

INSTRUCTIONS–PARTS LIST



306–646

Rev R
Supersedes P

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

BULLDOG® and KING™ PUMPS

DRUM LENGTH, WITH PRIMING PISTON

10:1 RATIO BULLDOG PUMPS

*100 psi (7 bar) MAXIMUM AIR WORKING PRESSURE
1000 psi (70 bar) MAXIMUM FLUID WORKING PRESSURE*

Model 204–287, Series K

With Standard Air Motor

Model 215–873, Series B

With Quiet Air Motor

Model 222–526, Series A

With Standard Air Motor and Severe–Duty Displacement Pump

Model 223–984, Series A

With Quiet Air Motor and Severe–Duty Displacement Pump

20:1 RATIO KING PUMPS

*90 psi (6 bar) MAXIMUM AIR WORKING PRESSURE
1800 psi (124 bar) MAXIMUM FLUID WORKING PRESSURE*

Model 222–248, Series A

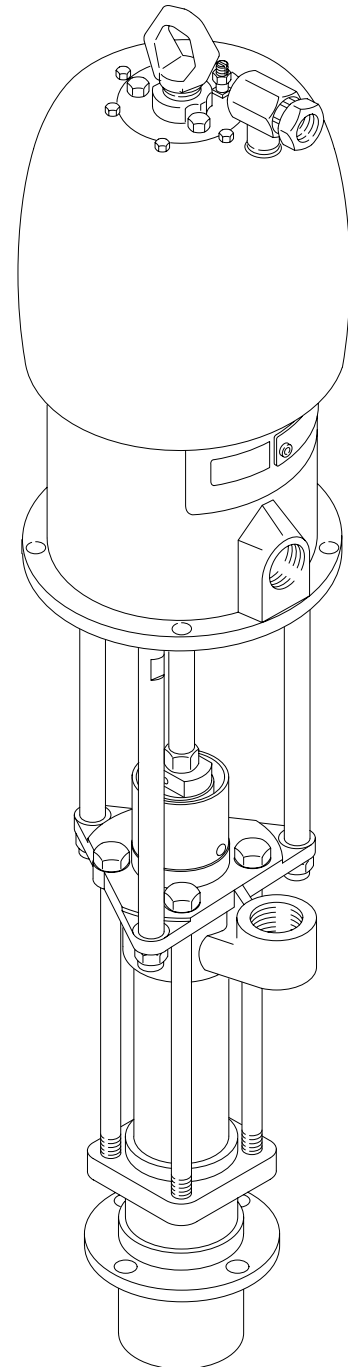
With Standard Air Motor

Model 222–539, Series A

With Standard Air Motor and Severe–Duty Displacement Pump

Model 223–991, Series A

With Quiet Air Motor and Severe–Duty Displacement Pump



Model 204–287 Shown

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SAFETY WARNINGS

HIGH PRESSURE FLUID CAN CAUSE SERIOUS INJURY. FOR PROFESSIONAL USE ONLY.

OBSERVE ALL WARNINGS. Read And Understand All Instruction Manuals Before Operating Equipment.

MOVING PARTS HAZARD

KEEP HANDS AND FINGERS AWAY FROM THE PRIMING PISTON DURING OPERATION AND WHENEVER THE PUMP IS CHARGED WITH AIR to reduce the risk of injury! On the pump downstroke the priming piston extends beyond the intake cylinder to pull the material into the pump. The priming piston works under extreme force. During operation and whenever the pump is charged with air, the priming piston can severely injure or amputate a hand or finger, or break a tool, caught between it and the intake cylinder. Always follow the **Pressure Relief Procedure**, below, before checking, clearing, cleaning, flushing or servicing any part of the pump.

The air motor piston (located behind the air motor shield) also moves when air is supplied to the motor. NEVER operate the pump with the air motor shield removed. Before servicing the pump, follow the **Pressure Relief Procedure** below to prevent the pump from starting accidentally.

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 on the skin can cause serious damage.

NEVER point the gun/valve at anyone or at any part of the body. NEVER put hand or fingers over the spray tip/nozzle, or over the bleeder valve hole.

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

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/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/dispensing, 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.

Trigger Guard (only on spray guns)

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

Diffuser (only on spray guns)

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

Tip Guard (only on spray guns)

ALWAYS have the tip guard in place on the spray gun while spraying. The tip guard alerts you to the fluid injection hazard and helps reduce, **but does not prevent**, the risk of accidentally placing your fingers or any part of your body close to the spray tip.

Spray Tip/Nozzle Safety

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

NEVER wipe off build-up around the spray tip/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 spray/dispensing system, when installing, cleaning or changing spray tips/nozzles, and whenever you stop spraying/dispensing.

1. Engage the gun/valve safety latch.
2. Shut off the air to the pump.
3. Close the bleed-type master air valve (required in your system).
4. Disengage the safety latch.
5. Hold a metal part of the gun/valve firmly to the side of a grounded metal pail, and trigger the gun/valve to relieve pressure.
6. Engage the gun/valve safety latch.
7. Open the drain valve and/or the pump bleeder 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/dispense again.

If you suspect that the spray tip/nozzle 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, nozzle, or hose end coupling and relieve pressure gradually, then loosen completely. Now clear the tip/nozzle or hose.

EQUIPMENT MISUSE HAZARD

General Safety

Any misuse of the spray/dispensing 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, splashing in the eyes or on the skin, or other serious bodily injury, or fire, explosion or property damage.

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

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

Always wear protective eyewear, gloves, clothing and respirator as recommended by the fluid and solvent manufacturer.

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 HOSES USED WITH A FLEXING MOTION MUST HAVE SPRING GUARDS ON BOTH ENDS! 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 the 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 safely contain the high pressure fluid.

FIRE OR EXPLOSION HAZARD

Static electricity is created by the flow of fluid through the pump and hose. If every part of the spray/dispensing 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/dispensing 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/dispensing 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 proper grounding. Do not use the system again until the problem has been identified and corrected.

To ground the pump:

To ground the pump, loosen the grounding lug locknut (W) and washer (X). Insert one end of a 1.5 mm² (12 ga) 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. See **ACCESSORIES** on page 16 to order a ground wire and clamp.

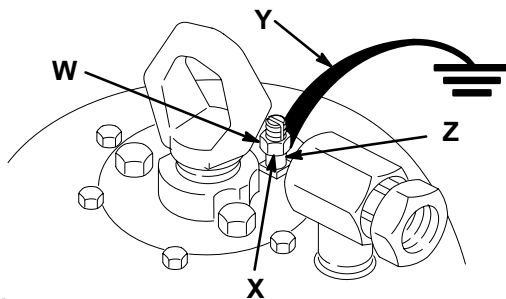


Fig 1

System Pressure

The 10:1 Bulldog Pump develops **1000 psi (70 bar) MAXIMUM WORKING PRESSURE** at 100 psi (7 bar) air pressure. The 20:1 King Pump develops **1800 psi (124 bar) MAXIMUM WORKING PRESSURE** at 90 psi (6 bar) air pressure. Never exceed these pressures.

Be sure that all spray/dispensing equipment and accessories are rated to withstand the maximum working pressure of the pump. DO NOT exceed the maximum working pressure of any component or accessory used in the 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 manufacturer's literature before using fluid or solvent in this pump.

HANDLE AND ROUTE HOSES CAREFULLY. Do not pull on hoses to move equipment. Do not use fluids which are not compatible with the inner tube and cover of the hose. DO NOT expose Graco hoses to temperatures above 82° C (180° F) or below -40° C (-40° F).

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**, below.

Grounding

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

1. *Pump:* use a ground wire and clamp. See 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/dispensing valve:* grounding is obtained through connection to a properly grounded fluid hose and pump.
6. *Fluid supply container:* according to your local code.
7. *Object being sprayed:* according to your local code.
8. *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.
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.

Flushing Safety

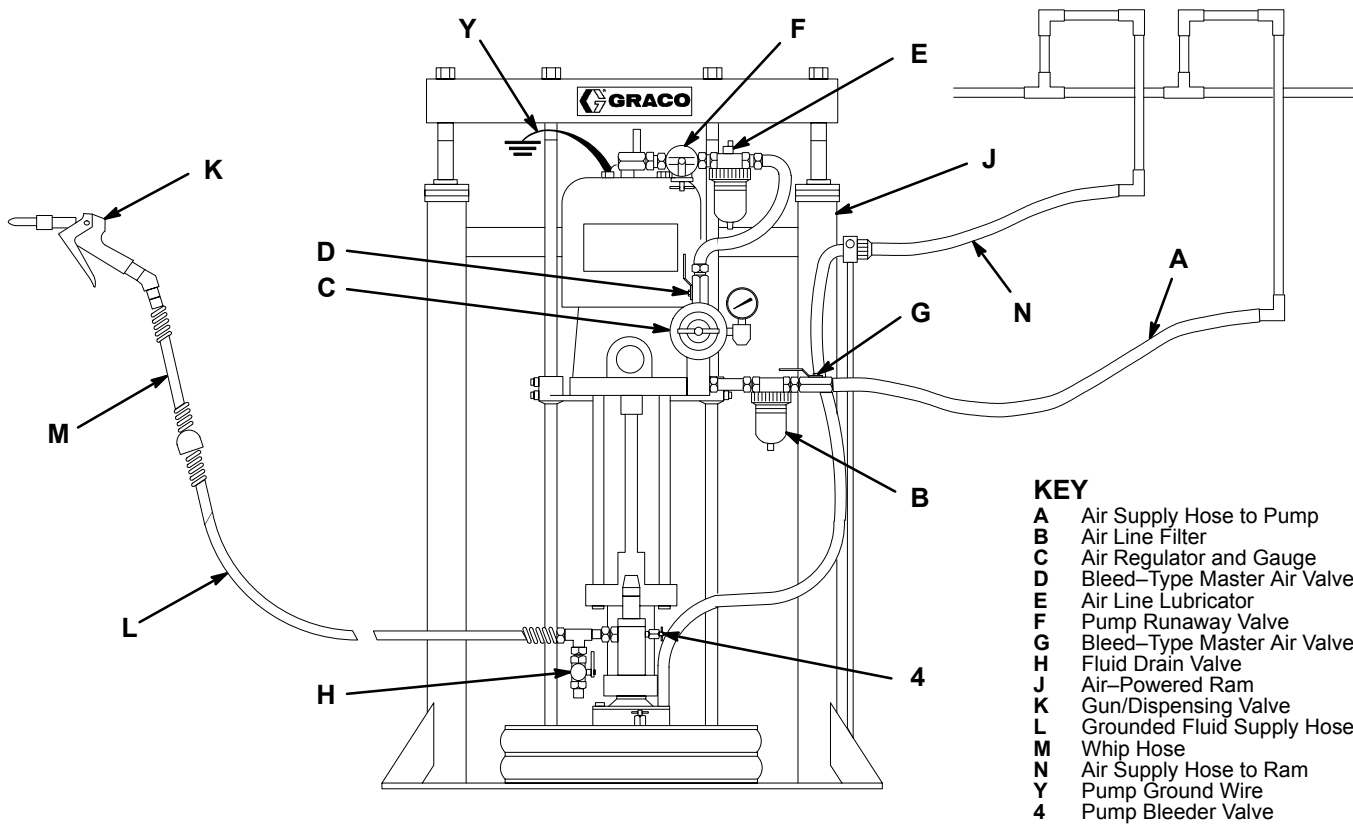
Before flushing, be sure the entire system and flushing pails are properly grounded. Refer to **Grounding**, above. Follow the **Pressure Relief Procedure** on page 2, and remove the spray tip/nozzle from the gun/valve. Always use the lowest possible fluid pressure, and maintain firm metal-to-metal contact between the gun/valve and the pail during flushing to reduce the risk of fluid injection injury, static sparking and splashing.

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.

INSTALLATION

TYPICAL INSTALLATION



KEY

- A Air Supply Hose to Pump
- B Air Line Filter
- C Air Regulator and Gauge
- D Bleed-Type Master Air Valve
- E Air Line Lubricator
- F Pump Runaway Valve
- G Bleed-Type Master Air Valve
- H Fluid Drain Valve
- J Air-Powered Ram
- K Gun/Dispensing Valve
- L Grounded Fluid Supply Hose
- M Whip Hose
- N Air Supply Hose to Ram
- Y Pump Ground Wire
- 4 Pump Bleeder Valve

The reference numbers and letters in the text refer to the callouts in Figures 1–3 and the Parts Drawings.

See pages 16–18 for accessories 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 particular needs, contact your Graco representative.

The Dimensional Drawing on page 19 provides necessary measurements for mounting the pump. If you use an accessory ram (J), as shown in the Typical Installation, refer to the separate ram manual for mounting dimension requirements.

System Accessories

Install the air line accessories in the order shown in the Typical Installation. Working upstream from the pump air inlet, install a pump runaway valve (F) to shut off the air to the pump if the pump accelerates beyond the preadjusted setting. A pump which runs too fast can be seriously damaged.

Next, install an air line lubricator (E) for automatic air motor lubrication, a bleed-type master air valve (D) to relieve air trapped between the valve and the pump, an air regulator (C) to control pump speed, and an air line filter (B) to remove harmful dirt and moisture from the compressed air supply. Install a second bleed valve (G) on the pump air line to isolate the accessories for servicing.

Be sure the pump air line (A) is properly grounded, and is large enough to supply an adequate volume of air to the motor. An air-powered ram (J) requires a separate grounded air supply line (N).

WARNING

Two accessories are required in your system: a bleed-type master air valve (D) and a fluid drain valve (H). 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 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 spray gun; triggering the spray gun to relieve pressure may not be sufficient.

Install a fluid drain valve (H) close to the pump fluid outlet. Then connect a **grounded** fluid supply hose (L). Between the fluid supply hose (L) and the gun/dispensing valve (K), install a whip hose (M) for greater flexibility.

NOTE: To use the optional fluid outlet at the base of the air motor, connect a riser tube between the standard outlet and the optional outlet.

GROUNDING

WARNING

Before operating the pump, ground the system as explained under **FIRE OR EXPLOSION HAZARD** and **Grounding** on page 3.

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 spray/dispersing system, when installing, cleaning or changing spray tips/nozzles, and whenever you stop spraying/dispersing.

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

If you suspect that the spray tip/nozzle 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, nozzle or hose end coupling and relieve pressure gradually, then loosen completely. Now clear the tip/nozzle or hose.

WARNING

Moving parts can pinch or amputate your fingers or other body parts. When the pump is operating, the priming piston (located at the pump intake) and the air motor piston (located behind the air motor shield) move. Therefore, NEVER operate the pump with the air motor shield removed, and keep your fingers and hands away from the priming piston.

Before attempting to clear an obstruction from the priming piston or service the pump, follow the **Pressure Relief Procedure Warning** above to prevent the pump from starting accidentally.

Flush the Pump Before Using

This pump was tested with lightweight motor oil which was left in to protect the pump parts. To prevent contamination of the fluid being pumped, flush the pump with a compatible solvent before using it. If the pump is being used to supply a circulating system, allow the solvent to circulate until the pump and lines are thoroughly flushed.

Keep the packing nut/wet-cup (21) one-half full with Graco Throat Seal Liquid (TSL), to help prevent the fluid being pumped from drying on the displacement rod and damaging the packings.

Starting and Adjusting the Pump

1. Make sure the air regulator (C), drain valve (H), and pump bleeder valve (4) are closed.
2. Open the bleed-type master air valve (D).
3. Hold a metal part of the gun/valve firmly to the side of a grounded metal pail, and trigger the gun/valve.
4. Slowly open the air regulator (C) until the pump starts running slowly and smoothly (about 20 psi [1.4 bar]). Cycle the pump slowly until all the air is purged from the pump and lines.
5. If the pump is not priming properly, open the bleeder valve (4) slightly. Do not open it all the way; the handle can come off. Cover the bleeder valve hole with something **other than your hand or fingers** and use it as a priming valve until the fluid appears at the bleeder hole. Close the bleeder valve.

WARNING

To reduce the risk of fluid injection, DO NOT use your hand or fingers to cover the bleeder hole when priming the pump.

6. Release the trigger and engage the safety latch. The pump will stall against pressure.
7. In a direct supply system, the pump will start and stop as the gun/valve is opened and closed. In a circulating system, it will run continuously and speed up or slow down as the system demands. Always use the lowest pressure necessary to obtain the desired results.

WARNING

To reduce the risk of serious bodily injury, including fluid injection and splashing in the eyes or on the skin, and property damage, never exceed the maximum air and fluid working pressure of the lowest rated component in your system. **See EQUIPMENT MISUSE HAZARD, System Pressure**, on page 3.

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. 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, prime the pump and the lines with fluid, or flush the pump and leave it filled with a compatible solvent. Be sure to eliminate all air from the fluid system.

NOTE: A pump runaway valve (F) can be installed on the air line to automatically shut off the pump if it starts to run too fast.

Shutdown and Care of the Pump

Always follow the **Pressure Relief Procedure Warning** on page 7 whenever you shut off the pump. Stop the pump at the bottom of its stroke to keep fluid from drying on the exposed displacement rod and damaging the throat packings.

Every 40 hours of operation, check that the packing nut/wet-cup (21) is tight. Follow the **Pressure Relief Procedure Warning** on page 7 first. Tighten just snug – do not overtighten or the packings may be damaged.

Always flush the pump before the fluid dries in the pump and hoses. If the pump is to be stored for any period of time, and you are pumping water-based fluid, first flush the pump with water, then with mineral spirits to protect the pump parts.

Flushing

To reduce the risk of fluid injection injury, static sparking, or splashing in the eyes or on the skin, follow the **Pressure Relief Procedure Warning** on page 7, and *remove the spray tip (spray guns 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 (E) provides automatic air motor lubrication. For daily, manual lubrication, disconnect the air regulator (C), 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.

Corrosion Protection

WARNING

Water, or even moist air, can cause your pump to corrode. To help prevent corrosion, never leave the pump filled with water or air. After normal flushing, flush the pump again with mineral spirits or oil-based solvent, relieve pressure, and leave the mineral spirits in the pump. Be sure to follow all steps of the **Pressure Relief Procedure Warning** on page 7.

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 spray/dispensing system, when installing, cleaning or changing spray tips/nozzles, and whenever you stop spraying/dispensing.

1. Engage the gun/valve safety latch.
2. Shut off the air to the pump.
3. Close the bleed-type master air valve (required in your system).
4. Disengage the safety latch.
5. Hold a metal part of the gun/valve firmly to the side of a grounded metal pail, and trigger the gun/valve to relieve pressure.

6. Engage the gun/valve safety latch.
7. Open the drain valve and/or the pump bleeder valve (required in your system), having a container ready to catch the drainage.
8. Leave the drain valve open until you are ready to use the system again.

If you suspect that the spray tip/nozzle 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, nozzle, or hose end coupling and relieve pressure gradually, then loosen completely. Now clear the tip/nozzle or hose.

NOTE: Check everything in the troubleshooting guide below before disassembling the pump.

PROBLEM	CAUSE	SOLUTION
Pump fails to operate	Exhausted fluid supply Restricted line or inadequate air supply Insufficient air pressure, closed or clogged air valves, etc. Obstructed fluid hose or gun/valve Fluid dried on the displacement rod Dirty or worn air motor parts	Refill and reprime or flush. Clear; see TECHNICAL DATA on back cover. Open, clear. Clear.* Clean. See SERVICE . Clean, service. See air motor manual, supplied.
Pump operates but output low on both strokes	Exhausted fluid supply Restricted line or inadequate air supply Insufficient air pressure, closed or clogged air valves, etc. Obstructed fluid hose or gun/valve Bleeder valve open or worn Air leaking into supply drum Fluid too heavy for pump priming Worn throat packings in displacement pump	Refill and reprime or flush. Clear. See TECHNICAL DATA on back cover. Open, clear. Clear.* Close; replace. Check inductor or ram plate seal. Use pump bleeder valve (see page 5). Use inductor or ram unit. Replace gland/packing stack.
Pump operates but output low on downstroke	Fluid too heavy for pump priming Held open or worn intake valve or packings	Use pump bleeder valve (see page 5). Use inductor or ram unit. Clear valve; replace gland/packing stack.
Pump operates but output low on upstroke	Held open or worn piston valve or packings	Clear valve; replace gland/packing stack.
Erratic or accelerated pump speed	Exhausted fluid supply Fluid too heavy for pump priming Held open or worn piston valve or packings Held open or worn intake valve or packings Worn throat packings in displacement pump	Refill and reprime or flush. Use pump bleeder valve (see page 5). Use inductor or ram unit. Clear valve; replace packings. Clear valve; replace gland/packing stack. Replace gland/packing stack.

* To clear the pump, follow the **Pressure Relief Procedure Warning**, above. Disconnect the fluid line. If the pump starts when the air is turned on, then the fluid hose or gun/valve is obstructed.

DISPLACEMENT PUMP SERVICE

WARNING

Moving parts can pinch or amputate your fingers or other body parts. When the pump is operating, the priming piston (located at the pump intake) and the air motor piston (located behind the air motor shield) move. Therefore, NEVER operate the pump with the air motor shield removed, and keep your fingers and hands away from the priming piston.

Before attempting to clear an obstruction from the priming piston or service the pump, follow the **Pressure Relief Procedure Warning** on page 7 to prevent the pump from starting accidentally.

Before You Start (All Models)

1. Repair Kit 220–861 is available. See pages 13 and 15. For the best results, use all the new parts in the kit, even if the old ones look good. Repair kit parts are indicated in the text and the parts list with an asterisk, for example (27*).
2. To reduce down time, keep spare parts on hand. Recommended spare parts are indicated in the parts list with a double asterisk, for example (41**).
3. The gland/packing stacks (64*, 65*) are preassembled. **Do not disassemble the stacks when installing them in the pump.**
4. For air motor service and parts information, refer to manual 307–049 for motor Model 208–356, manual 306–968 for motor Model 206–647, manual 307–304 for motor Model 215–255, or manual 307–741 for motor Model 220–106.
5. If possible, flush the pump before service with a compatible solvent. Follow the **Pressure Relief Procedure Warning** on page 7. Stop the pump at the bottom of its stroke.
6. Disconnect all the hoses. Remove the pump from its mounting and clamp it in a vise.

Model 204–641 Displacement Pump (Used on Models 204–287, 215–873 and 222–248)

Disassembly

NOTE: Refer to Fig 2 and the parts drawing.

1. Remove the cotter pin (41). Unscrew the coupling nut (50) and the three tie rod locknuts (44). Pull the displacement pump (2) off the air motor (1).
2. Remove the cotter pin (42). Loosen the locknut (45). Unscrew the connecting rod (53) from the upper cap (33).
3. Insert a 1/4 in. (6 mm) diameter rod in the holes of the packing nut/wet-cup (21), and loosen it. Push the displacement rod (18) down until the priming piston (37) clears the intake valve housing (28). Remove the nut (6), priming piston (37), valve plate (36) and plate guide (31).
4. Unscrew the four tie bolts (8) and pull the intake valve housing (28) off the pump. Pull the priming rod (32) and displacement rod (18) out of the bottom of the cylinder (39). Remove the pin (7) and unscrew the priming rod (32) from the connecting rod (20).

5. Pull the cylinder (39) down out of the outlet housing (26). Inspect the inner surface of the cylinder and the outer surface of the displacement rod (18) for scratches or scoring, which can cause premature packing wear and leaking. To check, run a finger over the surface or hold the part up to the light at an angle.
6. Disassemble the intake valve (3). Clean and inspect all parts, replacing as necessary. Check the intake valve seat (30) for nicks or damage.
7. Unscrew the upper cap (33) from the connecting rod (20). Pull the displacement rod (18) off the lower cap (19), and remove the piston assembly from the connecting rod. Disassemble the piston.
8. Unscrew the packing nut/wet-cup (21). Remove the wiper seal (66). Remove the throat packings from the outlet housing (26).
9. Clean and inspect all parts, replacing as necessary.

Reassembly

NOTE: Refer to Fig 2 and the parts drawing during the following procedure.

1. See Detail A of Fig 2. The gland/packing stack (64*) for the throat is preassembled. **Do not disassemble the stack.** Lubricate the gland/packing stack and install it into the outlet housing (26). *Be sure the lips of the v-packings are facing down.* Install the wiper seal (66) in the groove of the wet-cup (21) *with the lips facing down.* Loosely install the packing nut/wet-cup (21).
2. See Detail B of Fig 2. Install the two bearings (35*) and the u-cup packing (56*) on the piston (38). *Be sure the lips of the packing are facing up.* Install the small o-ring (15) in the lower cap (19) and the larger o-ring (17) on the outside of the lower cap.
3. Install the piston (38), valve plate (34), and lower cap (19) on the connecting rod (20).
4. Insert the connecting rod (20) into the displacement rod (18) so the lower cap (19) fits into the bottom of the displacement rod. Screw the top cap (33) onto the connecting rod (20) until it is tight against the top of the displacement rod (18).
5. Install one copper gasket (27*) in the outlet housing (26). Screw the priming rod (32) into the connecting rod (20) and secure with the pin (7). Push the displacement rod (18) and priming rod (32) up into the outlet housing (26) so the top of the displacement rod just protrudes from the packing nut/wet-cup (21). Lubricate the priming rod (32).
6. Install the cylinder (39) in the outlet housing (26), being careful not to scratch the polished inner surface of the cylinder.
7. See Detail C of Fig 2. Slide the intake valve gland/packing stack (65*) into the intake valve seal housing (3). **Do not disassemble the stack.** *Be sure the lips of the v-packings are facing up.* Tighten the packing nut (11). Install the valve seat (30) in the intake valve housing (28). Place the intake valve seal housing (3) on the seat (30).
8. Install two copper gaskets (27*) on the intake valve stop (29). Install the stop in the intake valve housing (28).

9. Carefully guide the intake valve housing (28) up over the priming rod (32) and install it on the cylinder (39). Insert the four tie bolts (8) through the outlet housing (26) and engage the holes in the intake valve housing. Torque the tie bolts oppositely and evenly to 60 ft-lb (82 N.m).
10. Install the plate guide (31), plate (36), priming piston (37) and nut (6) on the priming rod (32). If necessary, push down on the displacement rod (18) to provide sufficient clearance from the intake valve housing (28).
11. Tighten the packing nut/wet-cup (21) just enough to prevent leakage – no tighter.
12. Check the alignment of the displacement rod (18) by inserting a size E (0.254 in. diameter) drill shank between the packing nut/wet-cup (21) and the rod. If the drill shank cannot be passed freely around the

rod, tighten the tie bolt (8) on the side which is binding.

13. Screw the connecting rod (53) into the upper cap (33). Insert the cotter pin (42) and tighten the locknut (45).
14. Align the pump outlet on the outlet housing (26) with the optional outlet at the base of the air motor (1). Loosely screw the tie rod locknuts (44) onto the tie rods (52). Lubricate the o-ring (47) and the top thread of the connecting rod (53). Tighten the coupling nut (50) to attach the displacement pump to the motor. Insert the cotter pin (41).
15. Start the pump and run it slowly to check for binding. Adjust the tie rods as necessary, then torque the locknuts (44) to 40–50 ft-lb (54–68 N.m).
16. Reconnect the fluid and air lines. Reconnect the ground wire if it was disconnected during service.

DISPLACEMENT PUMP 204-641

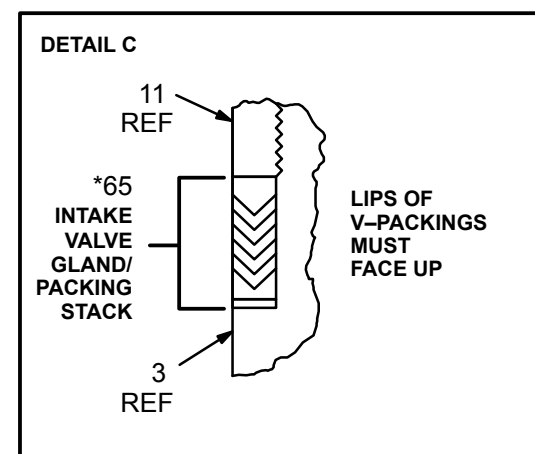
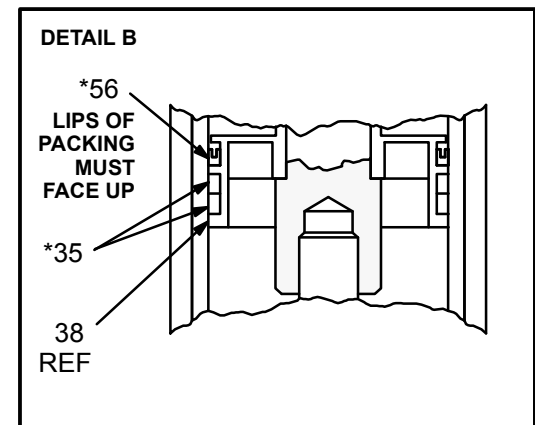
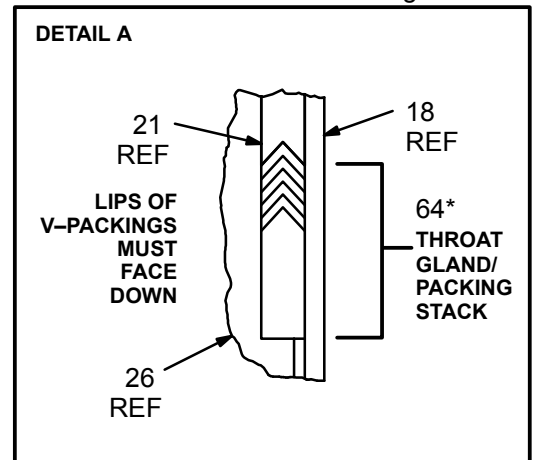
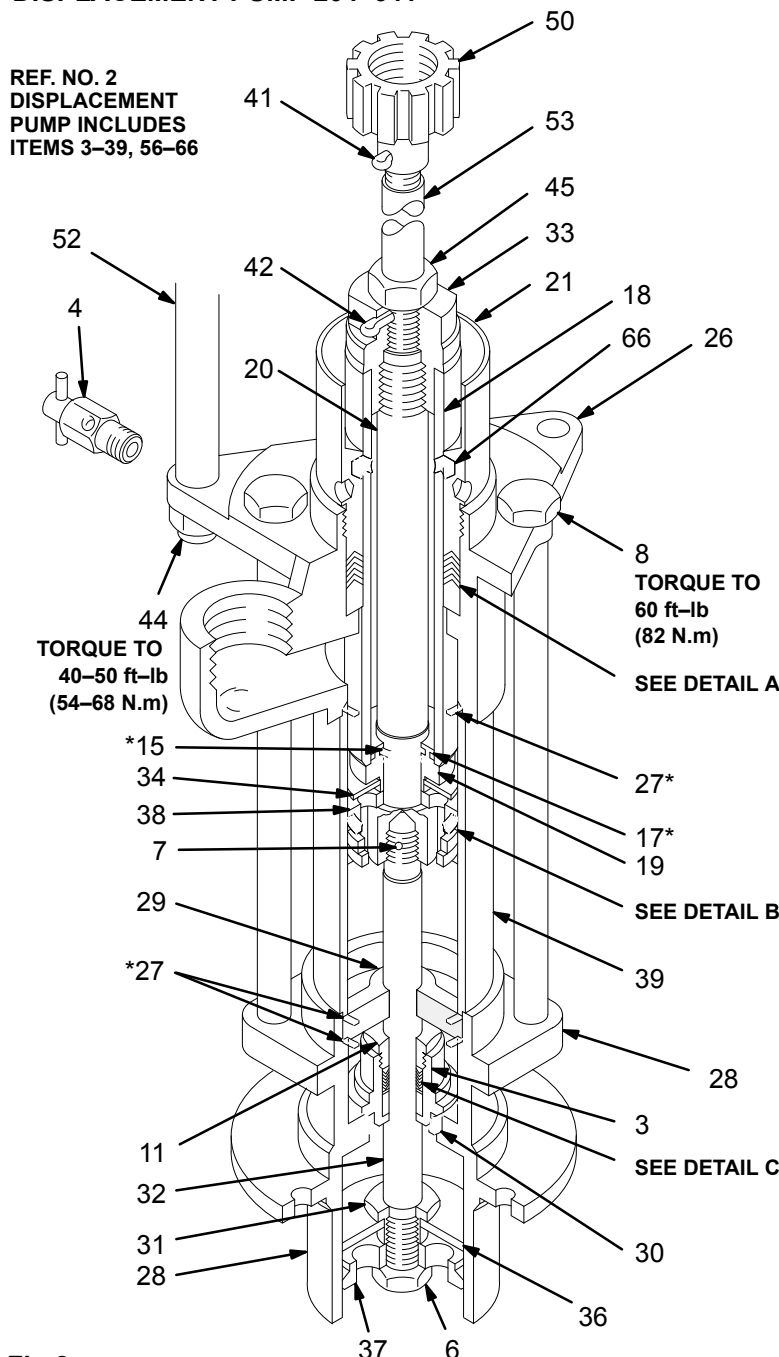


Fig 2

Model 222–638 Displacement Pump (Used on Models 222–526, 222–539, 223–984 and 223–991)

NOTE: Before beginning, read “Before You Start” on page 8.

Disassembly

NOTE: Refer to Fig 3 and the parts drawing during the following procedure.

1. Remove the cotter pin (41). Unscrew the coupling nut (50) and the three tie rod locknuts (44). Pull the displacement pump (2) off the air motor (1).
2. Remove the cotter pin (42). Loosen the locknut (45). Unscrew the connecting rod (53) from the displacement rod (60).
3. Insert a 1/4 in. (6 mm) diameter rod in the holes of the packing nut/wet-cup (21), and loosen it. Push the displacement rod (60) down until the priming piston (37) clears the intake valve housing (28). Remove the nut (6), priming piston (37), valve plate (36) and plate guide (31).
4. Unscrew the four tie bolts (8) and pull the intake valve housing (28) off the pump. Pull the priming rod (62) and displacement rod (60) out of the bottom of the cylinder (59). Remove the pin (7) and unscrew the priming rod (62) from the adapter (61).
5. Pull the cylinder (59) down out of the outlet housing (26). Inspect the inner surface of the cylinder and the outer surface of the displacement rod (18) for scratches or scoring, which can cause premature packing wear and leaking. To check, run a finger over the surface or hold the part up to the light at an angle.
6. Disassemble the intake valve (3). Clean and inspect all parts, replacing as necessary. Check the intake valve seat (30) for nicks or damage.
7. Unscrew the adapter (61) from the displacement rod (60). Remove and inspect the piston (38). Disassemble the piston.
8. Unscrew the packing nut/wet-cup (21). Remove the wiper seal (66). Remove the throat packings from the outlet housing (26).
9. Clean and inspect all parts, replacing as necessary.

Reassembly

NOTE: Refer to Fig 3 and the parts drawing during the following procedure.

1. See Detail A of Fig 3. The gland/packing stack (64*) for the throat is preassembled. **Do not disassemble the stack.** Lubricate the gland/packing stack and install it into the outlet housing (26). *Be sure the lips of the v-packings are facing down.* Install the wiper seal (66) in the groove of the wet-cup (21) *with the lips facing down.* Loosely install the packing nut/wet-cup (21).
2. See Detail B of Fig 3. Install the two bearings (35*) and the u-cup packing (56*) on the piston (38). *Be sure the lips of the packing are facing up.*

3. Install the piston (38), valve plate (34), and adapter (61) on the displacement rod (60).
4. Thread the connecting rod (62) into the adapter (61) and secure with the pin (7).
5. Install one copper gasket (27*) in the outlet housing (26). Push the displacement rod (60) and priming rod (62) up into the outlet housing (26) so the top of the displacement rod just protrudes from the packing nut/wet-cup (21). Lubricate the priming rod (62).
6. Install the cylinder (59) in the outlet housing (26), being careful not to scratch the polished inner surface of the cylinder.
7. See Detail C of Fig 3. Slide the intake valve gland/packing stack (65*) into the intake valve seal housing (3). **Do not disassemble the stack.** *Be sure the lips of the v-packings are facing up.* Tighten the packing nut (11). Install the valve seat (30) in the intake valve housing (28). Place the intake valve seal housing (3) on the seat (30).
8. Install two copper gaskets (27*) on the intake valve stop (29). Install the stop in the intake valve housing (28).
9. Carefully guide the intake valve housing (28) up over the priming rod (62) and install it on the cylinder (59). Insert the four tie bolts (8) through the outlet housing (26) and engage the holes in the intake valve housing. Torque the tie bolts oppositely and evenly to 60 ft-lb (82 N.m).
10. Install the plate guide (31), plate (36), priming piston (37) and nut (6) on the priming rod (62). If necessary, push down on the displacement rod (60) to provide sufficient clearance from the intake valve housing (28).
11. Tighten the packing nut/wet-cup (21) just enough to prevent leakage – no tighter.
12. Check the alignment of the displacement rod (60) by inserting a size E (0.254 in. diameter) drill shank between the packing nut/wet-cup (21) and the rod. If the drill shank cannot be passed freely around the rod, tighten the tie bolt (8) on the side which is binding.
13. Screw the connecting rod (53) into the top of the displacement rod (60). Insert the cotter pin (42) and tighten the locknut (45).
14. Align the pump outlet on the outlet housing (26) with the optional outlet at the base of the air motor (1). Loosely screw the tie rod locknuts (44) onto the tie rods (52). Lubricate the o-ring (47) and the top thread of the connecting rod (53). Tighten the coupling nut (50) to attach the displacement pump to the motor. Insert the cotter pin (41).
15. Start the pump and run it slowly to check for binding. Adjust the tie rods as necessary, then torque the locknuts (44) to 40–50 ft-lb (54–68 N.m).
16. Reconnect the fluid and air lines. Reconnect the ground wire if it was disconnected during service.

DISPLACEMENT PUMP 222-638

REF. NO. 2
DISPLACEMENT
PUMP INCLUDES
ITEMS 3-38, 56-66

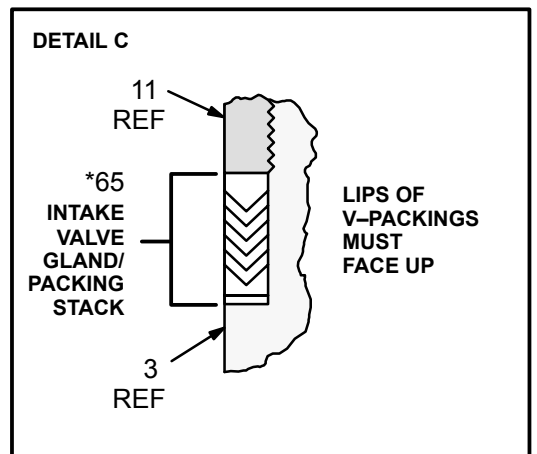
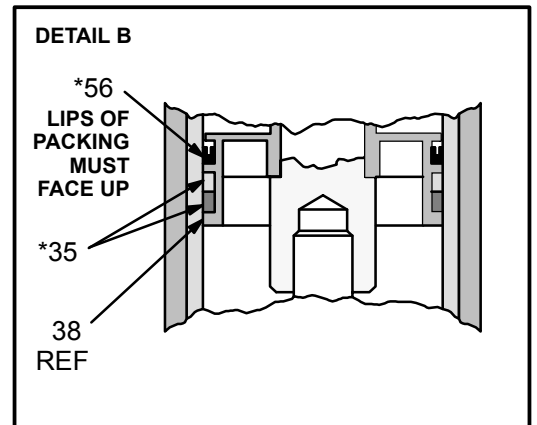
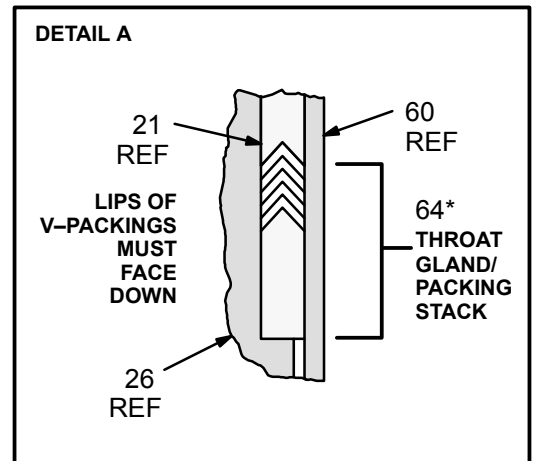
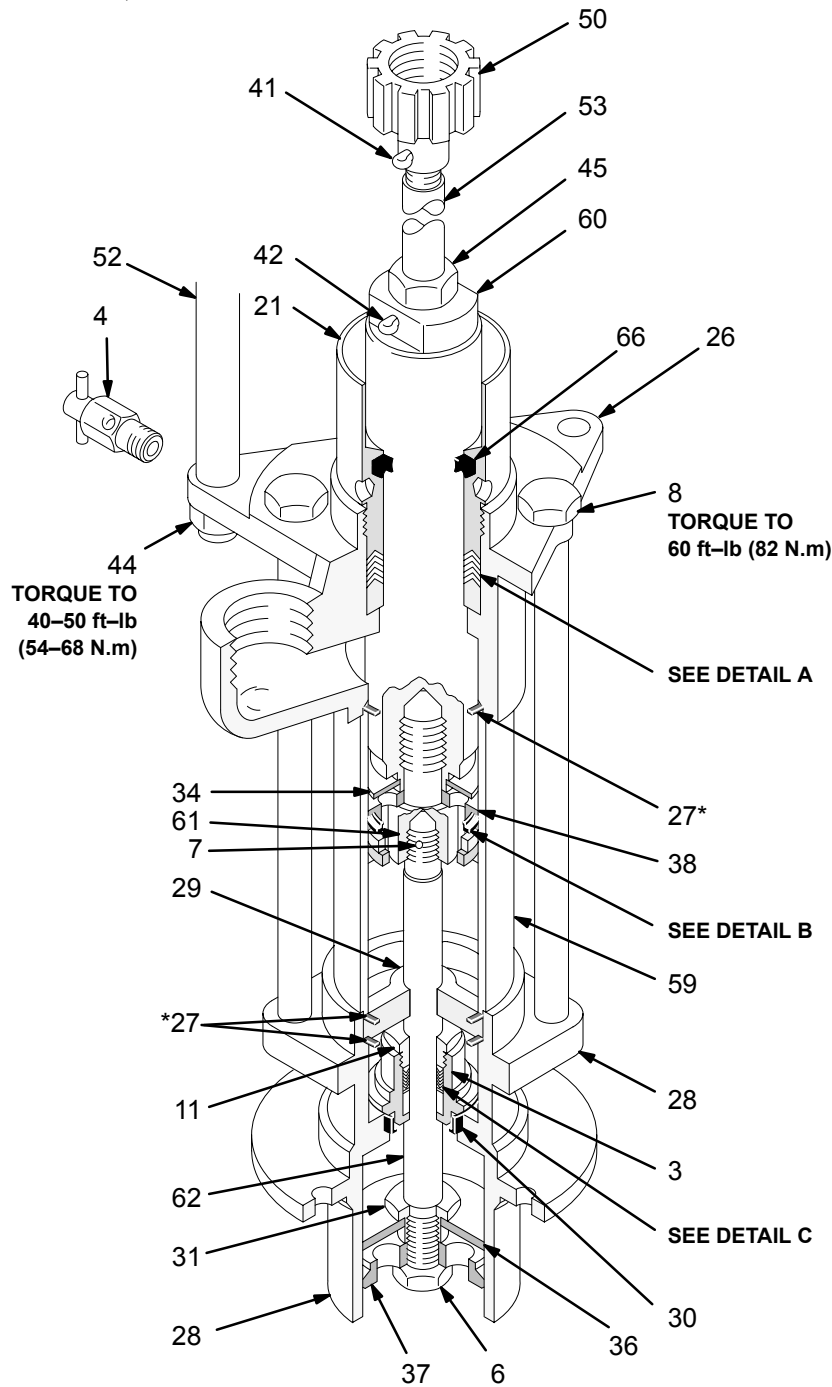


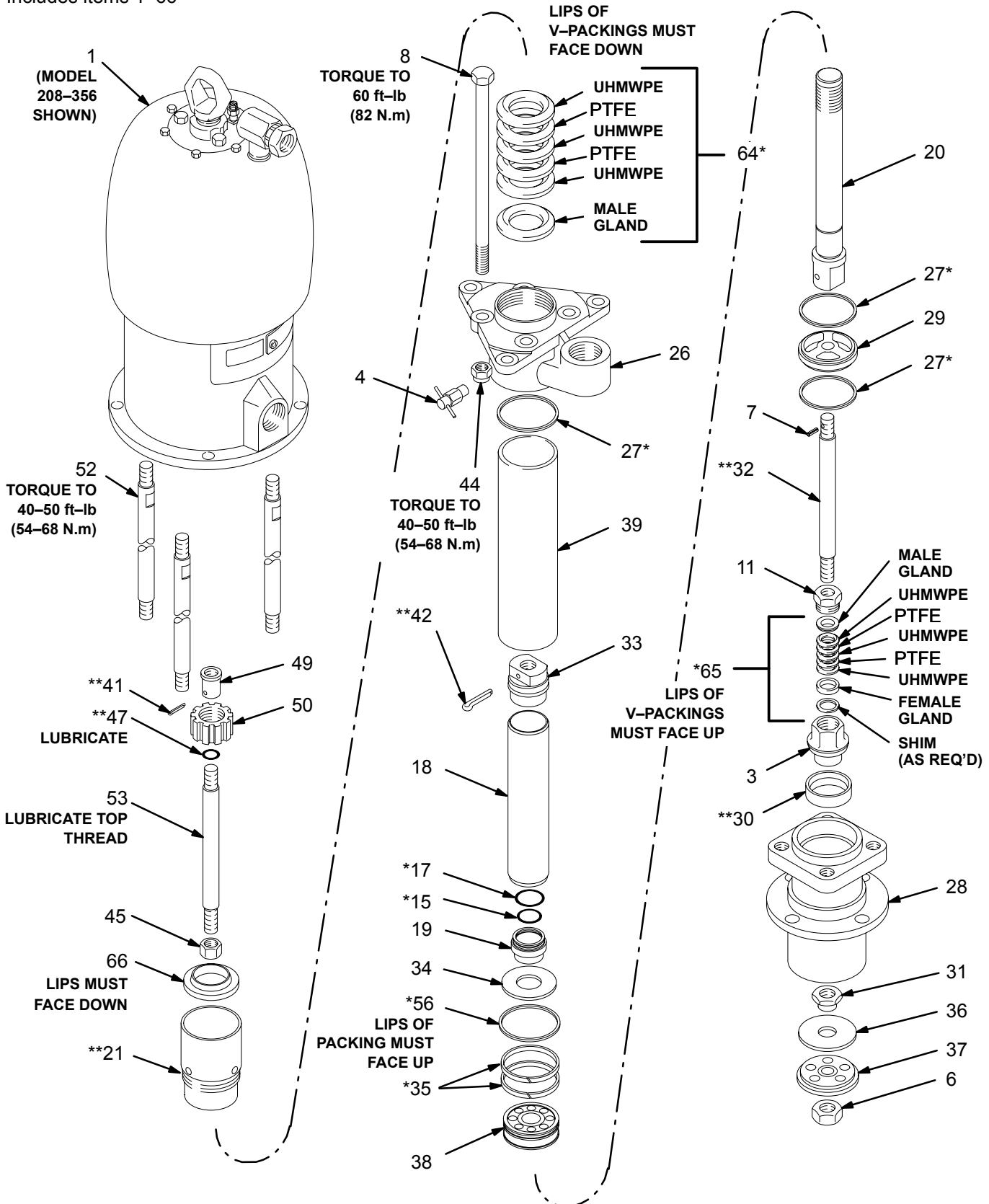
Fig 3

PARTS DRAWING – STANDARD PUMPS

Model 222–248, Series A
20:1 Ratio King Pump with Standard Air Motor
 Includes items 1–66

Model 215–873, Series B
10:1 Ratio Bulldog Pump with Quiet Air Motor
 Includes items 1–66

Model 204–287, Series K
10:1 Ratio Bulldog Pump with Standard Air Motor
 Includes items 1–66



PARTS LIST – STANDARD PUMPS

Model 222–248, Series A
20:1 Ratio King Pump with Standard Air Motor
 Includes items 1–66

Model 204–287, Series K
10:1 Ratio Bulldog Pump with Standard Air Motor
 Includes items 1–66

Model 215–873, Series B
10:1 Ratio Bulldog Pump with Quiet Air Motor
 Includes items 1–66

REF NO.	PART NO.	DESCRIPTION	QTY
1	207–647	KING, STANDARD AIR MOTOR, <i>Model 222–248 only</i> <i>see 306–968 for parts</i>	1
	215–255	BULLDOG, QUIET AIR MOTOR <i>Model 215–873 only</i> <i>see 307–304 for parts</i>	1
	208–356	BULLDOG, STANDARD AIR MOTOR <i>Model 204–287 only</i> <i>See 307–049 for parts</i>	1
2	204–641	DISPLACEMENT PUMP ASSEMBLY Includes items 3–39, 56–66	1
3	205–161	.HOUSING, intake valve seal Includes item 30	1
4	206–256	.VALVE, bleeder	1
6	100–155	.NUT, hex, jam; 5/8–18	1
7	101–354	.PIN, roll; 0.188" (4.8 mm) dia; 1.125" (28.6 mm) long	1
8	102–420	.BOLT, hex hd cap; 5/8–11 x 12"	4
11	158–440	.NUT, packing, intake valve	1
15	108–833*	.O–RING, Viton®	1
17	108–832*	.O–RING, Viton	1
18	162–887	.ROD, displacement	1
19	162–888	.CAP, lower	1
20	162–891	.ROD, connecting	1
21	186–058**	.PACKING NUT/WET–CUP	1
26	181–896	.HOUSING, outlet	1
27	162–898*	.GASKET, copper	3
28	162–900	.HOUSING, intake valve	1
29	162–901	.STOP, intake valve	1
30	162–902**	.SEAT, intake valve (part of item 3)	1
31	162–903	.GUIDE, valve plate	1
32	162–906**	.ROD, priming	1
33	164–442	.CAP, upper	1
34	165–888	.PLATE, valve	1
35	181–897*	.BEARING, piston	2
36	165–890	.PLATE, valve	1
37	172–199	.PISTON, priming	1
38	181–893	.PISTON, cylinder	1
39	180–936	.CYLINDER, pump	1
41	100–103**	PIN, cotter; 0.125" (3.2 mm) dia. x 1.5" (38 mm) long	1
42	100–104**	PIN, cotter; 0.125" (3.2 mm) dia. x 1.75" (45 mm) long	1
44	101–712	NUT, lock; 5/8–11; w/nylon insert	3
45	101–936	NUT, hex, jam; 3/4"	1
47	158–674**	O–RING, nitrile rubber	1
49	168–211	COUPLING, connecting rod <i>Model 222–248 only</i>	1
	161–543	COUPLING, connecting rod <i>Models 215–873 & 204–287 only</i>	1
50	168–210	NUT, shouldered <i>Model 222–248 only</i>	1
	161–544	NUT, shouldered <i>Models 215–873 & 204–287 only</i>	1
52	168–824	ROD, tie; 13–7/8" (352.4 mm) long, shoulder to shoulder	3

REF NO.	PART NO.	DESCRIPTION	QTY
53	168–253	ROD, connecting; 9–5/16" (236.5 mm) <i>Model 222–248 only</i>	1
	164–443	ROD, connecting; 9–3/8" (238.1 mm) <i>Models 215–873 & 204–287 only</i>	1
56	108–543*	PACKING, u–cup; UHMWPE	1
58	172–477***	TAG, warning (not shown)	1
64	223–369*	GLAND/PACKING STACK, throat	1
65	223–368*	GLAND/PACKING STACK, intake valve	1
66	110–769	SEAL, wiper; polyurethane	1

**Included in repair kit 220–861.*

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

****Extra warning labels and tags are available free.*

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

Displacement Pump Repair Kit 220–861

Must be purchased separately

Includes:

Ref No.	Qty
27	3
35	2
56	1
64	1
65	1

NOTE: O–ring 104–445 included in the kit is not used with these models.

HOW TO ORDER PARTS

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

6 digit Part Number	Qty	Part Description

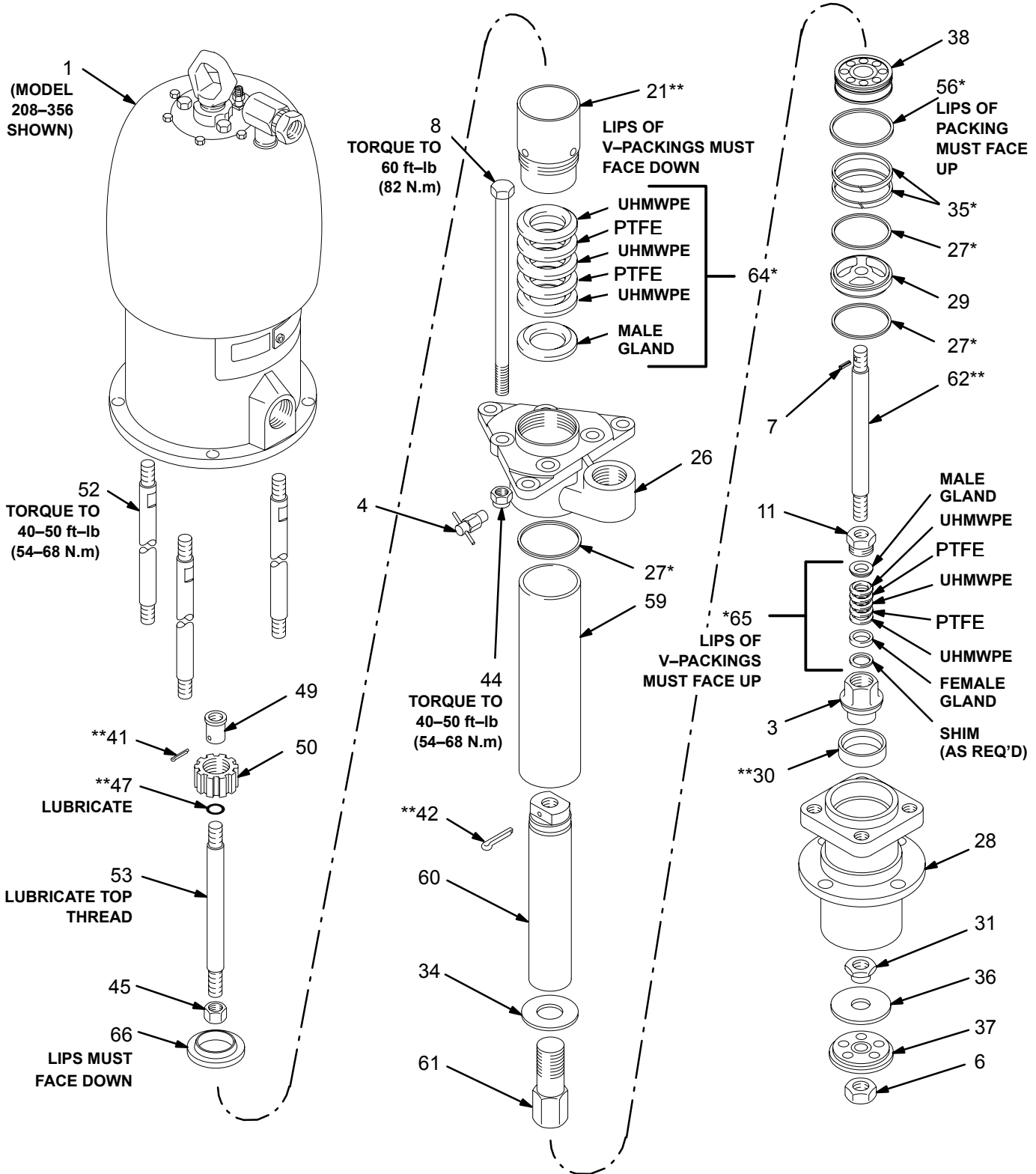
PARTS DRAWING – SEVERE-DUTY PUMPS

Model 222–539, Series A
20:1 Ratio King Pump with Standard Air Motor
and Severe-Duty Displacement Pump
 Includes items 1–66

Model 222–526, Series A
10:1 Ratio Bulldog Pump with Standard Air Motor
and Severe-Duty Displacement Pump
 Includes items 1–66

Model 223–991, Series A
20:1 Ratio King Pump with Quiet Air Motor
and Severe-Duty Displacement Pump
 Includes items 1–66

Model 223–984, Series A
10:1 Ratio Bulldog Pump with Quiet Air Motor
and Severe-Duty Displacement Pump
 Includes items 1–66



PARTS LIST – SEVERE-DUTY PUMPS

Model 222–539, Series A
20:1 Ratio King Pump with Standard Air Motor and Severe-Duty Displacement Pump
 Includes items 1–66

Model 223–991, Series A
20:1 Ratio King Pump with Quiet Air Motor and Severe-Duty Displacement Pump
 Includes items 1–66

REF NO.	PART NO.	DESCRIPTION	QTY
1	207–647	KING, STANDARD AIR MOTOR, <i>Model 222–539 only</i> <i>see 306–968 for parts</i>	1
	220–106	KING, QUIET AIR MOTOR, <i>Model 223–991 only</i> <i>see 307–741 for parts</i>	1
	208–356	BULLDOG, STANDARD AIR MOTOR <i>Model 222–526 only</i> <i>See 307–049 for parts</i>	1
	215–255	BULLDOG, QUIET AIR MOTOR <i>Model 223–984 only</i> <i>See 307–304 for parts</i>	1
2	222–638	DISPLACEMENT PUMP ASSEMBLY <i>Series B</i> Includes items 3–38, 56–66	1
3	205–161	.HOUSING, intake valve seal Includes item 30	1
4	206–256	.VALVE, bleeder	1
6	100–155	.NUT, hex, jam; 5/8–18	1
7	101–354	.PIN, roll; 0.188" (4.8 mm) dia; 1.125" (28.6 mm) long	1
8	102–420	.BOLT, hex hd cap; 5/8–11 x 12"	4
11	158–440	.NUT, packing, intake valve	1
21	186–058**	.PACKING NUT/WET-CUP	1
26	181–896	.HOUSING, outlet	1
27	162–898*	.GASKET; copper	3
28	162–900	.HOUSING, intake valve	1
29	162–901	.STOP, intake valve	1
30	162–902**	.SEAT, intake valve (part of item 3)	1
31	162–903	.GUIDE, valve plate	1
34	165–888	.PLATE, valve	1
35	181–897*	.BEARING, piston	2
36	165–890	.PLATE, valve	1
37	172–199	.PISTON, priming	1
38	181–893	.PISTON, cylinder	1
41	100–103**	PIN, cotter; 0.125" (3.2 mm) dia. x 1.5" (38 mm) long	1
42	100–104**	PIN, cotter; 0.125" (3.2 mm) dia. x 1.75" (45 mm) long	1
44	101–712	NUT, lock; 5/8–11; w/nylon insert	3
45	101–936	NUT, hex, jam; 3/4"	1
47	158–674**	O-RING; nitrile rubber	1
49	168–211	COUPLING, connecting rod <i>Models 222–539 and 223–991 only</i>	1
	161–543	COUPLING, connecting rod <i>Models 222–526 and 223–984 only</i>	1
50	168–210	NUT, shouldered <i>Models 222–539 and 223–991 only</i>	1
	161–544	NUT, shouldered <i>Models 222–526 and 223–984 only</i>	1
52	168–824	ROD, tie; 13–7/8" (352.4 mm) long, shoulder to shoulder	3
53	168–253	ROD, connecting; 9–5/16" (236.5 mm) <i>Models 222–539 and 223–991 only</i>	1
	164–443	ROD, connecting; 9–3/8" (238.1 mm) <i>Models 222–526 and 223–984 only</i>	1
56	108–543*	PACKING, u-cup; UHMWPE	1
58	172–477***	TAG, warning (not shown)	1

Model 222–526, Series A
10:1 Ratio Bulldog Pump with Standard Air Motor and Severe-Duty Displacement Pump
 Includes items 1–66

Model 223–984, Series A
10:1 Ratio Bulldog Pump with Quiet Air Motor and Severe-Duty Displacement Pump
 Includes items 1–66

REF NO.	PART NO.	DESCRIPTION	QTY
59	186–063	CYLINDER, pump	1
60	186–095	ROD, displacement	1
61	167–490	ADAPTER	1
62	167–476	ROD, priming	1
64	223–369*	GLAND/PACKING STACK, throat	1
65	223–368*	GLAND/PACKING STACK, intake valve	1
1			
66	110–769	SEAL, wiper; polyurethane	1

**Included in repair kit 220–861.*

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

****Extra warning labels and tags are available free.*

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

Displacement Pump Repair Kit 220–861
Must be purchased separately
 Includes:

Ref No.	Qty
27	3
35	2
56	1
64	1
65	1

NOTE: O-rings 108–832, 108–833, and 104–445 included in the kit are not used with these models.

HOW TO ORDER PARTS

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

6 digit Part Number	Qty	Part Description

ACCESSORIES

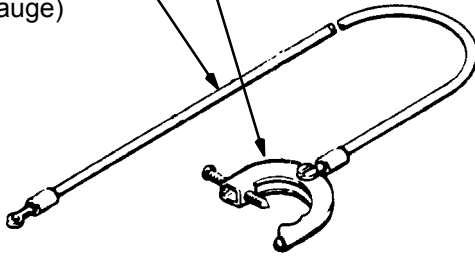
USE GENUINE GRACO PARTS AND ACCESSORIES

Must be purchased separately.

GROUNDING CLAMP 103-538

GROUND WIRE 208-950

7.6 m (25 ft) long,
1.5 mm² (12 gauge)



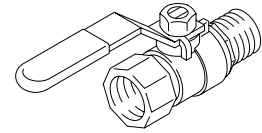
BLEED-TYPE MASTER AIR VALVE

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(mxf) inlet and outlet

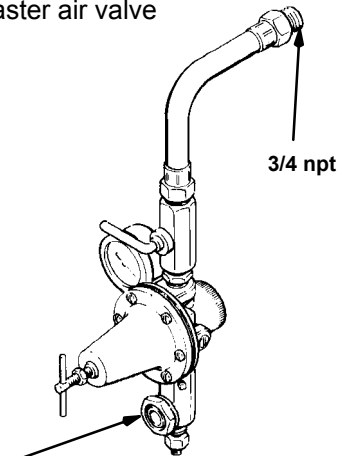
107-142 1/2 npt(mxf) inlet and outlet



AIR PRESSURE REGULATOR KIT 205-712

200 psi (14 bar) MAXIMUM WORKING PRESSURE

Includes bleed-type master air valve



3/4 npt

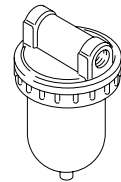
3/4 npsm(f) SWIVEL
AIR INLET UNION

AIR LINE FILTER

250 psi (17.5 bar) MAXIMUM WORKING PRESSURE

106-149 1/2 npt inlet and outlet

106-150 3/4 npt inlet and outlet

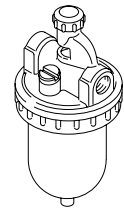


AIR LINE LUBRICATOR

250 psi (17.5 bar) MAXIMUM WORKING PRESSURE

214-848 1/2 npt inlet and outlet

214-849 3/4 npt inlet and outlet



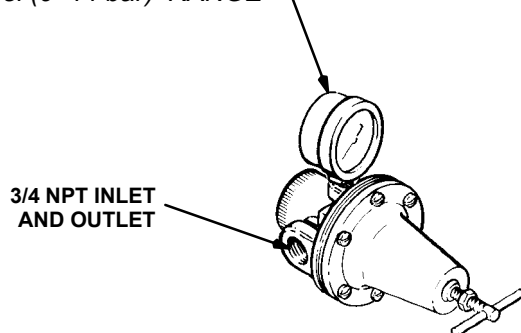
AIR PRESSURE REGULATOR 207-755

10-125 psi (1-9 bar) MAXIMUM WORKING PRESSURE

3/4 npt inlet and outlet

AIR PRESSURE GAUGE 101-180

0-200 psi (0-14 bar) RANGE

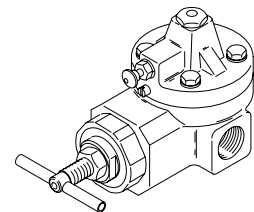


3/4 NPT INLET
AND OUTLET

PUMP RUNAWAY VALVE 215-362

180 psi (12 bar) MAXIMUM WORKING PRESSURE

Shuts off air supply to the pump if the pump accelerates beyond the pre-adjusted setting due to an empty supply container, interrupted fluid supply to the pump, or excessive cavitation. 3/4 npt(f) inlet and outlet.



ACCESSORIES CONTINUED ON THE NEXT PAGE

ACCESSORIES

USE GENUINE GRACO PARTS AND ACCESSORIES

Must be purchased separately.

GRACO THROAT SEAL LIQUID

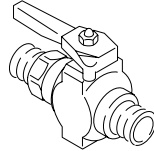
Non-evaporating liquid for wet cup

206-995 1 quart (0.95 liter)

206-996 1 gallon (3.8 liter)

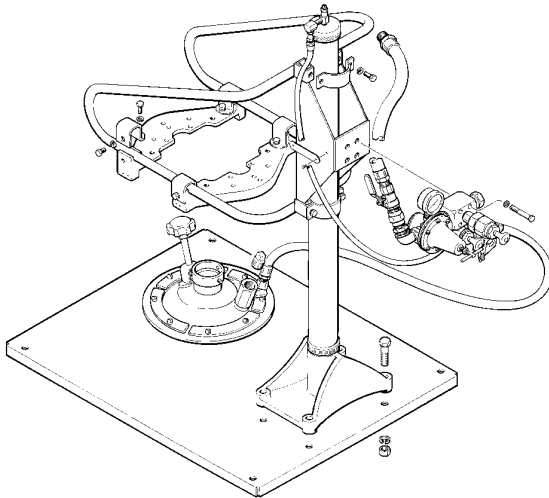
FLUID DRAIN VALVE 210-658

350 bar (5000 psi) MAXIMUM WORKING PRESSURE
3/8 npt(f) mbe; Viton seals



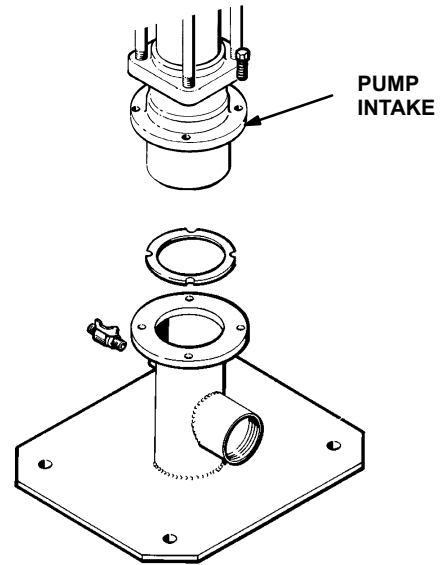
200 LITER (55 gal.) ELEVATOR/INDUCTOR 222-635

For highly viscous fluids that require the weight of a pump on an inductor plate to assist in pump priming.



FLOOR STAND KIT 222-699

Provides secure floor mounting for pump when used with bulk fluid containers. 3" npt fluid inlet. Includes instructions. (Part nos. 185-443 Ring and 185-445 Plate, included in the kit, are not used with these pumps.)



ACCESSORIES CONTINUED ON THE NEXT PAGE

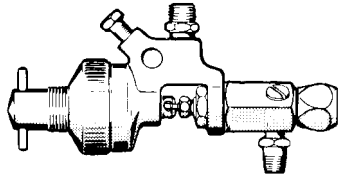
ACCESSORIES

USE GENUINE GRACO PARTS AND ACCESSORIES

Must be purchased separately.

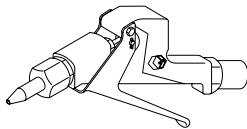
HYDRA-MASTIC AUTOMATIC AIRLESS SPRAY GUN 206-660

3000 psi (210 bar) MAXIMUM WORKING PRESSURE
Has a 0.180 in. (4.57 mm) fluid valve orifice and internal 3-pin safety diffuser for spraying highly viscous, semi-solid fluids. Requires installing a 3 way air solenoid control valve with a timer to operate the gun.



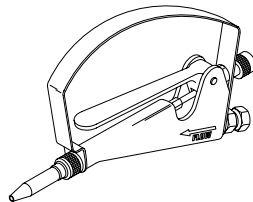
PISTOL GRIP FLO-GUN 207-945

6000 psi (420 bar) MAXIMUM WORKING PRESSURE



EXTRUSION FLO-GUN 204-355

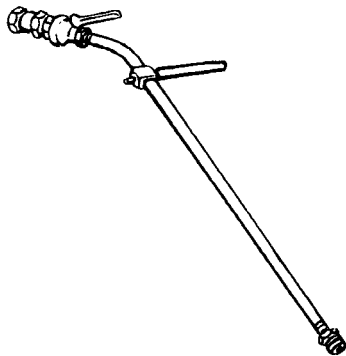
3000 psi (210 bar) MAXIMUM WORKING PRESSURE



JOINT SEALER POLE GUN 203-810

(Less Nozzle)

3000 psi (210 bar) MAXIMUM WORKING PRESSURE
For sealing joints in concrete.
3/4 npt



GROUNDING BUNA-N AIR SUPPLY HOSE

175 psi (12 bar) MAXIMUM WORKING PRESSURE

Part No.	ID	Length	Thd. Size
208-610	3/4" (19 mm)	6 ft (1.8 m)	3/4 npt(m)
205-548	3/4" (19 mm)	15 ft (4.5 m)	3/4 npt(m)
208-611	3/4" (19 mm)	25 ft (7.6 m)	3/4 npt(m)
208-612	3/4" (19 mm)	50 ft (15 m)	3/4 npt(m)

GROUNDING BUNA-N FLUID HOSE

3500 psi (240 bar) MAXIMUM WORKING PRESSURE

Part No.	ID	Length	Thd. Size
214-962	1/2" (12.7 mm)	15 ft (4.6 m)	1/2 npt(m)
214-963	1/2" (12.7 mm)	25 ft (7.6 m)	1/2 npt(m)
214-964	1/2" (12.7 mm)	50 ft (15.2 m)	1/2 npt(m)

GROUNDING NYLON FLUID HOSE

3000 psi (210 bar) MAXIMUM WORKING PRESSURE

Part No.	ID	Length	Thd. Size
214-700	3/16" (4.8 mm)	2 ft (610 mm) (fbc) swivel	1/4 npsm
214-701	3/16" (4.8 mm) x 1/4 npsm(f) swivel	3 ft (914 mm)	1/4 npt(m)
210-540	1/4" (6.4 mm)	25 ft (7.6 m)	1/4 npsm (fbc) swivel
210-541	1/4" (6.4 mm)	50 ft (15.2 m) (fbc) swivel	1/4 npsm
214-703	3/8" (9.5 mm)	25 ft (7.6 m)	3/8 npt (mbe)
214-705	3/8" (9.5 mm)	50 ft (15.2 m)	3/8 npt (mbe)
214-920	3/8" (9.5 mm)	100 ft (30.4 m)	3/8 npt (mbe)

GROUNDING BUNA-N FLUID HOSE

5000 psi (345 bar) MAXIMUM WORKING PRESSURE

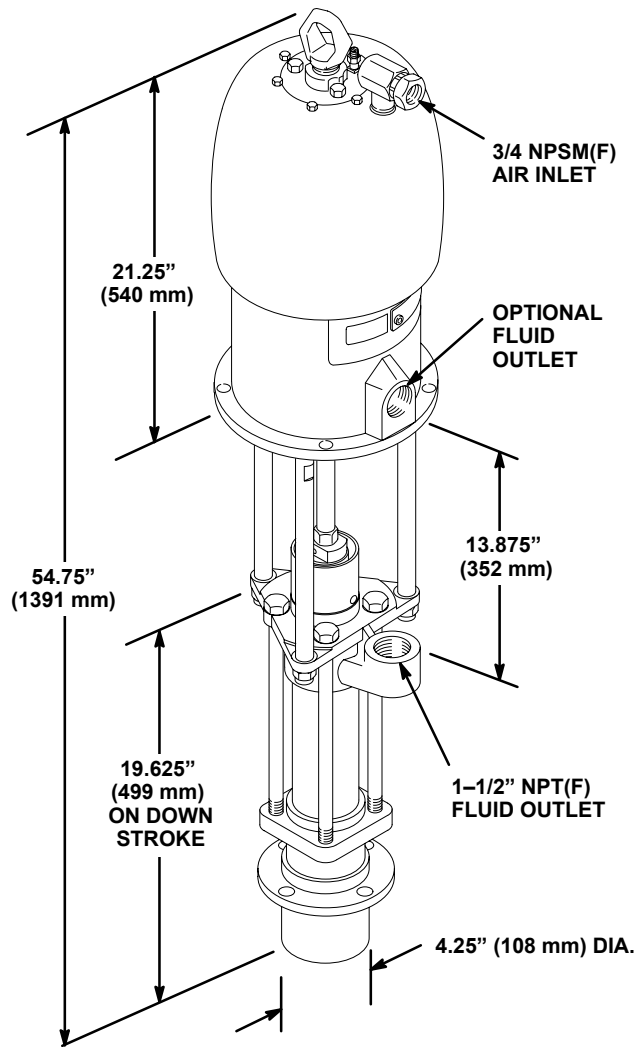
Part No.	ID	Length	Thd. Size
215-445	1/2" (12.7 mm)	5 ft (1.5 m)	1/2 npt (mbe)
215-441	1/2" (12.7 mm)	10 ft (3.1 m)	1/2 npt (mbe)
215-443	1/2" (12.7 mm)	25 ft (7.6 m)	1/2 npt (mbe)
215-444	1/2" (12.7 mm)	50 ft (15.2 m)	1/2 npt (mbe)

GROUNDING NEOPRENE FLUID HOSE

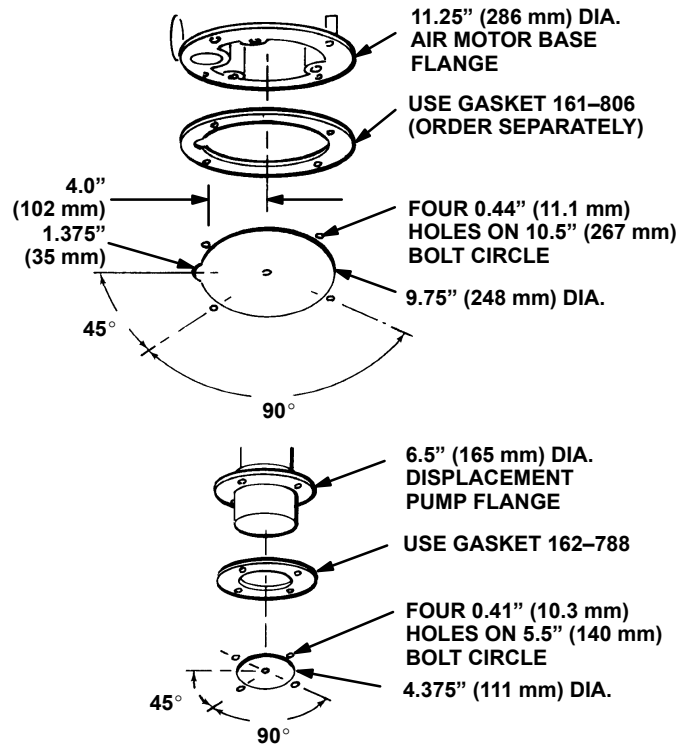
5000 psi (345 bar) MAXIMUM WORKING PRESSURE

Part No.	ID	Length	Thd. Size
215-241	3/4" (19.1 mm)	6 ft (1.8 m)	3/4 npt (mbe)
215-238	3/4" (19.1 mm)	10 ft (3.1 m)	3/4 npt (mbe)
215-239	3/4" (19.1 mm)	15 ft (7.6 m)	3/4 npt (mbe)
215-240	3/4" (19.1 mm)	25 ft (7.6 m)	3/4 npt (mbe)

DIMENSIONS



MOUNTING HOLE LAYOUT



SERVICE INFORMATION

SERIES CHANGE NOTE: Model 222-638 Displacement Pump is advanced to Series B.

ADDED MODELS NOTE: Model 223-984 Quiet Bulldog and 223-991 Quiet King are added to the manual.

TECHNICAL DATA

Air Operating Range

Bulldog Models 204–287, 215–873, 222–526, and 223–984 40–100 psi (3–7 bar)
King Models 222–248, 222–539, and 223–991 40–90 psi (3–6 bar)

Air consumption

Bulldog Models 204–287, 215–873, 222–526, and 223–984 13 cfm per gallon pumped (0.10 m³/min/liter) at 100 psi (7 bar) air pressure; up to 120 cfm (3.4 m³/min/liter) with pump operated within recommended range
King Models 222–248, 222–539, and 223–991 11 cfm per gallon pumped (0.31 m³/min/liter) at 70 psi (5 bar) air pressure; up to 80 cfm (2.26 m³/min/liter) with pump operated within recommended range

Pump Cycles Per Gallon (liter) 7 (26.5)

Maximum Recommended

Pump Speed 60 cycles/min;
8.5 gpm (32 liter/min) delivery

Maximum Pump Discharge Pressure

Bulldog Models 204–287, 215–873, 222–526, and 223–984 1000 psi (70 bar)
King Models 222–248, 222–539, and 223–991 1800 psi (124 bar)

Wetted Parts .. Carbon Steel, Zinc Plating, Nitralloy, Bronze, Ultra-High Molecular Weight Polyethylene, PTFE[®], Delrin[®], Viton[®], Thiokol[®]

Weight 101 lb (46 kg) approximate

Delrin[®], PTFE[®], and Viton[®] are registered trademarks of the DuPont Co.

Thiokol[®] is a registered trademark of the Thiokol Chemical Corp.

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 to an authorized Graco distributor for verification of the claim. 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.

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.

IMPORTANT PHONE NUMBERS

TO PLACE AN ORDER, contact your Graco distributor, or call this number to identify the distributor closest to you: **1-800-328-0211 Toll Free**

FOR TECHNICAL ASSISTANCE, service repair information or assistance regarding the application of Graco equipment: **1-800-543-0339 Toll Free**

Factory Branches: Atlanta, Chicago, Dallas, Detroit, Los Angeles, West Caldwell (N.J.)

Subsidiary and Affiliate Companies: Canada; England; Switzerland; France; Germany; Hong Kong; Japan

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