

SERVICE & OPERATING MANUAL



Models 85622, 85623, 85626, 85637 1/2" Non-Metallic Air-Operated Double Diaphragm Pump

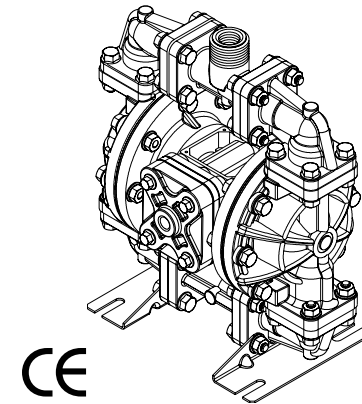
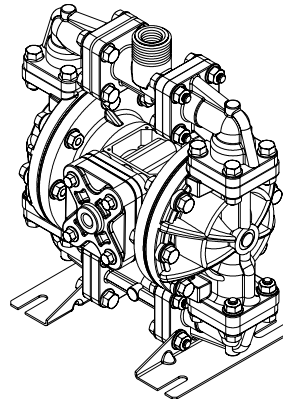


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Models 85622, 85623, 85626, 85637

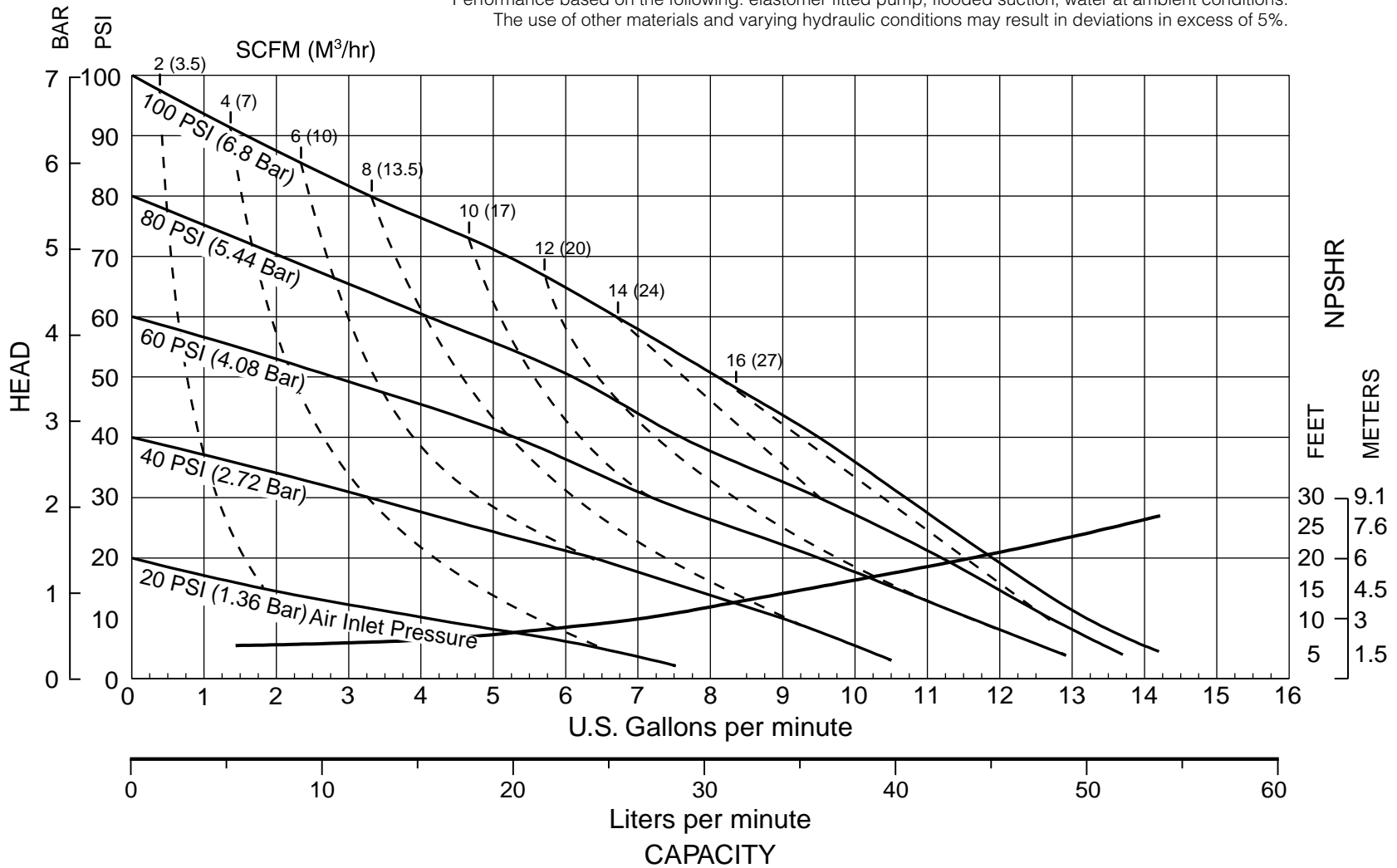
1/2" Non-Metallic Air-Operated Diaphragm Pump

ENGINEERING, PERFORMANCE
& CONSTRUCTION DATA

INTAKE/DISCHARGE PIPE SIZE 1/2" NPT(Internal) 1" NPT(External)	CAPACITY 0 to 14 gallons per minute (0 to 52 liters per minute)	AIR VALVE No-lube, no-stall design	SOLIDS-HANDLING Up to .125 in. (3mm)	HEADS UP TO 100 psi or 231 ft. of water (7 Kg/cm ² or 70 meters)	DISPLACEMENT/STROKE .026 Gallon / .098 liter
⚠ CAUTION! Operating temperature limitations are as follows:					
MATERIALS					
				Operating Temperatures	
				Maximum	Minimum
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
Polypropylene: Generally rugged and usually resistant to many chemicals solvents. Rugged and often stiffer than other plastics, economical.				180°F 82°C	-35°F 0°C
Buna N: 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

Performance Curve, Models 85622, 85623, 85626, 85637

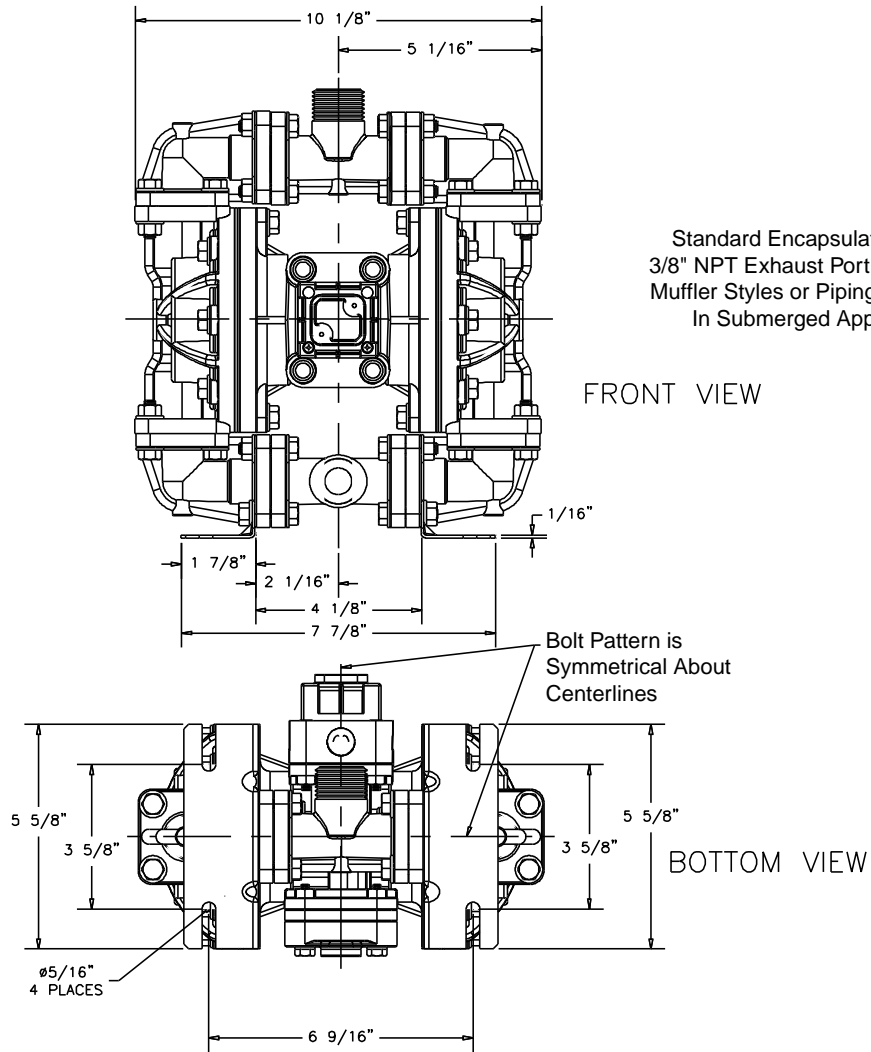
Performance based on the following: elastomer fitted pump, flooded suction, water at ambient conditions.
The use of other materials and varying hydraulic conditions may result in deviations in excess of 5%.



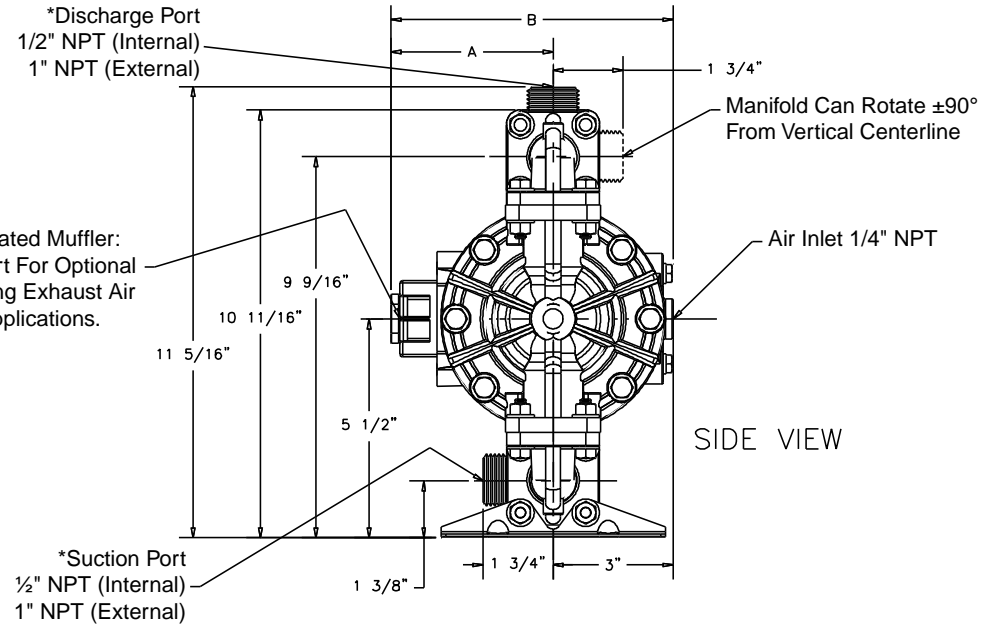
Dimensions

Dimensions in Inches

Dimensional tolerance: $\pm 1/8"$



Standard Encapsulated Muffler:
3/8" NPT Exhaust Port For Optional
Muffler Styles or Piping Exhaust Air
In Submerged Applications.

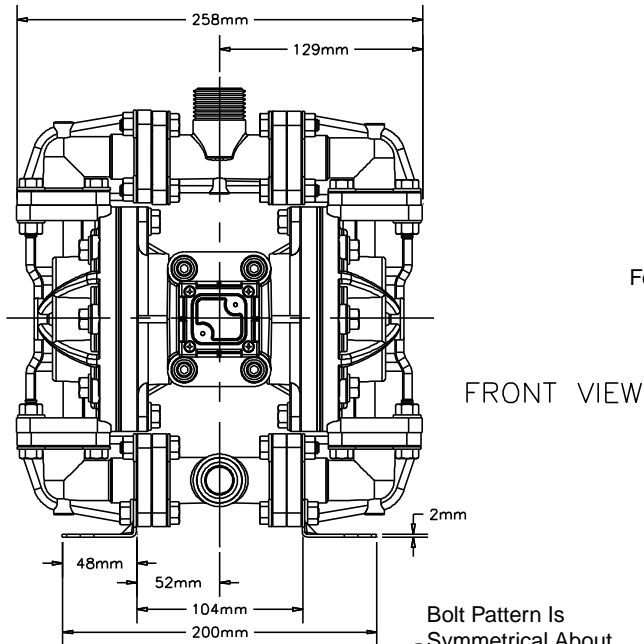


DIMENSION	A	B
Standard Pump	4 1/16"	7 1/16"

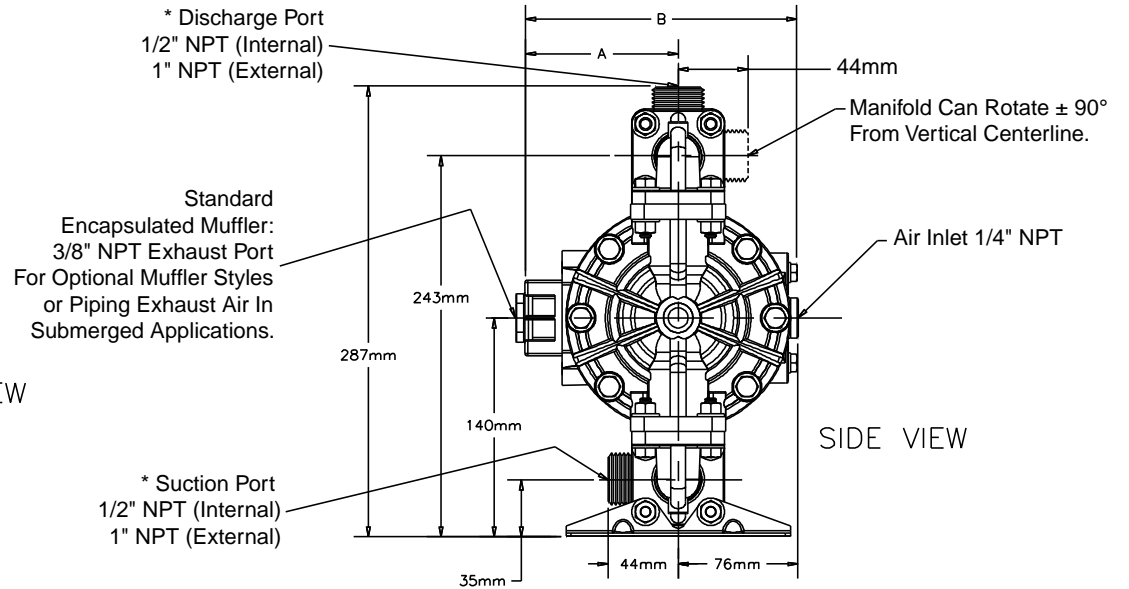
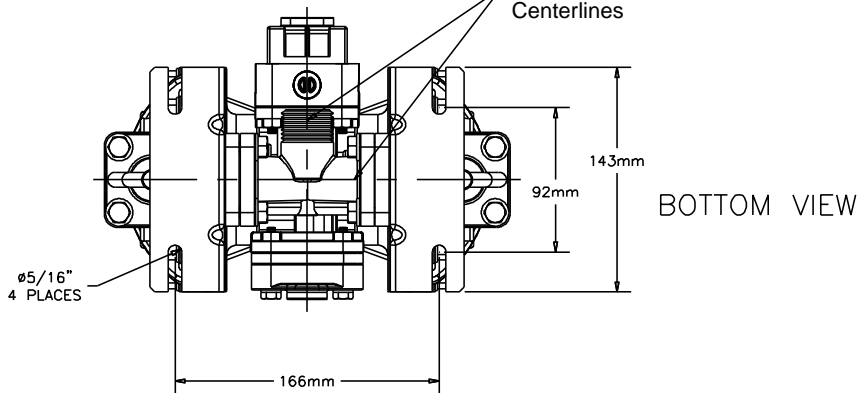
Metric Dimensions

Dimensions in millimeters

Dimensional tolerance: $\pm 3\text{mm}$



Bolt Pattern Is Symmetrical About Centerlines



* Discharge Port
1/2" NPT (Internal)
1" NPT (External)

Standard Encapsulated Muffler:
3/8" NPT Exhaust Port
For Optional Muffler Styles
or Piping Exhaust Air In
Submerged Applications.

* Suction Port
1/2" NPT (Internal)
1" NPT (External)

Manifold Can Rotate $\pm 90^\circ$
From Vertical Centerline.

Air Inlet 1/4" NPT

DIMENSION	A	B
Standard Pump	103mm	179mm

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 an 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 an 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.

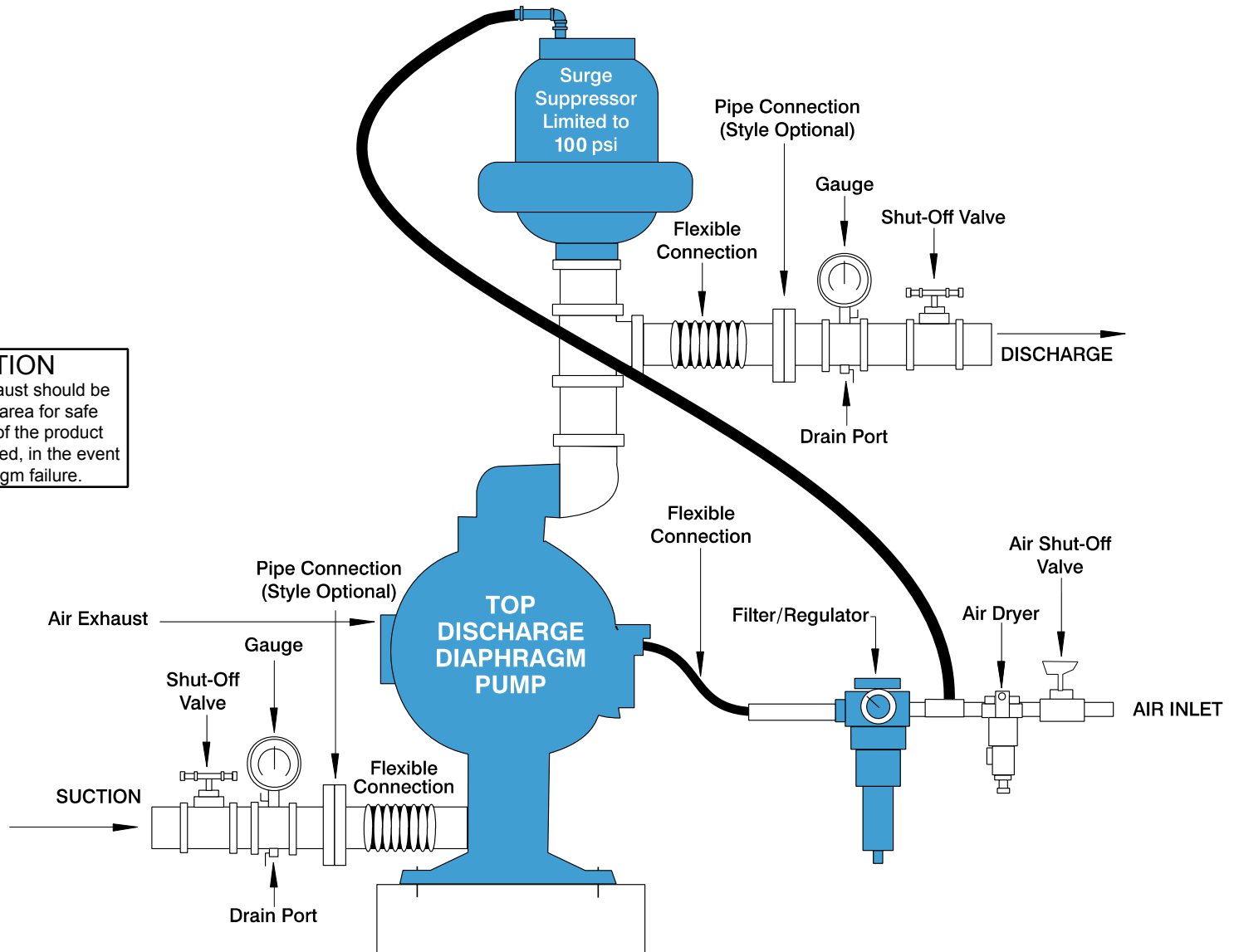
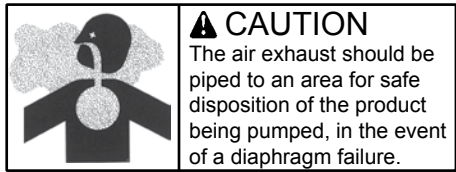
AIR INLET AND PRIMING

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



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 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! 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 technical services group for a service evaluation.

RECYCLING

Many components of LINCOLN Air-Operated Diaphragm pumps are made of recyclable materials (see chart on page 9 for material specifications). We encourage pump users to recycle worn out parts and pumps whenever possible, after any hazardous pumped fluids are thoroughly flushed.



Pump complies with EN809 Pumping Directive, Directive 2006/42/EC Machinery.

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. Retorque 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
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.

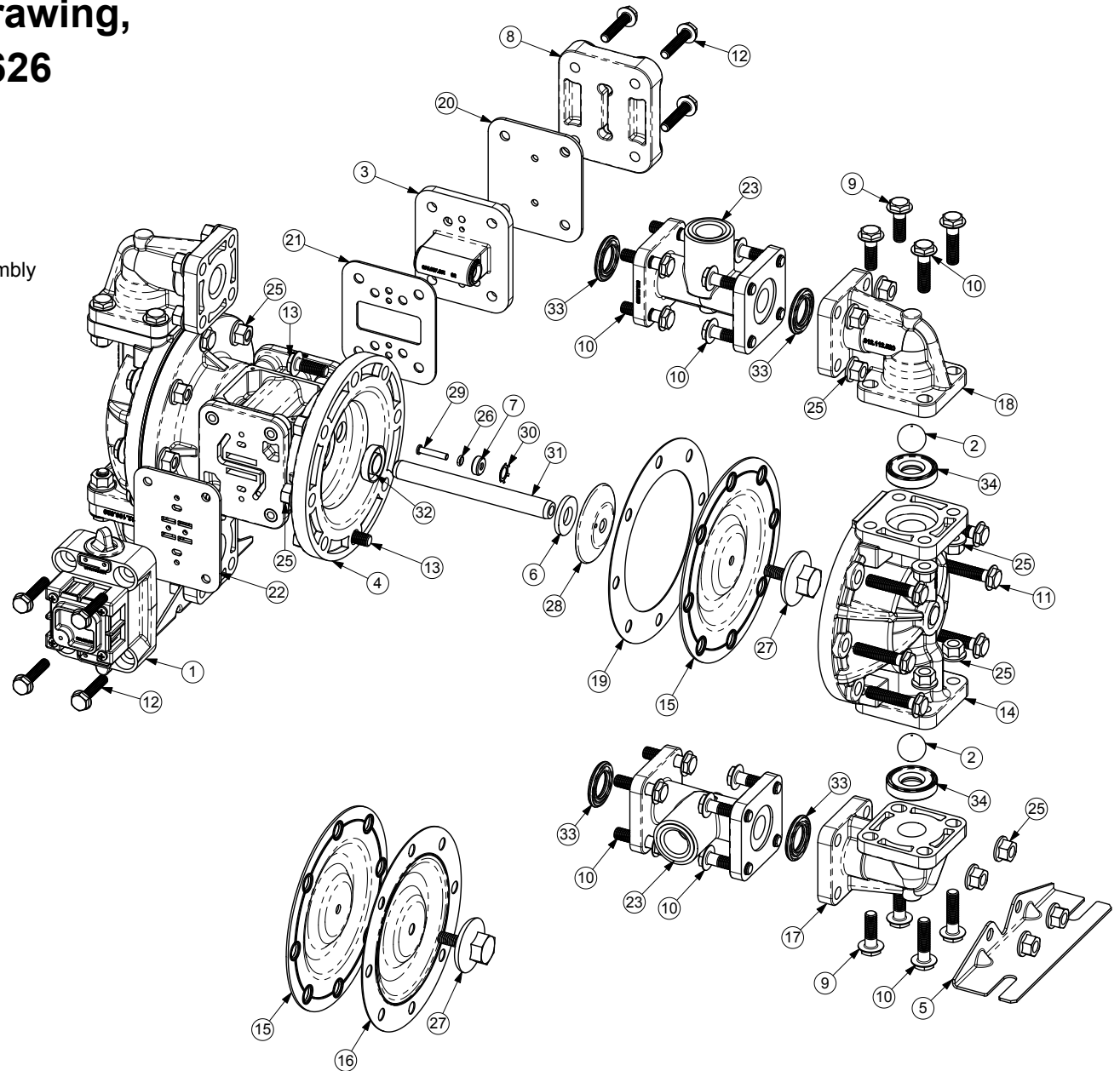
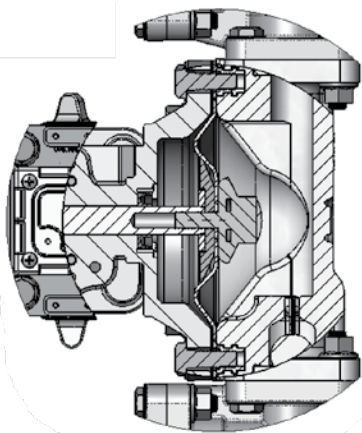
⚠ WARNING
Systems which will be dispensing fluids under pressure may need to be protected by using a thermal relief kit which will safely limit the pressures caused by thermal expansion. Please contact your local Lincoln distributor and refer to Service Page Section K5 Page 31 for more details. Failure to include thermal relief protection may cause damage not covered under Lincoln's warranty policy.

Composite Repair Parts Drawing, Models 85622, 85623 & 85626

Available Service And Conversion Kits

Part No.	Description
273053	AIR END KIT Seals, O-ring, Gaskets, Retaining Rings, Air Valve Assembly and Pilot Valve Assembly
271871	WET END KIT Buna Diaphragms, Buna Check Balls, PTFE Seats and PTFE Seals
271873	WET END KIT Santoprene Diaphragms, Nitrile Spacer Gaskets, Santoprene Check Balls, PTFE Seats and PTFE Seals
271872	WET END KIT Santoprene Diaphragms, PTFE Overlay Diaphragm, PTFE Check Balls, PTFE Seats and PTFE Seals

ILLUSTRATION SHOWS
DIRECTION OF DIAPHRAGM



*OVERLAY OPTION

Composite Repair Parts List, Models 85622, 85623 & 85626

Item	Description	Quantity	Model 85623	Model 85622	Model 85626
1	Air Valve Assembly	1	272836	272836	272836
2	Check Ball	4	252896	252895	272208
3	Pilot Valve Assembly	1	252897	252897	252897
4	Intermediate Housing	1	271986	271986	271986
5	Mounting Bracket	2	271996	271996	271996
6	Bumper	2	252900	252900	252900
7	Plunger Bushing	2	252901	252901	252901
8	Air Inlet Cap	1	271987	271987	271987
9	Hex Flange Capscrew 5/16-18 x 1.00 long	8	271988	271988	271988
10	Hex Flange Capscrew 5/16-18 x 1.25 long	24	271989	271989	271989
11	Hex Flange Capscrew 5/16-18 x 1.50 long	12	271990	271990	271990
12	Hex Flange Capscrew 1/4-20 x 1.25 long	8	271991	271991	271991
13	Hex Flange Capscrew 5/16-18 x .88 long	4	271992	271992	271992
14	Outer Chamber	2	271985	271985	271985
15	Diaphragm	2	252907	252907	271865
16	Overlay Diaphragm	2	252908		
17	Suction Elbow	2	252909	252909	252909
18	Discharge Elbow	2	271994	271994	271994
19	Spacer Gasket	2		252910	
20	Air Inlet Gasket	1	252911	252911	252911
21	Pilot Valve Gasket	1	252912	252912	252912
22	Air Valve Gasket	1	252913	252913	252913
23	Manifold	2	252914	252914	252914
25	Hex Nut 5/16-18	36	271993	271993	271993
26	O-ring	2	240655	240655	240655
27	Outer Diaphragm Plate	2	240768	240768	240768
28	Inner Diaphragm Plate	2	252917	252917	252917
29	Actuator Plunger	2	252918	252918	252918
30	Retaining Ring	2	240717	240717	240717
31	Diaphragm Rod	1	252920	252920	252920
32	U-Cup Seal	2	252921	252921	252921
33	Manifold Seal	4	252922	252922	252922
34	Check Valve Seat	4	271995	271995	271995

Composite Repair Parts Drawing, Dual Port Suction Model 85637

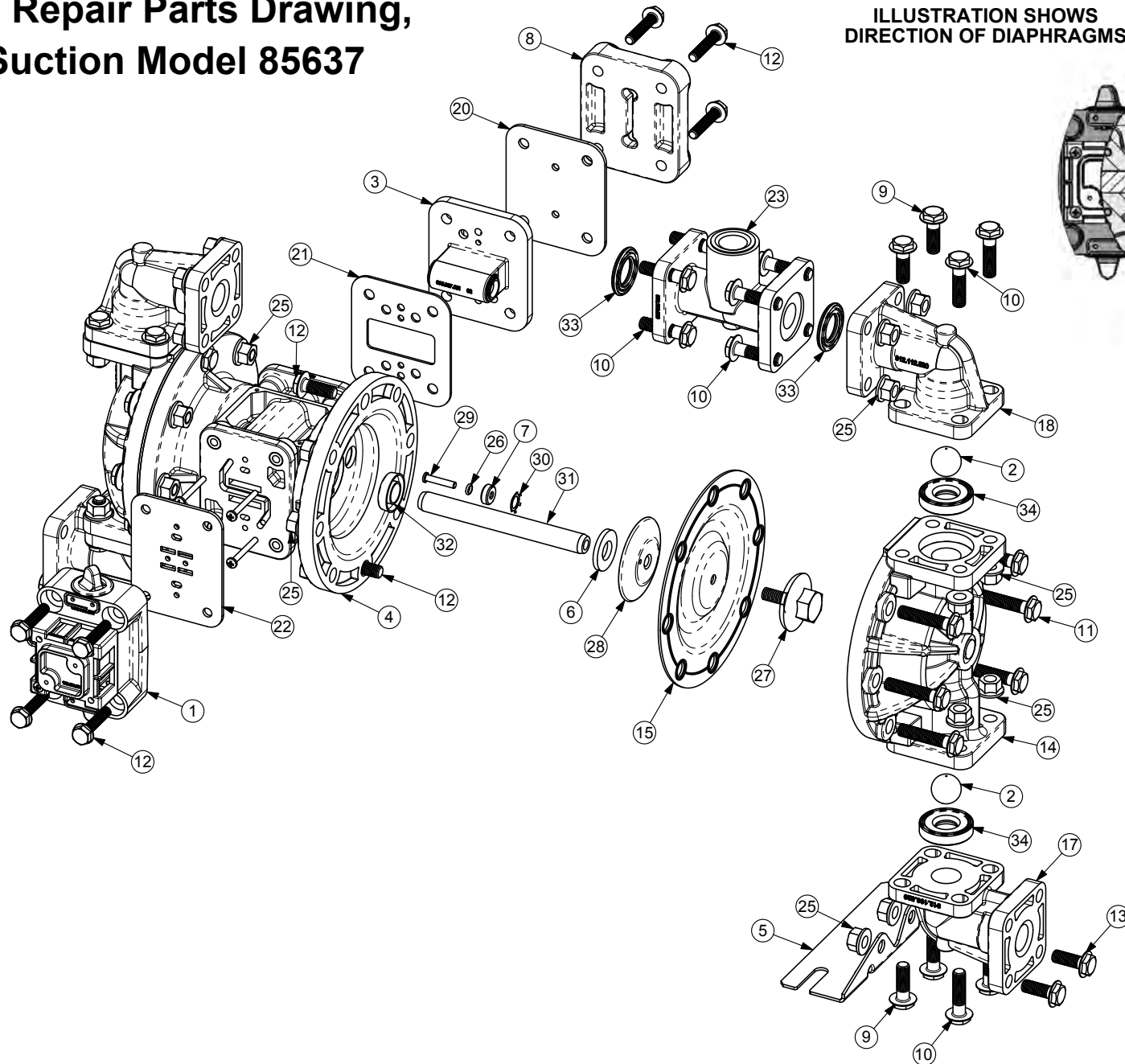
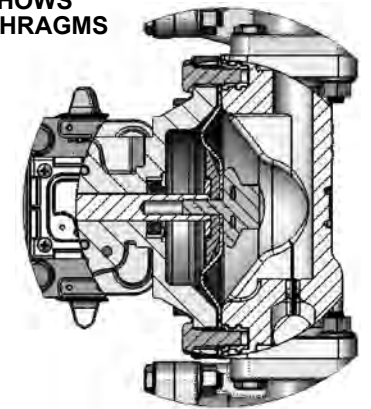


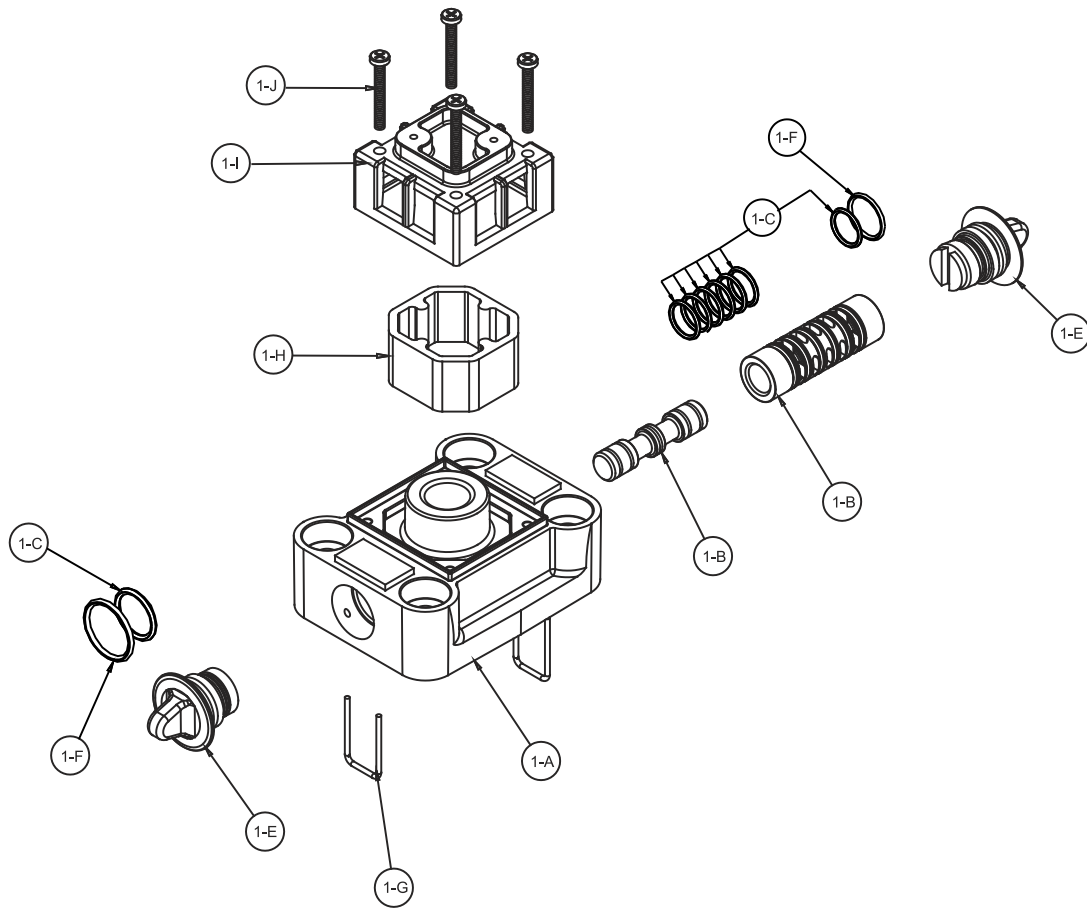
ILLUSTRATION SHOWS
DIRECTION OF DIAPHRAGMS



Composite Repair Parts List, Dual Port Suction Model 85637

Item	Description	Quantity	Model 85637
1	Air Valve Assembly	1	272836
2	Check Ball	4	272208
3	Pilot Valve Assembly	1	252897
4	Intermediate Housing	1	271986
5	Mounting Bracket	2	271996
6	Bumper	2	252900
7	Plunger Bushing	2	252901
8	Air Inlet Cap	1	271987
9	Hex Flange Capscrew 5/16-18 x 1.00 long	8	271988
10	Hex Flange Capscrew 5/16-18 x 1.25 long	16	271989
11	Hex Flange Capscrew 5/16-18 x 1.50 long	12	271990
12	Hex Flange Capscrew 1/4-20 x 1.25 long	8	271991
13	Hex Flange Capscrew 5/16-18 x .88 long	8	271992
14	Outer Chamber	2	271985
15	Diaphragm	2	271865
17	Suction Elbow, 1/2" NPT	2	275810
18	Discharge Elbow	2	271994
20	Air Inlet Gasket	1	252911
21	Pilot Valve Gasket	1	252912
22	Air Valve Gasket	1	252913
23	Manifold	1	252914
25	Hex Nut 5/16-18	32	271993
26	O-ring	2	240655
27	Outer Diaphragm Plate	2	240768
28	Inner Diaphragm Plate	2	252917
29	Actuator Plunger	2	252918
30	Retaining Ring	2	240717
31	Diaphragm Rod	1	252920
32	U-Cup Seal	2	252921
33	Manifold Seal	2	252922
34	Check Valve Seat	4	271995

Air Distribution Valve Assembly Drawing



MAIN AIR VALVE ASSEMBLY PARTS LIST

Item	Part Number	Description	Qty
1	272836	Air Valve Assembly	1
1-A	273051	Body, Air Valve	1
1-B	252929	Sleeve and Spool Set	1
1-C	252927	O-Ring	8
1-E	273046	End Cap	2
1-F	273047	O-Ring	2
1-G	273048	End Cap Retainer	2
1-H	272842	Muffler	1
1-I	252931	Muffler Cap	1
1-J	252932	Self-Tapping Screw	4

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 3/8" wrench or socket, remove the four hex flanged capscrews (item 12). Remove the air valve assembly from the pump.

STEP #2: Disassembly of the air valve.

To access the internal air valve components first remove the two end cap retainers (item 1-G) by inserting a small flat screwdriver into the two slotted grooves on the valve body and gently lifting the retainers out.

Next remove the two end caps (item 1-E) by grasping the pull tab with finger and thumb or pliers and tugging. Inspect the two o-rings (items 1-C and 1-F) on each end cap for wear or cuts. Replace the o-rings if necessary.

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 clean cloth and inspect for scratches or abrasive 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). **Note:** The sleeve and spool set is match-ground to a specified clearance. Sleeves and spools cannot be interchanged.

STEP #3: Reassembly of the air distribution valve.

Install one end cap with o-rings (items 1-E, 1-C, and 1-F) into one end of the air valve body (item 1-A). Insert one end cap retainer (item 1-G) into the two smaller holes, align with groove in the end cap, and push until the closed end of the retainer is below the flat surface of the valve body.

Remove the new sleeve and spool set (item 1-B) from the plastic bag. Carefully remove the spool from the sleeve. Install the six o-rings (item 1-C) 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. 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. Push the spool in until the pin touches the end cap on the opposite end.

Install the remaining end cap with o-rings and retainer.

Fasten the air valve assembly (item 1) and gasket (item 23) to the pump, using the four hex flanged capscrews (item 12).

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



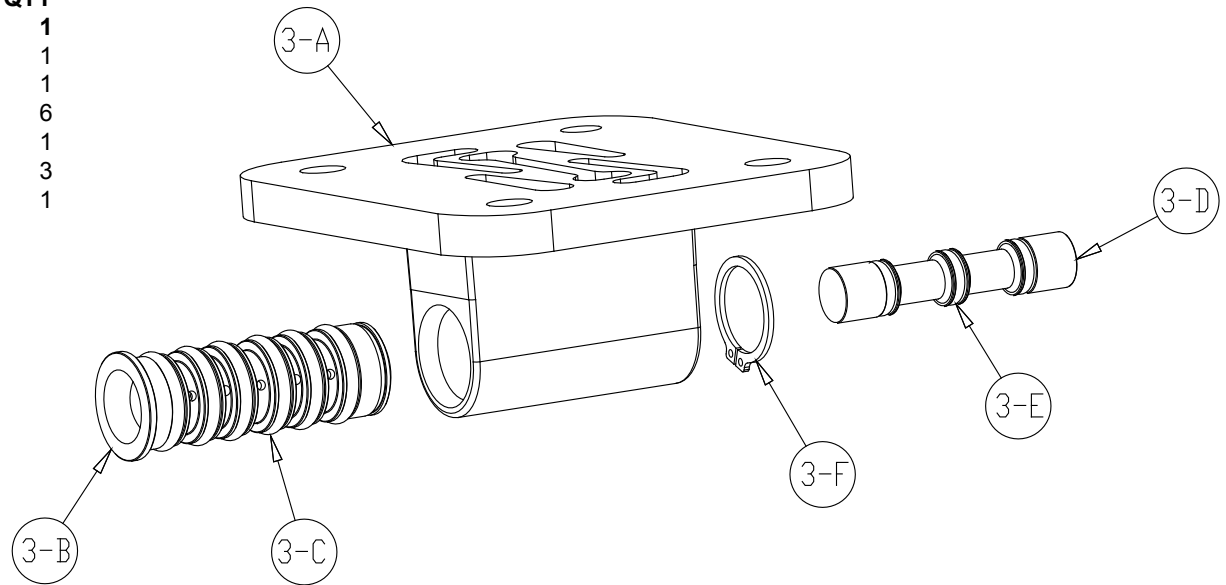
! IMPORTANT

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.

Pilot Valve Servicing, Assembly Drawing & Parts List

PILOT VALVE ASSEMBLY PARTS LIST

ITEM	PART NUMBER	DESCRIPTION	QTY
3	252897	Pilot Valve Assembly	1
3-A	252933	Pilot Valve Body	1
3-B	274585	Pilot Valve Sleeve with O-rings	1
3-C	275751	O-ring	6
3-D	274587	Pilot Valve Spool with O-rings	1
3-E	275752	O-ring	3
3-F	274589	Retaining Ring	1



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 7/16" wrench or socket, remove the four capscrews (item 12). Remove the air inlet cap (item 8) and air inlet gasket (item 20). The pilot valve assembly (item 3) can now be removed for inspection and service.

STEP #2: Disassembly of the pilot valve.

Remove the pilot valve spool (item 3-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 3-F) from the end of the sleeve (item 3-b) and remove the sleeve from the valve body (item 3-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.

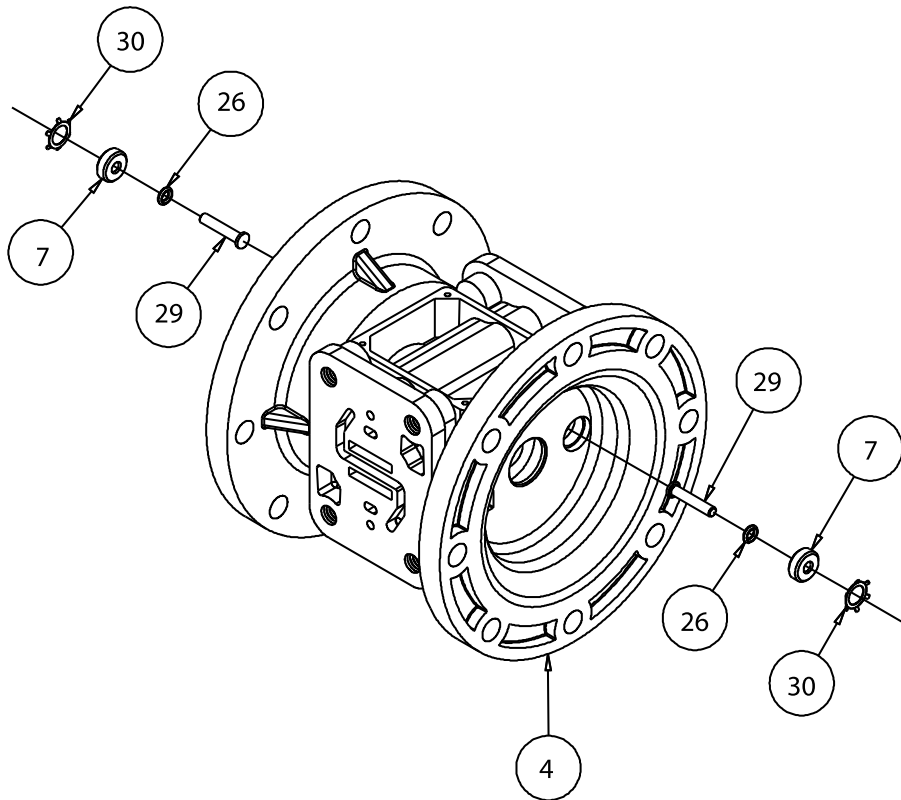
Generously lubricate outside diameter of the sleeve and o-rings. Then carefully insert sleeve into valve body. Take CAUTION when inserting sleeve, not to shear any o-rings. Install retaining ring to sleeve. Generously lubricate outside diameter of spool and o-rings. Then carefully insert spool into sleeve. 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.

Intermediate Assembly Drawing



INTERMEDIATE REPAIR PARTS LIST

Item	Part Number	Description	Qty
4	271986	Bracket, Intermediate	1
7	252901	Bushing, Plunger	2
26	240655	O-Ring	2
29	252918	Plunger, Actuator	2
30	240717	Ring, Retaining*	2

***Note:** It is recommended that when plunger components are serviced, new retaining rings be installed.

Intermediate Assembly Servicing

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 3/8" wrench or socket, remove the four capscrews (items 12). Remove the air inlet cap (item 8) and air inlet gasket (item 20). The pilot valve assembly (item 3) can now be removed.

Step #2: Servicing the actuator plungers. See PUMP ASSEMBLY DRAWING.

The actuator plungers (items 29) can be reached through the stem cavity of the pilot valve in the intermediate bracket (item 4). To service bushings, o-rings and retaining rings, see Intermediate Drawing.

Remove the plungers (items 29) from the bushings (item 7) in each end of the intermediate cavity. Inspect for wear or damage. Replace plunger as needed. 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.

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 (items 12).

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

PLUNGER BUSHING, O-RING, AND RETAINING RING SERVICING

To service the plunger bushing components first remove the two retaining rings (items 30) using a small flat screwdriver. ***Note:** It is recommended that new retaining rings be installed.

Next remove the two plunger bushings (items 7). Inspect the bushings for wear or scratches. Replace the bushings as necessary.

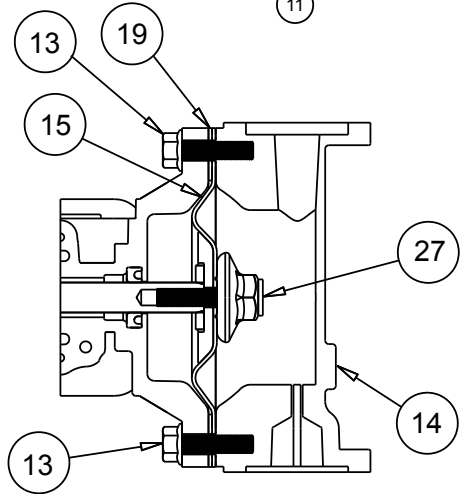
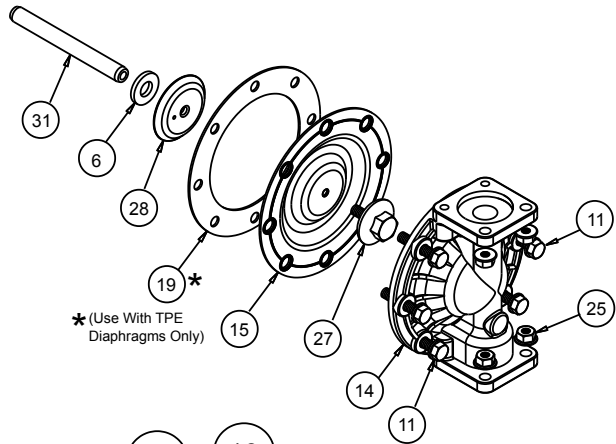
Inspect the two o-rings (26) for cuts and/or wear.



! IMPORTANT

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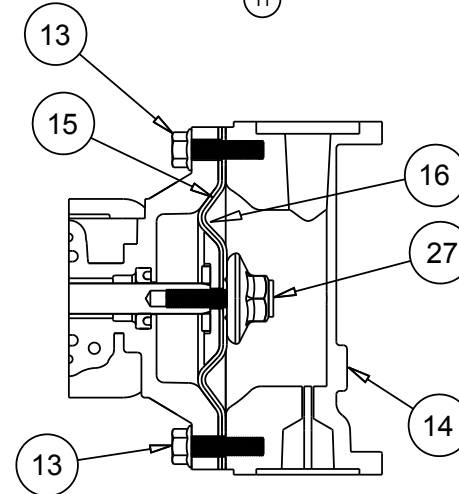
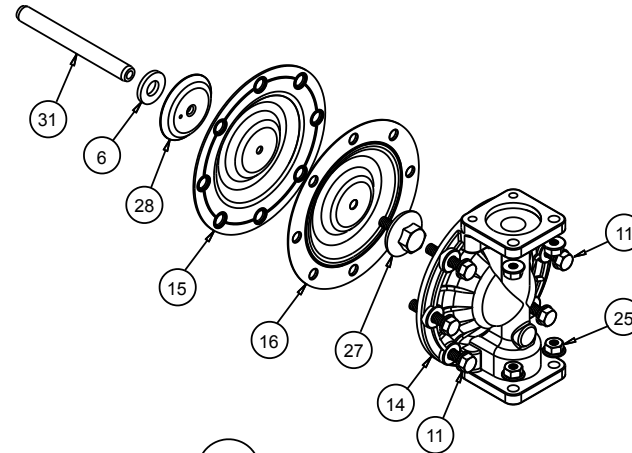
Diaphragm Service Drawing



Diaphragm Orientation

Install diaphragm and spacer as shown above.

Diaphragm Service Drawing, with Overlay



Diaphragm Orientation

Install diaphragm and overlay as shown above.

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 composite repair parts drawing, and the diaphragm servicing illustration.

Using a 1/2" wrench or socket, remove the 16 capscrews (items 9 & 10), and flanged nuts that fasten the elbows (items 17 and 18) to the outer chambers (items 14). Remove the elbows with the manifolds and spacers attached.

Step #2: Removing the outer chambers.

Using a 1/2" wrench or socket, remove the 16 capscrews (items 11 and 13), and flanged nuts that fasten the outer chambers, diaphragms, and intermediate (item 4) together.

Step #3: Removing the diaphragm assemblies.

Use a 3/4" (19mm) 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.

Insert a 6-32 set screw into the smaller tapped hole in the inner diaphragm plate (item 28). Insert the protruding stud and the 6-32

fastener loosely into a vise. Use a 3/4" wrench or socket to remove the outer diaphragm plate (item 27) by turning counterclockwise. Inspect the diaphragm (item 15) 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. Insert the loose assembly with the above 6-32 fastener back into the vise. Use a torque wrench to tighten the diaphragm assembly together to 90 in lbs. (10.17 Newton meters) 120 in lbs. Santoprene (13.56 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 31) 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 intermediate (item 4).

Fasten the outer chamber (item 14) to the pump, using the capscrews (items 11 and 13) and flanged 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 31) as far as possible and still allow for alignment of the bolt holes in the diaphragm with the bolt pattern in the inner chamber. Install diaphragms with convolutions facing towards center of pump. See sectional view on previous page.

Fasten the remaining outer chamber (item 14) to the pump, using the capscrews (items 11 and 13) and flanged nuts.

Step #6: Re-install the elbow/spacer/manifold assemblies to the pump, using the capscrews (items 9 & 10) and flanged nuts.

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 snugly over the exterior of the standard TPE diaphragm (item 15).

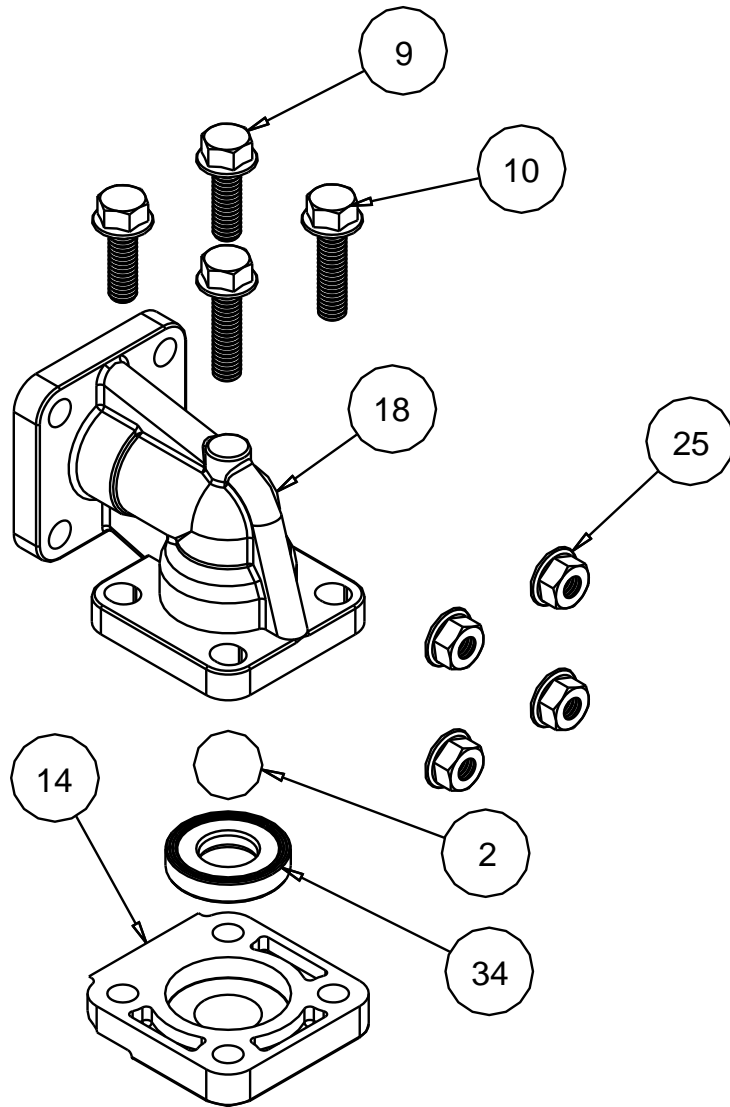


! IMPORTANT

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this manual for reference. Failure to comply with the recommendations stated in this manual will damage the pump, and void factory warranty.

Check Ball Valve Drawing



MODULAR CHECK BALL VALVE SERVICING

Before servicing the check valves, 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 modular check valve, remove the elbows (items 17 and 18 from pump composite repair parts drawing). Use a 1/2" wrench or socket to remove the fasteners. Once the elbows are removed, the modular check valves can be seen in the cavities of the outer chamber (items 14).

Inspect the check balls (items 2) for wear, abrasion, or cuts on the spherical surface. The check valve seats (items 34) should be inspected for cuts, abrasive wear, or embedded material on the surfaces of both the external and internal chamfers. The spherical surface of the check balls must seat flush to the surface of the inner chamfer on 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

Place a check ball (item 2) in the ball cage of either the discharge elbow or the outer chamber. Install a check valve seat in the counter on each end of the chamber. Refasten the elbows to the chamber.



! IMPORTANT

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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 3/8" 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.

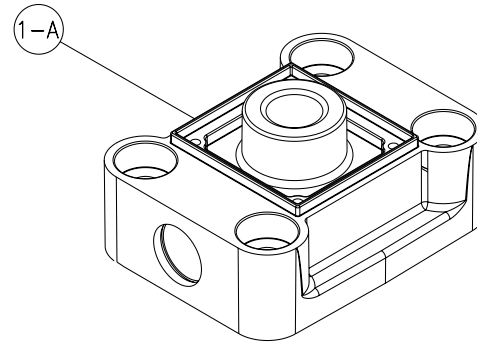
Use a #8 Torx or flat screwdriver to remove the four self-tapping screws (item 1-J) (Plastic Valves). Use a Phillips screwdriver to remove four machine screws (item 1-I) (Aluminum Valves).

Remove the muffler cap and muffler. The air distribution valve body has 3/8" NPT threads for installation of alternate mesh or sound dampening mufflers or piped exhaust.

IMPORTANT INSTALLATION NOTE:

The manufacturer recommends installing a flexible hose or connection between the pump and any rigid plumbing. This reduces stresses on the molded plastic 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 physically supported. Failure to support these connections could also result in damage to the air distribution valve body.



CONVERTED EXHAUST ILLUSTRATION

