

SERVICE & OPERATING MANUAL

Original Instructions

Certified Quality



intertek

Total Quality. Assured.

ISO 9001 Certified

ISO 14001 Certified



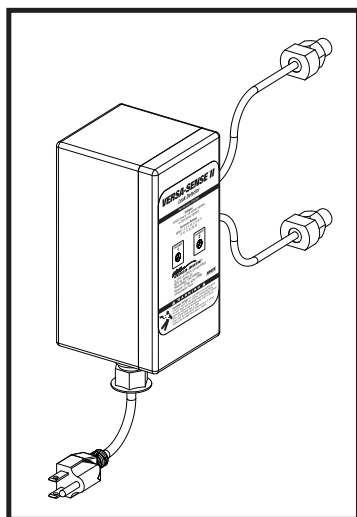
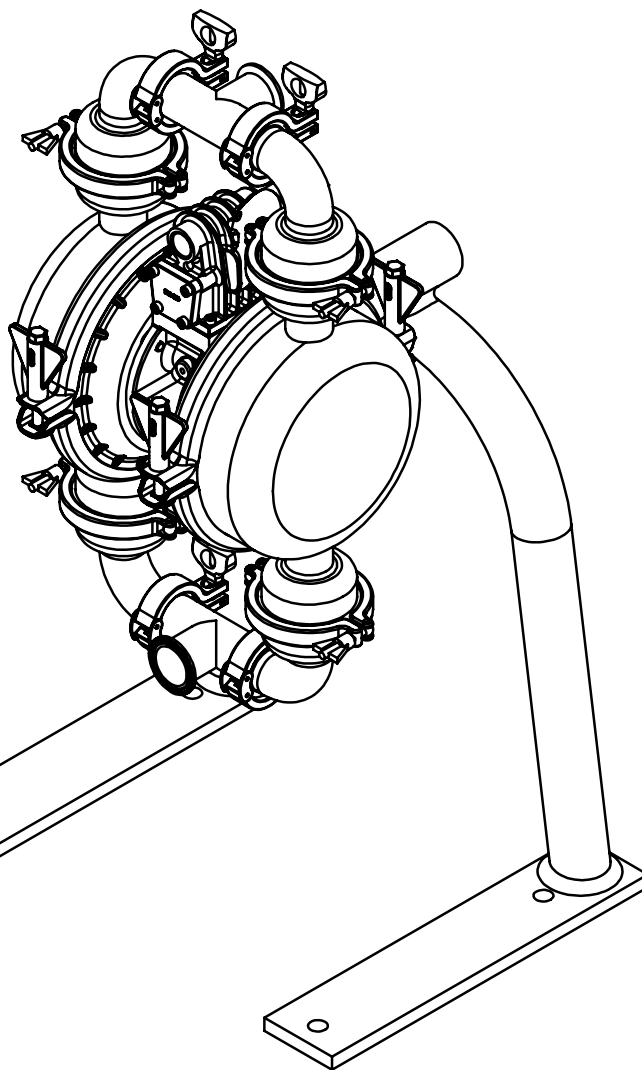
Warren Rupp, Inc.
A Unit of IDEX Corporation
800 N. Main St.,
Mansfield, Ohio 44902 USA
Telephone 419.524.8388
Fax 419.522.7867
SANDPIPERPUMP.COM



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Model F15 - 3A

**Metallic Sanitary Processing Pump
Constructed with FDA Compliant Materials
Design Level 1**



1: PUMP SPECS

2: INSTAL & OP

3: EXP VIEW

4: WARRANTY

SANDPIPER®
A WARREN RUPP, INC. BRAND

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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.



Plastic 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.



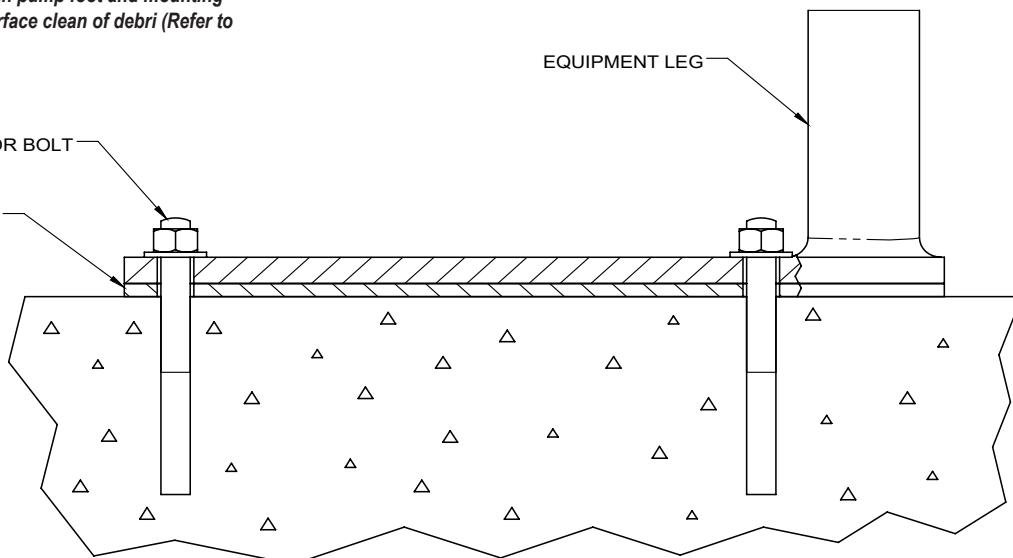
WARNING

Do not operate pump in a sterilization system as described in 3A standard 44-03 section D14.3



Place gasket between pump foot and mounting surface to keep interface clean of debris (Refer to figure below).

ANCHOR BOLT
SEALING GASKET



! 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

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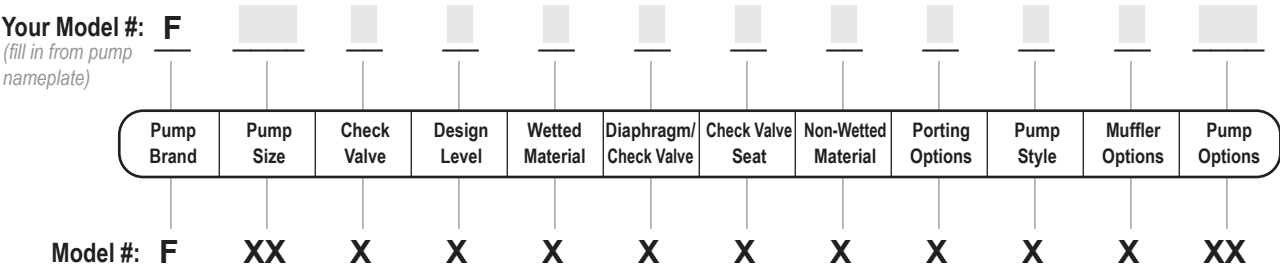
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Explanation of Pump Nomenclature



Pump Brand
F Food Processing

Pump Size
15 1-1/2"

Check Valve Type
B Ball

Design Level
1 Design Level

Wetted Material
S Stainless Steel

Diaphragm/Check Valve Materials
Z PTFE One-Piece Fusion Diaphragm / PTFE

Check Valve Seat
S Stainless Steel

Non-Wetted Material Options
N Nickel Plated Aluminum

Porting Options
T 1 1/2" Sanitary Clamp

Pump Style
3 3-A Certified

Muffler Options
6 Metal Muffler

Pump Options
0 None

Your Serial #: *(fill in from pump nameplate)* _____

*Complies with Code of Federal Regulations (CFR) Title 21 Part 177

Performance

1: PUMP SPECS

3-A Sanitary Pump PTFE Fitted

Flow Rate

Adjustable to 0-51 gpm (193 lpm)

Port Size

Suction 1 1/2" Sanitary Clamp

Discharge 1 1/2" Sanitary Clamp

Air Inlet

..... 1/2" NPT

Air Exhaust

..... 3/4" NPT

Suction Lift

Dry 15' (4.57 m)

Wet 25' (7.62 m)

Max Solid Size (Diameter)

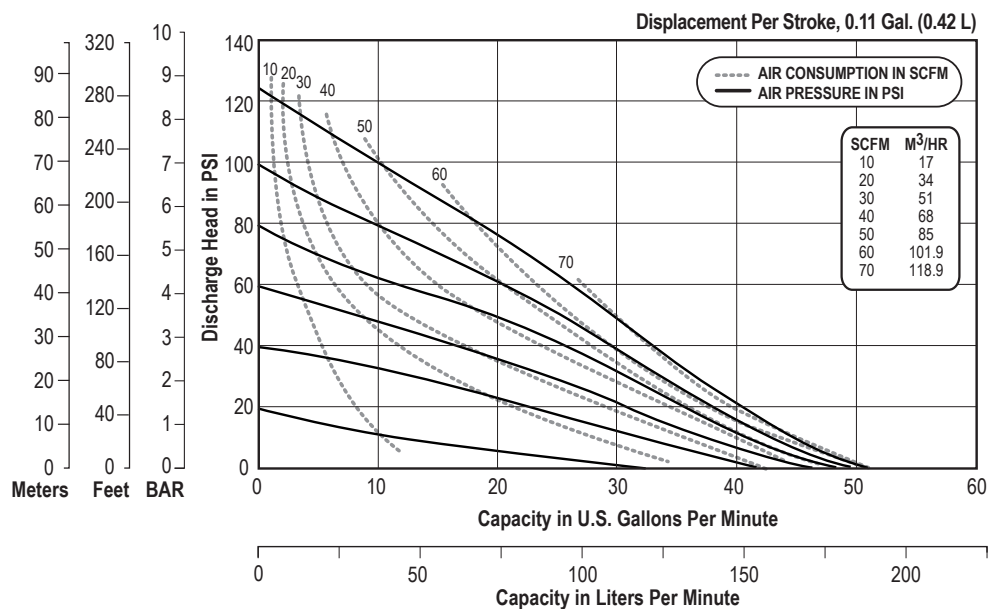
..... 3/8" (9.5 mm)

Max Noise Level

..... 101 dB(A)

Shipping Weights

Stainless Steel 75 lbs (34 kg)



NOTE: Performance based on the following: PTFE fitted pump, flooded suction, water at ambient conditions. The use of other materials and varying hydraulic conditions may result in deviations in excess of 5%.

Materials

Material Profile:	Operating Temperatures:	
	Max.	Min.
CAUTION! Operating temperature limitations are as follows: Virgin PTFE: (PFA/TFE) Chemically inert, virtually impervious. Very few chemicals are known to chemically react with PTFE; molten alkali metals, turbulent liquid or gaseous fluorine and a few fluoro-chemicals such as chlorine trifluoride or oxygen difluoride which readily liberate free fluorine at elevated temperatures.	220°F 104°C	-35°F -37°C
<i>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.</i>		
Metals:		
Stainless Steel: Equal to or exceeding ASTM specification A743 CF-8M for corrosion resistant iron chromium, iron chromium nickel and nickel based alloy castings for general applicaitons. Commonly referred to as 316 Stainless Steel in the pump industry.		

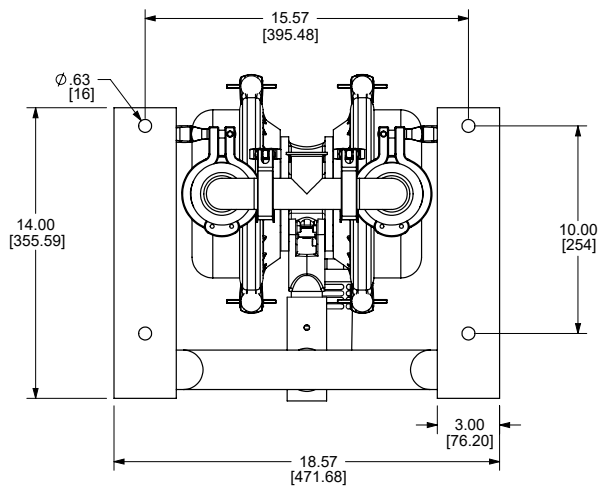
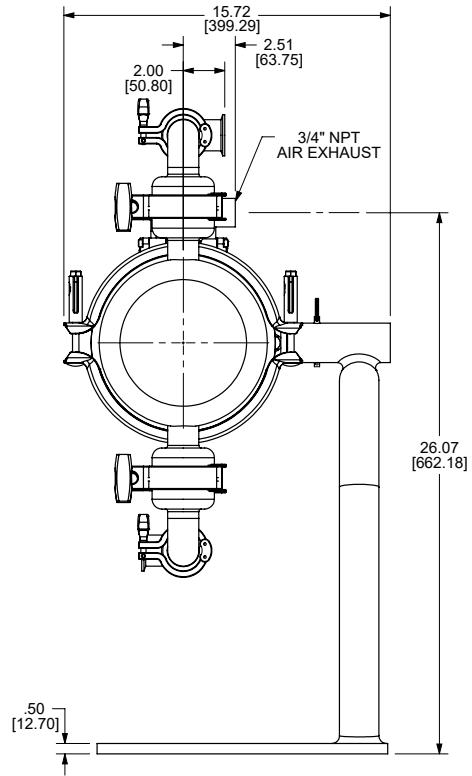
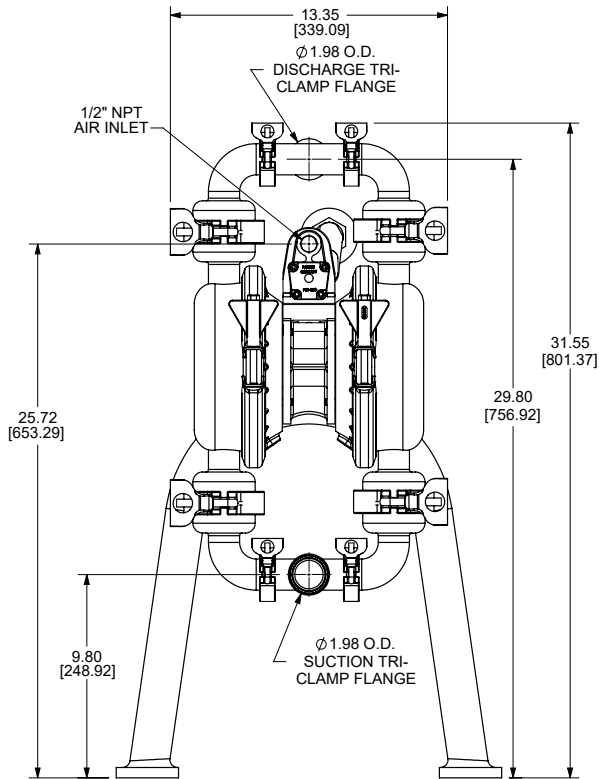
For specific applications, always consult the Chemical Resistance Chart.

Dimensional Drawings

3-A Sanitary Processing Metallic

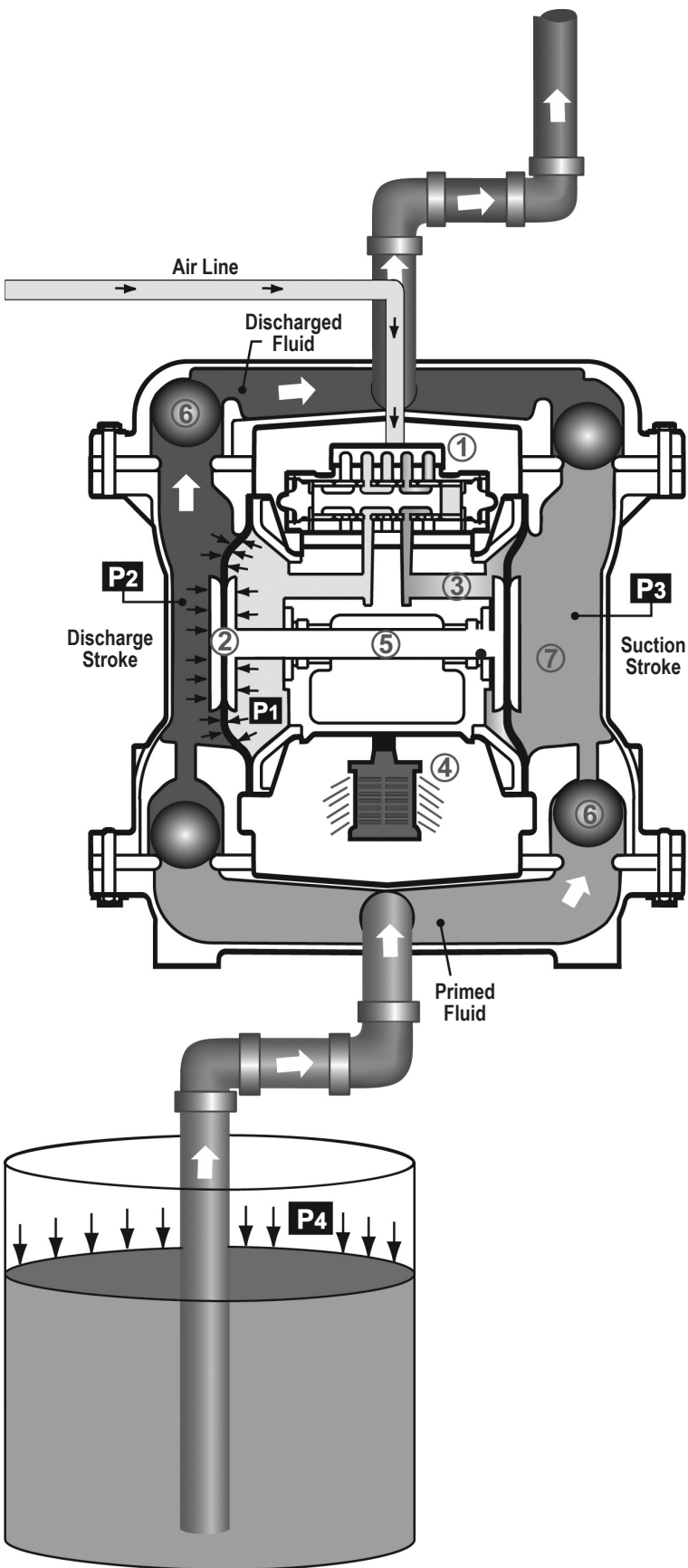
Dimensions in inches (mm dimensions in brackets).

The dimensions on this drawing are for reference only. A certified drawing can be requested if physical dimensions are needed.



BOTTOM VIEW

Principle of Pump Operation



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

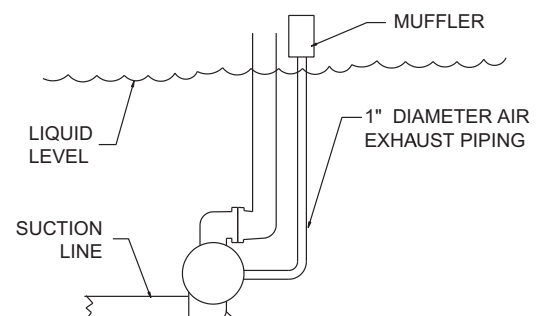
The main directional (air) control valve distributes compressed air to an air chamber, exerting uniform pressure over the inner surface of the diaphragm. At the same time, the exhausting air from behind the opposite diaphragm is directed through the air valve assembly(s) to an exhaust port.

As inner chamber pressure (**P1**) exceeds liquid chamber pressure (**P2**), the rod 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) 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.

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



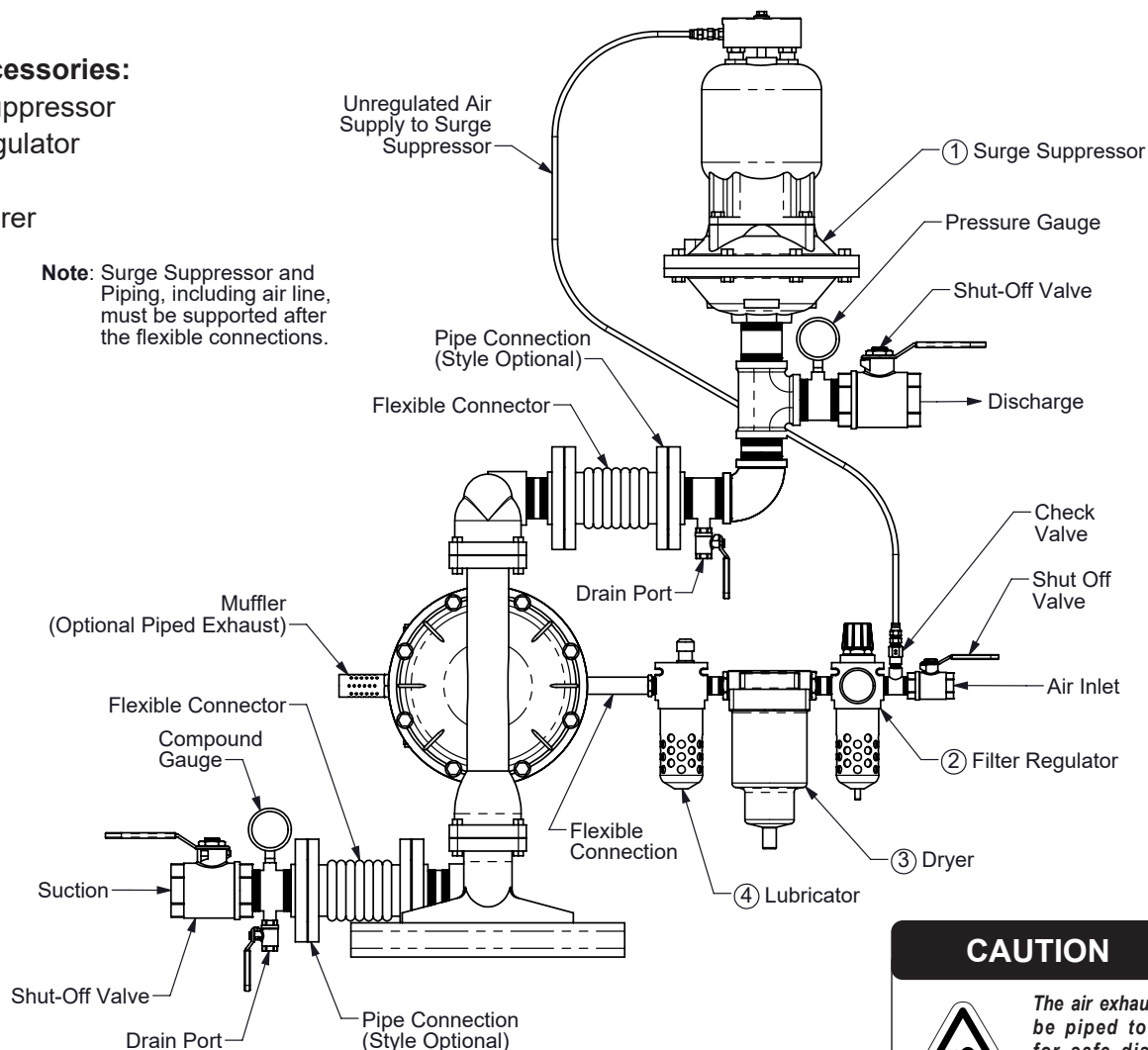
Pump can be submerged if the pump materials of construction are compatible with the liquid being pumped. The air exhaust must be piped above the liquid level. When the pumped product source is at a higher level than the pump (flooded suction condition), pipe the exhaust higher than the product source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

Recommended Installation Guide

Available Accessories:

1. Surge Suppressor
2. Filter/Regulator
3. Air Dry
4. Lubricator

Note: Surge Suppressor and Piping, including air line, must be supported after the flexible connections.



CAUTION



The air exhaust should be piped to an area for safe disposition of the product being pumped, in the event of a diaphragm failure.

Installation And Start-Up

Locate the pump as close to the product being pumped as possible. Keep the suction line length and number of fittings to a minimum. Do not reduce the suction line diameter.

Air Supply

Connect the pump air inlet to an air supply with sufficient capacity and pressure to achieve desired performance. A pressure regulating valve should be installed to insure air supply pressure does not exceed recommended limits.

Air Valve Lubrication

The air distribution system is designed to operate WITHOUT lubrication. This is the standard mode of operation. If lubrication is desired, install an air line lubricator set to deliver one drop of SAE 10 non-detergent oil for every 20 SCFM (9.4 liters/sec.) of air the pump consumes. Consult the Performance Curve to determine air consumption.

Air Line Moisture

Water in the compressed air supply may cause icing or freezing of the exhaust air, causing the pump to cycle erratically or stop operating. Water in the air supply can be reduced by using a point-of-use air dryer.

Air Inlet And Priming

To start the pump, slightly open the air shut-off valve. After the pump primes, the air valve can be opened to increase air flow as desired. If opening the valve increases cycling rate, but does not increase the rate of flow, cavitation has occurred. The valve should be closed slightly to obtain the most efficient air flow to pump flow ratio.

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 or 419-524-8388

Pump Inspection and Cleaning

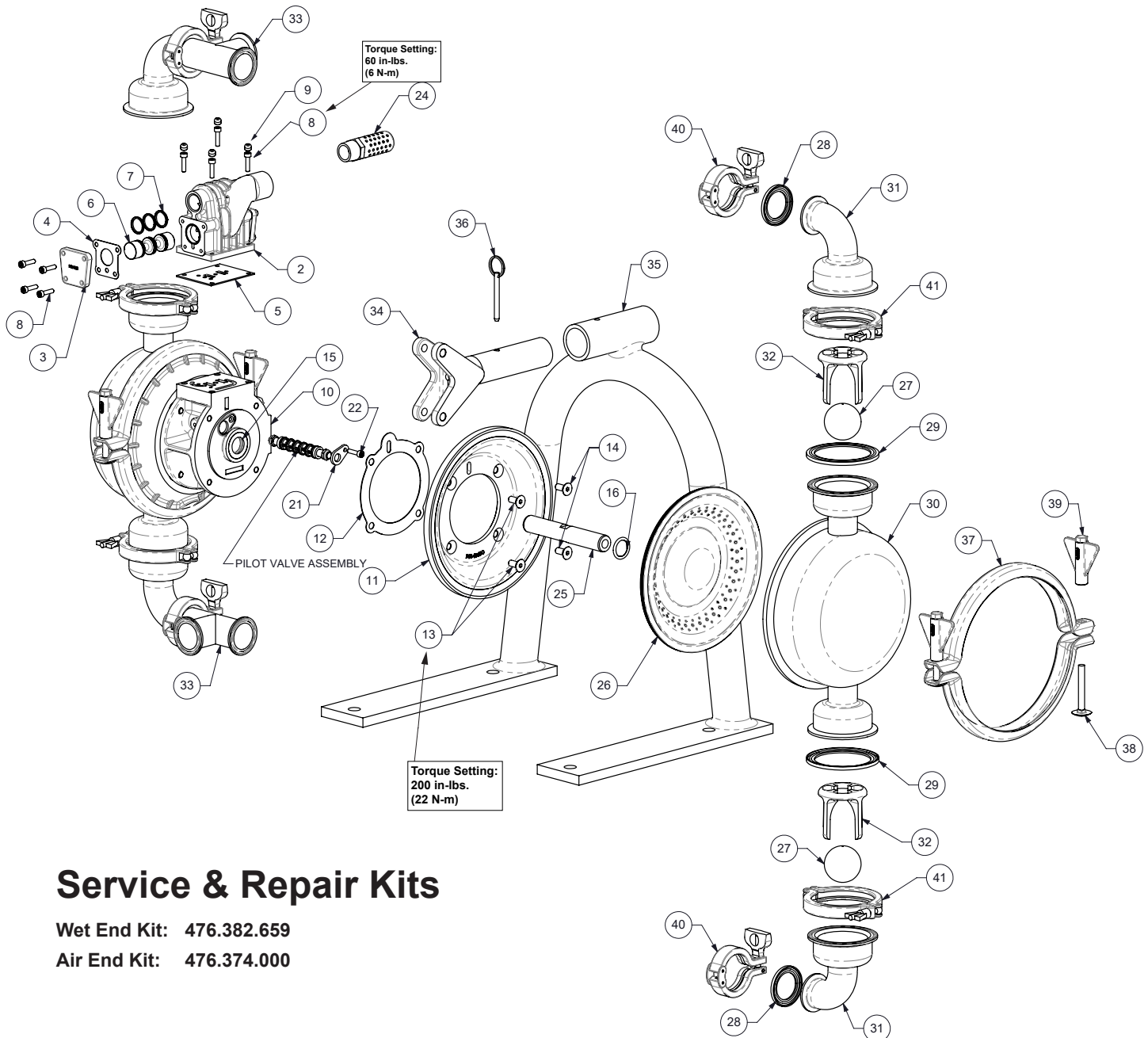
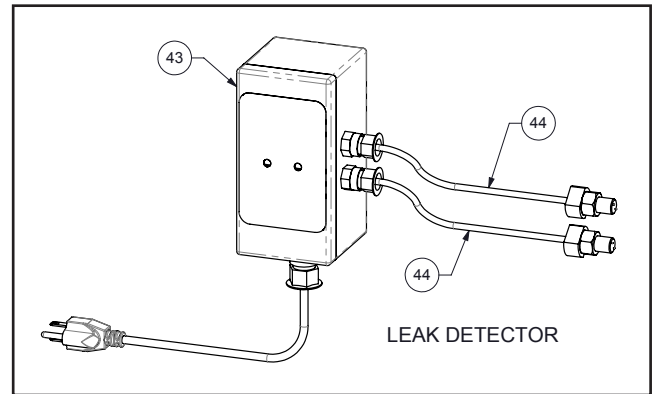
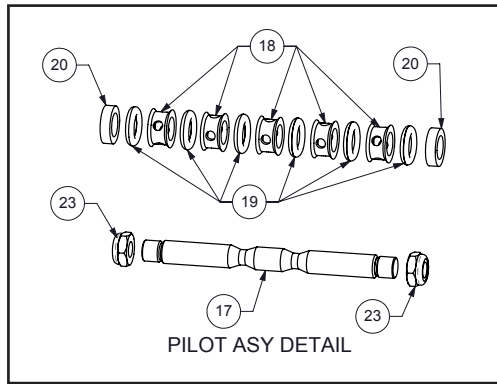
The Elimatic sanitary pump can be cleaned using several techniques. However, it is important to follow guidelines set by the IAMFES, the USPHS, and the DIC and/or internal rules for inspection, cleaning and sanitization. Remove the valve balls and ball cages from the pump and clean components separate from the pump.

If the pump is to be steam cleaned, disconnect the suction line from the pump. Connect the steam line to the pump inlet. Maintain the flow of steam through the pump for at least five minutes after the temperature at the outlet has reached 200°F (94°C).

Hot water may also be used. Pump water that is maintained at minimum of 170°F (77°C) through the pump for at least five minutes. Please note that the maximum cleaning temperature of the pump is 220° (104°C).

Chemical cleaning may also be used in sanitizing the pump. Be sure to consult your distributor or the manufacturer to verify that the elastomer(s) used in the pump are compatible with the chemicals being used in the cleaning process.

Composite Repair Parts Drawing



3: EXP VIEW

Service & Repair Kits

Wet End Kit: 476.382.659

Air End Kit: 476.374.000

Composite Repair Parts List

3: EXP VIEW

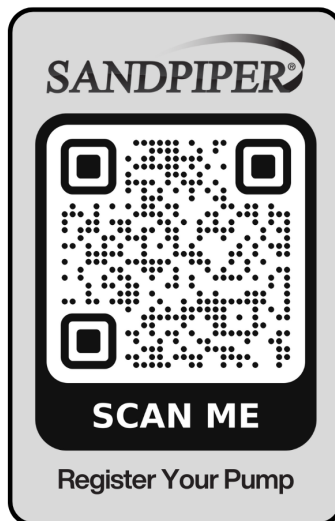
Air Valve Assembly			
Item #	Qty.	Description	Part Number
1	-	Valve Body Assembly (includes items 2-8)	P31-200-NP
2	1	Valve Body	P31-201NP
3	2	End Cap	P50-300NP
4	2	End Cap Gasket	P50-110
5	1	Valve Body Gasket	P31-202
6	1	Valve Spool	P50-104
7	3	Glyde Ring Assembly	P50-104C
8	12	Mounting Screws (8 included on item 1)	S1001
9	4	Cap	165.161.000
Center Section Assembly			
Item #	Qty.	Description	Part Number
10	1	Center Block Assembly (Includes item 15 & 16)	P31-400NP ASY
11	2	Air Chamber	P31-1013ANP
12	2	Air Chamber Gasket	P31-109
13	4	Air Chamber Bolt	P31-404
14	4	Air Chamber Bolt (Long)	P31-404B
15	2	Bearing Sleeve	P31-403
16	2	Main Shaft O-Ring	P24-403
17	1	Pilot Shaft	P50-112
18	5	Pilot Spacer	P24-106P
19	6	Pilot O-Ring	P24-107
20	2	Pilot Ring	P50-119
21	2	Pilot Retainer	P50-109
22	2	Screw	S1001
23	2	Stop Nut	P24-108
24	1	Muffler	530.060.000
Diaphragm Assembly / Elastomers			
Item #	Qty.	Description	Part Number
25	1	Main Shaft	P31-103
26	2	Diaphragm	V163F
27	4	Valve Ball	V171TF
28	4	Manifold Tee Seal	V273-TF
29	4	Manifold Elbow Seal	V274-TF
Wet End Assembly			
Item #	Qty.	Description	Part Number
30	2	Water Chamber	P29-165
31	4	Manifold Elbow	P29-167
32	4	Ball Cage	670.V004.110
33	2	Manifold Tee	P29-168
34	1	Stand Attachment	SP31-651
35	1	Pump Stand	P29-650CP
36	1	Locking Pin	P29-652
37	4	Large Clamp	SP31-110A
38	4	Large Clamp Bolt	SP31-110B
39	4	Large Clamp Wing Nut	FG39C
40	4	Small Tri-Clamp	V273A
41	4	Large Tri-Clamp	V274A
42	2	Air Chamber Plug (Not pictured)	P29-653
43	1	Leak Detector	249.035.000
44	2	Leak Detector Probe	P29-804

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 for complete warranty, including terms and conditions, limitations and exclusions. ~



ISSUE DATE: March 19, 1999

CERTIFICATE AUTHORIZATION NUMBER: 1012



THIS IS TO CERTIFY THAT

Warren Rupp, Inc.

800 North Main St., Mansfield, OH 44901-1568

is hereby authorized to continue to apply the
3-A Symbol to the models of equipment, conforming to 3-A Sanitary Standards for:

Number 44-03
44-03 (Diaphragm Pumps)

set forth below

Both CIP and COP Models: VERSAMATIC® E2SJ5F5S0C-3A, E2SS5F5S0C-3A, and
E4SJ5F5S0-3A, SANDPIPER® F15B1SZSNT3600 and F20B1SZSNT3600

VALID THROUGH: **December 31, 2024**

The issuance of this authorization for the use of the 3-A Symbol is based upon the voluntary certification, by the applicant for it, that the equipment listed above complies fully with the 3-A Sanitary Standard(s) designated. Legal responsibility for compliance is solely that of the holder of this Certificate of Authorization, and 3-A Sanitary Standards, Inc. does not warrant that the holder of an authorization at all times complies with the provisions of the said 3-A Sanitary Standards. This in no way affects the responsibility of 3-A Sanitary Standards, Inc. to take appropriate action in such cases in which evidence of nonconformance has been established.

NEXT TPV INSPECTION/REPORT DUE: **October 2027**