

Instructions – Parts List



55:1 RATIO KING™

Air-Powered Ram and Supply Pump

307538 rev.M

4950 psi (34.0 MPa, 340 bar) MWP

Model 222546, Series C

Severe-Duty King Pump with Ultra-High Molecular Weight
Polyethylene and PTFE Packings, mounted on
55 Gallon (200 Liter) Size Ram

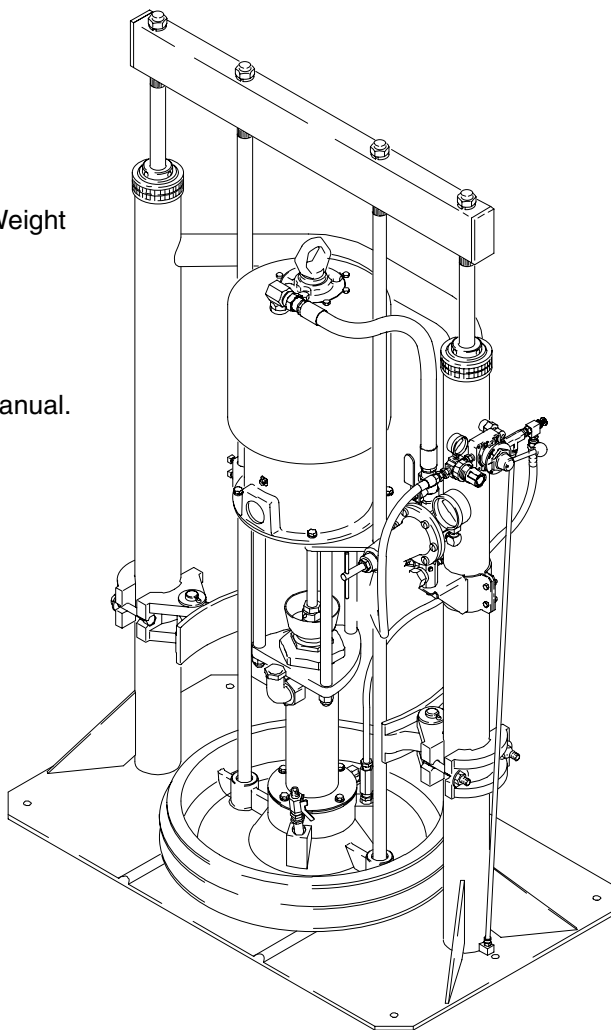


Important Safety Instructions

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

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PROVEN QUALITY. LEADING TECHNOLOGY.



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



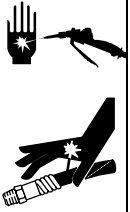
INSTRUCTIONS

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.

WARNING



SKIN INJECTION HAZARD

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

- Fluid injected into the skin might look like just a cut, but it is a serious injury. **Get immediate surgical treatment.**
- Do not point the 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.
- Lock the gun/valve trigger safety when you stop spraying.
- Follow the **Pressure Relief Procedure** on page 10 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 ram 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 ram plate and the lip of the drum while the ram is operating.
- Before servicing the equipment, follow the **Pressure Relief Procedure** on page 10 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

**WARNING**

**FIRE AND EXPLOSION HAZARD**
Before operating the pump, ground the system as explained below. Also read the section **FIRE AND EXPLOSION HAZARD** on page 4.

1. *Pump*: check ground wire and clamp. See Fig. 1. Remove the ground screw (Z) and insert through eye of ring terminal at the end of ground wire (Y). Fasten ground screw back onto pump and tighten securely. Connect the other end of the wire to a true earth ground. Order Part No. 222011 ground wire and clamp.

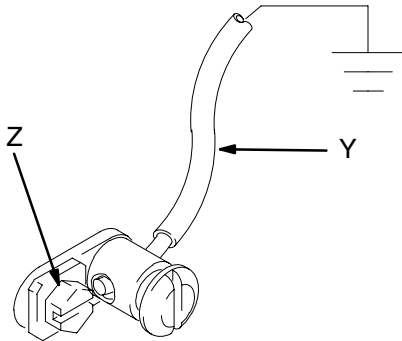


Fig. 1

TI1052

2. *Air and fluid hoses*: use only electrically conductive hoses.
3. *Air compressor*: follow manufacturer's recommendations.
4. *Spray gun*: 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 firmly to the side of a grounded *metal* pail, then trigger the gun.

Setup

KEY

A Pump
B Ram
C Ram Plate
D Electrically Conductive Air Supply Hose
E Main Air Bleed Valve (required, for pump and ram)
F Air Manifold
G Pump Air Regulator
H Pump Air Bleed Valve (required, for pump)

J Air Line Filter
K Bleed-Type Air Valve (for accessories)
L Fluid Drain Valve (required)
M Fluid Pressure Regulator
N Electrically Conductive Fluid Hose
P Electrically Conductive Fluid Whip Hose
R Gun/Valve Swivel

S Gun or Dispensing Valve
T Ram Air Regulator
U Ram Director Valve
V Air Release Valve
Y Ground Wire (required; see page 5 for installation instructions)
W Air Line Drain Valve
CC Vent Valve

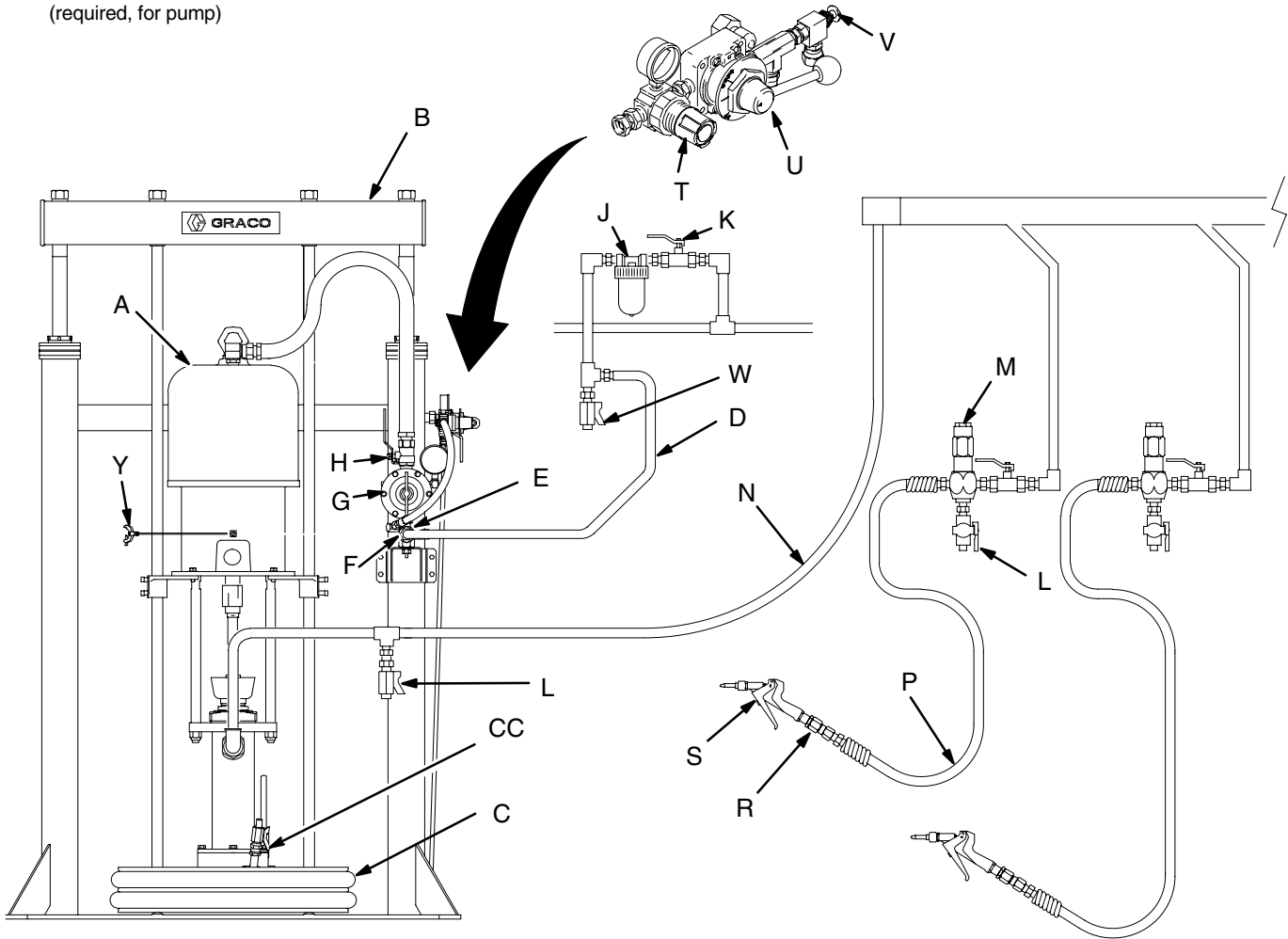


Fig. 2

Setup

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

Accessories are available from Graco. Make certain all accessories are adequately sized and pressure-rated to meet your system's requirements.

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.

Air Line Components and Accessories

Refer to Fig. 2.

WARNING

A main air bleed valve (E), pump air bleed valve (H), 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 main air bleed valve (E) shuts off and relieves the air to the pump and ram. 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 main air bleed valve (E) and move the director valve (U) to DOWN. The ram will slowly drop.

The pump air bleed valve (H) 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 assists in relieving fluid pressure in the displacement pump, hose, and gun. Triggering the gun to relieve pressure may not be sufficient.

- **The main air bleed valve (E)** is required in your system to shut off the air supply to the pump and ram (see the **WARNING** at left). When closed, the valve will bleed off all air in the ram and pump, and the ram will slowly lower. Be sure the valve is easily accessible from the pump, and is located **upstream** from the air manifold (F).
- **The pump air bleed valve (H)** 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 valve is easily accessible from the pump, and is located **downstream** from the air regulator (G).
- **The air regulator (G)** 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.
- **The air manifold (F)** has a swivel air inlet and 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 bleed-type air 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 (V)** opens and closes the flow of air to assist raising the ram plate (C) out of an empty drum.
- The **vent valve (CC)** bleeds air from under the ram plate (C) to assist in priming the pump and lowering the ram plate into the drum.

Setup

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 the Dimensional Drawing in the separate ram manual 306934, supplied.

Using the holes in the ram base as a guide, drill holes for 1/2 in. (13 mm) anchors.

Check that the ram base is level in all directions. If necessary, level the base using metal shims. Secure the base to the floor using 13 mm (1/2 in.) anchors which are long enough to prevent the ram from tipping.

NOTE: Remove the bracket (item 58 in instruction manual 306934) when mounting the pump.

Air and Fluid Hoses

Be sure all air hoses (D) and fluid hoses (N, P) 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 (P) and a swivel (R) between the main fluid hose (N) and the gun/valve (S) allows freer gun/valve movement.

Fluid Line Accessories

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** on page 7). 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 (S)** dispenses the fluid. The gun shown in Fig. 2 is a dispensing gun for highly viscous fluids.
- **A gun swivel (R)** allows freer gun/valve movement.

Notes

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

1. Refer to Fig. 2. Lock gun/valve trigger safety.
 2. Close pump air bleed valve (H, required in your system).
 3. Shut off main air bleed valve (E, required in your system). Set ram director valve (U) to DOWN.
- NOTE:** The ram will slowly drop from a raised position.
4. Unlock the gun/valve trigger safety.
 5. Hold metal part of gun/valve firmly to side of grounded metal pail, and trigger gun/valve to relieve pressure.
 6. Lock gun/valve trigger safety.
 7. Open drain valve (L, required in your system) and/or pump bleeder valve (H), having container ready to catch drainage.
 8. Leave drain valve open until 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.

Starting and Adjusting the Ram

1. Refer to Fig. 3. Close all air regulators and air valves.
2. Open main air bleed valve (E) and set ram air regulator (T) to 2.8 bar, 0.26 MPa (40 psi).
3. Move director valve (U) to UP, and raise ram to full height.
4. Set full drum of fluid on ram base. Slide drum against tube stop and center under ram plate (C). Use drum clamps (17) to center, hold, and properly align drum with ram.
5. Remove drum cover and smooth surface of fluid with straightedge.

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, ram plate, and lip of the drum.

NOTE: Do not use drums with side bungs or large dents with this ram. Rough bung openings or large dents will damage the wipers or stop the ram plate, resulting in a runaway pump.

6. Move director valve to DOWN, and lower ram until ram plate is about to enter drum. Set director valve to neutral.
7. Reposition drum as necessary so wipers will not hit drum lip. Open vent valve (CC) on ram plate.
8. Move director valve to DOWN and lower ram until fluid appears at vent valve (CC). Set director valve to neutral.
9. Close vent valve.

Operation

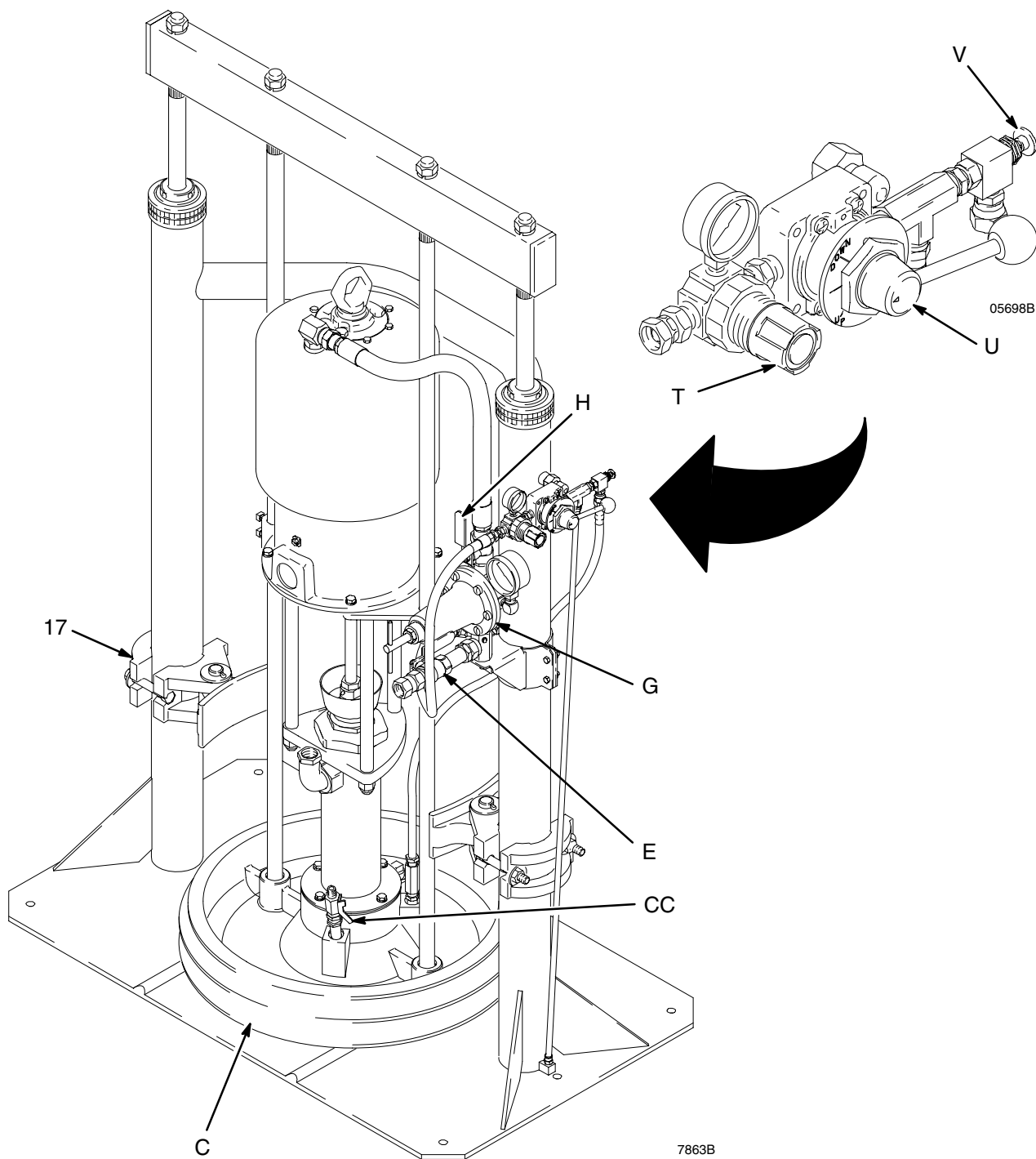


Fig. 3

Operation

Starting and Adjusting the Pump

1. Refer to Fig. 3. Be sure the pump air regulator (G) is closed. Then set the ram air regulator (T) to about 3.5 bar, 0.35 MPa (50 psi). Set the director valve (U) to DOWN.
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: Increase air pressure to the ram if the pump does not prime properly with heavier fluids. If fluid is forced out around the top wiper, ram pressure is too high and the air pressure should be decreased.

Changing Drums

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, ram plate, and lip of the drum.

1. Stop pump.
2. Close pump air bleed valve (H).

3. Before raising wiper plate, locate push button on air release valve (V) .
4. Set director valve (U) to UP to raise wiper plate. At the same time, carefully equalize pressure in drum by operating air release valve.
5. Raise wiper plate until it is completely out of drum.
6. Remove empty drum.
7. Inspect wiper plate and, if necessary, remove any remaining material or material build-up.
8. Place full drum on ram base.
9. Lower the ram and adjust the position of the drum relative to the ram plate, as explained under “Starting and Adjusting the Ram” on page 10.

Shutdown and Care of the Pump

1. Set director valve (U) to neutral.

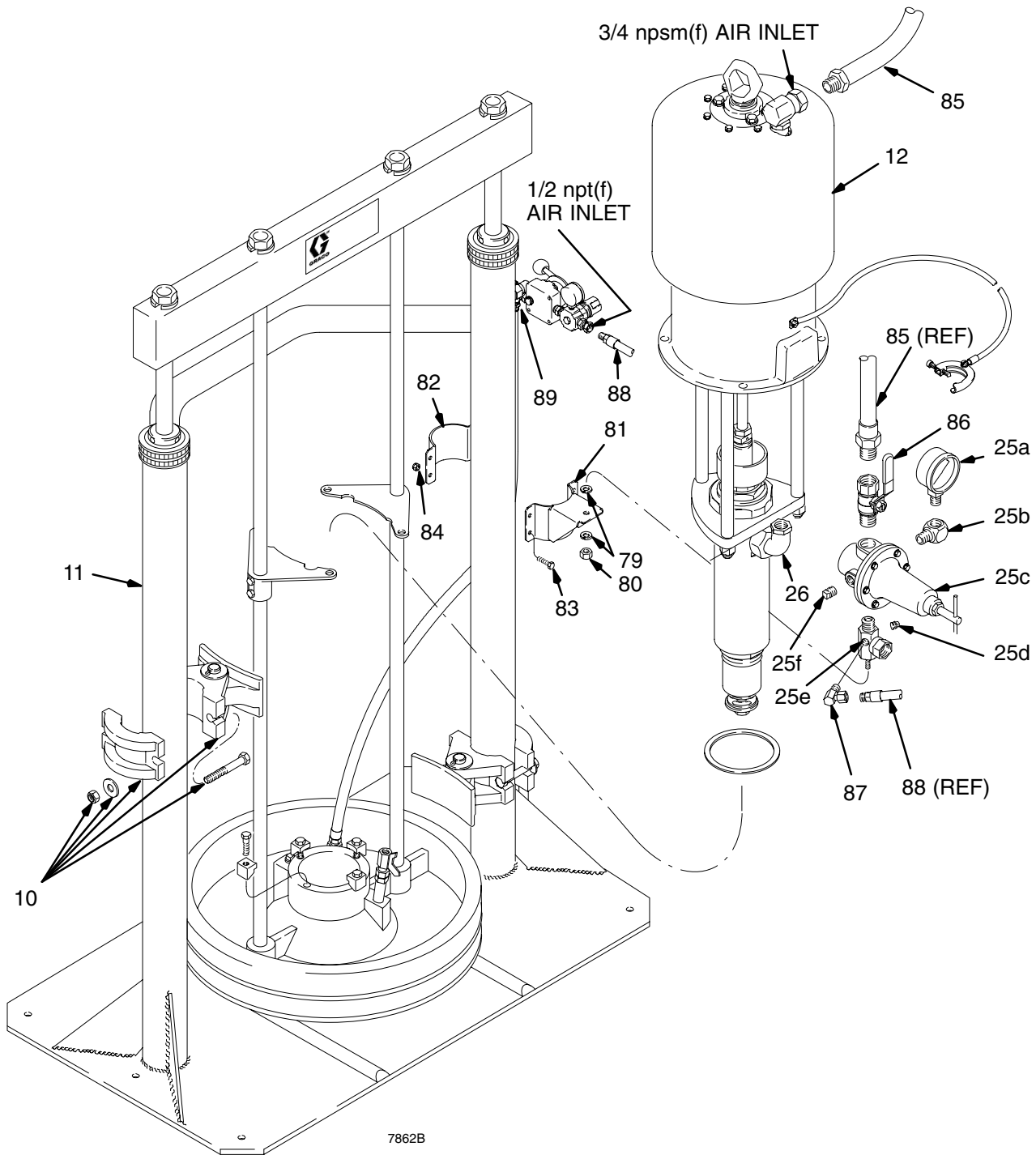
WARNING

To reduce the risk of serious injury whenever you are instructed to relieve pressure, always follow the **Pressure Relief Procedure** on page 10.

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

Notes

Parts



Parts

Model 222546, Series C

Ref No.	Part No.	Description	Qty	Ref No.	Part No.	Description	Qty
1	158586	BUSHING; 1 in. npt(m) x 3/4 npt(f)	1	25f	100509	. PLUG, pipe, 1/4–18 npt	1
10	206537	CLAMP, drum kit	1	26	110300	ELBOW, street; 1 in. npt (m x f)	1
11		RAM, drum, 200 liter (55 gal.)		79	100322	WASHER, lock, external tooth	2
		See 306934, P/N 207279 for parts	1	80	100131	NUT, full, hex	1
12	222545	PUMP, 55:1 Ratio King, Severe-Duty		81	237962	BRACKET, welded	1
		See instruction manual 307982	1	82	190747	BRACKET, mounting, ram	1
25	238704	AIR REGULATOR ASSY; 10–125 psi (0.1–0.9 MPa, 1–9 bar) regulated		83	100021	SCREW, cap	4
		pressure range; 3/4 npt(m) x 3/4 npt(f)		84	102040	NUT, lock	4
		swivel. Includes items 25a–25f	1	85	C12034	HOSE, coupled	1
25a	100960	. GAUGE, air pressure, 0–200 psi (0–14 bar) range, 1/4–18 npt thread	1	86	107141	BLEED VALVE; 3/4 npt (m x f)	1
25b	100840	. ELBOW, street, 90°, 1/4–18 npt (m x f)	1	87	155541	UNION, swivel, 90°	1
25c	207755	. AIR REGULATOR	1	88	109123	HOSE, coupled	1
25d	100403	. PLUG, pipe, 1/818 npt	1	89	113915	UNION, swivel; 1/8 npt(m) x 1/4 npsm(f)	1
25e	207675	. MANIFOLD, air 3/4–14 npt(m) x 3/4–14 npsm(f) swivel, 3/8–16 npt mounting stud	1	✓ Keep these spare parts on hand to reduce down time.			

Technical Data

Ratio	55:1
Maximum Pump Air Pressure	90 psi (0.6 MPa, 6.3 bar)
Maximum Ram Air Pressure	150 psi (1.0 MPa, 10.5 bar)
Maximum Working Pressure	4950 psi (34.0 MPa, 340 bar)
Pump Air Inlet	3/4 npsm(f)
Ram Air Inlet	1/2 npt(f)
Fluid Outlet	3/4 npt(f)
Wetted Parts	Refer to component manuals

Graco Standard Warranty

Graco warrants all equipment manufactured by Graco and bearing its name to be free from defects in material and workmanship on the date of sale to the original purchaser for use. With the exception of any special, extended, or limited warranty published by Graco, Graco will, for a period of twelve months from the date of sale, repair or replace any part of the equipment determined by Graco to be defective. This warranty applies only when the equipment is installed, operated and maintained in accordance with Graco's written recommendations.

This warranty does not cover, and Graco shall not be liable for general wear and tear, or any malfunction, damage or wear caused by faulty installation, misapplication, abrasion, corrosion, inadequate or improper maintenance, negligence, accident, tampering, or substitution of non-Graco component parts. Nor shall Graco be liable for malfunction, damage or wear caused by the incompatibility of Graco equipment with structures, accessories, equipment or materials not supplied by Graco, or the improper design, manufacture, installation, operation or maintenance of structures, accessories, equipment or materials not supplied by Graco.

This warranty is conditioned upon the prepaid return of the equipment claimed to be defective to an authorized Graco distributor for verification of the claimed defect. If the claimed defect is verified, Graco will repair or replace free of charge any defective parts. The equipment will be returned to the original purchaser transportation prepaid. If inspection of the equipment does not disclose any defect in material or workmanship, repairs will be made at a reasonable charge, which charges may include the costs of parts, labor, and transportation.

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

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

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

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

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 Numbers

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

1-800-367-4023 Toll Free

612-623-6921

612-378-3505 Fax

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