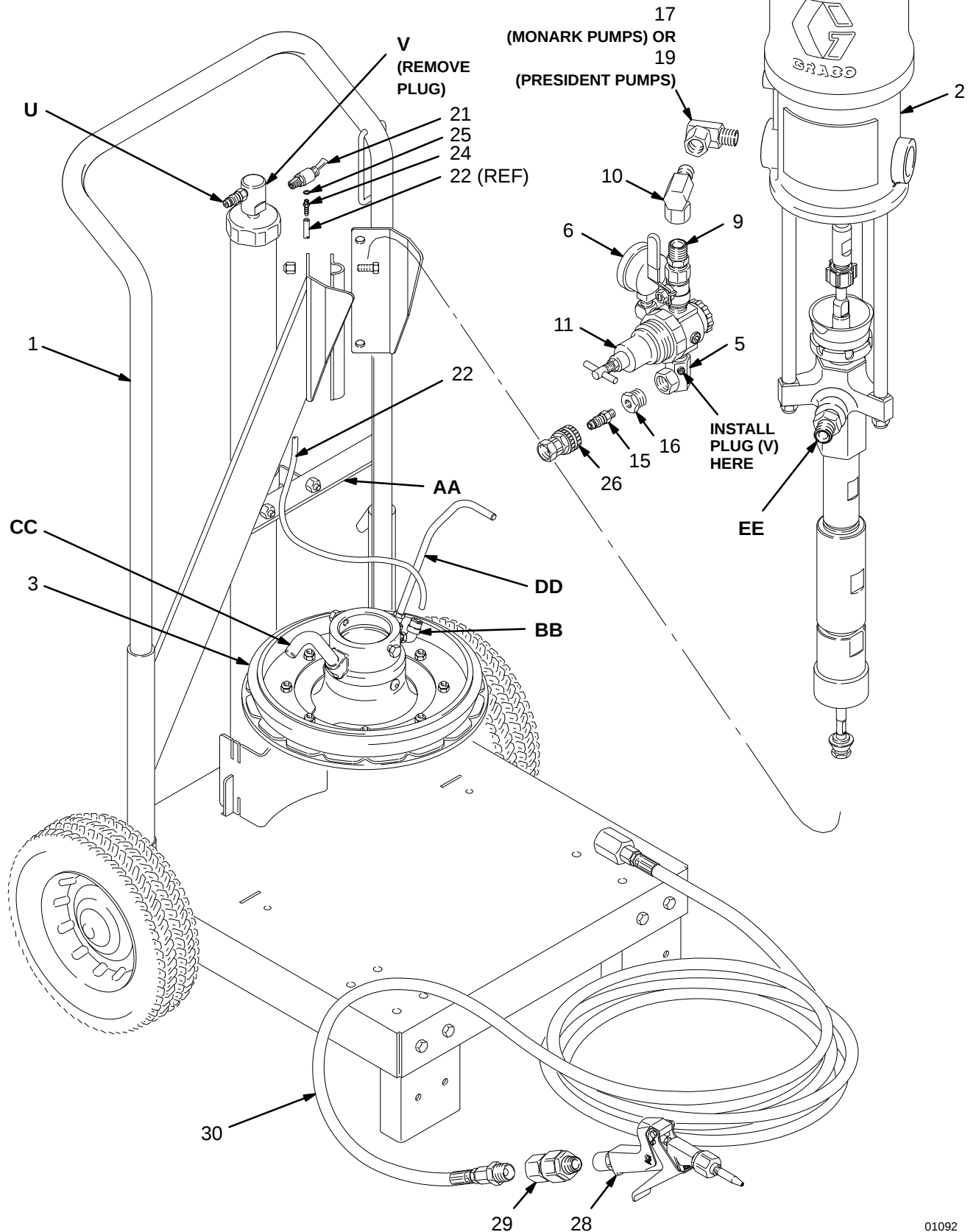


Fig 2

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WARNING

Pressure Relief Procedure

To reduce the risk of serious bodily injury, including fluid injection, splashing in the eyes or on the skin, or injury from moving parts, always follow this procedure whenever you shut off the pump, when checking or servicing any part of the spray/dispensing system, when installing, cleaning or changing spray tips/nozzles, and whenever you stop spraying/dispensing.

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

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

WARNING

Moving parts can pinch or amputate your fingers or other body parts. When the pump is operating, the priming piston (located at the pump intake) and the air motor piston (located behind the air motor plates) move. Therefore, **NEVER** operate the pump with the air motor plates removed, and keep your fingers and hands away from the priming piston.

Before attempting to clear an obstruction from the priming piston or service the pump, follow the **Pressure Relief Procedure Warning** above to prevent the pump from starting accidentally.

The elevator tube (FF) and frame slides (GG) move up and down when the elevator is in operation, and can pinch fingers or hands caught between them and the cart frame. Keep your hands away from the elevator tube, frame slides, and the frame of the cart when the elevator is in operation. See Fig 3.

The wiper plate (3) moves downward as the elevator is lowered, and can pinch or amputate fingers or hands caught between it and the lip of the container. Keep your hands away from the plate and the lip of the container when the elevator is in operation.

2. Raise the elevator to its maximum height, so the hanger (HH) on the cart handle is below the hook (JJ) on the elevator frame.
3. Make sure the air assist valve handle (MM) is pushed down all the way and locked (rotated counterclockwise 45° from horizontal). Operate the valve a few times to become familiar with its use.
4. Place a 19 liter (5 gallon) pail of fluid on the base of the cart. Slide the pail back against the pail stop (KK). The pail stop is adjustable to four positions, to properly align the pail with the wiper plate (3). Make the fluid surface concave by scooping fluid from the center of the pail to the sides.

Lowering the Elevator

1. Pull the hanger (HH) upward and hold it firmly against the handle of the cart. Disconnect the female quick coupler from the elevator air inlet fitting (U) and connect it to the pump air inlet fitting (15). After a short delay, the weight of the pump will cause the elevator to move downward. Continue to hold the hanger (HH) against the cart handle until the hook (JJ) on the frame is low enough to prevent it from engaging the hanger. See Fig 3.
2. If necessary, push down on the top of the pump to help the wiper plate (3) enter the pail. When the wiper plate enters the pail, loosen the wiper plate vent handle (LL) to open the vent hole (NN). Leave it open until fluid appears at the vent hole. Tighten the vent handle securely.

NOTE: If the vent hole (NN) is plugged, remove the handle (LL) completely and clear the hole using the barbed end of the handle.

3. Start the pump as explained in the separate pump manual.
4. When the pail is empty, change pails as follows.

Changing Pails

To raise the pump out of an empty pail:

1. Stop the pump and follow the **Pressure Relief Procedure Warning** at left.
2. Set the air release toggle valve (21) to the open (down) position. The toggle valve directs air under the wiper plate, making it easier to pull the plate out of the pail. See Fig 3.
3. Rotate the long handle (MM) in the wiper plate housing 45° **clockwise** and pull the handle upward (it should travel about 1/2 inch up and down). This opens a passage for air to assist in getting the plate out of the pail.
4. Disconnect the female quick coupler from the pump air inlet fitting (15), and connect it to the elevator air inlet fitting (U). After a short delay, the elevator will begin to raise the pump from the pail.
5. As the wiper plate (3) nears the top of the pail, the seal between the wiper and pail will decrease and the plate may not come completely out of the pail. At this time, slowly push the long handle (MM) down into the wiper plate, and rotate it 45° **counterclockwise** to lock. The elevator will lift the pump and pail together. Allow the elevator to rise to its maximum height, so

Raising the Elevator and Positioning the Pail

1. Disconnect the female quick coupler from the pump air inlet fitting (15) and connect it to the air inlet fitting (U) on the elevator. Turn on the main air. See Fig 3.

the hanger (HH) on the cart handle is below the hook (JJ) on the elevator frame, then just pull the pail off the plate.

NOTE: If the plate is stuck at the bottom of the pail and doesn't come out at all, the elevator will pull the pail up along with the plate. If this happens, allow the elevator to rise to its full height, then open the

wiper plate vent (LL). This will make it possible to pull the pail off the plate. Check for a blockage in the tube (22) near the wiper plate (3). Fluid may have dried in and around the wiper plate's air assist valve. Refer to the separate wiper plate manual 308-049 for details and clean as necessary.

6. Place the full pail on the cart base and position as explained on page 8.

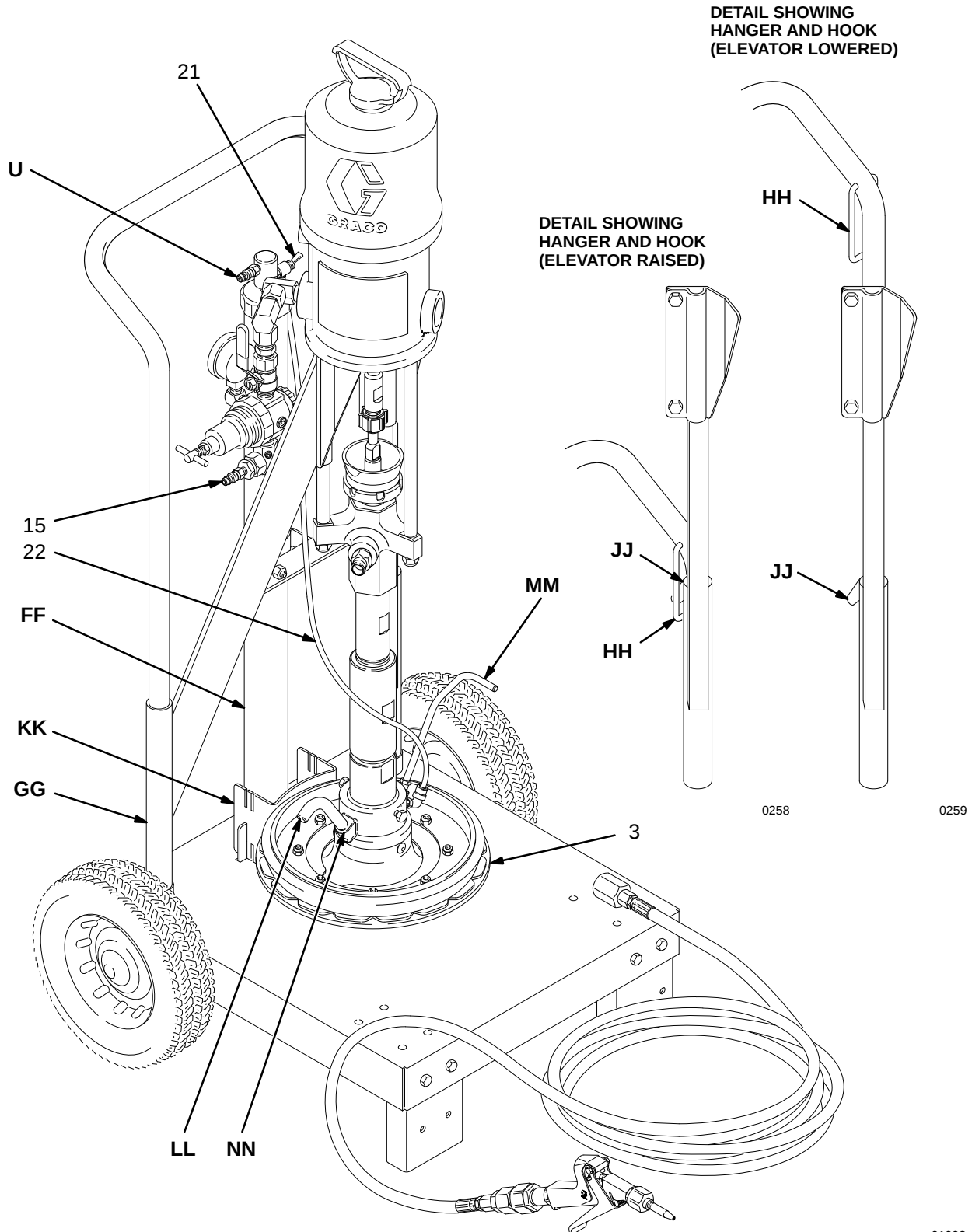
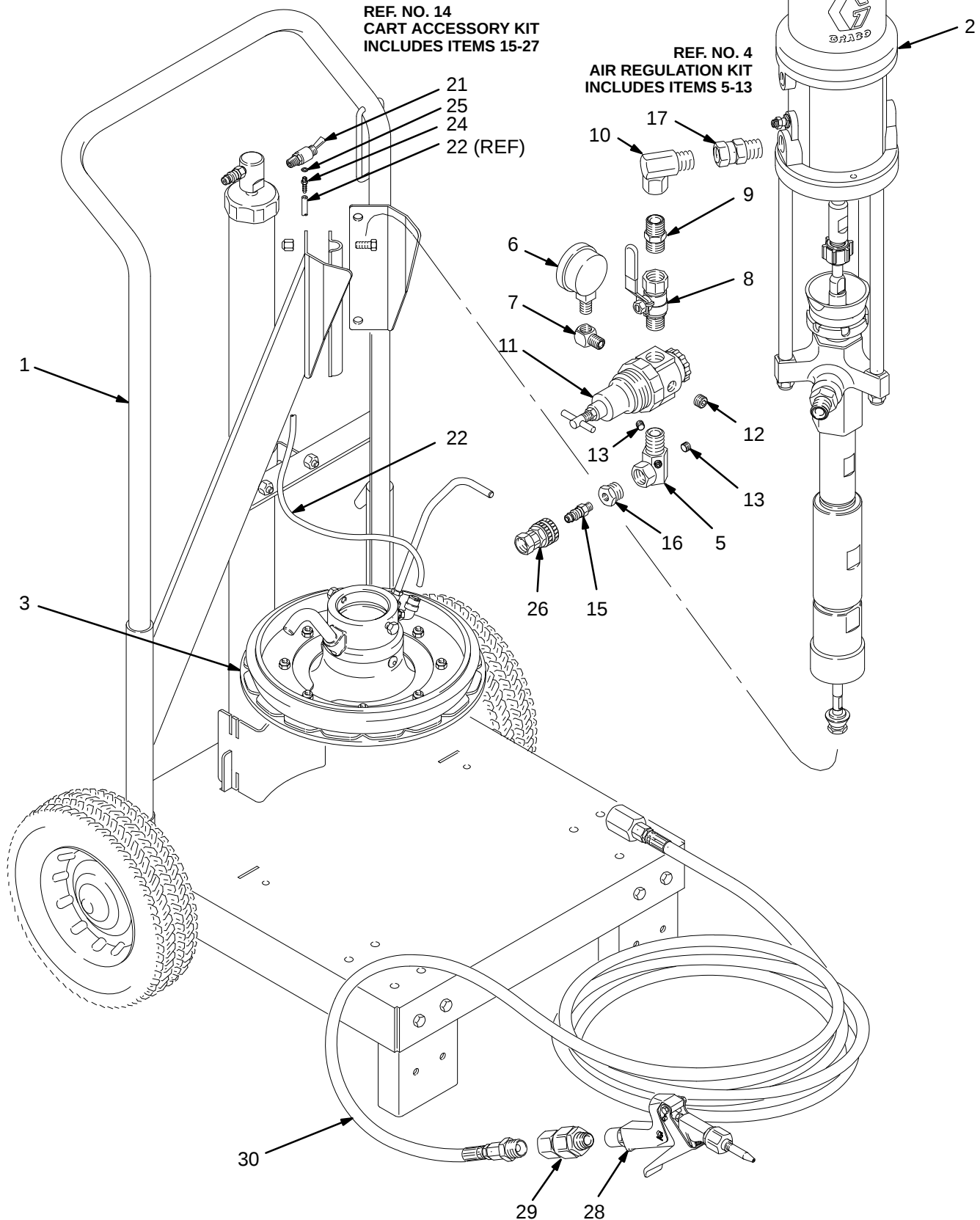


Fig 3

PARTS DRAWING

**Model 231-170, Series A, 23:1 Ratio Monark Pump
with Check-Mate 200 Stainless Steel Displacement Pump**
Includes items 1-27

**Model 231-171, Series A, 23:1 Ratio Monark Pump
with Check-Mate 200 Stainless Steel Displacement Pump**
Includes items 1-30



PARTS LIST

**Model 231-170, Series A, 23:1 Ratio Monark Pump
with Check-Mate 200 Stainless Steel Displacement Pump**
Includes items 1-27

**Model 231-171, Series A, 23:1 Ratio Monark Pump
with Check-Mate 200 Stainless Steel Displacement Pump**
Includes items 1-30

REF NO.	PART NO.	DESCRIPTION	QTY	REF NO.	PART NO.	DESCRIPTION	QTY
1	224-137	CART, elevator, pneumatic See 308-092 for parts	1	18	161-077	. UNION, adapter, straight; 1/2 npt(f) x 3/8 npsm(f) swivel <i>not used on these pumps</i>	1
2	222-839	23:1 RATIO MONARK PUMP See 308-200 for parts	1	19	155-470	. UNION, adapter, 90°; 1/2 npt(m) x 1/2 npsm(f) swivel; <i>not used on these pumps</i>	1
3	222-909	PLATE, wiper, 19 liter (5 gallon) See 308-049 for parts	1	20	161-490	. COUPLING, reducing; 3/4 npt(f) x 3/8 npt(f); <i>not used on these pumps</i>	1
4	223-815	AIR REGULATION KIT Includes items 5-13	1	21	111-305	. VALVE, release, toggle; 1/8 npt(m) x 10-32 unf-2b(f)	1
5	162-376	. MANIFOLD, air, swivel; 1/2 npt(m) x 1/2 npt(f) swivel; three 1/8 npt(f) ports	1	22	181-137	. TUBE; nylon; 4.6 mm (0.180") ID; 0.965 m (38") long	1
6	100-960	. GAUGE, air pressure; 0-14 bar (0-200 psi) range	1	23	104-172	. FITTING, tube; 1/8 npt(m) x 6 mm (1/4") OD tube; <i>not used on these pumps</i>	1
7	100-840	. ELBOW, street, 90°; 1/4 npt (m x f)	1	24	104-164	. STUD, tube, barbed; 10-32 unf-2a	1
8	107-142	. VALVE, bleed-type; 1/2 npt (m x f)	1	25	104-640	. GASKET; buna-N	1
9	158-491	. NIPPLE; 1/2 npt	1	26	208-536	. COUPLER, quick disconnect	1
10	155-470	. UNION, adapter; 1/2 npt(m) x 1/2 npsm(f) swivel	1	27	100-081	. BUSHING, reducer; 1/2 npt(m) x 3/8 npt(f); <i>not used on these pumps</i>	1
11	104-266	. AIR REGULATOR See 308-167 for parts	1	28	207-945	FLO-GUN See 307-004 for parts	1
12	100-721	. PLUG, pipe, headless; 1/4 npt	1	29	207-947	SWIVEL, straight, gun; 1/2 npt(m) x 1/2 npt(f)	1
13	104-765	. PLUG, pipe, headless; 1/8 npt	2	30	222-934	HOSE, fluid; Teflon®; sst braid cover; 10 mm (3/8") ID; 1/2 npt (m x f); 4.57 m (15 ft) long	1
14	224-376	KIT, accessory, cart Includes items 15-27	1				
15	169-971	. FITTING, quick disconnect, air 3/8 npt(m)	1				
16	158-212	. BUSHING, reducer; 1/2 npt(m) x 3/8 npt(f)	1				
17	162-505	. UNION, adapter, straight; 3/8 npt(m) x 1/2 npt(f) swivel	1				

HOW TO ORDER PARTS

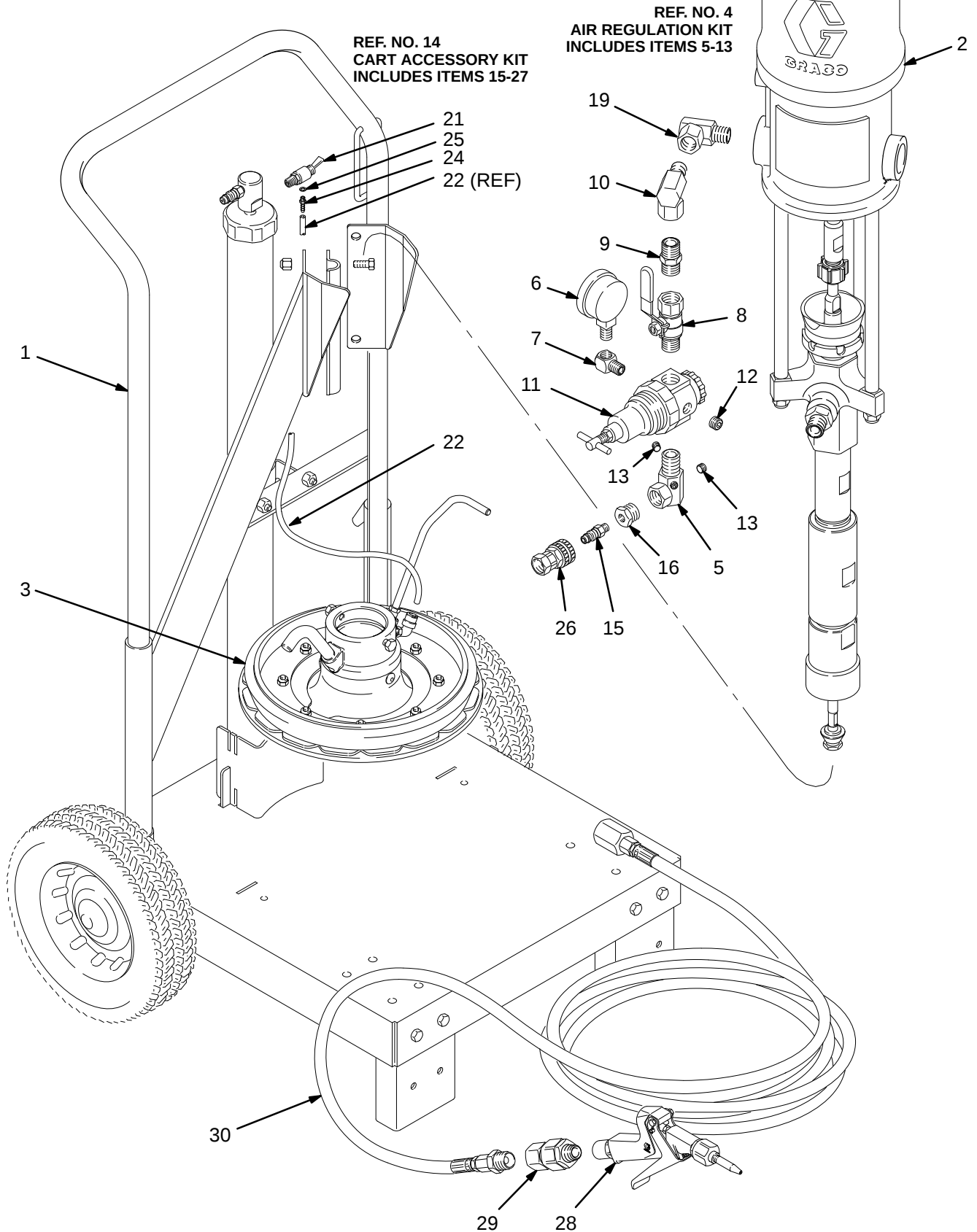
1. To be sure you receive the correct replacement parts, kits or accessories, always give all of the information requested in the chart below.
2. Check the parts list to identify the correct part number; do not use the ref. no. when ordering.
3. Order all parts from your nearest Graco distributor.

6 digit Part Number	Qty	Part Description

PARTS DRAWING

**Model 231-172, Series A, 46:1 Ratio President Pump
with Check-Mate 200 Stainless Steel Displacement Pump**
Includes items 1-27

**Model 231-173, Series A, 46:1 Ratio President Pump
with Check-Mate 200 Stainless Steel Displacement Pump**
Includes items 1-30



01095

PARTS LIST

**Model 231-172, Series A, 46:1 Ratio President Pump
with Check-Mate 200 Stainless Steel Displacement Pump**
Includes items 1-27

**Model 231-173, Series A, 46:1 Ratio President Pump
with Check-Mate 200 Stainless Steel Displacement Pump**
Includes items 1-30

REF NO.	PART NO.	DESCRIPTION	QTY	REF NO.	PART NO.	DESCRIPTION	QTY
1	224-137	CART, elevator, pneumatic See 308-092 for parts	1	18	161-077	. UNION, adapter, straight; 1/2 npt(f) x 3/8 npsm(f) swivel; <i>not used on these pumps</i>	1
2	222-907	46:1 RATIO PRESIDENT PUMP See 308-200 for parts	1	19	155-470	. UNION, adapter, 90°; 1/2 npt(m) x 1/2 npsm(f) swivel	1
3	222-909	PLATE, wiper, 19 liter (5 gallon) See 308-049 for parts	1	20	161-490	. COUPLING, reducing; 3/4 npt(f) x 3/8 npt(f); <i>not used on these pumps</i>	1
4	223-815	AIR REGULATION KIT Includes items 5-13	1	21	111-305	. VALVE, release, toggle; 1/8 npt(m) x 10-32 unf-2b(f)	1
5	162-376	. MANIFOLD, air, swivel; 1/2 npt(m) x 1/2 npt(f) swivel; three 1/8 npt(f) ports	1	22	181-137	. TUBE, nylon; 4.6 mm (0.180") ID; 0.965 m (38") long	1
6	100-960	. GAUGE, air pressure; 0-14 bar (0-200 psi) range	1	23	104-172	. FITTING, tube; 1/8 npt(m) x 6 mm (1/4") OD tube <i>not used on these pumps</i>	1
7	100-840	. ELBOW, street, 90°; 1/4 npt (m x f)	1	24	104-164	. STUD, tube, barbed; 10-32 unf-2a	1
8	107-142	. VALVE, bleed-type; 1/2 npt (m x f)	1	25	104-640	. GASKET, buna-N	1
9	158-491	. NIPPLE; 1/2 npt	1	26	208-536	. COUPLER, quick disconnect	1
10	155-470	. UNION, adapter; 1/2 npt(m) x 1/2 npsm(f) swivel	1	27	100-081	. BUSHING, reducer; 1/2 npt(m) x 3/8 npt(f); <i>not used on these pumps</i>	1
11	104-266	. AIR REGULATOR See 308-167 for parts	1	28	207-945	FLO-GUN See 307-004 for parts	1
12	100-721	. PLUG, pipe, headless; 1/4 npt	1	29	207-947	SWIVEL, straight, gun; 1/2 npt(m) x 1/2 npt(f)	1
13	104-765	. PLUG, pipe, headless; 1/8 npt	2	30	222-935	HOSE, fluid; Teflon®; sst braid cover; 10 mm (3/8") ID; 1/2 npt (m x f); 4.57 m (15 ft) long	1
14	224-376	KIT, accessory, cart Includes items 15-27	1				
15	169-971	. FITTING, quick disconnect, air 3/8 npt(m)	1				
16	158-212	. BUSHING, reducer; 1/2 npt(m) x 3/8 npt(f)	1				
17	162-505	. UNION, adapter, straight; 3/8 npt(m) x 1/2 npt(f) swivel; <i>not used on these pumps</i>	1				

HOW TO ORDER PARTS

- 1 To be sure you receive the correct replacement parts, kits or accessories, always give all of the information requested in the chart below.
- 2 Check the parts list to identify the correct part number; do not use the ref. no. when ordering.
- 3 Order all parts from your nearest Graco distributor.

6 digit Part Number	Qty	Part Description

ACCESSORIES

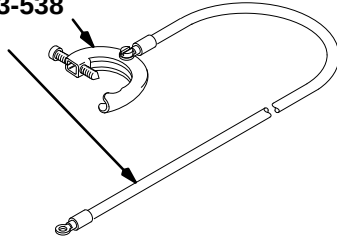
USE GENUINE GRACO PARTS AND ACCESSORIES

Must be purchased separately.

GROUNDING CLAMP 103-538

GROUND WIRE 208-950

7.6 m (25 ft) long,
1.5 mm² (12 gauge)

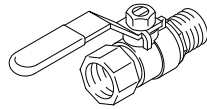


BLEED-TYPE MASTER AIR VALVE 107-142

21 bar (300 psi) MAXIMUM WORKING PRESSURE

1/2 npt(m) inlet x 1/2 npt(f) outlet

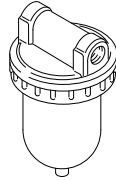
Relieves air trapped in the air line between the pump air inlet and this valve when closed. Also used to isolate air line accessories for servicing.



AIR LINE FILTER 106-149

17.5 bar (250 psi) MAXIMUM WORKING PRESSURE

1/2 npt(f) inlet and outlet

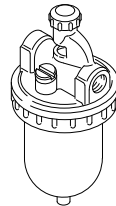


AIR LINE LUBRICATOR 214-848

17.5 bar (250 psi) MAXIMUM WORKING PRESSURE

0.24 liter (8 oz) bowl capacity.

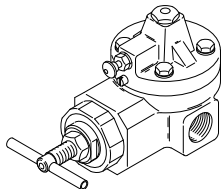
1/2 npt(f) inlet and outlet.



PUMP RUNAWAY VALVE 215-362

12 bar (180 psi) MAXIMUM WORKING PRESSURE

Shuts off air supply to the pump if the pump accelerates beyond the pre-adjusted setting due to an empty supply container, interrupted fluid supply to the pump, or excessive cavitation. 3/4 npt(f) inlet and outlet



GROUNDING 13 mm (1/2 in.) BUNA-S AIR HOSE

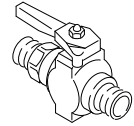
12 bar (175 psi) MAXIMUM WORKING PRESSURE

Part No.	ID	Length	Thd. Size
205-418	13 mm (1/2")	1.8 m (6 ft)	1/2 npt(m)
205-216	13 mm (1/2")	4.5 m (15 ft)	1/2 npt(m)
205-273	13 mm (1/2")	7.6 m (25 ft)	1/2 npt(m)
208-594	13 mm (1/2")	15.2 m (50 ft)	1/2 npt(m)

FLUID DRAIN VALVE (Carbon Steel)

350 bar (5000 psi) MAXIMUM WORKING PRESSURE
Open to relieve fluid pressure in hose and gun/valve.

- 210-657 1/4 npt (mbe)
- 210-658 3/8 npt (mbe)
- 210-659 1/4 npt x 3/8 npt (mbe)

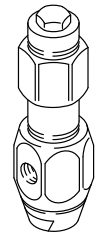


FLUID REGULATOR 903-958 (Carbon Steel)

350 bar (5000 psi) MAXIMUM WORKING PRESSURE

Regulates fluid pressure to the gun or dispensing valve, and dampens pressure surges. Spring operated, for highly viscous fluids.

3/4 npt(f) inlet, two 3/4 npt(f) outlets.



TEFLON FLUID HOSE, with Stainless Steel Braid and Stainless Steel Couplings

222-934 1/2 npt (m x f); 4.8 m (15 ft) long

276 bar (4000 psi) MAXIMUM WORKING PRESSURE

222-935 1/2 npt (m x f); 4.8 m (15 ft) long

222-936 1/2 npt (m x f); 7.6 m (25 ft) long

350 bar (5000 psi) MAXIMUM WORKING PRESSURE

NYLON FLUID HOSE, with Spring Guards and Carbon Steel Couplings

184-138 3/4 npt (mbe); 4.8 m (15 ft) long

276 bar (4000 psi) MAXIMUM WORKING PRESSURE

184-139 1/2 npt (mbe); 1.5 m (5 ft) long

184-156 1/2 npt (mbe); 6.1 m (20 ft) long

215-244 3/8 npt (mbe); 7.6 m (25 ft) long

350 bar (5000 psi) MAXIMUM WORKING PRESSURE

GUN SWIVELS (Carbon Steel)

420 bar (6000 psi) MAXIMUM WORKING PRESSURE

To connect the fluid hose to the gun, and allow freer gun movement. For non-abrasive fluids.

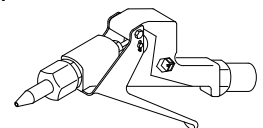
207-947 Straight swivel; 1/2 npt(f) x 1/2 npt(m)

207-948 Zee swivel; 1/2 npt(f) x 1/2 npt(m)

EXTRUSION FLO GUN 207-945 (Carbon Steel)

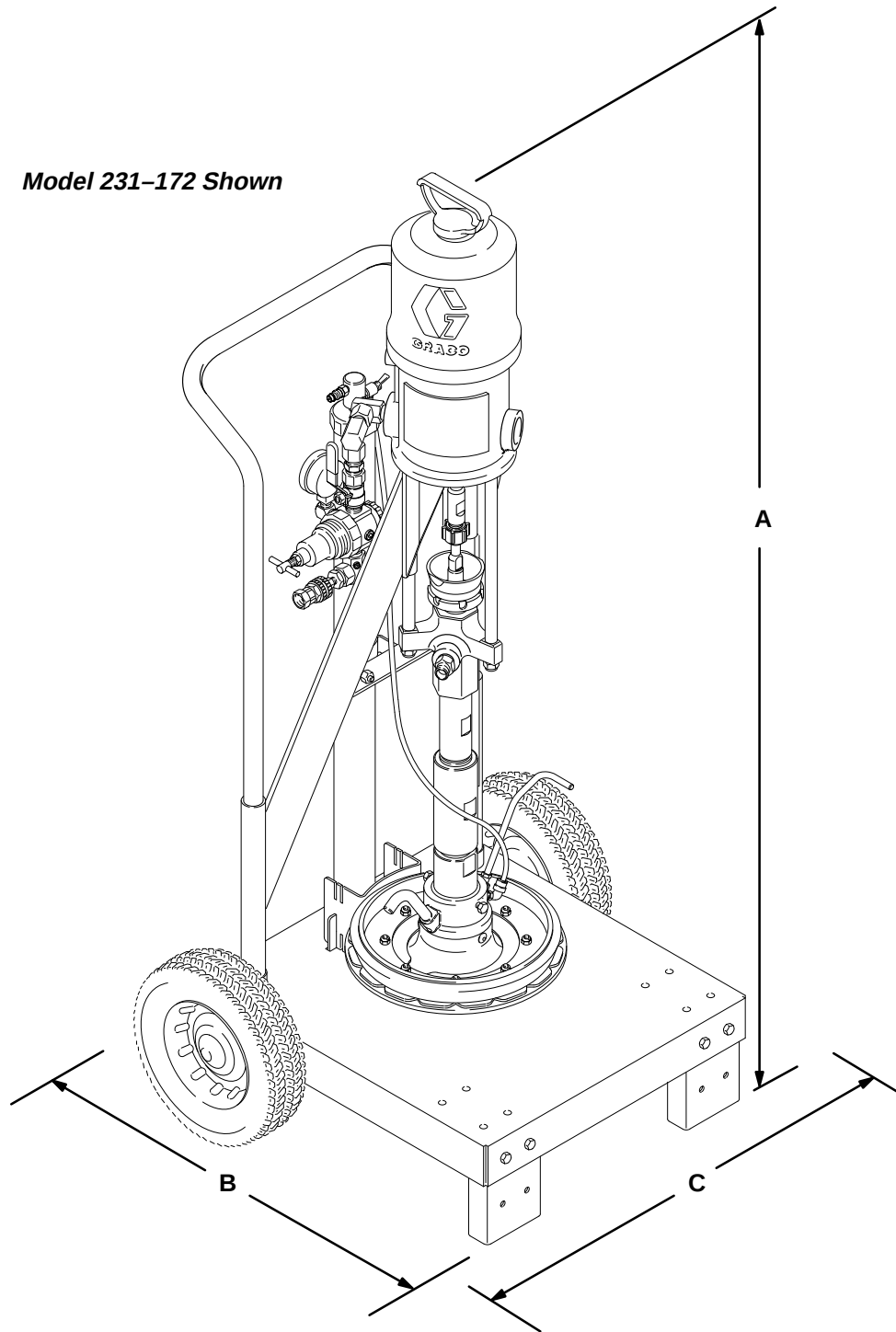
420 bar (6000 psi) MAXIMUM WORKING PRESSURE

Pistol-type trigger. 1/2 npt(f) inlet.



DIMENSIONAL DRAWING

Model 231-172 Shown



Pump Model	A (Raised)	A (Lowered)	B	C (Wheelbase)	Weight (Less Hose & Gun)
231-170, 231-171	1791 mm (70.51 in.)	1352 mm (53.23 in.)	575.5 mm (22.66 in.)	670 mm (26.34 in.)	61.2 kg (135 lb)
231-172, 231-173	1844 mm (72.60 in.)	1405 mm (55.31 in.)	575.5 mm (22.66 in.)	670 mm (26.34 in.)	63.5 kg (140 lb)

TECHNICAL DATA

Maximum fluid working pressure (pump)	<i>Model 231-170: 285 bar (4140 psi)</i> <i>Model 231-171: 276 bar (4000 psi)</i> <i>Models 231-172 & 231-173: 320 bar (4600 psi)</i>
Maximum air input pressure (pump)	<i>Model 231-170: 12.5 bar (180 psi)</i> <i>Model 231-171: 11.9 bar (173 psi)</i> <i>Models 231-172 & 231-173: 7 bar (100 psi)</i>
Maximum air input pressure (cart)	14 bar (200 psi)
Wetted parts	See separate component manuals

THE GRACO WARRANTY AND DISCLAIMERS

WARRANTY

Graco warrants all equipment manufactured by it 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. As purchaser's sole remedy for breach of this warranty, Graco will, for a period of twelve months from the date of sale, repair or replace any part of the equipment proven 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, 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 with Graco equipment of 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 claim. 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.

DISCLAIMERS AND LIMITATIONS

THE TERMS OF THIS WARRANTY CONSTITUTE PURCHASER'S SOLE AND EXCLUSIVE REMEDY AND ARE IN LIEU OF ANY OTHER WARRANTIES (EXPRESS OR IMPLIED), INCLUDING WARRANTY OF MERCHANTABILITY OR WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE, AND OF ANY NON-CONTRACTUAL LIABILITIES, INCLUDING PRODUCT LIABILITIES, BASED ON NEGLIGENCE OR STRICT LIABILITY. EVERY FORM OF LIABILITY FOR DIRECT, SPECIAL OR CONSEQUENTIAL DAMAGES OR LOSS IS EXPRESSLY EXCLUDED AND DENIED. IN NO CASE SHALL GRACO'S LIABILITY EXCEED THE AMOUNT OF THE PURCHASE PRICE. ANY ACTION FOR BREACH OF WARRANTY MUST BE BROUGHT WITHIN TWO (2) YEARS OF THE DATE OF SALE.

EQUIPMENT NOT COVERED BY GRACO WARRANTY

GRACO MAKES NO WARRANTY, AND DISCLAIMS ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, WITH RESPECT TO ACCESSORIES, EQUIPMENT, MATERIALS, OR COMPONENTS SOLD BUT NOT MANUFACTURED BY GRACO. These items sold, but not manufactured by Graco (such as electric motor, 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.

IMPORTANT PHONE NUMBERS

TO PLACE AN ORDER, contact your Graco distributor, or call this number to identify the distributor closest to you: **1-800-328-0211 Toll Free**

FOR TECHNICAL ASSISTANCE, service repair information or assistance regarding the application of Graco equipment: **1-800-543-0339 Toll Free**

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Subsidiary and Affiliate Companies: Canada; England; Switzerland; France; Germany; Hong Kong; Japan; Korea
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