INSTRUCTIONS-PARTS LIST

306-800
Rev C
SUPERSEDES B

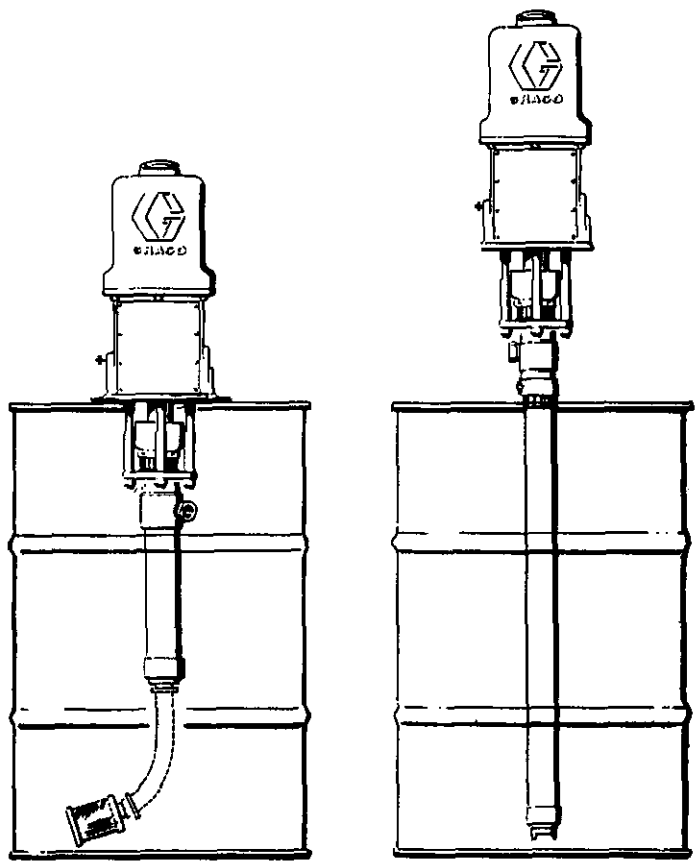
This manual contains **IMPORTANT WARNINGS** and **INSTRUCTIONS**
READ AND RETAIN FOR REFERENCE

STAINLESS STEEL, PTFE PACKED

5:1 RATIO MONARK PUMP

Model 206-393, Series G
55 Gallon Drum Size, 2 in. npt bung mounting
900 psi (62 bar) MAXIMUM WORKING PRESSURE

Model 208-470, Series C
Stubby Pump, for wall or open head drum mounting
600 psi (41 bar) MAXIMUM WORKING PRESSURE



INDEX

GRACO INC. P.O. Box 1441 MINNEAPOLIS, MN 55440-1444

WARNING

HIGH PRESSURE SPRAY CAN CAUSE SERIOUS INJURY.
FOR PROFESSIONAL USE ONLY. OBSERVE ALL WARNINGS.
Read and understand all instruction manuals before operating equipment.

FLUID INJECTION HAZARD

General Safety

This equipment generates very high fluid pressure. Spray from the gun/valve, leaks or ruptured components can inject fluid through your skin and into your body and cause extremely serious bodily injury, including the need for amputation. Also, fluid injected or splashed into the eyes or onto the skin can cause serious damage.

NEVER point the spray gun or dispensing valve at anyone or at any part of the body. NEVER put hand or fingers over the spray tip.

ALWAYS have the tip guard in place on the gun/valve when spraying.

ALWAYS follow the **Pressure Relief Procedure**, at right, *before* cleaning or removing the spray tip or nozzle or servicing any system equipment.

NEVER try to "blow back" paint; this is not an air spray pump.

NEVER try to stop or deflect leaks with your hand or body.

Be sure equipment safety devices are operating properly before each use.

Medical Alert—Airless Spray Wounds

If any fluid appears to penetrate your skin, get **EMERGENCY MEDICAL CARE AT ONCE. DO NOT TREAT AS A SIMPLE CUT.** Tell the doctor exactly what fluid was injected.

Note to Physician: *Injection in the skin is a traumatic injury.* **It is important to treat the injury surgically as soon as possible.** *Do not delay treatment to research toxicity. Toxicity is a concern with some exotic coatings injected directly into the blood stream. Consultation with a plastic surgeon or reconstructive hand surgeon may be advisable.*

Spray Gun and Dispensing Valve Safety Devices

Be sure all gun/valve safety devices are operating properly before each use. Do not remove or modify any part of the gun/valve; this can cause a malfunction and result in serious bodily injury.

Safety Latch

Whenever you stop spraying, even for a moment, always set the gun/valve safety latch in the closed or "safe" position, making the gun/valve inoperative. Failure to set the safety latch can result in accidental triggering of the gun/valve.

Diffuser

The gun diffuser breaks up spray and reduces the risk of fluid injection when the tip is not installed. Check diffuser operation regularly. Follow the **Pressure Relief Procedure**, at right, then remove the spray tip. Aim the gun into a grounded metal pail, holding the gun firmly to the pail. Using the lowest possible pressure, trigger the gun. If the fluid emitted *is not* diffused into an irregular stream, replace the diffuser immediately.

Tip Guard

ALWAYS have the tip guard in place on the gun/valve while spraying. The tip guard alerts you to the fluid injection hazard and helps prevent accidentally placing your fingers or any part of your body close to the spray tip.

Trigger Guard

Never operate the gun with the trigger guard removed. This guard helps prevent the gun from triggering accidentally if it is dropped or bumped.

Spray Tip and Nozzle Safety

Use extreme caution when cleaning or changing spray tips or nozzles. If the spray tip or nozzle clogs while spraying, engage the gun/valve safety latch immediately. ALWAYS follow the **Pressure Relief Procedure** and then remove the spray tip or nozzle to clean it.

NEVER wipe off build-up around the spray tip or nozzle until pressure is fully relieved and the gun/valve safety latch is engaged.

Pressure Relief Procedure

To reduce the risk of serious bodily injury, including fluid injection, splashing in the eyes or on the skin, or injury from moving parts, always follow this procedure whenever you shut off the pump, when checking or servicing any part of the system, when installing or changing spray tips, and whenever you stop spraying.

1. Engage the spray gun or dispensing valve safety latch.
2. Close the pump air regulator.
3. Close the bleed-type master air valve (required in your system).
4. Disengage the gun or dispensing valve safety latch.
5. Hold a metal part of the gun or valve firmly to a grounded metal waste container and trigger to relieve the fluid pressure.
6. Engage the safety latch again.
7. Open the pump drain valve (required in your system), having a container ready to catch the drainage.
8. Leave the drain valve open until you are ready to spray again.

If you suspect that the spray tip or hose is clogged or that fluid pressure is not fully relieved after following the steps above, VERY SLOWLY loosen the tip guard or hose end coupling and allow pressure to be relieved gradually, then remove completely. Now clear the tip or hose obstruction.

EQUIPMENT MISUSE HAZARD

General Safety

Any misuse of the spray equipment or accessories, such as overpressurizing, modifying parts, using incompatible chemicals and fluids, or using worn or damaged parts, can cause them to rupture and result in fluid injection or other serious bodily injury, fire, explosion or property damage.

NEVER alter or modify any part of this equipment; doing so could cause it to malfunction.

CHECK all spray equipment regularly and repair or replace worn or damaged parts immediately.

ALWAYS read and follow the fluid and solvent manufacturer's recommendations regarding the use of protective clothing and equipment.

System Pressure

Pump Model 206-393 develops *900 psi (62 bar) MAXIMUM WORKING PRESSURE* at 180 psi (12 bar) air pressure. Model 208-470 develops *600 psi (41 bar) MAXIMUM WORKING PRESSURE* at 120 psi (8 bar) air pressure. NEVER exceed these air pressures to the motor. NEVER exceed the stated maximum working pressure of the pump or of the lowest rated component in your system.

Be sure that all accessories you add to the spray system are properly rated to withstand the maximum air and fluid working pressures of this system.

Fluid Compatibility

BE SURE that all fluids and solvents used are chemically compatible with the wetted parts shown in the Technical Data on the back cover. Always read the fluid and solvent manufacturer's literature before using them in this pump.

FIRE OR EXPLOSION HAZARD

Static electricity is created by the high velocity flow of fluid through the pump and hose. If every part of the spray equipment is not properly grounded, sparking may occur, and the system may become hazardous. Sparking may also occur when plugging in or unplugging a power supply cord. Sparks can ignite fumes from solvents and the fluid being sprayed, dust particles and other flammable substances, whether you are spraying indoors or outdoors, and can cause a fire or explosion and serious bodily injury and property damage. Do not plug in or unplug any power supply cords in the spray area when there is any chance of igniting fumes still in the air.

If you experience any static sparking or even a slight shock while using this equipment, **STOP SPRAYING IMMEDIATELY.** Check the entire system for positive grounding. Do not use the system again until the problem has been identified and corrected.

Grounding

To reduce the risk of static sparking, ground the pump and all other spray equipment used or located in the spray 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 equipment:

1. *Pump:* use a ground wire and clamp as shown in Fig 1.
2. *Air hoses:* use only grounded air hoses.
3. *Fluid hoses:* use only grounded fluid hoses.
4. *Air compressor:* follow manufacturer's recommendations.
5. *Spray gun or dispensing valve:* grounding is obtained through connection to a properly grounded fluid hose and pump.
6. *Fluid supply container:* according to local code.
7. *Object being sprayed:* according to your local code.
8. *All solvent pails* used when flushing, according to 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 gun/valve firmly to the side of a grounded *metal* pail, then trigger the gun/valve.

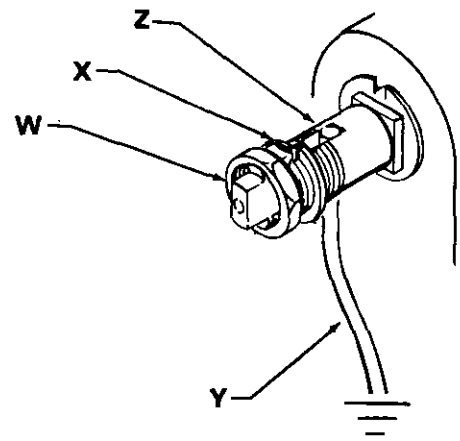


Fig 1

To ground the pump, loosen the grounding lug locknut (W) and washer (X). Insert one end of a 12 ga (1.5 mm^2) minimum ground wire (Y) into the slot in lug (Z) and tighten locknut securely. See Fig 1. Connect the other end of the wire to a true earth ground. Refer to page 12 to order a ground wire and clamp.

Flushing Safety

To reduce the risk of fluid injection injury, static sparking, or splashing, follow the **Pressure Relief Procedure** on page 2, and *remove the spray tip (spray guns or spray valves only) before flushing.* Hold a metal part of the gun/valve firmly to the side of a grounded *metal* pail and use the lowest possible fluid pressure during flushing.

MOVING PARTS HAZARD

The piston in the air motor, located behind the air motor plates, moves when air is supplied to the motor. Moving parts can pinch or amputate your fingers or other body parts. Therefore, NEVER operate the pump with the air motor plates removed. KEEP CLEAR of moving parts when starting or operating the pump. Before checking or servicing the pump, follow the **Pressure Relief Procedure** on page 2 to prevent the pump from starting accidentally.

HOSE SAFETY

High pressure fluid in the hoses can be very dangerous. If the hose develops a leak, split or rupture due to any kind of wear, damage or misuse, the high pressure spray emitted from it can cause a fluid injection injury or other serious bodily injury or property damage.

ALL FLUID SPRAY HOSES MUST HAVE SPRING GUARDS! (except certain mastic applications) The spring guards help protect the hose from kinks or bends at or close to the coupling which can result in hose rupture.

TIGHTEN all fluid connections securely before each use. High pressure fluid can dislodge a loose coupling or allow high pressure spray to be emitted from the coupling.

NEVER use a damaged hose. Before each use, check entire hose for cuts, leaks, abrasion, bulging cover, or damage or movement of the hose couplings. If any of these conditions exist, replace the hose immediately. DO NOT try to recouple high pressure hose or mend it with tape or any other device. A repaired hose cannot contain the high pressure fluid.

HANDLE AND ROUTE HOSES CAREFULLY. Do not pull on hoses to move equipment. Do not use fluids or solvents which are not compatible with the inner tube and cover of the hose.

DO NOT expose Graco hose to temperatures above 180°F (82°C) or below -40°F (-40°C).

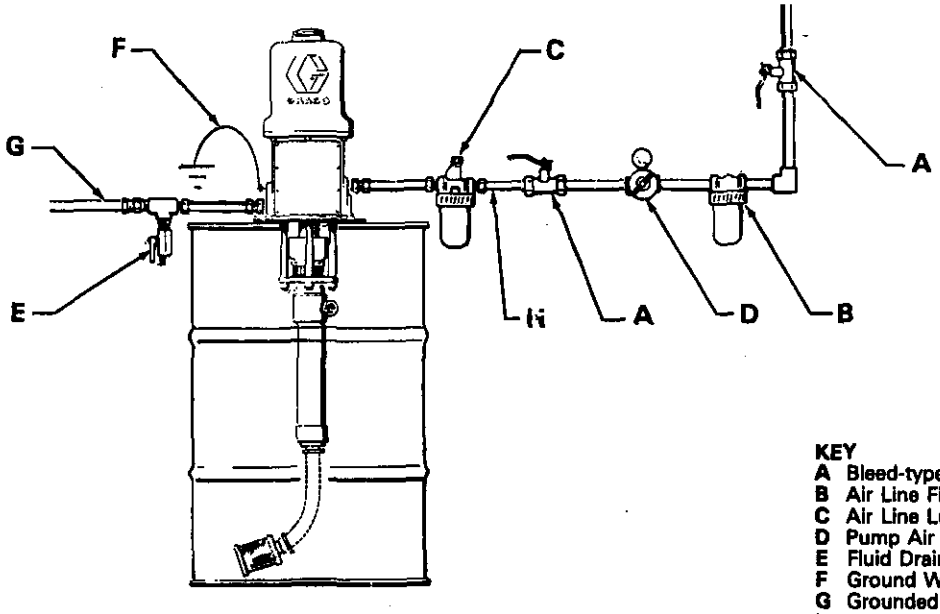
Hose Grounding Continuity

Proper hose grounding continuity is essential to maintaining a grounded spray system. Check the electrical resistance of your air and fluid hoses at least once a week. If your hose does not have a tag on it which specifies the maximum electrical resistance, contact the hose supplier or manufacturer for the maximum resistance limits. Use a resistance meter in the appropriate range for your hose to check the resistance. If the resistance exceeds the recommended limits, replace it immediately. An ungrounded or poorly grounded hose can make your system hazardous. Also, read **FIRE OR EXPLOSION HAZARD,** above.

IMPORTANT

United States Government safety standards have been adopted under the Occupational Safety and Health Act. These standards—particularly the General Standards, Part 1910, and the Construction Standards, Part 1926—should be consulted.

TYPICAL INSTALLATION



KEY
A Bleed-type Master Air Valve
B Air Line Filter
C Air Line Lubricator
D Pump Air Regulator
E Fluid Drain Valve
F Ground Wire
G Grounded Fluid Hose
H Grounded Air Hose

INSTALLATION

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

See page 12 for accessories that are available from Graco. Be sure all accessories are properly sized to withstand the pressures in the system.

The Typical Installation shown above is only a guide to selecting and installing required and optional accessories. For assistance in designing a system to suit your needs, contact your Graco representative.

Mount the pump to suit the type of installation planned. The pump dimensions and mounting hole layout are shown on page 13. In a bung type drum, loosen the vent plug to prevent a vacuum.

System Accessories

WARNING

Two accessories are required in your system: a bleed-type master air valve (A) and a fluid drain valve (E). These accessories help reduce the risk of serious bodily injury including fluid injection, splashing in the eyes or on the skin, and injury from moving parts if you are adjusting or repairing the pump.

The bleed-type master air valve relieves air trapped between this valve and the pump after the air regulator 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.

Install the air line accessories in the approximate order shown in the Typical Installation drawing. Install the bleed-type master air valve (A) *within easy reach of the pump.* An air line filter (B) removes harmful dirt and moisture from the compressed air supply. For automatic air motor lubrication, install an air line lubricator (C) downstream from all other accessories. Install an air regulator (D) to control air to the motor and pump speed.

Be sure the air supply hose is properly grounded, and is large enough to supply an adequate volume of air to the motor.

On the fluid line, install a drain valve (E) close to the fluid outlet to assist in relieving fluid pressure. Connect a suitable, grounded fluid hose and spray gun or dispensing valve to the pump's 3/4 npt(f) outlet.

Grounding

Proper grounding is essential to maintaining a safe system. Read **FIRE OR EXPLOSION HAZARD** on page 3, then ground the pump and system as explained in that section.

OPERATION

WARNING

Pressure Relief Procedure
To reduce the risk of serious bodily injury, including fluid injection, splashing in the eyes or on the skin, or injury from moving parts, always follow this procedure whenever you shut off the pump, when checking or servicing any part of the system, when installing or changing spray tips, and whenever you stop spraying.

1. Engage the spray gun or dispensing valve safety latch.
2. Close the pump air regulator.
3. Close the bleed-type master air valve (required in your system).
4. Disengage the gun or dispensing valve safety latch.
5. Hold a metal part of the gun or valve firmly to a grounded metal waste container and trigger to relieve the fluid pressure.
6. Engage the safety latch again.
7. Open the pump drain valve (required in your system), having a container ready to catch the drainage.
8. Leave the drain valve open until you are ready to spray again.

If you suspect that the spray tip or hose is clogged or that fluid pressure is not fully relieved after following the steps above, VERY SLOWLY loosen the tip guard or hose end coupling and allow pressure to be relieved gradually, then remove completely. Now clear the tip or hose obstruction.

Flush the Pump Before Using
Pumps are tested with lightweight oil which is left in to protect pump parts. To prevent contamination of fluid, flush the pump with a compatible solvent before using it.

Fill the wet-cup 1/2 full with Graco Throat Seal Liquid or a compatible solvent. Keep the cup filled at all times to help prevent the fluid you are pumping from drying on the displacement rod and damaging the throat packings.

Starting and Adjusting the Pump
Open the bleed-type master air valve (A).

Trigger the gun and slowly open the air regulator (D) until the pump starts running. Run the pump slowly until all the air is purged, release the gun trigger, and engage the safety latch—the pump will start and stop as the gun is opened and closed. In a circulating system the pump runs continuously and speeds up or slows down as the system demands. Always use the lowest pressure necessary to get the desired results.

WARNING

NEVER exceed the *MAXIMUM WORKING PRESSURE* of the lowest rated component in the system, to avoid damage to the pump and to reduce the risk of component rupture which can cause serious bodily injury, including fluid injection or splashing of fluids in the eyes or on the skin.

Never allow the pump to run dry of fluid being pumped. A dry pump will quickly accelerate to a high speed, possibly damaging itself. If your pump accelerates quickly, or is running too fast, stop it immediately and check the fluid supply. If the supply container is empty and air has been pumped into lines, prime pump and lines with fluid, or flush and leave filled with compatible solvent. Be sure to eliminate all air from fluid system.

Check Valve Adjustment
The piston and intake valve housing are set for high flow or high viscosity fluids. To set the valves for low viscosity or lower flow rate, which minimizes surging at pump stroke changeover, move the ball stop pins to a lower set of holes, decreasing the check ball travel. See Fig 2.

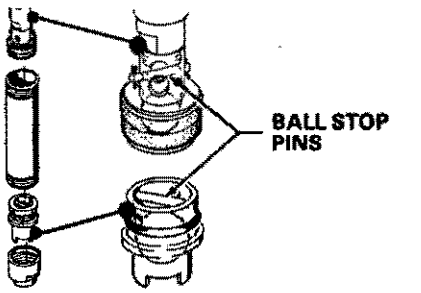


Fig 2

CAUTION

Maximum operating temperature for immersion fluid pump is 480°F (248°C); for air motor 200°F (93°C). These pumps are not warranted against excessive wear due to pumping abrasive or corrosive fluids, other than those recommended by GRACO for use in these pumps.

MAINTENANCE

Shutdown and Care of the Pump
Always stop the pump at the bottom of its stroke to prevent fluid from drying on the rod and damaging the throat packings. When you finish pumping always follow the **Pressure Relief Procedure** above.

If you are pumping fluid which dries, hardens or sets up, flush the system with a compatible solvent as often as necessary to prevent a build up of dried fluid in the pump or hoses.

Every 40 hours of operation, check that the packing nut is tight. Follow **Pressure Relief Procedure** (above) first. Tighten the packing nut just snug—do not overtighten or the packings may be damaged.

Flushing
To reduce the risk of fluid injection injury, static sparking, or splashing, follow the **Pressure Relief Procedure** above, and *remove the spray tip (airless spray guns or spray valves only) before flushing.* Hold a metal part of the gun/valve firmly to the side of a grounded *metal* pail and use the lowest possible fluid pressure during flushing.

Lubrication
The accessory air line lubricator (C) provides automatic air motor lubrication. For daily, manual lubrication, disconnect the regulator, place about 15 drops of light machine oil in the pump air inlet, reconnect the regulator and turn on the air supply to blow oil into the motor.

TROUBLESHOOTING GUIDE

WARNING

Pressure Relief Procedure
To reduce the risk of serious bodily injury, including fluid injection, splashing in the eyes or on the skin, or injury from moving parts, always follow this procedure whenever you shut off the pump, when checking or servicing any part of the system, when installing or changing spray tips, and whenever you stop spraying.

1. Engage the spray gun or dispensing valve safety latch.
2. Close the pump air regulator.
3. Close the bleed-type master air valve (required in your system).
4. Disengage the gun or dispensing valve safety latch.
5. Hold a metal part of the gun or valve firmly to a grounded metal waste container and trigger to relieve the fluid pressure.
6. Engage the safety latch again.
7. Open the pump drain valve (required in your system), having a container ready to catch the drainage.
8. Leave the drain valve open until you are ready to spray again.

If you suspect that the spray tip or hose is clogged or that fluid pressure is not fully relieved after following the steps above, VERY SLOWLY loosen the tip guard or hose end coupling and allow pressure to be relieved gradually, then remove completely. Now clear the tip or hose obstruction.

WARNING

Follow the **Pressure Relief Procedure** before performing any troubleshooting or service procedures.

To reduce the risk of serious bodily injury, NEVER operate the pump with the air motor plate removed. The moving piston behind the plate can pinch or amputate fingers.

NOTE: Check all possible remedies before disassembling the pump.

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 valve, clean if necessary.
	Exhausted fluid supply.	Refill.
	Damaged air motor.	Service. See 307-043.
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 fluid supply.	Refill.
	Obstructed fluid line, valves, gun, etc.	Clear.
	Fluid check valves need adjustment.	Adjust.
	Loose packing nut or worn packings.	Tighten nut or replace packings.
	Damaged cylinder o-rings.	Replace.
Pump operates but output low on downstroke.	Held open or worn fluid intake valve.	Clear, service.
	Damaged cylinder o-rings.	Replace.
Pump operates but output low on upstroke.	Held open or worn fluid piston valve, or packing leaking.	Clear, service.
Erratic or accelerated operation.	Exhausted fluid supply.	Refill.
	Fluid check valves need adjustment.	Adjust.
	Held open or worn fluid intake valve.	Clear, service.
	Held open or worn piston valve, or packing leaking.	Clear, service.

Before you repair the pump:

1. Be sure you have all the necessary repair parts on hand to reduce down time.
2. Packing repair kit 207-580 is available. Refer to the parts page. For the best results, use all the parts in the kit. Reference numbers with a star, for example (*18) indicate that the part is included in the repair kit.
3. If you are using a repair kit, be sure to replace the glands when replacing the packings.
4. Clean all parts as you disassemble the pump, and inspect them for wear or damage. Replace parts as needed. Scoring or irregular surfaces on the displacement rod or polished inner wall of the cylinder cause premature packing wear and leaking. Check these parts by rubbing a finger on the surface and by holding the parts up to a light at a slight angle.

MODEL 206-393 SERVICE

WARNING

To reduce the risk of serious bodily injury, always follow the **Pressure Relief Procedure** on page 6 before servicing any part of this pump.

Refer to Fig 4 and the Parts List on page 10.

Intake Valve

1. Unscrew the intake valve retainer (20). Remove the valve housing (28) and then the ball stop pin (19). Inspect the ball (16) for wear or damage.
2. Be sure there are no nicks in the seat of the housing which would prevent the ball from seating properly. Inspect the o-ring (23).
3. If no further pump service is needed, reassemble the intake valve. Be sure the o-ring (23) is in place and place the ball stop pin in the proper holes. (Refer to OPERATION, page 5.)

Piston

1. With the intake valve removed, unscrew the cylinder (33) and slide it down just enough so you can reach the coupling nut (30). Unscrew the coupling nut and push the piston assembly and the connecting rod (37) out the bottom of the cylinder. Remove the cylinder and check the inner surface for scoring or damage. Check the o-ring (21) in the outlet housing (38) and replace it if necessary.
2. Remove the ball stop pin (26). Use a 1/2 in. (13 mm) diameter rod in the large holes to screw the piston housing (34) off the adapter (31). Remove the packings from the piston.
3. Check the ball (15) and seat for nicks, wear, or damage which would prevent the ball from seating properly.
4. Grease the packings. Place a washer (35*) and a seal (29*) in the large groove of the piston. Wrap the bearing (27*) around the small groove of the piston, leaving a 0.020-0.050 in. (0.508-1.27 mm) gap in the bearing seam.
5. Install the ball (15*) in the piston, and install the ball stop pin (26) in the correct holes. See OPERATION, page 5. Screw the piston assembly onto the adapter.

NOTE: If you are repairing the throat area, skip ahead to the next section. If not, proceed with Step 6.

6. Slide the connecting rod and piston up through the cylinder (33) and reconnect the connecting rod (37) to the displacement rod (24).
7. With the o-ring (21*) in place, screw the cylinder (33) into the outlet housing (38). Reassemble the intake valve to the cylinder.

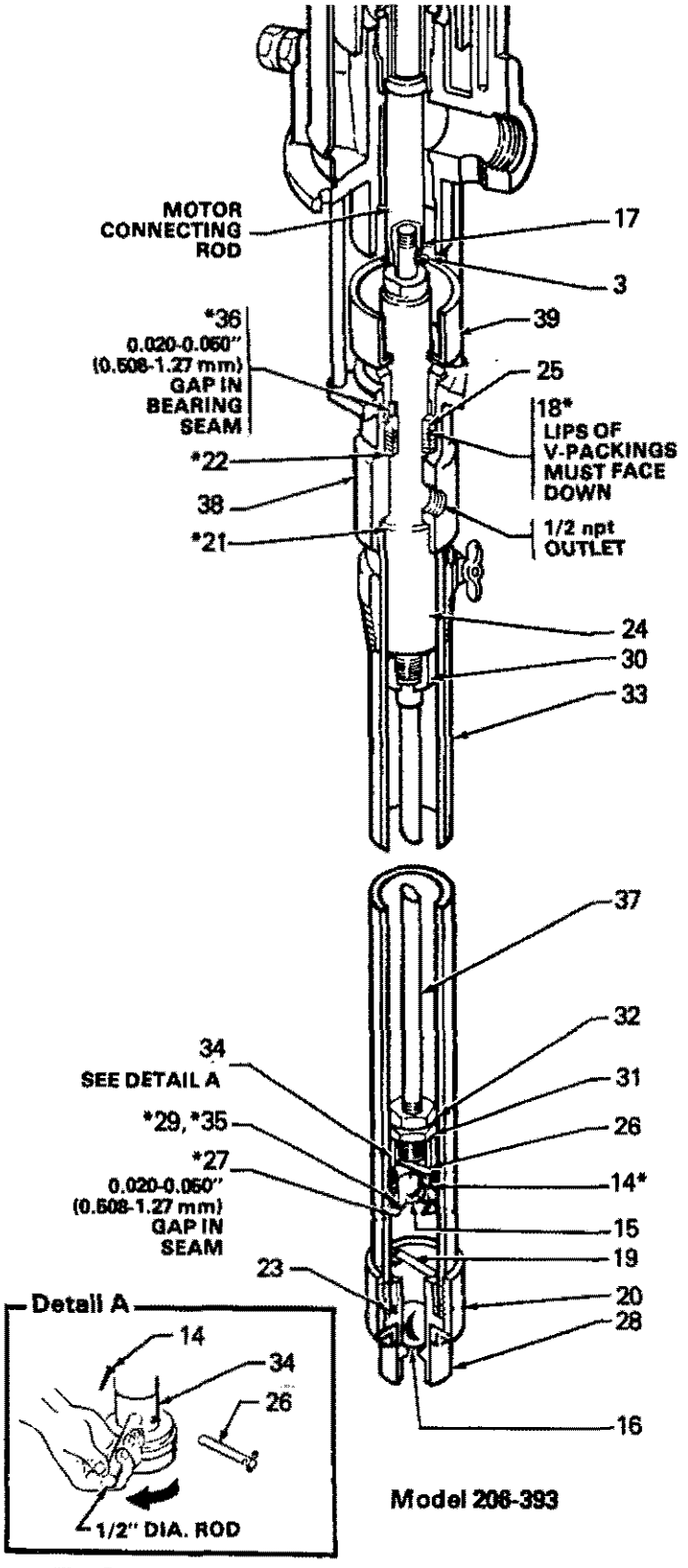


Fig 3

Throat Packings

1. Remove the intake valve, piston assembly, connecting rod, and cylinder as explained in the preceding paragraphs. Remove the cotter pin (3) from the motor connecting rod and unscrew the displacement rod (24).

2. Loosen the packing nut (39). Push the displacement rod (24) down out the bottom of the outlet housing (38). Check the outer surface of the rod for scoring or damage.

3. Screw the packing nut (39) out of the outlet housing (38). Remove the glands and packings from the throat, and the bearing (36) from the packing nut.

4. Grease the new packings. One at a time, install the male gland (22*), four v-packings (18*) with the lips facing down into the outlet housing, and the female gland (25*).

5. Install the bearing (36*) in the packing nut (39), leaving a 0.020-0.050 in. (0.508-1.27 mm) gap in the bearing seam.

6. Push the displacement rod up into the outlet housing (38) until it protrudes from the packing nut (39).

7. Reinstall the connecting rod, cylinder, and intake valve as described in the preceding sections.

8. Tighten the packing nut (39) just tight enough to prevent leakage, but no tighter. Fill it half full with TSL.

9. Reconnect the pump to the motor. Reconnect the ground wire if it was disconnected during servicing.

WARNING

To reduce the risk of serious bodily injury, always follow the **Pressure Relief Procedure** on page 6 before servicing any part of this pump.

Refer to Fig 5 and the Parts List on page 11.

Intake Valve

1. Unscrew the intake valve retainer (17). Remove the valve housing (30) and then the ball stop pin (16). Inspect the ball (13) for wear or damage.
2. Be sure there are no nicks in the seat of the housing which would prevent the ball from seating properly. Inspect the o-ring (22).
3. If no further pump service is needed, reassemble the intake valve. Be sure the o-ring (22) is in place and place the ball stop pin in the proper holes. (Refer to OPERATION, page 5.)

Piston

1. With the intake valve removed, remove the cotter pin (12) from the motor connecting rod and unscrew the displacement rod (23).
2. Loosen the packing nut (33). Push the displacement rod (23) down until the piston assembly clears the cylinder (18). Grasp the piston and pull it and the displacement rod out of the cylinder.
3. Remove the ball stop pin (25). Use a 1/2 in. (13 mm) diameter rod in the large holes to screw the piston housing (28) off the displacement rod. See Detail A. Remove the packings from the piston.
4. Check the ball (13) and seat for nicks, wear, or damage which would prevent the ball from seating properly.
5. Screw the cylinder (18) out of the outlet housing (32). Check the o-ring (20*) in the housing and replace it if necessary. Check the outer surface of the displacement rod (23) and inner surface of the cylinder (18) for scoring or damage.
6. Grease the packings. Place a washer (29*) and a seal (27*) in the large groove of the piston. Wrap the bearing (26*) around the small groove of the piston, leaving a 0.020-0.050 in. (0.508-1.27 mm) gap in the bearing seam.
7. Install the ball (13*) in the piston, and install the ball stop pin (25) in the correct holes. See OPERATION, page 5.
8. Screw the piston onto the displacement rod (18).

NOTE: If you are repairing the throat area, skip ahead to the next section. If not, proceed with Step 9.

9. With the o-ring (20*) in place, screw the cylinder (18) into the outlet housing (32). Slide the displacement rod (23) up from the bottom of the cylinder until the rod protrudes from the packing nut (33). Tighten the packing nut just enough to prevent leaking. Reconnect the displacement pump to the motor.

Throat Packings

1. With the intake valve and displacement rod removed, screw the packing nut (33) out of the outlet housing. Remove the packings and glands from the throat, and the bearing from the packing nut.
2. Grease the new packings. One at a time, install the male gland (21*), four v-packings (15*) *with the lips of the v-packings facing into the housing,* and the female gland (24*).
3. Install a bearing (31*) in the packing nut (33), leaving a 0.020-0.050 in. (0.508-1.27 mm) gap in the bearing seam.
4. Install the o-ring (20*) and cylinder (18) into the outlet housing if they were removed. Guide the displacement rod and piston assembly into the bottom of the cylinder until the rod protrudes through the packing nut (33).
5. Reassemble the intake valve to the cylinder.
6. Tighten the packing nut just enough to stop leakage, but no tighter. Fill the wet-cup one-half full with TSL.
7. Reconnect the pump to the motor. Reconnect the ground wire if it was removed during servicing.

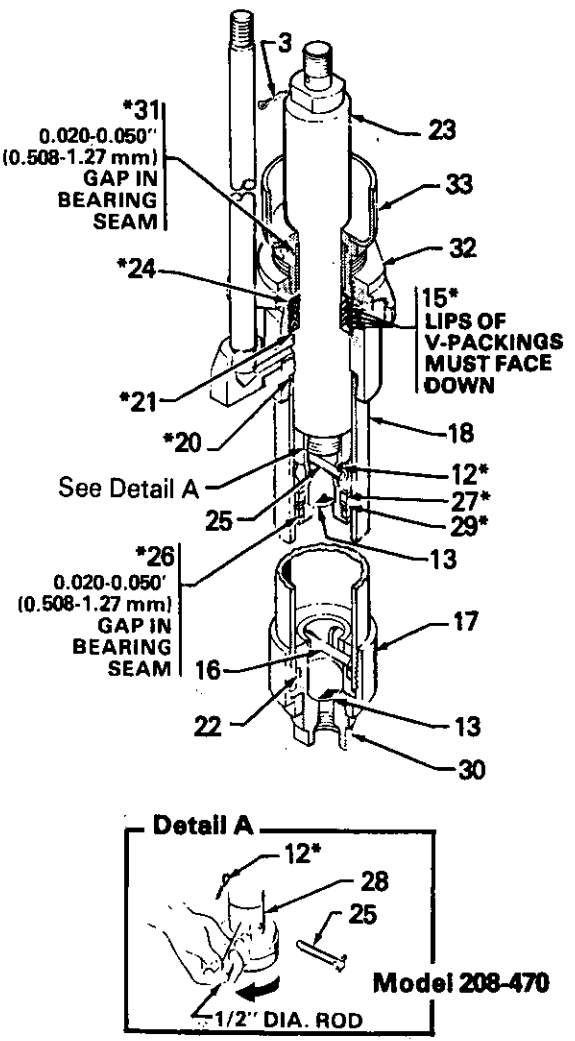


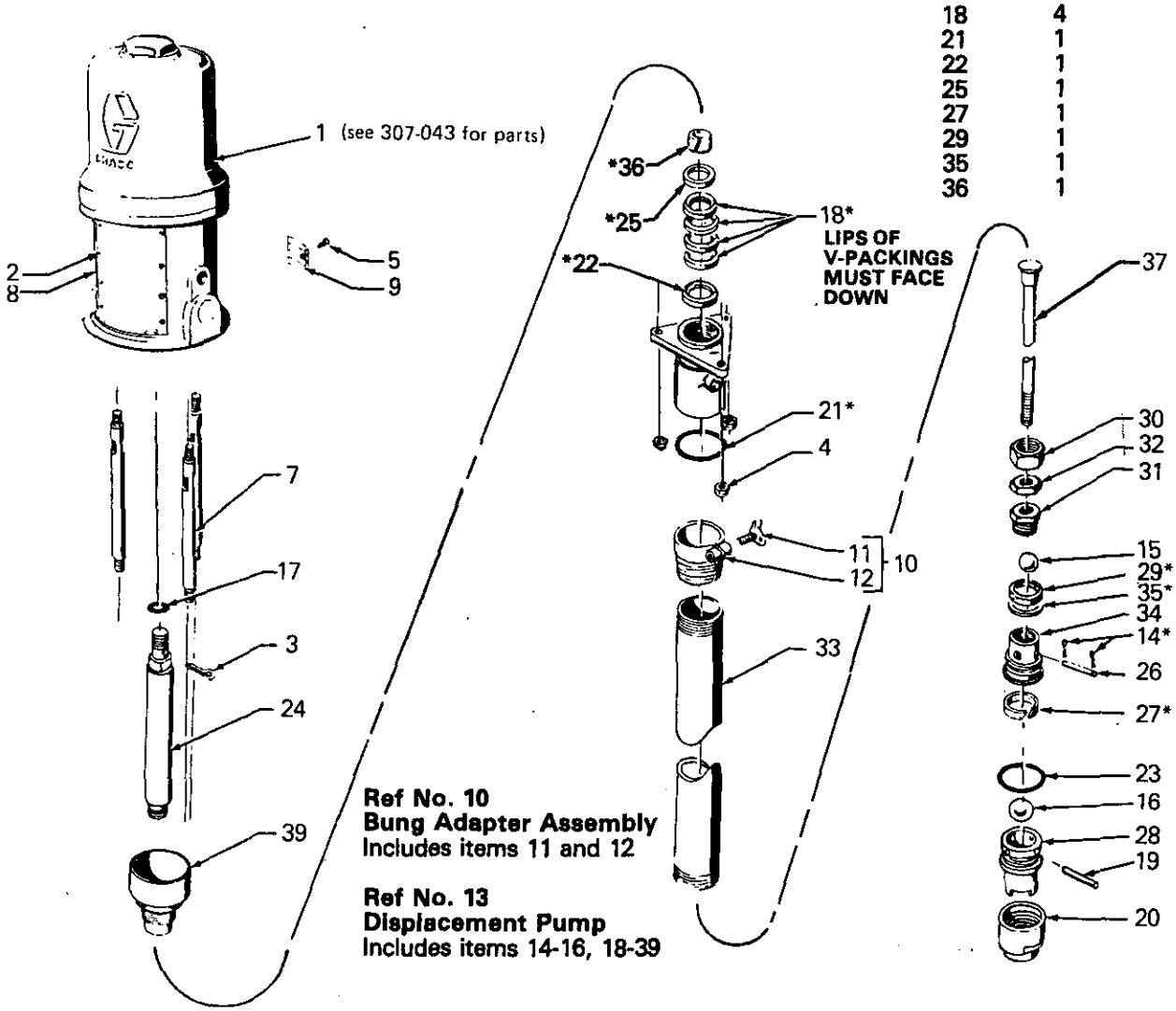
Fig 4

PARTS DRAWING

Model 206-393, Series G
5:1 Ratio Monark Pump
Includes items 1-39

207-580 Displacement Pump Repair Kit
(Must be purchased separately)
Consists of:

Ref No.	Qty
14	1
18	4
21	1
22	1
25	1
27	1
29	1
35	1
36	1



Ref No. 10
Bung Adapter Assembly
Includes items 11 and 12

Ref No. 13
Displacement Pump
Includes items 14-16, 18-39

REF NO.	PART NO.	DESCRIPTION	QTY
1	205-997	MONARK AIR MOTOR (see 307-043 for parts)	1
3	**101-946	PIN, cotter, sst; 1/8" dia; 1-1/2" long	1
4	102-021	LOCKNUT, sst; 3/8-16 thd sz	3
5	104-088	RIVET, blind	2
7	165-297	ROD, tie; 4-3/4" (121 mm) long	3
9	172-446	PLATE, serial	1
10	205-573	BUNG ADAPTER and SCREW ASSY Includes items 11, 12	1
11	101-961	.THUMBSCREW, 1/4-20 thd sz	1
12	205-572	.ADAPTER, bung (bare)	1
13	220-381 Series A	DISPLACEMENT PUMP Assy Includes items 14-16, 18-39	1
14	*100-063	.PIN, cotter, sst; 1/16" dia; 1" long	2
15	**101-917	.BALL, sst; 7/8" dia	1
16	**101-968	.BALL, sst; 1-1/4" dia	1
17	**156-082	O-RING, nitrile rubber	1
18	*162-866	V-PACKING, PTFE	4
19	**162-947	PIN, ball stop	1
20	164-630	RETAINER, intake valve	1
21	*164-782	O-RING, PTFE	1
22	*164-837	GLAND, male	1
23	**164-846	O-RING, PTFE	1
24	165-285	ROD, displacement	1
25	*165-288	GLAND, female	1
26	**165-291	PIN, ball stop	1
27	*165-292	BEARING, PTFE	1
28	**166-025	HOUSING, intake valve	1
29	*166-026	SEAL, PTFE	1
30	166-033	NUT, coupling	1
31	166-036	ADAPTER, connecting rod	1
32	166-037	NUT, jam; 5/8-11 thd sz	1
33	166-038	CYLINDER	1
34	166-510	HOUSING, piston	1
35	*166-512	WASHER, flat; PTFE	1
36	*168-285	BEARING; PTFE	1
37	206-449	ROD, connecting; 28-1/2" (724 mm) long	1
38	207-210	HOUSING, outlet	1
39	207-708	NUT, packing; with wet-cup	1

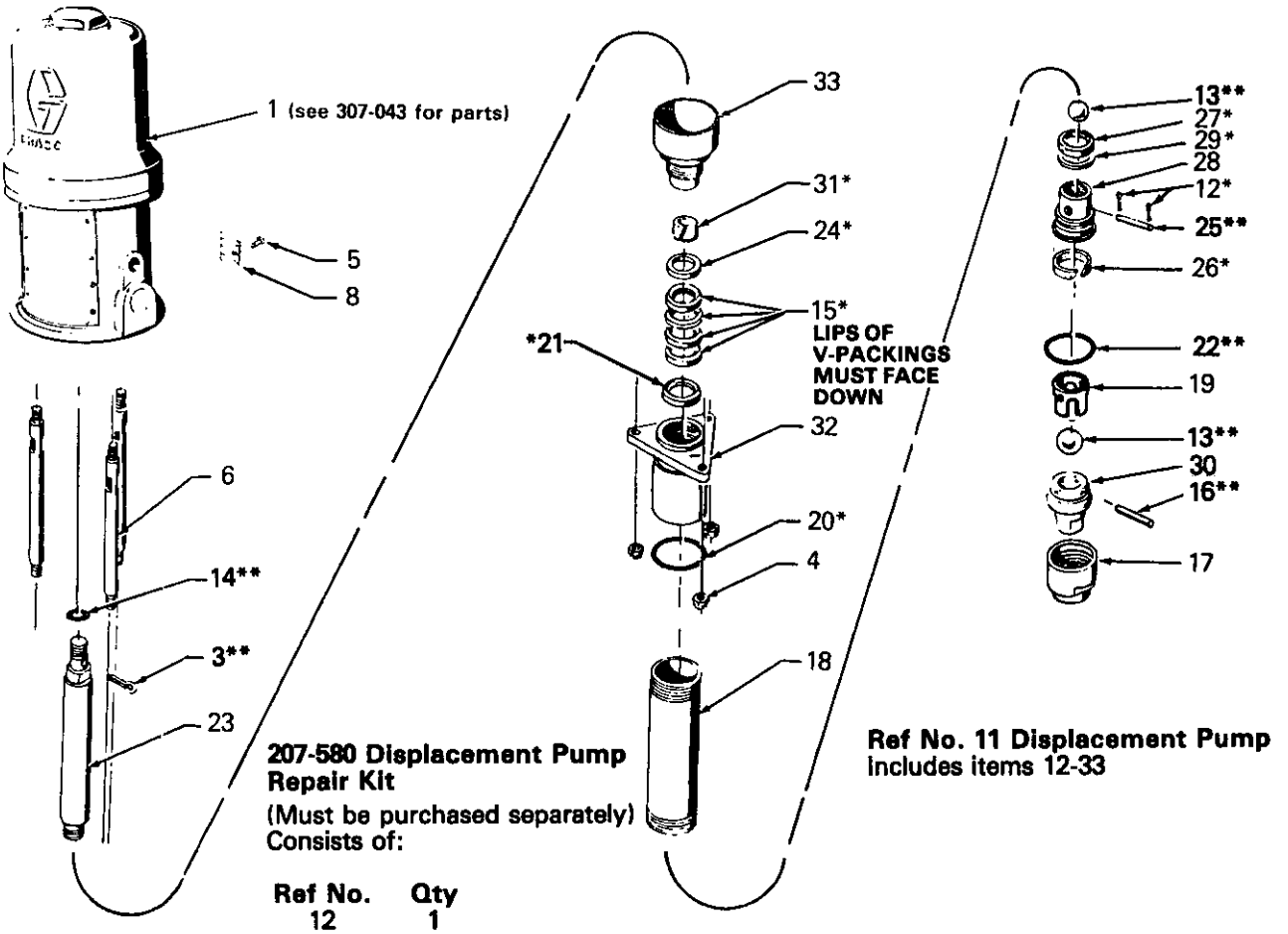
307 Number in description refers to separate instruction manuals.

**Included in repair kit 207-580.*

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

Refer to "How To Order Replacement Parts" on the back cover.

Model 208-470, Series C
5:1 Ratio Monark Pump
Includes items 1-33



207-580 Displacement Pump Repair Kit
(Must be purchased separately)
Consists of:

Ref No.	Qty
12	1
15	4
20	1
21	1
24	1
26	1
27	1
29	1
31	1

Ref No. 11 Displacement Pump
Includes items 12-33

REF NO.	PART NO.	DESCRIPTION	QTY
1	205-997	MONARK AIR MOTOR (see 307-043 for parts)	1
3	**101-946	PIN, cotter, sst; 1/8" dia; 1-1/2" long	1
4	102-021	LOCKNUT, sst; 3/8-16 thd sz	3
5	104-088	RIVET, blind	2
6	165-297	ROD, tie; 4-3/4" (121 mm) long	3
8	172-446	PLATE, serial	1
11	206-784 Series B	DISPLACEMENT PUMP Assy Includes items 12-33	1
12	*100-063	.PIN, cotter, sst; 1/16" dia; 1" long	2
13	**101-917	.BALL, sst; 7/8" dia	2
14	**156-082	.O-RING, nitrile rubber	1
15	*162-866	.V-PACKING, PTFE	4
16	**162-947	.PIN, ball stop	1
17	164-630	.RETAINER, intake valve	1
18	164-631	.CYLINDER	1
19	164-679	.GUIDE, ball, intake valve	1
20	*164-782	.O-RING, PTFE	1
21	*164-837	.GLAND, male	1
22	**164-846	.O-RING, PTFE	1
23	165-285	.ROD, displacement	1
24	*165-288	.GLAND, female	1
25	**165-291	.PIN, ball stop	1
26	*165-292	.BEARING, PTFE	1
27	*166-026	.SEAL, piston; PTFE	1
28	166-510	.HOUSING, piston	1
29	*166-512	.WASHER, flat; PTFE	1
30	166-616	.HOUSING, intake valve; 3/4 npt(f)	1
31	*168-285	.BEARING, PTFE	1
32	205-999	.HOUSING, outlet	1
33	207-708	.NUT, packing with wet-cup	1

307 Number in description refers to separate instruction manuals.

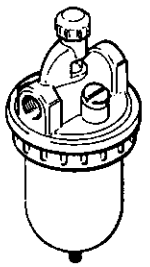
**Included in Repair Kit 207-580.*

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

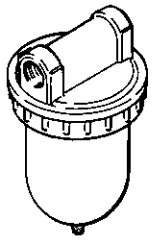
Refer to "How To Order Replacement Parts" on the back cover.

ACCESSORIES (Must be purchased separately)

AIR LINE LUBRICATOR 214-847
250 psi (17.5 bar) MAXIMUM WORKING PRESSURE
3/8 npt Inlet and Outlet

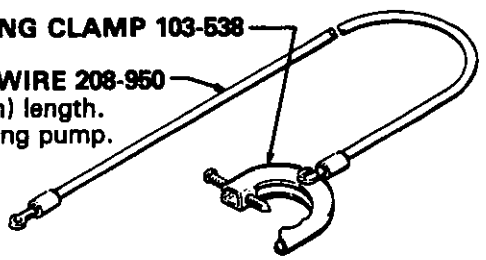


AIR LINE FILTER 106-149
250 psi (17 bar) MAXIMUM WORKING PRESSURE
1/2 npt Inlet and Outlet

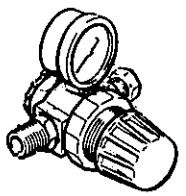


GROUNDING CLAMP 103-538

GROUND WIRE 208-950
25 ft (7.6 m) length.
For grounding pump.

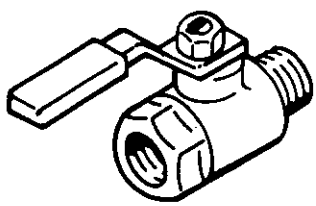


AIR PRESSURE REGULATOR AND GAUGE 202-858
200 psi (14 bar) MAXIMUM WORKING PRESSURE
1/2 npt Inlet and Outlet

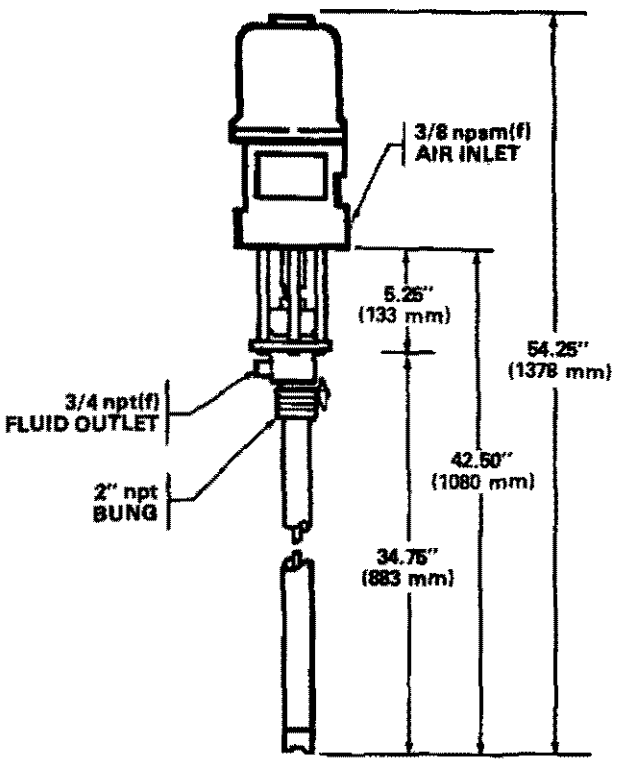


GRACO THROAT SEAL LIQUID
Non-evaporating solvent for wet-cup
206-995 1 quart (0.95 liter)
206-996 1 gallon (3.8 liter)

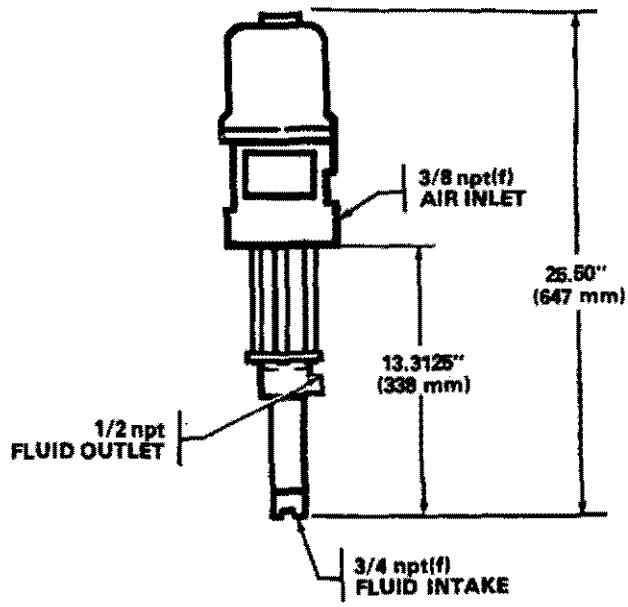
BLEED-TYPE MASTER AIR VALVE (Required)
300 psi (21 bar) MAXIMUM WORKING PRESSURE
Relieves air trapped in the air line between the pump air inlet and this valve when closed.
107-141 3/4 npt(m x f) inlet & outlet
107-142 1/2 npt(m x f) inlet & outlet



DIMENSIONAL DRAWING

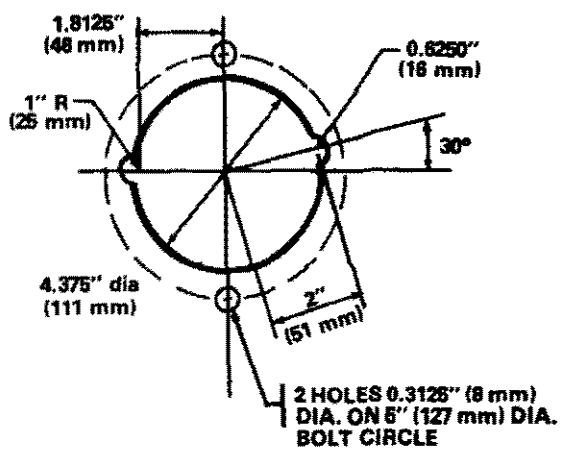


Model 206-393
Weight: 30 lb (13 kg)



Model 206-470
Weight: 20 lb (9 kg)

MOUNTING HOLE LAYOUT



TECHNICAL DATA

Fluid pressure ratio	: 5:1
Maximum working pressure	: *Pump 206-393:* 900 psi (62 bar) *Pump 208-470:* 600 psi (41 bar)
Recommended air operating range	: *Pump 206-393:* 30-180 psi (2-12 bar) *Pump 208-470:* 30-120 psi (2-8 bar)
Pump cycles per gallon (liter)	: 28 (8)
Recommended maximum pump delivery	: 2-1/2 gpm (66 cycles/min)
Air consumption	: Approx. 8.2 cfm (0.23 m^3/min) at 1 gpm (3.8 liter/min) at 100 psi (7 bar)
Wetted parts	: 303 Stainless Steel and PTFE
Maximum operating temperature for disp pump	: 480°F (213°C)
Maximum operating temperature for air motor	: 200°F (93°C)

SERVICE INFORMATION

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

ASSEMBLY CHANGED	PART STATUS	REF NO.	PART NO.	NAME
Model 206-393 Pump	DELETED	2	100-078	Screw
	DELETED	6	155-665	Union
	DELETED	8	172-443	Plate
	OLD		None	Displ. Pump
	NEW	13	220-381	Displ. Pump
Model 208-470 Pump	DELETED	2	100-078	Screw
	DELETED	7	172-443	Plate

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

DISCONTINUED MODEL NOTE: Model 205-639 has been discontinued and removed from the manual.

HOW TO ORDER REPLACEMENT PARTS

1. To be sure you receive the correct replacement parts, kit or accessories, always give all of the information requested in the chart below.
2. Check the parts list to identify the correct part number; ***do not use the ref. no. when ordering.***
3. Order all parts from your nearest Graco distributor.

6 digit PART NUMBER	QTY	PART DESCRIPTION

THE GRACO WARRANTY AND DISCLAIMERS

WARRANTY

Graco warrants all equipment manufactured by it 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. As purchaser's sole remedy for breach of this warranty, Graco will, for a period of twelve months from the date of sale, repair or replace any part of the equipment proven 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, 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 with Graco equipment of 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 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 material or workmanship, repairs will be made at a reasonable charge, which charges may include the the costs of parts, labor and transportation.

DISCLAIMERS AND LIMITATIONS

THE TERMS OF THIS WARRANTY CONSTITUTE PURCHASER'S SOLE AND EXCLUSIVE REMEDY AND ARE 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. IN NO CASE SHALL GRACO'S LIABILITY EXCEED THE AMOUNT OF THE PURCHASE PRICE. ANY ACTION FOR BREACH OF WARRANTY MUST BE BROUGHT WITHIN TWO (2) YEARS OF THE DATE OF SALE.

EQUIPMENT NOT COVERED BY GRACO WARRANTY

GRACO MAKES NO WARRANTY, AND DISCLAIMS ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, WITH RESPECT TO ACCESSORIES, EQUIPMENT, MATERIALS, OR COMPONENTS SOLD BUT NOT MANUFACTURED BY GRACO. These items sold, but not manufactured by Graco (such as electric motor, 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.

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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