

# Instructions – Parts List



UHMWPE/NEOPRENE PACKED, FOR PRESSURE WASHING

## Stainless Steel Hydra-Clean® Pumps

308117G

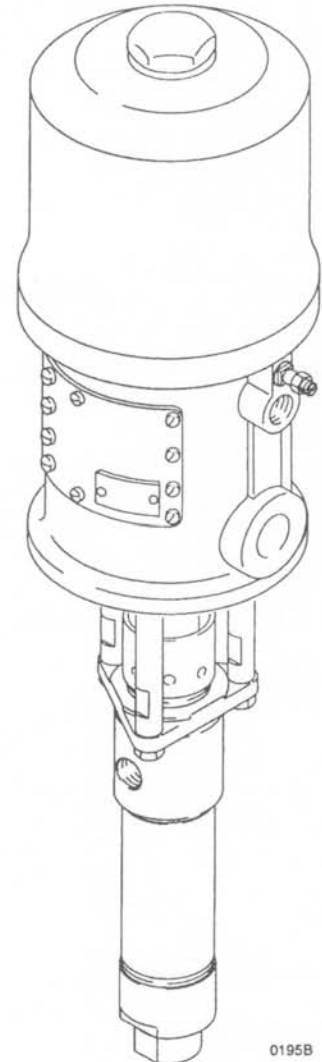
**Part No. 224345, Series A**  
**5:1 Ratio Monark® Pump**  
*600 psi (42 bar) Maximum Fluid Working Pressure*  
*120 psi (8.4 bar) Maximum Air Input Pressure*

**Part No. 224346, Series A**  
**10:1 Ratio President® Pump**  
*1800 psi (125 bar) Maximum Fluid Working Pressure*  
*180 psi (12.5 bar) Maximum Air Input Pressure*

**Part No. 247146, Series A**  
**10:1 Ratio President® Pump** ←  
*1800 psi (125 bar) Maximum Fluid Working Pressure*  
*180 psi (12.5 bar) Maximum Air Input Pressure*

**Part No. 224347, Series A**  
**10:1 Ratio President® Pump, with riser tube**  
*1800 psi (125 bar) Maximum Fluid Working Pressure*  
*180 psi (12.5 bar) Maximum Air Input Pressure*

**Part No. 903295, Series A**  
**10:1 Ratio President® Pump, with riser tube**  
*1800 psi (125 bar) Maximum Fluid Working Pressure*  
*180 psi (12.5 bar) Maximum Air Input Pressure*



0195B

Model 224346 Shown

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### Important Safety Instructions

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

PROVEN QUALITY. LEADING TECHNOLOGY.

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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.

Use this pump only for pumping water and water-diluted cleaning solutions in a pressure washing system. Never use the pump for paint or any other coatings. Any misapplication of the pump may cause dangerous operating conditions which can result in serious injury and substantial property damage.

- 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 not sure, call your Graco distributor.
- Do not alter or modify this equipment.
- 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 pages 25–26 for the maximum working pressure of this equipment.
- Use fluids and solvents which are compatible with the equipment wetted parts. Refer to the **Technical Data** section of all equipment manuals. Read the fluid and solvent manufacturer's warnings.
- Do not use hoses to pull equipment.
- Route hoses away from traffic areas, sharp edges, moving parts, and hot surfaces. Do not expose Graco hoses to temperatures above 180°F (82°C) or below -40°F (-40°C).
- Wear hearing protection when operating this equipment.
- Do not lift pressurized equipment.
- Comply with all applicable local, state, and national fire, electrical, and safety regulations.

# ! WARNING

## SKIN INJECTION HAZARD



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



- Fluid injected into the skin might look like just a cut, but it is a serious injury. **Get immediate surgical treatment.**
- Do not point the gun at anyone or at any part of the body.
- Do not put your hand or fingers over the spray tip.
- Do not stop or deflect leaks with your hand, body, glove or rag.
- Do not "blow back" fluid; this is not an air spray system.
- Always have the tip guard and the trigger guard on the gun when spraying.
- Check the gun diffuser operation weekly. Refer to the gun manual.
- Be sure the gun trigger safety operates before spraying.
- Lock the gun trigger safety when you stop spraying.
- Follow the **Pressure Relief Procedure** on page 8 if the spray tip 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 air motor piston, can pinch or amputate your fingers.

- Keep clear of all moving parts when starting or operating the pump.
- Never operate the pump with the air motor plates removed.
- 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 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.
- Keep the spray area free of debris, including solvent, rags, and gasoline.
- Electrically disconnect all equipment in the spray area.
- Extinguish all open flames or pilot lights in the spray area.
- Do not smoke in the spray area.
- Do not turn on or off any light switch in the spray area while operating or if fumes are present.
- Do not operate a gasoline engine in the spray area.



## TOXIC FLUID HAZARD

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

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

# Installation

## General Information

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

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

Fig. 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.

## 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.



Although water generally provides a natural electrical ground, the following equipment must be grounded if the cleaning chemicals are volatile.

1. *When cleaning in enclosed areas*, such as storage tanks, locate the pump and air compressor outside the area and well away from it. Provide adequate ventilation. If the area you are cleaning has stored flammable materials, take appropriate precautions to avoid static sparking. Consult your local codes.
2. *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. Order Part No. 237569 Ground Wire and Clamp.

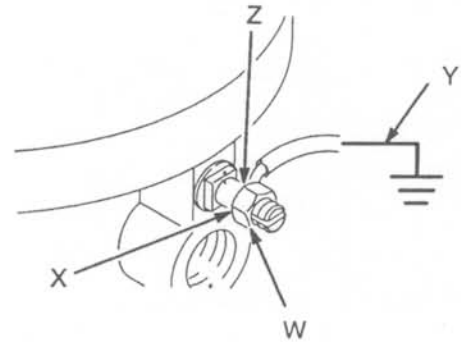


Fig. 1

3. *Air and fluid hoses:* use only electrically conductive hoses.
4. *Air compressor:* follow manufacturer's recommendations and local codes.
5. *Spray gun:* ground through connection to a properly grounded fluid hose and pump.
6. *Fluid supply container:* follow your local code.
7. *Object being sprayed:* follow your local code.
8. *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.
9. *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.

## Mounting the Pump

Mount the pump (A) to suit the type of installation planned. The pump dimensions and mounting hole layout are shown on page 27.




# Service

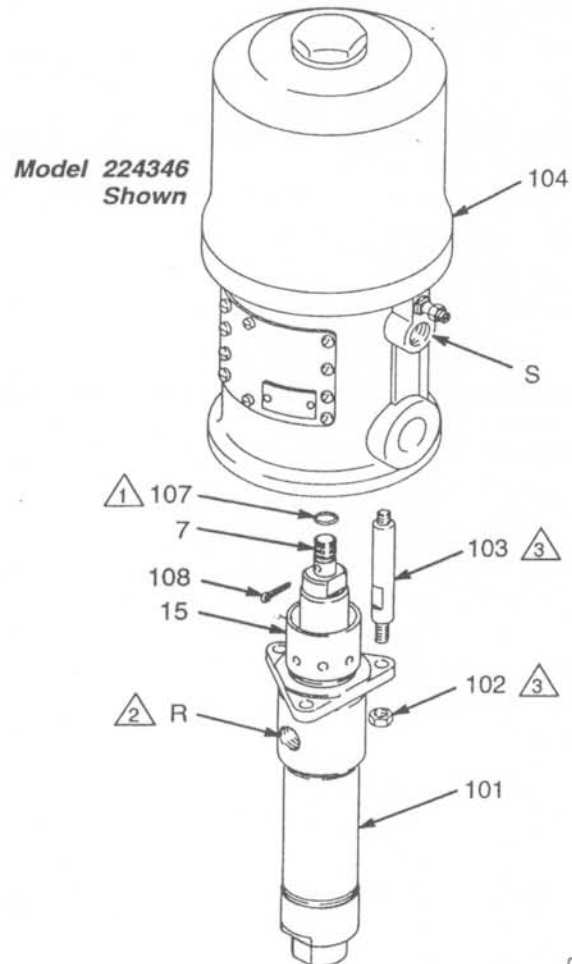
## Disconnecting the Displacement Pump

### 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. Flush the pump if possible. Stop the pump at the bottom of its stroke. **Relieve the pressure.**
2. Disconnect the air and fluid hoses. Remove the pump from its mounting. Note the relative position of the pump's fluid outlet (R) to the air motor's air inlet (S). See Fig. 4.
3. *On Models 224347 and 903295 only, unscrew the riser tube (110) from the pump outlet elbow (109). Refer to the parts drawing on page 17.*
4. Unscrew the locknuts (102) from the tie rods (103). Remove the cotter pin (108). Unscrew the displacement rod (7) from the air motor (104). Carefully pull the displacement pump (101) off the air motor. Inspect the o-ring (107).
5. Refer to page 14 for displacement pump service. To service the air motor, refer to the separate air motor manual (306982 or 307043), supplied.

-  Lubricate.
-  Apply thread sealant, as required.
-  Models 224346, 224347, & 903295: Torque to 20–30 ft-lb (27–41 N.m). Model 224345: Torque to 10–15 ft-lb (14–20 N.m).



0194C

Fig. 4

# Service

## Reconnecting the Displacement Pump

1. Lubricate the o-ring (107) and check that it is in place on the displacement rod (7). Orient the pump's fluid outlet (R) to the air motor's air inlet (S) as was noted in step 2 under **Disconnecting the Displacement Pump**. Position the displacement pump (101) on the tie rods (103). See Fig. 4. *On Models 224347 and 903295 only, be sure the fluid outlet of the displacement pump is aligned with the riser tube and fluid outlet of the air motor.*
2. Screw the locknuts (102) onto the tie rods (103) loosely. *On Models 224347 and 903295 only, make certain that the fluid outlet elbow (109) is installed in the fluid outlet. Apply thread sealant to the parts of the riser tube assembly. See the parts drawing on page 17. Screw the riser tube (110) all the way down into the pump outlet elbow (109).*
3. Screw the displacement rod (7) into the shaft of the air motor (104) until the pin holes in the displacement rod and motor shaft align. Install the cotter pin (108).
4. Apply thread sealant to the pump fluid outlet (R) and the threads of the fluid hose. Mount the pump and reconnect all hoses. Reconnect the ground wire if it was disconnected during repair. Tighten the packing nut/wet-cup (15) so it is just snug – no tighter. Fill the wet-cup with Graco Throat Seal Liquid or compatible solvent.
5. Tighten the tie rod locknuts (102) evenly, and torque as shown in Fig. 4.
6. Start the pump and run it at about 40 psi (2.8 bar) air pressure, to check that it is operating properly.
7. Check for fluid leakage at the packing nut/wet-cup (15). **Relieve the pressure** before tightening the packing nut/wet-cup.

### **WARNING**

To reduce the risk of serious injury whenever you are instructed to relieve pressure, always follow the **Pressure Relief Procedure** on page 8.

# Service

## Displacement Pump Disassembly

When disassembling the pump, lay out all removed parts in sequence, to ease reassembly. Refer to Fig. 5.

**NOTE:** Repair Kit 224402 (Neoprene/UHMWPE packings) is available. For the best results, use all the new parts in the kit. Parts included in the kit are marked with one asterisk, for example (1\*).

Conversion Kit 224404 is available to convert the pump throat packings to UHMWPE and PTFE. See page 19 for details.

Clean all the parts thoroughly when disassembling. Check them carefully for damage or wear, replacing parts as needed.




1. Remove the displacement pump from the air motor as explained on page 12.
2. Unscrew the locking ring (17) from the cylinder (11). See Fig. 5. Remove the intake valve housing (13).
3. Remove the o-ring (12), ball stop pin (5), ball guide (22) and ball (2) from the intake valve housing (13).
4. Loosen the packing nut (15). Push the displacement rod (7) down as far as possible, then pull it out the bottom of the cylinder (11).
5. Secure the flats of the displacement rod (7) in a vise. Using a wrench on the flats of the piston mounting stud (28), screw the piston off the rod. Remove one cotter pin (1) and the ball stop pin (10), taking note which set of holes it is in. Then remove the ball (2).
6. Place the flats of the piston mounting stud (28) in a vise, and unscrew the piston stud (14). Remove the piston packings (25, 26), glands (24, 27), shim (29), and washer (23).
7. Remove the packing nut (15), throat packings (9, 19) and glands (6, 8) from the outlet housing (16).
8. Inspect all parts for damage. Clean all parts and threads with a compatible solvent before reassembling. Replace any worn or damaged parts.
9. Inspect the polished surfaces of the displacement rod (7) and cylinder (11) for scratches, scoring or other damage, which can cause premature packing wear and leaking. To check, run a finger over the surface or hold the part up to the light at an angle.
10. Be sure the ball seats of the piston (14) and intake valve housing (13) are not chipped or nicked.



## Displacement Pump Reassembly



1. Lubricate the throat packings and install them in the outlet housing (16) one at a time as follows, with the lips of the v-packings facing down: the male gland (6\*), two neoprene v-packings (9\*), one UHMWPE v-packing (19\*), and the female gland (8\*). Apply thread lubricant and install the packing nut (15) loosely. See Detail A of Fig. 5.
2. If you removed the cylinder (11), be sure to replace the o-ring (4). Lubricate the o-ring and apply thread lubricant to the cylinder, then reinstall the cylinder in the outlet housing (16).
3. Lubricate the piston packings and install them onto the piston stud (14) one at a time in the following order, with the lips of the v-packings facing up: the female gland (27\*), one UHMWPE v-packing (25\*), one neoprene v-packing (26\*), one UHMWPE v-packing (25\*), the male gland (24\*), the shim (29\*), and the washer (23\*). See Detail B of Fig. 5.
4. Screw the piston stud (14) onto the piston mounting stud (28). Torque to 50–70 ft-lb (68–95 N.m). Install the piston ball (2\*) on the piston seat. Slide the ball stop pin (10\*) into the desired set of holes, and secure with the cotter pin (1\*).
5. Place the flats of the displacement rod (7) in a vise. Screw the piston assembly onto the displacement rod. Torque to 50–70 ft-lb (68–95 N.m).
6. Insert the displacement rod (7) into the bottom of the cylinder (11), being careful not to scratch the cylinder. Push the rod straight up until it protrudes from the packing nut (15).
7. Install the ball (2\*), guide (22), o-ring (12), and ball stop pin (5\*) in the intake valve housing (13). Place the intake valve assembly in the locking ring (17). Apply thread lubricant to the locking ring and cylinder (11), and screw the ring onto the cylinder.
8. Reconnect the displacement pump to the air motor as explained on page 13.

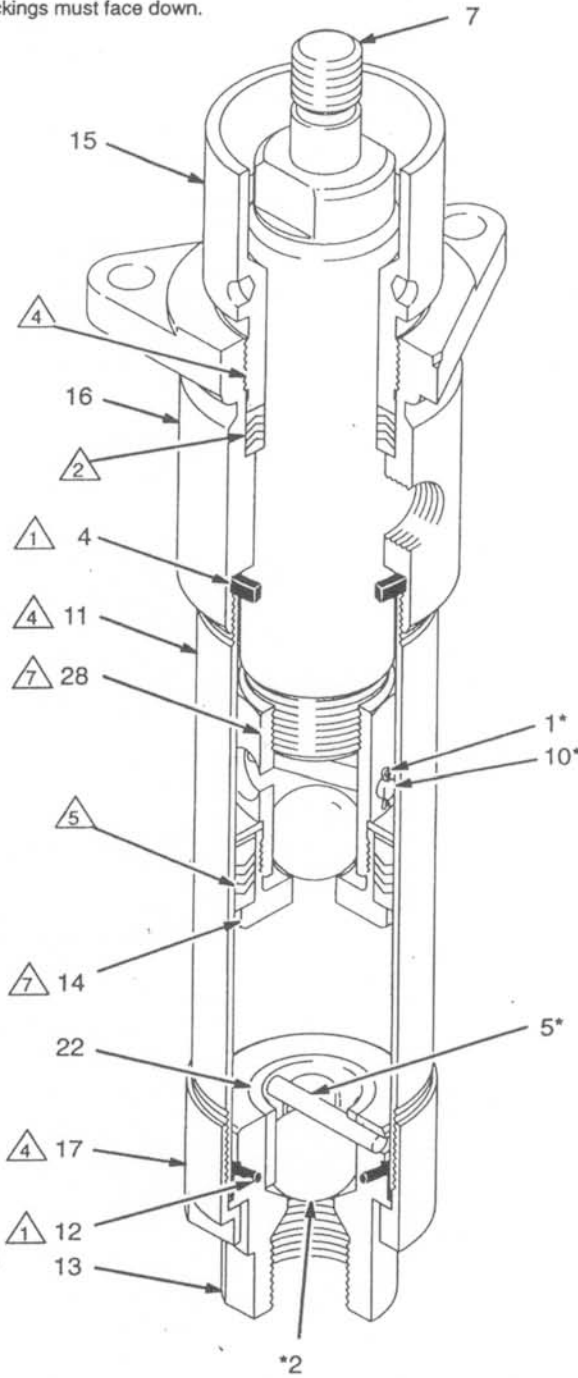


# Service

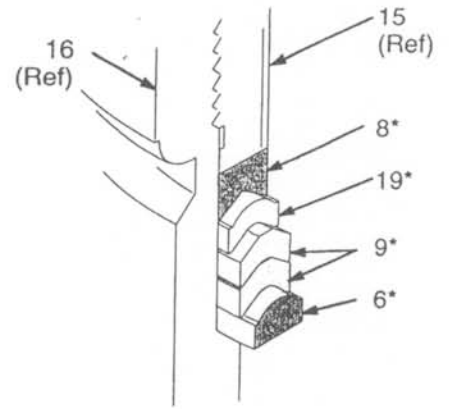
-  Lubricate.
-  See Detail A.
-  Lips of v-packings must face down.

-  Apply thread lubricant.
-  See Detail B.

-  Lips of v-packings must face up.
-  Torque to 50-70 ft-lb (68-95 N.m).



## Detail A: Throat Packings



## Detail B: Piston Packings

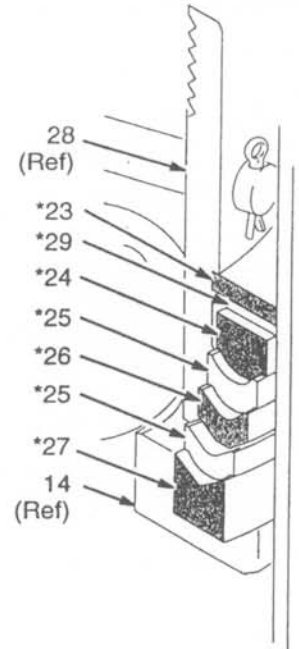
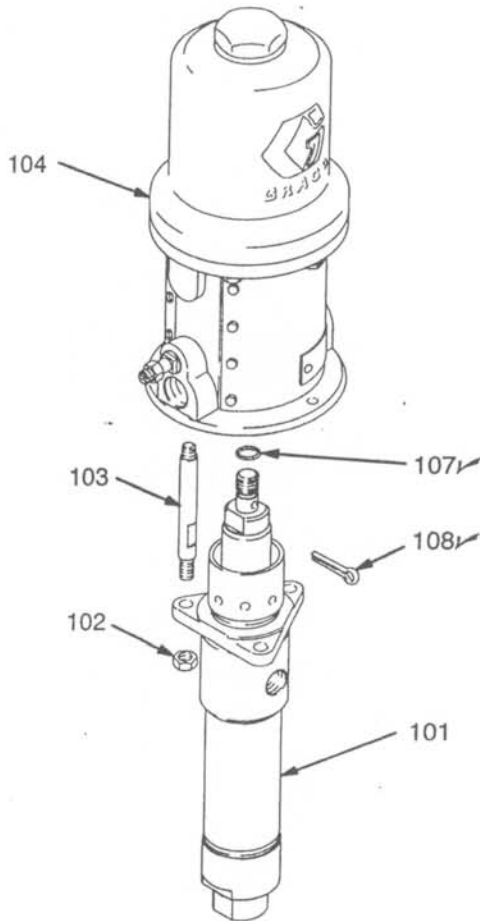


Fig. 5

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# Parts

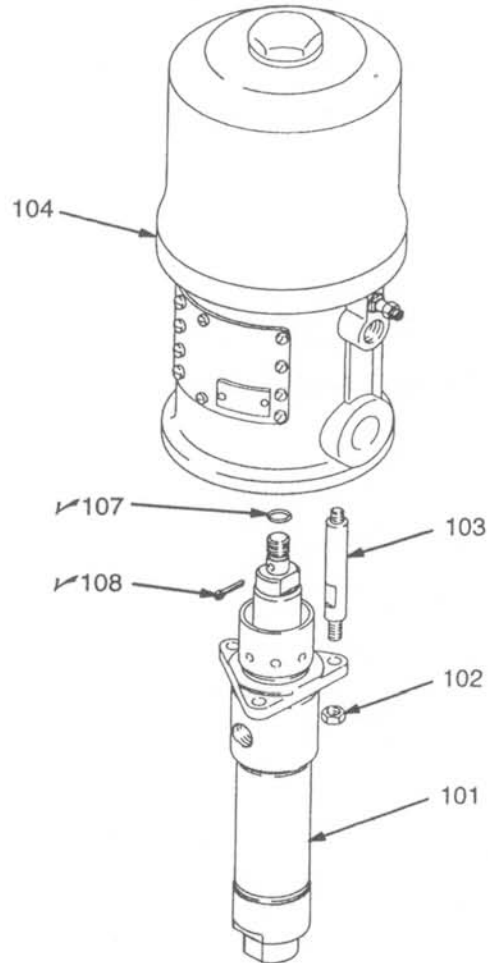
**Model 224345, Series A**  
**5:1 Ratio Monark® Hydra-Clean® Pump**



0196A

**Model 224346, Series A**  
**10:1 Ratio President® Hydra-Clean® Pump**

**Model 247146, Series A**  
**10:1 Ratio President® Hydra-Clean® Pump**



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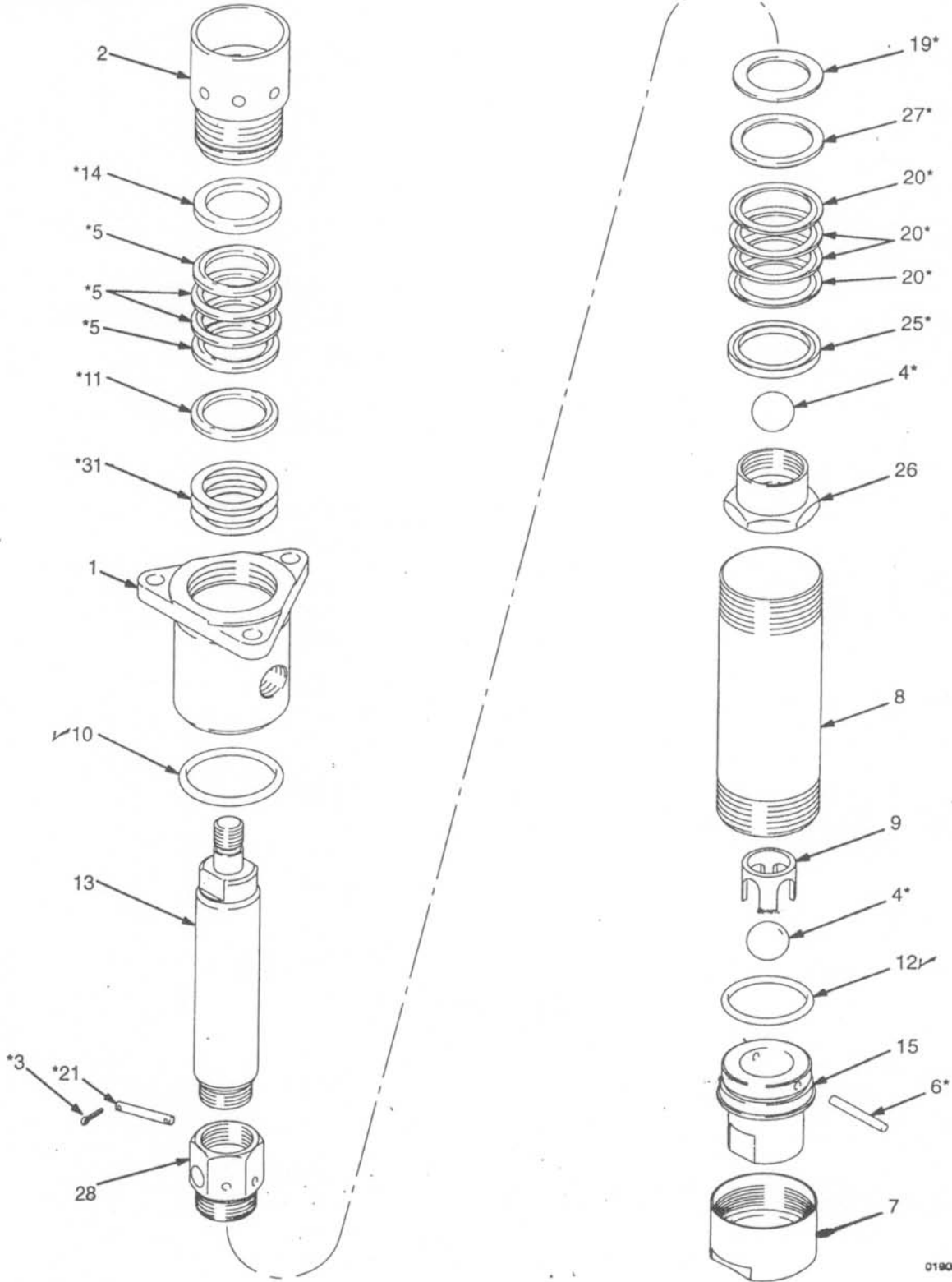
Ref No.	Part No.	Description	Qty	Ref No.	Part No.	Description	Qty
				101	224344	DISPLACEMENT PUMP ASSY (224346 only)	1
						See pages 18 and 19 for parts	
101	224344	DISPLACEMENT PUMP ASSY	1		15G976	DISPLACEMENT PUMP ASSY (247146 only)	1
		See pages 18 and 19 for parts				See pages 20 and 21 for parts	
102	102021	NUT, lock; 3/8-16; stainless steel	3	102	102021	NUT, lock; 3/8-16; stainless steel	3
103	165297	ROD, tie; stainless steel; 3.5 in. (89 mm) shoulder-to-shoulder	3	103	166237	ROD, tie; stainless steel; 3.5 in. (89 mm) shoulder-to-shoulder	3
104	205997	AIR MOTOR	1	104	207352	AIR MOTOR	1
		See 307043 for parts				See 309982 for parts	
107✓	159082	SEAL, o-ring; nitrile rubber	1	107✓	159082	SEAL, o-ring; nitrile rubber	1
108✓	101946	PIN, cotter; stainless steel; 0.12 in. (3.2 mm) x 1.5 in. (3.8 mm)	1	108✓	101946	PIN, cotter; stainless steel; 0.12 in. (3.2 mm) x 1.5 in. (3.8 mm)	1

✓ Keep these spare parts on hand to reduce down time.  
 16 306117

✓ Keep these spare parts on hand to reduce down time.

# Parts

Model 15G976, Series A  
Severe-Duty, Stainless Steel Displacement Pump  
Includes items 1-31



D1908

# Parts

## Model 15G976, Series A

### Severe-Duty, Stainless Steel Displacement Pump

Includes items 1-31

Ref. No.	Part No.	Description	Qty.	Optional PTFE Packing Conversion Kit 224889				
1	205999	HOUSING, outlet; stainless steel	1	Use to convert the pump to all PTFE packings. Kit must be purchased separately. Includes the following items:				
2	186995	PACKING NUT/WET-CUP; stainless steel	1					
3*	100063	PIN, cotter; 1/16 in. x 1/2 in.; stainless steel	2					
4*	101917	BALL; stainless steel; 0.875 in. (22 mm) dia.	2					
5*	162866	V-PACKING, throat; PTFE	4			Part No.	Description	Qty.
6*	162947	PIN, ball stop, intake; stainless steel	1			162866	V-PACKING; PTFE	4
7	164630	RING, locking; stainless steel	1			186987	GLAND, throat, male; stainless steel	1
8	186994	CYLINDER; stainless steel	1			186988	GLAND, throat, female; stainless steel	1
9	164679	GUIDE, ball, intake; stainless steel	1			176635	V-PACKING, piston; PTFE	4
10✓	164782	O-RING; PTFE	1			186989	GLAND, piston, female; stainless steel	1
11*	186987	GLAND, throat, male; stainless steel	1			186990	GLAND, piston, male; stainless steel	1
12✓	164846	O-RING; PTFE	1					
13	186997	ROD, displacement; stainless steel	1					
14*	186988	GLAND, throat, female; stainless steel	1					
15	186992	HOUSING, valve, intake; stainless steel	1					
19*	176634	WASHER, piston; stainless steel	1					
20*	176635	V-PACKING, piston; PTFE	4					
21*	176637	PIN, ball stop, piston; stainless steel	1					
25*	186989	GLAND, piston, female; stainless steel	1					
26	186993	STUD, piston; stainless steel	1					
27*	186990	GLAND, piston, male; stainless steel	1					
28	176644	STUD, mounting, piston; stainless steel	1					
31*	190484	SHIM	3					

\* These parts are included in Repair Kit 224401, which may be purchased separately.

✓ Keep these spare parts on hand to reduce down time.

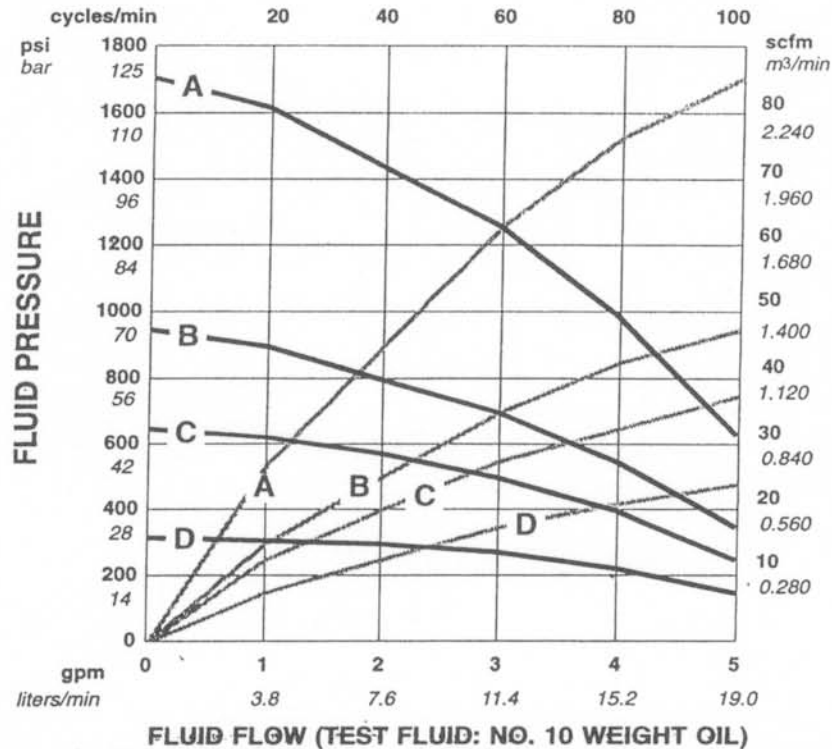
# Technical Data (10:1 President)

Category	Data
Maximum fluid working pressure	1800 psi (125 bar)
Maximum air input pressure	180 psi (12.5 bar)
Pump cycles per 1 gallon (3.8 liters)	20
Fluid flow at 60 cycles per minute	3 gallons (11.4 liters)
Recommended speed for optimum pump life	15–25 cycles/min; 0.75 to 1.25 gpm (2.84 to 4.73 liters/min)
Maximum operating temperature	180°F (82°C)
* Sound level at 100 psi, 60 cycles per minute	94 dBa
* Sound power level at 100 psi, 60 cycles per minute	109 dBa
Weight	approx. 31 lb (14 kg)
Wetted parts	AISI 302, 303, 304, 316, and 17–4 PH grades of Stainless Steel; Chrome-Plating; Ultra-High Molecular Weight Polyethylene; PTFE; Nitrile Rubber; Neoprene. <i>Riser Tube (Models 224347 and 903295 only):</i> 303 and 304 grades of Stainless Steel.

\* Tested in accordance with ISO 3744.

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

A 180 psi (12.5 bar) air pressure  
B 100 psi (7 bar) air pressure  
C 70 psi (4.9 bar) air pressure  
D 40 psi (2.8 bar) air pressure



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

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

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

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

# 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 Information

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

**1-800-328-0211 Toll Free**

**612-623-6921**

**612-378-3505 Fax**

*All written and visual data contained in this document reflects the latest product information available at the time of publication. Graco reserves the right to make changes at any time without notice.*

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International Offices: Belgium, China, Japan, Korea

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