INSTRUCTIONS-PARTS LIST

GRACO

307-138
Rev C
SUPERSEDES B

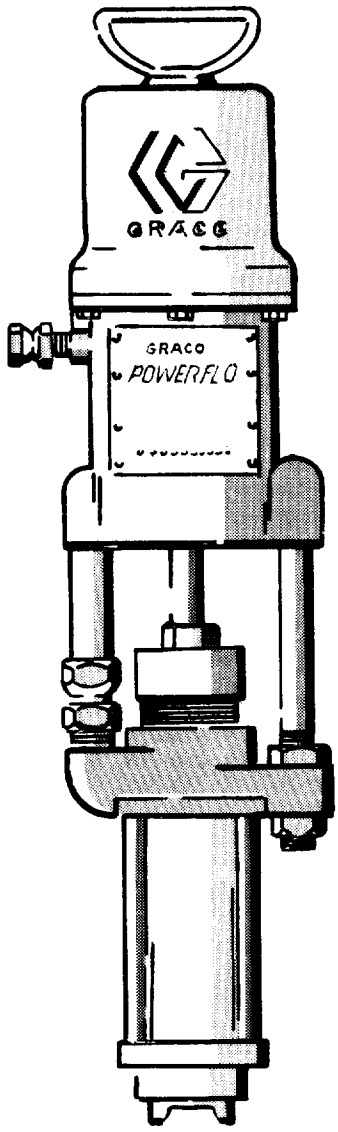
This manual contains **IMPORTANT**
WARNINGS and **INSTRUCTIONS**
READ AND RETAIN FOR REFERENCE

2:1 RATIO

MONARK PUMP

360 PSI (25 bar) MAXIMUM WORKING PRESSURE

Model 210-003 Series E
For Water Reducible Materials



Air powered pump is easy to control; simply adjust air pressure.

Divorced design prevents air motor fouling.

Displacement pump valves are adjustable for varying viscosity requirements.

Accessories on page 5.

TECHNICAL DATA on back page.

GRACO INC. P.O. BOX 1441 MINNEAPOLIS, MN 55440

INSTALLATION

Mount Pump

Mount pump to suit the type of installation planned. Mounting accessories are shown on page 5. Pump dimensional drawings and mounting hole layout are given on back page.

Connect Hoses

Connect a 3/8 in. (10 mm) minimum ID grounded air supply hose to 3/8 npt inlet union (A). Main air line should include a bleed type valve (B) for shutting down and relieving air pressure.

Connect a 3/4 in. (19 mm) minimum ID fluid hose to the 3/4 npt (m) outlet (C) of pump with a suitable adapter. If pump is being used in a circulating system, connect return hose to 1/2 npt(m) fitting (8).

If pump is to be supplied by suction hose, connect a 3/4 in. (19 mm) minimum ID hose to the 1-1/2" npt pump inlet (D) with suitable adapter. If pump is to be supplied direct from the circulating or dead end supply line, mount pump in line with suitable plumbing.

Whenever flammable materials are being pumped, connect a ground wire to pump air motor. Loosen grounding lug locknut (F) and washer (G), insert one end of a 12 g. (1.5 mm²) minimum ground wire into slot in lug (H) and tighten locknut securely. See Fig 1.

Connect the other end of wire to a good ground, such as a steel building column or water pipe. See ACCESSORIES for available ground wire and clamp.

We recommend installing an air line filter to remove dirt and moisture from the air supply. Downstream from the filter, install an air line oiler for automatic air motor lubrication. See ACCESSORIES. If you supply your own filter or oiler, be sure that it is adequately sized to meet your system air requirements.

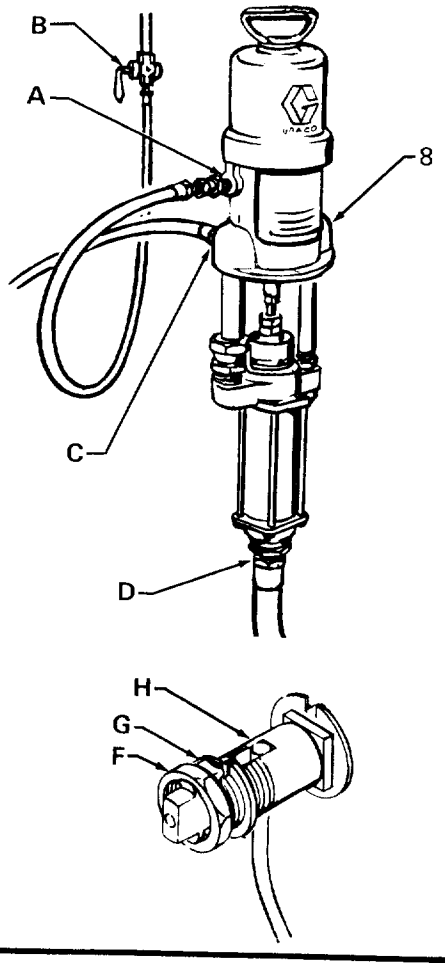


Fig 1

OPERATION

Adjusting Pump Speed and Pressure

In a direct supply system, with air supply turned on, the pump is remotely operated; it starts and stops as the fluid valve is opened or closed. In a circulating system, pump operates until the air supply is turned off.

Use an air regulator to control material pressure and pump speed. See page 5 for an accessory Graco air regulator. Always use the lowest air pressure needed to give the results you want.

Lubrication and Care

For automatic lubrication of the air motor, adjust the air line oiler according to its instructions. For daily, manual lubrication, disconnect air supply, put about 15 drops of light oil in the air inlet and reconnect air supply.

When operating the pump non-immersed, keep the wet-cup (38) filled with Graco Throat Seal Liquid (TSL). See Fig 2.

Check the tightness of the packing nut (38) weekly. Packing nut should be tight enough to stop leakage — no tighter. Shut off air and relieve fluid pressure, then use a spanner wrench or a 1/4 in. rod to tighten nut.

If pump accelerates suddenly, or is running too fast, stop pump immediately and check fluid supply. If fluid supply has been exhausted and air has gotten into the system, immediately reprime pump and lines with material or flush and leave filled with the proper solvent for the material being pumped. Always stop the pump at the bottom of its stroke to prevent material from drying on displacement rod (29) and damaging packings.

When pumping materials which dry, harden, or set up, flush system with the proper solvent as often as necessary to prevent build-up.

For overnight and holiday shutdown, turn off air to pump and bleed off fluid pressure through gun. In a circulating system "blow back" paint in hoses into circulating line. Then remove and clean paint hoses and spray guns, and turn off all air to system.

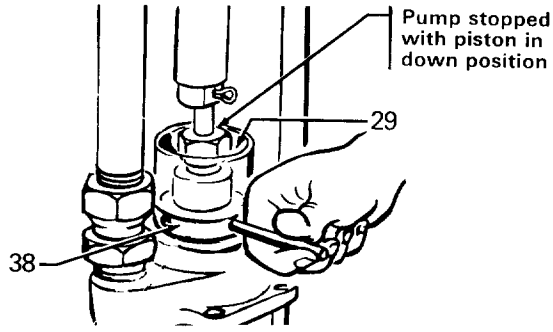


Fig 2

Fluid Piston and Intake Valve Adjustment

The fluid piston and intake valves are factory set for pumping medium viscosity fluids such as spray paints. Pin (44) in intake valve is in lower set of holes and piston ball travel is set at 0.19 in. (5 mm) or four complete turns of ball stop screw (28) from rest on piston ball.

1. If extremely heavy paint is used and erratic pump operation develops, increase ball travel in intake valve by moving pin (44) to center or upper set of holes (according to viscosity of paint) and in piston valve by backing out ball stop screw (28) two complete turns or 0.28 in. (7 mm) total travel. See Fig 3.

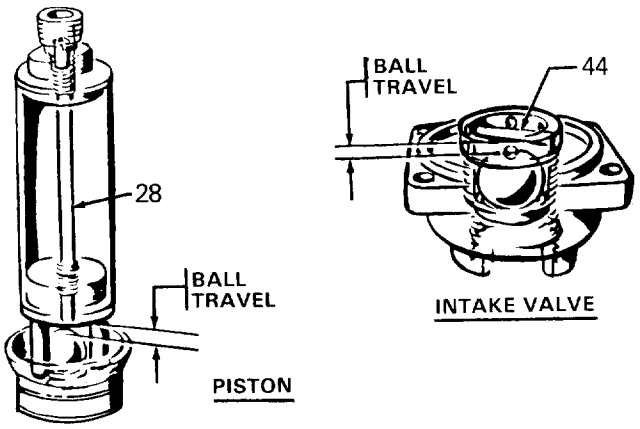


Fig 3

2. If extremely light paint is used and surging develops, reduce surging effect by screwing in ball stop screw (28) two complete turns or 0.09 in. (2 mm) total travel at piston valve. Refer to Fig 3.

If valves are to be adjusted disassemble pump as explained on page 4 and adjust valves as follows: Place piston in vise as shown in Fig 4, loosen upper displacement plunger (31) to relieve tension on ball stop screw (28). Adjust ball stop screw for desired ball travel and retighten upper plunger cap (31) securely. Refer to Fig 4. Set intake valve pin as desired and reassemble pump.

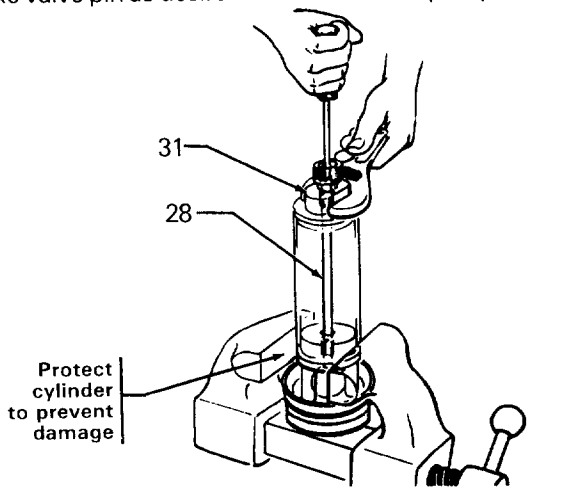


Fig 4

SERVICE

WARNING

TO AVOID POSSIBLE PERSONAL INJURY: *Always* disconnect air line and relieve all pressures before servicing pump. *Never* run pump with air muffler plates removed.

TROUBLESHOOTING CHART

Problem	Cause	Solution
Pump fails to operate.	Restricted line or inadequate air supply.	Clear line or increase line size.
	Insufficient air pressure. Closed or clogged air valves, etc.	Open air valves, clean if necessary.
	Exhausted material supply.	Refill.
	Damaged air motor.	Service.
Pump operates but output low on both strokes.	Restricted line or inadequate air line supply.	Clear line or increase line size.
	Insufficient air pressure. Closed or clogged air valves, etc.	Open air valves, clean if necessary.
	Exhausted material supply.	Refill.
	Obstructed material line valves, gun, etc.	Clear*
	Fluid check valves need adjustment.	Adjust.
	Loose throat packing nut or worn packings.	Tighten nut or replace packings.

Continued on Page 4.

*Release pressures and disconnect material line. Turn on air - if pump starts, the line, etc. is clogged.

TROUBLESHOOTING CHART (Cont'd)

Problem	Cause	Solution
Pump operates but output low on downstroke.	Held open or worn fluid intake valve.	Clear, service.
Pump operates but output low on upstroke.	Held open or worn fluid piston or packing.	Clear, service.
Erratic or accelerated operation.	Exhausted material supply.	Refill.
	Fluid check valves need adjustment.	Adjust.
	Held open or worn fluid intake valve.	Clear, service.
	Held open or worn piston or packing.	Clear, service.

Check all other remedies before disassembling pump.

Fluid Pump Service

Flush pump with proper solvent, relieve pressures, remove pump from system and disassemble as explained below.

Unscrew coupling nut (39) from displacement rod plunger (31). Unscrew lower locknut (9) from return mounting tube (11) and swivel union (21) from supply mounting tube (10). See Fig 5. If mounting tubes are to be removed, wrench tubes close to air motor base to prevent thread damage in base.

Unscrew the four tie bolts (20) from pump head (27), loosen packing nut (38) and disassemble fluid pump as necessary to correct trouble. See Fig 6.

NOTE: If ball stop pin (44) or screw (28) are to be removed, note their position before removal and reinstall in proper location.

Clean and inspect all parts carefully for wear or damage and replace as necessary. Give special attention to displacement plunger rod (29) and cylinder (48), packings (25 & 26), and valve balls (14 & 15) and seats (33 & 52).

NOTE: Replace packing glands (40 & 41) whenever throat or piston packings (25 & 26) are replaced.

Lubricate, assemble and install all parts of fluid pump reverse from disassembly. Refer to Fig 6. Install new throat V-packings one at a time and leave packing nut (38) loose until displacement plunger rod (29) is installed. Then tighten just enough to prevent leakage—DO NOT overtighten packing nut.

CAUTION

DO NOT attempt to reseat balls in intake or fluid piston valves. The hard nitralloy seats are easily chipped.

Place fluid pump on mounting tubes. Thread upper lock nut (9) onto return mounting tube (11) a couple turns and tighten swivel union (21) onto supply mounting tube (10). Refer to Fig 5. Butt coupling nut (39) and displacement plunger (31) together and adjust lock nuts on return mounting tube to align rod and plunger. Then tighten lock nuts securely, being careful not to disturb alignment. Tighten coupling nut securely onto plunger. See Parts Drawing on page 6 for torque specifications.

Operate pump at minimum of air pressure: 50 PSI (3.5 bar) maximum. Adjust locknuts on return mounting tube as necessary until pump operates smoothly on 15 PSI (1 bar) or less. Tighten nuts securely. See Fig 5.

Remount pump in system and attach air and fluid lines.

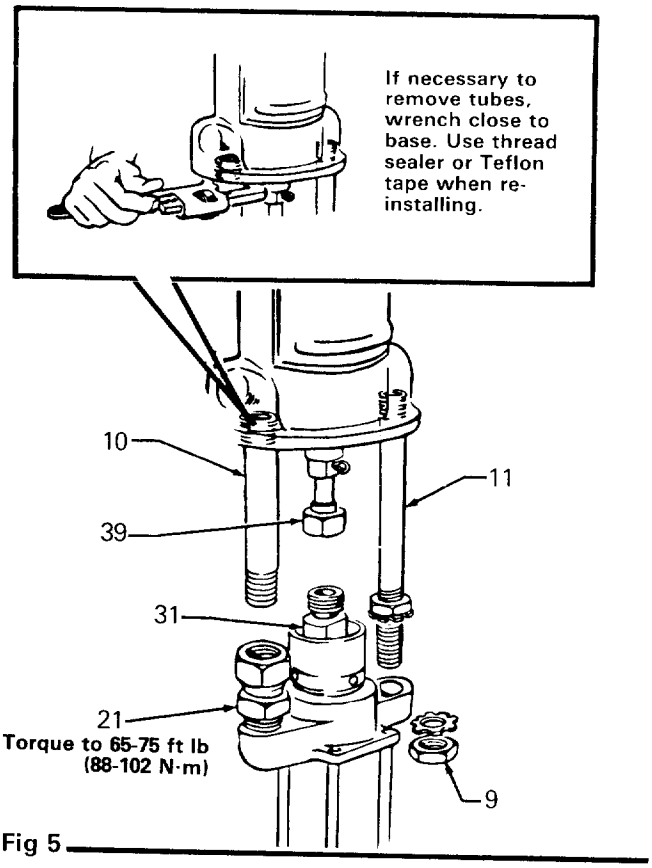


Fig 5

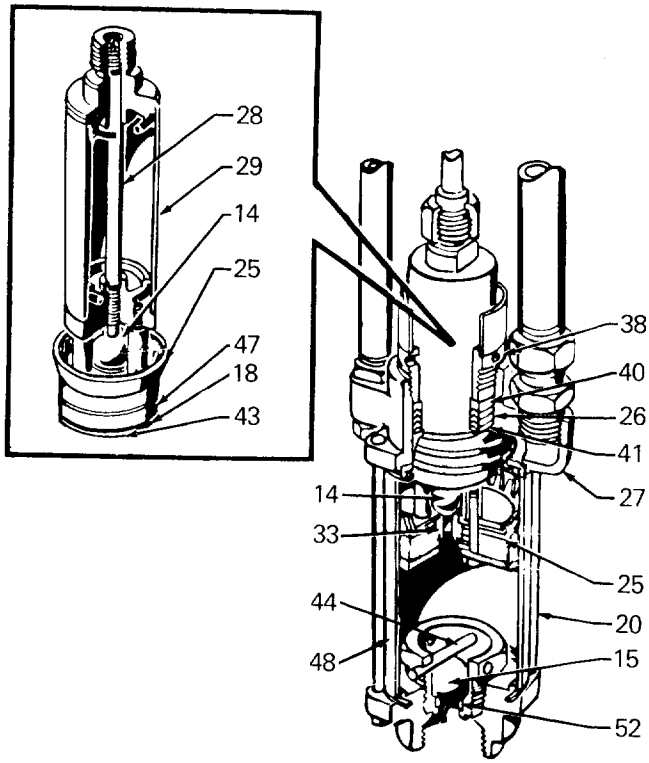


Fig 6

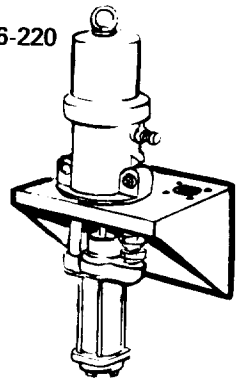
ACCESSORIES (Must be purchased separately)

SAFETY MIXING TANKS
210-035, 30 Gallon
210-036, 15 Gallon

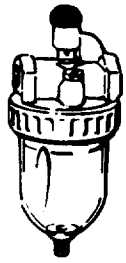
See instruction manual 307-153.

Includes Fluid Couplers and Nipple
104-134 and **104-133** 1/2 NPT
104-136 and **104-135** 3/4 NPT

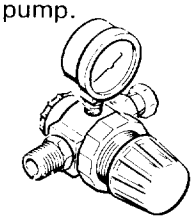
WALL MOUNTING BRACKET 206-220
See instruction manual 306-783



AIR LINE OILER 214-848
250 PSI (17.5 bar) MAXIMUM WORKING PRESSURE
1/2 NPT (F) inlet and outlet.



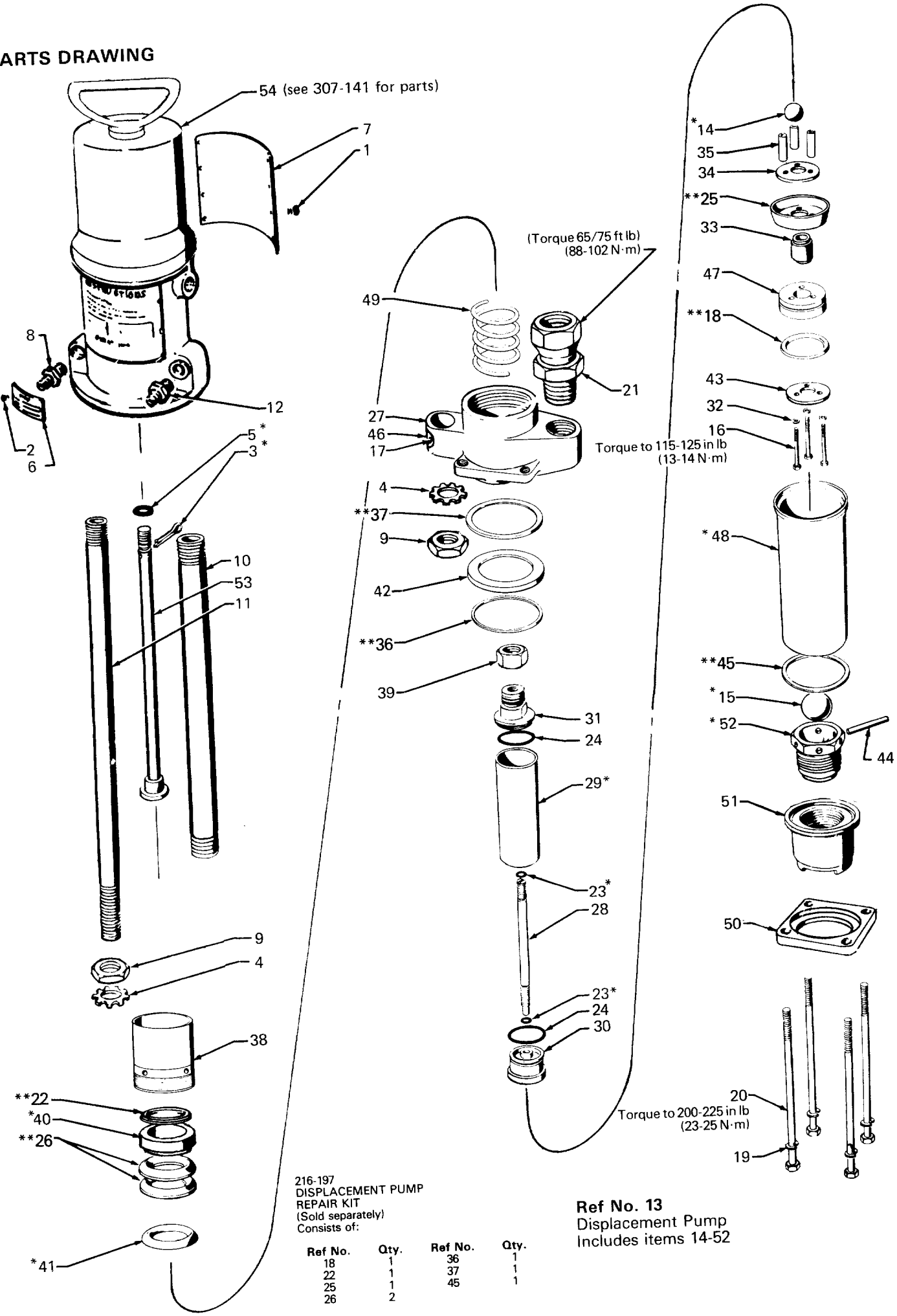
AIR REGULATOR & GAUGE 202-858
300 PSI (20 bar) MAXIMUM INLET PRESSURE
0-200 PSI (0-14 bar) Pressure Adjustment Range
Nitrile Rubber Diaphragm
1/2 NPSM(F) swivel inlet
3/8 NPT(M) outlet
See instruction manual 307-204.
For controlling volume of air delivered to pump.



AIR LINE MOISTURE SEPARATOR 203-421
200 PSI (14 bar) MAXIMUM WORKING PRESSURE
See instruction manual 306-393. 1/2 in. NPT inlet and outlet.

GROUNDING WIRE AND CLAMP
See instruction manual 307-255
103-538 Grounding Clamp
208-950 Ground Wire
25 ft. (7.6 m) long.

ARTS DRAWING



216-197
DISPLACEMENT PUMP
REPAIR KIT
(Sold separately)
Consists of:

Ref No.	Qty.	Ref No.	Qty.
18	1	36	1
22	1	37	1
25	1	45	1
26	2		

Ref No. 13
Displacement Pump
Includes items 14-52

PARTS LIST

REF NO.	PART NO.	DESCRIPTION	QTY
1	100-078	SCREW, rd hd mach; 8-32 x 3/8	8
2	104-088	RIVET, blind	2
3	*100-579	PIN, cotter; 7/64 dia x 1"	1
4	103-960	LOCKWASHER, ext tooth; 1" ID	2
5	*156-082	O-RING, nitrile rubber	1
6	172-446	PLATE, serial	1
7	172-443	PLATE, name	1
8	166-443	NIPPLE, hex reducing; 3/4 NPT x 1/2 NPT	1
9	171-217	NUT, lock; 3/4-11	2
10	171-218	TUBE, supply mounting	1
11	171-220	TUBE, return mounting	1
12	171-439	NIPPLE, hex reducing; 1" NPT x 3/4 NPT	1
13	214-620 Series B	DISPLACEMENT PUMP ASSY Includes items 14-52	1
14	*101-917	. BALL, 7/8" Dia.	1
15	*101-968	. BALL, 1-1/4" Dia.	1
16	103-971	. CAPSCREW, hex hd; 3/8-16 x 2-3/4"	3
17	103-972	. SCREW, drive; type "u", 1/8 x 3/16	2
18	**103-974	. V-PACKING, neoprene and cotton duck	1
19	103-975	. LOCKWASHER, spring; 3/8 size	4
20	103-976	. CAPSCREW, hex hd; 3/8-16 x 7-3/4"	4
21	103-977	. UNION, str adapter; 1" NPT(M) x 1" NPSM(F)	1
22	**103-978	. RING, wiper	1
23	*160-015	. O-RING, nitrile rubber	2
24	161-547	. O-RING, nitrile rubber	2
25	**162-870	. PACKING, cup; "Teflon"	1
26	**165-949	. V-PACKING, neoprene and cotton duck	2
27	175-004	. HOUSING, outlet	1
28	171-158	. ROD, plunger	1
29	*175-005	. ROD, displacement	1
30	171-160	. PLUNGER, displacement; lower	1
31	171-161	. PLUNGER, displacement; upper	1
32	171-163	. WASHER	3
33	171-164	. SEAT, valve	1
34	171-165	. WASHER, piston	1
35	171-167	. SPACER	3
36	**177-718	. GASKET, nylon	1
37	**171-169	. GASKET, nylon	1
38	171-170	. NUT, packing	1
39	171-171	. NUT, coupling	1
40	*171-172	. GLAND, packing; female	1
41	*166-377	. GLAND, packing; male	1
42	177-717	. RETAINER, spring	1
43	171-175	. PLATE, retainer	1
44	171-176	. PIN, straight headless	1
45	**171-177	. GASKET, nylon	1
46	171-178	. PLATE, designation	1
47	171-179	. BEARING, piston	1
48	175-007	. CYLINDER, displacement	1
49	171-181	. SPRING, tapered compression	1
50	171-250	. PLATE, tie	1
51	171-251	. HOUSING, intake valve	1
52	*214-618	. VALVE SEAT	1
53	210-002	CONNECTING ROD	1
54	210-004	AIR MOTOR(see 307-141 for parts)	1

307 Number in description refers to separate instruction manual.

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

***Parts supplied in repair kit 216-197.*

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

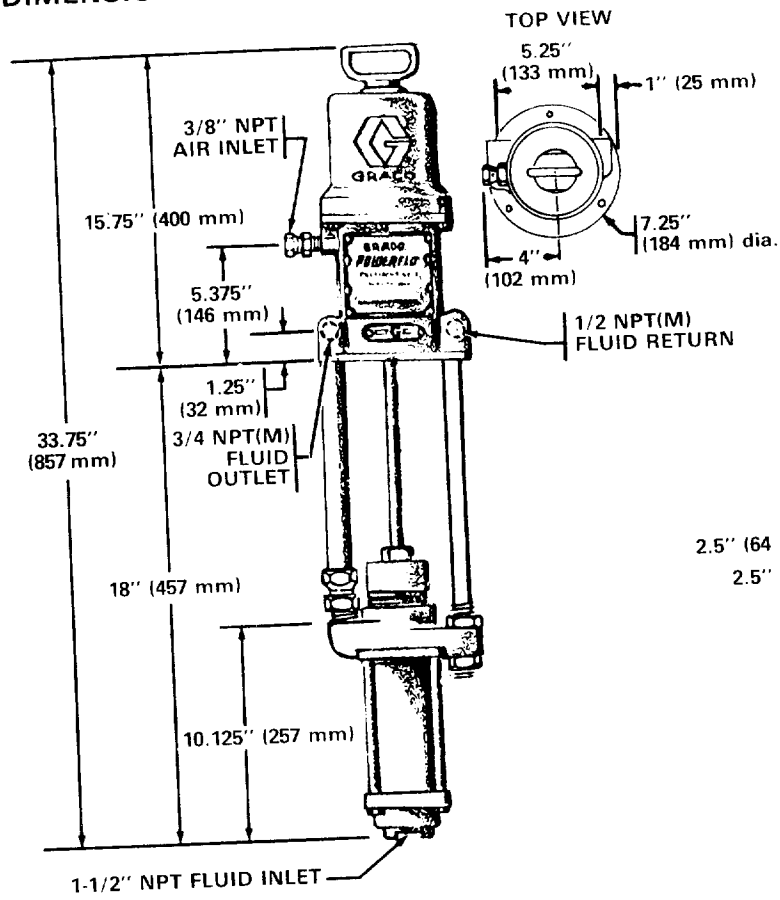
SERVICE INFORMATION

Listed below by the assembly changed are OLD and NEW parts.

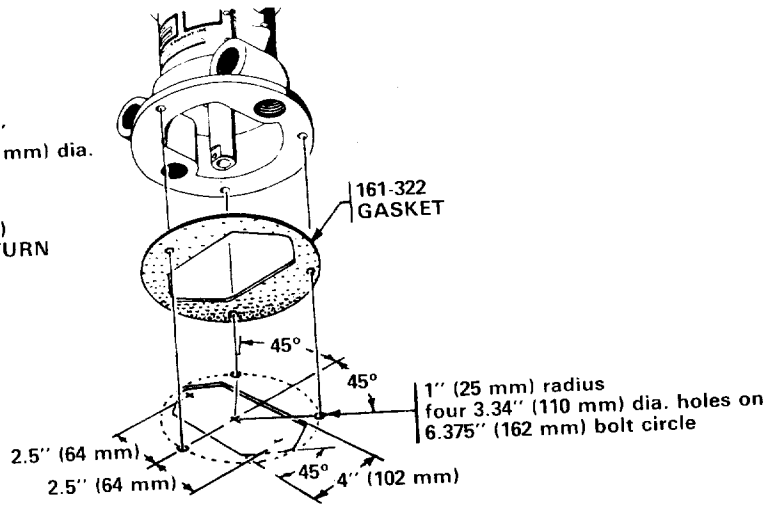
ASSEMBLY CHANGED	PART STATUS	REF NO.	PART NO.	NAME
214-620 Disp Pump Series to B	OLD		171-168	Gasket
	OLD		171-174	Retainer
	NEW	36	177-718	Gasket
	NEW	42	177-717	Retainer

INTERCHANGEABILITY NOTE: NEW parts replace OLD parts listed directly above them.

DIMENSIONAL DRAWING



MOUNTING HOLE LAYOUT



TECHNICAL DATA

Recommended air operating range	: 40-180 PSI (3-12 bar)
Air consumption	: 2.5 cfm per gallon pumped (0.07 m3/min/liter) at 100 PSI (7 bar) air pressure: *up to 15 cfm (0.42 m3/min) with pump operated within recommended range.*
Pump cycles/gallon(3.785 liter)	: 11
Recommended max. pump delivery(continuous duty)	: 6 gpm (23 liter/min)
Wetted parts	: Stainless steel, Nitralloy Steel, "Teflon", delrin, nitrile rubber

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. This warranty extends to the original purchaser for a period of 12 months from the date of purchase and applies only when the equipment is installed and operated in accordance with written factory recommendations. This warranty does not cover damage or wear which, in the reasonable judgment of Graco, arises from misuse, abrasion, corrosion, negligence, accident, substitution of non-Graco parts, faulty installation or tampering.

This warranty is conditioned upon the prepaid return of the equipment claimed to be defective for examination by Graco to verify 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 workmanship or material, repairs will be made at a reasonable charge and return transportation will be charged.

THIS LIMITED WARRANTY IS EXCLUSIVE, AND IS IN LIEU OF ANY OTHER WARRANTIES (EXPRESS OR IMPLIED) INCLUDING WARRANTY OF MERCHANTABILITY OR WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE AND OF ANY NON-CONTRACTUAL LIABILITIES INCLUDING PRODUCT LIABILITIES BASED ON NEGLIGENCE OR STRICT LIABILITY. EVERY FORM OF LIABILITY FOR DIRECT, SPECIAL OR CONSEQUENTIAL DAMAGES OR LOSS IS EXPRESSLY EXCLUDED AND DENIED.

EQUIPMENT NOT COVERED BY GRACO WARRANTY. Accessories or components of equipment sold by Graco that are 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 such claims.

Factory Branches: Atlanta, Dallas, Detroit, Los Angeles, West Caldwell (N.J.)
Subsidiary and Affiliate Companies: Canada; England; Switzerland; France; Germany; Hong Kong; Japan
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