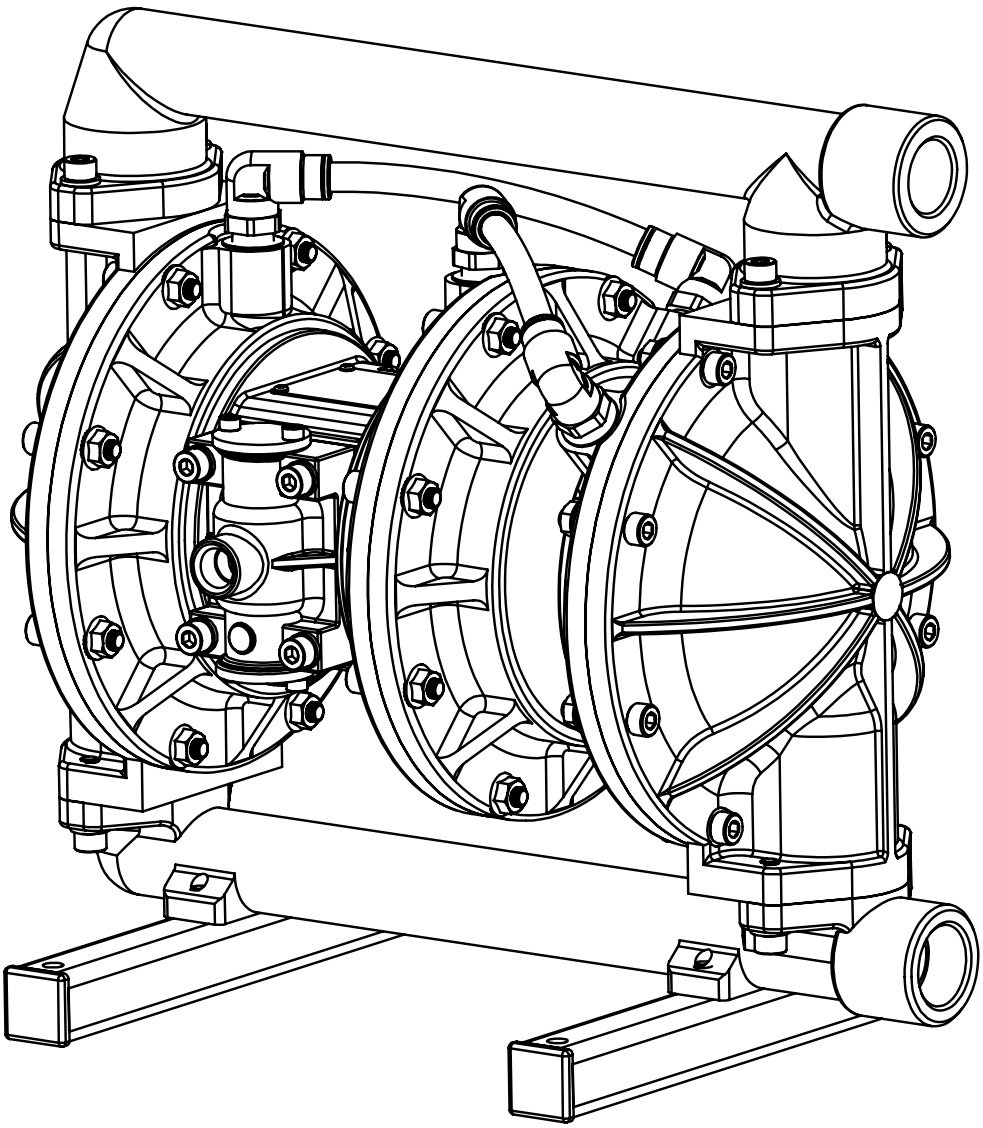
SERVICE&OPERATINGMANUAL

ORIGINAL INSTRUCTIONS

E1

1" Elima-Matic High Pressure Pump

ISO 9001 Certified
ISO 14001 Certified



VERSAMATIC®

VERSAMATIC®
Warren Rupp, Inc. • A Unit of IDEX Corporation

800 North Main Street, Mansfield, OH 44902 USA
Phone: (419) 526-7296 • **www.versamatic.com**

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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
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

ATEX Pumps - Conditions For Safe Use

1. Ambient temperature range is as specified in tables 1 & 2 on the next page

2. ATEX compliant pumps are suitable for use in explosive atmospheres when the equipment is properly grounded in accordance with local electrical codes

3. 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. 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.

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Temperature Tables

Table 1. Category 2 ATEX Rated Pumps

Ambient Temperature Range [°C]	Process Temperature Range [°C]	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	

Table 2. Category M2 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.

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Table of Contents

SECTION 1: PUMP SPECIFICATIONS.....1

- Nomenclature
- Performance
- Materials
- Dimensional Drawings

SECTION 2: INSTALLATION & OPERATION ...8

- Principle of Pump Operation
- Typical Installation Guide
- Troubleshooting

SECTION 3: EXPLODED VIEW.....11

- Composite Drawings
- Parts List
- Materials Code

SECTION 4: WARRANTY & CERTIFICATES ..14

- Warranty
- EU Declaration of Conformity - Machinery Directive
- EU Declaration of Conformity - ATEX Directive

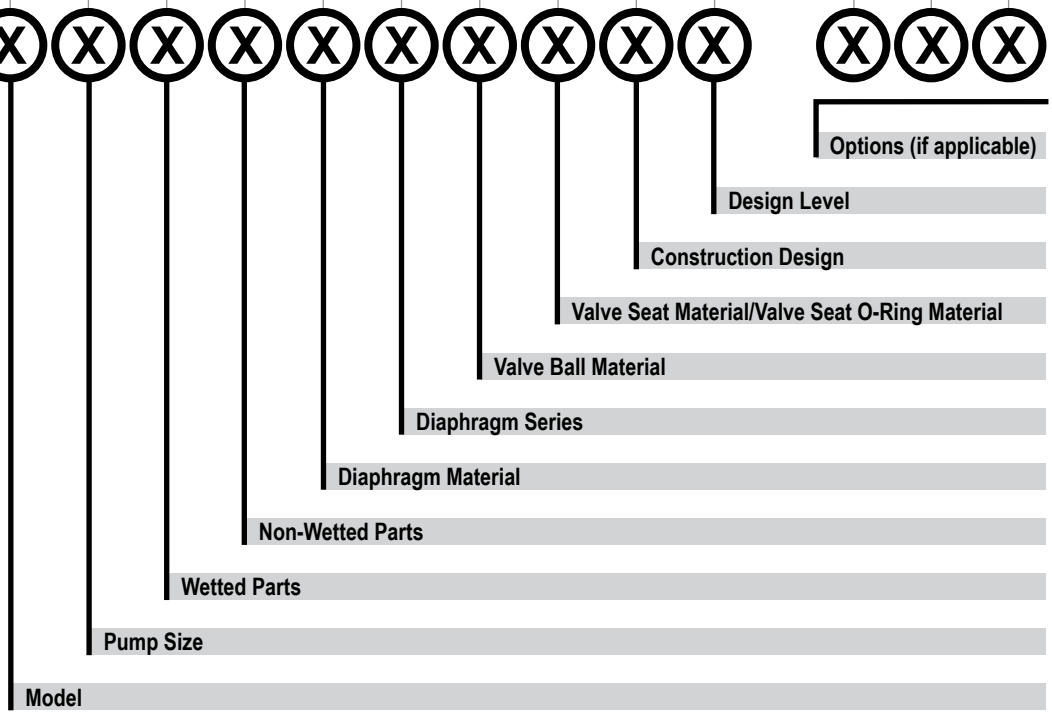
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Explanation of Pump Nomenclature

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

Your Model #:
(fill in from pump nameplate)

Model #: X X X X X X X X X X X X X



Model
E Elima-Matic

Pump Size
1 1"
2 2"

Wetted Parts
A Aluminum
S Stainless Steel

Non-Wetted Parts
A Aluminum

Diaphragm Material
1 Neoprene
2 Nitrile (Buna)
5 PTFE
6 Santoprene XL

Diaphragm Series
R Rugged
X Thermo-Matic
T PTFE (2-piece)

Valve Ball Material Valve
1 Neoprene
2 Nitrile
5 PTFE

Seat/Valve Seat O-Ring Material
S Stainless Steel

Construction Design
9 Bolted

Design Level
A

Miscellaneous Options
B BSP Tapered Thread
ATEX ATEX Compliant
HP High Pressure

*More than one option may be specified for a particular pump model.

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Materials

Material Profile:	Operating Temperatures:	
⚠ *CAUTION! Operating temperature limitations are as follows:*	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 sovents; especially all aliphatic, aromatic and halogenated hydrocarbons, acids, animal and vegetable oils. Hot water or hot aqueous solutions (over 70°F) 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
Polypropylene: A thermoplastic polymer. Moderate tensile and flex strength. Resists stong 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 applicaitons. Commonly referred to as 316 Stainless Steel in the pump industry.

For specific applications, always consult the Chemical Resistance Chart.

Note: This document is a high level guide. Please be aware that not all model and or material combinations are possible for all sizes. Please consult factory or your distributor for specific details.

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Performance

E1 HP HIGH PRESSURE

SUCTION/DISCHARGE PORT SIZE
- 1" NPT (internal)
- 1" BSP Tapered (internal)

CAPACITY
- 0 to 33 gallons per minute (0 to 125 liters per minute)

AIR DISTRIBUTION VALVE
- No-lube, no-stall design

SOLIDS-HANDLING
- Up to .12 in. (3mm)

HEADS UP TO
- 232 PSI (535 ft)
16.0 BAR (163 meters)

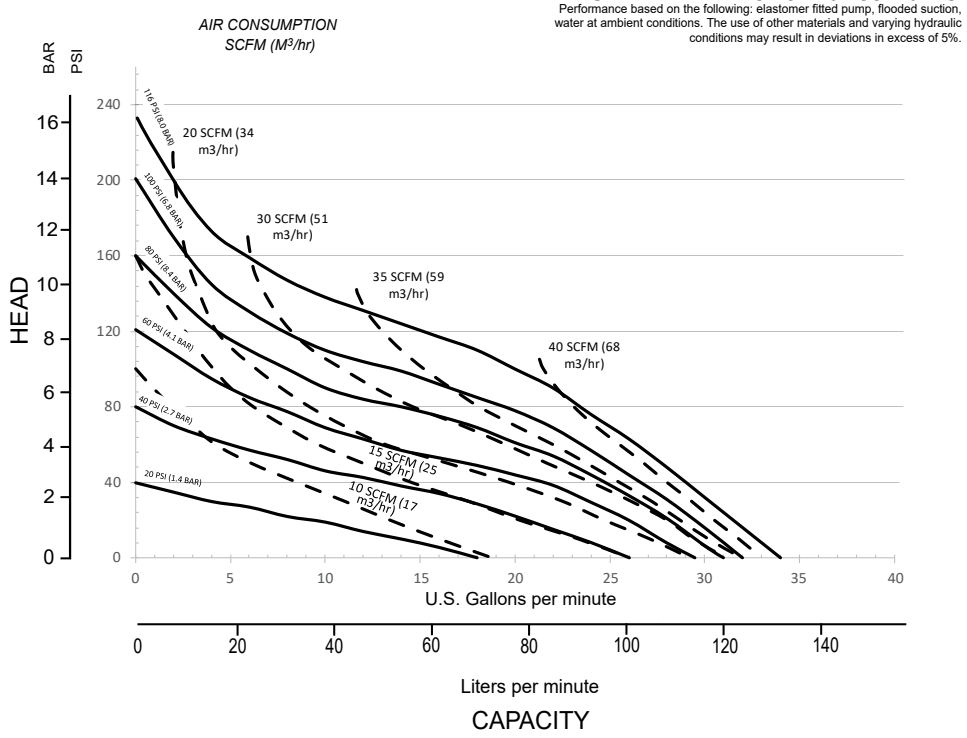
DISPLACEMENT/STROKE
- .13 Gallon / .48 liter

MAXIMUM OPERATING PRESSURE
- 116 PSI (8.0 BAR)

SHIPPING WEIGHT
- Aluminum 52.2 lbs. (25.5kg)
- Stainless Steel 76.1 lbs. (34.5kg)

MODEL E1 HP Performance Curve

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



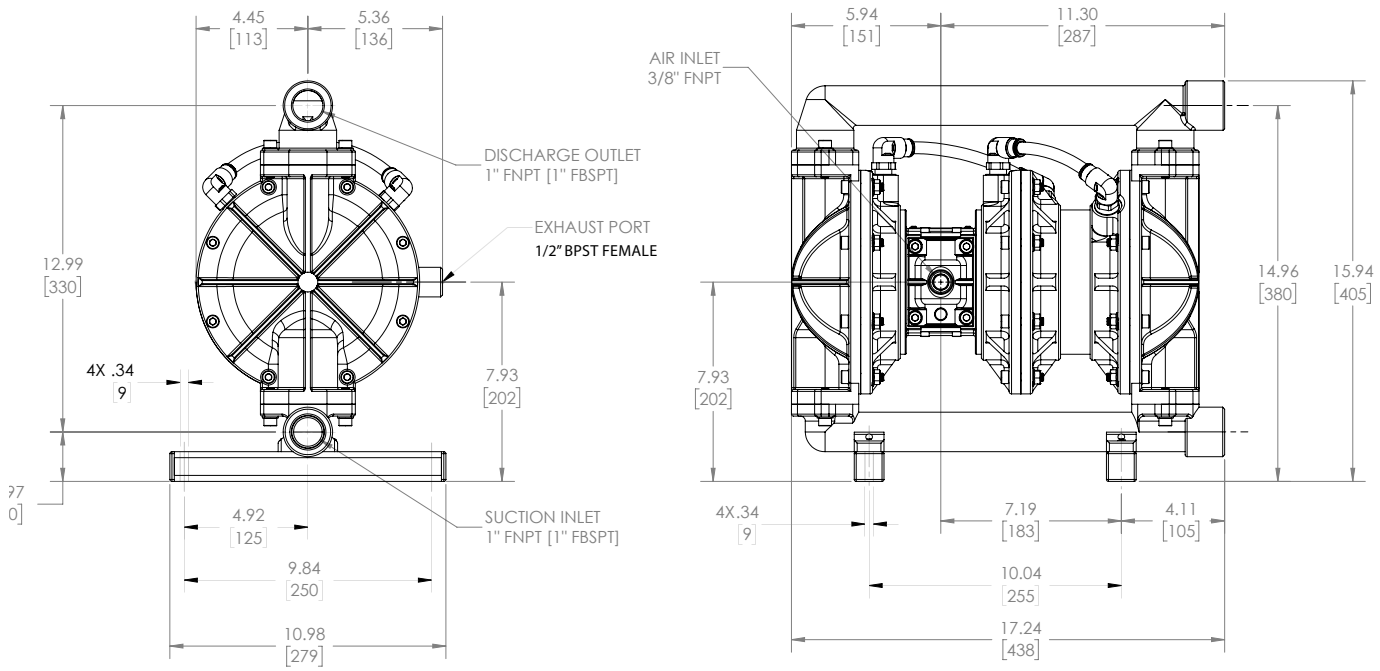
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Dimensional Drawings

E1 HP

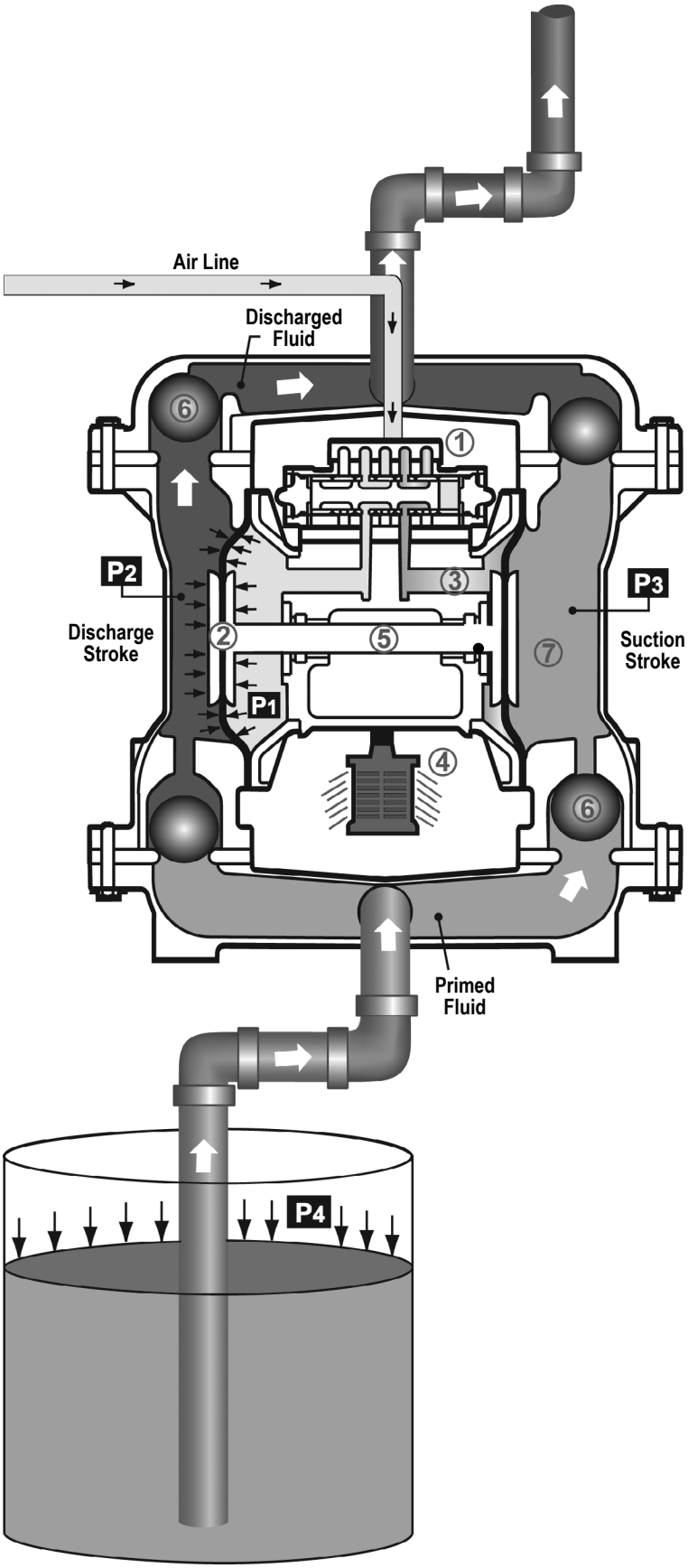
Dimensions in inches (mm dimensions in brackets)

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



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Principle of Pump Operation



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

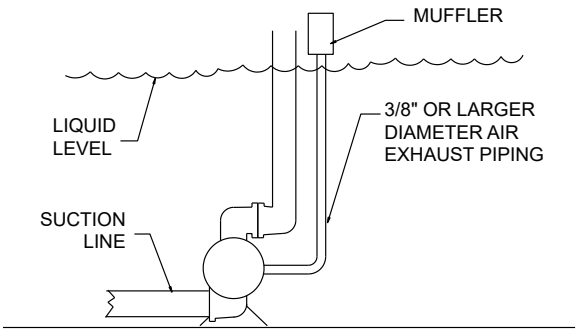
The main directional (air) control valve distributes compressed air to an air chamber, exerting uniform pressure over the inner surface of the diaphragm . At the same time, the exhausting air from behind the opposite diaphragm is directed through the air valve assembly(s) to an exhaust port .

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

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

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

SUBMERGED ILLUSTRATION



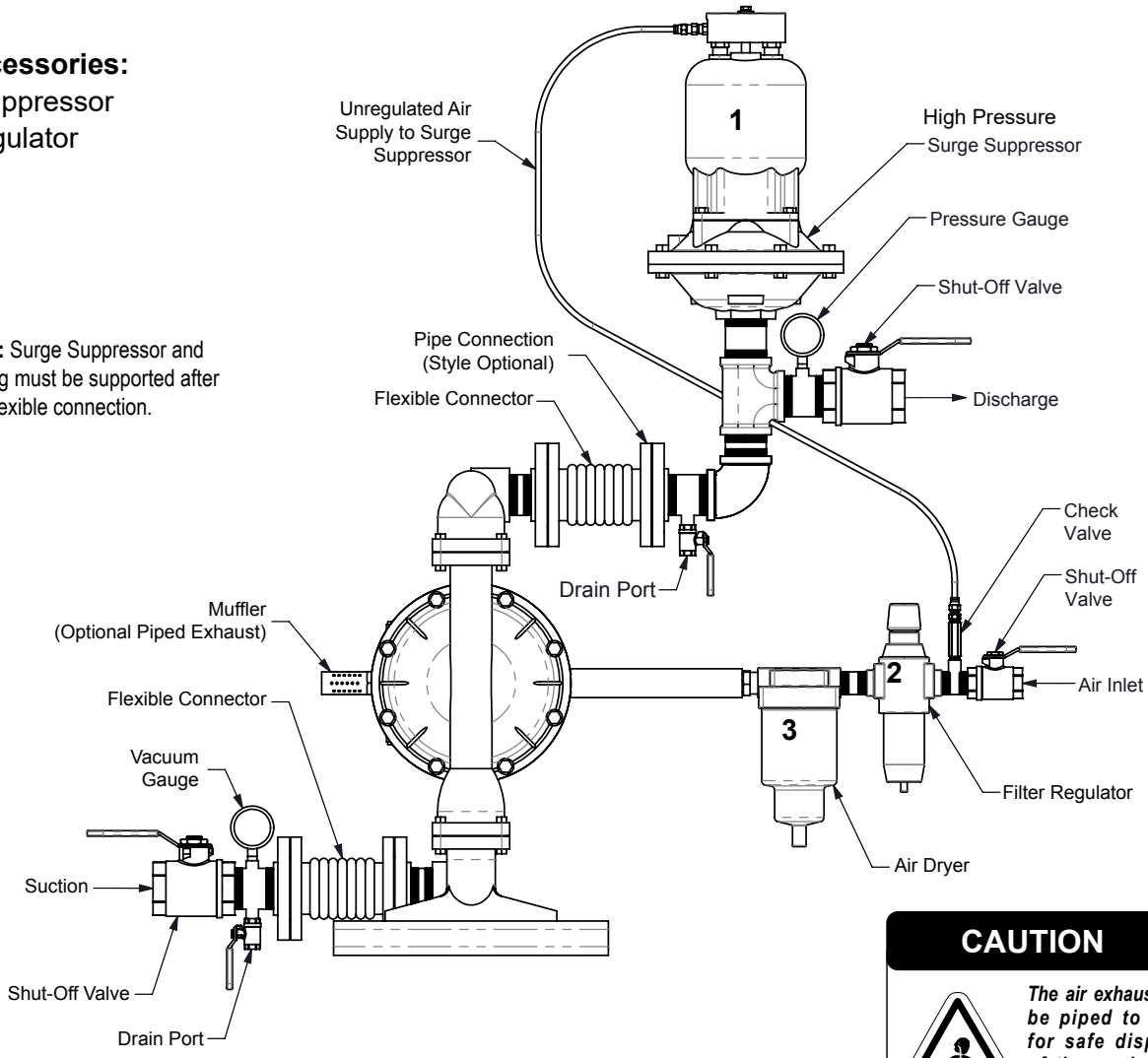
Pump can be submerged if the pump materials of construction are compatible with the liquid being pumped. The air exhaust must be piped above the liquid level. When the pumped product source is at a higher level than the pump (flooded suction condition), pipe the exhaust higher than the product source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

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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.

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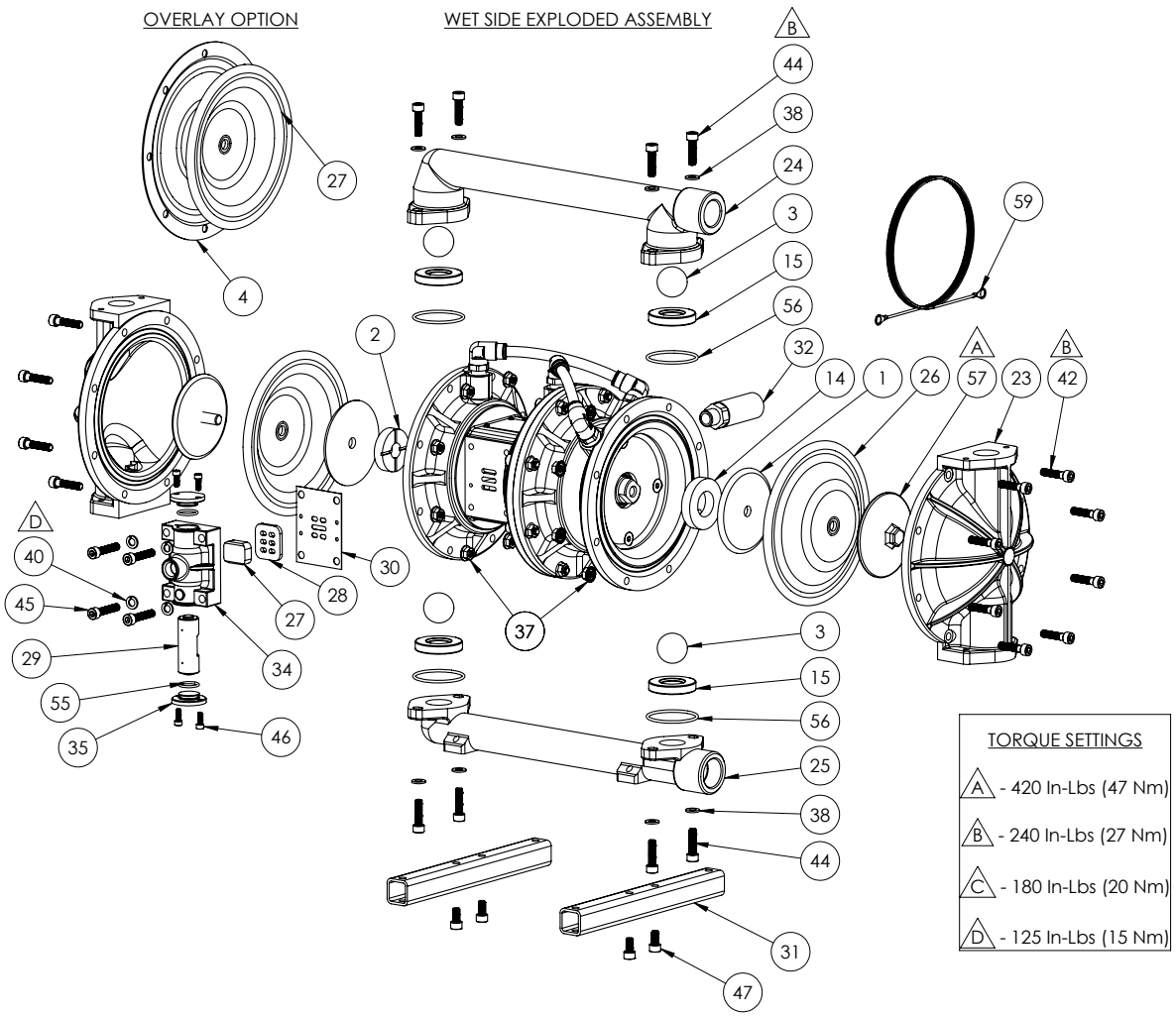
Troubleshooting Guide

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

For additional troubleshooting tips contact After Sales Support at service.warrenrupp@idexcorp.com or 419-524-8388

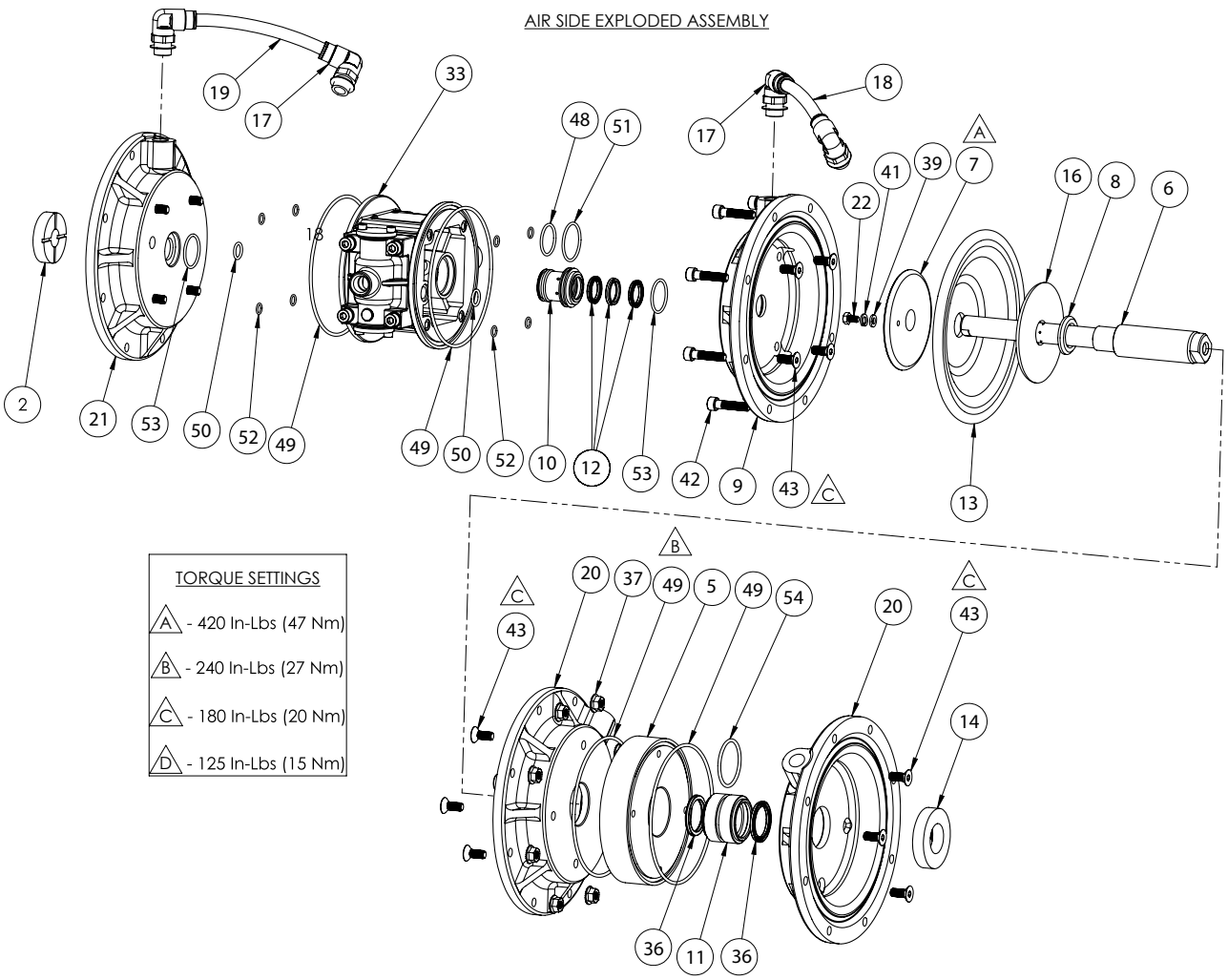
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Composite Repair Parts Drawing



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Composite Repair Parts Drawing



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Composite Repair Parts List

Item	Part Number	Description	Qty
1	1A007	Plate, Inner Diaphragm	2
2	1A009	Bumper	2
3	1A072	Ball, Check Weighted - Buna	4
	1A091	Ball, Check Weighted - Neoprene	4
	1A002	Ball, Check - PTFE	
4	25-016	Diaphragm, Overlay (PTFE Fitted Pumps Only)	2
5	25-080	Spacer	1
6	25-081	Shaft, Diaphragm	1
7	25-082	Plate, Locking	1
8	25-083	Washer, Thrust	1
9	25-085	Chamber, Inner Center RH	1
10	25-089	Bushing, Shaft	2
11	25-090	Bushing, Spacer	1
12	25-091	Seal, Shaft	6
13	25-092	Diaphragm, Air Chamber	1
14	25-094	Bumper, Diaphragm	1
15	25-097	Seat, Check Valve SS	4
16	25-102	Plate, Diaphragm Air Chamber	1
17	25-103	Elbow, Swivel Adapter	4
18	25-104	Hose, Air	1
19	25-105	Hose, Air	1
20	25-110	Chamber, Inner	2
21	25-111	Chamber, Inner Center LH	1
22	25-231	Bolt, Hex HD M6 x 10 AL	1
	25-231S	Bolt, Hex HD M6 x 10 SS	1
23	25-084	Chamber, Outer AL	2
	25-073	Chamber, Outer SS	2
24	25-088N	Manifold, Discharge AL NPT	1
	25-088B	Manifold, Discharge AL BSPT	1
	25-078N	Manifold, Discharge SS NPT	1
	25-078B	Manifold, Discharge SS BSPT	1
25	25-087N	Manifold, Suction AL NPT	1
	25-087B	Manifold, Suction AL BSPT	1
	25-079N	Manifold, Suction SS NPT	1
	25-079B	Manifold, Suction SS BSPT	1
26	25-014	Diaphragm, Buna	2
	25-023	Diaphragm, Neoprene	2
	25-045	Diaphragm, Santoprene	2
27	40-004	Valve, Slide	1
28	40-005	Plate, Valve	1
29	40-192	Valve, Carrier	1
30	40-204	Gasket, Air Valve	1
31	40-225	Bracket, Foot	2
32	40-240	½" BSP Muffler, Exhaust	1
33	40-259	Block, Center	1
34	40-265	Body, Air Valve NPT	1
35	40-266	Cap, End	2
36	50-206	Seal, Shaft	2
37	B003	Nut, Flanged M8 AL	24
	B003S	Nut, Flanged M8 SS	24
38	C013	Washer, Flat M8 AL	8
	C013S	Washer, Flat M8 SS	8
39	C048	Washer, Flat M6 AL	1
	C048S	Washer, Flat M6 SS	1
40	C165	Washer, Lock M8 AL	4
	C165S	Washer, Lock M8 SS	4
41	C263	Washer, Lock M6 AL	1
	C263S	Washer, Lock M6 SS	1
42	D114	Capscrew, Socket Hd M8 x 35 AL	24
	D114S	Capscrew, Socket Hd M8 x 35 SS	24
43	D216	Capscrew, Countersunk HD M8 x 20 AL	16
	D216S	Capscrew, Countersunk HD M8 x 20 SS	16
44	D222	Capscrew, Socket Hd M6 x 30 AL	8
	D222S	Capscrew, Socket Hd M6 x 30 SS	8
45	D337	Capscrew, Socket Hd M8 x 40 AL	4
	D337S	Capscrew, Socket Hd M8 x 40 SS	4
46	D391	Capscrew, Socket Hd M5 x 14 AL	4
	D391S	Capscrew, Socket Hd M5 x 14 SS	4
47	D490	Capscrew, Socket Hd M8 x 16 AL	4
	D490S	Capscrew, Socket Hd M8 x 16 SS	4
48	G189	O-Ring	2
49	G242	O-ring	4
50	G243	O-Ring	2
51	G245	O-Ring	2
52	G339	O-Ring	8
53	G367	O-ring	2
54	G373	O-Ring	1
55	G512	O-Ring	2
56	G068	O-Ring, Seat - Buna	4
	G067	O-Ring, Seat - Neoprene	4
	G069	O-Ring, Seat - EPDM	4
	G431	O-Ring, Seat - PTFE	4
57	SA10502	Plate, Outer Diaphragm - AL	2
	SA10104	Plate, Outer Diaphragm - SS	2
58*	SA10288	Strap, Ground	1

* not included - can be purchased separately

3: EXP VIEW

476.V392.000 AIR END KIT
Air Side Diaphragm, Air Hoses, Seals and O-rings

476.V391.360 WET END KIT - BUNA
Buna Diaphragms, Buna Balls, Buna o-rings

476.V391.365 WET END KIT - NEOPRENE
Neoprene Diaphragms, Neoprene Balls, Neoprene o-rings

476.V391.600 WET END KIT - PTFE
PTFE Diaphragms, Neoprene Backups, PTFE Balls, FEP o-rings

476.V391.644 WET END KIT - SANTOPRENE/PTFE
Santoprene Diaphragms, PTFE Balls, EPDM o-rings

LEGEND:

◯ = Items contained in 476.392.XXX Air End Kits

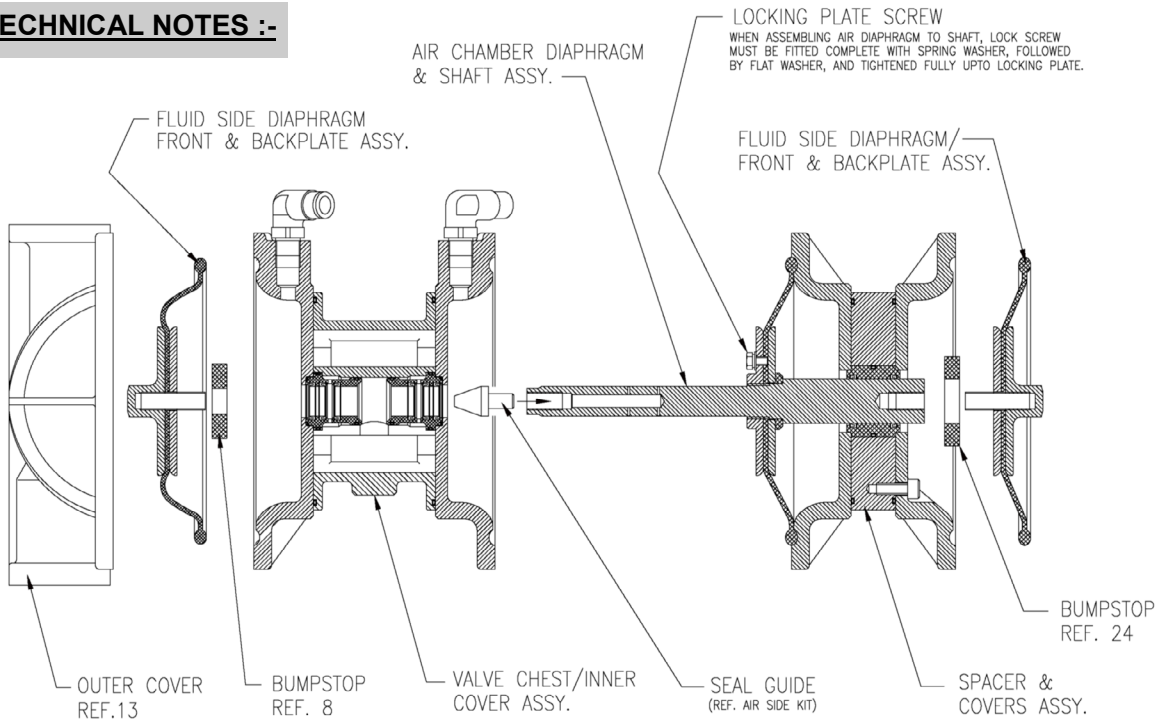
□ = Items contained in 476.391.XXX Wet End Kits

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

ATEX Compliant

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TECHNICAL NOTES :-

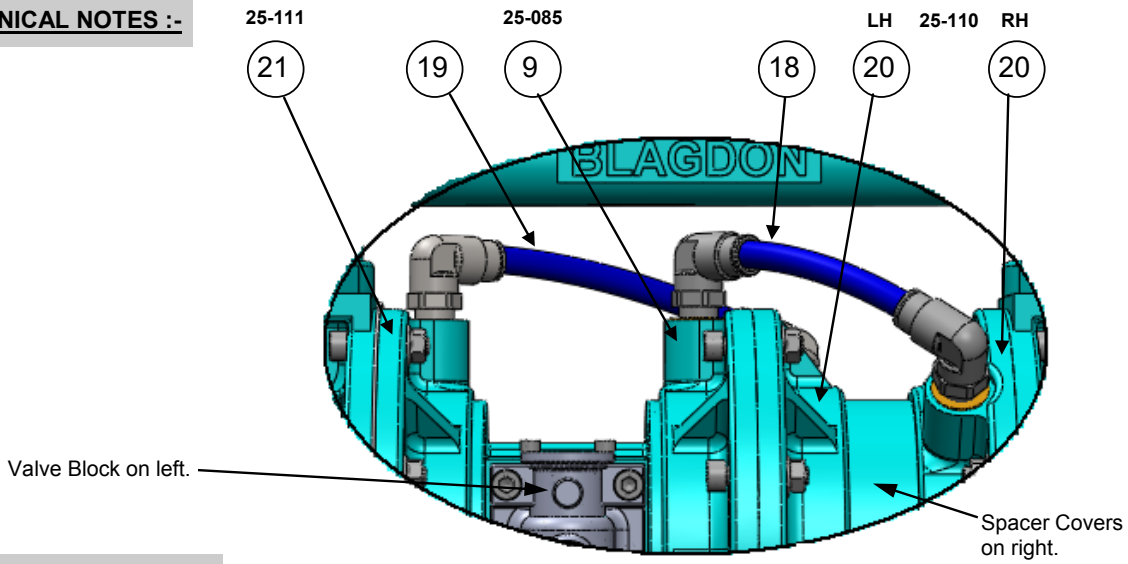


Removal of Diaphragm Shaft :-

After first removing manifolds and air-hoses, remove both outer covers (13), followed by frontplates (12), fluid diaphragms (11), backplates (9) and bumpstops (8 & 24). Separate Spacer/Covers Assy. from Valve Chest Assy. by removing 8 off M8 x 35 bolts and sliding either halve from shaft. Diaphragm Shaft can now be removed together with air-chamber diaphragm and locking plate etc. Assembly is reverse of removal, after first fitting seal guide supplied in air side kit SA10459 into end of diaphragm shaft as shown above before sliding valve chest centre over shaft. This will allow shaft to pass thro' centre without damaging seals. If air-chamber diaphragm has been removed from shaft, apply a small amount of Loctite grade 242 to locking plate (42) prior to refitting. Refit Locking Screw, Spring Washer and Plain Washer, tightening screw into the diaphragm until tight against the plate.

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TECHNICAL NOTES :-



Air Hose connections :-

When looking from the air valve side of the pump, air hoses (items 18 & 19) are connected as shown. Inner chamber LH (21) connects to LH spacer chamber (20) and inner chamber RH (9) connects to RH spacer chamber (20).

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IMPORTANT!

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

SERVICE

The following sections give a general overview on how to service all models of BLAGDON Diaphragm Pumps. For details on individual part numbers, quantities, materials, etc., please consult the parts list supplied with the pump.

NOTE : ***Before commencing any service or maintenance work on the pump, ensure that the air supply has been disconnected or isolated.***

AIR VALVE SYSTEMS

PNEUMATIC TYPE Remove the 4 screws securing the valve block to the valve chest, together with any associated gaskets or seals.

Remove slide valve plate & slide valve from the valve block assembly. Clean all parts thoroughly and inspect for excessive wear, replacing where necessary.

The slide valve and valve plate contact faces should be flat and free from scratches. A light polishing on a flat surface with a fine abrasive paper will remove most scratches.

If excessive wear is suspected in the valve block bore or valve carrier, remove the valve block plugs and withdraw the valve carrier. Check valve block plug o-rings for wear or attack & replace where required.

Clean the valve carrier & valve block bore with white spirits to remove any oil films.

NOTE : ***The nominal diametrical clearance between the valve carrier and the valve block block bore should be 0.05 - 0.09mm. A clearance in excess of this will cause the valve system to run erratically.***

Apply a light grease to the valve block plug O-rings when re-assembling into the valve block bore. Any damage to the O-ring may cause the valve system to malfunction.

Re-assemble the valve block assembly & re-torque in accordance to the settings shown in the parts list.

In the event of a complete air-side overhaul, the pump should be dis-assembled down to the centre section assembly as described later in the "Wet-Side Overhaul" section.

With the valve block assembly dismantled, remove the inner covers where appropriate.

A careful note of the position of all related seals and gaskets should be made to facilitate re-assembly.

Remove diaphragm shaft bushes, where appropriate, and check all seals and 'O' rings for wear or damage. If worn, replace immediately.

NOTE:- ***The integrity of the diaphragm shaft seals is essential for the correct functioning of all pneumatically actuated valve systems.***

Check the diaphragm shaft for excessive wear as this will result in premature seal failure. Replace as required. Lubricate all components and re-assemble as detailed above, in reverse order. Ensure the correct position of all components detailed in all sectional assembly drawings.

WET-SIDE OVERHAUL

REPLACING BALL VALVES Remove discharge manifold from pump assembly together with associated valve balls, seats and 'O' rings.

NOTE :- ***The orientation of the valve seat relative to the valve ball should be noted as incorrect positioning may result in a performance loss.***

Turn pump through 180° and remove the suction manifold. Clean and inspect the components. Check for any wear or damage and replace as required.

NOTE :- ***Ball or valve seat wear may result in loss of performance and suction lift.***

Re-assemble the valve balls/seats and ensure manifolds are adequately torqued to the settings shown in the parts list.

REPLACING DIAPHRAGMS Remove both suction and discharge manifolds as detailed in the previous section, removing all ball valves, seats and 'O' rings.

Loosen and remove both outer covers from the pump assembly. The orientation of the covers should be noted so as to facilitate re-assembly.

Holding one of the frontplates in a vice, ('soft jaws' should be fitted), or with an adjustable spanner, loosen and remove the frontplate from the opposite end. Remove the diaphragm, backplate and bumpstop from diaphragm shaft.

Carefully withdraw the diaphragm shaft from the centre section and hold the free end in a vice, holding between the flats machined on the end. Loosen and remove the frontplate and remove the diaphragm together with backplate and bumpstop (where fitted).

NOTE :- ***Care should be taken with all plastic, coated and hygienic pumps, so that the surface of the frontplate is not damaged.***

Thoroughly clean all parts and check for wear, damage, swelling, cracking, delamination and chemical attack.

Replace components where required.

NOTE :- ***Rubber diaphragms should be replaced if they are worn to such an extent that the fabric re-enforcing is evident on the surface of the diaphragm.***

For pumps fitted with PTFE diaphragms, a light coating of grease should be applied to the back-up diaphragm prior to re-assembly.

Before re-assembly, it is advisable to check the condition of the diaphragm shaft seal/'O' rings for wear or attack. If either is evident, it is recommended that they be replaced.

Assemble the diaphragms onto the shaft in a reverse sequence to their removal. Care should be taken as to the orientation of the diaphragm relative to the front and back plates. All diaphragms have "AIR SIDE" molded onto one side. The backplate must be fitted adjacent to the AIR SIDE of the diaphragm.

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5 - YEAR Limited Product Warranty

Quality System ISO9001 Certified • Environmental Management Systems ISO14001 Certified

Versamatic warrants to the original end-use purchaser that no product sold by Versamatic that bears a Versamatic 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 Versamatic's factory.

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 complete warranty at http://vm.salesmrc.com/pdfs/VM_Product_Warranty.pdf

VERSAMATIC®

EC Declaration of Conformity

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

Certifies that Air-Operated Double Diaphragm Pump Models: E Series, VL Series, VM Series, U2 Series; Submersible Pump Models: VSMA3 Series, SPA15 Series and Surge Dampener/Suppressor Models: VDA Series, VTA 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

Signature of authorized person

Dennis Hall
Printed name of authorized person

Engineering Manager
Title

IDEX

CE

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EC Declaration of Conformity

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

Certifies that Air-Operated Double Diaphragm Pump Models: E Series, VL Series, VM Series, U2 Series; Submersible Pump Models: VSMA3 Series, SPA15 Series and Surge Dampener/Suppressor Models: VDA Series, VTA 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

UK CA

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VERSAMATIC®

ATEX

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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

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
- Metal pump models with external aluminum components (E-series, VL Series, VMD Series)
- Versa-Surge® surge suppressors (VTA-Series)



I M2 Ex h Mb
II 2 G Ex h IIC T5...225°C (T2) Gb
II 2 D Ex h IIIC T100°C...T200°C Db
- Metal pump models with no external aluminum (E-Series)
- Conductive plastic pumps (E-Series, VMV Series Plastic)



II 2 G Ex h IIB T5...225°C (T2) Gb
II 2 D Ex h IIIB T100°C...T200°C Db
- E1 HP & E2 HP Series due to the projected area of non-conductive external air hoses

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
- Conductive plastic pumps equipped with conductive muffler (VMV Series)

➢ See “Safety Information” page for conditions of safe use

DATE/APPROVAL/TITLE:
9 NOV 2023

Dennis Hall
Engineering Manager

VM_DofC_ATEX_MetallicAndNon-Metallic_V_Rev1123

VERSAMATIC®

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

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 IIIC T100°C...T200°C Db
- Metal pump models with external aluminum components (E-series, VL Series, VMD Series)
- Versa-Surge® surge suppressors (VTA-Series)

I M2 Ex h Mb
II 2 G Ex h IIC T5...225°C (T2) Gb
II 2 D Ex h IIIC T100°C...T200°C Db
- Metal pump models with no external aluminum (E-Series)
- Conductive plastic pumps (E-Series, VMV Series Plastic)

II 2 G Ex h IIB T5...225°C (T2) Gb
II 2 D Ex h IIIB T100°C...T200°C Db
- E1 HP & E2 HP Series due to the projected area of non-conductive external air hoses

➢ See “Safety Information” page for conditions of safe use

DATE/APPROVAL/TITLE:
9 NOV 2023

Dennis Hall
Engineering Manager

VM_DofC_UKEx_MetallicAndNon-Metallic_V_Rev1123

VIPTech

Your partner for Versamatic AODD pumps

VM E1 Specialty HP Service Manual

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This document is the original manufacturer documentation (Warren Rupp, Inc. / Versamatic), supplemented with VIPTech contact details. Technical content unchanged.