

# SERVICE & OPERATING MANUAL

## Original Instructions

Certified Quality



ISO 9001 Certified  
ISO 14001 Certified

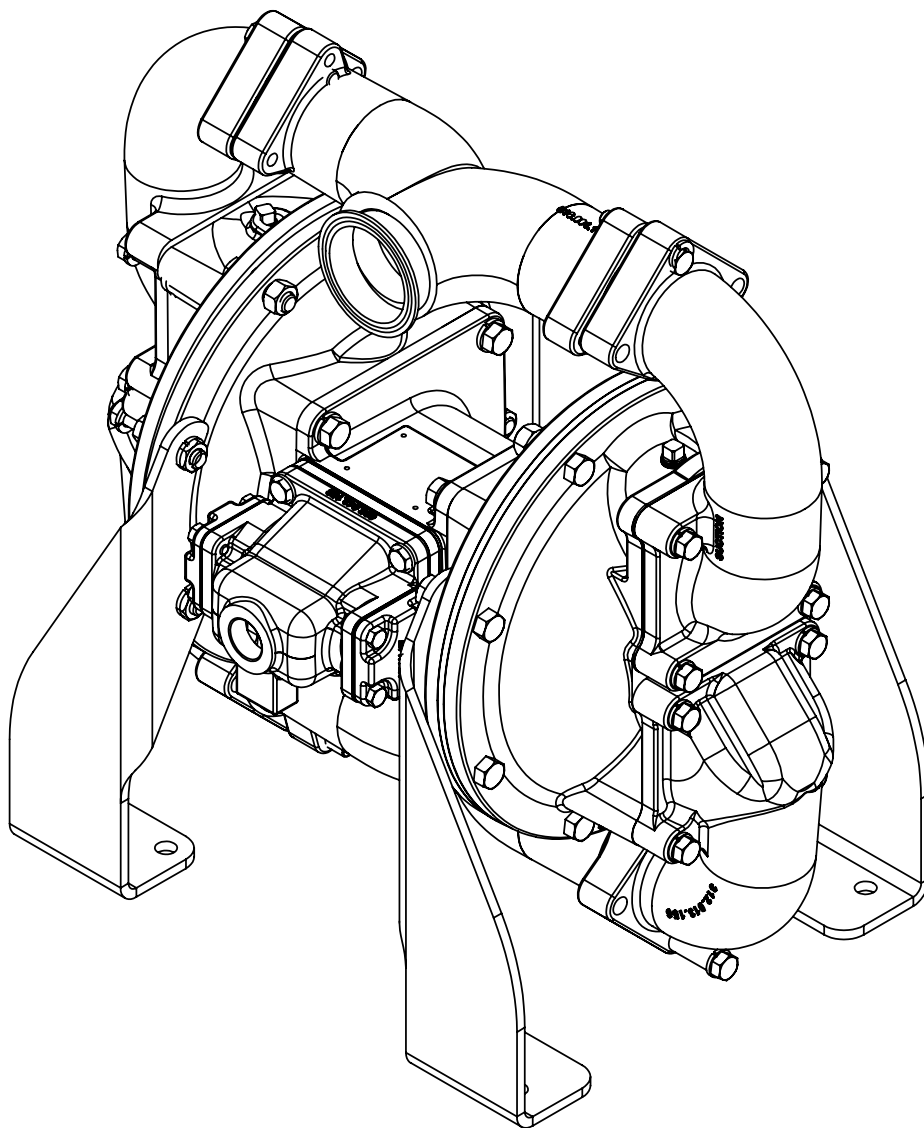


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## Model TSA2 Design Level 5



1: PUMP SPECS

2: INSTAL & OP

3: EXP VIEW

4: AIR END

5: WET END

6: OPTIONAL

7: WARRANTY

**SANDPIPER®**  
A WARREN RUPP, INC. BRAND

SANDPIPERPUMP.COM

# Safety Information

## ! IMPORTANT



Read the safety warnings and instructions in this manual before pump installation and start-up. Failure to comply with the recommendations stated in this manual could damage the pump and void factory warranty.



When the pump is used for materials that tend to settle out or solidify, the pump should be flushed after each use to prevent damage. In freezing temperatures the pump should be completely drained between uses.

## ! CAUTION



Before pump operation, inspect all fasteners for loosening caused by gasket creep. Retighten loose fasteners to prevent leakage. Follow recommended torques stated in this manual.



Nonmetallic pumps and plastic components are not UV stabilized. Ultraviolet radiation can damage these parts and negatively affect material properties. Do not expose to UV light for extended periods of time.



### **WARNING**

Pump not designed, tested or certified to be powered by compressed natural gas. Powering the pump with natural gas will void the warranty.



### **WARNING**

The use of non-OEM replacement parts will void (or negate) agency certifications, including CE, ATEX, CSA, 3A and EC1935 compliance (Food Contact Materials). Warren Rupp, Inc. cannot ensure nor warrant non-OEM parts to meet the stringent requirements of the certifying agencies.

## ! WARNING



When used for toxic or aggressive fluids, the pump should always be flushed clean prior to disassembly.



Before maintenance or repair, shut off the compressed air line, bleed the pressure, and disconnect the air line from the pump. Be certain that approved eye protection and protective clothing are worn at all times. Failure to follow these recommendations may result in serious injury or death.



Airborne particles and loud noise hazards. Wear eye and ear protection.



In the event of diaphragm rupture, pumped material may enter the air end of the pump, and be discharged into the atmosphere. If pumping a product that is hazardous or toxic, the air exhaust must be piped to an appropriate area for safe containment.



Take action to prevent static sparking. Fire or explosion can result, especially when handling flammable liquids. The pump, piping, valves, containers and other miscellaneous equipment must be properly grounded.



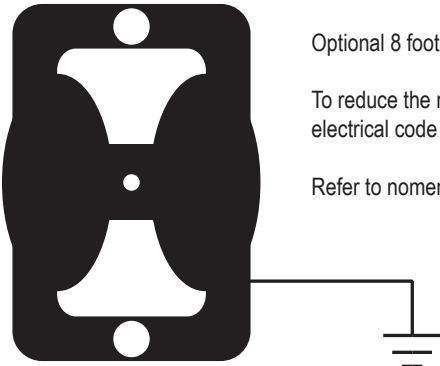
This pump is pressurized internally with air pressure during operation. Make certain that all fasteners and piping connections are in good condition and are reinstalled properly during reassembly.



Use safe practices when lifting

## Grounding the Pump

To be fully groundable, the pumps must be ATEX Compliant. Refer to the nomenclature page for ordering information.



Optional 8 foot long (244 centimeters) Ground Strap is available for easy ground connection.

To reduce the risk of static electrical sparking, this pump must be grounded. Check the local electrical code for detailed grounding instruction and the type of equipment required.

Refer to nomenclature page for ordering information.

## ! WARNING



Take action to prevent static sparking. Fire or explosion can result, especially when handling flammable liquids. The pump, piping, valves, containers or other miscellaneous equipment must be grounded.

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1: PUMP SPECS

2: INSTAL & OP

3: EXP VIEW

4: AIR END

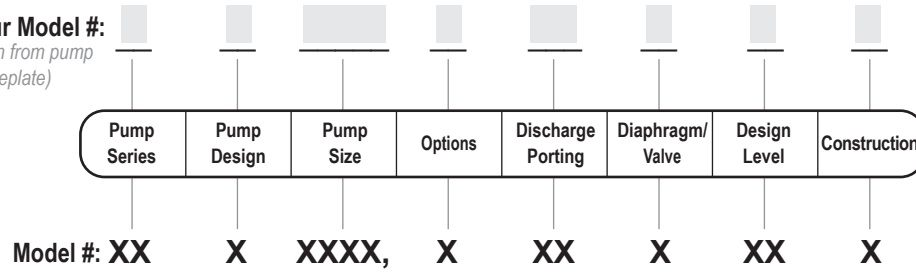
5: WET END

6: OPTIONAL

7: WARRANTY

# Explanation of Pump Nomenclature

Your Model #:   
(fill in from pump nameplate)



**Pump Series**  
TS SANDPIPER®

**Pump Design**  
A Flap

**Pump Size**  
2 2 1/2" Sanitary Tri-Clamp

**Discharge Porting Position**  
D Bottom

**Wet End Materials**  
F FDA White Nitrile

**Design Level**  
5

**Construction**  
SW Stainless Steel Wetted, White Epoxy-Coated Aluminum Air Center  
S Stainless Steel Wetted, Aluminum Air

Your Serial #: (fill in from pump nameplate) \_\_\_\_\_

# Performance

## TSA2

### SUCTION/DISCHARGE PORT SIZE

- 2.5" Sanitary Tri-Clamp Fitting

### CAPACITY

- 0 to 208 gallons per minute  
(0 to 787 liters per minute)

### AIR DISTRIBUTION VALVE

- No-lube, no-stall design

### SOLIDS-HANDLING

- Up to 2 in. (50mm)

### HEADS UP TO

- 125 psi or 289 ft. of water  
(8.8 Kg/cm<sup>2</sup> or 88 meters)

### MAXIMUM OPERATING PRESSURE

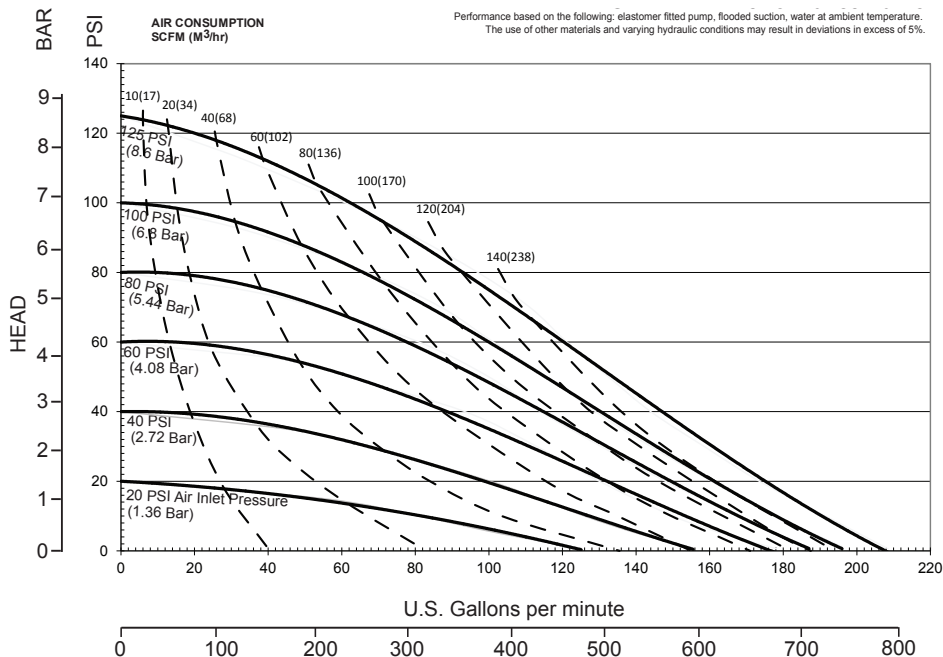
- 125 psi (8.6 bar)

### DISPLACEMENT/STROKE

- .43 Gallon / 1.60 liter

### SHIPPING WEIGHT

- Stainless Steel 133 lbs. (60kg)



# Materials

Material Profile:	Operating Temperatures:	
	Max.	Min.
<b>⚠ CAUTION!</b> Operating temperature limitations are as follows: <b>Nitrile:</b> General purpose, oil-resistant. Shows good solvent, oil, water and hydraulic fluid resistance. Should not be used with highly polar solvents like acetone and MEK, ozone, chlorinated hydrocarbons and nitro hydrocarbons.	190°F 88°C	-10°F -23°C
Maximum and Minimum Temperatures are the limits for which these materials can be operated. Temperatures coupled with pressure affect the longevity of diaphragm pump components. Maximum life should not be expected at the extreme limits of the temperature ranges.		
Metals:		
<b>Stainless Steel:</b> Equal to or exceeding ASTM specification A743 CF-8M for corrosion resistant iron chromium, iron chromium nickel and nickel based alloy castings for general applications. Commonly referred to as 316 Stainless Steel in the pump industry.		

Ambient temperature range: -20°C to +40°C

In addition, the ambient temperature range and the process temperature range do not exceed the operating temperature range of the applied non-metallic parts as listed in the manuals of the pumps.

For specific applications, always consult the Chemical Resistance Chart.

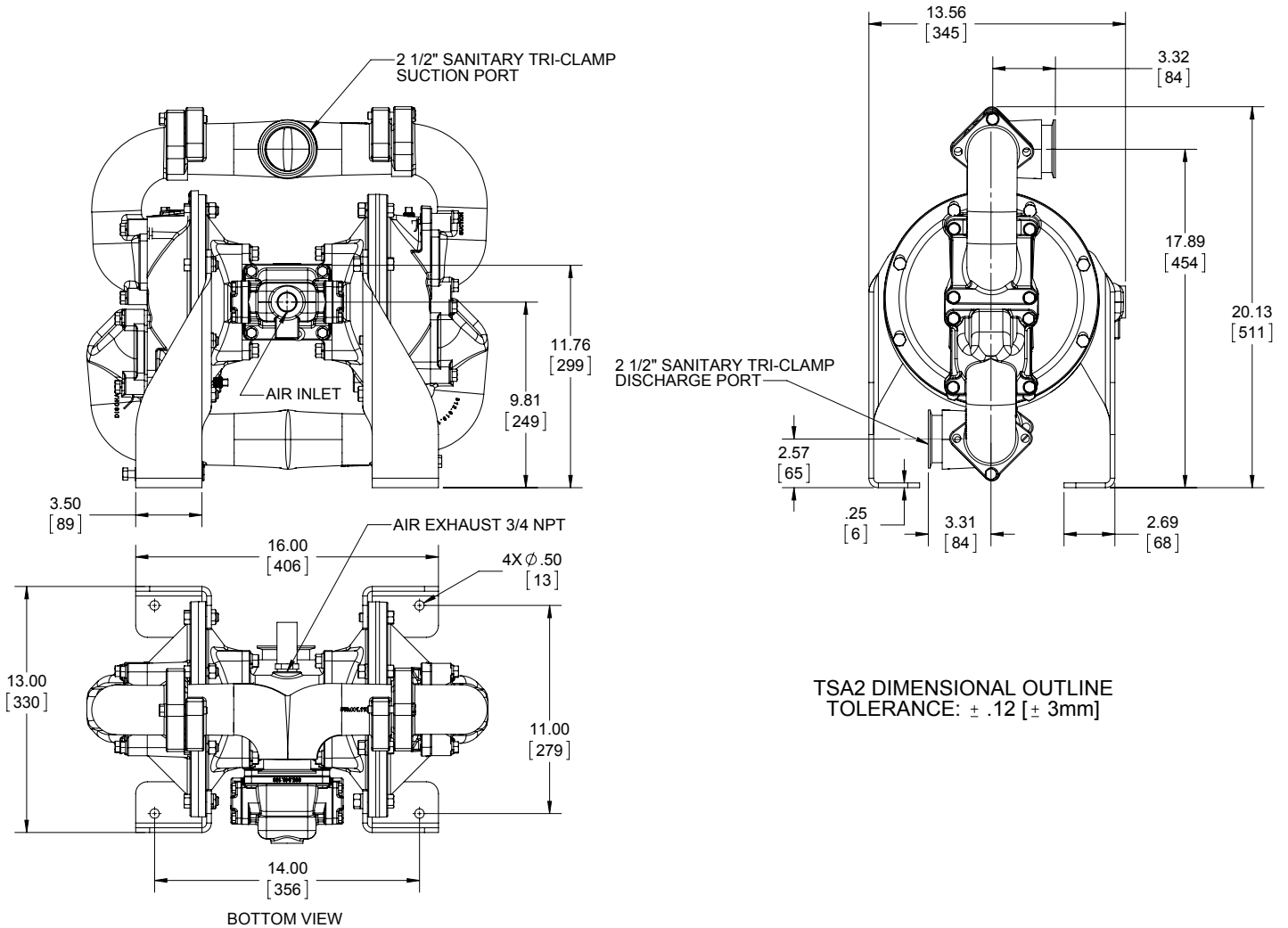
# Dimensional Drawings

## TSA2

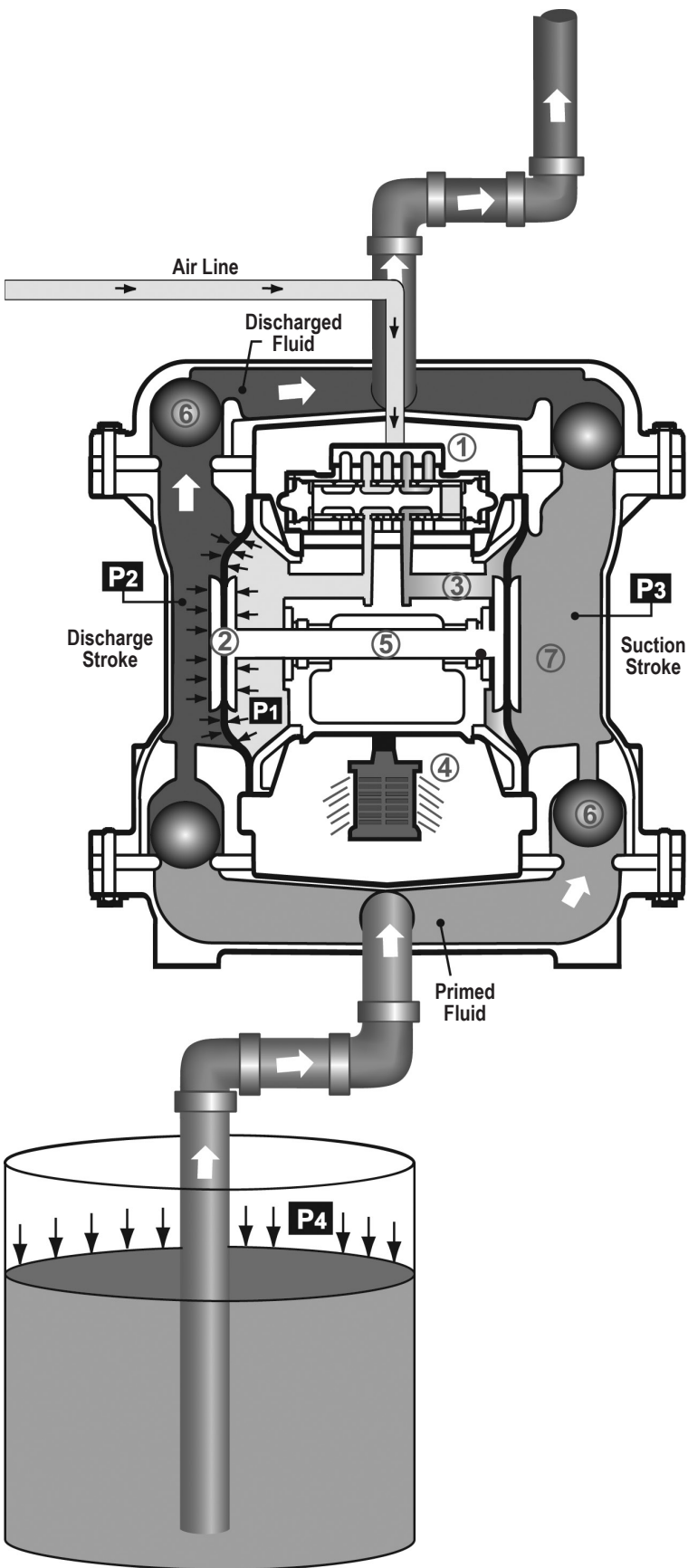
Dimensions in inches (metric dimensions in brackets).

Dimensional Tolerance .125" (3mm).

1: PUMP SPECS



# Principle of Pump Operation



Air-Operated Double Diaphragm (AODD) pumps are powered by compressed air or nitrogen.

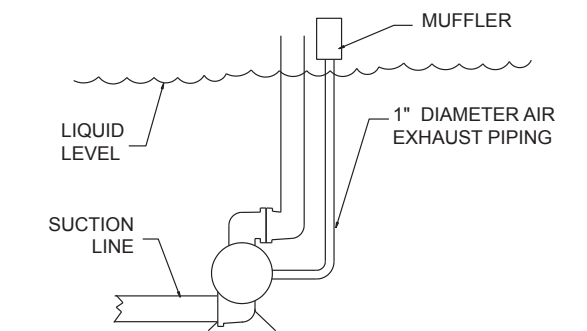
The main directional (air) control valve ① distributes compressed air to an air chamber, exerting uniform pressure over the inner surface of the diaphragm ②. At the same time, the exhausting air ③ from behind the opposite diaphragm is directed through the air valve assembly(s) to an exhaust port ④.

As inner chamber pressure (**P1**) exceeds liquid chamber pressure (**P2**), the rod ⑤ connected diaphragms shift together creating discharge on one side and suction on the opposite side. The discharged and primed liquid's directions are controlled by the check valves (ball or flap)⑥ orientation.

The pump primes as a result of the suction stroke. The suction stroke lowers the chamber pressure (**P3**) increasing the chamber volume. This results in a pressure differential necessary for atmospheric pressure (**P4**) to push the fluid through the suction piping and across the suction side check valve and into the outer fluid chamber ⑦.

Suction (side) stroking also initiates the reciprocating (shifting, stroking or cycling) action of the pump. The suction diaphragm's movement is mechanically pulled through its stroke. The diaphragm's inner plate makes contact with an actuator plunger aligned to shift the pilot signaling valve. Once actuated, the pilot valve sends a pressure signal to the opposite end of the main directional air valve, redirecting the compressed air to the opposite inner chamber.

## SUBMERGED ILLUSTRATION



Pump can be submerged if the pump materials of construction are compatible with the liquid being pumped. The air exhaust must be piped above the liquid level. When the pumped product source is at a higher level than the pump (flooded suction condition), pipe the exhaust higher than the product source to prevent siphoning spills.





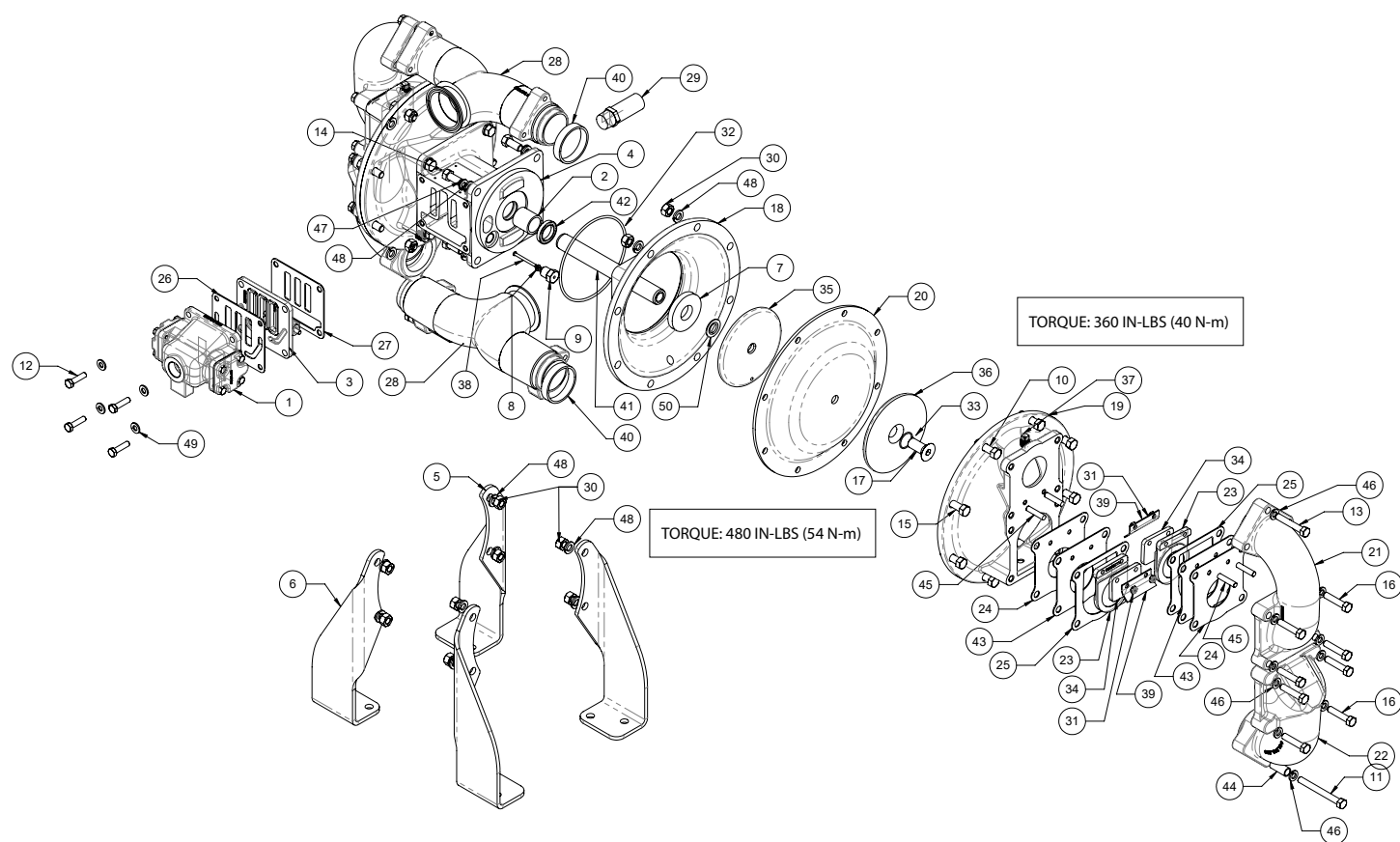


# Troubleshooting Guide

Symptom:	Potential Cause(s):	Recommendation(s):
Pump Cycles Once	Deadhead (system pressure meets or exceeds air supply pressure).	Increase the inlet air pressure to the pump. Pump is designed for 1:1 pressure ratio at zero flow. (Does not apply to high pressure 2:1 units).
	Air valve or intermediate gaskets installed incorrectly.	Install gaskets with holes properly aligned.
	Bent or missing actuator plunger.	Remove pilot valve and inspect actuator plungers.
Pump Will Not Operate / Cycle	Pump is over lubricated.	Set lubricator on lowest possible setting or remove. Units are designed for lube free operation.
	Lack of air (line size, PSI, CFM).	Check the air line size and length, compressor capacity (HP vs. cfm required).
	Check air distribution system.	Disassemble and inspect main air distribution valve, pilot valve and pilot valve actuators.
	Discharge line is blocked or clogged manifolds.	Check for inadvertently closed discharge line valves. Clean discharge manifolds/piping.
	Deadhead (system pressure meets or exceeds air supply pressure).	Increase the inlet air pressure to the pump. Pump is designed for 1:1 pressure ratio at zero flow. (Does not apply to high pressure 2:1 units).
	Blocked air exhaust muffler.	Remove muffler screen, clean or de-ice, and re-install.
	Pumped fluid in air exhaust muffler.	Disassemble pump chambers. Inspect for diaphragm rupture or loose diaphragm plate assembly.
	Pump chamber is blocked.	Disassemble and inspect wetted chambers. Remove or flush any obstructions.
Pump Cycles and Will Not Prime or No Flow	Cavitation on suction side.	Check suction condition (move pump closer to product).
	Check valve obstructed. Valve ball(s) not seating properly or sticking.	Disassemble the wet end of the pump and manually dislodge obstruction in the check valve pocket. Clean out around valve ball cage and valve seat area. Replace valve ball or valve seat if damaged. Use heavier valve ball material.
	Valve ball(s) missing (pushed into chamber or manifold).	Worn valve ball or valve seat. Worn fingers in valve ball cage (replace part). Check Chemical Resistance Guide for compatibility.
	Valve ball(s) / seat(s) damaged or attacked by product.	Check Chemical Resistance Guide for compatibility.
	Check valve and/or seat is worn or needs adjusting.	Inspect check valves and seats for wear and proper setting. Replace if necessary.
	Suction line is blocked.	Remove or flush obstruction. Check and clear all suction screens or strainers.
	Excessive suction lift.	For lifts exceeding 20' of liquid, filling the chambers with liquid will prime the pump in most cases.
	Suction side air leakage or air in product.	Visually inspect all suction-side gaskets and pipe connections.
	Pumped fluid in air exhaust muffler.	Disassemble pump chambers. Inspect for diaphragm rupture or loose diaphragm plate assembly.
Pump Cycles Running Sluggish / Stalling, Flow Unsatisfactory	Over lubrication.	Set lubricator on lowest possible setting or remove. Units are designed for lube free operation.
	Icing.	Remove muffler screen, de-ice, and re-install. Install a point of use air drier.
	Clogged manifolds.	Clean manifolds to allow proper air flow.
	Deadhead (system pressure meets or exceeds air supply pressure).	Increase the inlet air pressure to the pump. Pump is designed for 1:1 pressure ratio at zero flow. (Does not apply to high pressure 2:1 units).
	Cavitation on suction side.	Check suction (move pump closer to product).
	Lack of air (line size, PSI, CFM).	Check the air line size, length, compressor capacity.
	Excessive suction lift.	For lifts exceeding 20' of liquid, filling the chambers with liquid will prime the pump in most cases.
	Air supply pressure or volume exceeds system hd.	Decrease inlet air (press. and vol.) to the pump. Pump is cavitating the fluid by fast cycling.
	Undersized suction line.	Meet or exceed pump connections.
	Restrictive or undersized air line.	Install a larger air line and connection.
	Suction side air leakage or air in product.	Visually inspect all suction-side gaskets and pipe connections.
	Suction line is blocked.	Remove or flush obstruction. Check and clear all suction screens or strainers.
	Pumped fluid in air exhaust muffler.	Disassemble pump chambers. Inspect for diaphragm rupture or loose diaphragm plate assembly.
	Check valve obstructed.	Disassemble the wet end of the pump and manually dislodge obstruction in the check valve pocket.
	Check valve and/or seat is worn or needs adjusting.	Inspect check valves and seats for wear and proper setting. Replace if necessary.
	Entrained air or vapor lock in chamber(s).	Purge chambers through tapped chamber vent plugs. Purging the chambers of air can be dangerous.
Product Leaking Through Exhaust	Diaphragm failure, or diaphragm plates loose.	Replace diaphragms, check for damage and ensure diaphragm plates are tight.
	Diaphragm stretched around center hole or bolt holes.	Check for excessive inlet pressure or air pressure. Consult Chemical Resistance Chart for compatibility with products, cleaners, temperature limitations and lubrication.
Premature Diaphragm Failure	Cavitation.	Enlarge pipe diameter on suction side of pump.
	Excessive flooded suction pressure.	Move pump closer to product. Raise pump/place pump on top of tank to reduce inlet pressure. Install Back pressure device (Tech bulletin 41r). Add accumulation tank or pulsation dampener.
	Misapplication (chemical/physical incompatibility).	Consult Chemical Resistance Chart for compatibility with products, cleaners, temperature limitations and lubrication.
	Incorrect diaphragm plates or plates on backwards, installed incorrectly or worn.	Check Operating Manual to check for correct part and installation. Ensure outer plates have not been worn to a sharp edge.
Unbalanced Cycling	Excessive suction lift.	For lifts exceeding 20' of liquid, filling the chambers with liquid will prime the pump in most cases.
	Undersized suction line.	Meet or exceed pump connections.
	Pumped fluid in air exhaust muffler.	Disassemble pump chambers. Inspect for diaphragm rupture or loose diaphragm plate assembly.
	Suction side air leakage or air in product.	Visually inspect all suction-side gaskets and pipe connections.
	Check valve obstructed.	Disassemble the wet end of the pump and manually dislodge obstruction in the check valve pocket.
	Check valve and/or seat is worn or needs adjusting.	Inspect check valves and seats for wear and proper setting. Replace if necessary.
	Entrained air or vapor lock in chamber(s).	Purge chambers through tapped chamber vent plugs.

For additional troubleshooting tips contact After Sales Support at [service.warrenrupp@idexcorp.com](mailto:service.warrenrupp@idexcorp.com) or 419-524-8388

# Composite Repair Parts Drawing



## Service & Repair Kits

476.247.000

### Air End Kit

Pilot Valve Body Assembly, Bumper, Diaphragms, Acuator Bushing, Gaskets, O-Rings, Plunger, Actuator, Seal, U-Cup

476.040.366

### Wet End Kit

FDA White Nitrile Diaphragms, Flap Valve, Gaskets, Seat, Flange, Hinge Pad, Sealing Ring, Spacer

# Composite Repair Parts List

Item	Part Number	Description	Qty	Item	Part Number	Description	Qty
1	031.019.313	Valve Body Assembly	1	26	360.041.379	Gasket, Valve Body	1
2	070.006.170	Sleeve Bearing	2	27	360.048.425	Gasket, Pilot Valve	1
3	095.073.001	Pilot Valve Body Assembly	1	28	518.001.110 TC	Manifold Weldment	2
4	114.002.313	Bracket, Intermediate	4	29	530.036.000	Muffler	1
5	115.158.315	Bracket, Foot	2	30	545.007.115	7/16-14 Hex Nut	16
6	115.159.315	Bracket, Foot	2	31	547.002.110	1/4-20 Stop Nut	8
7	132.002.360	Bumper, Diaphragm	2	32	560.022.360	5-1/2 ID x 1/8 CS O-Ring	2
8	560.001.360	O-Ring	2	33	560.070.610	O-Ring	2
9	135.016.162	Actuator Bushing	2	34	570.001.366	Pad, Hinge (White)	4
10	170.023.115	7/16-14x 1 3/4 Capscrew	8	35	612.047.330	Plate, Diaphragm	2
11	170.026.115	3/8-16X 3 1/2 Capscrew	2	36	612.096.110	Outer Diaphragm Plate	2
12	170.045.115	5/16-18X 1 1/4 Capscrew	4	37	618.003.110	Pipe, Plug	2
13	170.052.115	3/8-16x2 1/4 Capscrew	2	38	620.011.114	Plunger, Actuator	2
14	170.058.115	7/16x 14 x 1 1/4	8	39	670.005.110	Retainer, Flap Valve	4
15	170.060.115	7/16-14x 1 3/4 Capscrew	8	40	675.013.366	Ring, Sealing (White)	4
16	170.020.115	3/8-16x 2 CA Screw	16	41	685.007.120	Rod Diaphragm	1
17	171.002.110	5/8-11 x 1 1/2 Capscrew	2	42	720.004.360	Seal, U-Cup	2
18	196.001.313	Chamber, Inner	2	43	722.004.110	Seat, Flap Valve	4
19	196.002.110 NS	Chamber, Outer	2	44	770.005.115	Spacer	2
20	286.007.366	Diaphragm (FDA White Nitrile)	2	45	807.018.110	Stud	8
21	312.012.110 P	Elbow, Suction (Prod)	2	46	900.005.115	3/8 Lock Washer	20
22	312.013.110	Elbow, Discharge	2	47	900.006.115	7/16 Lock Washer	8
23	338.005.366	Flap Valve (White)	4	48	901.022.115	7/16 Flat Washer	28
24	360.011.366	Gasket, Seat	2	49	901.038.115	Flat Washer	4
25	360.012.366	Gasket, Flange	4	50	902.003.000	Stat-O-Seal	2

## LEGEND:

○ = Items contained within Air End Kits

□ = Items contained within Wet End Kits

**Note:** Kits contain components specific to the material codes.

# Material Codes - The Last 3 Digits of Part Number

000.....Assembly, sub-assembly; and some purchased items	364.....EPDM Rubber Color coded: BLUE
010.....Cast Iron	365.....Neoprene Rubber Color coded: GREEN
015.....Ductile Iron	366.....Food Grade Nitrile
020.....Ferritic Malleable Iron	368.....Food Grade EPDM
080.....Carbon Steel, AISI B-1112	371.....Philthane (Tuftane)
110.....Alloy Type 316 Stainless Steel	374.....Carboxylated Nitrile
111.....Alloy Type 316 Stainless Steel (Electro Polished)	375.....Fluorinated Nitrile
112.....Alloy C	378.....High Density Polypropylene
113.....Alloy Type 316 Stainless Steel (Hand Polished)	379.....Conductive Nitrile
114.....303 Stainless Steel	408.....Cork and Neoprene
115.....302/304 Stainless Steel	425.....Compressed Fibre
117.....440-C Stainless Steel (Martensitic)	426.....Blue Gard
120.....416 Stainless Steel (Wrought Martensitic)	440.....Vegetable Fibre
148.....Hardcoat Anodized Aluminum	500.....Delrin® 500
150.....6061-T6 Aluminum	502.....Conductive Acetal, ESD-800
152.....2024-T4 Aluminum (2023-T351)	503.....Conductive Acetal, Glass-Filled
155.....356-T6 Aluminum	506.....Delrin® 150
156.....356-T6 Aluminum	520.....Injection Molded PVDF Natural color
157.....Die Cast Aluminum Alloy #380	540.....Nylon
158.....Aluminum Alloy SR-319	542.....Nylon
162.....Brass, Yellow, Screw Machine Stock	544.....Nylon Injection Molded
165.....Cast Bronze, 85-5-5-5	550.....Polyethylene
166.....Bronze, SAE 660	551.....Glass Filled Polypropylene
170.....Bronze, Bearing Type, Oil Impregnated	552.....Unfilled Polypropylene
180.....Copper Alloy	555.....Polyvinyl Chloride
305.....Carbon Steel, Black Epoxy Coated	556.....Black Vinyl
306.....Carbon Steel, Black PTFE Coated	557.....Conductive Polypropylene
307.....Aluminum, Black Epoxy Coated	558.....Conductive HDPE
308.....Stainless Steel, Black PTFE Coated	570.....Rulon II®
309.....Aluminum, Black PTFE Coated	580.....Ryton®
313.....Aluminum, White Epoxy Coated	600.....PTFE (virgin material) Tetrafluorocarbon (TFE)
330.....Zinc Plated Steel	603.....Blue Gylon®
332.....Aluminum, Electroless Nickel Plated	604.....PTFE
333.....Carbon Steel, Electroless Nickel Plated	606.....PTFE
335.....Galvanized Steel	607.....Envelon
337.....Silver Plated Steel	608.....Conductive PTFE
351.....Food Grade Santoprene®	610.....PTFE Encapsulated Silicon
353.....Geolast; Color: Black	611.....PTFE Encapsulated FKM
354.....Injection Molded #203-40 Santoprene® Duro 40D +/-5; Color: RED	632.....Neoprene/Hytrel®
356.....Hytrel®	633.....FKM/PTFE
357.....Injection Molded Polyurethane	634.....EPDM/PTFE
358.....Urethane Rubber (Some Applications) (Compression Mold)	635.....Neoprene/PTFE
359.....Urethane Rubber	637.....PTFE, FKM/PTFE
360.....Nitrile Rubber Color coded: RED	638.....PTFE, Hytrel®/PTFE
363.....FKM (Fluorocarbon) Color coded: YELLOW	639.....Nitrile/TFE
	643.....Santoprene®/EPDM
	644.....Santoprene®/PTFE
	656.....Santoprene® Diaphragm and Check Balls/EPDM Seats
	661.....EPDM/Santoprene®
	666.....FDA Nitrile Diaphragm, PTFE Overlay, Balls, and Seals

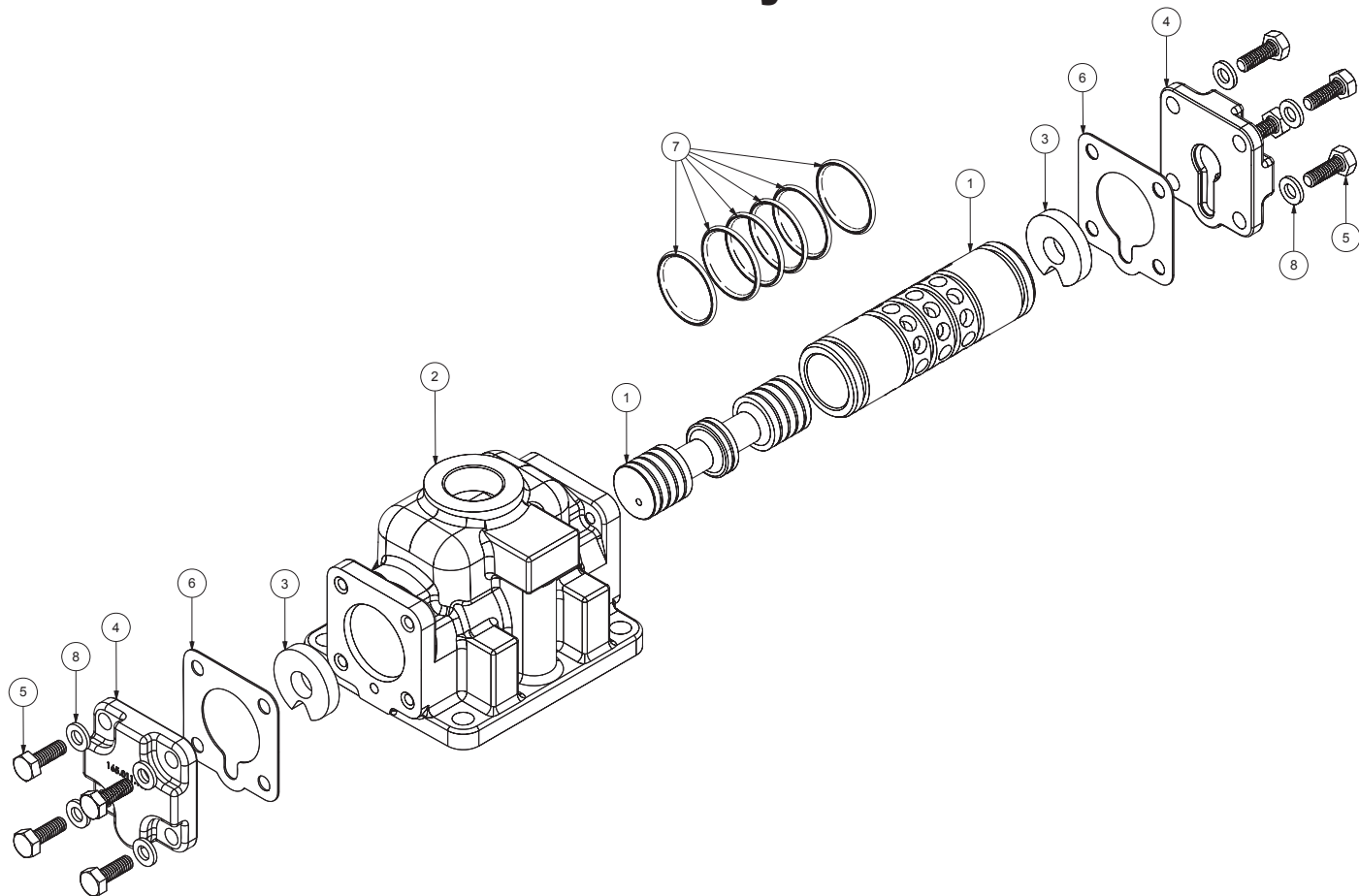
668.....PTFE, FDA Santoprene®/PTFE

- Delrin and Hytrel are registered tradenames of E.I. DuPont.
- Nylatron is a registered tradename of Polymer Corp.
- Gylon is a registered tradename of Garlock, Inc.
- Santoprene is a registered tradename of Exxon Mobil Corp.
- Rulon II is a registered tradename of Dixon Industries Corp.
- Ryton is a registered tradename of Phillips Chemical Co.
- Valox is a registered tradename of General Electric Co.

## RECYCLING

Warren Rupp is an ISO14001 registered company and is committed to minimizing the impact our products have on the environment. Many components of SANDPIPER® AODD pumps are made of recyclable materials. We encourage pump users to recycle worn out parts and pumps whenever possible, after any hazardous pumped fluids are thoroughly flushed. Pump users that recycle will gain the satisfaction to know that their discarded part(s) or pump will not end up in a landfill. The recyclability of SANDPIPER products is a vital part of Warren Rupp's commitment to environmental stewardship.

# Air Distribution Valve Assembly



## Air Distribution Valve Servicing

See repair parts drawing, remove screws.

- Step 1:** Remove Hex Head Cap Screws (5).
- Step 2:** Remove end cap (4), gasket (6) and bumper (3).
- Step 3:** Remove spool part of (1) (caution: do not scratch).
- Step 4:** Press sleeve (1) from body (2).
- Step 5:** Inspect O-Ring (7) and replace if necessary.
- Step 6:** Lightly lubricate O-Rings (7) on sleeve (1).
- Step 7:** Press sleeve (1) into body (2).
- Step 8:** Reassemble in reverse order, starting with step 3.

**Note:** Sleeve and spool (1) set is match ground to a specified clearance sleeve and spools (1) cannot be interchanged.

## MAIN AIR VALVE ASSEMBLY PARTS LIST

Item	Part Number	Description	Qty
①	031.012.000	Sleeve And Spool Set	1
2	095.043.313	Body, Main Air Valve	1
③	132.014.358	Bumper, Valve Spool	2
4	165.011.313	Cap, End	2
5	170.032.115	Capscrew, Hex Head 1/4-20 X .75	8
⑥	360.010.425	Gasket, End Cap	2
⑦	560.020.360	O-Ring	6
8	901.037.115	1/4" Flat Washer	8

### LEGEND:

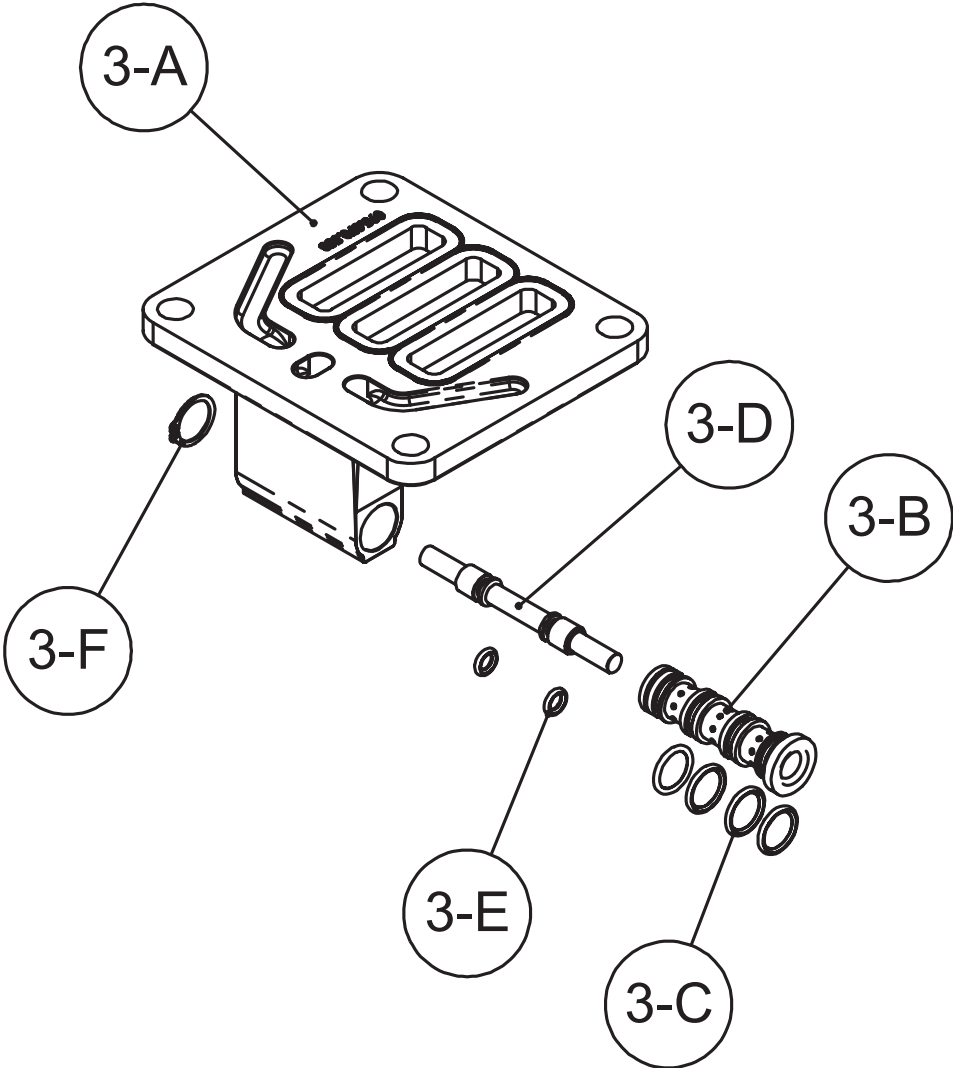
○ = Items contained within Air End Kits

### ! IMPORTANT



*Read these instructions completely, before installation and start-up. It is the responsibility of the purchaser to retain this manual for reference. Failure to comply with the recommendations stated in this manual will damage the pump, and void factory warranty.*

# Pilot Valve Assembly



4: AIR END

## Pilot Valve Servicing

With Pilot Valve removed from pump.

- Step 1:** Remove snap ring (3-F).
- Step 2:** Remove sleeve (3-B), inspect O-Rings (3-C), replace if required.
- Step 3:** Remove spool (3-D) from sleeve (3-B), inspect O-Rings (3-E), replace if required.
- Step 4:** Lightly lubricate O-Rings (3-C) and (3-E).
- Reassemble in reverse order.

## PILOT VALVE ASSEMBLY PARTS LIST

Item	Part Number	Description	Qty
3	095.073.001	Pilot Valve Assembly	1
3-A	095.070.558	Valve Body	1
3-B	755.025.000	Sleeve (With O-Rings)	1
3-C	560.033.360	O-Ring (Sleeve)	4
3-D	775.026.000	Spool (With O-Rings)	1
3-E	560.023.360	O-Ring (Spool)	2
3-F	675.037.080	Retaining Ring	1



# Diaphragm Servicing

**Step 1:** With manifolds and outer chambers removed, remove diaphragm assemblies from diaphragm rod. **DO NOT** use a pipe wrench or similar tool to remove assembly from rod. Flaws in the rod surface may damage bearings and seal. Soft jaws in a vise are recommended to prevent diaphragm rod damage.

**Step 1.A: NOTE:** Not all inner diaphragm plates are threaded. Some models utilize a through hole in the inner diaphragm plate. If required to separate diaphragm assembly, place assembly in a vise, gripping on the exterior cast diameter of the inner plate. Turn the outer plate clockwise to separate the assembly.

Always inspect diaphragms for wear cracks or chemical attack. Inspect inner and outer plates for deformities, rust scale and wear. Inspect intermediate bearings for elongation and wear. Inspect diaphragm rod for wear or marks.

Clean or repair if appropriate. Replace as required.

**Step 2:** Reassembly: There are two different types of diaphragm plate assemblies utilized throughout the Sandpiper product line: Outer plate with a threaded stud, diaphragm, and a threaded inner plate.

Outer plate with a threaded stud, diaphragm, and an inner plate with through hole. Secure threaded inner plate in a vise. Ensure that the plates are being installed with the outer radius against the diaphragm.

**Step 3:** Lightly lubricate, with a compatible material, the inner faces of both outer and inner diaphragm plates when using on non Overlay diaphragms (For EPDM water is recommended). No lubrication is required.

**Step 4:** Push the threaded outer diaphragm plate through the center hole of the diaphragm.

**Note:** Most diaphragms are installed with the natural bulge out towards the fluid side. S05, S07, and S10 non-metallic units are installed with the natural bulge in towards the air side.

**Step 5:** Thread or place, outer plate stud into the inner plate. For threaded inner plates, use a torque wrench to tighten the assembly together. Torque values are called out on the exploded view.

Repeat procedure for second side assembly. Allow a minimum of 15 minutes to elapse after torquing, then re-torque the assembly to compensate for stress relaxation in the clamped assembly.

**Step 6:** Thread one assembly onto the diaphragm rod with sealing washer (when used) and bumper.

**Step 7:** Install diaphragm rod assembly into pump and secure by installing the outer chamber in place and tightening the capscrews.

**Step 8:** On opposite side of pump, thread the remaining assembly onto the diaphragm rod. Using a torque wrench, tighten the assembly to the diaphragm rod. Align diaphragm through bolt holes, always going forward past the recommended torque. Torque values are called out on the exploded view. **NEVER** reverse to align holes, if alignment cannot be achieved without damage to diaphragm, loosen complete assemblies, rotate diaphragm and reassemble as described above.

## IMPORTANT



*Read these instructions completely, before installation and start-up. It is the responsibility of the purchaser to retain this manual for reference. Failure to comply with the recommendations stated in this manual will damage the pump, and void factory warranty.*



# Written Warranty

## 5 - YEAR Limited Product Warranty

Warren Rupp, Inc. ("Warren Rupp") warrants to the original end-use purchaser that no product sold by Warren Rupp that bears a Warren Rupp brand shall fail under normal use and service due to a defect in material or workmanship within five years from the date of shipment from Warren Rupp's factory. Warren Rupp brands include Warren Rupp®, SANDPIPER®, SANDPIPER Signature Series™, MARATHON®, Porta-Pump®, SludgeMaster™ and Tranquilizer®.

The use of non-OEM replacement parts will void (or negate) agency certifications, including CE, ATEX, CSA, 3A and EC1935 compliance (Food Contact Materials). Warren Rupp, Inc. cannot ensure nor warrant non-OEM parts to meet the stringent requirements of the certifying agencies.

~ See [sandpiperpump.com/content/warranty-certifications](http://sandpiperpump.com/content/warranty-certifications) for complete warranty, including terms and conditions, limitations and exclusions. ~

**WARREN  
RUPP, INC.**

## Declaration of Conformity

**Manufacturer: Warren Rupp, Inc., 800 N. Main Street  
Mansfield, Ohio, 44902 USA**

Certifies that Air-Operated Double Diaphragm Pump Series: HDB, HDF, M Non-Metallic, S Non-Metallic, M Metallic, S Metallic, T Series, G Series, U Series, EH and SH High Pressure, RS Series, W Series, F Series, SMA and SPA Submersibles, and Tranquilizer® Surge Suppressors comply with the European Community Directive 2006/42/EC on Machinery, according to Annex VIII.

This product has used Harmonized Standard EN809:2012, Pumps and Pump Units for Liquids - Common Safety Requirements, to verify conformance.

David Roseberry  
Signature of authorized person

October 20, 2005  
Date of issue

Authorised Representative:  
IDEX Pump Technologies  
R79 Shannon Industrial Estate  
Shannon, Co. Clare, Ireland

Director of Engineering  
Title

February 27, 2017  
Date of revision

Attn: Barry McMahon

**IDEX**

Revision Level: F

**CE**