

INSTRUCTIONS-PARTS LIST



306-694

Rev. W
Supersedes Rev U
and PCN W



This manual contains important
warnings and information.
READ AND KEEP FOR REFERENCE.

INSTRUCTIONS

First choice when
quality counts.™

HYDRA-SPRAY®

30:1 RATIO BULLDOG® PUMP

3000 psi (21.0 MPa, 210 bar) MAXIMUM FLUID WORKING PRESSURE

100 psi (0.7 MPa, 7 bar) MAXIMUM AIR INPUT PRESSURE

Model 237-004, Series A

With Reduced Icing Quiet Air Motor and Severe-Duty Displacement Pump*

Model 221-068, Series A

With Quiet Air Motor and Severe-Duty Displacement Pump*

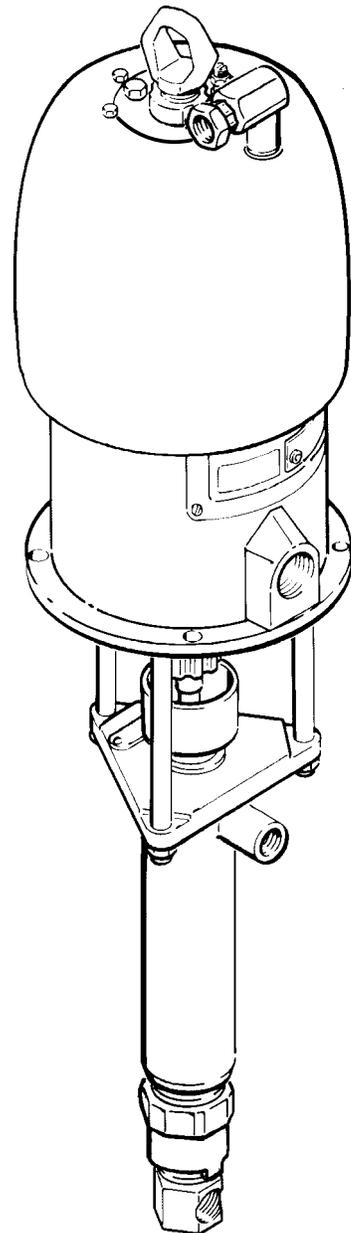
Model 217-579, Series B

With Standard Air Motor and Severe-Duty Displacement Pump*

Model 237-067, Series A

With Standard Air Motor and PTFE-Packed Displacement Pump

* Severe-Duty Displacement Pumps have an abra-
sion and corrosion-resistant displacement rod and
sleeve. Refer to **Technical Data** in manual 307-862
for Wetted Parts information.



MODEL 217-579 SHOWN

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

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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.

- This equipment is for professional use only.
- Read all instruction manuals, tags, and labels before operating the equipment.
- Use the equipment only for its intended purpose. If you are uncertain about usage, call your Graco distributor.
- Do not alter or modify this equipment. Use only genuine Graco parts and accessories.
- Check equipment daily. Repair or replace worn or damaged parts immediately.
- Do not exceed the maximum working pressure of the lowest rated system component. This equipment has a **3000 psi (21.0 MPa, 210 bar) maximum working pressure at 100 psi (0.7 MPa, 7 bar) maximum incoming air pressure.**
- 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 82°C (180°F) or below -40°C (-40°F).
- Wear hearing protection when operating this equipment.
- Do not lift pressurized equipment.
- Comply with all applicable local, state, and national fire, electrical, and safety regulations.

WARNING



INJECTION HAZARD

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

- Fluid injected into the skin might look like just a cut, but it is a serious injury. **Get immediate medical attention.**
- Do not point the gun 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 whenever you: are instructed to relieve pressure; stop spraying; clean, check, or service the equipment; and install or clean the spray tip.
- Tighten all fluid connections before operating the equipment.
- Check the hoses, tubes, and couplings daily. Replace worn, damaged, or loose parts immediately. Permanently coupled hoses cannot be repaired; replace the entire hose.
- Use only Graco approved hoses. Do not remove any spring guard that is used to help protect the hose from rupture caused by kinks or bends near the couplings.



MOVING PARTS HAZARD

Moving parts, such as the air motor piston, can pinch or amputate your fingers.

- Keep clear of all moving parts when starting or operating the pump.
- Before servicing the equipment, follow the **Pressure Relief Procedure** on page 8 to prevent the equipment from starting unexpectedly.

WARNING



FIRE AND EXPLOSION HAZARD

Improper grounding, poor ventilation, open flames or sparks can cause a hazardous condition and result in a fire or explosion and serious injury.



- Ground the equipment and the object being sprayed. 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

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.

1. *Pump*: loosen the grounding lug locknut (W) and washer (X). Insert one end of a 12 ga (1.5 mm²) minimum ground wire (Y) into the slot in lug (Z) and tighten the locknut securely. See Fig. 1. Connect the other end of the wire to a true earth ground.
2. *Air and fluid hoses*: use only grounded hoses with a maximum of 500 ft (150 m) combined hose length to ensure grounding continuity.
3. *Air compressor*: follow manufacturer's recommendations.
4. *Spray gun*: grounding is obtained through connection to a properly grounded fluid hose and pump.

5. *Object being sprayed*: according to your local code.
6. *Fluid supply container*: according to your local code.
7. *All solvent pails used when flushing*, according to your local code. Use only metal pails, which are conductive, placed on a grounded surface. Do not place the pail on a nonconductive surface, such as paper or cardboard, which interrupts the grounding continuity.
8. *To maintain grounding continuity when flushing or relieving pressure*, always hold a metal part of the spray gun firmly to the side of a grounded metal pail, then trigger the gun.

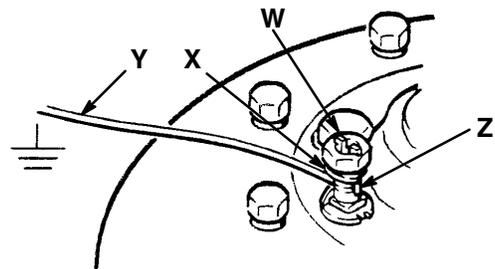


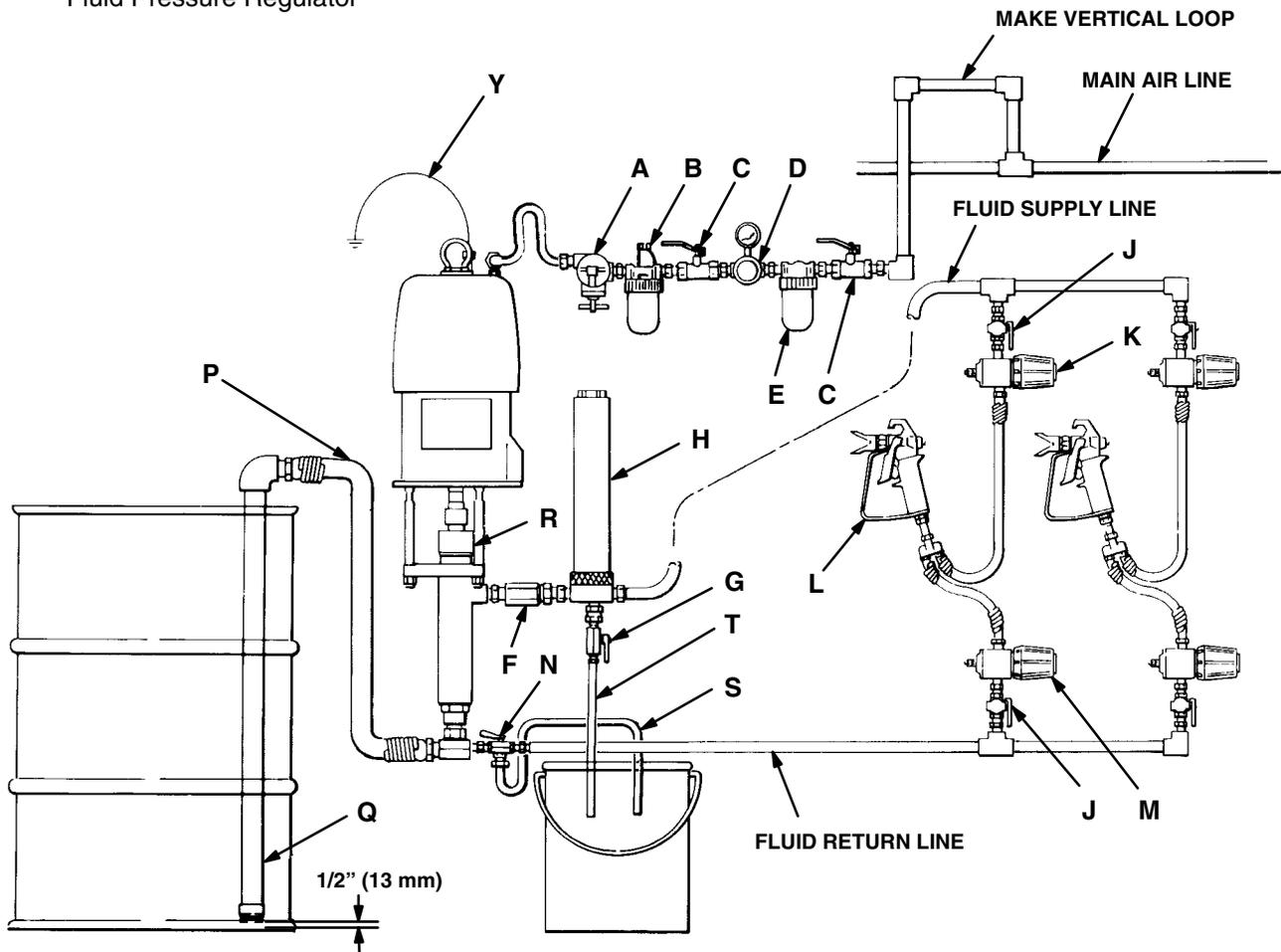
Fig. 1

Installation

Typical Installation

KEY

- | | | | |
|----------|--|----------|-------------------------|
| A | Pump Runaway Valve | L | Spray Gun |
| B | Air Line Lubricator | M | Back Pressure Regulator |
| C | Bleed-Type Master Air Valve (required) | N | Director Valve |
| D | Pump Air Regulator | P | Fluid Suction Hose |
| E | Air Line Filter | Q | Suction Tube |
| F | Check Valve | R | Packing Nut/Wet-Cup |
| G | Fluid Drain Valve (required) | S | Drain Back Tube |
| H | Surge Tank | T | Drain Tube |
| J | Fluid Shutoff Valve | Y | Ground Wire (required) |
| K | Fluid Pressure Regulator | | |



Installation

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

If you supply your own accessories, be sure they are adequately sized and pressure-rated to meet the system's requirements.

The Typical Installation drawing on page 6 shows the pump being used for continuous duty over extra long circulating lines with multiple spray outlets. This drawing is only a guide for selecting and installing system components and accessories. Contact your Graco distributor for help in designing a system to suit your particular needs.

SYSTEM ACCESSORIES

Refer to the Typical Installation drawing on page 6.

WARNING

Two accessories are required in your system: a bleed-type master air valve (C) and a fluid drain valve (G). These accessories help reduce the risk of serious 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 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.

Mounting the Pump

Refer to the Dimensions on page 18, and mount the pump to suit the type of installation planned. If you are using a wall bracket, be sure the wall is strong enough to support the weight of the pump, bracket, accessories, and operating stress.

Air Line Accessories

Install the following accessories in the order shown in the Typical Installation, using adapters as necessary:

A pump runaway valve (A) senses when the pump is running too fast and automatically shuts off the air to the motor. A pump which runs too fast can be seriously damaged. Install closest to the pump air inlet.

An air line lubricator (B) provides automatic air motor lubrication.

A bleed-type master air valve (C) is required in your system to relieve air trapped between it and the air

motor when the valve is closed (see the **WARNING** at left). Be sure the bleed valve is easily accessible from the pump, and is located **downstream** from the air regulator.

An air regulator (D) controls pump speed and outlet pressure by adjusting the air pressure to the pump. Locate the regulator close to the pump, but **upstream** from the bleed-type master air valve.

An air line filter (E) removes harmful dirt and moisture from the compressed air supply.

A second bleed-type air valve (C) isolates the air line accessories for servicing. Locate upstream from all other air line accessories.

When dropping the air line down from the main air supply, always install plumbing in a vertical loop as shown in the Typical Installation.

Fluid Supply Line Accessories

Install the following accessories in the positions shown in the Typical Installation, using adapters as necessary:

A check valve (F) prevents backflow into the pump when the pump is shut off.

A surge tank (H) with fluid filter reduces line pulsations and filters the fluid.

A fluid drain valve (G) is required in your system to relieve fluid pressure in the hose and gun (see the **WARNING** at left).

When dropping down to each gun station, install a **fluid shutoff valve (J)** to isolate the station during maintenance and repair.

Install a **fluid pressure regulator (K)** for precise control of pressure to the **gun (L)**.

Fluid Return Line Accessories

Install the following accessories in the positions shown in the Typical Installation, using adapters as necessary:

Install a **back pressure regulator (M)** after each gun station to maintain constant back pressure in the system.

Install a **shutoff valve (J)** after each back pressure regulator to isolate the station for repair and maintenance.

Pump Intake and Suction Line

In a circulating system such as that shown in the Typical Installation, remove the intake elbow (8) supplied with the pump and replace it with an intake manifold. Install a **director valve (N)** in the intake manifold. Connect the fluid return line to the director valve. Connect a drain back tube (S) to the branch of the director valve.

Connect the **suction hose (P)** to the pump intake or the intake manifold. The **suction tube (Q)** should rest 1/2 in. (13 mm) off the bottom of the supply container.

Operation

Pressure Relief Procedure

WARNING



INJECTION HAZARD

The system pressure must be manually relieved to prevent the system from starting or spraying accidentally. Fluid under high pressure can be injected through the skin and cause serious injury. To reduce the risk of an injury from injection, splashing fluid, or moving parts, follow the **Pressure Relief Procedure** whenever you:

- are instructed to relieve the pressure,
- stop spraying,
- check or service any of the system equipment,
- or install or clean the spray tips.

1. Lock the gun trigger safety.
2. Shut off the air to the pump.

3. Close the bleed-type master air valve (required in your system).
4. Unlock the gun trigger safety.
5. Hold a metal part of the gun firmly to the side of a grounded metal pail, and trigger the gun to relieve pressure.
6. Lock the gun trigger safety.
7. Open the drain valve (required in you system), having a grounded metal container ready to catch the drainage.
8. Leave the drain valve open until you area ready to spray again.

If you suspect that the spray tip or hose is completely clogged, or that pressure has not been fully relieved after following the steps above, very slowly loosen the tip guard retaining nut or hose end coupling and relieve pressure gradually, then loosen completely. Now clear the tip or hose.

Operation

WARNING

Moving parts can pinch or amputate your fingers or other body parts. When air is supplied to the motor, the air motor piston (located behind the air motor shield) moves. Therefore, NEVER operate the pump with the air motor shield removed.

Flush the Pump Before Using

WARNING

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

The pump is tested with lightweight oil, which is left in to protect the pump parts. If the fluid you are pumping may be contaminated by the oil, flush out the oil with a compatible solvent before using the pump. If the pump is being used to supply a circulating system, allow the solvent to circulate until the fluid lines are thoroughly flushed.

WARNING

For your safety, read the warning section, **FIRE AND EXPLOSION HAZARD** on page 4 before flushing, and follow all recommendations given there.

Daily System Startup, Circulating Supply Systems

NOTE: Be sure the wet-cup is 1/2 full with Graco Throat Seal Liquid or compatible solvent.

1. If you are using an agitator, turn it on and thoroughly mix the coating fluid.
2. Be sure the bleed-type master air valves (C), the air regulator (D), and the fluid drain valves (G) are closed, and the shutoff valves (J), fluid pressure regulators (K), and back pressure regulators (M) are open.

3. Place the suction tube (Q) in the fluid supply.
4. Open the bleed-type master air valves (C).

WARNING

To reduce the risk of splashing and static sparking, maintain firm metal-to-metal contact between the gun and a grounded metal pail when priming the pump.

5. **If there IS solvent in the system:**
 - a. Turn the director valve (N) to circulate.
 - b. Disconnect the return line from the director valve, and place it in a large waste container.
 - c. Open the pump air regulator **slowly**, just until the pump is running slowly and smoothly. Watch for coating fluid to come from the return line, and then quickly shut off the pump. Cap the hose end with a high pressure plug or cap.
 - d. With no tip installed, unlock the gun trigger safety. Hold the trigger open and restart the pump. Watch for coating fluid to appear at the gun, and then quickly release the trigger. Lock the gun trigger safety. Repeat for all gun stations.
 - e. Reinstall the return line.
6. **If there IS NO solvent in the system:**
 - a. Turn the director valve (N) to circulate.
 - b. With no tip installed, unlock the gun trigger safety. Trigger the gun into a container and **slowly** open the pump air regulator, just until the pump is running slowly and smoothly. Allow the fluid to purge air from the gun line hose, then release the trigger and lock the gun trigger safety. Repeat for all gun stations.
 - c. Allow the pump to circulate fluid slowly and purge all air from the return line.

Operation

7. **If the pump is hard to prime**, follow steps 1 to 4. Place a waste container under the fluid drain valve and open the valve. **Slowly** open the air regulator. Run the pump slowly until it primes. Shut off the air regulator; the pump will stall. Quickly close the drain valve. Continue with step 5 or 6.
8. **Relieve the pressure** and install a spray tip and tip guard.
9. Unlock the gun trigger safety, start the pump, and spray a test pattern to check the atomization and pattern. **Relieve the pressure** before making any adjustments to the spray tip or system.
10. Adjust the fluid pressure regulator (K), back pressure regulator (M), and pump air input pressure for the best spraying combination and proper circulation of the fluid. Record the regulator and air pressure settings for future reference.
11. Adjust the air line lubricator (B) and pump runaway valve (A). See the instructions supplied with them.
12. Lock the gun trigger safety whenever you stop spraying, even for a moment. Always **relieve the pressure** when shutting down for any period of time.
13. Never allow the pump to run dry of the fluid being pumped. A dry pump will quickly accelerate to a high speed, possibly damaging itself. A pump runaway valve (A), which shuts off the air supply to the pump if the pump accelerates beyond the pre-set speed, is available. See the Typical Installation on page 6. 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 the lines, refill the container and prime the pump and the lines with fluid, or flush and leave it filled with a compatible solvent. Be sure to eliminate all air from the fluid system.

WARNING

To reduce the risk of overpressurizing the pump, which can cause a component to rupture and result in serious injury, NEVER exceed 100 psi (0.7 MPa, 7 bar) MAXIMUM AIR PRESSURE to the pump.

Reduce the air pressure, which reduces the fluid outlet pressure, if any fluid line accessory is not rated to withstand the maximum working pressure of this pump.

Maintenance

WARNING

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

Keep the packing nut/wet-cup (R) half filled with Graco Throat Seal Liquid (TSL) or compatible solvent, to help prolong the packing life. Check the tightness of the packing nut weekly. Adjust the packing nut so it is just tight enough to prevent leakage; do not overtighten. Always **relieve the pressure** before adjusting the packing nut.

Each day, check the lubricator and fill as needed, drain the air filter, and clean any fluid line filters. Always **relieve the pressure** first.

Check Valve Adjustment

To adjust the intake check valve, refer to the separate displacement pump manual 307–862.

Shutdown and Care of the Pump

WARNING

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

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

Always flush the pump before the fluid dries on the displacement rod. If you do not flush a circulating system every day, be sure the fluid is circulated frequently enough to prevent fluid from drying or settling during shutdowns.

Never leave water or water-based fluid in the pump overnight. First flush with water or a compatible solvent, then with mineral spirits. **Relieve the pressure** after flushing, but leave the mineral spirits in the pump to protect parts from corrosion.

Troubleshooting

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. **Relieve the pressure.**
2. Check all possible causes and problems before disassembling the pump.

PROBLEM	CAUSE	SOLUTION
Pump fails to operate	Restricted line or inadequate air supply	Clear; increase air supply.
	Obstructed fluid hose, gun, or dispensing valve	Open, clear.*
	Exhausted fluid supply	Refill; purge all air from pump and fluid lines.
	Fluid dried on displacement rod	Clean; always stop pump at bottom of stroke; keep wet-cup 1/2 filled with compatible solvent.
	Damaged air motor	Service air motor (see 307-049 or 307-304).
Pump operates but output low on both strokes	Restricted line or inadequate air supply	Clear; increase air supply.
	Obstructed fluid hose, gun, or dispensing valve	Open, clear.*
	Exhausted fluid supply	Refill; purge all air from pump and fluid lines.
	Air in displacement pump and hose	Reprime.
	Check valves need adjustment	Adjust (see manual 307-862).
	Packing nut too tight or too loose	Adjust (see page 11).
	Worn throat packings	Replace (see manual 307-862).
Pump operates but output low on down stroke	Held open or worn intake valve	Clear; service. See manual 307-862.
Pump operates but output low on up stroke	Held open or worn fluid piston valve or packings	Clear; service. See manual 307-862.
Erratic or accelerated operation	Exhausted fluid supply	Refill; purge all air from pump and fluid lines.
	Packing nut too tight	Adjust (see page 11).
	Check valves need adjustment	Adjust (see manual 307-862).
	Held open or worn intake valve	Clear; service. See manual 307-862.
	Held open or worn fluid piston valve or packings	Clear; service. See manual 307-862.

* To determine if the fluid hose or gun is obstructed, **relieve the pressure**. Disconnect the fluid hose and place a container at the pump fluid outlet to catch any fluid. Turn on the air just enough to start the pump (about 20-40 psi [140-280 kPa, 1.4-2.8 bar]). If the pump starts when the air is turned on, the obstruction is in the fluid hose or gun.

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 to the air motor's air inlet.
3. Remove the upper cotter pin (1) and unscrew the coupling nut (10) from the air motor (16). Unscrew the tie rod locknuts (3) from the tie rods (9). Carefully pull the displacement pump (17) away from the motor.
4. Loosen the packing nut (R). Loosen the jam nut (4). Remove the lower cotter pin (1) from the displacement rod (U). Unscrew the connecting rod (12) from the displacement rod (U) and from the coupling (11). See Fig 2.
5. Refer to the separate manual 307-862 for displacement pump service instructions.
6. Refer to the air motor instruction manual supplied with your pump for air motor service instructions (307-049 for Standard Bulldog Motors, and 307-304 for Quiet Bulldog Motors).

RECONNECTING THE DISPLACEMENT PUMP

1. Inspect the o-ring (7) on the connecting rod (12) and replace if necessary. Lubricate the threads of the connecting rod (12). Insert the coupling (11) in the coupling nut (10) and screw the coupling onto the connecting rod (12) so the holes in the coupling align with the top holes in the rod.
2. Screw the connecting rod (12) into the displacement rod (U) until the holes in both parts are aligned. Install the lower cotter pin (1). Tighten the jam nut (4) down against the displacement rod (U). See Fig 2.
3. Orient the pump's fluid outlet to the air motor's air inlet as was noted in step 2 under **Disconnecting the Displacement Pump**. Position the displacement pump (17) on the tie rods (9).
4. Screw the locknuts (3) onto the tie rods (9) loosely. Screw the coupling nut (10) onto the air motor (16). Install the upper cotter pin (1).
5. Mount the pump and reconnect all hoses. Reconnect the ground wire if it was disconnected during repair.
6. Tighten the tie rod locknuts (3) evenly, and torque to 40-50 ft-lb (54-68 N.m).

7. Tighten the packing nut/wet-cup (R) with the wrench (5) supplied, so it is just snug – no tighter. Fill the wet-cup half full with Graco Throat Seal Liquid or compatible solvent. Start the pump and run it slowly, at about 20 psi (140 MPa, 1.4 bar) air pressure, to check that it is operating properly.

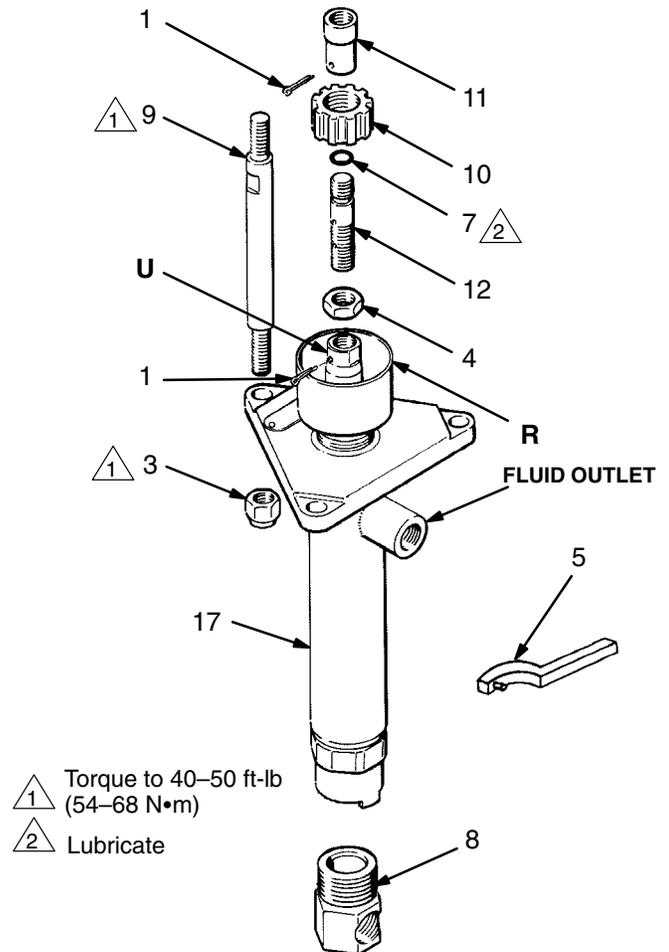
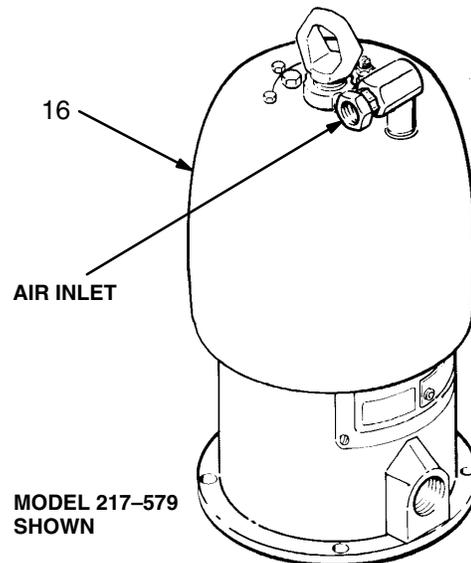
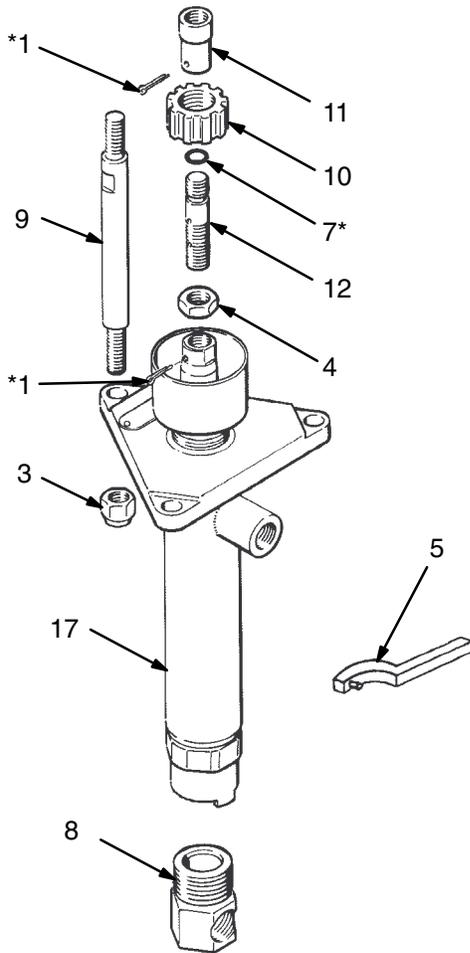
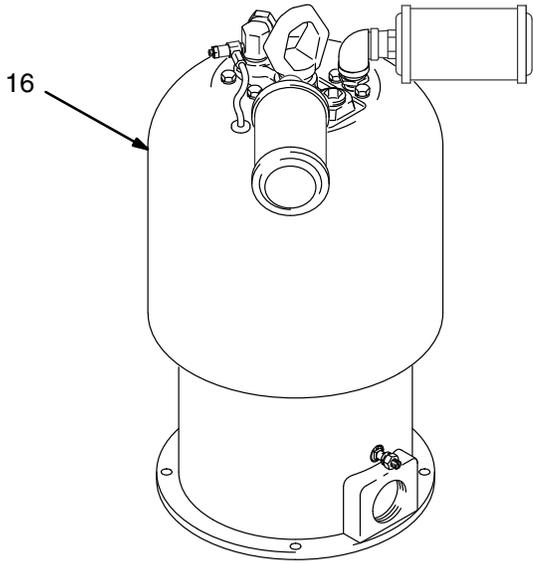


Fig. 2

Parts

Model 237-004, Series A
30:1 Ratio Bulldog Pump,
 with Reduced Icing Quiet Air Motor and Severe-Duty Displacement Pump
 Includes items 1-17



REF NO.	PART NO.	DESCRIPTION	QTY
1	100-103*	PIN, cotter; 0.12" (3.2 mm) x 1.5" (38 mm)	2
3	101-712	NUT, lock; w/nylon inserts; 5/8-11	3
4	101-936	NUT, hex, jam; 3/4-10	1
5	102-176	WRENCH, spanner	1
7	158-674*	SEAL, o-ring; buna-N	1
8	180-180	ELBOW, street; 1-1/2" npt(m) x 1" npt(f)	1
9	167-911	ROD, tie; 7" (178 mm), shoulder-to-shoulder	3
10	168-210	NUT, coupling	1
11	168-211	COUPLING	1
12	168-212	ROD, connecting	1
14	176-529**	LABEL, warning (not shown)	1
16	237-001	BULLDOG AIR MOTOR, reduced icing, quiet See 307-304 for parts	1
17	217-530	DISPLACEMENT PUMP ASSY See 307-862 for parts	1

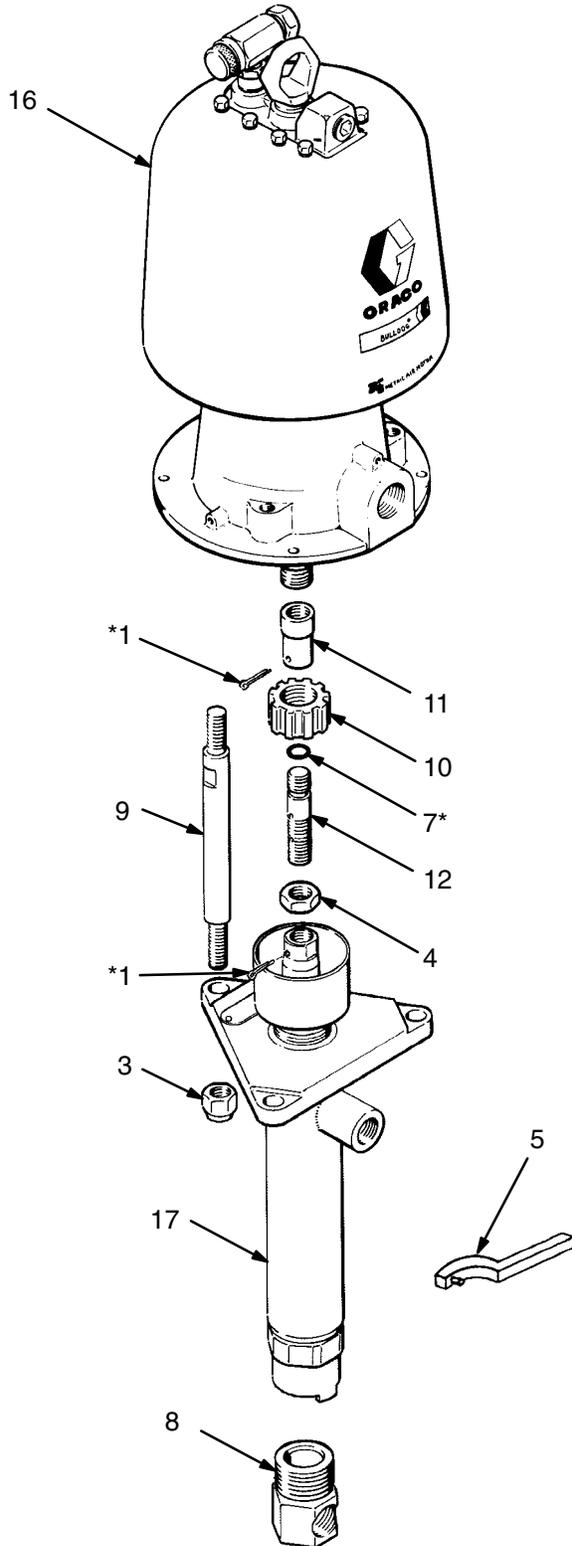
* Recommended "tool box" spare parts. Keep on hand to reduce downtime.

** Extra warning tags and labels available at no extra charge.

306 and 307 numbers in descriptions refer to separate instruction manuals, supplied.

Parts

Model 221-068, Series A
30:1 Ratio Bulldog Pump,
 with Quiet Air Motor and Severe-Duty Displacement Pump
 Includes items 1-17



REF NO.	PART NO.	DESCRIPTION	QTY
1	100-103*	PIN, cotter; 0.12" (3.2 mm) x 1.5" (38 mm)	2
3	101-712	NUT, lock; w/nylon inserts; 5/8-11	3
4	101-936	NUT, hex, jam; 3/4-10	1
5	102-176	WRENCH, spanner	1
7	158-674*	SEAL, o-ring; buna-N	1
8	180-180	ELBOW, street; 1-1/2" npt(m) x 1" npt(f)	1
9	167-911	ROD, tie; 7" (178 mm), shoulder-to-shoulder	3
10	168-210	NUT, coupling	1
11	168-211	COUPLING	1
12	168-212	ROD, connecting	1
14	176-529**	LABEL, warning (not shown)	1
16	215-255	BULLDOG AIR MOTOR, quiet See 307-304 for parts	1
17	217-530	DISPLACEMENT PUMP ASSY See 307-862 for parts	1

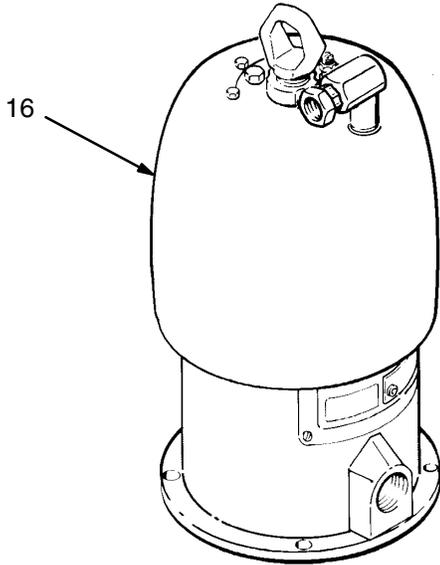
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30:1 Ratio Bulldog Pump,
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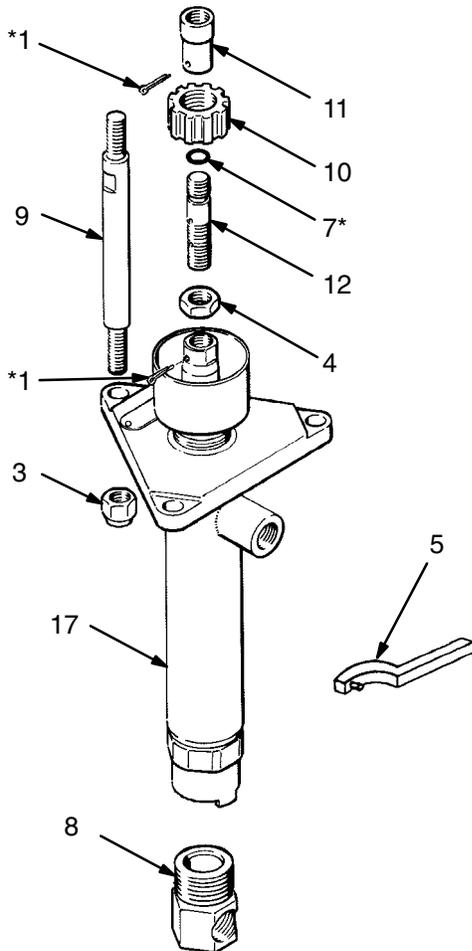


REF NO.	PART NO.	DESCRIPTION	QTY
1	100-103*	PIN, cotter; 0.12" (3.2 mm) x 1.5" (38 mm)	2
3	101-712	NUT, lock; w/nylon inserts; 5/8-11	3
4	101-936	NUT, hex, jam; 3/4-10	1
5	102-176	WRENCH, spanner	1
7	158-674*	SEAL, o-ring; buna-N	1
8	180-180	ELBOW, street; 1-1/2" npt(m) x 1" npt(f)	1
9	167-911	ROD, tie; 7" (178 mm), shoulder-to-shoulder	3
10	168-210	NUT, coupling	1
11	168-211	COUPLING	1
12	168-212	ROD, connecting	1
14	172-447**	LABEL, warning (not shown)	1
16	208-356	BULLDOG AIR MOTOR, standard See 307-049 for parts	1
17	217-530	DISPLACEMENT PUMP ASSY See 307-862 for parts	1

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

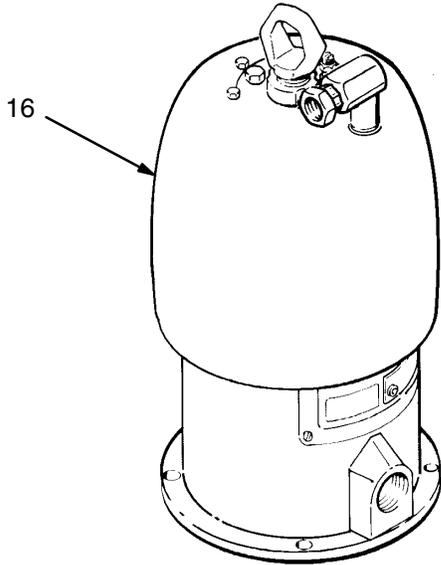
** Extra warning tags and labels available at no extra charge.

306 and 307 numbers in descriptions refer to separate instruction manuals, supplied.



Parts

Model 237-067, Series A
30:1 Ratio Bulldog Pump,
 with Standard Air Motor and PTFE-Packed Displacement Pump
 Includes items 1-17

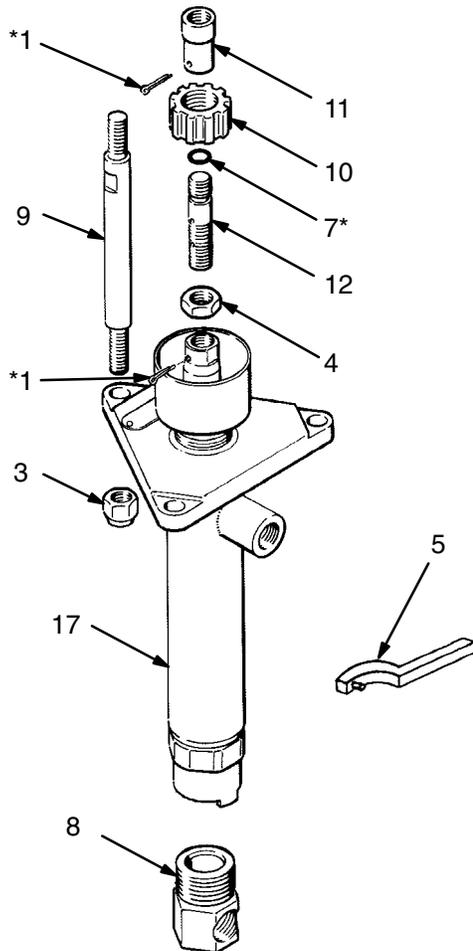


REF NO.	PART NO.	DESCRIPTION	QTY
1	100-103*	PIN, cotter; 0.12" (3.2 mm) x 1.5" (38 mm)	2
3	101-712	NUT, lock; w/nylon inserts; 5/8-11	3
4	101-936	NUT, hex, jam; 3/4-10	1
5	102-176	WRENCH, spanner	1
7	158-674*	SEAL, o-ring; buna-N	1
8	180-180	ELBOW, street; 1-1/2" npt(m) x 1" npt(f)	1
9	167-911	ROD, tie; 7" (178 mm), shoulder-to-shoulder	3
10	168-210	NUT, coupling	1
11	168-211	COUPLING	1
12	168-212	ROD, connecting	1
14	172-447**	LABEL, warning (not shown)	1
16	208-356	BULLDOG AIR MOTOR, standard See 307-049 for parts	1
17	237-066	DISPLACEMENT PUMP ASSY, PTFE packed, See 307-862 for parts	1

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

** Extra warning tags and labels available at no extra charge.

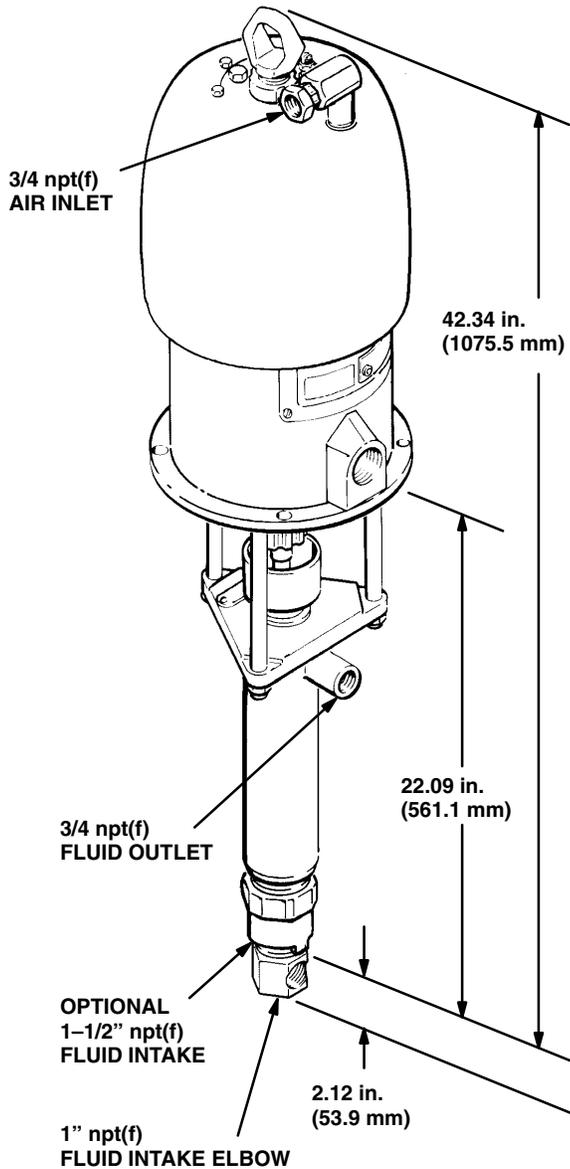
306 and 307 numbers in descriptions refer to separate instruction manuals, supplied.



Dimensions

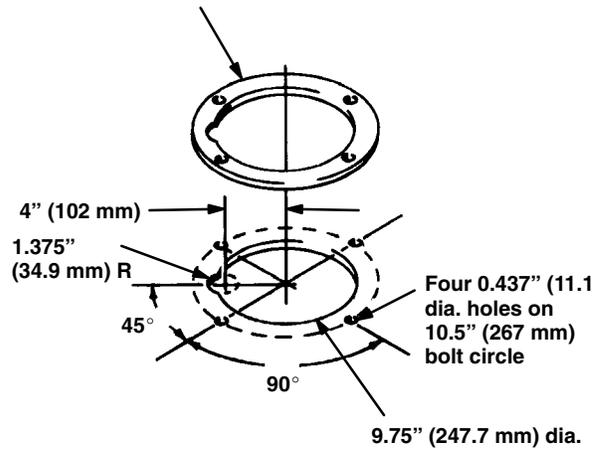
Model 217-579 Shown

See 307-049 or 307-304 for
Air Motor Dimensional Drawing.



Mounting Hole Layout

USE GASKET 161-806



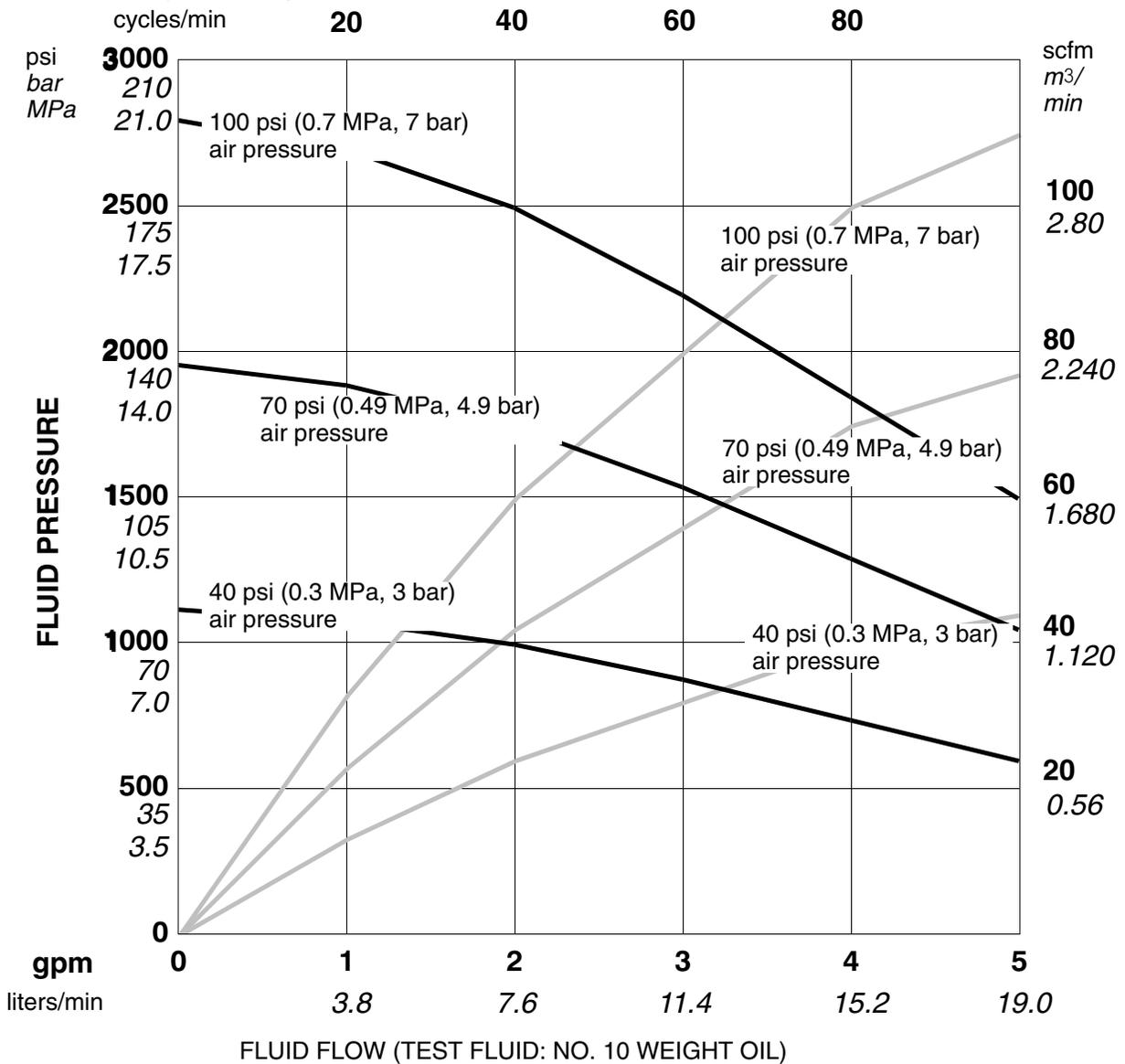
Manual Change Summary

This manual was updated to include the changes from
PCN W.

Technical Data

Maximum fluid working pressure	3000 psi (21.0 MPa, 210 bar)
Air input pressure operating range	40–100 psi (0.28–0.7 MPa, 2.8–7 bar)
Ratio	30:1
Pump cycles per 1 gallon (3.8 liters)	20
Maximum recommended pump speed for continuous operation	60 cycles per min
Maximum flow	3 gpm (11.34 liter/min)
Air consumption	approx. 34 scfm (0.95 m ³ /min)
	at 1 gpm (3.8 liters/min) at 100 psi (0.7 MPa, 7 bar) air pressure
Air inlet	3/4 npt(f)
Fluid outlet	3/4 npt(f)
Weight	approx. 75 lb (34 kg)
Wetted parts	See displacement pump manual 307–862

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



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

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 (m³/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 Warranty

Graco warrants all equipment listed in this manual which is manufactured by Graco and bearing its name to be free from defects in material and workmanship on the date of sale by an authorized Graco distributor to the original purchaser for use. With the exception of any special extended or limited warranty published by Graco, Graco will, for a period of twelve months from the date of sale, repair or replace any part of the equipment determined by Graco to be defective. This warranty applies only when the equipment is installed, operated and maintained in accordance with Graco's written recommendations.

This warranty does not cover, and Graco shall not be liable for general wear and tear, or any malfunction, damage or wear caused by faulty installation, misapplication, abrasion, corrosion, inadequate or improper maintenance, negligence, accident, tampering, or substitution of non-Graco component parts. Nor shall Graco be liable for malfunction, damage or wear caused by the incompatibility of Graco equipment with structures, accessories, equipment or materials not supplied by Graco, or the improper design, manufacture, installation, operation or maintenance of structures, accessories, equipment or materials not supplied by Graco.

This warranty is conditioned upon the prepaid return of the equipment claimed to be defective to an authorized Graco distributor for verification of the claimed defect. If the claimed defect is verified, Graco will repair or replace free of charge any defective parts. The equipment will be returned to the original purchaser transportation prepaid. If inspection of the equipment does not disclose any defect in material or workmanship, repairs will be made at a reasonable charge, which charges may include the costs of parts, labor, and transportation.

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.

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PRINTED IN U.S.A. 306-694 January 1961, Revised July 1997