Instruction-Parts

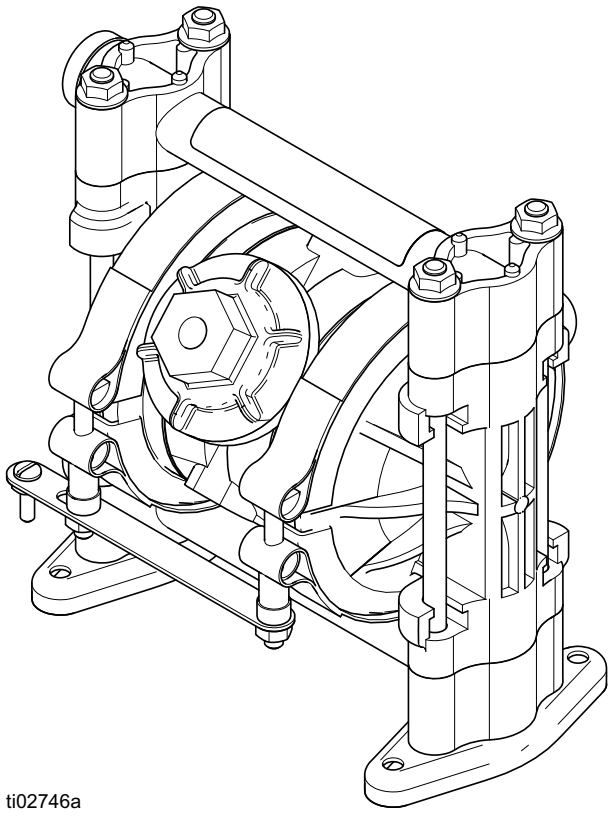
VERDERAIR VA 10 Air-Operated Diaphragm Pumps

819.0154ZAM

EN

For pumping transfer applications. For professional use only. Only pumps with acetal fluid sections are approved for use in European explosive atmosphere locations.

Important Safety Instructions
Read all warnings and instructions in this manual. Save these instructions.



ti02746a

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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
	Equipment Misuse Hazard
	Fire and Explosion Hazard
	Pressurized Equipment Hazard
	Toxic Fluid Hazard



Safety Alert Symbol

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

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



EQUIPMENT MISUSE HAZARD

Equipment misuse can cause the equipment to rupture or malfunction and result in serious injury.

- This equipment is for professional use only.
- Read all instruction manuals, tags, and labels before operating the equipment.
- Use the equipment only for its intended purpose. If you are not sure, call your distributor.
- Do not alter or modify this equipment.
- Check equipment daily. Repair or replace worn or damaged parts immediately.
- Do not exceed the maximum working pressure of the lowest rated component in your system. This equipment has a **100 psi (7 bar) maximum working pressure at 100 psi (0.7 MPa, 7 bar) maximum incoming air pressure.**
- Use fluids and solvents that are compatible with the equipment wetted parts. Refer to the **Technical Specifications** section of all equipment manuals. Read the fluid and solvent manufacturer's warnings.
- Do not kink or overbend hoses or use hoses to pull equipment.
- Route hoses away from traffic areas, sharp edges, moving parts, and hot surfaces. Do not expose hoses to temperatures above 82° C (180° F) or below -40° C (-40° F).
- Do not lift pressurized equipment.
- Comply with all applicable local, state, and national fire, electrical, and safety regulations.



TOXIC FLUID HAZARD

Hazardous fluid or toxic fumes can cause serious injury or death if splashed in the eyes or on the skin, inhaled, or swallowed.

- Know the specific hazards of the fluid you are using.
- Store hazardous fluid in an approved container. Dispose of hazardous fluid according to all local, state and national guidelines.
- Always wear protective eyewear, gloves, clothing and respirator as recommended by the fluid and solvent manufacturer.
- Pipe and dispose of the exhaust air safely, away from people, animals, and food handling areas. If the diaphragm fails, the fluid is exhausted along with the air. See **Air Exhaust Ventilation** on page 14.
- To pump acids, ***always*** use a polypropylene pump. Take precautions to avoid acid or acid fumes from contacting the pump housing exterior. Stainless steel parts will be damaged by exposure to acid spills and fumes. ***Never*** use an acetal pump to pump acids.

⚠ WARNING



FIRE AND EXPLOSION HAZARD

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

- Ground all equipment. Refer to **Grounding** on page 9.
- ***Never*** use a polypropylene pump with non-conductive flammable fluids as specified by your local fire protection code. Refer to **Grounding** on page 9 for additional information. Consult your fluid supplier to determine the conductivity or resistivity of your fluid.
- If there is any static sparking or you feel an electric shock while using this equipment, **stop pumping immediately.** Do not use the equipment until you identify and correct the problem.
- Provide fresh air ventilation to avoid the buildup of flammable fumes from solvents or the fluid being pumped.
- Pipe and dispose of the exhaust air safely, away from all sources of ignition. If the diaphragm fails, the fluid is exhausted along with the air. See **Air Exhaust Ventilation** on page 14.
- Keep the work area free of debris, including solvent, rags, and gasoline.
- Electrically disconnect all equipment in the work area.
- Extinguish all open flames or pilot lights in the work area.
- Do not smoke in the work area.
- Do not turn on or off any light switch in the work area while operating or if fumes are present.
- Do not operate a gasoline engine in the work area.
- Keep a fire extinguisher in the work area.

Configuration Matrix

Check the identification plate (ID) for the 16-digit Configuration Number of your pump. Use the following matrix to define the components of your pump.

Sample Configuration Number: VA10DP - AC TF TF TB OO

VA10	**D**	**P**	**AC**	**TF**	**TF**	**TB**	**OO**
Pump Model	Fluid Section	Air Section	Seats	Balls	Diaphragms	Connections	Options

NOTE: Some combinations are not possible. Please check with your local supplier.

Pump Model (1 and 2)	**Fluid Section Material (3)**		**Air Section Material (4)**		**Seats (5)**	
VA10	**D**	Acetal*	**P**	Polypropylene	**AC**	Acetal
	P	Polypropylene			**SS**	Stainless Steel
					PP	Polypropylene

Balls (6)		**Diaphragm (7)**		**Connections (8)**		**Options (9)**	
BN	Buna-N	**BN**	Buna-N	**TB**	Threaded BSP	**OO**	Standard
HY	TPE	**HY**	TPE	**TN**	Threaded NPT	**OR**	Reverse Outlet
SS	Stainless Steel	**SP**	Santoprene				
TF	PTFE	**TF**	PTFE with Buna-N O-Ring				

Approvals

Model Information*	Approvals
Acetal models are certified:	**II 2 GD** **Ex h IIC 66°...135°C Gb** **Ex h IIIC T135°C Db** ATEX T-code rating is dependent on the temperature of the fluid being pumped. Fluid temperature is limited by the materials of the pump interior wetted parts. See **Technical Specifications** on page 32for the maximum fluid operating temperature for your specific pump model.

* See **Configuration Matrix** on page 6 for detailed descriptions.

Installation

General Information

- The figures in **Typical Installations** on page 12 are only guides for selecting and installing system components. Contact your distributor for assistance in planning a system to suit your needs.
- Always use Genuine Verder Parts and Accessories, available from your distributor.
- Use a compatible, liquid thread sealant or PTFE tape on all male threads. Tighten all connections firmly to avoid air or fluid leaks. ***Do not overtighten plastic threads.***
- Reference numbers and letters in parentheses refer to the callouts in the Figures and **Parts** on page 26.

⚠ WARNING



TOXIC FLUID HAZARD
Hazardous fluid or toxic fumes can cause serious injury or death if splashed in the eyes or on the skin, inhaled, or swallowed.

1. Read **TOXIC FLUID HAZARD** on page 4.
2. Use fluids and solvents which are compatible with the equipment wetted parts. Refer to the **Technical Specifications** section of all equipment manuals. Read the fluid and solvent manufacturer's warnings.

⚠ CAUTION

See **Technical Specifications** for the maximum fluid operating temperature for your specific pump model.

Operating outside these temperature limits will adversely affect the strength of the pump housing. Certain chemicals may further reduce the operating temperature range. Consult engineering guides for chemical compatibilities and temperature limits, or contact your Verder distributor.

Tightening Threaded Fasteners Before First Use

Before using the pump for the first time, check and retorque all external fasteners. See **Torque Sequence** on page 29. After the first day of operation, retorque the fasteners. Although pump use varies, a general guideline is to retorque fasteners every two months.

Mountings

- Be sure the mounting can support the weight of the pump, hoses, and accessories, as well as the stress caused during operation.
- The equipment can be used in a variety of installations, some of which are shown in **Typical Installations** on page 12. Kits are available to adapt your pump to your system.
- For all other mountings, be sure the pump is adequately secured.
- Prolonged exposure to UV radiation will degrade natural polypropylene components of the pumps. To prevent potential injury or equipment damage, do not expose pump or the plastic components to direct sunlight for prolonged periods.

Grounding

⚠ WARNING

FIRE AND EXPLOSION HAZARD
This pump must be grounded. Before operating the pump, ground the system as explained at right. Also read the section **FIRE AND EXPLOSION HAZARD** on page 5.

The acetal pump contains stainless steel fibers, which makes the wetted parts conductive. Attaching the ground wire to the grounding strip grounds the air motor and the wetted parts.

The polypropylene pump is ***not*** conductive.

When pumping conductive flammable fluids, ***always*** ground the entire fluid system by making sure the fluid system has an electrical path to a true earth ground (see FIG. 4 through FIG. 7). ***Never*** use a polypropylene pump with non-conductive flammable fluids as specified by your local fire protection code.

US Code (NFPA 77 Static Electricity) recommends a conductivity greater than 50 x 10^{-12} Siemans/meter (mhos/meter) over your operating temperature range to reduce the hazard of fire. Consult your fluid supplier to determine the conductivity or resistivity of your fluid. The resistivity must be less than 2 x 10^{12} ohm-centimeters.

To reduce the risk of static sparking, ground the pump and all other equipment used or located in the pumping area. Check your local electrical code for detailed grounding instructions for your area and type of equipment.

Ground all of this equipment:

- Pump: Attach a ground wire (Y) to the grounding strip (112) with the screw (28), lockwasher (29) and nut (27), as shown in FIG. 1. Connect the clamp end of the ground wire to a true earth ground. Order part number 819.0157 Ground Wire and Clamp.

NOTE: When pumping conductive flammable fluids with a polypropylene pump, ***always*** ground the fluid system. **Typical Installations** on page 12 shows recommended methods of grounding flammable fluid containers during filling.

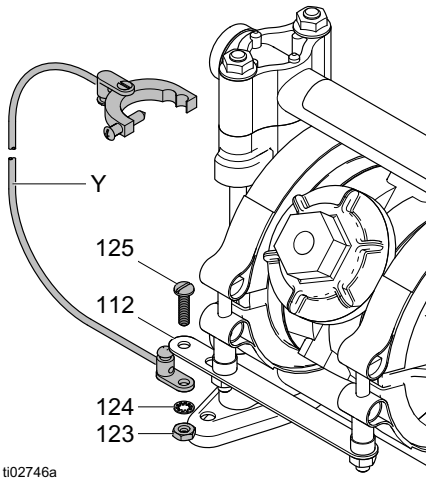


FIG. 1: Grounding

- Air and fluid hoses: Use only electrically conductive hoses.
- Air compressor: Follow the manufacturer's recommendations.
- Solvent pails used when flushing: Follow your local code. Use only metal pails, which are conductive. Do not place the pail on a non-conductive surface, such as paper or cardboard, which interrupts the grounding continuity.
- Fluid supply container: Follow your local code.

Air Line

⚠ WARNING

A bleed-type master air valve (B) is required in your system to relieve air trapped between this valve and the pump. Trapped air can cause the pump to cycle unexpectedly, which could result in serious injury, including splashing in the eyes or on the skin, injury from moving parts, or contamination from hazardous fluids.

⚠ CAUTION

The pump exhaust air may contain contaminants. Ventilate to a remote area if the contaminants could affect your fluid supply. See **Air Exhaust Ventilation** on page 14.

1. Install the air line accessories as shown in **Typical Installations** on page 12. Mount these accessories on the wall or on a bracket. Be sure the air line supplying the accessories is grounded.

   a. The fluid pressure can be controlled in either of two ways. To control it on the air side, install an air regulator (H). To control it on the fluid side, install a fluid regulator (M) near the pump fluid outlet.

   b. Locate one bleed-type master air valve (B) close to the pump and use it to relieve trapped air. Locate the other master air valve (E) upstream from all air line accessories and use it to isolate them during cleaning and repair.

   c. The air line filter (F) removes harmful dirt and moisture from the compressed air supply.

2. Install an electrically conductive, flexible air hose (C) between the accessories and the 1/4 npt(f) pump air inlet (see **Typical Installations** on page 12). Use a minimum 6 mm (1/4 in.) ID air hose. Screw an air line quick disconnect coupler (D) onto the end of the air hose (C), and screw the mating fitting into the pump air inlet snugly. Do not connect the coupler (D) to the fitting yet.

Fluid Suction Line

For all pumps, use a flexible fluid hose.

- If using a conductive (acetal) pump, use conductive hoses. If using a non-conductive (polypropylene) pump, ground the fluid system. See **Grounding** on page 9.
- The pump fluid inlet is 3/8 npt(f). Screw the fluid fitting into the pump inlet snugly. Use a compatible liquid thread sealant or PTFE tape on connections to prevent air from getting into material line.
- At inlet fluid pressures greater than 0.1 MPa,1 bar (15 psi), diaphragm life will be shortened.
- See the **Technical Specifications** on page 32 for maximum suction lift.

Fluid Outlet Line

⚠ WARNING

A fluid drain valve (J) is required in your system to relieve pressure in the hose if it is plugged. See **Typical Installations**. The drain valve reduces the risk of serious injury, including splashing in the eyes or on the skin, or contamination from hazardous fluids when relieving pressure. Install the valve close to the pump fluid outlet.

- Use electrically conductive, flexible fluid hoses (N). The pump fluid outlet is 3/8 npt(f). See FIG. 2. Screw the fluid fitting into the pump outlet snugly.
- Install a fluid regulator (M) at the pump fluid outlet to control fluid pressure, if desired (see **Typical Installations** on page 12). See **Air Line** on page 10**,** step 1a, for another method of controlling pressure.
- Install a fluid drain valve (J) near the fluid outlet.

Changing the Orientation of the Fluid Inlet and Outlet Ports

The pump is shipped with the fluid inlet and outlet ports facing the same direction. See FIG. 2. If desired, the direction of one or both ports can be changed. Remove the manifold(s) from the pump as explained in **Ball Check Valves** on page 22 steps 1, 2, and 4. Reattach with the port facing the desired direction. See **Torque Sequence** on page 29. ***Do not over-torque.***

1. Apply thread lube, and torque to 5.6–6.8 N•m (50–60 in-lb). Do not over-torque.
2. 1/4 npt(f) air inlet
3. 3/8 npt(f) or 3/8 BSPT fluid inlet, depending on manifold choice
4. 3/8 npt(f) or 3/8 BSPT fluid outlet, depending on manifold choice
5. 3/8 npt(f) air exhaust port

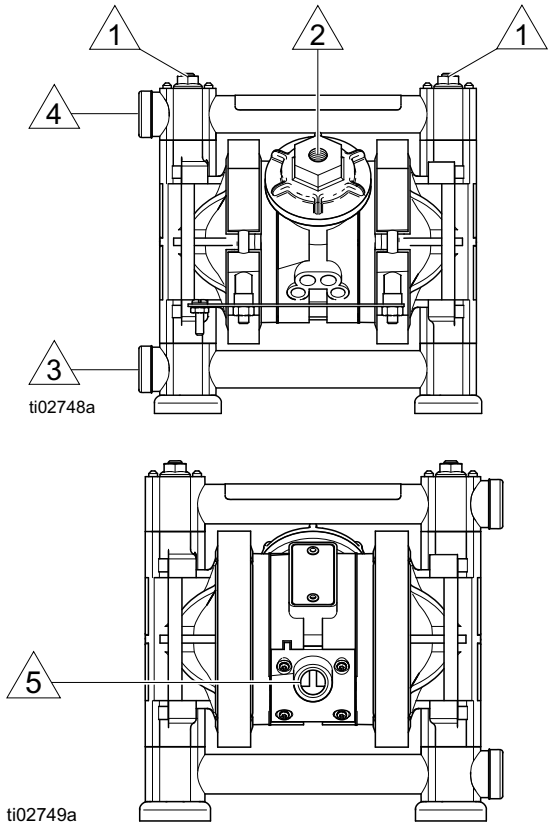


FIG. 2: Fluid Input and Output Ports (acetal pump shown)

Fluid Pressure Relief Valve

⚠ CAUTION

Some systems may require installation of a pressure relief valve at the pump outlet to prevent overpressurization and rupture of the pump or hose. See FIG. 3.

Thermal expansion of fluid in the outlet line can cause overpressurization. This can occur when using long fluid lines exposed to sunlight or ambient heat, or when pumping from a cool to a warm area (for example, from an underground tank).

Overpressurization can also occur if the pump is being used to feed fluid to a piston pump, and the intake valve of the piston pump does not close, causing fluid to back up in the outlet line.

KEY

A 3/8 npt(f) fluid inlet port
B 3/8 npt(f) fluid outlet port
C Pressure relief valve, part number 819.0159 (stainless steel)

1. Install valve between fluid inlet and outlet ports.
2. Connect fluid inlet line here. Use a compatible liquid sealant or PTFE tape on connection to prevent air from getting into the material line.
3. Connect fluid outlet line here.

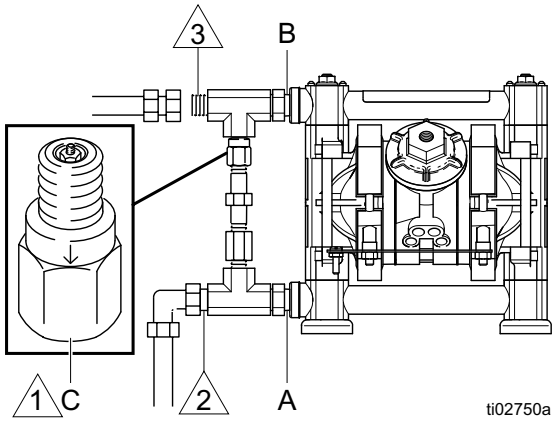
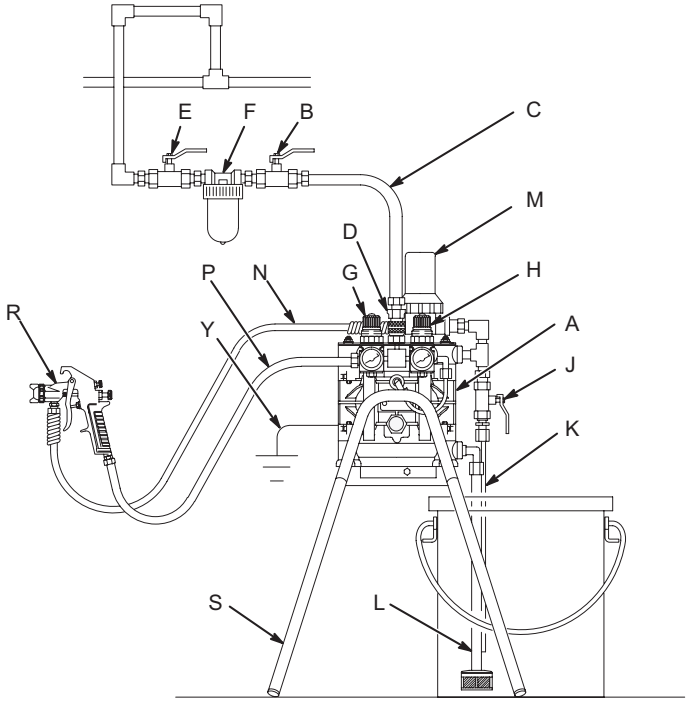


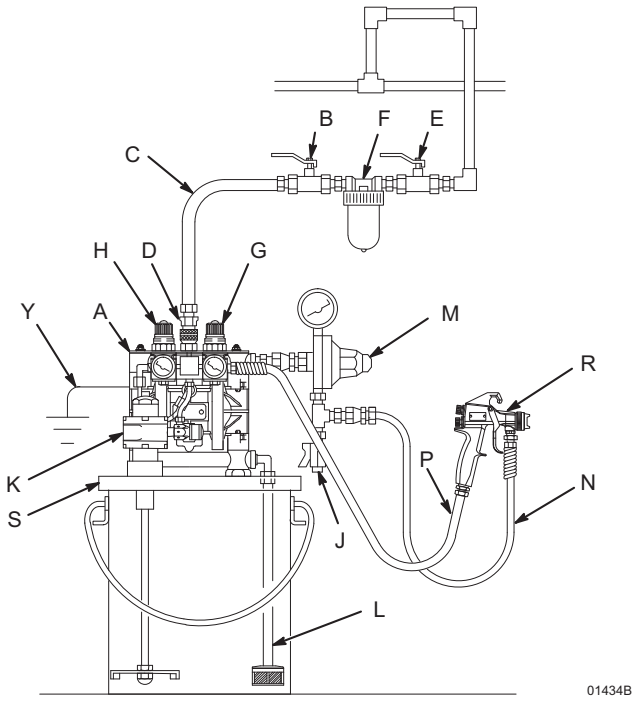
FIG. 3: Fluid Pressure Relief Valve

Typical Installations



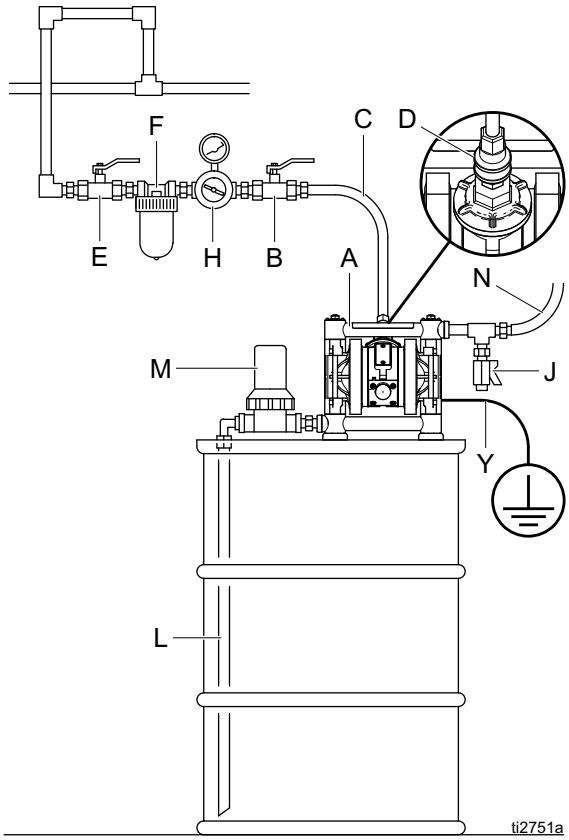
KEY
- A Pump
- B Bleed-Type Master Air Valve (required for pump)
- C Air Supply Hose
- D Air Line Quick Disconnect
- E Master Air Valve (for accessories)
- F Air Line Filter
- G Gun Air Regulator
- H Pump Air Regulator
- J Fluid Drain Valve (required)
- K Fluid Recirculation Line
- L Fluid Suction Line
- M Surge Tank and Filter
- N Fluid Supply Hose
- P Gun Air Supply Hose
- R Air Spray Gun
- S Floor Stand
- Y Ground Wire (required; see **Grounding** on page 9 for installation instructions)

FIG. 4: Stand-Mounted Air Spray Installation



KEY
- A Pump
- B Bleed-Type Master Air Valve (required for pump)
- C Air Supply Line
- D Air Line Quick Disconnect
- E Master Air Valve (for accessories)
- F Air Line Filter
- G Gun Air Regulator
- H Pump Air Regulator
- J Fluid Drain Valve (required)
- K Agitator
- L Fluid Suction Line
- M Fluid Regulator
- N Fluid Supply Hose
- P Gun Air Supply Hose
- R HVLP Air Spray Gun
- S Pail Cover
- Y Ground Wire (required; see **Grounding** on page 9 for installation instructions)

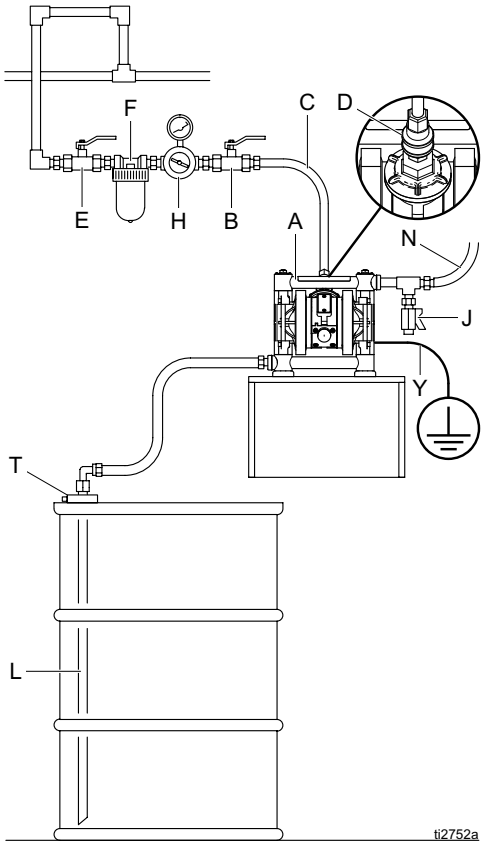
FIG. 5: Pail-Mounted HVLP Air Spray Installation



KEY

A Pump
B Bleed-Type Master Air Valve (required for pump)
C Air Supply Line
D Air Line Quick Disconnect
E Master Air Valve (for accessories)
F Air Line Filter
H Pump Air Regulator
J Fluid Drain Valve (required)
L Fluid Suction Line
M Fluid Inlet Filter
N Fluid Supply Hose
Y Ground Wire (required; see **Grounding** on page 9 for installation instructions)

FIG. 6: Bung-Mount Transfer Installation



KEY

A Pump
B Bleed-Type Master Air Valve (required for pump)
C Air Supply Line
D Air Line Quick Disconnect
E Master Air Valve (for accessories)
F Air Line Filter
H Pump Air Regulator
J Fluid Drain Valve (required)
L Fluid Suction Line
N Fluid Supply Hose
S Wall Bracket
T Bung Adapter
Y Ground Wire (required; see **Grounding** on page 9 for installation instructions)

FIG. 7: Wall-Mount Transfer Installation

Air Exhaust Ventilation

⚠ WARNING



FIRE AND EXPLOSION HAZARD
Be sure to read **FIRE AND EXPLOSION HAZARD** on and **TOXIC FLUID HAZARD** starting on page 4, before operating this pump.



Be sure the system is properly ventilated for your type of installation. You must vent the exhaust to a safe place, away from people, animals, food handling areas, and all sources of ignition when pumping flammable or hazardous fluids.

Diaphragm failure will cause the fluid being pumped to exhaust with the air. Place an appropriate container at the end of the air exhaust line to catch the fluid. See FIG. 8.

The air exhaust port is 3/8 npt(f). Do not restrict the air exhaust port. Excessive exhaust restriction can cause erratic pump operation.

To exhaust to a remote location:

1. Remove the muffler (3) from the pump air exhaust port.

⚠ WARNING



PRESSURIZED EQUIPMENT HAZARD
To reduce the risk of serious eye injury from ice particles, *never* operate the pump with the air exhaust port open. Ice may form during pump operation, and ice particles will be ejected from the port along with the exhaust air. If the muffler (3) is removed, *always* connect an air exhaust hose to the exhaust port.

2. Install an electrically conductive air exhaust hose (X) and connect the muffler to the other end of the hose. The minimum size for the air exhaust hose is 10 mm (3/8 in.) ID. If a hose longer than 4.57 m (15 ft) is required, use a larger diameter hose. Avoid sharp bends or kinks in the hose.

3. Place a container (Z) at the end of the air exhaust line to catch fluid in case a diaphragm ruptures. If the fluid is flammable, ground the container. See FIG. 8.

In a submerged installation (as shown), all wetted and non-wetted pump parts must be compatible with the fluid being pumped.

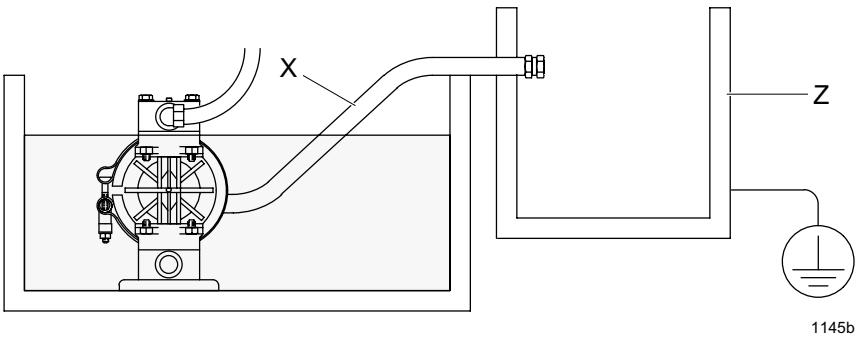


FIG. 8 : Venting Exhaust Air (submerged installation shown)

Operation

Pressure Relief Procedure

⚠ WARNING



PRESSURIZED EQUIPMENT HAZARD

The system pressure must be manually relieved to prevent the system from starting or spraying accidentally. To reduce the risk of an injury from accidental spray from the gun, splashing fluid, or moving parts, follow the **Pressure Relief Procedure** whenever you:

- Are instructed to relieve the pressure
- Stop spraying
- Check or service any of the system equipment
- Install or clean the spray tips

1. Shut off the air to the pump.
2. Open the dispensing valve, if used.
3. Open the fluid drain valve to relieve all fluid pressure, having a container ready to catch the drainage.

Flush the Pump Before First Use

The pump was tested in water. If water could contaminate the fluid you are pumping, flush the pump thoroughly with a compatible solvent. Follow the steps under **Starting and Adjusting the Pump** on page 15**.**

Starting and Adjusting the Pump

⚠ WARNING



TOXIC FLUID HAZARD

Hazardous fluid or toxic fumes can cause serious injury or death if splashed in the eyes or on the skin, inhaled, or swallowed. Do not lift a pump under pressure. If dropped, the fluid section may rupture. Always follow the **Pressure Relief Procedure** above before lifting the pump.

1. Be sure the pump is properly grounded. Read **FIRE AND EXPLOSION HAZARD** on page 5.
2. Check all fittings to be sure they are tight. Be sure to use a compatible liquid thread sealant or PTFE tape on all male threads. Tighten the fluid inlet and outlet fittings snugly. Do not overtighten the fittings into the pump.
3. Place the suction tube (if used) in the fluid to be pumped.
4. Place the end of the fluid hose (N) into an appropriate container. Close the fluid drain valve (J).
5. With the pump air regulator (H) closed, open all bleed-type master air valves (B, E).
6. If the fluid hose has a dispensing device, hold it open while continuing with the following step. Slowly open the air regulator (H) until the pump starts to cycle. Allow the pump to cycle slowly until all air is pushed out of the lines and the pump is primed.

   If you are flushing, run the pump long enough to thoroughly clean the pump and hoses. Close the air regulator. Remove the suction tube from the solvent and place it in the fluid to be pumped.

Pump Shutdown

⚠ WARNING

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

At the end of the work shift, **relieve the pressure.**

Troubleshooting

⚠ WARNING

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

1. **Relieve the pressure** before checking or servicing the equipment.
2. Check all possible problems and causes before disassembling the pump.

Problem	Cause	Solution
The pump will not cycle, or cycles once and stops.	The air valve is stuck or dirty.	Disassemble and clean the air valve. Use filtered air.
The pump cycles at stall or fails to hold pressure at stall.	The check valves or O-rings (108) are leaking.	Replace these parts. See **Ball Check Valves**.
	The check balls (301) or seat (201) are worn.	Replace these parts. See **Ball Check Valves**.
	The check ball (301) is wedged in the seat (201).	Replace the ball. See **Ball Check Valves**.
There is excessive air leakage from the exhaust port.	The air valve cup (8) or plate (14) is worn.	Replace these parts. See **Air Valve**.
	The U-cup seals (2) are worn.	Replace the seals. See **Air Valve**.
The pump operates erratically.	The suction line is clogged.	Inspect; clear the line.
	The check valve balls (301) are sticking or leaking.	Clean or replace the balls. See **Ball Check Valves**.
	The diaphragm (401) is ruptured.	Replace the diaphragm. See **Diaphragm Repair**.
There are air bubbles in the fluid.	The suction line is loose, or there is a lack of thread sealant.	Tighten the suction line. Use a compatible liquid thread sealant or PTFE tape on connections.
	The diaphragm (401) is ruptured.	Replace the diaphragm. See **Diaphragm Repair**.
	The manifolds (102) are loose or the O-rings (108) are damaged.	Tighten the manifold bolts (104) or nuts (106); replace the O-rings (108). See FIG. 11.
	The outer diaphragm plates (103) are loose.	Tighten the plates. See **Diaphragm Repair**.
There is fluid in the exhaust air.	The diaphragm (401*) is ruptured.	Replace the diaphragm. See **Diaphragm Repair**.
	The outer diaphragm plates (103) are loose.	Tighten the plates. See **Diaphragm Repair**.
The pump exhausts air at stall.	The air valve cup (8) or plate (14) is worn.	Replace these parts. See **Air Valve**.
	The U-cup seals (2) are worn.	Replace the seals. See **Air Valve**.
The pump exhausts air from the clamps.	The clamps (111) are loose.	Tighten the clamp nuts (113). See **Tightening the Clamps**.

Problem	Cause	Solution
The pump exhausts air near the air valve.	The air valve screws (15) are loose.	Tighten the screws. See **Air Valve**.
	The air valve O-ring (4) is damaged.	Inspect; replace the O-ring. See **Air Valve**.
The pump leaks fluid from the check valves.	The O-rings (108) are worn or damaged.	Inspect; replace the O-rings. See **Ball Check Valves**.

Maintenance

Lubrication

The air valve is lubricated at the factory to operate without additional lubrication. If lubrication is desired, every 500 hours of operation (or monthly), remove the hose from the pump air inlet and add two drops of machine oil to the air inlet.

⚠ CAUTION

Do not over-lubricate the pump. Oil is exhausted through the muffler, which could contaminate your fluid supply or other equipment. Excessive lubrication can also cause the pump to malfunction.

Flushing and Storage

⚠ WARNING

To reduce the risk of serious injury whenever you are instructed to relieve pressure, always follow the **Pressure Relief Procedure** on page 15.

Flush the pump when necessary to prevent the fluid you are pumping from drying or freezing in the pump and damaging it. Use a compatible solvent.

Before storing the pump, always flush the pump and **relieve the pressure.**

Tightening Threaded Connections

Before each use, check all hoses for wear or damage, and replace as necessary. Check to be sure all threaded connections are tight and leak-free.

Check fasteners. Tighten or retorque as necessary. Although pump use varies, a general guideline is to retorque fasteners every two months. See **Torque Sequence** on page 29.

Tightening the Clamps

When tightening the clamps (111), apply thread lubricant to the bolts and ***be sure*** to torque the nuts (113) to 5.6 to 6.8 N•m (50 to 60 in-lb). See FIG. 9. See **Torque Sequence** on page 29.

△1 Apply thread lube and torque nuts to 5.6–6.8 N•m (50 to 60 in-lb). See **Torque Sequence** on page 29.

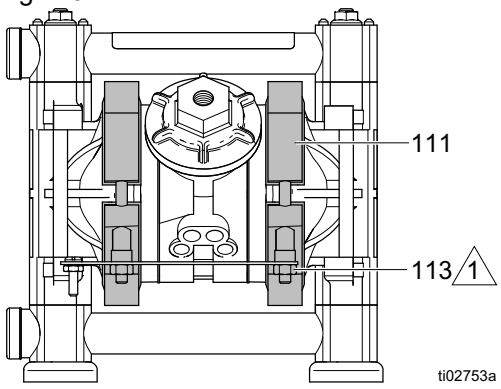


FIG. 9 : Tightening the Clamps

Preventive Maintenance Schedule

Establish a preventive maintenance schedule, based on the pump's service history. This is especially important for prevention of spills or leakage due to diaphragm failure.

Service

Air Valve

NOTE: Air Valve Repair Kit 819.9740 is available. Parts included in the kit are marked with a (†) in FIG. 10 and FIG. 11. A tube of general purpose grease is supplied in the kit.

⚠ WARNING

To reduce the risk of serious injury whenever you are instructed to relieve pressure, always follow the **Pressure Relief Procedure** on page 15.

1. **Relieve the pressure.** Disconnect all hoses.
2. Remove the cover (10) and the O-ring (4).
3. Remove the carriage plungers (7), carriages (8), carriage pins (9), and valve plate (14) from the center housing (11).
4. Clean all the parts, and inspect them for wear or damage.

NOTE: If you are installing the Air Valve Repair Kit 819.9740, use all the parts in the kit.

5. Grease the lapped surface of the valve plate (14), and install the valve plate with the lapped surface facing up.
6. Grease the bores of the center housing (11), install the U-cup packings (2) on the carriage plungers (7), and slide the carriage plungers into the carriage plunger bores. See the following important installation notes:

NOTES:

- When you install each U-cup packing (2) on each carriage plunger (7), make sure the lips of the U-cup packing face toward the clip end (the smaller end) of the carriage plunger.
- When you slide the carriage plungers (7) into the bores, slide them in with the clip ends (the smaller ends) facing toward the center of the center housing (11).

7. Grease the carriage pins (9), and slide the carriage pins into the carriage pin bores.
8. Install the carriages (8). Make sure the carriages engage the clip ends of the carriage plungers (7) and carriage pins (9).
9. Grease the O-ring (4), and seat it in the groove around the cover opening of the center housing (11).
10. Screw the cover (10) into the center housing, and torque the cover to 9.0–11.3 N•m (80–100 in-lb).

NOTE: Center housing (11) is shown in FIG. 10 separated from the air covers, but it is not necessary to remove the air covers for this service. Leave the center housing and air covers assembled for this service. To replace the pilot pin O-rings (1), the air covers (119/126) will need to be removed. See **Air Section** on page 21.

† Included in Air Valve Repair Kit 819.9740

1 Torque to 9.0–11.3 N•m (80–100 in-lb).

2 Apply grease.

3 Apply grease to lapped face.

4 Apply grease to bores of center housing (11) before installing.

5 Seal lips face clip end (the smaller end) of carriage plunger (7).

6 Install with the clip ends (the smaller ends) facing toward center of center housing (11).

7 Torque to 0.8–1.1 Nm (7–10 in-lb).

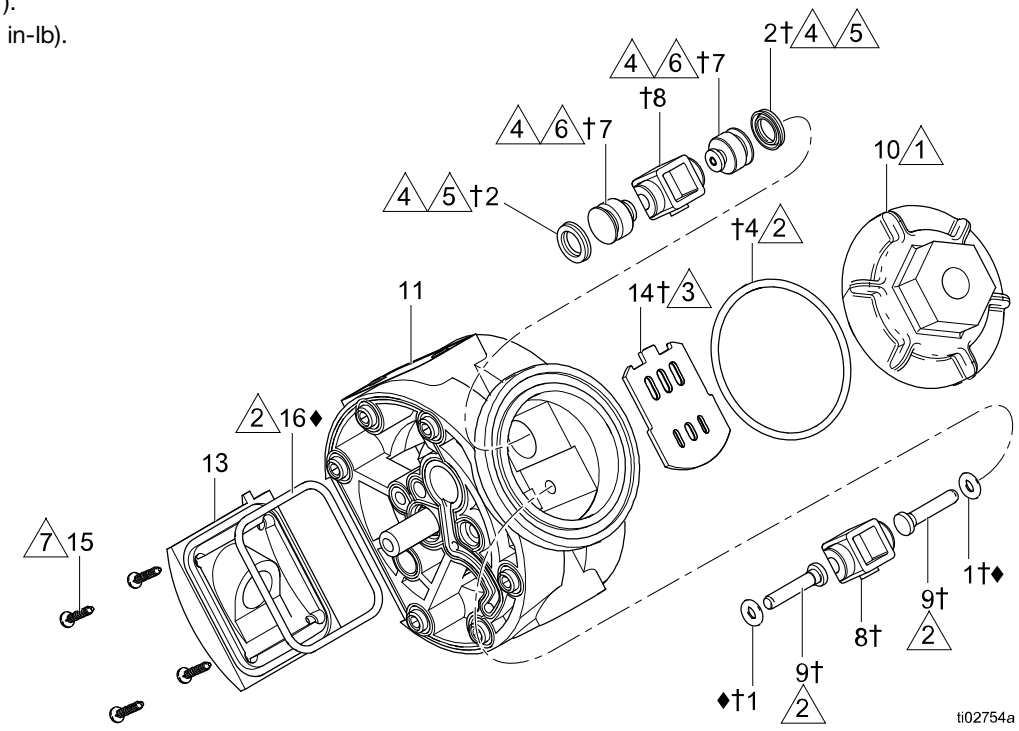


FIG. 10: Air Valve

Air Section

NOTE: Air Valve Repair Kit 819.9740 is available. Parts included with the kit are marked with a (†) in FIG. 11. General purpose grease is supplied in the kit.

Disassembly

⚠ WARNING

To reduce the risk of serious injury whenever you are instructed to relieve pressure, always follow the **Pressure Relief Procedure** on page 15.

1. **Relieve the pressure.** Disconnect all hoses.
2. Remove the manifolds (102) and fluid covers (101).

   NOTE: Make sure all the check valve parts stay in place. See FIG. 11.
3. Remove the grounding strip from the V-clamps (112), and remove the V-clamps (111).
4. Remove one of the fluid-side diaphragm plates (103) (whichever one comes loose first when you use a wrench on the hex of each), and pull the diaphragm shaft out of the center housing (11).
5. Use a wrench on the flats of the diaphragm shaft (23) to remove the other fluid-side diaphragm plate (103) from the diaphragm shaft.
6. Remove the screws (121) and air covers (119/126), and remove all old gasket (120) material from the ends of the center housing (11) and the surfaces of the air covers.
7. Remove the diaphragm shaft U-cups (122) and pilot pin O-rings (1).
8. Inspect all parts for wear or damage, and replace as necessary.

Reassembly

1. Insert a diaphragm shaft U-cup (122) and a pilot pin O-ring (1) into the end of the diaphragm shaft bore and pilot pin bore of the center housing (11).

   NOTE: Make sure the lips of the U-cup face out of the center housing.
2. Line up the holes in the gasket (120) with the holes in the end of the center housing (11), and use six screws (121) to fasten an air cover (119/126) to the end of the center housing (11). Torque the screws to 5.3–5.9 N•m (47–52 in-lb).
3. Repeat steps 1 and 2 for the other end of the center housing and the remaining air cover.
4. Install on one end of the diaphragm shaft (23) the following parts (see proper order in FIG. 11): air-side diaphragm plate (118), diaphragm (401), fluid-side diaphragm plate (103). Install the O-ring (404) in the grooves of the air cover (119/126).
5. Put grease on the diaphragm shaft (23), and carefully (do not damage the shaft U-cups) run the diaphragm shaft (23) through the center housing (11) bore.
6. Repeat step 4 for the other end of the diaphragm shaft (23), and torque the diaphragm shaft screws (103) 8.5–9.6 N•m (75–85 in-lb) at 100 rpm maximum.
7. Install the muffler (3).

   NOTE: When you install the V-clamps in step 9, orient the center housing (11) so the air inlet is approximately 45° above horizontal and the muffler (3) is approximately horizontal.
8. Apply thin, even film of grease to inside of vee clamp (111).
9. Position the fluid covers (101), install the V-clamps (111) around the fluid and air covers, install the grounding strip on the V-clamps, and torque the vee clamp nuts to 5.6–6.8 N•m (50–60 in-lb). See **Torque Sequence** on page 29.
10. Make sure all the check valve parts are in place. See FIG. 11.
11. Install the manifolds (102), rods (104), and nuts (106), and torque the nuts to 5.6–6.8 N•m (50–60 lb). Follow **Torque Sequence** on page 29.

Ball Check Valves

Tools Required

- Torque wrench
- 1/2 in. socket wrench
- O-ring pick

NOTE: A Fluid Section Repair Kit is available. See **Fluid Kits** on page 27 for the correct kit for your equipment. Parts included in the kit are marked with an asterisk in FIG. 11, for example (301*). Use all the parts in the kit for the best results. Always replace the O-rings (108) with new ones whenever the old ones are removed.

⚠ WARNING

To reduce the risk of serious injury whenever you are instructed to relieve pressure, always follow the **Pressure Relief Procedure** on page 15.

Disassembly

1. **Relieve the pressure.** Disconnect all hoses. Remove the pump from its mounting.
2. Using a 1/2 in. socket wrench, remove the nuts (106) holding the top manifold (102) to the covers (101). Lift the manifold off the pump. See FIG. 11.
3. Remove the outer O-ring (108), ball guide (202), ball (301), seat (201), and inner O-ring (108) from each of the covers.
4. Turn the pump over. Pull the tie rods (104) out of the pump, leaving the four nuts (106) on the rods. Remove the feet (107) and lower manifold (102).
5. Remove the outer O-ring (108), seat (201), ball (301), ball guide (202), and inner O-ring (108) from each of the covers (101).
6. Clean all parts and inspect for wear or damage. Replace parts as needed.

Reassembly

1. Reassemble the intake ball checks in the bottom of the pump, following all notes in FIG. 11. Be sure the ball checks are assembled **exactly** as shown.
2. Set the lower manifold (102) and feet (107) in place on the bottom of the pump.
3. Insert the long threads of each rod (104) through the feet and lower manifold. Push the rods up through the covers (101) until the nut (106) on the end of the rods bottoms on the foot. Make sure the rods are pushed all the way through. Turn the pump upright (the rods are a slight interference fit and will hold the pump parts securely in place).
4. Reassemble the outlet ball checks in the top of the pump, following all notes in FIG. 11. Be sure the ball checks are assembled **exactly** as shown. To avoid leaks, run your finger over the O-rings (108) to ensure that they are properly seated.
5. Install the top manifold (102) and four nuts (106). Torque to 5.6–6.8 N•m (50–60 in-lb). See **Torque Sequence** on page 29**. *Do not over-torque.***

Diaphragm Repair

Tools Required

- Torque wrench
- One 7/16 in. and two 1/2 in. socket wrenches
- 3/16 in. wrench
- Phillips screwdriver
- O-ring pick
- Rubber mallet
- Vise with soft jaws

A Diaphragm Repair Kit is available. See **Diaphragm Kits** on page 28 for the correct kit. Parts included in the kit are marked with an asterisk in FIG. 11, for example (401*). Use all the parts in the kit for the best results.

Disassembly

⚠ WARNING

To reduce the risk of serious injury whenever you are instructed to relieve pressure, always follow the **Pressure Relief Procedure** on page 15.

1. **Relieve the pressure.** Disconnect all hoses.
2. Remove the manifolds (102) and disassemble the ball check valves as explained in **Ball Check Valves** on page 22. Always replace the O-rings (108) with new ones.
3. Using a 7/16 in. socket wrench, remove the clamp nuts (113) and the grounding strip (112). Loosen the clamps (111) and slip them over the housing (11). Pull the covers (101) off the pump, then remove the clamps from the housing. See the Detail in FIG. 9.
4. Using a 1/2 in. socket wrench on both outer diaphragm plates (103), unscrew one plate from the diaphragm shaft (23). Remove one diaphragm (401), inner diaphragm plate (118), and O-ring (404). Pull the opposite diaphragm assembly and the diaphragm shaft out of the pump housing (11). Use a 3/16 in. wrench to hold the shaft and unscrew the outer plate (103), then disassemble the remaining diaphragm assembly.
5. Inspect the diaphragm shaft (23) for wear or scratches. If it is damaged, replace.
6. Hook the shaft seals (122) with an O-ring pick and pull them out of the housing (1). Avoid scratching the bore.
7. Clean all parts and inspect for wear or damage. Replace parts as needed.

Reassembly

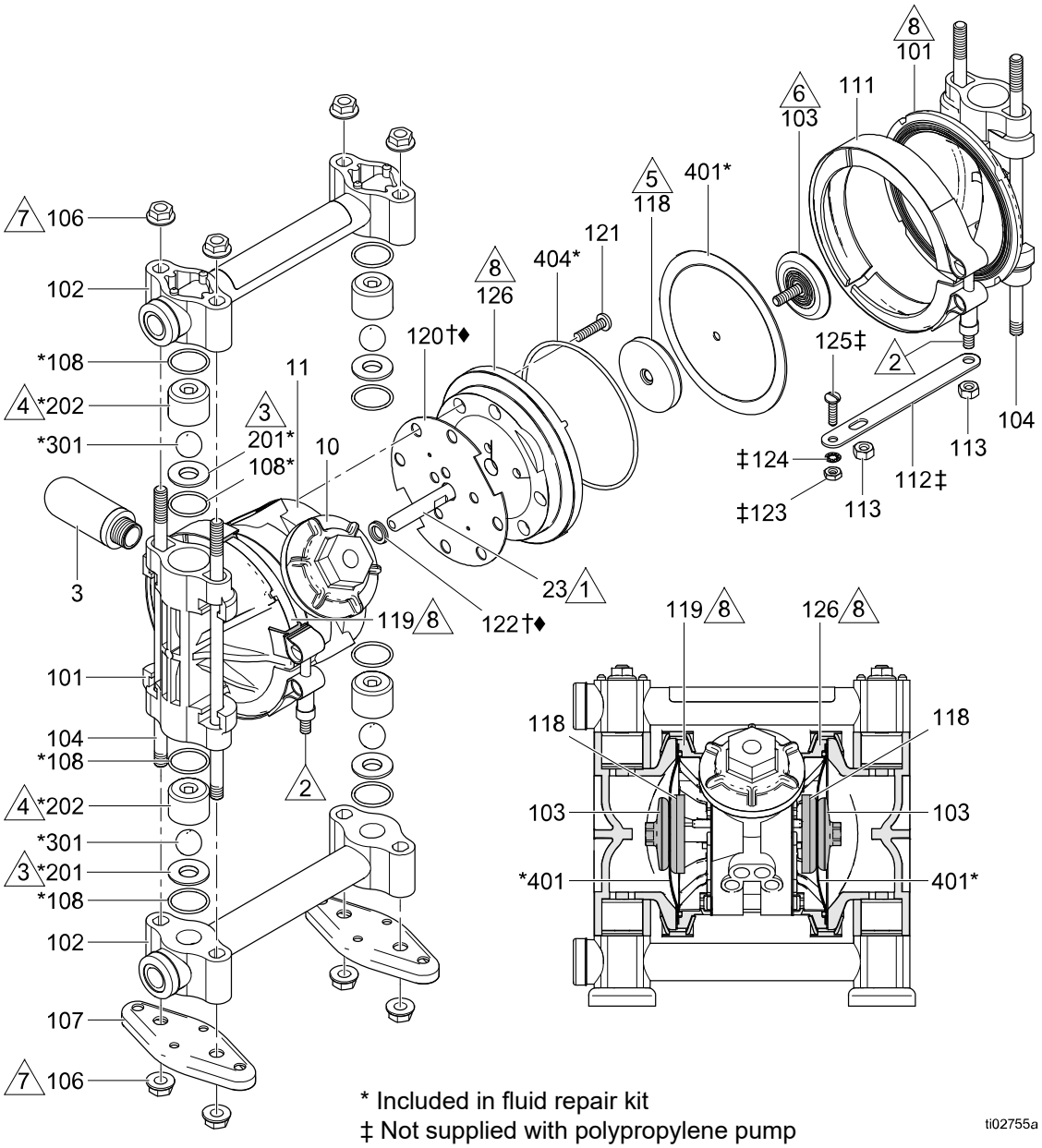
1. Install the shaft seals (122) in the housing (11).
2. Grease the diaphragm shaft (23) and slide it into the housing (11). Install the O-rings (404) in the grooves of the air covers (119/126).
3. Assemble the inner diaphragm plates (118), diaphragms (401), and outer diaphragm plates (103) as shown in FIG. 11. Apply medium-strength (blue) thread locker to the threads of the fluid-side plates (103), and torque the plates to 8.5–9.6 N•m (75–85 in-lb) at 100 rpm maximum using a 1/2-in. socket wrench. ***Do not over-torque.*** These parts ***must*** be assembled correctly.

⚠ NOTICE

Do not over-torque the outer diaphragm plates (103). Doing so will damage the hex heads.

4. When installing the covers (101), slip the clamps (111) over the housing (11) before positioning the covers. See the Detail in FIG. 11. Engage the notches in the covers with the locator tabs on the housing, then position the clamps over both parts. The clamp bolts should be on the air valve side of the housing, and pointing down toward the bottom of the pump. Install the grounding strip on the bolts. Apply thread lubricant to the bolts, then install the clamp nuts (113). Using a 7/16 in. socket wrench, torque the nuts to 5.6–6.8 N•m (50–60 in-lb). See **Torque Sequence.**

5. Reassemble the ball check valves and manifolds as explained in **Ball Check Valves** on page 22**.** Always install new O-rings (108), and make sure they are properly seated.



* Included in fluid repair kit
‡ Not supplied with polypropylene pump
† Included in Air Valve Repair kit

1. Grease shaft.
2. Apply thread lubricant.
3. Flat side faces ball.
4. Beveled end up.
5. Round side must face toward diaphragm.
6. Torque to 8.5–9.6 Nm (75–85 in-lb) at 100 rpm max using a 1/2 in. socket wrench.
7. Torque to 5.6–6.8 Nm (50–60 in-lb). Do not overtorque.
8. Notches must match engage tabs.

FIG. 11: Reassembly

Parts

Fluid Section

Fluid Section Material	Ref. No.	Part No.	Description	Qty
D	101	819.0188	COVER, fluid; acetal with conductive sst fibers	2
	102	819.0313	MANIFOLD; acetal with conductive sst fibers; BSPT	2
		819.0189	MANIFOLD; acetal with conductive fibers; NPT	2
	103	819.0190	PLATE, fluid side; acetal	2
	104	819.0203	ROD, tie; 5/16–18	4
	106	819.9748	NUT; 5/16–18	8
	107	819.0193	FEET	2
	108	819.1337	KIT, VA10P --, --, --, TF	1
	109▲	819.6313	LABEL, warning	1
	111	819.0196	CLAMP	2
	112	819.6354	STRIP, grounding	1
	113	819.0198	NUT, hex	2
	118	819.9810	PLATE, air side sst	2
	119	819.9807	COVER, air, left	1
	120	819.6917	GASKET	2
	121	819.6936	SCREW	12
	122	819.6910	PACKING, U-CUP	2
	123	819.0185	NUT, 5/16-18	1
	124	819.0187	LOCK WASHER	1
	125	819.6880	GROUND SCREW	1
	126	819.9808	COVER, air, right	1
P	101	819.0200	COVER, fluid; polypropylene	2
	102	819.0201	MANIFOLD; polypropylene; BSPT	2
		819.6475	MANIFOLD; polypropylene; NPT	2
	103	819.0202	PLATE, fluid side; polypropylene	2
	104	819.0203	ROD, tie; 5/16–18	4
	106	819.9748	NUT; 5/16–18	8
	107	819.0193	FEET	2
	108	819.1337	KIT, VA10P --, --, --, TF	1
	109▲	819.6313	LABEL, warning	1
	111	819.0196	CLAMP	2
	113	819.0198	NUT, hex	2
	118	819.9810	PLATE, air side sst	2
	119	819.9807	COVER, air, left	1
	120	819.6917	GASKET	2
	122	819.6910	PACKING, U-CUP	2
	126	819.9808	COVER, air, right	1

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

Air Motor

Ref. No.	Part No.	Description	Qty
*1	819.6909	PACKING, O-ring	2
*2	819.6910	PACKING, U-cup	2
3	819.5351	MUFFLER	1
*4	819.6584	PACKING, O-ring	1
*7	819.5999	PLUNGER, carriage	2
*8	819.6913	CARRIAGE	2
*9	819.6914	PIN, carriage	2
10	819.6915	COVER, valve chamber	1
11	819.6916	HOUSING, center	1
13	819.6918	COVER, exhaust	1
*14	819.6919	PLATE, valve	1
15	814-0315	SCREW, #6 self-tapping	4
16	819.6584	PACKING, O-ring	1
23	819.9809	SHAFT, diaphragm	1
118	819.9810	PLATE, diaphragm air side	2
*120	819.6917	GASKET	2
*122	819.6910	PACKING, U-cup	2

* *Included in Air Valve Repair Kit.*

Repair Kits

VERDERAIR VA 10 Acetal and Polypropylene Pumps, Series F

Repair Kits may only be ordered as kits. To repair the air valve, order part number 819.6864. Parts included in the Air Section Repair Kit are marked with a symbol in the Air Motor parts list (*).

Fluid Kits

Fluid Kits	
Kit No.	**Description**
819.0144	VA10 PP,SS,BN,TF
819.5456	VA10 PP,SP,HY,TF
819.5457	VA10 PP,SP,SP,TF
819.0140	VA10 PP,TF,BN,TF
819.5451	VA10 PP,TF,SP,TF
819.0142	VA10 PP,SS,TF,TF
819.0152	VA10 PP,BN,BN,TF
819.0146	VA10 PP,HY,TF,TF
819.0148	VA10 PP,HY,BN,TF
819.0147	VA10 PP,HY,HY,TF
819.0123	VA10 SS,SS,HY,TF
819.5442	VA10 SS,SS,SP,TF
819.0124	VA10 SS,SS,BN,TF
819.0120	VA10 SS,TF,BN,TF
819.0118	VA10 SS,TF,TF,TF
819.0122	VA10 SS,SS,TF,TF
819.0138	VA10 PP,TF,TF,TF
819.5447	VA10 SS,SP,SP,TF
819.0126	VA10 SS,HY,TF,TF
819.0102	VA10 AC,SS,TF,TF
819.0104	VA10 AC,SS,BN,TF
819.0103	VA10 AC,SS,HY,TF
819.5413	VA10 AC,TF,SP,TF
819.0098	VA10 AC,TF,TF,TF
819.0100	VA10 AC,TF,BN,TF
819.0099	VA10 AC,TF,HY,TF
819.0112	VA10 AC,BN,BN,TF
819.0111	VA10 AC,BN,HY,TF
819.5437	VA10 AC,SP,SP,TF
819.0107	VA10 AC,HY,HY,TF

AC=Acetal; BN=Buna-N; HY=TPE; PP=Polypropylene; SS=316 sst; TF=PTFE; SP=Santoprene

Fluid Kits include:

- 4 ball stops
- 4 ball guides
- 4 balls
- 2 diaphragms
- 8 O-rings
- 8 PTFE O-rings
- 2 packing O-rings
- 1 packet anaerobic adhesive

Valve Seat Kits

Seat Material	Ref. No.	Kit No.	Description	Qty
AC	201	819.1467	SEAT VA10 AC	1
	202	– – –	GUIDE	
	108	– – –	O-RING	8
SS	201	819.1465	SEAT VA10 SS	1
	202	– – –	GUIDE	
	108	– – –	O-RING	8
PP	201	819.1466	SEAT VA10 PP	1
	202	– – –	GUIDE	
	108	– – –	O-RING	8

– – – Not available separately.

Check Ball Kits

Material	Ref. No.	Kit No.	Description	Qty
TF	301	819.1471	BALL-B1 TF	1
	108	– – –	O-RING	8
SS	301	819.1472	BALL-B1 SS	1
	108	– – –	O-RING	8
HY	301	819.1469	BALL-B1 HY	1
	108	– – –	O-RING	8
SP	301	819.1470	BALL-B1 SP	1
	108	– – –	O-RING	8
BN	301	819.1468	BALL-B1 BN	1
	108	– – –	O-RING	8

– – – Not available separately.

Diaphragm Kits

Diaphragm Material	Ref. No.	Kit No.	Description	Qty
TF	401	819.1476	DIAPHRAGM-B1 TF	1
	404	– – –	O-RING	
HY	401	819.1474	DIAPHRAGM-B1 HY	1
	404	– – –	O-RING	
SP	401	819.1475	DIAPHRAGM-B1 SP	1
	404	– – –	O-RING	
BN	401	819.1473	DIAPHRAGM-B1 BN	1
	404	– – –	O-RING	

– – – Not available separately.

Seal Kit

Ref. No.	Kit No.	Description	Qty
	819.1477	SEAL KIT	
1	– – –	O-RING	2
2/122	– – –	U-CUP	4
4/16	– – –	O-RING	2
108	– – –	O-RING	8
120	– – –	GASKET	2
404	– – –	O-RING	2

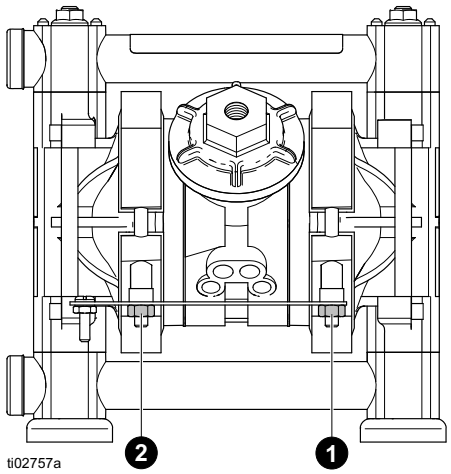
– – – Not available separately.

Torque Sequence

Always follow torque sequence when instructed to torque fasteners.

1. Left/Right Fluid Covers

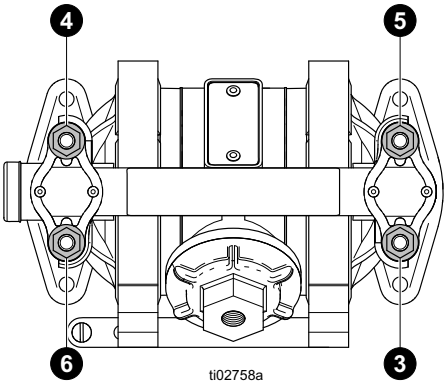
   Torque bolts to 5.6–6.8 N•m (50–60 in-lb)



FRONT VIEW

2. Outlet Manifold

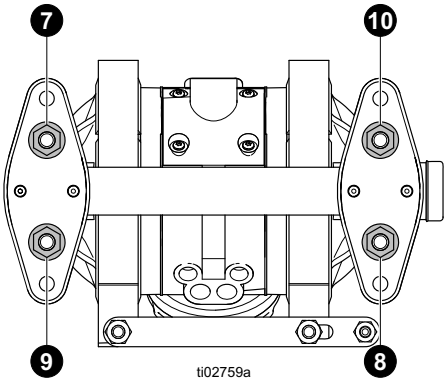
   Torque bolts to 5.6–6.8 N•m (50–60 in-lb)



TOP VIEW

3. Inlet Manifold

   Torque bolts to 5.6–6.8 N•m (50–60 in-lb)



BOTTOM VIEW

Performance Chart

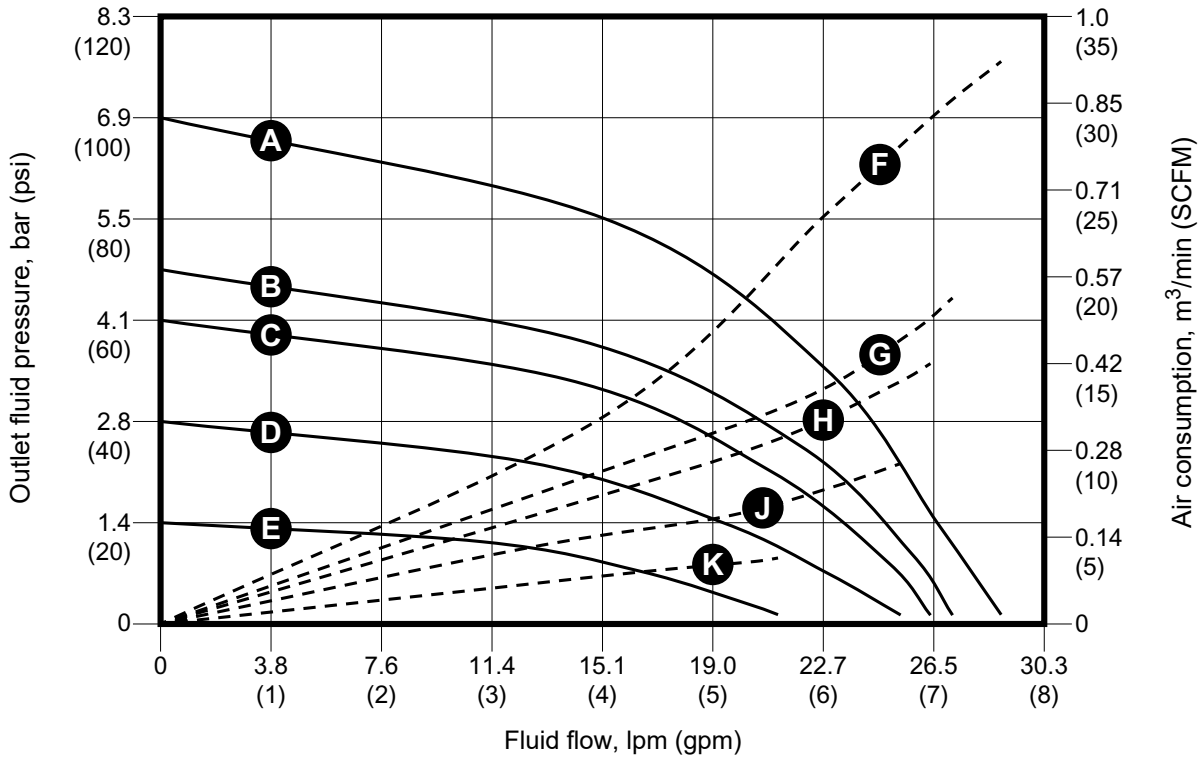
Pump tested in water with inlet submerged. Performance may vary based on pump materials, suction condition, discharge pressure, and fluid type.

KEY

A	Fluid outlet pressure at 6.9 bar (100 psi) inlet pressure	F	Air consumption at 6.9 bar (100 psi) inlet pressure
B	Fluid outlet pressure at 4.8 bar (70 psi) inlet pressure	G	Air consumption at 4.8 bar (70 psi) inlet pressure
C	Fluid outlet pressure at 4.1 bar (60 psi) inlet pressure	H	Air consumption at 4.1 bar (60 psi) inlet pressure
D	Fluid outlet pressure at 2.8 bar (40 psi) inlet pressure	J	Air consumption at 2.8 bar (40 psi) inlet pressure
E	Fluid outlet pressure at 1.4 bar (20 psi) inlet pressure	K	Air consumption at 1.4 bar (20 psi) inlet pressure

_____ Outlet fluid pressure

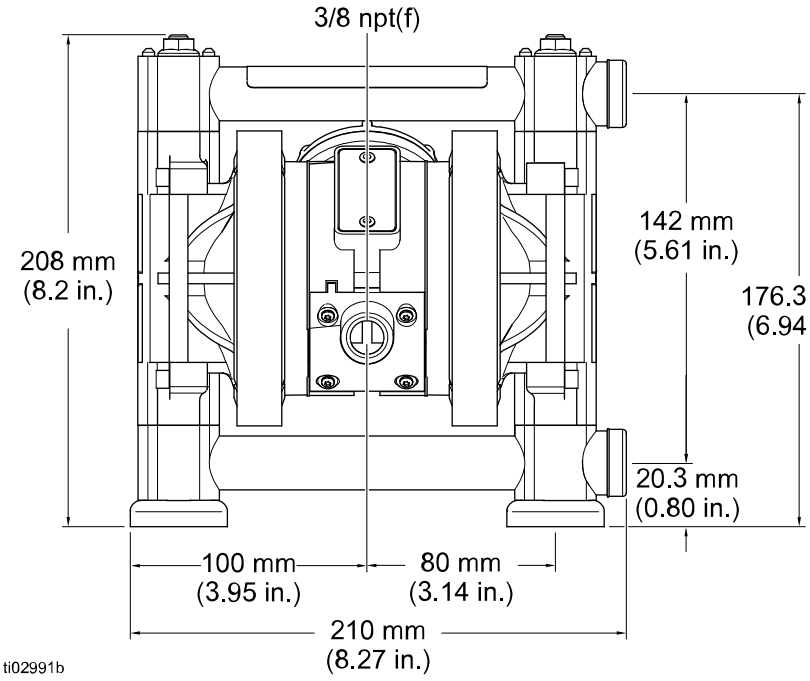
– – – – Air consumption



Example: The user wants 11.4 lpm flow and 4.1 bar outlet pressure. Follow the 11.4 lpm vertical line up until its intersection with the horizontal 4.1 bar line. Solid line B is closest to this intersection indicating it will require 4.8 bar air inlet pressure to achieve this condition. Starting from the intersection of the dashed line G and the 11.4 lpm vertical line, project to the right to see 0.18m^3/min is the expected air consumption at this condition.

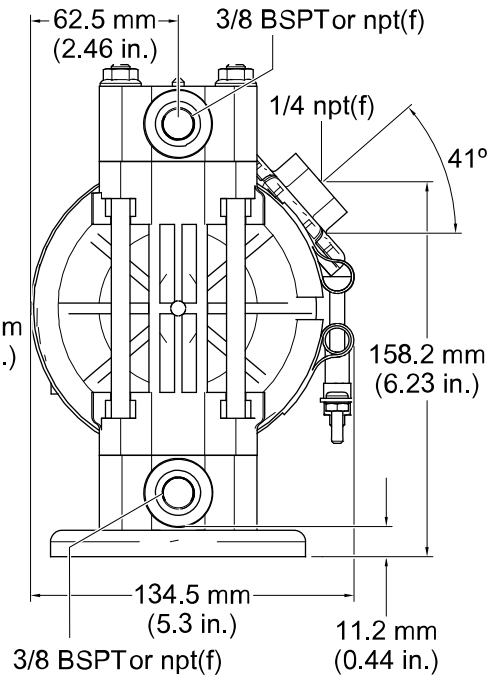
Dimensions

FRONT VIEW

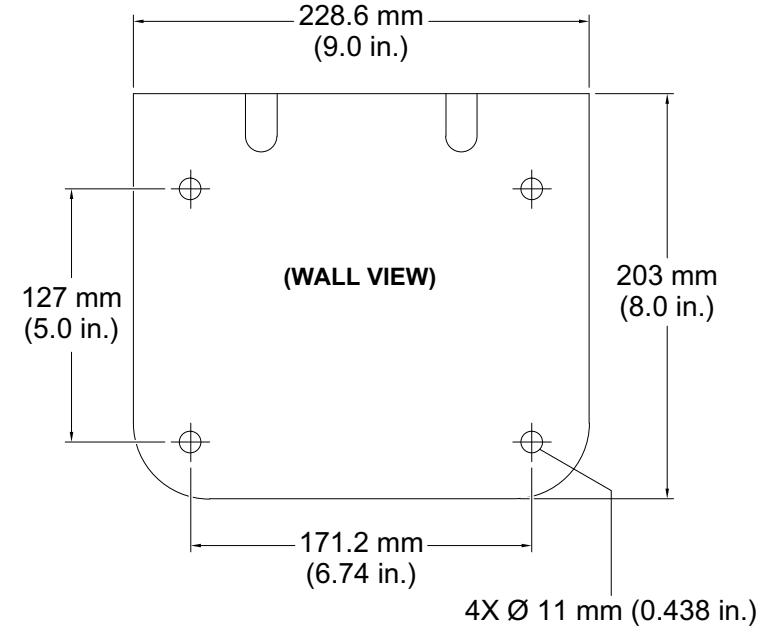


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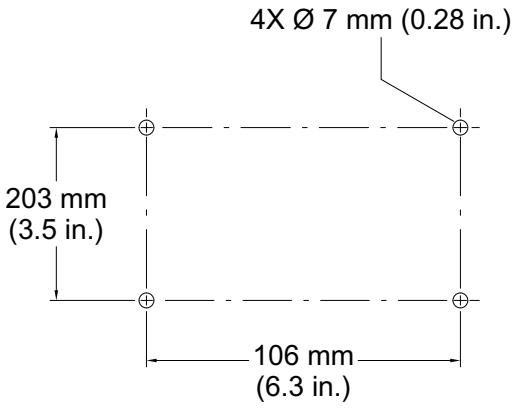
SIDE VIEW



WALL BRACKET 819.5951



PUMP MOUNTING HOLE PATTERN



ti02992a

Technical Specifications

VERDERAIR VA 10 Pumps		
	Metric	**US**
Maximum fluid working pressure	7 bar, 0.70 MPa	100 psi
Air pressure operating range	1.4–7 bar, 0.14–0.7 MPa	20–100 psi
Maximum air consumption (see **Performance Chart** on page 30)	0.85 m^3/min	30 SCFM
Maximum free flow delivery	28.5 lpm	7.5 gpm
Maximum pump speed	330 cpm	
Maximum suction lift	3.7 m (dry)	12 ft (dry)
	6.4 m (wet)	21 ft (wet)
Sound power level (at maximum flow) Sound power measured per ISO standard 9614-2	85 dba	
Operating temperature range	4.4°–65.5°C	40°–140°F
Air inlet size	1/4 NPT(f)	
Fluid inlet and outlet size	3/8 NPT(f) or 3/8 BSPT	
Wetted parts	Vary by model. See “Configuration Matrix” on page 6.	
Weight, Acetal pumps	2.4 kg	5.25 lb
Weight, Polypropylene pumps	2.2 kg	4.75 lb

California Proposition 65

CALIFORNIA RESIDENTS

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

Customer Services/Guarantee

CUSTOMER SERVICES

If you require spare parts, please contact your local distributor, providing the following details:

- Pump Model
- Type
- Serial Number, and
- Date of First Order.

GUARANTEE

All VERDER pumps are warranted to the original user against defects in workmanship or materials under normal use (rental use excluded) for two years after purchase date. This warranty does not cover failure of parts or components due to normal wear, damage or failure which in the judgement of VERDER arises from misuse.

Parts determined by VERDER to be defective in material or workmanship will be repaired or replaced.

LIMITATION OF LIABILITY

To the extent allowable under applicable law, VERDER's liability for consequential damages is expressly disclaimed. VERDER's liability in all events is limited and shall not exceed the purchase price.

WARRANTY DISCLAIMER

VERDER has made an effort to illustrate and describe the products in the enclosed brochure accurately; however, such illustrations and descriptions are for the sole purpose of identification and do not express or imply a warranty that the products are merchantable, or fit for a particular purpose, or that the products will necessarily conform to the illustration or descriptions.

PRODUCT SUITABILITY

Many regions, states and localities have codes and regulations governing the sale, construction, installation and/or use of products for certain purposes, which may vary from those in neighbouring areas. While VERDER attempts to assure that its products comply with such codes, it cannot guarantee compliance, and cannot be responsible for how the product is installed or used. Before purchasing and using a product, please review the product application as well as the national and local codes and regulations, and be sure that product, installation, and use complies with them.

Original instructions. This manual contains English
Revision ZAM, March 2025

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