



# SERVICE AND OPERATING MANUAL

CE **Model SSB1**  II 2GD cT5  
**Model DSB1** -This Model is not ATEX Compliant

Type 3

## Table of Contents

Principle of Operation .....	1
Installation and Start-Up .....	1
Air Supply .....	1
Air Inlet & Priming .....	2
ESADS+Plus®: Externally Serviceable Air Distribution System .....	2
Air Exhaust .....	3
Between Uses .....	3
Check Valve Servicing .....	3
Diaphragm Servicing .....	3
Reassembly .....	3
Pilot Valve .....	4
Pilot Valve Actuator .....	4
Service Instructions: Troubleshooting .....	5
Warranty .....	5
Important Safety Information .....	6
Recycling .....	6
Grounding The Pump .....	7
Material Codes .....	8
Declaration of Conformity .....	9
Composite Repair Parts List .....	10-11
Composite Repair Drawing .....	12



## PRINCIPLE OF OPERATION

This ball check valve pump is powered by compressed air and is a 1:1 pressure ratio design. It alternately pressurizes the inner side of one diaphragm chamber, while simultaneously exhausting the other inner chamber. This causes the diaphragms, which are connected by a common rod, to move endwise. Air pressure is applied over the entire surface of the diaphragm, while liquid is discharged from the opposite side. The diaphragm operates under a balanced condition during the discharge stroke, which allows the unit to be operated at discharge heads over 200 feet (61 meters) of water head.

Since the diaphragms are connected by a common rod, secured by plates to the center of the diaphragms, one diaphragm performs the discharge stroke, while the other is pulled to perform the suction stroke in the opposite chamber.

For maximum diaphragm life, keep the pump as close to the liquid being pumped as possible. Positive suction head in excess of 10 feet of liquid (3.048 meters) may require a back pressure regulating device. This will maximize diaphragm life.

Alternate pressuring and exhausting of the diaphragm chamber is performed by means of an externally mounted, pilot operated, four-way spool type air distribution valve. When the spool shifts to one end of the valve body, inlet air pressure is applied to one diaphragm chamber and the other diaphragm chamber exhausts. When the spool shifts to the opposite end of the valve body, the porting of chambers is reversed. The air distribution valve spool is moved by an internal pilot valve which alternately pressurizes one side of the air distribution valve spool, while exhausting the other side. The pilot valve is shifted at each end of the diaphragm stroke by the diaphragm plate coming in contact with the end of the pilot valve spool. This pushes it into position for shifting of the air distribution valve.

The chambers are manifolded together with a suction and discharge check valve for each chamber, maintaining flow in one direction through the pump.

## INSTALLATION & START-UP

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

For installations of rigid piping, short flexible sections of hose should be installed between pump and piping. This reduces vibration and strain to the piping system. A Warren Rupp Tranquilizer® surge suppressor is recommended to further reduce pulsation in flow.

This pump was tested at the factory prior to shipment and is ready for operation. It is completely self-priming from a dry start for suction lifts of 10 feet (3.05 meters) or less. For suction lifts exceeding 10 feet of liquid, fill the chambers with liquid prior to priming.

## AIR SUPPLY

Air supply pressures cannot exceed 125 psi (8.61 bar). Connect the pump air inlet to an air supply of sufficient capacity and pressure required for desired performance. When the air line is solid piping, use a short length of flexible hose [not less than 3/4" (19mm) in diameter] between pump and piping to eliminate strain to pipes. Use of a Warren Rupp Filter/Regulator in the air line is recommended. An air line lubricator is not recommended, particularly if EPDM is being used. Chemical attack could occur.

## AIR INLET & PRIMING

For start-up, open an air valve approximately 1/2" to 3/4" turn. After the unit primes, an air valve can be opened to increase flow as desired. If opening the valve increases cycling rate, but does not increase flow rate, cavitation has occurred, and the valve should be closed slightly.

For the most efficient use of compressed air and the longest diaphragm life, throttle the air inlet to the lowest cycling rate that does not reduce flow.

## AIR EXHAUST

If a diaphragm fails, the pumped liquid or fumes can enter the air end of the pump, and be exhausted into the atmosphere. When pumping hazardous or toxic materials, pipe the exhaust to an appropriate area for safe disposition.

This pump can be submerged if materials of construction are compatible with the liquid. The air exhaust must be piped above the liquid level. Piping used for the air exhaust must not be smaller than 1" (2.54 cm). Reducing the pipe size will restrict air flow and reduce pump performance. When the product source is at a higher level than the pump (flooded suction), pipe the exhaust higher than the product source to prevent siphoning spills.

Freezing or icing of the air exhaust can occur under certain temperature and humidity conditions. Use of a Warren Rupp Air Dryer should eliminate most icing problems.

## **BETWEEN USES**

When used for materials that tend to settle out or transform to solid form, the pump should be completely flushed after each use, to prevent damage. Product remaining in the pump between uses could dry out or settle out. This could cause problems with valves and diaphragms at re-start. In freezing temperatures, the pump must be drained between uses in all cases.

## **CHECK VALVE SERVICING**

Need for inspection or service of the check valves is usually indicated by poor priming, unstable cycling, reduced performance or the pump's cycling but not pumping.

Inspect the surfaces of both check valve and seat for wear or damage that could prevent proper sealing. If pump is to prime properly, valves must seat air tight.

## **DIAPHRAGM SERVICING**

Remove the twelve stud nut assemblies (six each side) securing the manifold assemblies to the outer chambers. Remove the eight stud nut assemblies securing the outer chamber to the inner chamber.

The interior components consisting of shaft seals, sleeve bearings and bearing retainers are now accessible for service. Remove the eight bolts securing the outer chamber to the inner chamber. Loosen the diaphragm plate from the rod by leaving the opposite side of the pump intact, preventing rotation of the rod. **DO NOT USE A WRENCH ON THE DIAPHRAGM ROD. FLAWS ON THE SURFACE MAY DAMAGE BEARINGS AND SEAL.**

## **REASSEMBLY**

During reassembly make certain that the rubber bumper is on the rod on each side. Install the diaphragm with the natural bulge outward as indicated on the diaphragm. Make sure the large radius of the inner plate is toward the diaphragm. Place the sealing washer between the inner diaphragm plate and the end of the rod. Tighten the capscrew to approximately 25 ft. lbs. (33.90 Newton meters). Torque while allowing diaphragm to turn freely with plates. Use a wrench on the capscrew of the opposite side to keep the rod from rotating. If the opposite chamber is assembled, the rod need not be held. This final torquing will lock the diaphragm assemblies together. Place the remaining outer chamber on the open end and loosely tighten the bolts. Replace the manifold assemblies to square the flanges before final tightening of the remaining bolts. Alternating for progressive tightening, torque the eight capscrews to 150 in./lbs. (16.94 Newton meters).

## **A Note about Air Valve Lubrication**

The SANDPIPER pump's pilot valve and main air valve assemblies are designed to operate WITHOUT lubrication. This is the preferred mode of operation. There may be instances of personal preference, or poor quality air supplies when lubrication of the compressed air supply is required. The pump air system will operate with properly lubricated compressed air supplies. Proper lubrication of the compressed air supply would entail the use of an air line lubricator (available from Warren Rupp) set to deliver one drop of 10 wt., non-detergent oil for every 20 SCFM of air the pump consumed at its point of operation. Consult the pump's published Performance Curve to determine this.

It is important to remember to inspect the sleeve and spool set routinely. It should move back and forth freely. This is most important when the air supply is lubricated. If a lubricator is used, oil accumulation will, over time, collect any debris from the compressed air. This can prevent the pump from operating properly.

Water in the compressed air supply can create problems such as icing or freezing of the exhaust air causing the pump to cycle erratically, or stop operating. This can be addressed by using a point of use air dryer (available from Warren Rupp) to supplement a plant's air drying equipment. This device will remove excess water from the compressed air supply and alleviate the icing or freezing problem.

## **ESADS+Plus: Externally Serviceable Air Distribution System**

Please refer to the exploded view drawing and parts list in the Service Manual supplied with your pump. If you need replacement or additional copies, contact your local Warren Rupp Distributor, or the Warren Rupp factory Literature Department at the number shown below. To receive the correct manual, you must specify the MODEL and TYPE information found on the name plate of the pump.

### **Models with 1" suction/discharge or larger, and METAL center sections:**

The main air valve sleeve and spool set is located in the valve body mounted on the pump with four hex head capscrews. The valve body assembly is removed from the pump by removing these four hex head capscrews.

With the valve body assembly off the pump, access to the sleeve and spool set is made by removing four hex head capscrews (each end) on the end caps of the valve body assembly. With the end caps removed, slide the spool back and forth in the sleeve. The spool is closely sized to the sleeve and must move freely to allow for proper pump operation. An accumulation of oil, dirt or other contaminants from the pump's air supply, or from a failed diaphragm, may prevent the spool from moving freely. This can cause the spool to stick in a position that prevents the pump from operating. If this is the case, the sleeve and spool set should be removed from the valve body for cleaning and further inspection.

Remove the spool from the sleeve. Using an arbor press or bench vise (with an improvised mandrel), press the sleeve from the valve body. Take care not to damage the sleeve. At this point, inspect the o-rings on the sleeve for nicks, tears or abrasions. Damage of this sort could happen during assembly or servicing. A sheared or cut o-ring can allow the pump's compressed air supply to leak or bypass within the air valve assembly, causing the pump to leak compressed air from the pump air exhaust or not cycle properly. This is most noticeable at pump dead head or high discharge pressure conditions. Replace any of these o-rings as required or set up a routine, preventive maintenance schedule to do so on a regular basis. This practice should include cleaning the spool and sleeve components with a safety solvent or equivalent, inspecting for signs of wear or damage, and replacing worn components.

To re-install the sleeve and spool set, lightly lubricate the o-rings on the sleeve with an o-ring assembly lubricant or lightweight oil (such as 10 wt. air line lubricant). Re-install one end cap, gasket and bumper on the valve body. Using the arbor press or bench vise that was used in disassembly, carefully press the sleeve back into the valve body, without shearing the o-rings. You may have to clean the surfaces of the valve body where the end caps mount. Material may remain from the old gasket. Old material not cleaned from this area may cause air leakage after reassembly. Take care that the bumper stays in place allowing the sleeve to press in all the way. Re-install the spool, opposite end cap, gasket and bumper on the valve body. After inspecting and cleaning the gasket surfaces on the valve body and intermediate, re-install the valve body on the pump using new gaskets. Tighten the four hex head capscrews evenly and in an alternating cross pattern.

### **Models with 1" suction/discharge or larger, and NON-METAL center sections:**

The main air valve sleeve and spool set is located in the valve body mounted on the pump with four hex head capscrews. The valve body assembly is removed from the pump by removing these four hex head capscrews.

With the valve body assembly off the pump, access to the sleeve and spool set is made by removing a retaining ring (each end) securing the end cap on the valve body assembly. With the end caps removed, slide the spool back and forth in the sleeve. The spool is closely sized to the sleeve and must move freely to allow for proper

pump operation. An accumulation of oil, dirt or other contaminants from the pump's air supply, or from a failed diaphragm, may prevent the spool from moving freely. This can cause the spool to stick in a position that prevents the pump from operating. If this is the case, the sleeve and spool set should be removed from the valve body for cleaning and further inspection.

Remove the spool from the sleeve. Using an arbor press or bench vise (with an improvised mandrel), press the sleeve from the valve body. Take care not to damage the sleeve. At this point, inspect the o-rings on the sleeve for nicks, tears or abrasions. Damage of this sort could happen during assembly or servicing. A sheared or cut o-ring can allow the pump's compressed air supply to leak or bypass within the air valve assembly, causing the pump to leak compressed air from the pump air exhaust or not cycle properly. This is most noticeable at pump dead head or high discharge pressure conditions. Replace any of these o-rings as required or set up a routine, preventive maintenance schedule to do so on a regular basis. This practice should include cleaning the spool and sleeve components with a safety solvent or equivalent, inspecting for signs of wear or damage, and replacing worn components.

To re-install the sleeve and spool set, lightly lubricate the o-rings on the sleeve with an o-ring assembly lubricant or lightweight oil such as 10 wt. air line lubricant). Re-install one end cap, and retaining ring on the valve body. Using the arbor press or bench vise that was used in disassembly, carefully press the sleeve back into the valve body, without shearing the o-rings. Re-install the spool, opposite end cap and retaining ring on the valve body. After inspecting and cleaning the gasket surfaces on the valve body and intermediate, reinstall the valve body on the pump using new gaskets. Tighten the four hex head capscrews evenly and in an alternating cross pattern, at 150 in./lbs. (16.94 Newton meters).

## **PILOT VALVE**

The pilot valve assembly is accessed by removing the main air distribution valve body from the pump and lifting the pilot valve body out of the intermediate housing.

Most problems with the pilot valve can be corrected by replacing the o-rings. Always grease the spool prior to inserting it into the sleeve. If the sleeve is removed from the body, reinsertion must be at the chamfered side. Grease the o-rings to slide the sleeve into the valve body. Securely insert the retaining ring around the sleeve. When reinserting the pilot valve, push both plungers (located inside the intermediate bracket) out of the path of the pilot valve spool ends to avoid damage.

## **PILOT VALVE ACTUATOR**

Bushings for the pilot valve actuators are threaded into the intermediate bracket from the outside. The plunger may be removed for inspection or replacement. First remove the air distribution valve body and the pilot valve body from the pump. The plungers can be located by looking into the intermediate. It may be necessary to use a fine piece of wire to pull them out. The bushing can be turned out through the inner chamber by removing the outer chamber assembly. Replace the bushings if pins have bent.

## **TROUBLESHOOTING**

### **Pump will not cycle**

- A. Check to make sure the unit has enough pressure to operate and that the air inlet valve is open.
- B. Check the discharge line to insure that the discharge line is neither closed nor blocked.
- C. If the spool in the air distribution valve is not shifting, check the main spool. It must slide freely.
- D. Excessive air leakage in the pump can prevent cycling. This condition will be evident air leakage into the discharge line indicates a ruptured diaphragm. Air leakage from the exhaust port indicates leakage in the air distribution valve. See further service instructions.
- E. Blockage in the liquid chamber can impede movements of diaphragm.

### **Pump cycles but will not pump**

- A. Suction side of pump pulling in air. Check the suction line for air leaks and be sure that the end of the suction line is submerged. Check flange bolting. Check valve flanges and manifold to chamber flange joints.

- B. Make certain the suction line or strainer is not plugged. Restriction at the suction is indicated by a high vacuum reading when a vacuum gauge is installed in the suction line.
- C. Check valves may not be seating properly. To check, remove the suction line and cover the suction port with your hand. If the unit does not pull a good suction (vacuum), the check valves should be inspected for proper seating.
- D. Static suction lift may be too high. Priming can be improved by elevating the suction and discharge lines higher than the check valves and pouring liquid into the unit through the suction inlet. When priming at high suction lifts or with long suction lines operate the pump at maximum cycle rate.

**Low performance**

- A. Capacity is reduced as the discharge pressure increases, as indicated on the performance curve. Performance capability varies with available inlet air supply. Check air pressure at the pump inlet when the pump is operating to make certain that adequate air supply is maintained.
- B. Check vacuum at the pump suction. Capacity is reduced as vacuum increases. Reduced flow rate due to starved suction will be evident when cycle rate can be varied without change in capacity. This condition will be more prevalent when pumping viscous liquids. When pumping thick, heavy materials the suction line must be kept as large in diameter and as short as possible, to keep suction loss minimal.
- C. Low flow rate and slow cycling rate indicate restricted flow through the discharge line. Low flow rate and fast cycling rate indicate restriction in the suction line or air leakage into suction.
- D. Unstable cycling indicates improper check valve seating on one chamber. This condition is confirmed when unstable cycling repeats consistently on alternate exhausts. Cycling that is not consistently unstable may indicate partial exhaust restriction due to freezing and thawing of exhaust air. Use of an anti-freeze lubricant in an air line lubricator should solve this problem.

For additional information, see the Warren Rupp Troubleshooting Guide.

**WARRANTY**

This unit is guaranteed for a period of five years against defective material and workmanship. Failure to comply with the recommendations stated in this manual voids all factory warranty.

**RECOMMENDED WARREN RUPP ACCESSORIES  
TO MAXIMIZE PUMP PERFORMANCE:**

- **Tranquilizer® Surge Suppressor:** For nearly pulse-free flow.
- **Warren Rupp Air Dryer:** For clean, dry, compressed air.
- **Warren Rupp Filter/Regulator:** For modular installation and service convenience.
- **Warren Rupp Speed Control:** For manual or programmable process control. Manual adjustment or 4-20mA reception.

*For more detailed information on these accessories, contact your local Warren Rupp Factory-Authorized Distributor, or Warren Rupp corporate headquarters.*


©2007 Warren Rupp, Inc. All rights reserved.  
©SANDPIPER and Tranquilizer are registered tradenames of Warren Rupp, Inc.  
®Neverseize is a registered tradename of Loctite.  
Printed in U.S.A.

# IMPORTANT SAFETY INFORMATION




**IMPORTANT**

Read these safety warnings and instructions in this manual completely, before installation and start-up of the pump. 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.




**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. (See page 32)



**WARNING**

This pump is pressurized internally with air pressure during operation. Always make certain that all bolting is in good condition and that all of the correct bolting is reinstalled during assembly.




**CAUTION**

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




**WARNING**

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



**WARNING**

Before maintenance or repair, shut off the compressed air line, bleed the pressure, and disconnect the air line from the pump. The discharge line may be pressurized and must be bled of its pressure.



**WARNING**

Before doing any maintenance on the pump, be certain all pressure is completely vented from the pump, suction, discharge, piping, and all other openings and connections. Be certain the air supply is locked out or made non-operational, so that it cannot be started while work is being done on the pump. Be certain that approved eye protection and protective clothing are worn all times in the vicinity of the pump. Failure to follow these recommendations may result in serious injury or death.



**WARNING**

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 which is hazardous or toxic, the air exhaust must be piped to an appropriate area for safe disposition.



**WARNING**

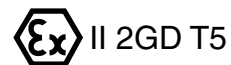
Airborne particles and loud noise hazards. Wear ear and eye protection.

## RECYCLING

Many components of SANDPIPER® AODD pumps are made of recyclable materials (see chart on page 9 for material specifications). We encourage pump users to recycle worn out parts and pumps whenever possible, after any hazardous pumped fluids are thoroughly flushed.



Pump complies with EN809 Pumping Directive, Directive 98/37/EC Safety of Machinery, and Directive 94/9/EC, EN13463-1 Equipment for use in Potentially Explosive Environments. For reference to the directive certificates visit: [www.warrenrupp.com](http://www.warrenrupp.com). The Technical File No. AX1 is stored at KEMA, Notified Body 0344, under Document #203040000.



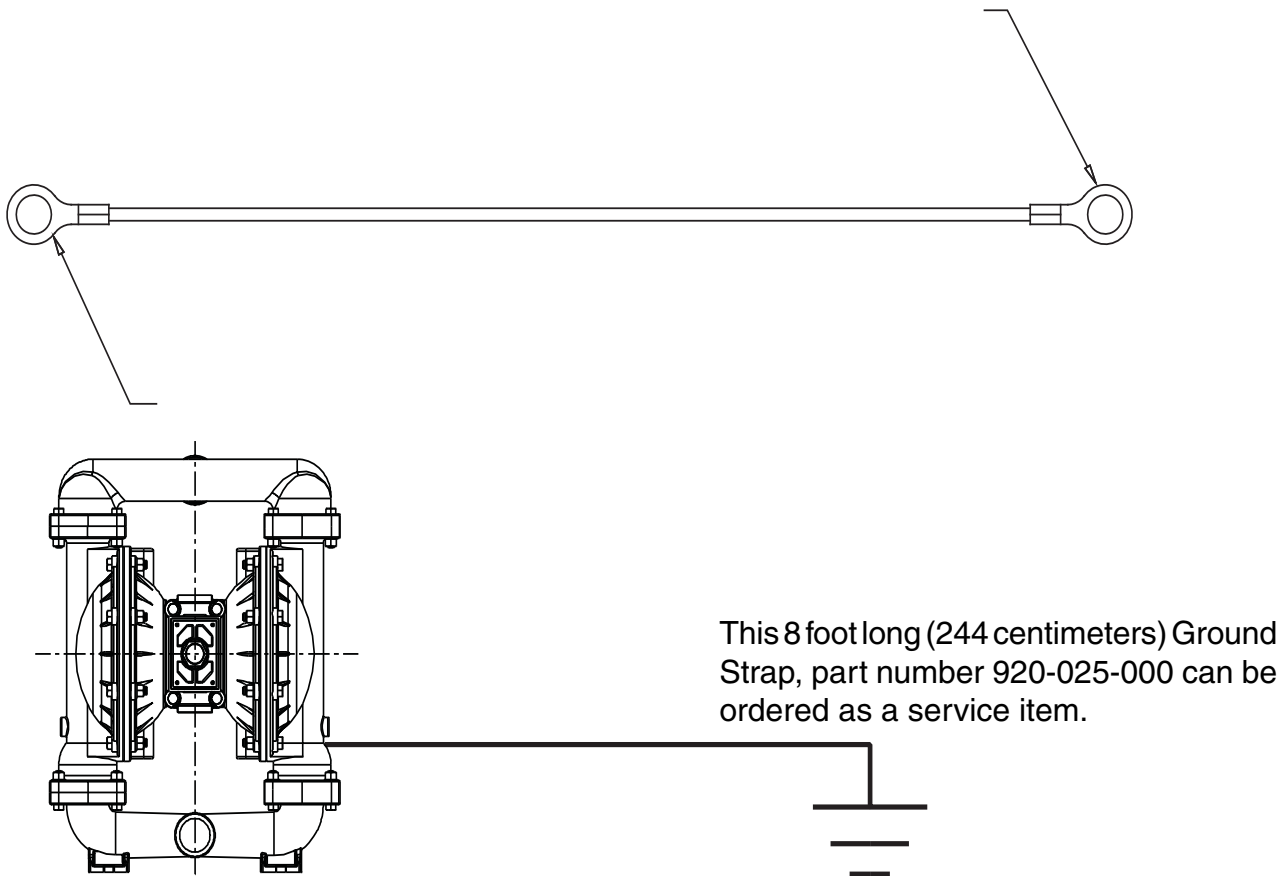


# GROUNDING THE PUMP

To be fully groundable, the pumps must be ATEX Compliant. Refer to pump data sheet for ordering.

**! 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.*



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, or in the absence of local codes, an industry or nationally recognized code having jurisdiction over specific installations.

# MATERIAL CODES

## THE LAST 3 DIGITS OF PART NUMBER

000	Assembly, sub-assembly; and some purchased items	337	Silver Plated Steel	555	Polyvinyl Chloride
010	Cast Iron	340	Nickel Plated	556	Black Vinyl
012	Powered Metal	342	Filled Nylon	558	Conductive HDPE
015	Ductile Iron	351	Food Grade Santoprene	570	Rulon II
020	Ferritic Malleable Iron	353	Geolast; Color: Black	580	Ryton
025	Music Wire	354	Injection Molded #203-40 Santoprene- Duro 40D +/-5; Color: RED	590	Valox
080	Carbon Steel, AISI B-1112	355	Thermal Plastic	591	Nylatron G-S
100	Alloy 20	356	Hytrel	592	Nylatron NSB
110	Alloy Type 316 Stainless Steel	357	Injection Molded Polyurethane	600	PTFE (virgin material) Tetrafluorocarbon (TFE)
111	Alloy Type 316 Stainless Steel (Electro Polished)	358	Urethane Rubber (Some Applications) (Compression Mold)	601	PTFE (Bronze and moly filled)
112	Alloy C	359	Urethane Rubber	602	Filled PTFE
113	Alloy Type 316 Stainless Steel (Hand Polished)	360	Nitrile Rubber Color coded: RED	603	Blue Gylon
114	303 Stainless Steel	361	Nitrile	604	PTFE
115	302/304 Stainless Steel	363	FKM (Fluorocarbon). Color coded: YELLOW	606	PTFE
117	440-C Stainless Steel (Martensitic)	364	E.P.D.M. Rubber. Color coded: BLUE	607	Envelon
120	416 Stainless Steel (Wrought Martensitic)	365	Neoprene Rubber. Color coded: GREEN	608	Conductive PTFE
123	410 Stainless Steel (Wrought Martensitic)	366	Food Grade Nitrile	610	PTFE Encapsulated Silicon
148	Hardcoat Anodized Aluminum	368	Food Grade EPDM	611	PTFE Encapsulated FKM
149	2024-T4 Aluminum	370	Butyl Rubber Color coded: BROWN	632	Neoprene/Hytrel
150	6061-T6 Aluminum	371	Philthane (Tuftane)	633	FKM/PTFE
151	6063-T6 Aluminum	374	Carboxylated Nitrile	634	EPDM/PTFE
152	2024-T4 Aluminum (2023-T351)	375	Fluorinated Nitrile	635	Neoprene/PTFE
154	Almag 35 Aluminum	378	High Density Polypropylene	637	PTFE, FKM/PTFE
155	356-T6 Aluminum	379	Conductive Nitrile	638	PTFE, Hytrel/PTFE
156	356-T6 Aluminum	405	Cellulose Fibre	639	Nitrile/TFE
157	Die Cast Aluminum Alloy #380	408	Cork and Neoprene	643	Santoprene®/EPDM
158	Aluminum Alloy SR-319	425	Compressed Fibre	644	Santoprene®/PTFE
159	Anodized Aluminum	426	Blue Gard	656	Santoprene Diaphragm and Check Balls/EPDM Seats
162	Brass, Yellow, Screw Machine Stock	440	Vegetable Fibre	661	EPDM/Santoprene
165	Cast Bronze, 85-5-5-5	465	Fibre	666	FDA Nitrile Diaphragm, PTFE Overlay, Balls, and Seals
166	Bronze, SAE 660	500	Delrin 500	668	PTFE, FDA Santoprene/PTFE
170	Bronze, Bearing Type, Oil Impregnated	501	Delrin 570		
175	Die Cast Zinc	502	Conductive Acetal, ESD-800		Delrin and Hytrel are registered tradenames of E.I. DuPont.
180	Copper Alloy	503	Conductive Acetal, Glass-Filled		Gylon is a registered tradename of Garlock, Inc.
305	Carbon Steel, Black Epoxy Coated	505	Acrylic Resin Plastic		Nylatron is a registered tradename of Polymer Corp.
306	Carbon Steel, Black PTFE Coated	506	Delrin 150		Santoprene is a registered tradename of Monsanto Corp.
307	Aluminum, Black Epoxy Coated	520	Injection Molded PVDF Natural color		Rulon II is a registered tradename of Dixon Industries Corp.
308	Stainless Steel, Black PTFE Coated	540	Nylon		Ryton is a registered tradename of Phillips Chemical Co.
309	Aluminum, Black PTFE Coated	541	Nylon		Valox is a registered tradename of General Electric Co.
310	PVDF Coated	542	Nylon		PortaPump, Tranquilizer and SludgeMaster are registered tradenames of Warren Rupp, Inc.
313	Aluminum, White Epoxy Coated	544	Nylon Injection Molded		
330	Zinc Plated Steel	550	Polyethylene		
331	Chrome Plated Steel	551	Glass Filled Polypropylene		
332	Aluminum, Electroless Nickel Plated	552	Unfilled Polypropylene		
333	Carbon Steel, Electroless Nickel Plated	553	Unfilled Polypropylene		
335	Galvanized Steel				
336	Zinc Plated Yellow Brass				

**WARREN  
RUPP®**

**IDEX**  
FLUID & METERING

## Declaration of Conformity

Warren Rupp, Inc., 800 North Main Street, Mansfield, Ohio, certifies that Air-Operated Double Diaphragm Metallic Pumps Series: HDB, HDF, M Non-Metallic, S Non-Metallic, M Metallic, S Metallic, Containment Duty, Gas, UL, High Pressure, W, Submersible and Tranquilizers comply with the European Community Directive 98/37/EC, Safety of Machinery. This product has used EN 809, Pumps and Pump Units for Liquids - Common Safety Requirements harmonized standard to verify conformance.

*David Roseberry*

Signature of authorized person

October 20, 2005

Date of issue

David Roseberry

Printed name of authorized person

Engineering Manager

Title

CE



# SERVICE AND OPERATING MANUAL



**Model SSB1**



II 2GD c T5

**Model DSB1 - This Model is not ATEX Compliant**

Type 3

ITEM NO.	PART NUMBER	DESCRIPTION	TOTAL RQD.
1	095-051-558	Body, Spool Valve	1
2	<b>031-039-000</b>	<b>Sleeve &amp; Spool Set</b>	<b>1</b>
3	<b>560-058-360</b>	<b>O-Ring</b>	<b>8</b>
4	165-038-356	Cap, End	2
5	<b>675-043-115</b>	<b>Ring, Retaining</b>	<b>2</b>
6	165-042-332	Cap, Valve Body	1
7	<b>360-056-379</b>	<b>Gasket</b>	<b>1</b>
8	<b>360-057-360</b>	<b>Gasket</b>	<b>1</b>
9	<b>360-058-360</b>	<b>Gasket</b>	<b>1</b>
10	<b>095-074-000</b>	<b>Pilot Valve Body Assembly *</b>	<b>1</b>
10-A	<b>095-071-551</b>	<b>Pilot Valve Body</b>	<b>1</b>
10-B	<b>755-025-000</b>	<b>Sleeve (with O-Ring)</b>	<b>1</b>
10-C	<b>560-033-360</b>	<b>O-Ring (Sleeve)</b>	<b>4</b>
10-D	<b>775-014-000</b>	<b>Spool (with O-Ring)</b>	<b>1</b>
10-E	<b>560-023-360</b>	<b>O-Ring (Spool)</b>	<b>4</b>
10-F	<b>675-037-080</b>	<b>Retaining Ring</b>	<b>1</b>
11	170-063-115	Capscrew, Hex Head	1
12	901-035-115	Washer, Flat	7
13	542-001-115	Nut, Square	1
14	170-033-115	Capscrew, Hex Head	4
15	901-005-115	Washer, Flat	4
16	170-043-115	Capscrew, Hex Head	6
17	114-011-332	Bracket., Intermediate	1
18	196-066-332	Chamber, Inner	1
19	196-064-332	Chamber, Inner	1
20	<b>560-040-360</b>	<b>O-Ring</b>	<b>2</b>
21	<b>560-001-360</b>	<b>O-Ring</b>	<b>2</b>
22	<b>135-034-506</b>	<b>Bushing</b>	<b>2</b>
23	<b>675-042-115</b>	<b>Ring, Retainer</b>	<b>2</b>
24	<b>620-007-114</b>	<b>Plunger, Actuator</b>	<b>2</b>
25	<b>132-022-360</b>	<b>Bumper</b>	<b>2</b>
26	<b>070-012-170</b>	<b>Bearing, Sleeve</b>	<b>2</b>
27	<b>720-010-375</b>	<b>Seal, U-Cup</b>	<b>2</b>
28	196-065-111	Chamber, Outer	2
	196-072-113	Chamber, Outer (For DSB1)	2
29	901-012-180	Washer, Sealing	2
30	115-078-115	Bracket, Mounting	1
31	<b>675-040-360</b>	<b>Ring, Sealing</b>	<b>2</b>
32	685-039-120	Rod, Diaphragm	1
33	<b>132-019-360</b>	<b>Bumper</b>	<b>2</b>
34	612-101-111	Plate, Outer Diaphragm	2
	612-110-113	Plate, Outer Diaphragm (For DSB1)	2
35	612-022-330	Plate, Inner Diaphragm	2
36	<b>286-008-366</b>	<b>Diaphragm</b>	<b>2</b>
	<b>286-008-368</b>	<b>Diaphragm</b>	<b>2</b>
	<b>286-039-366</b>	<b>Diaphragm (For DSB1)</b>	<b>2</b>

\* Available in kit form. Order P/N 031-060-000 which also includes Items No. 7, 8, 9, 24, and 25.

ITEM NO.	PART NUMBER	DESCRIPTION	TOTAL RQD.
37	722-045-366	Seat, Valve	4
	722-045-368	Seat, Check Valve	4
38	050-019-366	Ball, Check Valve	4
	050-019-368	Ball, Check Valve	4
39	518-048-110	Manifold, Suction	1
	518-048-113	Manifold, Suction (for DSB1)	1
40	518-049-110	Manifold, Discharge	1
	518-049-113	Manifold, Discharge (for DSB1)	1
41	312-052-111	Elbow, Suction	2
	312-065-113	Elbow, Suction (for DSB1)	2
42	312-051-111	Elbow, Discharge	2
	312-056-113	Elbow, Discharge (for DSB1)	2
43	361-005-366	Gasket Seal, Suction	2
	361-005-368	Gasket Seal	2
44	361-006-366	Gasket Seal, Discharge	2
	361-006-368	Gasket, Sealing	2
45	200-032-115	Clamp, Suction	2
46	200-033-115	Clamp, Discharge	2
47	542-002-114	Stud Nut	4
48	542-003-000	Stud Nut Assembly	16
	542-008-000	Stud Nut Assembly (for DSB1)	16
49	542-004-000	Stud Nut Assembly	12
50	170-044-115	Capscrew, Hex Head	4
51	900-004-115	Washer, Lock	4
52	545-004-115	Hex Nut	4
53	618-003-110	Pipe Plug	1
54	312-044-555	45° Elbow (DSB1 Only)	1
	255-012-335	Coupling (SSB1 Only)	1
55	538-025-555	Nipple, Close (DSB1 Only)	1
56	530-018-000	Muffler, Exhaust (DSB1 Only)	1
	530-036-000	Muffler (SSB1 Only)	1
58	807-048-115	Stud	2
59	Not Shown:		
	031-030-000	Valve Body Assembly (Includes items 1, 2, 3, 4, 5)	1

---

## MODEL DSB1-3A TYPE TF-3-SS

### 3-A STANDARD AND USDA ACCEPTED FOR DAIRY APPLICATIONS

Certain wetted components are changed to comply with USDA Dairy Division requirements.

Use of model DSB1-A without an electronic leak detector assembly P/N 032-017-000 voids the USDA DAIRY ACCEPTANCE. Usage of this control device is mandatory for acceptance in USDA Accepted Dairy Operations.

#### Change the following:

ITEM 28 CHANGE TO P/N 196-072-113

ITEM 34 CHANGE TO P/N 612-110-113

ITEM 36 CHANGE TO P/N 286-039-366

ITEM 39 CHANGE TO P/N 518-048-113

ITEM 40 CHANGE TO P/N 518-049-113

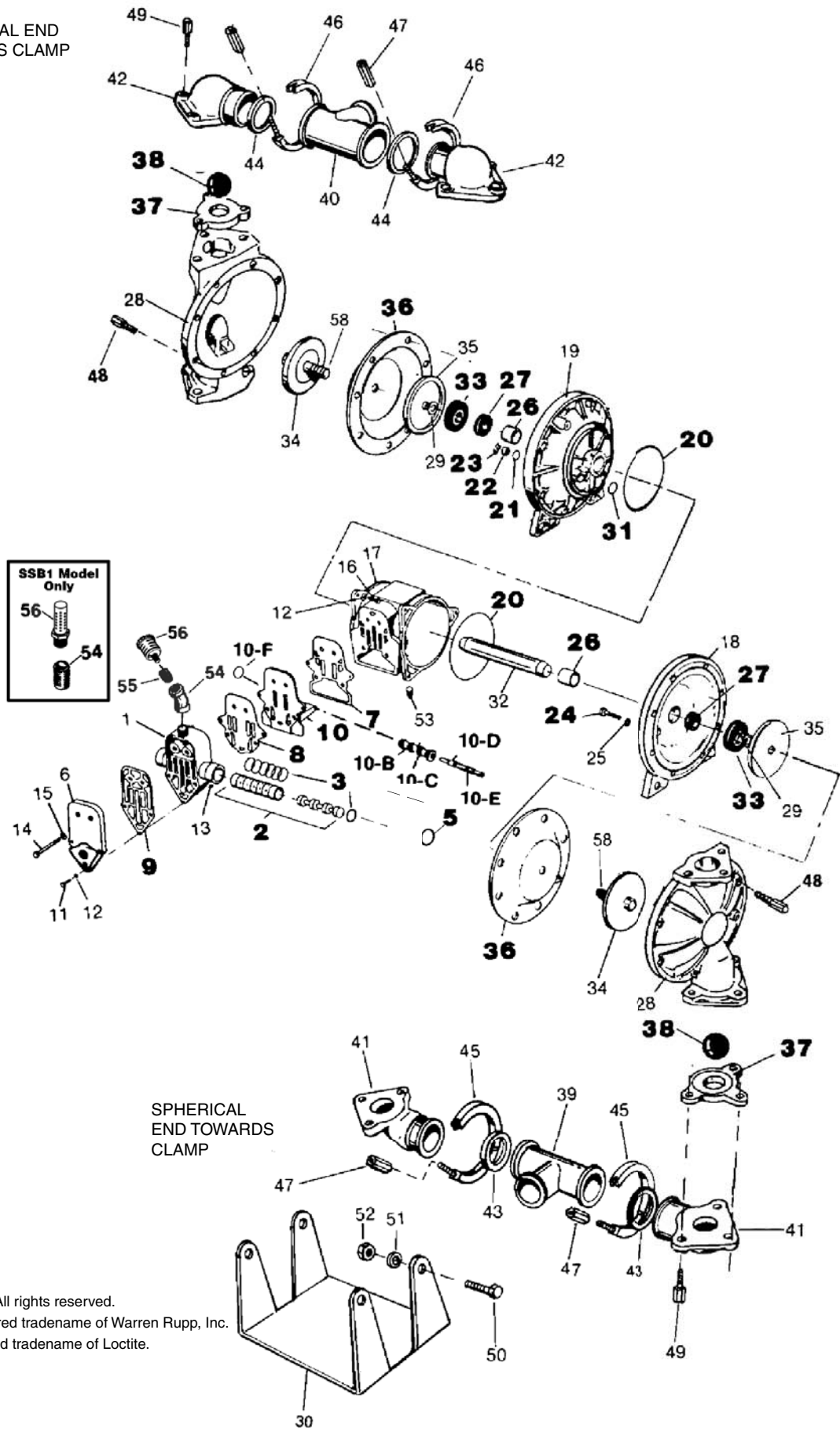
ITEM 41 CHANGE TO P/N 312-065-113

ITEM 42 CHANGE TO P/N 312-056-113

ITEM 48 CHANGE TO P/N 542-008-000

P/N 032-017-000 ELECTRONIC LEAK DETECTOR ASSEMBLY is required to maintain USDA-DAIRY ACCEPTANCE.

SPHERICAL END  
TOWARDS CLAMP



© 2008 Warren Rupp, Inc. All rights reserved.  
 © SANDPIPER is a registered trademark of Warren Rupp, Inc.  
 © Neversize is a registered trademark of Loctite.  
 Printed in U.S.A.