

This manual contains **IMPORTANT WARNINGS** and **INSTRUCTIONS**

READ AND RETAIN FOR REFERENCE

## VISCOUNT II 2000 PUMP

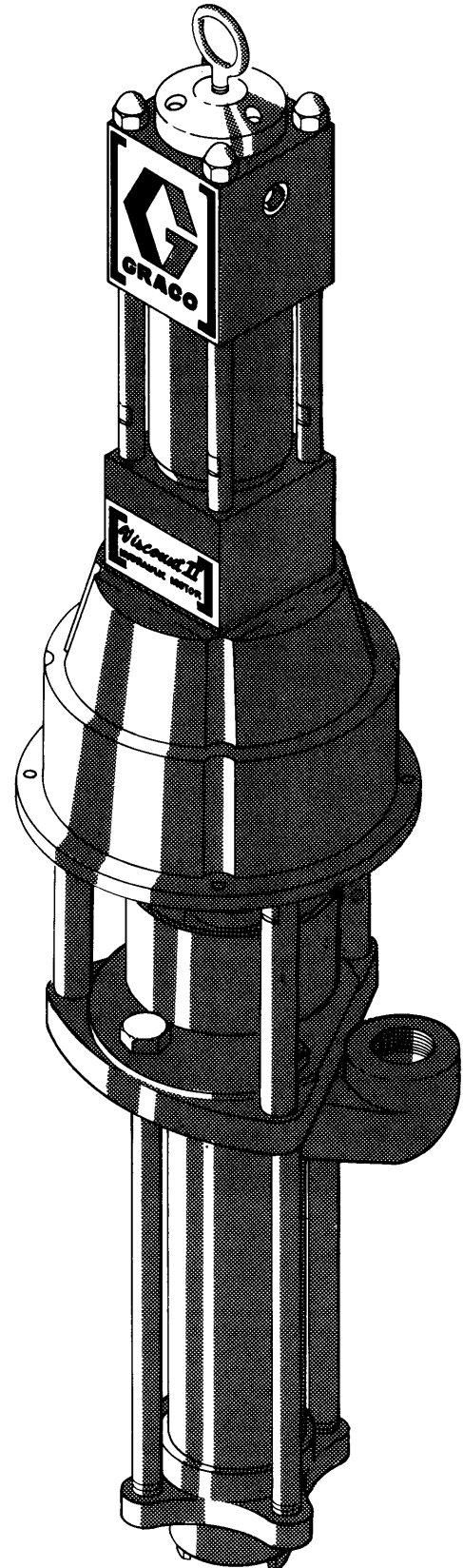
1500 PSI (100 bar) MAXIMUM HYDRAULIC INPUT PRESSURE

2000 PSI (140 bar) MAXIMUM WORKING PRESSURE

Model 210-390 Series "A"

### NOTES:

1. The maximum cycle rate of this pump is 50 cycles/min. Never allow hydraulic fluid supply to exceed 10 gpm (37.8 liter/min). Install a pressure compensated flow control valve at the inlet of the Graco Hydraulic Motor to limit the hydraulic fluid volume to that required for your installation. See PUMP PERFORMANCE CHARTS on back page.
2. Never allow hydraulic oil temperature to exceed 130° F (54°C). The hydraulic motor will not operate properly if the hydraulic oil exceeds this temperature.



## INSTALLATION

### WARNING

Be sure that all accessory equipment will withstand the pressure developed by this pump. Using the maximum recommended hydraulic input pressure of 1500 psi (100 bar), the pump will develop a full 4500 psi (310 bar) material pressure at its outlet.

Mount pump to suit the type of installation planned. Graco mounting accessories are shown on page 6, pump dimensions and mounting hole layout are shown on page 7.

### CAUTION

With hydraulic powered pumps, it is vitally important that the hydraulic supply system is kept clean at all times. Before connecting the Graco Hydraulic Motor into a system, be sure that all hydraulic fluid lines are absolutely clean. Blow out with air and flush thoroughly with solvent before connecting to motor.

Be sure that your 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.

Connect a 3/4" minimum ID hydraulic supply line to the 3/4" inlet of hydraulic motor. See Fig 1. Connect a 1.0" minimum ID return line to the 1" npt return port on hydraulic motor. Install high pressure shutoff valves at supply and return line ends for use when removing pump for inspection or service.

Install a properly sized, pressure compensated flow control valve at the inlet of the Graco Hydraulic Motor. Limit the fluid volume to that required for your installation: see PUMP PERFORMANCE CHARTS on back page of instruction manual provided. Never allow hydraulic fluid volume to exceed 10 gpm (37.8 liter/min).

The hydraulic motor is equipped with a drip pan to collect any leakage that might occur. Connect a 1/4" ID hose to the barbed hose fitting on drip pan. See Fig 1 and ACCESSORIES on page 6.

Connect a grounded material line to the 1-1/2" npt material outlet on displacement pump, and attach material supply line to the 2" npt pump material intake. See Fig 1.

## OPERATION

### WARNING

Never exceed 1500 psi (100 bar) hydraulic input pressure to the hydraulic motor.

Before starting hydraulic power supply, check the hydraulic fluid level. Add fluid as necessary to replace the amount used to fill lines.

Fill the wet-cup 1/3 full of Graco Throat Seal Liquid (TSL) or compatible solvent to prevent material from drying on displacement rod and damaging pump packings.

The displacement pump was factory tested in light oil, which was left in to protect pump parts. To prevent contamination of the material to be pumped, flush pump before using. Be sure that the solvent you use is compati-

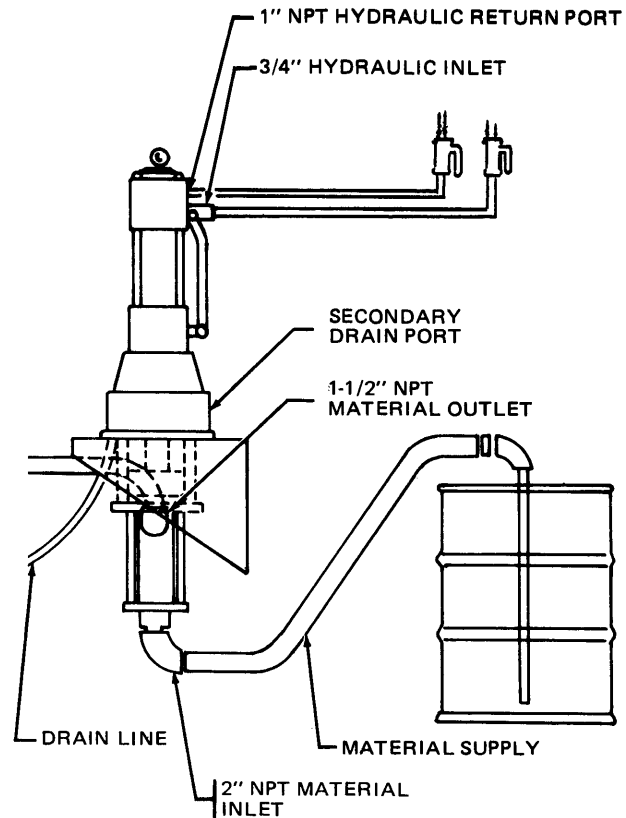


Fig 1

### WARNING

The high velocity flow of material through pump and system could create static electricity. Be sure that the entire system is properly grounded to prevent potentially hazardous static sparking. Use only grounded paint supply hose.

If your installation calls for pumping through a long hose, or if the material you will be pumping is highly compressible, giving an accumulator effect, install a check valve at pump outlet.

### WARNING

Be sure that the check valve you choose is capable of handling the flow and pressure developed in your system.

ble with the material to be pumped. If you are using the pump to supply a circulating system, circulate solvent for about 10 minutes, then remove pump intake from solvent and let pump force solvent from system.

In a direct supply system, with the hydraulic power supply turned on, the pump will start when the material valve is opened, and stall against pressure when the material valve is closed. In a circulating system, the pump will operate continuously until the hydraulic power supply is turned off.

The chart on the back page is a guide to pump performance. Pump output and pressure is dependant upon the hydraulic supply to the pump hydraulic motor. Always use the lowest pump speed possible for your application.

## LUBRICATION AND CARE

Keep the wet-cup 1/3 filled with Graco Throat Seal Liquid or compatible solvent and check tightness of packing retainer plate weekly. Plate should be tight enough to prevent leakage -- no tighter. Too tight an adjustment will cause packings to bind or wear excessively. If adjustment is necessary, shut off hydraulic power supply, relieve hydraulic and material pressures and adjust four screws evenly.

Carefully monitor material supply. If supply has been exhausted and air has been pumped into system, immediately re-prime system with material or flush with a compatible solvent. Don't allow air to remain in system.

Always flush the pump before material dries, and always stop the pump at the bottom of its stroke to prevent material from drying on displacement rod.

## ADJUSTING CHECK VALVES

The intake and piston check valves are set for mid-range ball travel at the factory. For low viscosity liquids, decrease check ball travel by moving ball stop pins to lower set of holes. For high viscosity fluid, increase ball travel by moving pins to higher set of holes. See page 4 for disassembly instructions.

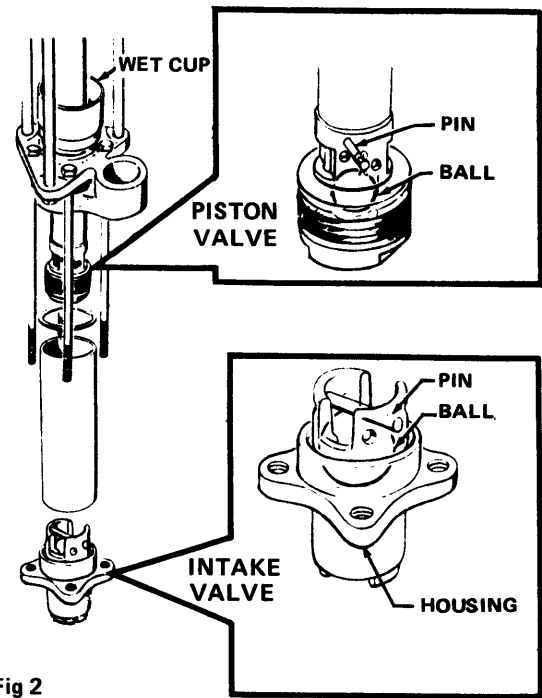


Fig 2

## SERVICE

### WARNING

Always shut off power supply and relieve all hydraulic and material pressures before attempting any service.

## TROUBLESHOOTING CHART

### WHAT'S WRONG

Pump operates, but

- output low on both strokes
- output low on down stroke
- output low on up stroke

Erratic operation

Pump fails to operate

### WHY

- Restricted lines or inadequate hydraulic supply
- Insufficient hydraulic pressure -- closed or clogged valves, etc.
- Exhausted material supply
- Clogged material line, valves, etc.
- Packing nut too tight
- Loose packing nut or worn packings
- Check valves need adjustment
- Held open or worn intake valve
- Held open or worn piston or packings
- Damaged hydraulic motor
- Dried material seizure of displacement rod
- Excessive hydraulic fluid supply volume

### WHAT TO DO

- .. Clear; increase
- .. Open, clean
- .. Refill
- .. Clear\*
- .. Loosen
- .. Tighten; replace
- .. Adjust
- .. Clear; service
- .. Clear; service
- .. Service\*\*
- .. Service
- .. See NOTE on front cover

\* Release pressures and disconnect material line. If pump starts when hydraulic power is restored, line, etc. is clogged.

\*\* See 307-158 for parts and service.

Check all possible remedies in chart before disassembling pump.

## DISCONNECTING HYDRAULIC MOTOR

Shut off hydraulic power supply and relieve all pressures.

Disconnect hydraulic supply, return and drain lines from motor. Remove cotter pin and unscrew connecting rod coupling nut. See Fig 3. Remove the tie rod lock nuts, then unscrew tie rods from hydraulic motor base. See separate instruction manual 307-158 for hydraulic motor service instructions.

When re-connecting motor to displacement pump, use locking compound and tighten tie rods securely into hydraulic motor base. Torque tie rod lock nuts to 35-50 ft lb (47-68 N-m).

## DISPLACEMENT PUMP SERVICE

### INTAKE VALVE

Unscrew tie bolts and remove intake valve from pump. Disassemble, clean and inspect all parts for wear or damage, replacing as needed. Reassemble, being sure to replace ball stop pin in proper holes, and reinstall. When reassembling, torque tie bolts evenly to 60 ft lb (81 N-m).

### PISTON

Remove intake valve (above). Loosen packing nut and push displacement rod down until piston body "flats" protrude. Loosen piston body and pull cylinder, piston and displacement rod from outlet housing. Remove piston and rod from cylinder. Unscrew piston from rod and remove packings, glands, etc. Clean and inspect all parts for wear or damage. Replace as necessary. Always replace glands when replacing packings.

### THROAT PACKINGS

Disassemble as explained above. Screw packing nut out of outlet housing and remove packings and glands. Clean and inspect, and replace parts as needed. Always replace glands when replacing packings. If leather packings are to be used, soak in light oil until pliable. When installing new packings, place in cavity one at a time to be sure they nest properly.

Reassemble in reverse of disassembly. When installing connecting rod, screw it all the way into displacement rod, then back off 3/4 turn and tighten lock nut. Packing nut should be tight enough to stop leakage--no tighter. To insure proper displacement pump alignment, leave tie rod lock nuts loose, start pump and, with pump cycling slowly, torque lock nuts evenly to 35-50 ft lb (47-68 N-m).

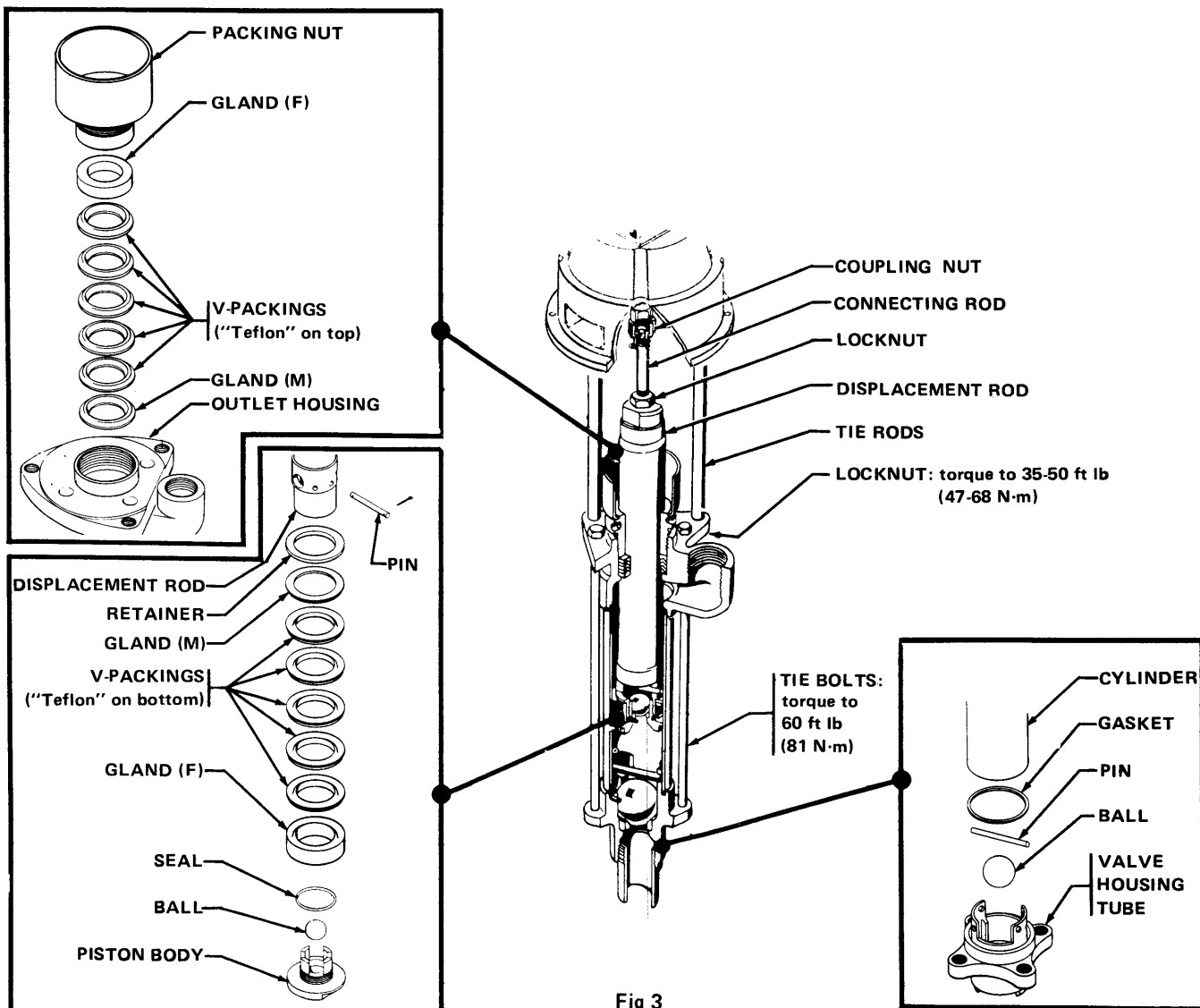
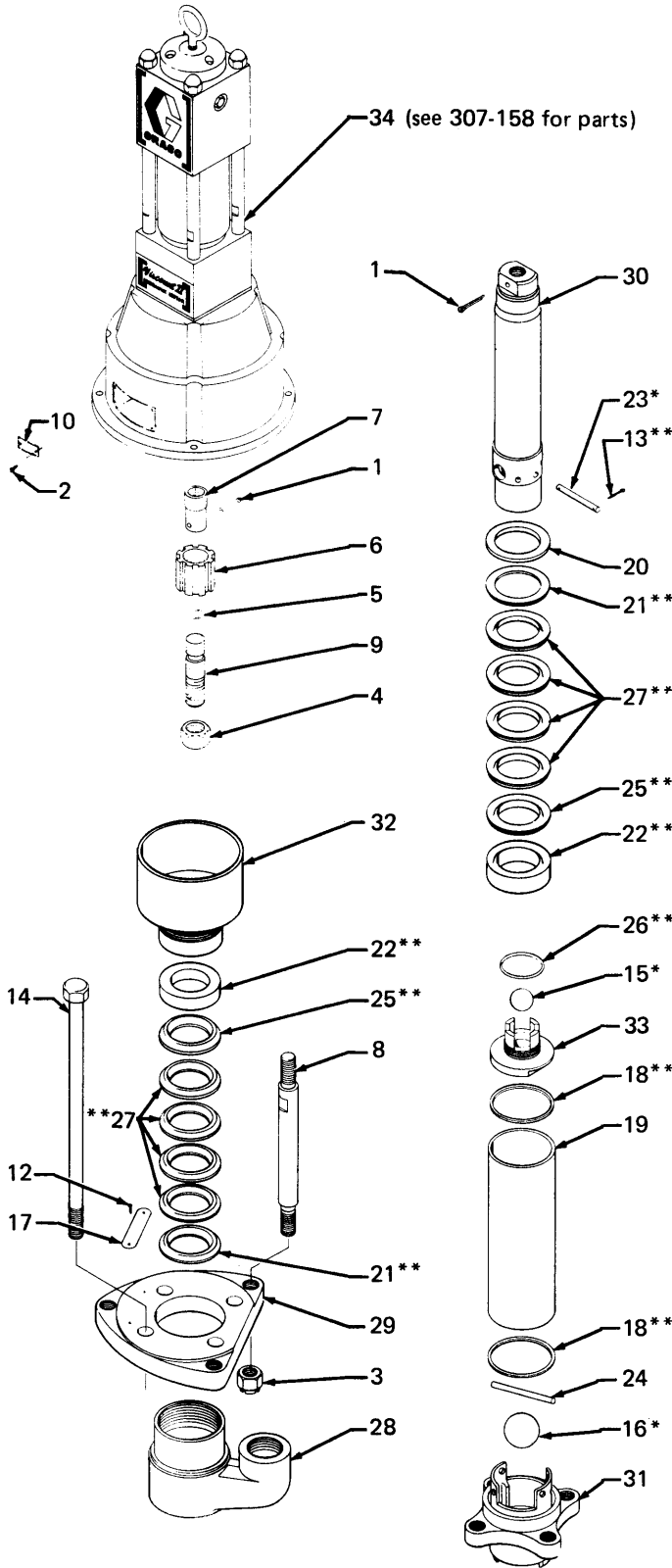


Fig 3

**Model 210-390 VISCOUNT II 2000 PUMP**  
**Series "A"**



**Ref No. 11 DISPLACEMENT PUMP Assy**  
**Series "C" includes items 12-33**

REF PART NO.	DESCRIPTION	QTY
1 <b>100-103</b>	PIN, cotter; 0.125" (3.18 mm) x 1.50" (38.1 mm)	2
2 <b>101-343</b>	SCREW, type "u" drive; no. 0 x 0.188"	2
3 <b>101-712</b>	NUT, lock; 0.625"-11	3
4 <b>101-936</b>	NUT, hex jam; 0.75"-10	1
5 158-674	O-RING, nitrile rubber	1
6 168-210	NUT, shouldered	1
7 <b>168-211</b>	COUPLING, connecting rod	1
8 <b>168-213</b>	ROD, tie	3
9 171-727	ROD, connecting	1
10 <b>171-749</b>	PLATE, serial	1
11 207-655	DISPLACEMENT PUMP Assy Series "C" includes items 12-33	1
12 <b>100-055</b>	. SCREW, type "u" drive; no. 6 x 0.5"	2
13 ** 100-063	. PIN, cotter; 0.062" (1.57 mm) x 0.50" (12.7 mm)	2
14 <b>101-720</b>	. BOLT, hex hd mach; 0.625"-11 x 14"	4
15 * 102-973	. BALL, stainless steel; 1.25" (31.8 mm) dia	1
16 * 102-974	. BALL, stainless steel; 2.00" (50.8 mm) dia	1
17 <b>150-707</b>	. PLATE, serial	1
18 ** 162-898	. GASKET, copper	2
19 165-941	. CYLINDER, displacement	1
20 165-943	. RETAINER, packing	1
21 ** 165-944	. GLAND, male packing	2
22 ** 165-945	. GLAND, female packing	2
23 * 165-947	. PIN, ball stop	1
24 165-948	. PIN, ball stop	1
25 ** 166-165	. V-PACKING; "Teflon"	2
26 ** 166-238	. SEAL, o-ring; nitrile rubber	1
27 ** 166-489	. V-PACKING; leather	8
28 <b>168-200</b>	. HOUSING, outlet	1
29 <b>168-202</b>	. PLATE, tie	1
30 168-678	. ROD, displacement	1
31 206-477	. HOUSING, intake valve	1
32 207-656	. NUT, packing	1
33 207-658	. SEAT, piston	1
34 210-107	HYDRAULIC MOTOR Series "A" see 307-158 for parts	1

\*Recommended "tool box" spare parts. Keep on hand to reduce down time.

\*\* Included in repair kit 207-729.

Items with shaded part numbers are not normally sold as replacement parts. These parts do not normally need replacement, or are available at local hardware outlets. Available from Graco on special order only.

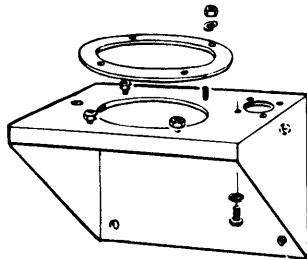
Order parts by name and number. Always give the model number and series letter of the assembly for which you are ordering.

**207-729 REPAIR KIT**  
 (must be purchased separately)  
 consists of:

Ref No.	Qty
13	1
18	2
21	2
22	2
25	2
26	1
27	8

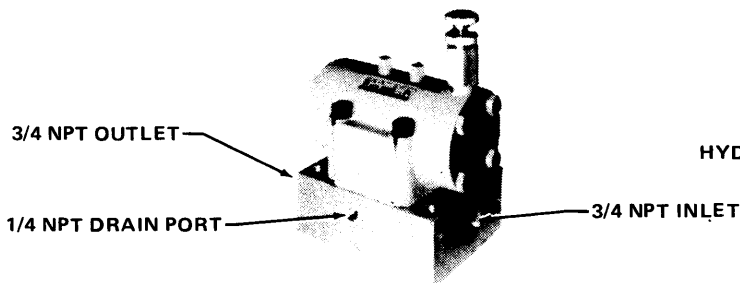
**ACCESSORIES (must be purchased separately)**

**206-221 WALL MOUNTING BRACKET**

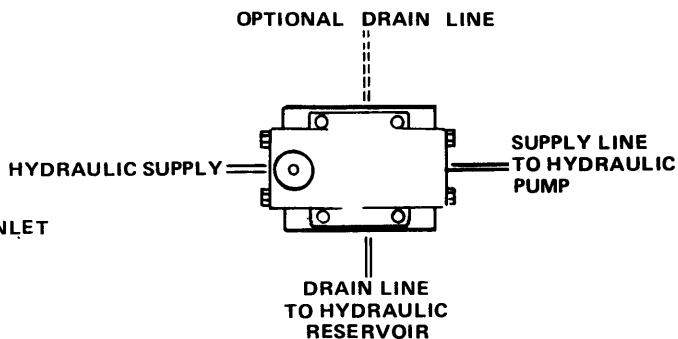
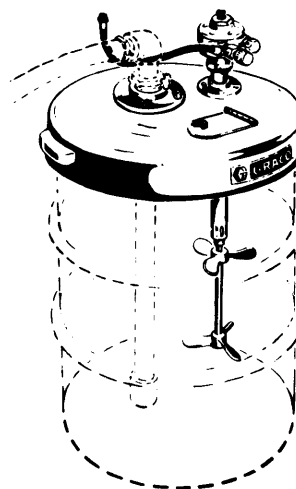


**054-106 POLYETHYLENE TUBE**  
 0.25" (6.4 mm) ID; 0.375" (9.5 mm) OD.  
 Connect to barbed hose fitting on hydraulic motor drip pan.

**103-055 HYDRAULIC PRESSURE CONTROL REGULATOR**  
 Controls pressure to hydraulic motor



**207-199 COVER AND AGITATOR**



**TSL THROAT SEAL LIQUID**  
**206-995** 1 quart (0.95 liter) non-evaporation solvent for wet-cup  
**206-996** 1 gallon (3.8 liter) size



**207-428 HYDRAULIC FLUID; 1 gallon (3.8 liter)**



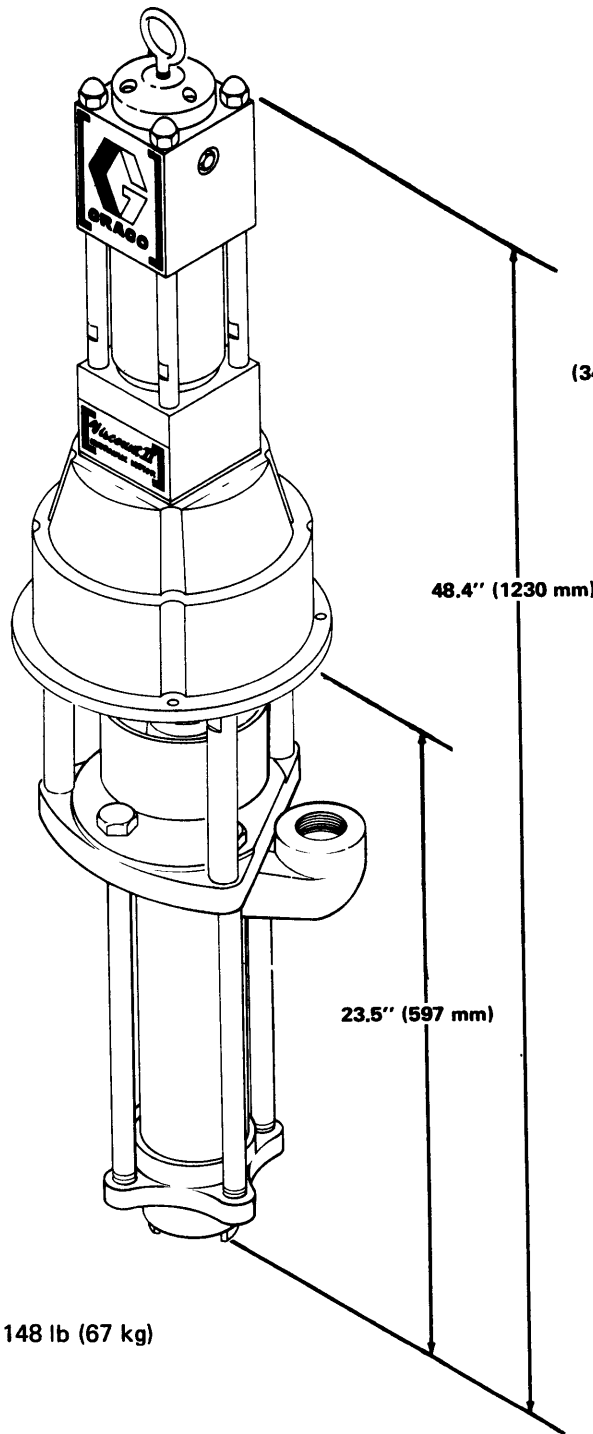
206-266		55 gallon SUCTION TUBE	
REF NO.	PART NO.	DESCRIPTION	QTY
1	100-220	THUMBSCREW	1
2	150-994	ADAPTER, bung	1
3	156-591	ELBOW, 90°; 3/4 npt; 1.5"-24 NS	1
4	156-592	TUBE, riser	1
5	156-593	SEAL, o-ring	1
6	159-100	RETAINER, screen	1
7	159-101	NUT, screen retainer	1
8	161-377	SCREEN, filter	1

**204-729 SUCTION HOSE; 6 ft (1829 mm) lg**  
 For hydrocarbon solvent flushing; not for water base materials.

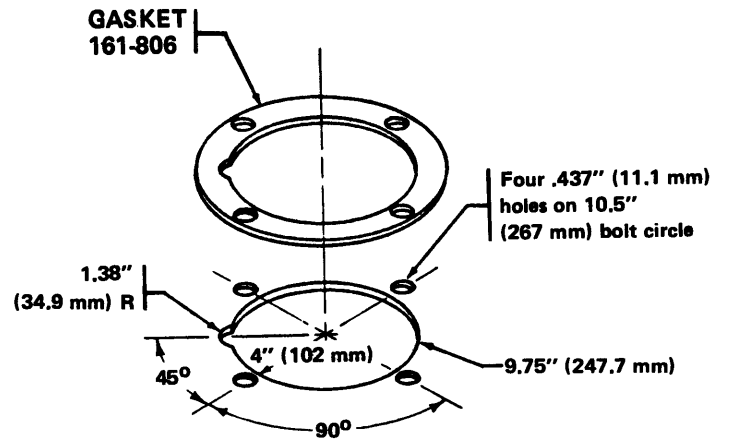
**160-049 SUCTION HOSE: 6 ft (1829 mm) lg**  
 For petroleum base solvent flushing and water base materials.

# DIMENSIONAL DRAWING

# MOUNTING HOLE LAYOUT



Weight : 148 lb (67 kg)



# TECHNICAL DATA

Maximum hydraulic input pressure : 1500 psi (100 bar)  
 Maximum pump output pressure : 2000 psi (140 bar)  
 Maximum recommended pump speed : 50 cycles per minute--  
 7.2 gpm (27 liter/min) delivery  
 Hydraulic fluid consumption : 0.2 gpm (0.76 liter) per cycle  
 Wetted parts : Nitralloy, Tungsten Carbide,  
 Copper, impregnated Leather  
 "Teflon"; 440 Stainless Steel

## PUMP PERFORMANCE CHARTS

PUMP PRESSURE DEVELOPED	
HYDRAULIC INPUT PRESSURE	PUMP OUTLET PRESSURE
100 psi (7 bar)	138 psi (10 bar)
200 psi (14 bar)	277 psi (20 bar)
300 psi (21 bar)	415 psi (29 bar)
400 psi (28 bar)	554 psi (38 bar)
500 psi (34 bar)	692 psi (47 bar)
600 psi (41 bar)	831 psi (57 bar)
700 psi (48 bar)	969 psi (67 bar)
800 psi (55 bar)	1108 psi (77 bar)
900 psi (62 bar)	1246 psi (86 bar)
1000 psi (69 bar)	1384 psi (96 bar)
1100 psi (76 bar)	1523 psi (105 bar)
1200 psi (83 bar)	1661 psi (114 bar)
1300 psi (90 bar)	1800 psi (124 bar)
1400 psi (97 bar)	1938 psi (134 bar)
1500 psi (104 bar)	2077 psi (143 bar)

PUMP OUTPUT					
PUMP SPEED (cycles/min)	HYDRAULIC FLUID REQUIRED		PUMP OUTPUT		
	gpm	liter/min	gpm	liter/min	
5	1.0	3.8	0.72	2.7	
10	2.0	7.6	1.45	5.5	
15	3.0	11.4	2.15	8.1	
20	4.0	15.1	2.90	11.0	
25	5.0	18.9	3.60	13.6	
30	6.0	22.7	4.30	16.3	
35	7.0	26.5	5.05	19.1	
40	8.0	30.3	5.75	21.8	
45	9.0	34.1	6.50	24.6	
50	10.0	37.8	7.20	27.3	

## THE GRACO WARRANTY

Graco Inc. warrants all equipment manufactured by it and bearing its name to be free from defects in material and workmanship under normal use and service. Scope of this warranty extends to the original purchaser for a period of 12 months from the date of purchase and is applicable only when the equipment is installed and operated in accordance with factory recommendations. The warranty does not extend to damage or wear caused by misuse, abrasion, corrosion, negligence, accident, faulty installation or tampering in a manner to impair its normal operation.

In the event the equipment supplied by Graco Inc. is found to be defective within the above-stated 12-month period, Graco Inc. will repair or replace free of charge such defective parts if returned prepaid to the factory or to an authorized Graco service agency and is found by Graco Inc.'s inspection to be truly defective in workmanship or material. In the event said material is deemed defective in workmanship or material, it will be corrected and shipped transportation prepaid within the continental U.S. If inspection of any such equipment by Graco Inc. does not disclose any defect in workmanship or material, repairs will be made at a reasonable charge. Purchased assemblies which are incorporated into Graco equipment, carry the manufacturer's regular warranty.

The foregoing warranties are exclusive, and are in lieu of all other warranties (whether written, oral or implied) including warranty of merchantability in other respects than expressly set forth above and warranty of fitness for a particular purpose. Except as herein provided, every form of liability for direct or consequential damages or loss is expressly excluded and denied.



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