



This manual contains important warnings and information.
READ AND RETAIN FOR REFERENCE

INSTRUCTIONS

819.0154

Rev. M

VERDERAIR VA 10 Air-Operated Diaphragm Pumps

7 bar Maximum Fluid Working Pressure

7 bar Maximum Air Input Pressure

***NOTE:** Refer to the Pump Listing on page 22 to find Model No. of your pump.

Patents Pending

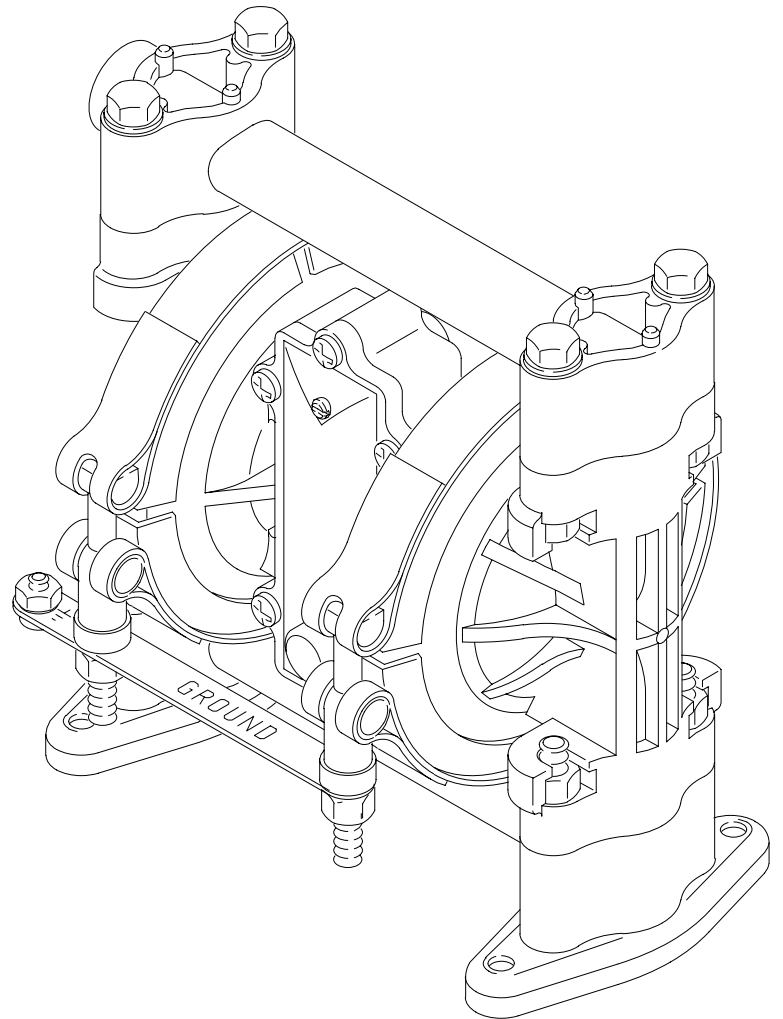


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Symbols

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



INSTRUCTIONS

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 9.
- 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 can 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 the equipment. Refer to **Grounding** on page 5.
- Never use a polypropylene pump with non-conductive flammable fluids as specified by your local fire protection code. Refer to **Grounding** on page 5 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 9.
- 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 Figs. 2–3 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, available from your VERDER customer. 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 Teflon® 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 24 to 26.

Tightening Screws Before First Use

After unpacking the pump, and before using it for the first time, check and retorque external fasteners. See the **Service** section for torque specifications. After the first day of operation, check and retorque the fasteners again. Although the recommended frequency for retorquing of fasteners varies with pump usage, 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 3.
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 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 Figs. 4–3. 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.

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 3.



The acetal pump contains stainless steel fibers that make 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 3.

Never use a polypropylene pump with non-conductive flammable fluids as specified by your local fire protection code. U.S. 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 Kynar pump, **always** ground the entire fluid system. See the **WARNING** left.

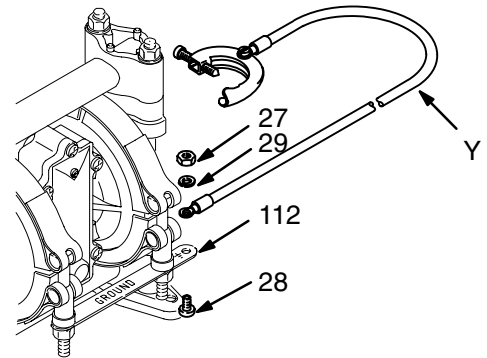


Fig. 1

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- **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 Figs. 2–3. 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 9.

1. Install the air line accessories as shown in Figs. 2–3. 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 5. 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 pages 28 and 29 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 Figs. 2–3. 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). The pump fluid outlet is 3/8 bspt. 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.

Installation

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 5 for installation instructions)

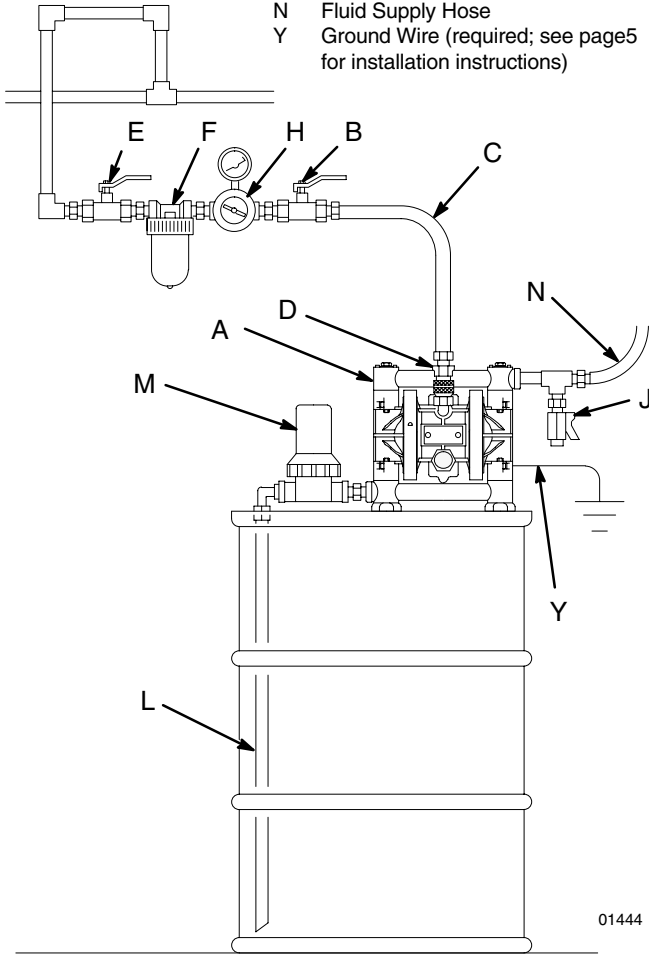


Fig. 2

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 5 for installation instructions)

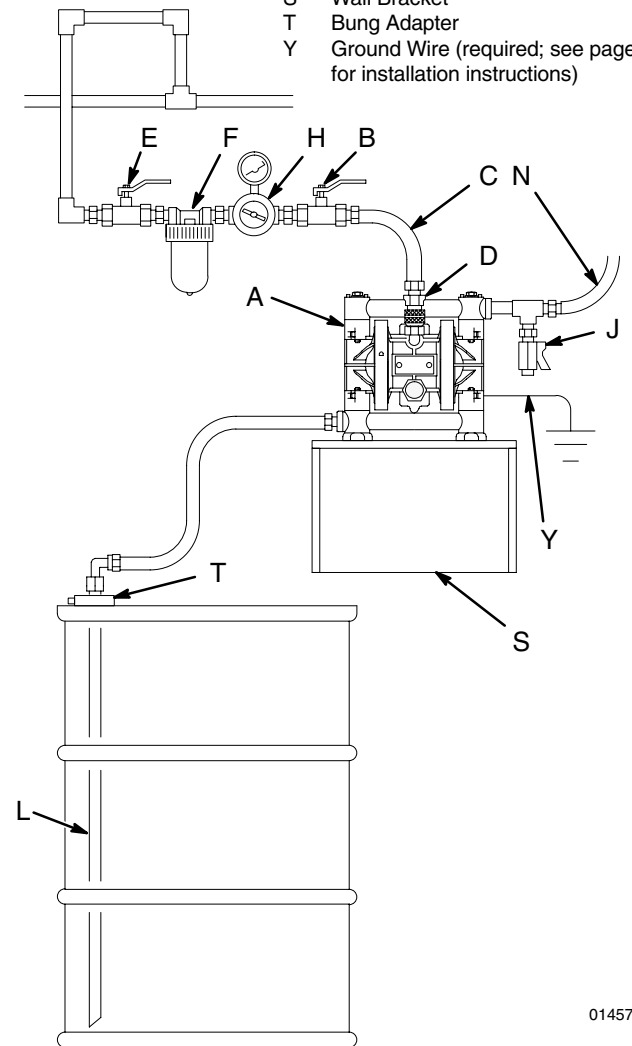


Fig. 3

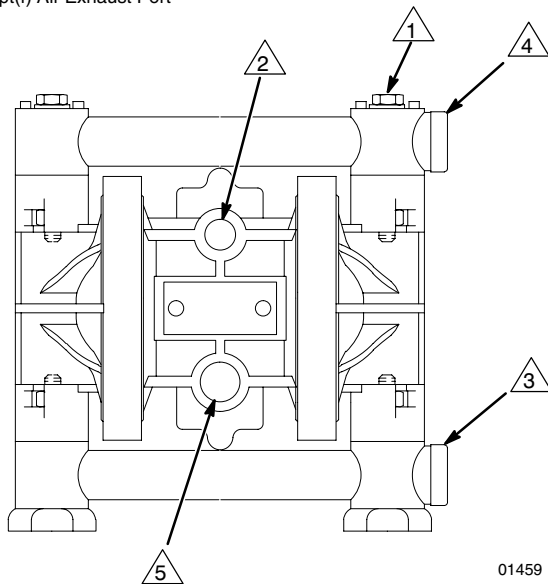
Installation

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 18 (for acetal pumps) or steps 1–2 and 4 on page 19 (for polypropylene pumps). Reattach with the port facing the desired direction. **Do not over-torque.**

Acetal Pump Shown

- 1 Apply thread lube and torque to 3.9–6.2 N.m. Do not over-torque.
- 2 1/4 npt(f) Air Inlet
- 3 3/8 bspt Fluid Inlet
- 4 3/8 bspt Fluid Outlet
- 5 3/8 npt(f) Air Exhaust Port



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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.

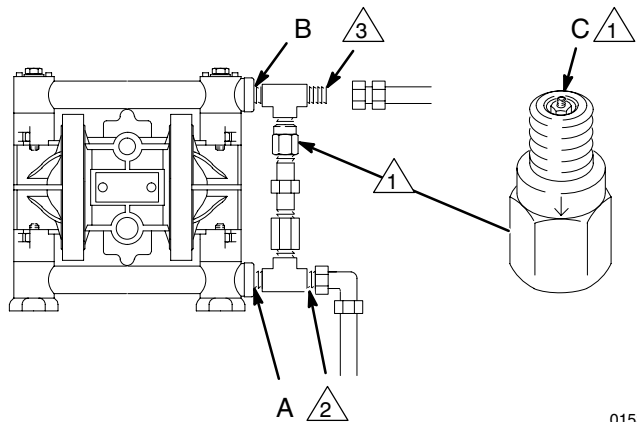
Thermal expansion of fluid in the outlet line can cause overpressurization. This can occur when using long fluid lines exposed to sunlight or ambient heat, or when pumping from a cool to a warm area (for example, from an underground tank).

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 Fluid Inlet Port
- B 3/8 bspt Fluid Outlet Port
- C Pressure Relief Valve
Part No. 819.0158 (Aluminum)
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.



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Fig. 5

Installation

Air Exhaust Ventilation

Warning



FIRE AND EXPLOSION HAZARD
Be sure to read **FIRE OR EXPLOSION HAZARD** and **TOXIC FLUID HAZARD** on page 3, 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.

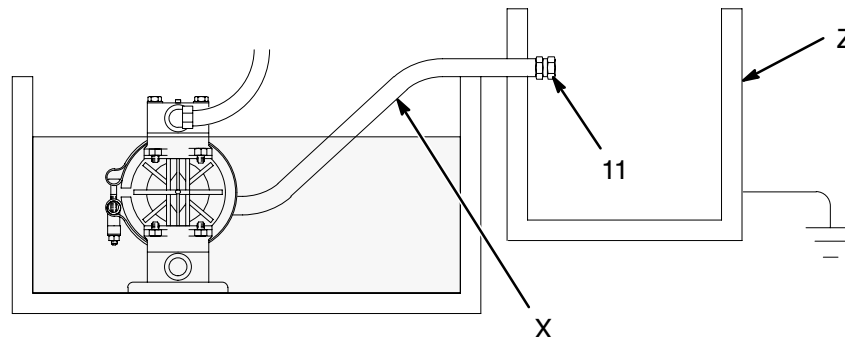


Fig. 6

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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.

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 with water. If the water could contaminate the fluid you are pumping, flush the pump thoroughly with a compatible fluid. 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 OR EXPLOSION HAZARD** on page 3.
2. Check all fittings to be sure they are tight. Be sure to use a compatible liquid thread sealant or Teflon® 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.

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 10.

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 and retorque all threaded connections at least once every two months.

The recommended frequency for retorquing of fasteners varies with pump usage; a general guideline is to retorque fasteners every two months.

Tightening the Clamps

When tightening the clamps (111), apply thread lubricant to the bolts and **be sure** to torque the nuts (113) to 5.6–6.8 N.m. See Fig. 7.

 Apply thread lube and torque nuts to 5.6–6.8 N.m

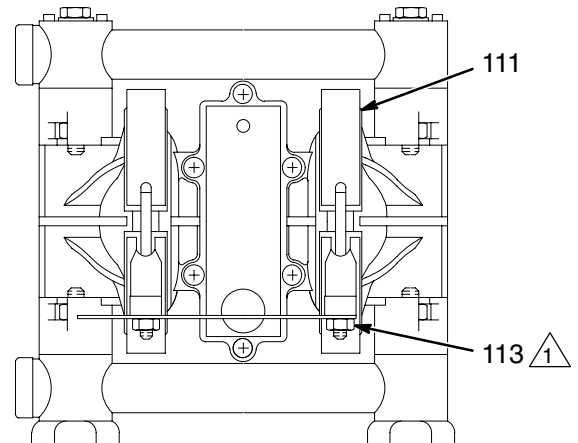


Fig. 7

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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 10.

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 16, 17. Use filtered air.
	The detent link (22) is worn or broken.	Replace the detent link (22) and ball (8). See pages 16, 17.
	The springs (3, 6) and/or valve cup (5) and plate (13) are broken or damaged.	Replace these parts. See pages 16, 17.
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 18 or 19.
	The check balls (301) or seat (201) are worn.	Replace these parts. See page 18 or 19.
	The check ball (301) is wedged in the seat (201).	Replace the ball. See page 18 or 19.
There is excessive air leakage from the exhaust port.	The air valve cup (5) or plate (13) is worn.	Replace these parts. See pages 16, 17.
	The shaft seals (30‡) are worn.	Replace the seals. See page 20.
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 18 or 19.
	The diaphragm (401) is ruptured.	Replace the diaphragm. See page 20.

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 20.
	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 18 or 19.
	The outer diaphragm plates (103) are loose.	Tighten the plates. See page 20.
There is fluid in the exhaust air.	The diaphragm (401*) is ruptured.	Replace the diaphragm. See page 20.
	The outer diaphragm plates (103) are loose.	Tighten the plates. See page 20.
The pump exhausts air at stall.	The air valve cup (5) or plate (13) is worn.	Replace these parts. See pages 16, 17.
	The shaft seals (31‡) are worn.	Replace the seals. See page 20.
The pump exhausts air from the clamps.	The clamps (111) are loose.	Tighten the clamp nuts (113). See page 11.
The pump exhausts air near the air valve.	The air valve screws (15) are loose.	Tighten the screws. See page 14.
	The air valve o-ring (19) is damaged.	Inspect; replace the o-ring. See pages 16, 17.
The pump leaks fluid from the check valves.	The o-rings (108) are worn or damaged.	Inspect; replace the o-rings. See page 18 or 19.

Service

Tools Required

- Torque wrench
- Phillips screwdriver
- O-ring pick

Replacing the Air Valve

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.

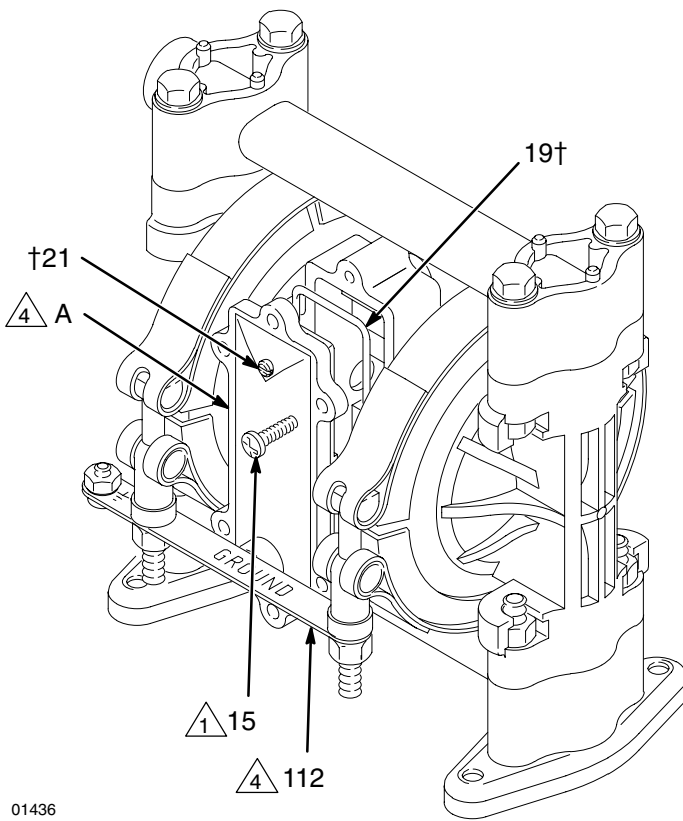
Warning

To reduce the risk of serious injury whenever you are instructed to relieve pressure, always follow the **Pressure Relief Procedure** on page 10.

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 0.6–0.8 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 0.9–1.6 N.m.

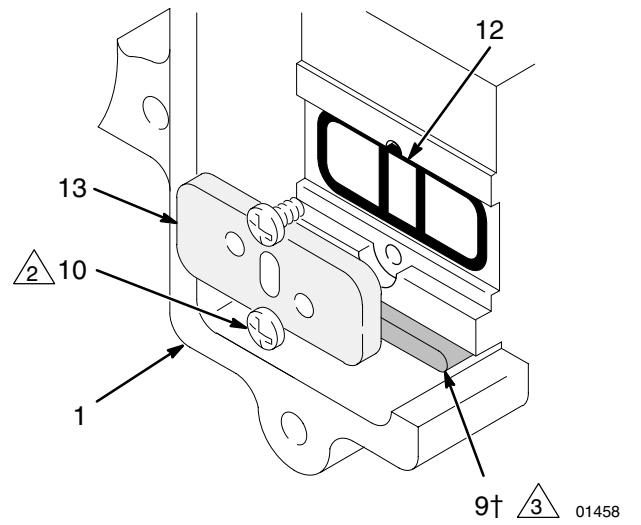
Service



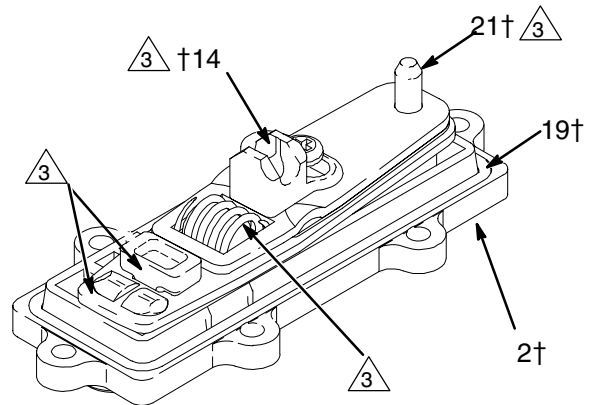
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- 1 Torque oppositely and evenly to 0.9–1.6 N.m.
- 2 Torque to 0.6–0.8 N.m.
- 3 Apply grease (26†).

VALVE PLATE DETAIL



GREASE APPLICATION



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Fig. 8

Service

Tools Required

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

Repairing the Air Valve

Disassembly

Warning

To reduce the risk of serious injury whenever you are instructed to relieve pressure, always follow the **Pressure Relief Procedure** on page 10.

1. **Relieve the pressure.**
2. Remove the air valve from the pump (see page 14).
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**, page 17.

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

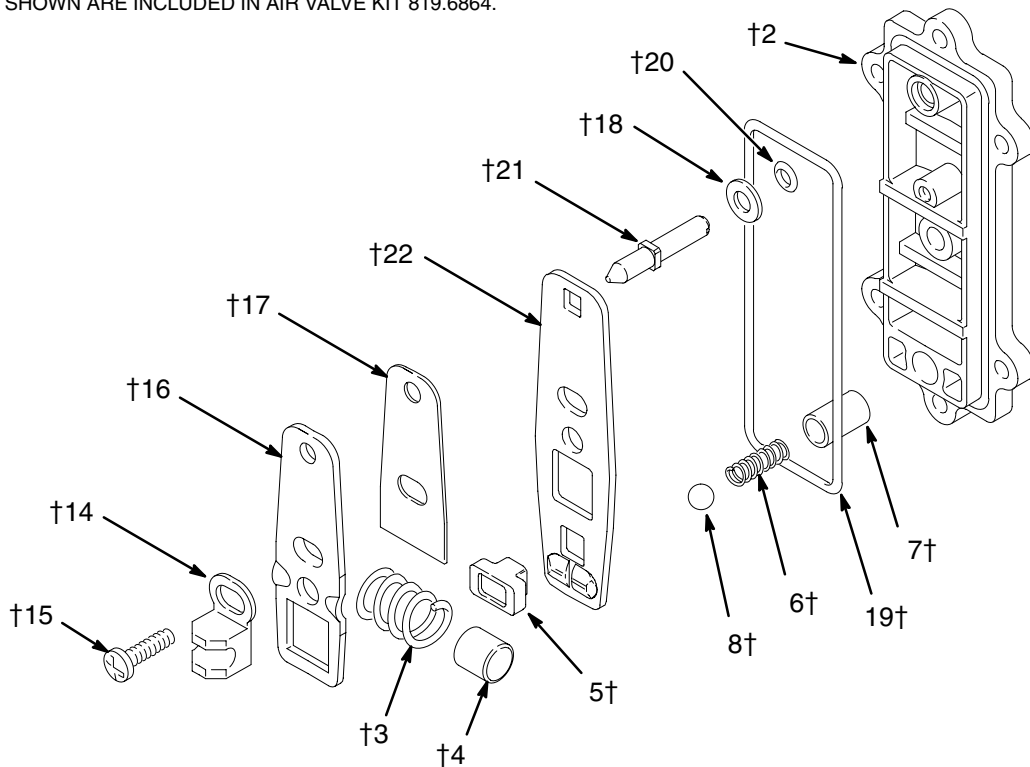


Fig. 9

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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.

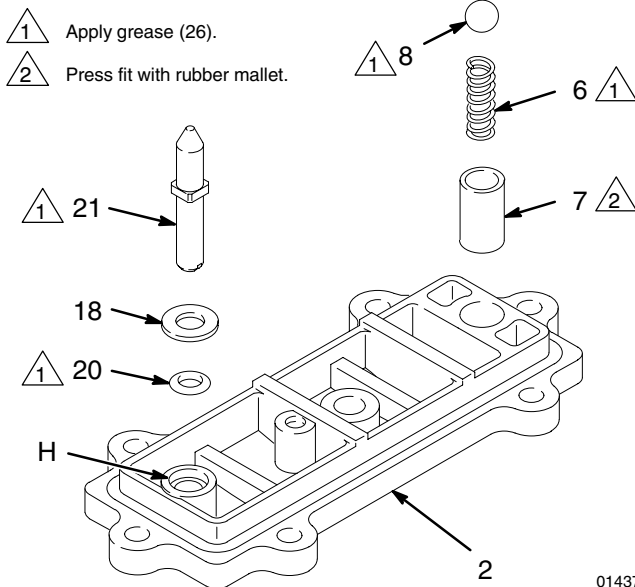


Fig. 10

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).

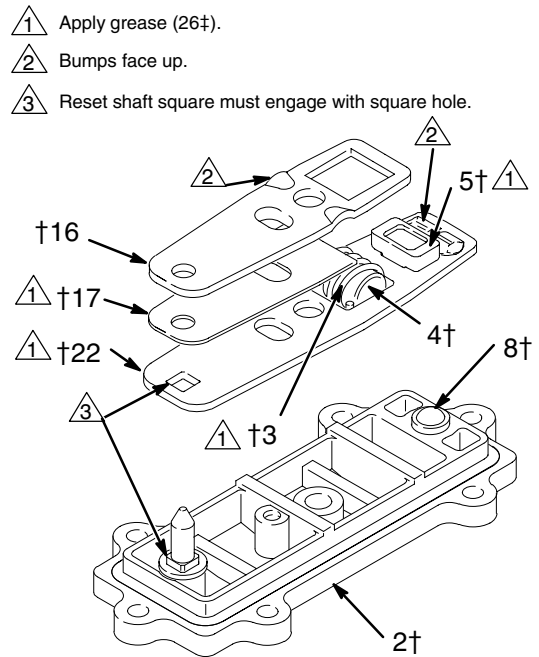


Fig. 11

7505A

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 14.

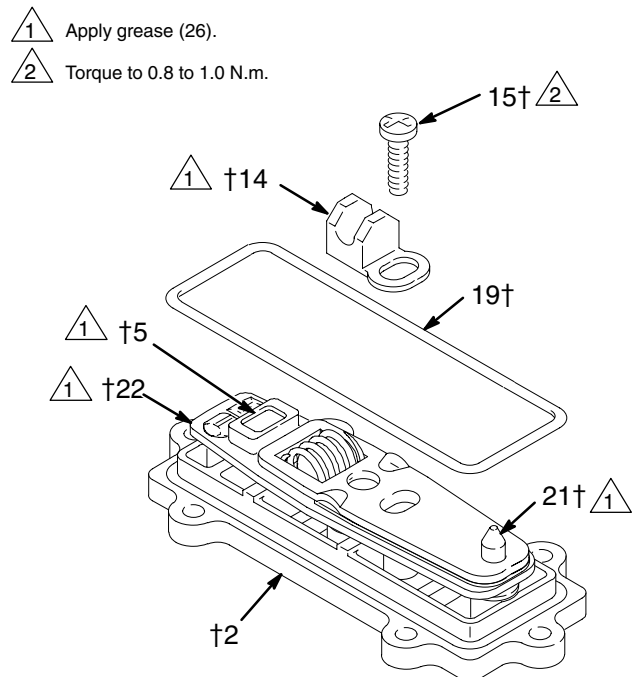


Fig. 12

7506A

Service

Tools Required

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

Ball Check Valves (Acetal Pumps)

NOTE: A Fluid Section Repair Kit is available. See page 23 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 10.

1. **Relieve the pressure.** Disconnect all hoses. Remove the pump from its mounting.
2. Using a 1/2" socket wrench, remove the bolts (104) and 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 and remove the bolts (104), nuts (106), 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 in the reverse order, following all notes in Fig. 13. Be sure the ball checks are assembled **exactly** as shown. To avoid pump leakage, run your finger over the o-rings (108) and ensure that they are seated properly.

Caution

Do not over-torque the manifold bolts (104). Doing so may cause the nuts (106) to spin in the housings, damaging the cover (101).

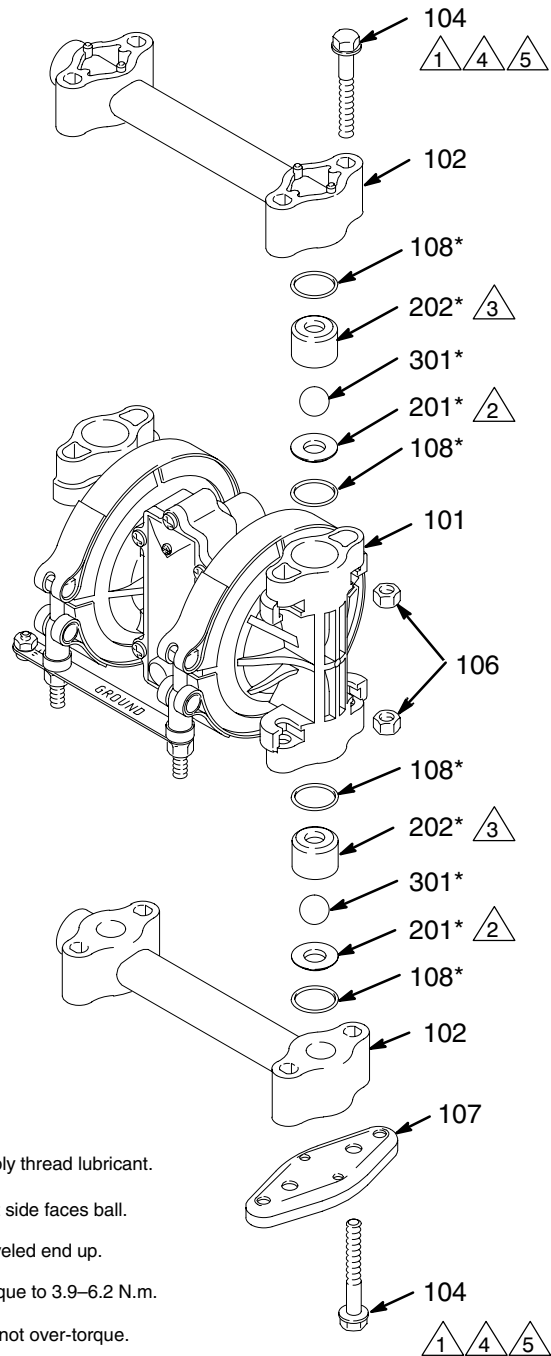


Fig. 13

01435

Service

Tools Required

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

Ball Check Valves (Polypropylene Pumps)

NOTE: A Fluid Section Repair Kit is available. See page 23 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 10.

1. **Relieve the pressure.** Disconnect all hoses. Remove the pump from its mounting.
2. Using a 1/2" socket wrench, remove the nuts (106) holding the top manifold (102) to the covers (101). Lift the manifold off the pump. See Fig. 14.
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. 14. 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. 14. Be sure the ball checks are assembled **exactly** as shown. To avoid pump leakage, run your finger over the o-rings (108) and ensure that they are seated properly.
11. Install the top manifold (102) and four nuts (106). Torque to 3.9–6.2 N.m. **Do not over-torque.**

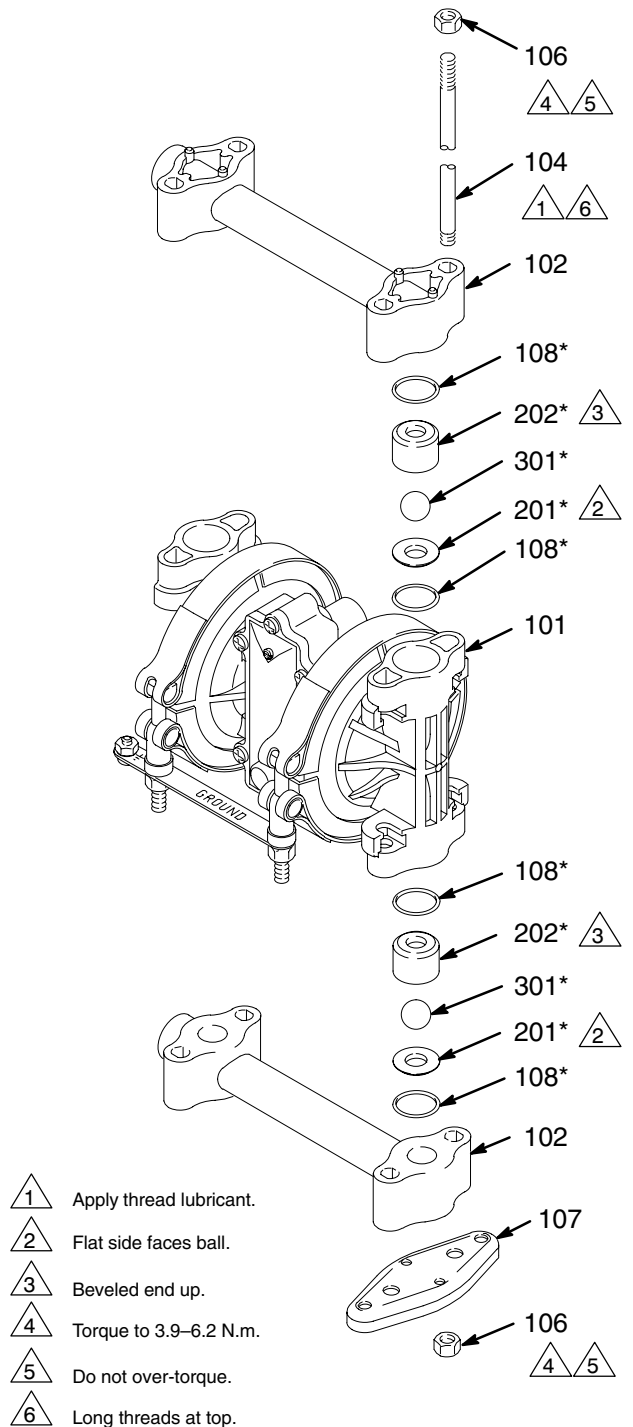


Fig. 14

02457B

Service

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

Diaphragm Repair

Disassembly

NOTE: A Fluid Section Repair Kit is available. See page 23 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 10.

1. **Relieve the pressure.** Disconnect all hoses.
2. Remove the air valve from the pump (see page 14).
3. Remove the manifolds (102) and disassemble the ball check valves as explained on pages 18–19. Always replace the o-rings (108) with new ones.
4. Using a 7/16" 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 in Fig. 15.
5. Using a 1/2" 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 Fig. 15. 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 Fig. 15). 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.

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 Fig. 15.
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 in Fig. 15. Apply medium-strength (blue) Loctite® or equivalent to the threads of the fluid-side plates (103), and torque the plates to 3.9 to 6.2 N-m at 100 rpm maximum using a 1/2" socket wrench. **Do not over-torque.** These parts **must** be assembled correctly.

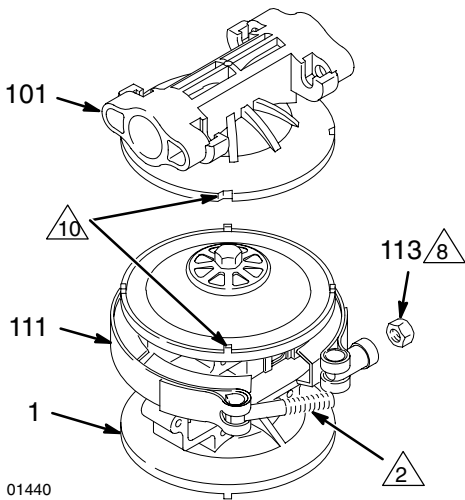
Caution

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

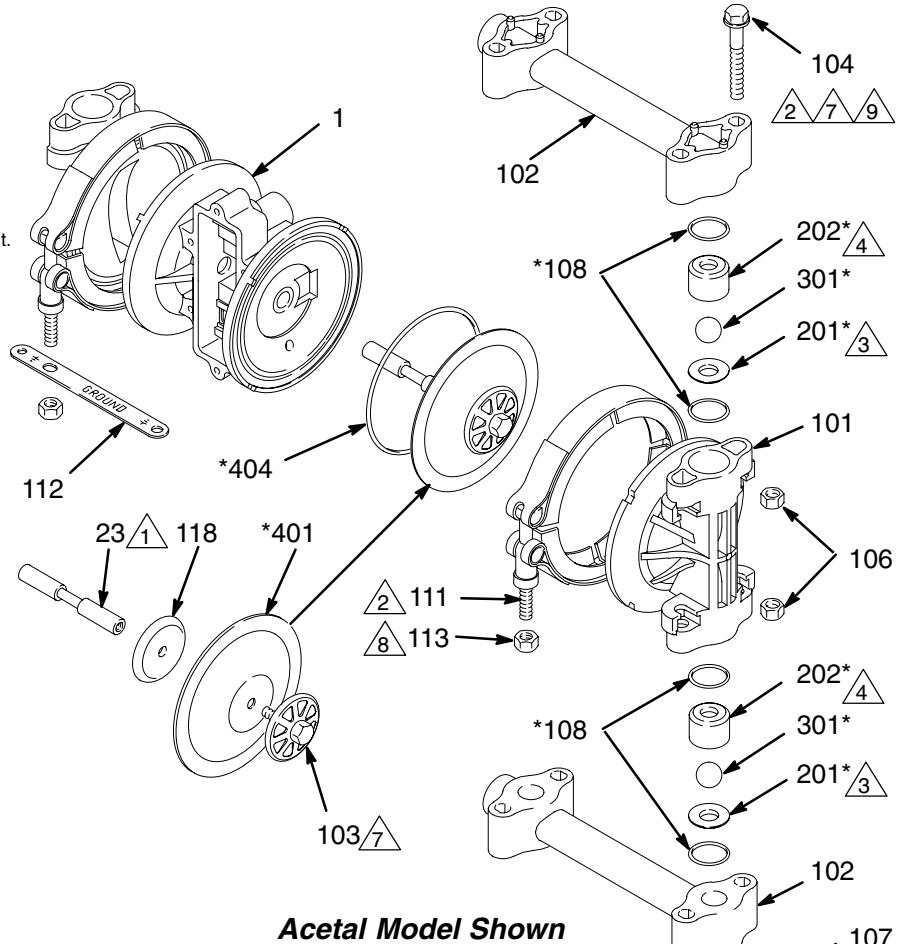
4. When installing the covers (101), slip the clamps (111) over the housing (1) before positioning the covers. See the Detail in Fig. 15. Engage the notches in the covers with the locator tabs on the housing, then position the clamps over both parts. The clamp bolts should be on the air valve side of 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" socket wrench, torque the nuts to 5.6–6.8 N.m.
5. Reassemble the ball check valves and manifolds as explained on pages 18–19. Always install new o-rings (108*), and make sure they are seated properly.
6. Reinstall the air valve, using the six mounting screws (15). See Fig. 8.

Service

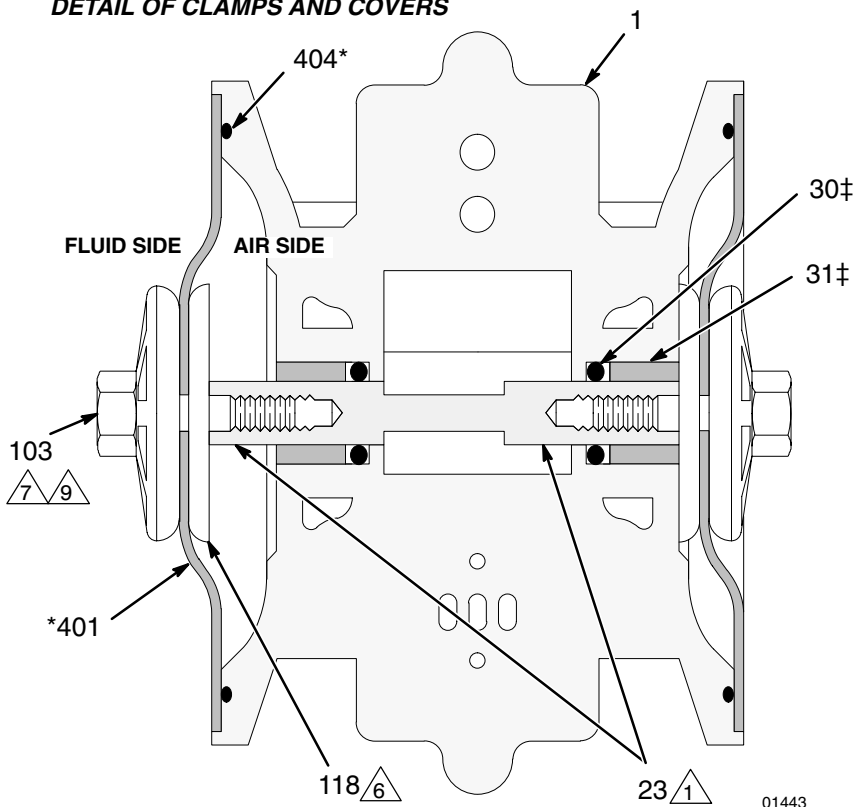
- ▲1 Grease shaft.
- ▲2 Apply thread lubricant.
- ▲3 Flat side faces ball.
- ▲4 Beveled end up.
- ▲6 Round side must face toward diaphragm.
- ▲7 Apply medium-strength (blue) Loctite or equivalent. Torque to 3.9–6.2 N.m at 100 rpm maximum.
- ▲8 Torque to 5.6–6.8 N.m.
- ▲9 Do not over-torque.
- ▲10 Notches must engage tabs.



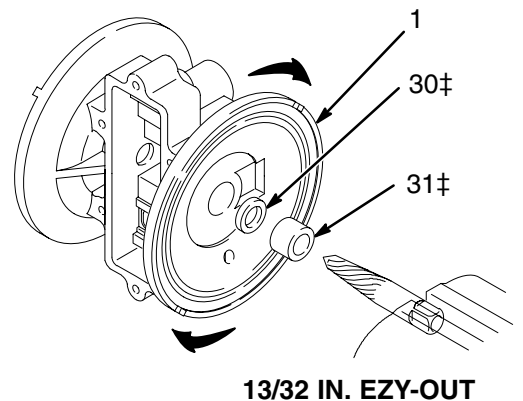
DETAIL OF CLAMPS AND COVERS



Acetal Model Shown



CUTAWAY VIEW OF DIAPHRAGM ASSEMBLIES IN PUMP HOUSING



DETAIL OF BEARING REMOVAL USING EZY-OUT

Fig. 15

Pump Listing

VERDERAIR VA 10 Acetal and Polypropylene Pumps, Series E

Your Model No. is marked on the pump's serial plate. The listing of existing *VERDERAIR VA 10* pumps is below:

Part No.	Fluid Section	Seats	Balls	Diaphragms
810.0001	ACE	ACE	TEF	TEF
810.0004	ACE	ACE	316	TEF
810.0008	ACE	ACE	HYT	HYT
810.0012	ACE	ACE	BUN	BUN
810.0013	ACE	316	TEF	TEF
810.0016	ACE	316	316	TEF
810.0044	POL	ACE	HYT	HYT
810.0049	POL	316	TEF	TEF
810.0052	POL	316	316	TEF
810.0061	POL	POL	TEF	TEF
810.0068	POL	POL	HYT	HYT
810.0072	POL	POL	BUN	BUN

ACE = Acetal BUN = Buna-N HYT = Hytrel POL = Polypropylene 316 = 316 sst TEF = PTFE

Repair Kit Listing

For **VERDERAIR VA 10** Acetal and Polypropylene Pumps, Series E

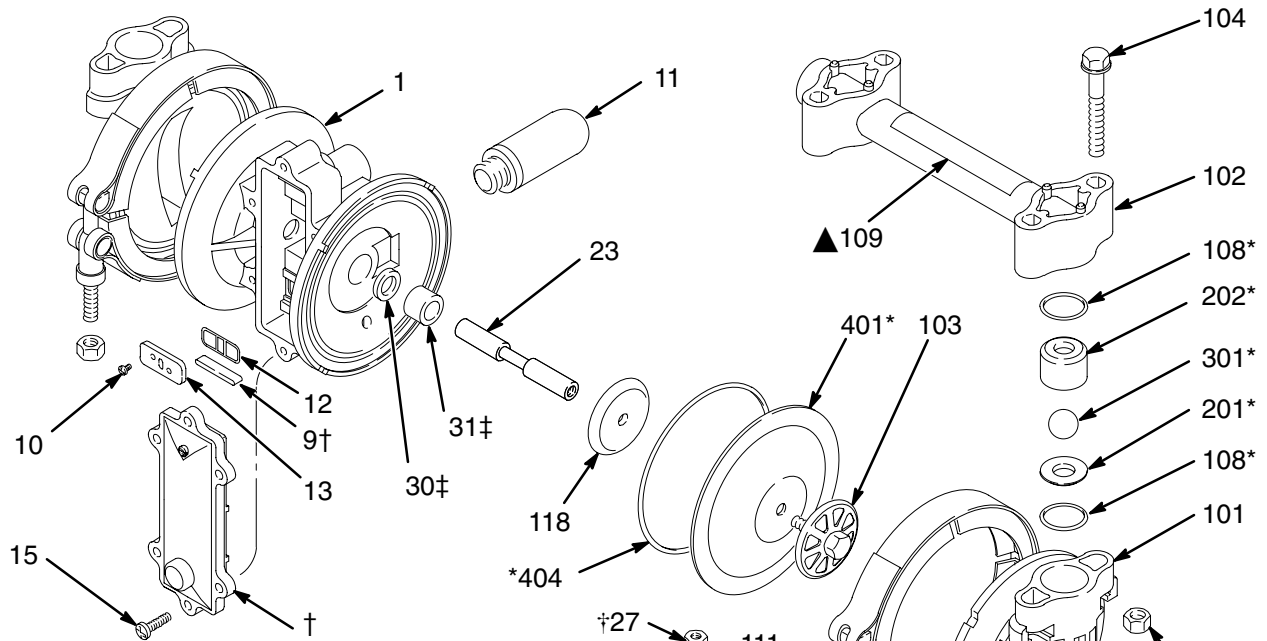
Repair Kits may only be ordered as kits. To repair the air valve, order **Part No. 819.6864** (see page 26). Parts included in the Air Valve Repair Kit are marked with a symbol in the parts list, for example (2†). The list of existing Repair Kits is below:

Part No.	O-Rings	Seats	Balls	Diaphragms
819.0074	TEF	NUL	NUL	TEF
819.0075	TEF	NUL	NUL	HYT
819.0076 ■	TEF	NUL	NUL	BUN
819.0097	TEF	ACE	TEF	NUL
819.0098	TEF	ACE	TEF	TEF
819.0102	TEF	ACE	316	NUL
819.0105	TEF	ACE	HYT	NUL
819.0107	TEF	ACE	HYT	HYT
819.0109 ■	TEF	ACE	BUN	NUL
819.0112	TEF	ACE	BUN	BUN
819.0118	TEF	316	TEF	TEF
819.0117	TEF	316	TEF	NUL
819.0121	TEF	316	316	NUL
819.0122	TEF	316	316	TEF
819.0124	TEF	316	316	BUN
819.0137	TEF	POL	TEF	NUL
819.0138	TEF	POL	TEF	TEF
819.0145	TEF	POL	HYT	NUL
819.0147	TEF	POL	HYT	HYT
819.0149 ■	TEF	POL	BUN	NUL
819.0152	TEF	POL	BUN	BUN
819.5442 ■	TEF	316	316	SAN

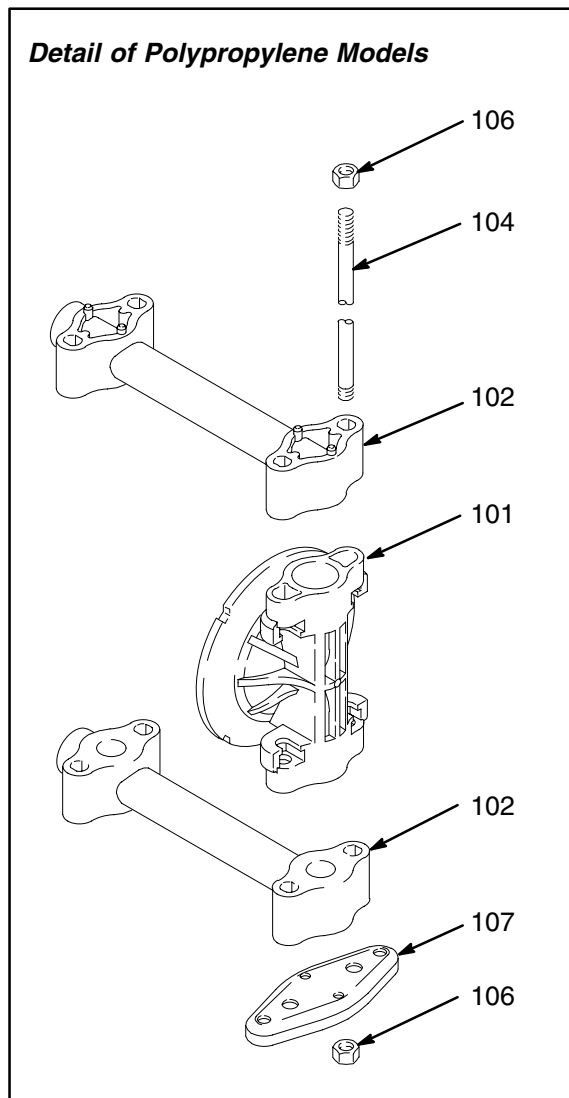
ACE = Acetal BUN = Buna-N HYT = Hytrel POL = Polypropylene 316 = 316 sst TEF = PTFE NUL = Null

Parts

Acetal Model Shown



Detail of Polypropylene Models



* Included in Pump Repair Kit, which may only be purchased as a kit. See page 23.

† Included in Air Valve Kit 819.6864, which may only be purchased as a kit. See parts list on page 26.

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

‡ Not supplied with polypropylene pump..

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

01429E

Parts

Fluid Section Parts List

Fluid section material	Ref. No.	Part No.	Description	Qty	
A C E T A L	101	819.0188	COVER, fluid; acetal with conductive sst fibers	2	
	102	819.0189	MANIFOLD; acetal with conductive sst fibers	2	
	103	819.0190	PLATE, fluid side; acetal	2	
	104	819.0191	BOLT; 5/16–18; 57 mm long	8	
	105	None	Not Used	0	
	106	819.9748	NUT; 5/16–18	8	
	107	819.0193	FEET	2	
	108	819.0194	O-RING; PTFE	8	
	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	
	119	819.6355	TAG, re-torque	1	
	P O L Y P R O P Y L E N E	101	819.0200	COVER, fluid; polypropylene	2
		102	819.0201	MANIFOLD; polypropylene	2
		103	819.0202	PLATE, fluid side; polypropylene	2
		104	819.0203	ROD, tie; 5/16–18	4
		105	None	Not Used	0
106		819.9748	NUT; 5/16–18	8	
107		819.0193	FEET	2	
108		819.0194	O-RING; PTFE	8	
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		
119	819.6355	TAG, re-torque	1		

Ball Parts List

Ref. No.	Part No.	Description	Qty
301*	819.0210	BALL; PTFE	4
301*	819.0211	BALL; 316 stainless steel	4
301*	819.0212	BALL; Hytrel	4
301*	819.0213	BALL; buna-N	4

Seat Parts List

Seat material	Ref. No.	Part No.	Description	Qty
A C E T A L	201*	819.0205	SEAT; acetal	4
	202*	819.0206	GUIDE; acetal	4
3 1 6 S S T	201*	819.0207	SEAT; 316 stainless steel	4
	202*	819.0206	GUIDE; acetal	4
P O L Y P R O P Y L E N E	201*	819.0208	SEAT; polypropylene	4
	202*	819.0209	GUIDE; polypropylene	4

Diaphragm Parts List

Diaphragm material	Ref. No.	Part No.	Description	Qty
P T F E	401*	819.0214	DIAPHRAGM; PTFE	2
	404*	819.0217	O-RING; buna-N	2
H Y T R E L	401*	819.0218	DIAPHRAGM; Hytrel	2
	404*	819.0217	O-RING; buna-N	2
B U N A - N	401*	819.0219	DIAPHRAGM; buna-N	2
	404*	819.0217	O-RING; buna-N	2

Parts

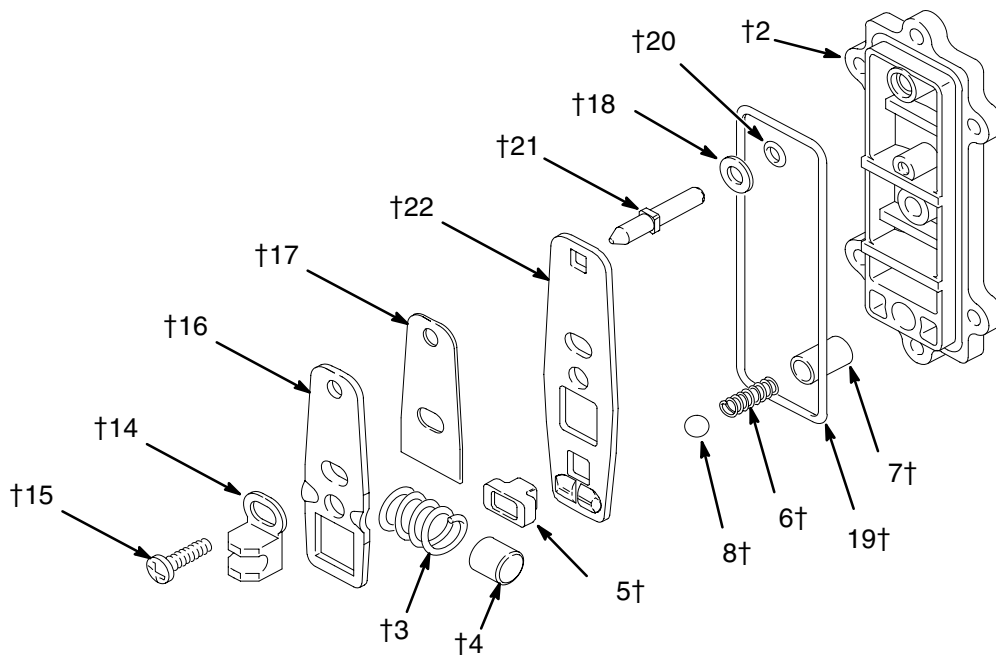
Air Motor Parts List

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 24	7

Ref. No.	Part No.	Description	Qty
16†	819.0176	LINK, actuator; sst	1
17†	819.0177	SPACER, link; acetal	1
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; Viton	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).

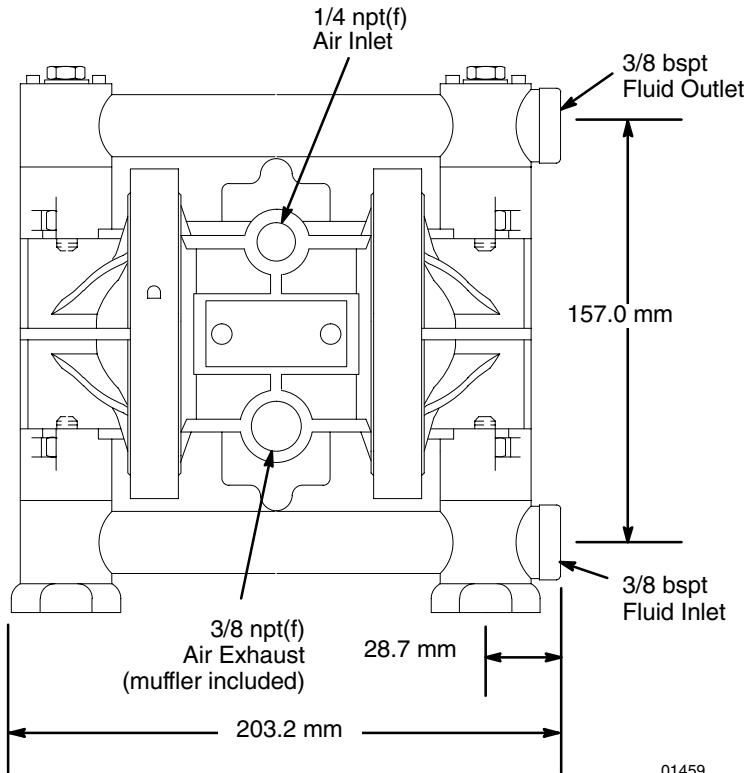
‡ These parts are included in Diaphragm Shaft Kit 819.6349, which may be purchased separately.



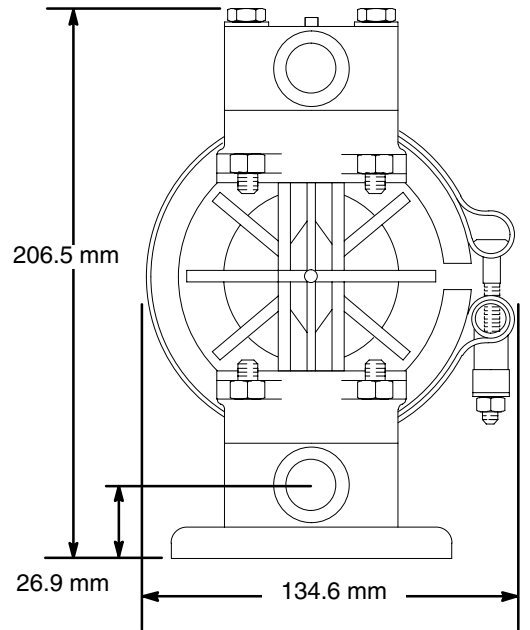
01431A

Dimensions

FRONT VIEW

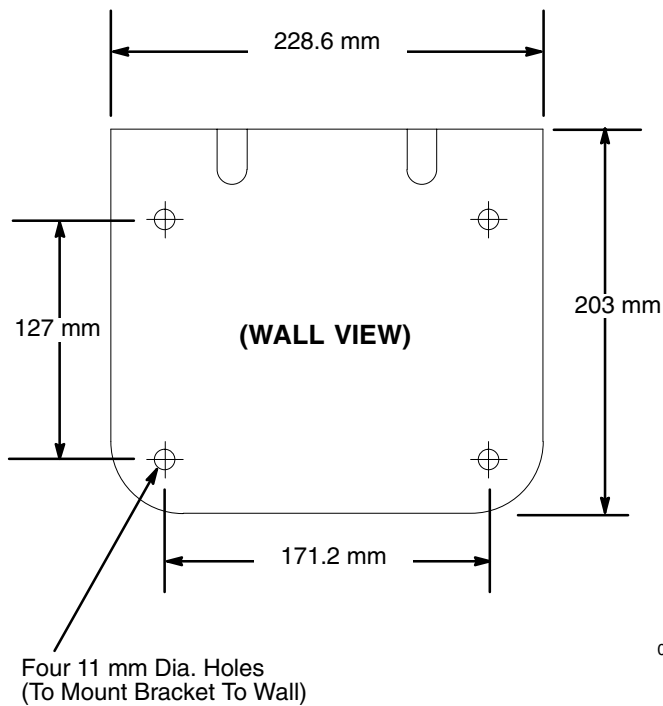


SIDE VIEW

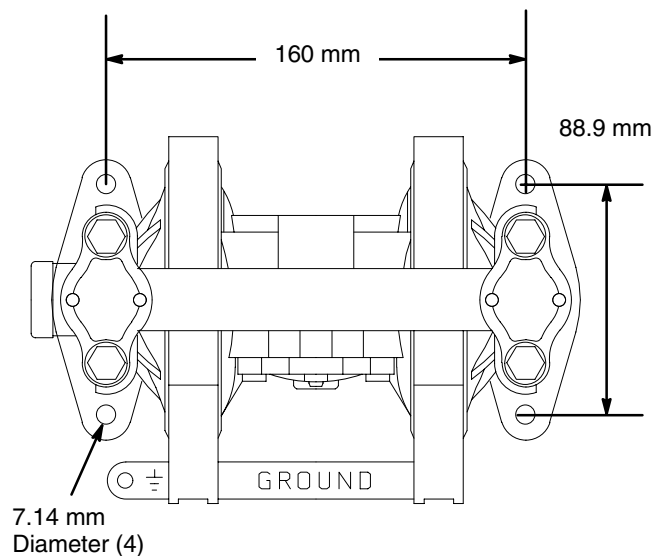


Mounting Hole Layouts

WALL BRACKET 819-5951



VERDERAIR VA 10 PUMP (TOP VIEW)



Technical Data

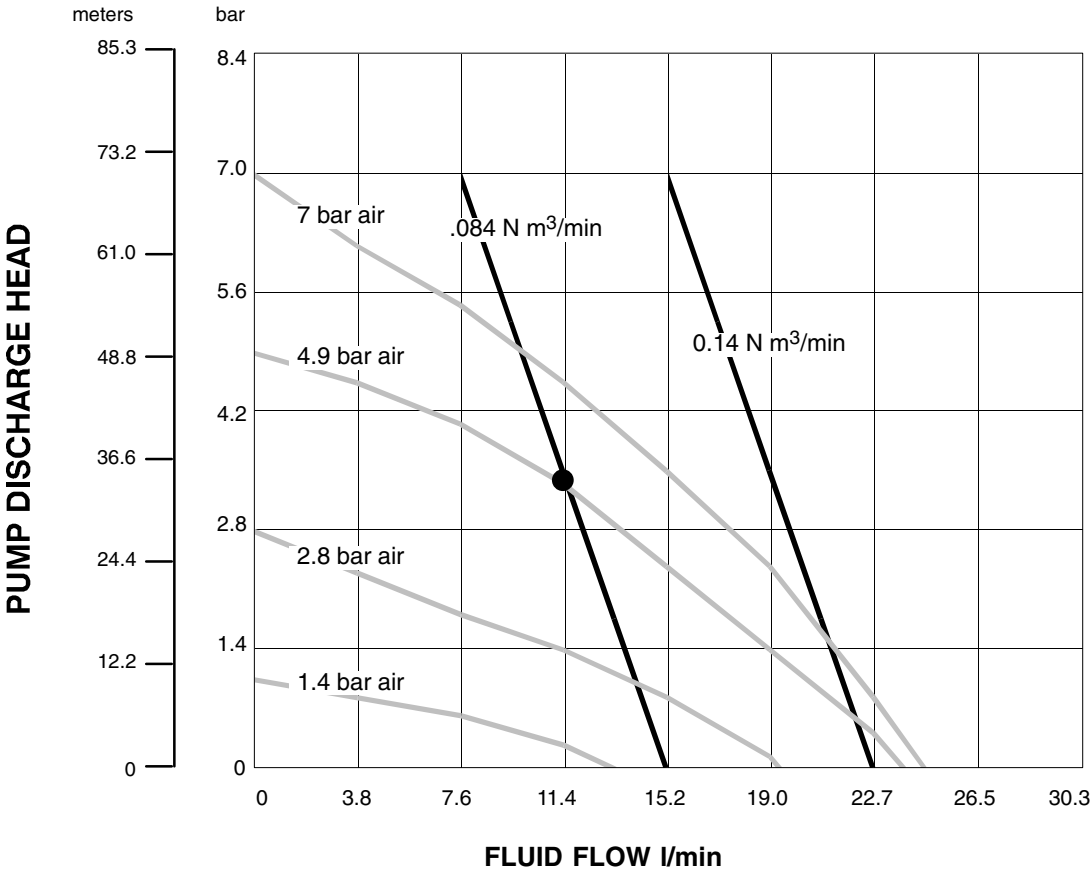
Pumps with Hytrel® or Buna-N Diaphragms

Maximum Fluid Working Pressure 7 bar
 Air Pressure Operating Range 1.4–7 bar
 Maximum Air Consumption 0.15 N m³/min (see chart)
 Maximum Free Flow Delivery 26.5 l/min
 Maximum Pump Speed 330 cpm
 Maximum Suction Lift 3.7 m dry; 6.4 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 4.4–65.5°C
 Air Inlet Size 1/4 npt(f)
 Fluid Inlet and Outlet Size 3/8 bspt

Wetted Parts Vary by model. See pages 26–25.
 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.
 Viton® is a registered trademark of the DuPont Co.
 Loctite® is a registered trademark of the Loctite Corporation.

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 .084 N m³/min air consumption at 4.9 bar inlet air pressure.

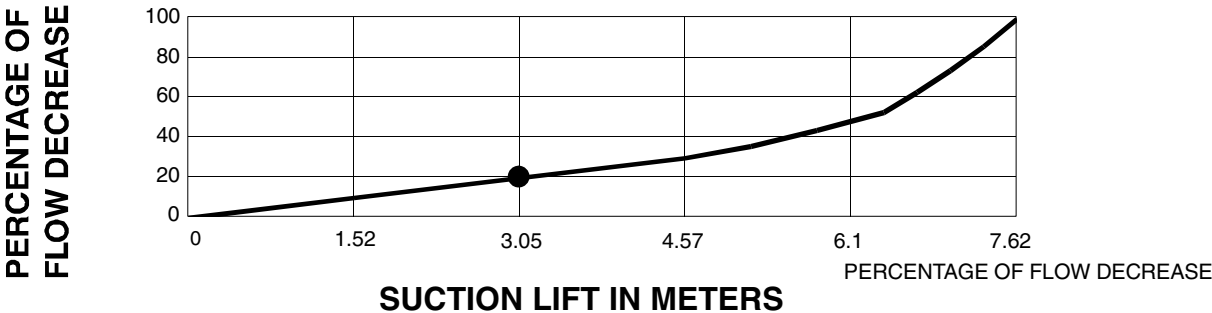


TEST CONDITIONS
 Pump tested in water with inlet submerged.

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.

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.

EC-DECLARATION OF CONFORMITY

EU-OVERENSSTEMMELSESERKLÆRING, EYILMOITUS YHTÄPITÄVYYDESTÄ, CE-DECLARATION DE CONFORMITE, EG-ÜBEREN STIMMUNG SERKLÄRUNG, DICHIARAZIONE DI CONFORMITÀ-CE, EG-VERKLARING VAN O VEREENSTEMMING, EC-DECLARACÃO DE CONFORMIDADE, EC-DECLARACIÓN DE CONFORMIDAD, EG-DECLARATION OM ÖVERENSSTÄMMELSE, ΔΗΛΩΣΗ ΣΥΜΜΟΡΦΩΣΗΣ-ΕΚ

Model

Model, Malli, Modèle, Modell, Modello, Model, Modelo, Modelo, Model, Μοντέλο

VERDERAIR VA 10

Part No.

Part No., Osanro, Référence, Teile-Nr., Parte Codice, Part Nr., Peça No., Referencia, Part No., Αρ. Ανταλλακτικού

810.0001 to 810.0072

This Product Complies With The Following European Community Directives:

Dette produkt opfylder kravene i de følgende direktiver af det Europæiske Fællesskab, Tämä tuote on yhtäpitävä ministerineuvoston allamainittun direktiivin vaatimusten kanssa, Ce produit se conforme aux directives de la Communauté Européenne suivantes, Dieses Produkt entspricht den nachstehend aufgeführten Richtlinien der Europäischen Union, Questo prodotto si conforma ai seguenti direttivi della Comunità europea, Dit produkt voldoet aan de volgende richtlijnen van de Europese Gemeenschap, Este Produto Cumpre As Seguintes Directivas das Comunidades Europeias, Este producto cumple con las directivas siguientes de la Comunidad Económica Europea, Denna Product Överensstämmer Med Kraven Ministerrådets Direktiv Enligt Följande, Το Προϊόν Αυτό Έχει Κατασκευαστεί Σύμφωνα Με Τις Παρακάτω Κοινοτικές Οδηγές:

98/37/EC Machinery Directive

94/9/EC ATEX Directive (Ex II 2 G EEx c IIA T6)

The Following Standards Were Used To Verify Compliance With The Directives:

De følgende standarder blev anvendt som bekræftelse på at direktivernes bestemmelser overholdes, Alla oleva standardia on käytetty vahvistamaan yhtäpitävyyttä direktiivin kanssa, Les normes suivantes ont été appliquées pour vérifier que ce produit se conforme aux directives, Die folgenden Normen garantieren die Übereinstimmung mit diesen Richtlinien, Sono state usate le seguenti norme per verificare la conformità ai direttivi, De overeenstemming met de richtlijnen werd gecontroleerd aan de hand van de volgende normen, Para Verificar A Conformidade Com As Directivas Utilizaram-se As Seguintes Normas, Las normas siguientes han sido utilizadas para verificar que el producto cumpla con las directivas correspondientes, Följande standard Har Använts För Att Bestyrka Överensstämmelse Med Direktiven, Ως Κριτήρια Τήρησης Των Οδηγιών χρησιμοποιήθηκαν Τα Παρακάτω Πρότυπα:

EN 292 EN 1127-1 EN 13463-1

ISO 9614-1

EC Notified Body:

EU Bemyndigede Organer, Tiedon Antava Vranomainen, Organisme Agrée, EG Anerkantes Organ, Ente-CE notificato, EG Aangemelde Instantie, Organismo Reconhecido pela CE, Organismo Certificado por la CE, Underrätad EG Myndighet, Ενήμερο Κοινοτικό Όργανο

0359

Approved By:

Attesteret Ved, Todistaa, Approuvée Par, Genehmigt Durch, Approvato da, Goedgekeurd Door, Para Aprovação, Aprobado por, Ihtygas Av, Έγκρίθηκε Από



Date

Dato, Päri väys, Date, Datum, Data, Datum, Data, Jecha, Datum, Ημερομηνία

19May2004

Frank Meersman

DIRECTOR (Print)

Date

Dato, Päri väys, Date, Datum, Data, Datum, Data, Jecha, Datum, Ημερομηνία

19May2004

Verder Ltd.
Whitehouse street
Leeds LS10 1AD
Great Britain

Part No. : 819.5964

Austria

VERDER Ges. mbH Austria
Perfektasstrasse 86
A-1232 Wien
Tel. 0222-8651074-0
Fax 0222-8651076

Belgium

VERDER Belgium N.V.
Industrieterrein Den Hoek
Bijkhoevelaan 3
B-2110 Wijnegem
Tel. 03-3263336
Fax 03-3263650

Czech Republic

VERDER Praha s.r.o.
Pod pekàrnami 15
CZ-19000 Praha 9
Tel. 02-6603 21 17
Fax 02-6603 21 15

U.S.A

VERDER Inc
PO Box 364
Pocopson, PA
Tel. 610 793 4250
Fax 610 793 4333

Germany

VERDER Deutschland GmbH
Rheinische StraÙe 43
PO Box 1739
D-42781 Haan
Tel. 02129-9342-0
Fax 02129-9342-60

France

POMPES VERDER s.a.r.l.
Rue de Bouvreill
F-95610 Eragny sur Oise
Tel. 01 34 64 31 11
Fax 01 34 64 44 50

The Netherlands

VERDER VLEUTEN B.V.
Utrechtseweg 4a
PO box 1
NL-3450 AA Vleuten
Tel. 030-6779230
Fax 030-6773945

Poland

VERDER Polska Sp. z o.o
ul. Kamienskiego 201-219
PL-51-124 Wroclaw, Polska
Tel. 0 71726158 w.e.w. 59
Fax 0 71726474

Romania

VERDER Romania s.r.l.
Soseaua Viilor no.79
RO-Sector 5, Bucuresti
Tel. 01-335 45 92
Fax 01-337 33 92

United Kingdom

VERDER LTD.
Whitehouse Street
Leeds GB-LS10 1AD
Tel. 0113-244 61 11
Fax 0113-246 56 49