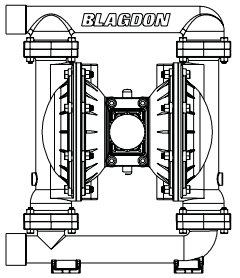
SERVICE & OPERATING MANUAL

BLAGDON PUMP®

Model X40 Metallic Design Level 1



See pages 2 & 23 for ATEX markings.

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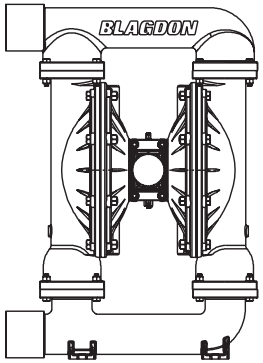
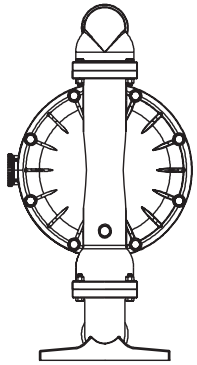




X40 Metallic Design Level 1 Ball Valve

Air-Powered Double-Diaphragm Pump

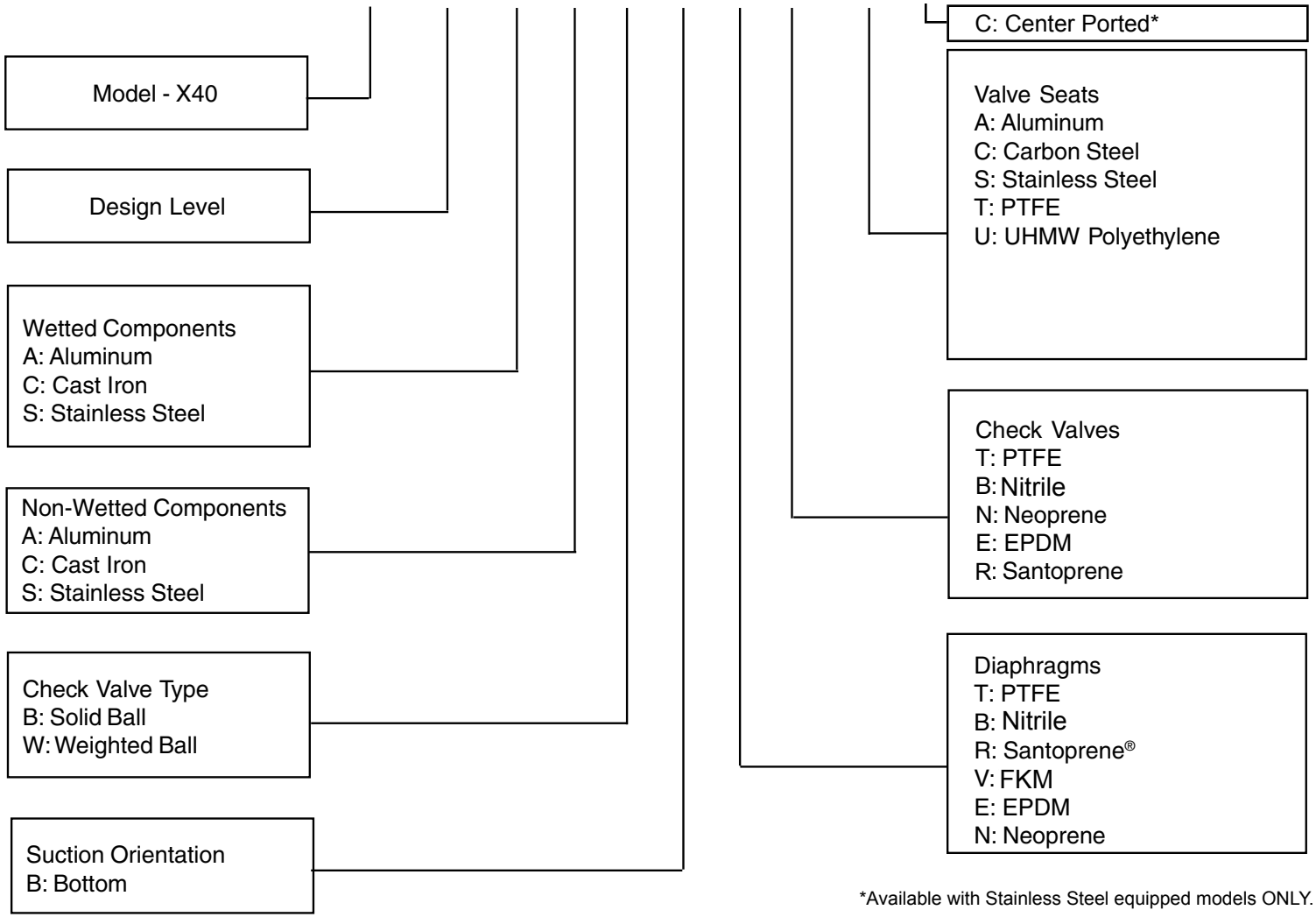
ENGINEERING, PERFORMANCE
& CONSTRUCTION DATA

INTAKE/DISCHARGE PIPE SIZE	CAPACITY	AIR VALVE	SOLIDS-HANDLING	HEADS UP TO	DISPLACEMENT/STROKE
3" BSPT (tapered) or 3" BSP Parallel (internal)	0 to 196 UK gallons per minute (0 to 889 liters per minute)	No-lube, no-stall design	Up to .25 in. (6mm)	125 psi or 289 ft. of water (8.6 Kg/cm^2 or 86 meters)	.78 UK Gallons / 3.56 liters

⚠ CAUTION! ***Operating temperature limitations are as follows:***

Materials	Operating Temperatures Maximum	Minimum
Nitrile 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 hyrdrocarbons.	190°F 88°C	-10°F -23°C
EPDM Shows very good water and chemical resistance. Has poor resistance to oil and solvents, but is fair in ketones and alcohols.	280°F 138°C	-40°F -40°C
Neoprene All purpose. Resistant to vegetable oil. Generally not affected by moderate chemicals, fats, greases and many oils and solvents. Generally attacked by strong oxidizing acids, ketones, esters, nitro hydrocarbons and chlorinated aromatic hydrocarbons.	200°F 93°C	-10°F -23°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
Virgin PTFE Chemically inert, virtually impervious. Very few chemicals are known to react chemically 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
Conductive HDPE	180°F 82°C	32°F 0°C

TYPICAL CODE= X40. 01. A A. B B. B B B - C



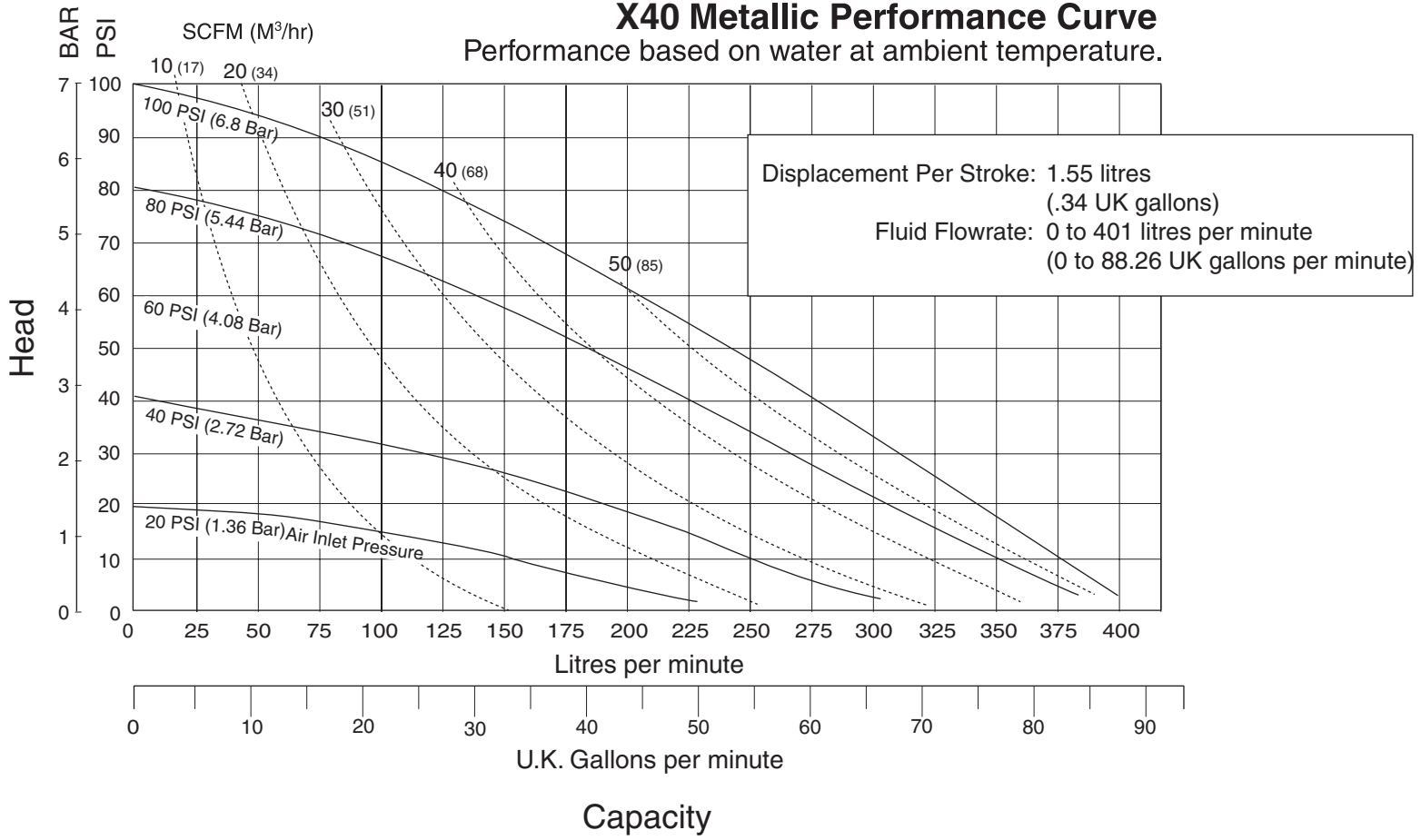
*Available with Stainless Steel equipped models ONLY.

II 1G c T5 II 3/1 G c T5 II 1D c T100°C I M1 c I M2 c	Models equipped with Wetted Options C or S , Non-Wetted Options C or S. Note: See page 23 EC-Type Certificate.
II 2G c T5 II 3/2 G c T5 II 2D c T100°C	Models equipped with Wetted Options A, C or S, Non-Wetted Options A, C or S. Note: See page 23 Type Examination Certificate.

Maximum delivery: 401 ltrs/min
Max. working pressure: 8.6 bar
Max. solid particle size: 6mm
Air inlet: 3/4" BSP (Parallel, Internal)
Temperature limits: Determined by elastomers
Fluid inlet/outlet: 1½" BSP (Parallel, Internal)

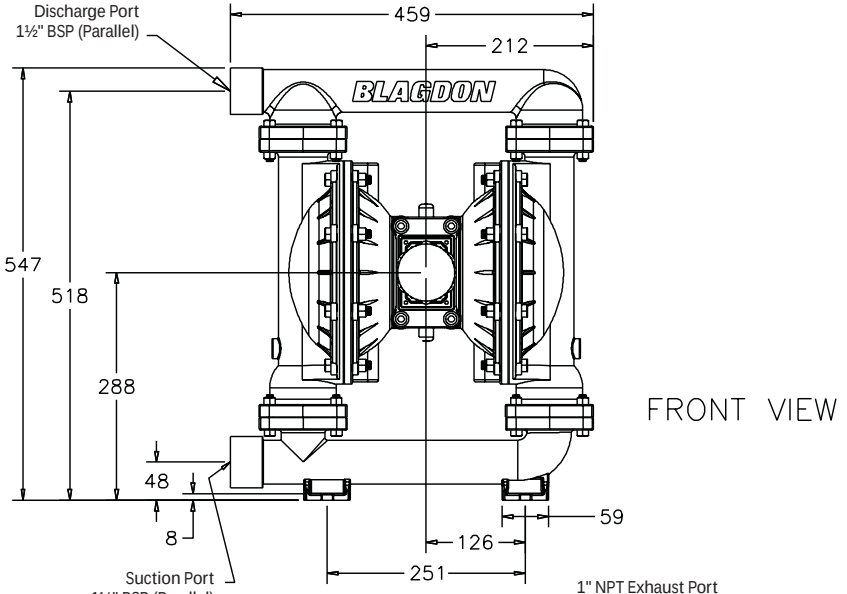
Installation: Surface mounted
Accessories included: Exhaust air silencer
Shipping weights with
Aluminum mid sections: A: 52kg
C: 98kg
S: 87kg
Shipping dimensions: 560x430x690mm

Performance Curve

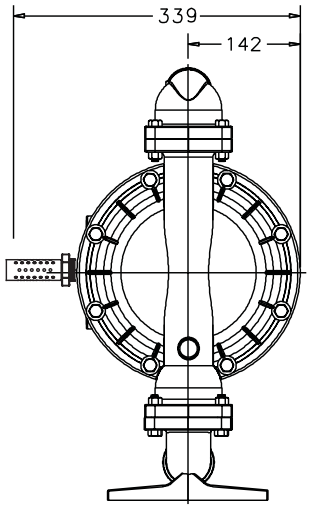


Dimensions (Side Porting):

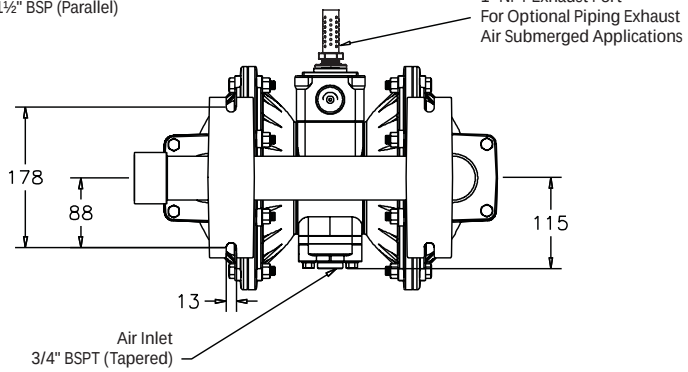
Dimensions in Millimeters
Dimensional Tolerance:± 3mm



FRONT VIEW



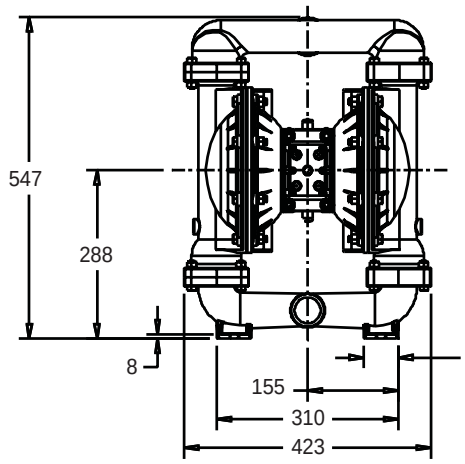
SIDE VIEW



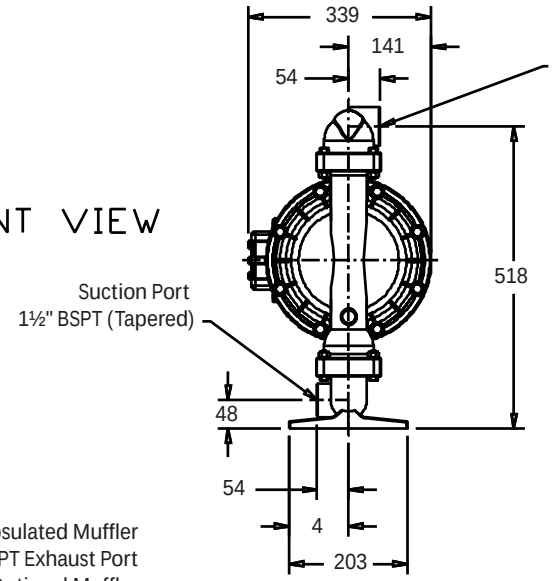
BOTTOM VIEW

Dimensions (Center Porting): Stainless Steel Only

Dimensions in Millimeters
Dimensional Tolerance:± 3mm

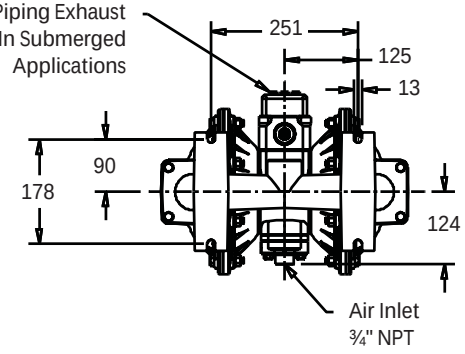


FRONT VIEW



SIDE VIEW

Encapsulated Muffler
1" NPT Exhaust Port
For Optional Muffler
Styles Or Piping Exhaust
Air In Submerged
Applications



BOTTOM VIEW

PRINCIPLE OF PUMP OPERATION

This ball type check valve pump is powered by compressed air and is a 1:1 ratio design. The inner side of one diaphragm chamber is alternately pressurized while simultaneously exhausting the other inner chamber. This causes the diaphragms, which are connected by a common rod secured by plates to the centers of the diaphragms, to move in a reciprocating action. (As one diaphragm performs the discharge stroke the other diaphragm is pulled to perform the suction stroke in the opposite chamber.) Air pressure is applied over the entire inner surface of the diaphragm while liquid is discharged from the opposite side of the diaphragm. The diaphragm operates in a balanced condition during the discharge stroke which allows the pump to be operated at discharge heads over 200 feet (61 meters) of water.

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 to maximize diaphragm life.

Alternate pressurizing and exhausting of the diaphragm chamber is performed by an externally mounted, pilot operated, four way spool type air distribution valve. When the spool shifts to one end of the valve body, inlet 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 pressure to the chambers is reversed. The air distribution valve spool is moved by a internal pilot valve which alternately pressurizes one end of the air distribution valve spool while exhausting the other end. The pilot valve is shifted at each end of the diaphragm stroke when a actuator plunger is contacted by the diaphragm plate. This actuator plunger then pushes the end of the pilot valve spool into position to activate the air distribution valve.

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

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.

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

AIR SUPPLY

Air supply pressure cannot exceed 125 psi (8.6 bar). Connect the pump air inlet to an air supply of sufficient capacity and pressure required for desired performance. When the air supply line is solid piping, use a short length of flexible hose not less than 1/2" (13mm) in diameter between the pump and the piping to reduce strain to the piping. The weight of the air supply line, regulators and filters must be supported by some means other than the air inlet cap. Failure to provide support for the piping may result in damage to the pump. A pressure regulating valve should be installed to insure air supply pressure does not exceed recommended limits.

AIR VALVE LUBRICATION

The air distribution valve and the pilot valve 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 supply. Proper lubrication requires the use of 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 at the point of operation. Consult the pump's published Performance Curve to determine this.

AIR LINE MOISTURE

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. Water in the air supply can be reduced by using a point-of-use air dryer to supplement the user's air drying equipment. This device removes water from the compressed air supply and alleviates the icing or freezing problems.

AIR INLET AND PRIMING

To start the pump, open the air valve approximately 1/2" to 3/4" turn. 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.

BETWEEN USES

When the pump is used for materials that tend to settle out or solidify when not in motion, the pump should be 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 the diaphragms and check valves at restart.) In freezing temperatures the pump must be completely drained between uses in all cases.

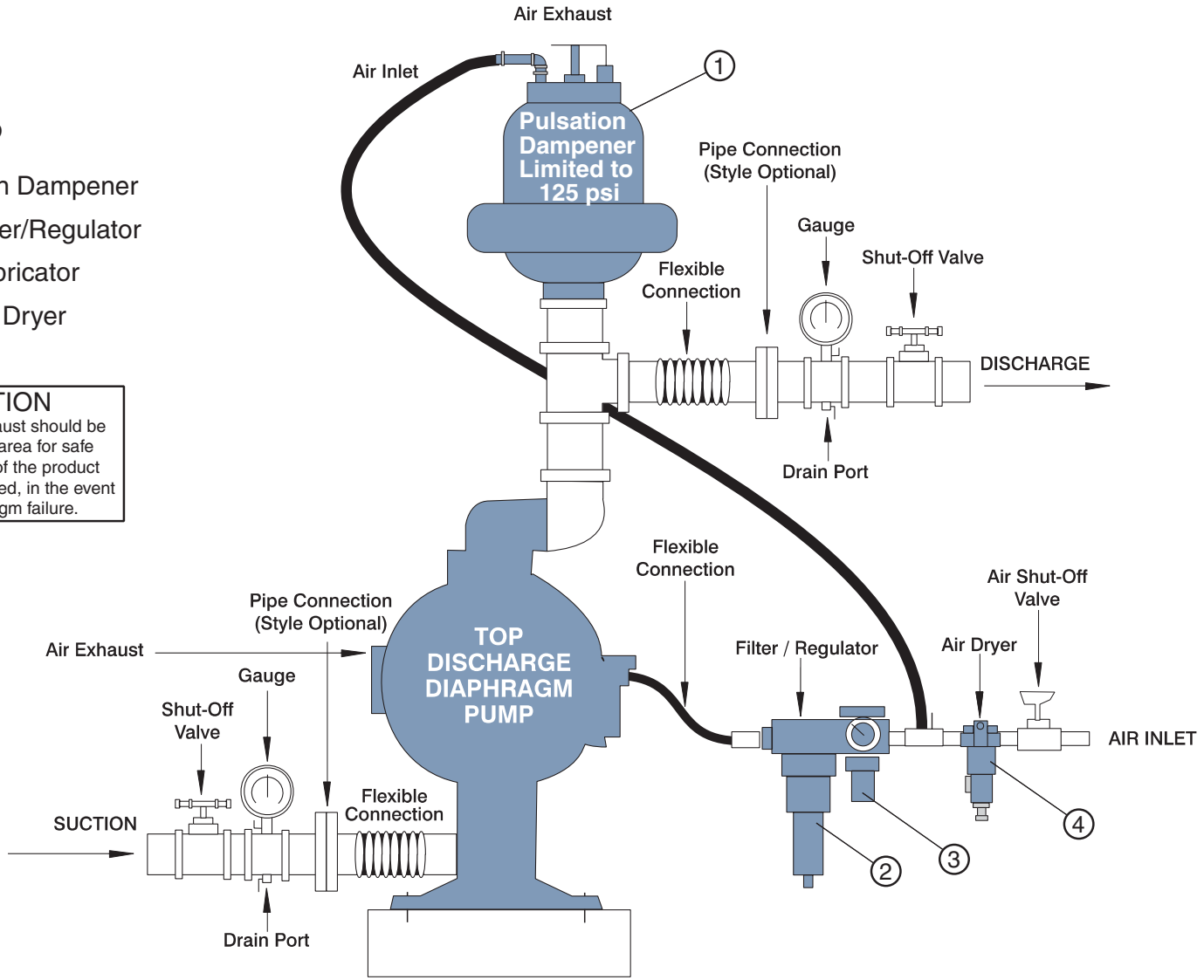
INSTALLATION GUIDE

Top Discharge Ball Unit

Available from Blagdon Pump

① PD75M Pulsation Dampener
② 020-052-000 Filter/Regulator
③ 020-052-001 Lubricator
④ 020-048-008 Air Dryer

⚠ 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.



TROUBLESHOOTING

Possible Symptoms:

- Pump will not cycle.
- Pump cycles, but produces no flow.
- Pump cycles, but flow rate is unsatisfactory.
- Pump cycle seems unbalanced.
- Pump cycle seems to produce excessive vibration.

What to Check: Excessive suction lift in system.
Corrective Action: For lifts exceeding 20 feet (6 meters), filling the pumping chambers with liquid will prime the pump in most cases.

What to Check: Excessive flooded suction in system.
Corrective Action: For flooded conditions exceeding 10 feet (3 meters) of liquid, install a back pressure device.

What to Check: System head exceeds air supply pressure.
Corrective Action: Increase the inlet air pressure to the pump. Most diaphragm pumps are designed for 1:1 pressure ratio at zero flow.

What to Check: Air supply pressure or volume exceeds system head.
Corrective Action: Decrease inlet air pressure and volume to the pump as calculated on the published PERFORMANCE CURVE. Pump is cavitating the fluid by fast cycling.

What to Check: Undersized suction line.
Corrective Action: Meet or exceed pump connection recommendations shown on the DIMENSIONAL DRAWING.

What to Check: Restricted or undersized air line.
Corrective Action: Install a larger air line and connection. Refer to air inlet recommendations shown in your pump's SERVICE MANUAL.

What to Check: Check ESADS, the Externally Serviceable Air Distribution System of the pump.
Corrective Action: Disassemble and inspect the main air distribution valve, pilot valve and pilot valve actuators. Refer to the parts drawing and air valve section of the SERVICE MANUAL. Check for clogged discharge or closed valve before reassembly.

What to Check: Rigid pipe connections to pump.
Corrective Action: Install flexible connectors and a surge suppressor.

What to Check: Blocked air exhaust muffler.
Corrective Action: Remove muffler screen, clean or de-ice and reinstall. Refer to the Air Exhaust section of your pump SERVICE MANUAL.

What to Check: Pumped fluid in air exhaust muffler.
Corrective Action: Disassemble pump chambers. Inspect for diaphragm rupture or loose diaphragm plate assembly. Refer to the Diaphragm Replacement section of your pump SERVICE MANUAL.

What to Check: Suction side air leakage or air in product.
Corrective Action: Visually inspect all suction side gaskets and pipe connections.

What to Check: Obstructed check valve.
Corrective Action: Disassemble the wet end of the pump and manually dislodge obstruction in the check valve pocket. Refer to the Check Valve section of the pump SERVICE MANUAL for disassembly instructions.

What to Check: Worn or misaligned check valve or check valve seat.
Corrective Action: Inspect check valves and seats for wear and proper seating. Replace if necessary. Refer to Check Valve section of the pump SERVICE MANUAL for disassembly instructions.

What to Check: Blocked suction line.
Corrective Action: Remove or flush obstruction. Check and clear all suction screens and strainers.
What to Check: Blocked discharge line.
Corrective Action: Check for obstruction or closed discharge line valves.

What to Check: Blocked pumping chamber.
Corrective Action: Disassemble and inspect the wetted chambers of the pump. Remove or flush any obstructions. Refer to the pump SERVICE MANUAL for disassembly instructions.

What to Check: Entrained air or vapor lock in one or both pumping chambers.
Corrective Action: Purge chambers through tapped chamber vent plugs. PURGING THE CHAMBERS OF AIR CAN BE DANGEROUS! Contact the Technical Services Group before performing this procedure. Any model with top-ported discharge will reduce or eliminate problems with entrained air.

If your pump continues to perform below your expectations, contact your local Distributor or factory Technical Services Group for a service evaluation.

WARRANTY

Refer to the enclosed Warranty Certificate.

RECYCLING

Many components of Metallic AODD pumps are made of recyclable materials (see chart on page 10 for material specifications). We encourage pump users to recycle worn out parts and pumps whenever possible, after any hazardous pumped fluids are thoroughly flushed.

IMPORTANT SAFETY INFORMATION

⚠ IMPORTANT

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

⚠ CAUTION

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

⚠ WARNING

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

⚠ WARNING

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

⚠ WARNING

Take action to prevent static sparking. Fire or explosion can result, especially when handling flammable liquids. The pump, piping, valves, containers or other miscellaneous equipment must be grounded. ***(See page 21)***

⚠ WARNING

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

⚠ WARNING

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

⚠ WARNING

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

⚠ WARNING

Airborne particles and loud noise hazards.

Wear ear and eye protection.

MATERIAL CODES

The Last 3 Digits of Part Number

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

Delrin, FKM and Hytrel are registered tradenames 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 Dixion Industries Corp.
Ryton is a registered tradename of Phillips Chemical Co.
Valox is a registered tradename of General Electric Co.

Composite Repair Parts Drawing

AVAILABLE SERVICE AND CONVERSION KITS

B476-227-000 **AIR END KIT**
Seals, O-ring, Gaskets, Retaining Rings, Air Valve Sleeve and Spool Set, and Pilot Valve Assembly

B476-196-360 **WET END KIT**
Nitrile Diaphragms, Balls, and Seats.

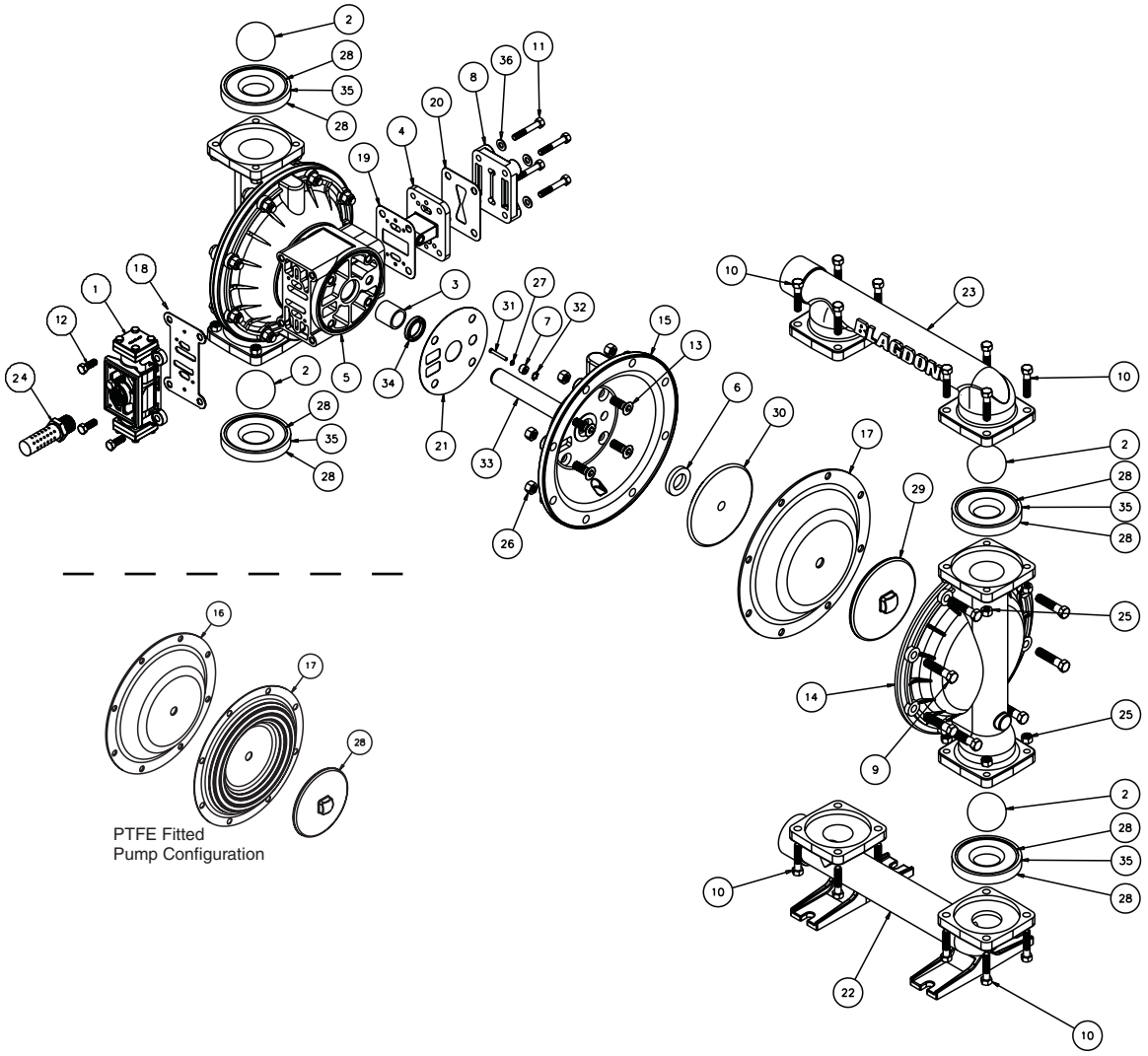
B476-196-656 **WET END KIT**
Santoprene Diaphragms, Balls and EPDM Seats.

B476-196-365 **WET END KIT**
Neoprene Diaphragms, Balls, and Seats.

B476-196-635 **WET END KIT**
Neoprene Diaphragms, PTFE Overlay, PTFE Balls and PTFE Seats.

HARDWARE KITS

B475-200-330 Zinc Plated Capscrews, Washers, and Hex Nuts

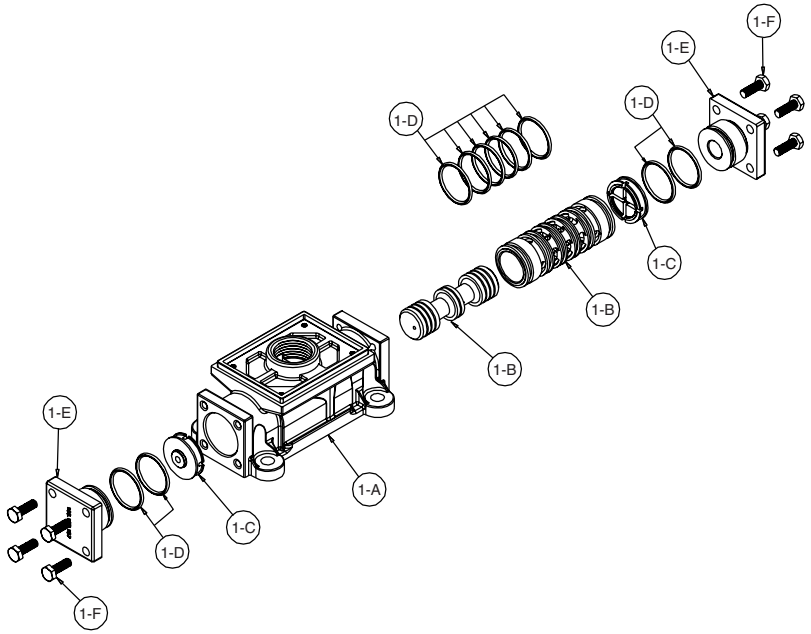


PTFE Fitted
Pump Configuration

Composite Repair Parts List

ITEM	PART NO.	DESCRIPTION	QTY
1	B031-183-000	Air Valve Assembly	1
	B031-179-000	Air Valve Assembly	1
2	B050-005-354	Ball, Check	4
	B050-005-360	Ball, Check	4
	B050-005-363	Ball, Check	4
	B050-005-364	Ball, Check	4
	B050-005-365	Ball, Check	4
	B050-010-600	Ball, Check	4
3	B070-006-170	Bushing	2
4	B095-096-000	Pilot Valve Assembly	1
5	B114-024-157	Intermediate, Bracket	1
	B114-024-010	Intermediate, Bracket	1
	B114-024-110	Internediate, Bracket	1
6	B132-035-360	Bumper, Diaphragm	2
7	B135-034-506	Bushing, Plunger	2
8	B165-118-157E	Cap, Air Inlet Assembly 3/4" NPT	1
	B165-118-010E	Cap, Air Inlet Assembly 3/4" BSP (Parallel)	1
	B165-118-110	Cap, Air Inlet Assembly 3/4" NPT	1
9	B170-060-115	Capscrew, Hex Hd 7/16-14 X 2.00	16
	B170-060-330	Capscrew, Hex Hd 7/16-14 X 2.00	16
10	B170-061-115	Capscrew, Hex Hd 3/8-16 X 1.75	16
	B170-061-330	Capscrew, Hex Hd 3/8-16 X 1.75	16
11	B170-085-115	Capscrew, Hex Hd 5/16-18 X 2.00	4
	B170-085-330	Capscrew, Hex Hd 5/16-18 X 2.00	4
12	B170-006-115	Capscrew, Hex Hd 3/8-16 X 1.00	4
	B170-006-330	Capscrew, Hex Hd 3/8-16 X 1.00	4
13	B171-059-115	Capscrew, Soc Hd 7/16-14 X 1.25	8
	B171-059-330	Capscrew, Soc Hd 7/16-14 X 1.25	8
	B171.011.110	Capscrew, Soc Hd 1/2-13 X 1.25 (Stainless Steel Only)	8
14	B196-169-156	Chamber, Outer	2
	B196-169-010	Chamber, Outer	2
	B196-169-110	Chamber, Outer	2
15	B196-170-156	Chamber, Inner	2
	B196-170-010	Chamber, Inner	2
	B196-170-110	Chamber, Inner	2
16	B286-103-354	Diaphragm	2
	B286-103-360	Diaphragm	2
	B286-103-364	Diaphragm	2
	B286-103-365	Diaphragm	2
17	B286-103-600	Diaphragm, Overlay	2
18	B360-093-360	Gasket, Air Valve	1
19	B360-103-360	Gasket, Pilot Valve	1
20	B360-104-379	Gasket, Air Inlet	1
21	B360-105-360	Gasket, Inner Chamber	2
22	B518-161-010E	Manifold, Suction 1½" BSP (Parallel)	1
	B518-151-110E	Manifold, Suction 1½" BSP Tapered Center-Ported Stainless Steel ONLY.	1
	B518-161-156E	Manifold, Suction 1½" BSP (Parallel)	1
23	B518-162-010E	Manifold, Discharge 1½" BSP (Parallel)	1
	B518-152-110E	Manifold, Discharge 1½" BSP Tapered Center-Ported Stainless Steel ONLY.	1
	B518-162-156E	Manifold, Discharge 1½" BSP (Parallel)	1
24	B530-033-000	Silencer	1
25	B545-005-115	Nut, Hex 3/8-16	16
	B545-005-330	Nut, Hex 3/8-16	16
26	B545-007-115	Nut, Hex 7/16-14	16
	B545-007-330	Nut, Hex 7/16-14	16
27	B560-001-360	O-Ring	2
28	B560-084-360	Seal (O-Ring) (see item 34)	8
	B560-084-363	Seal (O-Ring) (see item 34)	8
	B560-084-364	Seal (O-Ring) (see item 34)	8
	B720-061-600	Seal (see item 34)	8
29	B612-039-157	Plate, Outer Diaphragm	2
	B612-039-010	Plate, Outer Diaphragm	2
	B612-097-110	Plate, Outer Diaphragm	2
30	B612-195-157	Plate, Inner Diaphragm	2
	B612-195-082	Plate, Inner Diaphragm	2
31	B620-020-115	Plunger, Actuator	2
32	B675-042-115	Ring, Retaining	2
33	B685-059-120	Rod, Diaphragm	1
34	B720-004-360	Seal, Diaphragm Rod	2
35	B722-091-550	Seat, Check Ball	4
	B722-091-080	Seat, Check Ball	4
	B722-091-110	Seat, Check Ball	4
	B722-091-150	Seat, Check Ball	4
	B722-091-600	Seat, Check Ball	4
36	B901-038-115	5/16 Flat Washer	4
	B901-038-330	5/16 Flat Washer	4
37	B901-038-115	3/8 Flat Washer	4
	B901-048-330	3/8 Flat Washer	4
38	B570-009-363	Pad, Wear (Use With 286-099-363)	2

Air Valve Servicing, Assembly Drawing & Parts List



Air Valve Assembly Parts List (Use w/Aluminum centers only)

Item	Part Number	Description	Qty
1	**031-183-000**	**Air Valve Assembly**	**1**
1-A	095-109-157	Body, Air Valve	1
1-B	031-139-000	Sleeve and Spool Set	1
1-C	132-029-357	Bumper	2
1-D	560-020-360	O-Ring	10
1-E	165-127-157	Cap, End	2
1-F	170-032-330	Hex Head Capscrew 1/4-20 x .75	8

Air Valve Assembly Parts List (Use w/Cast Iron centers only)

Item	Part Number	Description	Qty
1	**031-179-000**	**Air Valve Assembly**	**1**
1-A	095-109-110	Body, Air Valve	1
1-B	031-139-000	Sleeve and Spool Set	1
1-C	132-029-357	Bumper	2
1-D	560-020-379	O-Ring	10
1-E	165-127-110	Cap, End	2
1-F	170-032-115	Hex Head Capscrew 1/4-20 x .75	8

Air Distribution Valve Servicing

To service the air valve first shut off the compressed air, bleed pressure from the pump, and disconnect the air supply line from the pump.

Step #1: See COMPOSITE REPAIR PARTS DRAWING.

Using a 9/16" wrench or socket, remove the four hex capscrews (items 12). Remove the air valve assembly from the pump.

Remove and inspect gasket (item 18) for cracks or damage. Replace gasket if needed.

Step #2: Disassembly of the air valve.

Using a 7/16" wrench or socket, remove the eight hex capscrews (items 1-F) that fasten the end caps to the valve body. Next remove the two end caps (items 1-E). Inspect the two o-rings (items 1-D) on each end cap for damage or wear. Replace the bumpers as needed.

Remove the bumpers (items 1-C). Inspect the bumpers for damage or wear. Replace the bumpers as needed.

Remove the spool (part of item 1-B) from the sleeve. Be careful not to scratch or damage the outer diameter of the spool. Wipe spool with a soft cloth and inspect for scratches or wear.

Inspect the inner diameter of the sleeve (part of item 1-B) for dirt, scratches, or other contaminants. Remove the sleeve if needed and replace with a new sleeve and spool set (item 1-B).

Step #3: Reassembly of the air valve.

Install one bumper (item 1-C) and one end cap (item 1-E), with two o-rings (items 1-D), and fasten with four hex capscrews (items 1-F) to the valve body (item 1-A).

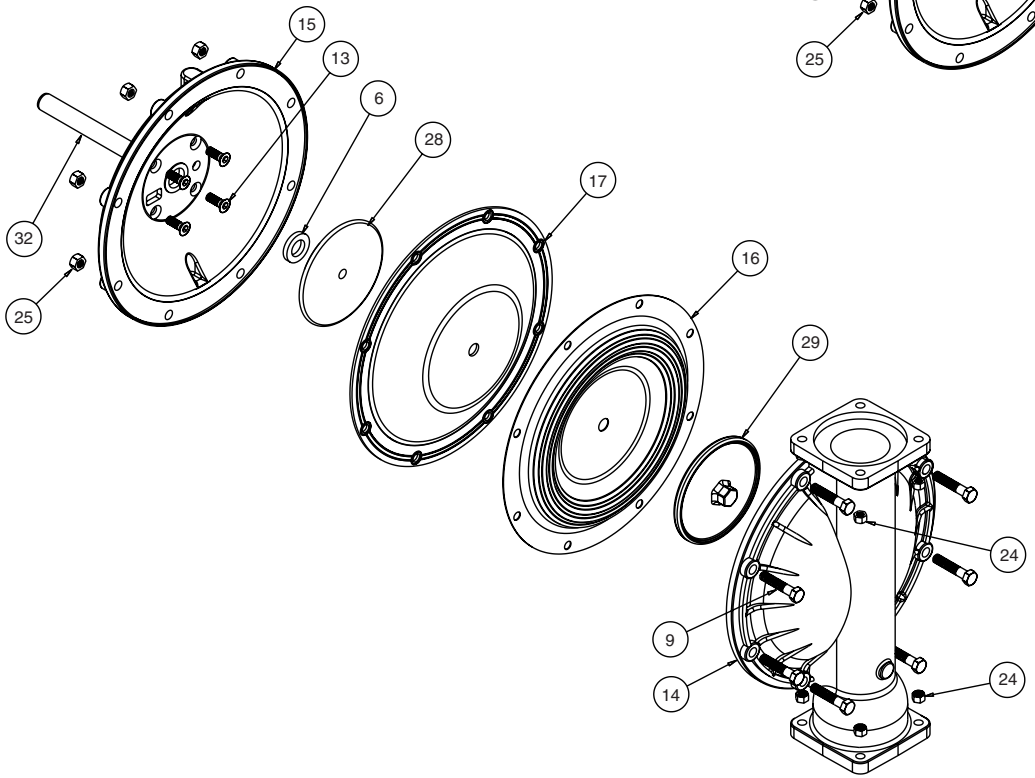
Remove the new sleeve an spool set (item 1-B) from the plastic bag. Carefully remove the spool from the sleeve. Install the six o-rings (item 1-D) into the six grooves on the sleeve. Apply a light coating of grease to the o-rings before installing the sleeve into the valve body (item 1-A), align the slots in the sleeve with the slots in the valve body. Insert the spool into the sleeve. Be careful not to scratch or damage the spool during installation. Carefully insert the sleeve into the bumper and end cap (with o-rings) and fasten with the remaining hex capscrews.

Fasten the air valve assembly (item 1) and gasket to the pump.Connect the compressed air line to the pump. The pump is now ready for operation.

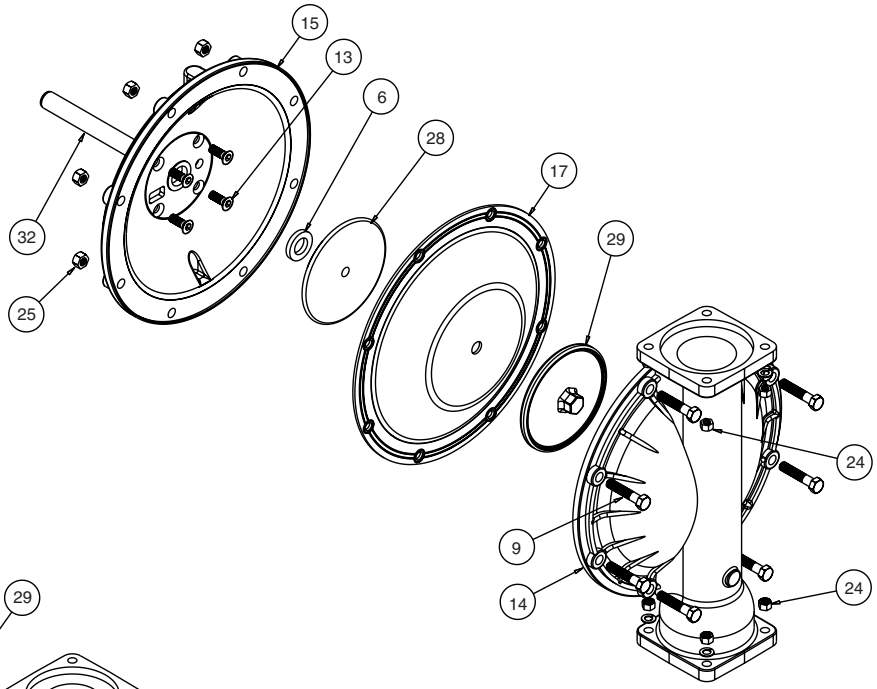
⚠ IMPORTANT

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.

Diaphragm Service Drawing, with Overlay



Diaphragm Service Drawing, Non-Overlay



DIAPHRAGM SERVICING

To service the diaphragms first shut off the suction, then shut off the discharge lines to the pump. Shut off the compressed air supply, bleed the pressure from the pump, and disconnect the air supply line from the pump. Drain any remaining liquid from the pump.

Step #1: See the pump assembly drawing, and the diaphragm servicing illustration.

Using a 9/16" wrench or socket, remove the 16 capscrews (item 10), and hex nuts that fasten the manifolds (items 22 & 23) to the outer chambers (item 14).

Step #2: Removing the outer chambers.

Using a 11/16" and a 5/8" wrench or socket, remove the 16 capscrews (items 9), and hex nuts that fasten the outer chambers, diaphragms, and inner chambers (items 15) together.

Step #3: Removing the diaphragm assemblies.

Use a $1^{1}/_{16}$" (27mm) wrench or six pointed socket to remove the diaphragm assemblies (outer plate, diaphragm, and inner plate) from the diaphragm rod (item 32) by turning counterclockwise.

NOTE: To uninstall the diaphragm plates from the diaphragm, hold the inner diaphragm plate using one of two methods:

Preferred Method: Place the assembled plates and diaphragm in a large vise, gripping on the exterior cast diameter of the inner diaphragm plate (see the drawing at far right).

Alternate Method: When a larger vise is not available, insert a 1/4 - 20UNC hex capscrew or setscrew (standard hardware) into the tapped hole in the inner diaphragm plate. Insert the assembled plates and diaphragm into a vise with the stud from the outer plate and the 1/4 - 20 fastener loosely between the jaws of the vise (see illustration at right).

Use a $1^{1}/_{16}$" wrench or socket to remove the outer diaphragm plate (item 29) by turning counterclockwise. Inspect the diaphragm (item 17) for cuts, punctures, abrasive wear or chemical attack. Replace the diaphragms if necessary.

Step #4: Installing the diaphragms.

Push the threaded stud of the outer diaphragm plate through the center hole of the diaphragm. Thread the inner plate clockwise onto the stud. Use one of the two methods for holding the inner diaphragm plate that was described in prior note in step #3. Use a torque wrench to tighten the diaphragm assembly together to 50 ft. lbs. (67.79 Newton meters). Allow a minimum of 15 minutes to elapse after torquing, then re-torque the assembly to compensate for stress relaxation in the clamped assembly.

Step #5: Installing the diaphragm assemblies to the pump.

Make sure the bumper (item 6) is installed over the diaphragm rod.

Thread the stud of the one diaphragm assembly clockwise into the tapped hole at the end of the diaphragm rod (item 32) until the inner diaphragm plate is flush to the end of the rod. Insert rod into pump.

Align the bolt holes in the diaphragm with the bolt pattern in the inner chamber (item 15).

Fasten the outer chamber (item 14) to the pump, using the capscrews (items 9), and hex nuts.

On the opposite side of the pump, pull the diaphragm rod out as far as possible. Make sure the bumper (item 6) is installed over the diaphragm rod.

Thread the stud of the remaining diaphragm assembly clockwise into the tapped hole at the end of the diaphragm rod (item 32) as far as possible and still allow for alignment of the bolt holes in the diaphragm with the bolt pattern in the inner chamber (item 15).

Fasten the remaining outer chamber (item 14) to the pump, using the capscrews (items 9), and hex nuts.

Step #6: Re-install the manifolds to the pump, using the capscrews (items 10), hex nuts and flat washers.

⚠ 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.

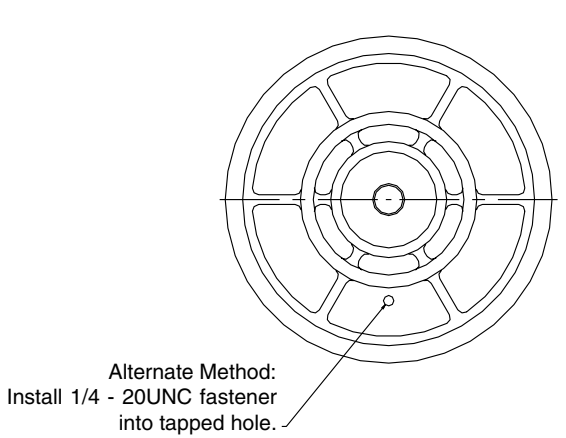
The pump is now ready to be re-installed, connected and returned to operation.

OVERLAY DIAPHRAGM SERVICING

The overlay diaphragm (item 16) is designed to fit over the exterior of the standard TPE diaphragm (item 17).

The molded directional arrows on the overlay diaphragm must point vertically.

Follow the same procedures described for the standard diaphragm for removal and installation.



Pilot Valve Servicing, Assembly Drawing & Parts List

PILOT VALVE ASSEMBLY PARTS LIST

ITEM	PART NUMBER	DESCRIPTION	QTY
4	095-110-000	Pilot Valve Assembly	1
4-A	095-095-157	Valve Body	1
4-B	755-051-000	Sleeve (With O-rings)	1
4-C	560-033-379	O-ring (Sleeve)	6
4-D	775-055-000	Spool (With O-rings)	1
4-E	560-023-379	O-ring (Spool)	3
4-F	675-037-080	Retaining Ring	1

FOR PUMPS WITH CAST IRON CENTER SECTION

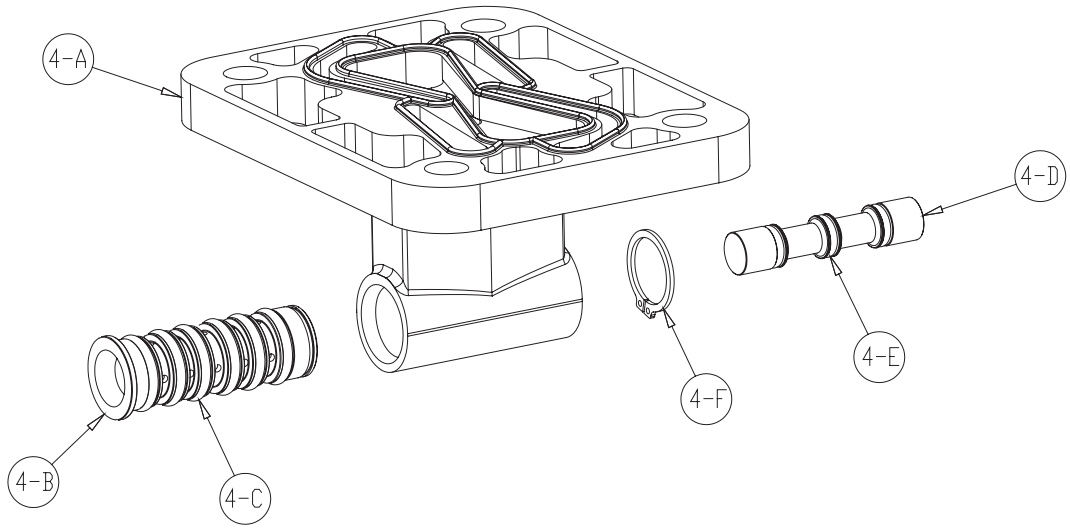
ITEM	PART NUMBER	DESCRIPTION	QTY
4	095-110-558	Pilot Valve Assembly	1
4-A	095-095-558	Valve Body	1

(includes all other items used on 095-110-000)

FOR PUMPS WITH STAINLESS STEEL CENTER SECTION

ITEM	PART NUMBER	DESCRIPTION	QTY
4	095-110-110	Pilot Valve Assembly	1
4-A	095-095-110	Valve Body	1

(includes all other items used on 095-110-000)



PILOT VALVE SERVICING

To service the pilot valve first shut off the compressed air supply, bleed the pressure from the pump, and disconnect the air supply line from the pump.

STEP #1: See pump assembly drawing.

Using a 1/2" wrench or socket, remove the four capscrews (item 11). Remove the air inlet cap (item 8) and air inlet gasket (item 21). The pilot valve assembly (item 4) can now be removed for inspection and service.

STEP #2: Disassembly of the pilot valve.

Remove the pilot valve spool (item 4-D). Wipe clean and inspect spool and o-rings for dirt, cuts or wear. Replace the o-rings and spool if necessary.

Remove the retaining ring (item 4-F) from the end of the sleeve (item 4-B) and remove the sleeve from the valve body (item 4-A). Wipe clean and inspect sleeve and o-rings for dirt, cuts or wear. Replace the o-rings and sleeve if necessary.

STEP #3: Re-assembly of the pilot valve.

Generously lubricate outside diameter of the sleeve and o-rings. Then carefully insert sleeve into valve body. Take CAUTION when inserting sleeve, not to shear any o-rings. Install retaining ring to sleeve. Generously lubricate outside diameter of spool and o-rings. Then carefully insert spool into sleeve. Take CAUTION when inserting spool, not to shear any o-rings. Use BP-LS-EP-2 multipurpose grease, or equivalent.

STEP #4: Re-install the pilot valve assembly into the intermediate.

Be careful to align the ends of the pilot valve stem between the plunger pins when inserting the pilot valve into the cavity of the intermediate.

Re-install the gasket, air inlet cap and capscrews. Connect the air supply to the pump. The pump is now ready for operation.

ACTUATOR PLUNGER SERVICING

To service the actuator plunger first shut off the compressed air supply, bleed the pressure from the pump, and disconnect the air supply line from the pump.

Step #1: See PUMP ASSEMBLY DRAWING.

Using a 1/2" wrench or socket, remove the four capscrews (items 11). Remove the air inlet cap (item 8) and air inlet gasket (item 20). The pilot valve assembly (item 4) can now be removed.

Step #2: Inspect the actuator plungers.

See ILLUSTRATION AT RIGHT.

The actuator plungers (items 30) can be reached through the pilot valve cavity in the intermediate assembly (item 5).

Remove the plungers (item 30) from the bushings (item 7) in each end of the cavity. Inspect the installed o-ring (items 26) for cuts and/or wear. Replace the o-rings if necessary. Apply a light coating of grease to each o-ring and re-install the plungers in to the bushings. Push the plungers in as far as they will go.

To remove the bushings (item 7), first remove the retaining rings (item 31) by using a flat screwdriver. **NOTE**: It is recommended that new retaining rings be installed.

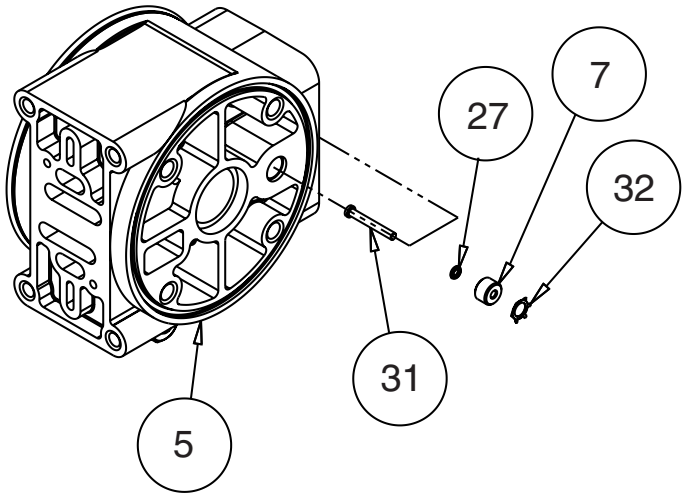
Step #3: Re-install the pilot valve assembly into the intermediate assembly.

Be careful to align the ends of the stem between the plungers when inserting the stem of the pilot valve into the cavity of the intermediate.

Re-install the gasket (item 20), air inlet cap (item 8) and capscrews (item 11).

Connect the air supply to the pump. The pump is now ready for operation.

ACTUATOR PLUNGER SERVICING



⚠ 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.

CHECK VALVE SERVICING

Before servicing the check valve components, first shut off the suction line and then the discharge line to the pump. Next, shut off the compressed air supply, bleed air pressure from the pump, and disconnect the air supply line from the pump. Drain any remaining fluid from the pump. The pump can now be removed for service.

To access the check valve components, remove the manifold (item 23 or item 22 not shown). Use a 9/16" wrench or socket to remove the fasteners. Once the manifold is removed, the check valve components can be seen.

Inspect the check balls (items 2) for wear, abrasion, or cuts on the spherical surface. The check valve seats (item 34) should be inspected for cuts, abrasive wear, or embedded material on the surfaces of both the external and internal chambers. The spherical surface of the check balls must seat flush to the surface of the check valve seats for the pump to operate to peak efficiency. Replace any worn or damaged parts as necessary.

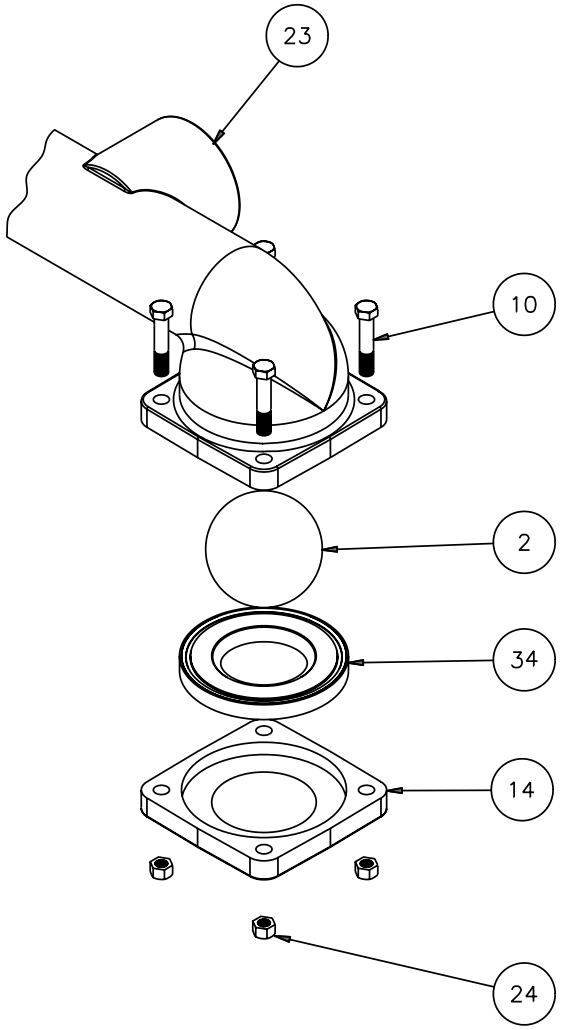
Re-assemble the check valve components. The seat should fit into the counter bore of the outer chamber.

The pump can now be reassembled, reconnected and returned to operation.

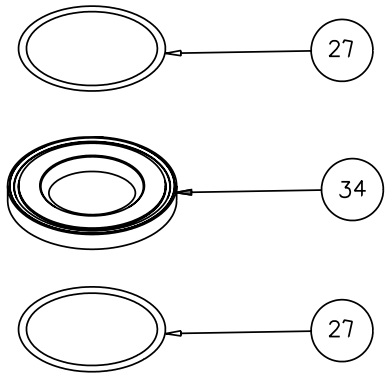
METALLIC SEATS

Two o-rings (or conductive PTFE seals) (item 27) are required for metallic seats.

Check Valve Drawing



with Non-Metallic Seats



with Metallic Seats

PUMPING HAZARDOUS LIQUIDS

When a diaphragm fails, the pumped liquid or fumes enter the air end of the pump. Fumes are exhausted into the surrounding environment. When pumping hazardous or toxic materials, the exhaust air must be piped to an appropriate area for safe disposal. See illustration #1 at right.

This 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. See illustration #2 at right. Piping used for the air exhaust must not be smaller than 1" (2.54 cm) diameter. Reducing the pipe size will restrict air flow and reduce pump performance. 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. See illustration #3 at right.

CONVERTING THE PUMP FOR PIPING THE EXHAUST AIR

The following steps are necessary to convert the pump to pipe the exhaust air away from the pump.

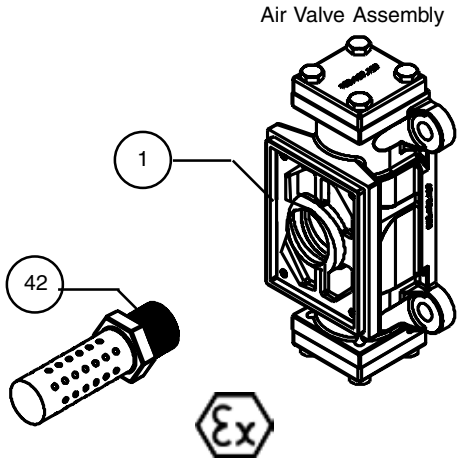
Remove the muffler (item 42). The air distribution valve (item 1) has 1" NPT threads for piped exhaust.

IMPORTANT INSTALLATION

NOTE: The manufacturer recommends installing a flexible conductive hose or connection between the pump and any rigid plumbing. This reduces stresses on the molded threads of the air exhaust port. Failure to do so may result in damage to the air distribution valve body.

Any piping or hose connected to the pump's air exhaust port must be conductive and physically supported. Failure to support these connections could also result in damage to the air distribution valve body.

Air Valve Assembly



On ATEX compliant units the pump comes equipped with a standard metal muffler

CONVERTED EXHAUST ILLUSTRATION

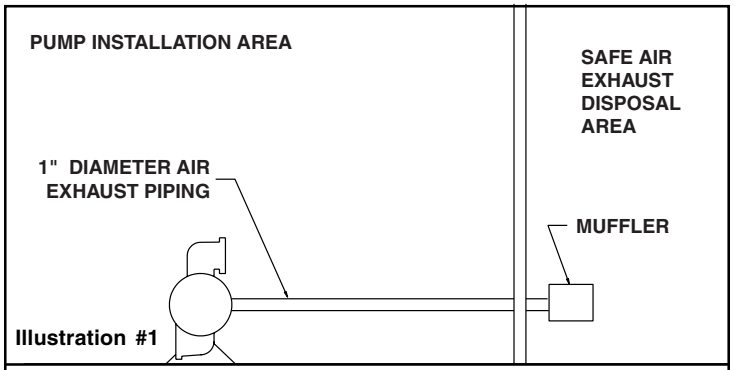


Illustration #1

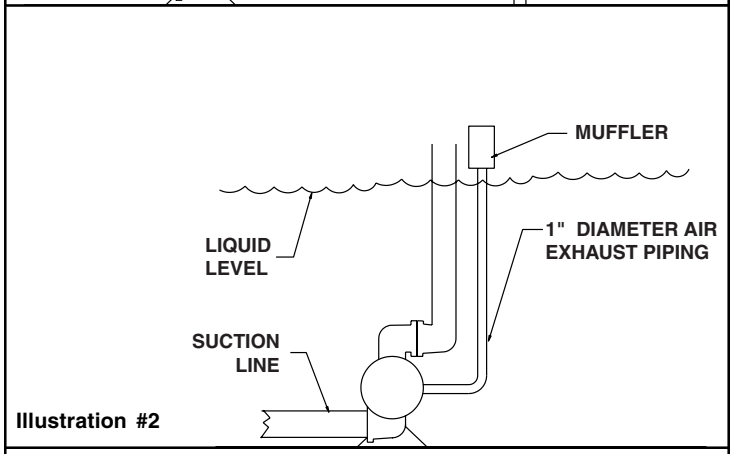


Illustration #2

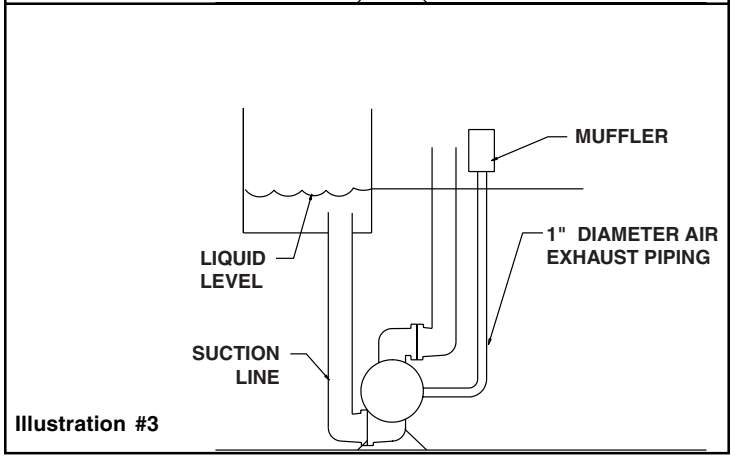
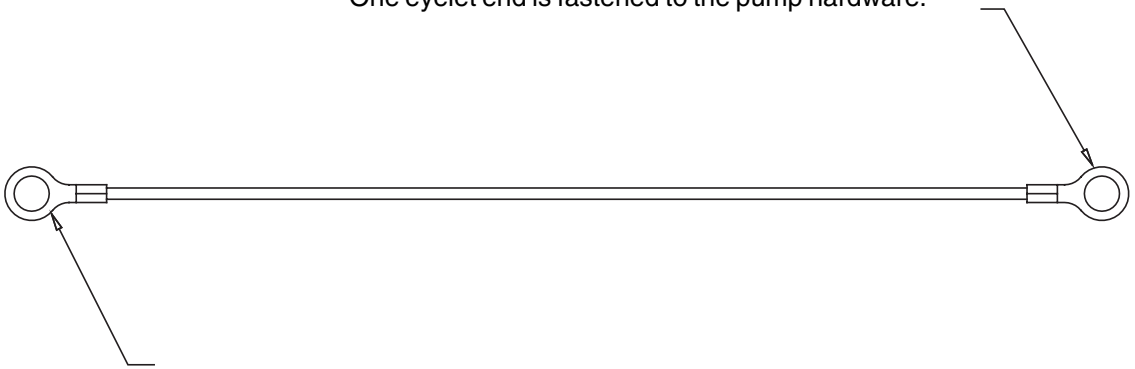


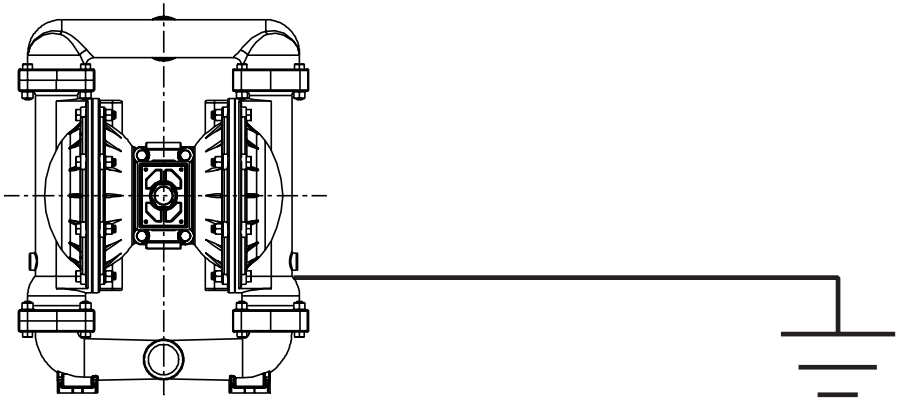
Illustration #3

Grounding The Pump

One eyelet end is fastened to the pump hardware.



One eyelet end is installed to a true earth ground.



This 8 foot long (244 centimeters) Ground Strap, part number 920-025-000, can be ordered as a service part.

To reduce the risk of static electrical sparking, this pump must be grounded. Check the local electrical code for detailed grounding instruction and the type of equipment required.

⚠ WARNING

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

BLAGDON PUMP®

Declaration of Conformity

Manufacturer: IDEX Pump Technologies (Ireland) Ltd.,
A Unit of IDEX Corporation, R79, Shannon, Co Clare, IRELAND.

Certifies that Air-Operated Double Diaphragm Pump B and X Series, comply with the European Community Directive 2006/42/EC on Machinery, according to Annex VIII. This product has used Harmonized Standard EN 809, Pumps and Pump Units for Liquids - Common Safety Requirements, to verify conformance.

D Monaghan
Signature of authorized person

October 20, 2005
Date of issue

Des Monaghan
Printed name of authorized person

Production & Tech Manager
Title

Revision Level: E

May 27, 2010
Date of revision

IDEX FLUID & METERING

CE

Declaration of Conformity

Declaration of Conformity

Declaration of Conformity

BLAGDON PUMP®

EC Declaration of Conformity

In accordance with ATEX Directive 94/9/EC,
Equipment intended for use in potentially explosive environments.

Manufacturer: IDEX Pump Technologies (Ireland) Ltd.,
A Unit of IDEX Corporation, R79, Shannon, Co Clare, IRELAND.

AODD Pumps Equipped with Aluminium
Type Examination Certificate: KEMA 09ATEX0072 X

AODD (Air-Operated Double Diaphragm) Pumps
EC Type Examination Certificate No. Pumps: KEMA 09ATEX0071 X
KEMA Quality B.V.
Utrechtseweg 310
6812 AR Arnhem, The Netherlands

Applicable Standard:
EN13463-1: 2001,
EN13463-5: 2003

IDEX FLUID & METERING

DATE/APPROVAL/TITLE:
27 MAY 2010

Production and Technical Manager

Declaration of Conformity