

Repair/Parts



VERDERAIR Electric-Operated

Diaphragm Pumps

859.0773
Rev.C
EN

Models VA-EH50, VA-E2H52, VA-E2H53, VA-E2H54
2-inch, 3-inch, and 4-inch pumps with electric drive for fluid transfer applications. Not approved for use in explosive atmospheres or hazardous (classified) locations unless otherwise stated. See Approvals page for more information. For professional use only.

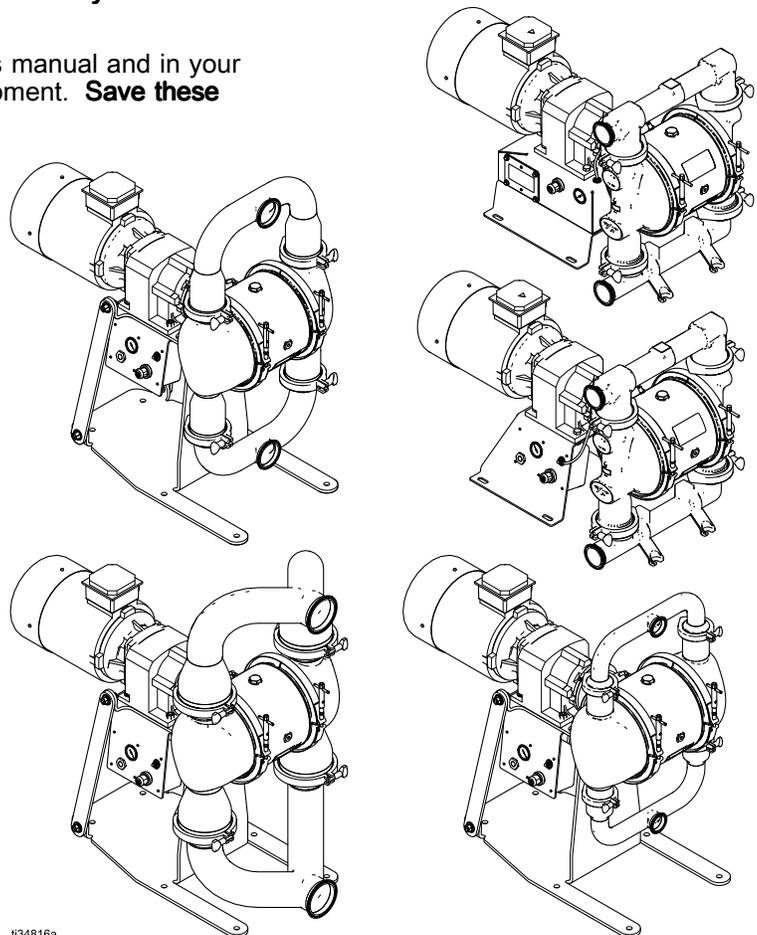


Important Safety Instructions

Read all warnings and instructions in this manual and in your Operation manual before using the equipment. **Save these instructions.**

See Technical Data on page 38 for model information, including Maximum Working Pressure.

See page 10 for approvals.



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Related Manuals

Manual Number	Title
859.0769	VERDERAIR Electric-Operated Diaphragm Pumps, Models VA-EH50, VA-E2H52, VA-E253, VA-E2H54, 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;">DANGER</h1>	
 	<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.

 <h1 style="margin: 0;">WARNING</h1>	
    	<p>FIRE AND EXPLOSION HAZARD</p> <p>Flammable fumes, such as solvent, in work area can ignite or explode. 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 sparking). 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 lines. 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.

 <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 fluid lines, 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 fluid lines and cables away from traffic areas, sharp edges, moving parts, and hot surfaces. • Do not kink or over bend fluid lines or use fluid lines 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.

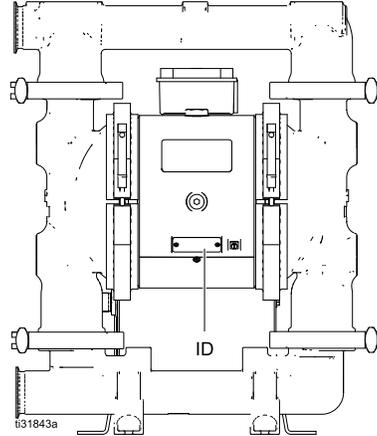
 <h1 style="margin: 0;">WARNING</h1>	
	<p>THERMAL EXPANSION HAZARD</p> <p>Fluids subjected to heat in confined spaces, including lines, can create a rapid rise in pressure due to the thermal expansion. Over-pressurization can result in equipment rupture and serious injury.</p> <ul style="list-style-type: none"> • Open a valve to relieve the fluid expansion during heating. • Replace lines 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 solvents to clean plastic structural or pressure-containing parts. • See Technical Specifications in all equipment manuals for materials of construction. Consult the solvent manufacturer for information and recommendations about compatibility. • 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.

Pump Matrix for VA-EH50 Food Grade Pumps

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

When you receive your pump, record the 8 character part number found on the shipping box (e.g., 811.0018):

Also record the configuration number on the pump ID plate to assist you when ordering replacement parts:



Sample Configuration Number: **VA-EH50SA-STSPFT6ACFD21**

VA-EH	50	S	A	ST	SP	TF	T6	AC	FD	21
Pump Model	Pump Size	Wetted Parts	Center Section	Seats	Balls	Diaphragms	Connections	Drive	Options	Certifications

NOTE: Some combinations are not possible. Please check with your local supplier or the pump configurator on www.verdeair.com.

Pump	Pump Size		Wetted Parts		Center Section Material		Seat Material		Ball Material	
	VA-EH	50	50 mm	S	Stainless Steel	A	Aluminum	SE	Stainless Steel with EPDM o-rings	NW
					S	Stainless Steel	ST	Stainless Steel with PTFE o-rings	SP	Santoprene
									TF	PTFE

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Pump Matrix for VA-EH50 Food Grade Pumps

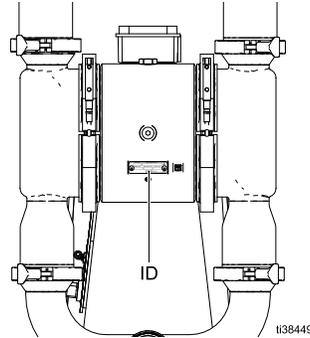
Diaphragm Material		Connections		Drive		Options		Certifications	
SP	Santoprene	D6	Stainless Steel, DIN 11851, 65 mm	A1	Standard AC Induction Motor (High Speed Gear Ratio) with 120V Air Compressor	FD	Food Grade	21	EN 10204 type 2.1
TF	PTFE/EPDM 2-Piece	T6	Stainless Steel, tri-clamp, 2.5 in.	A2	Standard AC Induction Motor (High Speed Gear Ratio) with 220V Air Compressor			31	EN 10204 type 3.1
				AC	Standard AC Induction Motor (High Speed Gear Ratio)				
				AF★	Flameproof AC Induction Motor (High Speed Gear Ratio)				
				AX◆	ATEX AC Induction Motor (High Speed Gear Ratio)				
				B1	Standard AC Induction Motor (Medium Speed Gear Ratio) with 120V Compressor				
				B2	Standard AC Induction Motor (Medium Speed Gear Ratio) with 220V Compressor				
				BC	Standard AC Induction Motor (Medium Speed Gear Ratio)				
				BF★	Flameproof AC Induction Motor (Medium Speed Gear Ratio)				
				BX◆	ATEX AC Induction Motor (Medium Speed Gear Ratio)				
				C1	Standard AC Induction Motor (Low Speed Gear Ratio) with 120V Compressor				
				C2	Standard AC Induction Motor (Low Speed Gear Ratio) with 220V Compressor				
				CC	Standard AC Induction Motor (Low Speed Gear Ratio)				
				CF★	Flameproof AC Induction Motor (Low Speed Gear Ratio)				
				CX◆	ATEX AC Induction Motor (Low Speed Gear Ratio)				
				WG+	No Motor, No Gearbox				

Pump Matrix for VA-E2H52, VA-E2H53, and VA-E2H54 High Sanitary Pumps

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

When you receive your pump, record the 8 character part number found on the shipping box (e.g., 811.0018):

Also record the configuration number on the pump ID plate to assist you when ordering replacement parts:



Sample Configuration Number: **VA-E2H52XS-STTFTST5AXSB21**

VA-E2H	52	X	S	ST	TF	TS	T5	AX	SB	21
Pump Model	Pump Size	Wetted Parts	Center Section	Seats	Checks	Diaphragms	Connections	Drive	Options	Certifications

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

Pump	Pump Size		Wetted Parts		Center Section Material		Seat Material		Check Material	
	VA-E2H	52	50 mm (2-inch port)	X	High Sanitary, 3-A 0.8 µm	S	Stainless Steel	SE	Stainless Steel with EPDM seals	BN
	53	50 mm (3-inch port)	Y	Pharmaceutical 0.5 µm			ST	Stainless Steel with TF-EP seals	NW	Polychloroprene Weighted Ball
	54	50 mm (4-inch port)					SB	Stainless Steel with Buna-N seals	FL	Stainless Steel Flapper
							SV	Stainless Steel with FKM seals	SP	Santoprene Ball
									TF	PTFE Ball
									VT	FKM Ball

Continued on next page

Pump Matrix for VA-E2H52, VA-E2H53, and VA-E2H54 High Sanitary Pumps

Diaphragm Material		Connections		Drive		Options		Certifications			
BN	Buna-N	D5	Stainless Steel, DIN 11851, 50 mm	A1	Standard AC Induction Motor (High Speed Gear Ratio) with 120V Air Compressor	3A	3-A	21	EN 10204 type 2.1		
EO	EPDM Overmolded	T5	Stainless Steel, tri-clamp, 2.0 in.	A2	Standard AC Induction Motor (High Speed Gear Ratio) with 220V Air Compressor	SB	Hygienic ball	31	EN 10204 type 3.1		
SP	Santoprene	D8	Stainless Steel, DIN 11851, 80 mm	AC	Standard AC Induction Motor (High Speed Gear Ratio)	SF	Hygienic flapper				
TS	PTFE/Santoprene 2-Piece	T8	Stainless Steel, tri-clamp, 3.0 in.	AF★	Flameproof AC Induction Motor (High Speed Gear Ratio)						
VT	FKM	D1	Stainless Steel, DIN 11851, 100 mm	AX◆	ATEX AC Induction Motor (High Speed Gear Ratio)						
				T1	Stainless Steel, tri-clamp, 4.0 in.					B1	Standard AC Induction Motor (Medium Speed Gear Ratio) with 120V Compressor
				B2	Standard AC Induction Motor (Medium Speed Gear Ratio) with 220V Compressor						
				BC	Standard AC Induction Motor (Medium Speed Gear Ratio)						
				BF★	Flameproof AC Induction Motor (Medium Speed Gear Ratio)						
				BX◆	ATEX AC Induction Motor (Medium Speed Gear Ratio)						
				C1	Standard AC Induction Motor (Low Speed Gear Ratio) with 120V Compressor						
				C2	Standard AC Induction Motor (Low Speed Gear Ratio) with 220V Compressor						
				CC	Standard AC Induction Motor (Low Speed Gear Ratio)						
				CF★	Flameproof AC Induction Motor (Low Speed Gear Ratio)						
CX◆	ATEX AC Induction Motor (Low Speed Gear Ratio)										
				WG+	No Motor, No Gearbox						

Approvals

Approvals		
◆ Pumps with motor code X are approved to:		II 2 G Ex h d IIB T3 Gb
✚ Pumps with motor code WG are approved to:		II 2 G Ex h IIB T3 Gb
★ Motors coded F are approved to:	 	Class I, Div 1, Group D, T3B Class II, Div 1, Group F & G, T3B
Diaphragm materials coded EO , TF , or TS combined with check materials coded FL or TF comply with:		EC 1935/2004
All Models (except gearbox and compressor code 1, or motor code F) are approved to:		
Diaphragm materials coded EO or TS combined with check materials coded FL or TF comply with:		Class VI
All fluid contact materials are FDA-compliant and meet the United States Code of Federal Regulations (CFR)		

Troubleshooting



- Follow the [Pressure Relief Procedure, page 13](#), 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.
Reduced pump performance.	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

NOTE: When reassembling fluid section components, loosely assemble initially to ensure acceptable alignment. Once all components are in place, tighten all clamps.

Pressure Relief Procedure



Follow the Pressure Relief Procedure whenever you see this symbol.



This equipment stays pressurized until pressure is manually relieved. To help prevent serious injury from pressurized fluid, such as splashing fluid, follow the Pressure Relief Procedure when you stop dispensing and before cleaning, checking, or servicing the equipment.

1. Turn off the pump and disconnect power to the system.
2. Close the master air valve (J) to shut off the air to the pump.
3. Open the fluid drain valve (L) to relieve fluid pressure. Have a container ready to catch the drainage.
4. Close the pump air inlet port (E) on the pneumatic enclosure.

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.

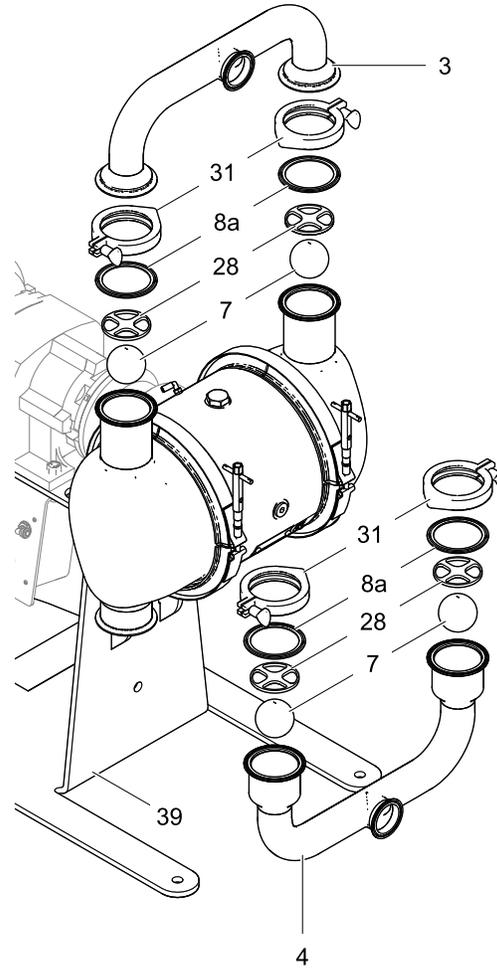
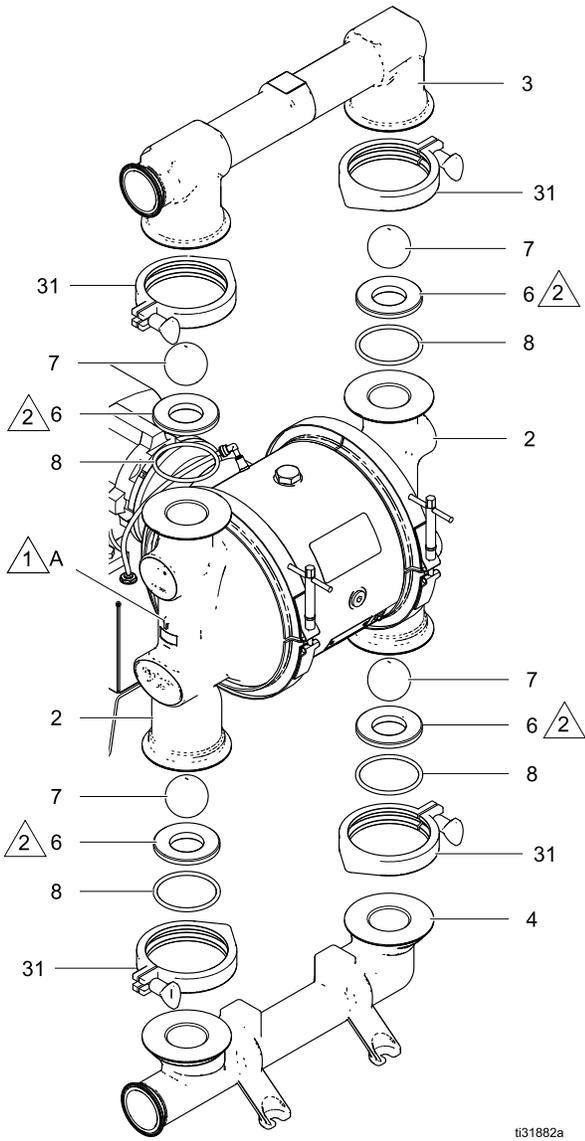
Disassemble the Check Valve

1. Follow the [Pressure Relief Procedure, page 13](#). Disconnect power from the motor. Disconnect all fluid and air lines.
2. Remove the clamps (31) holding the outlet manifold (3) to the fluid covers (2), then remove the outlet manifold.
3. Remove the ball check valve assemblies:
 - a. On the VA-EH50, remove the seats (6), balls (7), and o-rings (8).
 - b. On the VA-E2H52, VA-E2H53, VA-E2H54, remove the ball stops (28), balls (7), and gaskets (8a).
4. Turn the pump over and remove the inlet manifold (4). Remove the seats (6), balls (7), and o-rings (8).
5. To continue with diaphragm disassembly, see [Disassemble the Standard Diaphragms, page 16](#).

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. If present on the fluid covers (2), the arrows (A) **must** point toward the outlet manifold (3). For fluid covers without arrows, the tallest opening in the fluid cover **must** be attached to the outlet manifold.

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.

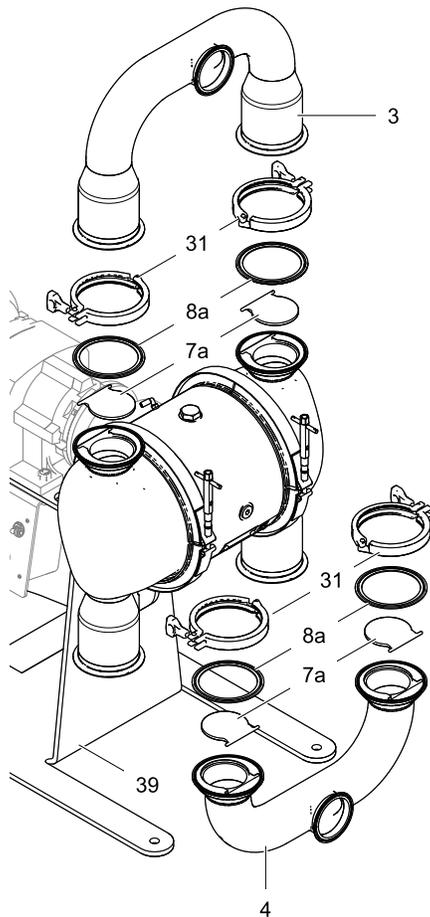
Disassemble the Flapper Check Valve

1. Follow the [Pressure Relief Procedure, page 13](#). Disconnect power from the motor. Disconnect all fluid and air lines.
2. Remove the clamps (31) holding the outlet manifold (3) to the fluid covers, then remove the outlet manifold.
3. Remove the flappers (7a), and gaskets (8a).
4. Repeat steps to remove the inlet manifold (4). Remove the flappers (7a), and gaskets (8a).
5. To continue with diaphragm disassembly, see [Disassemble the Standard Diaphragms, page 16](#).

Reassemble the Flapper Check Valve

1. Clean all parts and inspect for wear or damage. Replace parts as needed.
2. Reassemble in the reverse disassembly order. Put the inlet manifold on first. Be sure the flapper checks and manifolds are assembled **exactly** as shown.

NOTE: Install the flapper valves (7a) with the text side facing the seat.



Standard Diaphragm Repair



Tools Required

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

Disassemble the Standard Diaphragms

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

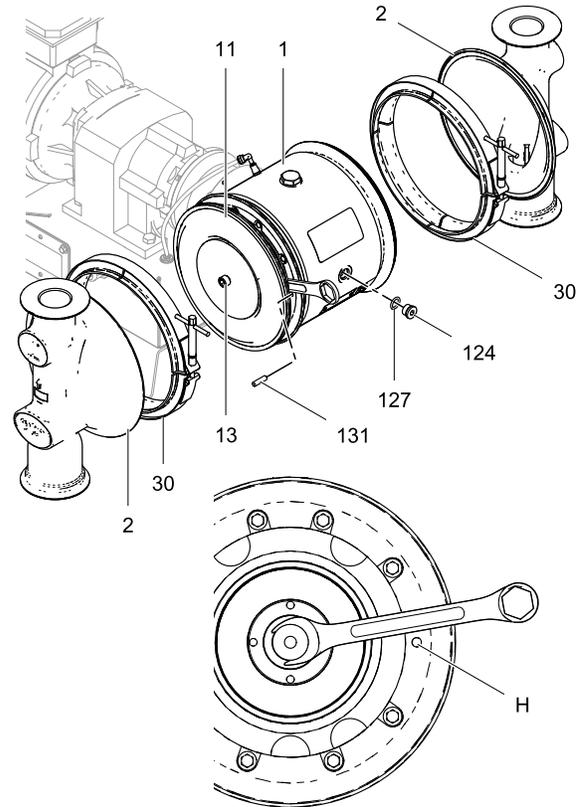
1. Follow the [Pressure Relief Procedure, page 13](#). Disconnect power from the motor. Disconnect all fluid and air lines.
2. Remove the manifolds and disassemble the ball check valves as explained in [Check Valve Repair, page 13](#).
3. Remove the clamps (30) from the fluid covers, then pull the fluid 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. Use pin (131), placed in either hole (H) as a brace for the wrench while removing or installing diaphragm bolts.

- 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 the other side. Repeat step 4a.

5. To continue with diaphragm disassembly, see [Disassemble the Center Section, page 20](#).



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Reassemble the Standard Diaphragms

NOTICE

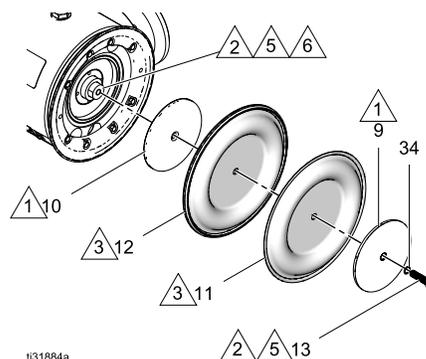
After reassembly, allow the thread locker to cure for 12 hours, or per manufacturer's instructions, prior to operating the pump. Damage to the pump will occur if the diaphragm shaft bolt loosens.

TIP: If you are also repairing or servicing the center section (drive shaft, piston, etc.), follow [Center Section Repair, page 20](#), before replacing diaphragms.

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 (13). Install the o-ring (34).
3. 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.
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 135 N•m (100 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 16](#).
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.
10. Reassemble the check valves and manifolds. See [Reassemble the Check Valve, page 13](#).
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. 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.

2-Piece (PT or SP) Models



Overmolded Diaphragm Repair



Tools Required

- 28 mm open end wrench

Disassemble the Overmolded Diaphragms

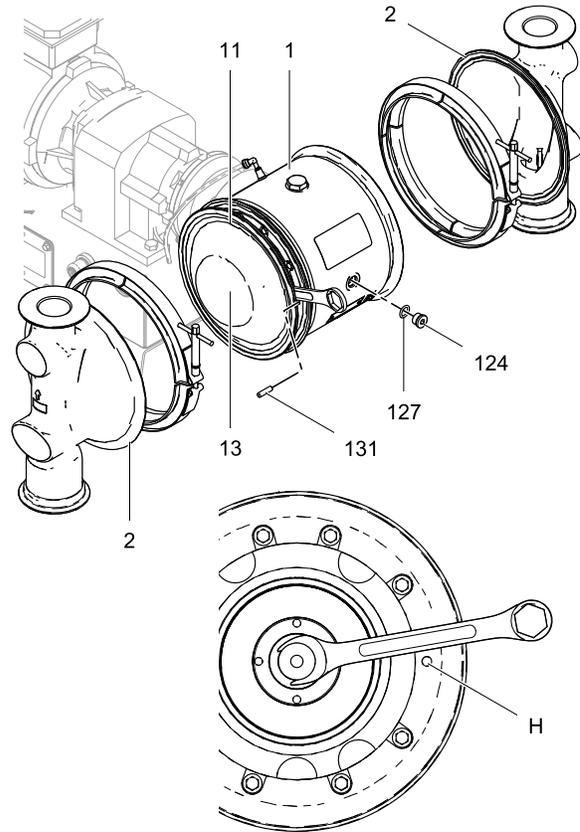
NOTE: Diaphragm kits are available in a range of materials and styles. See Parts section.

1. Follow the [Pressure Relief Procedure, page 13](#). Disconnect power from the motor. Disconnect all fluid and air lines.
2. Remove the manifolds and disassemble the ball check valves as explained in [Check Valve Repair, page 13](#).
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. Use pin (131), placed in either hole (H) as a brace for the wrench while removing or installing diaphragm bolts.

- a. Hold a 28 mm wrench on the wrench flats of the exposed piston shaft. Grip the diaphragm securely around the outer edge and rotate counterclockwise.

- b. Rotate the drive shaft to move the piston fully to the other side. Repeat step 4a.
5. To continue with diaphragm disassembly, see [Disassemble the Center Section, page 20](#).



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Reassemble the Overmolded Diaphragms

NOTICE

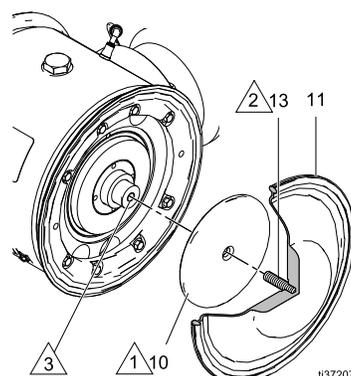
After reassembly, allow the thread locker to cure for 12 hours, or per manufacturer's instructions, prior to operating the pump. Damage to the pump will occur if the diaphragm shaft bolt loosens.

TIP: If you are also repairing or servicing the center section (drive shaft, piston, etc.), follow [Center Section Repair, page 20](#), before replacing diaphragms.

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 (13). Install the o-ring (34).
3. 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.
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 135 N•m (100 ft-lb).
7. Rotate the drive shaft to move the piston fully to one side. See instructions in step 4 of [Disassemble the Overmolded Diaphragms, page 18](#).
8. Repeat to install the other diaphragm assembly.
9. Attach the fluid covers.
10. Reassemble the check valves and manifolds. See [Reassemble the Check Valve, page 13](#).
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. Apply primer to the female threads. Allow to dry.

1-Piece (EO) Model



Center Section Repair



Disassemble the Center Section

See the illustrations on page 18.

1. Follow the [Pressure Relief Procedure, page 13](#). Disconnect power from the motor. Disconnect all fluid and air lines.
2. Remove the manifolds and check valve parts as directed in [Disassemble the Check Valve, page 13](#).
3. Remove the fluid covers and diaphragms as directed in [Disassemble the Standard Diaphragms, page 16](#).
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.

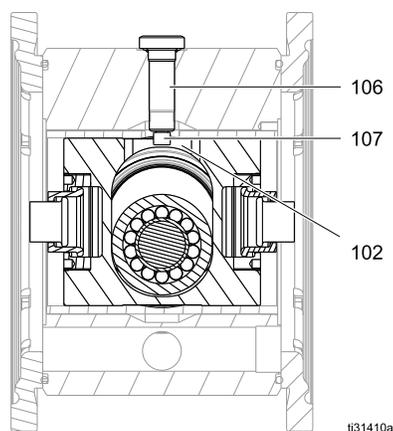
NOTICE

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.

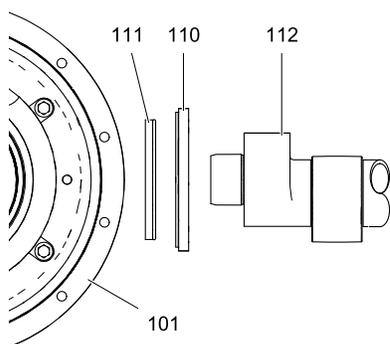
8. The shaft coupler (113) might come out with the drive shaft assembly. If not, remove from gearbox (118).
9. Remove the seal cartridge (110), the o-ring (109) and the radial seal (111) from the drive shaft assembly.
10. Slide the piston assembly (102) out of the center.
11. Only remove the alignment 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).



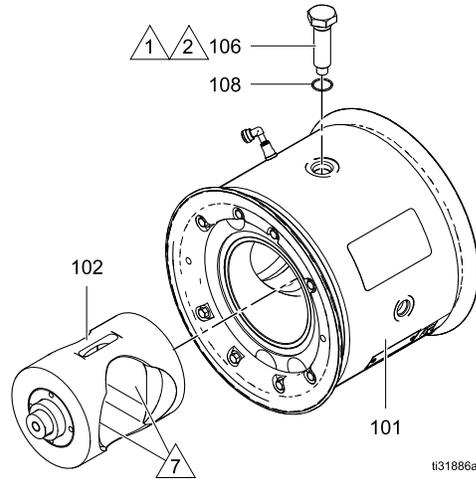
4. Be sure the sealing surface of the drive shaft (112) is clean. Install the seal cartridge (110) and the radial seal (111) on the drive shaft. The lips on the radial seal (111) must face **IN** toward the center. Inspect seal lip for damage. Replace if necessary.



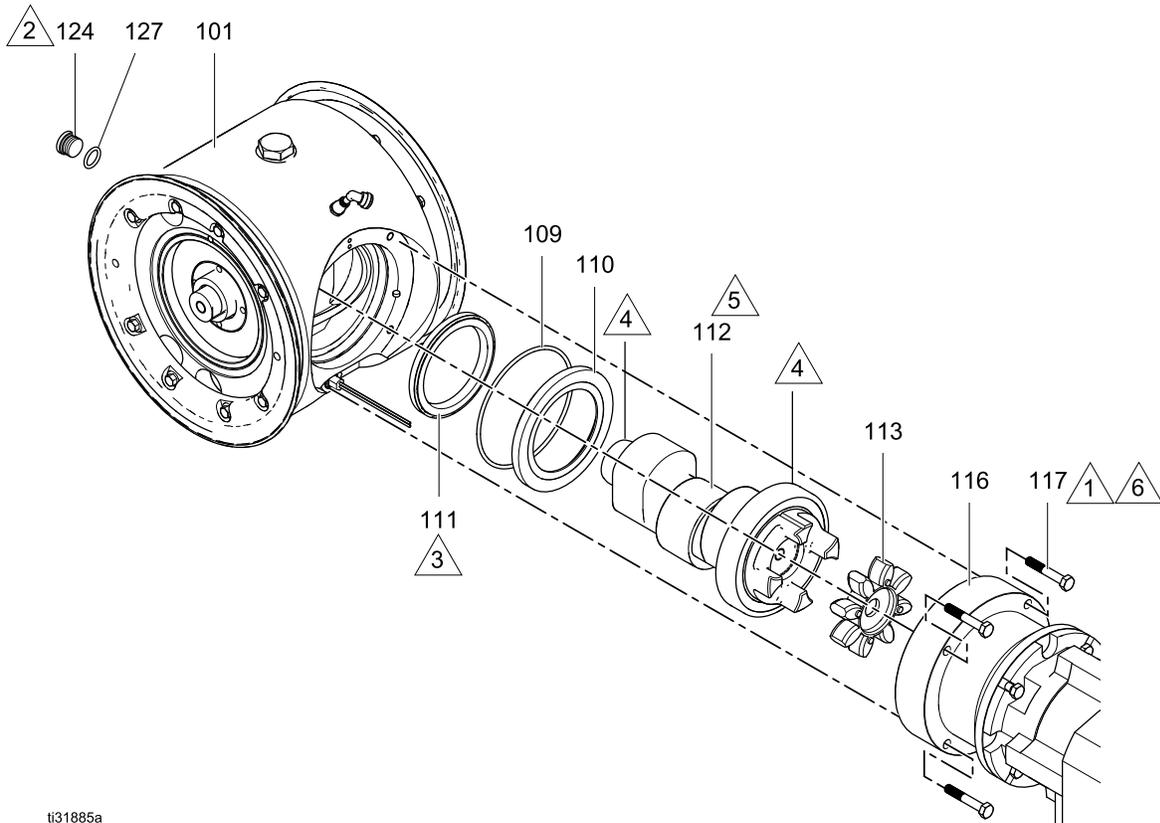
5. Install o-ring (109) to the center housing (101).
6. Apply anti-seize lubricant on the mating edges of the drive shaft, as shown in the illustration, page 18.
7. Center the piston in the housing and install the drive shaft assembly (112) into the center housing (101) with the groove facing up.
8. 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 Standard Diaphragms, page 17](#), and [Reassemble the Check Valve, page 13](#).

Repair

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



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Disconnect the Motor and Gearbox

				
<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>				

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.

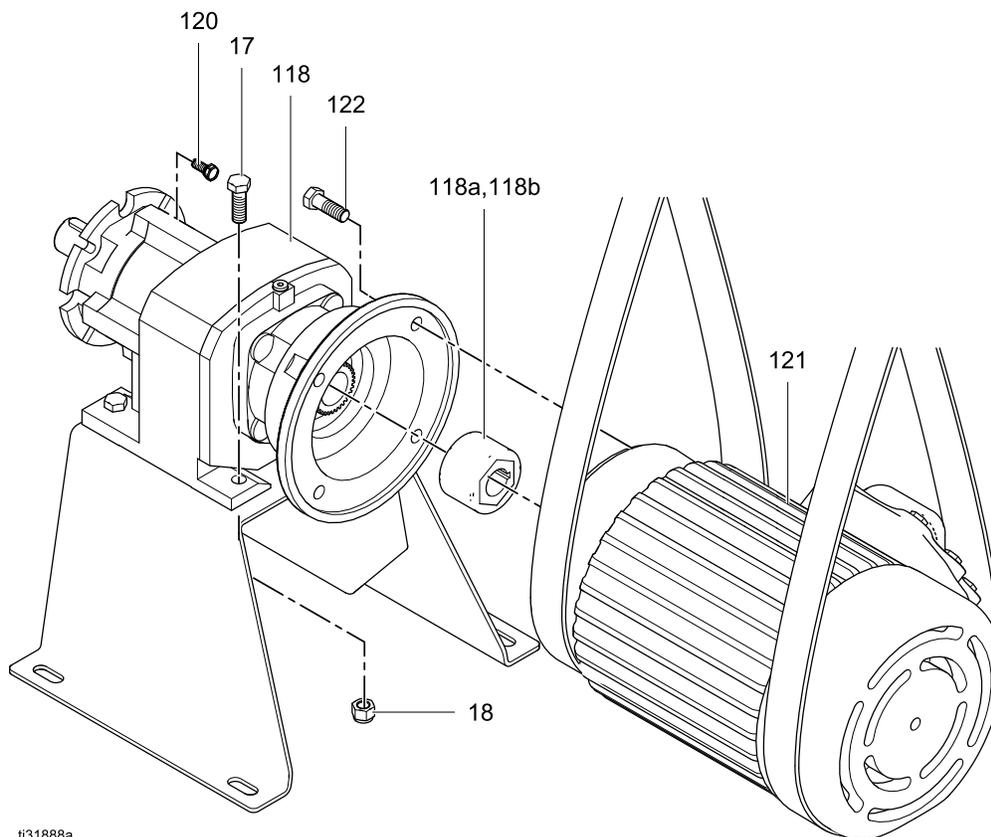
Start at step 1 for ATEX or Flameproof motors.
Standard AC motors (AC, A1, or A2) are of one piece

with the gearbox, so begin with step 3.

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

1. Turn off the pump and disconnect power.
2. Use a 3/4 in. socket wrench to remove 4 screws (122).
3. Pull the motor (121) straight off of the gearbox (118).
4. 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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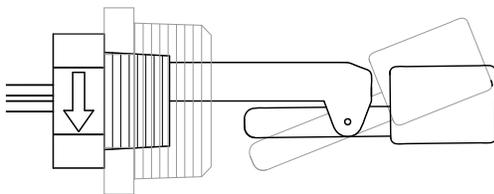
Leak Sensor Repair

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 13](#). Disconnect 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.



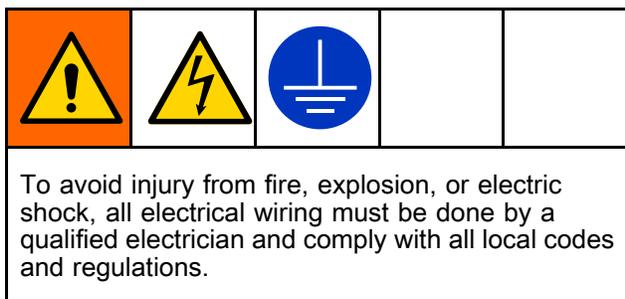
ti33058a

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.

Install Compressor Kits



Install Compressor Kits for VA-EH50 Pumps

Follow this procedure to install your compressor kit for VA-EH50 pumps. See [Kits and Accessories, page 37](#) for compressor kit options.

1. Follow the [Pressure Relief Procedure, page 13](#).
2. Turn off the pump and Disconnect power to the unit.
3. Locate the illustration for your pump model under [Parts, page 27](#), for reference for installing your compressor kit.
4. Attach the riser bracket (35) to the compressor box (16) using bolts (35a).

NOTE: Be sure to align the slot from the riser bracket (35) with the compressor motor inside of the compressor box (16).

5. Attach the pump motor (121) to the compressor box (16) using bolts (17). Use medium-strength Loctite® to secure the bolts and torque to 27 N•m (20 ft-lb).
6. Refer to your pump Operation manual for wiring instructions.

Install Compressor Kits for VA-E2H52,53,54 Pumps

Follow this procedure to install your compressor kit for VA-E2H52, VA-E2H53, or VA-E2H54 pumps.

See [Kits and Accessories, page 37](#) for compressor kit options.

1. Follow the [Pressure Relief Procedure, page 13](#).
2. Turn off the pump and Disconnect power to the unit.
3. Locate the illustration for your pump model under [Parts, page 27](#), for reference for installing your compressor kit.
4. Attach the cover (42) to the compressor (16) using bolts (43).

NOTE: Be sure to align the slot from the cover (42) with the compressor motor inside of the compressor (16).

5. Apply high-strength Loctite to the end of the screws (40), then fasten into the threaded nuts of the compressor (16) so that 4.13 cm (1.625 in.) of the screws show above the nut. Allow Loctite to cure according to manufacturer instructions.
6. Align the pump motor (121) on top of the mounting base (39).

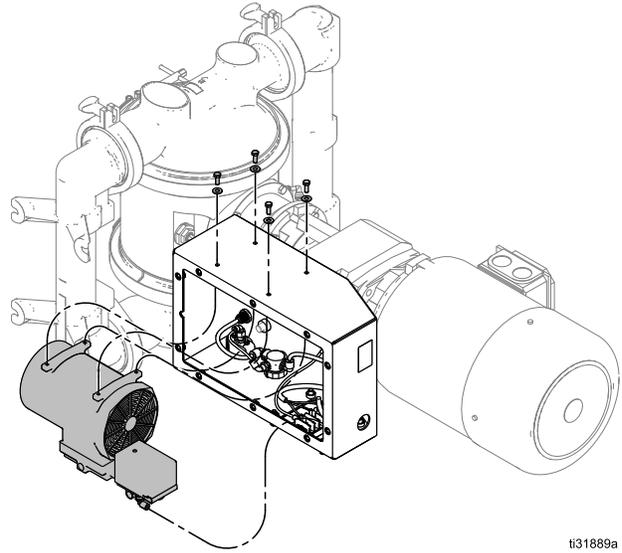
NOTE: Use lifting straps to support the pump weight.

7. Position the compressor assembly (16) under the mounting base (39). Attach the compressor to the base using the screws (40) and nuts (18). Use medium-strength Loctite to secure the nuts and torque to 27 N•m (20 ft-lb).
8. Cover the exposed portion of the thread screws (40) with caps (41).
9. Refer to your pump Operation manual for wiring instructions.

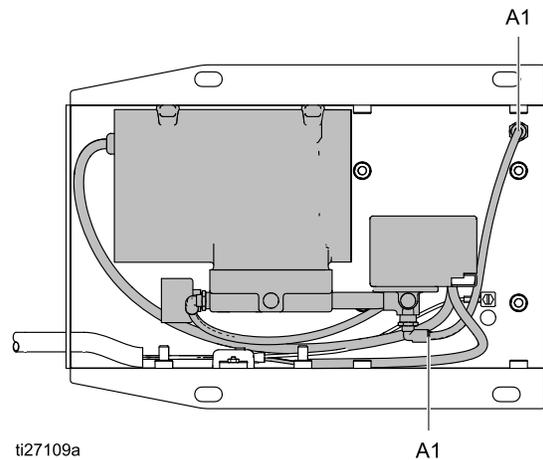
Replace the Compressor

				
<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 13](#).
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.

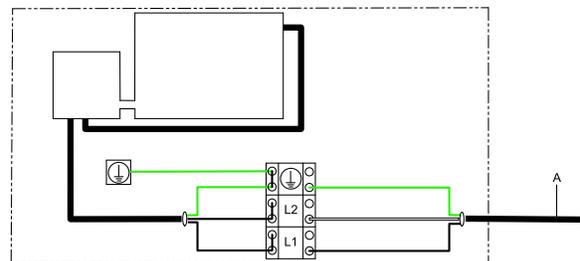


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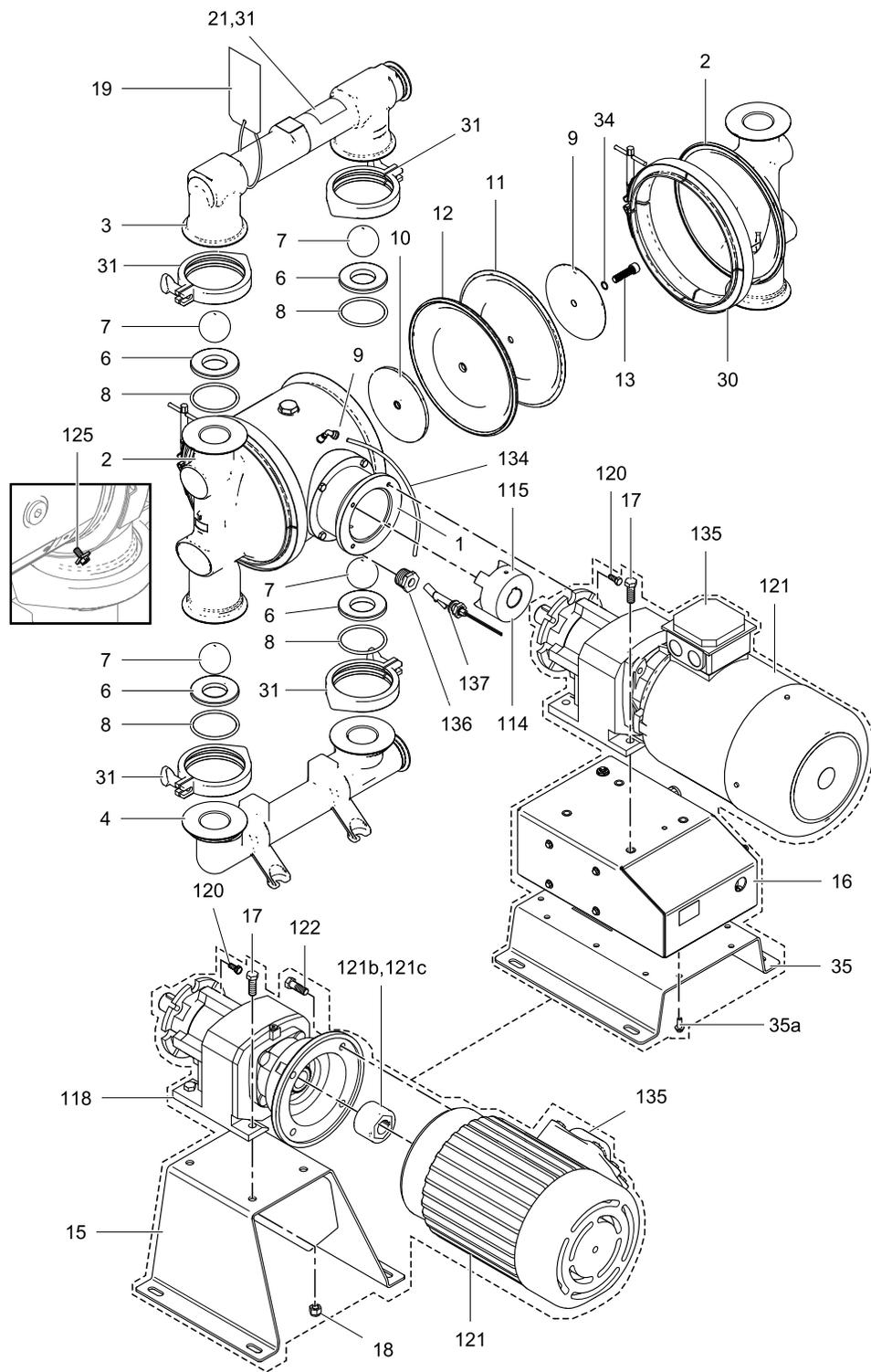
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A1



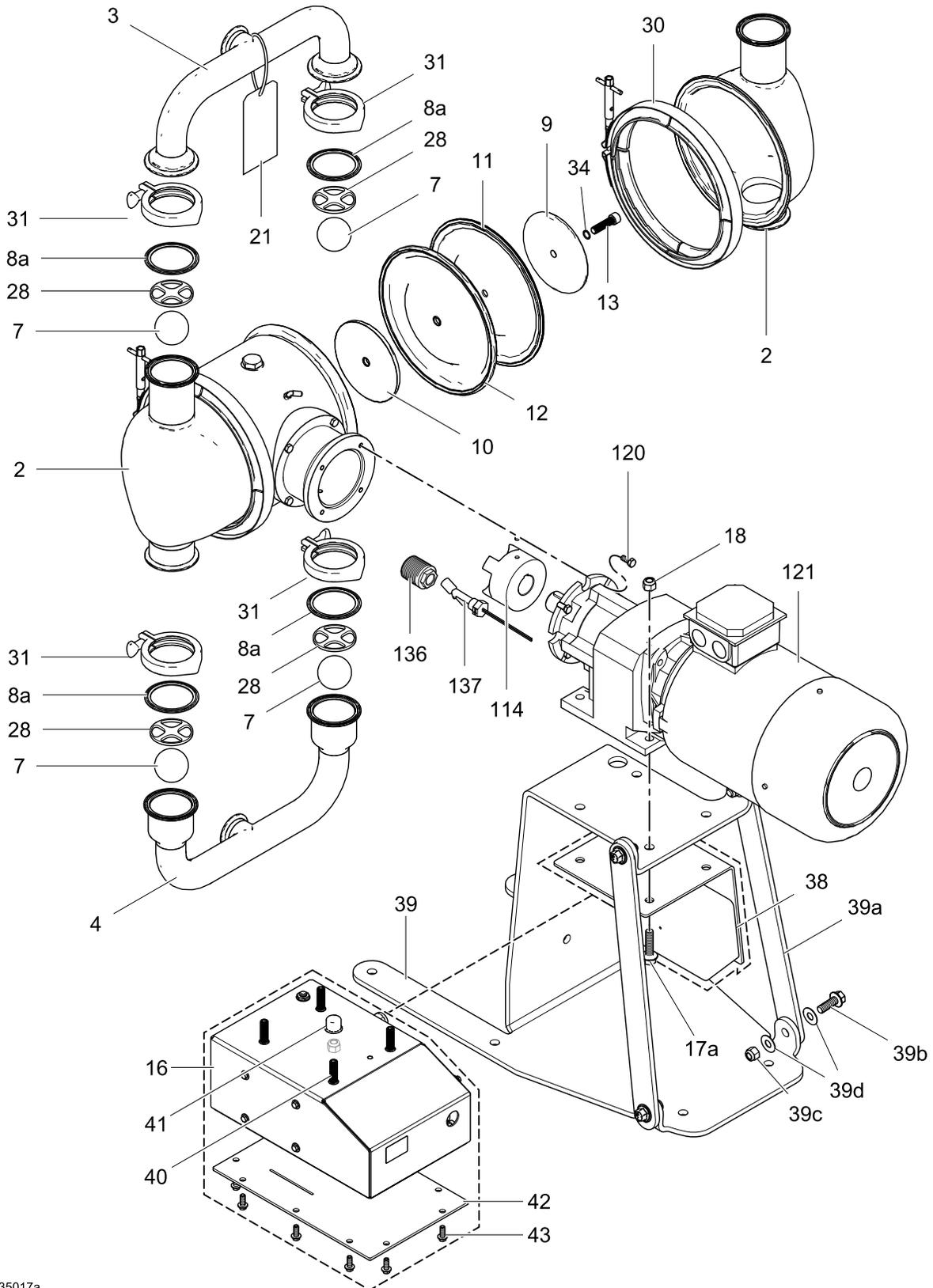
Parts

VA-EH50 Pump



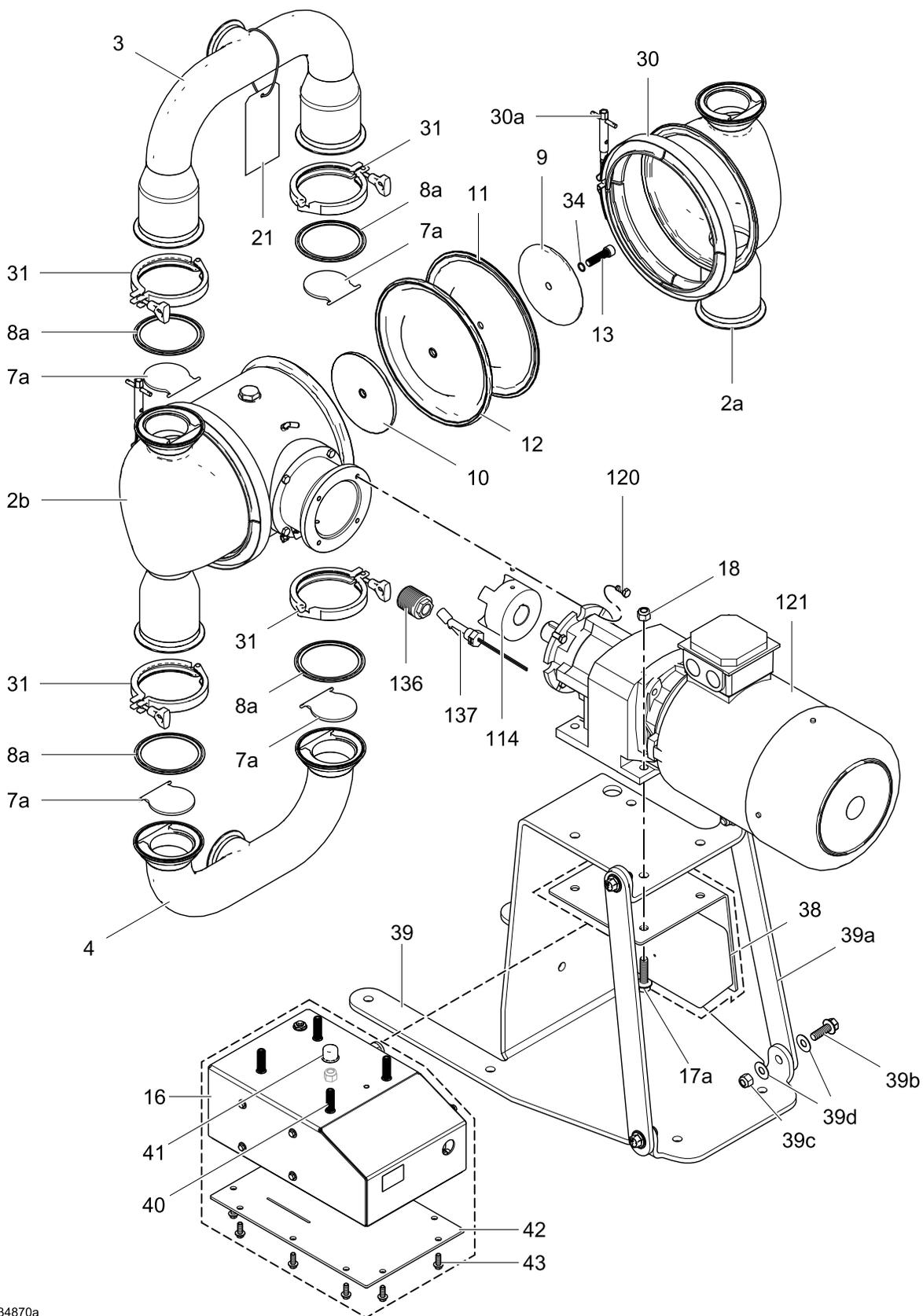
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VA-E2H52 Ball Check Pump



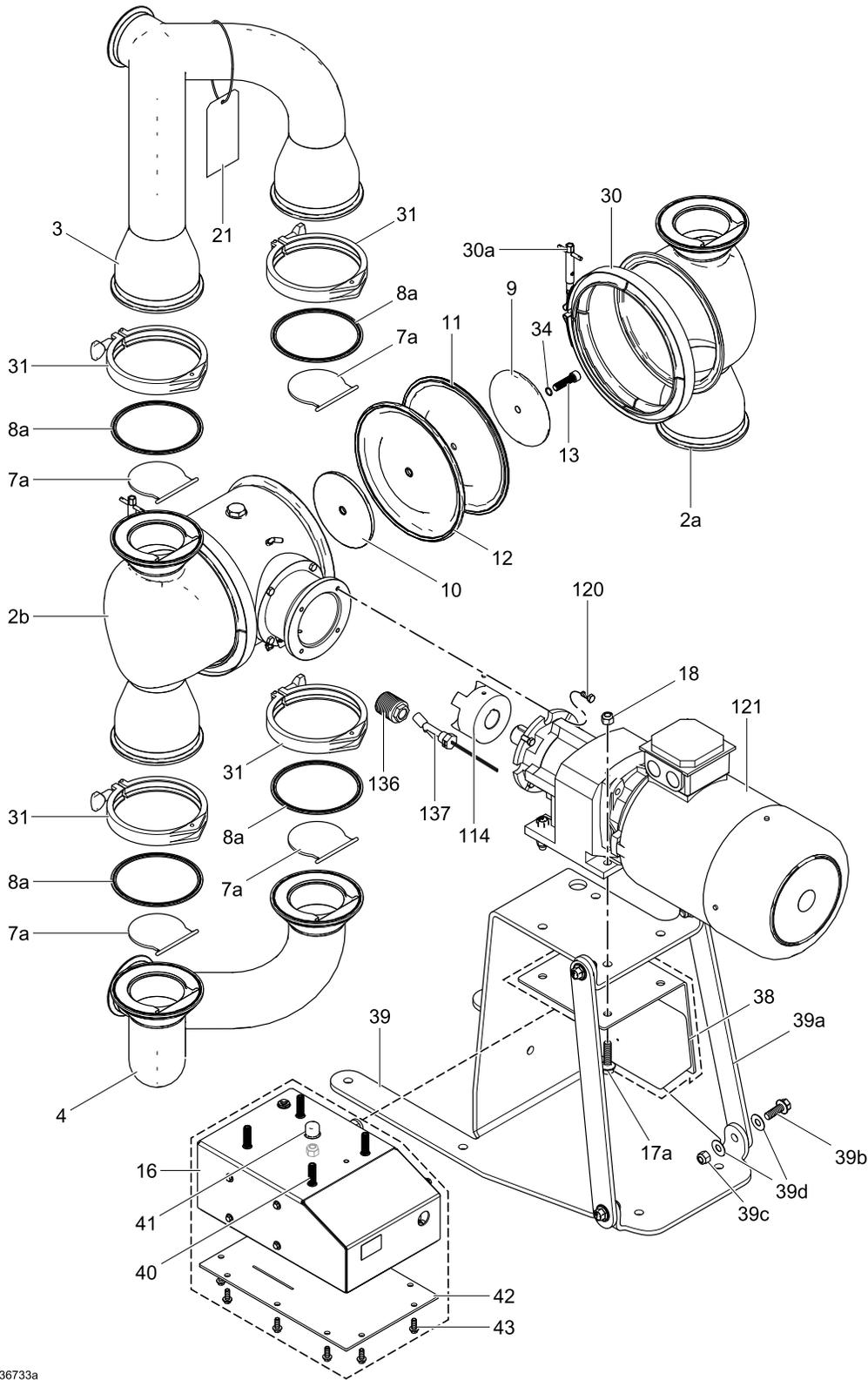
ti35017a

VA-E2H53 Flapper Pump



ti34870a

VA-E2H54 Flapper Pump



1136733a

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 page 30.</i>	1
2	819.0492	----	VA-EH50	2
	812.0017	----	VA-E2H52, X	
	812.0025	----	VA-E2H52, Y	
2a	812.0018	----	COVER, fluid, left, VA-E2H53	1
	812.0020	----	COVER, fluid, left, VA-E2H54	1
2b	812.0019	----	COVER, fluid, right, VA-E2H53	1
	812.0021	----	COVER, fluid, right, VA-E2H54	1
3	----	----	MANIFOLD, outlet; SST	1
	819.0498	----	VA-EH50 Flange	
	819.0622	----	VA-EH50 DIN	
	812.0030	----	VA-E2H52, X, Flange	
	812.0104	----	VA-E2H52, Y, Flange	
	812.0166	----	VA-E2H52, X, DIN	
	812.0031	----	VA-E2H53 Flange	
	812.0164	----	VA-E2H53 DIN	
	812.0032	----	VA-E2H54 Flange	
812.0266	----	VA-E2H54 DIN		
4	----	----	MANIFOLD, inlet; SST	1
	819.0497	----	VA-EH50 Flange	
	819.0621	----	VA-EH50 DIN	
	812.0037	----	VA-E2H52, X, Flange	
	812.0103	----	VA-E2H52, Y, Flange	
	812.0167	----	VA-E2H52, X, DIN	
	812.0038	----	VA-E2H53 Flange	
	812.0165	----	VA-E2H53 DIN	
	812.0039	----	VA-E2H54 Flange	
812.0265	----	VA-E2H54 DIN		
6*	----	819.0539	SEAT, SS, VA-EH50 only; pkg of 4	1
7*	----	----	BALLS, kits are pkg of 4; <i>see page 33</i>	1
7a	----	812.0110	CHECK VALVE, flapper, pkg of 4 VA-E2H53	1
	----	812.0109	VA-E2H54	

Ref.	Part	Kit	Description	Qty.
8*	----	----	O-RING, pkg of 4, VA-EH50 only; <i>see page 33</i>	1
8a*	----	----	GASKET, sanitary, pkg of 4; <i>see page 33</i>	1
9	819.0466	----	PLATE, fluid side; Stainless Steel, for all diaphragms except EO diaphragms	2
10	819.1283	----	PLATE, air side	2
11*	----	----	DIAPHRAGM, kit; <i>see page 32</i>	1
12*	----	----	DIAPHRAGM, backup, <i>included with Ref. 11 where needed</i>	2
13	----	819.1281	BOLT, shaft; <i>includes Ref. 34</i>	1
15	----	819.1259	BRACKET, gear box, for VA-EH50 models without compressor; <i>includes 4 each of refs 17 and 18</i>	1
16	----	----	COMPRESSOR, assembly; <i>includes Ref. 40, 41, 42, and 43 where needed</i>	1
	----	812.0293	120 Volt, High Sanitary	
	----	819.1269	120 Volt, Food Grade	
	----	812.0295	240 Volt, High Sanitary	
	----	819.1270	240 Volt, Food Grade	
17	----	----	BOLT, hex washer head, M8-1.25 x 32 mm, <i>included with Ref. 15</i>	4
17a	----	812.0275	SCREW kit, gear box, for all models except VA-EH50; <i>includes Ref. 18</i>	1
18	----	----	NUT, qty 4; <i>included with Ref. 15 and Ref. 17a</i>	1
21▲	812.0271	----	LABEL, warning, VA-EH50	1
	812.0136	----	VA-E2H52, VA-E2H53, VA-E2H54	
28	----	812.0121	STOP, ball, pkg of 4	1
30	819.0532	----	CLAMP, sanitary, diaphragm VA-EH50	2
	812.0134	----	VA-E2H52, VA-E2H53, VA-E2H54	
30a	----	----	HANDLE, tee, <i>included with Ref. 30</i>	2

Parts

Ref.	Part	Kit	Description	Qty.
31	819.0504 819.0516 812.0262	— — —	CLAMP, sanitary VA-EH50, VA-E2H53 VA-E2H52 VA-E2H54	4
34*	— — —	— — —	O-RING, for diaphragm shaft bolt, <i>included with Ref. 13</i>	2
35	— — —	819.1264 812.0294	BRACKET, riser; <i>used for VA-EH50 models with a compressor; includes Ref 35a</i>	1
35a	— — —	— — —	BOLT, air compressor box, M8 x 1.25, 20mm, <i>included with Ref. 35</i>	10
38	— — —	812.0296	CONTROL, air, with bracket	1
39	— — —	812.0274 812.0294	BASE, mounting	1
39a	— — —	— — —	BRACE, mounting, <i>included with Ref. 39</i>	2
39b	— — —	— — —	SCREW, flanged, <i>included with Ref. 39</i>	4
39c	— — —	— — —	NUT. lock, <i>included with Ref. 39</i>	4
39d	— — —	— — —	WASHER, <i>included with Ref. 39</i>	8

Ref.	Part	Kit	Description	Qty.
40	— — —	— — —	SCREW, set, 1/2 X 2.25, pkg of 4	1
41	— — —	— — —	CAP, 3/4" nut, rigid	1
42	— — —	— — —	COVER, compressor box plate, <i>included with Ref. 16</i>	1
43	— — —	— — —	BOLT, hex head, M8 x 1.25 x 20mm, <i>included with Ref. 16</i>	10

— — — Not sold separately.

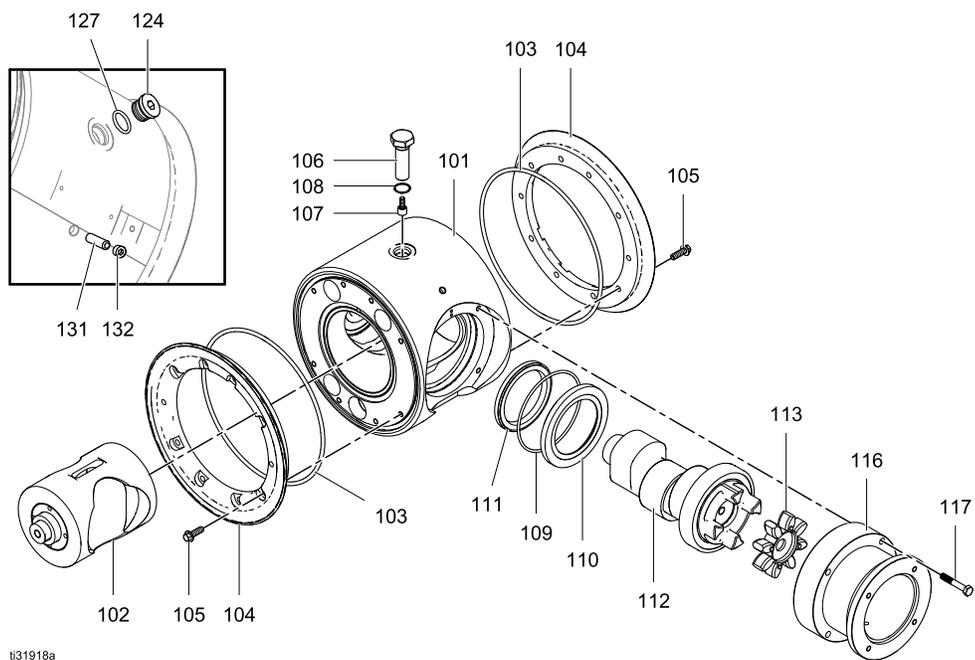
▲ Replacement safety labels, signs, tags, and cards are available at no cost.

* Included in the fluid section repair kit, which may be purchased separately.

Center Section

Sample Configuration Number:

Pump Model	Pump Size	Wetted Parts	Center Section	Seats	Balls	Diaphragms	Connections	Drive	Options	Certifications
VA-E2H	52	X	S	ST	TF	TS	T5	AX	SB	21



ti31918a

Parts

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 819.1249	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 819.1258.

Diaphragms

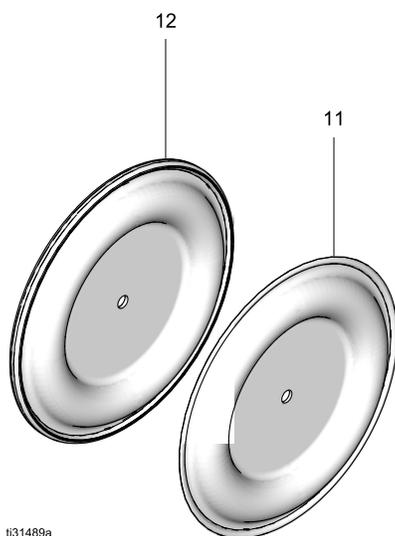
Sample Configuration Number:

Pump Model	Pump Size	Wetted Parts	Center Section	Seats	Balls	Diaphragms	Connections	Drive	Options	Certifications
VA-E2H	52	X	S	ST	TF	TS	T5	AX	SB	21

Bolt-Through Diaphragm Kits		
Diaphragm Material	Kit	Qty.
<i>For VA-EH50 Food Grade Pumps</i>		
TF	819.0671	1
SP	819.1304	1
<i>For VA-E2H High Sanitary Pumps</i>		
BN	812.0260	1
SP	819.1304	1
TS	812.0267	1
VT	812.0129	1

Kits include:

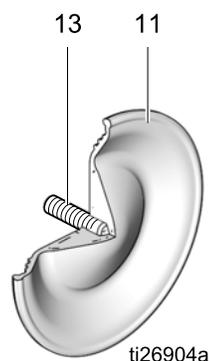
- 2 diaphragms (11)
- 2 diaphragm backers (12), if applicable
- 2 o-rings
- 1 packet anaerobic adhesive



Overmolded Diaphragm Kit		
Diaphragm Material	Kit	Qty.
<i>For VA-E2H High Sanitary Pumps</i>		
EO	819.1411	1

Kit includes:

- 2 diaphragms (11)
- 2 set screws (13) installed in the diaphragm



Manifold Seals and Check Balls

Sample Configuration Number:

Pump Model	Pump Size	Wetted Parts	Center Section	Seats	Balls	Diaphragms	Connections	Drive	Options	Certifications
VA-E2H	52	X	S	ST	TF	TF	T5	AX	SB	21

Ball Kits			
Ball Material	Kit	Description	Qty.
BN	819.0507	Kit, Ball-H1 BN	1
TF	819.0430	Kit, Ball-H1 TF	1
SP	819.0431	Kit, Ball-H1 SP	1
VT	819.0506	Kit, Ball-H1 VT	1
NW	819.0670	Kit, Ball-H1 NW	1

Kits include:

- 4 balls (7)

O-Ring Kits for VA-EH50 Pumps				
Seats	O-ring Material	Kit	Description	Qty.
ST	TF	819.0544	Kit, O-ring-H2 TF-4	1
SE	EP	819.0542	Kit, O-ring-H2 EP-4	1

Kits include:

- 4 o-rings (8)

Optional Sanitary Gasket Kits for VA-E2H52, VA-E2H53, and VA-E2H54 Pumps					
Seats	Gasket Material	Kit	Description	Gasket Size	Qty.
SB	BN	812.0245	Hygienic Gasket-H3 BN-4	80 mm	1
		812.0246	Hygienic Gasket-K1 BN-4	100 mm	
		812.0248	Hygienic Gasket-M1 BN-4	150 mm	
SE	EP	812.0009	Hygienic Gasket-H3 EP-4	80 mm	1
		812.0010	Hygienic Gasket-K1 EP-4	100 mm	
		812.0012	Hygienic Gasket-M1 EP-4	150 mm	
ST	TF-EP	812.0159	Hygienic Gasket-H3 TF-EP	80 mm	1
		812.0160	Hygienic Gasket-K1 TF-EP	100 mm	
		812.0162	Hygienic Gasket-M1 TF-EP	150 mm	
SV	VT	812.0152	Hygienic Gasket-H3 VT-4	80 mm	1
		812.0153	Hygienic Gasket-K1 VT-4	100 mm	
		812.0155	Hygienic Gasket-M1 VT-4	150 mm	

Kits include:

- 4 gaskets (8a)

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.

Seats, Balls, and Diaphragm Kits

Fluid Section Repair Kits for VA-EH50 Pumps		
Kit	Description	Qty.
819.0603	VA-EH50S SS,TF,TF,TF	1
819.0605	VA-EH50S SS,SP,SP,TF	1
819.0606	VA-EH50S SS,NW,SP,TF	1
819.0608	VA-EH50S SS,TF,TF,EP	1

Kits include:

- 4 seats
- 4 balls
- 2 diaphragms (10)
- 2 diaphragm backers (11), if applicable
- 4 o-rings
- 2 diaphragm bolt o-rings
- 1 packet anaerobic adhesive

HS Compressor Box Kits 812.0293 (120 V) and 812.0295 (240 V)

Kits include:

- 1 compressor box (16)
- 4 set screws (40)
- 4 nuts (18)
- 4 nut caps (41)
- 1 nylon tube (134)
- 1 compressor box cover (42)
- 10 bolts (43)

HS Bracket with Air Control Kit 812.0294

Kit includes:

- 1 air control (38), without compressor
- 1 stand base (39)
- 2 stand braces (39a)
- 4 base mounting screws (39b)
- 4 base mounting nylon lock nuts (39c)
- 8 SST flat washers (39d)
- 4 gear box screws (17a)
- 4 gear box nylon lock nuts (18)

FG Bracket with Air Control Kit 819.1310

Optional kit for the gear box bracket (15). Includes air controls.

Parts

Fluid Section Repair Kits for VA-E2H52, VA-E2H53, and VA-E2H54 Pumps		
Kit	Description	Qty.
812.0204	VA-E2H52X-Y --,BN,BN,BN	1
812.0205	VA-E2H52X-Y --,NW,EO,EP	1
812.0206	VA-E2H52X-Y --,NW,VT,VT	1
812.0297	VA-E2H52X-Y --,NW,SP,EP	1
812.0208	VA-E2H52X-Y --,EP,EO,EP	1
812.0298	VA-E2H52X-Y --,EP,SP,EP	1
812.0210	VA-E2H52X-Y --,VT,VT,VT	1
812.0211	VA-E2H52X-Y --,TF,EO,EP	1
812.0213	VA-E2H52X-Y --,TF,TS,TF	1
812.0299	VA-E2H52X-Y --,TF,SP,EP	1
812.0300	VA-E2H52X-Y --,SP,SP,EP	1
812.0218	VA-E2H53X --,FL,BN,BN	1
812.0219	VA-E2H53X --,FL,EO,EP	1
812.0220	VA-E2H53X --,FL,VT,VT	1
812.0222	VA-E2H53X --,FL,TS,TF	1

Fluid Section Repair Kits for VA-E2H52, VA-E2H53, and VA-E2H54 Pumps		
Kit	Description	Qty.
812.0301	VA-E2H53X --,FL,SP,EP	1
812.0225	VA-E2H54X --,FL,BN,BN	1
812.0226	VA-E2H54X --,FL,EO,EP	1
812.0227	VA-E2H54X --,FL,VT,VT	1
812.0229	VA-E2H54X --,FL,TS,TF	1
812.0302	VA-E2H54X --,FL,SP,EP	1

Kits include:

- 4 balls or flapper valves
- 2 diaphragms (10)
- 2 diaphragm backers (11), if applicable
- 4 gaskets
- 2 diaphragm bolt o-rings (for all diaphragms except EO diaphragms)
- 1 packet anaerobic adhesive (for all diaphragms except EO diaphragms)

Technical Data

VERDERAIR Electric-Operated Diaphragm Pumps, Models VA-EH50, VA-E2H52, VA-E2H53, VA-E2H54		
	US	Metric
Maximum fluid working pressure		
VA-EH50, VA-E2H52	100 psi	0.69 MPa, 6.9 bar
VA-E2H53, VA-E2H54	60 psi	0.41 MPa, 4.1 bar
Air pressure operating range		
VA-EH50, VA-E2H52	20 to 100 psi	0.14 to 0.69 MPa, 1.4 to 6.9 bar
VA-E2H53, VA-E2H54	20 to 60 psi	0.14 to 0.41 MPa, 1.4 to 4.1 bar
Air inlet size	3/8 in. npt(f)	
Maximum suction lift (reduced if checks don't seat well due to damage, blockage, or extreme speed of cycling)		
VA-EH50, VA-E2H52 (@ 22 Hz)	Wet: 30 ft Dry: 14 ft	Wet: 9.1 m Dry: 4.3 m
VA-E2H53, VA-E2H54	Wet: 30 ft Dry: 4.5 ft	Wet: 9.1 m Dry: 1.4 m
Maximum size pumpable solids		
VA-EH50, 2 in. balls	0.25 in.	6.3 mm
VA-E2H52, 2 in. balls	0.5 in.	12.7 mm
VA-E2H53, 3 in. flapper	2.5 in.	62.5 mm
VA-E2H54, 4 in. flapper	3.8 in.	96.5 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)		
VA-EH50, VA-E2H52	0.6 gallons	2.3 liters
VA-E2H53, VA-E2H54	0.4 gallons	1.5 liters
Maximum free-flow delivery (continuous duty)		
VA-EH50, VA-E2H52	100 gpm	378 lpm
VA-E2H53	56 gpm	212 lpm
VA-E2H54	52 gpm	197 lpm
Maximum pump speed (continuous duty)	160 cpm	
Fluid Inlet and Outlet Size		
VA-EH50	65 mm DIN 11851 or 2.5 in. sanitary connection	
VA-E2H52	50 mm DIN 11851 or 2 in. sanitary connection	
VA-E2H53	80 mm DIN 11851 or 3 in. sanitary connection	
VA-E2H54	100 mm DIN 11851 or 4 in. sanitary connection	
Electric Motor		
AC (A1), AC Standard CE (AC, A2)		
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	

VERDERAIR Electric-Operated Diaphragm Pumps, Models VA-EH50, VA-E2H52, VA-E2H53, VA-E2H54		
	US	Metric
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 (B1), AC Standard CE (BC, B2)		
Power	5.0 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	16.46	
Voltage	3-phase 230V / 3-Phase 460V	
Maximum Amperage Load	13.0 A (230V) / 6.5 A (460V)	
AC (C1), AC Standard CE (CC, C2)		
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 (AX)		
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 (BX)		
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 (CX)		
Power	3.0 HP	2.2 kW
Number of Motor Poles	4-Pole	
Speed	1800 rpm (60 Hz) or 1500 rpm (50 Hz)	

VERDERAIR Electric-Operated Diaphragm Pumps, Models VA-EH50, VA-E2H52, VA-E2H53, VA-E2H54		
	US	Metric
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 (AF)		
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 230V / 3-Phase 460V	
Maximum Amperage Load	20.0 A (230V) / 10.0 A (460V)	
AC, Explosionproof (BF)		
Power	5.0 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	16.46	
Voltage	3-phase 230V / 3-Phase 460V	
Maximum Amperage Load	13.0 A (230V) / 6.5 A (460V)	
AC, Explosionproof (CF)		
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)	

VERDERAIR Electric-Operated Diaphragm Pumps, Models VA-EH50, VA-E2H52, VA-E2H53, VA-E2H54	
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: Stainless Steel	
Non-wetted parts	
Non-wetted parts include aluminum, coated carbon steel, PTFE, stainless steel, polypropylene	

Pump Weights*

Model	Pump Material	Motor/Gearbox																			
	Center Section	Standard AC						ATEX AC						Flameproof AC						No Gear-motor	
		AC		BC		CC		AX		BX		CX		AF		BF		CF		WG	
		lb	kg	lb	kg	lb	kg	lb	kg	lb	kg	lb	kg	lb	kg	lb	kg	lb	kg	lb	kg
VA-EH50	Aluminum	360	163	328	149	308	139	475	215	351	159	325	147	517	234	427	194	418	190	217	98
	Stainless Steel	442	200	410	186	390	177	557	253	433	196	407	185	599	271	509	231	500	227	299	136
VA-E2H52	Aluminum	358	162	326	148	306	139	473	215	349	158	323	146	515	234	425	193	416	189	215	98
	Stainless Steel	440	200	408	185	388	176	555	252	431	195	405	184	597	271	507	230	498	226	297	135
VA-E2H53	Aluminum	365	166	333	151	313	142	480	218	356	161	330	150	522	237	432	196	423	192	222	101
	Stainless Steel	447	203	415	188	395	179	562	255	438	199	412	187	604	274	514	233	505	229	304	138
VA-E2H54	Aluminum	407	185	375	170	355	161	522	237	398	180	372	169	564	256	474	215	465	211	264	120
	Stainless Steel	489	222	457	207	437	198	604	274	480	218	454	206	646	293	556	252	547	248	346	157

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

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

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 2-piece PTFE/EPDM diaphragm (TF)	40° to 220°F	4° to 104°C
2-piece PTFE/Santoprene diaphragm (TS)	40° to 180°F	4° to 82°C
Buna-N check balls (BN)	10° to 180°F	-12° to 82°C
FKM Fluorelastomer check balls (VT)	-40° to 275°F	-40° to 135°C
EPDM overmolded diaphragms (EO)	-40° to 250°F	-40° to 121°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 time 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 C, September 2020

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