

A measured step forward™

Operations & Maintenance Manual

AODD

1/2" Air Operated Double Diaphragm Pump



Contents

Cautions – Read First!.....	4
Model Designation Matrix - Aluminum	5
Model Designation Matrix - Stainless Steel.....	6
Principles of Operation	7
How an Air Operated Double Diaphragm Pump works.....	7
1/2” Pump Dimensions.....	8
Aluminum Center Section.....	8
1/2” Pump Dimensions.....	9
Polypropylene Center Section	9
Performance Curves	10
Installation, Troubleshooting and Maintenance	11
Installation.....	11
Suggested Installation	12
Troubleshooting.....	13
Operation	14
Maintenance	14
Maintenance Schedule	14
Repair and Assembly	15
Pump wet end removal.....	15
Repair and Assembly	17
Air Valve Removal.....	17
Repair and Assembly	19
Pilot Valve Removal.....	19
Exploded View & Parts List.....	21
Aluminum and Stainless Steel Pumps with Aluminum Center Section.....	21
Parts List.....	22
Drum Pump Kits.....	23
Exploded View & Parts List.....	24
Aluminum and Stainless Steel Pumps with Plastic Center Section.....	24
Parts List.....	25
Drum Pump Kits.....	26
Elastomers & Repair Kits.....	27

Cautions – Read First!

READ THESE WARNINGS AND SAFETY PRECAUTIONS PRIOR TO INSTALLATION OR OPERATION. FAILURE TO COMPLY WITH THESE INSTRUCTIONS COULD RESULT IN PERSONAL INJURY AND OR PROPERTY DAMAGE. RETAIN THESE INSTRUCTIONS FOR FUTURE REFERENCE.

WARNING Pump, valves and all containers must be properly grounded prior to handling flammable fluids and/or whenever static electricity is a hazard.

WARNING Prior to servicing the pump, ensure that the air and fluid lines are closed and disconnected. While wearing personal protective equipment, flush, drain and process liquid from the pump in a safe manner.

WARNING The TX marking refers to the maximum surface temperature depending not on the equipment itself, but mainly on operating conditions. In this case, the maximum surface temperature depends upon the temperature of the process fluids.

CAUTION The temperature of the process fluid and air input must be no more than 36 °F (20C) less of the maximum temperature allowed for the appropriate non-metallic material. See the list of temperatures below for each material's maximum recommended temperature:

Buna-N (Nitrile):
10 °F to 180 °F (-12C to 82C)

Geolast®:
10 °F to 180 °F (-12C to 82C)

EPDM:
-40 °F to 280 °F (-40C to 138C)

Santoprene®:
-40 °F to 225 °F (-40C to 107C)

Viton® (FKM):
-40 °F to 350 °F (-40C to 177C)

PTFE:
40 °F to 220 °F (4C to 104C)

Polyethylene:
32 °F to 158 °F (0C to 70C)

Polypropylene:
32 °F to 180 °F (0C to 82C)

PVDF:
0 °F to 250 °F (-18C to 121C)

Nylon:
0 °F to 200 °F (-18C to 93C)

Temperature limits are solely based upon mechanical stress and certain chemicals will reduce the maximum operating temperature. The allowable temperature range for the process fluid is determined by the materials in contact with the fluid being pumped. Consult a chemical resistance guide for chemical compatibility and a more precise safe temperature limit. Always use minimum air pressure when pumping at elevated temperatures.

WARNING

= Hazards or unsafe practices which could result in severe personal injury, death or substantial property damage

CAUTION

= Hazards or unsafe practices which could result in minor personal injury, product or property damage.

CAUTION Do not lubricate air supply.

CAUTION Do not connect a compressed air source to the exhaust port of the pump.

WARNING Use only with liquid process fluid.

WARNING Maintenance must not be performed when a hazardous atmosphere is present.

CAUTION Do not exceed 120 psig (8.3 bar) air-inlet pressure.

CAUTION Do not exceed 10 psig (0.7 bar) or 23 ft-H₂O suction pressure.

CAUTION Ensure all wetted components are chemically compatible with the process fluid and the cleaning fluid.

CAUTION Ensure pump is thoroughly cleaned and flushed prior to installation into a process line.

CAUTION Always wear Personal Protective Equipment (PPE) when operating pump.

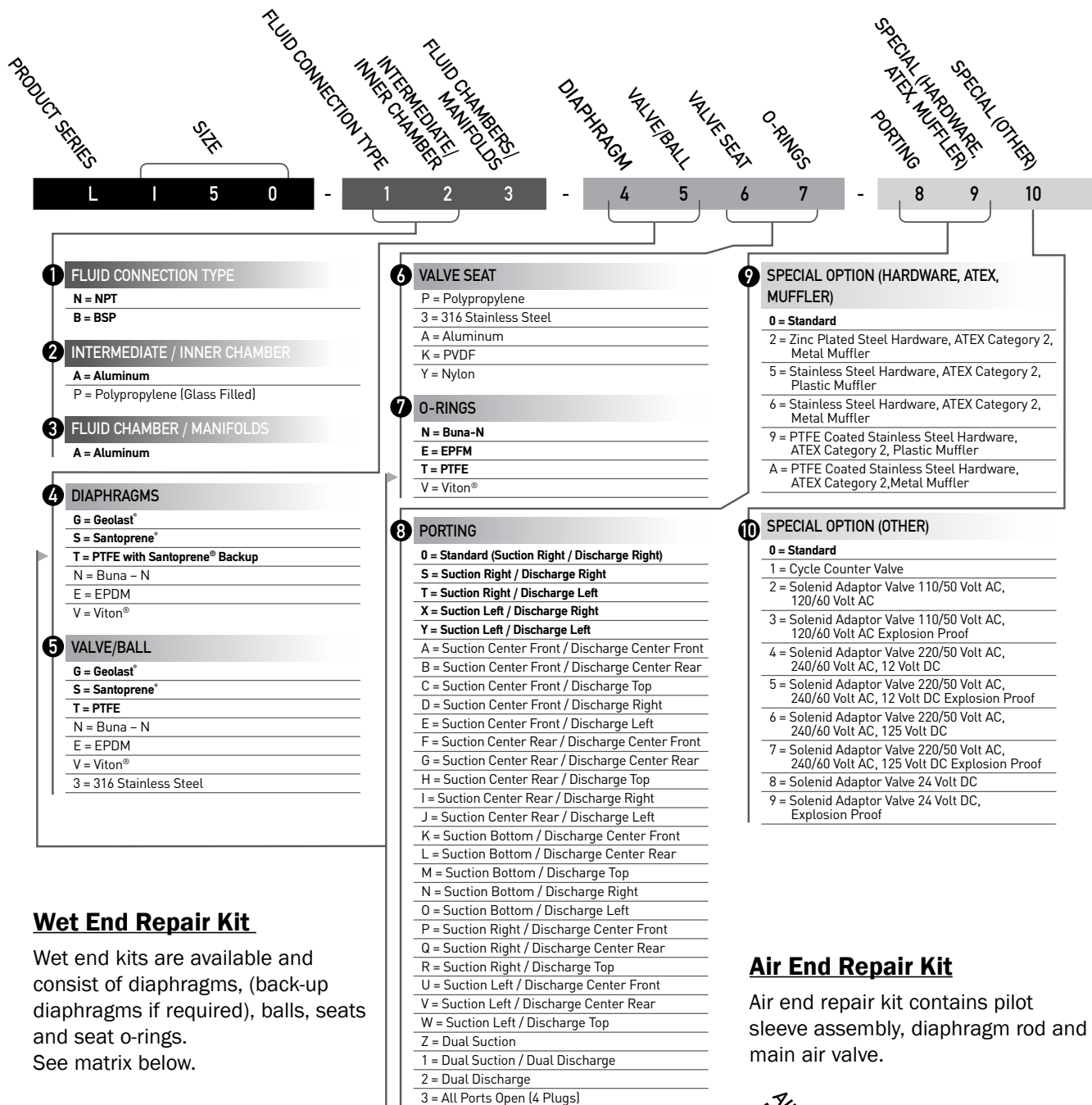
CAUTION Close and disconnect all compressed air and bleed all air from the pump prior to service. Remove all process fluid in a safe manner prior to service.

CAUTION Blow out all compressed air lines in order to remove any debris, prior to pump installation. Ensure that the muffler is properly installed prior to pump operation.

CAUTION Ensure air exhaust is piped to atmosphere prior to a submerged installation.

CAUTION Ensure all hardware is set to correct torque values prior to operation.

Model Designation Matrix - Aluminum

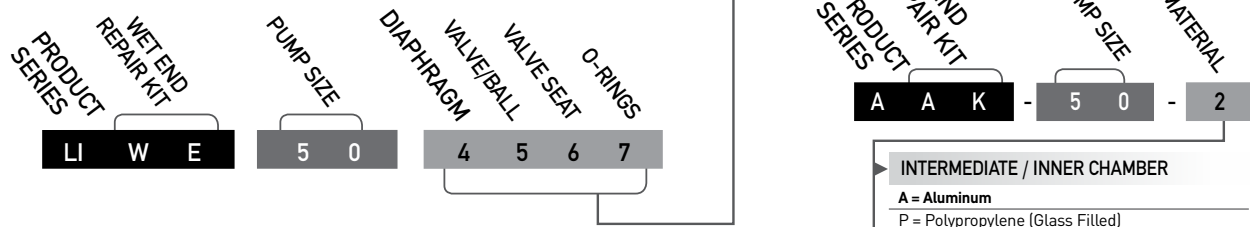


Wet End Repair Kit

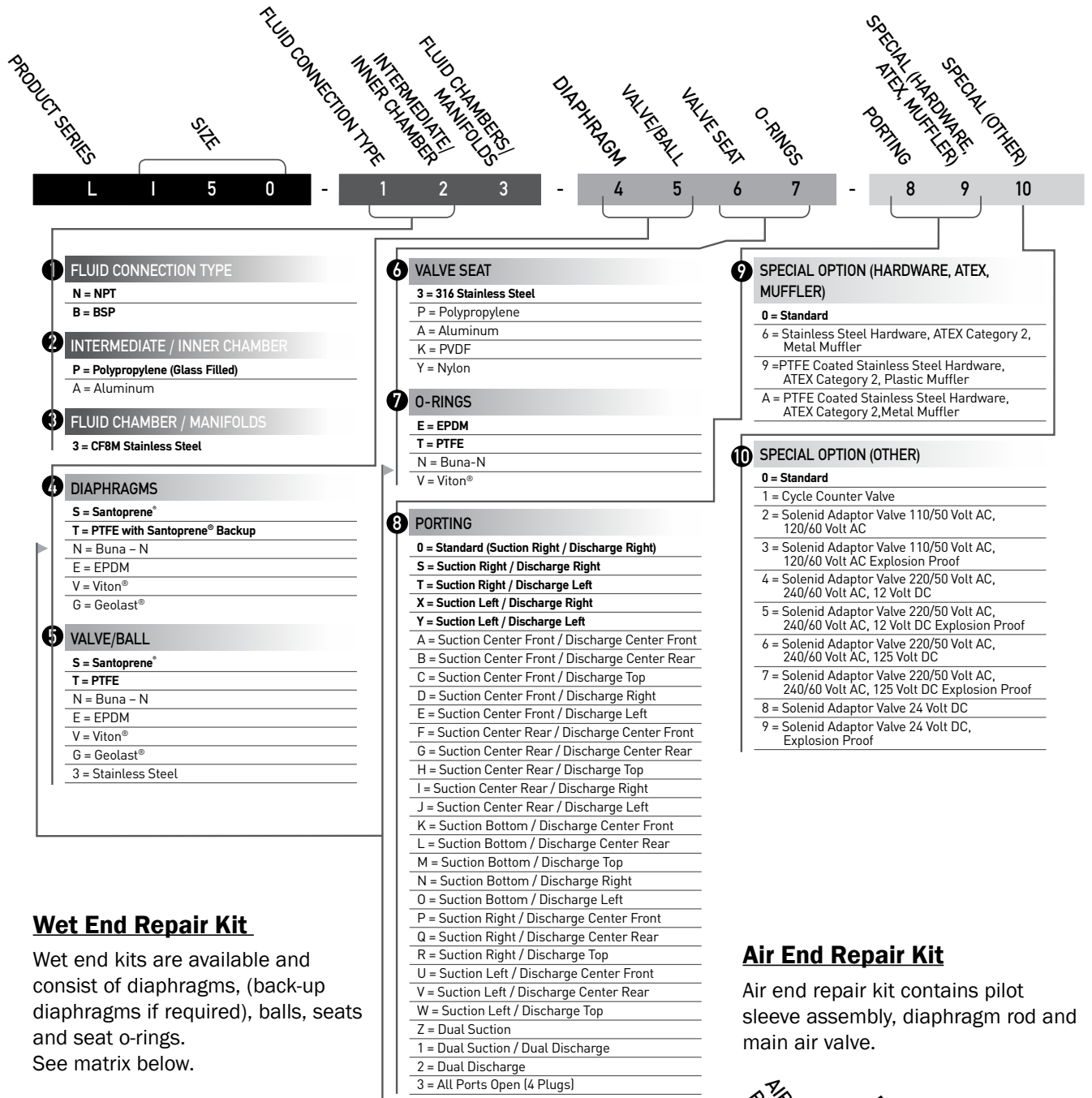
Wet end kits are available and consist of diaphragms, (back-up diaphragms if required), balls, seats and seat o-rings. See matrix below.

Air End Repair Kit

Air end repair kit contains pilot sleeve assembly, diaphragm rod and main air valve.



Model Designation Matrix - Stainless Steel

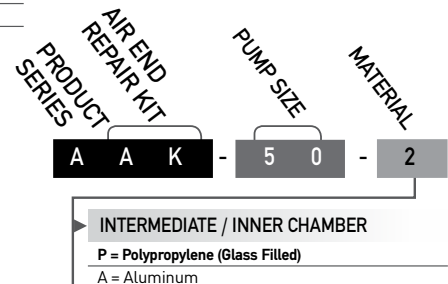
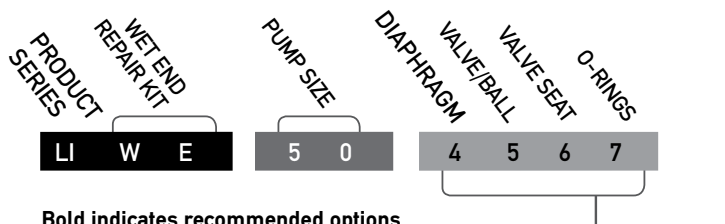


Wet End Repair Kit

Wet end kits are available and consist of diaphragms, (back-up diaphragms if required), balls, seats and seat o-rings. See matrix below.

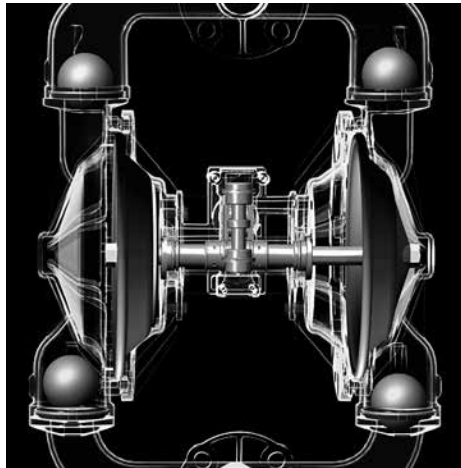
Air End Repair Kit

Air end repair kit contains pilot sleeve assembly, diaphragm rod and main air valve.



Principles of Operation

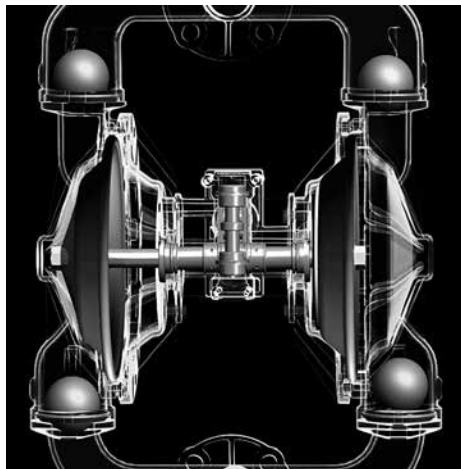
How an Air Operated Double Diaphragm Pump works



The air-valve directs pressurized air behind the diaphragm on the right, causing the diaphragm on the right to move outward (to the right).

Since both the right diaphragm and the left diaphragm are connected via a diaphragm rod, when the right diaphragm moves to the right, the left diaphragm (through the action of the diaphragm rod) moves to the right also.

When the diaphragm on the left side is moving to the right, it is referred to as suction stroke. When the left diaphragm is in its suction stroke, the left suction ball moves upward (opens) and the left discharge ball moves downward (closes). This action creates suction and draws liquid into the left side chamber.



The air-valve directs pressurized air behind the left diaphragm, causing the left diaphragm to move outward (to the left).

Since both the left diaphragm and the right diaphragm are connected via a diaphragm rod, when the left diaphragm moves to the left, the right diaphragm (through the action of the diaphragm rod) moves to the left also.

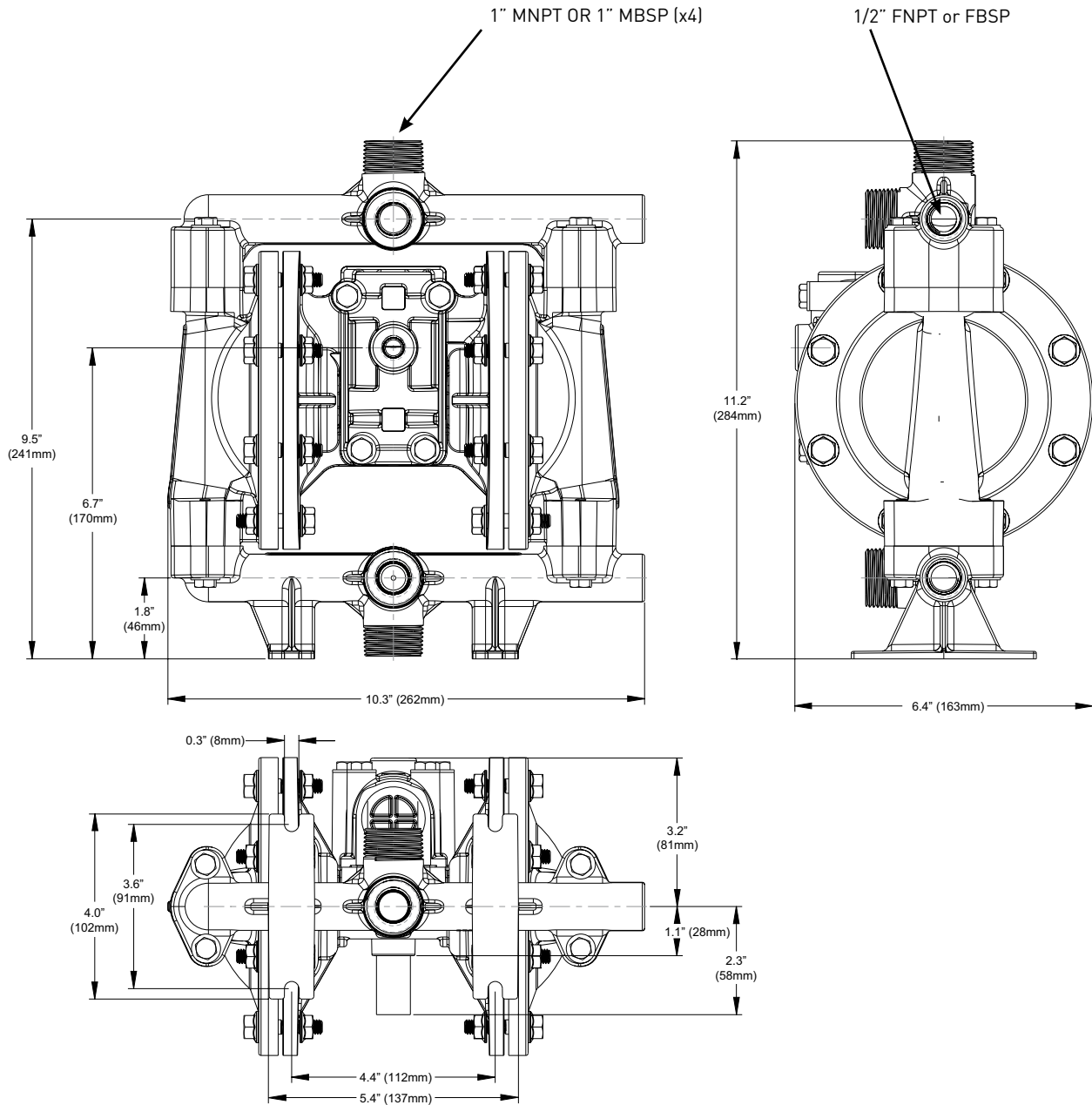
When the diaphragm on the left side moves outward, the left discharge ball moves upward (opens) and the left suction ball moves downward (closes). This causes the liquid to leave the left side liquid outlet of the pump.

Simultaneously, the right diaphragm moves inward (to the left), which causes the right suction ball to open and the right discharge to close, which in turn causes suction, drawing liquid into the right chamber.

The process of alternating right suction / left discharge (and vice-versa) continues as long as compressed air is supplied to the pump.

1/2" Pump Dimensions

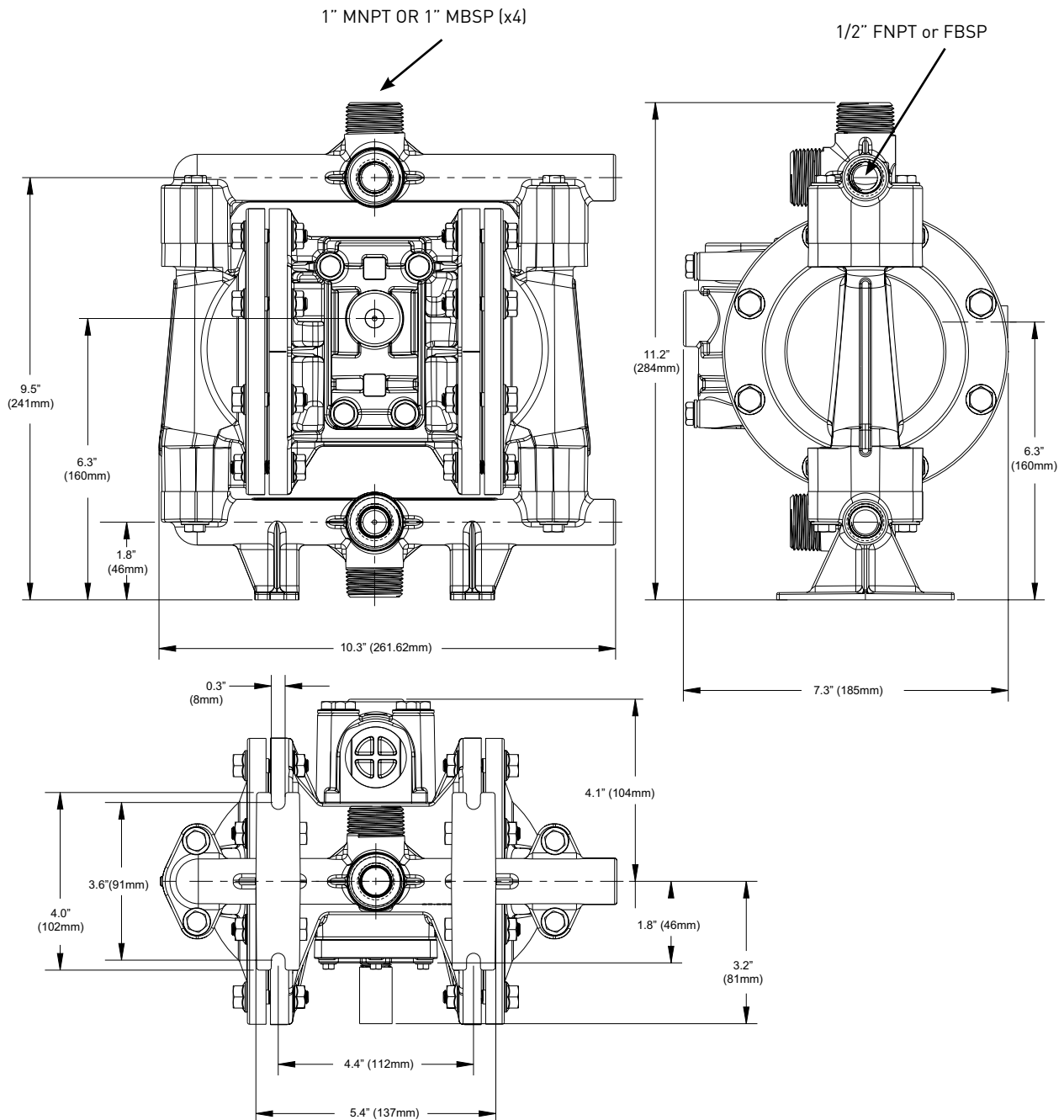
Aluminum Center Section



Note - Suction Right / Discharge Right are default ports. See part number matrix option code for additional porting options.

1/2" Pump Dimensions

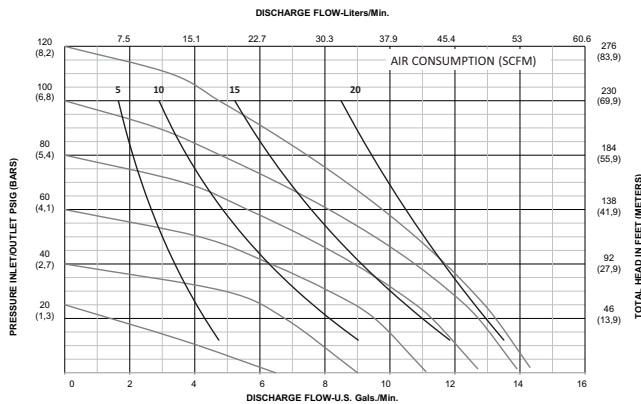
Polypropylene Center Section



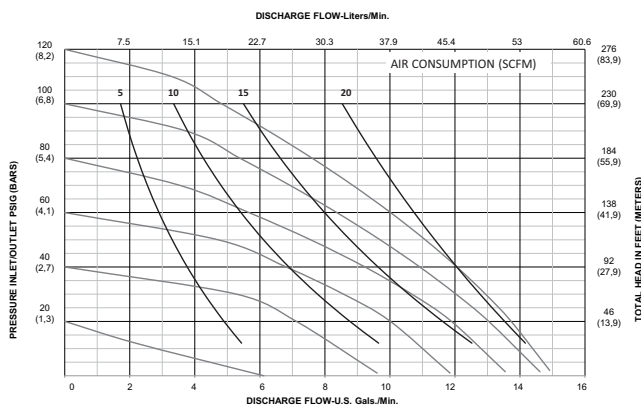
Note - Suction Right / Discharge Right are default ports. See part number matrix option code for additional porting options.

Performance Curves

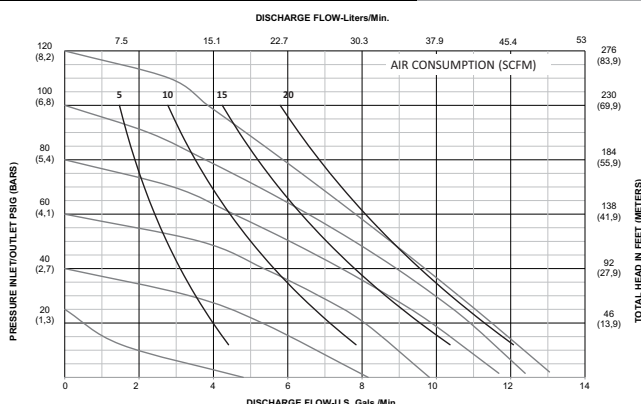
PERFORMANCE CURVE (1/2" RUBBER)*



PERFORMANCE CURVE (1/2" TPE)*



PERFORMANCE CURVE (1/2" PTFE)*



Performance Specifications

Max. Flow:	14 gpm (53.0 lpm)
Max. Air Pressure:	120 psi (8.3 bar)
Max. Solids:	1/8" (3.2 mm)
Max. Suction Lift Dry:	15 ft-H ₂ O (4.5 m-H ₂ O)
Max. Suction Lift Wet:	31 ft-H ₂ O (9.4 m-H ₂ O)
Weight:	AL-10 lbs (4.5 kg)/SS-20 lbs (9.1 kg)
Air Inlet:	1/4" FNPT
Liquid Inlet:	1/2" FNPT/BSP
Liquid Outlet:	1/2" FNPT/BSP
Height:	11.2" (284 mm)
Width:	10.3" (262 mm)
Depth:	6.4" (163 mm)**

Performance Specifications

Max. Flow:	15 gpm (56.8 lpm)
Max. Air Pressure:	120 psi (8.3 bar)
Max. Solids:	1/8" (3.2 mm)
Max. Suction Lift Dry:	15 ft-H ₂ O (4.5 m-H ₂ O)
Max. Suction Lift Wet:	31 ft-H ₂ O (9.4 m-H ₂ O)
Weight:	AL-10 lbs (4.5 kg)/SS-20 lbs (9.1 kg)
Air Inlet:	1/4" FNPT
Liquid Inlet:	1/2" FNPT/BSP
Liquid Outlet:	1/2" FNPT/BSP
Height:	11.2" (284 mm)
Width:	10.3" (262 mm)
Depth:	6.4" (163 mm)**

Performance Specifications

Max. Flow:	13 gpm (49.2 lpm)
Max. Air Pressure:	120 psi (8.3 bar)
Max. Solids:	1/8" (3.2 mm)
Max. Suction Lift Dry:	14 ft-H ₂ O (4.3 m-H ₂ O)
Max. Suction Lift Wet:	31 ft-H ₂ O (9.4 m-H ₂ O)
Weight:	AL-10 lbs (4.5 kg)/SS-20 lbs (9.1 kg)
Air Inlet:	1/4" FNPT
Liquid Inlet:	1/2" FNPT/BSP
Liquid Outlet:	1/2" FNPT/BSP
Height:	11.2" (284 mm)
Width:	10.3" (262 mm)
Depth:	6.4" (163 mm)**

*Flow rates indicated on all three charts shown were determined by pumping water at flooded suction, using an aluminum intermediate fitted pump. For optimum life and performance, pumps should be specified so that daily operation parameters will fall in the center of the pump performance curve. **Polypropylene intermediate is 7.3" (185mm) deep.

Installation, Troubleshooting and Maintenance

Installation

Piping

Whenever possible ensure the pump is installed using the shortest possible pipe lengths with the minimum amount of pipe fittings. Ensure all piping is supported independent of the pump.

Suction and discharge piping should not be smaller than the connection size of the pump. When pumping liquids of high viscosity, larger piping may be used, in order to reduce frictional pipe loss.

Employ flexible hoses in order to eliminate the vibration caused by the pump. Mounting feet can also be used to reduce vibration effects.

All hoses should be reinforced, non-collapsible and be capable of high vacuum service. Ensure that all piping and hoses are chemically compatible with the process and cleaning fluid.

For processes where pulsation effects should be reduced, employ a pulsation dampener on the discharge side of the pump.

For self-priming applications, ensure all connections are airtight and the application is within the pumps dry-lift capability. Refer to product specifications for further details.

For flooded suction applications, install a gate valve on the suction piping in order to facilitate service.

For unattended flooded suction operation, it is recommended to pipe the exhaust air above the liquid source. In the event of a diaphragm failure this will reduce or eliminate the possibility of liquid discharging through the exhaust onto the ground.

Location

Ensure that the pump is installed in an accessible location, in order to facilitate future service and maintenance.

Air

Ensure that the air supply is sufficient for the volume of air required by the pump. Refer to product specifications for further details. For reliable operation, install a 5 micron air filter, air-valve and pressure regulator. Do not exceed the pumps maximum operating pressure of 120 psig.

Remote Operation

Utilize a three way solenoid valve for remote operation. This ensures that air between the solenoid and the pump is allowed to “bleed off,” ensuring reliable operation. Liquid transfer volume is estimated by multiplying displacement per stroke times the number of strokes per minute

Noise

Correct installation of the muffler reduces sound levels. Refer to product specifications for further details.

Submerged Operation

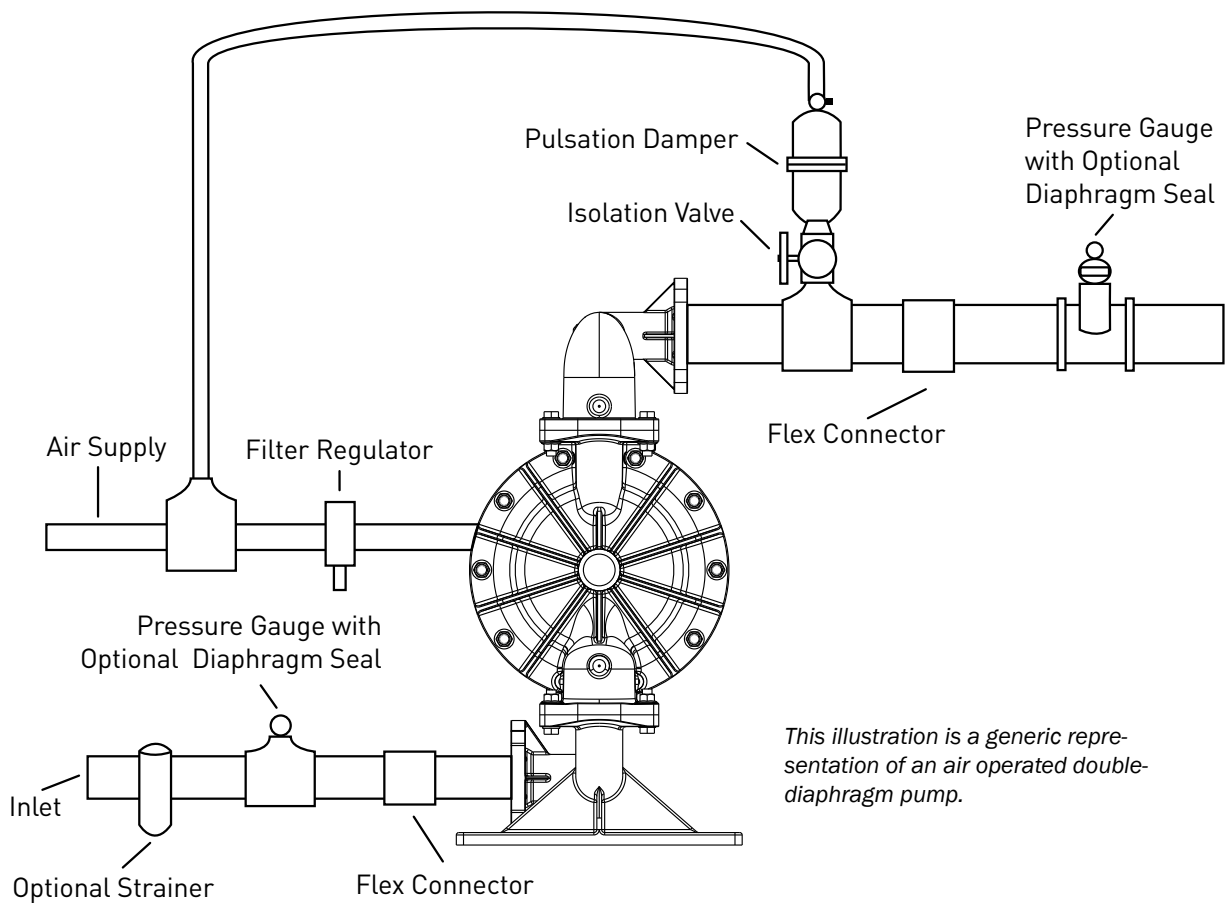
For submersible operation, pipe the air exhaust to atmosphere

Grounding the Pump

Loosen grounding screw and install a grounding wire. Tighten grounding screw. Wire size should be a 12 gauge wire or larger. Connect the other end of the wire to a true earth ground. Equipment must be grounded to achieve ATEX rating and it is recommended to configure the pump with a grounding lug option.



Suggested Installation



Troubleshooting

Problem	Effect/Solution
Pump Will Not Cycle	<ul style="list-style-type: none"> Discharge line closed or plugged Discharge filter blocked Check valve stuck Air filter blocked Air supply valve closed Air supply hooked up to muffler side of pump Compressor not producing air or turned off Muffler iced or blinded Diaphragm ruptured Plant air supply line ruptured Air valve wear/debris Pilot sleeve wear/debris Diaphragm rod broken Diaphragm plate loose
Pumped Fluid Coming Out of Muffler	<ul style="list-style-type: none"> Diaphragm ruptured Diaphragm plate loose Inlet liquid pressure excessive (above 10 psig)
Pump Cycles but no Flow	<ul style="list-style-type: none"> Inlet strainer clogged Suction valve closed Suction line plugged No liquid in the suction tank Suction lift excessive Debris stuck in valves Excessive wear of check valves Air leak on suction side with suction lift
Pump Cycles with Closed Discharge Valve	<ul style="list-style-type: none"> Debris stuck in check valve Excessive wear of check valves
Pump Running Slowly/Not Steady	<ul style="list-style-type: none"> Air compressor undersized Leak in air supply Air-line, filter regulator or needle valve undersized Muffler partially iced or blinded Air valve gasket leak or misalignment Air valve wear/debris Pilot sleeve wear/debris Liquid fluid filter blocked Pump may be cavitating, reduce speed of operation Suction strainer clogged
Pump Will Not Prime	<ul style="list-style-type: none"> Air leak in suction pipe Air leak in pump manifold connections Suction strainer and lines clogged Excessive lift conditions Check valve wear Debris in check valve

Operation

The Air-Operated Double Diaphragm Pump requires a minimum of 20 psig of air to operate, with some variation according to diaphragm material. Increasing the air pressure results in a more rapid cycling of the pump and thus a higher liquid flow rate. In order to not exceed 120 psig of inlet air pressure, and for accurate control of the pump, it is suggested to use a pressure regulator on the air inlet.

An alternate means of controlling the flow-rate of the pump is to use an inlet air valve and partially open or close accordingly. When the air valve is completely in the closed position, the pump will cease to operate.

A third method of controlling the flow rate of the pump is to use a liquid discharge valve. Closing the liquid discharge valve will cause a decrease in the flow rate since the pump will operate against a higher discharge pressure.


Solenoid control of the inlet air may also be used in order to facilitate remote operation. A three way solenoid valve is recommended, in order to allow the air to "bleed off" between the solenoid and the pump.

Do not use valves for flow control on the suction side of the pump. (Closing or partially closing a liquid suction valve restrict the suction line and may cause damage to the diaphragms.) Suction strainers may be employed to reduce or eliminate larger solids, but routine maintenance is necessary in order to prevent a restriction on the suction.

Maintenance

Due to the unique nature of each application, periodic inspection of the pump is the best method to determine a proper maintenance schedule. A record should be kept of all repairs made to an installed pump. This will serve as the best predictor of future maintenance.

Typical maintenance involves replacing of "wear-parts" such as the diaphragms, balls, valve seats and o-rings. Proper maintenance can ensure trouble-free operation of the pump. Refer to repair and assembly instructions for further details.

 **WARNING** Maintenance must not be performed when a hazardous atmosphere is present.

Maintenance Schedule

Weekly (or daily)

Make a visual check of the pump. If pumped fluid is leaking out of the pump, pipe fittings or muffler turn off pump and schedule maintenance.

Every three months

Inspect fasteners and tighten any loose fasteners to recommended torque settings.

Schedule pump service based on pump's service history.

Repair and Assembly

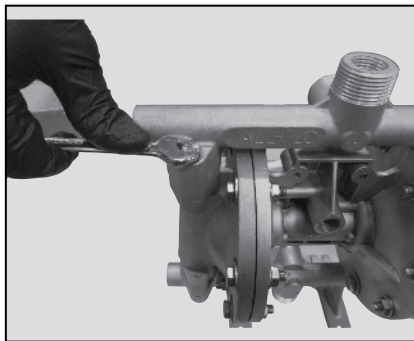
Pump wet end removal

Required Tools

- 1) One Wrench, $\frac{7}{16}$ Inch
- 2) Two Wrenches, $\frac{1}{2}$ Inch
- 3) Two Wrenches, $\frac{3}{4}$ Inch
- 4) One Screwdriver, Slotted Head

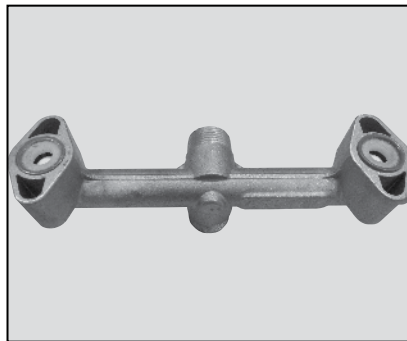
⚠ WARNING Prior to servicing the pump, ensure that the air and fluid lines are closed and disconnected. While wearing personal protective equipment, flush, drain and process liquid from the pump in a safe manner.

⚠ WARNING Maintenance must not be performed when a hazardous atmosphere is present.



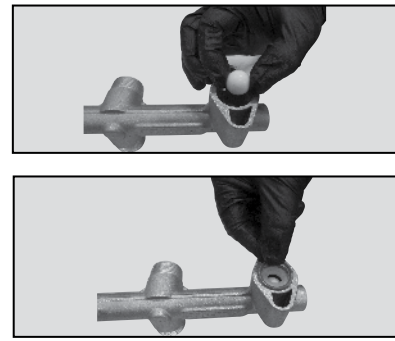
STEP 1

Using the $\frac{7}{16}$ inch wrench remove four "Hex-Head Cap Screws ($\frac{1}{4}$ "-20 x 1- $\frac{3}{4}$ ")" and four "Flat Washers ($\frac{1}{4}$ ")" from the "Discharge Manifold"



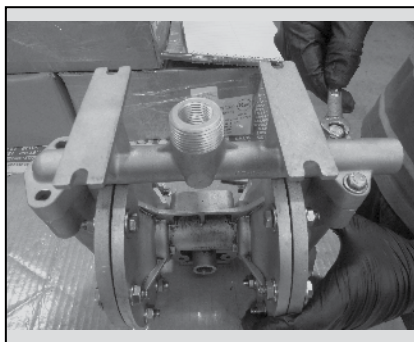
STEP 2

Remove the "Discharge Manifold".



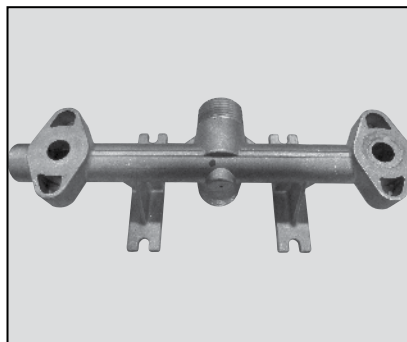
STEP 3

Remove the "Ball", "Valve Seat" and "O-Ring" from the "Discharge Manifold".



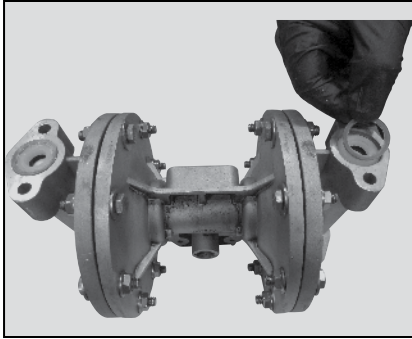
STEP 4

Using the $\frac{7}{16}$ inch wrench remove four "Hex-Head Cap Screws ($\frac{1}{4}$ "-20 x 1- $\frac{3}{4}$ ")" and four "Flat Washers ($\frac{1}{4}$ ")" from the "Suction Manifold".



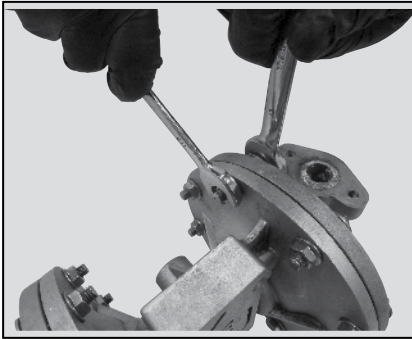
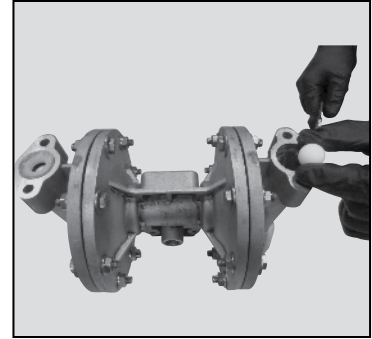
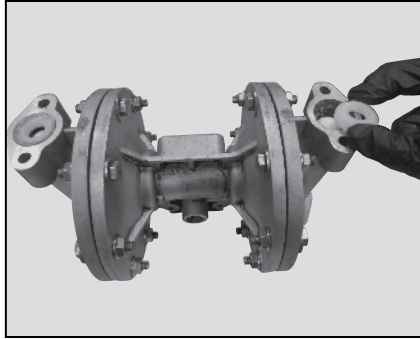
STEP 5

Remove the "Suction Manifold".



STEP 6

Remove the "O-Ring", "Valve Seat" and "Ball" from the "Suction Manifold".



STEP 7

In order to remove both "Outer Chambers", using two 1/2 inch wrenches, remove eight "Hex Head Cap Screws (5/16" - 18 x 1-3/8")" and eight "Hex Flange Nuts (5/16" - 18)".



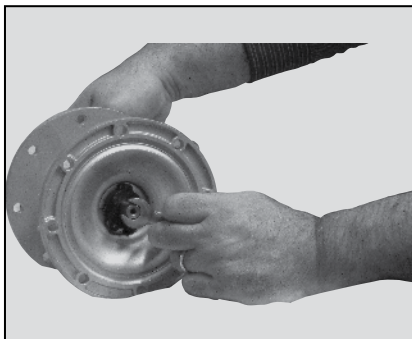
STEP 8

Remove both "Outer Chambers" from the "Intermediate".



STEP 9

Using two 3/4 Inch wrenches, remove "Outer Diaphragm Plate", "Diaphragm", "Inner Diaphragm Plate" and "Flat Washer (1/4")" from one side of the pump.



STEP 10

Placing the 3/4 inch wrench on the remaining "Outer Diaphragm Plate", and the 7/16 inch wrench on the "Diaphragm Rod Assembly", remove the remaining "Outer Diaphragm Plate", "Diaphragm", "Inner Diaphragm Plate" and "Flat Washer (1/4")" from the other side of the pump.

To assemble the wet end of the pump, reverse the order of disassembly. Ensure all hardware is fastened in accordance with torque specifications (see page 18). Inverting one of the diaphragms during reassembly will facilitate ease of assembly.

Repair and Assembly

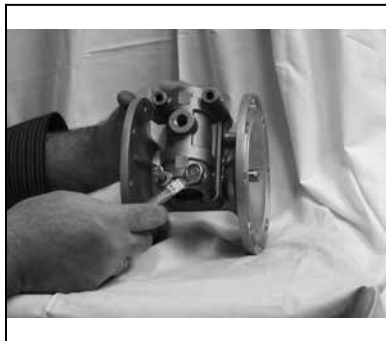
Air Valve Removal

Required Tools

- 1) One Wrench, $\frac{7}{16}$ Inch
- 2) One Pick, General Purpose
- 3) One Pair of Pliers

⚠ WARNING Prior to servicing the pump, ensure that the air and fluid lines are closed and disconnected. While wearing personal protective equipment, flush, drain and process liquid from the pump in a safe manner.

⚠ WARNING Maintenance must not be performed when a hazardous atmosphere is present.



STEP 1

Using the $\frac{7}{16}$ inch wrench, remove four "Hex Head Cap Screws (1/4"-20 x 3")" and four flat washers (1/4").



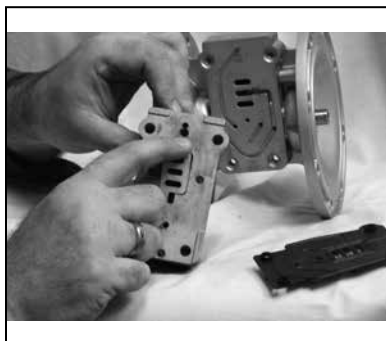
STEP 2

Remove the main "Air-Valve Assembly" from the pump.



STEP 3

Remove the "Air-Valve Gasket" from the main "Air-Valve Assembly".



STEP 4

Remove the "Shuttle Plate" from the main "Air-Valve Assembly".



STEP 5

Remove the "Shuttle" from the main "Air-Valve Assembly".



STEP 6

Using the pair of pliers, remove the "Air Valve End Plug" from the main "Air-Valve Assembly".



STEP 7

Remove the "Air Valve Spool" from the main "Air-Valve Assembly".



STEP 8

Using the pick, remove the "Lip Seal (Air Valve)" from the main "Air-Valve Assembly".



STEP 9

Using the pick, remove the second "Lip Seal (Air Valve)" from the main "Air-Valve Assembly".

To assemble the air valve, reverse the order of disassembly. During assembly, ensure that the open side of the lip-seals are both facing each other inward. Lubrication of the air valve assembly, with a non-synthetic lubricant, is recommended in order to facilitate re-assembly into the intermediate. Lubrication is not necessary for pump operation. Magna-Lube or Magna-Plate are recommended for assembly lubrication (see detailed parts list for ordering information).

Note that if the lip-seals are installed incorrectly, they will be unable to rotate. Insert the spool, hole side first. Then install the air-valve end plug in the bottom of the Air-Valve Assembly.

Repair and Assembly

Pilot Valve Removal

Required Tools

- 1) One Screwdriver, Phillips
- 2) Two Wrenches, $\frac{7}{16}$ Inch

⚠ WARNING Prior to servicing the pump, ensure that the air and fluid lines are closed and disconnected. While wearing personal protective equipment, flush, drain and process liquid from the pump in a safe manner.

⚠ WARNING Maintenance must not be performed when a hazardous atmosphere is present.



STEP 1

Using the screwdriver, remove three “Phillips Flat-Head Mach Screws (#6-32 x 7/16)” in order to remove the “Retaining Plate”. Repeat for both sides of the pump.



STEP 2

Remove the diaphragm rod and the pilot sleeve assembly from the “Intermediate”.



STEP 3

Remove both “Lip Seals (Diaphragm Rod)” and both “End Spacers (Pilot Sleeve)” from the pilot sleeve assembly. Remove both “O-Rings (End Spacer)” from both “End Spacers (Pilot Sleeve)”.



STEP 4

Remove three “Inner Spacers (Pilot Sleeve)” and four “O-Rings (Pilot Sleeve)” from the pilot sleeve assembly.



STEP 5

Using two $\frac{7}{16}$ inch wrenches, disassemble the “Diaphragm Rod Assembly” into its two parts.



STEP 6

Remove the “Pilot Sleeve” from the disassembled “Diaphragm Rod Assembly”.

To assemble the pilot valve, reverse the order of disassembly. Should process fluid have contact with the pilot valve o-rings, they should be replaced as swelling may occur and cause irregular operation. During assembly, ensure that the open side of the lip-seals are facing outward. Lubrication of the pilot sleeve assembly, with a non-synthetic lubricant, is recommended in order to facilitate re-assembly into the intermediate. Magna-Lube or Magna-Plate are recommended for assembly lubrication (see detailed parts list for ordering information).

TORQUE SPECIFICATION CHART

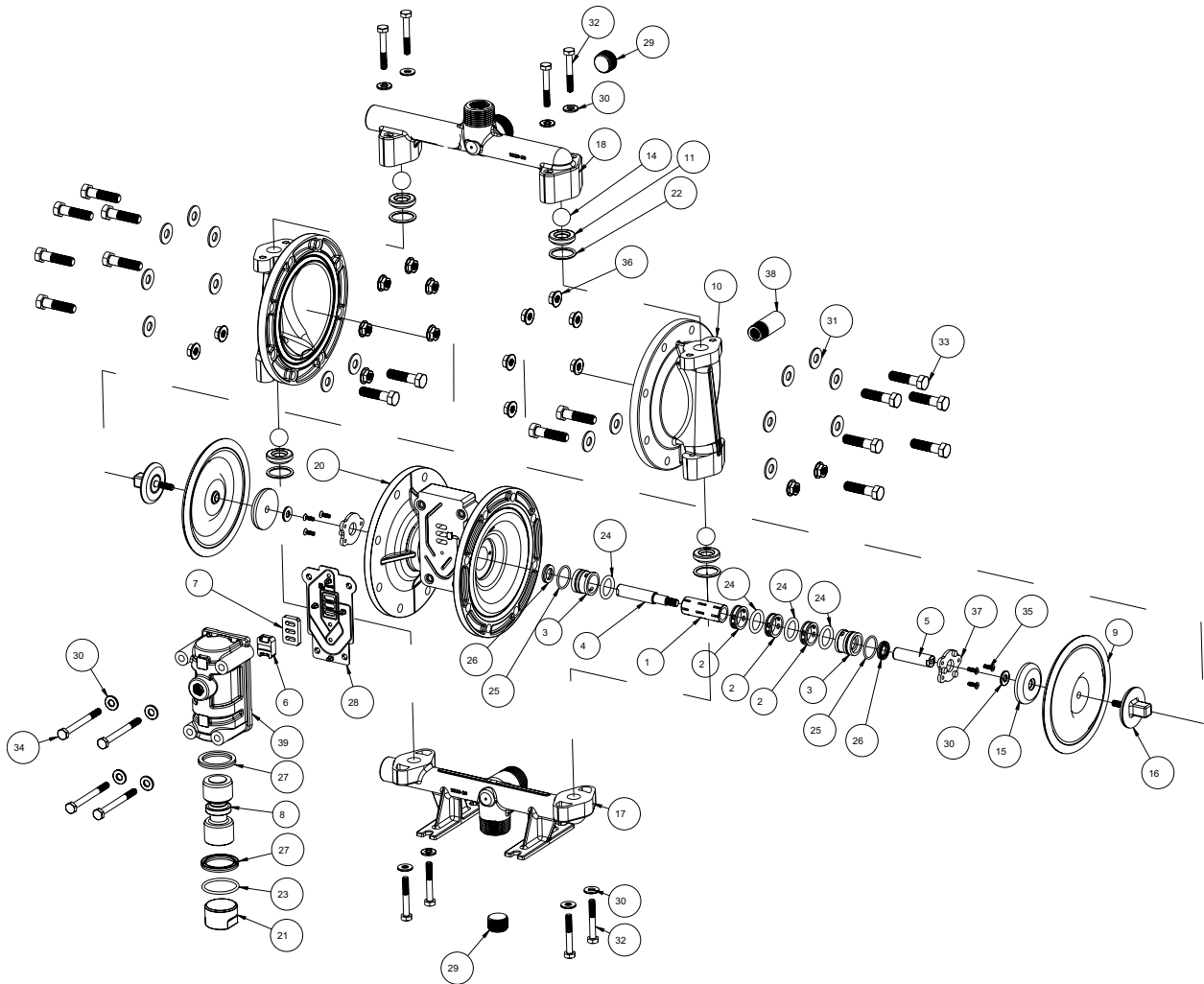
MAXIMUM TORQUE SPECIFICATIONS (G2)

	1/2" Pumps	Wrench Size
Manifold Bolts	78 in-lbs (8.8 N-m)	7/16"
Chamber Bolts	85 in-lbs (9.6 N-m)	1/2"
Air Valve Bolts	40 in-lbs (4.5 N-m)	7/16"
Diaphragm plate	70 in-lbs (7.9 N-m)	3/4"
Diaphragm plate (PTFE)	70 in-lbs (7.9 N-m)	3/4"

IN/FT-LBS (N•m)

Exploded View & Parts List

Aluminum and Stainless Steel Pumps with Aluminum Center Section



Parts List

ITEM	DESCRIPTION	QTY	PUMP MODEL	PART NO.	MATERIAL
1	Pilot Sleeve	1	ALL MODELS	10105-31	Acetel
2	Inner Spacer (Pilot Sleeve)	3	ALL MODELS	10203-40	Polypro
3	End Spacer (Pilot Sleeve)	2	ALL MODELS	10204-40	Polypro
4	Diaphragm Rod (long)	1	ALL MODELS	see assembly	SS
5	Diaphragm Rod (short)	1	ALL MODELS	see assembly	SS
4 & 5	Diaphragm Rod Assembly	1	ALL MODELS	33000-00	SS
6	Shuttle	1	ALL MODELS	10415-00	Special
7	Shuttle Plate	1	ALL MODELS	10416-77	Ceramic
8	Air Valve Spool	1	ALL MODELS	10480-31	Acetel
9	Diaphragm	2	LI50-***-C***-***	10600-19	Geolast
			LI50-***-S***-***	10600-23	Santo
			LI50-***-T***-***	10600-23	Santo
			LI50-***-N***-***	10600-21	Nitrile
			LI50-***-E***-***	10600-15	EPDM
			LI50-***-V***-***	10600-13	Viton
10	Outer Chamber	2	LI50-**A-****-***	10720-20	AL
			LI50-**3-****-***	10720-26	SS
11	Valve Seat	4	LI50-***-**3*-***	10900-26	SS
			LI50-***-**A*-***	10900-20	AL
			LI50-***-**P*-***	10900-40	Polypro
			LI50-***-**K*-***	10900-56	PVDF
			LI50-***-**Y*-***	10900-42	Nylon
12	Future Option				
13	Future Option				
14	Ball	4	LI50-***-G**-*	11000-11	Geolast
			LI50-***-V**-*	11000-13	Viton
			LI50-***-S**-*	11000-23	Santo
			LI50-***-3**-*	11000-26	SS
			LI50-***-N**-*	11000-21	Nitrile
			LI50-***-E**-*	11000-15	EPDM
			LI50-***-T**-*	11000-45	PTFE
15	Inner Diaphragm Plate	2	ALL MODELS	11100-40	Polypro
16	Outer Diaphragm Plate	2	LI50-**A-****-***	11208-20	AL
			LI50-**3-****-***	11208-26	SS
17	Suction Manifold	1	LI50-N*A-****-0**	11328-20-NPT	AL
			LI50-B*A-****-0**	11328-20-BSP	AL
			LI50-N*3-****-0**	11328-26-NPT	SS
			LI50-B*3-****-0**	11328-26-BSP	SS
18	Discharge Manifold	1	LI50-N*A-****-0**	11329-20-NPT	AL
			LI50-B*A-****-0**	11329-20-BSP	AL
			LI50-N*3-****-0**	11329-26-NPT	SS
			LI50-B*3-****-0**	11329-26-BSP	SS
19	Overlay (optional)	2	LI50-***-T***-***	11400-59	PTFE
20	Intermediate	1	LI50-*A*-****-***	11527-20	AL
21	Air Valve End Plug	1	LI50-*A*-****-***	11706-20	AL
22	O-Ring (Valve Seat)	4	LI50-***-***N-***	11904-11	Nitrile
			LI50-***-***V-***	11904-13	Viton
			LI50-***-***E-***	11904-15	EPDM
			LI50-***-***T-***	11904-17	PTFE

Parts List (con't)

ITEM	DESCRIPTION	QTY	PUMP MODEL	PART NO.	MATERIAL
23	O-Ring (Air Valve End Plug)	1	ALL MODELS	11913-11	Nitrile
24	O-Ring (Pilot Sleeve)	4	ALL MODELS	11920-16	Urethane
25	O-Ring (End Spacer)	2	ALL MODELS	11923-11	Nitrile
26	Lip Seal (Diaphragm Rod)	2	ALL MODELS	12000-76	Nitrile
27	Lip Seal (Air Valve)	2	ALL MODELS	12003-76	Nitrile
28	Air Valve Gasket	1	ALL MODELS	12126-19	Nitrile
29	Pipe Plug	2	LI50-N*A-****_***	12255-20-NPT	AL
			LI50-B*A-****_***	12255-20-BSP	AL
			LI50-N*3-****_***	12255-26-NPT	SS
			LI50-B*3-****_***	12255-26-BSP	SS
30	Flat Washer (1/4")	2	LI50-*AA-****_***	12300-26	SS
			LI50-*AA-****_***	12300-25	PS
			LI50-*A3-****_***	12300-26	SS
31	Washer (5/16")	16	LI50-*AA-****_***	12314-25	PS
			LI50-*A3-****_***	12314-26	SS
32	Hex Head Cap Screw (1/4"-20 x 1.75")	8	LI50-*AA-****_***	12500-25	PS
			LI50-*A3-****_***	12500-26	SS
33	Hex Head Cap Screw (3/8"-16 x 1-3/8")	16	LI50-*AA-****_***	12546-25	PS
			LI50-*A3-****_***	12546-26	SS
34	Hex Head Cap Screw (1/4"-20 x 2.75")	4	LI50-*AA-****_***	12576-25	PS
			LI50-*A3-****_***	12576-26	SS
35	Phillips Flat-Head Mach Screw (#6-32 x 7/16)	6	ALL MODELS	12578-26	SS
36	Hex Flange Nut (5/16"-18)	16	LI50-*AA-****_***	12608-25	PS
			LI50-*A3-****_***	12608-26	SS
37	Retaining Plate	2	ALL MODELS	12708-40	Polypro
38	Muffler	1	ALL MODELS	13008-00	Standard
	Muffler (Metal)		Optional	13002-00	Metal
39	Air Valve Body	1	LI50-*A*-****_***	42001-20	AL
6, 7, 8, 21, 23, 27, 28, 39	Air Valve Assembly	1	LI50-*A*-****_***	42005-20	Various
1, 2, 3, 24, 26, 25	Pilot Sieve Assembly	1	LI50-*A*-****_***	41000-00	Various
	Magnalube® .75 oz.	As Required	ALL MODELS	13404-00	Grease

* Any Character

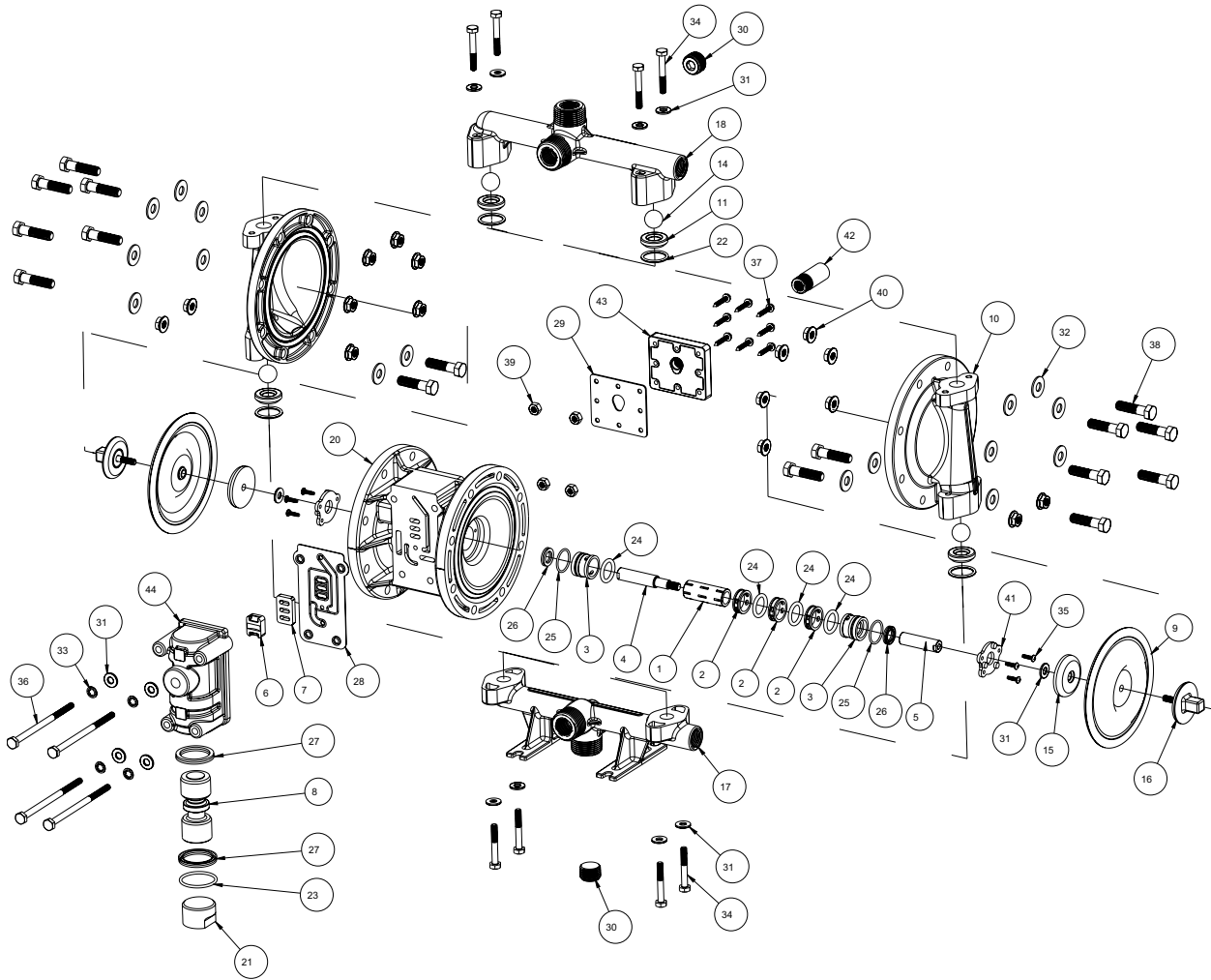
Drum Pump Kits

Kits consist of bung adaptor and suction tube

DESCRIPTION	PART NUMBER
Kit for 1/2" Alumimum Pump with BSP Connection	ADK-050-B-A
Kit for 1/2" Alumimum Pump with NPT Connection	ADK-050-N-A
Kit for 1/2" Stainless Steel Pump with BSP Connection	ADK-050-B-S
Kit for 1/2" Stainless Steel Pump with NPT Connection	ADK-050-N-S

Exploded View & Parts List

Aluminum and Stainless Steel Pumps with Plastic Center Section



Parts List

ITEM	DESCRIPTION	QTY	PUMP MODEL	PART NO.	MATERIAL
1	Pilot Sleeve	1	ALL MODELS	10105-31	Acetel
2	Inner Spacer (Pilot Sleeve)	3	ALL MODELS	10203-40	Polypro
3	End Spacer (Pilot Sleeve)	2	ALL MODELS	10204-40	Polypro
4	Diaphragm Rod (long)	1	ALL MODELS	see assembly	SS
5	Diaphragm Rod (short)	1	ALL MODELS	see assembly	SS
4 & 5	Diaphragm Rod Assembly	1	ALL MODELS	33000-00	SS
6	Shuttle	1	ALL MODELS	10415-00	Special
7	Shuttle Plate	1	ALL MODELS	10416-77	Ceramic
8	Air Valve Spool	1	ALL MODELS	10480-31	Acetel
9	Diaphragm	2	LI50-***-C***-***	10600-19	Geolast
			LI50-***-S***-***	10600-23	Santo
			LI50-***-T***-***	10600-23	Santo
			LI50-***-N***-***	10600-21	Nitrile
			LI50-***-E***-***	10600-15	EPDM
			LI50-***-V***-***	10600-13	Viton
10	Outer Chamber	2	LI50-**A-****-***	10720-20	AL
			LI50-**3-****-***	10720-26	SS
11	Valve Seat	4	LI50-***-**3*-***	10900-26	SS
			LI50-***-**A*-***	10900-20	AL
			LI50-***-**P*-***	10900-40	Polypro
			LI50-***-**K*-***	10900-56	PVDF
			LI50-***-**Y*-***	10900-42	Nylon
12	Future Option				
13	Future Option				
14	Ball	4	LI50-***-*G**-*	11000-11	Geolast
			LI50-***-*V**-*	11000-13	Viton
			LI50-***-*S**-*	11000-23	Santo
			LI50-***-*3**-*	11000-26	SS
			LI50-***-*N**-*	11000-21	Nitrile
			LI50-***-*E**-*	11000-15	EPDM
			LI50-***-*T**-*	11000-45	PTFE
15	Inner Diaphragm Plate	2	ALL MODELS	11100-40	Polypro
16	Outer Diaphragm Plate	2	LI50-**A-****-***	11208-20	AL
			LI50-**3-****-***	11208-26	SS
17	Suction Manifold	1	LI50-N*A-****-0**	11328-20-NPT	AL
			LI50-B*A-****-0**	11328-20-BSP	AL
			LI50-N*3-****-0**	11328-26-NPT	SS
			LI50-B*3-****-0**	11328-26-BSP	SS
18	Discharge Manifold	1	LI50-N*A-****-0**	11329-20-NPT	AL
			LI50-B*A-****-0**	11329-20-BSP	AL
			LI50-N*3-****-0**	11329-26-NPT	SS
			LI50-B*3-****-0**	11329-26-BSP	SS
19	Overlay (optional)	2	LI50-***-T***-***	11400-59	PTFE
20	Intermediate	1	LI50-*P*-****-***	11521-60	Polypro
21	Air Valve End Plug	1	LI50-*P*-****-***	11703-60	Polypro
22	O-Ring (Valve Seat)	4	LI50-***-***N-***	11904-11	Nitrile
			LI50-***-***V-***	11904-13	Viton
			LI50-***-***E-***	11904-15	EPDM
			LI50-***-***T-***	11904-17	PTFE

Parts List (con't)

ITEM	DESCRIPTION	QTY	PUMP MODEL	PART NO.	MATERIAL	
23	O-Ring (Air Valve End Plug)	1	ALL MODELS	11913-11	Nitrile	
24	O-Ring (Pilot Sleeve)	4	ALL MODELS	11920-16	Urethane	
25	O-Ring (End Spacer)	2	ALL MODELS	11923-11	Nitrile	
26	Lip Seal (Diaphragm Rod)	2	ALL MODELS	12000-76	Nitrile	
27	Lip Seal (Air Valve)	2	ALL MODELS	12003-76	Nitrile	
28	Air Valve Gasket	1	ALL MODELS	12116-19	Nitrile	
29	Gasket, 1/2" Bolted Muffler Plate	1	LI50-*P*-****_***	12117-19	Nitrile	
30	Pipe Plug	2	LI50-N*A-****_***	12255-20-NPT	AL	
			LI50-B*A-****_***	12255-20-BSP	AL	
			LI50-N*3-****_***	12255-26-NPT	SS	
			LI50-B*3-****_***	12255-26-BSP	SS	
31	Flat Washer (1/4")	2	LI50-*AA-****_***	12300-26	SS	
			12	LI50-*AA-****_***	12300-25	PS
			14	LI50-*A3-****_***	12300-26	SS
32	Washer (5/16")	16	LI50-*AA-****_***	12314-25	PS	
			LI50-*A3-****_***	12314-26	SS	
33	1/4" Lock Washer	4	LI50-*P*-****_***	12350-26	SS	
34	Hex Head Cap Screw (3/8"-16 x 1-3/8")	8	LI50-*PA-****_***	12500-25	PS	
			LI50-*P3-****_***	12500-26	SS	
35	Phillips Flat-Head Mach Screw (#6-32 x 7/16)	6	ALL MODELS	12510-26	SS	
36	Hex Head Cap Screw (1/4"-20 x 2.75")	4	LI50-*PA-****_***	12513-25	PS	
			LI50-*P3-****_***	12513-26	SS	
37	Slotted Washer-Head Self Tap #8 X 1" Screw	8	LI50-*P*-****_***	12525-26	SS	
38	Hex Head Cap Screw (3/8-16 x 1-3/8")	16	LI50-*PA-****_***	12546-25	PS	
			LI50-*P3-****_***	12546-26	SS	
39	Hex Nut, Standard, 1/4-20	4	LI50-*PA-****_***	12600-20	PS	
			LI50-*PS-****_***	12600-26	SS	
0	Hex Flange Nut (5/16"-18)	16	LI50-*PA-****_***	12608-25	PS	
41	Retaining Plate	2	ALL MODELS	12708-40	Polypro	
42	Muffler	1	ALL MODELS	13008-00	Standard	
	Muffler (Metal)		Optional	13002-00	Metal	
43	Muffler Plate	1	LI50-*P*-****_***	13111-60	Polypro	
44	Air Valve Body	1	LI50-*P*-****_***	42001-60	Various	
6, 7, 8, 21, 23, 27, 28, 44	Air Valve Assembly	1	LI50-*A*-****_***	42005-60	Various	
1, 2, 3, 24, 25, 26	Pilot Sieve Assembly	1	LI50-*A*-****_***	41000-00	Various	
	Magnalube® .75 oz.	As Required	ALL MODELS	13404-00	Grease	

* Any Character

Drum Pump Kits

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Kit for 1/2" Alumimum Pump with NPT Connection	ADK-050-N-A
Kit for 1/2" Stainless Steel Pump with BSP Connection	ADK-050-B-S
Kit for 1/2" Stainless Steel Pump with NPT Connection	ADK-050-N-S

Elastomers & Repair Kits

BUNA-N (NITRILE)

is a general purpose elastomer used with water and many oils. Temperature range 10°F to 180°F (-12C to 82C).

GEOLAST®

is an injection molded thermoplastic material with characteristics similar to Nitrile. Has excellent abrasion resistance. Temperature range 10°F to 180°F (-12C to 82C).

EPDM

is a general purpose elastomer with good resistance to many acids and bases. Temperature range -40°F to 280°F (-40C to 138C).

SANTOPRENE®

is an injection molded material with characteristics similar to EPDM. Has excellent abrasion resistance. Temperature range -40°F to 225°F (-40C to 107C).

VITON®

is an elastomer with good corrosion resistance to a wide variety of chemicals. Temperature range -40°F to 350°F (-40C to 177C).

FKM

is an elastomer with good corrosion resistance to a wide variety of chemicals. Similar in chemical resistance to Viton®. Temperature range -40°F to 350°F (-40C to 177C).

PTFE (POLYTETRAFLUOROETHYLENE)

is a thermoplastic polymer that is inert to most chemicals. Similar in chemical resistance to Teflon®. Temperature range 40°F to 220°F (4C to 104C).

Most of the above elastomers are available in FDA approved formulations.

Viton® is a registered trademark of DuPont Performance Elastomers L.L.C.
Geolast® is a registered trademark of ExxonMobil Chemical Co.
Santoprene® is a registered trademark of ExxonMobil Chemical Co.
Teflon® is a registered trademark of DuPont Performance Elastomers L.L.C.
MagnaLube® is a registered trademark of Carleton-Stuart Corp.



II 2 GD c TX

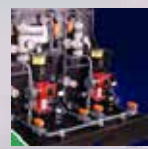
Warning: The TX marking refers to the maximum surface temperature depending not on the equipment itself, but mainly on operating conditions. In this case, the maximum surface temperature depends upon the temperature of the process fluids.



Accessories



Chemical Feed Systems



Measuring and Control Technology



Transfer Pumps



Metering Pumps



December 2015