

INSTRUCTIONS-PARTS LIST



308-145

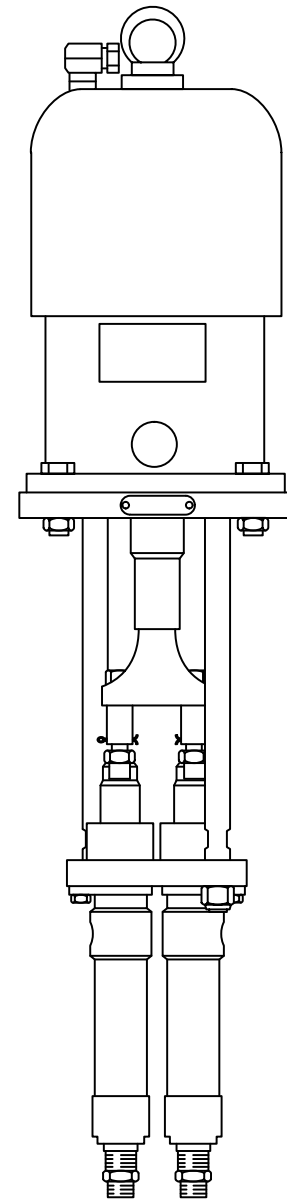
Rev A

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

Bulldog® PLURAL COMPONENT PUMP

1500 psi (105 bar) *MAXIMUM WORKING PRESSURE*
100 psi (6.9 bar) *MAXIMUM INCOMING AIR PRESSURE*

Model 224-567, Series A



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WARNING

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Plural Component Chemicals Hazard

Graco Inc. does not manufacture or supply any of the reactive chemical materials that may be used in this equipment and is not responsible for their effects. Because of the vast number of chemicals that could be used and their varying chemical reactions, before using this equipment, the buyer and the user should determine all facts relating to the materials used, including any of the potential hazards involved. Particular inquiry and investigation should be made into potential dangers relating to toxic fumes, fires, explosions, reaction times, and exposure of human beings to the individual components or their resultant mixtures. Graco assumes no responsibility for loss, damage, expense or claims for bodily injury or property damage, direct or consequential, arising from the use of such chemical components.

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

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WARNING

High pressure spray can cause serious injury. For professional use only.

Observe all warnings. Read and understand all instruction manuals before operating equipment.

FLUID INJECTION HAZARD

General Safety

This equipment generates very high fluid pressure. Spray from the gun, 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 can cause serious damage.

NEVER point the spray gun as anyone or at any part of the body. NEVER put hand or fingers over the nozzle.

ALWAYS follow the **Pressure Relief Procedure**, below, before cleaning or removing the 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 Safety Devices

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

EQUIPMENT MISUSE HAZARD

General Safety

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

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

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

WEAR APPROPRIATE PROTECTIVE CLOTHING, eyewear and respirator as recommended by the fluid and solvent manufacturer.

Safety Latch

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

Trigger Guard

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

Nozzle Safety

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

PRESSURE RELIEF PROCEDURE

Always relieve the fluid pressure in the sprayer and hoses and shut off the electric power before checking or adjusting the hoses or any other component in the system, and when you stop spraying, to reduce the risk of serious bodily injury from fluid injection or electric shock.

1. Engage the spray gun trigger safety latch.
2. Shut off the air to the feed pumps.
3. Turn off the air to the proportioning pump.
4. Close the gun manifold needle valves.
5. Disengage the trigger safety latch again.
6. Open both fluid filter drain valves, having a container ready to catch the draining fluid.
7. Shut off the main electrical power to the heater if you are working on any part of the heater.

System Pressure

This system has a **1500 psi (105 bar) MAXIMUM WORKING PRESSURE AT 100 psi (6.9 bar) MAXIMUM INCOMING AIR PRESSURE.** Be sure that all spray equipment and accessories are rated to withstand the maximum working pressure of this heater. DO NOT exceed the maximum working pressure of any component or accessory used in the system.

NEVER install any fluid shut off device at the fluid outlet of either heater or filter. Shutting off the fluid at the outlet causes high back pressure which can cause component rupture and result in serious bodily injury.

Fluid Compatibility

BE SURE all fluids and solvents used are chemically compatible with the wetted parts shown in the Technical Data on page 12. Always read the fluid and solvent manufacturer’s literature before using them in this system.

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.

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 Graco heated hose until the couplings are properly insulated and the hose abrasion cover is in place.

Never operate a heated hose when it is coiled. Doing so causes excessive heat buildup which can result in hose rupture and cause serious bodily injury, including fluid injection and property damage.

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 contain the high pressure fluid.

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

FIRE OR EXPLOSION HAZARD

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

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

Grounding

To reduce the risk of static sparking, ground the sprayer and all other spray equipment used or located in the spray area. CHECK your local electrical code for detailed grounding instructions for your area and type of equipment. BE SURE to ground all of this spray equipment:

1. *Sprayer & Plural Component Pump*: by using a ground wire and clamp to connect the sprayer to a true earth ground. See page 12 to order a grounding wire and clamp.

2. *Feed Pumps*: by using a ground wire and clamp to connect the pump to a true earth ground. See separate manual 307–552.
3. *Air Compressors*: according to the manufacturer's recommendations.
4. *Foam-Cat Heater*: by wiring to a positively grounded power supply. In a mobile installation, be sure the truck or trailer is grounded to a true earth ground.
5. *Foam-Cat Heated Hoses*: by connection to a properly grounded heater. The Ground Fault Interrupter on the hose control panel of the Foam-Cat Heater senses electrical continuity in the heated hoses; it cannot function unless the heater is positively grounded.
6. *Air and Fluid Hoses*: use only grounded hoses and check electrical resistance regularly.
7. *Spray Gun*: obtain grounding through connection to a properly grounded fluid hose and sprayer.
8. *Object Being Sprayed*: according to local code.
9. *All pails used when flushing* according to local code. Use only metal pails, which are conductive. Place the pail on a grounded surface and do not interrupt the grounding continuity by placing a cloth or paper under the pail.
10. *To maintain grounding continuity when flushing or relieving pressure*, always hold a metal part of the gun firmly to the side of grounded metal pail, then trigger the gun.

IMPORTANT

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

TYPICAL INSTALLATION

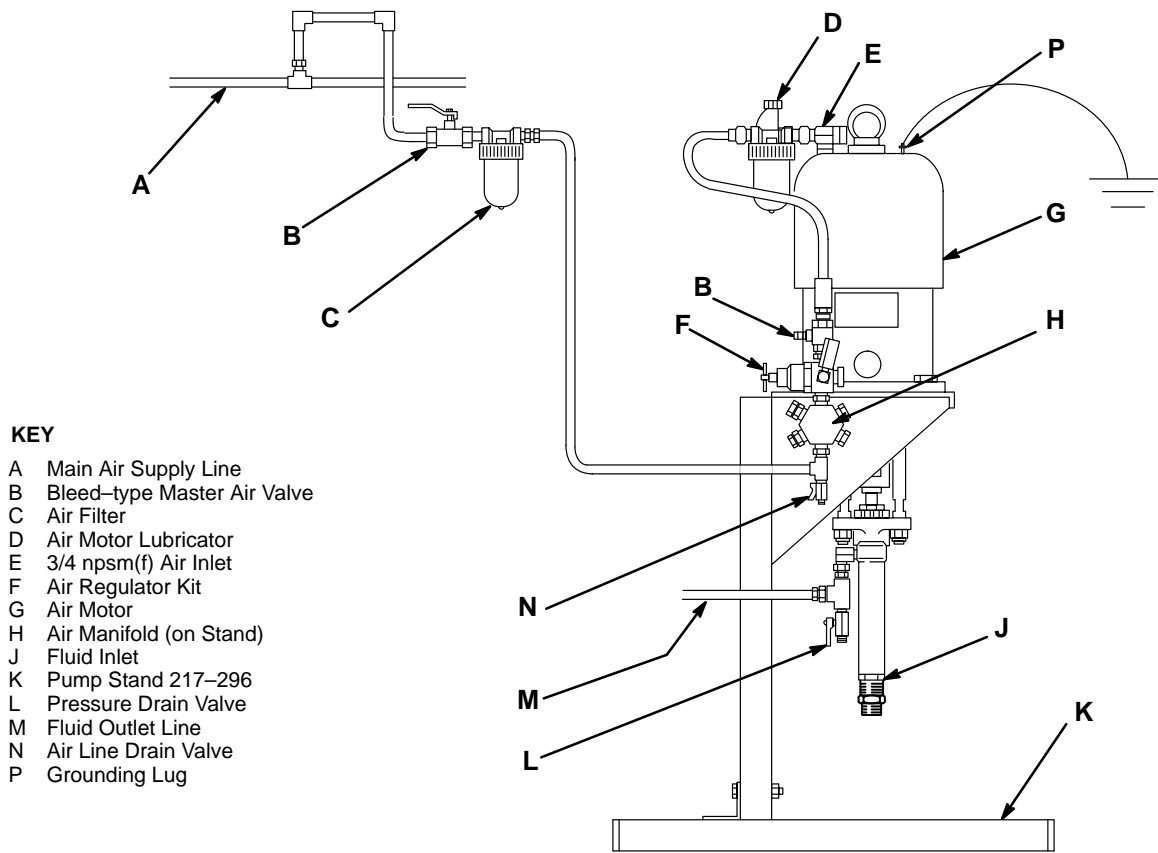


Fig 4–1

INSTALLATION

The Typical Installation shown above is only a guide. Contact your Graco representative for assistance in designing a system to suit your needs.

If you are using this pump in a Foam–Cat system, refer to manual 308–144 for additional installation information after reading this manual.

Mount the pump to suit the type of installation planned. The pump dimensions and mounting hole diagram are shown on page 11. Recommended system accessories are on page 12.

WARNING

To reduce the risk of serious bodily injury, including electric shock, fire or explosion, read the **FIRE OR EXPLOSION HAZARD** warning section on page 3 and ground all of your equipment as explained there and in the following paragraph.

Grounding

If the pump is mounted on stand 217–296, attach a grounding wire to the grounding lug (P) of the stand. If the pump is mounted on a cart or stand without a grounding lug, attach the grounding wire and clamp to the air motor grounding lug. Connect the clamp to a true earth ground according to your local electrical codes.

WARNING

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

The bleed-type master air valve (B) relieves air trapped between this valve and the pump after the air regulator is shut off. Trapped air can cause the pump to cycle unexpectedly.

The fluid drain valve (L) assists in relieving fluid pressure in the displacement pumps, hose and gun; triggering the gun to relieve pressure may not be sufficient.

Air Line

Mount the air line accessories in the order shown. Notice the upward loop in the drop from the air line (A), and the tee and low pressure drain valve (N) which have been added where the air line is connected to the manifold (H). These plumbing methods, along with the air filter (C), significantly reduce the chance of harmful dirt and moisture getting into the air motor. Open the drain valve (N) regularly to drain accumulated moisture in the air line.

Install the bleed-type master air valve (B) and use to relieve air pressure in the air line and motor when shutting down the system or isolating it for service.

Install an air regulator (F) to control pump speed and outlet pressure. A regulator kit (p/n 205-712) which includes a regulator, gauge, bleed-type master air valve, hose and mounting adapter, are shown in Fig 4-1. Close to the air motor inlet, install a lubricator (D) to automatically lubricate the air motor (G).

Fluid Outlet Line

Install a drain valve (L) at the fluid outlet to help relieve fluid pressure in the pump during shutdown. See Fig 4-1. If necessary, install a surge tank, with or without a filter, to reduce line vibrations.

Fluid Intake

Connect an appropriate suction tube to the 3/4 npt(m) pump intake. If necessary, use a check valve to prevent backflow into the pump when it is shut off.

OPERATION

Fill the Wetcups

Keep the wetcups 1/3 full of ISO Pump Lube to prevent fluid from drying on the displacement rod and damaging the pump packings. See Fig 6-1.

Each week, relieve pressure and check the tightness of the packing nut. It should be just tight enough to prevent leakage. Too tight an adjustment causes the packings to bind or wear prematurely and leak. See ACCESSORIES, page 12, to order the ISO Pump Lube.

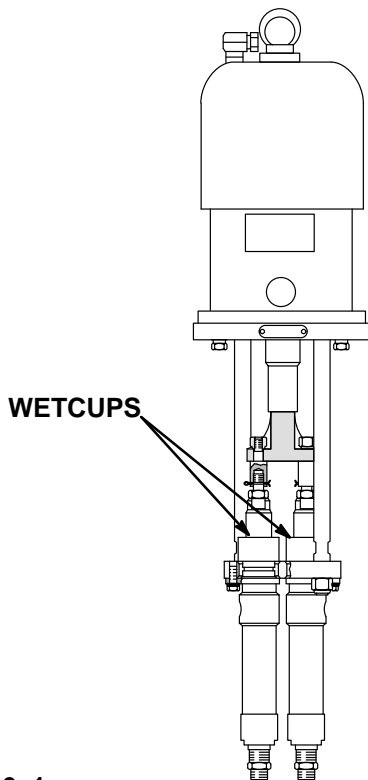


Fig 6-1

Flush the Pump

WARNING

To reduce the risk of splashing and static sparking, which may cause a fire or explosion and serious bodily injury or property damage, always use the lowest possible pressure when flushing. Use only grounded metal flushing containers and maintain firm metal-to-metal contact between the gun and metal flushing container. See Fig 6-2.

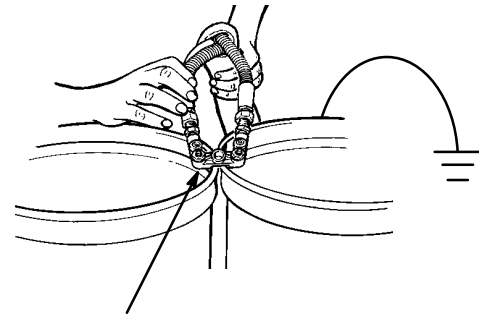


Fig 6-2

The displacement pump was factory tested in light oil, which was left in to protect the pump parts. To prevent contamination of the fluid to be pumped, flush the pumps before using them. Be sure the solvent used is compatible with the fluid being pumped.

In a circulating system, circulate the solvent for about 10 minutes. Then remove the pump intake from the solvent and let the pump force the solvent from the system.

In a dead-end system, trigger the gun into a grounded metal waste container (maintain metal-to-metal contact between the gun and pail) and run solvent through the system until all oil is removed from the system. See Fig 6-2.

OPERATION

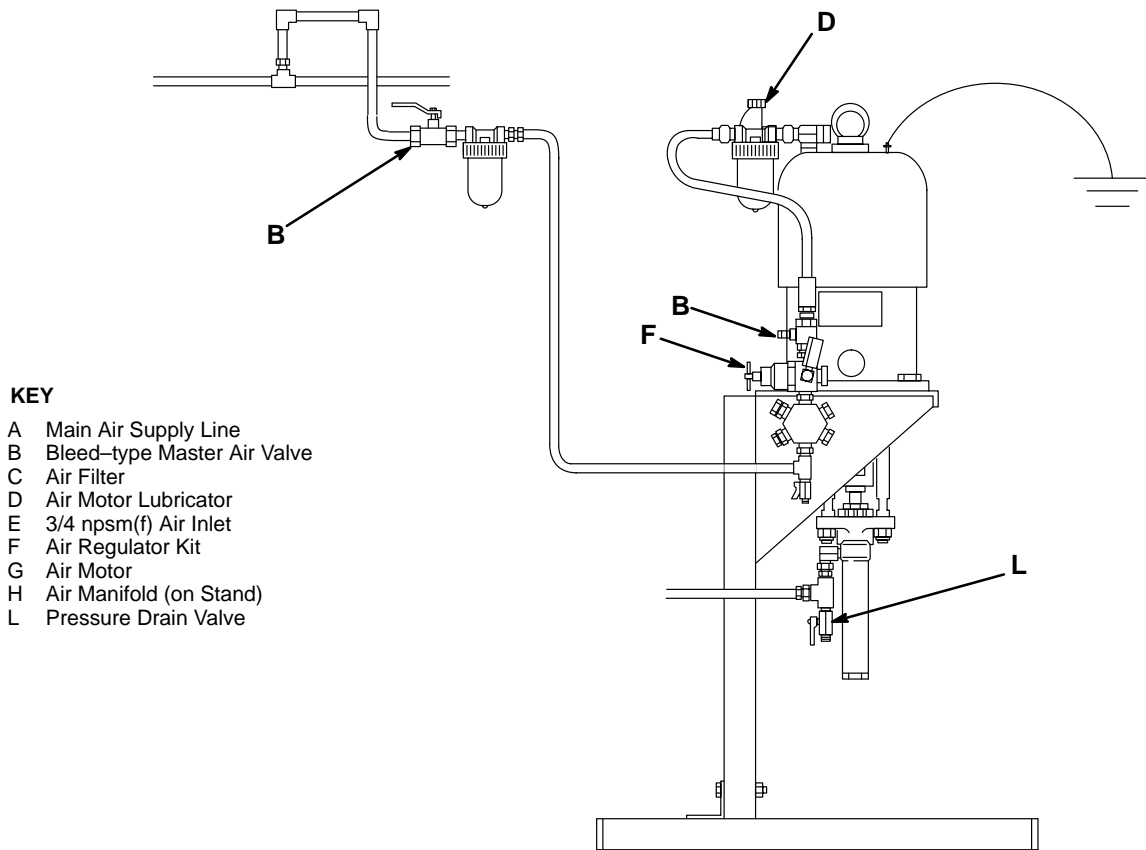


Fig 7-1

Pump Startup

The startup procedure will depend on how your system is set up. If this pump is being used in a Foam-Cat system, refer to manual 308-144 for detailed startup procedures.

For other systems, the general startup procedure is:

1. Put the pump suction tubes in the fluids to be pumped.
2. Place waste containers under each pressure drain valve (L). Open the valves.
3. Close the bleed-type master air valve (B) and the air regulator (F).
4. Turn on the main air supply. Open the bleed-type master air valve (B). If you are using an air regulator kit, be sure its master air valve (B) is open, too.
5. Slowly open the air regulator (F). Run the pump slowly until all air is purged from the pump and fluid is flowing freely from the pressure drain valves (L). Close the valves.
6. Trigger the gun into a grounded waste container until all air is purged from the hose.

7. Adjust the lubricator (D), if used. See the instructions supplied with the lubricator.
8. Adjust the pump speed using the air regulator. Always use the lowest pump speed necessary to get a good spray pattern, which extend spray tip and pump life.

NOTE: Discard purged fluid.

Lubrication and Care

Maintain the wetcups as instructed on page 6.

Carefully monitor the fluid supply. If the supply container is empty and air has been pumped into the system, immediately refill the container and prime the system with fluid. Don't allow air to remain in the system.

Always stop the pump at the bottom of its stroke to prevent fluid from drying on the displacement rod and damaging the packings.

When storing the pump, flush all fluid out of the displacement pumps and hoses and fill with mineral spirits or rust-inhibiting solvent to prevent corrosion. Relieve pressure.

TROUBLESHOOTING

WARNING

Pressure Relief Procedure

Always relieve the fluid pressure in the sprayer and hoses and shut off the electric power before checking or adjusting the hoses or any other component in the system, and when you stop spraying, to reduce the risk of serious bodily injury from fluid injection or electric shock.

1. Engage the spray gun trigger safety latch.

2. Shut off the air to the feed pumps.
3. Turn off the air to the proportioning pump.
4. Close the gun manifold needle valves.
5. Disengage the trigger safety latch again.
6. Open both fluid filter drain valves, having a container ready to catch the draining fluid.
7. Shut off the main electrical power to the heater if you are working on any part of the heater.

WARNING

NEVER operate the pump with the air motor shield removed, to reduce the risk of pinch or amputating your fingers on moving parts, such as the air motor piston.

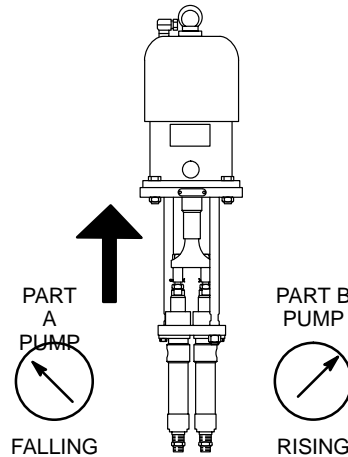
This chart uses the proportioner gauges to determine pump malfunctions.

Faulty manifold checks can mask pump cylinder problems. Always keep these valves operating properly.

Observe the gauge relationships during the stroke direction indicated by the bold arrow, and immediately after closing the manifold.

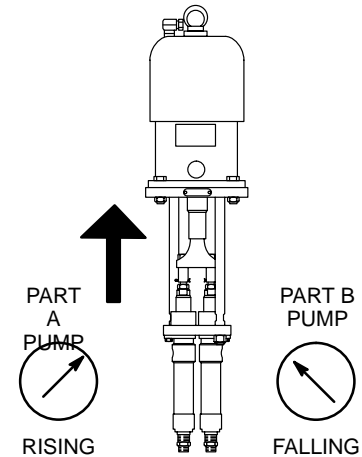
TROUBLE AREA: PART A PUMP LEAKAGE

1. THROAT PACKING
2. PISTON PACKING
3. PISTON BALL CHECK



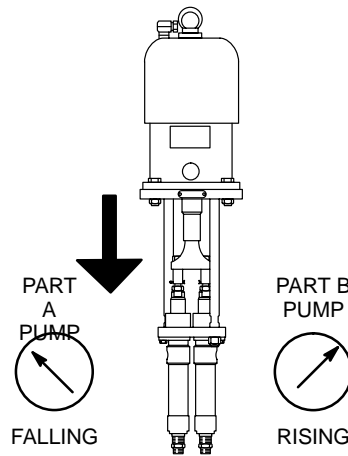
TROUBLE AREA: PART B PUMP LEAKAGE

1. THROAT PACKING
2. PISTON PACKING
3. PISTON BALL CHECK



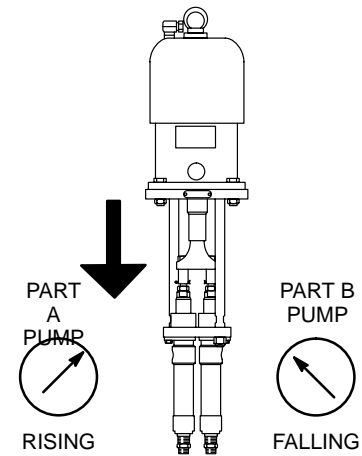
TROUBLE AREA: PART A PUMP LEAKAGE

1. THROAT PACKING
2. FOOT VALVE BALL CHECK



TROUBLE AREA: PART B PUMP LEAKAGE

1. THROAT PACKING
2. FOOT VALVE BALL CHECK



Disconnecting the Motor

1. Follow the **Pressure Relief Procedure Warning** on page 8.
2. Disconnect the air hose.
3. Remove the capscrews (27) and lockwashers (26), nuts (14), and bolts (12). Remove the pumps (7).
4. Screw down the coupler (2). Remove the nuts (22).
5. Lift the motor (1) up.

Disconnecting the Displacement Pumps

1. Follow the **Pressure Relief Procedure Warning** on page 8.
2. Remove the cotter pin (11). Unscrew the rod extension nut (14).
3. Remove the capscrews (12) and lockwashers (13).
4. Pull the displacement pump (7) down.
5. Remove the extensions (10).

Reassembly

1. Reassemble in the reverse order of disassembly.
2. Be sure the tie rods are parallel and there is no binding.
3. Tighten the nuts (12) to 40–50 ft–lb (55–68 N.m).

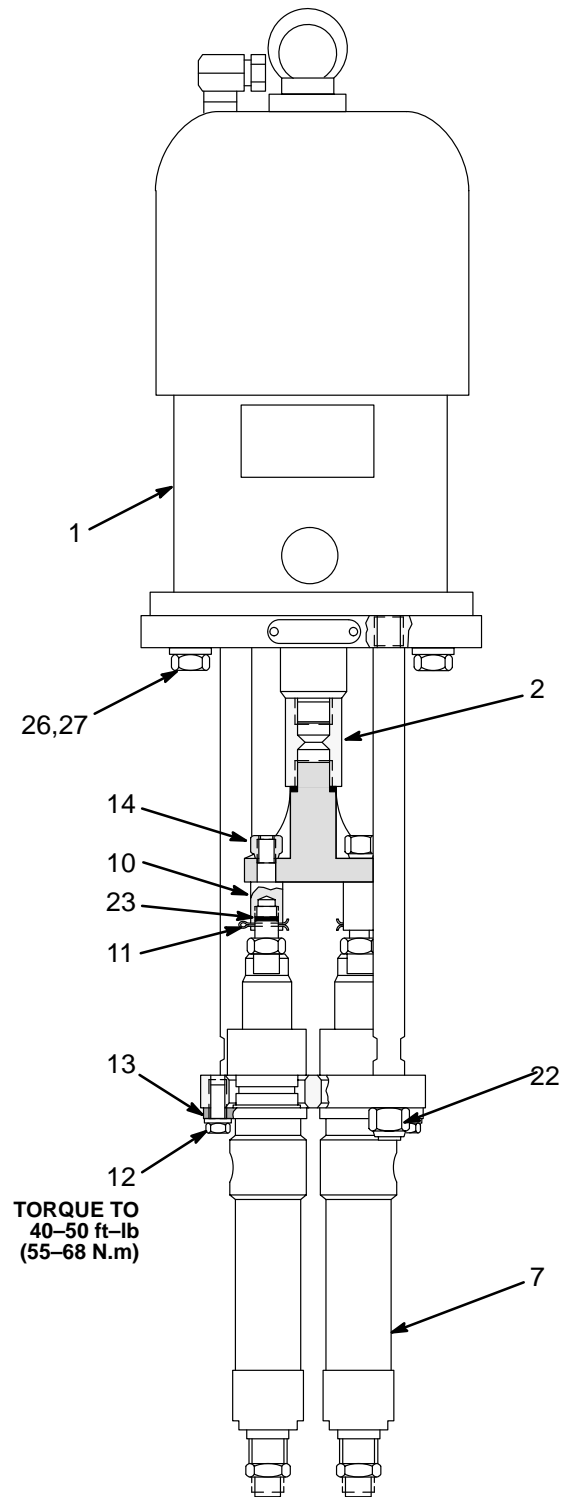


Fig 1

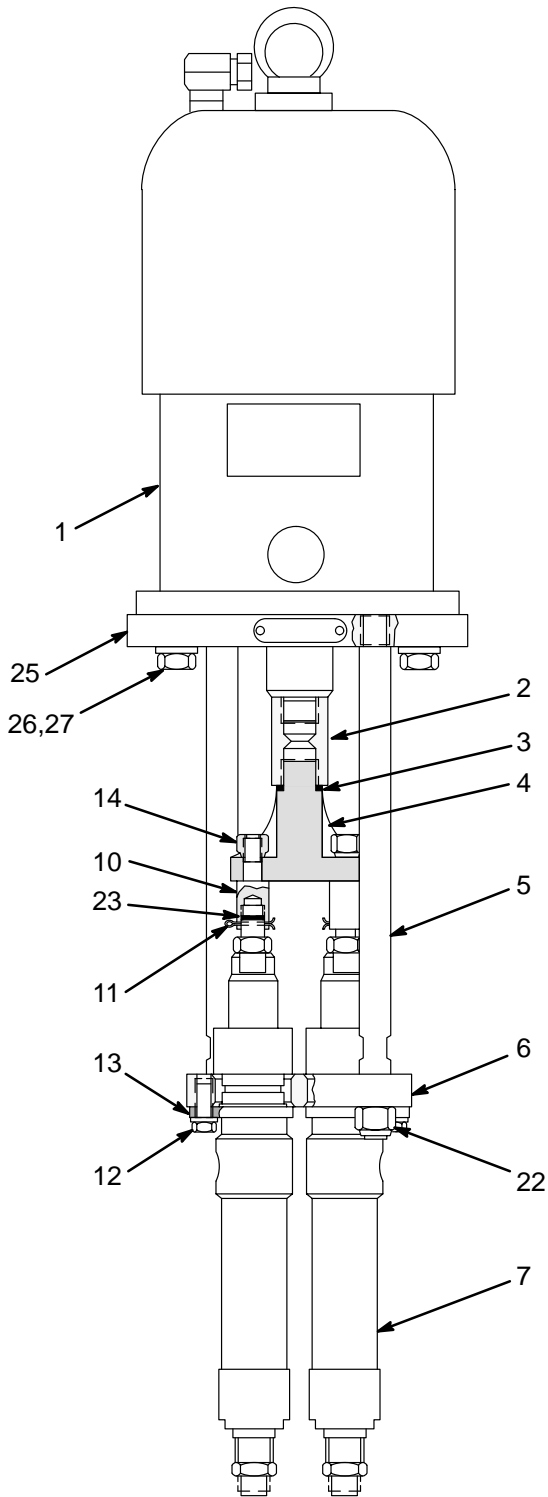
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PARTS DRAWING

PARTS LIST

Bulldog Plural Component Pump Model 224-567

Includes items 1 to 27 as listed.

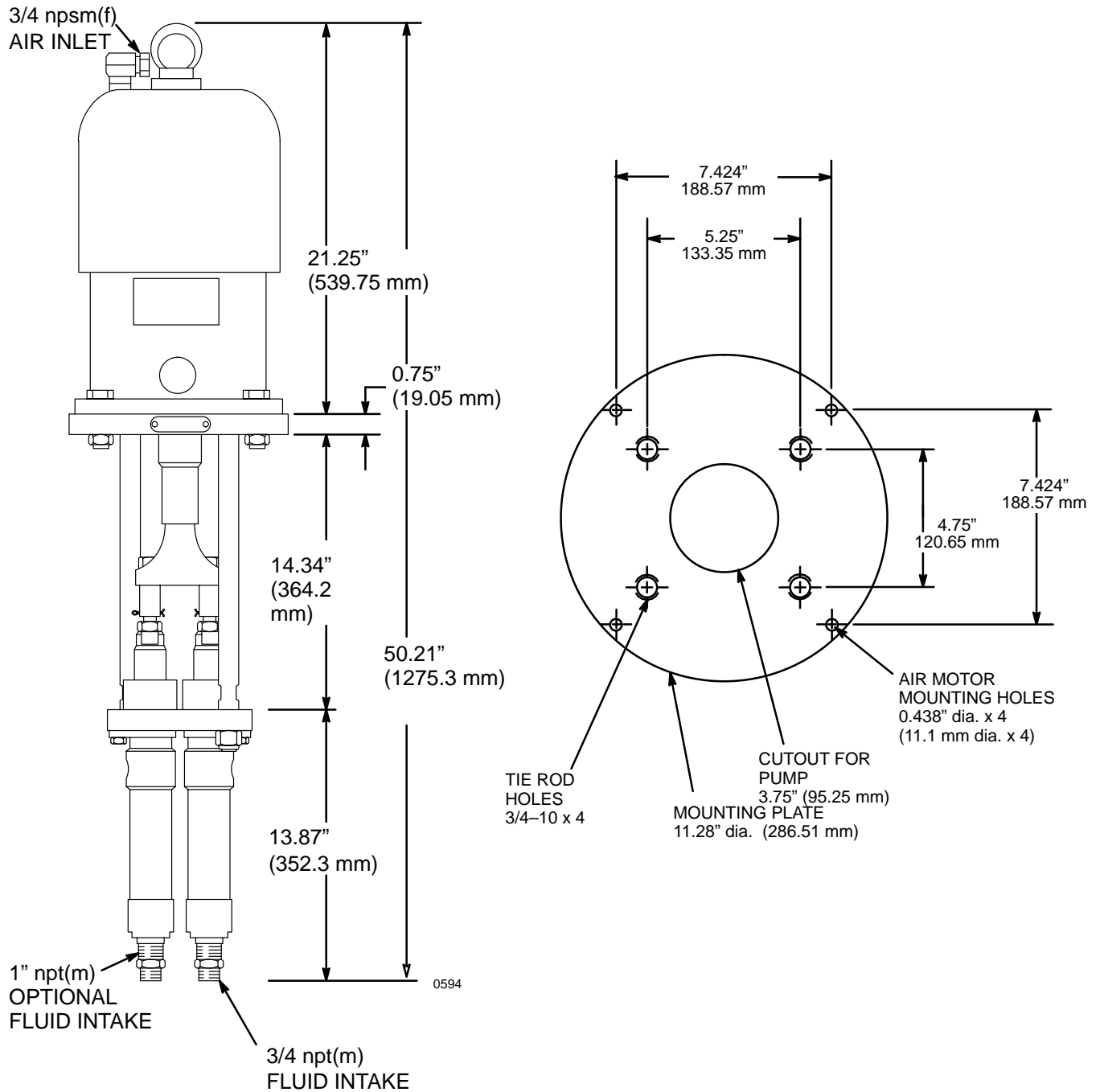


REF NO.	PART NO.	DESCRIPTION	QTY
1	208-356	BULLDOG AIR MOTOR see manual 307-049 for parts	1
2	172-726	COUPLER	1
3	150-429	GASKET, copper	1
4	181-887	YOKE, connecting rod	1
5	187-056	ROD, tie, 12" (305 mm) long	4
6	181-890	PLATE, tie	1
7	217-339	DISPLACEMENT PUMP see manual 307-430 for parts	2
10	171-314	EXTENSION, rod, displacement	2
11	101-946	PIN, cotter, 1/8" dia. x 1-1/2"	2
12	100-101	CAPSCREW, hex hd, 3/8 x 1.0"	6
13	100-133	LOCKWASHER, 3/8"	6
14	101-712	LOCKNUT, 5/8-11	2
22	108-540	LOCKNUT, 3/4-10 UNC-2B	2
23	156-082	O-RING	2
25	187-055	PLATE, adapter	1
26	100-128	LOCKWASHER, spring, 5/8"	4
27	100-428	CAPSCREW, hex hd, 5/8-11 x 2"	4

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DIMENSIONS

MOTOR MOUNTING DIAGRAM



TECHNICAL DATA

Maximum Working Pressure . . . 1500 psi (105 bar)
 Maximum Air Inlet Pressure 100 psi (6.9 bar)
 Air to Fluid Ratio 15:1
 Mix Ratio 1:1
 Maximum Cycle Rate 50
 Weight (approximate) 100 lb (45 kg)

Maximum Flow Rate
Foam materials 30 lb/min (13.5 kg/min)
Other materials 3.0 gpm (11.4 liter/min)
 Delivery/Cycle
Foam materials 0.6 lb/min (0.27 kg/min)
Other materials 0.6 gpm (2.27 liter/min)
 Air Consumption
Foam materials 60 SCFM (1.68 m³/min)
 at 100 psi (6.9 bar) and 30 lb/min (13.5 kg/min)
Other materials 60 SCFM (1.68 m³/min)
 at 100 psi (6.9 bar) and 3 gpm (11.4 liter/min)

ACCESSORIES

Must be purchased separately.

PUMP MOUNTING STAND 217-296

Bolts to floor. Also holds Graco Foam-Cat Heater and Controls. See Fig 1, page 3, for illustration.

ISO PUMP OIL

Helps protect displacement pump throat packings.

GROUND WIRE 208-950

25 ft (7.6 m) long, 12 ga

217-374 1 pint (0.47 liter)

218-656 1 gallon (3.8 liter)

CLAMP 103-538

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.

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

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

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