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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.



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

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 are in good condition and are reinstalled properly during reassembly.



Use safe practices when lifting

RECYCLING

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.

ATEX Pumps - Conditions For Safe Use

1. Ambient temperature range is as specified in tables 1 to 3 on the next page (*per Annex I of DEKRA 18ATEX0094X*)
2. ATEX compliant pumps are suitable for use in explosive atmospheres when the equipment is properly grounded in accordance with local electrical codes
3. **Non-Metallic ATEX Pumps only — See Explanation of Pump Nomenclature / ATEX Details Page**
Conductive Polypropylene, conductive Acetal or conductive PVDF pumps are not to be installed in applications where the pumps may be subjected to oil, greases and hydraulic liquids.
4. The optionally provided solenoids shall be protected by a fuse corresponding to its rated current (max 3*I_{rat} according to EN 60127) or by a motor protecting switch with short circuit and thermal instantaneous tripping (set to the rated current) as short circuit protection. For solenoids with a very low rated current, a fuse with the lowest current value according to the indicated standard will be sufficient. The fuse may be accommodated in the associated supply unit or shall be separately arranged. The rated voltage of the fuse shall be equal or greater than the stated rated voltage of the solenoid. The breaking capacity of the fuse shall be as high as or higher than the maximum expected short circuit current at the location of the installation (usually 1500 A). The maximum permissible ripple is 20% for all dc solenoids.
***Not applicable for all pump models — See Explanation of Pump Nomenclature / ATEX Details Page**
5. When operating pumps equipped with non-conductive diaphragms that exceed the maximum permissible projected area, as defined in EN ISO 80079-36 : 2016 section 6.7.5 table 8, the following protection methods must be applied
- Equipment is always used to transfer electrically conductive fluids or
- Explosive environment is prevented from entering the internal portions of the pump, i.e. dry running.
6. Pumps provided with the pulse output kit and used in the potentially explosive atmosphere caused by the presence of the combustible dust shall be installed in such a way that the pulse output kit is protected against impact
***Not applicable for all pump models — See Explanation of Pump Nomenclature / ATEX Details Page**

Temperature Tables

Table 1. Category 1 & Category 2 ATEX Rated Pumps

Ambient Temperature Range [°C]	Process Temperature Range [°C] ¹	Temperature Class	Maximum Surface Temperature [°C]
-20°C to +60°C	-20°C to +80°C	T5	T100°C
	-20°C to +108°C	T4	T135°C
	-20°C to + 160°C	T3	T200°C
	-20°C to +177°C	(225°C) T2	

¹Per CSA standards ANSI LC6-2018 US & Canadian Technical Letter R14, G-Series Natural Gas Models are restricted to (-20°C to + 80°C) process temperature

Table 2. Category 2 ATEX Rated Pumps Equipped with Pulse Output Kit or Integral Solenoid:

Ambient Temperature Range [°C]	Process Temperature Range [°C]	Temperature Class	Maximum Surface Temperature [°C]	Options	
				Pulse Output Kit	Integral Solenoid
-20°C to +60°C	-20°C to +100°C	T5	T100	X	
-20°C to +50°C	-20°C to +100°C	T5	T100		X

²ATEX Pulse output or Integral Solenoid Not Available For All Pump Models See Explanation of Pump Nomenclature / ATEX Details Page

Table 3. Category M1 ATEX Rated Pumps for Mining

Ambient Temperature Range [°C]	Process Temperature Range [°C]
-20°C to +60°C	-20°C to +150°C

Note: The ambient temperature range and the process temperature range should not exceed the operating temperature range of the applied non-metallic parts as listed in the manuals of the pumps.

**WARREN
RUPP®**

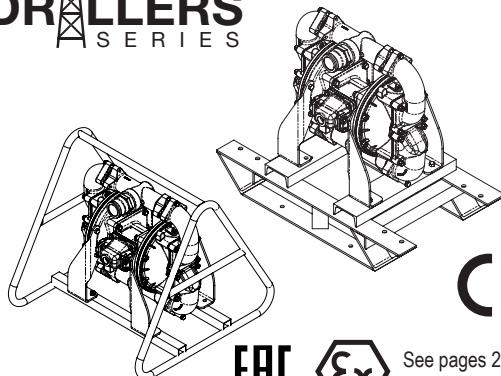
**DRILLERS
SERIES**

SANDPIPER®
A WARREN RUPP PUMP BRAND



Intertek
Total Quality Assured.
ISO 9001 Certified
ISO 14001 Certified

IMEX



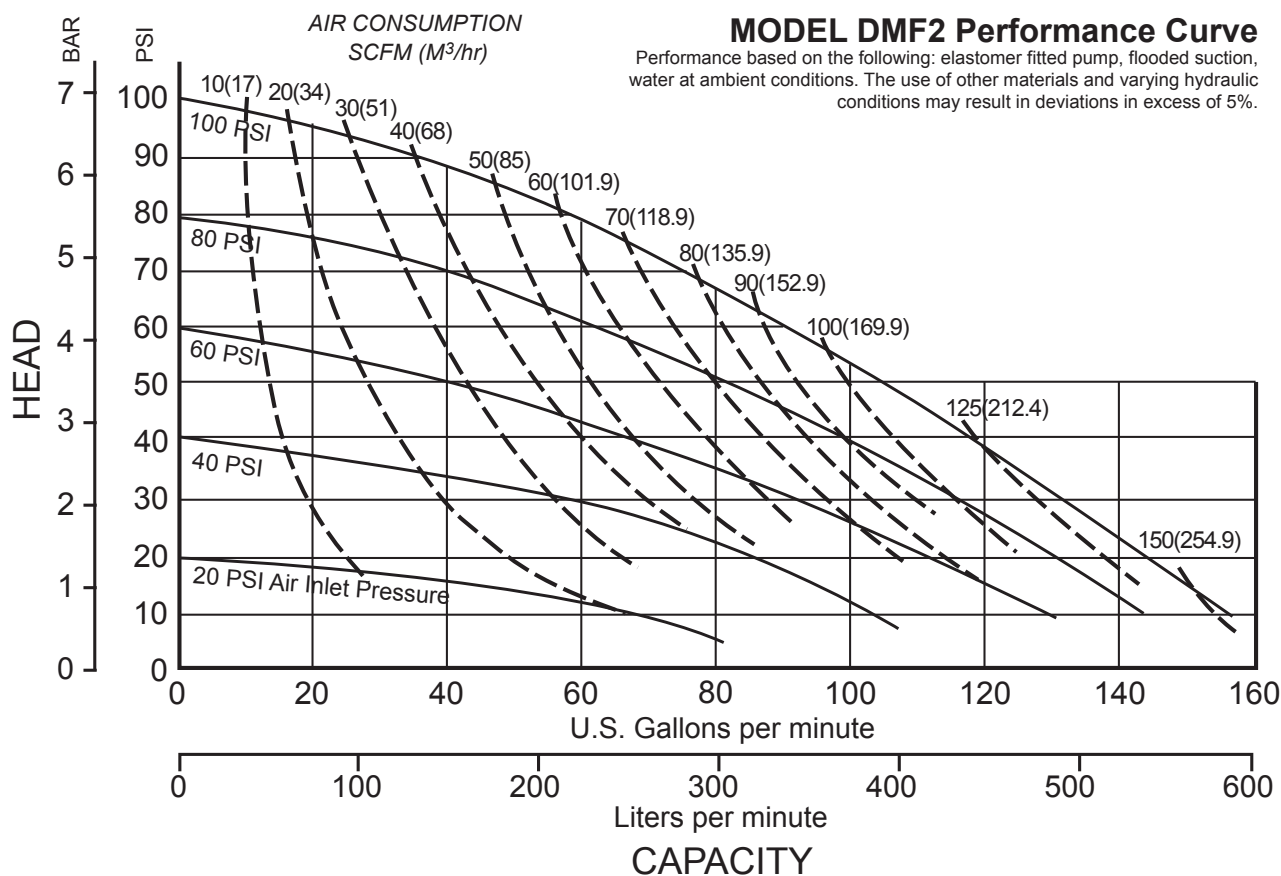
EAC



See pages 20 & 21
for ATEX ratings

2" Flap Valve
**DMF2R &
DMF2S Type 5**
**Air-Operated
Double Diaphragm Pump**
*ENGINEERING, PERFORMANCE
& CONSTRUCTION DATA*

INTAKE/DISCHARGE PIPE SIZE 2" (50mm) NPT (F)	CAPACITY 0 to 140 gallons per minute (0 to 530 liters per minute)	AIR VALVE No-lube, no-stall design	SOLIDS-HANDLING Up to 2" (50mm)	HEADS UP TO 125 psi or 289 ft. of water (8.8 Kg/cm ² or 88 meters)
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SANDPIPER® PUMPS ARE DESIGNED TO BE POWERED ONLY BY COMPRESSED AIR.

Explanation of Pump Nomenclature: DMF2R & DMF2S

MATERIALS OF CONSTRUCTION

To order a pump or replacement parts, first enter the Model Number DMF2R , or DMF2S , followed by the Type Designation listed below in the far left column.														
DMF2 Type 5	Manifold Elbow	Outer Chamber	Inner Chamber	Outer Diaphragm plates	Inner Diaphragm Plate	Intermediate Housing	Diaphragm Rod	Valve Seat	Hardware	Diaphragm	Flap Valve Material	Seat Gasket	Sealing Rings	Shipping Wt. (lbs)
DB-5-A	AL380DC	AL380DC	AL380DC	PS	PS	356-T6AL	435SS	316SS	PS	B	B	N/A	B	86

Meanings of Abbreviations:

AL = Aluminum
B = Nitrile

DC = Die Cast
PS = Plated Steel

SS = Stainless Steel

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.

Materials	Operating Temperatures	
	Maximum	Minimum
Nitrile 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

For specific applications, always consult "Chemical Resistance Chart" Technical Bulletin



II 2 G Ex h IIC T5...225°C (T2) Gb

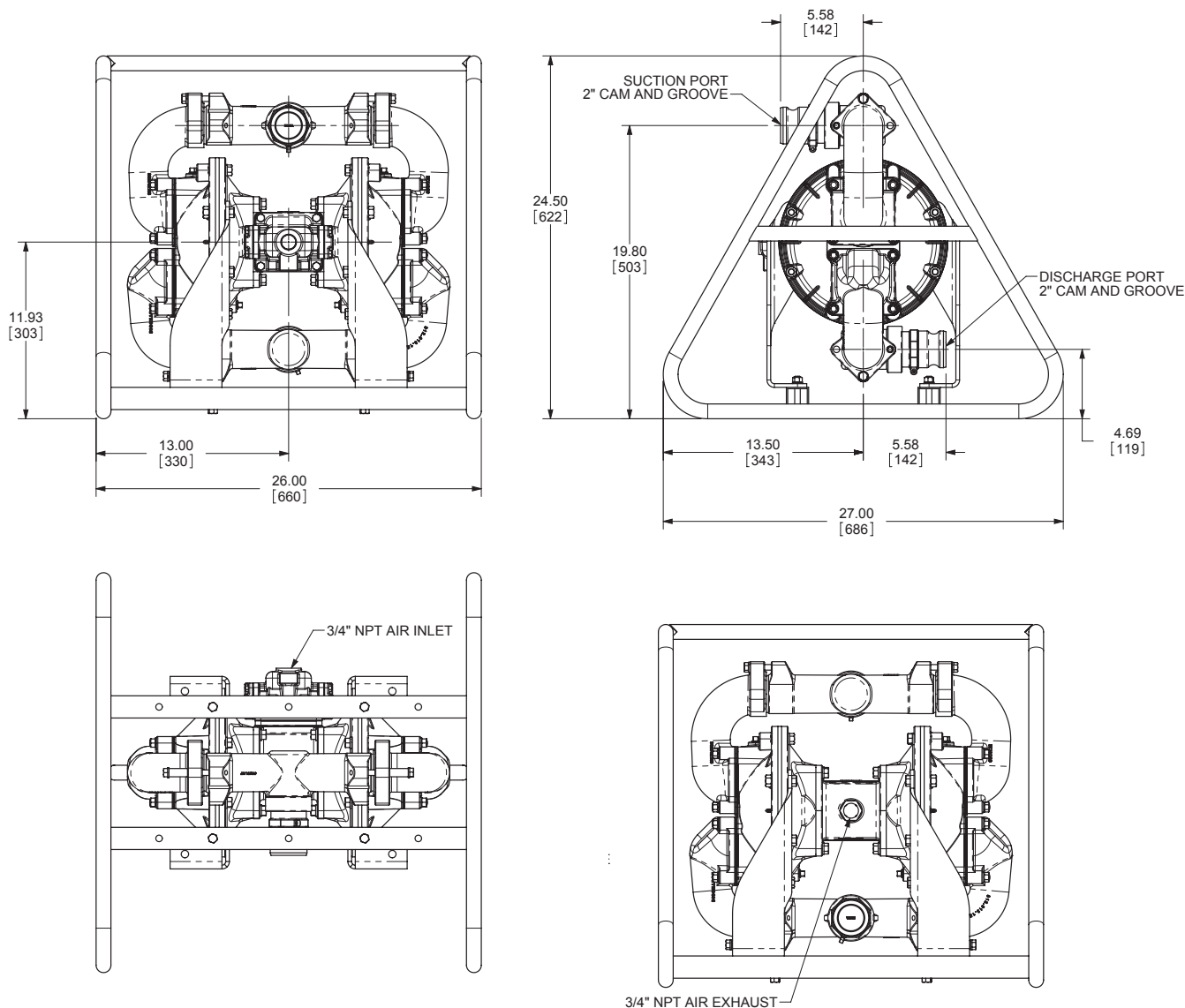
II 2 D Ex h IIC T100°C...T200°C Db

All models, including pumps equipped with Aluminum wetted and midsection parts.

See page 21 for ATEX Explanation of Type Examination Certificate.

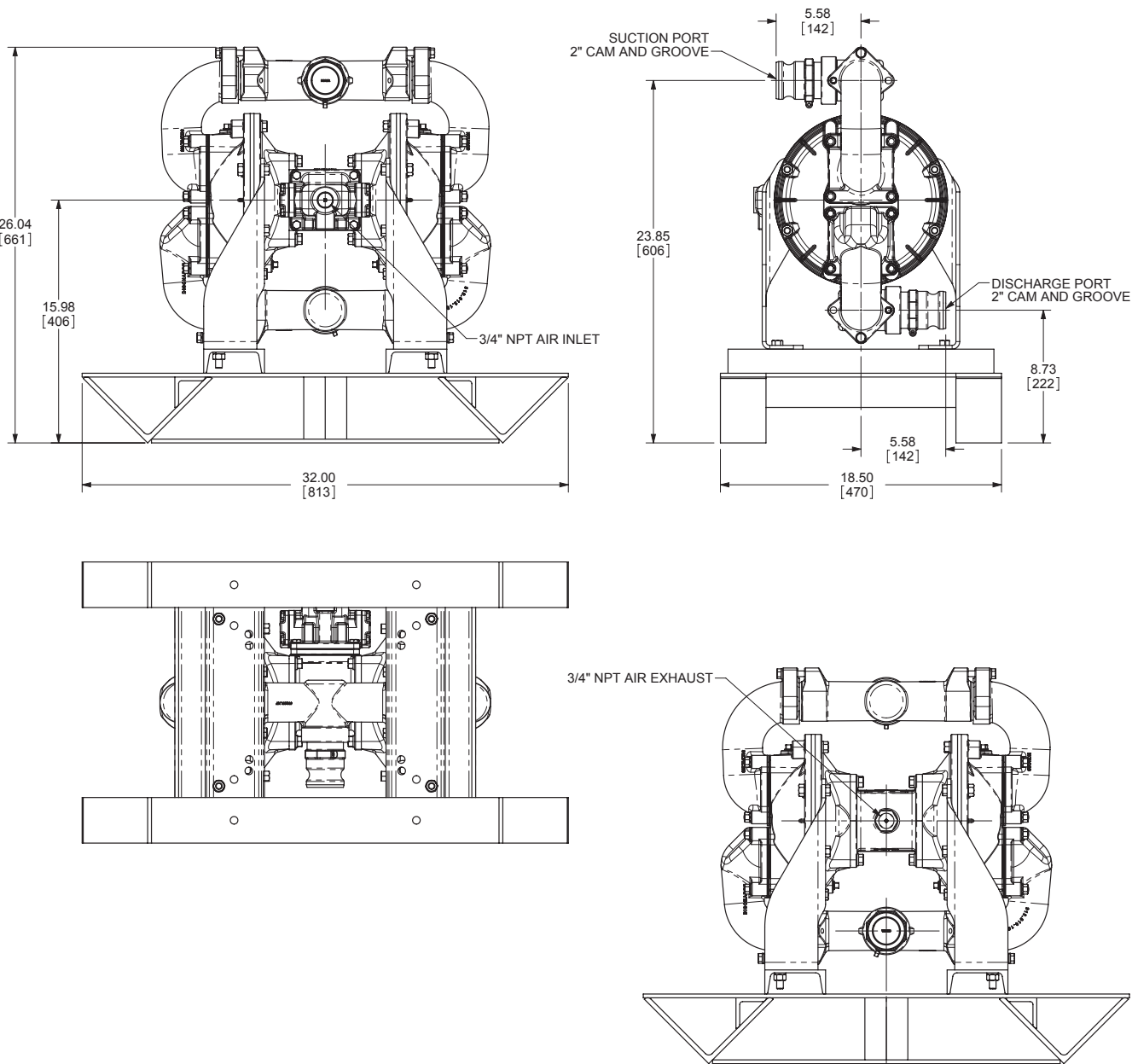
Dimensions: DMF2R

Dimensions are $\pm 1/8"$
Figures in parenthesis = millimeters



Dimensions: DMF2S

Dimensions are $\pm 1/8"$
Figures in parenthesis = millimeters



PRINCIPLE OF PUMP OPERATION

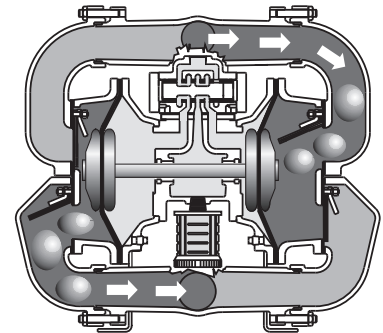
This flap swing valve pump is powered by compressed air and is a 1:1 pressure ratio design. It alternately pressurizes the inner side of one diaphragm chamber, while simultaneously exhausting the other inner chamber. This causes the diaphragms, which are connected by a common rod, to move endwise. Air 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 spool. This pushes it into position for shifting of the air distribution valve.

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



Heavy Duty Flap

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 Tranquillizer® 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 20 feet (6.096 meters) or less. For suction lifts exceeding 20 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.

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.

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 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. airline 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. Reinstall 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, reinstall the valve body on the pump using new gaskets. Tighten the four hex head capscrews evenly and in an alternating cross pattern.

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. (See page 7)

Freezing or icing-up of the air exhaust can occur under certain temperature and humidity conditions. Use of an air dryer unit 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.

FLAP VALVE SERVICING

Valve inspection requires removal of 3/8" hex nuts and elbows. When the top suction elbows are removed, the valve and seat are connected as an assembly. When the bottom discharge elbows are removed, the valve and seat stay with the outer chamber. Visual inspection and cleaning is possible. If parts are to be replaced, remove the self-locking nuts and all parts are accessible.

DIAPHRAGM SERVICING

Diaphragms can be inspected or the diaphragm assembly removed without removing the suction and discharge flanges. Remove (8) nuts around the chamber flange, and the housing assembly will pull off. Flap valves can be inspected for proper seating at this point as well as the diaphragm. Use care to keep foreign matter from behind the diaphragm. The opposite diaphragm may be inspected by the same procedure. If either diaphragm has to be replaced, follow closely these steps: Pull the outer diameter of one diaphragm off the (8) capscrews. NOTE: One side only! On the free diaphragm assembly, use a 3/8" allen wrench to turn the assembly (diaphragm, plates and screw) loose from the shaft. Once the assembly has turned, it will turn out by hand by use of the diaphragm. Now the opposite diaphragm assembly and the drive shaft will pull free from the capscrews and pump intermediate assembly. The interior components consisting of sleeve bearings, rod seals, and pilot valve actuator bushings are now accessible for service if required. Hold the shaft in a clamping device making sure to protect surface of shaft so as not to scratch or mar it in any way. The diaphragm assembly will turn loose. To disassemble the components, turn a 1/4"-20 cap screw by hand into the tapped hole in the inner plate. This keeps the plate from turning while the socket head cap screw is removed. To do this, place assembly in a vise so the two protruding ends of screws are loose in the vise jaws (about 3/4" apart). Turn the center screw loose from the back plate and the assembly will come apart.

REASSEMBLY

All procedures for reassembling the pump are the reverse of the previous instructions with further instructions as shown:

1. The diaphragm assemblies are to be installed with the natural bulge outward or toward the head of the center screw. Make sure both plates are installed with outer radii against the diaphragm. After all components are in position in a vise and hand tight, set a torque wrench for 480 inch pounds (40 ft. pounds) (54.23 Newton meters) using a (3/8") allen head socket. After each diaphragm sub assembly has been completed, thread one assembly into the shaft (held near the middle in a vise having soft jaws to protect the finish) making sure the stainless steel washer is in place on the cap screw.

Make sure 1/4"-20 mounting screw has been removed and that the bumper (Item #19 on drawing) is in place in the shaft.

Install this sub assembly into the pump and secure by placing the outer chamber housing and capscrews on the end with the diaphragm. This will hold the assembly in place while the opposite side is installed. Make sure the last diaphragm assembly is torqued to 30 ft. lbs. (40.67 Newton meters) before placing the outer diaphragm over the capscrews. If the holes in the diaphragm flange do not line up with the holes in the chamber flange, turn the diaphragm assembly in the direction of tightening to align the holes so that the capscrews can be inserted. This final torquing of the last diaphragm assembly will lock the two diaphragm assemblies together.

Place remaining outer chamber on the open end and tighten down the securing nuts gradually and evenly on both sides.

Caution should be used while reassembling flap valves. The valves are designed for some preload over the retainer hinge pad. This is done to insure proper face contact with the seat. After all parts are in place, tighten the lock nuts down on the assembly to the point where visual inspection shows that seat and valve face mate without gap. This is important for dry prime. However, after priming action has started, valves will function due to differential pressure without concern or trouble.

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.

WARRANTY

This unit is guaranteed for a period of five years against defective material and workmanship.

TROUBLESHOOTING - For additional information, see the Warren Rupp Troubleshooting Guide.

PROBLEM

Pump cycles but will not pump. (Note: higher suction lifts require faster cycling speed for priming.)

POSSIBLE CAUSES:

- A. Air leak in suction line.
- B. Excessive suction lift.
- C. Flap valve not seating properly.
- D. Leakage at joint of suction manifold or elbow flange.
- E. Suction line or strainer plugged.
- F. Diaphragm ruptured.

PROBLEM

Pump will not cycle. (Note: Always disconnect air supply to relieve air pressure before disassembling any portion of pump.)

POSSIBLE CAUSES:

- A. Discharge hose or line plugged, or discharge head requirement greater than air supply pressure. (Disconnect discharge line to check.)
- B. Spool in air distribution valve not shifting. (Remove end cap and check spool — must slide freely.)
- C. Diaphragm ruptured. (Air will escape out discharge line in this case.)
- D. Blockage in diaphragm chamber preventing movement. (Shut off air supply and reopen after pressure is relieved.)

PROBLEM

Uneven discharge flow. (Indicates one chamber not operating properly.)

POSSIBLE CAUSES:

- A. Flap valve not sealing properly in one chamber.
- B. Diaphragm failure in one chamber.
- C. Air leak at suction manifold joint or elbow flange one side.

For additional information, see the Warren Rupp Troubleshooting Guide.

MATERIAL CODES

THE LAST 3 DIGITS OF PART NUMBER

000	Assembly, sub-assembly; and some purchased items	353	Geolast; Color: BLACK	557	Conductive Polypropylene; Color: BLACK; Color Coded: SILVER
010	Cast Iron	354	Injection Molded #203-40 Santoprene- Duro 40D +/-5; Color: RED	558	Conductive HDPE; Color: BLACK Color Coded: SILVER
012	Powered Metal	355	Thermal Plastic	559	Conductive Polypropylene; Color: BLACK Color Coded: SILVER
015	Ductile Iron	356	HytreI; Color: BLUE	570	Rulon II
020	Ferritic Malleable Iron	357	Injection Molded Polyurethane; Color: GREEN	580	Ryton
025	Music Wire	358	Urethane Rubber; Color: NATURAL (Some Applications)	590	Valox
080	Carbon Steel, AISI B-1112		(Compression Mold)	591	Nylatron G-S
100	Alloy 20	359	Urethane Rubber; Color: NATURAL	592	Nylatron NSB
110	Alloy Type 316 Stainless Steel	360	Nitrile Rubber; Color Coded: RED	600	PTFE (virgin material) Tetrafluorocarbon (TFE)
111	Alloy Type 316 Stainless Steel (Electro Polished)	361	Nitrile	601	PTFE (Bronze and moly filled)
112	Alloy C	363	FKM (Fluorocarbon). Color Coded: YELLOW	602	Filled PTFE
113	Alloy Type 316 Stainless Steel (Hand Polished)	364	E.P.D.M. Rubber. Color Coded: BLUE	603	Blue Gylon
114	303 Stainless Steel	365	Neoprene Rubber; Color Coded: GREEN	604	PTFE
115	302/304 Stainless Steel	366	Food Grade Nitrile; Color: WHITE	606	PTFE
117	440-C Stainless Steel (Martensitic)	368	Food Grade EPDM; Color: GRAY	607	Envelon
120	416 Stainless Steel (Wrought Martensitic)	370	Butyl Rubber Color Coded: BROWN	608	Conductive PTFE; Color: BLACK
123	410 Stainless Steel (Wrought Martensitic)	371	Philthane (Tuftane)	610	PTFE Encapsulated Silicon
148	Hardcoat Anodized Aluminum	374	Carboxylated Nitrile	611	PTFE Encapsulated FKM
149	2024-T4 Aluminum	375	Fluorinated Nitrile	632	Neoprene/Hytrel
150	6061-T6 Aluminum	378	High Density Polypropylene	633	FKM/PTFE
151	6063-T6 Aluminum	379	Conductive Nitrile; Color Coded: RED & SILVER	634	EPDM/PTFE
152	2024-T4 Aluminum (2023-T351)		Conductive Neoprene; Color Coded: GREEN & SILVER	635	Neoprene/PTFE
154	Almag 35 Aluminum	384	Cellulose Fibre	637	PTFE , FKM/PTFE
155	356-T6 Aluminum	405	Cork and Neoprene	638	PTFE , Hytrel/PTFE
156	356-T6 Aluminum	408	Compressed Fibre	639	Nitrile/TFE
157	Die Cast Aluminum Alloy #380	425	Blue Gard	643	Santoprene®/EPDM
158	Aluminum Alloy SR-319	426	Vegetable Fibre	644	Santoprene®/PTFE
159	Anodized Aluminum	440	Fibre	656	Santoprene Diaphragm and Check Balls/EPDM Seats
162	Brass, Yellow, Screw Machine Stock	465	Delrin 500	661	EPDM/Santoprene
165	Cast Bronze, 85-5-5-5	500	Delrin 570	666	FDA Nitrile Diaphragm, PTFE Overlay, Balls, and Seals
166	Bronze, SAE 660	501	Conductive Acetal, ESD-800; Color: BLACK	668	PTFE, FDA Santoprene/PTFE
170	Bronze, Bearing Type, Oil Impregnated	502	Conductive Acetal, Glass-Filled Color: BLACK; Color Coded: YELLOW		
175	Die Cast Zinc	503	Acrylic Resin Plastic		
180	Copper Alloy	505	Delrin 150		
305	Carbon Steel, Black Epoxy Coated	506	Injection Molded PVDF; Color: NATURAL		
306	Carbon Steel, Black PTFE Coated	520	Injection Molded Conductive PVDF; Color: BLACK; Color Coded: LIGHT GREEN		
307	Aluminum, Black Epoxy Coated	521	Nylon		
308	Stainless Steel, Black PTFE Coated	540	Nylon		
309	Aluminum, Black PTFE Coated	541	Nylon		
310	PVDF Coated	542	Nylon Injection Molded		
313	Aluminum, White Epoxy Coated	544	Polyethylene		
330	Zinc Plated Steel	550	Glass Filled Polypropylene; Color: BLACK		
331	Chrome Plated Steel	551	Unfilled Polypropylene; Color: NATURAL		
332	Aluminum, Electroless Nickel Plated	552	Polyvinyl Chloride		
333	Carbon Steel, Electroless Nickel Plated	555	Black Vinyl		
335	Galvanized Steel	556			
336	Zinc Plated Yellow Brass				
337	Silver Plated Steel				
340	Nickel Plated				
342	Filled Nylon				
351	Food Grade Santoprene; Color: NATURAL				

Delrin is a registered
tradename of E.I. DuPont.

Gylon is a registered tradename
of Garlock, Inc.

Nylatron is a registered tradename
of Polymer Corp.

Santoprene is a registered tradename
of Exxon Mobil Corp.

Rulon II is a registered tradename
of Dixon Industries Corp.

Ryton is a registered tradename
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PortaPump, Tranquiliizer and SludgeMaster are
registered tradenames of Warren Rupp, Inc.

SERVICE AND OPERATING MANUAL



See pages 20 & 21
for ATEX ratings



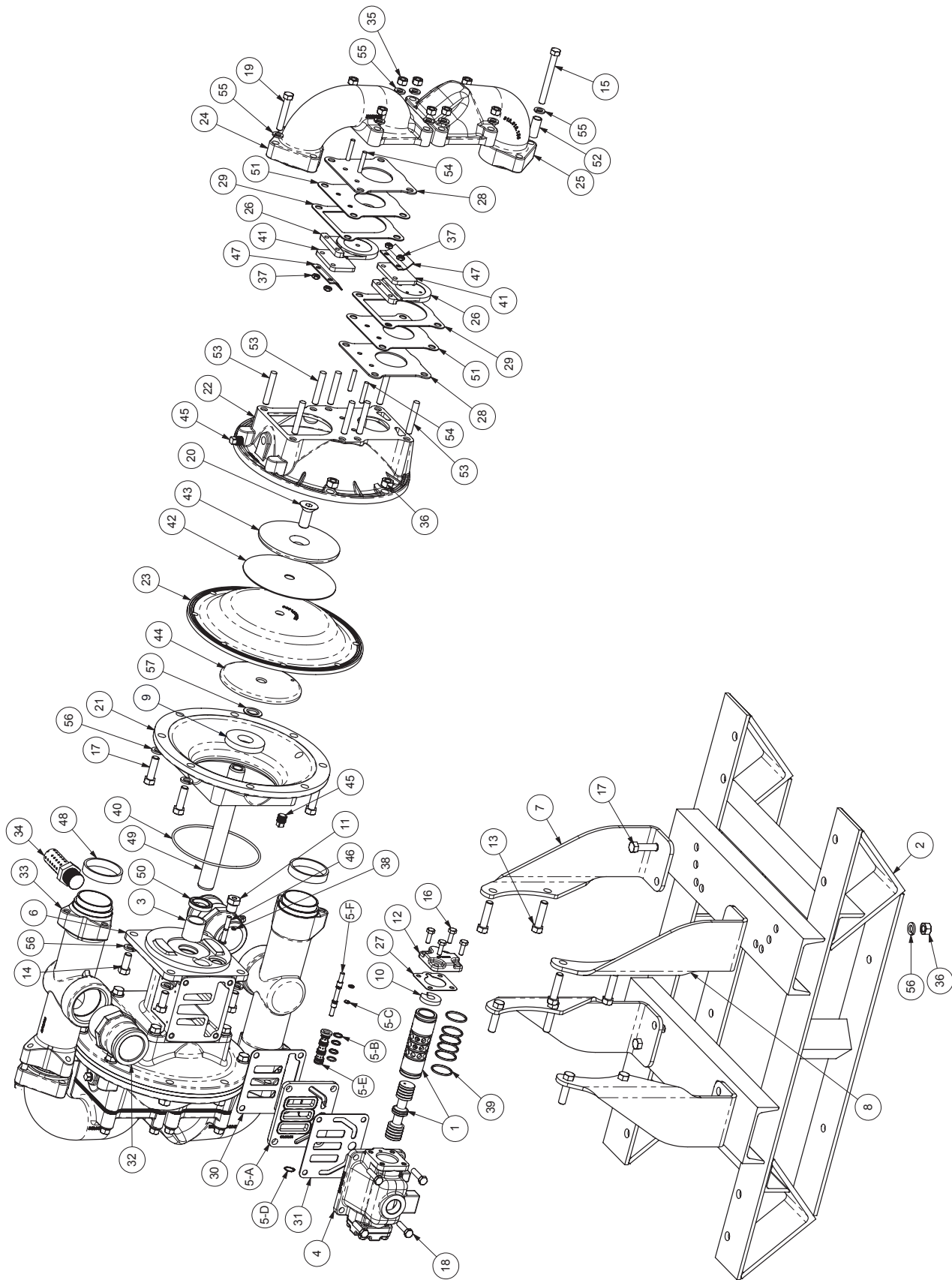
Model DMF2S Repair parts list 2" Flap Valve Pump Type 5

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	031.012.000	SLEEVE & SPOOL SET	1
2	060.096.000	BASE, PUMP	1
3	070.006.170	SLEEVE, BEARING	2
4	095.043.156	BODY, AIR VALVE	1
5	095.073.000	ASSEMBLY, PILOT VALVE	1
5-A	095.070.551	BODY, PILOT VALVE	1
5-B	560.033.360	O-RING	4
5-C	560.023.360	O-RING (SPOOL)	2
5-D	675.037.080	RETAINING RING	1
5-E	755.025.000	SLEEVE, PILOT VALVE	1
5-F	775.026.000	SPOOL, PILOT VALVE	1
6	114.002.156	INTERMEDIATE	1
7	115.158.080	BRACKET, LEG	2
8	115.159.080	BRACKET, LEG	2
9	132.002.360	BUMPER, DIAPHRAGM PLATE	2
10	132.014.358	BUMPER, AIR VALVE	2
11	135.016.162	BUSHING, THREADED, W/ O-RING 560.001.360	2
12	165.011.157	CAP, END	2
13	170.023.330	CAPSCREW, HEX HEAD 7/16-14 X 1.75	8
14	170.024.330	CAPSCREW, HEX HD, 7/16-14 X 1	8
15	170.026.330	CAPSCREW, HEX HEAD 3/8-16 X 3.5	2
16	170.032.330	CAPSCREW, HEX HEAD 1/4-20 X .75	8
17	170.035.330	CAPSCREW, HEX HD, 7/16-14 X 1.50	12
18	170.045.330	CAPSCREW HEX HEAD 5/16-18 X 1.25	4
19	170.052.330	CAPSCREW, HEX HEAD 3/8-16 X 2.25	2
20	171.002.330	CAPSCREW, SOCKET HEAD	2
21	196.001.157	CHAMBER, INNER	2
22	196.002.156	CHAMBER, OUTER	2
23	286.007.360	DIAPHRAGM	2
24	312.012.156	ELBOW SUCTION	2
25	312.013.156	ELBOW, DISCHARGE	2
26	338.005.360	FLAP VALVE	4
27	360.010.425	GASKET, END CAP	2
28	360.011.425	GASKET, SEAT	4
29	360.012.379	GASKET, FLANGE	4
30	360.041.379	GASKET, VALVE BODY	1
31	360.048.425	GASKET, VALVE BODY	1
32	429.001.156	CAM AND GROOVE, 2" ALUMINUM MALE	2
33	518.001.157	MANIFOLD	2
34	530.036.000	MUFFLER	1
35	545.005.330	NUT, HEX, 3/8-16	16

Model DMF2S Parts List, Continued

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
36	545.007.330	NUT, HEX - 7/16-14	12
37	547.002.110	NUT, STOP	8
38	560.001.360	O-RING	2
39	560.020.360	O-RING	6
40	560.022.360	O-RING	2
41	570.001.360	PAD, HINGE-FLAP VALVE	4
42	570.009.360	PAD, WEAR	2
43	612.008.330	PLATE, OUTER DIAPHRAGM	2
44	612.047.330	PLATE, INNER DIAPHRAGM	2
45	618.003.330	PLUG, PIPE, 1/4	4
46	620.011.114	PLUNGER, ACTUATOR	2
47	670.005.110	RETAINER, FLAP VALVE	4
48	675.013.360	RING, SEALING	4
49	685.007.120	ROD, DIAPHRAGM	1
50	720.004.360	SEAL, U-CUP	2
51	722.004.110	SEAT, FLAP VALVE	4
52	770.005.330	SPACER	2
53	807.008.330	STUD	16
54	807.018.110	STUD, 1/4-20	8
55	900.005.330	WASHER, LOCK, 3/8	20
56	900.006.330	WASHER, LOCK - 7/16	20
57	902.003.000	WASHER, SEALING	2

Model DMF2S Composite Repair Drawing



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SERVICE AND OPERATING MANUAL



See pages 20 & 21
for ATEX ratings



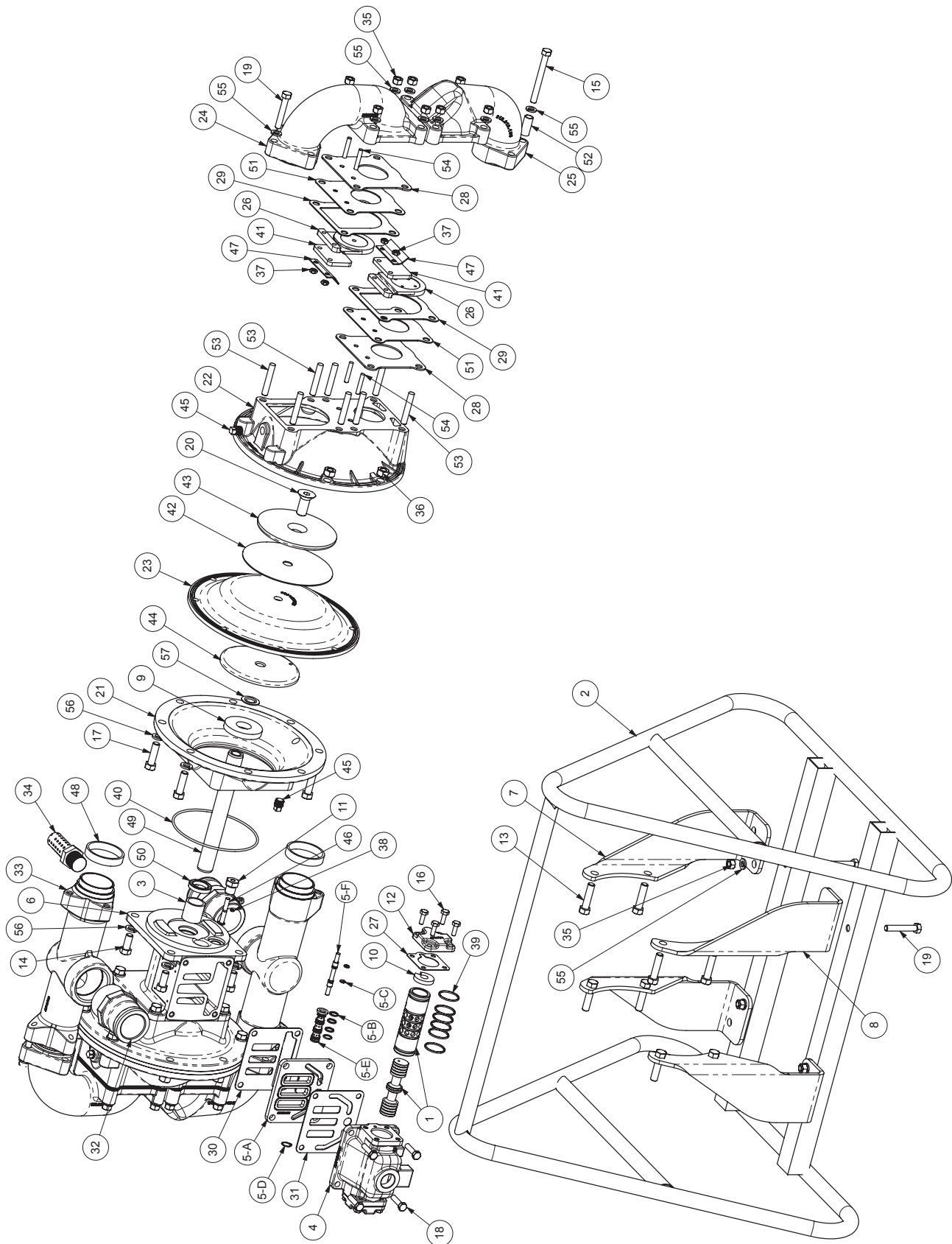
Model DMF2R Repair parts list 2" Flap Valve Pump Type 5

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	031.012.000	SLEEVE & SPOOL SET	1
2	060.045.000	BASE, CAGE, WELDMENT	1
3	070.006.170	SLEEVE, BEARING	2
4	095.043.156	BODY, AIR VALVE	1
5	095.073.000	PILOT VALVE ASSEMBLY	1
5-A	095.070.551	BODY, PILOT VALVE	1
5-B	560.033.360	O-RING	4
5-C	560.023.360	O-RING (SPOOL)	2
5-D	675.037.080	RETAINING RING	1
5-E	755.025.000	SLEEVE, PILOT VALVE	1
5-F	775.026.000	SPOOL, PILOT VALVE	1
6	114.002.156	INTERMEDIATE	1
7	115.158.080	BRACKET, LEG	2
8	115.159.080	BRACKET, LEG	2
9	132.002.360	BUMPER, DIAPHRAGM PLATE	2
10	132.014.358	BUMPER, AIR VALVE	2
11	135.016.162	BUSHING, THREADED, W/ O-RING 560.001.360	2
12	165.011.157	CAP, END	2
13	170.023.330	CAPSCREW, HEX HEAD	8
14	170.024.330	CAPSCREW, HEX HD, 7/16-14 X 1	8
15	170.026.330	CAPSCREW, HEX HEAD	2
16	170.032.330	CAPSCREW, HEX HEAD	8
17	170.035.330	CAPSCREW, HEX HD, 7/16-14 X 1.50	8
18	170.045.330	CAPSCREW HEX HEAD	4
19	170.052.330	CAPSCREW, HEX HEAD	6
20	171.002.330	CAPSCREW, SOCKET HEAD	2
21	196.001.157	CHAMBER, INNER	2
22	196.002.157	CHAMBER, OUTER	2
23	286.007.360	DIAPHRAGM	2
24	312.012.156	ELBOW SUCTION	2
25	312.013.156	ELBOW, DISCHARGE	2
26	338.005.360	FLAP VALVE	4
27	360.010.425	GASKET, END CAP	2
28	360.011.425	GASKET, SEAT	4
29	360.012.379	GASKET, FLANGE	4
30	360.041.379	GASKET, VALVE BODY	1
31	360.048.425	GASKET, VALVE BODY	1
32	429.001.156	CAM AND GROOVE, 2" ALUMINUM MALE	2
33	518.001.157	MANIFOLD	2
34	530.036.000	MUFFLER	1
35	545.005.330	NUT, HEX, 3/8-16	20

Model DMF2R Parts List, Continued

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
36	545.007.330	NUT, HEX - 7/16-14	8
37	547.002.110	NUT, STOP	8
38	560.001.360	O-RING	2
39	560.020.360	O-RING	6
40	560.022.360	O-RING	2
41	570.001.360	PAD, HINGE-FLAP VALVE	4
42	570.009.360	PAD, WEAR	2
43	612.008.330	PLATE, OUTER DIAPHRAGM	2
44	612.047.330	PLATE, INNER DIAPHRAGM	2
45	618.003.330	PLUG, PIPE, 1/4	4
46	620.011.114	PLUNGER, ACTUATOR	2
47	670.005.110	RETAINER, FLAP VALVE	4
48	675.013.360	RING, SEALING	4
49	685.007.120	ROD, DIAPHRAGM	1
50	720.004.360	SEAL, U-CUP	2
51	722.004.110	SEAT, FLAP VALVE	4
52	770.005.330	SPACER	2
53	807.008.330	STUD	16
54	807.018.110	STUD, 1/4-20	8
55	900.005.330	WASHER, LOCK, 3/8	24
56	900.006.330	WASHER, LOCK - 7/16	16
57	902.003.000	WASHER, SEALING	2

Model DMF2R Composite Repair Drawing



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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. ~



EC Declaration of Conformity

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

Certifies that Air-Operated Double Diaphragm Pump Models: DSB Series, DMF Series, G Series, HDB Series, HDF Series, HP Series, F Series, MS Series, S Series, SL Series, SP Series, SSB Series, T Series, U1F Series, WR Series; High Pressure Pump Models: EH Series, GH Series, SH Series; Submersible Pump Models: SMA3 Series, SPA Series; and Surge Dampener/Suppressor Models: DA Series, TA Series 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.

October 3, 2022

DATE/APPROVAL/TITLE:

Technical File on record with:
DEKRA Certification B.V.
Meander 1051
6825 MJ Arnhem
The Netherlands

A handwritten signature in black ink, appearing to read "Dennis Hall".

Signature of authorized person

Dennis Hall

Printed name of authorized person

Engineering Manager

Title





EC Declaration of Conformity

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

Certifies that Air-Operated Double Diaphragm Pump Models: DSB Series, DMF Series, G Series, HDB Series, HDF Series, HP Series, F Series, MS Series, S Series, SL Series, SP Series, SSB Series, T Series, U1F Series, WR Series; High Pressure Pump Models: EH Series, GH Series, SH Series; Submersible Pump Models: SMA3 Series, SPA Series; and Surge Dampener/Suppressor Models: DA Series, TA Series comply with the United Kingdom Statutory Instruments 2008 No. 1597, The Supply of Machinery (Safety) Regulations 2008, according to Annex VIII. This product has used Designated Standard EN809:2012, Pumps and Pump Units for Liquids - Common Safety Requirements, to verify conformance.

October 17, 2022

DATE/APPROVAL/TITLE:

Technical File on record with:
DEKRA Certification UK Limited
Stokenchurch House
Oxford Road
Stokenchurch
HP14 3SX

Signature of authorized person

Dennis Hall

Printed name of authorized person

Engineering Manager

Title



SCAN ME

Register Your Pump



ATEX



EU Declaration of Conformity

Manufacturer:

Warren Rupp, Inc.
A Unit of IDEX Corporation
800 North Main Street
Mansfield, OH 44902 USA

This declaration of conformity is issued under the sole responsibility of the manufacturer. Warren Rupp, Inc. declares that Air Operated Double Diaphragm Pumps (AODD) and Surge Suppressors listed below comply with the requirements of Directive **2014/34/EU** and applicable harmonized standards.

Harmonized Standards:

- EN ISO 80079-36: 2016
- EN ISO 80079-37: 2016
- EN 60079-25: 2010

1. AODD Pumps and Surge Suppressors - Technical File on record with DEKRA Certification B.V.

Meander 1051
6825 MJ Arnhem
The Netherlands

Hazardous Location Applied:



II 2 G Ex h IIC T5...225°C (T2) Gb
II 2 D Ex h IIIC T100°C...T200°C Db

- Metallic pump models with external aluminum components (DMF Series, EH Series, F Series, G & GH Series, HDB Series, HDF Series, MS Series, S Series, SH Series, SL Series, SPB Series, ST Series, T Series, and U1F Series)
- Conductive plastic pump models with integral muffler (PB1/4 Series, S Series, SL Series, SPE Series)
- Tranquilizer® surge suppressors (TA Series)



II 2 G Ex h IIB T5...225°C (T2) Gb
II 2 D Ex h IIIB T100°C...T200°C Db

- ST Series with sight tubes (VL) and HP Series because of the projected area of non-conductive external components

2. AODD Pumps - EU Type Examination Certificate No.: DEKRA 18ATEX0094X - DEKRA Certification B.V. (0344)

Meander 1051
6825 MJ Arnhem
The Netherlands

Hazardous Location Applied:



I M1 Ex h I Ma
II 1 G Ex h IIC T5...225°C (T2) Ga
II 1 D Ex h IIIC T100°C...T200°C Da

- Metallic pump models with no external aluminum (HDB Series, HDF Series, G Series, S Series, SPB Series)
- Conductive plastic pumps equipped with conductive muffler (S Series, SPE Series)



II 2 G Ex h ia IIC T5 Gb
II 2 D Ex h ia IIIC T100°C Db

- Pump models with ATEX rated pulse output kit option (HDB Series, HDF Series, PB1/4, S Series, SB Series)



II 2 G Ex h mb IIC T5 Gb
II 2 D Ex h mb tb IIIC T100° Db

- Pump model series S05, S1F, S15, S20, S30 equipped with ATEX rated integral solenoid option

- See "ATEX Details" page in user's manual for more information
- See "Safety Information" page for conditions of safe use

DATE/APPROVAL/TITLE:
9 NOV 2023

Dennis Hall
Engineering Manager



UKEx



EU Declaration of Conformity

Manufacturer:

Warren Rupp, Inc.
A Unit of IDEX Corporation
800 North Main Street
Mansfield, OH 44902 USA

This declaration of conformity is issued under the sole responsibility of the manufacturer.

Warren Rupp, Inc declares that Air Operated Double Diaphragm Pumps (AODD) and Surge Suppressors listed below comply with the requirements of United Kingdom Statutory Instruments **2016 No. 1107** and all the applicable standards.

Designated Standards:

- EN ISO 80079-36: 2016
- EN ISO 80079-37: 2016
- EN 60079-25: 2010

1. AODD Pumps and Surge Suppressors - Technical File on record with: DEKRA Certification UK Limited
Stokenchurch House
Oxford Road
Stokenchurch
HP14 3SX

Hazardous Location Applied:



II 2 G Ex h IIC T5...225°C (T2) Gb
II 2 D Ex h IIC T100°C...T200°C Db

- Metallic pump models with external aluminum components (DMF Series, EH Series, F Series, G & GH Series, HDB Series, HDF Series, MS Series, S Series, SH Series, SL Series, SPB Series, ST Series, T Series, and U1F Series)
- Conductive plastic pump models with integral muffler (PB1/4 Series, S Series, SL Series, SPE Series)
- Tranquilizer® surge suppressors (TA Series)



II 2 G Ex h IIB T5...225°C (T2) Gb
II 2 D Ex h IIB T100°C...T200°C Db

- ST Series with sight tubes (VL) and HP Series because of the projected area of non-conductive external components

- See "ATEX Details" page in user's manual for more information
- See "Safety Information" page for conditions of safe use

DATE/APPROVAL/TITLE:
9 NOV 2023


Dennis Hall
Engineering Manager