

Repair/Parts



Verderair VA-E80

Electric-Operated Diaphragm

Pump

859.0635
Rev.D
EN

3-Inch pumps with electric drive for fluid transfer applications. Not approved for use in explosive atmospheres or hazardous locations unless otherwise stated. For professional use only.

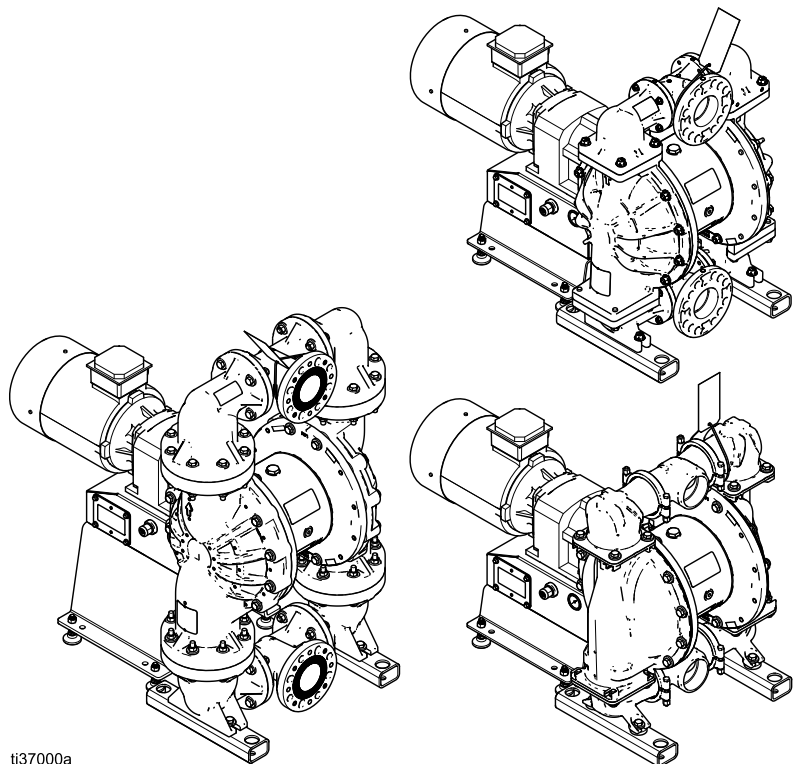


Important Safety Instructions

Read all warnings and instructions in this manual and in your Operation manual. **Save these instructions.**

*Maximum working pressure: 5.5 bar
(0.55 MPa, 80 psi)*

See page 7 for approvals.



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Related Manuals








Manual Number	Title
859.0634	VA-E80 Electric-Operated Diaphragm Pump, Operation







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 symbols refer to procedure-specific risks. When these symbols appear in the body of this manual or on warning labels, refer back to these Warnings. Product-specific hazard symbols and warnings not covered in this section may appear throughout the body of this manual where applicable.

 DANGER	
	<p>SEVERE ELECTRIC SHOCK HAZARD</p> <p>This equipment can be powered by more than 240 V. Contact with this voltage will cause death or serious injury.</p> <ul style="list-style-type: none"> • Turn off and disconnect power at main switch before disconnecting any cables and before servicing equipment. • This equipment must be grounded. Connect only to grounded power source. • All electrical wiring must be done by a qualified electrician and comply with all local codes and regulations.

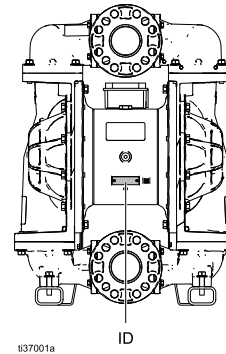
 WARNING	
    	<p>FIRE AND EXPLOSION HAZARD</p> <p>Flammable fumes, such as solvent and paint fumes, in work area can ignite or explode. Paint or solvent flowing through the equipment can cause static sparking. To help prevent fire and explosion:</p> <ul style="list-style-type: none"> • Use equipment only in well ventilated area. • Eliminate all ignition sources; such as pilot lights, cigarettes, portable electric lamps, and plastic drop cloths (potential static arc). • Ground all equipment in the work area. See Grounding instructions. • Keep work area free of debris, including solvent, rags and gasoline. • Do not plug or unplug power cords, or turn power or light switches on or off when flammable fumes are present. • Use only grounded hoses. • Stop operation immediately if static sparking occurs or you feel a shock. Do not use equipment until you identify and correct the problem. • Keep a working fire extinguisher in the work area. <p>Static charge may build up on plastic parts during cleaning and could discharge and ignite flammable vapors. To help prevent fire and explosion:</p> <ul style="list-style-type: none"> • Clean plastic parts only in well ventilated area. • Do not clean with a dry cloth. • Do not operate electrostatic guns in equipment work area.

 <h1 style="margin: 0;">WARNING</h1>	
  	<p>PRESSURIZED EQUIPMENT HAZARD</p> <p>Fluid from the equipment, leaks, or ruptured components can splash in the eyes or on skin and cause serious injury.</p> <ul style="list-style-type: none"> • Follow the Pressure Relief Procedure when you stop spraying/dispensing 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.
 	<p>EQUIPMENT MISUSE HAZARD</p> <p>Misuse can cause death or serious injury.</p> <ul style="list-style-type: none"> • 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 Safety Data Sheet (SDS) from distributor or retailer. • Turn off all equipment and follow the Pressure Relief Procedure 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. Alterations or modifications may void agency approvals and create safety hazards. • Make sure all equipment is rated and approved for the environment in which you are using it. • 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.
	<p>PRESSURIZED ALUMINUM PARTS HAZARD</p> <p>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.</p> <ul style="list-style-type: none"> • Do not use 1,1,1-trichloroethane, methylene chloride, other halogenated hydrocarbon solvents or fluids containing such solvents. • Do not use chlorine bleach. • Many other fluids may contain chemicals that can react with aluminum. Contact your material supplier for compatibility.

 <h1 style="margin: 0;">WARNING</h1>	
	<p>THERMAL EXPANSION HAZARD</p> <p>Fluids subjected to heat in confined spaces, including hoses, can create a rapid rise in pressure due to the thermal expansion. Over-pressurization can result in equipment rupture and serious injury.</p> <ul style="list-style-type: none"> • Open a valve to relieve the fluid expansion during heating. • Replace hoses proactively at regular intervals based on your operating conditions.
	<p>PLASTIC PARTS CLEANING SOLVENT HAZARD</p> <p>Many solvents can degrade plastic parts and cause them to fail, which could cause serious injury or property damage.</p> <ul style="list-style-type: none"> • Use only compatible water-based solvents to clean plastic structural or pressure-containing parts. • See Technical Data in this and all other equipment instruction manuals. Read fluid and solvent manufacturer's Safety Data Sheet (SDS) and recommendations.
	<p>TOXIC FLUID OR FUMES HAZARD</p> <p>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 Safety Data Sheet (SDS) to know the specific hazards of the fluids you are using. • Store hazardous fluid in approved containers, and dispose of it according to applicable guidelines.
	<p>BURN HAZARD</p> <p>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</p> <p>Wear appropriate protective equipment when in the work area to help prevent serious injury, including eye injury, hearing loss, inhalation of toxic fumes, and burns. This protective equipment includes but is not limited to:</p> <ul style="list-style-type: none"> • Protective eyewear, and hearing protection. • Respirators, protective clothing, and gloves as recommended by the fluid and solvent manufacturer.

Configuration Number Matrix

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



Sample Configuration Number: **VA-E80AASSTFTFTNAC5**

VA-E	80	A	A	SS	TF	TF	TN	AC5
Pump Model	Pump Size	Wetted Section Material	Center Section Material	Seats	Balls	Diaphragms	Connections	Options






NOTE: Some combinations are not possible. Please check with your local supplier or on verderair.com.

Pump Model	Pump Size		Wetted Section Material		Center Section Material	
VA-E	80	80 mm	A	Aluminum	A	Aluminum
			P	Polypropylene		
			S	Stainless Steel		

Seat Material		Ball Material		Diaphragm Material**		Connections		Options	
BN	Buna-N*	AC	Acetal	GE	Geolast	FC	Center Flanged, 80 mm (3 in.) DIN/ANSI	AC5	Standard Induction Motor
GE	Geolast	BN	Buna-N	TF	PTFE	TN	Threaded NPT	A25	Standard Motor/240V Compressor
HY	Hytrel*	GE	Geolast	SP	Santoprene	TB	Threaded BSP	WG	No Motor or Compressor
SP	Santoprene	TF	PTFE	HY	Hytrel			AX5	ATEX Induction Motor
SS	Stainless Steel	SP	Santoprene					AF5	Flameproof Induction Motor
PP	Polypropylene								

* Models with Buna-N or Hytrel seats do not have manifold/seat o-rings.

** All diaphragms have a fiber-reinforced Neoprene backer.

Approvals	
◆ Aluminum and stainless steel pumps with option code AX5 are certified to:	 II 2 G Ex h d IIB T3 Gb
✦ Aluminum and stainless steel pumps with option code WG are certified to:	 II 2 G Ex h IIB T3 Gb
★ Pump options coded AF5 are certified to:	 LISTED Class I, Div 1, Group D, T3B Class II, Div 1, Group F & G, T3B 
All Models (except option code AF5) are marked:	

Troubleshooting



- Follow the [Pressure Relief Procedure, page 10](#), before checking or servicing the equipment.
- Check all possible problems and causes before disassembly.

Problem	Cause	Solution
Pump cycles but will not prime and/or pump.	Pump is running too fast, causing cavitation before prime.	Slow down the controller (VFD)
	Center section has no air pressure, or air pressure is too low.	Apply air pressure to center section per your application requirements.
	Check valve ball is severely worn or wedged in seat or manifold.	Replace the ball and seat.
	The pump has insufficient suction pressure.	Increase the suction pressure. See the Operation manual.
	Seat is severely worn.	Replace the ball and seat.
	Outlet or inlet is restricted.	Remove the restriction.
	Inlet fittings or manifolds are loose.	Tighten.
The center section is excessively hot.	Manifold o-rings are damaged.	Replace o-rings.
	The drive shaft is broken.	Replace.
Pump fails to hold fluid pressure at stall.	Check valve balls, seats, or o-rings are worn.	Replace.
	Manifold screws or fluid cover screws are loose.	Tighten.
	Diaphragm shaft bolt is loose	Tighten.
Pump will not cycle.	Motor or controller is wired improperly.	Wire per manual.
	The leak detector (if installed) has tripped.	Check diaphragm for rupture or incorrect installation. Repair or replace.
The motor is operating, but the pump will not cycle.	The jaw coupling between the motor and gearbox is not connected properly.	Check the connection.
Pump flow rate is erratic.	Suction line is clogged.	Inspect; clear.
	Check balls are sticky or leaking .	Clean or replace.
	Diaphragm (or backup) ruptured.	Replace.
Pump makes unusual noises.	Pump is operating near or at stall pressure.	Adjust air pressure or slow the pump speed.

Problem	Cause	Solution
Air consumption is higher than expected.	A fitting is loose.	Tighten. Inspect thread sealant.
	Loose or damaged o-rings or shaft seal.	Replace.
	Diaphragm (or backup) ruptured.	Replace.
Air bubbles in fluid.	Suction line is loose.	Tighten.
	Diaphragm (or backup) ruptured.	Replace.
	Loose manifolds, damaged seats or o-rings.	Tighten manifold bolts or replace seats or o-rings.
	Loose diaphragm shaft bolt.	Tighten.
Pump leaks fluid externally from joints.	Loose manifold screws or fluid cover screws.	Tighten.
	Manifold o-rings worn out.	Replace o-rings.
The controller faults or shuts down.	A GFCI has tripped.	Remove the controller from the GFCI circuit.
	Supply power is poor.	Determine and fix the source of the power problem.
	Operational parameters are exceeded.	See performance chart; ensure pump is operating within the continuous duty range.
Excessive motor regeneration fault from VFD	Inlet check clogged/improperly installed	Remove debris/install properly
	Broken diaphragm bolt	Replace bolt
NOTE: For problems with a Variable Frequency Device (VFD), see your VFD manual.		

Repair

Pressure Relief Procedure



Follow the Pressure Relief Procedure whenever you see this symbol.

<p>This equipment stays pressurized until pressure is relieved manually. To help prevent serious injury from pressurized fluid, such as splashing in the eyes or on skin, follow the Pressure Relief Procedure when you stop pumping and before you clean, check, or service the equipment.</p>				

1. Remove power to the system.
2. Open the fluid drain valve to relieve fluid pressure. Have a container ready to catch the drainage.
3. Shut off the master air valve.
4. Turn down center section regulator to zero to relieve air pressure in center section.

Check Valve Repair

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NOTE: Kits are available for new check valve balls and seats in a range of materials. O-ring and fastener kits also are available.

NOTE: To ensure proper seating of the check balls, always replace the seats when replacing the balls. Also, replace the o-rings every time the manifold is removed.

Disassemble the Check Valve

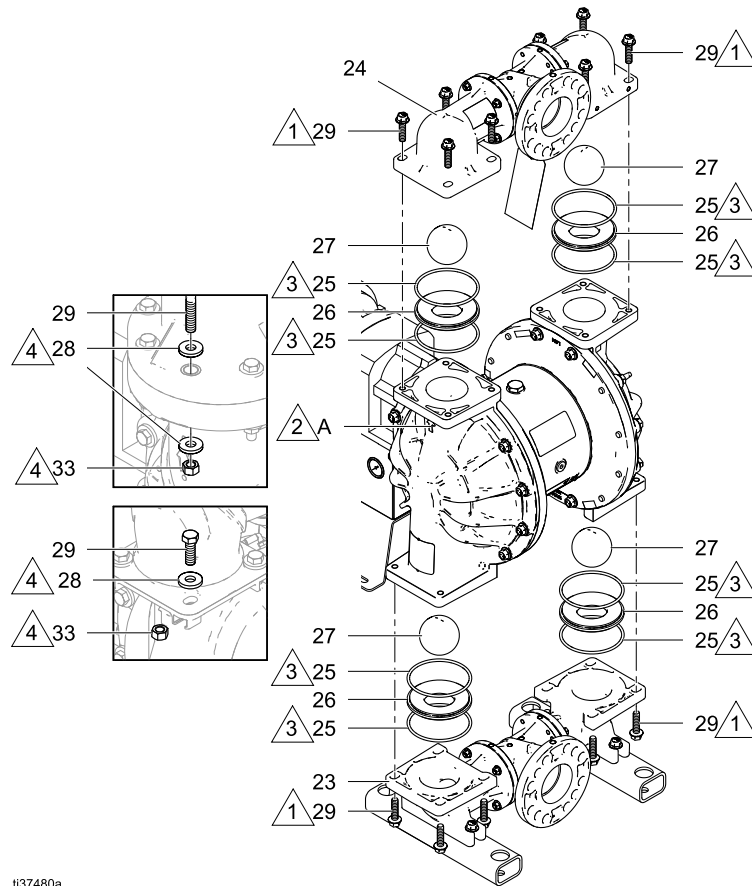
1. Follow the [Pressure Relief Procedure, page 10](#). Remove power to the motor. Disconnect all hoses.
2. **NOTE for plastic pumps:** Use hand tools until thread-locking adhesive patch releases.
3. Remove the manifold fasteners (29) and nuts (33; used only on stainless steel and plastic models), and washers (28; used only on stainless steel and plastic models), then remove the outlet manifold (24).
4. Remove the seats (26), balls (27), and o-rings (25) if present.
NOTE: Some models do not use o-rings (25).
5. Repeat for the inlet manifold (23), o-rings (25) if present, seats (26), and balls (27).

To continue disassembly, see [Disassemble the Standard Diaphragms, page 12](#).





Reassemble the Check Valve

1. Clean all parts and inspect for wear or damage. Replace parts as needed.
2. Reassemble in the reverse order, following all notes in the illustration. Put the inlet manifold on first. Be sure the ball checks and manifolds are assembled **exactly** as shown. The arrows (A) on the fluid covers (2) **must** point toward the outlet manifold (24).

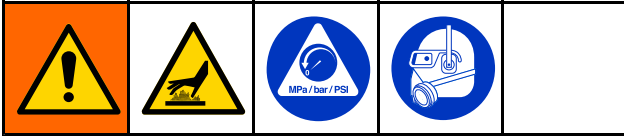
Check valve assembly, aluminum model shown



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-  Apply medium-strength (blue) thread locker. Torque to the value specified for your pump. See [Torque Instructions, page 20](#).
-  Arrow (A) must point toward outlet manifold.
-  Not used on some models.
-  Plastic and stainless steel models include nuts (33) and washers (28).

Standard Diaphragm Replacement

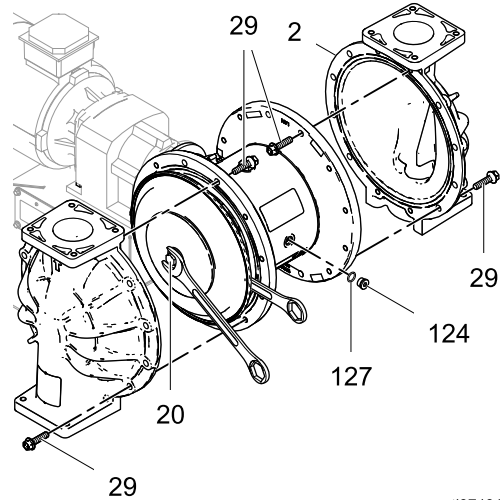


6. Rotate the drive shaft to move the piston fully to the other side. See instructions in step 4. Repeat step 5.
7. To continue with disassembly, see [Disassemble the Center Section, page 14.](#)

Disassemble the Standard Diaphragms

NOTE: Diaphragm kits are available in a range of materials and styles. See Parts section.

1. Follow the [Pressure Relief Procedure, page 10.](#) Remove power to the motor. Disconnect all hoses.
2. Remove the manifolds and disassemble the ball check valves as explained in [Check Valve Repair, page 10.](#)
3. Remove the bolts (29) from the fluid covers, then pull the fluid covers off of the pump.
4. To remove the diaphragms, the piston must be moved fully to one side. If the pump is not attached to the gearbox, turn the shaft by hand to move the piston. If the pump is still attached to the gearbox, loosen the screws and remove the fan cover. Turn the fan by hand to rotate the shaft to shift the piston to one side.
5. Hold a 28 mm wrench on the wrench flats of the exposed piston shaft. Use another wrench on the shaft bolt (20) to remove it. Then remove all parts of the diaphragm assembly.



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Reassemble the Standard Diaphragms

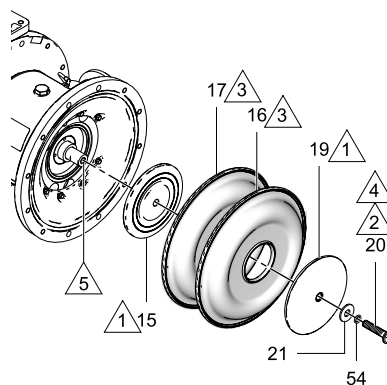
NOTICE

After reassembly, allow the thread locker to cure for 12 hours, or per manufacturer's instructions, prior to operating the pump. Damage to the pump will occur if the diaphragm shaft bolt loosens.

TIP: If you are also repairing or servicing the center section (drive shaft, piston, etc.), see [Center Section Repair, page 14](#), before you put the diaphragms back on.

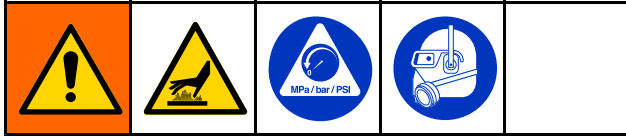
1. Clean all parts and inspect for wear or damage. Replace parts as needed. Be sure the center section is clean and dry.
2. Thoroughly clean or replace the diaphragm bolt (20). Install the o-ring (54, metal pump only) and washer (21, metal pump only).
3. Assemble the fluid side plate (19), the diaphragm (16), the backup diaphragm (17), and the air side diaphragm plate (15) on the bolt exactly as shown.
4. Clean the female threads of the piston shaft with a wire brush dipped in solvent to remove any residual thread locker. Apply thread-locking primer and allow it to dry.
5. Apply medium-strength (blue) thread locker to the threads of the bolt.
6. Hold a 28 mm wrench on the wrench flats of the piston shaft. Screw the bolt onto the shaft and torque to 203 N•m (150 ft-lb).
7. Rotate the drive shaft to move the piston fully to one side. See instructions in step 4 of [Disassemble the Standard Diaphragms, page 12](#).
8. Repeat to install the other diaphragm assembly.
9. Attach the fluid covers. The arrow on each fluid cover must point toward the outlet manifold. Apply medium-strength (blue) thread locker to the bolt threads. See [Torque Instructions, page 20](#), to tighten.
10. Reassemble the check valves and manifolds. See [Reassemble the Check Valve, page 10](#).
11. Restore motor cooling fan cover and pin (131) to their original locations.

- 1 Rounded side faces diaphragm.
- 2 Apply medium-strength (blue) thread locker to the threads.
- 3 AIR SIDE markings on diaphragm must face the center housing.
- 4 Torque to 203 N•m (150 ft-lb) at 100 rpm maximum.
- 5 Apply primer to the female threads. Allow to dry.



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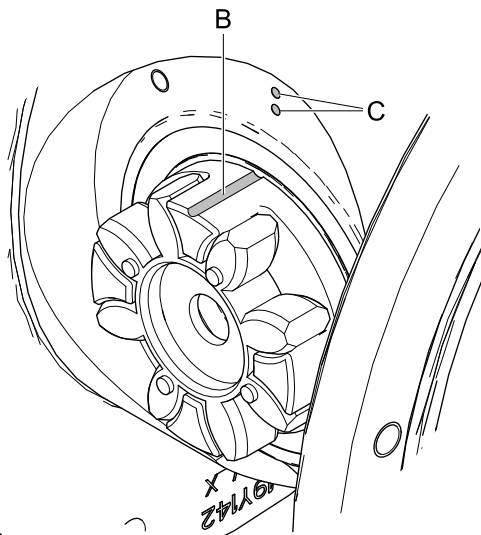
Center Section Repair



Disassemble the Center Section

See the illustrations in [Center Section](#), page 28.

1. Follow the [Pressure Relief Procedure](#), page 10. Remove power to the motor. Disconnect all hoses.
2. Remove the manifolds and check valve parts as directed in [Disassemble the Check Valve](#), page 10.
3. Remove the fluid covers and diaphragms as directed in [Disassemble the Standard Diaphragms](#), page 12.
TIP: Clamp the gear box bracket (6 or 8) to the bench. Leave the pump connected to the motor.
4. Use a 10 mm hex wrench to remove 4 bolts (3). Pull the pump off the alignment housing (110).
TIP: It may be necessary to tap the pump with a rubber mallet to disengage the coupler.
5. Use a 5/16 hex wrench to remove the plug (124). Use a 30 mm socket wrench to remove the bearing bolt (114) and the o-ring (113) from the top.
6. Turn the shaft so the groove on the shaft (B) is at the top, in line with the alignment markings (C).



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7. Use a 3/4-16 bolt to push out the drive shaft assembly (109). You can also use the bearing bolt (114), but remove the bearing (112) first. Be sure that the groove on the drive shaft remains aligned with the markings in the center section.

NOTE: Remove the bolt after the drive shaft is freed.

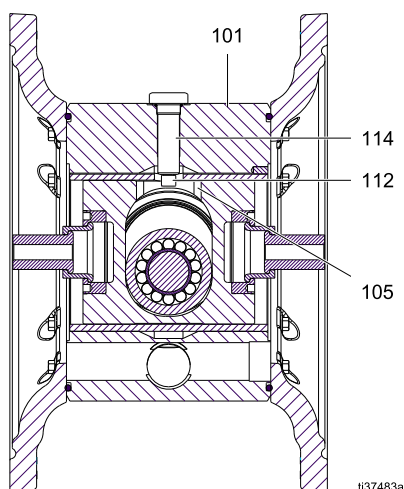
NOTICE

Proper alignment is essential. Do not apply more than about 14 N•m (10 ft-lbs) of torque. Excessive torque could damage the housing thread. If you encounter resistance, check alignment or contact your distributor.

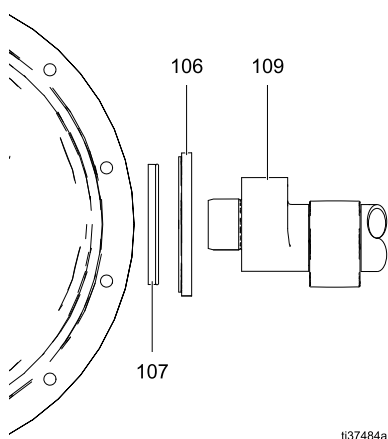
8. The shaft coupler (115) might come out with the drive shaft assembly. If not, remove from gearbox (118).
9. Remove the seal cartridge (106), the o-ring (108) and the radial seal (107) from the drive shaft assembly.
10. Slide the piston assembly (105) out of the center.
11. Only remove the alignment housing (110) if needed. Use a 10 mm hex wrench to remove 4 bolts (111). Pull the alignment housing off the gearbox (118).
12. Leave the gearbox coupler (118a) attached to the gearbox shaft (118) unless it is damaged. If you need to remove it, a bearing puller must be used.

Reassemble the Center Section

1. Clean and dry the center housing (101), the center of the piston (105) and the drive shaft (109).
2. Inspect the piston and center section bearings for excessive wear and replace if needed. Install the piston in the center section with the slot on the top, in line with the alignment markings in the center section.
3. Install the o-ring (113) and apply medium-strength (blue) thread locker to the bearing bolt (114) and screw into the center section. Be sure that the bearing (112) is in the slot on the piston as shown. Be sure that the piston moves freely. Torque the bolt (114) to 20–34 N•m (15–25 ft-lb).
5. Install o-ring (108) to the center housing (101).
6. Apply anti-seize lubricant on the mating edges of the drive shaft as shown in the illustration, page 17.
7. Apply Loctite® Primer 7471 and Retaining Compound 641 to the bearing bore and outer race. Assemble immediately. Allow to cure for a minimum of 12 hours before running the pump.
8. Center the piston in the housing and install the drive shaft assembly (109) into the center housing (101) with the groove facing up.
9. Inspect the shaft coupler (115) for wear and replace if needed. Install on the drive shaft.

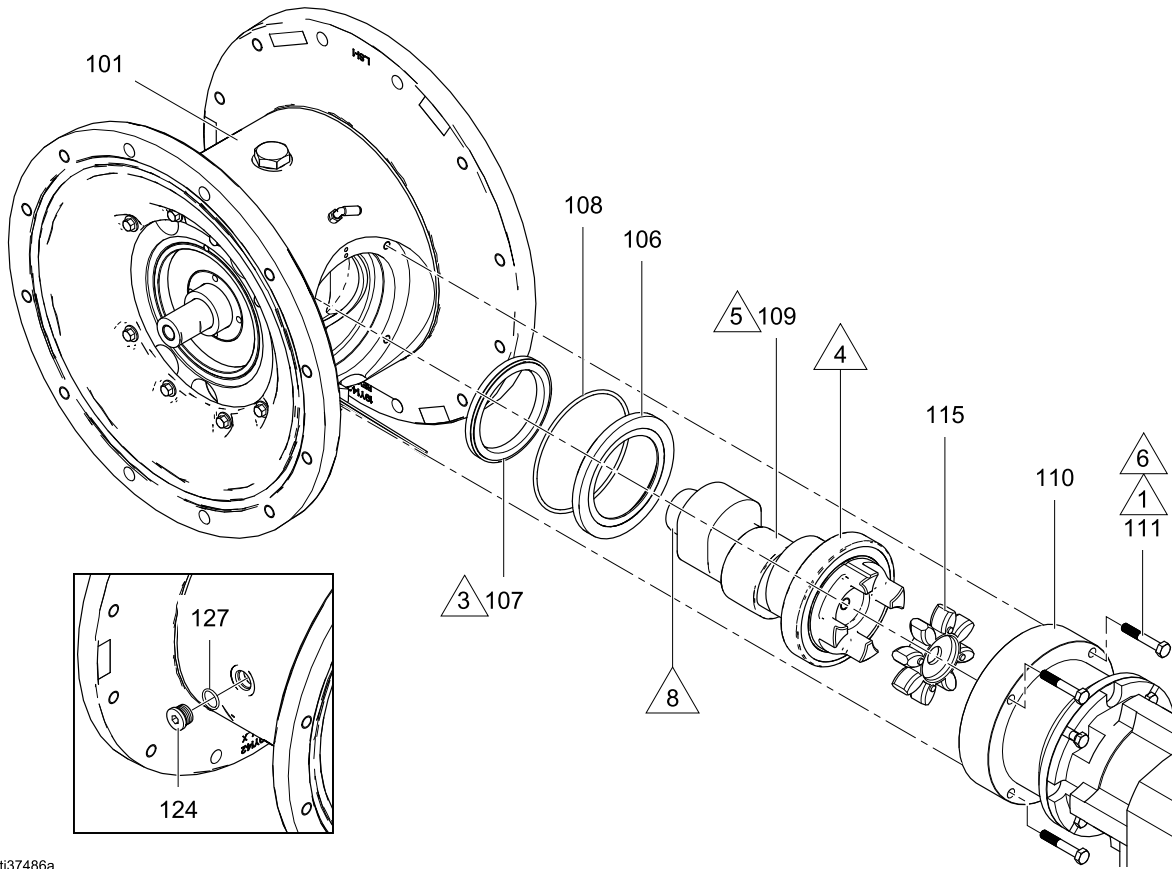
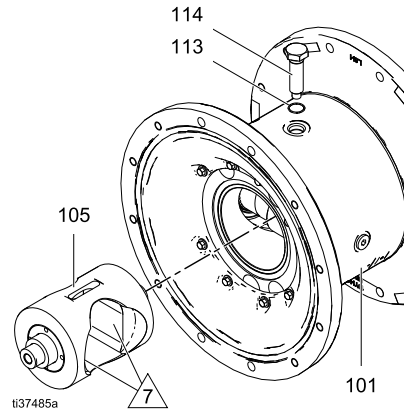


10. If removed, install the alignment housing to the center section. Apply medium-strength (blue) thread locker and install the housing screws (111). Torque to 15–18 N•m (130–160 in-lb).
 11. If removed, install the gearbox coupler (4) on the gearbox shaft. Use an M12 x 30 bolt and a large washer inserted into the hole in the shaft to press the coupler into position. The coupler is in proper position when it is flush with the end of the shaft.
 12. Be sure the gearbox coupler (4) is aligned properly. Turn by hand if needed. Connect the pump to the gearbox assembly, engaging the couplers.
 13. Apply medium-strength (blue) thread locker and install the gearbox screws (3). Torque to 15–18 N•m (130–160 in-lb).
 14. Be sure o-ring (127) is on the plug (124). Install the plug and torque to 20–34 N•m (15–25 ft-lb).
 15. See [Reassemble the Standard Diaphragms, page 13](#), and [Reassemble the Check Valve, page 10](#).
4. Be sure the sealing surface of the drive shaft (109) is clean. Install the seal cartridge (106) and the radial seal (107) on the drive shaft. The lips on the radial seal (107) must face **IN** toward the center. Inspect seal lip for damage. Replace if necessary.



Repair

- 1 Apply medium-strength (blue) thread locker to threads.
- 2 Torque to 20–34 N•m (15–25 ft-lb).
- 3 Lips must face **IN** toward the center.
- 4 Apply Loctite® Primer 7471 and Retaining Compound 641 to the bearing bore and outer race. Assemble immediately. Allow to cure for a minimum of 12 hours before running the pump.
- 5 Install the drive shaft assembly with the groove facing up.
- 6 Tighten screws in a crisscross pattern, 5 turns at a time, to engage the coupler evenly. Torque to 15–18 N•m (130–160 in-lb).
- 7 Apply lubricant to inner mating surface.
- 8 Apply anti-seize lubricant liberally on this radial surface of the drive shaft assembly.



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Disconnect the Motor and Gearbox

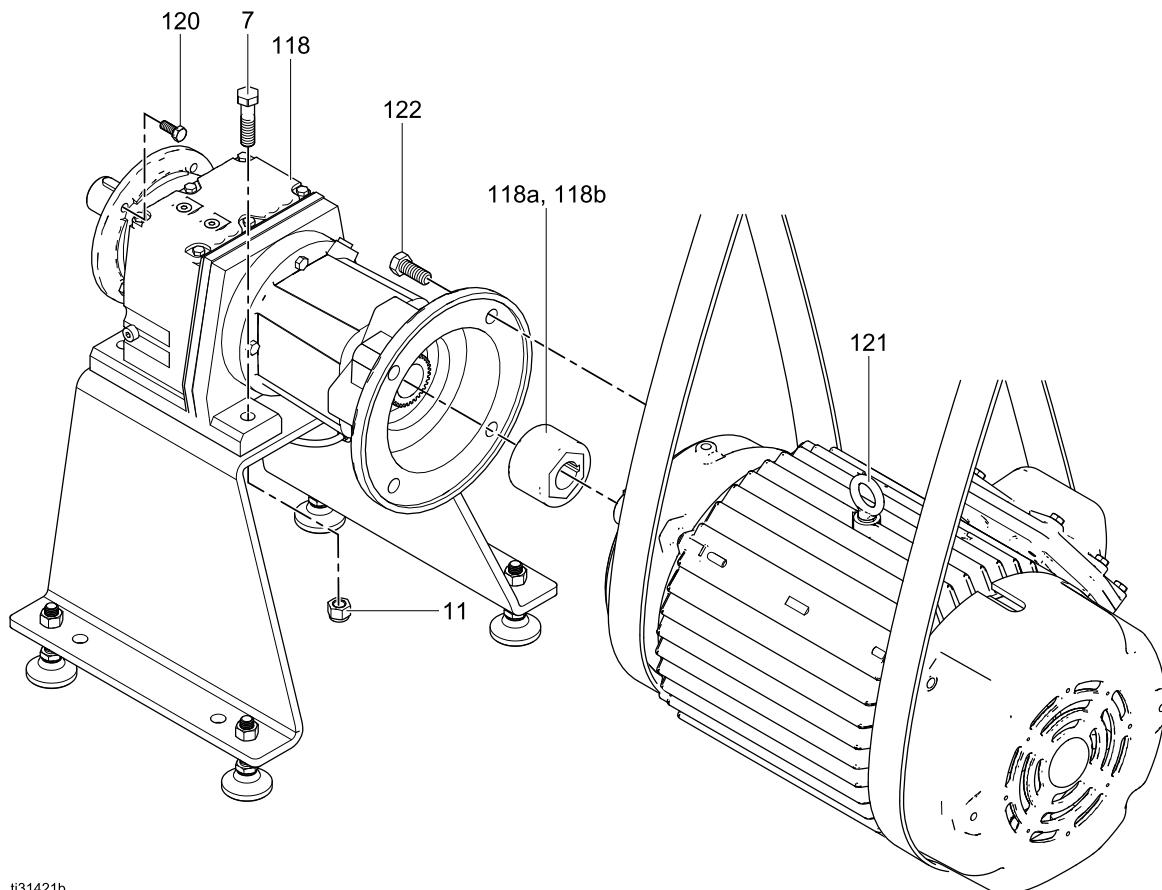
NOTE: Normally, the motor remains connected to the gearbox. Disconnect the motor only if you suspect that the motor or gearbox must be replaced.

TIP: Clamp the gearbox bracket to the bench.

Start at step 1 for ATEX or Flameproof motors. Standard AC motors are of one piece with the gearbox, so begin with step 3.

NOTE: Use a hoist and sling to remove motor weight from the gearbox during removal.

1. Use a 3/4 in. socket wrench to remove 4 screws (122).
2. Pull the motor (121) straight off of the gearbox (118).
3. Use a 3/4 in. socket wrench to remove 4 bolts (7) and nuts (11, if present). Lift the gear box off of the bracket. **NOTE:** If you have an AC motor with gearbox, lift the whole unit off of the bracket.



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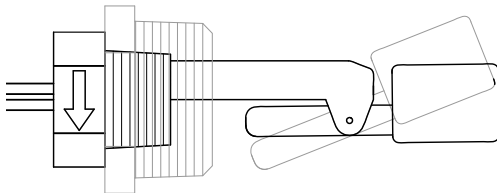
Leak Sensor Repair

The leak sensor can be replaced or re-positioned. When properly positioned, the two arrows imprinted on two of the flat surfaces of the leak sensor hex head are vertical and pointing down.

Leak Sensor Testing

Testing the continuity of the leak sensor is possible to ensure proper operation. If continuity testing indicates that the leak sensor is not functional, a replacement kit, 819.1273, can be ordered separately.

1. Follow the [Pressure Relief Procedure, page 10](#). Remove power to the motor and VFD.
2. To test the leak sensor without removing from the pump:
 - a. Note the connection locations of the leak sensor wires within the VFD or other monitoring device, then disconnect the leak sensor wires.
 - b. Use an ohmmeter attached to the leak sensor leads to test the conductivity of the leak sensor. Continuity is affirmed by a reading of 0-5 ohms.
 - c. Loosen the leak sensor bushing 1/2 turn (leak sensor arrows point up).
 - d. Use an ohmmeter attached to the leak sensor leads to test the conductivity of the leak sensor. An open circuit should be indicated.






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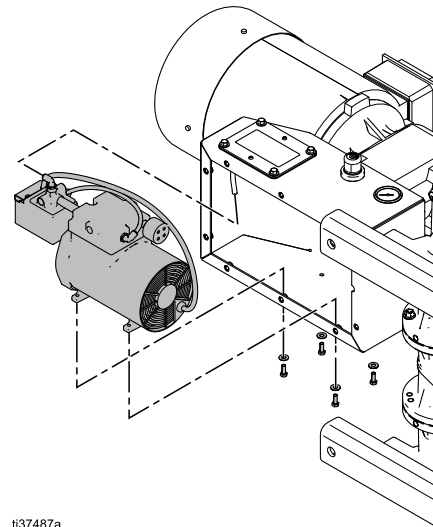
Normal operation position shown by dark float. Lighter float line indicates the open circuit position.

- e. If the continuity test result indicates that the leak sensor is not functioning properly, proceed to step 3. Otherwise, tighten the bushing to its original position so that the arrows on the leak sensor point down. Attach the removed leak sensor wires to the point where they were disconnected from the VFD or other monitoring device.
 - f. Apply air pressure to the pump and use a soapy solution around the bushing to ensure an air tight seal. If air bubbles appear, it will be necessary to return to the steps above for air pressure relief and removing the bushing from the pump. Apply new thread sealer on the bushing and install in the pump so that the leak sensor is properly positioned. Repeat this step to test for air leakage around the bushing.
3. Remove and replace the leak sensor at the pump:
 - a. Note the connection locations of the leak sensor wires within the VFD or other monitoring device, then disconnect the leak sensor wires.
 - b. Remove the leak sensor and bushing from the pump center section.
 - c. Apply thread tape or paste to the bushing threads and screw finger tight into the pump.
 - d. To ensure a watertight seal, apply Loctite® 425 Assure™ threadlocker supplied with the leak sensor kit to the leak sensor threads and screw the leak sensor into the bushing.
 - e. Verify that the leak sensor was properly oriented in the pump so that the arrows imprinted on the leak sensor hex head are vertical positioned with the arrows pointing down. It may be necessary to further tighten both the bushing and leak sensor to achieve proper positioning.
 - f. Use an ohmmeter attached to the leak sensor leads to test the conductivity of the leak sensor. Continuity is affirmed by a reading of 0-5 ohms. Attach the leak sensor wires to the VFD or other monitoring device.
 - g. Apply air pressure to the pump and use a soapy solution around the bushing to ensure an air tight seal. If air bubbles appear, it will be necessary to return to the steps above for air pressure relief and removing the bushing from the pump. Apply new thread sealer on the bushing and install in the pump so that the leak sensor is properly positioned. Repeat this step to test for air leakage around the bushing.

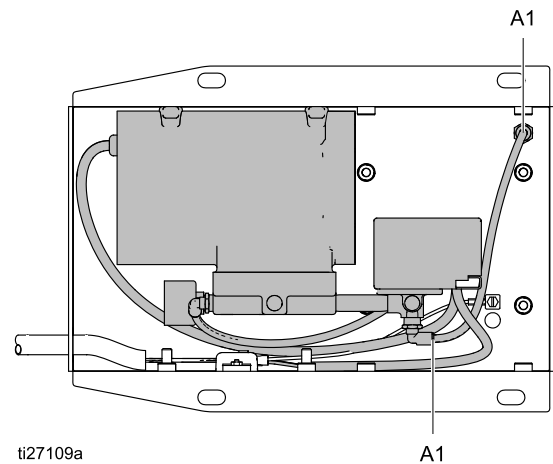
Replace the Compressor

				
<p>To avoid injury from fire, explosion, or electric shock, all electrical wiring must be done by a qualified electrician and comply with all local codes and regulations.</p>				

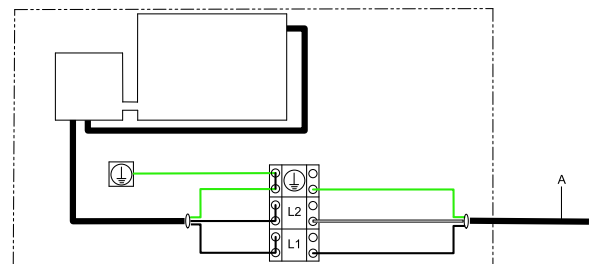
1. Follow the [Pressure Relief Procedure](#), page 10.
2. Remove electrical power to the pump.
3. Remove the 8 bolts holding the pump to the mounting surface.
4. Tip the pump on its side to provide access to the compressor box.
5. Remove riser bracket (8).
6. Remove the air line (A1) from the compressor. Disconnect the compressor wires at the terminal block (L1, L2, and ground). Remove the four bolts and carefully pull the compressor out of the box.
7. Use the four bolts to install the new compressor. Connect the air line from A1 to A1 as shown.
8. Connect the wires from the new compressor to the terminal block as shown.
9. Replace riser bracket.
10. Return the pump to its mounting location. Secure it with the 8 bolts.
11. Return power to the pump.



ti37487a



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Torque Instructions

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

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) thread locker to the threads.

NOTE: Always completely torque fluid covers before torquing manifolds.

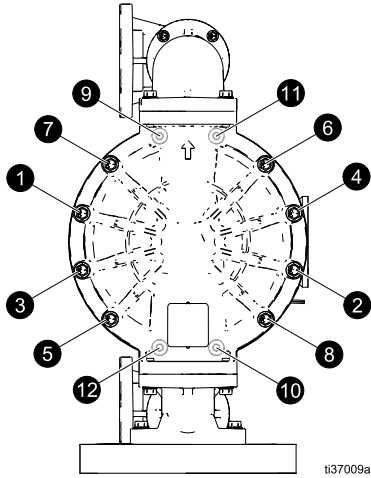
1. Start all fluid cover screws a few turns. Then, turn down each screw just until head contacts cover.
2. Turn each screw by 1/2 turn or less working in a crisscross pattern to specified torque.
3. Repeat for manifolds.

Torque Sequence

Aluminum Pumps

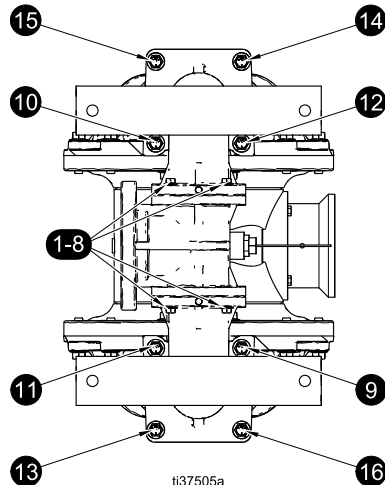
Torque bolts to 74.6–81.3 N•m (55-60 ft-lb)

1. Left/Right Fluid Covers



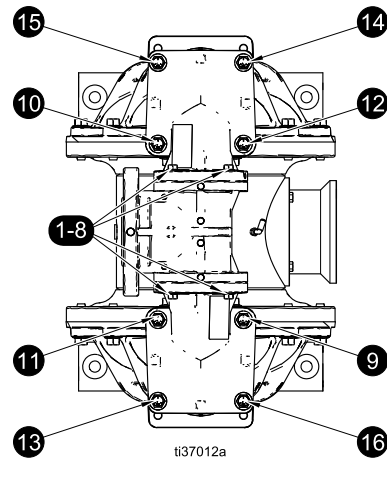
SIDE VIEW

2. Inlet Manifold



BOTTOM VIEW

3. Outlet Manifold

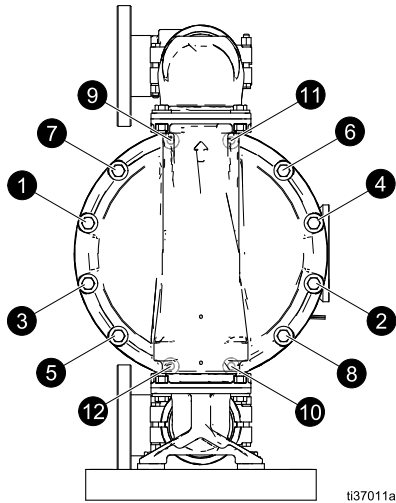


TOP VIEW

Stainless Steel Pumps

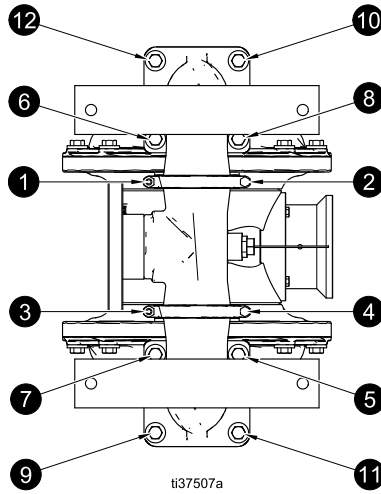
Torque bolts to 54.2–61.2 N•m (40-45 ft-lb)

1. Left/Right Fluid Covers



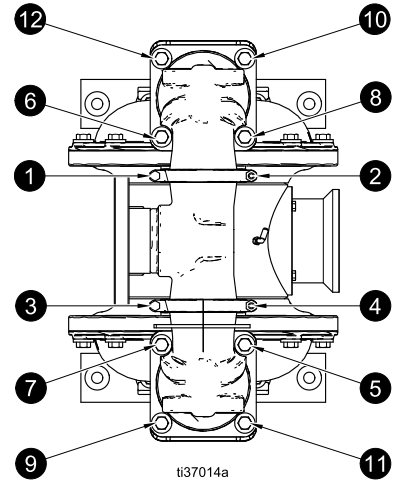
SIDE VIEW

2. Inlet Manifold



BOTTOM VIEW

3. Outlet Manifold

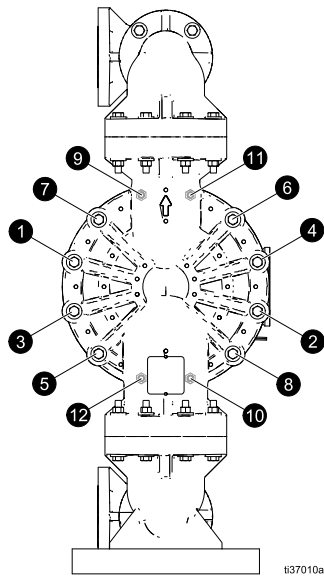


TOP VIEW

Plastic Pumps

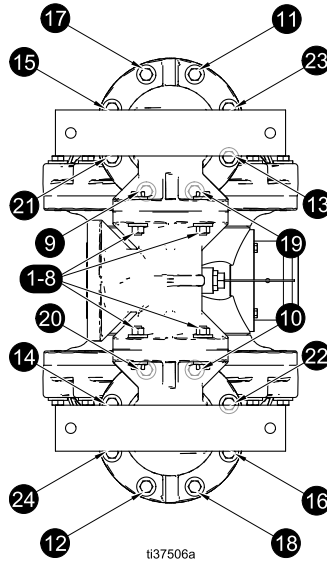
Torque bolts to 54.2–61.2 N•m (40-45 ft-lb)

1. Left/Right Fluid Covers



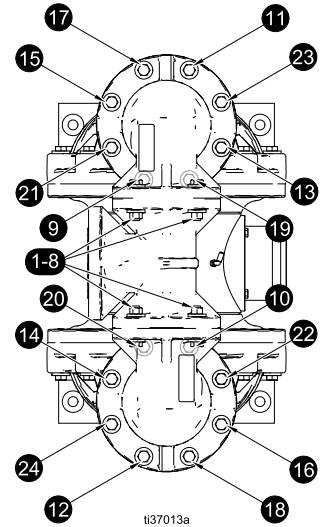
SIDE VIEW

2. Inlet Manifold



BOTTOM VIEW

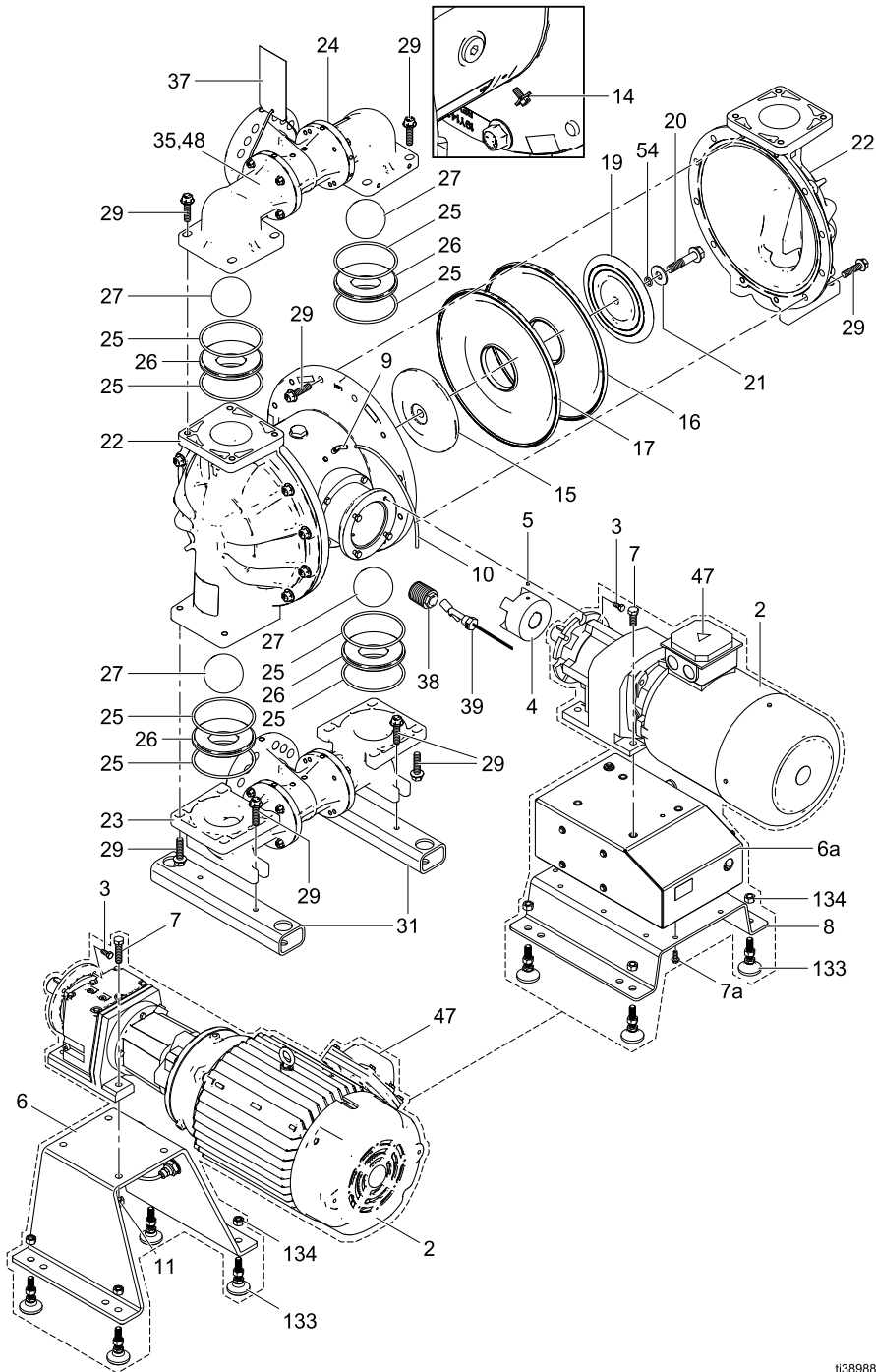
3. Outlet Manifold



TOP VIEW

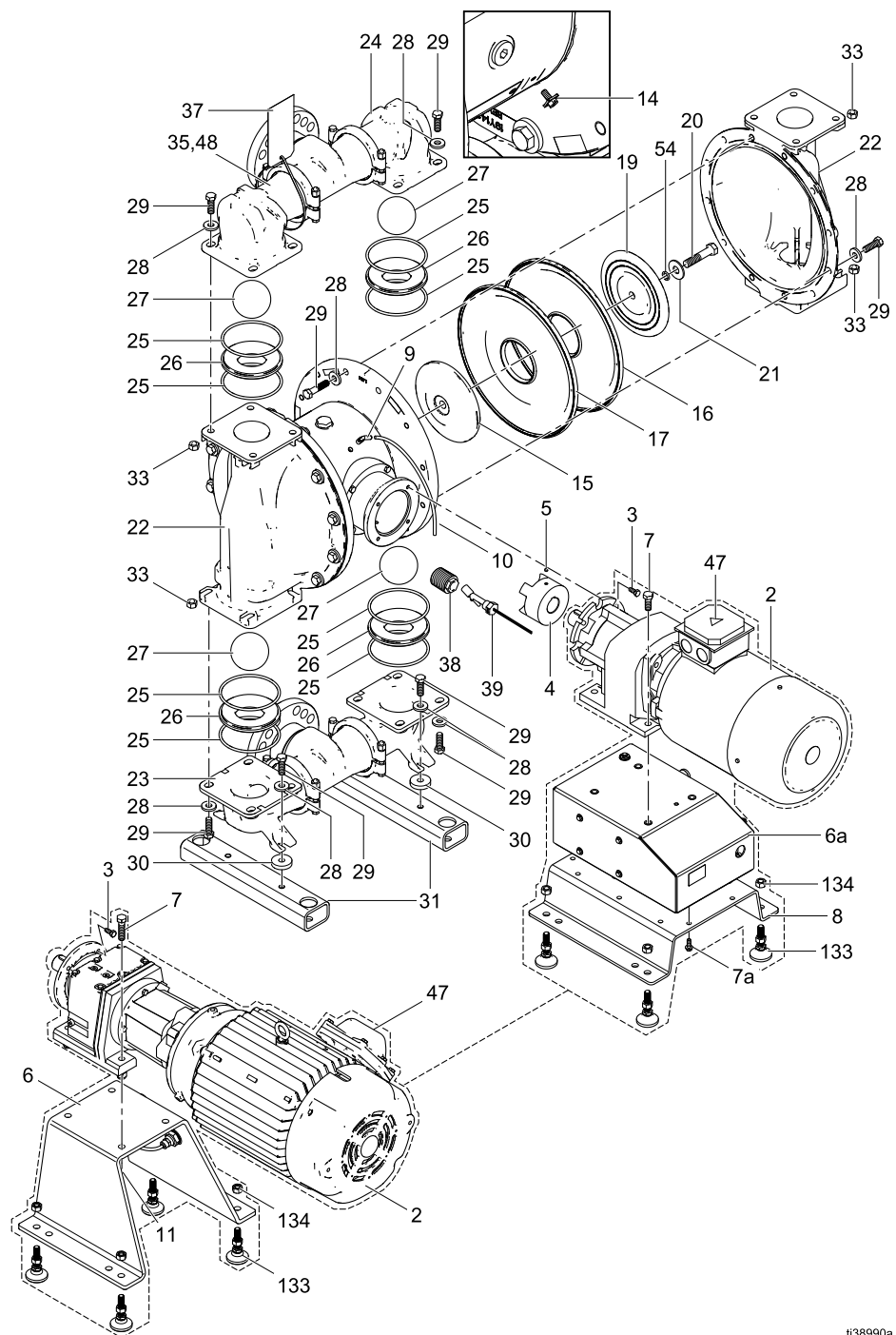
Parts

Aluminum pump shown



t138988a

Stainless steel pump shown



i138990a

Parts/Kits Quick Reference

Use this table as a quick reference for parts/kits. Go to the pages indicated in the table for a full description of kit contents.

Ref.	Part/Kit	Description	Qty.
1	— — —	MODULE, drive; <i>See pages 29–30.</i>	1
2	819.1240	GEARMOTOR assembly Standard gearmotor	
	819.1241	ATEX motor	
	819.1244	Flameproof motor	
3	— — —	SCREW, cap, hex head,	4
4	819.1250	COUPLER, jaw	1
6	859.0620	AIR CONTROL, kit, no compressor	1
	859.0621	metal pumps poly pump	
	819.1270	COMPRESSOR, assembly; <i>includes Ref. 6a</i> 120 Volt, 240 Volt	1
6a	859.0505	COMPRESSOR, 120 Volt, 240 Volt	1
7	— — —	SCREW, cap, hex head, 1/2–13 x 2	4
7a	— — —	BOLT, M8 x 1.25, 20mm	10
8	859.0609	BRACKET, riser; <i>used for models with a compressor</i> for aluminum or stainless steel fluid section	1
	859.0610	for poly fluid section	
9	— — —	FITTING, elbow	1
10	— — —	TUBE, 1/4 O.D. x 1.2 ft	1
11	— — —	NUT	4
14	— — —	SCREW, ground	1
15	859.0611	PLATE, air side	2
16	— — —	DIAPHRAGM, kit; <i>See page 33.</i>	1 kit
17	— — —	DIAPHRAGM, backup, <i>included with Ref. 16</i>	2
19	859.0206	PLATE, fluid side; Aluminum fluid section, <i>includes Ref. 20, 21, 54</i>	2
	859.0208	Stainless steel fluid section, <i>includes Ref. 20, 21, 54</i>	
	859.0207	Poly (includes Ref 20)	
20	— — —	BOLT, shaft Aluminum fluid section, <i>includes Ref. 19</i>	2
	— — —	Stainless steel fluid section, <i>includes Ref. 19</i>	
21	— — —	WASHER Aluminum fluid section, <i>includes Ref. 19</i>	2
	— — —	Stainless steel fluid section, <i>includes Ref. 19</i>	
22	— — —	COVER, fluid; <i>See page 30.</i>	2
23	— — —	MANIFOLD, inlet; <i>See pages 30–31</i>	1

Ref.	Part/Kit	Description	Qty.
24	— — —	MANIFOLD, outlet; <i>See pages 30–31</i>	1
25	— — —	O-RING, manifold, (not used on some models); <i>See page 31.</i> Used with the following seats: Geolast seats Polypropylene seats PVDF seats Santoprene seats 316 SST seats	4
26	— — —	SEAT; <i>See page 32</i>	4
27	— — —	BALLS, <i>See page 32</i>	4
28	— — —	WASHER	100
29	— — —	FASTENERS: Aluminum fluid section	
	859.0604	Fluid Cover, Outlet Manifold, Inlet Manifold, 1/2-13 x 2	44
	— — —	Polypropylene fluid section	
	859.0606	Fluid Cover, Outlet Manifold, Inlet Manifold 1/2-13 x 4.8	32
	— — —	Stainless Steel fluid section	
	859.0605	Fluid Cover, Outlet Manifold, Inlet Manifold 1/2-13 x 1.8	36
30	859.0612	SPACER	4
31	859.0234	BRACKET, mounting, foot, <i>included with Ref. 28, 29, 33</i> Aluminum fluid section	2
	859.0233	Stainless Steel fluid section	
	859.0233	Polypropylene fluid section	
33	859.0607	NUT, hex	32
35▲	859.6311	LABEL, safety	1
37▲	819.0388	TAG, warning, retorque Aluminum	1
	819.0389	Polypropylene	
	819.0390	Stainless Steel	
38	— — —	BUSHING	1
39	819.1273	SENSOR, leak, float, <i>includes Ref. 38</i>	1
47▲	859.0615	LABEL, warning, high voltage	1
54	— — —	O-RING, for diaphragm shaft bolt, <i>included in Ref. 19</i>	2
56	859.0614	BOLT, hex, 3.25 lg	16
57	859.0613	BOLT, hex, 2.25 lg	8

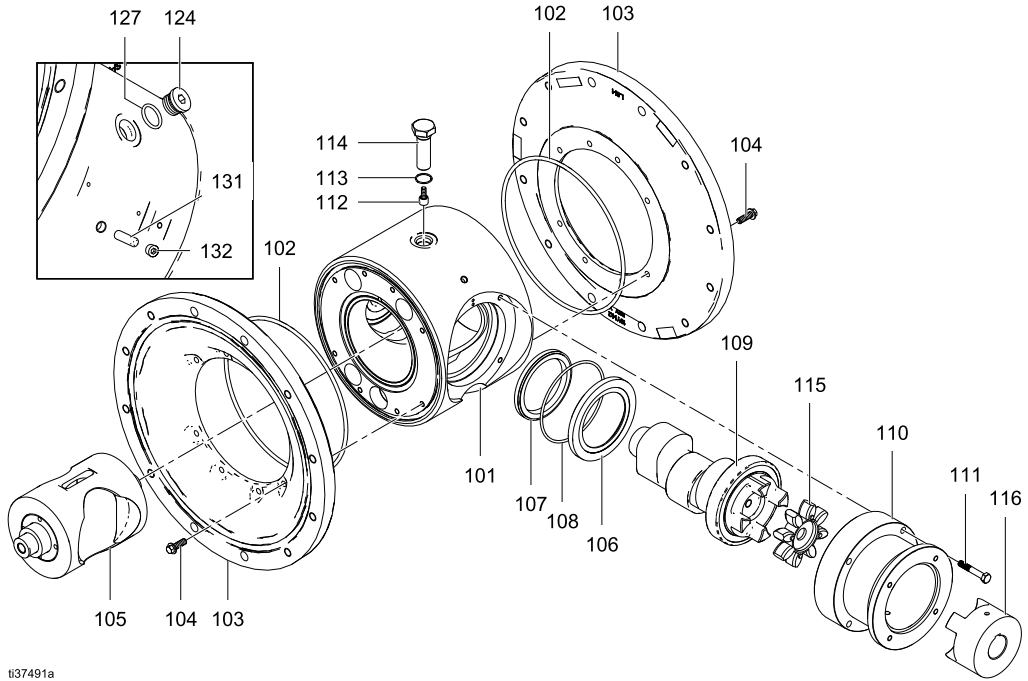
— — — *Not sold separately.*

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

Center Section

Sample Configuration Number

Pump Model	Pump Size	Wetted Section Material	Center Section Material	Seats	Balls	Diaphragms	Connections	Options
VA-E	80	A	A	TP	TP	TP	TN	AC5



ti37491a

Ref	Part	Description	Qty
101	819.1253	HOUSING, center, assembly	1
102	— — —	O-RING, air cover	2
103	859.0608	AIR COVER, <i>included with ref 102</i>	2
104	859.7051	BOLT, air cover	16
105	819.1237	PISTON, assembly	1
106†	— — —	CARTRIDGE, seal	1
107†	— — —	SEAL, radial	1
108†	— — —	O-RING, Size 153, Buna-N	1
109	819.1252	SHAFT, drive, assembly; <i>includes o-ring (Ref. 108), cartridge (Ref. 106) and seal (Ref. 107)</i>	1
110	819.1255	HOUSING, alignment, assembly; <i>includes screws (Ref. 111) Aluminum (Axx)</i>	1
111	— — —	SCREW, socket head, M8 x 50 mm; <i>included with Ref. 110</i>	4
112	— — —	BEARING, cam follower. <i>included with Ref. 114</i>	1
113	— — —	O-RING, Size 019, Fluoroelastomer; <i>included with Ref. 114</i>	1
114	819.1257	BOLT, bearing; <i>includes Refs. 112 and 113 for aluminum center housing</i>	1
115	819.1251	COUPLER, shaft	1
116	819.1250	COUPLER, gearbox; <i>includes mounting hardware</i>	1

Ref	Part	Description	Qty
118	819.1324	GEARBOX IEC 132 for use with motor option AX5	1
	859.0797	NEMA 213/215 TC for use with motor option AF5	
118a	— — —	COUPLER; <i>included with Ref 118</i>	1
118b	— — —	KEY; <i>included with Ref 118</i>	1
120	— — —	SCREW, cap, hex head, M8 x 20 mm	4
121	819.1240	MOTOR gearmotor for use with motor option AC5	1
	819.1244	motor, flameproof for use with motor option AF5	
	819.1241	motor, ATEX for use with motor option AX5	
122	— — —	SCREW, cap, 1/2–13 x 1.5 in.	4
124	859.0495	PLUG, front access <i>includes ref 127</i>	1
127	— — —	O-RING <i>included with Ref 124</i>	1
131	— — —	PIN, stop, 5/16 x 1-1/4 in.	1
132	— — —	PLUG; 1/8-27 npt	1
133	— — —	FOOT, leveling	4
134	— — —	NUT, 1/2-13	4

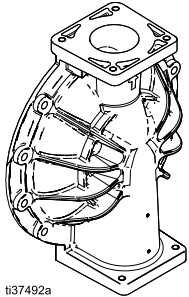
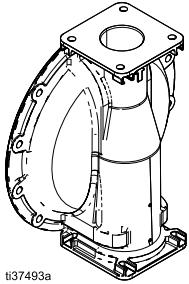
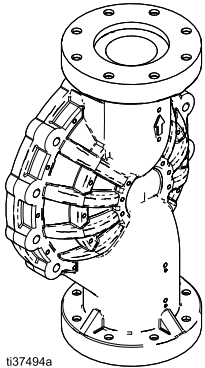
— — — *Not sold separately.*

† *Included in Shaft Seal Repair Kit 819.1258.*

Fluid Covers and Manifolds

Sample Configuration Number

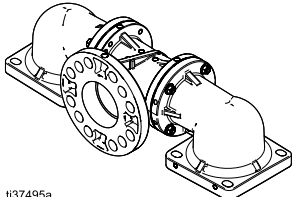
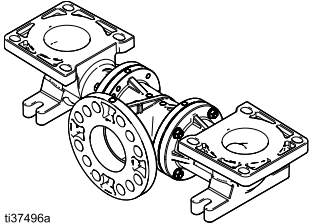
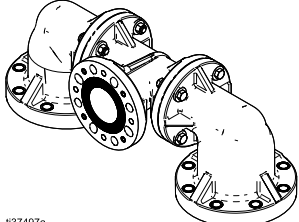
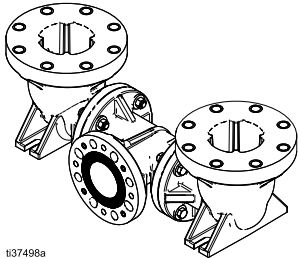
Pump Model	Pump Size	Wetted Section Material	Center Section Material	Seats	Balls	Diaphragms	Connections	Options
VA-E	80	A	A	SS	TF	TF	TN	AC5

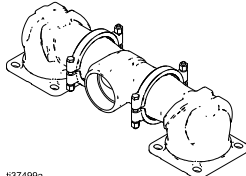
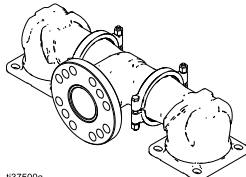
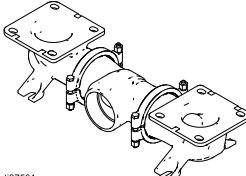
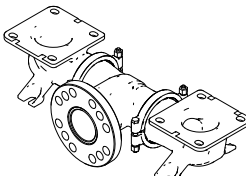
Fluid Cover Kits		
Kits include: 1 fluid cover (22)		
Aluminum		
A	859.0171	 <p>ti37492a</p>
Stainless Steel		
S	859.0176	 <p>ti37493a</p>
Polypropylene		
P	859.0173	 <p>ti37494a</p>

NOTE: Outlet manifolds include a Warning label. Replacement warning labels, signs, tags, and cards are available at no cost.

Sample Configuration Number

Pump Model	Pump Size	Wetted Section Material	Center Section Material	Seats	Balls	Diaphragms	Connections	Options
VA-E	80	A	A	SS	TF	TF	TN	AC5

Manifold Kits		
Kits include: 1 manifold		
Aluminum		
Outlet (24) with aluminum wetted parts		
TN	859.0628	 ti37495a
TB	859.0629	
Inlet (23) with aluminum wetted parts		
TN	859.0622	 ti37496a
TB	859.0623	
Polypropylene		
Outlet (24) with polypropylene wetted parts		
FC	859.0630	 ti37497a
Inlet (23) with polypropylene wetted parts		
FC	859.0624	 ti37498a

Manifold Kits		
Kits include: 1 manifold		
Stainless Steel		
Outlet (24) with stainless steel wetted parts		
TN	859.0631	 ti37499a
TB	859.0632	
FC	859.0633	 ti37500a
Inlet (23) with stainless steel wetted parts		
TN	859.0625	 ti37501a
TB	859.0626	
FC	859.0627	 ti37502a

Seats and Check Balls

Sample Configuration Number

Pump Model	Pump Size	Wetted Section Material	Center Section Material	Seats	Balls	Diaphragms	Connections	Options
VA-E	80	A	A	SS	TF	TF	TN	AC5

Valve Seat Kits			
Seat Material	Kit	Description	Qty.
BN	859.0214	VA80(HE)M/P BN,--,--,--	1
GE	859.0215*	VA80(HE)M/P GE,--,--,--	1
HY	859.0216	VA80(HE)M/P HY,--,--,--	1
PP	859.0217*	VA80(HE)M/P PP,--,--,--	1
SP	859.0218*	VA80(HE)M/P SP,--,--,--	1
SS	859.0219*	VA80(HE)M/P SS,--,--,--	1

Kits include:

- 4 seats, material indicated in table.
- * Other o-ring materials available on page 31.

Ball Kits			
Ball Material	Kit	Description	Qty.
AC	859.0221	VA80(HE)M/P --,AC,--,--	1
BN	859.0222	VA80(HE)M/P --,BN,--,--	1
GE	859.0223	VA80(HE)M/P --,GE,--,--	1
SP	859.0228	VA80(HE)M/P --,SP,--,--	1
TF	859.0227	VA80(HE)M/P --,TF,--,--	1

Kits include:

- 4 balls, material indicated in table.

Diaphragms

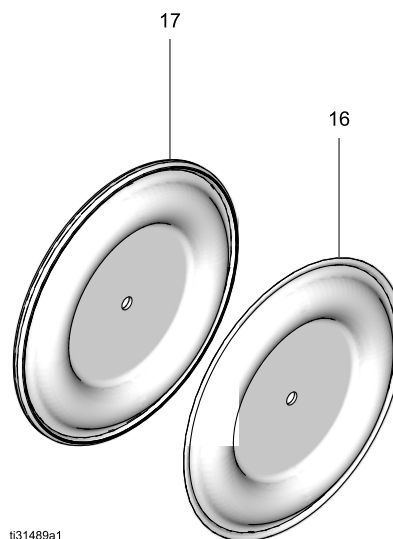
Sample Configuration Number

Pump Model	Pump Size	Wetted Section Material	Center Section Material	Seats	Balls	Diaphragms	Connections	Options
VA-E	80	A	A	SS	TF	TF	TN	AC5

Two-Piece Diaphragm Kits			
Diaphragm Material	Kit	Description	Qty.
GE	859.0617	VA-E80M/P --,--,GE,--	1
HY	859.0619	VA-E80M/P --,--,HY,--	1
SP	859.0618	VA-E80M/P --,--,SP,--	1
TF	859.0616	VA-E80M/P --,--,TF,--	1

Kits include:

- 2 diaphragms (16)
- 2 diaphragm backers (17)
- 1 packet anaerobic adhesive
- 2 screws



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Manifold Seals

O-Ring Kits			
Manifold Material	Kit	Description	Qty.
BN	859.0209	VA80(HE)M/P, --,--,--,BN	1
TF	859.0211	VA80(HE)M/P, --,--,--,TF	1
VT	859.0210	VA80(HE)M/P, --,--,--,VT	1

Kits Include:

- 1 o-ring (9); not used on models with Buna-N or Hytrel seats.

Kits and Accessories

Center Section Repair Tool Kit 819.1272

Includes tools needed to remove the bearing from the center section.

Bearing Puller Kit 859.0529


Includes an interchangeable bearing puller set.

Seals Kit 819.1338

Includes center section seals (Part references 102, 107, 108, 113, and 127).

Technical Data

VA-E80 Electric Double Diaphragm Pump		
	US	Metric
Maximum fluid working pressure	80 psi	0.55 MPa, 5.5 bar
Air pressure operating range	20 to 80 psi	0.14 to 0.55 MPa, 1.4 to 5.5 bar
Air inlet size	3/8 in. npt(f)	
Maximum suction lift (reduced if balls don't seat well due to damaged balls or seats, lightweight balls, or extreme speed of cycling)	Wet: 31 ft Dry: 16 ft	Wet: 9.4 m Dry: 4.8 m
Maximum size pumpable solids	1/2 in.	12.7 mm
Minimum ambient air temperature for operation and storage. NOTE: Exposure to extreme low temperatures may result in damage to plastic parts.	32°F	0°C
Fluid displacement per cycle (free-flow)	1.2 gallons	4.45 liters
Maximum free-flow delivery (continuous duty, 70 Hz)	220 gpm	830 lpm
Maximum pump speed (continuous duty, 70 Hz)	185 cpm	
Fluid Inlet and Outlet Size		
Polypropylene	3 in. ANSI/DIN flange	
Aluminum, Stainless Steel	3 in npt(f) or 3 in bspt	
Electric Motor		
AC, Standard CE (AC5 , A25)		
Power	7.5 HP	5.5 kW
Number of Motor Poles	4-Pole	
Speed	1800 rpm (60 Hz) or 1500 rpm (50 Hz)	
Constant Torque	6:1	
Gear Ratio	11.25	
Voltage	230V / 460V 3-Phase	
Maximum Amperage Load	19.5 A / 9.75 A	
IE Rating	IE3	
AC, ATEX (AX5)		
Power	7.4 HP	5.5 kW
Number of Motor Poles	4-Pole	
Speed	1770 rpm (60 Hz) or 1460 rpm (50 Hz)	
Constant Torque	6:1	
Gear Ratio	11.88	
Voltage	380V / 415V 3-Phase (50 Hz) 460V 3-Phase (60 Hz)	
Maximum Amperage Load	10.8 A / 10.4 A 3-Phase (50 Hz) 9.29 A 3-Phase (60 Hz)	
AC, Explosionproof (AF5)		
Power	7.5 Hp	5.5 kW
Number of Motor Poles	4-Pole	
Speed	1800 rpm (60 Hz) or 1500 rpm (50 Hz)	

VA-E80 Electric Double Diaphragm Pump	
Constant Torque	6:1
Gear Ratio	11.88
Voltage	230V / 460V 3-Phase
Maximum Amperage Load	20.0 A / 10.0 A
Leak Sensor	
Contact Ratings:	
State	Normally closed
Voltage	240V Max (AC/DC)
Current	0.28 A max at 120 VAC 0.14 A max at 240 VAC 0.28 A max at 24 VDC 0.07 A max at 120 VDC
Power	30 W max
Ambient Temperature	-20°C to 40°C (-4°F to 104°F)
Ex Ratings:	
Classification: "simple apparatus" in accordance with UL/EN/IEC 60079-11, clause 5.7	
Class I, Group D, Class II, Group F&G, Temp Code T3B	
	
II 2 G Ex ib IIC T3	
Parameters	U _i = 24 V I _i = 280 mA P _i = 1.3 W C _i = 13.2 pF L _i = 4.98 µH
Noise Data	
Sound Power (measured per ISO-9614-2)	
at 6.2 bar (90 psi) fluid pressure and 80 cpm	84 dBa
at 4.1 bar (60 psi) fluid pressure and 160 cpm (full flow)	92 dBa
Sound Pressure [tested 1 m (3.28 ft) from equipment]	
at 6.2 bar (90 psi) fluid pressure and 80 cpm	74 dBa
at 4.1 bar (60 psi) fluid pressure and 160 cpm (full flow)	82 dBa
Wetted Parts	
Wetted parts include material(s) chosen for seat, ball, and diaphragm options, plus the pump's material of construction: Aluminum, Polypropylene, or Stainless Steel	
Non-wetted parts	
Non-wetted parts include aluminum, PTFE, stainless steel, polypropylene	

Technical Data

Component/Model	U.S.	Metric
Compressor	28 lb	13 kg

Variable Frequency Drives (2 hp)

Model	Hp/kW	Input Voltage Range	Nominal Output Voltage †
819.1286	7.5/5.5	170–264 Vac, 3 phase	208–240 Vac, 3 phase
819.1287	7.5/5.5	340–528 Vac, 3 phase	400–480 Vac, 3 phase

† Output voltage is dependent on input voltage.

Weights

Pump Material		Motor/Gearbox							
Fluid Section	Center Section	Standard AC		ATEX AC		Flame-proof AC		No Gear-motor	
		AC5		AX5		AF5		WG	
		lb	kg	lb	kg	lb	kg	lb	kg
Aluminum	Aluminum	280	127	396	179	437	198	138	62
Polypropylene	Aluminum	483	219	387	175	428	194	129	58
Stainless Steel	Aluminum	547	248	458	208	499	226	200	90

Fluid Temperature Range

NOTICE

Temperature limits are based on mechanical stress only. Certain chemicals will further limit the fluid temperature range. Stay within the temperature range of the most-restricted wetted component. Operating at a fluid temperature that is too high or too low for the components of your pump may cause equipment damage.

Diaphragm/Ball/Seat Material	Fluid Temperature Range					
	Aluminum Cast Iron, or Stainless Steel Pumps		Polypropylene or Conductive Polypropylene Pumps		PVDF Pumps	
	Fahrenheit	Celsius	Fahrenheit	Celsius	Fahrenheit	Celsius
Acetal (AC)	10° to 180°F	-12° to 82°C	32° to 150°F	0° to 66°C	10° to 180°F	-12° to 82°C
Buna-N (BN)	10° to 180°F	-12° to 82°C	32° to 150°F	0° to 66°C	10° to 180°F	-12° to 82°C
Geolast® (GE)	-40° to 150°F	-40° to 66°C	32° to 150°F	0° to 66°C	10° to 150°F	-12° to 66°C
Polypropylene (PP)	32° to 150°F	0° to 66°C	32° to 150°F	0° to 66°C	32° to 150°F	0° to 66°C
PTFE check balls or two-piece PTFE/EPDM diaphragm (TF)	40° to 220°F	4° to 104°C	40° to 150°F	4° to 66°C	40° to 220°F	4° to 104°C
Santoprene® check balls (SP)	-40° to 180°F	-40° to 82°C	32° to 150°F	0° to 66°C	10° to 225°F	-12° to 107°C
TPE (HY)	-20° to 150°F	-29° to 66°C	32° to 150°F	0° to 66°C	10° to 150°F	-12° to 66°C

* The maximum temperature listed is based on the ATEX standard for T4 temperature classification. If you are operating in a non-explosive environment, FKM fluoroelastomer's maximum fluid temperature in aluminum or stainless steel pumps is 320°F (160°C).

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.

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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 Hungary Kft
Budafoko 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

Korea

Verder Korea
15-26, Beodeul-ro 1362
Paltan-myun, Hwaseong-si
Gyeonggi-do, 18578
KOREA
Tel: +82 31 355 0316
e-mail: sales@verder.kr

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