



INSTRUCTIONS

This manual contains important warnings and information.
READ AND KEEP IT FOR REFERENCE.

First choice when quality counts.™

19 LITER (5 GALLON) SIZE

Portable Ram Package

32 MPa, 317 bar (4600 psi) Maximum Fluid Working Pressure

0.7 MPa, 7 bar (100 psi) Maximum Pump Air Inlet Pressure

1.0 MPa, 10 bar (150 psi) Maximum Package Air Inlet Pressure

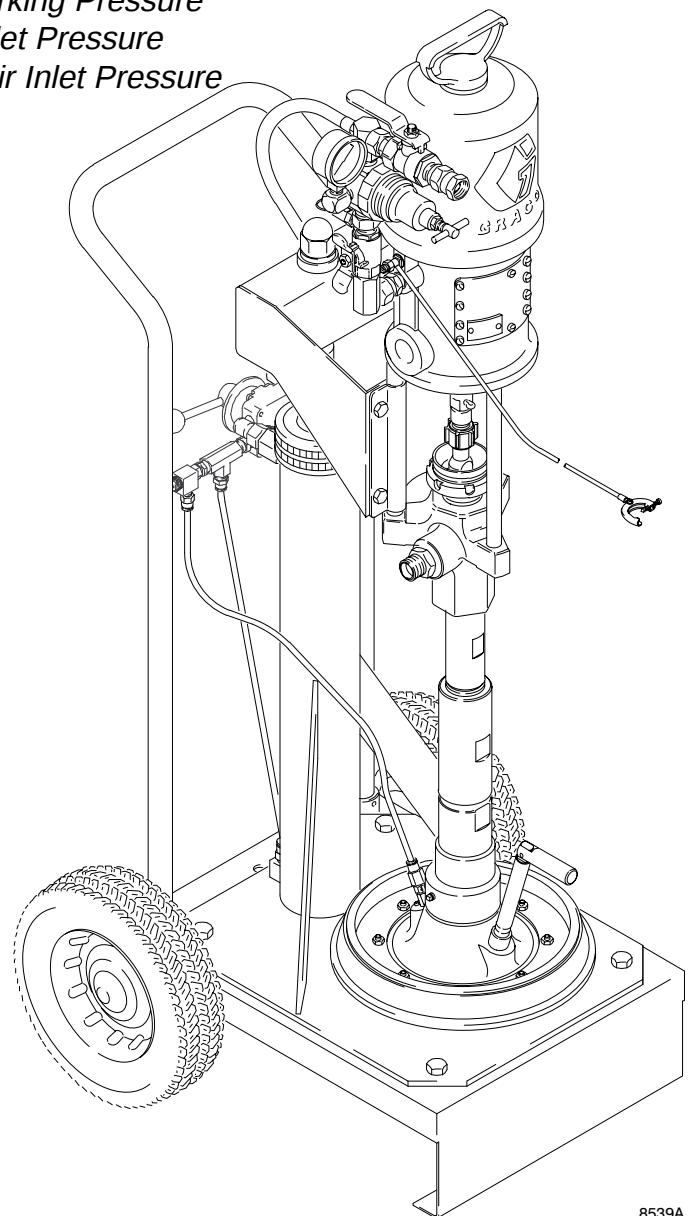
Part No. 232-105 Package, Series A

46:1 Ratio Pump, with President® Air Motor and Check-Mate™ 200 Carbon Steel Displacement Pump, 19 liter (5 gallon) ram, wiper plate, and cart



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Symbols

Warning Symbol



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

Caution Symbol



This symbol alerts you to the possibility of damage to or destruction of equipment if you do not follow the instructions.

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 stated on the equipment or in the **Technical Data** for your equipment. Do not exceed the maximum working pressure of the lowest rated component in your system.
- Use fluids and solvents which are compatible with the equipment wetted parts. Refer to the **Technical Data** section of all equipment manuals. Read the fluid and solvent manufacturer's warnings.
- Route hoses away from traffic areas, sharp edges, moving parts, and hot surfaces. Do not expose Graco hoses to temperatures above 82°C (180°F) or below -40°C (-40°F).
- Wear hearing protection when operating this equipment.
- Comply with all applicable local, state, and national fire, electrical, and safety regulations.
- To avoid tip-over, the cart must be on a flat and level surface.

⚠ WARNING



INJECTION HAZARD

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

- Fluid injected into the skin might look like just a cut, but it is a serious injury. **Get immediate medical attention.**
- Do not point the gun/valve at anyone or at any part of the body.
- Do not put your hand or fingers over the spray tip/nozzle.
- Do not stop or deflect 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/valve trigger safety operates before spraying/dispensing.
- Lock the gun/valve trigger safety when you stop spraying/dispensing.
- Follow the **Pressure Relief Procedure** on page 8 if the spray tip/nozzle clogs and before cleaning, checking or servicing the equipment.
- Tighten all fluid connections before operating the equipment.
- Check the hoses, tubes, and couplings daily. Replace worn or damaged parts immediately. Do not repair high pressure couplings; you must replace the entire hose.
- Fluid hoses must have spring guards on both ends, to help protect them from rupture caused by kinks or bends near the couplings.



MOVING PARTS HAZARD

Moving parts, such as the priming piston and wiper plate, can pinch or amputate your fingers.

- Keep clear of all moving parts when starting or operating the pump.
- Keep hands and fingers away from the priming piston during operation and whenever the pump is charged with air.
- Keep your hands away from the wiper plate and the lip of the pail while the ram is operating.
- Before servicing the equipment, follow the **Pressure Relief Procedure** on page 8 to prevent the equipment from starting unexpectedly.

WARNING



FIRE AND EXPLOSION HAZARD

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

- Ground the equipment and the object being sprayed. Refer to **Grounding** on page 5.
- If there is any static sparking or you feel an electric shock while using this equipment, **stop spraying/dispensing immediately**. Do not use the equipment until you identify and correct the problem.
- Provide fresh air ventilation to avoid the buildup of flammable fumes from solvents or the fluid being sprayed/dispensed.
- Keep the spray/dispense area free of debris, including solvent, rags, and gasoline.
- Electrically disconnect all equipment in the spray/dispense area.
- Extinguish all open flames or pilot lights in the spray/dispense area.
- Do not smoke in the spray/dispense area.
- Do not turn on or off any light switch in the spray/dispense area while operating or if fumes are present.
- Do not operate a gasoline engine in the spray/dispense area.



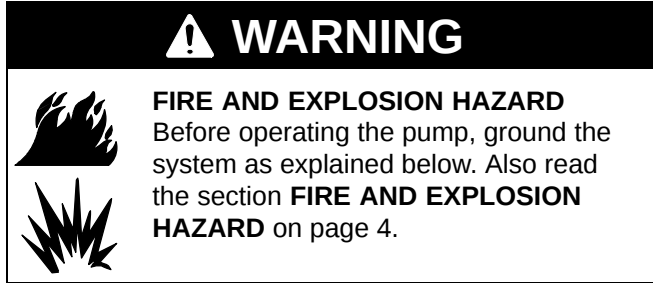
TOXIC FLUID HAZARD

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

- Know the specific hazards of the fluid you are using.
- Store hazardous fluid in an approved container. Dispose of hazardous fluid according to all local, state and national guidelines.
- Always wear protective eyewear, gloves, clothing and respirator as recommended by the fluid and solvent manufacturer.

Setup

Grounding



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 (Y) into the slot in lug (Z) and tighten the locknut securely. Connect the other end of the wire to a true earth ground.

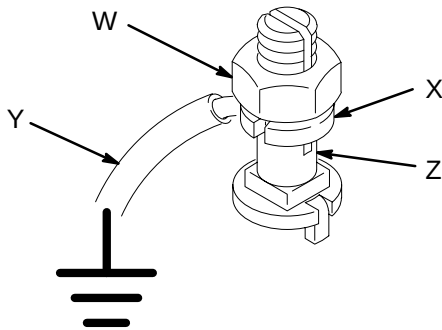


Fig. 1

2. *Air and fluid hoses*: use only electrically conductive hoses.
3. *Air compressor*: follow manufacturer's recommendations.
4. *Spray gun/dispense valve*: ground through connection to a properly grounded fluid hose and pump.
5. *Fluid supply container*: follow your local code.
6. *Object being sprayed*: follow your local code.

7. *Solvent pails used when flushing*: follow your local code. Use only metal pails, which are conductive, placed on a grounded surface. Do not place the pail on a nonconductive surface, such as paper or cardboard, which interrupts the grounding continuity.
8. *To maintain grounding continuity when flushing or relieving pressure*, hold a metal part of the spray gun/dispense valve firmly to the side of a grounded metal pail, then trigger the gun/valve.

Location

Position the ram so the air regulators for the pump and the ram will be easily accessible. Ensure that there is sufficient overhead clearance when the ram is fully raised. Refer to **Dimensions** on page 11.

Wiper Plate Shield Kit 223–689

Wiper Plate Shield Kit 223–689 is available to cover the fluid side of the 19 liter (5 gallon) wiper plate, to keep it clean. The kit includes ten disposable polyethylene shields. The shields may be reused, if desired, by removing excess material with a squeegee.

To use, place one shield on the surface of the fluid before the wiper plate enters the pail. The shield will adhere to the plate as the plate moves downward, preventing fluid from directly contacting the plate.

Components and Accessories

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. Refer to the Product Data Sheet, Form No. 305–545. If you supply your own accessories, be sure they are adequately sized and pressure rated for your system.

Fig. 2 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.

Setup

Components and Accessories (continued)

Refer to Fig. 2.

WARNING

A red-handled main air bleed valve (V), pump air bleed valve (G), and fluid drain valve (L) are required. These accessories 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 red-handled main air bleed valve (V, supplied) shuts off and relieves the air to the pump and ram. Order Part No. 113–269. The ram will hold pressure if the ram director valve (U) is in the horizontal (neutral) position. To relieve air pressure in the ram, close the red-handled bleed valve (V) and move the director valve (U) to DOWN. The ram will slowly drop.

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

The fluid drain valve (L) assists in relieving fluid pressure in the displacement pump, hose, and gun. Triggering the gun to relieve pressure may not be sufficient. Order Part No. 210–658 (3/8 npt).

Air Line

- **The red-handled main air bleed valve (V)** is required in your system to shut off the air supply to the pump and ram (see the **WARNING** above). When closed, the valve will bleed off all air in the ram and pump, and the ram will slowly drop. Be sure the valve is easily accessible from the pump, and is located **upstream** from the air manifold (D).
- **The pump air bleed valve (G)** 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 valve is easily accessible from the pump, and is located **downstream** from the pump air regulator (H).
- **The air pressure relief valve (Q)** limits air pressure to the pump, to prevent overpressurization.
- **The pump air regulator (H)** controls pump speed and outlet pressure by adjusting the air pressure to the pump. Locate the regulator close to the pump, but **upstream** from the pump air bleed valve (G).
- **The air manifold (D)** has a swivel air inlet. It provides ports for connecting lines to air-powered accessories.
- **An air line filter (J)** removes harmful dirt and moisture from the compressed air supply.
- **A second air bleed valve (K)** isolates the air line accessories for servicing. Locate upstream from all other air line accessories.
- **The ram air regulator (T)** controls the air pressure to the ram.
- **The ram director valve (U)** controls the raising and lowering of the ram.
- **The air release valve (X)** opens and closes the flow of air to assist raising the wiper plate (C) out of an empty pail.

Fluid Line

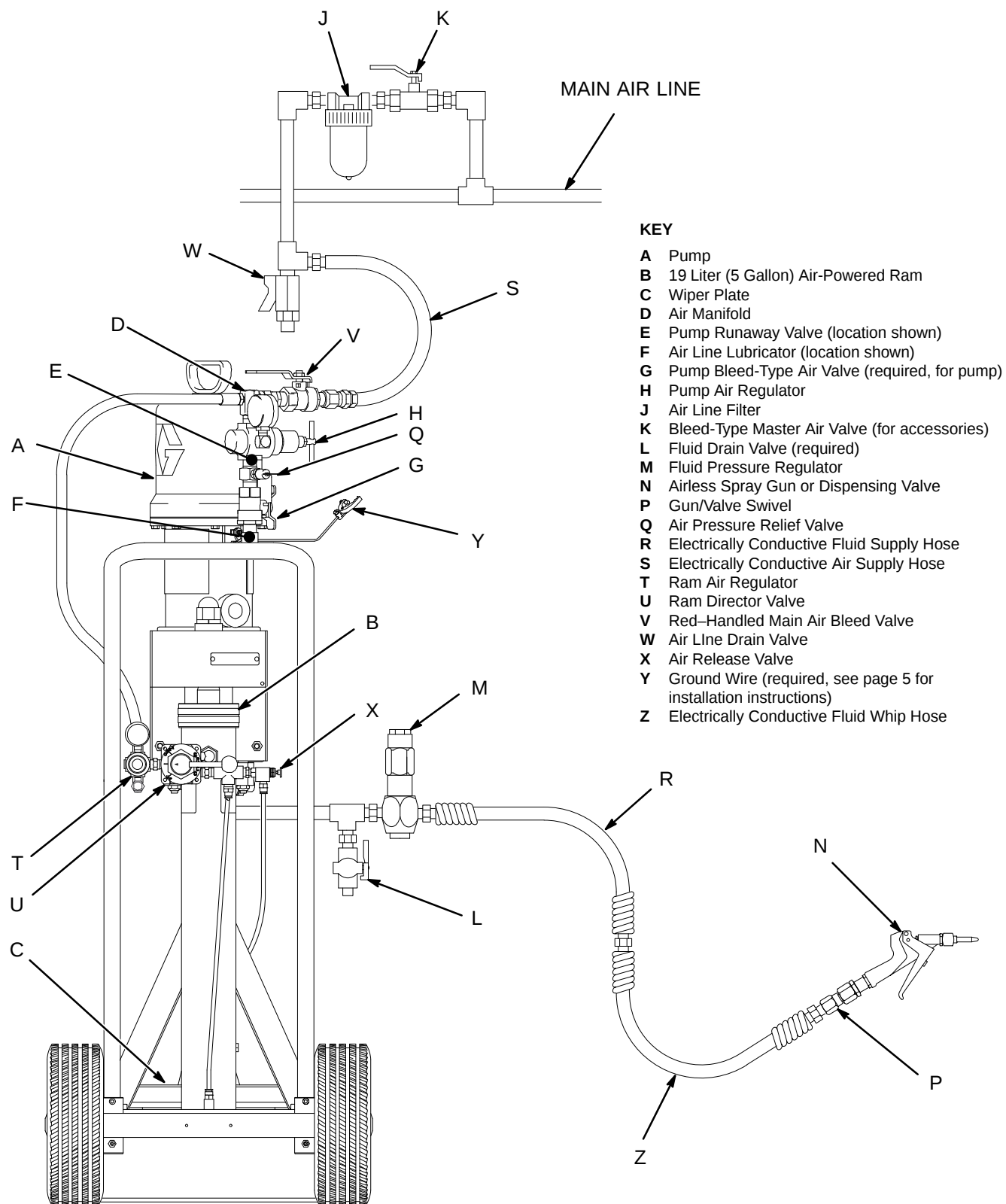
Install the following accessories in the locations shown in Fig. 2, using adapters as necessary:

- **A fluid drain valve (L)** is required in your system to relieve fluid pressure in the hose and gun/valve (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 will point up when opened.
- **A fluid regulator (M)** controls fluid pressure to the gun/valve, and dampens pressure surges.
- **A gun or valve (N)** dispenses the fluid. The gun shown in Fig. 2 is a dispensing gun for highly viscous fluids.
- **A gun swivel (P)** allows freer gun/valve movement.

Air and Fluid Hoses

Be sure all air hoses (S) and fluid hoses (R, Z) are properly sized and pressure-rated for your system. Use only electrically conductive hoses. Fluid hoses must have spring guards on both ends. Use of a short whip hose (Z) and a swivel (P) between the main fluid hose and the gun/valve (N) allows freer gun/valve movement.

Setup



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Fig. 2

Operation

Pressure Relief Procedure

WARNING



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/dispersing,
- check or service any of the system equipment,
- or install or clean the spray tip/nozzle.

1. Lock the gun/valve trigger safety.
2. Close the pump air bleed valve (G, required in your system).
3. Shut off the red-handled main air bleed valve (V, required in your system). Set the ram director valve (U) to DOWN. The ram will slowly drop.
4. Unlock the gun/valve trigger safety.
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. Lock the gun/valve trigger safety.
7. Open the drain valve (required in your system) and/or the pump bleeder valve (JJ), having a container ready to catch the drainage. See Fig. 3.
8. Leave the drain valve open until you are ready to spray 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.

WARNING

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

Starting and Adjusting the Ram

1. Refer to Fig. 3. Close all air regulators and air valves.
2. Open the red-handled main air bleed valve (V) and set the ram air regulator (T) to 0.28 MPa, 2.8 bar (40 psi). Pull up on the director valve (U) handle so the arrow points to UP, and let the ram rise to its full height.
3. Set a full 19 liter (5 gal.) pail of fluid on the ram base, slide it back against the ram tube and supports, and center it under the wiper plate (C). To prevent air from being trapped under the wiper plate, scoop fluid from the center of the pail to the sides, to make the surface concave.

WARNING



MOVING PARTS HAZARD

Moving parts can pinch or amputate your fingers. When the pump is operating and when raising or lowering the ram, keep your fingers and hands away from the pump intake, wiper plate, and lip of the fluid container.

4. With your hands away from the pail and the wiper plate, push down on the director valve handle so the arrow points to DOWN, and lower the ram until the wiper plate rests on the lip of the pail. Move the director valve handle to the horizontal position (neutral).
5. Adjust the pail to be sure it is aligned with the wiper plate, and remove the vent handle (KK) from the wiper plate (C) to open the vent hole (LL).
6. Set the director valve to DOWN and continue to lower the ram until fluid appears at the wiper plate vent hole (LL). Set the director valve to neutral, reinstall the vent handle and tighten securely. See Fig. 3.

Operation

Starting and Adjusting the Pump

1. Be sure the pump air regulator (H) is closed. Then set the ram air regulator (T) to about 0.21 MPa, 2.1 bar (30 psi). Set the director valve (U) to DOWN. See Fig. 3.
2. Start the pump as explained in the separate pump instruction manual.
3. Keep the director valve (U) set to DOWN while the pump is operating.

NOTE: Adjust the air pressure to the ram as needed, but do not increase it to a level where fluid is forced past the wiper plate (C).

KEY

A Pump
B Ram
C Wiper Plate
G Pump Air Bleed Valve
(required, for pump)

H Pump Air Regulator
T Ram Air Regulator
U Ram Director Valve
V Red-Handled Main Air Bleed Valve
(required, for pump and ram)

X Air Release Valve
JJ Pump Bleeder Valve
KK Wiper Plate Vent Handle
LL Vent Hole

Detail of Ram Air Controls

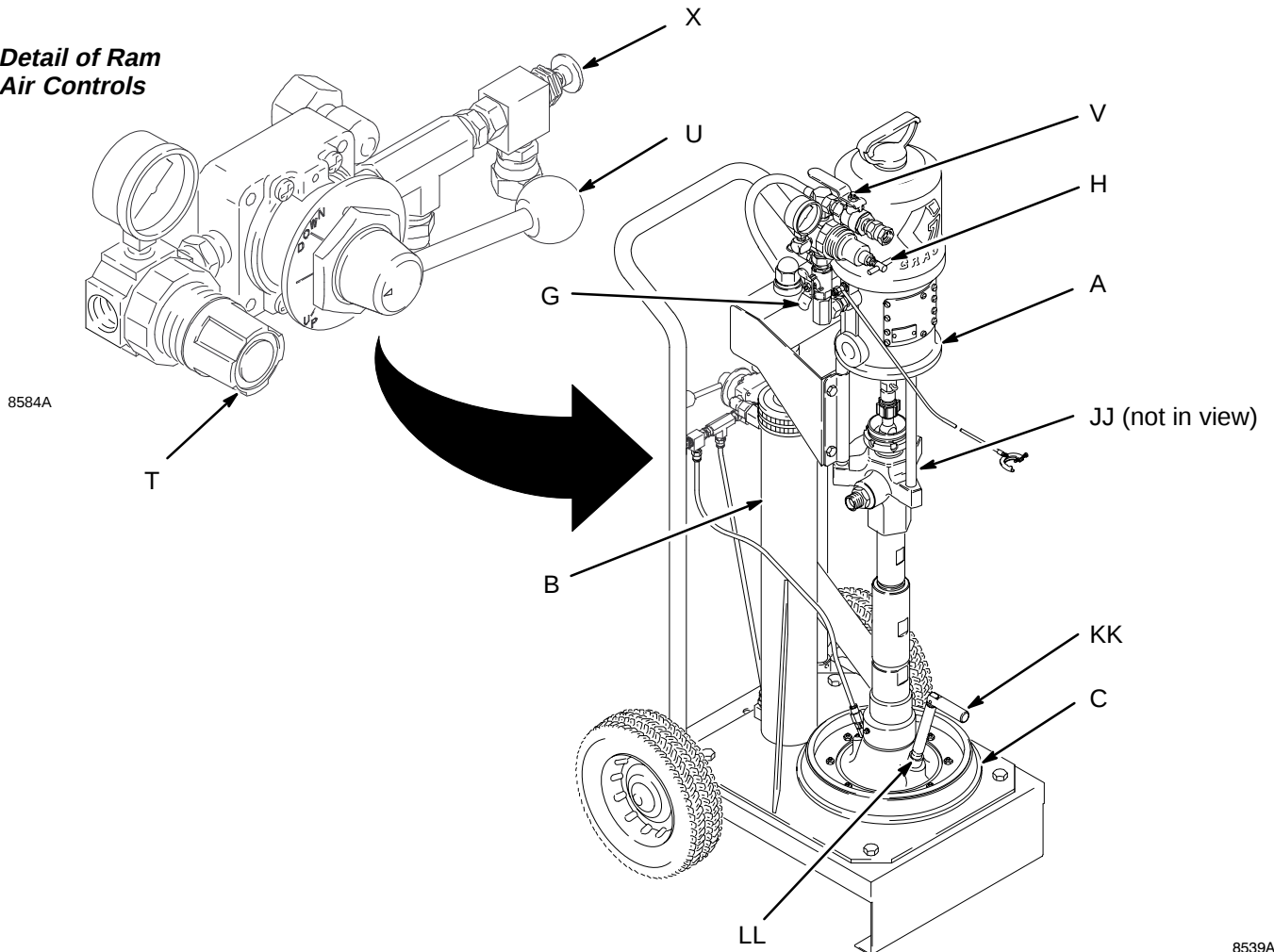


Fig. 3

Operation

Changing Fluid Pails

WARNING



MOVING PARTS HAZARD

Moving parts can pinch or amputate your fingers. When the pump is operating and when raising or lowering the ram, keep your fingers and hands away from the pump intake, wiper plate, and lip of the fluid container.

1. Stop the pump. Close the pump air bleed valve (G).
2. Before raising the wiper plate (C), locate the pushbutton on the air release valve (X) .
3. Set the director valve (U) to UP to raise the wiper plate. At the same time, carefully equalize the pressure in the pail by pressing the air release valve (X) pushbutton on and off.
4. Raise the wiper plate until it is completely out of the pail.
5. Inspect the wiper plate and, if necessary, remove any remaining material or material build-up.
6. Remove the empty pail and place a full pail on the ram base.
7. Lower the ram and adjust the position of the pail relative to the wiper plate, as explained under **"Starting and Adjusting the Ram"** on page 8.

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 8.

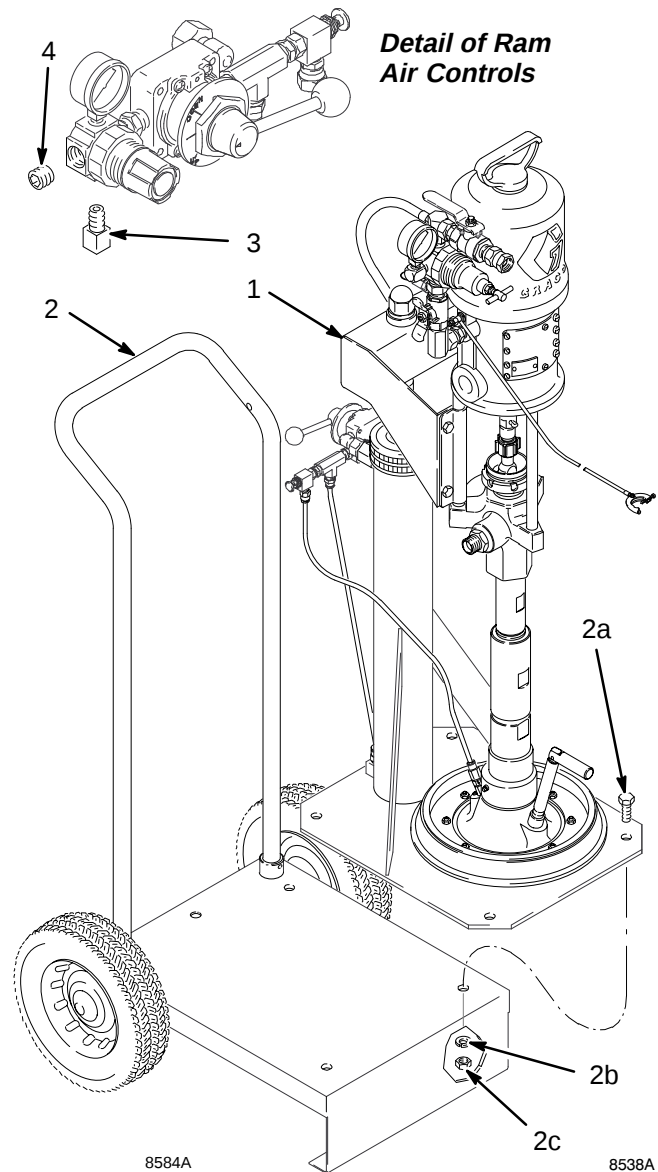
1. Relieve the pressure.
2. Follow the pump shutdown instructions in your separate pump manual.

Parts

Part No. 232-105, Series A

46:1 Ratio Pump, with President® Air Motor and Check-Mate™ 200 Carbon Steel Displacement Pump, 19 liter (5 gallon) ram, wiper plate, and cart

Ref. No.	Part No.	Description	Qty.
1	231-118	46:1 RATIO PRESIDENT PUMP with wiper plate, mounted on ram See manual 308-026	1
2	237-557	CART, universal bare Includes items 2a through 2c See manual 308-567	1
2a	100-424	. SCREW, cap, hex hd; 1/2-13; 38 mm (1-1/4") long	4
2b	100-018	. LOCKWASHER, spring; 1/2" size	4
2c	100-321	. NUT, hex; 1/2-13	4
3	100-839	ELBOW; 1/8 npt (m x f)	1
4	100-721	PLUG; 1/4 npt	1



Technical Data

Ratio	Max. Fluid Working Pressure	Max. Pump Air Input Pressure	Max. Package Air Input Pressure
46:1	32 MPa, 317 bar (4600 psi)	0.7 MPa, 7 bar (100 psi)	1.0 MPa, 10 bar (150 psi)

Wetted parts . . . See separate component manuals

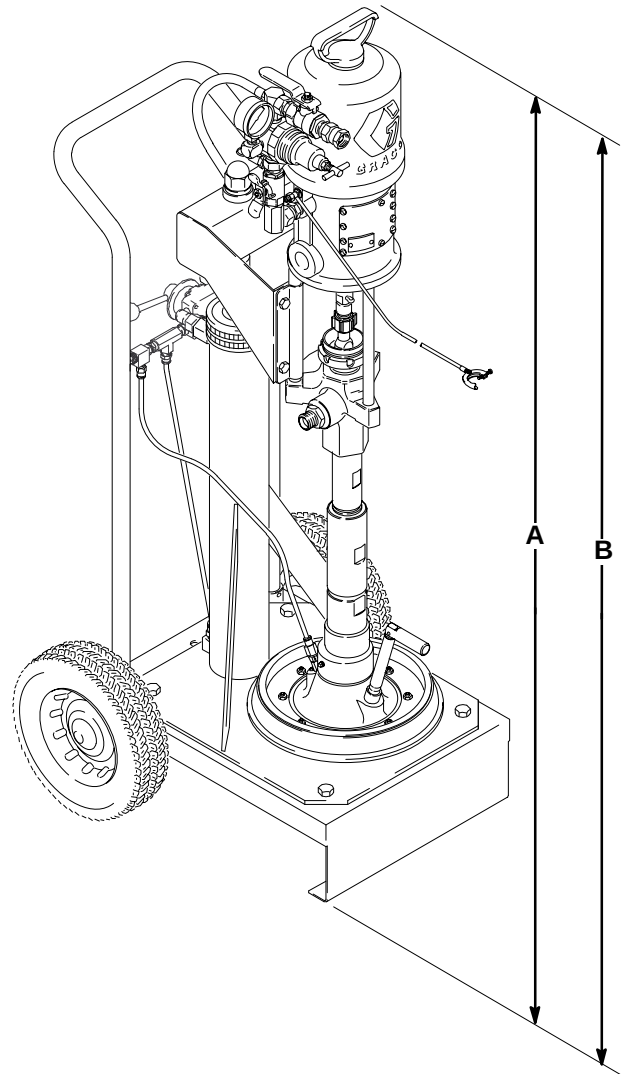
Sound Pressure Levels (dBa) (measured at 1 meter from unit)

Input Air Pressures at 15 cycles per minute		
0.28 MPa, 2.8 bar (40 psi)	0.48 MPa, 4.8 bar (70 psi)	0.7 MPa, 7 bar (100 psi)
73.6 dB(A)	78.3 dB(A)	80.9 dB(A)

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

Input Air Pressures at 15 cycles per minute		
0.28 MPa, 2.8 bar (40 psi)	0.48 MPa, 4.8 bar (70 psi)	0.7 MPa, 7 bar (100 psi)
87.4 dB(A)	92.1 dB(A)	94.6 dB(A)

Dimensions



A (Raised)	B (Lowered)	Weight
1702 mm (67.0 in.)	1278 mm (50.3 in.)	95 kg (210 lb)

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 Phone Number

TO PLACE AN ORDER, contact your Graco distributor, or call this number to identify the distributor closest to you:
1-800-367-4023 Toll Free

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