

VERDERAIR VA 10

Air-Operated Diaphragm Pumps

819.0154

Rev. ZAJ

EN

For pumping transfer applications. For professional use only.

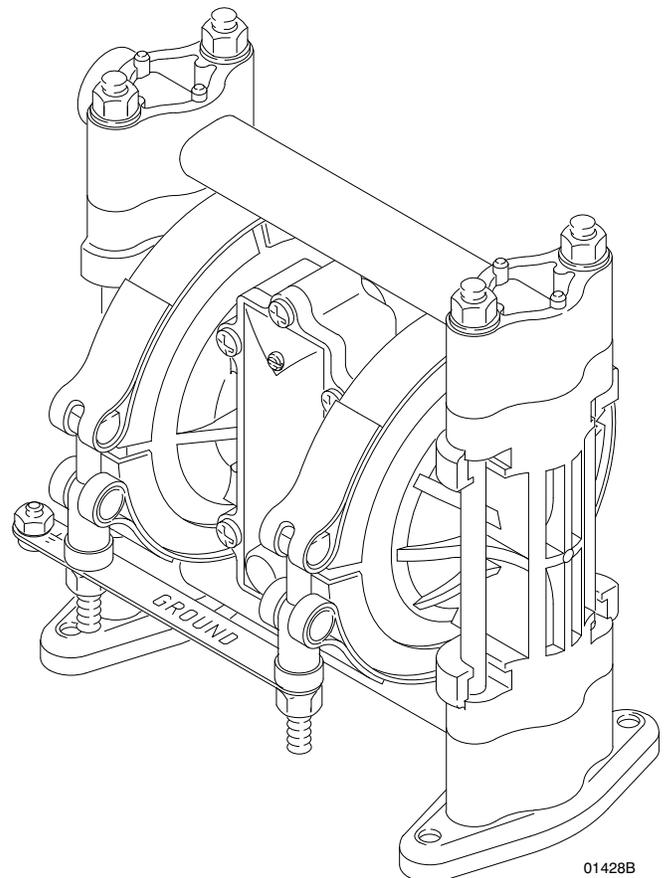
Only pumps with acetal fluid sections are approved for use in European explosive atmosphere locations.

7 bar Maximum Fluid Working Pressure

7 bar Maximum Air Input Pressure

**Important Safety Instructions**

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



II 2 GD
Ex h IIC 66°C...135°C Gb
Ex h IIIC T135°C Db

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Configuration Number 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				

* Acetal models are certified:

 **II 2 GD**
Ex h IIC 66°C...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 Data for the maximum fluid operating temperature for your specific pump model.

Symbols

Warning Symbol



This symbol alerts you to the possibility of serious injury or death if you do not follow the instructions.

Caution Symbol



This symbol alerts you to the possibility of damage to or destruction of equipment if you do not follow the instructions.

! 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 VERDER After Sales Service.
- 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 **7 bar maximum working pressure at 7 bar maximum incoming air pressure.**
- Use fluids and solvents which are compatible with the equipment wetted parts. Refer to the **Technical Data** section of all equipment manuals. Read the fluid and solvent manufacturer's warnings.
- Do not use hoses to pull equipment.
- Route hoses away from traffic areas, sharp edges, moving parts, and hot surfaces. Do not expose VERDER hoses to temperatures above 82° C or below -40° C.
- Do not lift pressurized equipment.
- Comply with all applicable local, state, and national fire, electrical, and safety regulations.

⚠ 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.



- 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 10.
- 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.



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 6.
- **Never** use a polypropylene pump with non-conductive flammable fluids as specified by your local fire protection code. Refer to **Grounding** on page 6 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 10.
- 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.

Installation

General Information

1. The Typical Installations in FIG. 2 and FIG. 3 are only guides for selecting and installing system components. Contact your VERDER Customer Service for assistance in planning a system to suit your needs.
2. Always use Genuine VERDER Parts and Accessories. Refer to the Product Data Sheets. If you supply your own accessories, be sure they are adequately sized and pressure rated for your system.
3. 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.**
4. Reference numbers and letters in parentheses refer to the callouts in the Figures and the parts lists on pages 26 to 27.

Tightening Screws Before First Use

Before using the pump for the first time, check and retorque all external fasteners. See **Torque Sequence**, 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.

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 Data** section of all equipment manuals. Read the fluid and solvent manufacturer's warnings.

CAUTION

Safe Operating Temperature
Minimum: 4.4°C; Maximum: 66°C.

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 After Sales Service.

Mountings

1. Be sure the mounting can support the weight of the pump, hoses, and accessories, as well as the stress caused during operation.
2. The **VERDERAIR VA 10** Pump can be used in a variety of installations, some of which are shown in FIG. 2 and FIG. 3. Kits are available to adapt your pump to your system. Refer to the Product Data Sheets.
3. For all other mountings, be sure the pump is adequately secured.
4. 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.

Dual Manifolds

Dual manifold kits are available to enable you to pump two fluids simultaneously, or to mix two fluids in the pump. Order Part No. 819.0155 for acetal pumps and Part No. 819.0156 for polypropylene pumps.

Installation

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 4.



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 fluid system by making sure the fluid has an electrical path to a true earth ground. See FIG. 2 and FIG. 3.

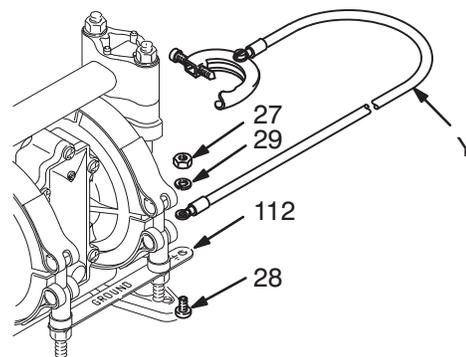
Never use a polypropylene pump with non-conductive flammable fluids as specified by your local fire protection code. US Code (NFPA 77 Static Electricity) recommends a conductivity greater than 50×10^{-12} Siemens/meter (mhos/meter) over your operating temperature range to reduce the hazard of fire. Consult your fluid supplier to determine the conductivity or resistivity of your fluid. The resistivity must be less than 2×10^{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), lockwashers (29) and nut (27), as shown in FIG. 1. Connect the clamp end of the ground wire to a true earth ground. Order Part No. 819.0157 Ground Wire and Clamp.

NOTE: When pumping conductive flammable fluids with a polypropylene or a PVDF pump, **always** ground the entire fluid system. See the **WARNING** at left.



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FIG. 1

- **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.

Installation

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. See FIG. 2 and FIG. 3. 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 10.

1. Install the air line accessories as shown in FIG. 2 and FIG. 3. 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. To control it on the air side, install an air regulator (H).
 - b. Locate one bleed-type master air valve (B) close to the pump and use it to relieve trapped air. See the **WARNING** above. 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 FIG. 4). Use a minimum 6.3 mm 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

1. If using a conductive (Acetal) pump, use conductive hoses. If using a non-conductive pump, ground the fluid system. See **Grounding** on page 6. The pump fluid inlet is 3/8 bspt. See FIG. 4. Screw the fluid fitting into the pump inlet snugly.
2. At inlet fluid pressures greater than 1.05 bar, diaphragm life will be shortened.
3. See the **Technical Data** on page 31 and 32 for maximum suction lift and flow rate loss at various lift distances.

Fluid Outlet Line



WARNING

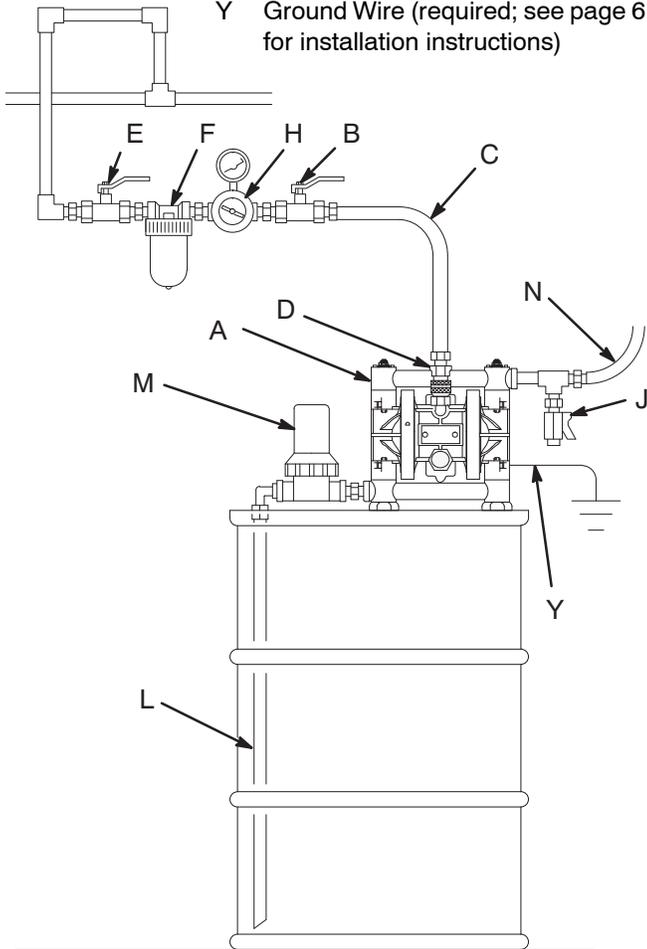
A fluid drain valve (J) is required in your system to relieve pressure in the hose if it is plugged. See FIG. 2 and FIG. 3. The drain valve reduces the risk of serious injury, including splashing in the eyes or on the skin, or contamination from hazardous fluids when relieving pressure. Install the valve close to the pump fluid outlet.

1. Use electrically conductive fluid hoses (N). Depending on your model, the pump fluid outlet is 3/8 bspt or 3/8 npt(f). See FIG. 4. Screw the fluid fitting into the pump outlet snugly.
2. Install a fluid drain valve (J) near the fluid outlet. See the **WARNING** above.

BUNG-MOUNT TRANSFER INSTALLATION

KEY

- A VERDERAIR VA 10 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 page 6 for installation instructions)



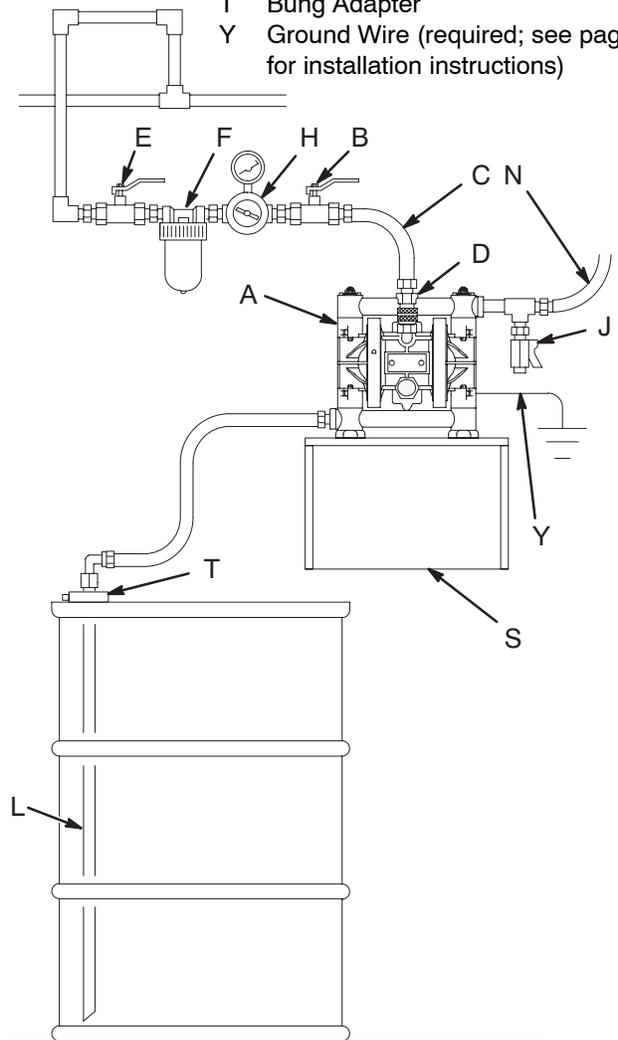
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FIG. 2

WALL-MOUNT TRANSFER INSTALLATION

KEY

- A VERDERAIR VA 10 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 page 6 for installation instructions)



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FIG. 3

Installation

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. 4. If desired, the direction of one or both ports can be changed. Remove the manifold(s) from the pump as explained in steps 1, 2, and 4 on page 20. Reattach with the port facing the desired direction. See **Torque Sequence** on page 29. **Do not over-torque.**

Acetal Pump Shown

- 1 Apply thread lube, and torque to 5.6 to 6.8 N-m. See **Torque Sequence** on page 29. Do not over-torque.
- 2 1/4 npt(f) air inlet
- 3 3/8 bspt or 3/8 npt(f) fluid inlet port
- 4 3/8 bspt or 3/8 npt(f) fluid outlet port
- 5 3/8 npt(f) air exhaust port

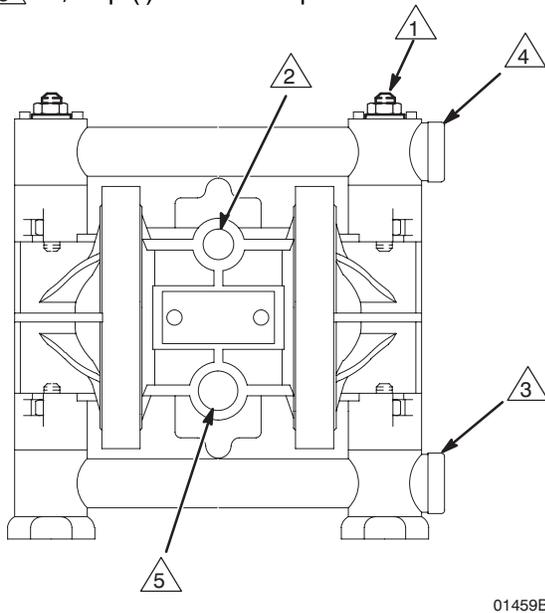


FIG. 4

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. 5.

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 *VERDERAIR* 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 bspt or 3/8 npt(f) fluid inlet port
- B 3/8 bspt or 3/8 npt(f) fluid outlet port
- C Pressure relief valve
Part No. 819.0159 (stainless steel)

- 1 Install valve between fluid inlet and outlet ports.
- 2 Connect fluid inlet line here.
- 3 Connect fluid outlet line here.

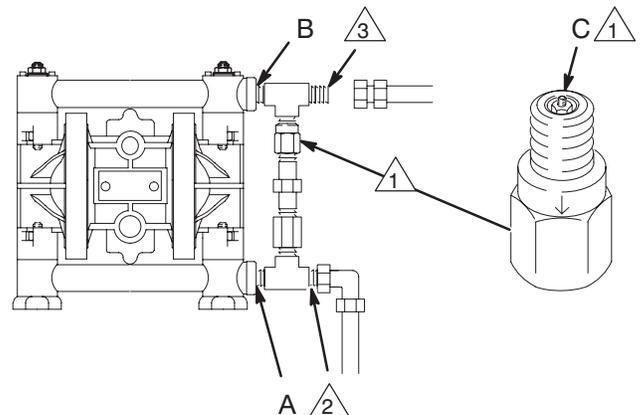


FIG. 5

Installation

Air Exhaust Ventilation

! WARNING



FIRE AND EXPLOSION HAZARD

Be sure to read **FIRE AND EXPLOSION HAZARD** and **TOXIC FLUID HAZARD** 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. 6.

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

VENTING EXHAUST AIR (Submerged Installation Shown)

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

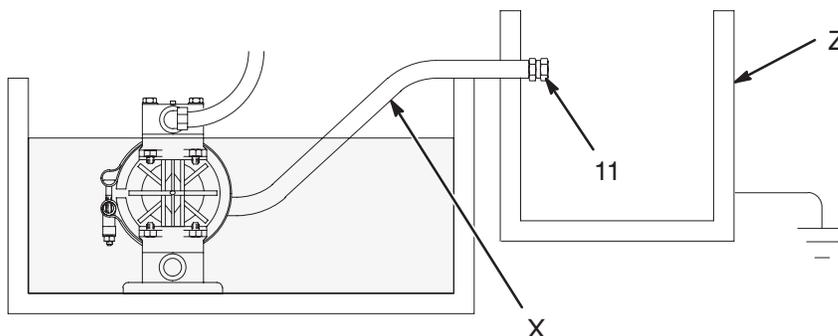


FIG. 6

To exhaust to a remote location:

1. Remove the muffler (11) 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 (11) 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 ID. If a hose longer than 4.57 m 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. 6.

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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,
- or 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**.

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 4.

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 flushing fluid 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 left.

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

Maintenance

Lubrication

The air valve is designed to operate unlubricated, however 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.



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



To reduce the risk of serious injury whenever you are instructed to relieve pressure, always follow the **Pressure Relief Procedure** on page 11.

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 fluid.

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.

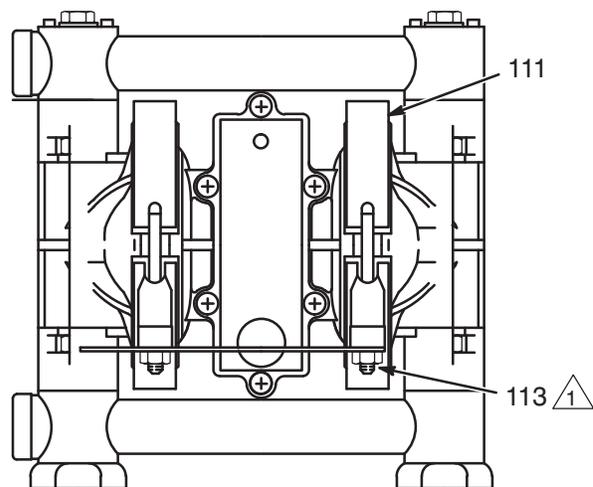
Check fasteners. Tighten or retorque as necessary. Although pump use varies, a general guideline is to retorque fasteners every two months. See **Torque Sequence**, page 29.

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. See FIG. 7. See **Torque Sequence** on page 29.



Apply thread lube and torque nuts to 5.6 to 6.8 N•m. See **Torque Sequence** on page 29.



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FIG. 7

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.

Troubleshooting



WARNING

To reduce the risk of serious injury whenever you are instructed to relieve pressure, always follow the **Pressure Relief Procedure** on page 11.

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.	Turn the reset shaft (21). Disassemble and clean the air valve. See pages 17, 18. Use filtered air.
	The detent link (22) is worn or broken.	Replace the detent link (22) and ball (8). See pages 17, 18.
	The springs (3, 6) and/or valve cup (5) and plate (13) are broken or damaged.	Replace these parts. See pages 17, 18.
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 page 20.
	The check balls (301) or seat (201) are worn.	Replace these parts. See page 20.
	The check ball (301) is wedged in the seat (201).	Replace the ball. See page 20.
There is excessive air leakage from the exhaust port.	The air valve cup (5) or plate (13) is worn.	Replace these parts. See pages 17, 18.
	The shaft seals (30±) are worn.	Replace the seals. See page 22.
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 page 20.
	The diaphragm (401) is ruptured.	Replace the diaphragm. See page 22.

Troubleshooting

PROBLEM	CAUSE	SOLUTION
There are air bubbles in the fluid.	The suction line is loose.	Tighten the suction line.
	The diaphragm (401) is ruptured.	Replace the diaphragm. See page 22.
	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 page 20.
	The outer diaphragm plates (103) are loose.	Tighten the plates. See page 22.
There is fluid in the exhaust air.	The diaphragm (401*) is ruptured.	Replace the diaphragm. See page 22.
	The outer diaphragm plates (103) are loose.	Tighten the plates. See page 22.
The pump exhausts air at stall.	The air valve cup (5) or plate (13) is worn.	Replace these parts. See pages 17, 18.
	The shaft seals (30‡) are worn.	Replace the seals. See page 22.
The pump exhausts air from the clamps.	The clamps (111) are loose.	Tighten the clamp nuts (113). See page 12.
The pump exhausts air near the air valve.	The air valve screws (15) are loose.	Tighten the screws. See page 15.
	The air valve o-ring (19) is damaged.	Inspect; replace the o-ring. See pages 17, 18.
The pump leaks fluid from the check valves.	The o-rings (108) are worn or damaged.	Inspect; replace the o-rings. See page 20.

Service

Replacing the Air Valve

Tools Required

- Torque wrench
- Phillips screwdriver
- O-ring pick

NOTE: Air Valve Kit 819.6864 is available. Parts included in the kit are marked with a dagger, for example (2†). A tube of general purpose grease (26†) is supplied in the kit. Install the kit as follows.

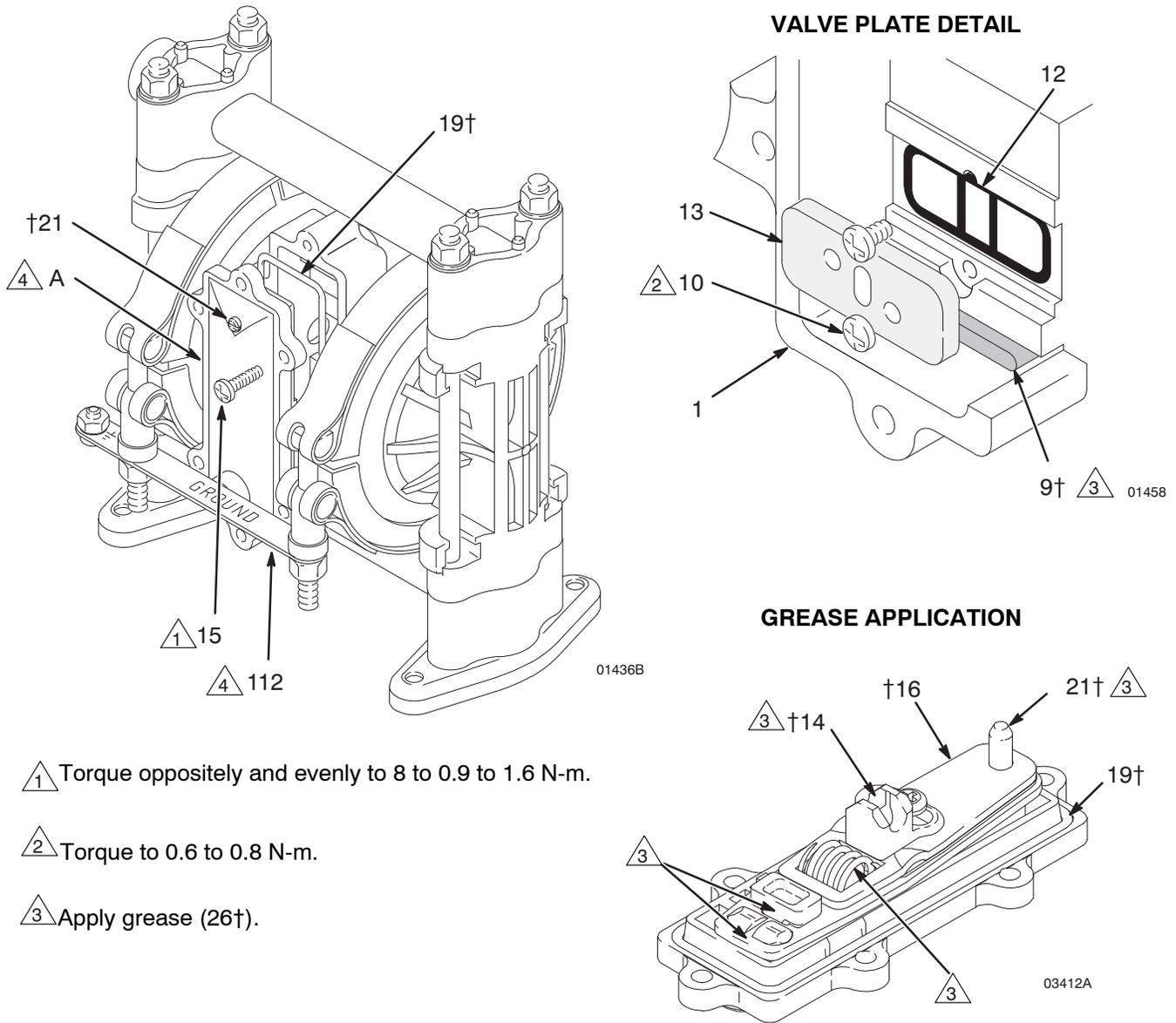


WARNING

To reduce the risk of serious injury whenever you are instructed to relieve pressure, always follow the **Pressure Relief Procedure** on page 11.

1. **Relieve the pressure.**
2. Unscrew the six mounting screws (15) and remove the air valve (A) from the pump. See FIG. 8.
3. Refer to the Valve Plate Detail in FIG. 8. Remove the two screws (10) holding the valve plate (13) to the pump. Use an o-ring pick to remove the valve plate, seal (12), and bearing (9).
4. Apply grease (26†) to the bearing (9†). Install the bearing and the seal (12) in the pump housing (1). Install the valve plate (13) and secure with the two screws (10†), as shown. Torque the screws to 0.6 to 0.8 N-m.
5. Make certain the o-ring (19†) is in place on the air valve cover (2†).
6. Apply grease (26†) where shown in FIG. 8.
7. Align the new air valve assembly so the reset shaft (21†) is at the top. Install the valve on the pump, making sure the valve saddle (14†) engages the recessed area on the diaphragm shaft (23). Install the six screws (15) and torque oppositely and evenly, to 0.9 to 1.6 N-m.

Service



1 Torque oppositely and evenly to 8 to 0.9 to 1.6 N-m.

2 Torque to 0.6 to 0.8 N-m.

3 Apply grease (26†).

FIG. 8

Service

Repairing the Air Valve

Tools Required

- Torque wrench
- Phillips screwdriver
- O-ring pick
- Rubber mallet

Disassembly



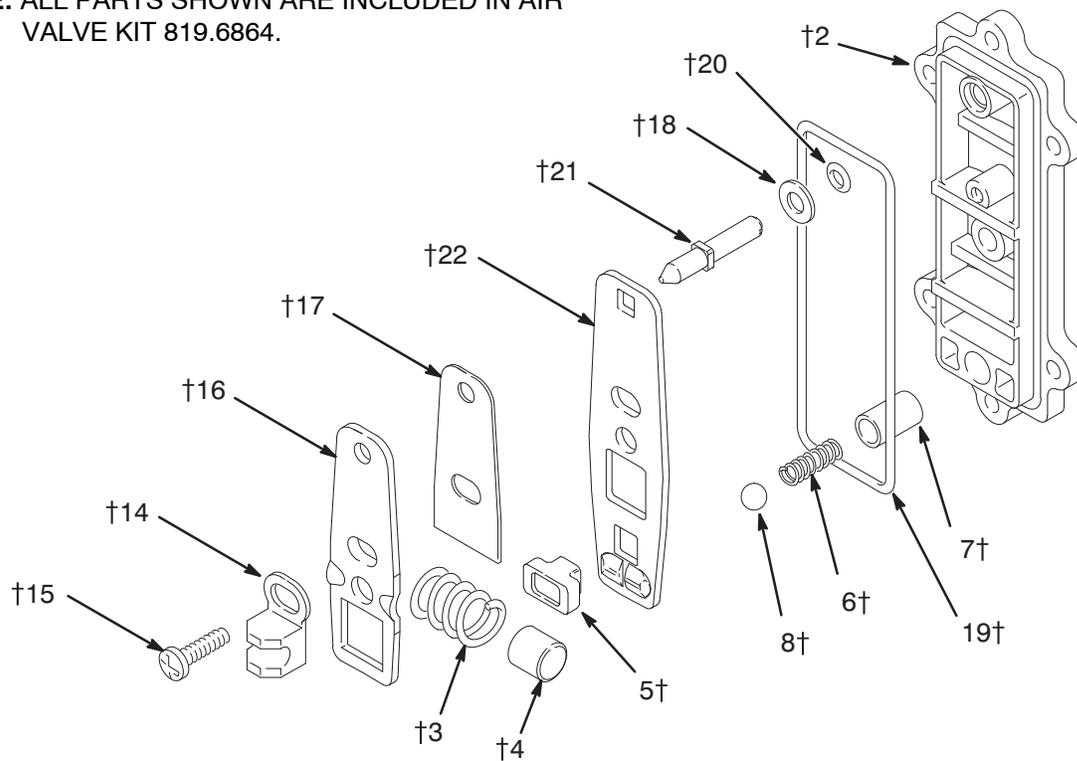
WARNING

To reduce the risk of serious injury whenever you are instructed to relieve pressure, always follow the **Pressure Relief Procedure** on page 11.

1. Relieve the pressure.

NOTE: ALL PARTS SHOWN ARE INCLUDED IN AIR VALVE KIT 819.6864.

2. Remove the air valve from the pump (see page 16).
3. Remove the screw (15) and shift saddle (14). See FIG. 9.
4. Disassemble the link assembly, consisting of the actuator link (16), spacer (17), detent link (22), spring (3), stop (4), and valve cup (5).
5. Remove the detent ball (8) and spring (6). The detent collar (7) is a press-fit and should not need removal; if it does require replacement, you should also replace the cover (2).
6. Remove the reset shaft (21), o-ring (20) and washer (18).
7. Clean all parts and inspect for wear or damage. Replace as needed. See **Reassembly** on page 18.



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FIG. 9

Service

Reassembly

1. If the detent collar (7) was removed, carefully install a new collar in a new cover (2), using a rubber mallet. See FIG. 10.
2. Grease the spring (6) and place it in the collar (7). Grease the ball (8) and set it on the spring.
3. Grease the o-ring (20) and install it in the hole (H) in the cover (2). See FIG. 10. Slide the washer (18) onto the blunt end of the reset shaft (21). Insert the shaft through the cover (2) until it seats.
4. Grease the spring (3). Place the link stop (4) inside the spring.

1 Apply grease (26†).

2 Press fit with rubber mallet.

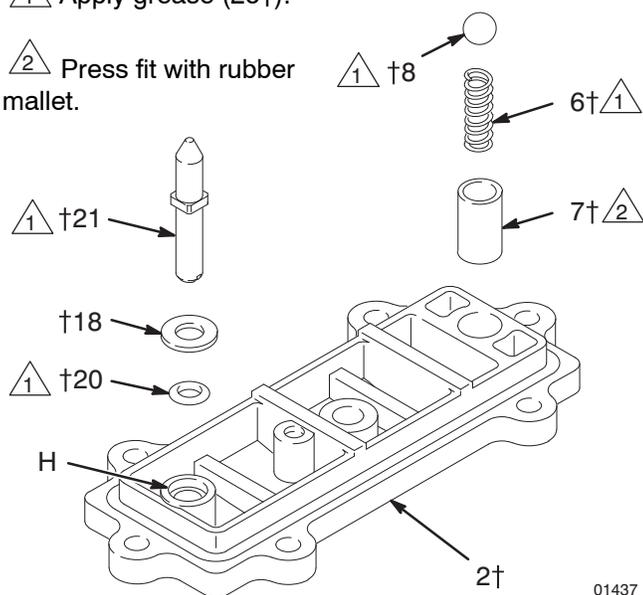


FIG. 10

5. Grease the detent link (22) and link spacer (17). Assemble the detent link, link spacer, and actuator link (16) as shown in FIG. 11. The raised bumps on the links (22 and 16) must face up.

6. Squeeze the spring (3) and install it and the stop (4) in the link assembly. The spring tension will hold all these parts together. Grease the valve cup (5) and install it in the link assembly as shown.
7. Install the link assembly on the cover (2) so the pointed end of the reset shaft (21) fits through the holes in the links and the square part of the shaft engages the square hole. Make certain the bumps on the detent link (22) engage the ball (8).

1 Apply grease (26†).

2 Bumps face up.

3 Reset shaft square must engage with square hole.

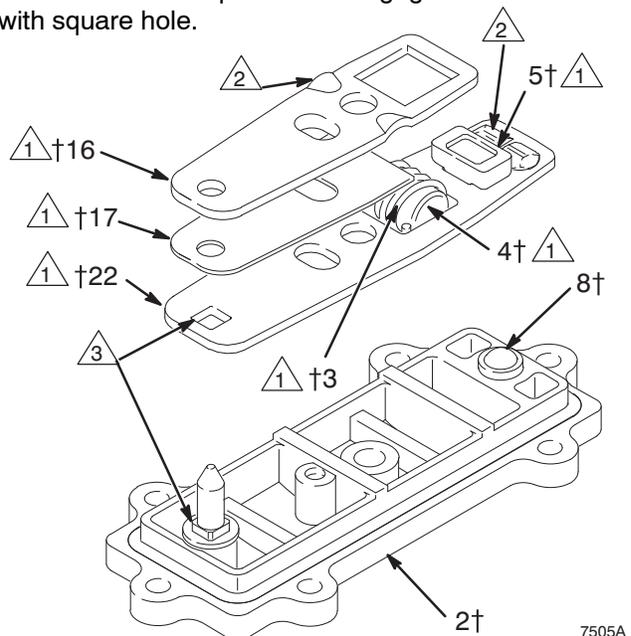


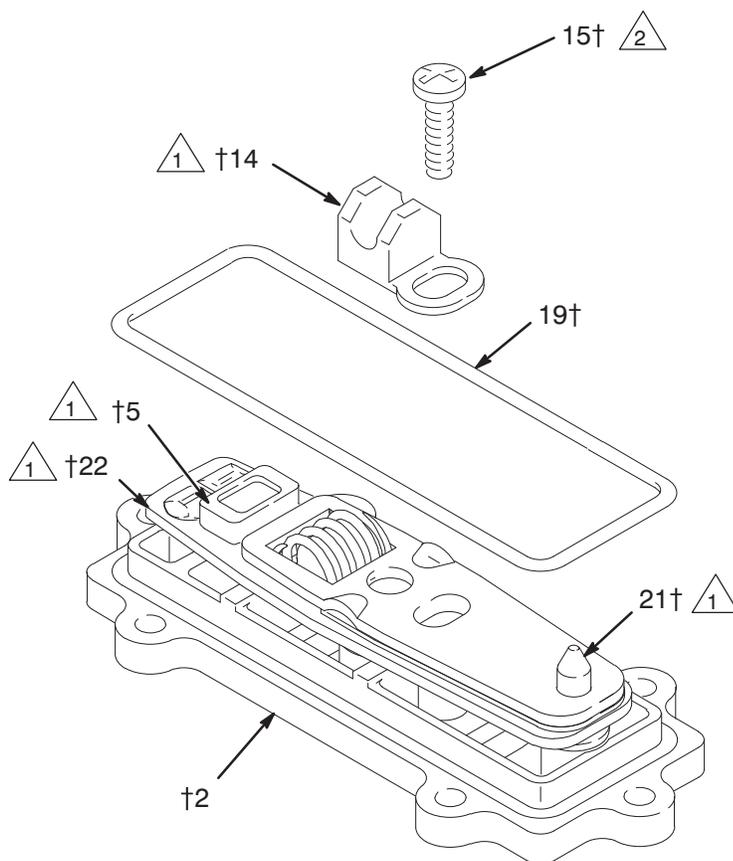
FIG. 11

Service

- 8. Grease the inside surfaces of the shift saddle (14) and install it as shown in FIG. 12. Hold the link assembly firmly in place and install the screw (15). Torque to 0.8 to 1.0 N-m. Install the o-ring (19) on the cover (2).
- 9. Reinstall the air valve as explained on page 15.

△1 Apply grease (26†).

△2 Torque to 0.8 to 1.0 N-m.



7506A

FIG. 12

Service

Ball Check Valves

Tools Required

- Torque wrench
- 13 mm socket wrench
- O-ring pick

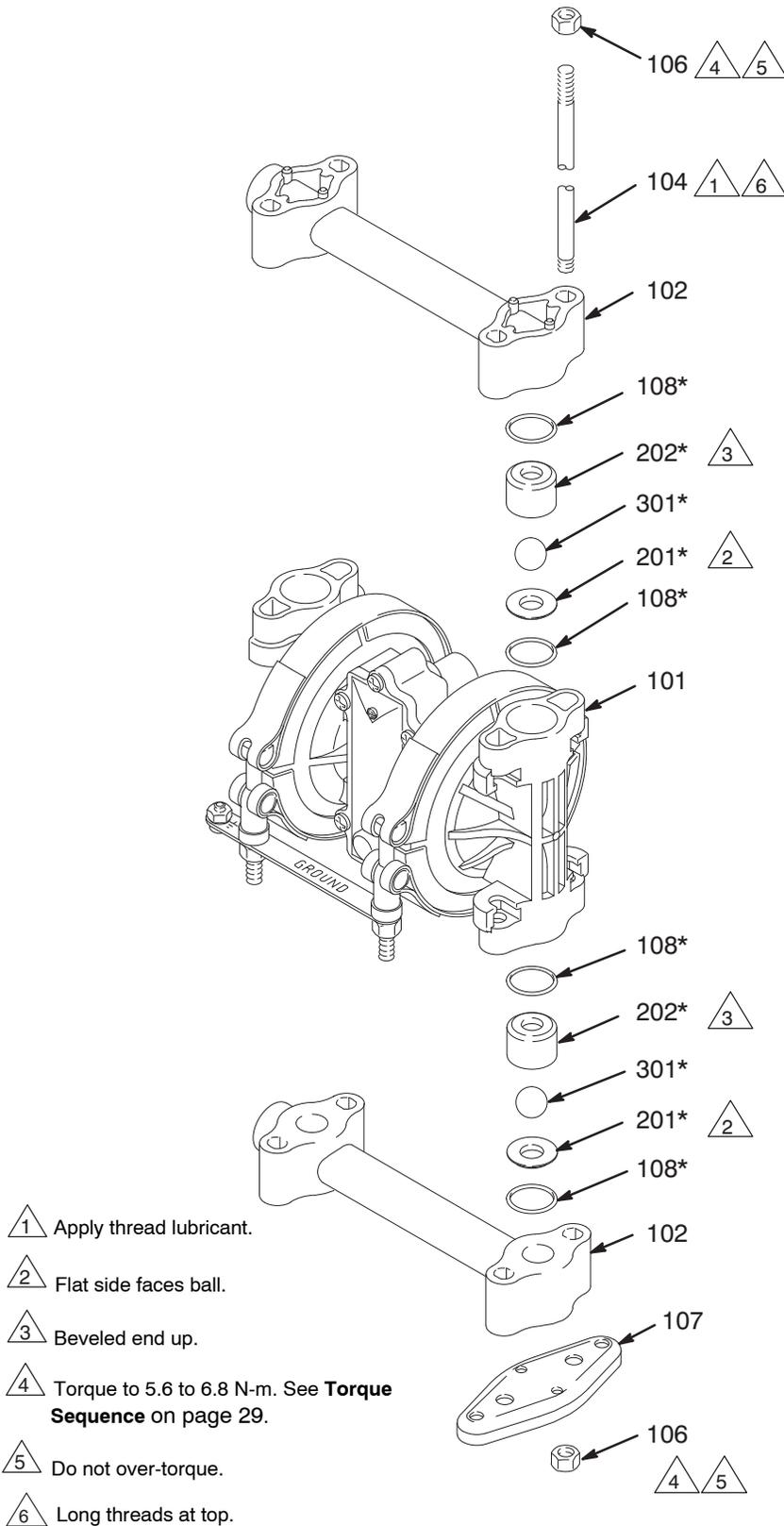
NOTE: A Fluid Section Repair Kit is available. See page 26 for the correct kit. Parts included in the kit are marked with an asterisk, for example (301*). Use all the parts in the kit for the best results. Always replace the o-rings (108) with new ones whenever the old ones are removed.

 **WARNING**

To reduce the risk of serious injury whenever you are instructed to relieve pressure, always follow the **Pressure Relief Procedure** on page 11.

1. **Relieve the pressure.** Disconnect all hoses. Remove the pump from its mounting.
2. Using a 13 mm socket wrench, remove the nuts (106) holding the top manifold (102) to the covers (101). Lift the manifold off the pump. See FIG. 13.
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.
7. Reassemble the intake ball checks in the bottom of the pump, following all notes in FIG. 13. Be sure the ball checks are assembled **exactly** as shown.
8. Set the lower manifold (102) and feet (107) in place on the bottom of the pump.
9. 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).
10. Reassemble the outlet ball checks in the top of the pump, following all notes in FIG. 13. 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.
11. Install the top manifold (102) and four nuts (106). Torque to 5.6 to 6.8 N-m. See **Torque Sequence** on page 29. **Do not over-torque.**

Service



02457C

FIG. 13

Service

Diaphragm Repair

Tools Required

- Torque wrench
- One 11 mm and two 13 mm socket wrenches
- Phillips screwdriver
- O-ring pick
- 13/32" EZY-OUT bearing extractor
- Rubber mallet
- Vise with soft jaws

Disassembly

NOTE: A Fluid Section Repair Kit is available. See page 25 for the correct kit. Parts included in the kit are marked with an asterisk, for example (401*). Use all the parts in the kit for the best results.



WARNING

To reduce the risk of serious injury whenever you are instructed to relieve pressure, always follow the **Pressure Relief Procedure** on page 11.

1. **Relieve the pressure.** Disconnect all hoses.
2. Remove the air valve from the pump (see page 15).
3. Remove the manifolds (102) and disassemble the ball check valves as explained on page 20. Always replace the o-rings (108) with new ones.
4. Using an 11 mm socket wrench, remove the clamp nuts (113) and the grounding strip (112). Loosen the clamps (111) and slip them over the housing (1). Pull the covers (101) off the pump, then remove the clamps from the housing. See the Detail on page 24.
5. Using a 13 mm 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 (1). See page 24. Clamp the shaft in a vise with soft jaws and unscrew the outer plate (103), then disassemble the remaining diaphragm assembly.
6. Inspect the diaphragm shaft (23) for wear or scratches. If it is damaged, check the bearings (31‡) also. Replace parts as needed. To remove the bearings, place a 13/32 EZY-OUT in a vise. Position the pump housing (1) over the EZY-OUT (see page 24). Turn the housing in the direction shown by the arrows to remove the bearing.
7. Hook the shaft seals (30‡) with an o-ring pick and pull them out of the housing (1).
8. Clean all parts and inspect for wear or damage. Replace parts as needed.

Service

Reassembly

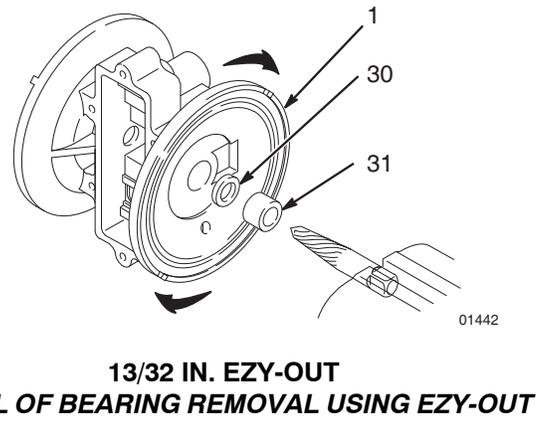
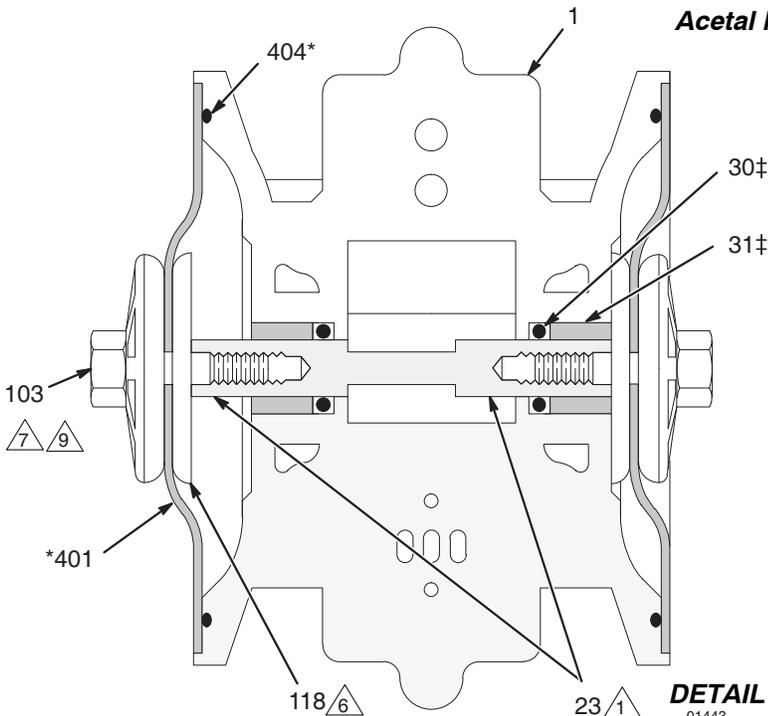
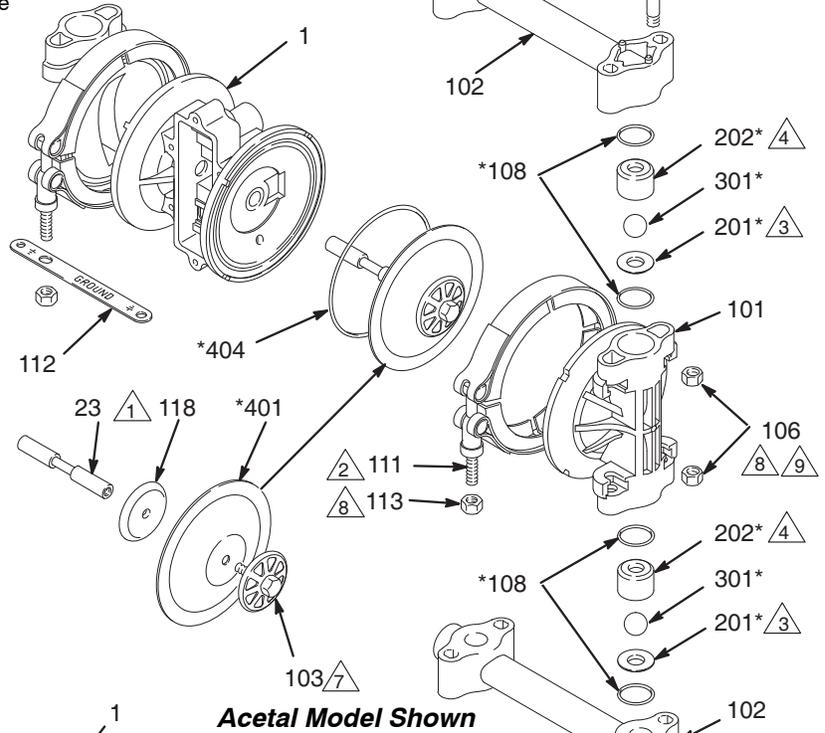
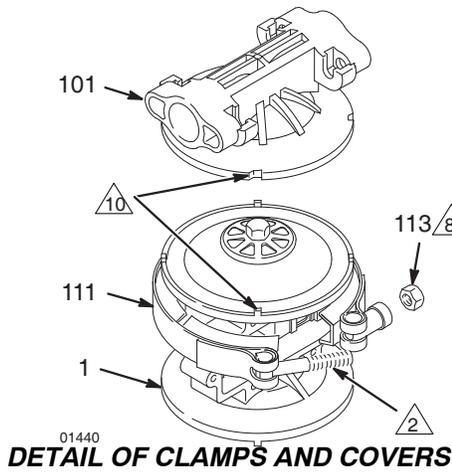
1. Install the shaft seals (30‡) in the housing (1). Using a rubber mallet, carefully drive the bearings (31‡) flush into the housing so the holes face out. See page 24.
2. Grease the diaphragm shaft (23‡) and slide it into the housing (1). Install the o-rings (404*) in the grooves of the housing.
3. Assemble the inner diaphragm plates (118), diaphragms (401*), and outer diaphragm plates (103) as shown on page 24. Apply medium-strength (blue) thread locker to the threads of the fluid-side plates (103), and torque the plates to 8.5 to 9.6 N•m at 100 rpm maximum using a 13 mm socket wrench. **Do not over-torque.** These parts **must** be assembled correctly.
4. When installing the covers (101), slip the clamps (111) over the housing (1) before positioning the covers. See the Detail on page 24. 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 an 11 mm socket wrench, torque the nuts to 5.6 to 6.8 N•m. See **Torque Sequence** on page 29.
5. Reassemble the ball check valves and manifolds as explained on page 20. Always install new o-rings (108*), and make sure they are properly seated.
6. Reinstall the air valve, using the six mounting screws (15). See FIG. 8.



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

Service

- 1 Grease shaft.
- 2 Apply thread lubricant.
- 3 Flat side faces ball.
- 4 Beveled end up.
- 6 Round side must face toward diaphragm.
- 7 Apply medium-strength (blue) thread locker. Torque to 8.5 to 9.6 N-m at 100 rpm maximum.
- 8 Torque to 5.6 to 6.8 N-m. See **Torque Sequence** on page 29.
- 9 Do not over-torque.
- 10 Notches must engage tabs.



Repair Kit Listing

VERDERAIR VA 10 Acetal and Polypropylene Pumps, Series F

Repair Kits may only be ordered as kits. To repair the air valve, order **Part No. 819.6864** (see page 28). Parts included in the Air Valve Repair Kit are marked with a symbol in the parts list, for example (2†). The list of existing Repair Kits is below:

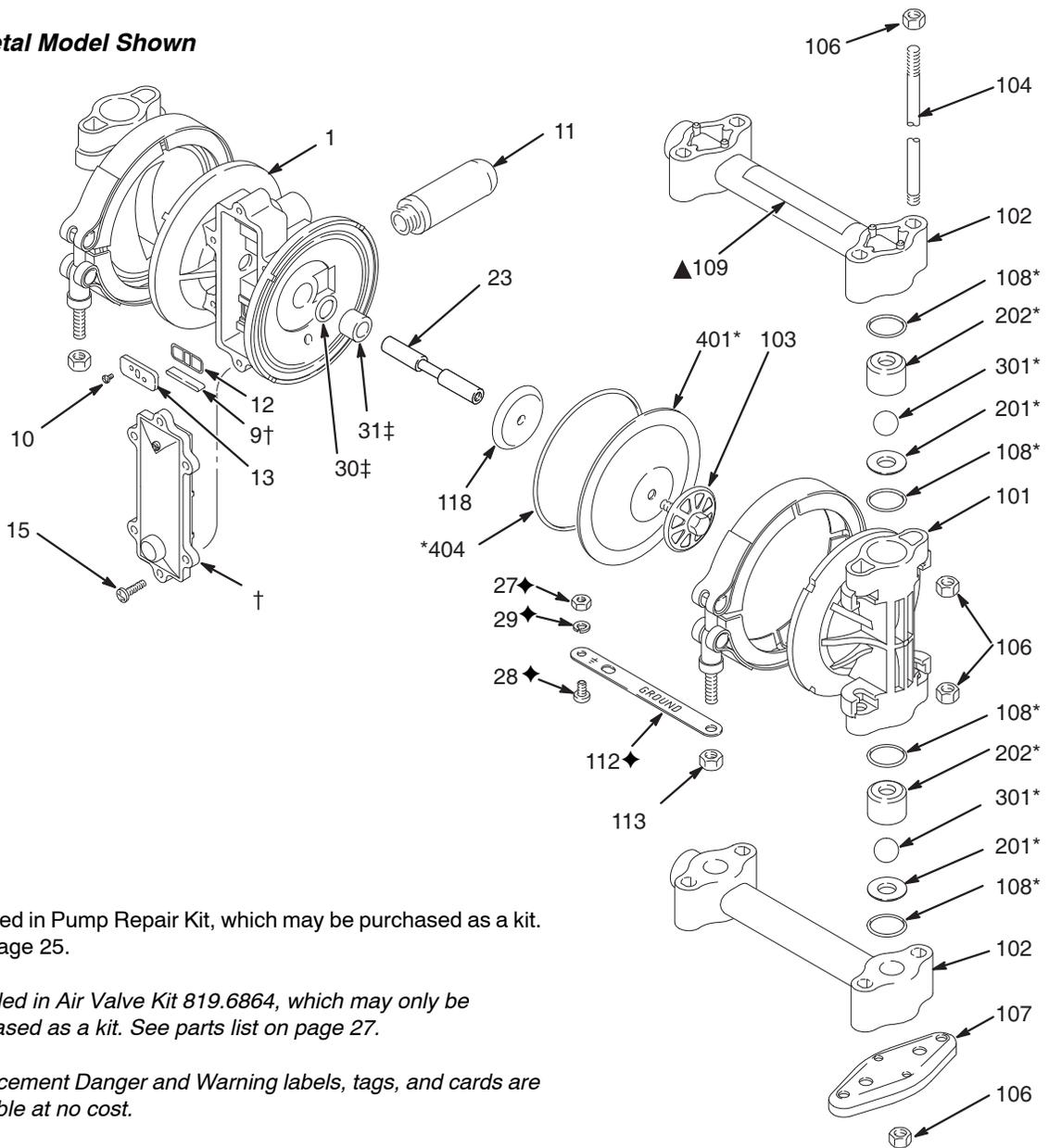
Part No.	Seats	Balls	Diaphragms	O-Rings
819.0061	--	--	SP	TF
819.0074	--	--	TF	TF
819.0075	--	--	HY	TF
819.0076	--	--	BN	TF
819.0077	--	TF	--	TF
819.0078	--	TF	TF	TF
819.0081	--	SS	--	TF
819.0082	--	SS	TF	TF
819.0085	--	HY	--	TF
819.0087	--	HY	HY	TF
819.0089	--	BN	--	TF
819.0092	--	BN	BN	TF
819.0093	AC	--	--	TF
819.0094	AC	--	TF	TF
819.0095	AC	--	HY	TF
819.0097	AC	TF	--	TF
819.0098	AC	TF	TF	TF
819.0099	AC	TF	HY	TF
819.0100	AC	TF	BN	TF
819.0101	AC	SS	--	TF
819.0102	AC	SS	TF	TF
819.0103	AC	SS	HY	TF
819.0105	AC	HY	--	TF
819.0107	AC	HY	HY	TF
819.0109	AC	BN	--	TF
819.0111	AC	BN	HY	TF
819.0112	AC	BN	BN	TF
819.0113	SS	--	--	TF
819.0115	SS	--	HY	TF
819.0117	SS	TF	--	TF
819.0118	SS	TF	TF	TF
819.0120	SS	TF	BN	TF

Part No.	Seats	Balls	Diaphragms	O-Rings
819.0121	SS	SS	--	TF
819.0122	SS	SS	TF	TF
819.0123	SS	SS	HY	TF
819.0124	SS	SS	BN	TF
819.0125	SS	HY	--	TF
819.0126	SS	HY	TF	TF
819.0129	SS	BN	--	TF
819.0133	PP	--	--	TF
819.0135	PP	--	HY	TF
819.0137	PP	TF	--	TF
819.0138	PP	TF	TF	TF
819.0140	PP	TF	BN	TF
819.0141	PP	SS	--	TF
819.0142	PP	SS	TF	TF
819.0144	PP	SS	BN	TF
819.0145	PP	HY	--	TF
819.0146	PP	HY	TF	TF
819.0147	PP	HY	HY	TF
819.0148	PP	HY	BN	TF
819.0149	PP	BN	--	TF
819.0152	PP	BN	BN	TF
819.5431	AC	TF	SP	TF
819.5437	AC	SP	SP	TF
819.5442	SS	SS	SP	TF
819.5444	SS	SP	--	TF
819.5447	SS	SP	SP	TF
819.5451	PP	TF	SP	TF
819.5454	PP	SP	--	TF
819.5456	PP	SP	HY	TF
819.5457	PP	SP	SP	TF
819.1337	--	---	--	TF
819.0104	AC	SS	BN	TF
819.1343	--	SP	--	TF

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

Parts

Acetal Model Shown



* Included in Pump Repair Kit, which may be purchased as a kit. See page 25.

† Included in Air Valve Kit 819.6864, which may only be purchased as a kit. See parts list on page 27.

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

‡ Included in Diaphragm Shaft Kit 819.6349, which may be purchased separately.

◆ Not supplied with Polypropylene pump.

01429E

Parts

Fluid Section Parts List

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, clamp; 1/4-28	2	
	118	819.6356	PLATE, air side; sst	2	
	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, clamp; 1/4-28	2	
118		819.6356	PLATE, air side; sst	2	

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

Valve Seat Kits

Seat Material	Ref. No.	Part No.	Description	Qty
AC	201	819.0093	VA10P AC,--,--,TF	1
	202	Included in above kit		
SS	201	819.0113	VA10P SS,--,--,TF	1
	202	Included in above kit		
PP	201	819.0133	VA10P PP,--,--,TF	1
	202	Included in above kit		

Check Ball Kits

Material	Ref. No.	Part No.	Description	Qty
TF	301	819.0077	VA10P --,TF,--,TF	1
SS	301	819.0081	VA10P --,SS,--,TF	1
HY	301	819.0085	VA10P --,HY,--,TF	1
SP	301	819.1343	VA10P --,SP,--,TF	1
BN	301	819.0089	VA10P --,BN,--,TF	1

Diaphragm Kits

Diaphragm Material	Ref. No.	Part No.	Description	Qty
TF	401	819.0074	VA10P --,--,TF,TF	1
	404	Included in above kit		
HY	401	819.0075	VA10P --,--,HY,TF	1
	404	Included in above kit		
SP	401	819.0061	VA10P --,--,SP,TF	1
	404	Included in above kit		
BN	401	819.0076	VA10P --,--,BN,TF	1
	404	Included in above kit		

Air Motor Parts List

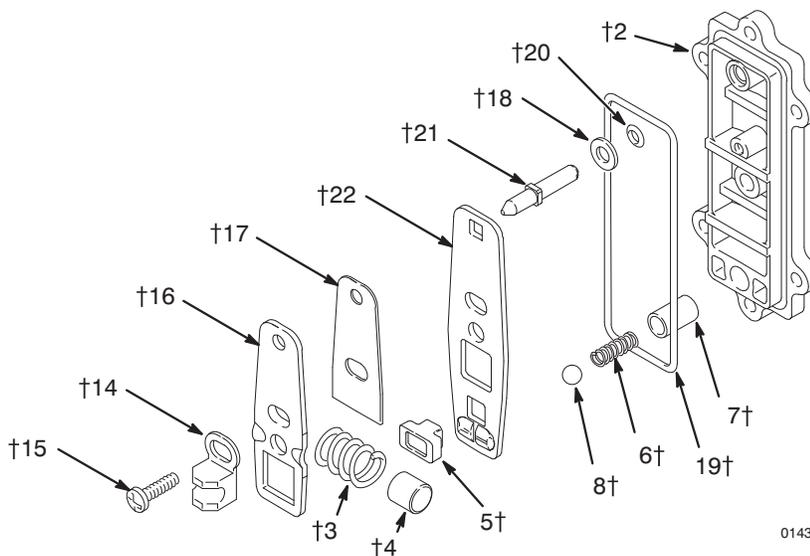
Ref. No.	Part No.	Description	Qty
1	819.0161	HOUSING, center; polypropylene	1
2†	819.0162	COVER, air valve; polypropylene	1
3†	819.0163	SPRING, compression; sst	1
4†	819.0164	STOP, link; acetal	1
5†	819.6863	CUP, valve; acetal	1
6†	819.0166	SPRING, compression; sst	1
7†	819.0167	COLLAR, detent; sst	1
8†	819.0168	BALL, detent; carbide	1
9†	819.0169	BEARING, link; acetal	1
10	819.0170	SCREW, thread-forming; 1/4-20; 9.5 mm long;	2
11	819.6351	MUFFLER	1
12	819.0172	SEAL, plate, valve; buna-N;	1
13	819.0173	PLATE, valve; sst	1
14†	819.0174	SADDLE, shift; acetal	1
15†	819.0175	SCREW, thread-forming; 10-14 size; 19 mm long; see below and page 26	7
16†	819.0176	LINK, actuator; sst	1
17†	819.0177	SPACER, link; acetal	1

Ref. No.	Part No.	Description	Qty
18†	819.0178	WASHER, plain; sst	1
19†	819.0179	O-RING; buna-N	1
20†	819.0180	O-RING; buna-N	1
21†	819.0181	SHAFT, reset; sst	1
22†	819.6862	LINK, detent; sst	1
23	819.6353	SHAFT, diaphragm; sst	1
26†	819.0184	GREASE, general purpose; 10.5 g; not shown	1
27◆	819.0185	NUT, hex; 10-24	1
28◆	819.6880	SCREW; 10-24; 8 mm long	1
29◆	819.0187	LOCKWASHER, int. tooth; no. 10	1
30‡	819.6352	PACKING, o-ring; fluoroelastomer	2
31‡	819.6350	BEARING, acetal	2

† These parts are included in Air Valve Kit 819.6864, which may only be purchased as a kit. The kit includes only one screw (15), shown below, and a tube of grease (26).

‡ These parts are included in Diaphragm Shaft Kit 819.6349, which may be purchased separately.

◆ Not supplied with polypropylene pump.

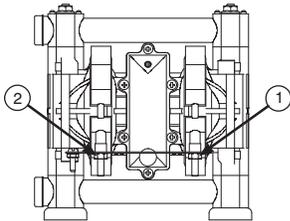


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Torque Sequence

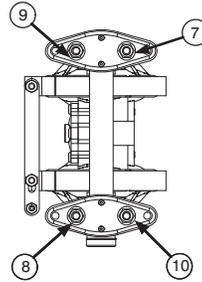
Always follow torque sequence when instructed to torque fasteners.

1. Left/Right Fluid Covers
Torque bolts to 5.6-6.8 N•m



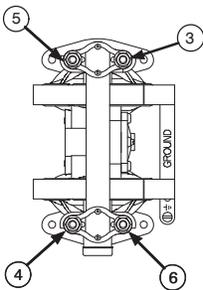
FRONT VIEW

3. Inlet Manifold
Torque bolts to 5.6-6.8 N•m



BOTTOM VIEW

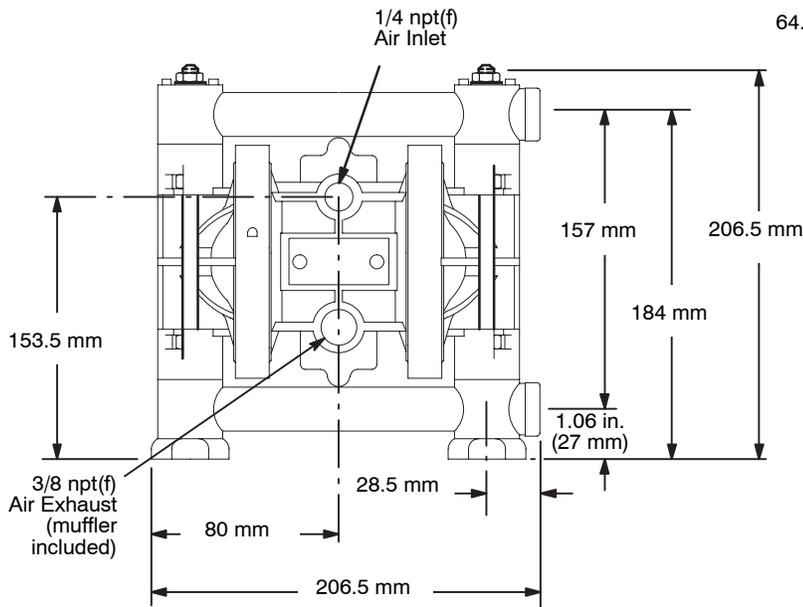
2. Outlet Manifold
Torque bolts to 5.6-6.8 N•m



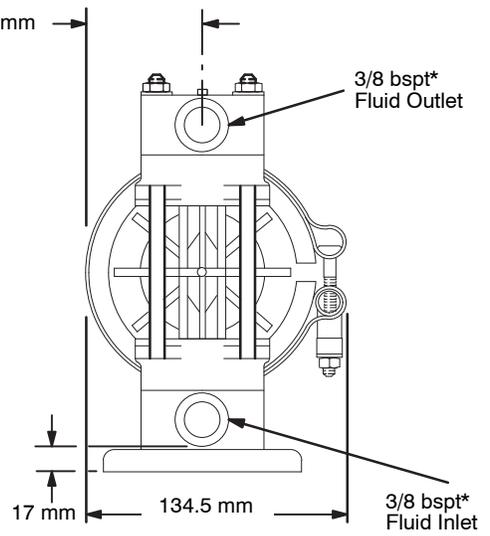
TOP VIEW

Dimensions

FRONT VIEW



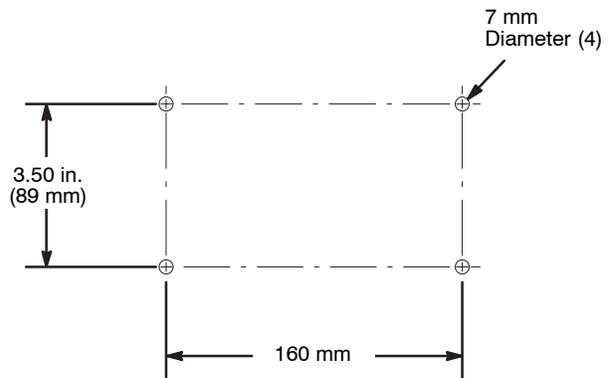
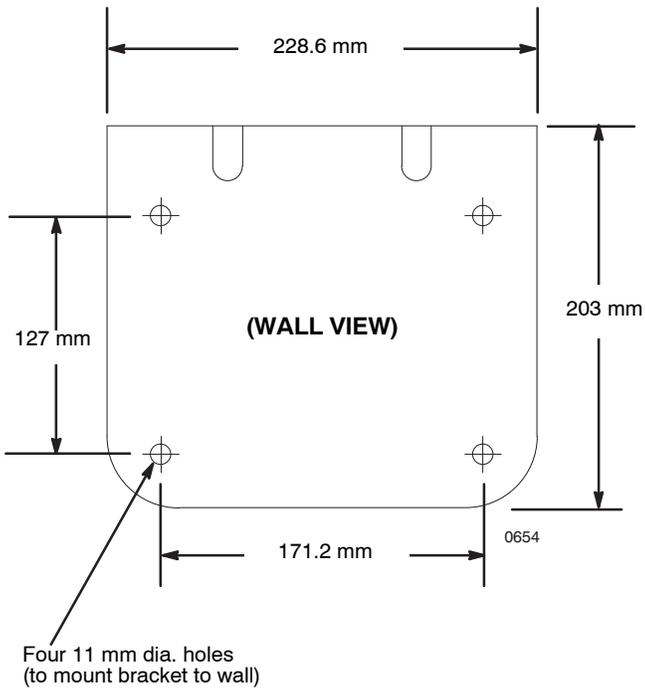
SIDE VIEW



* Pumps 810.0465 - 810.0474 have npt (f) threads on the fluid inlet and fluid outlet.

WALL BRACKET 819.5951

PUMP MOUNTING HOLE PATTERN



07316B

Technical Data

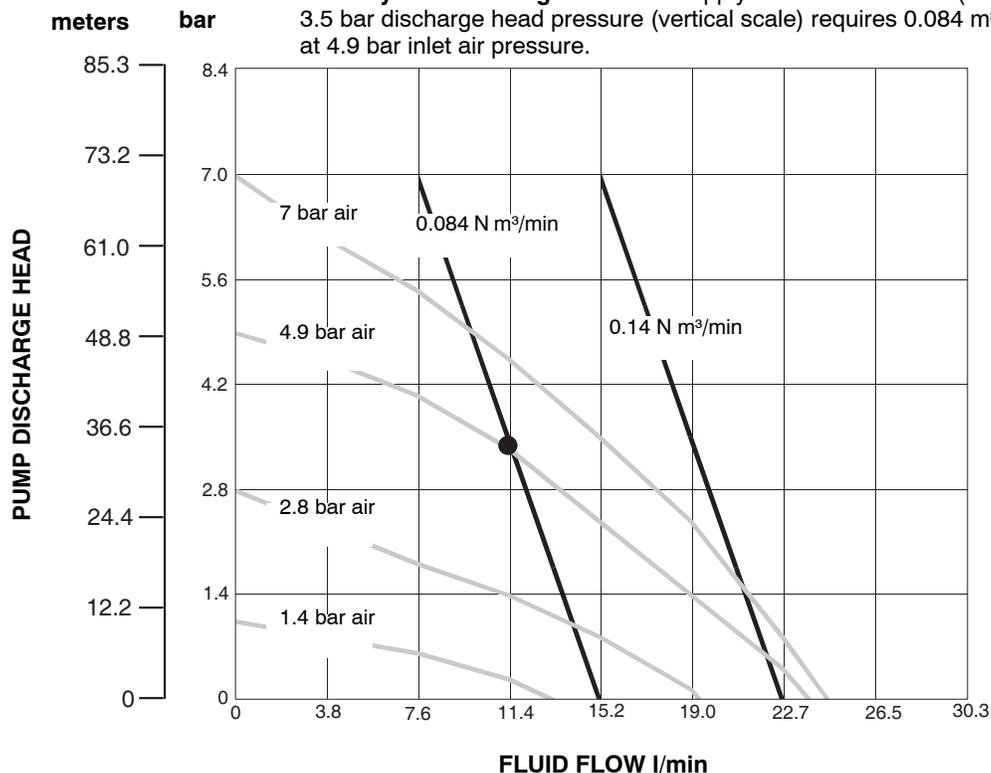
Pumps with PTFE Diaphragms

Maximum fluid working pressure..... 7 bar
 Air pressure operating range..... 1.4 to 7 bar
 Maximum air consumption0.15 N·m³/min (see chart)
 Maximum free flow delivery.....24.6 l/min
 Maximum pump speed 330 cpm
 Maximum suction lift.....2.1 m dry; 3.7 m wet
 Maximum size pumpable solids 1.6 mm
 Sound power level (at 7 bar, full flow)85 dBA
 Typical sound power level (at 4.9 bar, 308 l/min)..... 78 dBA
 Operating temperature range..... 4.4 to 65.5° C
 Air inlet size.....1/4 npt(f)

Fluid inlet and outlet size (Code 8) TB. 3/8 bspt
 (Code 8) TN 3/8 npt
 Wetted parts..... Vary by model. See pages 27 and 29.
 Acetal models include acetal with conductive sst fibers.
 Non-wetted external parts acetal, polyester (labels),
 glass-filled polypropylene with conductive SST fibers,
 303, 304 and 316 stainless steel
 Weight..... Acetal Pumps: 2.4 kg
 Polypropylene Pumps: 2.2 kg

* Sound power level measured per ISO standard 9614-2.
 Santoprene® is a registered trademark of the Monsanto Company.

Example of Finding Pump Air Consumption and Air Pressure at a Specific Fluid Delivery and Discharge Head: To supply 11.4 liters fluid flow (horizontal scale) at 3.5 bar discharge head pressure (vertical scale) requires 0.084 m³/min air consumption at 4.9 bar inlet air pressure.

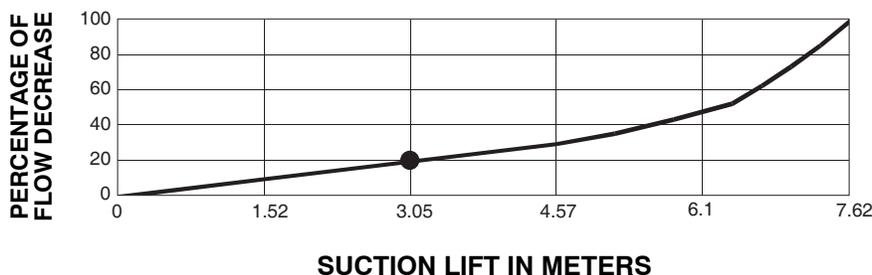


TEST CONDITIONS
 Pump tested in water with inlet submerged.

KEY
 — FLUID PRESSURE AND FLOW
 — N m³/min AIR CONSUMPTION

PUMPING RATE DECREASE AT DIFFERENT SUCTION LIFTS

EXAMPLE: At a suction lift of 3.05 m, the pump flow rate will be decreased by 20 percent.



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.

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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.

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