Instructions

22:1 Ratio Stainless Steel

DM-22 1 Gallon Supply System

3B0431A

EN

Used for precision dispense of single component viscous materials for 1 Gallon (3.79 liter) containers. For professional use only.

Not approved for use in explosive atmospheres or hazardous (classified) locations.

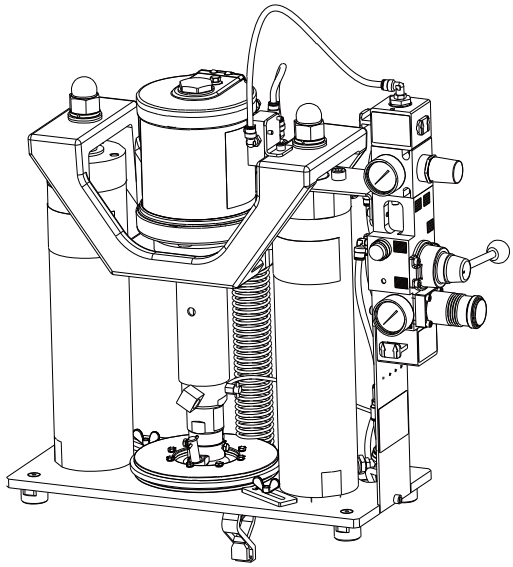
Part No. 2007873, 1 Gallon

Includes Pump and Ram

2200 psi (15.2 MPa, 152 bar) Maximum Fluid Working Pressure
100 psi (0.7 MPa, 7 bar) Maximum Air Inlet Pressure

Important Safety Instructions

Read all warnings and instructions in this manual before using the equipment. Be familiar with the proper control and usage of the equipment.Save these instructions.



1 Gallon

PROVEN QUALITY. LEADING TECHNOLOGY.

Contents

Related Manuals

Manual	Description
3A5364	Progressive Cavity Pump Repair-Parts Manual
3B0393	Progressive Cavity Pump System Instruction Manual
3B0400	High Pressure Elite Fluid Pressure Regulators Instruction Manual

Safety Symbols

The following safety symbols appear throughout this manual and on warning labels. Read the table below to understand what each symbol means.

Symbol	Meaning
	Burn Hazard
	Electric Shock Hazard
	Equipment Misuse Hazard
	Fire and Explosion Hazard
	Moving Parts Hazard
	Skin Injection Hazard
	Skin Injection Hazard
	Splash Hazard

Symbol	Meaning
	Toxic Fluid or Fumes Hazard
	Do Not Place Hands or Other Body Parts Near Fluid Outlet
	Do Not Stop Leaks with Hand, Body, Glove or Rag
	Eliminate Ignition Sources
	Follow Pressure Relief Procedure
	Ground Equipment
	Ventilate Work Area
	Wear Protective Equipment

Safety Alert Symbol
This symbol indicates: Attention! Become Alert! Look for this symbol throughout the manual to indicate important safety messages.

General Warnings

The following warnings apply throughout this manual. Read, understand, and follow the warnings before using this equipment. Failure to follow these warnings can result in serious injury.

⚠WARNING


ELECTRIC SHOCK HAZARD

This equipment must be grounded. Improper grounding, setup, or usage of the system can cause electric shock.

- Turn off and disconnect all power before disconnecting any cables and before servicing or installing equipment.
- Connect only to grounded power source.
- All electrical wiring must be done by a qualified electrician and comply with all local codes and regulations.





SKIN INJECTION HAZARD

High-pressure fluid from dispensing device, hose leaks, or ruptured components will pierce skin. This may look like just a cut, but it is a serious injury that can result in amputation. **Get immediate surgical treatment.**

- Do not point dispensing device at anyone or at any part of the body.
- Do not put your hand over the fluid outlet.
- Do not stop or deflect leaks with your hand, body, glove, or rag.
- Follow the **Pressure Relief Procedure** when you stop dispensing and before cleaning, checking, or servicing equipment.
- Tighten all fluid connections before operating the equipment.
- Check hoses and couplings daily. Replace worn or damaged parts immediately.

⚠WARNING

FIRE AND EXPLOSION HAZARD

Flammable fumes, such as solvent and paint fumes, in **work area** can ignite or explode. Paint or solvent flowing through the equipment can cause static sparking. To help prevent fire and explosion:

- Use equipment only in well ventilated area.
- Eliminate all ignition sources; such as pilot lights, cigarettes, portable electric lamps, and plastic drop cloths (potential static sparking).
- Ground all equipment in the work area. See **Grounding** instructions.
- Never spray or flush solvent at high pressure.
- Keep work area free of debris, including solvent, rags and gasoline.
- Do not plug or unplug power cords, or turn power or light switches on or off when flammable fumes are present.
- Use only grounded hoses.
- Hold dispensing device/gun firmly to side of grounded pail when triggering into pail. Do not use pail liners unless they are anti-static or conductive.
- **Stop operation immediately** if static sparking occurs or you feel a shock**.** Do not use equipment until you identify and correct the problem.
- Keep a working fire extinguisher in the work area.

EQUIPMENT MISUSE HAZARD

Misuse can cause death or serious injury.

- 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 Specifications** in all equipment manuals.
- Use fluids and solvents that are compatible with equipment wetted parts. See **Technical Specifications** in all equipment manuals. Read fluid and solvent manufacturer's warnings. For complete information about your material, request Safety Data Sheet (SDS) 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 ntraffic 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.

MOVING PARTS HAZARD

Moving parts can pinch, cut or amputate fingers and other body parts.

- 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.

BURN HAZARD

Equipment surfaces and fluid that is heated can become very hot during operation. To avoid severe burns:

- Do not touch hot fluid or equipment.

⚠WARNING

TOXIC FLUID OR FUMES HAZARD

Toxic fluids or fumes can cause serious injury or death if splashed in the eyes or on skin, inhaled, or swallowed.

- Read Safety Data Sheet (SDSs) 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.

SPLATTER HAZARD

Hot or toxic fluid can cause serious injury if splashed in the eyes or on skin. During blow off of platen, splatter may occur.

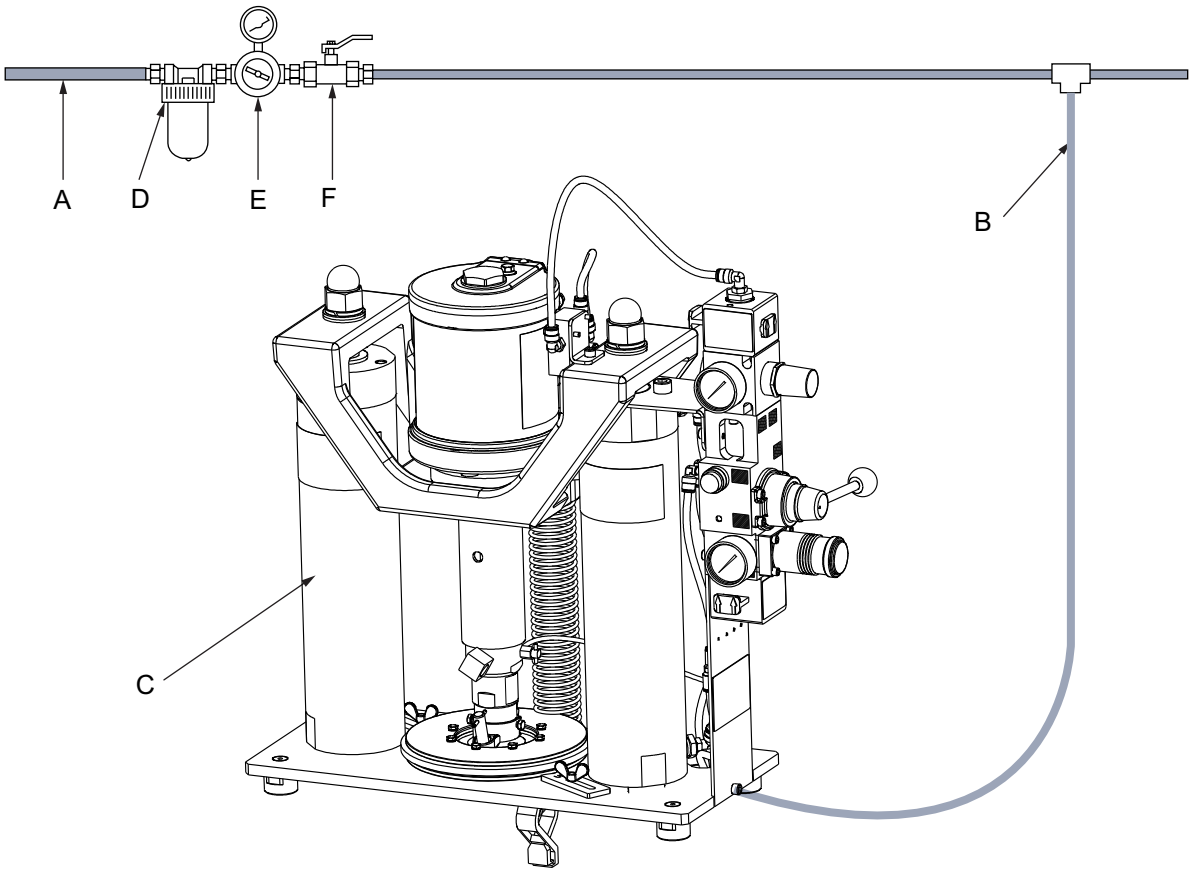
Use minimum air pressure when removing platen from drum.

PERSONAL PROTECTIVE EQUIPMENT

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. Protective equipment includes but is not limited to:

- Protective eyewear, and hearing protection.
- Respirators, protective clothing, and gloves as recommended by the fluid and solvent manufacturer.

Typical Installation



DM-22 Supply System, 1 gallon Shown

FIG. 1: Typical Installation

Key:

A Main Air Line
B Supply System Air Line
C DM-22 Supply System
D Air Filter (Required, but not supplied)
E Air Regulator (Required, but not supplied)
F Master Air Valve (Required, but not supplied)

Component Identification

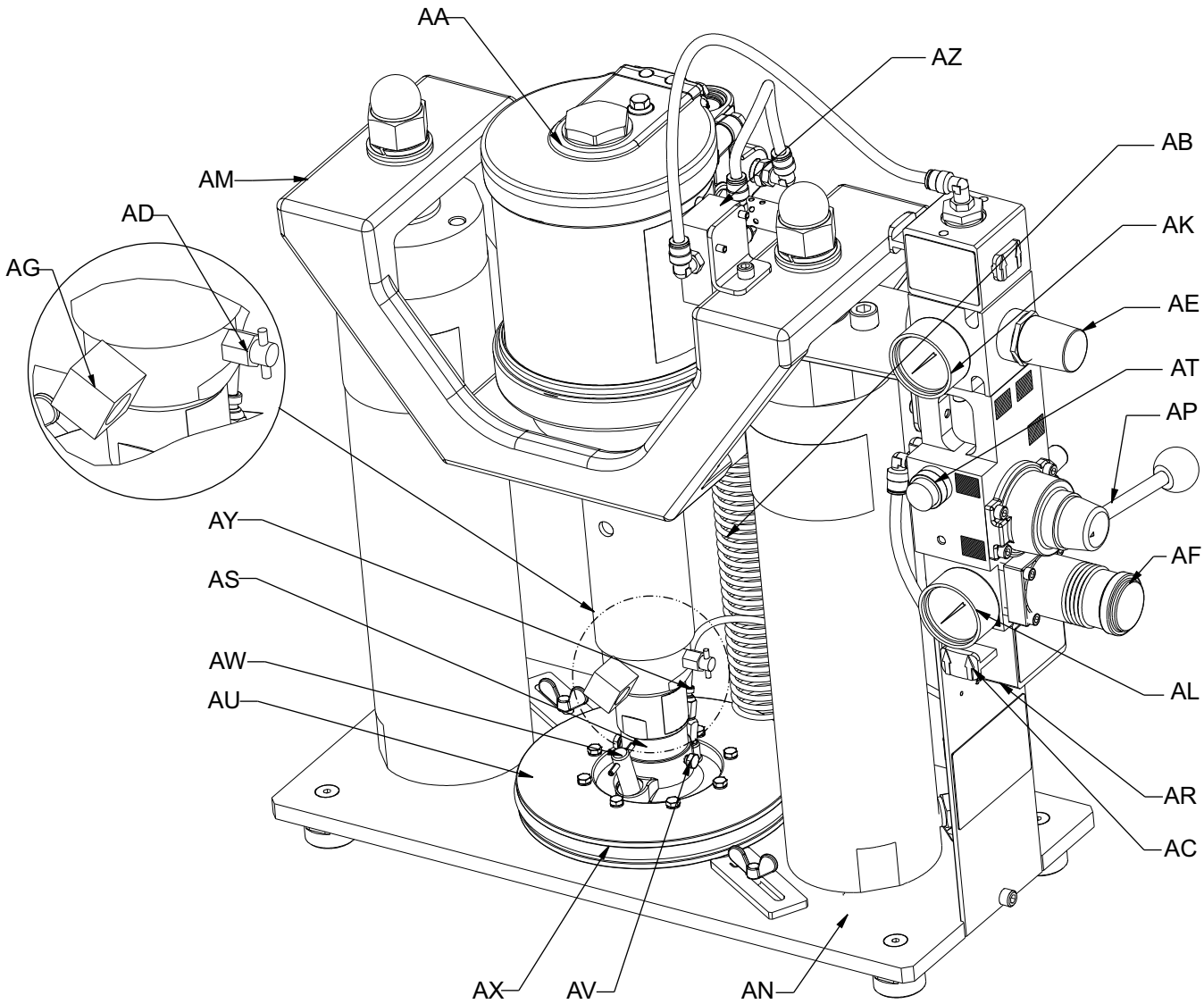


FIG. 2: System Components

Key:

AA Pump
AB Ground Wire
AC Master Air Switch
AD Pump Bleeder Valve
AE Pump Air Regulator
AF Ram Air Regulator
AG Fluid Outlet Fitting
AK Pump Air Pressure Gauge
AL Ram Air Pressure Gauge
AM Pump Bracket
AN Base
AP Ram Director Switch
AR Main Air Line Inlet Fitting
AS Pump Fluid Intake Housing
AT Air Assist Valve (Push Button)
AU Wiper Plate Assembly
AV Wiper Plate Cap Screws
AW Wiper Plate Bleed Valve
AX Wiper Plate Ring
AY Wiper Plate Connector
AZ Lower Limit stop valve

Installation

Grounding

The equipment must be grounded to reduce the risk of static sparking. Static sparking can cause fumes to ignite or explode. Grounding provides an escape wire for the electric current.

DM-22 Supply System (C, page 7): Connect the supplied ground wire and clamp to a true earth ground.

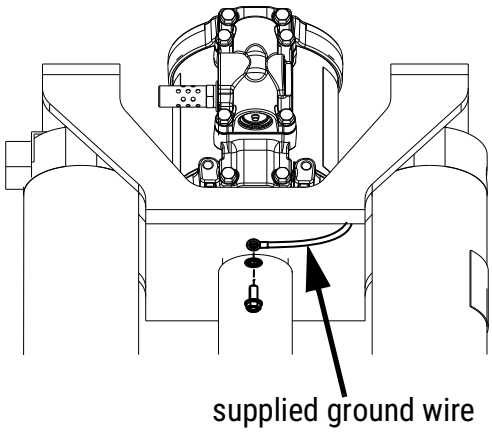


FIG. 3 Grounding

Air and fluid hoses: use only electrically conductive hoses with a maximum of 500 ft. (150 m) combined hose length to ensure grounding continuity. Check hoses' electrical resistance. If total resistance to ground exceeds 29 megohms, replace hose immediately.

Air compressor: follow manufacturer's recommendations.

Spray gun / Dispense valve: ground through connection to a properly grounded fluid hose and pump.

Fluid supply container: follow local codes and regulations.

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

System Location and Set Up

NOTE: Reference numbers and letters in parentheses in the text refer to the callouts in FIG. 2 on page 8 and the parts drawings. Refer to those for installation.

If you supply your own accessories, be sure they are adequately sized and pressure-rated to meet the system's requirements. Contact your Graco distributor for assistance in designing a system to suit your needs.

1. Place the system on a hard, level surface. Check that the system is level in all directions. Refer to **Dimensions** on page 28 to ensure there is sufficient overhead clearance for the pump when the ram is fully raised. Leave room on both sides for air regulators to be easily accessible.

2. Connect air tubes. Refer to **Connect and Disconnect Air Tubes** on page 11. Connect an air supply hose to the 1/2 NPT Main Air Line Inlet Fitting (AR, page 8).

Baseplate Secure

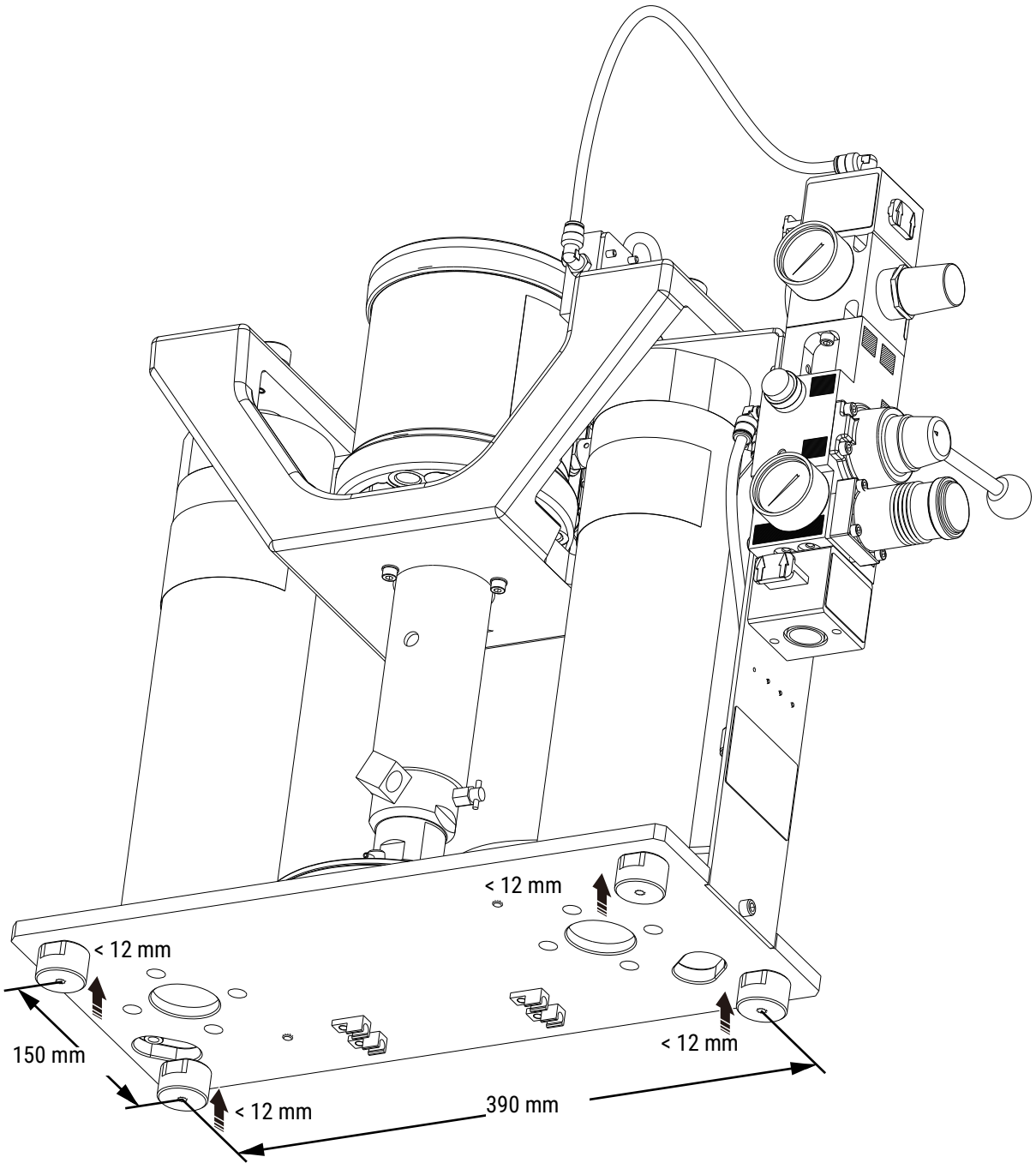


FIG. 4: Baseplate Secure

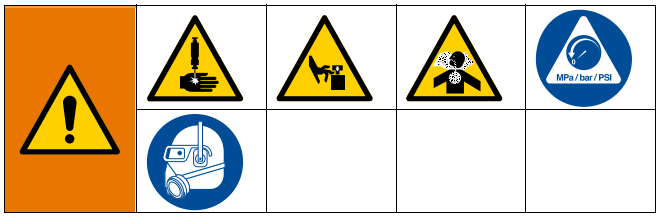
Connect and Disconnect Air Tubes

Follow these steps when connecting and disconnecting any air tubes on the DM-22 supply system.

Connection

1. Grasp the tube, then slowly push it straight into the fitting until it stops.
2. To avoid disconnection when air pressure is applied, pull gently on the tube to ensure a secure connection.

Disconnection



1. Follow the **Pressure Relief Procedure**, page 12.
2. Push evenly on the fitting's red release button.
3. While pressing the release button, pull tube out of fitting.
4. To reuse the tubing, cut off the previous connection portion at 90° while being careful not to damage the outer diameter of the tube.

NOTE: Use of a tube cutter is recommended. The fitting will leak if tubing is not cut at 90°.

System Components and Accessories

To help reduce the risk of serious injury when adjusting or repairing the pump, the pressure must be relieved. The pump includes two required safety devices: the bleed-type master air valve (AC, page 8) and the Pump Bleeder Valve (AD, page 8). These devices are used as part of the Pressure Relief Procedure.

The following components are supplied with the pump (see FIG. 2 on page 8).

- **The Bleed-type Master Air Valve (**AC, page 8**)** is supplied with your system to relieve air trapped between this valve and the pump after the air is shut off. Trapped air can cause the pump to cycle unexpectedly. The valve is located close to the pump, downstream from the pump air regulator.
- **The Pump Air Regulator (**AE, page 8**)** controls pump speed and outlet pressure by adjusting the air pressure to the pump. The regulator is located upstream from the bleed-type master air valve.
- **The Ram Air Regulator (**AF, page 8**)** controls ram speed by adjusting air pressure to the ram and pressure exerted by the wiper plate on the fluid.
- **The Pump Bleeder Valve (**AD, page 8**)** is supplied with your system to relieve fluid pressure in the displacement pump, hose, and dispensing valve. However, triggering the dispensing valve may not be sufficient to fully relieve pressure. Ensure the drain hole in the valve is pointing down. This valve is also used to bleed air from the pump when priming.

Air Line

Connect an air supply line to the 1/2 NPT Main Air Line Inlet Fitting (AR**,** page 8). Install an air line filter and lubricator in the main air line. In the main air line, upstream from all other air line accessories, install a second bleed-type master air valve to shut off all air to the system and to isolate accessories for servicing.

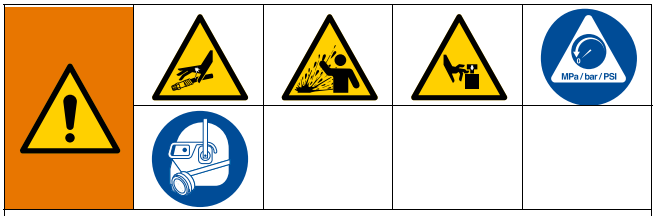
Fluid Line

Connect a fluid line to the Fluid Outlet Fitting (AG**,** page 8). Connect a suitable dispensing valve to the free end of the line.

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 dispensing and before cleaning, checking, or servicing the equipment.

1. Lock the dispense device trigger being used with the DM-22 supply system.
2. Disconnect the main air line from the machine.
3. Set the Ram Director Switch (AP) to the “down” position. The ram will gradually drop.
4. Quickly move the Ram Director Switch (AP) up and down to bleed air from the ram cylinder when the ram is dropping down.

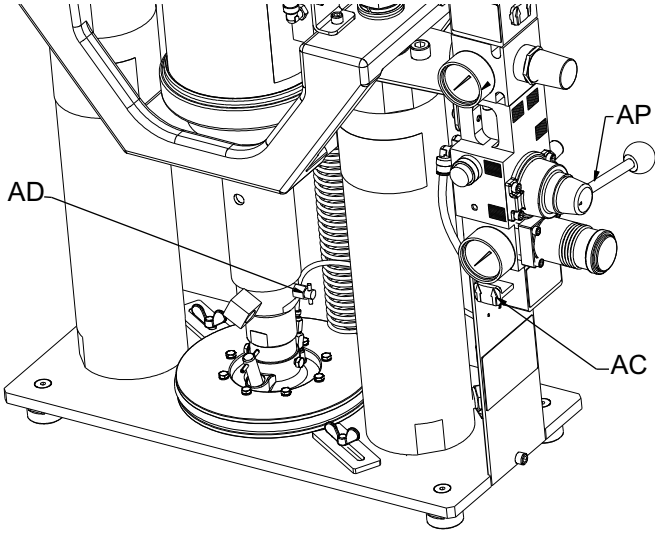


FIG. 5: Pressure Relief Components

5. Set the Bleed-type Master Air Switch (AC) to the ‘OFF’ position. The air in the air motor should be relieved.
6. Unlock the dispensing device trigger.
7. Hold a metal part of the gun/valve firmly to the side of a grounded pail. Trigger the dispensing device to relieve pressure.
8. Lock the dispensing device trigger.
9. Open the Pump Bleeder Valve (AD).
10. Leave the Pump Bleeder Valve (AD) open until ready to dispense again.

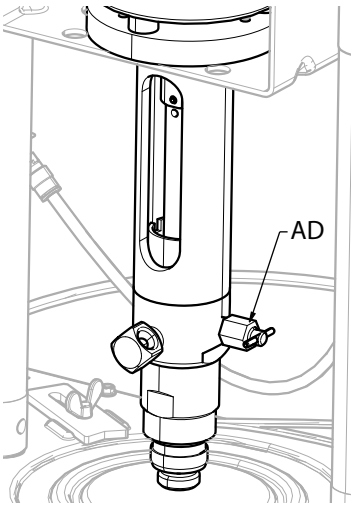
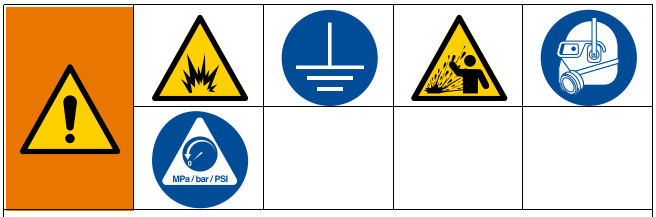


FIG. 6: Open Valves

If you suspect the spray tip/nozzle or hose is completely clogged or pressure has not been fully relieved, proceed as follows:

11. Ready container to catch drainage. Then, slowly open the Pump Bleeder Valve (AD).
12. Slowly loosen the hose end coupling to gradually relieve pressure, then loosen it completely to empty tip/nozzle or hose.
13. Clear the tip/nozzle or hose.

Flush the System



To avoid fire and explosion, always ground equipment and waste container. To avoid static sparking and injury from splashing, always flush at the lowest possible pressure.

NOTE: The pump is tested with lightweight oil, which remains to protect pump parts. If the fluid you are using might be contaminated by the oil, flush the oil out with a compatible solvent before using the pump.

Always flush the pump with a liquid or solvent compatible with the fluid you plan to pump through the system's wetted parts. Check with your fluid manufacturer or supplier for recommended fluids and flush frequency. Always flush the pump before fluid dries on the displacement rod.

NOTICE

Never leave water or water-based fluid in a carbon steel pump overnight. If you are pumping water-based fluid, flush with water first, then with a rust inhibitor, such as mineral spirits. Relieve pressure, but leave rust inhibitor in the pump to protect parts from corrosion.

1. Follow the **Pressure Relief Procedure** on page 12.
2. Remove the tip/nozzle from the dispensing device you are using with the system.
3. Hold a metal part of the dispensing device firmly to the side of a grounded metal pail.
4. Start the pump. See **Start and Adjust the Pump**, page 14. Always use the lowest possible fluid pressure when flushing.
5. Trigger the dispensing device.
6. Flush the system until clear solvent flows from the dispenser.
7. Follow the **Pressure Relief Procedure** on page 12.

Start and Adjust the Ram

Moving parts can pinch or amputate fingers. When the pump is operating, and when raising or lowering the ram, keep fingers and hands away from the Wiper Plate (AU, page 8), lip of the fluid can, pump bracket, ram tubes, and air motor coupling cavity.

NOTE: Reference numbers and letters in parentheses in the text refer to the callouts in FIG. 2 on page 8 and the parts drawings. Refer to those for operation.

1. Close all air regulators and bleed-type air valves.
2. Open air valve in the main air line and set the Ram Air Regulator (AF, page 8) to 28 psi (0.2 MPa, 2 bar). Set the Ram Director Switch (AP, page 8) to the "up" position and let the ram rise to its full height. To change the speed at which the ram raises and lowers, adjust the air regulator to increase or decrease the air volume.
3. Cut off the top of the fluid can with a can opener, or remove the bottom of the can. If necessary, bend the edge back with pliers so the Wiper Plate (AU, page 8) can enter the can without obstruction. Lubricate Wiper Plate Ring (AX, page 8) to help Wiper Plate (AU, page 8) enter the can easily.

NOTICE

Ensure that the fluid can is not dented or out of shape, and the edge is free of burrs, as this could damage the Wiper Plate (AU, page 8) and lead to leakage around the wiper.

4. Set a can of fluid on the ram base, centering it under the Wiper Plate (AU, page 8).

The seam of a welded fluid can could leak under pressure. To avoid injury from splashing fluid, face the welded seam to the rear of the pump.

5. Loosen the Wiper Bleed Valve (AW, page 8) enough to allow any air trapped under the wiper plate to escape. Keeping hands away from the lip of the can and the wiper plate, set the ram director valve switch (AP, page 8) to the "down" position. Lower the ram until the wiper plate enters the can, then reduce the air pressure.

NOTE: If the wiper plate does not enter the can easily, increase the ram pressure; once the wiper plate enters the can, immediately reduce the pressure.

6. Continue lowering the ram until fluid appears through the wiper plate vent hole. Stop lowering the ram, then tighten the Wiper Bleed Valve (AW, page 8) securely.

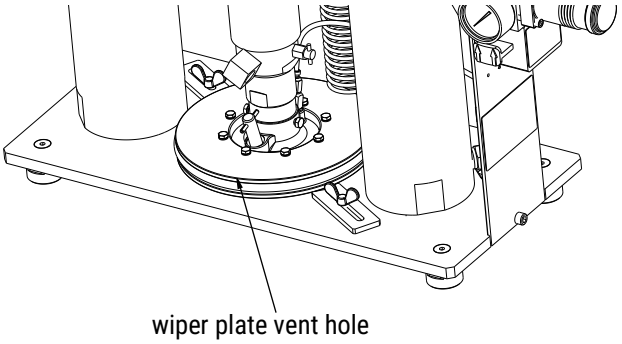
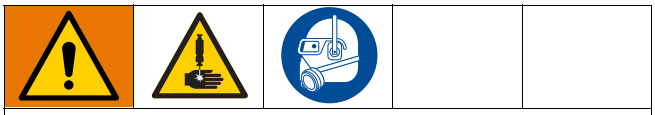


FIG. 7: Wiper Plate Vent Hole

Start and Adjust the Pump

To avoid pinching or amputation, keep hands and fingers away from the priming piston/pump inlet, located on the bottom of the platen, during operation and whenever the pump is pressurized with air. Do not place your hand or fingers into the air motor coupling cavity while the pump is operating. Follow the **Pressure Relief Procedure**, page 12 before checking, clearing, or priming the pump.

1. Supply fluid to the pump.
2. Prime the pump and pump fluid. See **Prime the Pump and Pump Fluid**, page 16 for more details.
3. Close the Pump Air Regulator (AE, page 8).
4. Set the Ram Air Regulator (AF, page 8) to 50 psi (3.5 bar).
5. Adjust the Ram Director Switch (AP, page 8) to the “up” position.
6. Install the fluid can into the cartridge or onto the ram base.
7. Set the Ram Air Regulator (AF, page 8) to 25 psi (1.8 bar)
8. Move the Ram Director Switch (AP, page 8) to the “down” position, then lower the Wiper Plate (AU, page 8) slowly until it touches the fluid’s surface. For detailed information, see step 5 and 6 of **Start and Adjust the Ram**.
9. Reduce the air motor regulator pressure to zero and open the Bleed-type Master Air Switch (AC, page 8).
10. Adjust Pump Air Regulator (AE, page 8) pressure until the pump starts.
11. Cycle the pump slowly until all air is pushed out and the pump and hoses are fully primed with fluid.
12. Release the dispensing device trigger and lock the safety. The pump should stall against the pressure.



To reduce the risk of skin injection, do not use your hand or fingers to cover the bleed hole in the underside of the pump bleeder valve (AD, page 8) when priming the pump. Use the handle or a crescent wrench to open and close the pump bleeder valve.

13. If the pump fails to prime properly, open the Pump Bleeder Valve (AD) slightly. Use the bleed hole on the underside of the valve as a priming valve until the fluid appears through the hole, then close the plug.

NOTE: Always use the lowest possible fluid pressure to bleed air out of the pump.

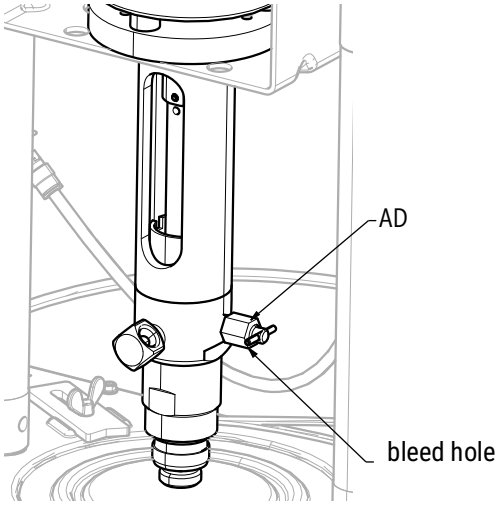


FIG. 8: Pump Bleeder Valve

NOTE: When changing fluid containers after the initial priming, open the Pump Bleeder Valve (AD) to re-prime the pump and vent any trapped air before new fluid enters the hose. Close the valve when all air is eliminated.

NOTICE

Do not allow the pump to run dry. It will quickly accelerate to a high speed, causing damage. If your pump is running too fast, stop it immediately and check the fluid supply. If the container is empty and air has been pumped into the lines, refill the container and re-prime the pump and the lines, or flush and leave it filled with a compatible solvent. Eliminate all air from the fluid system.

14. With the pump and lines primed, and adequate air pressure and volume supplied, the pump starts and stops as the user opens and closes the dispensing device. In a circulating system, the pump speeds up or slows down on demand until the air supply is shut off.

15. Use the air motor regulator to control pump speed and fluid pressure.

NOTICE

Always use the lowest air pressure necessary to get the desired results. Higher pressures cause premature tip/nozzle and pump wear.

Prime the Pump and Pump Fluid

1. Ensure the Pump Air Regulator (AE, page 8) is closed, then set the Ram Air Regulator (AF, page 8) to about 22 psi (0.15 MPa, 1.5 bar). Set the Ram Director Switch (AP, page 8) to the “down” position.
2. Open the Bleed-type Master Air Switch (AC, page 8), then set the Pump Air Regulator (AE, page 8) to 28 psi (0.2 MPa, 2 bar).
3. Open the Pump Bleeder Valve (AD, page 8), allowing air to bleed from the pump. When the pump is fully primed, close the valve.
4. Keep the Ram Director Switch (AP, page 8) in the “down” position while the pump is operating.

NOTE: Adjust the air pressure to the ram as needed, but do not increase it to a level where fluid is forced past the wiper plate.

Change the Fluid Can

When the fluid has reached the minimum fill line, the stopping valve (AZ) should cut air pressure from the air motor automatically.

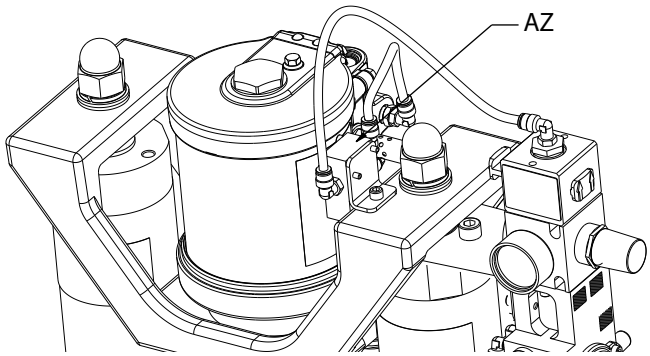


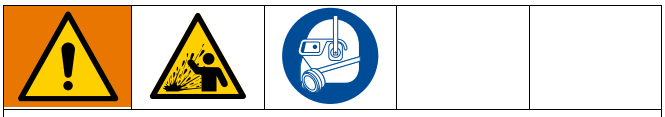
FIG. 9: Stopping Valve Position

1. To stop the air pump but keep air pressure on the ram, move the Master Air Switch (AC, page 8) to the “OFF” position.
2. Set the Ram Air Regulator (AF, page 8) to below 30 psi (0.21 MPa, 2.1 bar).
3. Follow the **Pressure Relief Procedure**, page 12.
4. Set the Ram Director Switch (AP, page 8) to the “up” position.
5. Push in the Air Assist Valve (AT, page 8) and hold it down until the Wiper Plate (AU, page 8) leaves the top of the can.

NOTICE

If the fluid has thickened or solidified and the wiper plate (AU, page 8) is stuck in the can, do not increase the setting pressure of the Ram Air Regulator (AF, page 8) to remove the Wiper Plate (AU). Excessive pressure in the can may cause the can to rupture. If you cannot pull the can off the Wiper Plate (AU) by hand, loosen the two screws (AV, page 8) holding the Wiper Plate (AU) to the pump (AA, page 8), disconnect the air tube from the Wiper Plate (AU), and remove the can and Wiper Plate (AU). It may be necessary to cut the can to remove the Wiper Plate (AU).

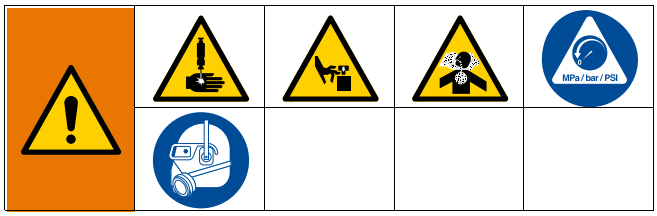
6. Loosen clamps and remove the empty can. Set a new full can on the ram base and position it under the wiper plate.



The seam of a welded fluid can could leak under pressure. To avoid injury from splashing fluid, face the welded seam to the rear of the pump.

7. Lower the ram and adjust the can’s position relative to the Wiper Plate (AU, page 8). See **Start and Adjust the Ram**, page 13.

Shutdown and Care of the Pump



NOTICE

Never leave water or water-based fluid in a carbon steel pump overnight. If you are pumping water-based fluid, flush with water first, then with a rust inhibitor, such as mineral spirits. After flushing with the rust inhibitor, relieve pressure to the system, but leave rust inhibitor in the pump to protect parts from corrosion.

1. Stop the pump at the bottom of the stroke to prevent fluid from drying on the exposed displacement rod and damaging the throat packings.
2. Set the Ram Director Switch (AP**,** page 8) to the “down” position.
3. Follow the **Pressure Relief Procedure**, page 12.

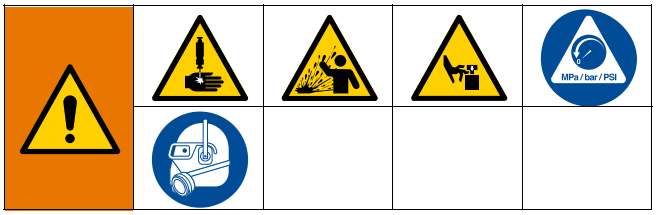
Recycling and Disposal

End of Product Life

At the end of the product’s useful life, dismantle and recycle it in a responsible manner.

- Follow the **Pressure Relief Procedure**, page 12.
- Drain and dispose of fluids according to applicable regulations. Refer to the material manufacturer’s Safety Data Sheet.
- Deliver remaining product to a recycling facility.

Troubleshooting



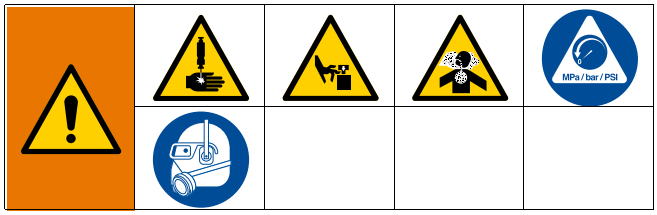
1. Follow the **Pressure Relief Procedure**, page 12, before checking or repairing the system.
2. Check all possible problems and causes before disassembling system.

Problem	Cause	Solution
Pump fails to operate.	Restricted line or inadequate air supply; closed or clogged valves.	Clear; increase air supply. Ensure that all valves are open.
	Obstructed fluid hose or gun/valve; fluid hose ID is too small.	Open and clear*; use a hose with a larger ID.
	Fluid dried on displacement rod.	Clean. Always stop pump at the bottom of the stroke. Keep enclosed wet cup 1/3 filled with a compatible solvent.
	Dirty, worn, or damaged motor parts.	Clean or repair; see separate motor manual.
Pump operates, but output is low.	Fluid is too heavy for pump priming	Use drain/purge valve; use a ram.
	Intake valve is held open or worn or seals are worn.	Clear valve; replace seals.
Erratic or accelerated pump.	Exhausted fluid supply.	Refill and prime.
	Fluid is too heavy for pump priming.	Use drain/purge valve.
	Intake valve is held open or worn or seals are worn.	Clear valve; replace seals.
	Priming piston is held open or worn.	Clear; service.
	Packings in displacement pump are worn.	Replace packings.

* *To determine if the fluid hose or gun is obstructed, follow the **Pressure Relief Procedure** on page 12. Disconnect the fluid hose and place a container at the pump fluid outlet to catch any fluid. Turn on the air just enough to start the pump (about 20-40 psi [0.14–0.28 MPa, 1.4–2.8 bar]). If the pump starts when the air is turned on, the obstruction is in the fluid hose or dispensing device.*

Repair

Disassembly



NOTE: Reference numbers in parentheses in the text refer to the callouts in section **Parts**, page 22. Refer to those for service.

1. Follow the **Pressure Relief Procedure**, page 12.
2. Disconnect all hoses. Remove the wiper plate. Remove the fluid outlet fitting, noting its position relative to the air inlet. Remove only the three screws and lock washers holding the pump to the mounting bracket.
3. Remove fluid outlet fitting and pump bleeder valve, then lift the pump straight up through the bracket.
4. Remove the pin (212) from the fluid piston (201). Unscrew the air motor shaft from the fluid piston (201) by turning the screw (227).
5. Unscrew the adapter (224) from the cylinder coupling (223). Pull the air motor coupling straight up until it clears the fluid piston (201).
6. Hold the fluid piston (201) steady by inserting a small screwdriver or punch into the 4 mm diameter hole (BA). Remove the screw (213) and lock washer (211) holding the priming piston (208) to the priming piston rod (204).
7. Pull the priming piston rod (204) and fluid piston (201) straight up out of the fluid housing (203). Remove the pin (210), and unscrew the priming piston rod (204) from the fluid piston (201).
8. Unscrew the pump fluid intake housing (205) from the fluid housing (203). Remove the o-ring (214) from the intake valve housing (205).
9. Remove the intake valve (207) and valve stop (206) from the pump fluid intake housing (205).
10. Unscrew the wet-cup/packing nut. Remove the u-cup packing (215) from the throat. Remove the washer (216) from the wet-cup/packing nut.
11. Unscrew the piston rod housing (232). Remove the u-cup packing (215) from the fluid housing (203).
12. Clean all parts with a solvent compatible with the fluid you are pumping, and inspect for wear or damage.

Air Motor

1. Use a 10 mm socket wrench to remove four screws (411). Remove the air valve (414) and gasket (409).
2. Remove four screws (411) and remove the manifold (420) and two gaskets (408).
3. Use a 10 mm socket wrench to remove the pilot valves (413) from the top and bottom cover.
4. Use a 13 mm socket wrench to remove the tie bolts (412).
5. Remove the top cover (410). Remove the o-ring (402). *On 3.5 in. motors only,* remove the plug (431) and o-ring (430).
6. Remove the shield (406) and cylinder (405).
7. Remove the o-ring (404) from the piston.
8. Secure the piston (419) in a vise with soft jaws. Use a wrench on the flats of the rod (418) to remove the rod and bottom cover assembly (401) from the piston.
9. Remove the rod from the bottom cover assembly.
10. Remove retaining ring (417), u-cup seals (407), and o-ring (402) from the bottom cover.

Reassembly

NOTE: Lubricate all packings and o-rings with a compatible grease before reassembling.

1. Install one u-cup packing (215) in the throat of the fluid housing (203), with the lips facing down. Apply thread lubricant and install the piston rod housing (232) with the rod guide (231) into the fluid housing (203). Torque to 298-314 in-lb (35–37 N•m).

2. Install the second u-cup packing (215) in the throat of the piston seal retainer (202) with lips facing the threads. Place the washer (216) over the seal. Apply thread lubricant and install the seal retainer (202) onto the fluid housing (203). Torque to 298-314 in-lb (35–37 N•m).

3. Screw the priming piston rod (204) into the fluid piston (201) until the holes align. Install the pin (210) in the holes. Carefully slide the assembled piston and rod down through the wet-cup and fluid housing.

4. Place the intake valve (207) onto the seat of the intake valve housing (205) with the snap-ring facing up. Insert the valve stop (206) into the intake valve housing. Be sure the valve stop (206) seats on the lip of the intake housing. Lubricate the o-ring (214). Bend it into a kidney shape, then carefully push it into the inner groove of the intake valve housing (205), to avoid damaging it.

5. Apply thread lubricant to the lower threads of the fluid housing (203). Bring the fluid housing and intake valve housing (205) together. Make sure the priming piston rod (204) passes straight through the valve stop (206) and intake valve (207) already installed in the housing (205). Screw together the fluid housing (203) and the fluid intake housing (205), then torque to 298-314 in-lb (35–37 N•m).

6. Apply lubricant to the threads of the screw (213). Hold the fluid piston (201) steady by inserting a small screwdriver or punch into the 4mm diameter hole (BA). Install the priming piston (208) onto the end of the priming piston rod (204), using the screw (213) and lockwasher (211). Torque to 14-20 in-lb (1.7–2.3 N•m).

7. Apply lubricant to the top threads of the fluid housing (203). Screw the cylinder coupling (223) onto the fluid housing, and torque to 298-314 in-lb (35–37 N•m).

8. Thread the fluid piston (201) into the shaft of the air motor (418) until the holes line up. Use the screw (213) to turn the fluid piston, if necessary. Once the holes in the air motor shaft and fluid piston are aligned, insert the pin (212).

9. Lower the pump through the mounting bracket. Orient it in the correct direction and secure to the bracket using the three screws and washers. Torque the screws to 17-33 in-lb (2–4 N•m). Reinstall the fluid outlet fitting.

10. Reinstall the wiper plate assembly on the fluid intake housing (205). Secure with the two wiper plate cap screws (302). Reconnect all hoses and return the pump to service.

Air Motor

NOTE: For easier reassembly, start with the top cover (210) turned over on the workbench and assemble the air motor upside-down.

1. Lubricate and install the o-ring (402) on the top cover (410).
2. Lubricate the inside of the cylinder (405). Lower the cylinder onto the top cover (410).
3. Install the shield (406) around the cylinder (405) and in the groove on the top cover (410).
4. See FIG. 10. Lubricate and install new u-cup seal (407) in the bottom of the bearing in the bottom cover (401). The lips must face down. Lubricate and install new u-cup seal (407) in the top of the bearing. Lips must face up. Install retaining ring (417).

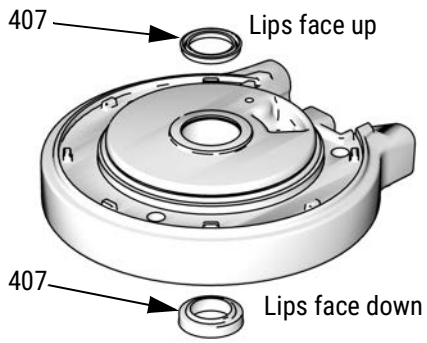


FIG. 10. Air Motor U-cup Installation

5. Lubricate and install the o-ring (402) on the bottom cover (401).
6. Carefully push the threaded end of the rod (418) up through the bottom cover (401).
7. Apply 16G561 adhesive to the threads of the rod (418). Screw the piston (419) onto the rod. Place the piston in a vise with soft jaws and torque to 35-40 ft-lb (47-54 N•m).
8. Lubricate and install the o-ring (404) on the piston (419).
9. See FIG. 11. Carefully place the bottom cover/piston assembly on the cylinder (405), sliding the piston (419) into the cylinder. The manifold surfaces of the top and bottom covers must align. Be sure the shield (406) is in the groove on both the top and bottom covers.

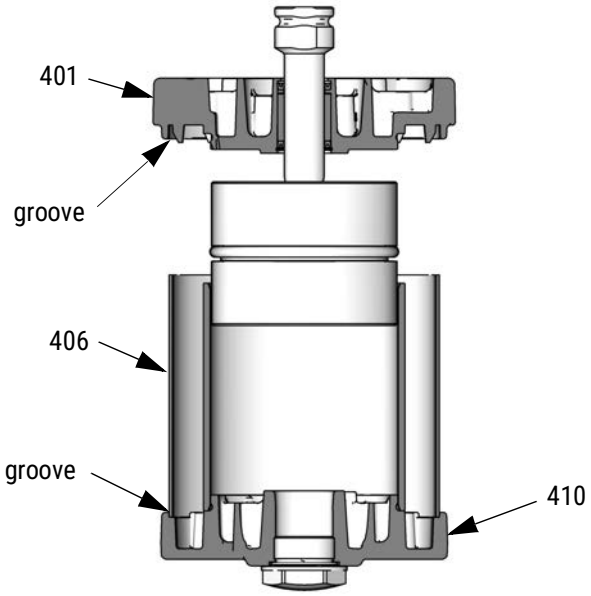


FIG. 11. Align Shield in Grooves on Covers

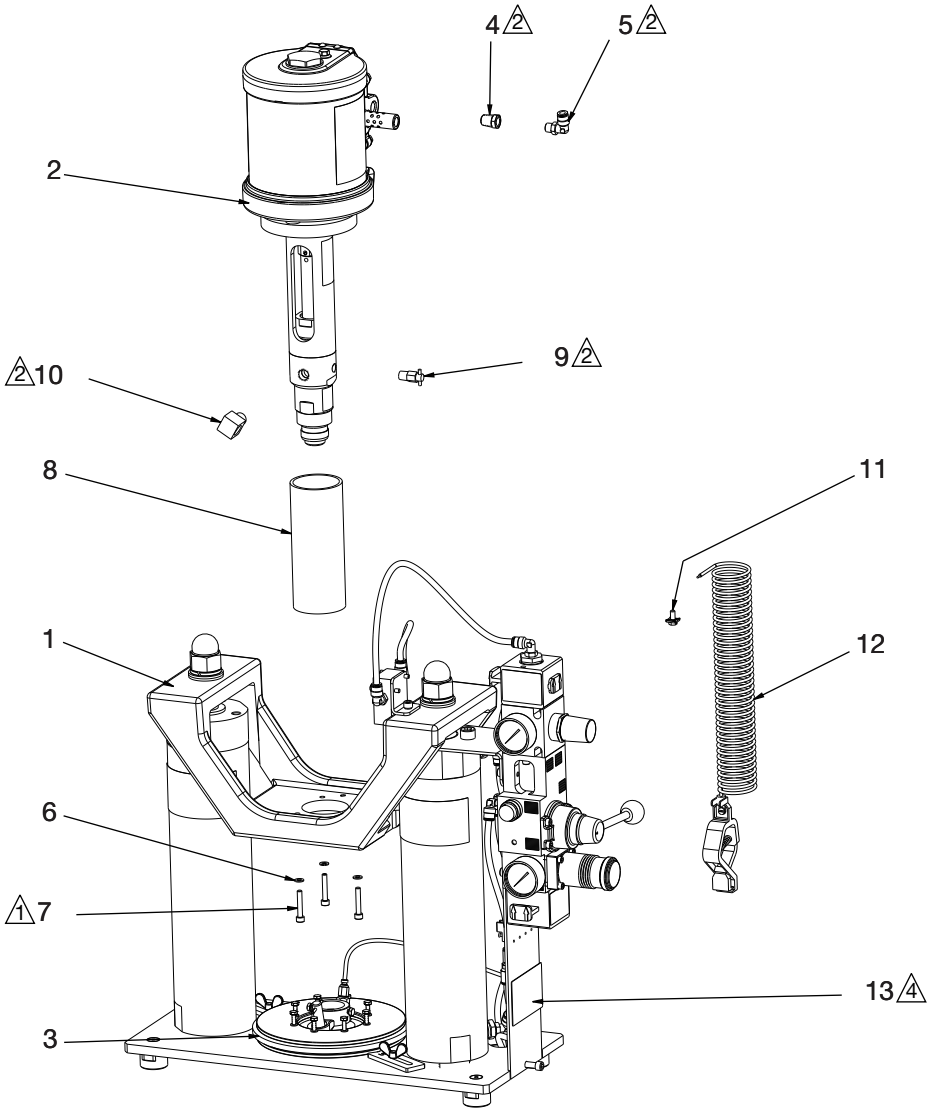
10. Install the tie bolts (412) hand tight.
11. Install two gaskets (408) on the manifold (420). Install the manifold (420). Torque screws (411) to 95-105 in-lb (10.7-11.9 N•m).

NOTE: The manifold is reversible for ease of placement of muffler or remote exhaust.

12. Align the air valve gasket (409) on the manifold, then attach the air valve (414). Torque screws (411) to 95-105 in-lb (11-12 N•m).
13. Tighten the tie bolts (412) halfway. Work in a crisscross pattern. Check that the shield (406) remains in the grooves on both covers. Continue tightening the bolts in pattern to 11-13 ft-lb (15-18 N•m).
14. *On 3.5 in. motors only,* lubricate the o-ring (430). Install it and the plug (431) in the top cover (410).
15. Lubricate and install pilot valves (413) in top and bottom cover. Torque to 95-105 in-lb (11-12 N•m).

Parts

System



1 Apply adhesive (200 series) to threads, per directions on packet.

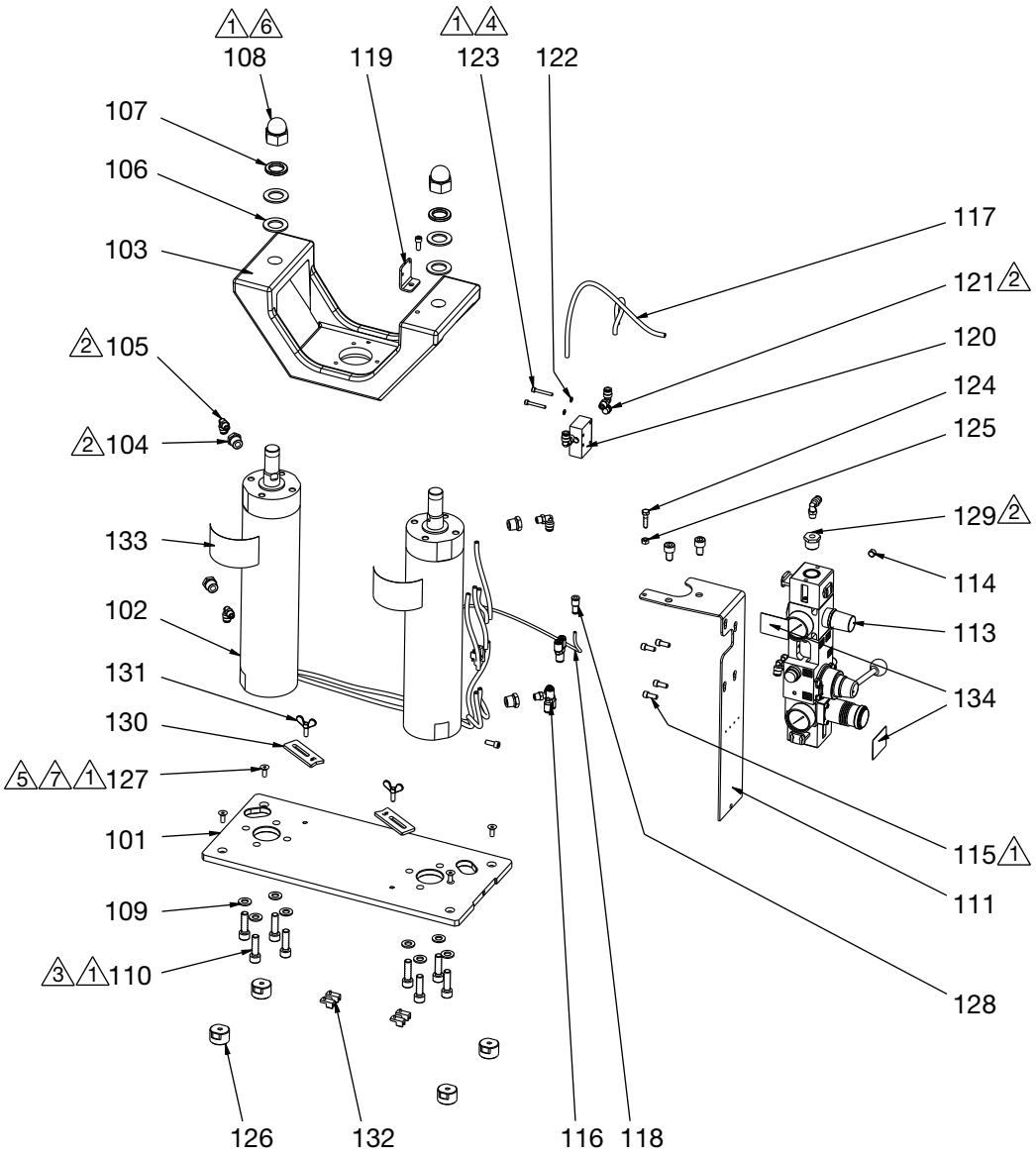
2 Lubricate inside surface of cylinder with grease.

4 Torque to 11-13 ft-lb (15-18 N•m).

System Part Lists

Ref.	Part	Description	Qty.
1	2007874	RAM, DM-22 1 gallon; see **Module, Frame**, page 24	1
2	2010608	PUMP, dynamite pump, 22:1, 1 gal; see **Module, Pump**, page 26	1
3	26G602	PLATE, o-ring, 1 gal, heavy duty	1
4	556402	FITTING,1/4 x 1/8 NPTF hex red	1
5	128863	FITTING, PTC, elbow,1/4 od,1/8 NPT	1
6	110874	WASHER, flat, M5	3
7	----	SCREW, M5X0.8-30, socket	3
8	----	GUARD, pinch	1
9	223730	VALVE, assy	1
10	166866	FITTING, elbow, street	1
11	116343	SREW, ground	1
12	238909	WIRE, ground	1
14	190774	LABEL	1

Module, Frame



1 Apply adhesive (200 series) to threads, per directions on packet.

2 Lubricate inside surface of cylinder with grease.

3 Torque to 35-40 ft-lb (47-54 N•m).

4 Torque to 11-13 ft-lb (15-18 N•m).

5 Torque to 95-105 in-lb (10.7-11.9 N•m).

6 Lubricate with grease.

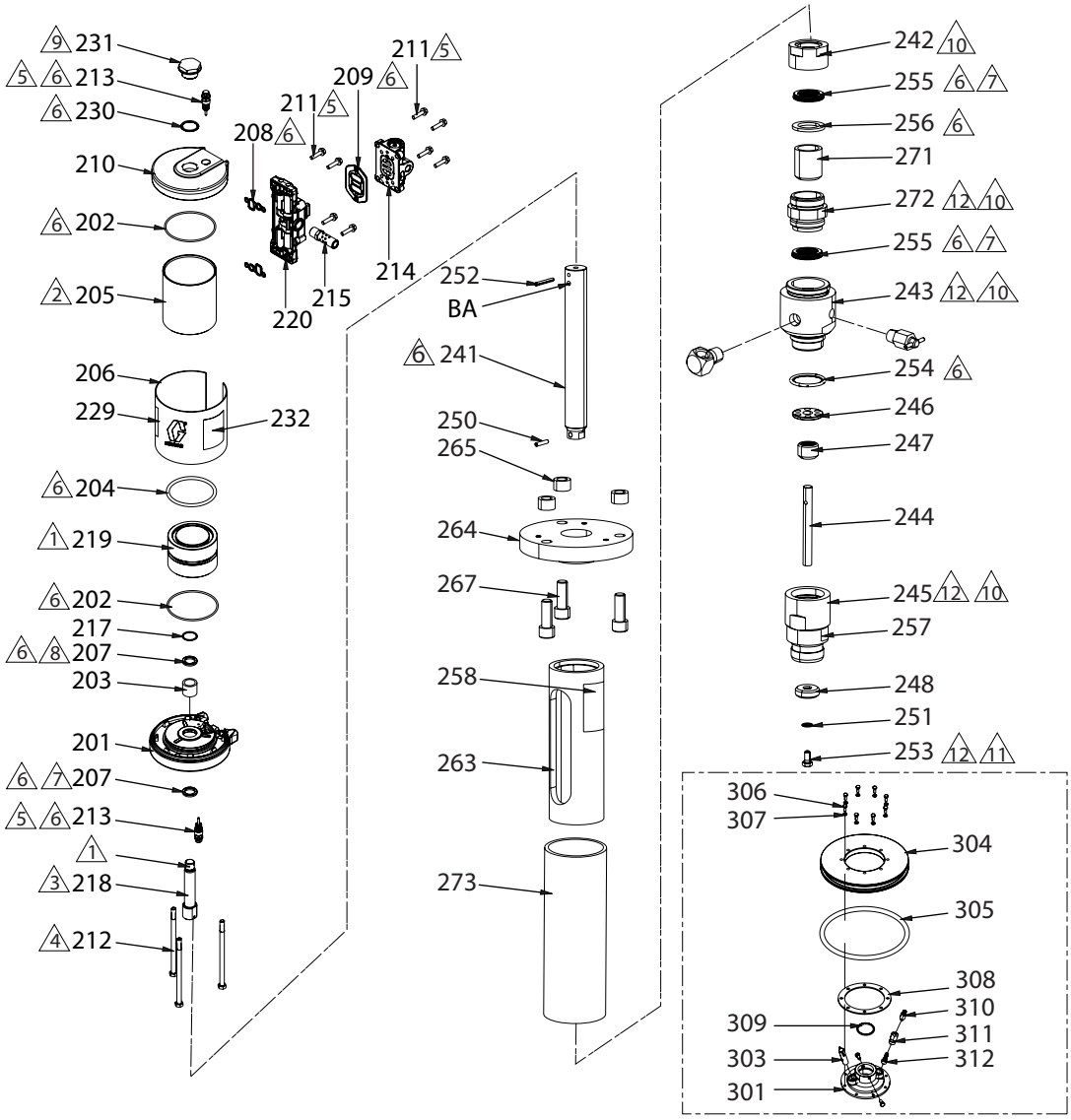
7 Lips face down.

Frame Part Lists

Ref.	Part	Description	Qty.
101	----	BASE, ram, DM-22 1 gallon	1
102	2007876	CYLINDER, 80 mm, stoke 250 mm, 3/8 NPT	2
103	----	FRAME, air motor, 1 gallon, DM-22	1
104	100730	BUSHING, 3/8 NPT x 1/8 NPT	4
105	128863	FITTING, PTC, elbow, 1/4 OD,1/8 NPT	7
106	----	WASHER, M22, flat, sst	4
107	----	WASHER, spring, M22	2
108	2010621	NUT, acorn hexagon, M22, sst	2
109	----	WASHER, M10, flat, sst	8
110	----	SCREW, M10x1.5-25, socket, sst	10
111	2007877	BRACKET, air control, DM-22	1
113	256658	CONTROL, air	1
114	----	PLUG, pipe, headless, 1/8	1
115	121112	SCREW, cap, socket head	6
116	133407	FITTING,Y-tube, push,1/4	2
117	----	TUBE, nylon, rnd	10
118	----	TUBE, nylon, rnd	2
119	2007878	BRACKET, valve, air motor	1
120	2007879	VALVE, limit switch	1
121	----	MUFFLER, PT1/8	1
122	----	WASHER, lock, M4	2
123	----	SCREW, M4X0.7-30, socket head	2
124	----	SCREW, cap, hex hd, M6 × 25	1
125	----	NUT, hex, M6	1
126	2007880	FOOT, base, DM-22	4
127	----	SCREW, M6 × 1.0-16, flat head	4
128	2007881	FITTING, tube connect, 1/4" × 5/32"	1
129	556405	FITTING, 1/2 × 1/8 NPTF hex red	1
130	186291	CLAMP, pail	2
131	186291	SCREW, wing	2
132	2008172	HOLDER, tube	2
133	15J074▲	LABEL, safety, crush & pinch	2
134	15V954	LABEL, valve, shutoff, air control	1

▲ *Replacement safety labels, tags, and cards are available at no cost.*

Module, Pump



1 Apply adhesive (200 series) to threads, per directions on packet.

2 Lubricate inside surface of cylinder with grease.

3 Torque to 35-40 ft-lb (47-54 N•m).

4 Torque to 11-13 ft-lb (15-18 N•m).

5 Torque to 95-105 in-lb (10.7-11.9 N•m).

6 Lubricate with grease.

7 Lips face down.

8 Lips face up.

9 Torque to 30-35 ft-lb (41-47 N•m).

10 Torque to 298-314 in-lb (35-37 N•m).

11 Torque to 14-20 in-lb (1.7-2.3 N•m).

12 Apply thread lubricant.

Pump Parts List

Ref.	Part	Description	Qty.
		Dynamic Pump	
201 [1]	15M127	KIT, cover, bottom; includes 402 (qty 1), 403, 407, 413 (qty 1), and 417	1
202 [1] [2]	111624	O-RING, cover	2
203 [1]	15M223	BEARING	1
204 [2] [3]	117336	O-RING, piston	1
205	15M211	CYLINDER, motor	1
206	----	COVER, cylinder	1
207 [1] [2]	108158	SEAL, u-cup	2
208 [2]	15R001	GASKET, manifold	2
209 [2]	15M182	GASKET, air valve	1
210	15M128	KIT, cover, top; includes 402 and 413 (qty 1 of each). 15X353 also includes 430 and 431.	1
211	15R553	SCREW, M6 x 25	8
212	15M314	BOLT, tie, hex head	3
213 [1]	247391	VALVE, pilot (pack of 2)	2
214	24P018	VALVE, air; includes items 409 and 411 (qty 4)	1
215	15M213	MUFFLER	1
217 [1] [2]	15M227	RING, retaining	1
218	2010594	ROD, air motor	1
219	----	PISTON, motor	1
220	15M130	MANIFOLD, assembly, includes 408, 409, and 411 (qty. 4)	1
229 [5]	2010591▲	LABEL, warning, English	1
230 [2]	110782	O-RING, top plug	1
231	16C431	PLUG, top cover	1
241 [6]	26A962	ROD, piston, fluid	1
242	18C131	RETAINER, seal, piston	1
243	187578	HOUSING, fluid	1
244 [6]	26A963	ROD, plunger	1
245	186283	VALVE, intake	1
246 [6]	26A964	STOP, fluid	1
247 [4]	26A965	CARTRIDGE, valve, fluid	1
248 [6]	17T152	PLUNGER, fluid	1
250 [6]	110893	PIN, spring	1
251	111640	WASHER, lock, internal	1
252 [6]	112120	PIN, spring	1
253	111639	SCREW, cap, hex hd	1
254 [4]	110966	PACKING, o-ring	1
255 [4]	18B719	SEAL, triple, lip	2
256	18C133	WASHER, spacer, seal	1
257 [5]	186501▲	LABEL, safety, warning	1
258 [5]	186500▲	LABEL, safety, warning	1
263	187582	COUPLING, cylinder	1
264	17J516	ADAPTER	1
265	17J517	SPACER	3
267	25A641	SCREW, shcs, 3/8 - 24 x 1.00	3
271 [6]	18C132	GUIDE, rod, piston	1
272 [6]	18C130	HOUSING, rod, piston	1
273	----	GUARD, pinch	1
		Platen	
301	187596	PLATE, inductor	1
302	111639	SCREW, cap, hex hd	2
303	223746	VALVE, bleed	1
304	18G065	PLATE, 1 gal, O-ring wipper	1
305	18G066	O-RING, ID 149.5 mm x 8.4 mm	1
306	130362	SCREW, cap, hex hd	8
307	111637	WASHER, lock	8
308	18G067	RING, backup	1
309 [6]	110954	PACKING, o-ring	1
310	110932	CONNECTOR, male	1
311	187683	HOUSING, valve	1
312	224918	VALVE, check	1

▲ *Replacement safety labels, tags, and cards are available at no cost.*

1) *Parts included in Kit 24G696 (purchase separately).*

2) *Parts included in Kit 24G700 (purchase separately).*

3) *Parts included in Kit 117336 (purchase separately).*

4) *These parts are included in Pump Repair Kit 26A972, which may be purchased separately. This kit also includes two Part No. 110954 PTFE O-rings for use with the wiper plate.*

5) *Replacement safety labels, tags, and cards are available at no cost.*

6) *These parts can be purchased separately.*

Accessory

Can Opener (not supplied with system)

For use with containers that have a lip at the top that needs to be removed.

Graco Kit 111002 is available and can be purchased separately.

Dimensions

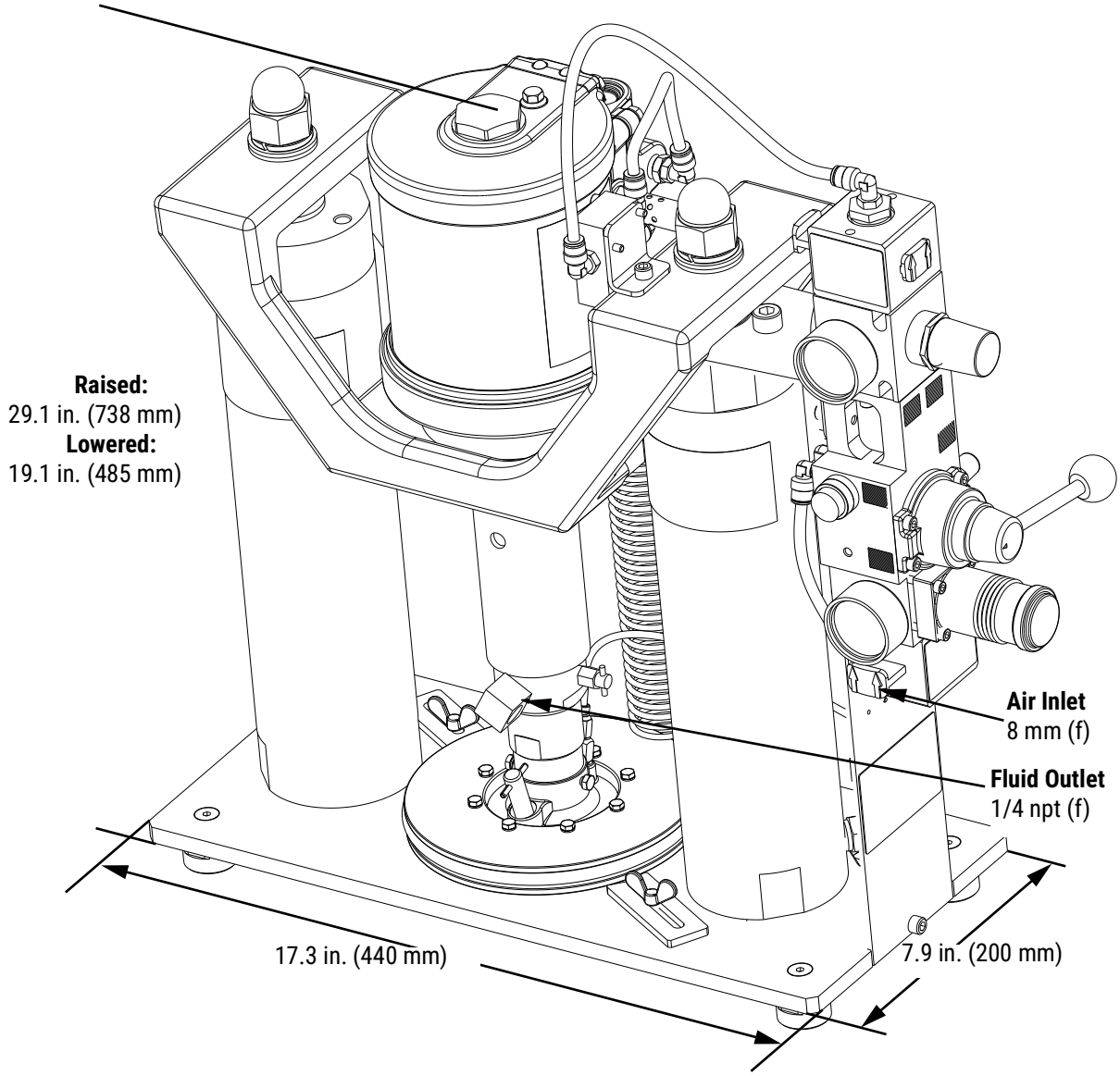


FIG. 12: DM-22 Supply System Dimensions

Technical Specifications

DM-22 Supply System		
	US	**Metric**
Maximum fluid output pressure	2200 psi	15.2 MPa, 152 bar
Air input pressure	0-100 psi	0-0.7 MPa, 0-7 bar
Maximum fluid viscosity	1,000,000 cps	
Volume per stroke	0.17 oz	5.0 cc
Recommended pump speed for continuous operation	40 cycles per minutes (cpm)	
Maximum recommended pump speed	60 cpm	
Stroke length	3/4 in.	19 mm
Maximum pump operating temperature	140 °F	60 °C
Net Weight		
2007873, 1 Gallon	66 lb	30 kg
Sound Data		
Sound power*	84.5 dB(A)	
Sound pressure**	77.9 dB(A)	
Inlet/Outlet Sizes		
Air inlet size	8 mm(f)	
Pump fluid outlet size	1/4 in. npt(f)	
Materials of Construction		
Wetted parts	304 and 17-4 pH stainless steel, PTFE, fluoroelastomer, PEEK	
Notes		
* Sound power at 70 psi (0.48 MPa, 4.8 bar), 80 cpm. Sound power measured per ISO-9614-2.		
** Sound pressure was tested 3.28 feet (1 m) from equipment.		
All trademarks or registered trademarks are the property of their respective owners.		

California Proposition 65

CALIFORNIA RESIDENTS

⚠ **WARNING:** Cancer and reproductive harm – www.P65warnings.ca.gov.

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

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

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

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Graco's sole obligation and buyer's sole remedy for any breach of warranty shall be as set forth above. The buyer agrees that no other remedy (including, but not limited to, incidental or consequential damages for lost profits, lost sales, injury to person or property, or any other incidental or consequential loss) shall be available. Any action for breach of warranty must be brought within two (2) years of the date of sale.

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

In no event will Graco be liable for indirect, incidental, special or consequential damages resulting from Graco supplying equipment hereunder, or the furnishing, performance, or use of any products or other goods sold hereto, whether due to a breach of contract, breach of warranty, the negligence of Graco, or otherwise.

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Graco reserves the right to make changes at any time without notice.

Original instructions. This manual contains English. MM 3B0431A
Graco Headquarters: Minneapolis
International Offices: Belgium, China, Japan, Korea

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