

5:1 Fire-Ball[®] 300 Pump

306518ZAG

EN

For pumping non-corrosive and non-abrasive greases and lubricants only. For professional use only.

**Model No. 203872, 203857, 204254,
222087, 203876**

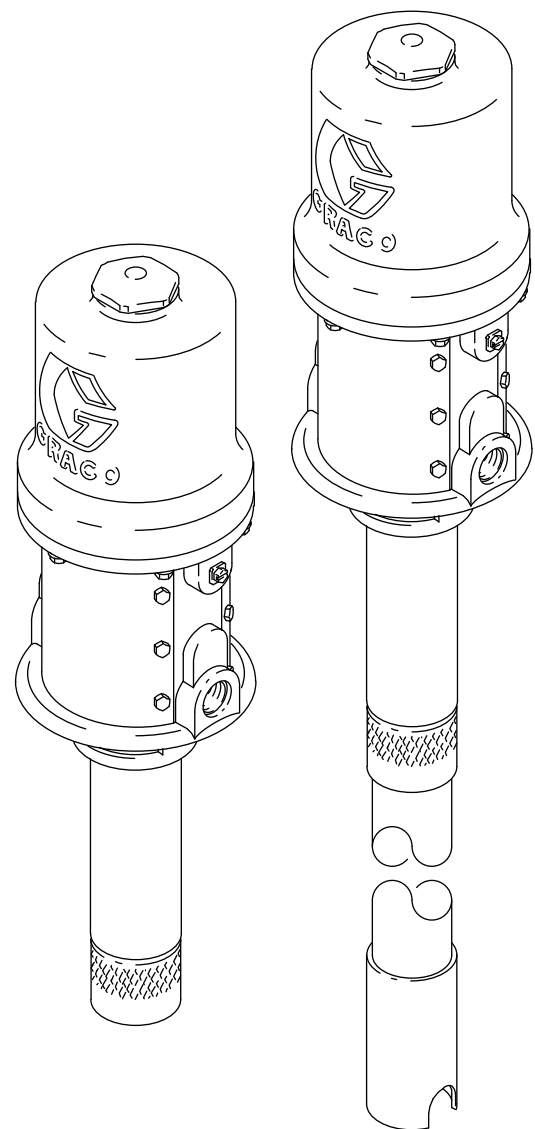
900 psi (6.2 MPa, 62 bar) Maximum Working Pressure

180 psi (1.2 MPa, 12 bar) Maximum Air Input Pressure



Important Safety Instructions

Read all warnings and instructions in this manual. Save these instructions.










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Warnings

The following warnings are for the setup, use, grounding, maintenance, and repair of this equipment. The exclamation point symbol alerts you to a general warning and the hazard symbols refer to procedure-specific risks. When these symbols appear in the body of this manual or on warning labels, refer back to these Warnings. Product-specific hazard symbols and warnings not covered in this section may appear throughout the body of this manual where applicable.

 <h2 style="margin: 0;">WARNING</h2>	
 	<p>EQUIPMENT MISUSE HAZARD</p> <p>Misuse can cause death or serious injury.</p> <ul style="list-style-type: none"> • Do not operate the unit when fatigued or under the influence of drugs or alcohol. • Do not exceed the maximum working pressure or temperature rating of the lowest rated system component. See Technical Data in all equipment manuals. • Use fluids and solvents that are compatible with equipment wetted parts. See Technical Data in all equipment manuals. Read fluid and solvent manufacturer's warnings. For complete information about your material, request MSDS from distributor or retailer. • Do not leave the work area while equipment is energized or under pressure. • Turn off all equipment and follow the Pressure Relief Procedure when equipment is not in use. • Check equipment daily. Repair or replace worn or damaged parts immediately with genuine manufacturer's replacement parts only. • Do not alter or modify equipment. Alterations or modifications may void agency approvals and create safety hazards. • Make sure all equipment is rated and approved for the environment in which you are using it. • Use equipment only for its intended purpose. Call your distributor for information. • Route hoses and cables away from traffic areas, sharp edges, moving parts, and hot surfaces. • Do not kink or over bend hoses or use hoses to pull equipment. • Keep children and animals away from work area. • Comply with all applicable safety regulations.
	<p>TOXIC FLUID OR FUMES HAZARD</p> <p>Toxic fluids or fumes can cause serious injury or death if splashed in the eyes or on skin, inhaled, or swallowed.</p> <ul style="list-style-type: none"> • Read MSDSs to know the specific hazards of the fluids you are using. • Store hazardous fluid in approved containers, and dispose of it according to applicable guidelines. • Always wear chemically impermeable gloves when spraying, dispensing, or cleaning equipment.
 	<p>MOVING PARTS HAZARD</p> <p>Moving parts can pinch, cut or amputate fingers and other body parts.</p> <ul style="list-style-type: none"> • Keep clear of moving parts. • Do not operate equipment with protective guards or covers removed. • Pressurized equipment can start without warning. Before checking, moving, or servicing equipment, follow the Pressure Relief Procedure and disconnect all power sources.
	<p>PERSONAL PROTECTIVE EQUIPMENT</p> <p>Wear appropriate protective equipment when in the work area to help prevent serious injury, including eye injury, hearing loss, inhalation of toxic fumes, and burns. This protective equipment includes but is not limited to:</p> <ul style="list-style-type: none"> • Protective eyewear, and hearing protection. • Respirators, protective clothing, and gloves as recommended by the fluid and solvent manufacturer

Installation

Grounding

<p>The equipment must be grounded to reduce the risk of static sparking and electric shock. Electric or static sparking can cause fumes to ignite or explode. Improper grounding can cause electric shock. Grounding provides an escape wire for the electric current.</p>						

Be sure to ground all this equipment:

Pump: Use a ground wire and clamp as shown in FIG. 1.

Fluid hoses: Use only electrically conductive hoses.

Air compressor: Follow manufacturer's recommendations.

Fluid supply container: Follow the local code.

To maintain grounding continuity when flushing or relieving pressure: hold metal part of the valve firmly to the side of a grounded metal pail, then trigger the gun/valve.

To ground the pump: remove the ground screw (Z) and insert through the eye of the ring terminal at end of the ground wire (Y). Fasten the ground screw back onto the pump and tighten securely. Connect the other end of the ground wire to a true earth ground. See Fig. To order a ground wire clamp, order Part. No. 222011.

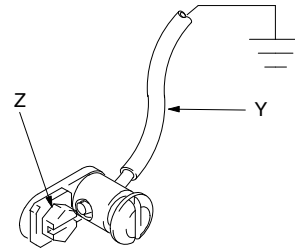


FIG. 1

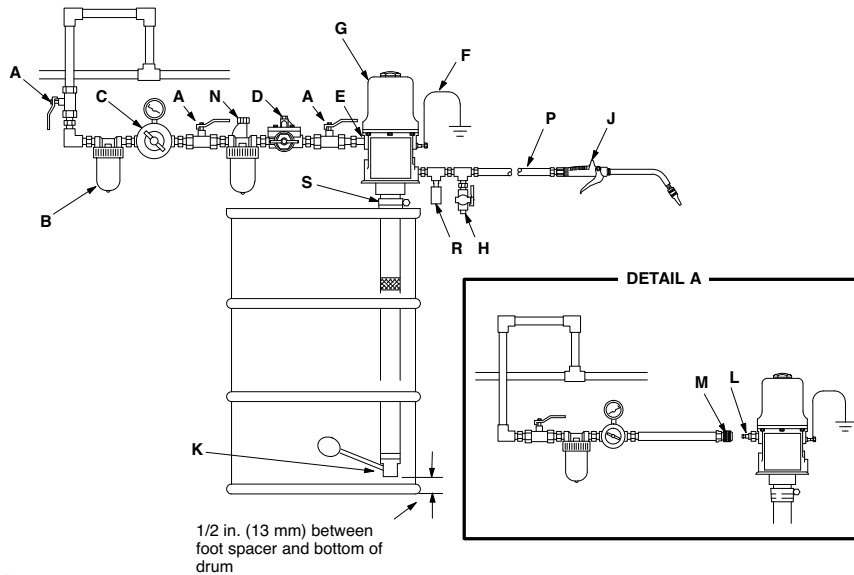


FIG. 2: Typical Installation

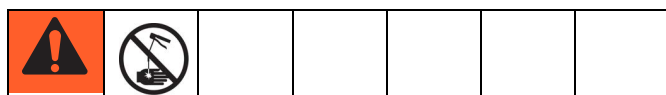
Key:

- | | |
|--|--|
| <p>A Bleed-type master air valve (required if quick-disconnect fitting [L] and coupler [M] are not installed) <i>Order Part No. 107142</i></p> <p>B Air line filter</p> <p>C Air regulator and gauge</p> <p>D Pump runaway valve</p> <p>E Air inlet</p> <p>F Ground wire (required) <i>Order Part No. 222011</i></p> | <p>G Pump (model 204254 shown)</p> <p>H Drain valve (required) <i>Order Part No. 210658</i></p> <p>J Dispensing valve</p> <p>K Low-level cut-off valve</p> <p>L Male quick-disconnect fitting</p> <p>M Female quick-disconnect coupler</p> |
|--|--|

- N Air line lubricator
 - P Fluid hose
 - R Thermal relief kit (required) *Order Part No. 237893*
 - S Bung adapter, models 204254 and 222087
1. Install the pump on the drum cover so that the pump's fluid intake is 1/2 inch. (13 mm) off the bottom of the drum. (FIG. 2)
 2. **On Models 204254 and 222087**, screw the bung adapter tightly into the drum cover's bung hole, adjust the position of the pump in the drum, and tighten the bung adapter screw to hold the pump,

System Accessories

Refer to FIG. 2 for the following instructions.



Four accessories are **required** in your system: an air shut-off valve/air bleed device, fluid drain valve, thermal relief kit, and ground wire. These accessories help reduce the risk of serious bodily injury, including fluid injection, splashing in the eye or on the skin, injury from moving parts if you are adjusting or repair the pump, and explosion from static sparking.

- The air bleed device relieves air trapped between it and air motor after the air supply is shut off. Trapped air can cause the motor to cycle unexpectedly, causing serious injury if you are adjusting or repairing the pump. Use either a bleed-type master air valve (A) or a quick-disconnect coupler (M) and fitting (L). Install them near the pump air inlet within easy reach from the pump.
- The fluid drain (H) assists in relieve fluid pressure in the displacement pump, hoses, and dispensing valve. Triggering the valve to relieve pressure may not be sufficient.
- The thermal relief kit (R) assists in relieving pressure in the pump, hose, and dispensing valve due to heat and expansion.
- The ground wire (F) reduces the risk of static sparking.

NOTICE

Do not hang the air accessories directly on the air inlet (E). The fittings are not strong enough to support the accessories and may break. Provide a bracket on which to mount the accessories.

NOTE: Install the air line accessories in the order shown in FIG. 2.

1. Install a pump runaway valve (D) to shut off the air to the pump if the pump accelerates beyond the pre-adjusted setting. A pump that runs too fast can be seriously damaged.

NOTICE

Never allow the pump to run dry of fluid being pumped. A dry pump will quickly accelerate to a high speed, possibly damaging itself, and it may get very hot.

2. Install an air line lubricator (N) for automatic air motor lubrication.
3. Install a bleed-type master air valve (A) to relieve air trapped between the valve and the motor. As an alternative, you can install an air line quick-disconnect coupler (M) and fitting (L) to serve as an air-bleed device. See FIG. 2.
4. Install a Thermal Relief Kit (K) on the dispensing valve side of the pump.
5. Install the air regulator (C) to control pump speed and pressure.
6. Install an air line filter (B) to remove harmful dirt and contaminants from the compressed air supply. Install another bleed-type master air valve (A) to isolate the accessories for servicing.
7. Install a drain valve (H) near the pump fluid outlet.
8. Install a suitable fluid hose (P) and dispensing valve (J).

Operation

Pressure Relief Procedure



Follow the Pressure Relief Procedure whenever you see this symbol.



This equipment stays pressurized until pressure is manually relieved. To help prevent serious injury from pressurized fluid, such as skin injection, splashing fluid and moving parts, follow the Pressure Relief Procedure when you stop spraying and before cleaning, checking, or servicing the equipment.

1. Close the pump air regulator and bleed-type master air valve (required in the system).
2. Hold a metal part of the dispensing valve firmly to a grounded metal waste container and trigger the valve to relieve the fluid pressure.

Start and Adjusting the Pump



1. With the air regulator (C) closed, open the bleed-type master air valves (A), or, if so equipped, join the quick-disconnect coupler (M) to the male fitting (L).
2. Open the dispensing valve (J) into a grounded metal waste container, making firm metal-to-metal contact between the container and valve.
3. Open the pump air regulator (C) slowly, just until the pump is running. When the pump is primed and all air has been pushed out of the lines, close the dispensing valve.

NOTE: When the pump is, and with sufficient air supplied, the pump starts when the dispensing valve is opened and shuts off when closed.

4. Adjust the air regulator until you get sufficient flow from the dispensing valve. Always run the pump at the lowest pressure necessary to get the desired

results. Do not exceed the maximum working pressure of any component in the system.

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

NOTICE

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, and it may get very hot.

NOTE:

- The low-level cut-off valve accessory (K) closes the pump fluid intake when the fluid level is low, which prevents air from entering the system.
 - A pump runaway valve (D) should be installed on the air line to automatically shut off the pump if it starts to run too fast.
6. Read and follow the instructions supplied with each component in the system.
 7. If the pump will be unattended for any period of time, if there is an air supply interruption, or at the end of the work shift, shut off the system and always relieve the pressure. (See Pressure Relief Procedure)

Troubleshooting



1. Follow **Pressure Relief Procedure**, page 6, before checking or repairing gun.
2. Check all possible problems and causes before disassembling gun.

Problem	Cause	Solution
Pump fails to operate	Inadequate air supply pressure or restricted air lines	Increase air supply and/or clear restriction
	Closed or clogged valves	Open and/or clear
	Clogged fluid lines, hoses, valves, etc.	Relieve pressure. Clear obstruction
	Damaged air motor	Assess damage and service air motor
	Exhausted fluid supply	Refill and reprime or flush
Continuous air exhaust	Worn or damaged air motor gasket or seal	Asses wear or damage and service air motor
Erratic pump operation	Exhausted fluid supply	Refill and reprime or flush
	Held open or worn intake valve or piston packings	Clear and service
Pump operates, but output low on upstroke	Held open or worn piston packings	Clear and service
Pump operates, but output low on downstroke	Held open or worn intake valve	Clear and service
Pump operates, but output low on both strokes	Inadequate air supply or restricted air line	Increase air supply and /or clear restriction
	Closed or clogged valves	Open and/or clear
	Exhausted fluid supply	Refill fluid supply and reprime pump or flush
	Clogged fluid lines, hoses, valves, etc.	Relieve pressure. Clear obstruction

Service

Displacement Pump Service

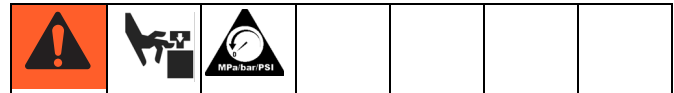


Pump Repair Kit 238286 is available and includes repair parts for the pump and air motor. Use all parts in the kit for best results.

1. Flush the pump.
2. Relieve the pressure before proceeding, page 6.
3. Disconnect the hoses, remove the pump from its mounting, and clamp the air motor base (5) in a vise horizontally by closing the vise jaws on the flange.
4. Unscrew the intake valve body (107) from the fluid cylinder (105). Disassemble the intake valve. (See Parts Drawing Page 12.) Clean and inspect the parts for wear or damage, and replace parts as needed. be sure to check the o-ring (108). Unless further intake valve service is needed, reassemble and reinstall, using liquid sealant on the male threads.
5. Use strap wrench on the fluid cylinder (105) to screw it out of the air motor base (5). Carefully inspect the smooth inner surface on the cylinder for scoring or irregular surfaces. Such damage causes premature packing wear and leaking, so replace the part if it is damaged.
6. Using wrenches on the flats of the displacement rod (8) and on the flats of the fluid piston (11), unscrew the fluid piston from the displacement rod.
7. Take the ball (111) out of the displacement rod (8), and take the packing o-ring (104) off of the fluid piston.
8. Clean and inspect all parts. Use all the repair kit parts during reassembly and replace other parts as necessary.
9. Place the piston ball (109) in the displacement rod (8).
10. Install the new packing o-ring (104) on the fluid piston (110).
11. Clamp the flats of the fluid piston (110) in a vise, and torque the displacement rod (8) to the piston to 40 to 60 ft-lbs (54 to 81 N.m).
12. Clamp the air motor base (5) in a vise horizontally by closing the vise jaws on the flange.
13. Use a strap wrench to screw the displacement pump cylinder (105) to the air motor base (5), and torque to 95 to 105 ft-lbs (129 to 142 N.m).
14. If the ground wire was disconnected before servicing, be sure to reconnect it before you operate the pump.

Air Motor and Throat Service

Refer to FIG. 3 and FIG. 4 for the following instructions.



Pump Repair Kit 238286 is available and includes repair parts for the pump and air motor. Use all parts in the kit for best results.

Two accessory tools should be used: *Padded Pliers*, 207579, are used to grip the trip rod without damaging its surface; *Gauge*, 171818, is used to ensure the proper clearance between the poppets and seat of the transfer valve.

Disassembly

1. Flush the pump.
2. Relieve the pressure, see page 6.
3. Disconnect the ground wire from the grounding screw (5a), disconnect the hoses, remove the pump from its mounting, and clamp the air motor base in a vise horizontally by closing the vise jaws on the flange.
4. Use a strap wrench on the fluid cylinder (105) to screw it out of the air motor base (5).
5. Pull the displacement rod (8) down as far as it will go. (FIG. 3)

6. Using wrenches on the flats of the displacement rod (8) and on the flats of the fluid piston (110), unscrew the fluid piston from the displacement rod. Remove the ball (111) from the end of the displacement rod, and remove the packing o-ring (104) from the fluid piston.
7. Clamp the air motor upright in the vise by closing the vise jaws below the flange.
8. Unscrew the cylinder cap nut (29) from the top of the air motor cylinder (17).
9. Pull up on the cylinder cap nut (29) to expose the trip rod, grasp the trip rod with padded pliers, and unscrew the cylinder cap nut from the trip rod.

NOTICE

Do not damage the plated surface of the trip rod (11). Damaging the surface of the trip rod can result in erratic air motor operation. Use the special padded pliers to grasp the rod.

10. Remove the six screws (21) holding the air motor cylinder (17) to the air motor base (5), and carefully pull the cylinder straight up off the piston (2).

NOTICE

To avoid damaging the cylinder wall, lift the cylinder straight up off the piston. Never tilt the cylinder while you are removing it.

11. Pull the air motor piston/displacement rod assembly (2, 8) clear of the air motor base (5) by pulling up on the air motor piston.
12. Remove the o-rings (9, 112) and u-cup packing (6) from the air motor base (5). Use needle-nose pliers to remove the u-cup packing from the bottom of the air motor base.

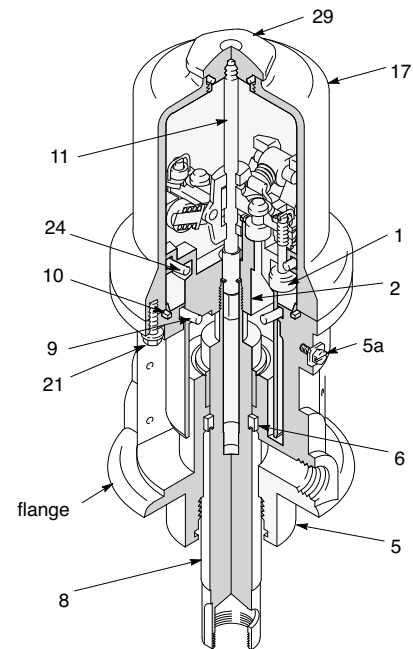


FIG. 3

13. Remove the o-ring (24) from the air motor piston (2).
14. Clamp the displacement rod upright in the vise by closing the vise jaws on the flats of the displacement rod.
15. Use a screw driver to push down on the trip rod yoke (22) to snap the toggles (M) down. (FIG. 4)
16. Remove the lockwires (31) from the adjusting nuts (30) of the transfer valves. Screw the top nuts off. Screw the valve poppet (1) stems out of the grommets (12) and bottom nuts (30). Take the valve poppets off the stems and squeeze them firmly to check for cracks.
17. Grip the toggle rockers (26) with pliers. Compress the springs (27) and swing the toggle assembly (M) up and away from the piston lugs (L), and remove the assembly. Check that the valve, actuator (13) is support by the spring clips (14), but slides easily into them. (FIG. 4)
18. Remove the trip rod yoke (22), actuator (13), and trip rod (11). Check the exhaust valve poppets (16) for cracks.
19. To remove the exhaust valve poppets (16), stretch them out and cut them with a sharp knife.

Reassembly

1. Clean all the parts carefully in a compatible solvent, and inspect for wear or damage. Use all the repair kit parts during reassembly, and replace other parts as needed.
 2. Check the polished surfaces of the piston (2), displacement rod (8), and cylinder (17) wall for scratches or wear. A scored rod causes premature throat seal wear and leaking.
 3. Lubricate all parts with a light, water-resistant grease.
 4. Clamp the displacement rod (8) upright in the vise by closing the vise jaws on the flats of the displacement rod.
 5. Pull the exhaust valve poppets (16) into the valve actuator (13), and clip off the top part shown with dotted lines in FIG. 4.
 6. Install the new grommets (12) in the actuator (22), place the inlet valve poppets (1) in the piston, and thread the bottom valve nuts (30) onto the stems of the inlet valve poppets until there are a few threads left before the threads run out.
- NOTE:** If you thread the valve nuts too far down onto the poppets, they will run off of the threaded part of the poppets.
7. Grease heavily and place the trip rod (11) in the air motor piston (2), place the actuator (13) in the yoke (22), and place the well-greased actuator/yoke assembly in the piston with the trip rod going through the center holes of the actuator and yoke and the stems of the inlet valve poppets (1) going through the grommets (12).
- NOTE:** A multipurpose, high temperature, water resistant NLGI#2 grease is recommended.
8. Thread the top of valve nuts (30) onto the stems of the inlet valve poppets (1) until one thread of the inlet valve poppets is exposed above the valve nuts.
 9. Install the pins (23) in the yoke (22), place the toggle arm (25) ends of the toggle assembly (M) onto the toggle pins, and snap the pivot pin (26) ends of the toggle assembly into the piston lugs (L).
 10. Measuring with the gauge create 0.145 inch (3.7 mm) of clearance between the inlet valve poppets

(1) and the piston seat when the inlet valve is open. See the Cutaway View, FIG. 4.

NOTE: Adjust the distance between the inlet valve poppets and the piston seat by turning the top valve nuts (30).

11. Tighten the bottom valve nuts (30) by hand. The grommets (12) should be slightly compressed.
12. Align the holes in the valve nuts (30) and the slots on the stems of the inlet valve poppets (1), and drop the lock wires (31) through the holes in the valve nuts and into the slots in the stems of the inlet valve poppets. Pull the lock wires down tightly, and bend the ends with pliers so that they cannot be pulled back out of the holes.

NOTICE

Never re-use the old lock wires. They will get brittle and break easily from too much bending.

13. Take the assembly out of the vise so that you can move it around for the next two steps.
14. Grease and install the new o-rings (9, 24, 112).
15. Install the new u-cup packing (6) through the bottom of the air motor base, with the lips facing toward the bottom of the pump.
16. Slide the displacement rod (8) down through the packings, and lower the air motor piston (2) into the air motor base (5).
17. Clamp the air motor upright in the vise by closing the vise jaws below the flange.
18. Carefully lower the air motor cylinder (17) straight down onto the piston assembly (2). Tighten the six screws (21) holding the air motor cylinder to the air motor base (5).

NOTICE

To avoid damaging the cylinder wall, lower the cylinder straight down onto the piston. Never tilt the cylinder as it is being lowered.

19. Pull the trip rod (11) so it is sticking up out of the air motor cylinder (17).

NOTE: You may have to hold the unit upside down to shake the trip rod loose.