

Repair/Parts

# VERDERAIR VA-EH50



## Electric-Operated Diaphragm

### Pump

859.0773  
Rev.A  
EN

2-Inch pumps with electric drive for fluid transfer applications.  
Not approved for use in explosive atmospheres or hazardous locations unless otherwise stated. See Approvals page for more information. For professional use only.

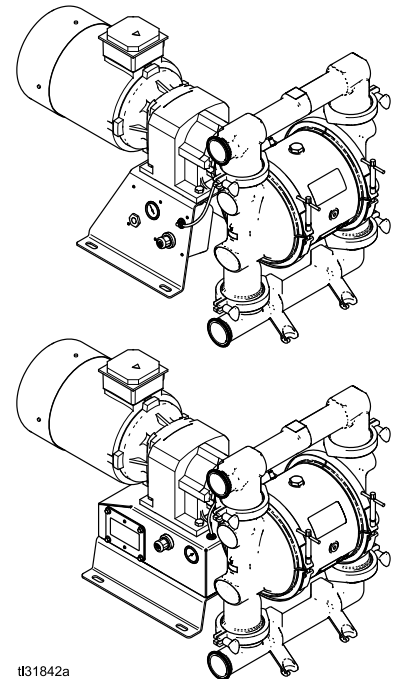


#### Important Safety Instructions

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

*Maximum working pressure: 7 bar (0.7 MPa, 100 psi)*

*See page 8 for approvals.*



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# Related Manuals







Manual Number	Title
859.0769	VERDERAIR VA-EH50 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.

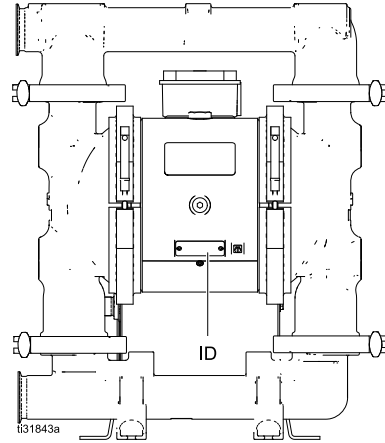
 <h1 style="margin: 0;">WARNING</h1>	
 	<p><b>ELECTRIC SHOCK HAZARD</b></p> <p>This equipment must be grounded. Improper grounding, setup, or usage of the system can cause electric shock.</p> <ul style="list-style-type: none"> <li>• Turn off and remove power before disconnecting any cables and before servicing or installing equipment. For cart-mounted models, unplug the power cord. For all other units, disconnect power at the main switch.</li> <li>• Connect only to grounded power source.</li> <li>• All electrical wiring must be done by a qualified electrician and comply with all local codes and regulations.</li> <li>• Wait five minutes for capacitor discharge before opening equipment.</li> </ul>
    	<p><b>FIRE AND EXPLOSION HAZARD</b></p> <p>Flammable fumes, such as solvent and paint fumes, in <b>work area</b> 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"> <li>• Use equipment only in well ventilated area.</li> <li>• Eliminate all ignition sources; such as pilot lights, cigarettes, portable electric lamps, and plastic drop cloths (potential static arc).</li> <li>• Ground all equipment in the work area. See <b>Grounding</b> instructions.</li> <li>• Keep work area free of debris, including solvent, rags and gasoline.</li> <li>• Do not plug or unplug power cords, or turn power or light switches on or off when flammable fumes are present.</li> <li>• Use only grounded hoses.</li> <li>• <b>Stop operation immediately</b> if static sparking occurs or you feel a shock. Do not use equipment until you identify and correct the problem.</li> <li>• Keep a working fire extinguisher in the work area.</li> </ul> <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"> <li>• Clean plastic parts only in well ventilated area.</li> <li>• Do not clean with a dry cloth.</li> <li>• Do not operate electrostatic guns in equipment work area.</li> </ul>

 <h1 style="margin: 0;">WARNING</h1>	
  	<p><b>PRESSURIZED EQUIPMENT HAZARD</b></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"> <li>Follow the <b>Pressure Relief Procedure</b> when you stop spraying/dispensing and before cleaning, checking, or servicing equipment.</li> <li>Tighten all fluid connections before operating the equipment.</li> <li>Check hoses, tubes, and couplings daily. Replace worn or damaged parts immediately.</li> </ul>
 	<p><b>EQUIPMENT MISUSE HAZARD</b></p> <p>Misuse can cause death or serious injury.</p> <ul style="list-style-type: none"> <li>Do not operate the unit when fatigued or under the influence of drugs or alcohol.</li> <li>Do not exceed the maximum working pressure or temperature rating of the lowest rated system component. See <b>Technical Data</b> in all equipment manuals.</li> <li>Use fluids and solvents that are compatible with equipment wetted parts. See <b>Technical Data</b> 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.</li> <li>Turn off all equipment and follow the <b>Pressure Relief Procedure</b> when equipment is not in use.</li> <li>Check equipment daily. Repair or replace worn or damaged parts immediately with genuine manufacturer's replacement parts only.</li> <li>Do not alter or modify equipment. Alterations or modifications may void agency approvals and create safety hazards.</li> <li>Make sure all equipment is rated and approved for the environment in which you are using it.</li> <li>Use equipment only for its intended purpose. Call your distributor for information.</li> <li>Route hoses and cables away from traffic areas, sharp edges, moving parts, and hot surfaces.</li> <li>Do not kink or over bend hoses or use hoses to pull equipment.</li> <li>Keep children and animals away from work area.</li> <li>Comply with all applicable safety regulations.</li> </ul>
	<p><b>PRESSURIZED ALUMINUM PARTS HAZARD</b></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"> <li>Do not use 1,1,1-trichloroethane, methylene chloride, other halogenated hydrocarbon solvents or fluids containing such solvents.</li> <li>Do not use chlorine bleach.</li> <li>Many other fluids may contain chemicals that can react with aluminum. Contact your material supplier for compatibility.</li> </ul>

 <h1 style="margin: 0;">WARNING</h1>	
	<p><b>THERMAL EXPANSION HAZARD</b></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"> <li>Open a valve to relieve the fluid expansion during heating.</li> <li>Replace hoses proactively at regular intervals based on your operating conditions.</li> </ul>
	<p><b>PLASTIC PARTS CLEANING SOLVENT HAZARD</b></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"> <li>Use only compatible water-based solvents to clean plastic structural or pressure-containing parts.</li> <li>See <b>Technical Data</b> in this and all other equipment instruction manuals. Read fluid and solvent manufacturer's Safety Data Sheet (SDS) and recommendations.</li> </ul>
	<p><b>TOXIC FLUID OR FUMES HAZARD</b></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"> <li>Read Safety Data Sheet (SDS) to know the specific hazards of the fluids you are using.</li> <li>Store hazardous fluid in approved containers, and dispose of it according to applicable guidelines.</li> </ul>
	<p><b>BURN HAZARD</b></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"> <li>Do not touch hot fluid or equipment.</li> </ul>
	<p><b>PERSONAL PROTECTIVE EQUIPMENT</b></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"> <li>Protective eyewear, and hearing protection.</li> <li>Respirators, protective clothing, and gloves as recommended by the fluid and solvent manufacturer.</li> </ul>

# Pump 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-EH50 SA ST SP TF T6 AC5K5**







<b>VA-EH50</b>	<b>S</b>	<b>A</b>	<b>ST</b>	<b>SP</b>	<b>TF</b>	<b>T6</b>	<b>AC5K5</b>
Pump Model	Fluid Section Material	Drive Section Material	Check Valve Seats	Check Valve Balls	Diaphragm	Connections	Options

**NOTE:** Some combinations are not possible. Please check with your local supplier or the pump configurator on [www.verderair.com](http://www.verderair.com).

Pump	Fluid Section Material		Drive Section Material		Check Valve Seats	
<b>VA-EH50</b>	<b>S</b>	Stainless Steel	<b>A</b>	Aluminum	<b>SE</b>	Stainless Steel with EPDM o-rings
			<b>S</b>	Stainless Steel	<b>ST</b>	Stainless Steel with PTFE o-rings

Balls		Diaphragm		Connections		Options	
NW	Polychloroprene Weighted	SP	Santoprene	D6	Stainless steel, DIN 11851, 65 mm	A15K5	Standard AC Induction Motor (High Speed Gear Ratio) with 120V Air Compressor
SP	Santoprene	TF	PTFE / Polychloroprene 2-Piece	T6	Stainless steel, tri-clamp, 2.5 in.	A25K5	Standard AC Induction Motor (High Speed Gear Ratio) with 220V Air Compressor
TF	PTFE					AC5K5	Standard AC Induction Motor (High Speed Gear Ratio)
						AF5K5	Flameproof AC Induction Motor (High Speed Gear Ratio)
						AX5K5	ATEX AC Induction Motor (High Speed Gear Ratio)
						B14K0	Standard AC Induction Motor (Medium Speed Gear Ratio) with 120V Compressor
						B24K0	Standard AC Induction Motor (Medium Speed Gear Ratio) with 220V Compressor
						BC4K0	Standard AC Induction Motor (Medium Speed Gear Ratio)
						BF4K0	Flameproof AC Induction Motor (Medium Speed Gear Ratio)
						BX4K0	ATEX AC Induction Motor (Medium Speed Gear Ratio)
						C12K2	Standard AC Induction Motor (Low Speed Gear Ratio) with 120V Compressor
						C22K2	Standard AC Induction Motor (Low Speed Gear Ratio) with 220V Compressor
						CC2K2	Standard AC Induction Motor (Low Speed Gear Ratio)
						CF2K2	Flameproof AC Induction Motor (Low Speed Gear Ratio)
						CX2K2	ATEX AC Induction Motor (Low Speed Gear Ratio)
						WG	No Motor, No Gearbox

Pump Matrix

Approvals	
◆ Pumps with motor code <b>X</b> are certified to:	 II 2 G Ex h d IIB T3 Gb
✚ Pumps with motor code <b>WG</b> are certified to:	 II 2 G Ex h IIB T3 Gb
★ Motors coded <b>F</b> are certified to:	 LISTED Class I, Div 1, Group D, T3B Class II, Div 1, Group F & G, T3B 
Ball materials coded <b>TF</b> and diaphragm materials coded <b>TF</b> are certified to:	
All Models (except gearbox and compressor code 1, or motor code <b>F</b> ) are certified to:	



# Troubleshooting



- Follow the [Pressure Relief Procedure, page 11](#), 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.
	Manifold o-rings are damaged.	Replace o-rings.
The center section is excessively hot.	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.

## Troubleshooting

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 from the system.
2. Open the dispensing valve, if used.
3. Open the fluid drain valve to relieve fluid pressure. Have a container ready to catch the drainage.
4. Back out regulator knob to bleed any internal air pressure.

## Check Valve Repair



### Tools Required

- O-ring pick

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

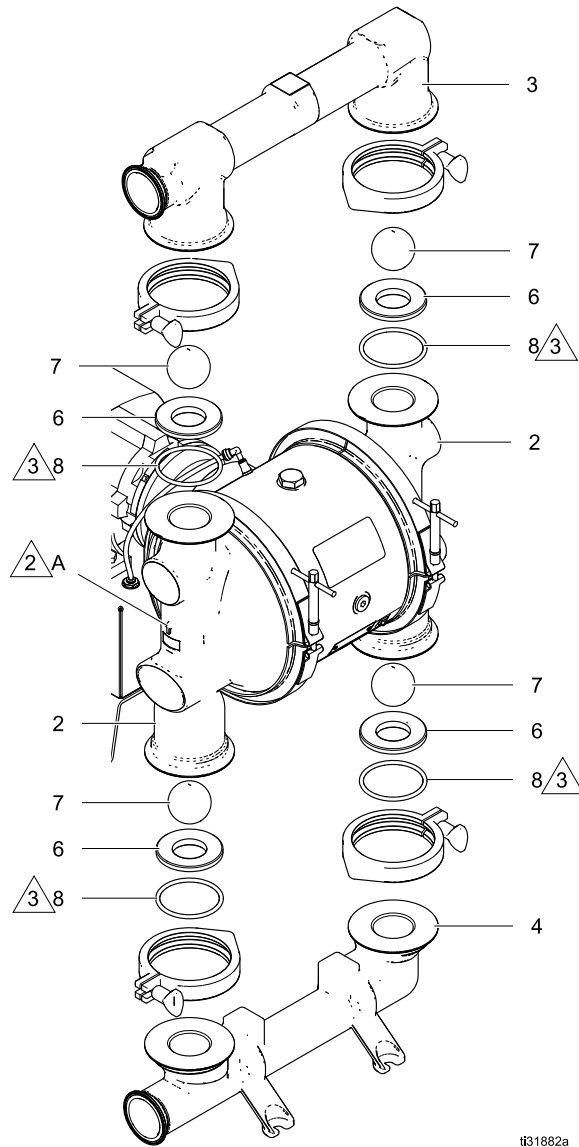
1. Follow the [Pressure Relief Procedure, page 11](#). Remove power from the motor. Disconnect all hoses.
2. Remove the clamps (31) holding the outlet manifold (3) to the fluid covers (2), then remove the outlet manifold.
3. Remove the seats (6), balls (7), and o-rings (8).
4. Turn the pump over and remove the inlet manifold (4). Remove the seats (6), balls (7), and o-rings (8).

To continue disassembly, see [Disassemble the Diaphragms, page 13](#).

## 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 (3).

Repair

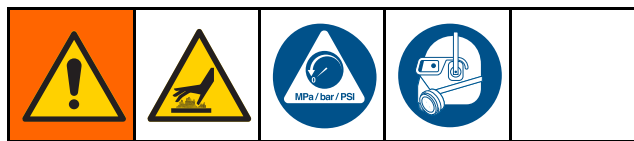


Arrow (A) must point toward outlet manifold.



Radiused seating surface must face the ball (7). Large chamfer on O.D. must face o-ring.

## Diaphragm Repair



### Tools Required

- Torque wrench
- 10 mm hex key wrench
- 28 mm open end wrench
- O-ring pick

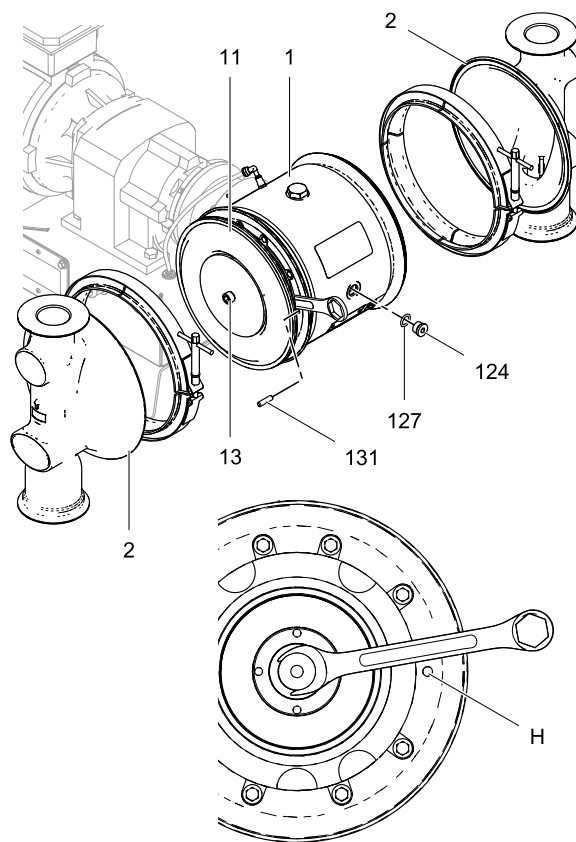
### Disassemble the Diaphragms

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

1. Follow the [Pressure Relief Procedure, page 11](#). Remove power from the motor. Disconnect all hoses.
2. Remove the manifolds and disassemble the ball check valves as explained in [Check Valve Repair, page 11](#).
3. Remove the clamps (30) 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.  
**TIP:** The air cover has 2 holes (H), one at the 9 o'clock position and another at the 3 o'clock position (shown below). Use pin (131), placed in either hole (H) as a brace for the wrench while removing or installing diaphragm bolts.

### 5. All Diaphragms

- a. Hold a 28 mm wrench on the wrench flats of the exposed piston shaft. Use another wrench (10 mm hex key) on the shaft bolt (13) to remove it. Then remove all parts of the diaphragm assembly.
- b. Rotate the drive shaft to move the piston fully to one side. See instructions in step 4. Repeat step a.



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6. To continue with disassembly, see [Disassemble the Center Section, page 15](#).

## Reassemble the Diaphragms

Follow all notes in the illustrations on page 15. These notes contain **important** information.

### 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.

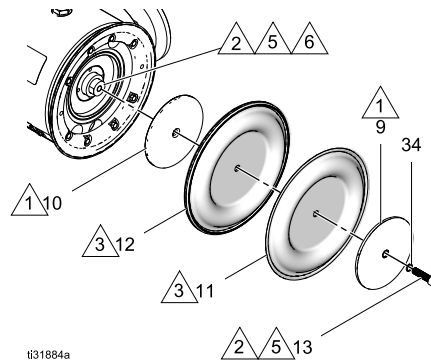
**TIP:** If you are also repairing or servicing the center section (drive shaft, piston, etc.), see [Center Section Repair, page 15](#), before you put the diaphragms back on.

1. Clean all parts and inspect for wear or damage. Replace parts as needed. Be sure the center section is clean and dry.
2. **All Diaphragms**
  - a. Thoroughly clean or replace the diaphragm bolt (13). Install the o-ring (34).
  - b. Assemble the fluid side plate (9), the diaphragm (11), the backup diaphragm (12, if present), and the air side diaphragm plate (10) on the bolt exactly as shown.

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. If the screw comes loose or is replaced, apply permanent (red) thread locker to diaphragm side threads. Apply medium-strength (blue) thread locker to shaft side threads.
5. Torque to 135 N•m (100 ft-lb) at 100 rpm maximum.
6. Apply primer to the female threads. Allow to dry.

- c. 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.
  - d. Apply medium-strength (blue) thread locker to the threads of the bolt.
  - e. Hold a 28 mm wrench on the wrench flats of the piston shaft. Screw the bolt onto the shaft and torque to 135 N•m (100 ft-lb).
  - f. Rotate the drive shaft to move the piston fully to one side. See instructions in step 4 of [Disassemble the Diaphragms, page 13](#).
  - g. Repeat to install the other diaphragm assembly.
3. Attach the fluid covers. The arrow on each fluid cover must point toward the outlet manifold.
  4. Reassemble the check valves and manifolds. See [Reassemble the Check Valve, page 11](#).
  5. Restore motor cooling fan cover and pin (131) to their original locations.

### 2-Piece (PT or SP) Models



## Center Section Repair



### Disassemble the Center Section

See the illustrations on page 18.

1. Follow the [Pressure Relief Procedure, page 11](#). Remove power from the motor. Disconnect all hoses.
2. Remove the manifolds and check valve parts as directed in [Disassemble the Check Valve, page 11](#).
3. Remove the fluid covers and diaphragms as directed in [Disassemble the Diaphragms, page 13](#).  
 TIP: Clamp the gear box bracket (15) to the bench. Leave the pump connected to the motor.
4. Use a 10 mm hex wrench to remove 4 bolts (117). Pull the pump off the alignment housing (116).  
 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 (106) and the o-ring (108) from the top.
6. Turn the drive shaft assembly (112) so the groove on the shaft is at the top, in line with the alignment markings.

7. Use a 3/4–16 bolt to push out the drive shaft assembly (112). You can also use the bearing bolt (106), but remove the bearing (107) 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

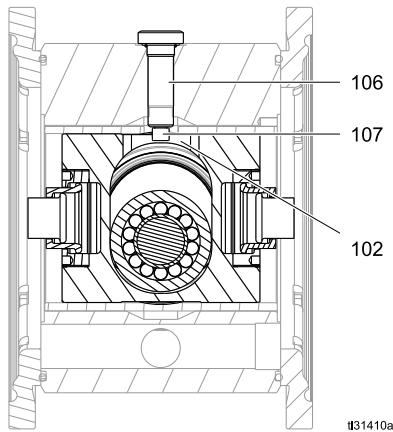
### NOTICE

Proper alignment is essential. Do not apply more than about 1.1 N•m (10 in-lb) of torque. Excessive torque could strip the housing thread. If you encounter resistance, check alignment or contact your distributor.

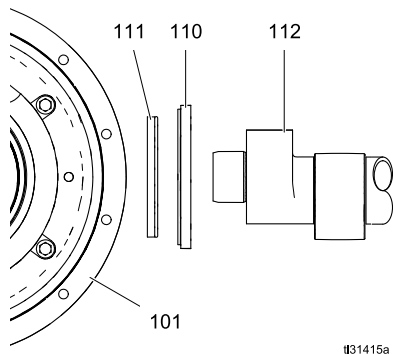
8. The shaft coupler (113) might come out with the drive shaft assembly. If not, remove from gearbox (118).
9. Remove the seal cartridge (110), the o-ring (109) and the radial seal (111) from the drive shaft assembly.
10. Slide the piston assembly (102) out of the center.
11. Only remove the alignment housing (116) if needed. Use a 10 mm hex wrench to remove 4 bolts (120). Pull the alignment housing off the gearbox (118).
12. Leave the gearbox coupler (114) 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 (102) and the drive shaft (112).
2. Inspect the piston and center section bearings for excessive wear and replace if needed. Grease the piston as shown and install it 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 (108) and apply medium-strength (blue) thread locker to the bearing bolt (106) and screw into the center section. Be sure that the bearing (107) is in the slot on the piston, as shown. Be sure that the piston moves freely. Torque the bolt to 20–34 N•m (15–25 ft-lb).



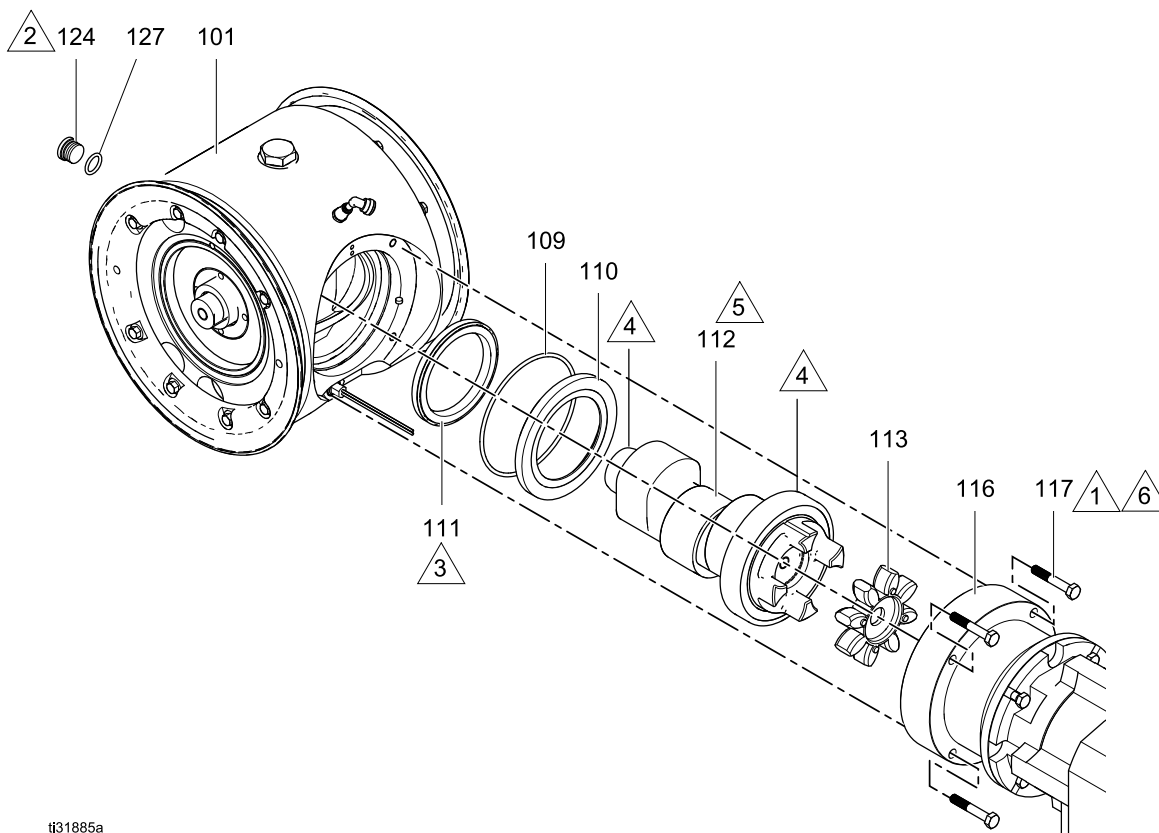
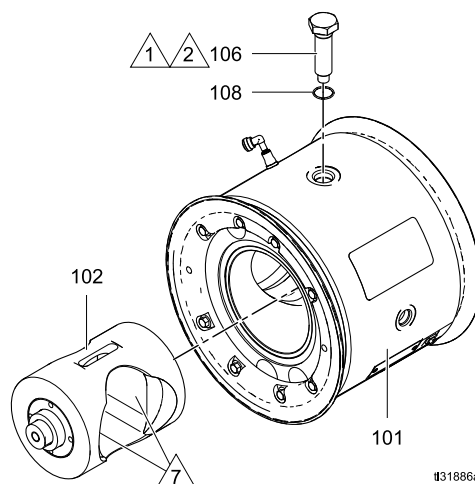
4. Be sure the sealing surface of the drive shaft (112) is clean. Install the seal cartridge (110) and the radial seal (111) on the drive shaft. The lips on the radial seal (111) must face IN toward the center. Inspect seal lip for damage. Replace if necessary.



5. Install o-ring (109) to the center housing (101).
6. Apply anti-seize lubricant on the mating edges of the drive shaft, as shown in the illustration, page 18.
7. Center the piston in the housing and install the drive shaft assembly (112) into the center housing (101) with the groove facing up.
8. Inspect the shaft coupler (113) for wear and replace if needed. Install on the drive shaft.
9. If removed, install the alignment housing to the center section. Apply medium-strength (blue) thread locker and install the housing screws (117). Torque to 15–18 N•m (130–160 in-lb).
10. If removed, install the gearbox coupler (114) on the gearbox (118) 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.
11. Be sure the gearbox coupler (114) is aligned properly. Turn by hand if needed. Connect the pump to the gearbox assembly, engaging the couplers.
12. Apply medium-strength (blue) thread locker and install the gearbox screws (120). Torque to 15–18 N•m (130–160 in-lb).
13. Be sure o-ring (127) is on the plug (124). Install the plug and torque to 20–34 N•m (15–25 ft-lb).
14. See [Reassemble the Diaphragms, page 14](#), and [Reassemble the Check Valve, page 11](#).



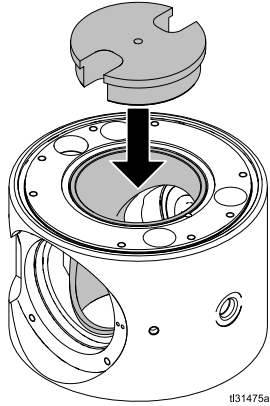
- 1 Apply medium-strength (blue) thread locker to threads.
- 2 Torque to 20–34 N•m (15–25 ft-lb).
- 3 Lips must face IN toward the center.
- 4 Apply anti-seize lubricant liberally on the radial surfaces of the drive shaft assembly.
- 5 Install the drive shaft assembly with the groove facing up.
- 6 Tighten 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.



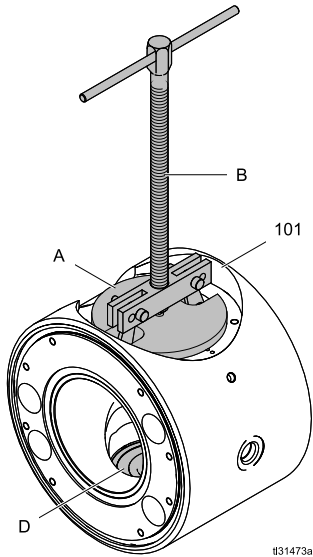
## Replace Center Bearing

**NOTE:** Follow this procedure only if you suspect that the center bearing is damaged. You will need Center Section Repair Kit 819.1271. You also will need Bearing Tool Kit 819.1272 and bearing puller kit 859.0829.

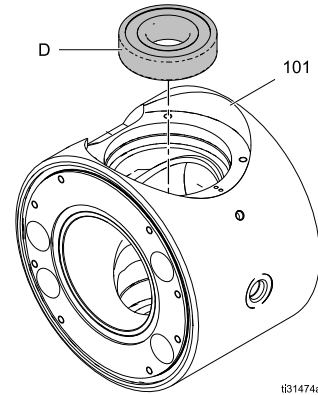
1. Follow all steps in [Disassemble the Center Section, page 15.](#)
2. Use arbor press and tool to push out center sleeve.



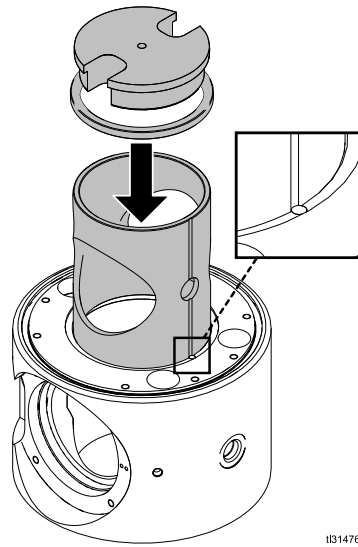
3. Place the center housing (101) in a vise with the bearing (D) side on the bottom.
4. Place the repair tool on the housing.
5. Use tool (A) and bearing puller (B) to remove the bearing (D).



6. Use an arbor press to install the new bearing (D) into the center housing (101). Press the bearing to the shoulder in the center housing.



7. Use an arbor press and the press-fit tool and alignment ring to install the sleeve. Ensure that the groove on the sleeve aligns with the pin in the center housing, as shown below. Install the sleeve flush with the center housing.



8. Follow all steps in [Reassemble the Center Section, page 16.](#)

## 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.

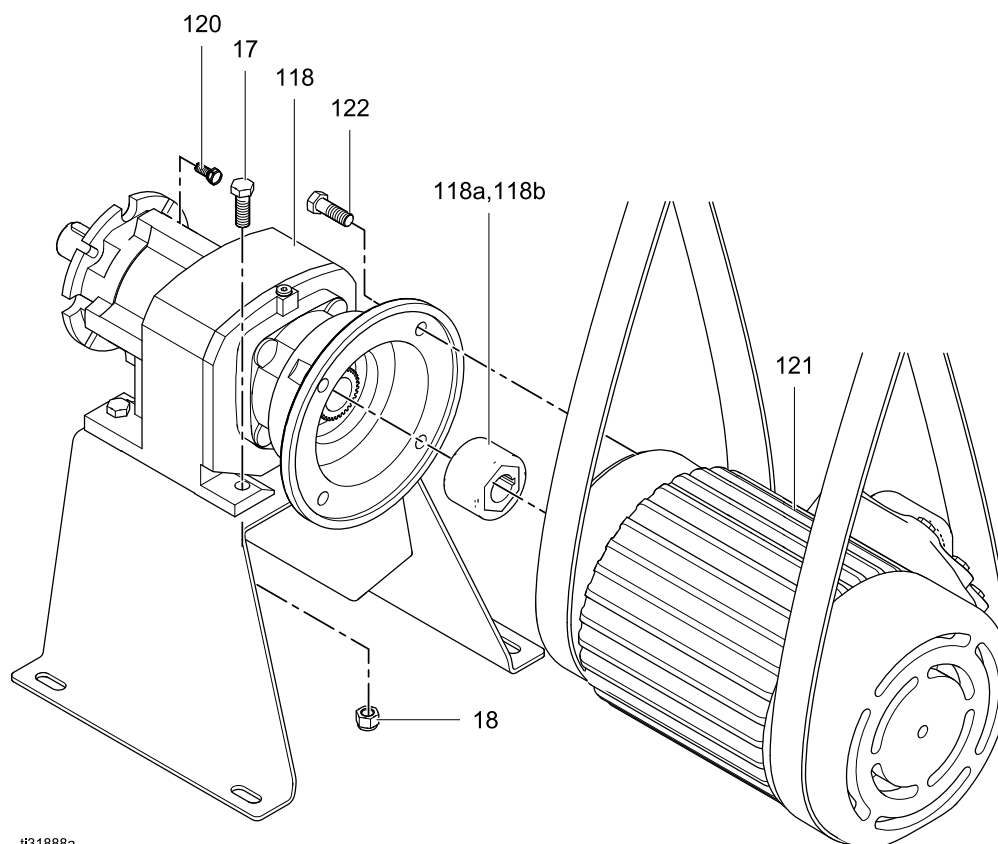
**TIP:** Clamp the gearbox bracket (15) to the bench.

Start at step 1 for ATEX or Flameproof motors. Standard AC motors (ACxxx, A1xxx, or A2xxx) 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 (17) and nuts (18, 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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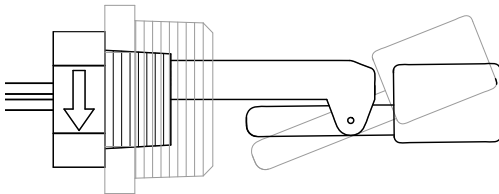
## Leak Sensor Repair

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 11](#). Remove power from the motor.
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.

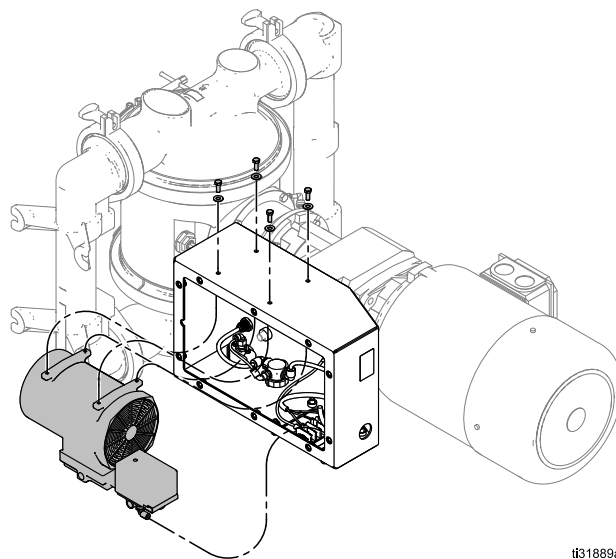
- e. If the continuity tests result indicate that the leak sensor is not functioning properly, proceed to step 3. Otherwise, tighten the bushing to its original position so that the arrows on the leak sensor point down. Attach the removed leak sensor wires to the point where they were disconnected from 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.

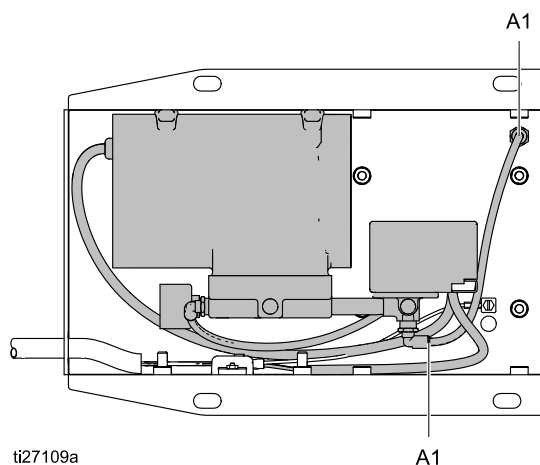
## Replace the Compressor

				
<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 11](#).
2. Remove electrical power from 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 (35).
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.

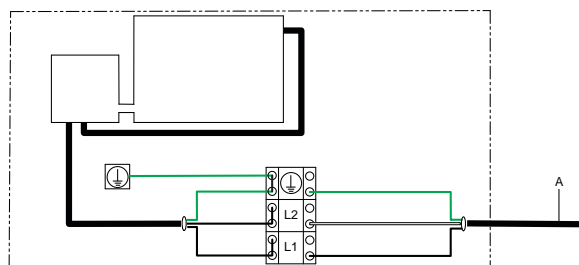


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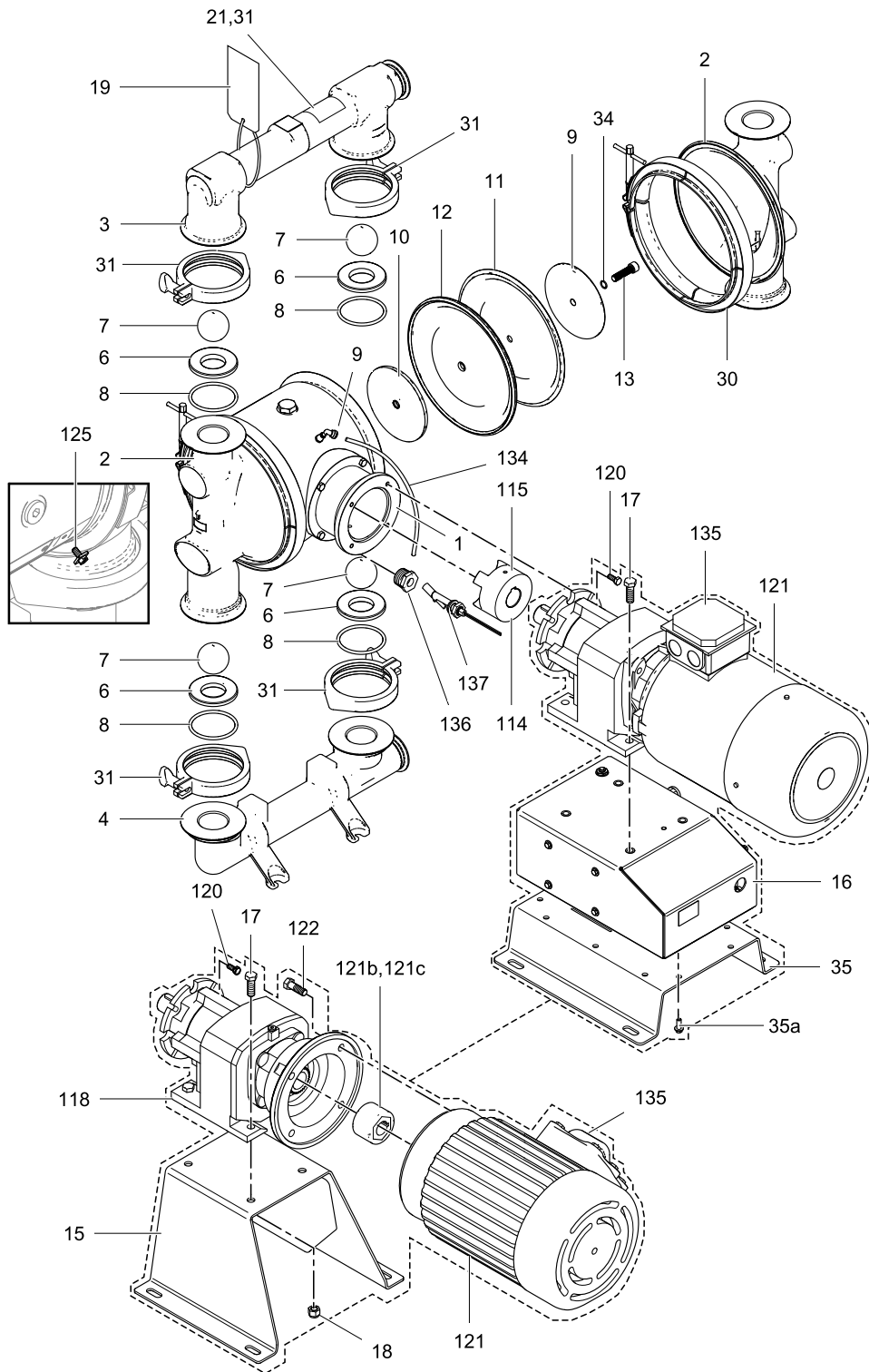


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A1



# Parts



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## 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 30–31.</i>	1
2	819.0492	COVER, fluid	2
3	819.0498 819.0622	MANIFOLD, outlet; SST Flange DIN	1
4	819.0497 819.0621	MANIFOLD, inlet; SST Flange DIN	1
6	819.0539	SEAT; qty 4	1
7	819.0430 819.0431 819.0670	BALLS, PTFE; qty 4 Santoprene; qty 4 Polychloroprene weighted; qty 4	1
8	819.0544 819.0542	O-RING, PTFE; qty 4 EPDM; qty 4	1
9	819.0466	PLATE, fluid side; Stainless Steel	2
10	819.1283	PLATE, air side	2
11	— — —	DIAPHRAGM, kit; <i>See page 35.</i>	1 kit
12	— — —	DIAPHRAGM, backup, <i>included with Ref. 11 where needed</i>	2
13	819.1281	BOLT, shaft; kit; <i>includes Ref. 34, qty 2</i>	1

Ref.	Part/Kit	Description	Qty.
15	819.1259	BRACKET, gear box, for models without compressor; includes refs 17 and 18	1
16	819.1269 819.1270	COMPRESSOR, assembly; <i>includes Ref. 16a</i> 120 Volt 240 Volt	1
16a	859.0504 859.0505	COMPRESSOR 120 Volt 240 Volt	1
17	— — —	BOLT, hex washer head, M8–1.25 x 32 mm; <i>included with Ref. 15</i>	4
18	— — —	NUT; <i>included with Ref. 15</i>	4
21▲	819.6311	LABEL, warning	1
30	819.0532	CLAMP, sanitary, diaphragm	2
31	819.0504	CLAMP, sanitary	4
34	— — —	O-RING, for diaphragm shaft bolt; <i>included with Ref. 13</i>	2
35	819.1264	BRACKET, riser; <i>used for models with a compressor; includes Ref 35a</i>	1
35a	— — —	BOLT, M8 x 1.25, 20mm	10

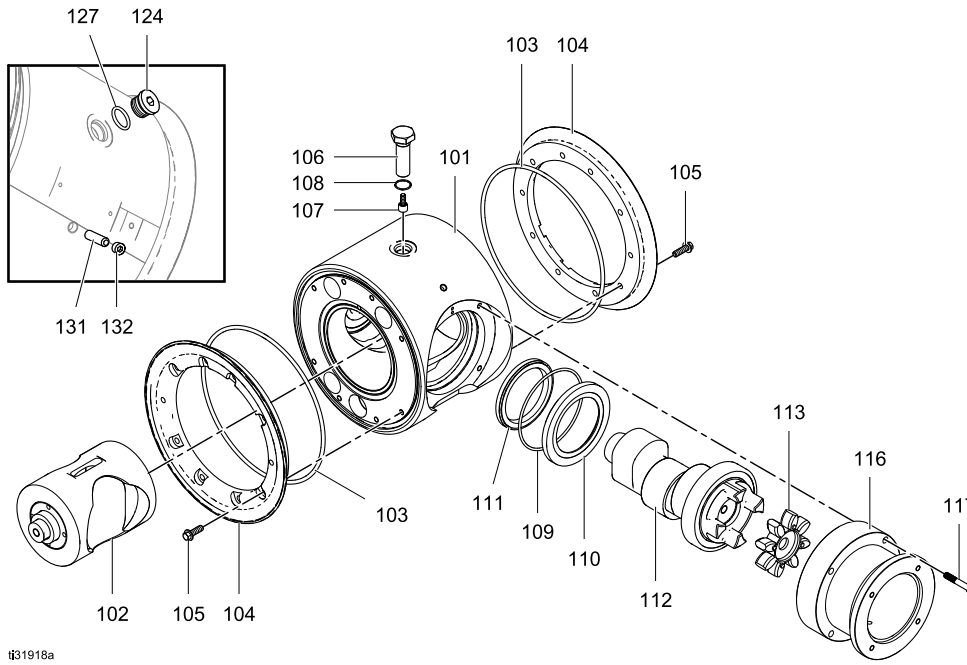
— — — *Not sold separately.*

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

## Center Section

Sample Configuration Number

Pump Model	Fluid Section Material	Drive Section Material	Check Valve Seats	Check Valve Balls	Diaphragms	Connections	Options
VA-EH50	S	A	SE	TF	TF	D6	A15K5





Ref	Part	Description	Qty
101	819.1253 819.1254	HOUSING, center, assembly; <i>includes plugs</i> Aluminum Stainless Steel; <i>also includes o-ring</i>	1
102	819.1237	PISTON, assembly	1
103	— — —	O-RING, air cover; <i>included with ref 104</i>	2
104	819.1280	AIR COVER, <i>includes refs 103, 105</i>	2
105	— — —	BOLT, air cover <i>included with ref 104</i>	16
106	819.1257	BOLT, bearing; <i>includes Refs. 107 and 108</i>	1
107	— — —	BEARING, cam follower. <i>included with Ref. 106</i>	1
108	— — —	O-RING, Size 019, Fluoroelastomer; <i>included with Ref. 106</i>	1
109†	— — —	O-RING, Size 153, Buna-N	1
110†	— — —	CARTRIDGE, seal	1
111†	— — —	SEAL, radial	1
112	819.1252	SHAFT, drive, assembly; <i>includes o-ring (Ref. 109), cartridge (Ref. 110) and seal (Ref. 111)</i>	1
113	819.1251	COUPLER, shaft	1
114	819.1250	COUPLER, gearbox; <i>includes mounting hardware</i>	1
116	819.1255 819.1256	HOUSING, alignment, assembly; <i>includes screws (Refs. 117, 120)</i> Aluminum Stainless steel	1
117	— — —	SCREW, socket head, M8 x 50 mm; <i>included with Ref. 116</i>	4

Ref	Part	Description	Qty
118	819.1247 819.1248 819.1247	GEARBOX; <i>includes Ref 118a, 118b, 122</i> low speed medium speed high speed	1
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	819.1238 819.1249 819.1240 819.1243 819.1242 819.1241 819.1246 819.1245 819.1244	MOTOR low speed gearmotor medium speed gearmotor high speed gearmotor low speed ATEX medium speed ATEX high speed ATEX low speed flameproof medium speed flameproof high speed flameproof	1
122	— — —	SCREW, cap, 1/2–13 x 1.5 in.	4
124	859.0495	PLUG, front access <i>includes ref 127</i>	1
125	— — —	SCREW, ground, M5 x 0.8	1
127	— — —	O-RING <i>included with Ref 124</i>	1
130	— — —	ELBOW, 1/8–27 npt	1
131	— — —	PIN, stop, 5/16 x 1-1/4 in.	1
132	— — —	PLUG; 1/8-27 npt	1
136	— — —	BUSHING <i>included with Ref 137</i>	
137	819.1273	Leak sensor <i>includes Ref 136</i>	

— — — *Not sold separately.*

† *Included in Shaft Seal Repair Kit 859.0806.*

## Diaphragms

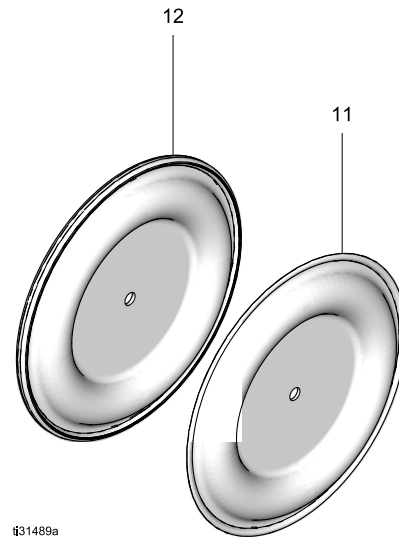
Sample Configuration Number

Pump Model	Fluid Section Material	Drive Section Material	Check Valve Seats	Check Valve Balls	Diaphragms	Connections	Options
VA-EH50	S	A	SE	TF	TF	D6	A15K5

Bolt-Through Diaphragm Kits	
TF	819.0671
SP	819.1304

Kits include:

- 2 diaphragms (11)
- 2 diaphragms (12)
- 1 packet anaerobic adhesive



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## Manifold Seals

*Sample Configuration Number*

Pump Model	Fluid Section Material	Drive Section Material	Check Valve Seats	Check Valve Balls	Diaphragms	Connections	Options
VA-EH50	S	A	SE	TF	TF	D6	A15K5

O-Ring Kits	
TF	819.0544
EP	819.0542

Kits include:

- 4 o-rings (8)

## 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.

# Technical Data

Verderair VA-EH50 Electric Double Diaphragm Pump		
	US	Metric
Maximum fluid working pressure	100 psi	0.7 MPa, 7 bar
Air pressure operating range	20 to 100 psi	0.14 to 0.7 MPa, 1.4 to 7 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 or Dry: 18 ft	Wet or Dry: 5.5 m
Maximum size pumpable solids	1/4 in.	6.3 mm
Minimum ambient air temperature for operation and storage. <b>NOTE:</b> Exposure to extreme low temperatures may result in damage to plastic parts.	32° F	0° C
Fluid displacement per cycle (free-flow)	0.6 gallons	2.27 liters
Maximum free-flow delivery (continuous duty)	100 gpm	378 lpm
Maximum pump speed (continuous duty)	160 cpm	
Fluid Inlet and Outlet Size		
Stainless Steel	2.5 in sanitary flange or 65 mm DIN 11851	
Electric Motor		
AC, Standard CE ( <a href="#">AC5K5</a> , <a href="#">A15K5</a> , <a href="#">A25K5</a> )		
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	3-phase 230V / 3-Phase 460V	
Maximum Amperage Load	19.5 A (230V) / 9.75 A (460V)	
IE Rating	IE3	
AC, Standard CE ( <a href="#">BC4K0</a> , <a href="#">B14K0</a> , <a href="#">B24K0</a> )		
Power	5.0 HP	4.0 kW
Number of Motor Poles	4-Pole	
Speed	1800 rpm (60 Hz) or 1500 rpm (50 Hz)	
Constant Torque	6:1	
Gear Ratio	16.46	
Voltage	3-phase 230V / 3-Phase 460V	
Maximum Amperage Load	13.0 A (230V) / 6.5 A (460V)	
AC, Standard CE ( <a href="#">CC2K2</a> , <a href="#">C12K2</a> , <a href="#">C22K2</a> )		
Power	3.0 HP	2.2 kW
Number of Motor Poles	4-Pole	
Speed	1800 rpm (60 Hz) or 1500 rpm (50 Hz)	
Constant Torque	6:1	
Gear Ratio	26.77	
Voltage	3-phase 230V / 3-Phase 460V	

Maximum Amperage Load	7.68 A (230V) / 3.84 A (460V)	
IE Rating	IE3	
AC, ATEX (AX5K5)		
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	11.88	
Voltage	3-phase 240V / 3-Phase 415V	
Maximum Amperage Load	20 A (230V) / 11.5 A (460V)	
AC, ATEX (BX4K0)		
Power	5.0 HP	4.0 kW
Number of Motor Poles	4-Pole	
Speed	1800 rpm (60 Hz) or 1500 rpm (50 Hz)	
Constant Torque	6:1	
Gear Ratio	16.46	
Voltage	3-phase 240V / 3-Phase 415V	
Maximum Amperage Load	14.7 A (230V) / 8.5 A (460V)	
AC, ATEX (CX2K2)		
Power	3.0 HP	2.2 kW
Number of Motor Poles	4-Pole	
Speed	1800 rpm (60 Hz) or 1500 rpm (50 Hz)	
Constant Torque	6:1	
Gear Ratio	26.77	
Voltage	3-phase 240V / 3-Phase 415V	
Maximum Amperage Load	8.5 A (230V) / 5.0 A (460V)	
AC, Explosionproof (AF5K5)		
Power	7.5 Hp	3.7 kW
Number of Motor Poles	4-Pole	
Speed	1800 rpm (60 Hz) or 1500 rpm (50 Hz)	
Constant Torque	6:1	
Gear Ratio	11.88	
Voltage	3-phase 230V / 3-Phase 460V	
Maximum Amperage Load	20.0 A (230V) / 10.0 A (460V)	
AC, Explosionproof (BF4K0)		
Power	5.0 Hp	4.0 kW
Number of Motor Poles	4-Pole	
Speed	1800 rpm (60 Hz) or 1500 rpm (50 Hz)	
Constant Torque	6:1	
Gear Ratio	16.46	
Voltage	3-phase 230V / 3-Phase 460V	
Maximum Amperage Load	13.0 A (230V) / 6.5 A (460V)	
AC, Explosionproof (CF2K2)		

Technical Data

Power	3.0 Hp	2.2 kW
Number of Motor Poles	4-Pole	
Speed	1800 rpm (60 Hz) or 1500 rpm (50 Hz)	
Constant Torque	6:1	
Gear Ratio	26.77	
Voltage	3-phase 230V / 3-Phase 460V	
Maximum Amperage Load	8 A (230V) / 4 A (460V)	
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° to 40°C (-4° to 104°F)	
Ex Ratings:		
Classification: "simple apparatus" in accordance with UL/EN/IEC 60079-11, clause 5.7 Class I, Div 1, Group D, T3B Class II, Div 1, Group F&G, T3B		
 II 2 G Ex ib IIC T3		
Parameters	$U_i = 24 \text{ V}$ $I_i = 280 \text{ mA}$ $P_i = 1.3 \text{ W}$ $C_i = 2.4 \text{ pF}$ $L_i = 1.00 \text{ }\mu\text{H}$	
Noise Data		
Sound Power (measured per ISO-9614-2)		
at 90 psi fluid pressure and 80 cpm	84 dBa	
at 60 psi fluid pressure and 160 cpm (full flow)	92 dBa	
Sound Pressure [tested 3.28 ft (1 m) from equipment]		
at 90 psi fluid pressure and 80 cpm	74 dBa	
at 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: <b>Stainless Steel</b>		
Non-wetted parts		
Non-wetted parts include aluminum, coated carbon steel, PTFE, stainless steel, polypropylene		

WEIGHTS

Pump Material	Motor/Gearbox																			
	Standard AC*						ATEX AC						Flameproof AC						No Gear-motor	
	AC5K5		BC4K0		CC2K2		AX5K5		BX4K0		CX2K2		AF5K5		BF4K0		CF2K2		WG	
Center Section	lb	kg	lb	kg	lb	kg	lb	kg	lb	kg	lb	kg	lb	kg	lb	kg	lb	kg	lb	kg
Aluminum	342	155	310	141	290	132	458	208	333	151	308	139	499	226	410	186	401	182	200	90
Stainless Steel	424	192	392	178	372	169	540	245	415	188	390	177	581	264	492	223	483	219	282	128

\* For compressor codes 1 or 2, add 13 kg (28 lb).

## 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	Stainless Steel Pump Fluid Temperature Range	
	Fahrenheit	Celsius
Polychloroprene check balls (NW)	0° to 180°F	-18° to 82°C
Santoprene check balls or diaphragm (SP)	-40° to 180°F	-40° to 82°C
PTFE check balls or two-piece PTFE/Polychloroprene diaphragm (TF)	40° to 220°F	4° to 104°C

\* The maximum temperature listed is based on the ATEX standard for T4 temperature classification.



# 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 A, February 2018

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