

VERDERAIR VA 25 (HE)

UL-Listed

Diaphragm Pumps

859.0120

Rev. J
EN

For use in general fuel transfer applications. For professional use only.

Model 850.0780, Evacuation and Transfer Pump

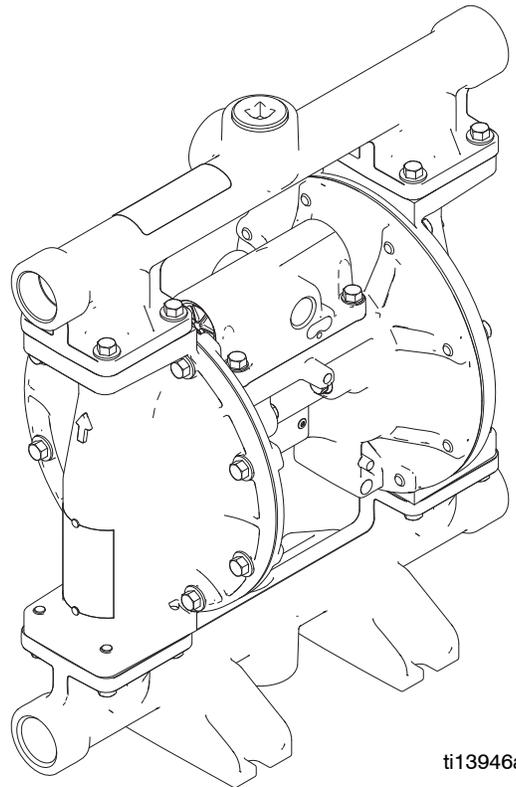
100 psi (0.7 MPa, 7.0 bar) Maximum Fluid Working Pressure

100 psi (0.7 MPa, 7.0 bar) Maximum Air Input Pressure



Important Safety Instructions

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



ti13946a



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



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Related Manual

Manual	Description
859.0089	<i>VERDERAIR</i> VA 25 (HE) Air-Operated Diaphragm Pump, Repair/Parts

Model Information

Part	Matrix Identification Number	Maximum Working Pressure psi (MPa, bar)
850.0780	VA25(HE)AA-HYACHYTNUL	100 (0.7, 7.0)

VA25(HE)	A	A	HY	AC	HY	TN	UL
Pump Model, 1 inch ports, 50 gpm	Fluid Section	Air Section	TPE Seats	Acetal Balls	TPE Diaphragms	npt connections	UL-Listed

UL Listing Details

Model 850.0780 is certified per UL 79 for use in pumping gasoline and gasoline/alcohol blends up to 10% ethanol, diesel fuel, fuel oil, and lubricating oil. This certification does not cover oil burner pumps; pumps for engine-powered automotive equipment; or pumps for use in mobile applications, chemical plants, utility plants, petroleum production facilities, and pipeline pump stations, nor does it cover the complete end user installation.

ATEX Note

The muffler included with the pump is not approved for use in explosive atmosphere locations. ATEX applications require the use of a metal or conductive plastic muffler, or remote exhaust using static-free hoses or metal piping.

Warnings

The following warnings are for the setup, use, grounding, maintenance, and repair of this equipment. The exclamation point symbol alerts you to a general warning and the hazard symbol refers to procedure-specific risk. When these symbols appear in the body of this manual, refer back to these warnings. Additional, product-specific warnings may be found throughout the body of this manual where applicable.



WARNING



FIRE AND EXPLOSION HAZARD

When flammable fluids are present in the work area, such as gasoline and windshield wiper fluid, be aware that flammable fumes can ignite or explode. To help prevent fire and explosion:

- Use equipment only in well ventilated area.
- Eliminate all ignition sources; such as cigarettes and portable electric lamps.
- Keep work area free of debris, including rags and spilled or open containers of solvent and gasoline.
- Route exhaust away from all sources of ignition. If diaphragm ruptures, fluid may be exhausted with air. See **Air Exhaust Ventilation**, page 9.
- Do not plug or unplug power cords, or turn lights on or off when flammable fumes are present.
- Ground all equipment in the work area. See **Grounding** instructions.
- Use only grounded hoses.
- Hold gun firmly to side of grounded pail when triggering into pail.
- If there is static sparking or you feel a shock, **stop operation immediately**. Do not use equipment until you identify and correct the problem.
- Keep a working fire extinguisher in the work area.



WARNING



EQUIPMENT MISUSE HAZARD

Misuse can cause death or serious injury.

- Do not operate the unit when fatigued or under the influence of drugs or alcohol.
- Do not exceed the maximum working pressure or temperature rating of the lowest rated system component. See **Technical Data** in all equipment manuals.
- Use fluids and solvents that are compatible with equipment wetted parts. See **Technical Data** in all equipment manuals. Read fluid and solvent manufacturer's warnings. For complete information about your material, request MSDS from distributor or retailer.
- Do not leave the work area while equipment is energized or under pressure. Turn off all equipment and follow the **Pressure Relief Procedure** in this manual when equipment is not in use.
- Check equipment daily. Repair or replace worn or damaged parts immediately with genuine manufacturer's replacement parts only.
- Do not alter or modify equipment.
- Use equipment only for its intended purpose. Call your distributor for information.
- Route hoses and cables away from traffic areas, sharp edges, moving parts, and hot surfaces.
- Do not kink or over bend hoses or use hoses to pull equipment.
- Keep children and animals away from work area.
- Comply with all applicable safety regulations.



PRESSURIZED EQUIPMENT HAZARD

Fluid from the gun/dispense valve, leaks, or ruptured components can splash in the eyes or on skin and cause serious injury.

- Follow the **Pressure Relief Procedure** when you stop spraying and before cleaning, checking, or servicing equipment.
- Tighten all fluid connections before operating the equipment.
- Check hoses, tubes, and couplings daily. Replace worn or damaged parts immediately.



PRESSURIZED ALUMINUM PARTS HAZARD

Use of fluids that are incompatible with aluminum in pressurized equipment can cause serious chemical reaction and equipment rupture. Failure to follow this warning can result in death, serious injury, or property damage.

- Do not use 1,1,1-trichloroethane, methylene chloride, other halogenated hydrocarbon solvents or fluids containing such solvents.
- Many other fluids may contain chemicals that can react with aluminum. Contact your material supplier for compatibility.



WARNING

	<p>PLASTIC PARTS CLEANING SOLVENT HAZARD Use only compatible water-based solvents to clean plastic structural or pressure-containing parts. Many solvents can degrade plastic parts and cause them to fail, which could cause serious injury or property damage. See Technical Data in this and all other equipment instruction manuals. Read fluid and solvent manufacturer's warnings.</p>
	<p>TOXIC FLUID OR FUMES HAZARD Toxic fluids or fumes can cause serious injury or death if splashed in the eyes or on skin, inhaled, or swallowed.</p> <ul style="list-style-type: none"> • Read MSDS's to know the specific hazards of the fluids you are using. • Route exhaust away from work area. If diaphragm ruptures, fluid may be exhausted with air. • Store hazardous fluid in approved containers, and dispose of it according to applicable guidelines.
	<p>BURN HAZARD Equipment surfaces and fluid that's heated can become very hot during operation. To avoid severe burns:</p> <ul style="list-style-type: none"> • Do not touch hot fluid or equipment.
	<p>PERSONAL PROTECTIVE EQUIPMENT You must wear appropriate protective equipment when operating, servicing, or when in the operating area of the equipment to help protect you from serious injury, including eye injury, inhalation of toxic fumes, burns, and hearing loss. This equipment includes but is not limited to:</p> <ul style="list-style-type: none"> • Clothing and respirator as recommended by the fluid and solvent manufacturer • Protective eyewear, gloves, and hearing protection

Installation

General Information

- The Typical Installations shown in FIG. 3 and FIG. 4 are only guides for selecting and installing system components. Contact your distributor for assistance in planning a system to suit your needs.
- 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 must be made tight with UL listed gasoline-resistant pipe compound.

Tighten Fasteners Before Setup

Before using the pump for the first time, check and retorque all external fasteners. Follow **Torque Instructions**, page 17.

Mounting

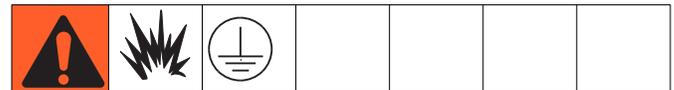


- The pump exhaust air may contain contaminants. Ventilate to a remote area. See **Air Exhaust Ventilation** on page 9.
- Never move or lift a pump under pressure. If dropped, the fluid section may rupture. Always follow the **Pressure Relief Procedure** on page 14 before moving or lifting the pump.

1. Be sure the mounting surface can support the weight of the pump, hoses, and accessories, as well as the stress caused during operation.

2. For all mountings, be sure the pump is bolted directly to the mounting surface.
3. For ease of operation and service, mount the pump so the air valve, air inlet, fluid inlet and fluid outlet ports are easily accessible.
4. Rubber Foot Mounting Kit 819.4333 is available to reduce noise and vibration during operation.

Grounding



This pump must be electrically grounded using the grounding conductor provided. Improper grounding can cause hazardous operation.

The equipment must be grounded. Grounding reduces the risk of static and electric shock by providing an escape wire for the electrical current due to static build up or in the event of a short circuit.

Pump: See FIG. 1. Loosen the grounding screw (GS). Insert one end of a 12 ga. minimum ground wire (R) behind the grounding screw and tighten the screw securely. Connect the clamp end of the ground wire to a true earth ground. A ground wire and clamp, Part 819.0157, is available.

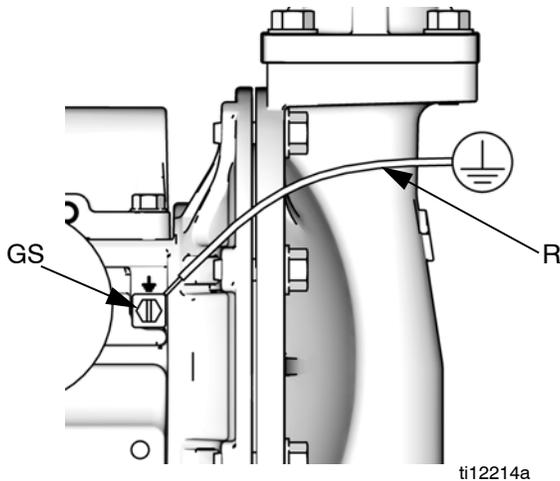


FIG. 1. Ground screw and wire

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.

Fluid supply container: Follow local code.

Solvent pails used when flushing: Follow local code. Use only conductive metal pails, placed on a grounded surface. Do not place the pail on a nonconductive surface, such as paper or cardboard, which interrupts grounding continuity.

Suction device nozzle: Bond to metal container from which it is suctioning by firm metal-to-metal contact to a properly grounded supply hose and pump.

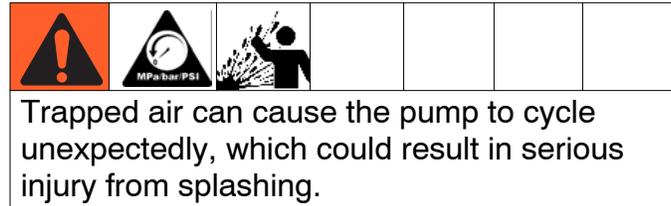
Piping, valves, and fittings: Use only electrically conductive materials. Bond and ground per code.

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.

Air Line

Install the air line accessories as shown in FIG. 3 and FIG. 4. Mount these accessories on the wall or on a bracket. Be sure the air line supplying the accessories is grounded.

1. Install an air regulator (C) and gauge to control the fluid pressure. Locate it close to the pump.
2. Locate a bleed-type master air valve (B) close to the pump and use it to relieve trapped air. Be sure the valve is easily accessible from the pump and located downstream from the regulator.



3. Locate another master air valve (E) upstream from all air line accessories and use it to isolate them during cleaning and repair.
4. An air line filter (F) removes harmful dirt and moisture from the compressed air supply.
5. Install a grounded, flexible air hose (A) between the accessories and the 1/2 npt(f) pump air inlet (D). Use a minimum 3/8 in. (10 mm) ID air hose.

Air Exhaust Ventilation



Be sure to read and follow the **TOXIC FLUID OR FUMES HAZARD** warnings, page 6, and **FIRE AND EXPLOSION HAZARD** warnings, page 4, before operating this pump. You must vent the exhaust away from people, animals, food handling areas, and all sources of ignition when pumping flammable or hazardous fluids. Vent in accordance with local codes, or in the absence of local codes, an industry or nationally recognized code having jurisdiction over the specific installation.

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

1. Remove the muffler (T) from the pump air exhaust port.
2. Install a grounded air exhaust hose (U) and connect the muffler (T) 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 at the end of the air exhaust line to catch fluid in case a diaphragm ruptures. 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.

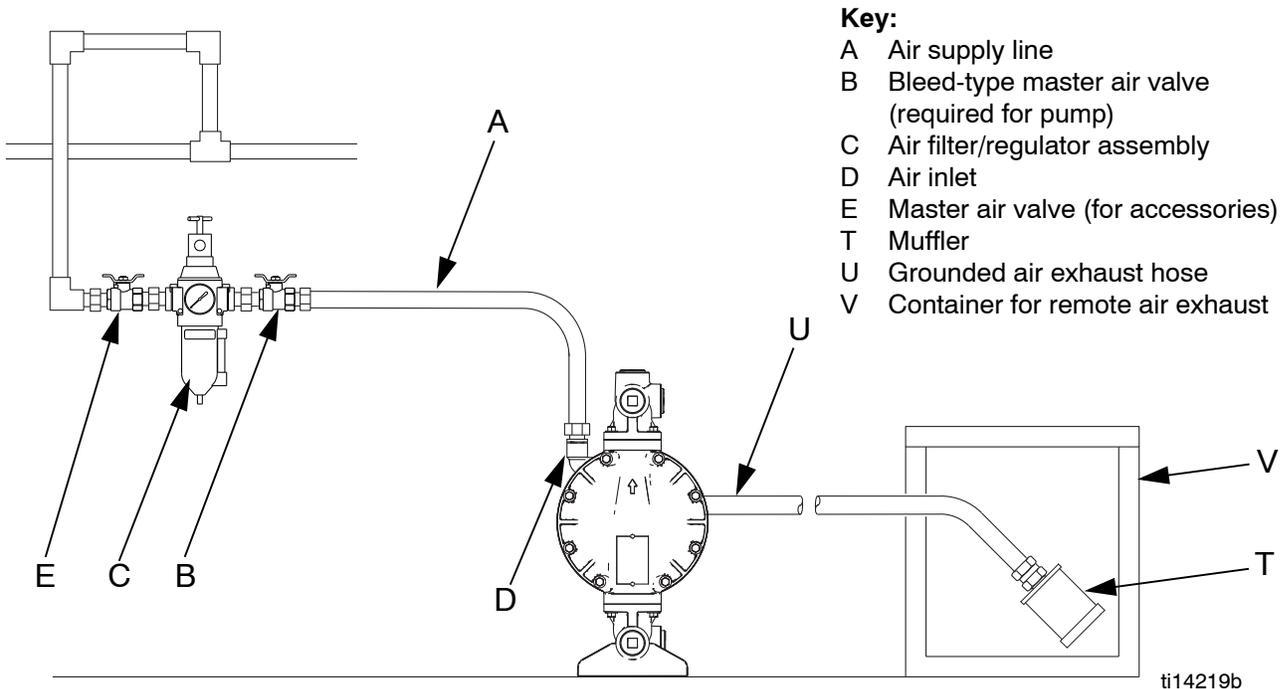
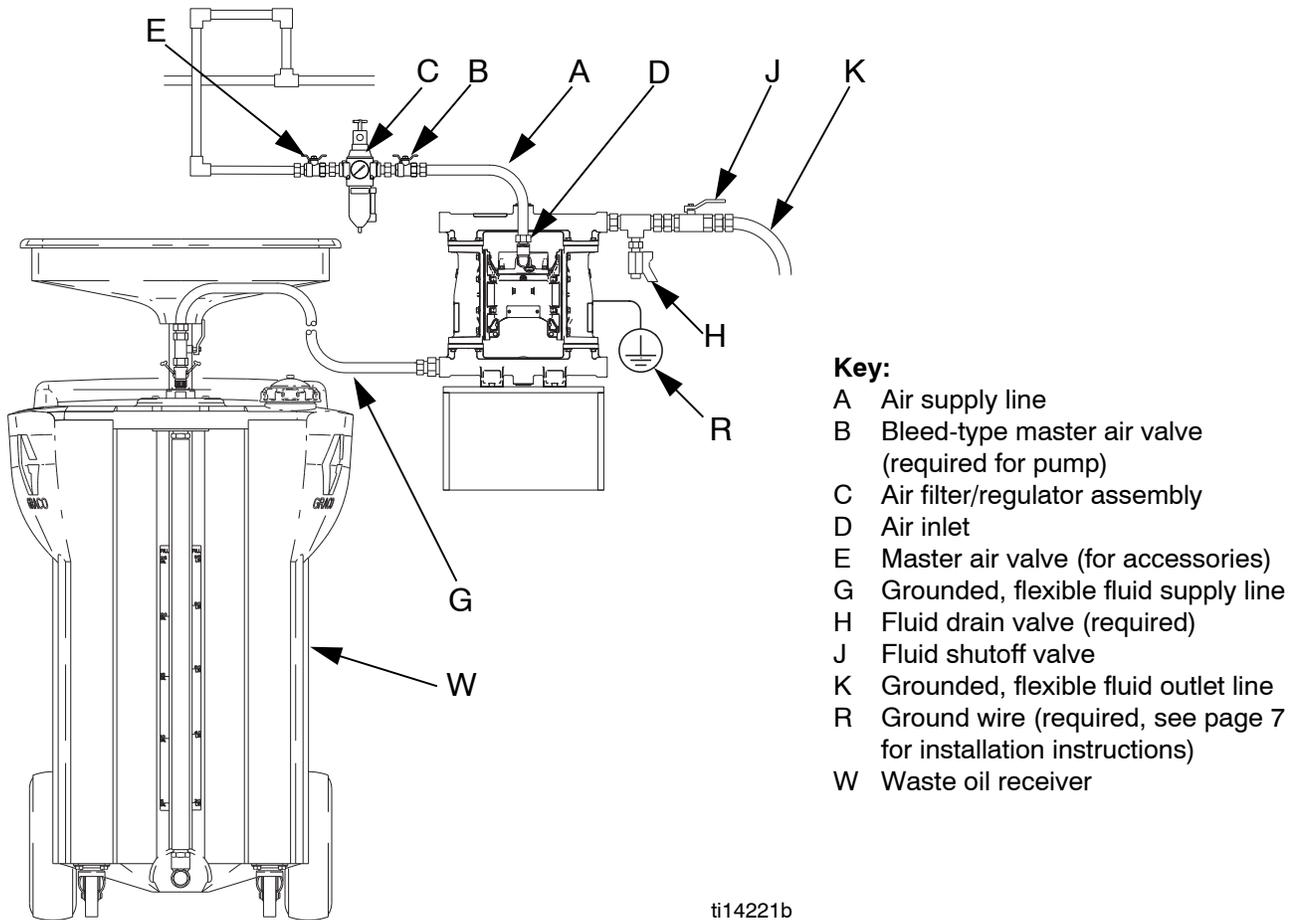


FIG. 2. Vent exhaust air



- Key:**
- A Air supply line
 - B Bleed-type master air valve (required for pump)
 - C Air filter/regulator assembly
 - D Air inlet
 - E Master air valve (for accessories)
 - G Grounded, flexible fluid supply line
 - H Fluid drain valve (required)
 - J Fluid shutoff valve
 - K Grounded, flexible fluid outlet line
 - R Ground wire (required, see page 7 for installation instructions)
 - W Waste oil receiver

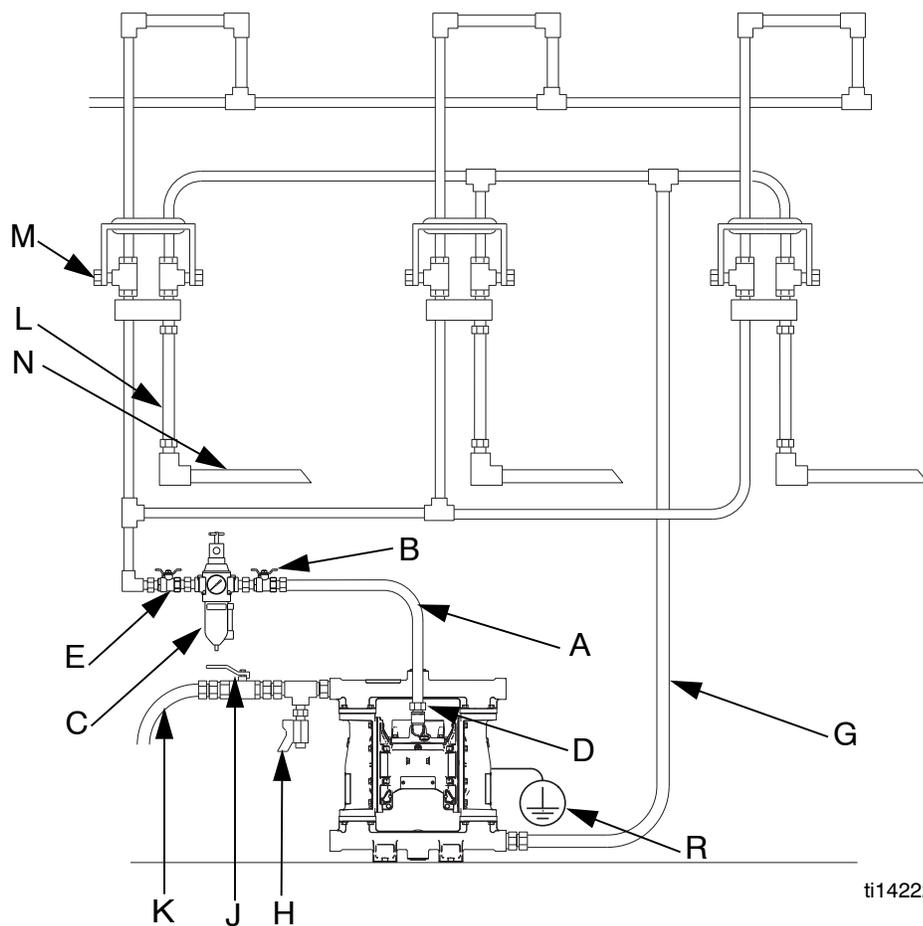
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FIG. 3. Waste oil or general fluid transfer, typical installation

Fluid Supply Line

See FIG. 3 and FIG. 4, pages 10 through 11.

1. Use grounded, flexible fluid supply lines (G). See **Grounding**, page 7.
2. If the inlet fluid pressure to the pump is more than 25% of the outlet working pressure, the ball check valves will not close fast enough, resulting in inefficient pump operation. Excessive inlet fluid pressure also will shorten diaphragm life. Approximately 3 - 5 psi (0.02- 0.03 MPa, 0.21-0.34 bar) should be adequate for most materials.
3. For maximum suction lift (wet and dry), see on page 19. For best results, always install the pump as close as possible to the material source.
4. For a Waste Oil Receiver Evacuation System, connect an appropriate suction hose (G) between the pump fluid inlet and the waste oil receiver. See FIG. 3.
5. For a Gear Oil Evacuation System, install a control valve (M), flexible hose (L), and an appropriate wand (N) in each service bay and connect to the fluid suction line (G). See FIG. 4, page 11.



Key:

- A Air supply line
- B Bleed-type master air valve (required for pump)
- C Air filter/regulator assembly
- D Air inlet
- E Master air valve (for accessories)
- G Fluid suction line, flexible hose
- H Fluid drain valve (required)
- J Fluid shutoff valve
- K Waste oil line (to storage tank)
- L Fluid line, flexible hose
- M Control valve
- N Suction wand
- R Ground wire (required, see page 7 for installation instructions)

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FIG. 4. Gear oil evacuation, typical installation

Fluid Outlet Line

See FIG. 3 and FIG. 4, pages 10 through 11.

1. Use grounded fluid hoses (G, K). See **Grounding**, page 7.
2. The pump fluid outlet is 1 in. npt(f). Screw the fluid fitting into the pump outlet securely.
3. A fluid drain valve (H) is required in your system to relieve pressure in the hose and dispense valve. Install the valve close to the pump fluid outlet.
4. Install a shutoff valve (J) in the fluid outlet line.

Fluid Inlet and Outlet Ports

NOTE: Remove and reverse the manifold(s) to change the orientation of inlet or outlet port(s). Follow **Torque Instructions**, page 17.

The fluid inlet and outlet manifolds each have four 1 in. npt(f) threaded ports. Close off the unused ports, using the supplied plugs.

Fluid Pressure Relief Valve



Some evacuation and transfer systems may require installation of a pressure relief valve at the pump outlet to prevent overpressurization and rupture of the pump or hose. Fluid Pressure Relief Kit 819.6479 is available. See FIG. 5. Relief pressure is between 150 and 180 psi (1.03 MPa-1.24 MPa, 10.3-12.4 bar).

Thermal expansion of fluid in the outlet line can cause overpressurization. Thermal expansion 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 also can occur if the pump is 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.

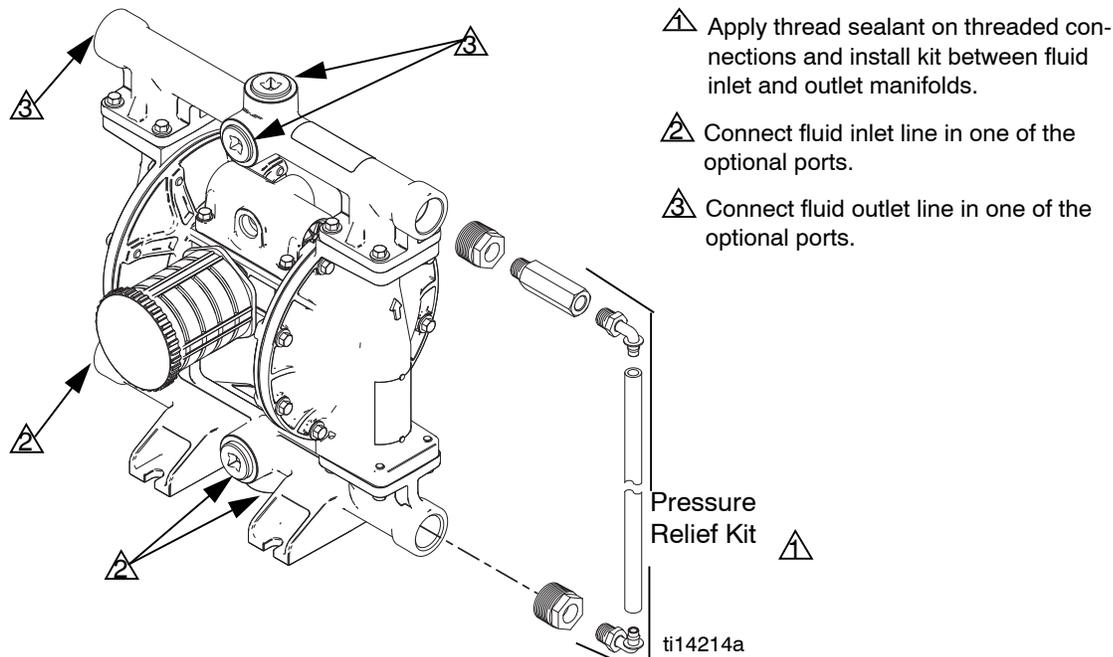


FIG. 5. Optional Fluid Pressure Relief Kit 819.6479, for Model 850.0780

Operation

Pressure Relief Procedure

						
<p>Trapped air can cause the pump to cycle unexpectedly, which could result in serious injury from splashing.</p>						

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

Flush the Pump Before First Use

The pump was tested in water. If water could contaminate the fluid you are pumping, flush the pump thoroughly with a compatible solvent. See **Flushing and Storage**, page 16.

Tighten Fasteners Before Setup

Before using the pump for the first time, check and retorque all external fasteners. Follow **Torque Instructions**, page 17. After the first day of operation, retorque the fasteners.

Starting and Adjusting the Pump

1. Be sure the pump is properly grounded. Refer to **Grounding** on page 7.
2. Check fittings to be sure they are tight. Use a compatible liquid thread sealant on male threads. Tighten the fluid inlet and outlet fittings securely.

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

Waste Oil Receiver Evacuation Systems or General Fluid Transfer Applications

See FIG. 3.

1. Close the pump air regulator (C) and the bleed-type master air valves (B, E).
2. Connect the pump suction hose (G) to the pump fluid inlet. Attach a fluid quick coupler to the other end of the hose, then connect the coupler to the outlet fitting of the waste oil receiver.
3. Place the end of the fluid hose into an appropriate container.
4. Close the fluid drain valve (H). Open the fluid shutoff valve (J).
5. Connect the air supply line to the pump air inlet (D).
6. Open the bleed-type master air valves (B, E).
7. Slowly increase air pressure 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.

NOTE: Use lowest possible air pressure to prime, just enough to cycle the pump. If the pump does not prime as expected, turn air pressure **DOWN**.

NOTICE

When replacing old models of VA 25: The new VA 25 (HE) operates more efficiently than did the old models. **Reduce** air inlet pressure by approximately **20 percent** to maintain an equivalent fluid output.

Gear Oil Evacuation Systems

See FIG. 4.

1. Close the pump air regulator (C) and the bleed-type master air valves (B, E).
2. Attach an appropriate wand to the suction hose. Place the wand in the differential or fluid to be pumped.
3. Place the end of the fluid hose into an appropriate container.
4. Close the fluid drain valve (H). Open the fluid shutoff valve (J).
5. Connect the air supply line to the pump air inlet (D).
6. Open the bleed-type master air valves (B, E).
7. Set the air regulator (C) to about 50 psi (350 kPa, 3.5 bar).
8. Pull the control valve handle (M) down to start the pump.

NOTE: Adjust the air regulator (C). Allow the pump to cycle slowly until all air is pushed out of the lines and the pump is primed. Use lowest possible air pressure to prime, just enough to cycle the pump. If the pump does not prime as expected, turn air pressure **DOWN**.

9. Push the control valve handle (M) up when finished. Place the wand in the holder on the control valve.

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

Pump Shutdown



At the end of the work shift and before you check, adjust, clean or repair the system, follow **Pressure Relief Procedure**, page 14.

Maintenance

Maintenance Schedule

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

Lubrication

The pump is lubricated at the factory. It is designed to require no further lubrication for the life of the pump. There is no need to add an in-line lubricator under normal operating conditions.

Tighten 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 Instructions**, page 17.

Flushing and Storage



- Flush before fluid can dry in the equipment, at the end of the day, before storing, and before repairing equipment.
- Flush at the lowest pressure possible. Check connectors for leaks and tighten as necessary.
- Flush with a fluid that is compatible with the fluid being dispensed and the equipment wetted parts.

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

Always flush the pump and relieve the pressure before storing it for any length of time.

Torque Instructions

NOTE: Fluid cover and manifold fasteners have a thread-locking adhesive patch applied to the threads. If this patch is excessively worn, the fasteners may loosen during operation. Replace screws with new ones or apply medium-strength (blue) Loctite or equivalent to the threads.

If fluid cover or manifold fasteners have been loosened, it is important to torque them using the following procedure to improve sealing.

NOTE: Always completely torque fluid covers before torquing manifolds.

Start all fluid cover screws a few turns. Then turn down each screw just until head contacts cover. Then turn each screw by 1/2 turn or less working in a crisscross pattern to specified torque. Repeat for manifolds.

Fluid cover and manifold fasteners:
100 in-lb (11.3 N•m)

Retorque the air valve fasteners (V) in a crisscross pattern to 80 in-lb (9.0 N•m).

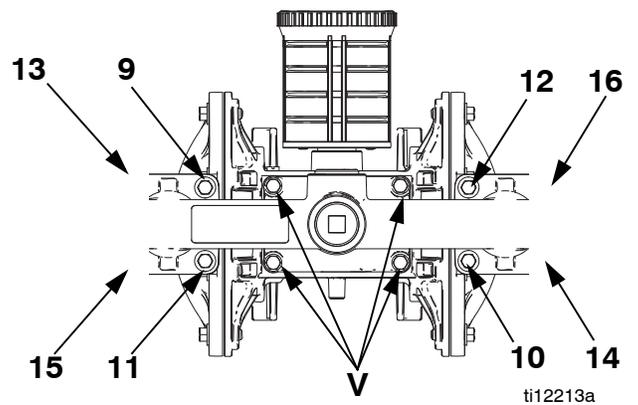
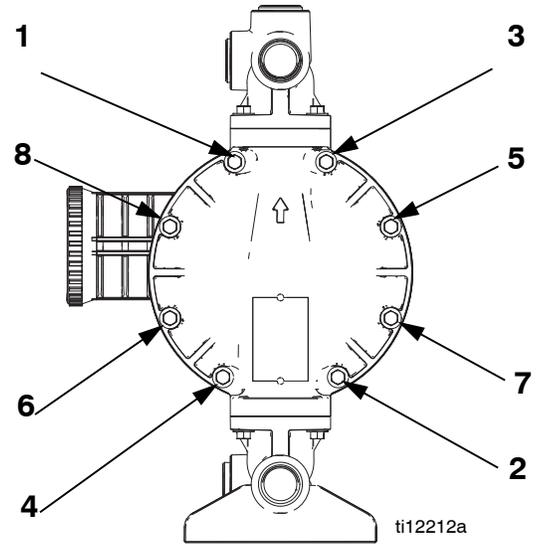
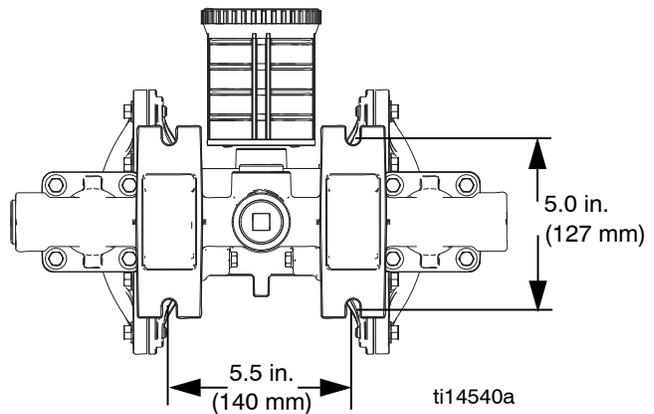
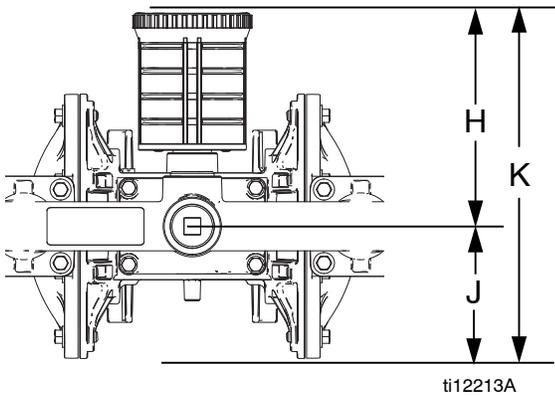
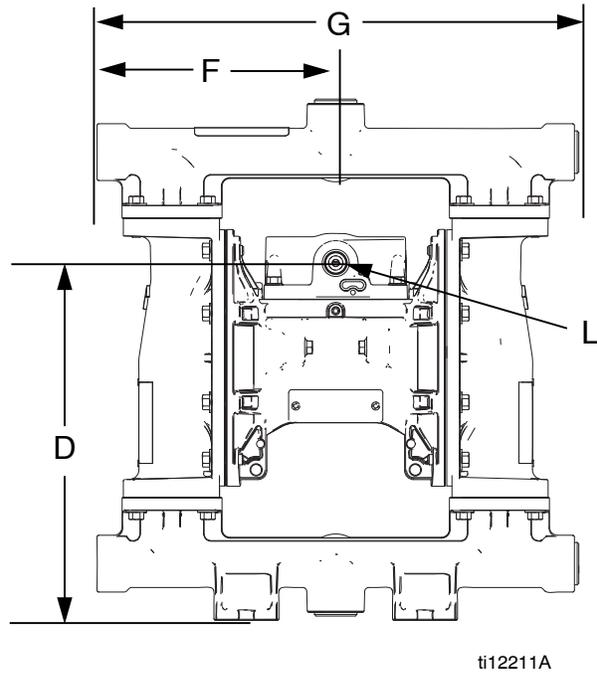
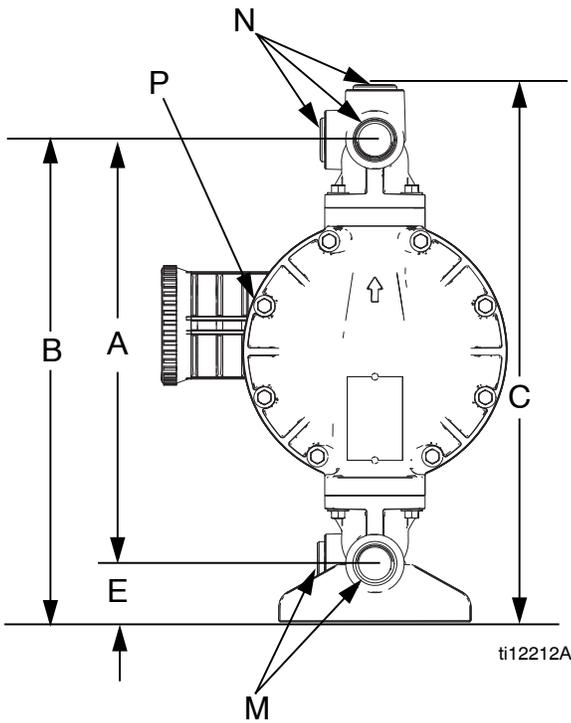


FIG. 6. Torque sequence

Dimensions

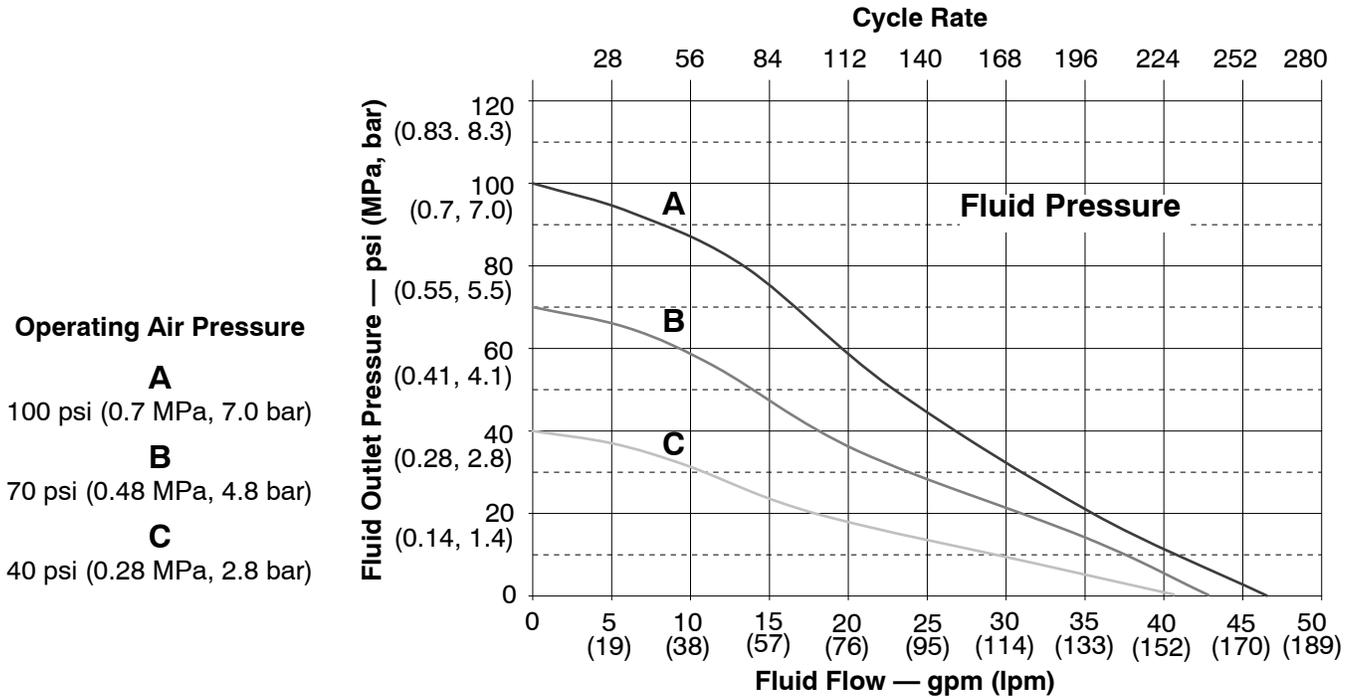


- A** 12.7 in. (323 mm)
- B** 14.4 in. (366 mm)
- C** 15.9 in. (404 mm)
- D** 10.9 in. (277 mm)
- E**..... 1.8 in. (46 mm)
- F**..... 7.3 in. (185 mm)
- G** 14.7 in. (373 mm)
- H** 6.1 in. (155 mm)
- J**..... 3.9 in. (99 mm)

- K**..... 10.0 in. (254 mm)
- L** 1/2 npt(f) air inlet
- M** 1 in. npt(f) fluid inlet ports (4)
- N**..... 1 in. npt(f) fluid outlet ports (4)
- P** 3/4 npt(f) air exhaust port

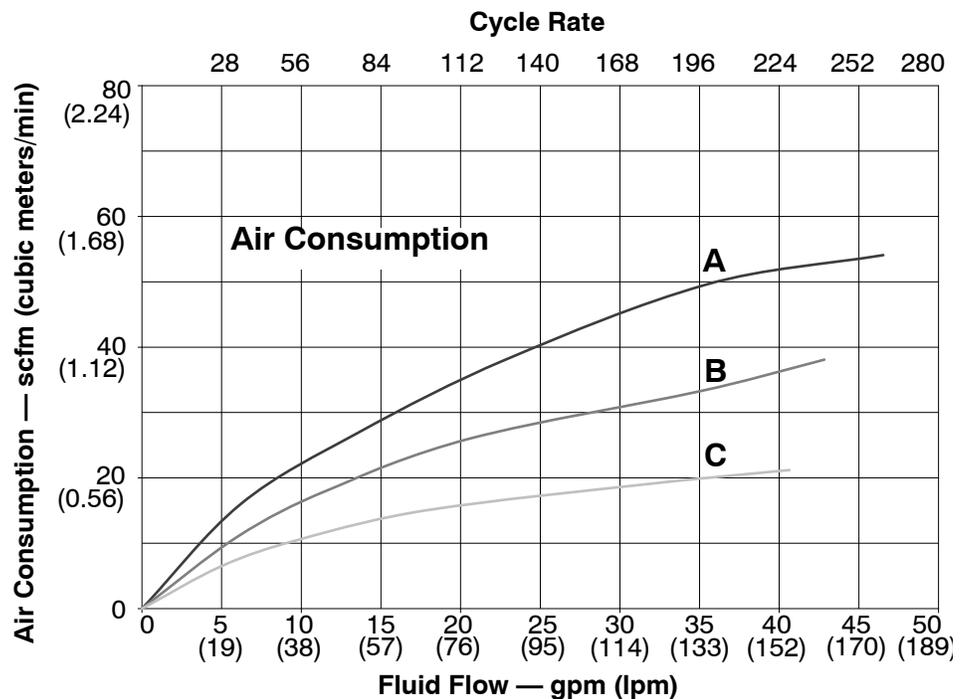
Performance Chart

Test Conditions: Pump tested in water with inlet submerged.



How to Read the Charts

1. Locate fluid flow rate along bottom of chart.
2. Follow vertical line up to intersection with selected operating air pressure curve.
3. Follow left to scale to read **fluid outlet pressure** (top chart) or **air consumption** (bottom chart).



Technical Data

Maximum fluid working pressure	100 psi (0.7 MPa, 7.0 bar)
Air pressure operating range	20-100 psi (0.14-0.7 MPa, 1.4-7.0 bar)
Air consumption at 70 psi (0.48 MPa, 4.8 bar), 20 gpm (76 lpm).	25 scfm
Fluid displacement per cycle	0.17 gal. (0.64 liters)
Flooded volume	0.375 gal. (1.42 liters)
Maximum values with water as media under submerged inlet conditions at ambient temperature:	
Maximum air consumption.	64 scfm
Maximum free-flow delivery.	50 gpm (189 lpm)
Maximum pump speed	275 cpm
Maximum suction lift (varies widely based on ball/seat material and wear, operating speed, material properties, and other variables)	16 ft (4.9 m) dry, 29 ft (8.8 m) wet
Maximum size pumpable solids	1/8 in. (3.2 mm)
Recommended cycle rate for continuous use	93 - 140 cpm
Recommended cycle rate for circulation systems	20 cpm
Sound Power*	
at 70 psi (0.48 MPa, 4.8 bar) and 50 cpm	78 dBa
at 100 psi (0.7 MPa, 7.0 bar) and full flow	90 dBa
Sound Pressure**	
at 70 psi (0.48 MPa, 4.8 bar) and 50 cpm	84 dBa
at 100 psi (0.7 MPa, 7.0 bar) and full flow	96 dBa
Operating temperature range.	10°F to 150°F (-12°C to 65°C)
Air inlet size	1/2 npt(f)
Fluid inlet size	1 in. npt(f)
Fluid outlet size	1 in. npt(f)
Weight	23 lb. (10.5 kg)
Wetted parts.	aluminum, TPC-ET, Acetal, PTFE
Non-wetted external parts	aluminum, coated carbon steel

* Sound power measured per ISO-9614-2.

** Sound pressure was tested 3.28 ft (1 m) from equipment.

All trademarks mentioned in this manual are the property of their respective owners.

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

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Austria

Verder Austria
Eitnergasse 21/Top 8
A-1230 Wien
AUSTRIA
Tel: +43 1 86 51 074 0
Fax: +43 1 86 51 076
e-mail: office@verder.at

Belgium

Verder nv
Kontichsesteenweg 17
B-2630 Aartselaar
BELGIUM
Tel: +32 3 877 11 12
Fax: +32 3 877 05 75
e-mail: info@verder.be

China

Verder Shanghai Instruments and Equipment Co., Ltd
Building 8 Fuhai Business Park No. 299
Bisheng Road, Zhangjiang Hiteck Park
Shanghai 201204
CHINA
Tel: +86 21 33932950
Fax: +86 21 33932955
e-mail: info@verder.cn

Bulgaria

Verder Bulgaria Ltd
Vitosh department,
Manastriski Livadi Zapad
district,
110 Bulgaria Blvd., 2-nd
Floor, apt. 15-16,
1618 - Sofia
BULGARIA
Tel: 0878407370
Fax: 02 9584085
email: office@verder.bg

Czech Republic

Verder s.r.o.
Vodnanská 651/6 (vchod
Chlumecka 15)
198 00 Praha 9-Kyje
CZECH REPUBLIC
Tel: +420 261 225 386-7
Web: <http://www.verder.cz>
e-mail: info@verder.cz

France

Verder France
8 Allée Rosa Luxembourg
Immeulde Arizona
95610 Eragny sur Oise
FRANCE
Tel: +33 173 43 98 41
Fax: +33 134 64 44 50
e-mail: info@verder.fr

Germany

Verder Deutschland GmbH
Retsch-Allee 1-5
42781 Haan
GERMANY
Tel: 02104/2333-200
Fax: 02104/2333-299
e-mail: info@verder.de

Hungary

Verder Hongary Kft
Budafoke ut 187 - 189
HU-1117 Budapest
HUNGARY
Tel: 0036 1 3651140
Fax: 0036 1 3725232
e-mail: info@verder.hu

India

Verder India Pumps Pvt
Ltd.
Plot No-3B, D-1 Block,
MIDC Chinchwad,
Pune - 411019
INDIA
e-mail:
Sales@verder.co.in
www.verder.co.in

Italy

Verder Italia
Via Maestri Del lavoro, 5
02100 Vazia, Rieti
ITALY
Tel: +39 07 46 229064
e-mail: info@verder.it

The Netherlands

Verder BV
Leningradweg 5
NL 9723 TP Groningen
THE NETHERLANDS
Tel: +31 50 549 59 00
Fax: +31 50 549 59 01
e-mail: info@verder.nl

Poland

Verder Polska
ul.Porcelanowa 23
PL-40 036 Katowice
POLAND
Tel: +48 32 78 15 032
Fax: +48 32 78 15 034
e-mail: verder@verder.pl

Romania

Verder România
Drumul Balta Doamnei
no 57-61
Sector 3
CP 72-117
032624 Bucuresti
ROMANIA
Tel: +40 21 335 45 92
Fax: +40 21 337 33 92
e-mail: office@verder.ro

Slovak Republik

Verder Slovakia s.r.o.
Silacska 1
SK-831 02 Bratislava
SLOVAK REPUBLIK
Tel: +421 2 4463 07 88
Fax: +421 2 4445 65 78
e-mail: info@verder.sk

South Africa

Verder SA
197 Flaming Rock Avenue
Northlands Business Park
Newmarket Street
ZA Northriding
SOUTH AFRICA
Tel: +27 11 704 7500
Fax: +27 11 704 7515
e-mail: info@verder.co.za

Switzerland

Verder Deutschland GmbH
Sales Switzerland
Retsch-Allee 1-5
D-42781 Haan
GERMANY
Tel: +41 (0)61 331 33 13
Fax: +41 (0)61 331 63 22
e-mail: info@verder.ch

United Kingdom

Verder UK Ltd.
Unit 3 California Drive
Castleford, WF10 5QH
UNITED KINGDOM
Tel: +44 (0) 1924 221 001
Fax: +44 (0) 1132 465 649
e-mail: info@verder.co.uk

United States of America

Verder Inc.
312 Corporate Parkway
Suite 101
Macon, GA 31210
USA
Tel: +1 877 783 7337
Fax: +1 478 476 9867
e-mail: sales@verder-us.com