

Instructions



Viscount[®] I 3000 Pump

307623 Rev.H

Model 221080, Series A

With a Severe-Duty Displacement Pump*

1000 psi (7 MPa, 69 bar) Maximum Hydraulic Input Pressure

3000 psi (21 MPa, 207 bar) Maximum Fluid Outlet Pressure

* Severe-Duty Displacement Pumps have an abrasion- and corrosion-resistant displacement rod and cylinder.

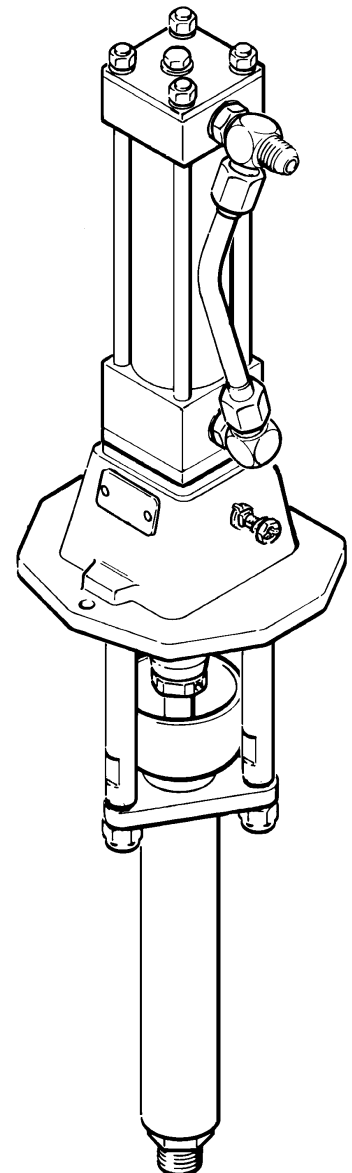
See manual 306981 for displacement pump parts and service information.

US Patent No. 4,383,475

Patent 1984 Canada

Brevete 1984

Foreign Patents Pending



PROVEN QUALITY. LEADING TECHNOLOGY.

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WARNING



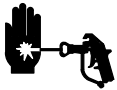
INSTRUCTIONS

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 15 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



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 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.
- 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 8 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 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 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/dispensed. Refer to **Grounding** on page 6.
- If there is any static sparking or you feel an electric shock while using this equipment, **stop spraying 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.

Installation

Grounding

To reduce the risk of static sparking, ground the pump, object being sprayed, and all 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*: 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.

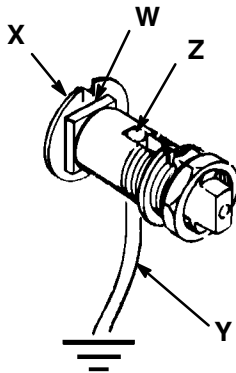


Fig. 1

2. *Hydraulic hoses*: use only electrically conductive hoses.
3. *Fluid hoses*: use only electrically conductive fluid hoses.
4. *Hydraulic power supply*: follow manufacturer's recommendations.
5. *Spray gun/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 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.

Install the Pump

⚠ CAUTION

Keep the hydraulic system clean

To reduce the risk of damaging the hydraulic power supply, blow out all hydraulic lines with air, flush thoroughly with solvent, and then blow out with air again before connecting the lines to the reciprocator.

Always plug the hydraulic inlets, outlets and lines when disconnecting them to avoid introducing dirt and other contaminants into the system.

Carefully follow the manufacturer's recommendations on reservoir and filter cleaning, and periodic changes of hydraulic fluid.

⚠ CAUTION

Recommended Hydraulic Oil

Use Graco-approved Hydraulic Oil or the equivalent. Order Part No. 169236 5 gallon (20 liter) or 207428 1 gallon (3.8 liter). The equivalent is a premium, ISO grade 46 petroleum-based hydraulic oil containing rust and oxidation inhibitors and anti-wear agents.

Before using any other type of oil in this Graco reciprocator, contact your Graco distributor. Unauthorized use of lesser grade oil or substitutes may void the warranty.

The Typical Installation shown in Fig. 2 is only representative. Contact your Graco distributor for specific information. Pump dimensions and mounting hole layout are shown on page 14.

Hydraulic Power Supply

Be sure that the hydraulic power supply is equipped with a suction filter to the hydraulic pump and a system return line filter of 10 micron size. Carefully follow the manufacturer's recommendations on reservoir and filter cleaning, and periodic changes of hydraulic fluid.

Installation

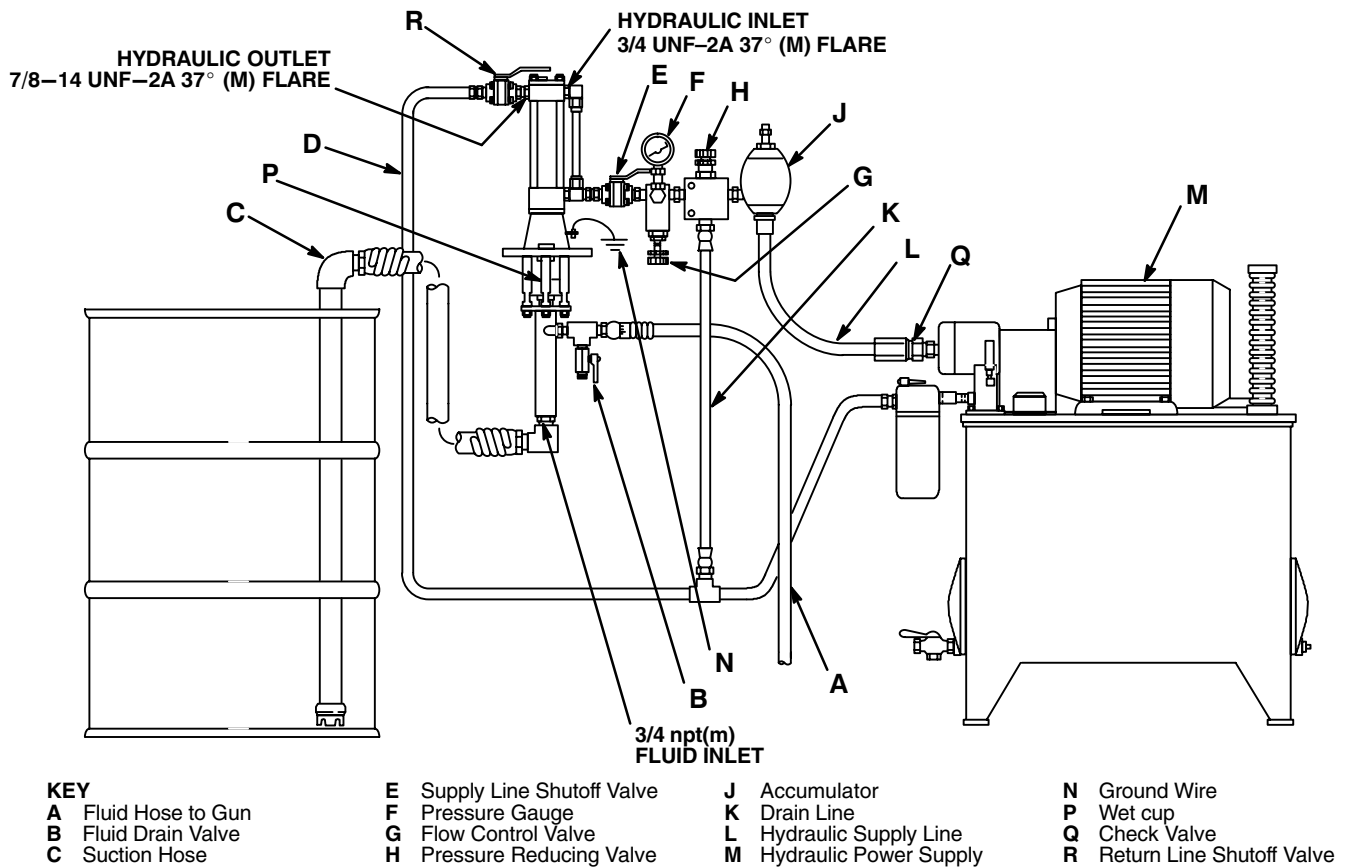


Fig. 2

Hydraulic Lines

Supply Line (L): Connect a 1/2 in. minimum ID to the 3/4-16 UNF-2a, 37° male flare inlet of the reciprocator.

Return line (D): Connect a 5/8 in. minimum ID to the 7/8-14 UNF-2a, 37° male flare outlet of the reciprocator.

On the hydraulic supply line (L), install the following accessories:

- A shutoff valve (E) to isolate the system for servicing.
- A fluid pressure gauge (F) to monitor the hydraulic oil pressure to the reciprocator and avoid overpressurizing the reciprocator or displacement pump
- A pressure- and temperature-compensated flow control valve (G) to prevent the reciprocator from running too fast.

- A pressure-reducing valve (H) with a drain line (K) running directly into the hydraulic return line.
- An accumulator (J) to reduce the hammering effect caused by the reciprocator reversing direction.

On the hydraulic return line (D), install a shutoff valve (R) for isolating the reciprocator for servicing.

⚠ WARNING

To reduce the risk of serious bodily injury, including fluid injection, your system must include a drain valve installed near the pump fluid outlet to help relieve fluid pressure in the displacement pump and hoses when shutting off the pump. See Fig. 2.

Install a fluid drain valve (B) and a grounded dispense hose (A) to the 3/8 npt fluid outlet on the displacement pump. Connect a suction hose to the 3/4 npt pump fluid intake. See Fig. 2.

Operation

Pressure Relief Procedure

WARNING



INJECTION HAZARD

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.

WARNING

Be sure you always shut off the supply line shutoff valve (E) first, and then the return line shutoff valve (R). This is to prevent overpressurizing the reciprocator or its seals. When starting up the hydraulic system, open the return line shutoff valve first.

1. Lock the spray gun/dispensing valve trigger safety.
2. Close the supply line shutoff valve (E) first, then the return line shutoff valve (R). Shut off the hydraulic power supply.
3. Unlock the gun/valve trigger safety.
4. 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.
5. Lock the gun/valve trigger safety.
6. Open the drain valve (required in your system), having a container ready to catch the drainage.
7. 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.

Before Startup

WARNING

Do not overpressurize the system

To reduce the risk of overpressurizing the system, which could result in serious bodily injury, including fluid injection:

- Never exceed the maximum working pressure of the lowest rated accessory in your system (hydraulic input or fluid output), or the stated maximum working pressures of this pump.
- Regulate the hydraulic input and fluid output pressures, as appropriate, to maintain safe working pressures.

CAUTION

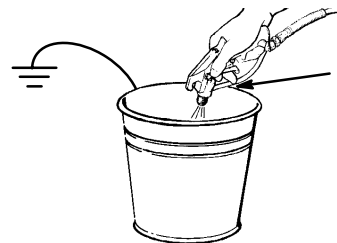
Hydraulic Oil Working Temperature

The recommended hydraulic oil operating temperature is 80 – 115°F (27 – 45°C). The reciprocator seals will wear faster and leakage may occur if the pump is operated at higher oil temperatures.

If the hydraulic oil temperature approaches 130°F (54°C), check the hydraulic fluid supply cooling system, filters, etc. and clean or repair as needed.

WARNING

Be sure the entire system and flushing pails are properly grounded before flushing. Always use the lowest possible pressure, and maintain firm metal-to-metal contact between the gun and pail to reduce the risk of static sparking and splashing.



Maintain firm metal-to-metal contact between gun and grounded metal pail.

Before you start the pump, check the hydraulic fluid level, and add fluid as necessary to fill the lines.

Flush the pump before using it for the first time to remove the light oil which was left in after factory test. Be sure the solvent used is compatible with the fluid to be sprayed and the wetted parts of the pump.

Operation

Fill the displacement pump wet-cup (S) 1/3 full with Graco Throat Seal Liquid or a compatible solvent, to prevent fluid from drying on the displacement rod or damaging the packings. See Fig. 3.

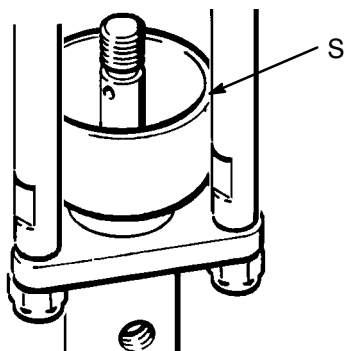


Fig. 3

Pump Startup

1. Turn on the hydraulic power supply.

! WARNING

Be sure you always open the return line shutoff valve (R) first, and then open the supply line valve (E). This is to prevent overpressurizing the reciprocator or its seals. When starting up the hydraulic system, open the return line shutoff valve first.

2. Open the return line shutoff valve (R) first, and then open the supply line valve (E).

3. Slowly open the flow control valve.
4. Use the lowest pressure needed to get good fluid flow or atomization. Higher pressures increase tip wear and pump wear.

In a direct supply system, the pump will start when the gun or valve is opened, and stall when it is closed.

In a circulating system, the pump will operate continuously until the hydraulic power supply is turned off.

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.

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

Always flush the pump before the fluid dries on the displacement rod. Never leave water or water-based fluid in the pump overnight. First, flush with water or a compatible solvent, then with mineral spirits. Relieve the pressure, but leave the mineral spirits in the pump to protect the parts from corrosion.

Maintenance

Hydraulic leaking at the reciprocator fittings. All of the fittings (7, 8 and 10) going into the upper and lower cylinder caps are self-sealing and have replaceable o-rings (24, 25). See **Parts**, page 13. If you experience any leaking at these fittings, tighten them. If the leaking persists, remove the fitting and replace the worn o-ring.

Check the tightness of the packing nut weekly.

Always follow the **Pressure Relief Procedure** on page 8 before adjusting it. The packing nut should be tight enough to stop leakage, but no tighter. Overtightening will compress and damage the packings and result in pump leaking.

Carefully monitor the fluid supply. If the pump empties the supply container, air is sucked into the pump, causing it to run too fast and to be damaged. If the pump runs too fast, shut it off immediately. Fill the supply container and prime the pump and hose to remove all air, or flush the pump and hose with a compatible solvent and leave it filled with an oil-base solvent to protect pump parts from corrosion.

CAUTION
Never leave water-based fluid or air in the pump when it is not in use. Flush the pump and fill it with mineral spirits or other oil-based solvent to prevent pump corrosion or fluid hardening in it.

Troubleshooting

WARNING

To reduce the risk of serious bodily injury, including fluid injection, injury from moving parts, and splashing in the eyes or on the skin, always follow the **Pressure Relief Procedure** on page 8 whenever you shut off the pump, check, service, clean or repair any part of the system.

1. Stop pump immediately if it is running too fast; check fluid supply. If empty, refill and reprime the pump; eliminate all air from system. Or flush the pump and store with mineral spirits in it.
2. Relieve pressure. Disconnect fluid line. If pump starts when hydraulic power is restored, the hydraulic line, valves, filters, etc are clogged.
3. Always stop the pump at the bottom of its stroke and keep the packing nut 1/3 full with TSL.

PROBLEM	CAUSE	SOLUTION
Pump operates, but output low on both strokes	Restricted lines or inadequate hydraulic supply.	Clear lines; increase hydraulic supply.
	Insufficient hydraulic pressure; closed or clogged valves, etc.	Open; clean.
	Exhausted fluid supply.	Refill and reprime, or flush ¹ .
	Clogged fluid line, valves, etc.	Clear ² .
	Packing nut too tight.	Loosen.
	Loose packing nut or worn packings.	Tighten; replace.
Pump operates, but output low on down stroke	Held open or worn intake valve.	Clear; service. See manual 306981.
Pump operates, but low on up stroke	Held open or worn piston or packings.	Clear; service. See manual 306981.
Erratic pump operation	Exhausted fluid supply.	Refill and reprime, or flush ¹
	Held open or worn intake valve or piston packings.	Clear; service. See manual 306981.
	Excessive hydraulic fluid supply volume.	Lower.
	Air entrained in fluid.	Purge all air; change fluid.
Pump fails to operate	Restricted lines or inadequate hydraulic supply.	Clear; increase.
	Insufficient hydraulic pressure; closed or clogged valves, etc.	Open; clean.
	Exhausted fluid supply.	Refill and reprime, or flush ¹ .
	Clogged fluid line, valves, etc.	Clear ² .
	Damaged hydraulic reciprocator.	Service; see manual 307654.
	Dried fluid seizure of displacement pump.	Service ³ . See manual 306981.

Service

NOTE: Clean all parts of the pump as you disassemble them and inspect them for wear or damage. Replace parts as necessary. Use a high grade, lithium-base lubricant when lubrication is specified. Use Loctite® Grade CV thread sealant when thread sealant is specified.

Removing the Displacement Pump (See Fig. 4)

1. Flush the pump if possible. Follow the **Pressure Relief Procedure** on page 8. Stop the pump at the bottom of its stroke.
2. Disconnect all hoses from the displacement pump.
3. If you remove the pump from its mounting, disconnect the hydraulic hoses first, and plug all hydraulic connections and lines to prevent contamination.
4. Remove the pin (17) from the top of the displacement rod (T).
5. Unscrew and remove the three tie rod locknuts (15).
6. Unscrew the displacement rod (T) from the reciprocator connecting rod and pull the pump off.
7. See manual 306981 for displacement pump parts and service information.

- △1 Torque to 20–30 ft-lb (27–41 N.m)
- △2 Torque to 29–31 ft-lb (39–42 N.m)

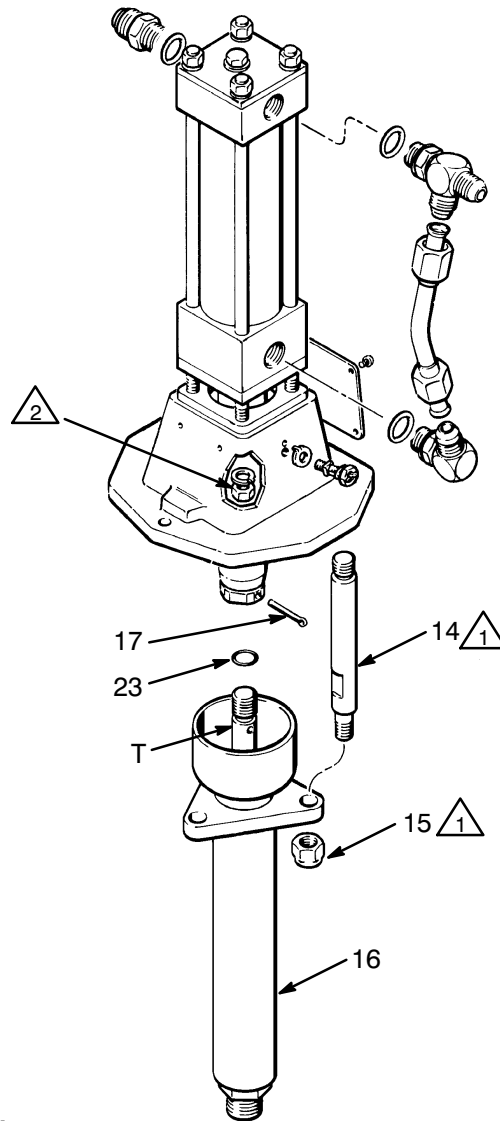


Fig. 4

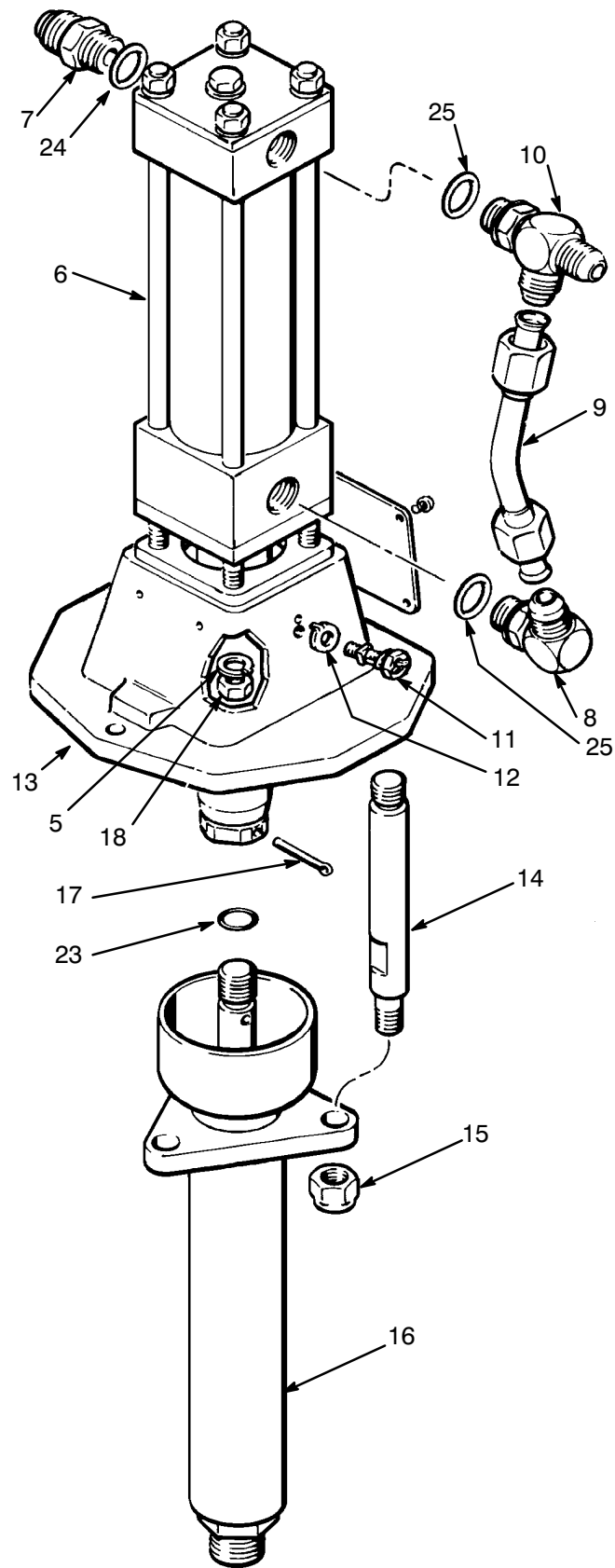
Parts

Model 221080 Viscount I 3000 Pump

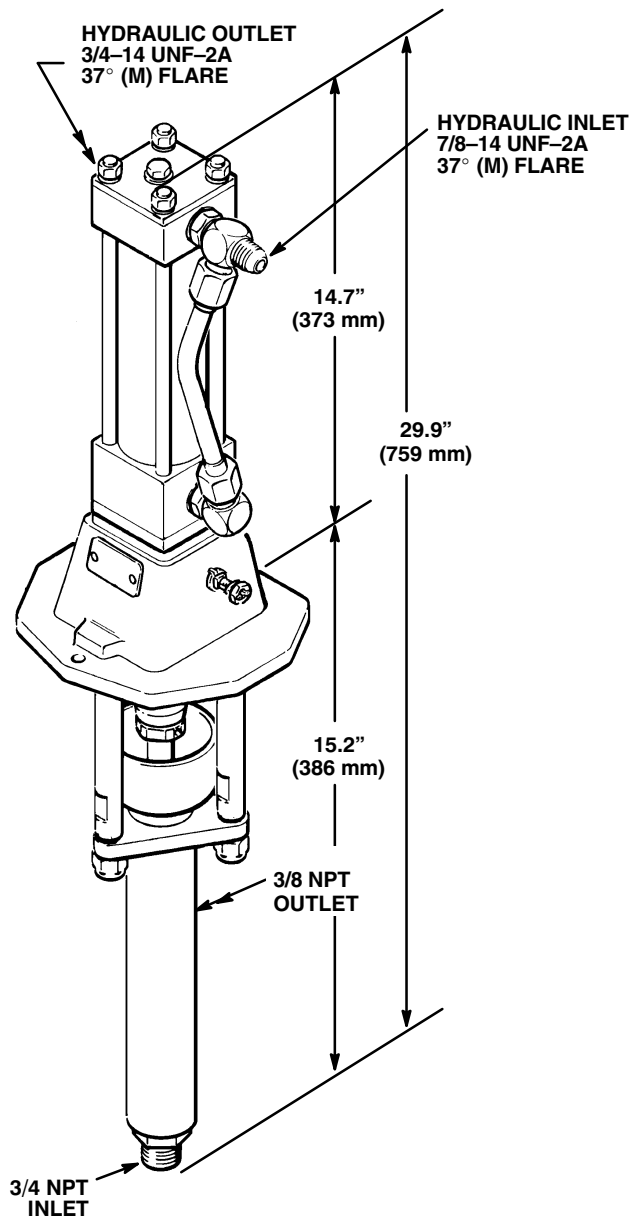
Series A, Stubby Length

Ref

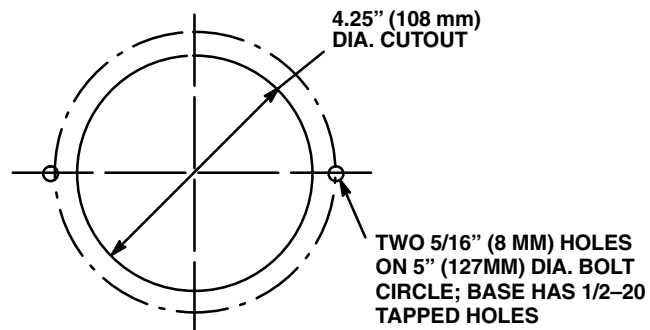
No.	Part No.	Description	Qty
5	100133	LOCKWASHER	4
6	217222	VISCOUNT I reciprocator See manual 307654 for parts	1
7	107195	ADAPTER, straight thd; 7/8-14 UNF -2a; 37° flare(m) <i>Includes 1 of item 24</i>	1
8	106470	ELBOW, straight thd, 3/4-16 UNF -2a; 37° flare <i>Includes 1 of item 25</i>	1
9	217221	TUBE, inlet, 1/2" ID	1
10	107197	TEE, run, straight thd; 3/4-16 UNF -2a; 37° flare(m) <i>Includes 1 of item 25</i>	1
11	104029	CLAMP, grounding	1
12	104582	WASHER, tab	1
13	179882	BASE, reciprocator	1
14	168221	ROD, tie; 5-3/4" (146 mm) long	3
15	102021	LOCKNUT, hex; 3/8-16 thd size	3
16	223587	DISPLACEMENT PUMP See manual 306981	1
17	100103	PIN, cotter	1
18	106292	NUT, hex, 3/8"	4
23	156082	O-RING	1
24	110926	O-RING	1
25	110987	O-RING	2



Dimensions



Mounting Hole Layout



Technical Data

Maximum outlet pressure	3000 psi (21 MPa, 207 bar)
Fluid delivery rate	5/8 gpm (3 l/min) at 2500 psi (17 MPa, 172 bar)
Fluid outlet size	3/8 npt(f)
Fluid inlet size	3/4 npt(m)
Maximum recommended pump speed	40 cycles/min.
Hydraulic fluid consumption	6.5 ounces (0.195 liter) per cycle; or one gallon per 19.5 cycles
Hydraulic input pressure	1000 psi (7 MPa, 69 bar) maximum
Hydraulic inlet	3/4-16 UNF-2A, 37 flare(m)
Hydraulic outlet size	7/8-14 UNF-2A, 37 flare(m)
Wetted parts	see manual 306981
Weight	37 lb (15.75 Kg)

Teflon® is a registered trademark of the DuPont Company.
Loctite® is a registered trademark of the Loctite Corporation.

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.

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Graco Information

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

612-623-6921

612-378-3505 Fax

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