

SERVICE & OPERATING MANUAL

Original Instructions

Certified Quality



 SAI GLOBAL

ISO 9001 Certified
ISO 14001 Certified

Member of:
Hydraulic
INSTITUTE

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Model MPB^{1/4}

Metallic Design Level 3



1: PUMP SPECS

2: INSTAL & OP

3: EXP VIEW

4: AIR END

5: WET END

6: OPTIONAL

7: WARRANTY

MARATHON
A WARREN RUPP, INC. BRAND

WARREN RUPP.COM

Safety Information

IMPORTANT



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



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

CAUTION



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



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



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



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

WARNING



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



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



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



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



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

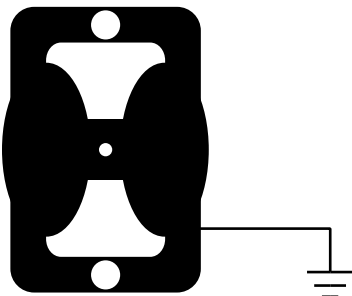


This pump is pressurized internally with air pressure during operation. Make certain that all fasteners are in good condition and are reinstalled properly during reassembly.



Use safe practices when lifting

Grounding ATEX Pumps



ATEX compliant pumps are suitable for use in explosive atmospheres when the equipment is properly grounded in accordance with local electrical codes. Pumps equipped with electrically conductive diaphragms are suitable for the transfer of conductive or non-conductive fluids of any explosion group. When operating pumps equipped with non-conductive diaphragms that exceed the maximum permissible projected area, as defined in EN 13463-1: 2009 section 6.7.5 table 9, 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

For further guidance on ATEX applications, please consult the factory.

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1: PUMP SPECS

2: INSTAL & OP

3: EXP VIEW

4: AIR END

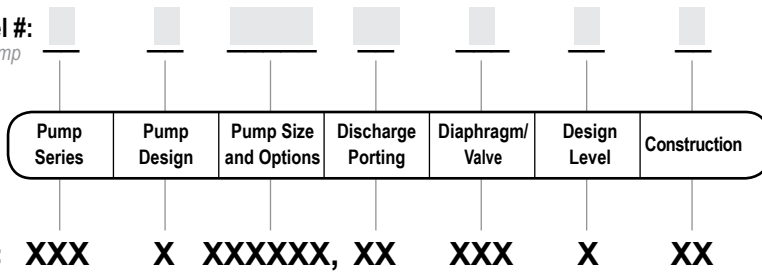
5: WET END

6: OPTIONAL

7: WARRANTY

Explanation of Pump Nomenclature

Your Model #: _____
 (fill in from pump nameplate)



Pump Series

- M Marathon
- P Plastic

Pump Design

- B Solid Ball

Pump Size and Options

- 1/4 1/4" NPT
- P1 Intrinsically Safe ATEX Compliant Pulse Output
- P0 10-30VDC Pulse Output Option
- P2 110/120 or 220/240VAC Pulse Output Option
- E0 Integral Solenoid 24VDC Coil
- E1 Integral Solenoid 24VDC Explosion-Proof Coil
- E2 Integral Solenoid 24VAC/12VDC Coil
- E3 Integral Solenoid 12VDC Explosion-Proof Coil
- E4 Integral Solenoid 110VAC Coil
- E5 Integral Solenoid 110VAC Explosion-Proof Coil
- E6 Integral Solenoid 220VAC Coil
- E7 Integral Solenoid 220VAC Explosion-Proof Coil
- E8 Integral Solenoid 115VAC, 50Hz Explosion-Proof Coil
- E9 Integral Solenoid 230VAC, 50Hz, Explosion-Proof Coil

Discharge Porting Position

- T Horizontal Suction, Vertical Discharge
- H Horizontal Suction, Horizontal Discharge
- V Vertical Suction, Horizontal Discharge
- VV Vertical Suction, Vertical Discharge

Diaphragm Check Valve Materials

- S Santoprene
- T Virgin PTFE
- U Santoprene Diaphragms/PTF E Ball

Design Level

- 3

Construction

- P Polypropylene Wet End and Center
- K PVDF Wet End and Polypropylene Center
- Δ CA Conductive Acetal Wet End and Center

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

ATEX Detail

	ATEX Detail	Construction	Muffler Options	Options
	II 1G c T5 II 1D c T100°C I M1 c I M2 c	CA	Metal	00
	II 2G c T5 II 2D c T100°C	CA	Integral	00
	II 2G Ex ia c II T5 II 2D Ex c iaD 20 IP67 T100°C	CA	Integral	P1

Performance

M1F METALLIC

SUCTION/DISCHARGE PORT SIZE

- 1/4" NPT (internal)
- 1/2" NPT (external)

CAPACITY

- 0 to 4 gallons per minute (0 to 15 liters per minute)

AIR DISTRIBUTION VALVE

- No-lube, no-stall design

SOLIDS-HANDLING

- Up to 1/32" (1mm)

HEADS UP TO

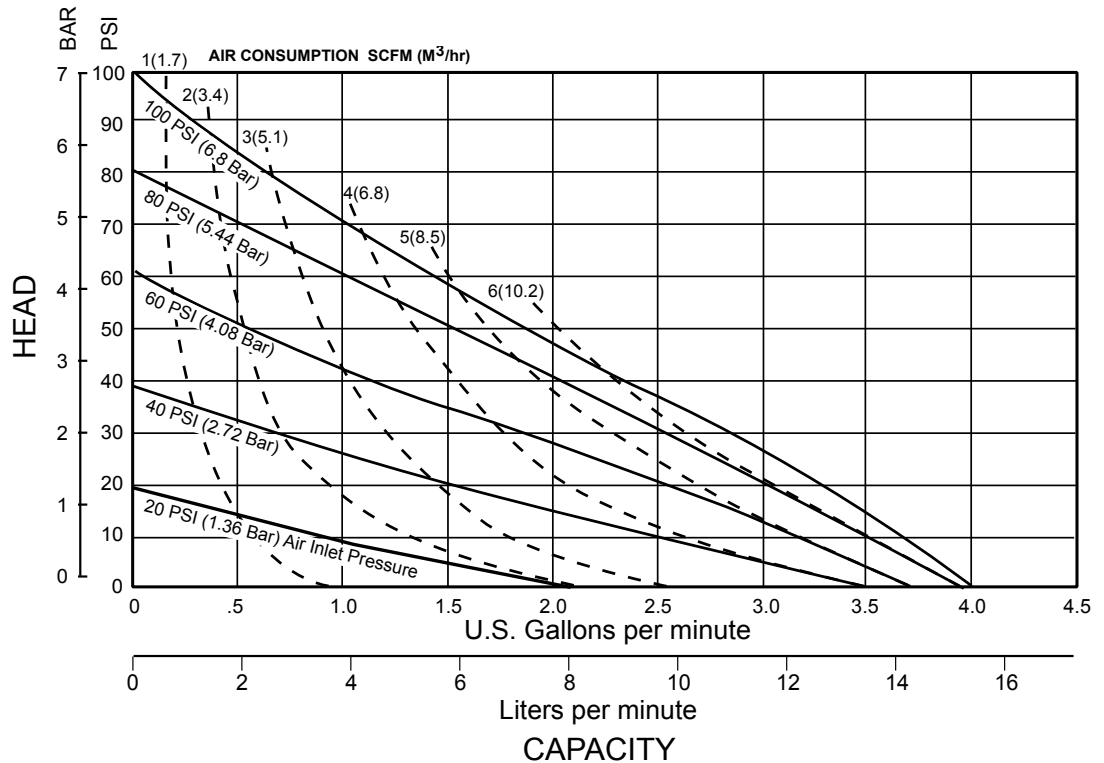
- 100 psi or 231 ft. of water (7 bar or 70 meters)

DISPLACEMENT/STROKE

- .01 US Gallons / .04 liters

MAXIMUM OPERATING PRESSURE

- 125 psi (8.6 bar)



1: PUMP SPECS

Materials

Material Profile:	Operating Temperatures:	
	Max.	Min.
Conductive Acetal: Tough, impact resistant, ductile. Good abrasion resistance and low friction surface. Generally inert, with good chemical resistance except for strong acids and oxidizing agents.	190°F 88°C	-20°F -29°C
EPDM: Shows very good water and chemical resistance. Has poor resistance to oils and solvents, but is fair in ketones and alcohols.	280°F 138°C	-40°F -40°C
FKM: (Fluorocarbon) Shows good resistance to a wide range of oils and solvents; especially all aliphatic, aromatic and halogenated hydrocarbons, acids, animal and vegetable oils. Hot water or hot aqueous solutions (over 70°F(21°C)) will attack FKM.	350°F 177°C	-40°F -40°C
Hytrel®: Good on acids, bases, amines and glycols at room temperatures only.	220°F 104°C	-20°F -29°C
Neoprene: All purpose. Resistance to vegetable oils. Generally not affected by moderate chemicals, fats, greases and many oils and solvents. Generally attacked by strong oxidizing acids, ketones, esters and nitro hydrocarbons and chlorinated aromatic hydrocarbons.	200°F 93°C	-10°F -23°C
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
Nylon: 6/6 High strength and toughness over a wide temperature range. Moderate to good resistance to fuels, oils and chemicals.	180°F 82°C	32°F 0°C

Ambient temperature range: -20°C to +40°C
Process temperature range: -20°C to +80°C for models rated as category 1 equipment
 -20°C to +100°C for models rated as category 2 equipment

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

Polypropylene: A thermoplastic polymer. Moderate tensile and flex strength. Resists strong acids and alkali. Attacked by chlorine, fuming nitric acid and other strong oxidizing agents.	180°F 82°C	32°F 0°C
PVDF: (Polyvinylidene Fluoride) A durable fluoroplastic with excellent chemical resistance. Excellent for UV applications. High tensile strength and impact resistance.	250°F 121°C	0°F -18°C
Santoprene®: Injection molded thermoplastic elastomer with no fabric layer. Long mechanical flex life. Excellent abrasion resistance.	275°F 135°C	-40°F -40°C
UHMW PE: A thermoplastic that is highly resistant to a broad range of chemicals. Exhibits outstanding abrasion and impact resistance, along with environmental stress-cracking resistance.	180°F 82°C	-35°F -37°C
Urethane: Shows good resistance to abrasives. Has poor resistance to most solvents and oils.	150°F 66°C	32°F 0°C
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

Maximum and Minimum Temperatures are the limits for which these materials can be operated. Temperatures coupled with pressure affect the longevity of diaphragm pump components. Maximum life should not be expected at the extreme limits of the temperature ranges.

Metals:
Alloy C: Equal to ASTM494 CW-12M-1 specification for nickel and nickel alloy.
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 applications. Commonly referred to as 316 Stainless Steel in the pump industry.

For specific applications, always consult the Chemical Resistance Chart.

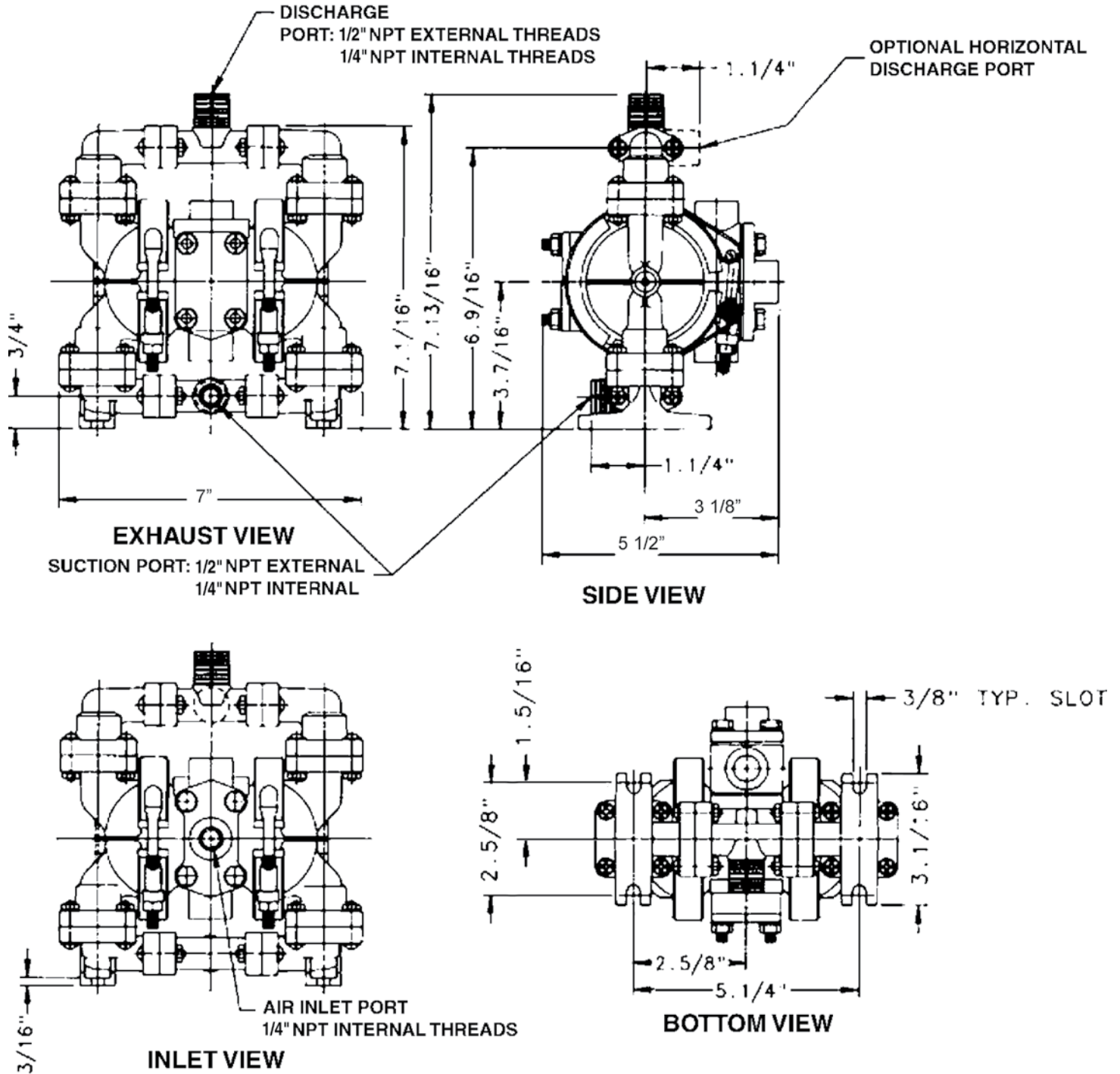
Dimensional Drawings

MPB 1/4 Non-Metallic

Dimensions in inches (mm dimensions in brackets). Dimensional Tolerance: $\pm 1/8"$ ($\pm 3\text{mm}$)

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

1: PUMP SPECS

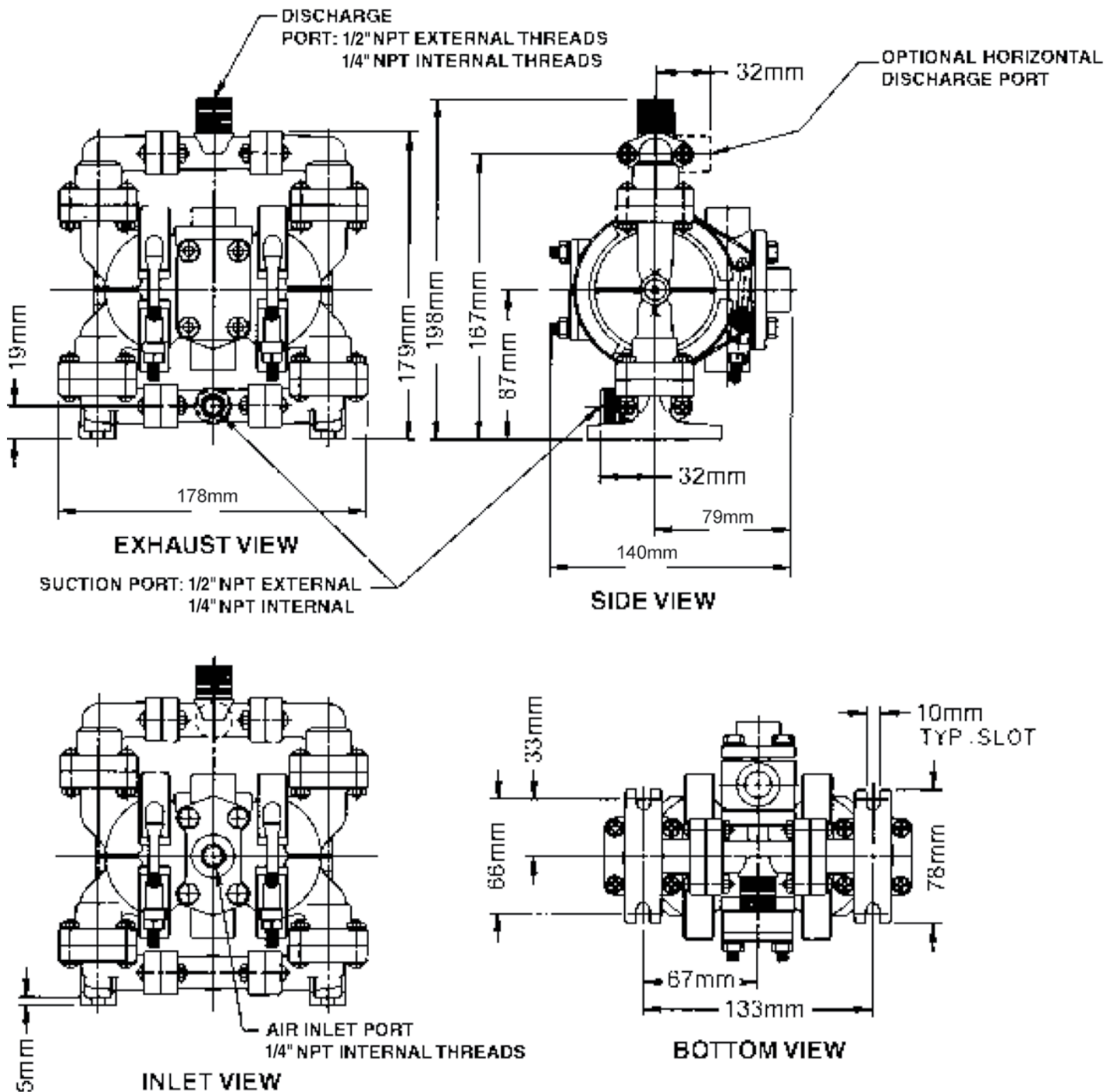


Dimensional Drawings

Metric Dimensions: MPB $\frac{1}{4}$ Non-Metallic

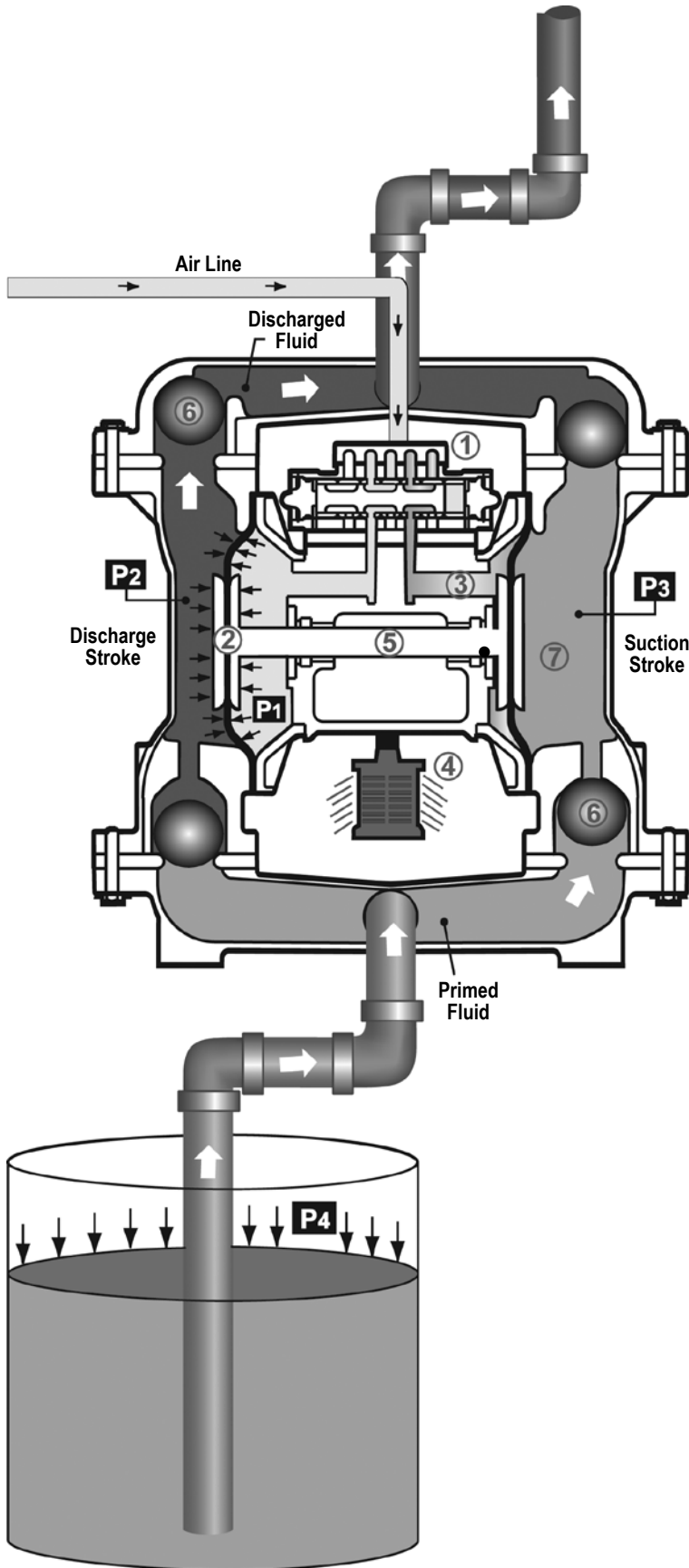
Dimensions in inches (mm dimensions in brackets). Dimensional Tolerance: $\pm 1/8"$ ($\pm 3\text{mm}$)

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



Principle of Pump Operation

2: INSTAL & OP



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

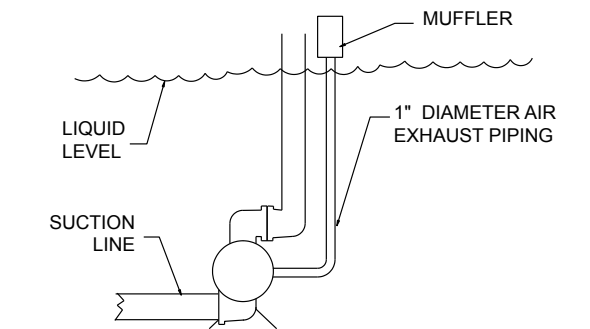
The main directional (air) control valve ① distributes compressed air to an air chamber, exerting uniform pressure over the inner surface of the diaphragm ②. At the same time, the exhausting air ③ from behind the opposite diaphragm is directed through the air valve assembly(s) to an exhaust port ④.

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

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

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

SUBMERGED ILLUSTRATION



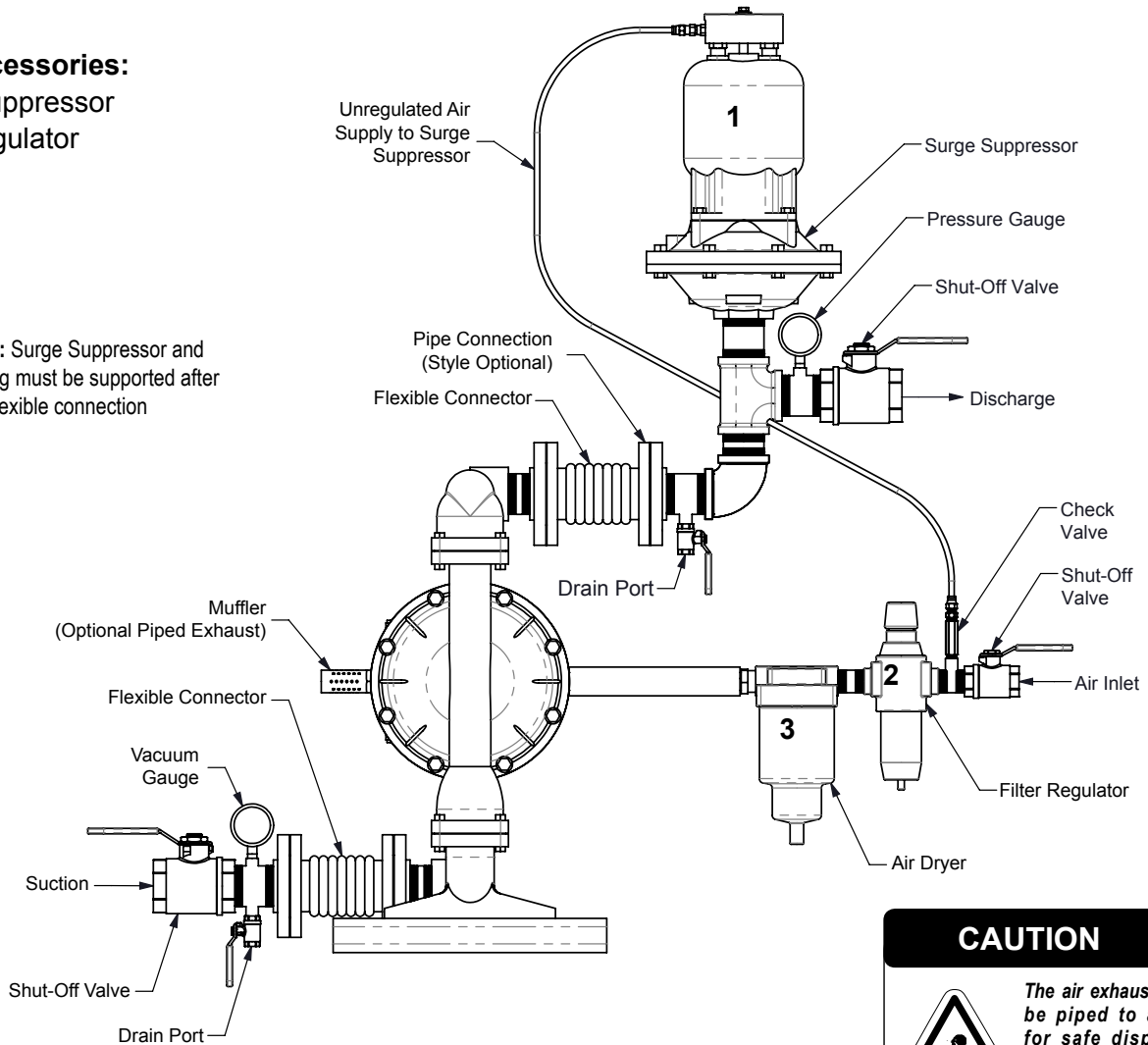
Pump can be submerged if the pump materials of construction are compatible with the liquid being pumped. The air exhaust must be piped above the liquid level. When the pumped product source is at a higher level than the pump (flooded suction condition), pipe the exhaust higher than the product source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

Recommended Installation Guide

Available Accessories:

1. Surge Suppressor
2. Filter/Regulator
3. Air Dryer

Note: Surge Suppressor and Piping must be supported after the flexible connection



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.

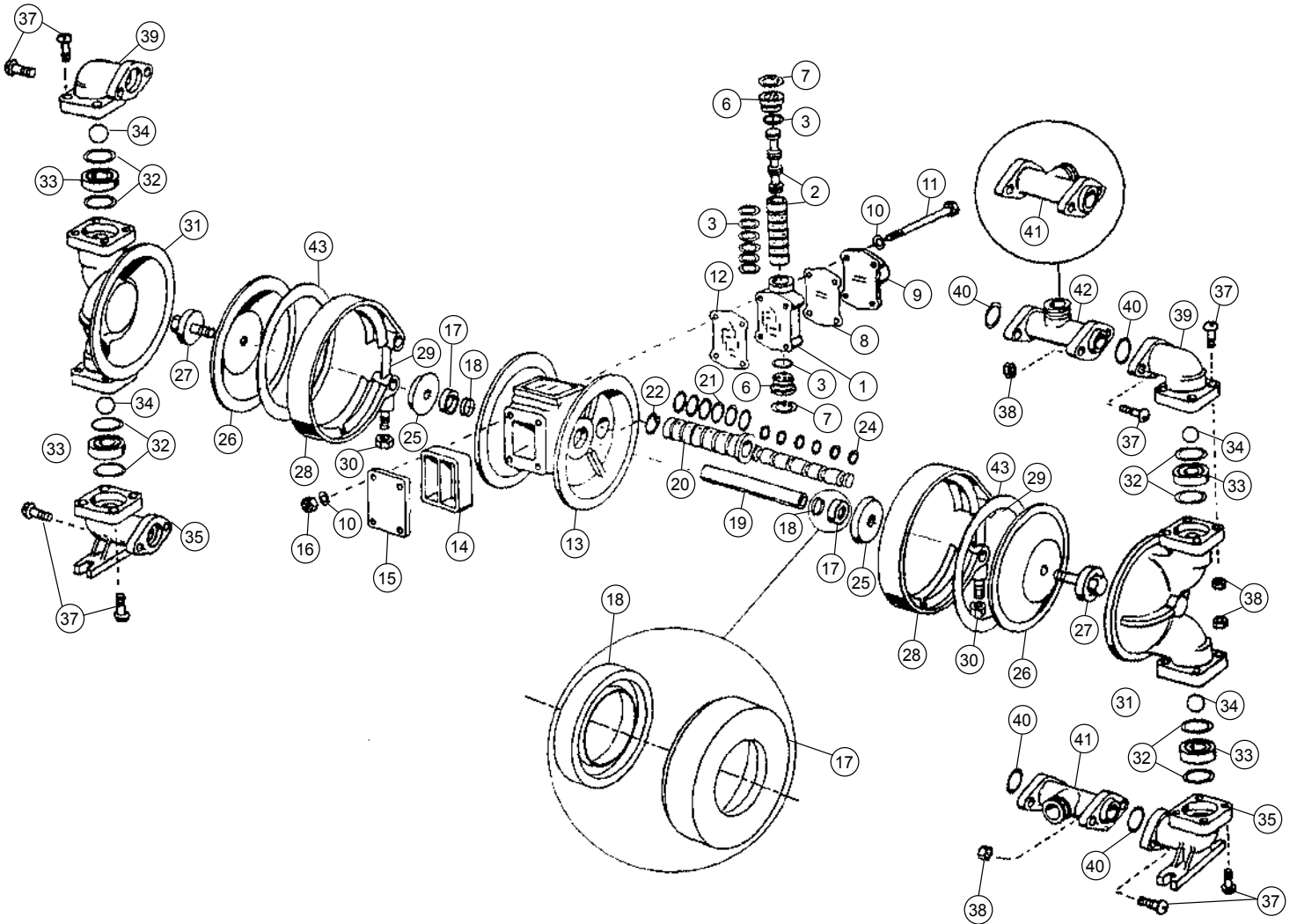
Troubleshooting Guide

2: INSTAL & OP

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.
Pump Cycles Running Sluggish / Stalling, Flow Unsatisfactory	Pumped fluid in air exhaust muffler.	Disassemble pump chambers. Inspect for diaphragm rupture or loose diaphragm plate assembly.
	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.
	Product Leaking Through Exhaust	Check valve obstructed.
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.
Premature Diaphragm Failure	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.
	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.
Unbalanced Cycling	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.
	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.	
Product Leaking Through Exhaust	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

Composite Repair Parts Drawing



3: EXP VIEW

Service & Repair Kits

031-107-551	Main Air Valve Body Assembly	476.117.356	Wetted End Kit Hytrel
031-107-503	Main Air Valve Body Assembly (Conductive Acetal only)	476-117-600	Diaphragms & Balls
031-101-000	Pilot Valve Assembly	476-117-644	Wetted End Kit PTFE
475-145-000	Air Exhaust Conversion Kit	476-129-000	Diaphragms & Balls
475-154-000	Air Exhaust Conversion Kit (Conductive Acetal only)		Wetted End Kit Santoprene
475-149-520	Pail Transfer Kit in PVDF		Diaphragms & Balls
475-149-552	Pail Transfer Kit in Polypropylene		Air End Kit
476-117-354	Wetted End Kit Santoprene		

Composite Repair Parts List

ITEM	PART NO.	DESCRIPTION	QTY	ITEM	PART NO.	DESCRIPTION	QTY
1	095-077-551	Body, Main Air Valve	1	27	612-146-520	Plate, Outer Diaphragm	2
	▲ 095-077-503	Body, Main Air Valve	1		▲ 612-146-502	Plate, Outer Diaphragm	2
2	031-106-000	Sleeve & Spool Set	1		612-146-552	Plate, Outer Diaphragm	2
3	560-101-360	O-Rings	8	28	200-057-115	Clamp, V-Band	2
6	165-074-551	Cap, End with O-Ring	2	29	100-002-115	T-Bolt	2
	▲ 165-074-503	Cap, End with O-Ring	2	30	545-027-337	Nut, Hex 1/4-28UNF	2
7	675-051-115	Ring, Retaining	2	31	196-145-520	Chamber, Outer	2
8	360-085-360	Gasket, Valve Body	1		▲ 196-145-502	Chamber, Outer	2
	▲ 360-085-379	Gasket, Valve Body (Conductive Acetal Only)	1		196-145-552	Chamber, Outer	2
9	165-072-551	Cap, Air Inlet	1	32	720-032-600	Seal, Check Valve	8
	▲ 165-072-503	Cap, Air Inlet	1	33	722-073-520	Seat, Check Valve	4
10	901-037-115	Washer, Flat 1/4"	8		722-073-506	Seat, Check Valve	4
11	170-103-115	Capscrew, Hex Head 1/4-20 5" Long	4		722-073-552	Seat, Check Valve	4
12	360-084-360	Gasket, Intermediate Bracket	1	34	050-033-354	Ball, Check	4
	▲ 360-084-379	Gasket, Intermediate Bracket (Conductive Acetal Only)	1		050-033-356	Ball, Check	4
					050-034-600	Ball, Check	4
13	114-019-551	Intermediate, Bracket	1	35	▲ 312-095-520	Elbow, Suction	2
	▲ 114-019-503	Intermediate, Bracket	1		312-095-502	Elbow, Suction	2
14	530-022-550	Muffler	1		312-095-552	Elbow, Suction	2
15	165-073-551	Cap, Air Exhaust	1	37	706-023-115	Screw, Machine 10-32UNF x 1" Long	32
	▲ 165-073-503	Cap, Air Exhaust	1	38	544-004-115	Nut, Hex Flange 10-32UNF	16
16	545-003-115	Nut, Hex 1/4-20UNC	4	39	▲ 312-096-520	Elbow, Discharge	2
17	449-021-551	Insert, Gland	2		312-096-502	Elbow, Discharge	2
	▲ 449-021-503	Insert, Gland	2		312-096-552	Elbow, Discharge	2
18	720-031-359	Seal, K-R	2	40	720-033-600	Seal, Manifold	4
19	685-046-120	Rod, Diaphragm	1	41	▲ 518-127-520	Manifold, Horizontal (Optional Discharge)	1/2
20	755-038-000	Sleeve, Pilot Valve with O-rings	1		518-127-502	Manifold, Horizontal (Optional Discharge)	1/2
21	560-066-360	O-rings	6		518-127-552	Manifold, Horizontal (Optional Discharge)	1/2
22	675-047-115	Ring, Retaining - Pilot Valve Sleeve	1	42	▲ 518-128-520	Manifold, Vertical	1
23	775-038-000	Spool, Pilot Valve with O-rings	1		518-128-502	Manifold, Vertical	1
24	560-029-374	O-rings	6		518-128-552	Manifold, Vertical	1
25	612-147-150	Plate, Inner Diaphragm	2	43	▲ 360-086-360	Gasket, Sealing	2
26	286-069-354	Diaphragm	2	54	920-025-000	Grounding Cable (Conductive Acetal Units Only)	1
	286-069-356	Diaphragm	2				
	286-070-600	Diaphragm	2				

Item not shown:

**706-025-115 Screw, Machine 10-32UNF x .88" Long

** (use in place of four 706-023-115 machine screws with horizontal manifold (item 41) on port side only when a pipe couple is installed on external 1/2" NPT porting threads.

3: EXP VIEW

Material Codes - The Last 3 Digits of Part Number

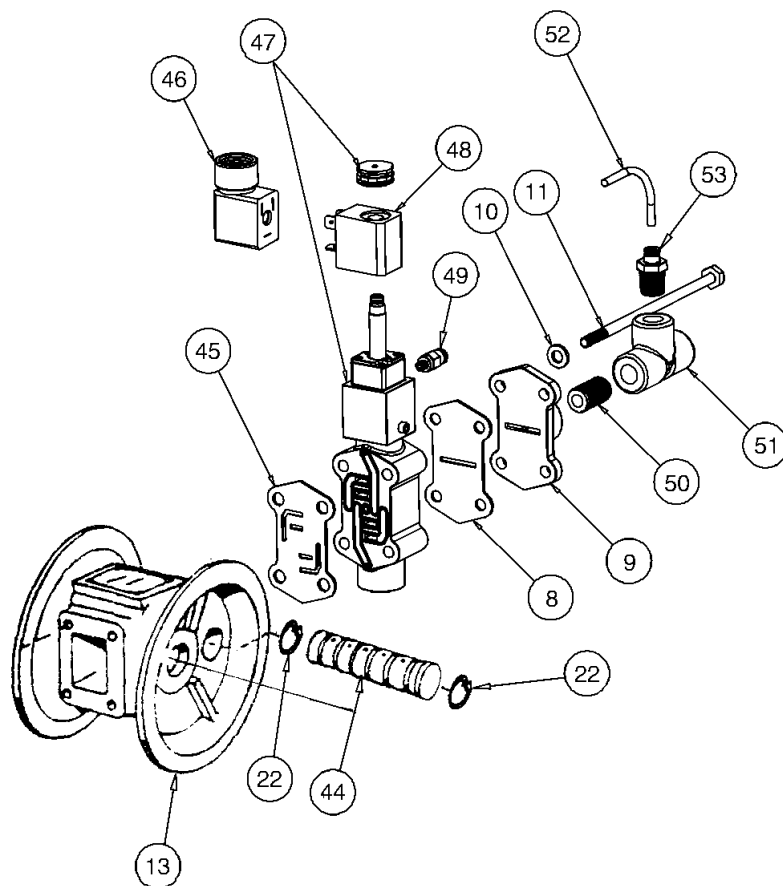
000.....Assembly, sub-assembly; and some purchased items	364.....EPDM Rubber Color coded: BLUE
010.....Cast Iron	365.....Neoprene Rubber Color coded: GREEN
015.....Ductile Iron	366.....Food Grade Nitrile
020.....Ferritic Malleable Iron	368.....Food Grade EPDM
080.....Carbon Steel, AISI B-1112	371.....Philthane (Tuftane)
110.....Alloy Type 316 Stainless Steel	374.....Carboxylated Nitrile
111.....Alloy Type 316 Stainless Steel (Electro Polished)	375.....Fluorinated Nitrile
112.....Alloy C	378.....High Density Polypropylene
113.....Alloy Type 316 Stainless Steel (Hand Polished)	379.....Conductive Nitrile
114.....303 Stainless Steel	408.....Cork and Neoprene
115.....302/304 Stainless Steel	425.....Compressed Fibre
117.....440-C Stainless Steel (Martensitic)	426.....Blue Gard
120.....416 Stainless Steel (Wrought Martensitic)	440.....Vegetable Fibre
148.....Hardcoat Anodized Aluminum	500.....Delrin® 500
150.....6061-T6 Aluminum	502.....Conductive Acetal, ESD-800
152.....2024-T4 Aluminum (2023-T351)	503.....Conductive Acetal, Glass-Filled
155.....356-T6 Aluminum	506.....Delrin® 150
156.....356-T6 Aluminum	520.....Injection Molded PVDF Natural color
157.....Die Cast Aluminum Alloy #380	540.....Nylon
158.....Aluminum Alloy SR-319	542.....Nylon
162.....Brass, Yellow, Screw Machine Stock	544.....Nylon Injection Molded
165.....Cast Bronze, 85-5-5-5	550.....Polyethylene
166.....Bronze, SAE 660	551.....Glass Filled Polypropylene
170.....Bronze, Bearing Type, Oil Impregnated	552.....Unfilled Polypropylene
180.....Copper Alloy	555.....Polyvinyl Chloride
305.....Carbon Steel, Black Epoxy Coated	556.....Black Vinyl
306.....Carbon Steel, Black PTFE Coated	557.....Unfilled Conductive Polypropylene
307.....Aluminum, Black Epoxy Coated	558.....Conductive HDPE
308.....Stainless Steel, Black PTFE Coated	559.....Glass Filled - Conductive Polypropylene
309.....Aluminum, Black PTFE Coated	558.....Conductive HDPE
313.....Aluminum, White Epoxy Coated	570.....Rulon II®
330.....Zinc Plated Steel	580.....Ryton®
332.....Aluminum, Electroless Nickel Plated	600.....PTFE (virgin material) Tetrafluorocarbon (TFE)
333.....Carbon Steel, Electroless Nickel Plated	603.....Blue Gylon®
335.....Galvanized Steel	604.....PTFE
337.....Silver Plated Steel	606.....PTFE
351.....Food Grade Santoprene®	607.....Envelon
353.....Geolast; Color: Black	608.....Conductive PTFE
354.....Injection Molded #203-40 Santoprene® Duro 40D +/-5; Color: RED	610.....PTFE Encapsulated Silicon
356.....Hytrel®	611.....PTFE Encapsulated FKM
357.....Injection Molded Polyurethane	632.....Neoprene/Hytrel®
358.....Urethane Rubber (Some Applications) (Compression Mold)	633.....FKM/PTFE
359.....Urethane Rubber	634.....EPDM/PTFE
360.....Nitrile Rubber Color coded: RED	635.....Neoprene/PTFE
363.....FKM (Fluorocarbon) Color coded: YELLOW	637.....PTFE, FKM/PTFE
	638.....PTFE, Hytrel®/PTFE
	639.....Nitrile/TFE
	643.....Santoprene®/EPDM
	644.....Santoprene®/PTFE
	656.....Santoprene® Diaphragm and Check Balls/EPDM Seats
	661.....EPDM/Santoprene®
	666.....FDA Nitrile Diaphragm, PTFE Overlay, Balls, and Seals
	668.....PTFE, FDA Santoprene®/PTFE

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

RECYCLING

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.

Solenoid Shifted Air Valve



SOLENOID SHIFTED AIR VALVE PARTS LIST

(Includes all items used on Composite Repair Parts List except as shown)

ITEM	PART NUMBER	DESCRIPTION	QTY
22	675-047-115	Ring, Retaining - Pilot Plug Sleeve	2
44	755-037-000	Pilot Plug Sleeve with O-rings	1
45	360-106-360	Gasket, Intermediate Bracket	1
46	241-001-000	Connector, conduit	1
47	893-095-000	Solenoid Valve, NEMA 4	1
48	219-001-000	Solenoid Coil, 24 VDC	1
	219-004-000	Solenoid Coil, 24 VAC/12 VDC	1
	219-002-000	Solenoid Coil, 120 VAC	1
	219-003-000	Solenoid Coil, 240 VAC	1
49	866-068-000	Tube Fitting	1
50	538-083-555	Nipple	1
51	835-009-555	Tee, Pipe	1
52	860-062-540	Tubing	1
53	866-069-000	Tube Fitting	1

FOR EXPLOSION PROOF SOLENOID VALVE

48	219-009-001	Solenoid Coil, 120VAC 60 Hz	1
	219-009-002	Solenoid Coil, 240VAC 60 Hz	1
	219-009-003	Solenoid Coil, 12VDC	1
	219-009-004	Solenoid Coil, 24VDC	1
	219-009-005	Solenoid Coil, 110VAC 50 Hz	1
	219-009-006	Solenoid Coil, 230VAC 50 Hz	1

ASSEMBLY INSTRUCTIONS: Must Be

Performed Prior To Start-Up. The tee (item 51), nipple (item 50), fitting (item 53) and tubing (item 52) have been pre-assembled at the factory. Thread this assembly into the air inlet cap (item 9). Be careful not to over tighten. Push the free end of the tubing into the fitting (item 49) which is attached to the valve.

6: OPTIONAL

SOLENOID SHIFTED AIR DISTRIBUTION VALVE OPTION

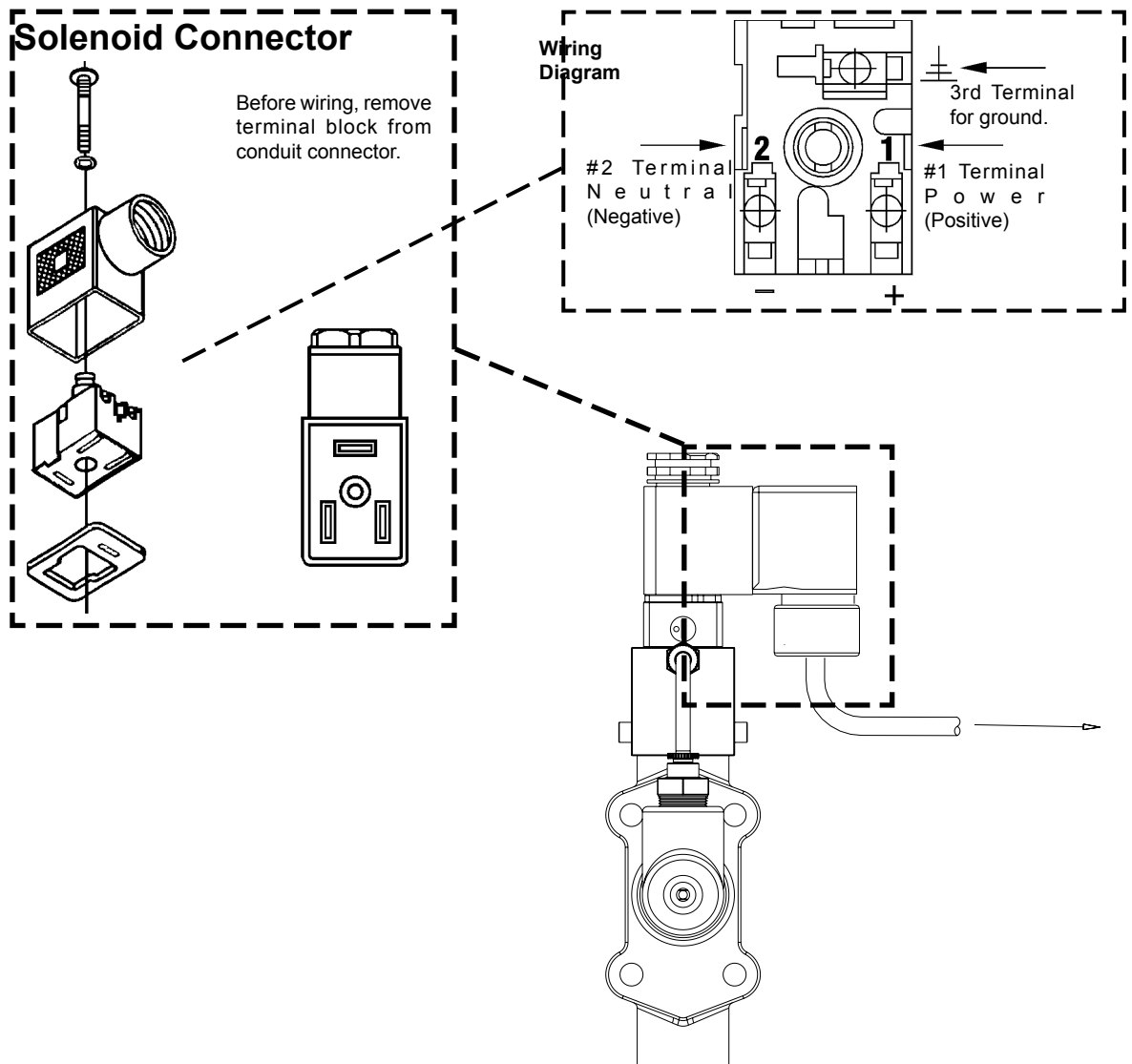
Warren Rupp's solenoid shifted, air distribution valve option utilizes electrical signals to precisely control your MARATHON's speed. The solenoid coil is connected to a customer - supplied control. Compressed air provides the pumping power, while electrical signals control pump speed (pumping rate).

OPERATION

The Solenoid Shifted MARATHON has a solenoid operated, air distribution valve in place of the standard MARATHON's pilot operated, air distribution valve. Where a pilot valve is normally utilized to cycle the pump's air distribution valve, an electric solenoid is utilized. As the solenoid is powered, one of the pump's air chambers is pressurized while the other chamber is exhausted. When electric power is turned off, the solenoid shifts and the pressurized chamber is exhausted while the other chamber is pressurized. By alternately applying and removing power to the solenoid, the pump cycles much like a standard MARATHON pump, with one exception. This option provides a way to precisely control and monitor pump speed.

BEFORE INSTALLATION

Before wiring the solenoid, make certain it is compatible with your system voltage.



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. ~

**WARREN
RUPP, INC.**

Declaration of Conformity

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

Certifies that Air-Operated Double Diaphragm Pump Series: HDB, HDF, M Non-Metallic, S Non-Metallic, M Metallic, S Metallic, T Series, G Series, U Series, EH and SH High Pressure, RS Series, W Series, SMA and SPA Submersibles, and Tranquilizer® Surge Suppressors comply with the European Community Directive 2006/42/EC on Machinery, according to Annex VIII. This product has used Harmonized Standard EN809:1998+A1:2009, Pumps and Pump Units for Liquids - Common Safety Requirements, to verify conformance.


Signature of authorized person

October 20, 2005
Date of issue

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

Director of Engineering
Title

February 27, 2017
Date of revision

Attn: Barry McMahon



Revision Level: F



WARREN RUPP, INC.

EC / EU Declaration of Conformity

The objective of the declaration described is in conformity with the relevant Union harmonisation legislation: Directive 94/9/EC (until April 19, 2016) and Directive 2014/34/EU (from April 20, 2016).

Manufacturer:

Warren Rupp, Inc.
A Unit of IDEX Corporation
800 North Main Street
P.O. Box 1568
Mansfield, OH 44902 USA

Applicable Standard:

EN13463-1: 2001
EN13463-5: 2003
EN60079-25: 2004

Harmonised Standard:

EN13463-1: 2009
EN13463-5: 2011
EN60079-25:2010

The harmonised standards have been compared to the applicable standards used for certification purposes and no changes in the state of the art technical knowledge apply to the listed equipment.

AODD Pumps and Surge Suppressors

Technical File No.: 203104000-1410/MER

AODD (Air-Operated Double Diaphragm) Pumps

EC Type Examination Certificate No. Pumps: KEMA 09ATEX0071 X

DEKRA Certification B.V. (0344)

Meander 1051
6825 MJ Arnhem
The Netherlands

Hazardous Locations Applied:

I M1 c	II 1 G c T5
II 2 G Ex ia c II CT5	II 1 D c T100°C
II 2 D Ex c ia D 20 IP67 T100°C	II 2 G c T5
II 2 G Eex m c II T5	II 2 D c T100°C
II 2 D c IP65 T100°C	

MARATHON
A WARREN RUPP, INC. BRAND

Tranquilizer[®]

DATE/APPROVAL/TITLE:
18 March 2016

David Roseberry
David Roseberry, Director of Engineering

IDEX