

Repair/Parts



# Verder HI-CLEAN Diaphragm

## Pump, Model VA-2H80

812.0066  
Rev.A  
EN

For transfer of fluids in sanitary applications. Not approved for use in European explosive atmosphere locations. For professional use only.

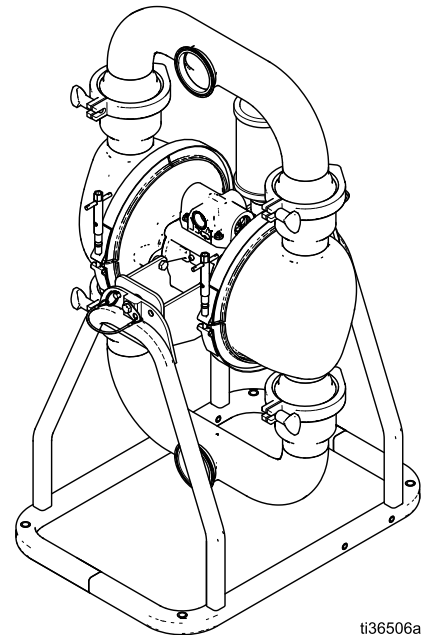


### Important Safety Instructions

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

*Maximum fluid working pressure: 6.9 bar (0.8 MPa, 100 psi)*

*Maximum air input pressure: 6.9 bar (0.8 MPa, 100 psi)*



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# Related Manuals

Manual Number	Title
812.0062	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="margin: 0;">WARNING</h1>	
   	<p><b>FIRE AND EXPLOSION HAZARD</b></p> <p>Flammable fumes, such as solvent, in <b>work area</b> 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"> <li>• Use equipment only in well ventilated area.</li> <li>• Eliminate all ignition sources; such as pilot lights, cigarettes, portable electric lamps, and plastic drop cloths (potential static sparking).</li> <li>• Ground all equipment in the work area. See <b>Grounding</b> instructions.</li> <li>• Keep work area free of debris, including solvent, rags and gasoline.</li> <li>• Do not plug or unplug power cords, or turn power or light switches on or off when flammable fumes are present.</li> <li>• Use only grounded fluid lines.</li> <li>• <b>Stop operation immediately</b> if static sparking occurs or you feel a shock. Do not use equipment until you identify and correct the problem.</li> <li>• Keep a working fire extinguisher in the work area.</li> <li>• Route exhaust away from all ignition sources. If diaphragm ruptures, fluid may be exhausted with air.</li> </ul>
  	<p><b>PRESSURIZED EQUIPMENT HAZARD</b></p> <p>Fluid from the equipment, leaks, or ruptured components can splash in the eyes or on skin and cause serious injury.</p> <ul style="list-style-type: none"> <li>• Follow the <b>Pressure Relief Procedure</b> when you stop spraying/dispensing and before cleaning, checking, or servicing equipment.</li> <li>• Tighten all fluid connections before operating the equipment.</li> <li>• Check fluid lines, tubes, and couplings daily. Replace worn or damaged parts immediately.</li> </ul>

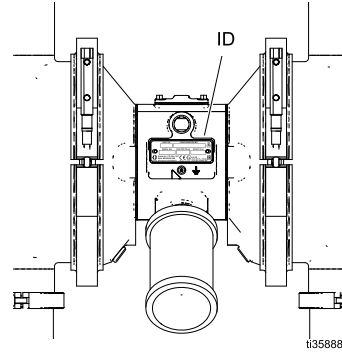
 <h1 style="margin: 0;">WARNING</h1>	
 	<p><b>EQUIPMENT MISUSE HAZARD</b></p> <p>Misuse can cause death or serious injury.</p> <ul style="list-style-type: none"> <li>• Do not operate the unit when fatigued or under the influence of drugs or alcohol.</li> <li>• Do not exceed the maximum working pressure or temperature rating of the lowest rated system component. See <b>Technical Data</b> in all equipment manuals.</li> <li>• Use fluids and solvents that are compatible with equipment wetted parts. See <b>Technical Data</b> in all equipment manuals. Read fluid and solvent manufacturer's warnings. For complete information about your material, request Safety Data Sheet (SDS) from distributor or retailer.</li> <li>• Turn off all equipment and follow the <b>Pressure Relief Procedure</b> when equipment is not in use.</li> <li>• Check equipment daily. Repair or replace worn or damaged parts immediately with genuine manufacturer's replacement parts only.</li> <li>• Do not alter or modify equipment. Alterations or modifications may void agency approvals and create safety hazards.</li> <li>• Make sure all equipment is rated and approved for the environment in which you are using it.</li> <li>• Use equipment only for its intended purpose. Call your distributor for information.</li> <li>• Route fluid lines and cables away from traffic areas, sharp edges, moving parts, and hot surfaces.</li> <li>• Do not kink or over bend fluid lines or use fluid lines to pull equipment.</li> <li>• Keep children and animals away from work area.</li> <li>• Comply with all applicable safety regulations.</li> </ul>
	<p><b>TOXIC FLUID OR FUMES HAZARD</b></p> <p>Toxic fluids or fumes can cause serious injury or death if splashed in the eyes or on skin, inhaled, or swallowed.</p> <ul style="list-style-type: none"> <li>• Read Safety Data Sheet (SDS) to know the specific hazards of the fluids you are using.</li> <li>• Route exhaust away from work area. If diaphragm ruptures, fluid may be exhausted into the air.</li> <li>• Store hazardous fluid in approved containers, and dispose of it according to applicable guidelines.</li> </ul>
	<p><b>BURN HAZARD</b></p> <p>Equipment surfaces and fluid that's heated can become very hot during operation. To avoid severe burns:</p> <ul style="list-style-type: none"> <li>• Do not touch hot fluid or equipment.</li> </ul>
	<p><b>PERSONAL PROTECTIVE EQUIPMENT</b></p> <p>Wear appropriate protective equipment when in the work area to help prevent serious injury, including eye injury, hearing loss, inhalation of toxic fumes, and burns. This protective equipment includes but is not limited to:</p> <ul style="list-style-type: none"> <li>• Protective eyewear, and hearing protection.</li> <li>• Respirators, protective clothing, and gloves as recommended by the fluid and solvent manufacturer.</li> </ul>

# 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 9 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-2H80XP-STTFTSD8SB21**




<b>VA-2H</b>	<b>80</b>	<b>X</b>	<b>P</b>	<b>ST</b>	<b>TF</b>	<b>TS</b>	<b>D8</b>	<b>SB</b>	<b>21</b>
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	
<b>VA-2H</b>	<b>80</b>	80 mm	<b>X</b>	High Sanitation, 3-A 0.8 µm	<b>P</b>	Polypropylene	<b>SB</b>	Stainless Steel, Buna-N gasket
			<b>Y</b>	Pharmaceutical, 0.5 µm			<b>SE</b>	Stainless Steel, EPDM gasket
							<b>ST</b>	Stainless Steel, EP-TF gasket
							<b>SV</b>	Stainless Steel, FKM gasket

Ball Material		Diaphragm Material		Connections		Options		Certification	
<b>BN</b>	Buna-N	<b>BN</b>	Buna-N	<b>D8</b>	DIN 11851 (DN80)	<b>3A</b>	3-A	<b>21</b>	EN 10204 type 2.1
<b>EP</b>	EPDM	<b>EO</b>	EPDM Overmolded	<b>T8</b>	TRI-CLAMP 3"	<b>SB</b>	Sanitary ball	<b>31</b>	EN 10204 type 3.1
<b>NE</b>	Polychloroprene	<b>SP</b>	Santoprene						
<b>SP</b>	Santoprene	<b>TS</b>	PTFE/Santoprene, 2-piece						
<b>TF</b>	PTFE	<b>VT</b>	FKM						
<b>VT</b>	FKM								

Configuration Number Matrix

Approvals		
Diaphragm materials coded EO, TO, or TS combined with TF ball checks comply with:		EC 1935/2004
Diaphragm materials coded EO or TS combined with 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)		

# 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 cycles but will not prime.	Pump is running too fast, causing cavitation before prime.	Reduce air inlet pressure.
	Check valve ball severely worn or wedged in seat or manifold.	Replace ball and seat component.
	Seat severely worn.	Replace ball and seat component.
	Outlet or inlet clogged.	Unclog.
	Inlet or outlet valve closed.	Open.
	Inlet fittings or manifolds loose.	Tighten clamp.
	Manifold gaskets damaged.	Replace gaskets.
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 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 <a href="#">Pressure Relief Procedure, page 9</a> . Disassemble ball check assembly and inspect for damage.
	Clogged dispensing valve.	Follow <a href="#">Pressure Relief Procedure, page 9</a> . Clear valve.
	Pilot valve worn, damaged, or plugged.	Replace pilot valve.
	Air valve gasket damaged.	Replace gasket.
	Leak detector has activated a shut-down solenoid.	Investigate failure and reset leak detector.
	Shaft seals worn or damaged.	Replace seals.
Air bubbles in fluid.	Suction line is loose.	Tighten.
	Diaphragm ruptured.	Replace. See standard or overmolded diaphragm repair procedure.
	Loose diaphragm shaft bolt.	Tighten.
	Loose inlet manifold, damaged seal between manifold and seat, damaged gaskets.	Tighten manifold clamps or replace gaskets or seating components.

Troubleshooting

Problem	Cause	Solution
Reduced pump performance.	Clogged suction line.	Inspect; clear.
	Sticky or leaking check balls.	Clean or replace.
	Diaphragm ruptured.	Replace. See standard or overmolded diaphragm repair procedure.
	Pilot valves damaged or worn.	Replace pilot valves.
	Air valve damaged.	Replace air valve.
	Air valve gasket damaged.	Replace air valve gasket.
	Air supply erratic.	Replace air supply.
	Exhaust muffler icing.	Use drier air supply.
	Restricted exhaust.	Remove restriction.
Leak in inlet or outlet sanitary fitting.	Loose sanitary clamp.	Tighten clamp.
	Damaged or worn gasket.	Replace gasket.
	Misalignment of inlet/outlet fluid line or pipe.	Use flexible fluid lines at pump inlet and outlet.
	Gasket does not seal.	Install correct air cover gaskets for the type of diaphragms in use. See parts list for correct gaskets.
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 cup or plate.	Replace.
	Damaged air valve gasket.	Replace gasket.
	Damaged pilot valve.	Replace pilot valves.
	Worn shaft seals.	Replace. See standard or overmolded diaphragm repair procedure.
Pump leaks air externally.	Air valve or fluid cover clamps loose.	Tighten.
	Diaphragm damaged.	Replace diaphragm.
	Air valve gasket damaged.	Replace gasket.
	Air cover gasket damaged.	Replace gasket.
Pump leaks fluid externally from joints.	Loose manifolds, damaged seal between manifold and seat, 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.

<p>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.</p>				

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).

## Repair or Replace Air Valve

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## Replace Complete Air Valve

1. Follow the [Pressure Relief Procedure, page 9](#).
2. Disconnect the supply air line at the motor.

3. Remove the nuts (105). Remove the air valve and gasket (103).
4. To repair the air valve, go to [Disassemble Air Valve, page 9](#). To install a replacement air valve, continue to the next step.
5. Align the new air valve gasket (103) on the center housing, then attach the air valve. Using a crisscross pattern, tighten the air valve nuts (105) to 5–6.2 N•m (45–55 in-lb).
6. Reconnect the supply air line at the motor.

## Replace Seals or Rebuild Air Valve

**NOTE:** Repair kits are available. See [Air Valve parts section](#).

## Disassemble Air Valve

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1. Remove the air valve from the center section. Refer to steps 1-3 of [Replace Complete Air Valve, page 9](#).
2. Remove screws (104j). Remove the valve plate (104e), cup assembly (104m, 104n, 104s), spring (104l), and detent assembly (104c).
3. Pull the cup (104n) off of the base (104m). Remove the o-ring (104s) from the cup.
4. Remove the retaining ring (104k) from each end of the air valve. Use the piston (104b) to push the end cap (104g) out of one end. Remove the u-cup seal (104h). Pull the piston out the end and remove the other u-cup seal (104h). Remove the other end cap (104g) and the end cap o-rings (104f).
5. Remove the detent cam (104d) from the air valve housing (104a).

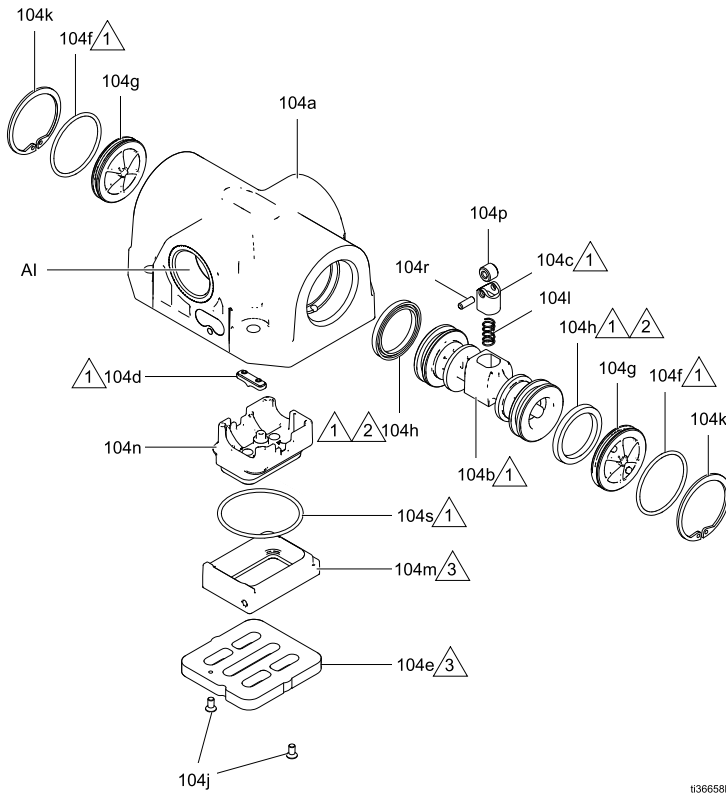
## Reassemble Air Valve

**NOTE:** If repairs involve removing fluid covers, perform the steps in [Reassemble the Overmolded Diaphragms, page 16](#), prior to reassembly of the air valve. The air valve configuration will be modified to aid fluid cover installation.

**NOTE:** Apply lithium-based grease whenever instructed to grease. Order Verder PN 819.0184.

1. Use all parts in the repair kits. Clean other parts and inspect for damage. Replace as needed.
2. Grease the detent cam (104d) and install into housing (104a).

3. Grease the u-cups (104h) and install on the piston with lips facing toward the center of the piston.
4. Grease both ends of the piston (104b) and the housing bore. Install the piston in the housing (104a), with the flat side toward the cup (104n). Be careful not to tear u-cups (104g) when sliding piston into housing.
5. Grease new o-rings (104f) and install on the end caps (104g). Install the end caps into the housing.
6. Install a retaining ring (104k) on each end to hold end caps in place.

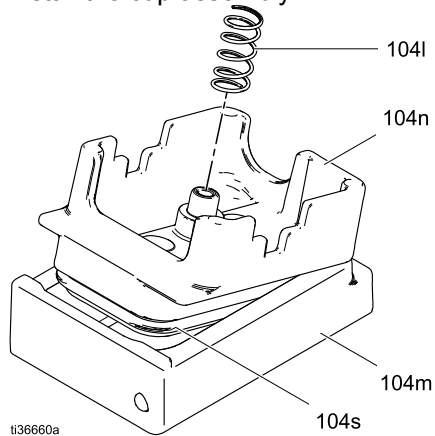


- △ 1 Apply lithium-based grease.
- △ 2 U-cup lips must face piston.
- △ 3 Apply lithium-based grease to contact surface.

**KEY**  
AI Air Inlet

7. Grease and install the detent assembly (104c) into the piston. Install the o-ring (104s) on the cup (104n). Apply a light film of grease to the outside surface of the o-ring and the inside mating surface of the base (104m).

Orient the end of the base that has a magnet toward the end of the cup that has the larger cutout. Engage the opposite end of the parts. Leave the end with the magnet free. Tilt the base toward the cup and fully engage the parts, using care so that the o-ring remains in place. Install the spring (104l) onto the protrusion on the cup. Align the magnet in the base with the air inlet and install the cup assembly.

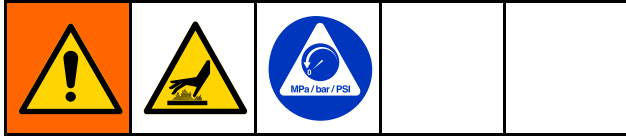


8. Grease the cup side and install the valve plate (104e). Align the small hole in the plate with the air inlet (AI). Tighten the screws (104j) to hold it in place.

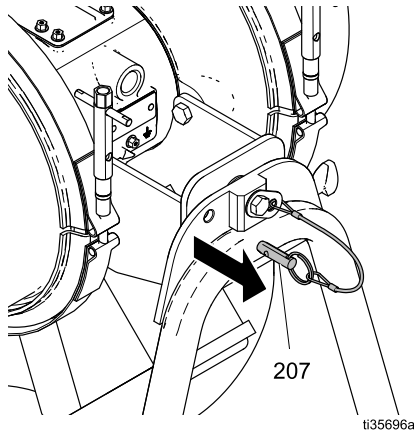
## Check Valve Repair

**NOTE:** Kits are available for new 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. To drain the pump, pull the frame quick-release pins (207) and rotate the pump. Insert the quick-release pins to prevent undesired rotation.

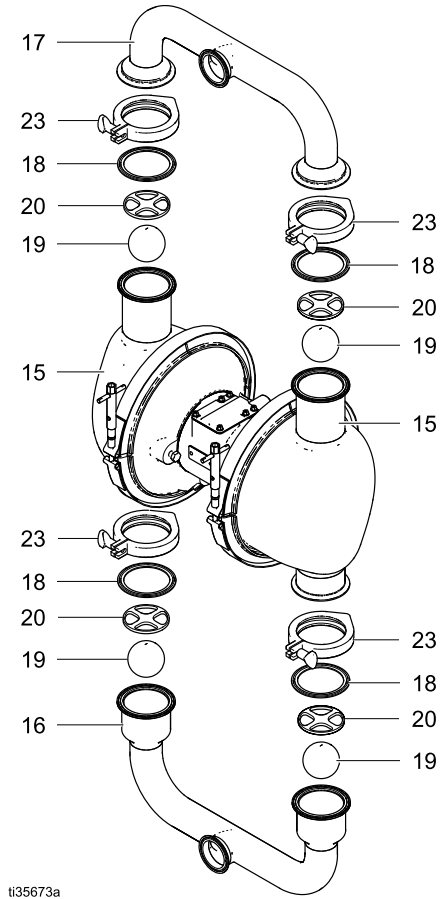


**NOTE:** After draining, rotate the pump to positions which will aid disassembly. The stand has locks at 90 degree increments.

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

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

4. Remove remaining clamps (23), manifolds (16, 17), gaskets (18), and check valves (19,20).



5. Clean and inspect gaskets, balls, ball stops, and seating surfaces for any damage and replace as necessary.
6. To continue with diaphragm disassembly, see [Disassemble the Standard Diaphragms, page 13](#).

### Reassemble the Check Valves

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

1. Reassemble check valve components in reverse order.
2. Attach the manifolds to the fluid covers. Tighten clamps hand tight.

## Standard Diaphragm Repair

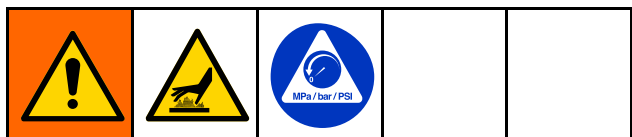
**NOTE:** Overmolded diaphragms are covered in [Overmolded Diaphragm Repair, page 15](#).

### Tools Required:

- Torque wrench
- 18 mm wrench
- 7/8 in open end wrench
- O-ring pick
- Diaphragm install tool (812.0268)
- Lithium base grease

**NOTE:** If changing diaphragm materials, center section gasket may also need to be replaced with some diaphragm types. See [Diaphragms](#) for affected air cover gaskets.

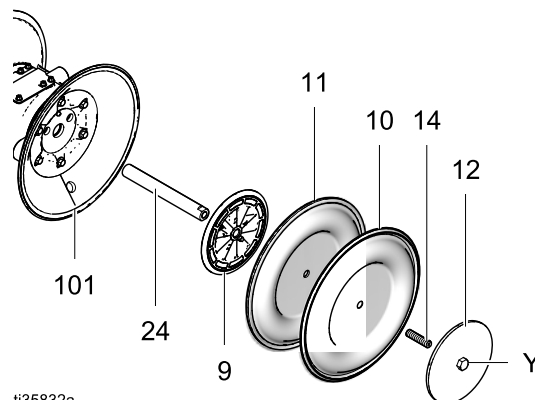
### Disassemble the Standard Diaphragms



**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 (15), then pull the fluid covers off of the pump.
4. With both fluid covers removed, using two 18 mm 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 7/8 in. 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 (107) in place. If the bearings are damaged, refer to [Center Section Repair, page 18](#).
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, see [Center Section Repair, page 18](#), 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) and toward the bearing (107) they are behind.
2. Assemble diaphragm (10), backer (11) if present, and plate (9) onto plate (12) 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.

6. Using the 18 mm wrenches hold the wrench flats of one diaphragm assembly and torque the other diaphragm to 81-94 N•m (60-70 ft-lb).

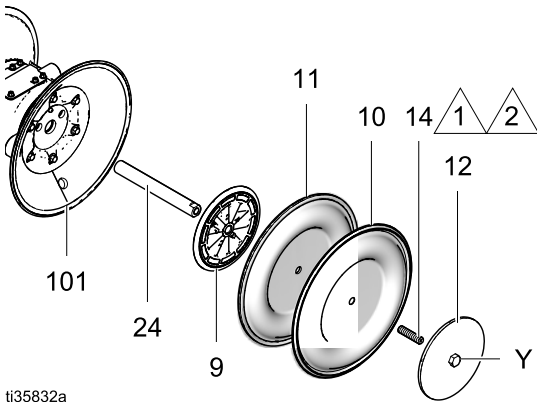
**NOTE:** Apply waterproof, sanitary lubricant to the clamp (21) and clamping surface of the cover (15) to ease assembly.

**NOTE:** Fluid cover movement may be needed when installing manifolds. Install cover clamps loose enough to allow cover movement for spacing and alignment of manifolds.


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


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

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



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 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.

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.

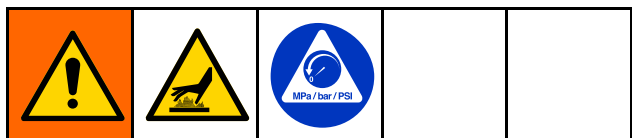
## Overmolded Diaphragm Repair

### Tools Required:

- Torque wrench
- 7/8 in. open end wrench
- O-ring pick
- Diaphragm install tool (812.0268)
- Lithium base grease

**NOTE:** If changing diaphragm materials, center section gasket may also need to be replaced with some diaphragm types. See [Diaphragms](#) for affected fluid and air lines.

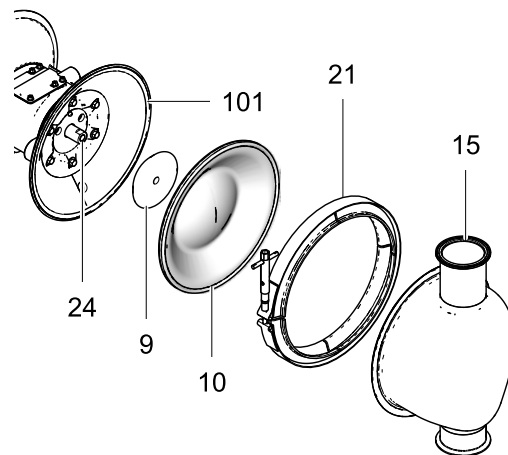
### Disassemble the Overmolded Diaphragms



**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 (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. Diaphragms are assembled hand tight. 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) 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 7/8 in. 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 (107) in place. If the bearings are damaged, refer to [Center Section Repair](#), page 18.
8. Clean all parts and inspect for wear or damage. Replace parts as needed.



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## Reassemble the Overmolded Diaphragms

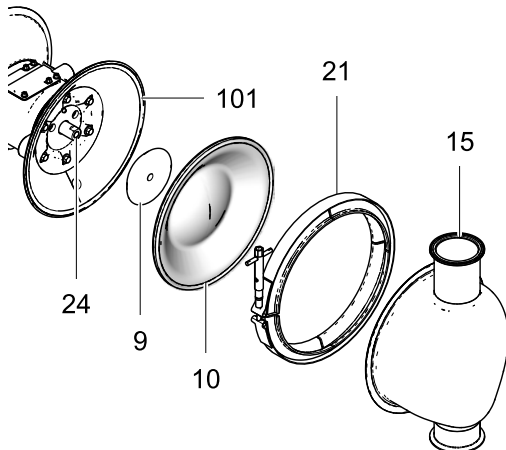
### NOTICE

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 18](#), before you put the diaphragms back on.

1. Lubricate and install the shaft u-cups (106) so the lips face **out** of the housing (101) and toward the bearing (107) they are behind.
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.



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1. Apply a high-strength thread locker to attach the screw to the diaphragm plate, if needed.
2. Apply a medium-strength thread locker to the shaft side of the screw.

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 (15) to ease assembly.

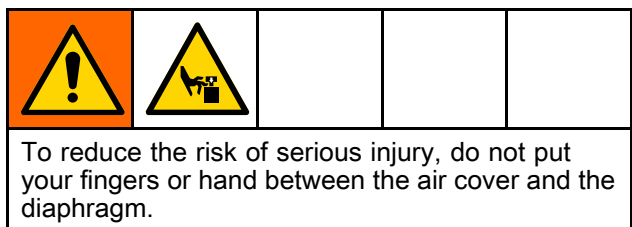
**NOTE:** Fluid cover movement may be needed when installing manifolds. Install cover clamps loose enough to allow cover movement for spacing and alignment of manifolds.

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

7. Align the fluid covers (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 [Using Diaphragm Install Tool, page 17](#), to position the diaphragm and allow fluid cover installation.
8. Reassemble the ball check valves and manifolds as explained in [Check Valve Repair, page 12](#).

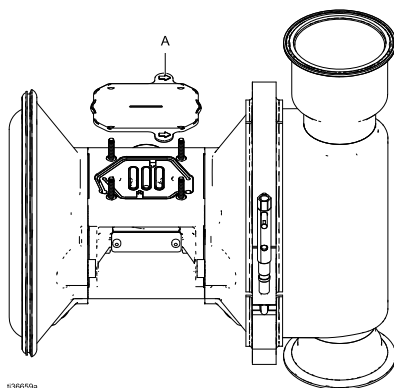


## Using Diaphragm Install Tool



If repairs involve removal of fluid covers, these steps will ease installation of fluid covers. The diaphragm install tool kit 812.0268 is available separately.

1. Remove the air valve nuts (105), air valve (104) and gasket (103).
2. Install the supplied diaphragm install tool so that the arrow (A) points toward the side of the pump with the diaphragm against the air cover. Install the air valve (104) and nuts (105). Snug the air valve cover nuts.



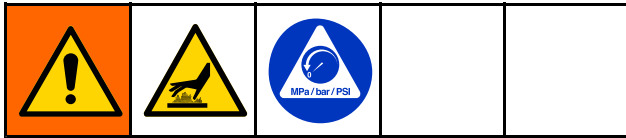
3. Supply the pump with low pressure air, just enough to move the diaphragm. Use about 0.7 bar (0.07 MPa, 10 psi) for standard diaphragms or 1.4 bar (0.14 MPa, 20 psi) for overmolded diaphragms. Shop air may be used. The diaphragm will shift so the second fluid cover will seat properly. Keep air pressure on until the second fluid cover is installed.
4. Install the remaining fluid cover and clamp.
5. Remove air supply from pump.
6. Follow the [Pressure Relief Procedure, page 9](#). Disconnect the air valve and the tool.
7. If no other air valve repairs are needed, install the gasket (103), air valve (104) and nuts (105). Use a crisscross pattern and torque nuts to 5-6.2 N•m (45-55 in-lb)

## Center Section Repair

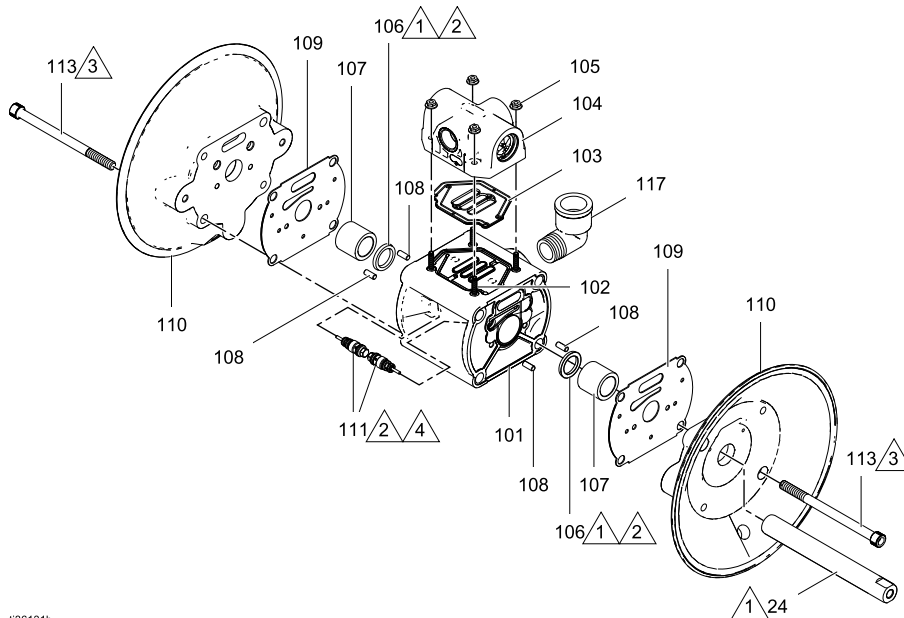
### Tools Required:

- 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



1. Follow either the [Disassemble the Standard Diaphragms, page 13](#) or [Disassemble the Overmolded Diaphragms, page 15](#), as appropriate.
  2. Remove pilot valves (111).
  3. Use a 3/8 hex wrench to remove two bolts (113), then remove one air cover (110) and alignment pins (108). Repeat for the other air cover.
  4. Inspect the diaphragm shaft (24) for wear or scratches. If it is damaged, inspect the bearings (107) in place. If they are damaged, use a bearing puller to remove them.
- NOTE:** Do not remove undamaged bearings.



- 1 Apply lithium-based grease.
- 2 Lips must face out of housing.
- 3 Torque to 41–54 N•m (30–40 ft-lb).
- 4 Torque to 2.3–2.8 N•m (20–25 in-lb).

### Reassemble the Center Section

**NOTE:** Use lithium-based grease whenever instructed to grease. Order Verder PN 819.0184.

1. Clean all parts and inspect for damage. Replace parts as needed.
2. Grease and install the diaphragm shaft u-cups (106) so the lips face **out** of the housing and toward the bearing they are behind.
3. If replacing the shaft bearings, insert the new bearings (107) into the center housing. Use a press or a block and rubber mallet to press-fit the bearing so it is flush with the surface of the center housing.
4. Install the air covers:
  - a. Put one air cover on the bench. Install the alignment pins (108) and a new gasket (109).
  - b. Carefully place the center section on the air cover.
  - c. Install the second set of alignment pins (108) and gasket (109) in the center section. Lower the second air cover onto the center housing.
  - d. Apply medium-strength (blue) thread locker on the bolts (113). Install two bolts and torque to 41-54 N•m (30-40 ft-lb). Turn the pump over on the bench and install and torque the other two bolts.
5. Grease and install pilot valves (111). Torque to 2.3-2.8 N•m (20-25 in-lb). Do not over-torque.

836131b

## 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

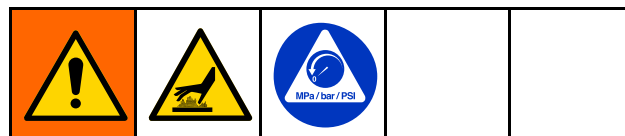
1. Obtain a small container of the material being pumped.
2. Perform the [Pressure Relief Procedure, page 9](#).
3. Unscrew and remove both leak detector bushings (with installed leak detectors) from the air side diaphragm covers.
4. For each leak detector, dip the bushing, with the leak detector still 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



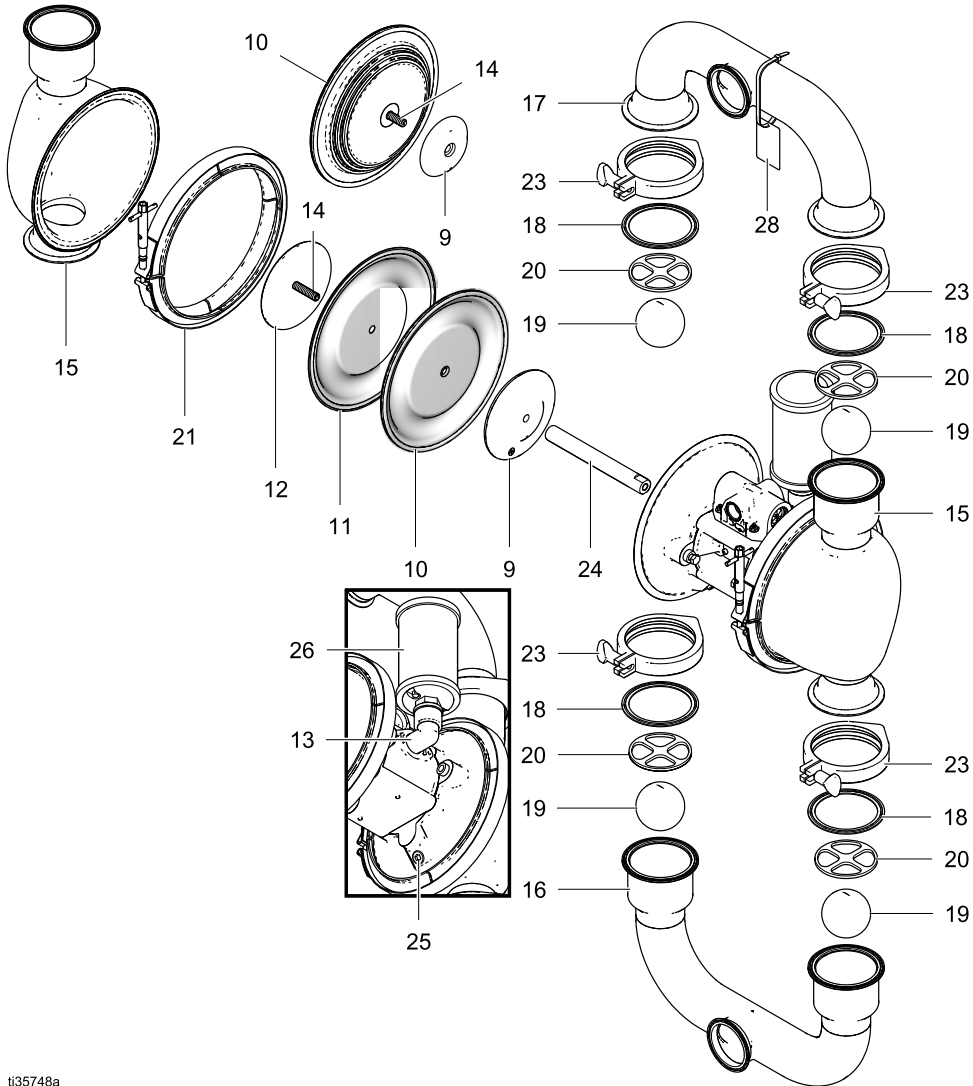
1. Follow the [Pressure Relief Procedure, page 9](#).
2. Note the connection locations of the leak detector wires within the monitoring device, then disconnect the leak detector wires.
3. Remove the leak detector from the bushing in the air side diaphragm cover.
4. If desired, repeat to remove the other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

### Leak Detector Reassembly

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. If removed, re-attach the leak detector wiring to the monitoring device.

# Parts



ti35748a

VA-2H80 model 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, drive; <i>See page 21</i>	1
2	-----	812.0138	FRAME; <i>See Frames</i>	1
3	-----	812.0138	BOLT, frame attachment	4
4	-----	812.0138	SPACER, frame attachment	4
9	819.4301	-----	PLATE, air side EO, VT, SP, TS, BN	2
10	-----	-----	DIAPHRAGM, kit; <i>See Diaphragms</i>	1 kit
11	-----	-----	DIAPHRAGM, backup, <i>included with Ref. 10 where needed</i>	2
12	819.0511	-----	PLATE, fluid side, VT, TS, SP, BN only	2
14	812.0133	-----	SCREW, manifold	2
15	-----	812.0022	COVER, fluid X	2
	-----	812.0026	Y	
16	-----	812.0040	MANIFOLD, inlet T8, X	1
	-----	812.0105	T8, Y	
	-----	812.0168	D8, X	
17	-----	812.0033	MANIFOLD, outlet T8, X	1
	-----	812.0106	T8, Y	
	-----	812.0169	D8, X	

Ref.	Part	Kit	Description	Qty.
18	-----	-----	GASKET, 100 mm	4
	-----	812.0010	EP (SE seats)	
	-----	812.0153	VT (SV seats)	
	-----	812.0160	EP-TF (ST seats)	
	-----	812.0246	BN (SB seats)	
19	-----	-----	BALLS, check valve; pkg of 4 TF	1
	-----	812.0144	TF	
	-----	812.0145	SP	
	-----	812.0146	BN	
	-----	812.0147	VT	
	-----	812.0148	NE	
	-----	812.0274	EP	
20	-----	812.0122	STOP, ball; pkg of 4	1
21	-----	812.0134	CLAMP, fluid cover <i>kit is one clamp</i>	2
22	-----	812.0134	HANDLE, tee; <i>included with 21</i>	2
23	819.0504	-----	CLAMP, sanitary	4
24	812.0269	-----	SHAFT, diaphragm	1
25	819.0419	-----	PLUG, leak detector holes, pkg of 2	1
26	-----	812.0149	MUFFLER	1
27	-----	812.0003	DETECTOR, leak, 3-A only; pkg of 2	1
28▲	812.0136	-----	LABEL, safety	1

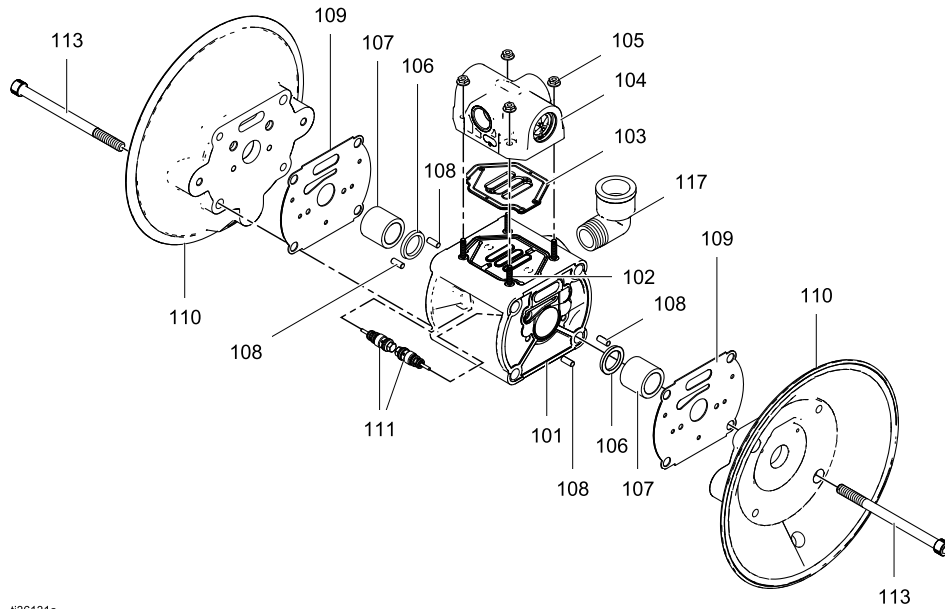
----- *Not available.*

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

## Center Section

Sample Configuration Number:

Pump Model	Pump Size	Wetted Parts	Air Section	Seats	Balls	Diaphragms	Connections	Options	Certifications
VA-2H	80	X	<b>P</b>	ST	TF	TS	D8	SB	21



ti36131a

Ref	Kit	Description	Qty
101	812.0143	HOUSING, center, assembly	1
102	812.0143	STUD	4
103	859.0159 859.0160 812.0137	GASKET, cover, air valve	1
104	812.0137	AIR VALVE, assembly	1
105	812.0137	NUT	4
106	812.0143 859.0154	U-CUP	2
107	812.0143 859.0154	BEARING, shaft	2
108	812.0117 812.0118	PIN, alignment X Y	4

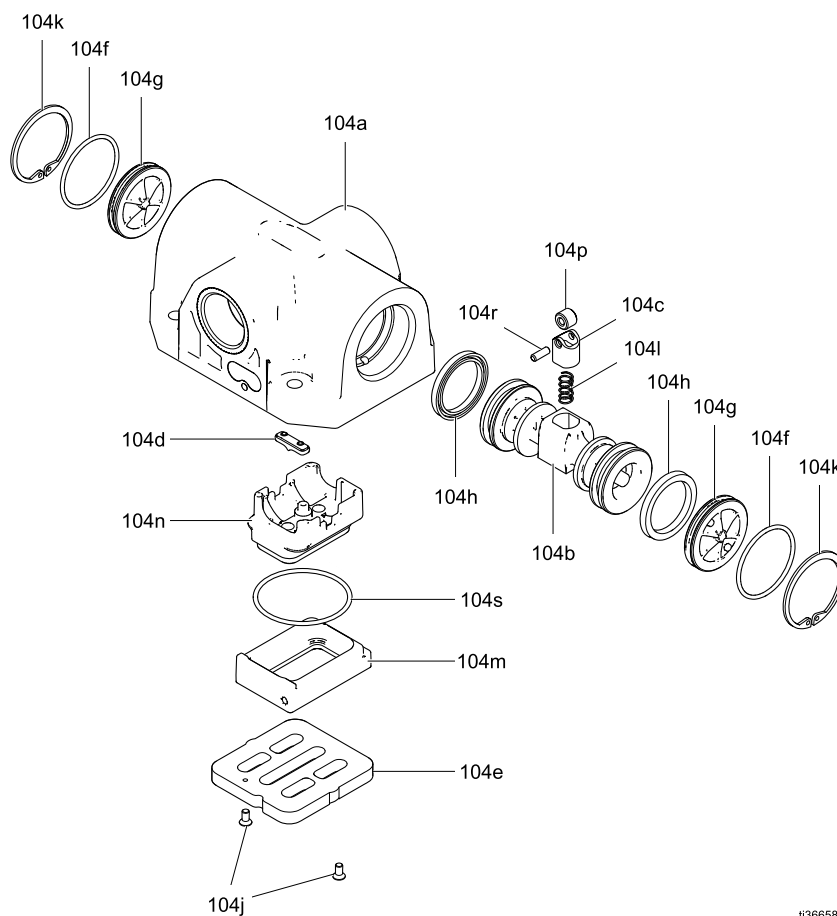
Ref	Kit	Description	Qty
109		GASKET, air cover <i>use with TS diaphragms:</i>	1
	812.0117	X	
	812.0118	Y	
	812.0142	pkg of 2 <i>use with all diaphragms except TS diaphragms:</i>	
	812.0117	X	
	812.0118	Y	
	812.0141	pkg of 2	
110		COVER, air; <i>includes Ref. 108 and 109</i>	2
	812.0017	3A, X	
	812.0118	Y	
111	859.0116	VALVE, pilot; pkg of 2	1
113	859.0169	SCREW; pkg of 4	1
117	812.0270	FITTING, muffler	1

The air section repair kit is available separately. Order kit 812.0115.

# Air Valve

Sample Configuration Number:

Pump Model	Pump Size	Wetted Parts	Air Section	Seats	Balls	Diaphragms	Connections	Options	Certifications
VA-2H	80	X	<b>P</b>	ST	TF	TS	D8	SB	21



t36658a

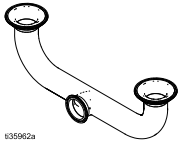
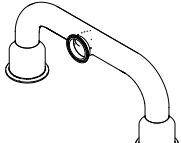
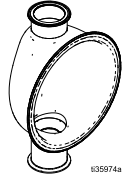
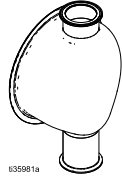
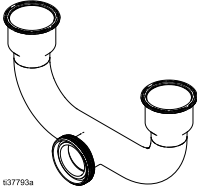
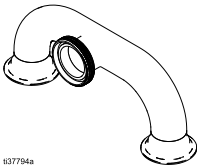
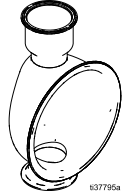
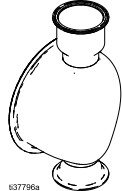
Ref.	Kit	Description	Qty.
104a	---	HOUSING	1
104b	859.0160	PISTON, air valve	1
104c	859.0160	PISTON, detent	1
104d	859.0160	CAM, detent	1
104e	859.0160	PLATE	1
104f	859.0159 859.0160 859.0073	O-RING	2
104g	859.0073	CAP	2
104h	859.0159 859.0160	SEAL, u-cup	2

Ref.	Kit	Description	Qty.
104j	859.0159 895.0160	SCREW, thd forming	2
104k	859.0073	RING, snap	2
104l	859.0160	SPRING, detent	1
104m	859.0160	BASE	1
104n	859.0160	CUP, air	1
104p	859.0160	ROLLER, detent	1
104r	859.0160	PIN, detent	1
104s	859.0160	O-RING	1

## Fluid Covers and Manifolds

Sample Configuration Number:

Pump Model	Pump Size	Wetted Parts	Air Section	Seats	Balls	Diaphragms	Connections	Options	Certifications
VA-2H	80	X	P	ST	TF	TS	D8	SB	21

Pump PN prefix	Manifold	Wetted Section	Manifold		Fluid Cover	
			Inlet	Outlet	Left (Ref 15)	Right (Ref 15)
VA-2H80	T8	X Y	 <small>i33562a</small> 812.0040 812.0105	 <small>i33569a</small> 812.0033 812.0106	 <small>i335974a</small> 812.0022 812.0026	 <small>i33581a</small> 812.0022 812.0026
VA-2H80	D8	X	 <small>i337793a</small> 812.0168	 <small>i337794a</small> 812.0169	 <small>i337795a</small> 812.0022	 <small>i337796a</small> 812.0022



## Diaphragms

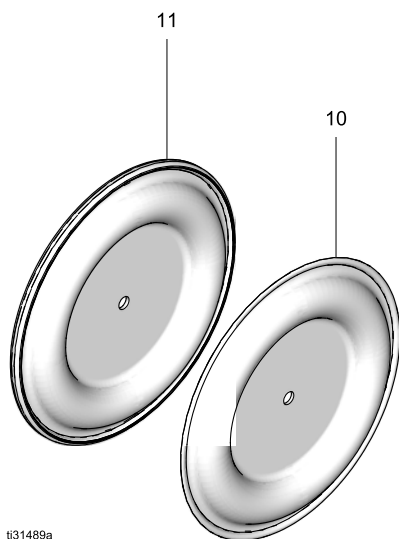
Sample Configuration Number:

Pump Model	Pump Size	Wetted Parts	Air Section	Seats	Balls	Diaphragms	Connections	Options	Certifications
VA-2H	80	X	P	ST	TF	TS	D8	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

Kits include:

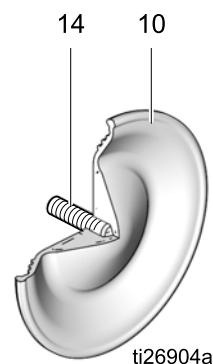
- 2 diaphragms (10)
- 2 diaphragm backers (11), if applicable
- 1 packet anaerobic adhesive
- 2 o-rings



Overmolded Diaphragm Kits		
Diaphragm Material	Kit	Qty.
EO	819.0568	1

Kits include:

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



Parts

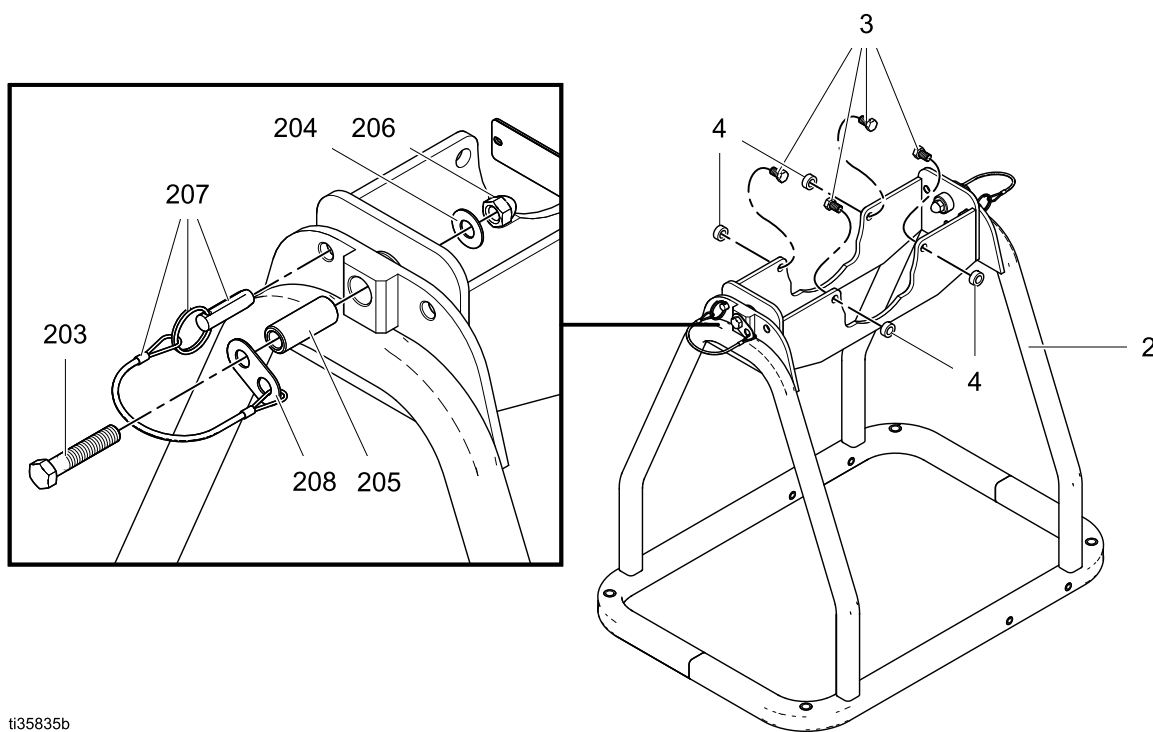
Fluid Section Repair Kits		
Kit	Description	Qty.
812.0232	VA-2H80X-Y --,BN,BN,BN	1
812.0233	VA-2H80X-Y --,NE,EO,EP	1
812.0234	VA-2H80X-Y --,NE,VT,VT	1
812.0235	VA-2H80X-Y --,NE,SP,EP	1
812.0236	VA-2H80X-Y --,EP,EO,EP	1
812.0237	VA-2H80X-Y --,EP,SP,EP	1
812.0238	VA-2H80X-Y --,VT,VT,VT	1
812.0239	VA-2H80X-Y --,TF,EO,EP	1
812.0240	VA-2H80X-Y --,TF,TS,TF	1

Fluid Section Repair Kits		
Kit	Description	Qty.
812.0241	VA-2H80X-Y --,TF,SP,EP	1
812.0242	VA-2H80X-Y --,SP,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

# Frames



i135835b

812.0138 shown; includes items 2, 3, and 4

Ref.	Kit	Description	Qty.
203	819.0583	SCREW, 3/8-16 unc	2
204	819.0583	WASHER, flat	2
205	819.0583	BUSHING	2
206	819.0583	NUT, acorn	2
207	819.0584	PIN, quick release	2
208	819.0584	RETAINER	2

# Technical Data

<b>Verder HI-CLEAN Diaphragm Pump, Model VA-2H80HE</b>		
	<b>US</b>	<b>Metric</b>
Maximum fluid working pressure	100 psi	0.7 MPa, 6.9 bar
Air pressure operating range	20 to 100 psi	0.14 to 0.7 MPa, 1.4 to 6.9 bar
Air inlet size	3/4 in. npt(f)	
Maximum suction lift (reduced if balls don't seat well due to damaged balls or seats, lightweight balls, or extreme speed of cycling)	Wet: 30 ft Dry: 10 ft	Wet: 9.1 m Dry: 3.0 m
Maximum size pumpable solids	3/4 in.	19 mm
Minimum ambient air temperature for operation and storage. <b>NOTE:</b> Exposure to extreme low temperatures may result in damage to plastic parts.	32° F	0° C
Fluid displacement per cycle	1.2 gallons	4.54 liters
Maximum free-flow delivery	230 gpm	870 lpm
Maximum pump speed	190 cpm	
<b>Weight</b>		
All models	124 lbs	56.2 kg
<b>Fluid Inlet and Outlet Size</b>		
Stainless Steel	3 in. sanitary flange or 80 mm DIN 11851, male thread	
<b>Noise Data</b>		
Sound Power (measured per ISO-9614-2)		
at 8.6 bar (125 psi) fluid pressure and full flow	106.1 dBa	
at 3.4 bar (50 psi) fluid pressure and 50 cpm	99.1 dBa	
Sound Pressure [tested 3.28 ft (1 m) from equipment]		
at 8.6 bar (125 psi) fluid pressure and full flow	98.2 dBa	
at 3.4 bar (50 psi) fluid pressure and 50 cpm	91.5 dBa	
<b>Wetted Parts</b>		
Wetted parts include material(s) chosen for seat, ball, and diaphragm options, 316 stainless steel		
<b>Non-wetted parts</b>		
Non-wetted external parts include nickel-plated aluminum, Nylon, 300-series stainless steel, 17-4 stainless steel, 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
FKM Fluoroelastomer (VT)	-40° to 275°F	-40° to 135°C
Polychloroprene check balls (NE)	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



# 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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