

Air-Operated Diaphragm Pumps

819.0254

Rev. L
EN

Intended for use in accordance with the United States Flammable and Combustible Liquids Code (NFPA 30) and the Automotive and Marine Service Station Code (NFPA 30A).
For professional use only.

VERDER AIR VA 25

Evacuation and Transfer Pumps

120 psi; 0.84 MPa; 8.4 bar Maximum Fluid Working Pressure
120 psi; 0.84 MPa; 8.4 bar Maximum Air Input Pressure

Part No. 810.0780*

with TPE diaphragms and seats, acetal balls

Part No. 810.0930*

with TF diaphragms and balls, fluoroelastomer seats

Patent No.
CN ZL94102643.4
FR 9408894
JA 3517270
US 5,368,452



Important Safety Instructions

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



This symbol on the nameplate means the product is listed by Underwriters Laboratories Inc. (UL Standard No. 79, Standard for Power-Operated Pumps for Petroleum Product Dispensing Systems).

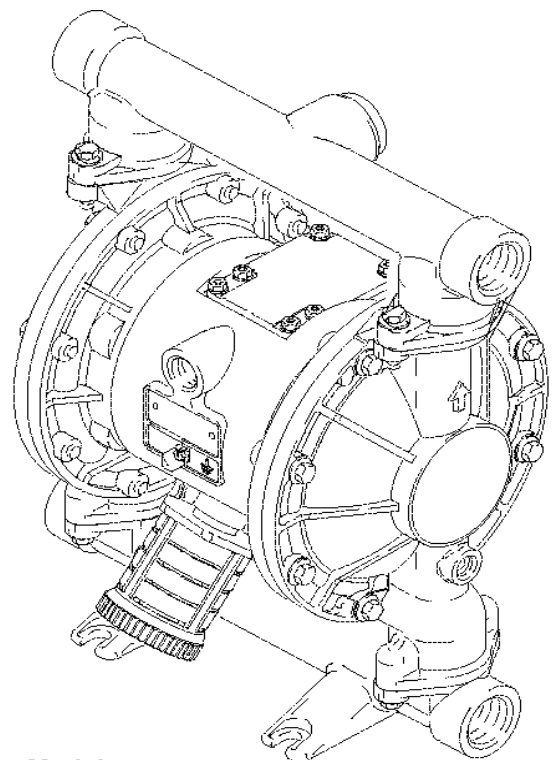


*

II 2 GD

Ex h IIC 66°C...135°C Gb

Ex h IIIC T135°C Db



Model 810.0780

02632B



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.

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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 your VERDER distributor.
- Do not alter or modify this equipment.
- Check equipment daily. Repair or replace worn or damaged parts immediately.
- Do not exceed the maximum working pressure of the lowest rated component in your system. Refer to the **Technical Data** on page 26 for the maximum working pressure of your equipment.
- 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 kink or overbend hoses or use hoses to pull equipment.
- Route hoses away from traffic areas, sharp edges, moving parts, and hot surfaces. Do not expose VERDER hoses to temperatures above 82°C (180°F) or below -40°C (-40°F).
- Wear hearing protection when operating this equipment.
- Do not lift pressurized equipment.
- Comply with all applicable local, state, and national fire, electrical, and safety regulations.
- Never use 1,1,1-trichloroethane, methylene chloride, other halogenated hydrocarbon solvents or fluids containing such solvents in pressurized aluminum equipment. Such use could result in a chemical reaction, with the possibility of explosion.



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.
- **Never** use an acetal pump to pump acids. 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.



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.
- 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.
- Keep a fire extinguisher in the work area.

Installation

General Information


- The Typical Installations shown in **Fig. 2 to Fig. 4** are only guides for selecting and installing system components. Contact your VERDER distributor for assistance in planning a system to suit your needs.
- Reference numbers and letters in parentheses refer to the callouts in the figures and the parts lists on pages 23 to 24.
- Installation and use must be in accordance with the Flammable and Combustible Liquids Code (NFPA 30) and Automotive and Marine Service Station Code (NFPA 30A) and must comply with all local, state, and federal codes.
- All pipe joints are to be made tight with UL listed gasoline-resistant pipe compound.
- *Solvent pails:* Ground all solvent pails used when flushing, according to 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:* ground according to local code.
- *Suction device nozzle:* must be bonded to metal container from which it is suctioning by firm metal-to-metal contact to a properly grounded suction hose and pump.
- *Piping, valves, and fittings:* use only electrically conductive materials. Bond and ground per code.

Tightening Screws Before First Use

Before using the pump for the first time, check and retorque all external fasteners. See **Torque Sequence** on page 25. After the first day of operation, retorque the fasteners. Although pump use varies, a general guideline is to retorque fasteners every two months.

Grounding

⚠ WARNING



FIRE AND EXPLOSION HAZARD
Before operating the pump, ground the system as explained below. Also read the section **FIRE AND EXPLOSION HAZARD** on page 4.

- *Pump:* loosen the grounding screw (W). Insert one end of a 12 ga (1.5 mm²) minimum ground wire (Y) behind the grounding screw and tighten the screw securely. See **Fig. 1**. Connect the clamp end of the ground wire to a true earth ground. Order Part No. 819.0157 Ground Wire and Clamp.
- *Air and fluid hoses:* use only grounded hoses with a maximum of 500 ft (150 m) combined hose length to ensure grounding continuity.
- *Air compressor:* follow manufacturer's recommendations.

Check your system electrical continuity after the initial installation, and then set up a regular schedule for checking continuity to be sure proper grounding is maintained.

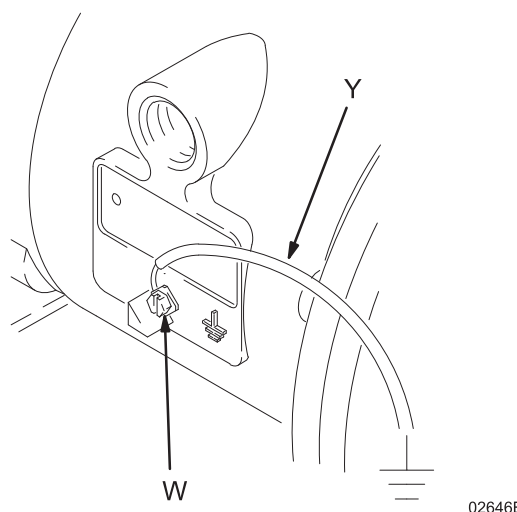


Fig. 1

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Installation

Mountings

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.

- Be sure the mounting surface can support the weight of the pump, hoses, and accessories, as well as the stress caused during operation.
- For all mountings, be sure the pump is bolted directly to the mounting surface.
- For ease of operation and service, mount the pump so the air valve cover (2), air inlet, and fluid inlet and outlet ports are easily accessible.
- Rubber Foot Mounting Kit 819.4333 is available to reduce noise and vibration during operation.

WARNING

To reduce the risk of serious injury, splashing in the eyes or on the skin, and toxic fluid spills, never move or lift a pump under pressure. If dropped, the fluid section may rupture. Always follow the **Pressure Relief Procedure** on page 11 before moving or lifting the pump.

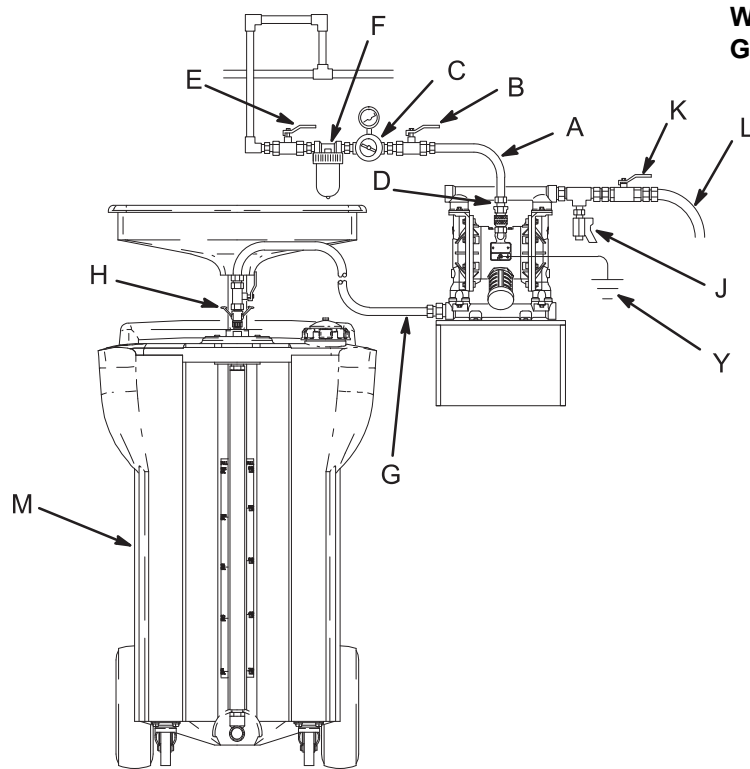
Air Line

WARNING

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

1. Install the air line accessories as shown in **Fig. 2 to Fig. 4** on pages 7 and 8. Mount these accessories on the wall or on a bracket. Be sure the air line supplying the accessories is grounded.
 - a. Install an air regulator (C) and gauge to control the fluid pressure. The fluid outlet pressure at stall will be the same as the setting of the air regulator.
 - 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 a grounded, flexible air hose (A) between the accessories and the 1/2 npt(f) pump air inlet (N). See **Fig. 6**. Use a minimum 1/2 in. (13 mm) ID air hose. Screw an air line quick disconnect coupler (D) onto the end of the air hose (A), and screw the mating fitting into the pump air inlet snugly. Do not connect the coupler (D) to the fitting until you are ready to operate the pump.

Installation



Waste Oil Receiver Evacuation System, or General Fluid Transfer Application

KEY FOR FIG. 2

- A Air supply line
- B Bleed-type master air valve (required for pump)
- C Air regulator
- D Air line quick disconnect
- E Master air valve (for accessories)
- F Air line filter
- G Fluid suction line
- H Fluid line quick disconnect
- J Fluid drain valve (required)
- K Fluid shutoff valve
- L Fluid line
- M Waste oil receiver
- Y Ground wire (required; see page 5 for installation instructions)

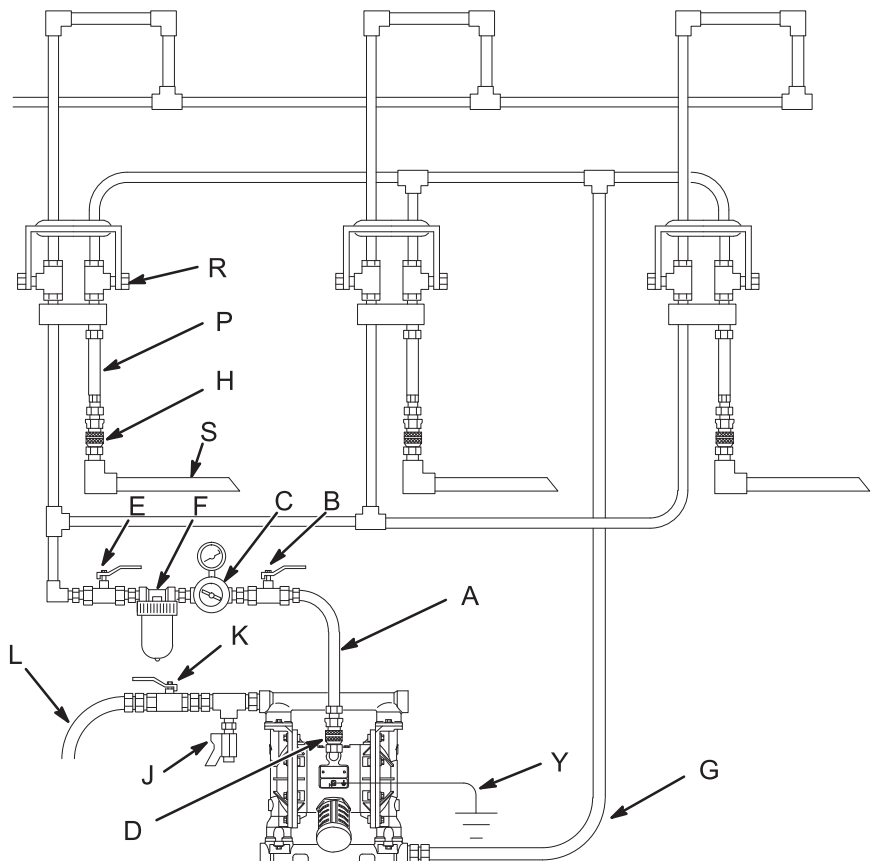
03541C

Fig. 2

Gear Oil Evacuation System

KEY FOR FIG. 3

- A Air supply line
- B Bleed-type master air valve (required for pump)
- C Air regulator
- D Air line quick disconnect
- E Master air valve (for accessories)
- F Air line filter
- G Fluid suction line
- H Fluid line quick disconnect
- J Fluid drain valve (required)
- K Fluid shutoff valve
- L Waste oil line (to storage tank)
- P Suction hose
- R Control valve
- S Suction wand
- Y Ground wire (required; see page 5 for installation instructions)



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Fig. 3

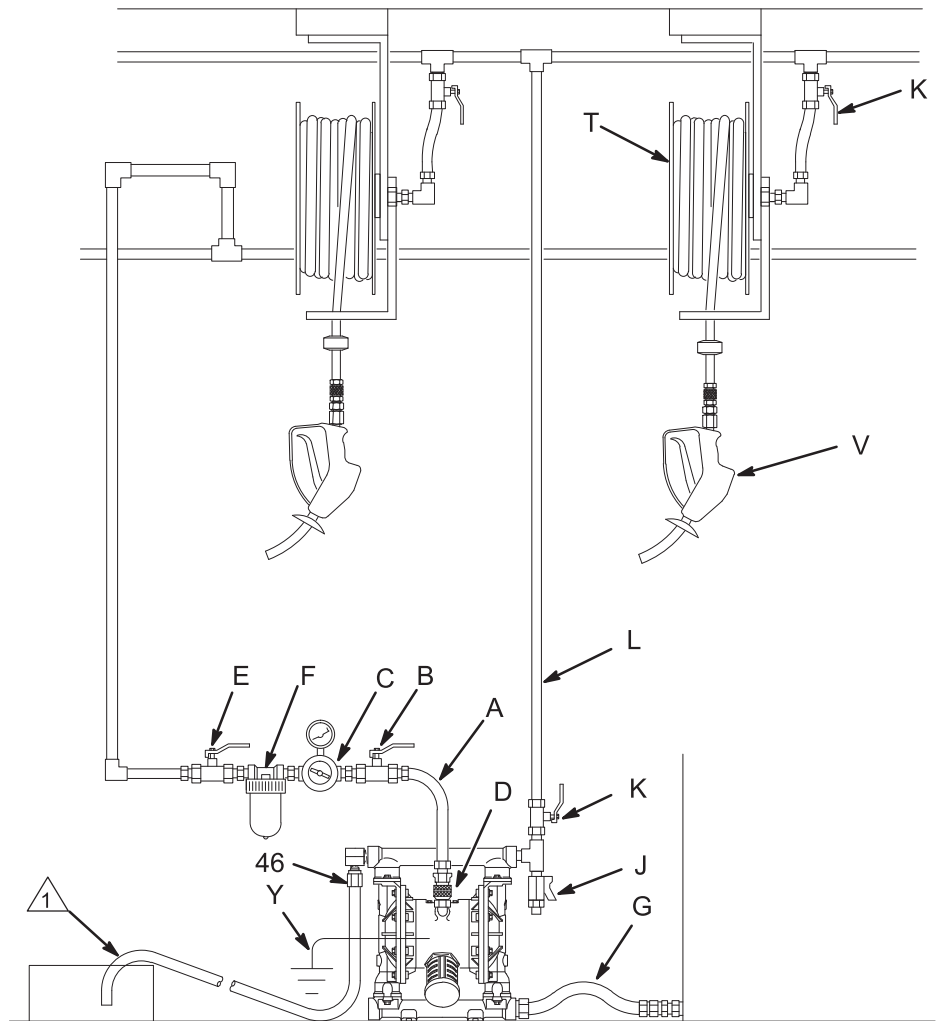
Installation

Fuel Dispense System

KEY FOR FIG. 4

- A Air supply line
- B Bleed-type master air valve (required for pump)
- C Air regulator
- D Air line quick disconnect
- E Master air valve (for accessories)
- F Air line filter
- G Fluid suction line
- J Fluid drain valve (required)
- K Fluid shutoff valve
- L Fluid line
- T Hose reel
- V Fuel dispense valve
- Y Ground wire (required; see page 5 for installation instructions)
- 46 Pressure relief valve (required to limit fluid outlet pressure to 50 psi [350 kPa, 3.5 bar])

1 Fluid from the relief valve (46) must be vented to a safe area.



03543B

Fig. 4

Pressure Relief Valve (Fuel Dispense Systems)

⚠ WARNING

Fuel Dispense Model 810.0781 requires a pressure relief valve 819.0252 (46), which is supplied with the pump, to prevent fluid pressure from exceeding 50 psi (350 kPa, 3.5 bar). Do not exceed the maximum air inlet pressure of 50 psi (350 kPa, 3.5 bar). Recommended air operating pressure is 40 psi (280 kPa, 2.8 bar) or less. As the air inlet pressure approaches 50 psi (350 kPa, 3.5 bar), the relief valve will open and vent fluid. Vented fluid must be routed to a container in a safe place.

Changing the Orientation of the Fluid Inlet and Outlet Ports

If desired, you can easily change the orientation of the fluid inlet and outlet ports. See Fig. 6.

1. Remove the screws (6) holding the inlet and/or outlet manifold (1, 3) to the covers (2).
2. Reverse the manifold and reattach. Install the screws and torque to 120 to 150 in-lb (14–17 N•m). See **Torque Sequence** on page 25.

Installation

Air Exhaust Ventilation

⚠ WARNING

Be sure to read and follow the **TOXIC FLUID HAZARD** and **FIRE AND EXPLOSION HAZARD** warnings 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 area, and all sources of ignition when pumping flammable or hazardous fluids.

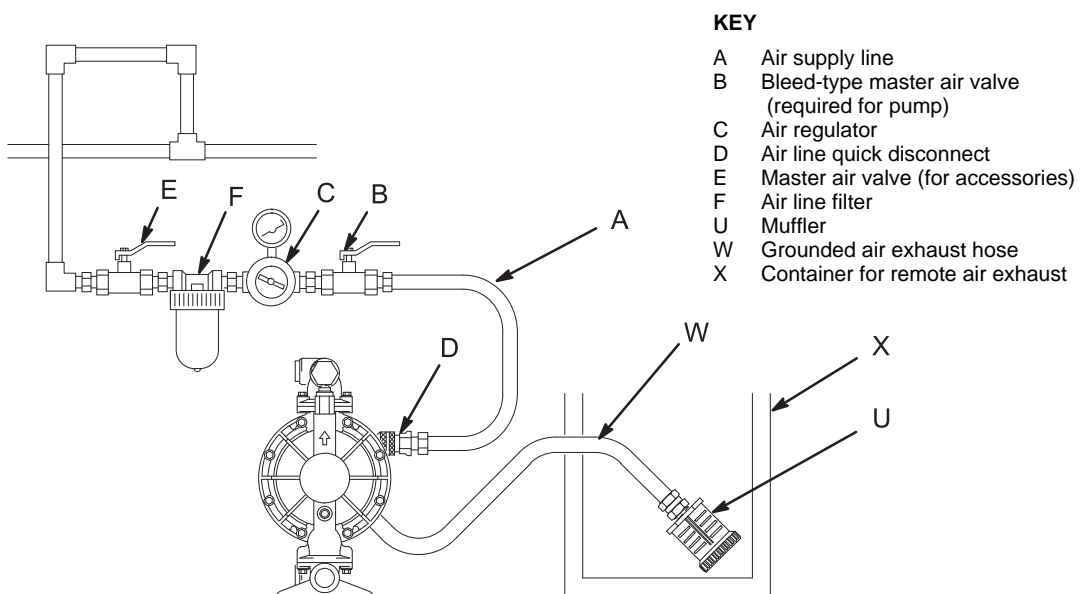
Diaphragm failure will cause the fluid being pumped to exhaust with the air. Place an appropriate container at the end of the air exhaust line to catch the fluid. See **Fig. 5**.

The air exhaust port is 3/4 npt(f). Do not restrict the air exhaust port. Excessive exhaust restriction can cause erratic pump operation.

To provide a remote exhaust:

1. Remove the muffler (U) from the pump air exhaust port.
2. Install a grounded air exhaust hose (W) and connect the muffler (U) to the other end of the hose. The minimum size for the air exhaust hose is 3/4 in. (19 mm) ID. If a hose longer than 15 ft (4.57 m) is required, use a larger diameter hose. Avoid sharp bends or kinks in the hose.
3. Place a container (X) at the end of the air exhaust line to catch fluid in case a diaphragm ruptures. See **Fig. 5**. Locate the container away from all sources of ignition, including pilot lights and waste materials. If the diaphragm ruptures, the fluid being pumped will exhaust with the air.

VENTING EXHAUST AIR



03539

Fig. 5

Installation

Fluid Pressure Relief Kit (for Pump Model 810.0780 only)

⚠ Caution

Pressure Relief Kit 819.6479 (Z) is available, to prevent overpressurization and rupture of the pump or hose. See **Fig. 6**. The kit includes instructions.

This kit is not for use in fuel dispense applications. Order a fuel dispense pump, Model 810.0781, which is equipped with a pressure relief valve 819.0252. See page 8.

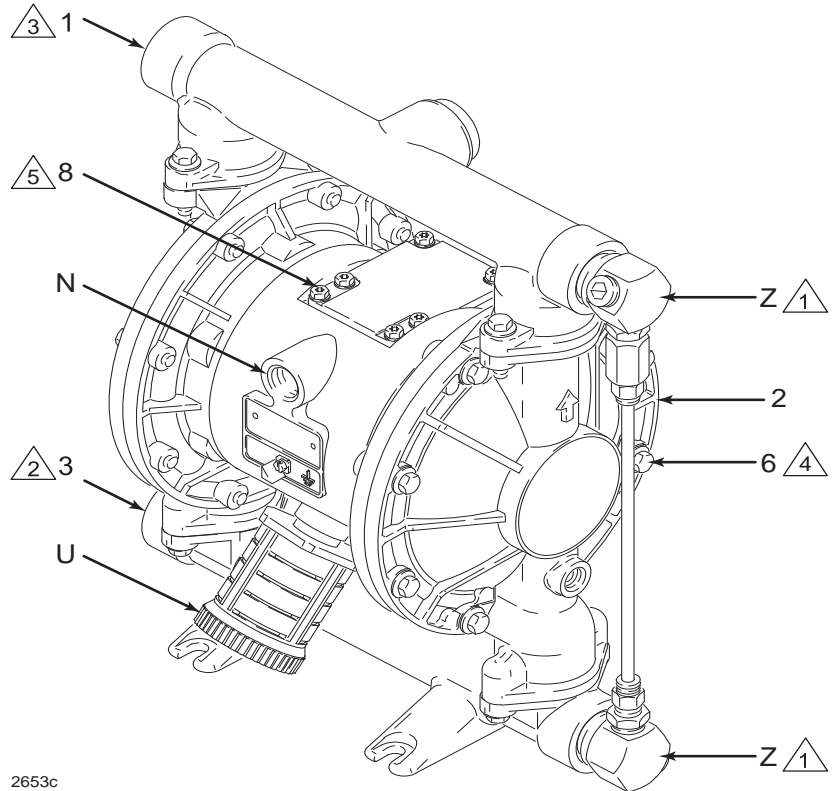
Thermal expansion of fluid in the outlet line can cause overpressurization. This can occur when using long fluid lines exposed to sunlight or ambient heat, or when pumping from a cool to a warm area (for example, from an underground tank).

Overpressurization can also occur if the VA 25 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

- 1 1 in. npt(f) optional fluid outlet port
- 2 Fluid covers
- 3 1 in. npt(f) optional fluid inlet port
- 6 Manifold and cover screws
- 8 Air valve screws
- N 1/2 in. npt(f) air inlet port
- U Muffler; air exhaust port is 3/4 in. npt(f)
- Z Pressure relief kit

- ⚠1 Apply medium-strength (blue) Loctite or equivalent to the threads and install kit between fluid inlet and outlet manifolds.
- ⚠2 Connect fluid inlet line here.
- ⚠3 Connect fluid outlet line here.
- ⚠4 Torque to 120 to 150 in-lb (14 to 15 N•m). See **Torque Sequence** on page 25. Apply medium-strength (blue) Loctite or equivalent to the threads.
- ⚠5 Torque to 50 to 60 in-lb (5.6 to 6.87 N•m).



2653c

Fig. 6

Operation

Pressure Relief Procedure

WARNING

PRESSURIZED EQUIPMENT HAZARD

The equipment stays pressurized until pressure is manually relieved. To reduce the risk of serious injury from pressurized fluid, accidental spray from the gun or splashing fluid, follow this procedure whenever you:

- Are instructed to relieve pressure
- Stop pumping
- Check, clean or service any system equipment
- Install or clean fluid nozzles

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 it thoroughly with a compatible solvent. Follow the steps under **Starting and Adjusting the Pump** on page 12.

Operation

Starting and Adjusting the Pump

All Systems

WARNING

To reduce the risk of serious injury, splashing in the eyes or on the skin, and toxic fluid spills, never move or lift a pump under pressure. If dropped, the fluid section may rupture. Always follow the **Pressure Relief Procedure** on page 11 before moving or lifting the pump.

1. Be sure the pump is properly grounded. Read and follow **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 on all male threads. Tighten the fluid inlet and outlet fittings securely.

NOTE: If the fluid inlet pressure to the pump is more than 25 percent of the outlet working pressure, the ball check valves will not close fast enough, resulting in inefficient pump operation.

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

Waste Oil Receiver Evacuation Systems, or General Fluid Transfer Applications (see Fig. 2)

1. Close the pump air regulator (C) and all bleed-type master air valves (B, E).
2. Connect the pump suction hose (G) to the pump fluid inlet. Attach a fluid quick coupler (H) to the other end of the hose, then connect the coupler to the outlet fitting of the waste oil receiver (M).
3. Place the end of the fluid hose (L) into an appropriate container.
4. Close the fluid drain valve (J). Open the fluid shutoff valve (K).
5. Connect the air side quick coupler (D) to the pump air inlet fitting.
6. Open all bleed-type master air valves (B, E).
7. Slowly increase air with the air regulator (C) 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.
8. Adjust the air regulator. Do not use higher air pressure than necessary for the pump to provide good suction. Increasing the pump cycle rate does not necessarily improve suction.

Gear Oil Evacuation Systems (see Fig. 3)

1. Close the pump air regulator (C) and all bleed-type master air valves (B, E).
2. Attach an appropriate wand (S) to the suction hose (P). Place the wand in the differential or fluid to be pumped.
3. Place the end of the fluid hose (L) into an appropriate container.
4. Close the fluid drain valve (J). Open the fluid shutoff valve (K).
5. Connect the air side quick coupler (D) to the pump air inlet fitting.
6. Open all bleed-type master air valves (B, E).
7. Set the air regulator (C) to about 50 psi (3.5 bar).
8. Pull the control valve handle (R) down to start the pump.
9. Adjust the air regulator. Allow the pump to cycle slowly until all air is pushed out of the lines and the pump is primed. Do not use higher air pressure than necessary for the pump to provide good suction. Increasing the pump cycle rate does not necessarily improve suction.
10. Push the control valve handle (R) up when finished. Place the wand (S) in the holder on the control valve.

NOTE: Be sure the control valve handle (R) is closed when evacuation is completed. Failure to close it may prevent other service bays from developing full suction.

Pump Shutdown (All Systems)

WARNING

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

At the end of the work shift and before checking, adjusting, cleaning, or repairing the system, **relieve the pressure.**

Maintenance

Lubrication

The air valve is designed to operate unlubricated. 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 11.

Flush the pump often enough to prevent the fluid you are pumping from drying or freezing in the pump and damaging it. Always flush the pump and relieve the pressure before storing it for any length of time. Use a compatible solvent.

Tightening Threaded Connections

Before each use, check all hoses for wear or damage, and replace as necessary. Check to be sure all threaded connections are tight and leak-free. Check fasteners. Tighten or retorque as necessary. Although pump use varies, a general guideline is to retorque fasteners every two months. See **Torque Sequence** on page 25.

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.

Relieve the pressure before checking or servicing the equipment.

Check all possible problems and causes before disassembling the pump.

PROBLEM	CAUSE	SOLUTION
Pump cycles at stall or fails to hold pressure at stall.	Worn check valve balls (16) or seats (17).	Replace. See page 17.
Pump will not cycle, or cycles once and stops.	Air valve is stuck or dirty.	Disassemble and clean air valve. See pages 15 and 16. Use filtered air.
	Check valve ball (16) severely worn and wedged in seat (17) or manifold (1 or 3).	Replace ball and seat. See page 17.
	Check valve ball (16) is wedged into seat (17), due to overpressurization.	Install Pressure Relief Kit (see page 10).
	Dispensing valve clogged.	Relieve pressure and clear valve.
Pump operates erratically.	Clogged suction line.	Inspect; clear.
	Sticky or leaking check valve balls (16).	Clean or replace. See page 17.
	Diaphragm (29) ruptured.	Replace. See pages 18 to 20.
	Restricted exhaust.	Remove restriction.
Pump will not operate.	Foreign material in ball checks.	Clean ball check area.
Air bubbles in fluid.	Suction line is loose.	Tighten.
	Diaphragm (29) ruptured.	Replace. See pages 18 to 20.
	Loose manifolds (1, 3), or damaged seal between manifold and seat (17).	Tighten manifold bolts (6) or replace seats (17). See page 17.
	Loose diaphragm shaft bolt (21).	Tighten. See pages 18 to 20.
	Damaged o-ring (25).	Replace. See pages 18 to 20.
Fluid in exhaust air.	Diaphragm (29) ruptured.	Replace. See pages 18 to 20.
	Loose diaphragm shaft bolt (21).	Tighten. See pages 18 to 20.
	Damaged o-ring (25).	Replace. See pages 18 to 20.
Pump exhausts excessive air at stall.	Worn air valve block (13), o-ring (12), plate (14), pilot block (9), or o-ring (27).	Repair or replace. See pages 15 and 16.
	Worn shaft seals (22).	Replace. See pages 18 to 20.
Pump leaks air externally.	Air valve cover (7) or air valve cover screws (8) are loose.	Tighten screws. See page 16.
	Air valve gasket (10) or air cover gasket (32) is damaged.	Inspect; replace. See pages 15 and 16, 21 and 22.
	Air cover screws (6) are loose.	Tighten screws. See pages 21 and 22.
Pump leaks fluid externally from ball check valves.	Loose manifolds (1, 3), or damaged seal between manifold and seat (17).	Tighten manifold bolts (6) or replace seats (17). See page 17.
Relief valve relieving (Fuel Dispense Model 810.0781).	Air inlet pressure is too high.	Reduce inlet air pressure to below 50 psi (3.5 bar).
In evacuation application, pump is not drawing suction.	Pump should run at uniform speed.	Reduce inlet air pressure.

Service

Repairing the Air Valve

Tools Required

- Torque wrench
- Torx (T20) screwdriver or 7 mm socket wrench
- Needle-nose pliers
- O-ring pick
- Lithium base grease

NOTE: Air Valve Repair Kit 819.4274 is available. Refer to page 24. Parts included in the kit are marked with a symbol, for example (10†). Use all the parts in the kit for the best results.

Disassembly

⚠ WARNING

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

1. **Relieve the pressure.**
2. With a Torx (T20) screwdriver or 7 mm (9/32 in.) socket wrench, remove the six screws (8), air valve cover (7), and gasket (10). See **Fig. 7**.
3. Move the valve carriage (11) to the center position and pull it out of the cavity. Remove the valve block (13) and o-ring (12) from the carriage. Using a needle-nose pliers, pull the pilot block (9) straight up and out of the cavity. See **Fig. 8**.
4. Pull the two actuator pistons (30) out of the bearings (31). Remove the u-cup packings (22) from the pistons. Pull the push pins (26) out of the bearings (28). Remove the o-rings (27) from the push pins. See **Fig. 9**.
5. Inspect the valve plate (14) in place. If damaged, use a Torx (T20) screwdriver or 7 mm (9/32 in.) socket wrench to remove the three screws (8). Remove the valve plate (14) and seal (15). See **Fig. 10**.
6. Inspect the bearings (28, 31) in place. See **Fig. 9**. The bearings are tapered and, if damaged, must be removed from the outside. This requires disassembly of the fluid section. See page 21.
7. Clean all parts and inspect for wear or damage. Replace as needed. Reassemble as explained on page 16.

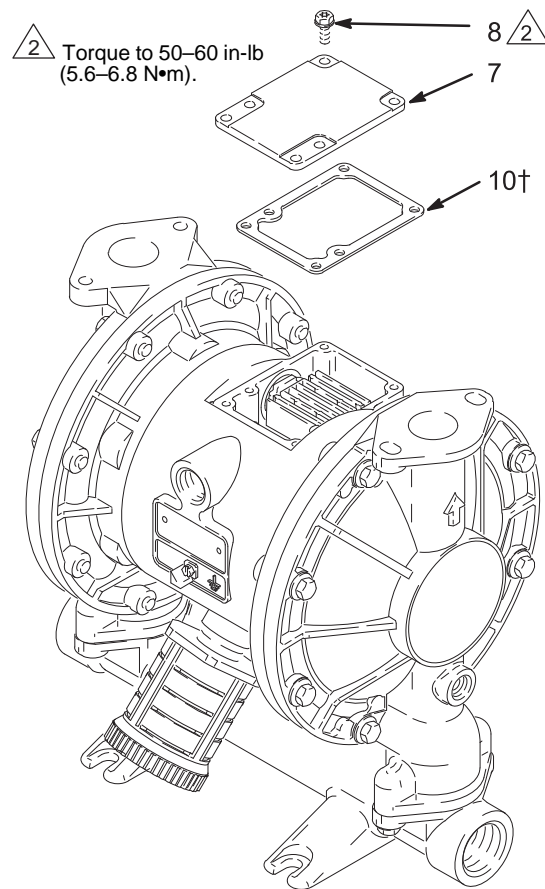


Fig. 7

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- 1 See Detail at right.
- 2 Grease.
- 3 Grease lower face.

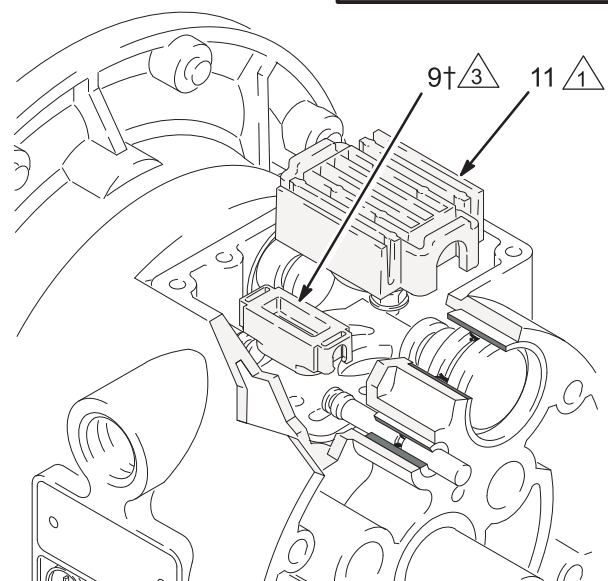
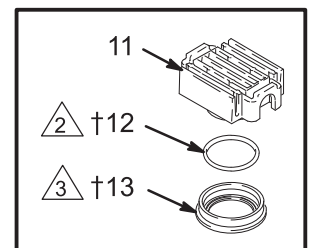


Fig. 8

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Service

- 1 Insert narrow end first.
- 2 Grease.
- 3 Install with lips facing narrow end of piston (30).
- 4 Insert wide end first.

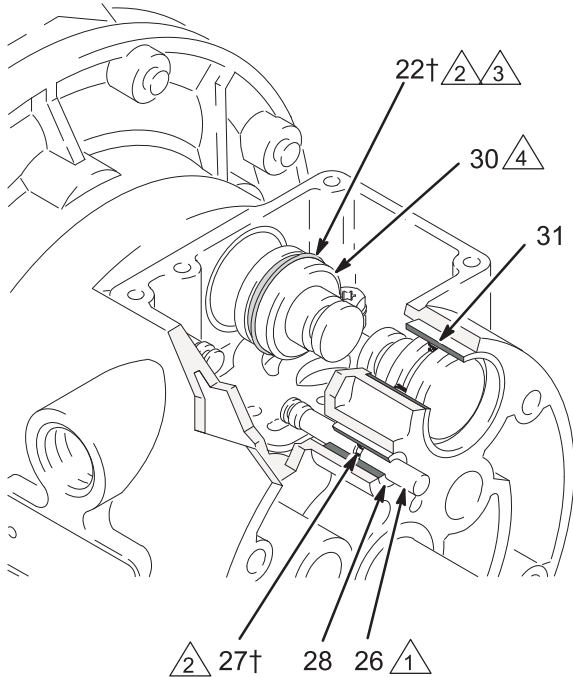


Fig. 9

02643

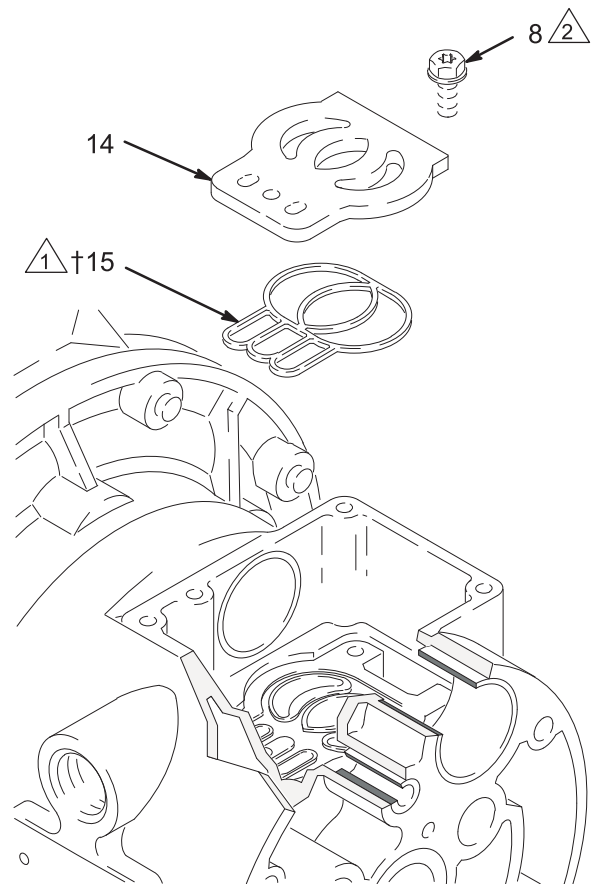


Fig. 10

02645

Reassembly

1. If you replaced the bearings (28, 31), reinstall as explained on page 21. Reassemble the fluid section.
2. Install the valve plate seal (15) into the groove at the bottom of the valve cavity. The rounded side of the seal **must face down** into the groove. See Fig. 10.
3. Install the valve plate (14) in the cavity. The plate is reversible, so either side can face up. Install the three screws (8), using a Torx (T20) screwdriver or 7 mm (9/32 in.) socket wrench. Torque to 50–60 in-lb (5.6–6.8 N•m). See Fig. 10.
4. Install an o-ring (27) on each push pin (26). Grease the pins and o-rings. Insert the pins into the bearings (28), **narrow** end first. See Fig. 9.
5. Install a u-cup packing (22) on each actuator piston (30), so the lips of the packings face the **narrow** end of the pistons. See Fig. 9.
6. Lubricate the u-cup packings (22) and actuator pistons (30). Insert the actuator pistons in the bearings (31), **wide** end first. Leave the narrow end of the pistons exposed. See Fig. 9.
7. Install the pilot block (9) so its tabs snap into the grooves on the ends of the push pins (26). See Fig. 8.
8. Grease the o-ring (12) and install it in the valve block (13). Push the block onto the valve carriage (11). Grease the lower face of the valve block. See Fig. 8.
9. Align the valve carriage (11) with the actuator pistons (30) and install so its tabs slip into the grooves on the narrow end of the pistons. See Fig. 8.
10. Align the valve gasket (10) and cover (7) with the six holes in the center housing (5). Secure with six screws (8), using a Torx (T20) screwdriver or 7 mm (9/32 in.) socket wrench. Torque to 50–60 in-lb (5.6–6.8 N•m). See Fig. 7.

Service

Ball Check Valve Repair

Tools Required

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

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.

NOTE: Fluid Section Repair Kit is available. Refer to page 24 to order the correct kit for your pump. Parts included in the kit are marked with an asterisk, for example (16*). Use all the parts in the kit for the best results.

NOTE: To ensure proper seating of the balls (16), always replace the seats (17) when replacing the balls.

1. **Relieve the pressure.** Disconnect all hoses.
2. Remove the pump from its mounting.
3. Using a 10 mm socket wrench, remove the four bolts (6) holding the outlet manifold (1) to the fluid covers (2). See **Fig. 14**.
4. Remove the seats (17) and balls (16) from the manifold.
5. Turn the pump over and remove the inlet manifold (3). Remove the seats (17) and balls (16) from the fluid covers (2).

Reassembly

1. Clean all parts and inspect for wear or damage. Replace parts as needed.
2. Reassemble in the reverse order, following all notes in **Fig. 14**. Be sure the ball checks are assembled exactly as shown. The arrows (A) on the fluid covers (2) must point toward the outlet manifold (1).

NOTE : Apply medium-strength (blue) Loctite or equivalent to the threads, and torque to 120 to 150 in-lb (14 to 17 N•m). See **Torque Sequence** on page 25.

Service

Diaphragm Repair

Tools Required

- Torque wrench
- 10 mm socket wrench
- 15 mm socket wrench
- O-ring pick
- Lithium-base grease

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.

NOTE: A Fluid Section Repair Kit is available. Refer to page 24 to order the correct kit for your pump. Parts included in the kit are marked with an asterisk, for example (29*). Use all the parts in the kit for the best results.

1. **Relieve the pressure.**
2. Remove the manifolds and disassemble the ball check valves as explained on page 17.
3. Using a 10 mm socket wrench, remove the screws (6) holding the fluid covers (2) to the air covers (4). Pull the fluid covers (2) off the pump. See **Fig. 11**.

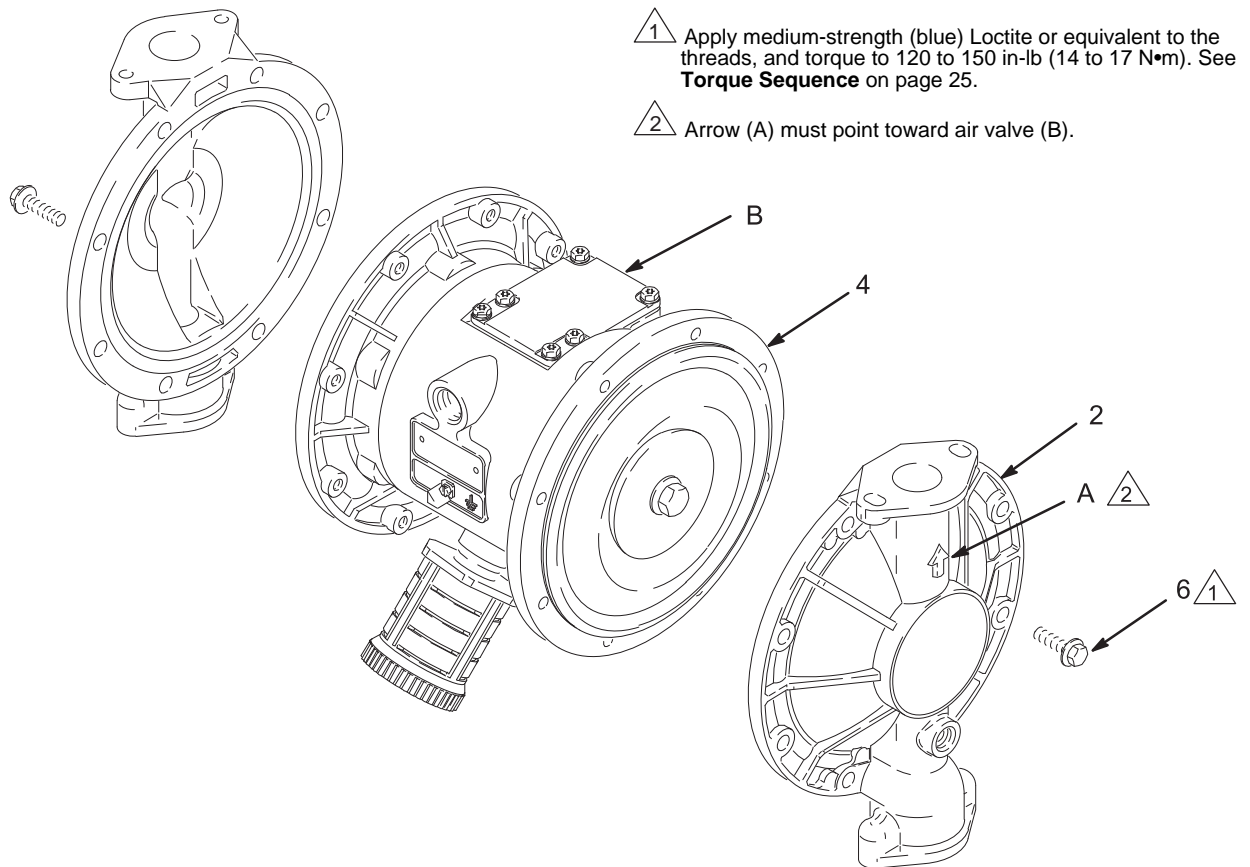


Fig. 11

02635B

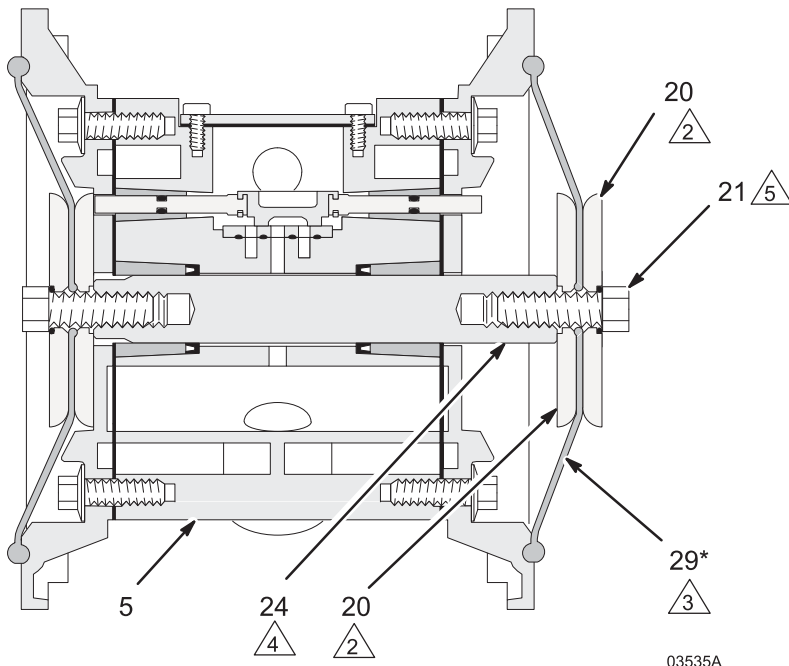
Service

4. Loosen but do not remove the diaphragm shaft bolts (21), using a 15 mm socket wrench on both bolts.
5. Unscrew one bolt from the diaphragm shaft (24) and remove the o-ring (25), fluid side diaphragm plate (20), diaphragm (29), and air side diaphragm plate (20). See **Fig. 12**.
6. Pull the other diaphragm assembly and the diaphragm shaft (24) out of the center housing (5). Remove the bolt (21) from the shaft and disassemble the remaining diaphragm assembly.
7. Inspect the diaphragm shaft (24) for wear or scratches. If it is damaged, inspect the bearings (23) in place. If the bearings are damaged, refer to page 21.
8. Reach into the center housing (5) with an o-ring pick and hook the u-cup packings (22), then pull them out of the housing. This can be done with the bearings (23) in place.
9. Clean all parts and inspect for wear or damage. Replace parts as needed.
- c. Install the diaphragm (29*) on the bolt. Make certain the side marked AIR SIDE faces the center housing (5).
- d. Install the air side diaphragm plate (20) so the rounded side faces the diaphragm (29).
- e. Apply medium-strength (blue) Loctite or equivalent to the bolt (21) threads. Screw the bolt (21) into the shaft (24) hand tight.
3. Grease the length and ends of the diaphragm shaft (24), and slide it through the housing (5).
4. Assemble the other diaphragm assembly to the shaft as explained in step 2.
5. Hold one shaft bolt (21) with a wrench and torque the other bolt to 20 to 25 ft-lb (27 to 34 N•m) at 100 rpm maximum.
6. Align the fluid covers (2) and the center housing (5) so the arrows (A) on the covers face the same direction as the air valve (B). Apply medium-strength (blue) Loctite or equivalent to the threads of the screws (6), and secure the covers with the screws (6) hand tight. See **Fig. 11**. Using a 10 mm socket wrench, torque the screws oppositely and evenly to 120 to 150 in-lb (14 to 17 N•m). See **Torque Sequence** on page 25.
7. Reassemble the ball check valves and manifolds as explained on page 17.

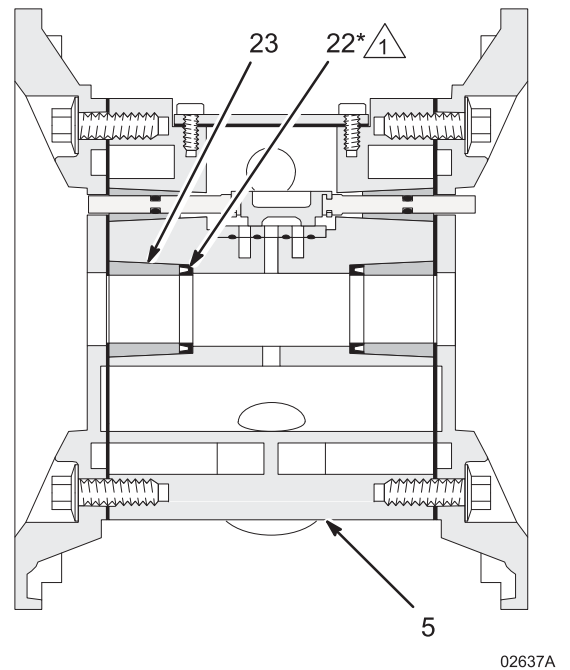
Reassembly

1. Install the shaft u-cup packings (22*) so the lips face out of the housing (5). Lubricate the packings. See **Fig. 12**.
2. Install the diaphragm assembly on one end of the shaft (24) as follows:
 - a. Install the o-ring (25*) on the shaft bolt (21).
 - b. Install the fluid side diaphragm plate (20) on the bolt so the rounded side faces the diaphragm (29).

Service



Cutaway View, with Diaphragms in Place



Cutaway View, with Diaphragms Removed

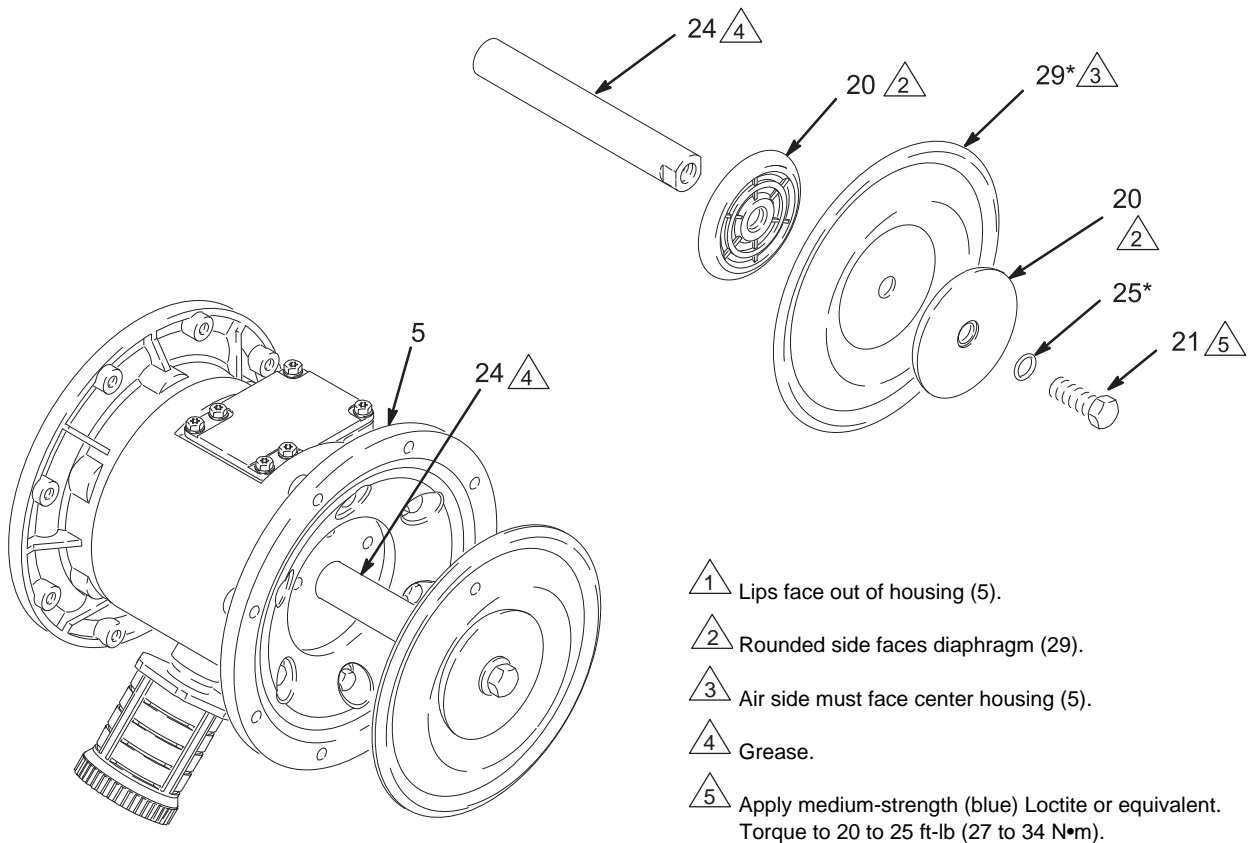


Fig. 12

03533B

Service

Bearing and Air Gasket Removal

Tools Required

- Torque wrench
- 10 mm socket wrench
- Bearing puller
- O-ring pick
- Press, or block and 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.

NOTE: Do not remove undamaged bearings.

1. Relieve the pressure.
2. Remove the manifolds and disassemble the ball check valves as explained on page 17.
3. Remove the fluid covers and diaphragm assemblies as explained on pages 18 to 19.

NOTE: If you are removing only the diaphragm shaft bearing (23), skip step 4.

4. Disassemble the air valve as explained on page 15.
5. Using a 10 mm socket wrench, remove the screws (6) holding the air covers (4) to the center housing (5). See **Fig. 13**.
6. Remove the air cover gaskets (32). Always replace the gaskets with new ones.
7. Use a bearing puller to remove the diaphragm shaft bearings (23), air valve bearings (31) or pilot pin bearings (28). Do not remove undamaged bearings.

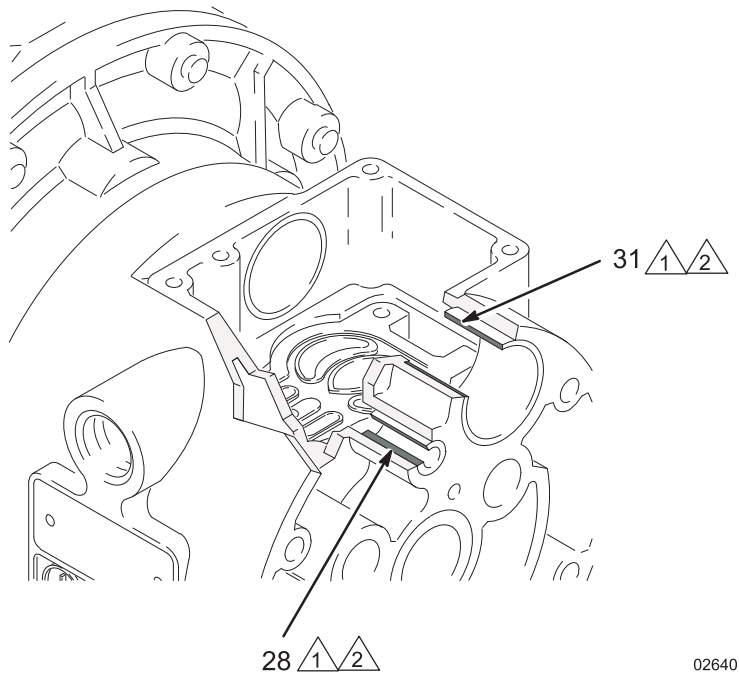
8. If you removed the diaphragm shaft bearings (23), reach into the center housing (5) with an o-ring pick and hook the u-cup packings (22), then pull them out of the housing. Inspect the packings. See **Fig. 12**.

Reassembly

1. If removed, install the shaft u-cup packings (22*) so the lips face out of the housing (5).
2. The bearings (23, 28, and 31) are tapered and can only be installed one way. Insert the bearings into the center housing (5), **tapered end first**. Using a press or a block and rubber mallet, press-fit the bearing so it is flush with the surface of the center housing.
3. Reassemble the air valve as explained on page 16.
4. Align the new air cover gasket (32) so the pilot pin (26) protruding from the center housing (5) fits through the proper hole (H) in the gasket.
5. Align the air cover (4) so the pilot pin (26) fits in the middle hole (M) of the three small holes near the center of the cover. Apply medium-strength (blue) Loctite or equivalent to the threads of the screws, and install the screws (6), hand-tighten. See **Fig. 13**. Using a 10 mm socket wrench, torque the screws oppositely and evenly to 120 to 150 in-lb (14 to 17 N•m). See **Torque Sequence** on page 25.
6. Install the diaphragm assemblies and fluid covers as explained on pages 18 to 19.
7. Reassemble the ball check valves and manifolds as explained on page 17.

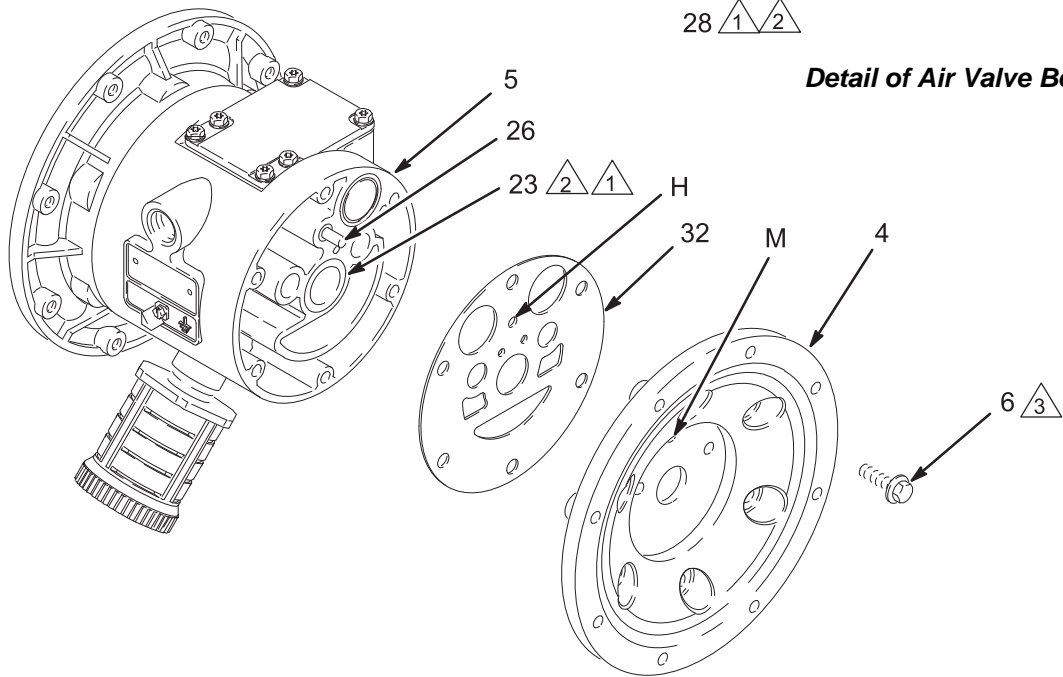
Service

- 1 Insert bearings tapered end first.
- 2 Press-fit bearings flush with surface of center housing (5).
- 3 Apply medium-strength (blue) Loctite or equivalent. Torque to 120 to 150 in-lb (14 to 17 N•m).



02640

Detail of Air Valve Bearings



02639B

Fig. 13

Parts Drawing

EVACUATION AND TRANSFER PUMPS

Part No. 810.0780

with TPE Diaphragms and Seats, Acetal Balls

Part No. 810.0930

with TF Diaphragms and Balls, Fluoroelastomer Seats

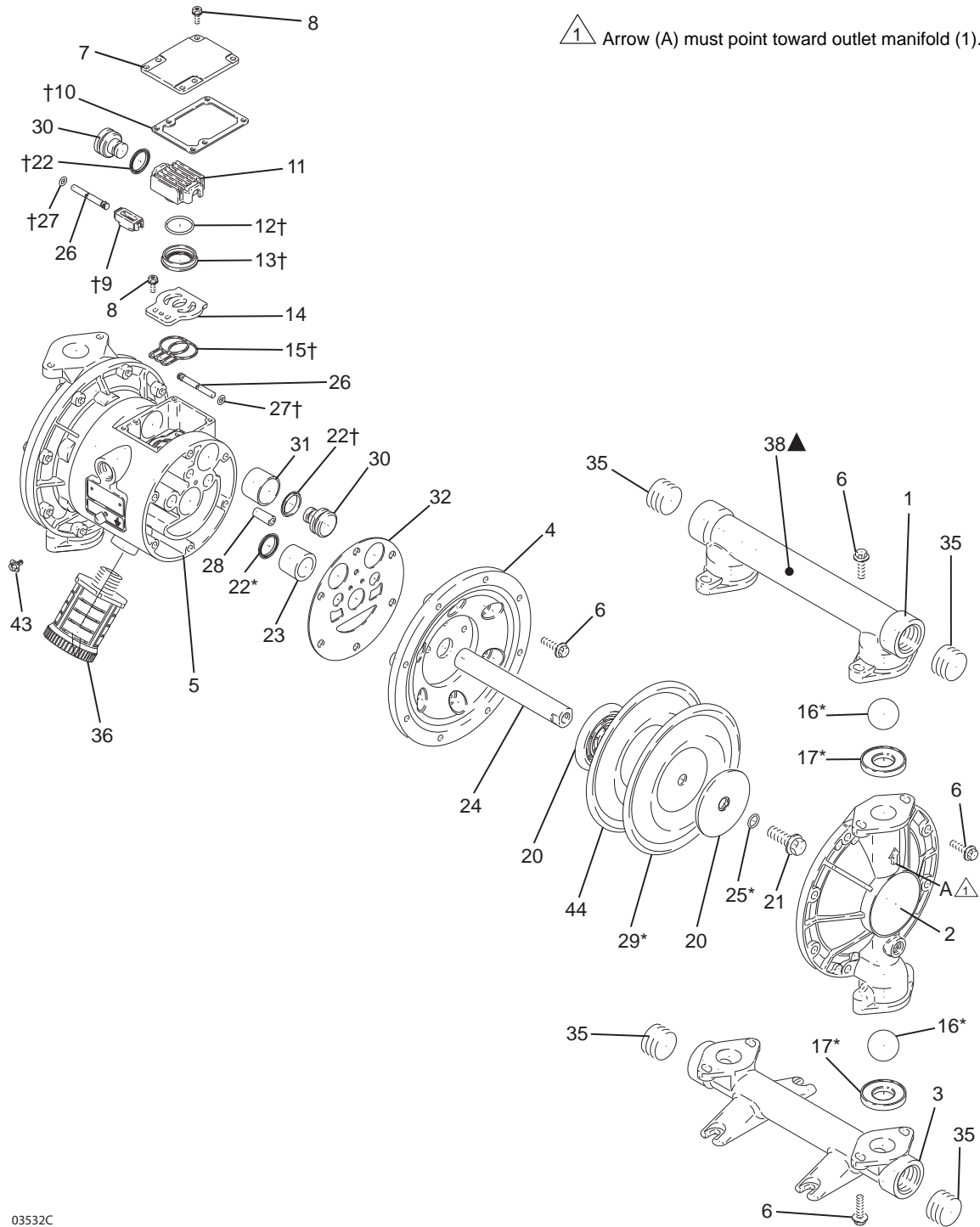


Fig. 14

03532C

Parts List

EVACUATION AND TRANSFER PUMPS

Part No. 810.0780

with TPE Diaphragms and Seats, Acetal Balls

Part No. 810.0930

with TF Diaphragms and Balls, Fluoroelastomer Seats

Ref No.	Part No.	Description	Qty	Ref No.	Part No.	Description	Qty
1	819.4475	MANIFOLD, outlet; aluminum	1	22*†	819.4284	PACKING, u-cup; nitrile	4
2	819.4473	COVER, fluid; aluminum	2	23	819.4291	BEARING, shaft; acetal	2
3	819.4474	MANIFOLD, inlet; aluminum	1	24	819.4369	SHAFT, diaphragm; stainless steel	1
4	819.4368	COVER, air; aluminum	2	25*	819.4304	O-RING; PTFE	2
5	819.4275	HOUSING, center; aluminum	1	26	819.4288	PIN, push; stainless steel	2
6	819.7051	SCREW, machine, hex washer hd; M8 x 1.25; 25 mm (1 in.) long	36	27†	819.4289	O-RING; buna-N	2
7	819.4276	COVER, air valve; aluminum	1	28	819.4287	BEARING, pin; acetal	2
8	819.0221	SCREW, machine, hex flange hd; M5 x 0.8 thread forming; 12 mm (0.47 in.) long	9	29*	819.0782	DIAPHRAGM, TPE, Qty. 2 For Model 810.0780	1
9†	819.4290	BLOCK, pilot; acetal	1		819.0781	DIAPHRAGM, TF, Qty. 2 For Model 810.0930	1
10†	819.4278	GASKET, cover; molded Santoprene	1	30	819.4285	PISTON, actuator; acetal	2
11	819.4279	CARRIAGE, air valve; aluminum	1	31	819.4286	BEARING, piston; acetal	2
12†	819.4280	O-RING; nitrile	1	32	819.4294	GASKET, air cover; HDPE foam	2
13†	819.4281	BLOCK, air valve; acetal	1	35	819.4477	PLUG, pipe; 1 in. npt; carbon steel	4
14	819.4282	PLATE, air valve; stainless steel	1	36	819.4376	MUFFLER	1
15†	819.4283	SEAL, valve plate; buna-N	1	38▲	819.4305	LABEL, warning	2
16*	819.0792	BALL, acetal, Qty. 4 For Model 810.0780	1	43	819.0220	SCREW, grounding	1
	819.0786	BALL, TF, Qty. 4 For Model 810.0930	1	44	----	DIAPHRAGM, backer, neoprene; included with kit. For Model 810.0930	1
17*	819.0972	SEAT, ball, TPE, Qty. 4 For Model 810.0780	1	* These parts are included in the Fluid Section Repair Kits. Refer to page 24 for the correct kit for your pump.			
	819.1068	SEAT, ball, fluoroelastomer For Model 810.0930	4	† These parts are included in Air Valve Repair Kit 819.4274.			
20	819.4373	PLATE, diaphragm; aluminum	4	▲ Replacement Danger and Warning labels, tags, and cards are available at no cost.			
21	819.4482	BOLT, hex hd; M12 x 1.75; 35 mm (1.38 in.) long	2				

Repair Kits

Use Only Genuine VERDER Parts and Accessories

Fluid Section Repair Kit 819.0986

For Models 810.0780 and 810.0781 VA 25 pumps. TPE diaphragms and seats, acetal balls. Includes:

Ref No.	Description	Qty
16	BALL; acetal	4
17	SEAT, ball; TPE	4
22	PACKING, u-cup; nitrile	2
25	O-RING; PTFE	2
29	DIAPHRAGM; TPE	2

Air Valve Repair Kit 819.4274

For all VA 25 pumps. Includes:

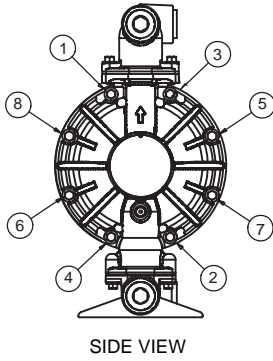
Ref No.	Description	Qty
9	BLOCK, pilot; acetal	1
10	GASKET, cover; molded Santoprene	1
12	O-RING; nitrile	1
13	BLOCK, air valve; acetal	1
15	SEAL, valve plate; buna-N	1
22	PACKING, u-cup; nitrile	2
27	O-RING; buna-N	2

Torque Sequence

When instructed to torque fasteners, always follow the torque sequence.

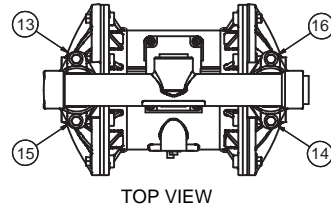
1. Left/Right Fluid Covers

Torque bolts to 120–150 in-lb (14–17 N•m)



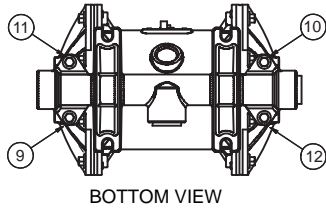
3. Outlet Manifold

Torque bolts to 120–150 in-lb (14–17 N•m)



2. Inlet Manifold

Torque bolts to 120–150 in-lb (14–17 N•m)



Technical Data

Evacuation and Transfer Pumps (Model 810.0780)

Maximum fluid working pressure 120 psi
 (0.84 MPa, 8.4 bar)
 Air pressure operating range 20 to 120 psi
 (0.14 to 0.84 MPa, 1.4 to 8.4 bar)
 Maximum air consumption 60 scfm
 Air consumption at 70 psi/20 gpm 20 scfm (see chart)
 Maximum free flow delivery 42 gpm (159 l/min)
 Maximum pump speed 276 cpm
 Gallons (Liters) per cycle 0.15 (0.57)
 Maximum suction lift 18 ft (5.48 m) wet or dry
 Maximum size pumpable solids 1/8 in. (3.2 mm)
 Maximum operating temperature 150F (65.5°C)
 * Maximum noise level at 100 psi, full flow: 89 dBA
 Sound power level: 100 LwA
 * Noise level at 70 psi, 50 cycles/min: 78 dBA

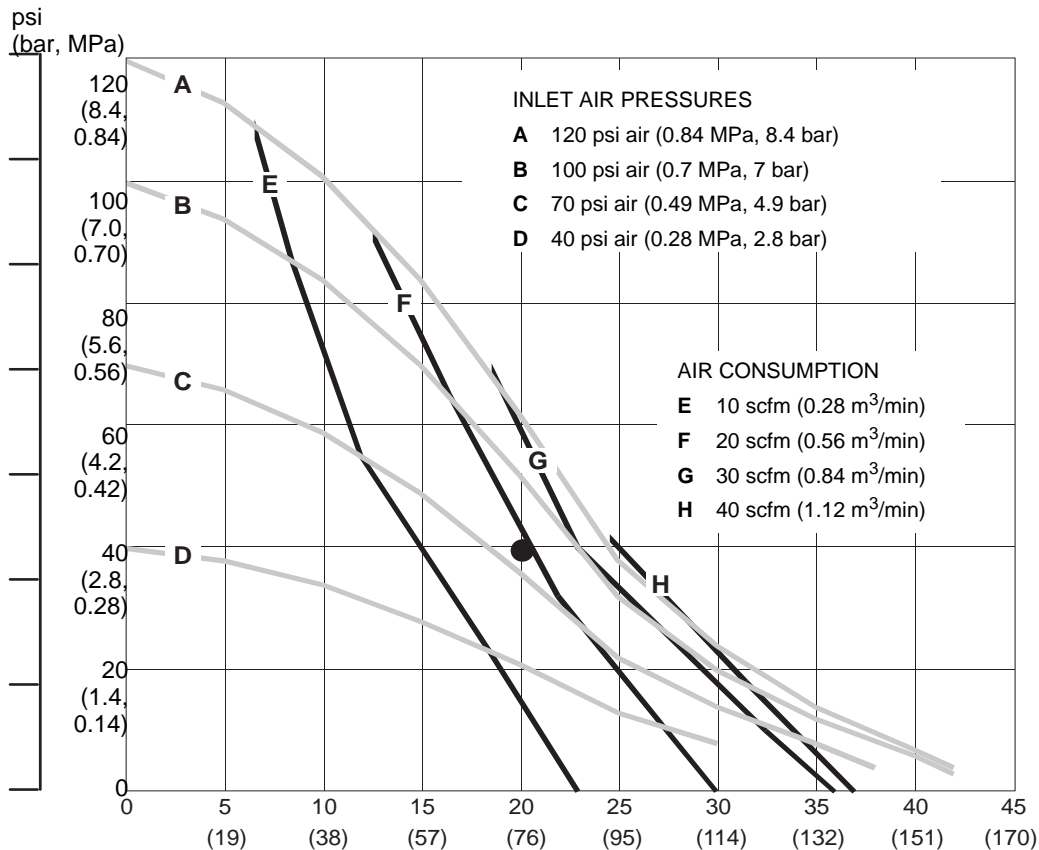
Air inlet size 1/2 npt(f)
 Fluid inlet size 1 in. npt(f)
 Fluid outlet size 1 in. npt(f)
 Wetted parts Model 810.0780: aluminum, TPE, acetal, PTFE
 Non-wetted external parts aluminum, 302 stainless steel, polyester (labels)
 Weight 18 lb (8.2 kg)

Loctite is a registered trademark of the Loctite Corporation.

* Noise levels measured with the pump mounted on the floor, using Rubber Foot Kit 819.4333. Sound power measured per ISO Standard 9216.

Example of Finding Pump Air Consumption and Air Pressure at a Specific Fluid Delivery and Discharge Head:

To supply 20 gpm (76 liters) fluid flow (horizontal scale) at 40 psi (0.28 MPa, 2.8 bar) discharge head pressure (vertical scale) requires approximately 20 scfm (0.56 m³/min) air consumption at 70 psi (0.49 MPa, 4.9 bar) inlet air pressure.



TEST CONDITIONS

Pump tested in water with PTFE diaphragm and inlet submerged.

KEY — FLUID PRESSURE AND FLOW
 — SCFM AIR CONSUMPTION

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 neighboring areas. While VERDER attempts to assure that its products comply with such codes, it cannot guarantee compliance, and cannot be responsible for how the product is installed or used. Before purchasing and using a product, please review the product application as well as the national and local codes and regulations, and be sure that product, installation, and use complies with them.

Original instructions. This manual contains English.
Revision L, December 2019

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