

Repair/Parts



Verder HI-CLEAN Diaphragm

Pumps

812.0065
Rev.A
EN

Models VA-2H52, VA-2H53, and VA-2H54

For transfer of fluids in sanitary 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.



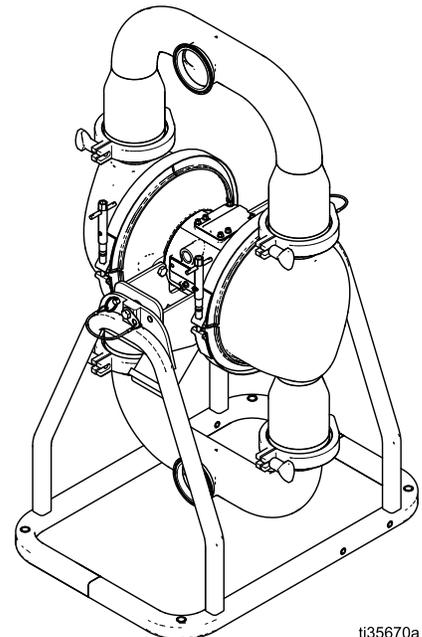
Important Safety Instructions

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

8 bar (0.8 MPa, 120 psi) Maximum Fluid Working Pressure

8 bar (0.8 MPa, 120 psi) Maximum Air Input Pressure

See page 6 for approvals.



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Contents

Related Manuals	2	Standard Diaphragm Repair	14
Warnings	3	Overmolded Diaphragm Repair.....	16
Configuration Number Matrix.....	5	Center Section Repair	19
Troubleshooting.....	7	Leak Detectors	21
Repair.....	9	Parts.....	22
Pressure Relief Procedure.....	9	Diaphragms	29
Air Valve Repair.....	9	Technical Data	33
Check Valve Repair	12	Customer Services/Guarantee.....	35

Related Manuals

Manual Number	Title
812.0061	Verder HI-CLEAN Diaphragm Pumps, Operation
812.0254	Leak Detection System, Instructions/Parts

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="font-size: 2em; 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 fluid 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. • Route exhaust away from all ignition sources. If diaphragm ruptures, fluid may be exhausted with air.
  	<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.

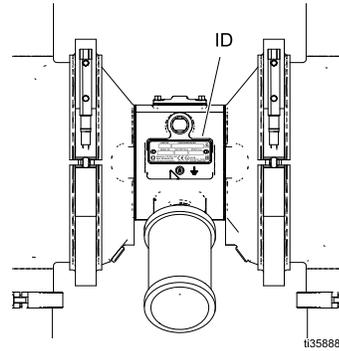
 <h1 style="margin: 0;">WARNING</h1>	
 	<p>EQUIPMENT MISUSE HAZARD</p> <p>Misuse can cause death or serious injury.</p> <ul style="list-style-type: none"> • Do not operate the unit when fatigued or under the influence of drugs or alcohol. • Do not exceed the maximum working pressure or temperature rating 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>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. • Route exhaust away from work area. If diaphragm ruptures, fluid may be exhausted into the air. • Store hazardous fluid in approved containers, and dispose of it according to applicable guidelines.
	<p>BURN HAZARD</p> <p>Equipment surfaces and fluid that's heated can become very hot during operation. To avoid severe burns:</p> <ul style="list-style-type: none"> • Do not touch hot fluid or equipment.
	<p>PERSONAL PROTECTIVE EQUIPMENT</p> <p>Wear appropriate protective equipment when in the work area to help prevent serious injury, including eye injury, hearing loss, inhalation of toxic fumes, and burns. This protective equipment includes but is not limited to:</p> <ul style="list-style-type: none"> • Protective eyewear, and hearing protection. • Respirators, protective clothing, and gloves as recommended by the fluid and solvent manufacturer.

Configuration Number Matrix

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

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-2H52XS-STTFTSD5SB21**

VA-2H	52	X	S	ST	TF	TS	D5	SB	21
Pump Model	Pump Size	Wetted Parts	Air Section	Seats	Balls	Diaphragms	Connections	Options	Certifications

NOTE: Some combinations are not possible. Please check with your local supplier.

Pump	Pump Size	Wetted Parts	Air Section	Seat Material
VA-2H	52 50 mm (2 inch port)	X High Sanitation, 3-A 0.8 µm	E Polished Stainless Steel	SB Stainless Steel, Buna-N gasket
	53 50 mm (3 inch port)	Y Pharmaceutical, 0.5 µm	S Stainless Steel	SE Stainless Steel, EPDM gasket
	54 50 mm (4 inch port)			ST Stainless Steel, EP-TF gasket
				SV Stainless Steel, FKM gasket

Ball Material	Diaphragm Material	Connections	Options	Certification
BN Buna-N	BN Buna-N	— Poultry	3A 3-A	21 EN 10204 type 2.1
EP EPDM	EO EPDM Overmolded	D5 DIN 11851 (DN50)	FH Flapper horizontal	31 EN 10204 type 3.1
FL Stainless Steel flapper	SO Santoprene Overmolded	D8 DIN 11851 (DN80)	FP Flapper poultry	
NW Polychloroprene weighted	SP Santoprene	D1 DIN 11851 (DN100)	SB Sanitary ball	
SP Santoprene	TO PTFE Overmolded	T5 TRI-CLAMP 2"	SF Sanitary flapper	
TF PTFE	TS PTFE/Santoprene, 2-piece	T8 TRI-CLAMP 3"		
VT FKM	VT FKM	T1 TRI-CLAMP 4"		

Configuration Number Matrix

Approvals		
Except for 3-A pumps, all pumps are approved to:		II 2 GD Ex h IIA T6...T3 Gb Ex h IIIB T160°C Db
Diaphragm materials coded EO , TO , or TS combined with flapper or TF ball checks comply with:		EC 1935/2004
Diaphragm materials coded EO or TS combined with flapper or TF ball checks comply with:		Class VI
All models are approved to:		
All fluid contact materials are FDA compliant and meet the United States Code of Federal Regulations (CFR)		

ATEX T-code rating is dependent on the temperature of the fluid being pumped. Fluid temperature is limited by the materials of the pump interior wetted parts. See [Technical Data, page 33](#), for the maximum fluid operating temperature for your specific pump model.

Troubleshooting



- Follow the [Pressure Relief Procedure, page 9](#) , before checking or servicing the equipment.
- Check all possible problems and causes before disassembly.

Problem	Cause	Solution
Pump cycles at stall or fails to hold pressure at stall.	Worn checks or seats.	Replace.
Pump will not cycle, or cycles once and stops.	Air valve is stuck or dirty.	Disassemble and clean air valve. Use filtered air.
	Check ball is severely worn and wedged in seat or manifold.	Replace ball and seat component.
	Check valve ball is severely wedged into seat due to overpressurization.	Follow Pressure Relief Procedure, page 9 . Disassemble ball check assembly and inspect for damage.
	Clogged dispensing valve.	Follow Pressure Relief Procedure, page 9 . Clear valve.
	Leak detector has activated a shut-down solenoid.	Investigate failure and reset leak detector.
Reduced Pump Performance	Clogged suction line.	Inspect; clear.
	Sticky or leaking check balls or flap valves.	Clean or replace.
	Flap valves installed upside-down.	Install the flapper valve with the text side facing the seat.
	Ruptured diaphragm.	Replace. See standard or overmolded diaphragm repair procedure.
	Restricted exhaust.	Remove restriction.
Air bubbles in fluid.	Loose suction line.	Tighten.
	Ruptured diaphragm.	Replace. See standard or overmolded diaphragm repair procedure.
	Loose inlet manifold, damaged seal between manifold and fluid cover, damaged gaskets.	Tighten manifold clamps or replace gaskets or seating components .
Leak in inlet or outlet sanitary fitting.	Loose sanitary clamp.	Tighten clamp.
	Damaged or worn gasket.	Replace gasket.
	Misalignment of inlet/outlet fluid lines or pipe.	Use flexible fluid lines at pump inlet and outlet.
Manifolds do not fit for installation onto fluid covers.	Use of incorrect air cover gaskets results in misalignment.	Install correct air cover gaskets for the type of diaphragms in use. See Parts list for correct gasket.

Troubleshooting

Problem	Cause	Solution
Fluid in exhaust air.	Diaphragm ruptured.	Replace. See standard or overmolded diaphragm repair procedure.
	Loose diaphragm plate.	Tighten or replace. See standard or overmolded diaphragm repair procedure.
Pump exhausts excessive air at stall.	Worn air valve block, plate, pilot block, u-cups, or pilot pin o-rings.	Repair or replace.
	Worn shaft seals.	Replace. See standard or overmolded diaphragm repair procedure.
Pump leaks air externally.	Air valve cover is loose.	Tighten screws.
	Air valve gasket or air cover gasket is damaged.	Inspect; replace.
	Air cover clamps are loose	Tighten clamps.
Pump leaks fluid externally from ball check valves.	Loose manifolds, damaged seal between manifold and fluid cover, or damaged gaskets.	Tighten manifold clamps or replace seats or clamps.
Chattering.	Check valve balls not seating properly/cleanly due to imbalance between fluid inlet and outlet line sizing. Noise is accentuated with light viscosity fluids.	Reduce size/diameter of inlet line relative to outlet line. Outlet line size should not exceed pump size.

Repair

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. Close the master air valve (A) to shut off the air to the pump.
2. Open outbound fluid valve to relieve fluid pressure from the pump.
 - a. **For simple transfer applications**, open either the fluid shutoff valve (J) or the fluid drain valve (K).
 - b. **For circulating applications**, ensure that the fluid shutoff valve (J) is closed and open the fluid drain valve (K).

Air Valve Repair

Tools Required:

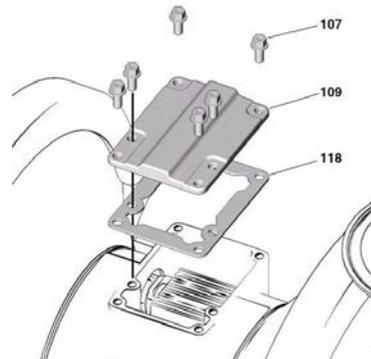
- Torque wrench
- Torx (T20) screwdriver or 7 mm (9/32 in.) socket wrench
- Needle-nose pliers
- O-ring pick
- Lithium base grease

Air valve repair kit 819.0664 is available. Use all parts in the kit for best results.

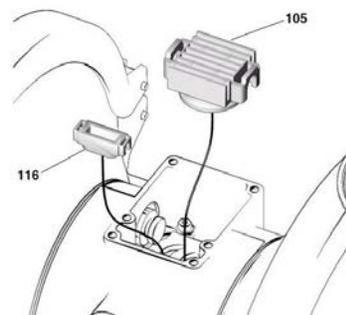
Disassemble Air Valve



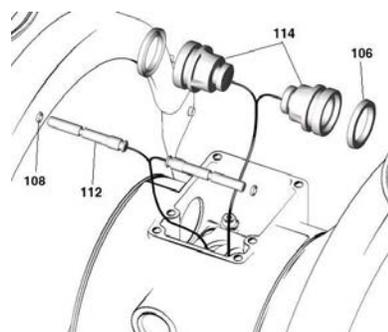
1. Follow the [Pressure Relief Procedure, page 9](#).
2. With a Torx (T20) screwdriver or 7 mm (9/32 in.) socket wrench, remove the six screws (107), air valve cover (109), and gasket (118).



3. Move the valve carriage (105) to the center position and pull it out of the cavity. Using a needle-nose pliers, pull the pilot block (116) straight up and out of the cavity.

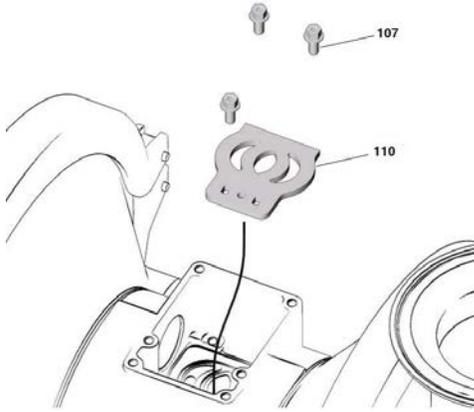


4. Pull the two actuator pistons (114). Remove the u-cups (106) from the pistons. Pull the pilot pins (112). Remove the o-rings (108) from the pilot pins.



Repair

5. Inspect the valve plate (110) in place. If damaged, use a Torx (T20) screwdriver or 7 mm (9/32 in.) socket wrench to remove the three screws (107). Remove the valve plate (110).

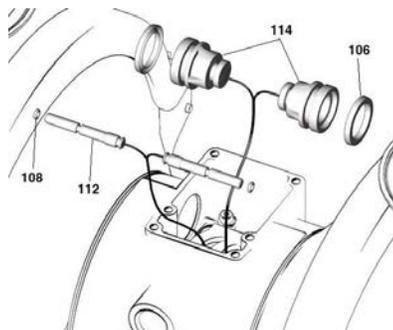


6. Inspect the bearings (113, 115) in place. See [Parts, page 22](#). The bearings are tapered and, if damaged, must be removed from the outside. This requires disassembly of the fluid section. See [Center Section Repair, page 19](#).
7. Clean all parts and inspect for wear or damage. Replace as needed.

Reassemble Air Valve

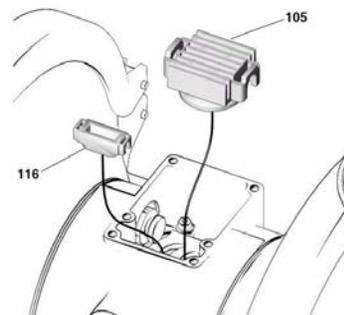
NOTE: If repairs involve removing fluid covers, perform the steps in [Reassemble the Overmolded Diaphragms, page 17](#), prior to reassembly of the air valve. The air valve configuration will be modified to aid fluid cover installation.

1. If the center section was disassembled to replace the bearings (113, 115), complete the [Center Section Repair, page 19](#), before continuing with the air valve reassembly.
2. Install the valve plate (110) in the cavity, seal down. Install the three screws (107), using a Torx (T20) screwdriver or 7 mm (9/32 in.) socket wrench. Tighten until the screws bottom out on the housing.
3. Install an o-ring (108) on each pilot pin (112). Grease the pins and o-rings. Insert the pins into the bearings, **narrow** end first.

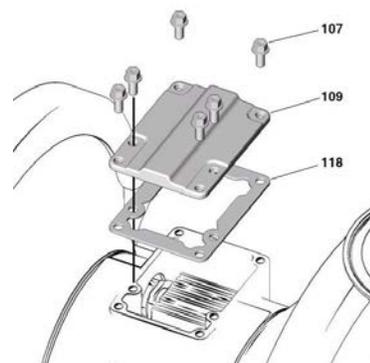


4. Install u-cups (106) on each actuator piston (114), so the lips of the packings face the **narrow** end of the pistons.

5. Grease the lower face of the pilot block (116) and install so its tabs snap into the grooves on the ends of the pilot pins (112).



6. Lubricate the u-cups (106) and actuator pistons (114). Insert the actuator pistons in the bearings (115), **wide** end first. Leave the narrow end of the pistons exposed.
7. Grease the lower face of the valve carriage (119).
8. Install the valve carriage (105) so its tabs slip into the grooves on the narrow end of the actuator pistons (114).
9. Align the valve gasket (118) and cover (109) with the six holes in the center housing (101). Secure with six screws (107), using a Torx (T20) screwdriver or 7 mm (9/32 in.) socket wrench. Torque to 5.7-6.8 N•m (50-60 in-lb).



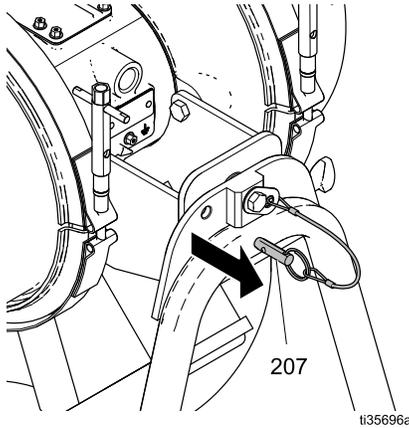
Check Valve Repair

NOTE: Kits are available for new check valve flappers, or check valve balls in a range of materials. Gasket kits also are available.

Disassemble the Check Valve



1. Follow the [Pressure Relief Procedure, page 9](#) . Disconnect all fluid and air lines.
2. Drain the pump
 - a. On rotatable stand, pull the frame quick-release pins (207) and rotate the pump.



NOTE: After draining, rotate the pump to positions which will aid disassembly.

- b. On non-rotatable stand, partially disassemble the fluid section as instructed in the following steps.

NOTE: The vertical pumps can be drained by removing the inlet manifold and manually raising the inlet flappers. Horizontal pumps will require removal of the fluid covers.

3. Remove the clamps (23) on the outlet manifold (17) and remove the manifold.

NOTE: Use care while removing manifold to avoid damage to check valve components.

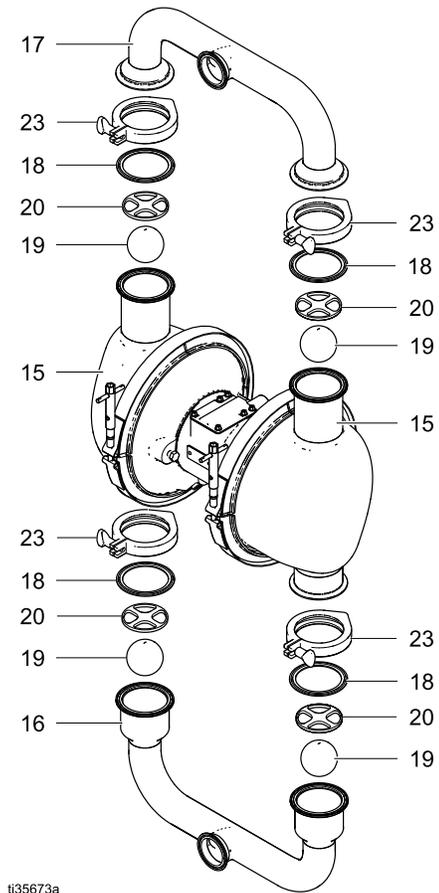
4. Remove remaining clamps, manifolds, gaskets and check valves.

NOTE: Inspect all components for any damage and replace as necessary.

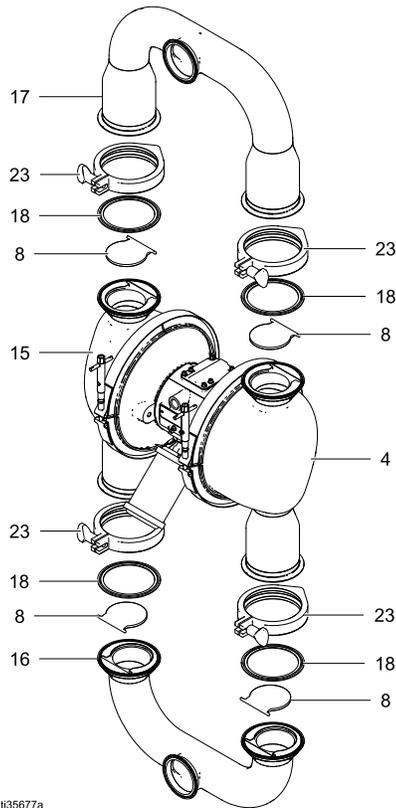
5. Clean and inspect gaskets, check valve components, and seating surfaces for any damage and replace as necessary.

6. To continue with diaphragm disassembly, see [Disassemble the Standard Diaphragms, page 14](#).

Ball pump shown



Vertical flapper pump shown



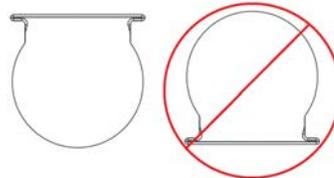
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Reassemble the Check Valves

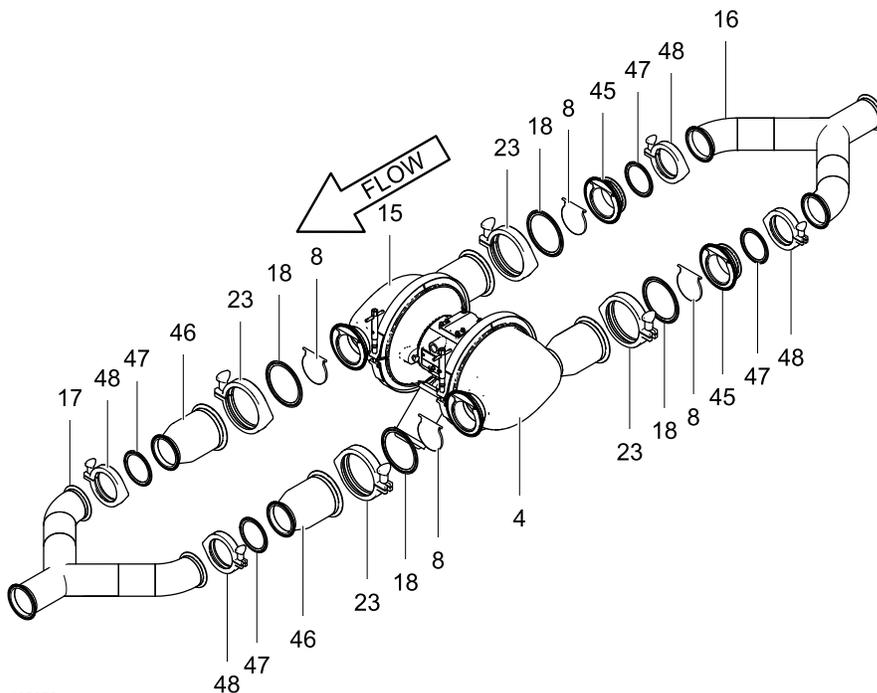
NOTE: Lubricate clamps and clamping surfaces with waterproof, sanitary lubricant.

1. Reassemble ball or flapper check assembly in reverse order.
2. Attach the manifolds to the fluid covers. Tighten clamps hand tight.

NOTE: Install the flapper valve (8) with the text side facing the seat.



NOTE: Flapper fluid covers are not interchangeable and their orientation is critical on horizontal pumps. Horizontal pump fluid covers must be positioned so that the flappers hang down from the hinge pin when placed in the fluid cover. Install the flapper valves (8) with the text side facing the seat.



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Horizontal flapper pump shown

Standard Diaphragm Repair

NOTE: Overmolded diaphragms are covered in [Overmolded Diaphragm Repair, page 16](#).

Tools Required:

- Torque wrench
- 5/8 in. wrench
- 19 mm open end wrench
- O-ring pick
- Lithium base grease

NOTE: Center section gasket is dependent on diaphragm material. If changing diaphragm material, it may be necessary to also replace the center section air cover gaskets. See [Diaphragms, page 29](#), for affected air cover gaskets.

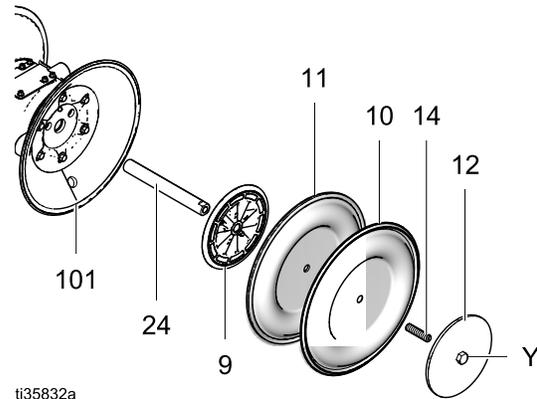
Disassemble the Standard Diaphragms



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

1. Follow the [Pressure Relief Procedure, page 9](#).
2. Remove the manifolds and disassemble the check valves as explained in [Check Valve Repair, page 12](#).
3. Remove the clamps (21) from the fluid covers (4, 15), then pull the fluid covers off of the pump.
4. With both fluid covers removed, using two 5/8 in. wrenches, hold the wrench flats on the plates (Y) of each diaphragm assembly and loosen. One diaphragm assembly will come free and the other will remain attached to the shaft.

5. Disassemble the free diaphragm assembly.
6. Remove plate (12) with bolt (14) installed, diaphragm (10), backer (11) if present, and plate (9).



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7. Pull the other diaphragm assembly and the diaphragm shaft (24) out of the center housing (101). Hold the shaft flats with a 19 mm open end wrench, and remove the diaphragm assembly from the shaft. Disassemble the remaining diaphragm assembly.
8. Inspect the diaphragm shaft (24) for wear or scratches. If it is damaged, inspect the bearings (111) in place. If the bearings are damaged, refer to [Center Section Repair, page 19](#).
9. Clean all parts and inspect for wear or damage. Replace parts as needed.

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.

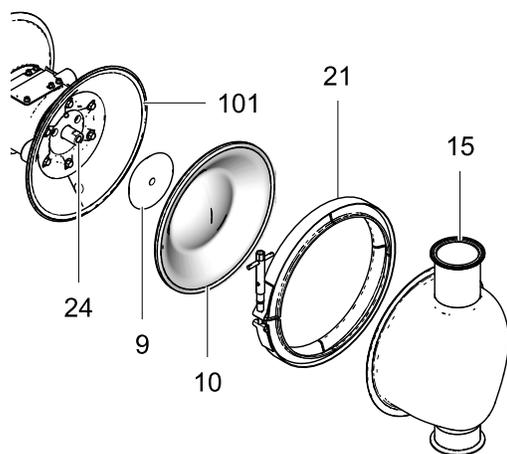
TIP: If you are also repairing or servicing the center section, follow [Center Section Repair, page 19](#), before replacing diaphragms.

1. Lubricate and install the shaft u-cups (106) so the lips face **out** of the housing (101).
2. Assemble plate (9) onto diaphragm (10), with screw (14). Rounded side of plate (9) should face diaphragm. Make sure the side marked AIR SIDE faces the center housing.

NOTE: Thread locker must be applied to screw (14) as shown for all diaphragm assemblies.

Apply a high-strength thread locker to attach the screw to the diaphragm plate, if needed.

Apply a medium-strength thread locker to the shaft side of the screw.



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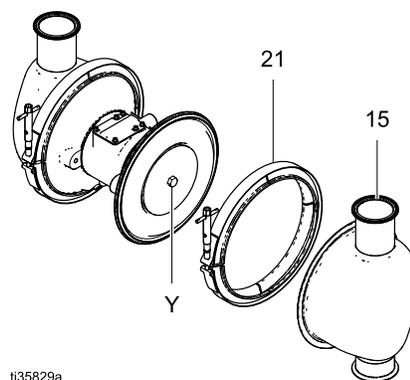
3. Screw assembled diaphragm assembly into shaft (24) and hand tighten.
4. Grease the length of the diaphragm shaft (24), and slide it through the housing (101).

5. Assemble the other diaphragm assembly to the shaft as explained in step 2.
6. Using a 5/8 in. wrench hold the wrench flats of one diaphragm assembly and torque the other diaphragm to 81-94 N•m (60-70 ft-lb).

NOTE: Apply waterproof, sanitary lubricant to the clamp (21) and clamping surface of the cover (4, 15) to ease assembly.

7. Align the fluid covers (4, 15) and the center housing. Secure the covers with the clamps (21) and hand tighten.

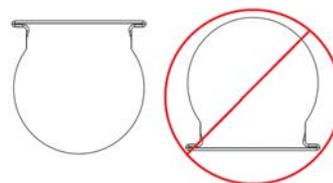
NOTE: Apply a food grade anti-seize lubricant on the clamp threads to aid assembly.



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NOTE: Ball pump fluid covers are interchangeable.

NOTE: Flapper fluid covers are not interchangeable and their orientation is critical on horizontal pumps. Horizontal pump fluid covers must be positioned so that the flappers hang down from the hinge pin when placed in the fluid cover. Install the flapper valves (8) with the text side facing the seat.



8. Reassemble the ball check valves and manifolds as explained in [Check Valve Repair, page 12](#).

Overmolded Diaphragm Repair

Tools Required

- Torque wrench
- 19 mm open end wrench
- O-ring pick
- Lithium base grease

NOTE: Center section gasket is dependent on diaphragm material. If changing diaphragm material, it may be necessary to also replace the center section air cover gaskets. See [Diaphragms, page 29](#), for affected air cover gaskets.

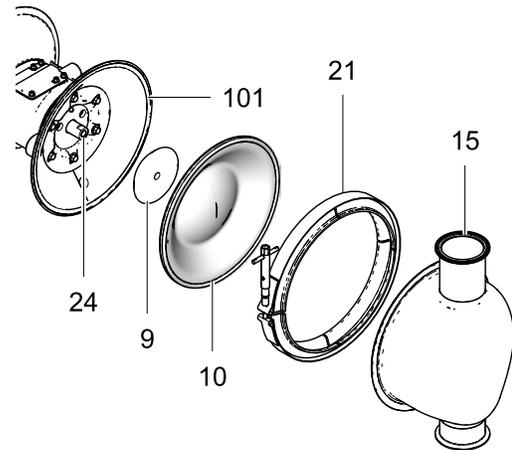
Disassemble the Overmolded Diaphragms



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

1. Follow the [Pressure Relief Procedure, page 9](#).
2. Remove the manifolds and disassemble the check valves as explained in [Check Valve Repair, page 12](#).
3. Remove the clamps (21) from the fluid covers (4, 15), then pull the fluid covers off of the pump.
4. Once the fluid covers are removed, the diaphragm on the side of the pump which was last pressurized with air will be separated from the center section/air cover. This allows you to grip the diaphragms.

5. To loosen, grip both diaphragms securely around the outer edge and rotate counterclockwise. One diaphragm assembly will come free and the other will remain attached to the shaft. Remove the freed diaphragm (10) with screw (14) and air side plate (9).
6. Pull the opposite diaphragm assembly and shaft (24) out of the center housing (101). Hold the shaft flats with a 19 mm open end wrench and remove the diaphragm and air side plate from the shaft.
7. Inspect the diaphragm shaft (24) for wear or scratches. If it is damaged, inspect the bearings (111) in place. If the bearings are damaged, refer to [Center Section Repair, page 19](#).
8. Clean all parts and inspect for wear or damage. Replace parts as needed.



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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.

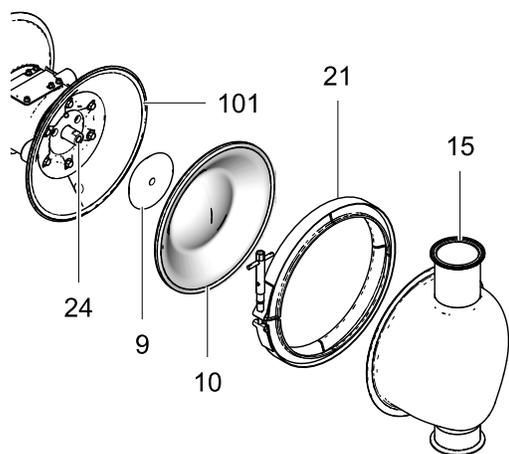
TIP: If you are also repairing or servicing the center section, see [Center Section Repair, page 19](#), before you put the diaphragms back on.

1. Lubricate and install the shaft u-cups (110) so the lips face **out** of the housing (101).
2. Assemble plate (9) onto diaphragm (10), with screw (14). Rounded side of plate (9) should face diaphragm. Make sure the side marked AIR SIDE faces the center housing.

NOTE: Thread locker must be applied to screw (14) as shown for all diaphragm assemblies.

Apply a high-strength thread locker to attach the screw to the diaphragm plate.

Apply a medium-strength thread locker to the shaft side of the screw.



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3. Screw assembled diaphragm assembly into shaft (24) and hand tighten.
4. Grease the length of the diaphragm shaft (24), and slide it through the housing (101).
5. Assemble the other diaphragm assembly to the shaft as explained in step 2.

6. Grip both diaphragms securely around their outer edges and rotate clockwise until bottomed on the shaft.

NOTE: Apply waterproof, sanitary lubricant to the clamp (21) and clamping surface of the cover (4, 15) to ease assembly.

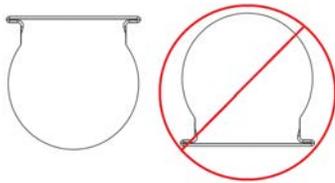
NOTE: Use a food grade anti-seize lubricant on the clamp threads to aid assembly.

Repair

7. Align the fluid covers (4, 15) and the center housing. Secure the covers with the clamps (21) and hand tighten. If, after installing the first fluid cover, the opposing diaphragm protrudes away from the center housing, leaving a gap between the center housing and the second fluid cover, do not try to force the diaphragm into position. Instead, complete the following procedures in steps 7a–7i to attach the second fluid cover.

NOTE: Ball pump fluid covers are interchangeable.

NOTE: Flapper fluid covers are not interchangeable and their orientation is critical on horizontal pumps. Horizontal pump fluid covers must be positioned so that the flappers hang down from the hinge pin when placed in the fluid cover. Install the flapper valves (8) with the text side facing the seat.

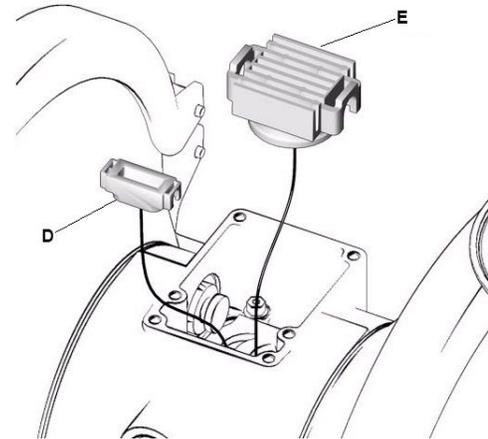
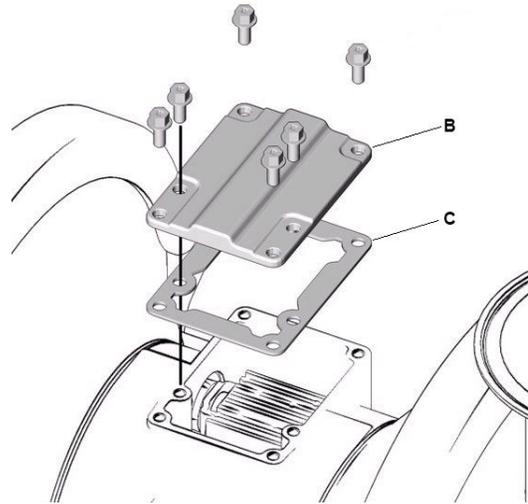


- a. Remove the air valve cover (B), the gasket (C), and the pilot cup (D). See the image in step i.
- b. Within the drive, shift the main air valve carriage (E) away from the installed fluid cover. This will expose the air passage that feeds the assembled side.
- c. Reinstall the gasket (C) and the air valve cover (B). Torque all bolts according to instructions in your pump manual.
- d. Supply the pump with 10–20 psi (0.07–0.14 MPa, 0.7–1.4 bar) air pressure, just enough to move the diaphragm. The diaphragm will shift so the second fluid cover will seat properly. Keep the air pressure on while air flows out of the exhaust.

NOTE: Too much air pressure may cause the diaphragm to deform and seat incorrectly.

- e. Install the remaining fluid cover.
- f. Follow the [Pressure Relief Procedure, page 9](#). Disconnect the air supply from the pump.
- g. Remove the air valve cover (B) and the gasket (C).
- h. Lubricate and reinstall the pilot cup (D).

- i. Reinstall the gasket (C) and the air valve cover (B). Torque all bolts according to instructions in your pump manual.



8. Reassemble the ball check valves and manifolds as explained in [Check Valve Repair, page 12](#).

Center Section Repair

Tools Required:

- Torque wrench
- 10 mm socket wrench
- 9/16 in. socket wrench
- Bearing puller
- O-ring pick
- Press, or block and mallet

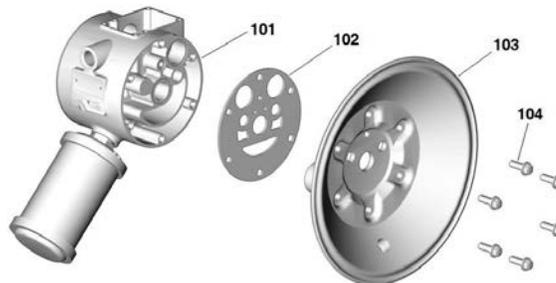
Disassemble the Center Section

NOTE: Do not remove undamaged bearings.



1. Follow the [Pressure Relief Procedure, page 9](#) . Disconnect all fluid and air lines.
2. Remove the manifolds and check valve parts as directed in [Disassemble the Check Valve, page 12](#).
3. Remove the fluid covers and diaphragms as directed in [Disassemble the Standard Diaphragms, page 14](#) or [Disassemble the Overmolded Diaphragms, page 16](#).
NOTE: If you are removing only the diaphragm shaft bearing (111), skip step 4.
4. Disassemble the air valve as explained in [Air Valve Repair, page 9](#) .
5. Use a 9/16 in. socket wrench to remove the screws (3) and nuts (105) holding the air covers to the frame.

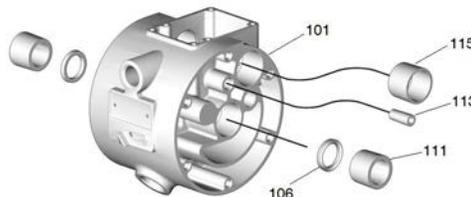
6. Use a 10 mm socket wrench to remove the screws (104) holding the air covers (103) to the center housing (101).



7. Remove the air cover gaskets (102). Always replace the gaskets with new ones.

NOTE: If removing the diaphragm shaft bearings (111), use an o-ring pick to remove the u-cups (106) first.

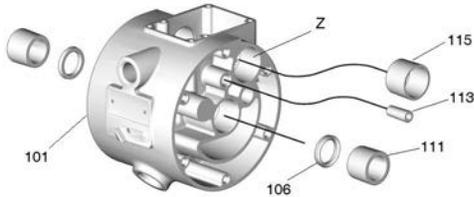
8. Use a bearing puller to remove the diaphragm shaft bearings (111), air valve bearings (115) or pilot pin bearings (113). Do not remove undamaged bearings.



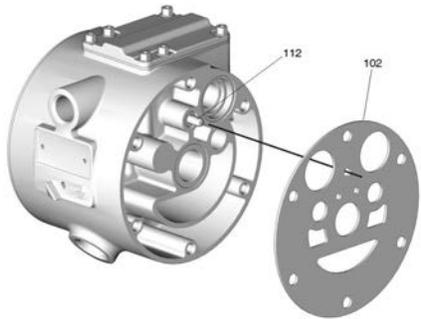
9. Inspect the u-cups. Replace as needed.

Reassemble the Center Section

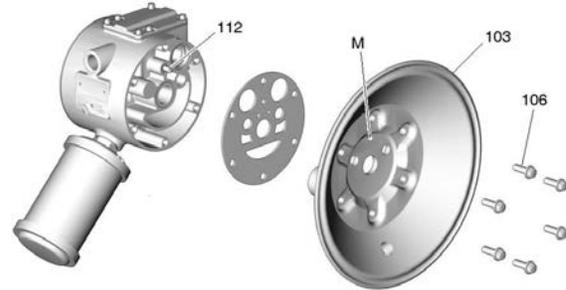
1. Install the shaft u-cups (106) so the lips face **out** of the housing.
2. Insert new bearings (111, 113, and 115) into the center housing (101), **tapered end first**. Using a press or a block and rubber mallet, press-fit the bearing so it is flush with the surface of the center housing.



3. Reassemble the air valve as explained in [Reassemble Air Valve, page 11](#).
4. Align the new air cover gasket (102) so the pilot pin (112) protruding from the center housing (101) fits through the proper hole in the gasket.



5. Align the air cover (103) so the pilot pin (112) fits in the middle hole (M) of the three small holes near the center of the cover.



6. Apply a medium-strength thread locker to the threads of the screws (106). Install the screws (106), hand tight. Using a 10 mm socket wrench, torque the screws oppositely and evenly to 15-17 N•m (130-150 in-lb). Install the diaphragm assemblies and fluid covers as explained in [Diaphragms, page 29](#).
7. See [Reassemble the Check Valves, page 13](#).

Leak Detectors

Leak detectors are sensors that are mounted in the air covers of the pump to monitor for fluid leakage caused by a diaphragm rupture. Leak detectors are provided with 3-A pumps and can be ordered separately for other pumps. For leak sensor electrical and configuration information, refer to the leak detection system manual (812.0254).

Available leak detection kits:

Kit	Description
812.0003	Kit, Standard, non-ATEX, 2 sensors, 2 bushings; provided with 3-A pumps
812.0004	Kit, ATEX, 2 sensors, 2 bushings, 2 o-rings
812.0005	Kit, Leak detection control box; not approved for use in an ATEX environment
812.0006	Kit, Leak detection control box mounting bracket and mounting hardware

Leak Detector Testing

1. Obtain a small container of the material being pumped.
2. Perform the [Pressure Relief Procedure, page 9](#).
3. Unscrew and remove both leak detector bushings (with installed leak detectors) from the air side diaphragm covers.
4. For each leak detector, dip the bushing, with the leak detector still installed, into the material container in an orientation that mimics how it would be oriented in the air side diaphragm cover. Observe whether the leak detector senses the presence of the material.
5. If the leak detector successfully detected the material, clean the bushing and leak detector and re-install the leak detector and bushing as described in step 6. Ensure that both leak detectors successfully detected the material before installing.

NOTE: If the leak detector fails to sense the material, troubleshoot the leak detector to see if the leak sensor has failed or the leak detector is unable to detect the material.

6. To install leak detector to the pump:
 - a. If the leak detector needs to be installed in the bushing, simply screw the leak detector in just past finger tight.

NOTE: If using the ATEX leak detector, install the o-ring onto the leak detector before installation into the bushing.
 - b. If the bushing is not installed in the air side diaphragm cover, screw the bushing into the air side diaphragm cover.
 - c. If the leak detector was disconnected from the monitoring device, re-attach the leak detector wires to the monitoring device.
7. Repeat steps 3–6 for the other leak detector.

Leak Detector Removal

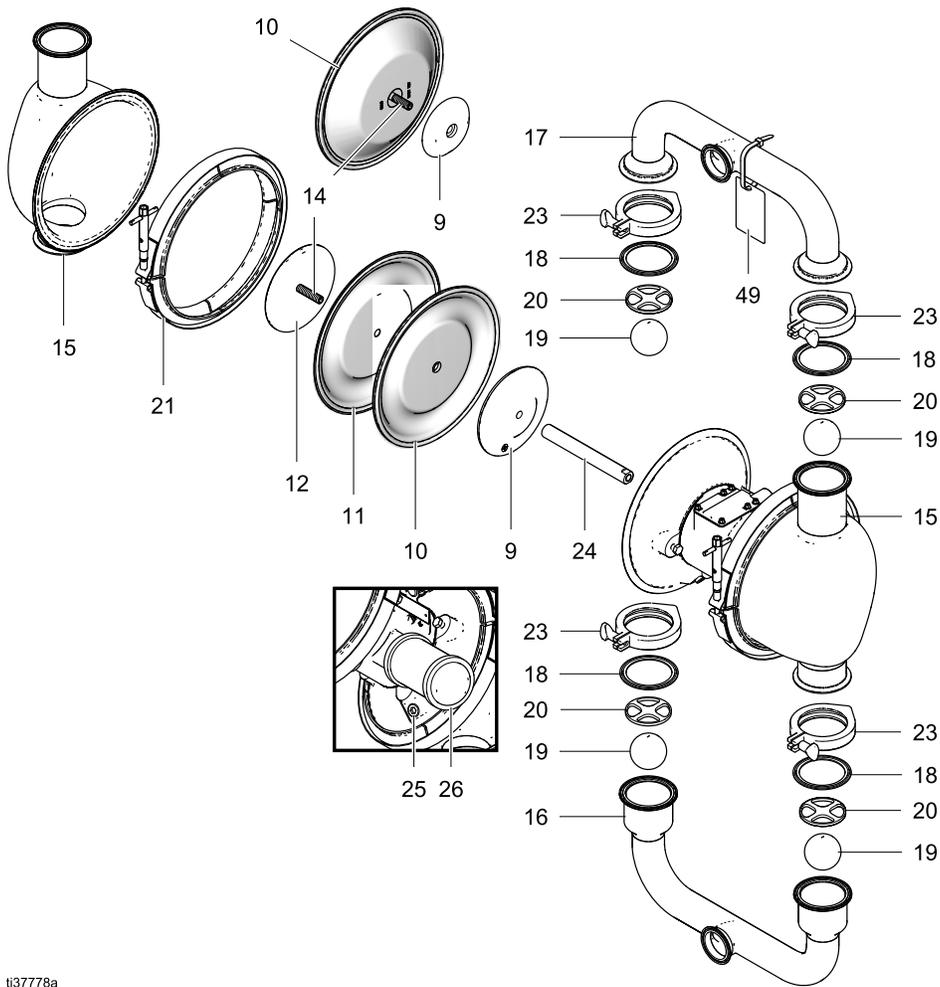
1. Follow the [Pressure Relief Procedure, page 9](#).
2. Note the connection locations of the leak detector wires within the monitoring device, then disconnect the leak detector wires.
3. Remove the leak detector from the bushing in the air side diaphragm cover.
4. If desired, repeat to remove the other leak detector from the other air side diaphragm cover.

Leak Detector Installation

1. If the leak detector needs to be installed in the bushing, simply screw the leak detector in just past finger tight.

NOTE: If using the ATEX leak detector, install the o-ring onto the leak detector before installation into the bushing.
2. If the bushing is not installed in the air side diaphragm cover, screw the bushing into the air side diaphragm cover.
3. Wire the leak detector to the monitoring device.

Parts



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Model VA-2H52 ball pump shown

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, motor; <i>See pages 25-26</i>	1
2	819.0582 812.0001 812.0002	FRAME, <i>includes Ref. 3; See page 29</i> vertical, rotateable (VA-2H52, VA-2H53) vertical, non-rotateable (VA-2H54) horizontal (VA-2H53, VA-2H54)	1
3	— — —	BOLT, frame attachment, <i>includes Ref. 2</i>	4
4	812.0019 812.0021	COVER, fluid, flapper VA-2H53 VA-2H54	1
8	812.0110 812.0109	FLAPPER, check valve VA-2H53 VA-2H54	4
9*	819.4301 819.0536	PLATE, air side VT, SP, TS, BN TO	2
10*	— — —	DIAPHRAGM, kit; <i>See page 28</i>	1 kit
11	— — —	DIAPHRAGM, backup, <i>included with Ref. 10 where needed</i>	2
12	819.0511	PLATE, fluid side, BN, VT, SP, TS only	2
14	812.0133	SCREW, manifold	2
15	812.0017 812.0018 812.0020	COVER, fluid VA-2H52 VA-2H53 VA-2H54	2 1 1
16	— — —	MANIFOLD, inlet; <i>See pages 27-28</i>	1
17	— — —	MANIFOLD, outlet; <i>See pages 27-28</i>	1
18	— — —	GASKET, pkg of 4; <i>See page 30 for gasket kit options</i> VA-2H52, 80 mm gasket VA-2H53, 100 mm gasket VA-2H54, 150 mm gasket	1
19*	819.0507 819.0430 819.0431 812.0261 819.0506 819.0670	BALLS, check valve BN TF SP EP VT NW	4

Ref.	Part/Kit	Description	Qty.
20	812.0121	STOP, ball, VA-2H52	4
21*	812.0134	CLAMP, fluid cover	2
22	— — —	HANDLE, tee; <i>includes Ref. 21</i>	2
23	819.0516 819.0504 812.0262	CLAMP, sanitary VA-2H52 VA-2H53 VA-2H54	4
24	819.4296	SHAFT, diaphragm	1
25	819.0419	PLUG, pipe, pkg of 2	1
26	819.0519	MUFFLER	1
27	812.0003	DETECTOR, leak, 3-A only	2
45	812.0263 812.0264	SEAT, flapper, horizontal only VA-2H53 VA-2H54	2
46	812.0107 812.0108	CHAMBER, flapper, horizontal only VA-2H53 VA-2H54	2
47	— — —	GASKET, horizontal only; <i>See page 30 for gasket kit options</i> VA-2H53, 80 mm gasket VA-2H54, 100 mm gasket	4
48	819.0516 819.0504	CLAMP, flapper, horizontal only VA-2H53 VA-2H54	4
49†	812.0136	LABEL, kit; <i>includes Ref. 50 & 51</i>	1
50	— — —	TAG	1
51	— — —	TIE	1

— — — *Not sold separately.*

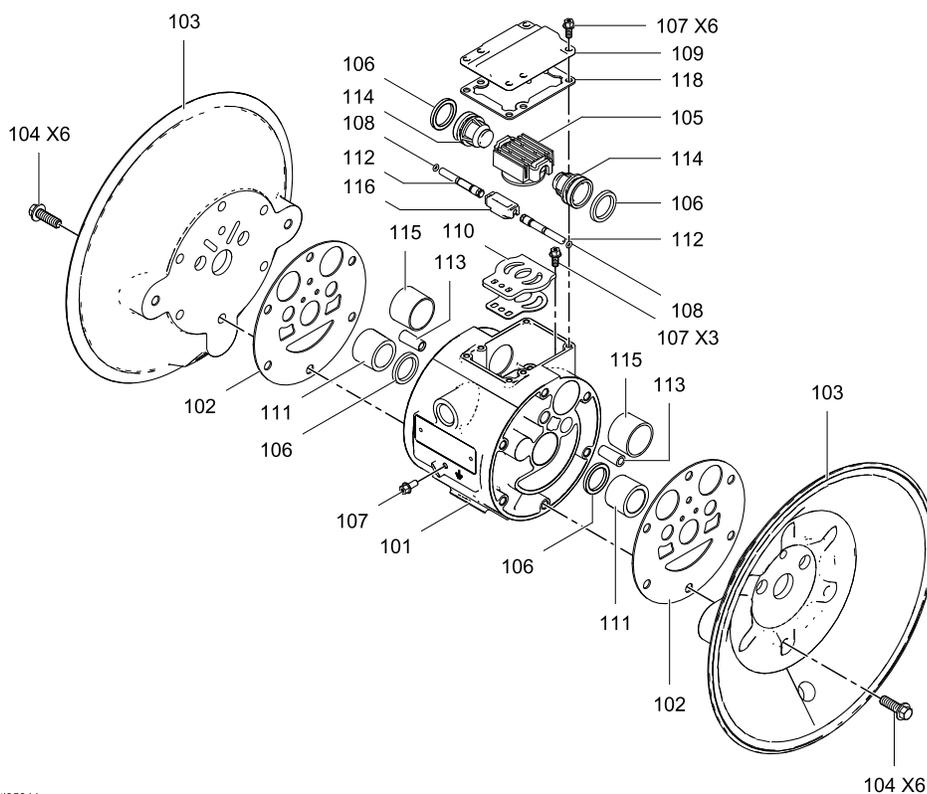
† *Replacement safety labels, tags, and cards are available at no cost.*

* *Valid for all pump sizes.*

Center Section

Sample Configuration Number:

Pump Model	Pump Size	Wetted Parts	Air Section	Seats	Balls	Diaphragms	Connections	Options	Certifications
VA-2H	52	X	S	ST	TF	TS	D5	SB	21



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Ref	Part	Description	Qty
101	819.0247 819.0552	HOUSING, center, assembly S E	1
102	819.0444 812.0135	GASKET, air cover kit; pkg of 2 use with TS diaphragms use with all diaphragms except TS diaphragms	1
103	819.0547 819.0510	COVER, air, <i>includes Ref. 25</i> S E	2
104	819.4297	SCREW	12
105†	---	CARRIAGE, assembly	1
106†	---	U-CUP	4
107	819.0439	SCREW, pkg of 9	10

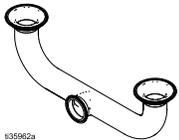
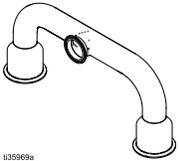
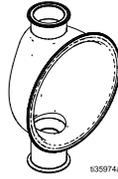
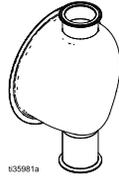
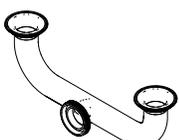
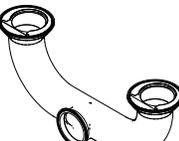
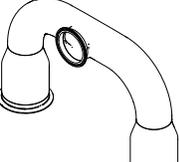
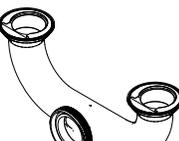
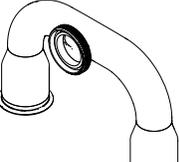
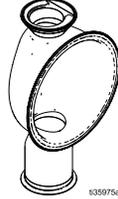
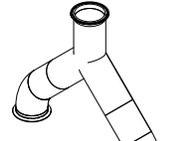
Ref	Part	Description	Qty
108†	---	O-RING	2
109	819.0259 819.0557	COVER S E	1
110†	---	PLATE, valve	1
111	819.0452	BEARING, shaft, pkg of 2	1
112	819.4288	PIN, push	2
113	819.4287	BEARING, pin	2
114	819.0451	PISTON, pkg of 2	1
115	819.0452	BEARING, piston, pkg of 2	1
116†	---	BLOCK, pilot	1
118†	---	GASKET, cover	1

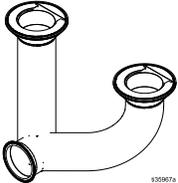
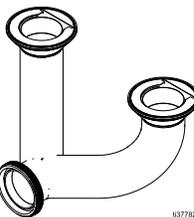
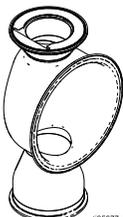
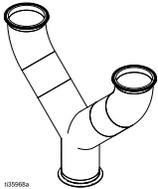
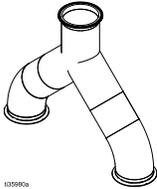
† Included in Air Valve Repair Kit 819.0664.

Fluid Covers and Manifolds

Sample Configuration Number:

Pump Model	Pump Size	Wetted Parts	Air Section	Seats	Balls	Diaphragms	Connections	Options	Certifications
VA-2H	52	X	S	ST	TF	TS	D5	SB	21

Pump PN prefix	Manifold	Wetted Section	Manifold		Fluid Cover	
			Inlet	Outlet	Left (Ref 15)	Right (Ref 4, 15)
VA-2H52	T5, SB	X Y	 <small>135962a</small> 812.0037 812.0103	 <small>135969a</small> 812.0030 812.0104	 <small>135974a</small>	 <small>135981a</small>
	D5, SB	X	 <small>137787a</small> 812.0167	 <small>137786a</small> 812.0166	812.0017 (X) 812.0025 (Y)	812.0017 (X) 812.0025 (Y)
VA-2H53	T8, SF	X	 <small>135964a</small> 812.0038	 <small>135971a</small> 812.0031		
	D8, SF	X	 <small>137781a</small> 812.0165	 <small>137780a</small> 812.0164	 <small>135975a</small> 812.0018	 <small>135976a</small> 812.0019
	T8, FH	X	 <small>135986a</small> 812.0041	 <small>135979a</small> 812.0041		

Pump PN prefix	Manifold	Wetted Section	Manifold		Fluid Cover	
			Inlet	Outlet	Left (Ref 15)	Right (Ref 4, 15)
VA-2H54	T1, SF	X	 812.0039	 812.0032		
	D1, SF	X	 812.0265	 812.0266	 812.0020	 812.0021
	T1, FH	X	 812.0098	 812.0098		

Parts

Dual Inlet and Dual Outlet

To convert to a dual inlet or outlet, the following parts are required:

Dual Inlet:			
Ref.	Part/Kit	Description	Qty.
45		SEAT, flapper, horizontal only	2
	812.0263	VA-2H53	
	812.0264	VA-2H54	
18 and 47		GASKET, EPDM, horizontal only (SE seat)	4
	812.0011	VA-2H53	
	812.0013	VA-2H54	
		GASKET, VT, horizontal only (SV seat)	
	812.0154	VA-2H53	
	812.0156	VA-2H54	
		GASKET, TF, horizontal only (ST seat)	
	812.0161	VA-2H53	
	812.0163	VA-2H54	
		GASKET, BN, horizontal only (SB seat)	
	812.0247	VA-2H53	
	812.0249	VA-2H54	
48		CLAMP, flapper, horizontal only	4
	819.0516	VA-2H53	
	819.0504	VA-2H54	

Dual Outlet:			
Ref.	Part/Kit	Description	Qty.
46		CHAMBER, flapper, horizontal only	2
	812.0107	VA-2H53	
	812.0108	VA-2H54	
18 and 47		GASKET, EPDM, horizontal only (SE seat)	4
	812.0011	VA-2H53	
	812.0013	VA-2H54	
		GASKET, VT, horizontal only (SV seat)	
	812.0154	VA-2H53	
	812.0156	VA-2H54	
		GASKET, TF, horizontal only (ST seat)	
	812.0161	VA-2H53	
	812.0163	VA-2H54	
		GASKET, BN, horizontal only (SB seat)	
	812.0247	VA-2H53	
	812.0249	VA-2H54	
48		CLAMP, flapper, horizontal only	4
	819.0516	VA-2H53	
	819.0504	VA-2H54	

Diaphragms

Sample Configuration Number:

Pump Model	Pump Size	Wetted Parts	Air Section	Seats	Balls	Diaphragms	Connections	Options	Certifications
VA-2H	52	X	S	ST	TF	TS	D5	SB	21

Bolt-Through Diaphragm Kits		
Diaphragm Material	Kit	Qty.
VT	812.0129	1
TS	812.0267	1
SP	819.0464	1
BN	812.0260	1

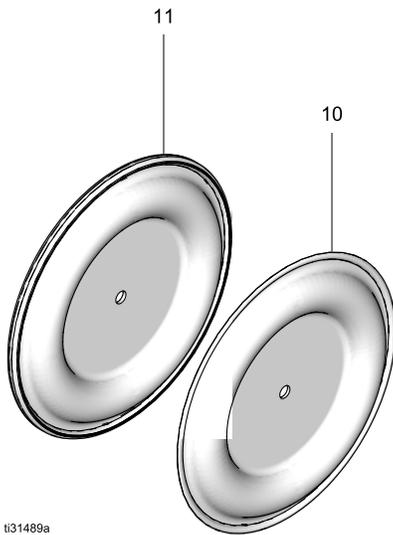
Overmolded Diaphragm Kits		
Diaphragm Material	Kit	Qty.
EO	819.0568	1
SO	812.0130	1
TO	819.0572	1

Kits include:

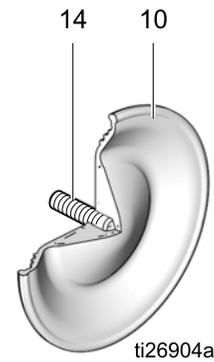
- 2 diaphragms (10)
- 2 diaphragm backers (11), if applicable
- 1 packet anaerobic adhesive
- 2 o-rings

Kits include:

- 2 overmolded diaphragms (10) with set screws (14)



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Parts

Fluid Section Repair Kits		
Kit	Description	Qty.
812.0204	VA-2H52X/Y --,BN,BN,BN	1
812.0205	VA-2H52X/Y --,NW,EO,EP	1
812.0206	VA-2H52X/Y --,NW,VT,VT	1
812.0207	VA-2H52X/Y --,NW,SP,EP	1
812.0208	VA-2H52X/Y --,EP,EO,EP	1
812.0209	VA-2H52X/Y --,EP,SP,EP	1
812.0210	VA-2H52X/Y --,VT,VT,VT	1
812.0211	VA-2H52X/Y --,TF,EO,EP	1
812.0212	VA-2H52X/Y --,TF,PO,TF	1
812.0213	VA-2H52X/Y --,TF,TS,TF	1
812.0214	VA-2H52X/Y --,TF,SO,EP	1
812.0215	VA-2H52X/Y --,TF,SP,EP	1
812.0216	VA-2H52X/Y --,SP,SP,EP	1
812.0217	VA-2H52X/Y --,SP,SO,EP	1
812.0218	VA-2H53X --,FL,BN,BN	1
812.0219	VA-2H53X --,FL,EO,EP	1
812.0220	VA-2H53X --,FL,VT,VT	1
812.0221	VA-2H53X --,FL,TO,TF	1

Fluid Section Repair Kits		
Kit	Description	Qty.
812.0222	VA-2H53X --,FL,TS,TF	1
812.0223	VA-2H53X --,FL,SO,EP	1
812.0224	VA-2H53X --,FL,SP,EP	1
812.0225	VA-2H54X --,FL,BN,BN	1
812.0226	VA-2H54X --,FL,EO,EP	1
812.0227	VA-2H54X --,FL,VT,VT	1
812.0228	VA-2H54X --,FL,TO,TF	1
812.0229	VA-2H54X --,FL,TS,TF	1
812.0230	VA-2H54X --,FL,SO,EP	1
812.0231	VA-2H54X --,FL,SP,EP	1

Kits include:

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

Seats and Check Balls

Sample Configuration Number:

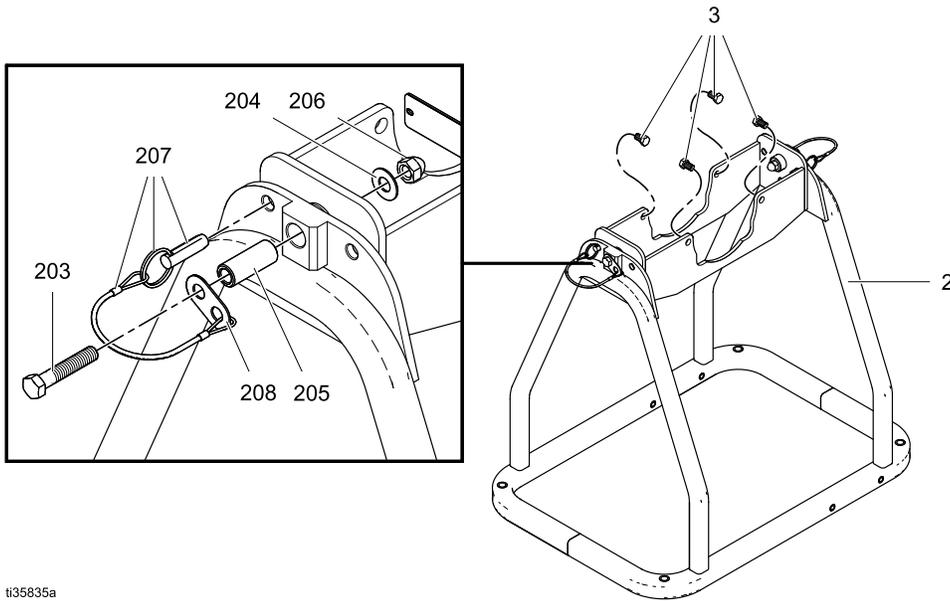
Pump Model	Pump Size	Wetted Parts	Air Section	Seats	Balls	Diaphragms	Connections	Options	Certifications
VA-2H	52	X	S	ST	TF	TS	D5	SB	21

Optional Sanitary Gasket Kits						
Gasket Material	Options	Pump Orientation	Kit	Description	Gasket Size	Qty.
BN	SB, 3A, SF	Vertical*	812.0245	VA-2H52 --,--,BN	80 mm	1
			812.0246	VA-2H53 --,--,BN	100 mm	
			812.0248	VA-2H54 --,--,BN	150 mm	
	FH, FP	Horizontal◆	812.0247	VA-2H53 --,--,BN	80/100 mm	
			812.0249	VA-2H54 --,--,BN	100/150 mm	
EP	SB, 3A, SF	Vertical*	812.0009	VA-2H52 --,--,EP	80 mm	1
			812.0010	VA-2H53 --,--,EP	100 mm	
			812.0012	VA-2H54 --,--,EP	150 mm	
	FH, FP	Horizontal◆	812.0011	VA-2H53 --,--,EP	80/100 mm	
			812.0013	VA-2H54 --,--,EP	100/150 mm	
EP-PT	SB, 3A, SF	Vertical*	812.0159	VA-2H52 --,--,EP-PT	80 mm	1
			812.0160	VA-2H53 --,--,EP-PT	100 mm	
			812.0162	VA-2H54 --,--,EP-PT	150 mm	
	FH, FP	Horizontal◆	812.0161	VA-2H53 --,--,EP-PT	80/100 mm	
			812.0163	VA-2H54 --,--,EP-PT	100/150 mm	
VT	SB, 3A, SF	Vertical*	812.0152	VA-2H52 --,--,VT	80 mm	1
			812.0153	VA-2H53 --,--,VT	100 mm	
			812.0155	VA-2H54 --,--,VT	150 mm	
	FH, FP	Horizontal◆	812.0154	VA-2H53 --,--,VT	80/100 mm	
			812.0156	VA-2H54 --,--,VT	100/150 mm	

* Vertical pumps with options SB, 3A, and SF include Ref. 18

◆ Horizontal pumps with options FH and FP include Ref. 18 and Ref. 47

Frames



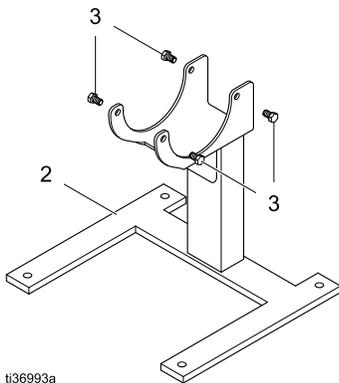
ti35835a

819.0582 shown (includes items 2 and 3)

Ref.	Part/Kit	Description	Qty.
203†	---	SCREW, 3/8-16 UNC	2
204†	---	WASHER, flat	2
205†	---	BUSHING	2
206†	---	NUT, acorn	2
207*	---	PIN, quick release	2
208*	---	RETAINER	2

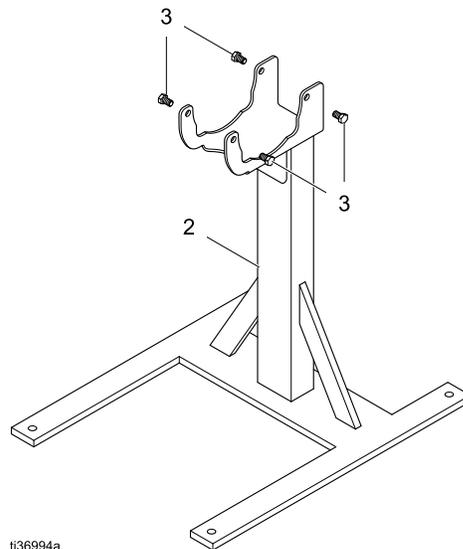
† Included in hinge repair kit 819.0583.

* Included in release pin kit 819.0584.



ti36993a

812.0001 shown (includes items 2 and 3)



ti36994a

812.0002 shown (includes items 2 and 3)

Technical Data

Verder HI-CLEAN Diaphragm Pumps, Models VA-2H52, VA-2H53, VA-2H54		
	US	Metric
Maximum fluid working pressure	120 psi	0.8 MPa, 8 bar
Air pressure operating range	20 to 120 psi	0.14 to 0.8 MPa, 1.4 to 8 bar
Air inlet size	1/2 in. (npt(f))	
Maximum suction lift (reduced if balls or flappers don't seat well due to damaged checks or seats, lightweight balls, or extreme speed of cycling)	Wet: 30 ft Dry: 10 ft (VA-2H52) 6 ft (VA-2H53) 5 ft (VA-2H54)	9.1 m 3.0 m (VA-2H52) 1.8 m (VA-2H53) 1.5 m (VA-2H54)
Maximum size pumpable solids	VA-2H52 ball 0.5 in. VA-2H53 flapper 2.46 in. VA-2H54 flapper 3.8 in.	12.7 mm 62.5 mm 96.5 mm
Fluid displacement per cycle	VA-2H52 ball 1.3 gallons VA-2H53 flapper 0.7 gallons VA-2H54 flapper 0.4 gallons	4.9 liters 2.65 liters 1.5 liters
Maximum free-flow delivery	VA-2H52 ball 180 gpm VA-2H53 flapper 130 gpm VA-2H54 flapper 90 gpm	681 lpm 492 lpm 340 lpm
Maximum pump speed	VA-2H52 ball 135 cpm VA-2H53 flapper 180 cpm VA-2H54 flapper 225 cpm	
Weights Values are for vertical pumps, horizontal pumps slightly lower		
	VA-2H52 ball 111 lb VA-2H53 flapper 118 lb VA-2H54 flapper 168 lb	50.3 kg 53.5 kg 76.2 kg
Fluid Inlet and Outlet Size , stainless steel		
	VA-2H52 2 in. sanitary flange or 50 mm DIN 11851 male thread VA-2H53 3 in. sanitary flange or 80 mm DIN 11851 male thread VA-2H54 4 in. sanitary flange or 100 mm DIN 11851 male thread	
Noise Data		
Sound Power (measured per ISO-9614-1)		
at 6.9 bar (100 psi) fluid pressure, full flow	103 dBa	
Sound Pressure		
at 4.83 bar (70 psi) fluid pressure and 50 cpm	85 dBa	
at 6.9 bar (100 psi) fluid pressure, full flow	90 dBa	
Wetted Parts		
Wetted parts include material(s) chosen for seat, ball, and diaphragm options, stainless steel		
Non-wetted parts		
Non-wetted external parts include 300-series SST, Nickel plated aluminum, 17-4 PH SST, Santoprene, LDPE, VHB acrylic		

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
Fluoroelastomer (VT)	-40° to 275°F	-40° to 135°C
Polychloroprene check balls (NW)	0° to 180°F	-18° to 82°C
EPDM overmolded diaphragm (EO)	-40° to 275°F	-40° to 135°C
PTFE overmolded diaphragm (TO)	40° to 180°F	4° to 82°C
PTFE check balls	40° to 220°F	4° to 104°C
2-piece PTFE/Santoprene diaphragms (TS)	40° to 180°F	4° to 82°C
Santoprene (SP)	-40° to 180°F	-40° to 82°C
Buna-N (BN)	10° to 180°F	-12° to 82°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, September 2020

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