

**Model: 10-6410-0000  
Lavatory Service Unit**

11/2010 – Rev. 03

REVISION	DATE	TEXT AFFECTED
01	12/2008	Original release
02	08/2010	Modified 2.1 Fill (Fresh) System and Parts List and Illustrations Added Appendix I
03	11/2010	Modified Parts List

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This product can not be modified without the written approval of Tronair, Inc. Any modifications done without written approval voids all warranties and releases Tronair, Inc., its suppliers, distributors, employees, or financial institutions from any liability from consequences that may occur. Only Tronair OEM replacement parts shall be used.

## **1.0 GENERAL DESCRIPTION**

The Tronair Model Lavatory Service Unit (LSU) provides a clean, sanitary means of servicing the aircraft lavatory system and transporting the waste fluid to the dump station.

Some important features are:

- Easily maneuverable with towbar
- Brakes on front tires for locking in static position
- Drain back system on fill hose to prevent fluid spillage
- Storage provided for fill and dump hoses and connector
- Heavy duty fill pump
- Fill and dump tanks made of non-corroding HD polyethylene material with UV inhibitor
- 3 inch I.D. gravity drain valve in dump tank with removable hose and fitting

## **2.0 TECHNICAL SPECIFICATIONS**

- Dimensions: 64 inches Long x 37-1/2 inches Wide x 49-1/2 inches High (with towbar in up position.)
- Weight: 600 pounds

### **2.1 FILL (FRESH) SYSTEM**

- 31 gallon tank capacity; HD polyethylene
- 0-14 gpm pneumatic pump
- 0-100 psi operating pressure, 125 psi max
- Three (3) inch tank fill port with cover
- Eight (8) foot fill hose

### **2.2 DUMP SYSTEM**

- 68 gallon tank capacity; HD polyethylene
- Six (6) inch tank clean out port with cover
- Four (4) inch aluminum tank flange for aircraft dump hose connection
- 18 inch long, three (3) inch I.D. dump tank hose with 45 connector

### **2.3 MECHANICAL**

- Pneumatic tires front (steering) wheels with semi-sealed ball bearing (Tire size 410/350 x 4) 50 psi tire pressure maximum
- Pneumatic tired rear wheels with tapered roller bearings (Tire size 4.80/4.00 x 8) 50 psi tire pressure maximum
- Towing speed - 10 mph maximum

### **2.4 KITS**

The following kits are available for Model: 10-6410-0000 LSU:

- K-2410 - Kit, Fill Connector
- K-2412 - Kit, Dump Connector with 5 foot hose
- K-2029 - Kit, Dump Connector
- K-2030 - Kit, Dump Connector; mates with K-2412
- K-3606 - Kit, Hose Cap (Dump Hose)

## **3.0 PREPARATION FOR USE**

This Lavatory Service Unit has been thoroughly inspected and tested prior to packaging and shipment. The unit is shipped completely assembled and is ready for use.

You are requested to generally check over the unit to assure the tightness of all nuts, bolts and screws that may have loosened during shipment. Bolts and elastic stopnuts should be tightened to a torque not to exceed industry standards for Grade "5" bolts. Tire pressure should not exceed 50 PSI.

#### 4.0 OPERATING INSTRUCTIONS

1. Open access panel on aircraft. Remove drain and fill coupling caps.
2. Connect dump hose assembly to aircraft drain coupling and fill hose assembly to mating aircraft coupling.
3. Follow aircraft manufacturer's instructions to drain sewage from aircraft into dump tank.
4. To flush aircraft toilet, the ball valve after the fill pump must have its handle in the up position (perpendicular to valve). Follow aircraft manufacturer's requirements for flushing.
5. After flushing, position ball valve handle in down position (parallel to valves). This allows for fill hose to be partially drained prior to disconnecting from aircraft.
6. Remove dump and fill hoses from aircraft and stow.
7. Following aircraft manufacturer's instructions, replace coupling caps on aircraft fittings. Close access panel.
8. Drain sewage into approved disposal system. Refill fill tank as required. Lavatory Service Unit is now ready for re-use.

#### 5.0 MAINTENANCE

1. Lubricate wheel bearings with multi-purpose grease; every 6 months minimum.
2. Lubricate front caster swivel plate bearings with multi-purpose grease; every 6 months minimum.
3. Periodically check for leaks at hose connections and tighten hose clamps, as required.
4. Regularly wash tanks and hoses with a mild detergent according to local procedures and regulations.

#### 6.0 TROUBLE SHOOTING

If fill pump fails during use, refer to Appendix I – Lincoln Pump Service Manual. Clean inside of pump. Replace any damaged parts. Failure to pump liquid may be caused by the following reasons:

Pump Will Not Prime: Clogged Suction; check that suction tubes are clear.

Not Enough Flow: Check suction and discharge hoses for clogging or pinching. Verify that nozzle is not clogged.

#### 7.0 GUARANTEES/LIMITATION OF LIABILITY

Tronair products are warranted to be free of manufacturing or material defects for a period of one year after shipment to the original customer. This is solely limited to the repair or replacement of defective components. This warranty does not cover the following items:

- a) Parts required for normal maintenance
- b) Parts covered by a component manufacturers warranty
- c) Replacement parts have a 90-day warranty from date of shipment

If you have a problem that may require service, contact Tronair immediately. Do not attempt to repair or disassemble a product without first contacting Tronair, any action may affect warranty coverage. When you contact Tronair be prepared to provide the following information:

- a) Product Model Number
- b) Product Serial Number
- c) Description of the problem

If warranty coverage is approved, either replacement parts will be sent or the product will have to be returned to Tronair for repairs. If the product is to be returned, a Return Material Authorization (RMA) number will be issued for reference purposes on any shipping documents. Failure to obtain a RMA in advance of returning an item will result in a service fee. A decision on the extent of warranty coverage on returned products is reserved pending inspection at Tronair. Any shipments to Tronair must be shipped freight prepaid. Freight costs on shipments to customers will be paid by Tronair on any warranty claims only. Any unauthorized modification of the Tronair products or use of the Tronair products in violation of cautions and warnings in any manual (including updates) or safety bulletins published or delivered by Tronair will immediately void any warranty, express or implied.

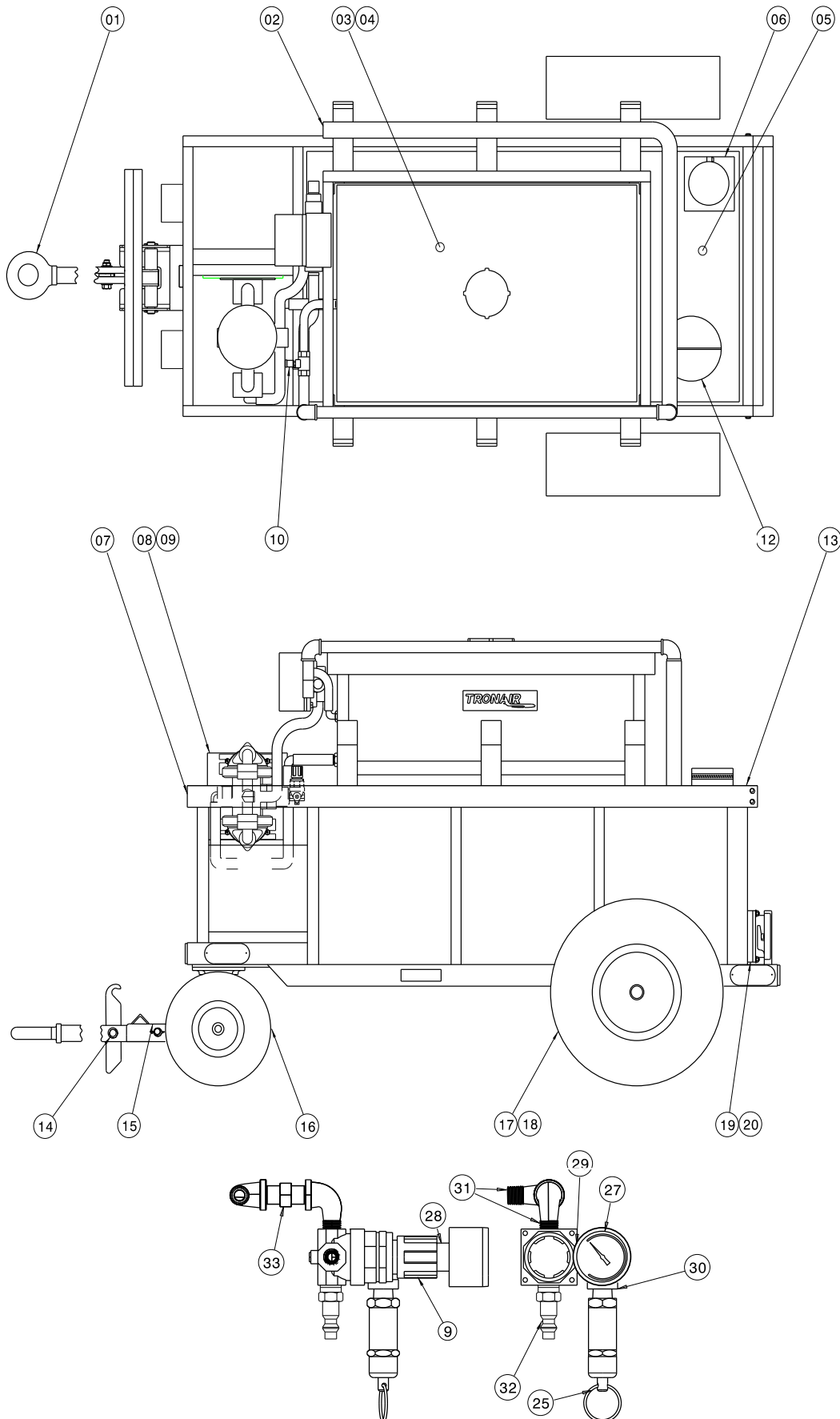
The obligations of Tronair expressly stated herein are in lieu of all other warranties or conditions expressed or implied. **Any unauthorized modification of the Tronair products or use of the Tronair products in violations of cautions and warnings in any manual (including updates) or safety bulletins published or delivered by Tronair will immediately void any warranty, express or implied and Tronair disclaims any and all liability for injury (WITHOUT LIMITATION and including DEATH), loss or damage arising from or relating to such misuse.**

#### 8.0 APPENDICES

APPENDIX I Lincoln Pump Service & Operating Manual

**Parts List**

When ordering replacement parts/kits, please specify model, serial number and color of your unit.



### Parts List

Item	Part Number	Description	Qty
1	Z-5584-01	Weldment, Tongue	1
2	TF-1005*96.0	Hose, 1.0 ID x 96 Long	1
7	Z-1517	Weldment, Frame	1
8	H-2660	Pump, Pneumatic	1
9	H-1397	Regulator	1
10	HC-1137	Valve, Ball	1
12	K-4916	Kit, Fillwell Replacement	1
17	U-1010	Assembly, Tire/Wheel	2
24	Z-6182-01	Weldment, Steering Axle	1
25	PC-1017-02-125	Valve, Safety	1
26	H-1416	Flowmeter	1
27	HC-1831	Gauge, Pressure, 0-160 psi	1
28	N-2210-02-S	Reducer, Pipe Thread	1
29	N-2201-03-S	Elbow, Male Pipe	1
30	N-2207-04-S	Tee, Female Pipe	1
31	N-2200-03-S	Elbow, Male Pipe	2
32	H-2016-11	Disconnect, Quick	1
33	N-2203-04-S	Nipple, Pipe	1
<i>Not Shown</i>	<b>K-4098</b>	<b>Kit, Drain Hose Assembly</b>	1
3	<b>K-1256</b>	<b>Kit, Fill Tank Replacement</b> ; consists of:	
	H-1316	Tank, 31 Gallon	1
	V-1033-01	Label, "Tronair"	1
4	<b>K-1688</b>	<b>Kit, Lid Replacement</b> ; consists of:	
	H-1626	Cover	1
	H-1627	Gasket	1
5	<b>K-1251</b>	<b>Kit, Dump Tank Replacement</b> ; consists of:	
	H-1331	Tank, 68 Gallon	1
	H-1286	Cap, Plastic	1
	K-1210	Kit, 4" Flange (See Item 6)	1
	K-1208	Kit, 6" Fillwell (See Item 12)	1
	K-1246	Kit, Drain Valve (See Item 19)	1
6	<b>K-1210</b>	<b>Kit, 4" Flange Replacement</b> ; consists of:	
	G-1100-105010	Bolt, Hex Head, Grade 5, 1/4-20 x 1" long	4
	G-1251-1050R	Lockwasher, 1/4 Regular	4
	H-1426-16	Clamp, Hose	1
	J-1403-02	Flange, Inner	1
	Z-1462	Weldment, Flanged 4" Adaptor	1
13	<b>K-1252</b>	<b>Kit, Rear Tank Gate Replacement</b> ; consists of:	
	G-1100-105016	Bolt, Hex Head, Grade 5, 1/4-20 x 1-3/4 " long	4
	G-1250-1050N	Flatwasher, 1/4 Narrow	4
	G-1251-1050R	Lockwasher, 1/4 Regular	4
	Z-1508-01-01	Weldment, Rear Tank Gate	1

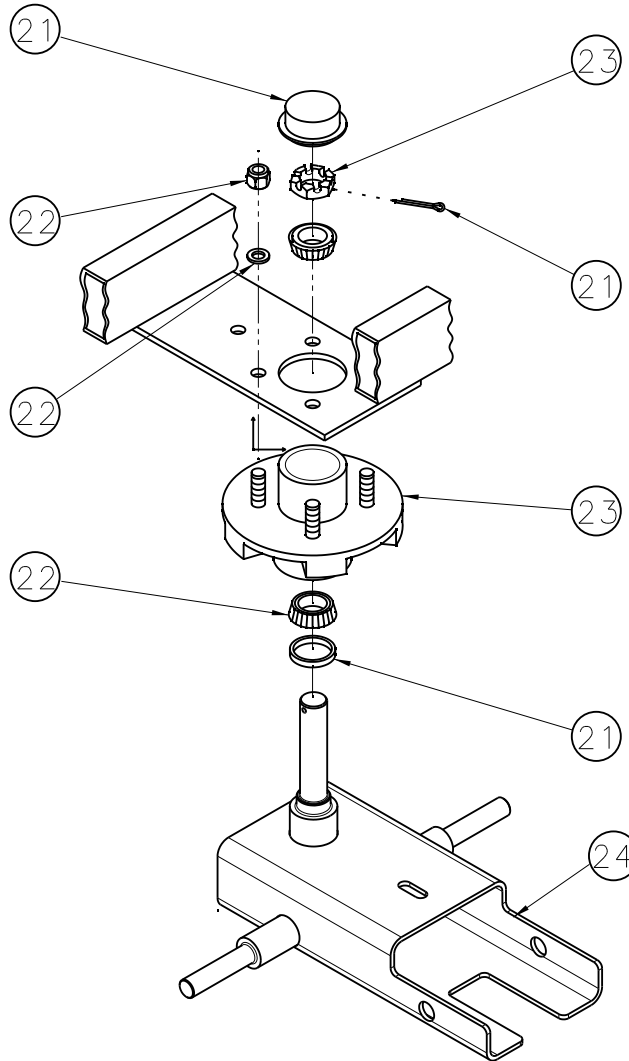
Continued on following page.

### Parts List

Item	Part Number	Description	Qty
14	<b>K-3971</b>	<b>Kit, Lever Replacement; consists of:</b>	
	G-1100-109522	Bolt, Hex Head, Grade 5, 1/2-20 x 2-1/4" long	1
	G-1203-1095	Stopnut, 1/2-20 Elastic	1
	G-1250-1090N	Flatwasher, 1/2 Narrow	1
	J-3427	Lever	1
15	<b>K-3970</b>	<b>Kit, Pin Replacement; consists of:</b>	
	G-1301-02	Pin, Cotter, 1/8" diameter x 1" long	2
	R-2096	Pin	1
16	<b>K-1550</b>	<b>Kit, Wheel (Single) Replacement; consists of:</b>	
	G-1203-1115	Jamnut, 3/4-16 Elastic	1
	G-1250-1110N	Flatwasher, 3/4 Narrow	1
	TR-1585	Spacer, Wheel	1
	U-1027	Wheel, Pneumatic Tire	1
18	<b>K-1633</b>	<b>Kit, Wheel Bearing &amp; Seal Replacement; consists of:</b>	
	U-1010	Wheel/Tire Assembly	1
	G-1230-01	Nut, Axle, 1"-14 UNS Thread	1
	G-1301-05	Pin, Cotter, 5/32" diameter x 1-1/2" long	1
	H-1155-01	Cap, Dust	1
	H-1559-01	Bearing	2
	H-1561-05	Seal, Grease	1
	H-1676-01	Cup, Bearing	2
19	<b>K-1246</b>	<b>Kit, Drain Valve Replacement; consists of:</b>	
	G-1100-105016	Bolt, Hex Head, Grade 5, 1/4-20 x 2" long	4
	G-1202-1050	Stopnut, 1/4-20 Elastic	4
	G-1250-1050N	Flatwasher, 1/4 Narrow	4
	H-1334	Seal, Stat-O	4
	H-1333	Valve, Drain	1
20	<b>K-1245</b>	<b>Kit, Valve Mounting Replacement; consists of:</b>	
	G-1100-105016	Bolt, Hex Head, Grade 5, 1/4-20 x 2" long	4
	G-1202-1050	Stopnut, 1/4-20 Elastic	4
	G-1250-1050N	Flatwasher, 1/4 Narrow	4
	H-1334	Seal, Stat-O	4



**Parts List Illustrations**



Item	Part Number	Description	Qty
21	<b>K-1253</b>	<b>Kit, Bearing &amp; Seal Replacement; consists of:</b>	
	G-1301-03	Pin, Cotter, 1/8" diameter x 1-1/2" long	1
	H-1155-01	Cap, Dust	1
	H-1559-01	Bearing	2
	H-1561-05	Seal, Grease	1
22	<b>K-1254</b>	<b>Kit, Hub Mounting Replacement; consists of:</b>	
	G-1100-109514	Bolt, Hex Head, Grade 5, 1/2-20 x 1-1/2" long	4
	G-1202-1095	Stopnut, 1/2-20 Elastic	4
	G-1250-1090N	Flatwasher, 1/2 Narrow	4
	G-1251-1090R	Lockwasher, 1/2 Regular	4
23	<b>K-1255</b>	<b>Kit, Hub Replacement; consists of:</b>	
	G-1202-1095	Stopnut, 1/2-20 Elastic	4
	G-1250-1090N	Flatwasher, 1/2 Narrow	4
	G-1230-01	Nut, Axle, 1"-14 UNS Thread	1
	G-1301-03	Pin, Cotter, 1/8" diameter x 1-1/2" long	1
	H-1335	Hub, Idler	1





## **APPENDIX I**

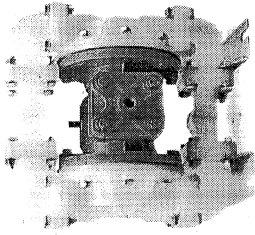
### **Lincoln Pump Service & Operating Manual**



**SERVICE & OPERATING MANUAL**



**Models 85626, 85622, 85623  
1/2" Air-Powered Diaphragm Pump**



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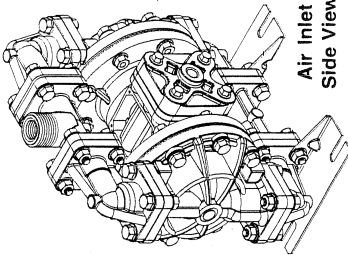


# Models 85626, 85622, 85623

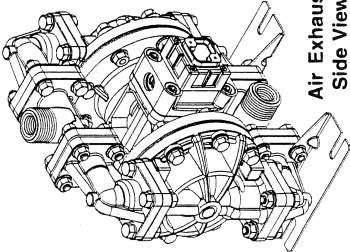
**Air-Powered  
Double-Diaphragm Pump**

ENGINEERING, PERFORMANCE  
& CONSTRUCTION DATA

U.S. Patent #  
5,996,627; 6,241,487  
Other U.S. Patents  
Applied for



Air Inlet  
Side View



Air Exhaust  
Side View

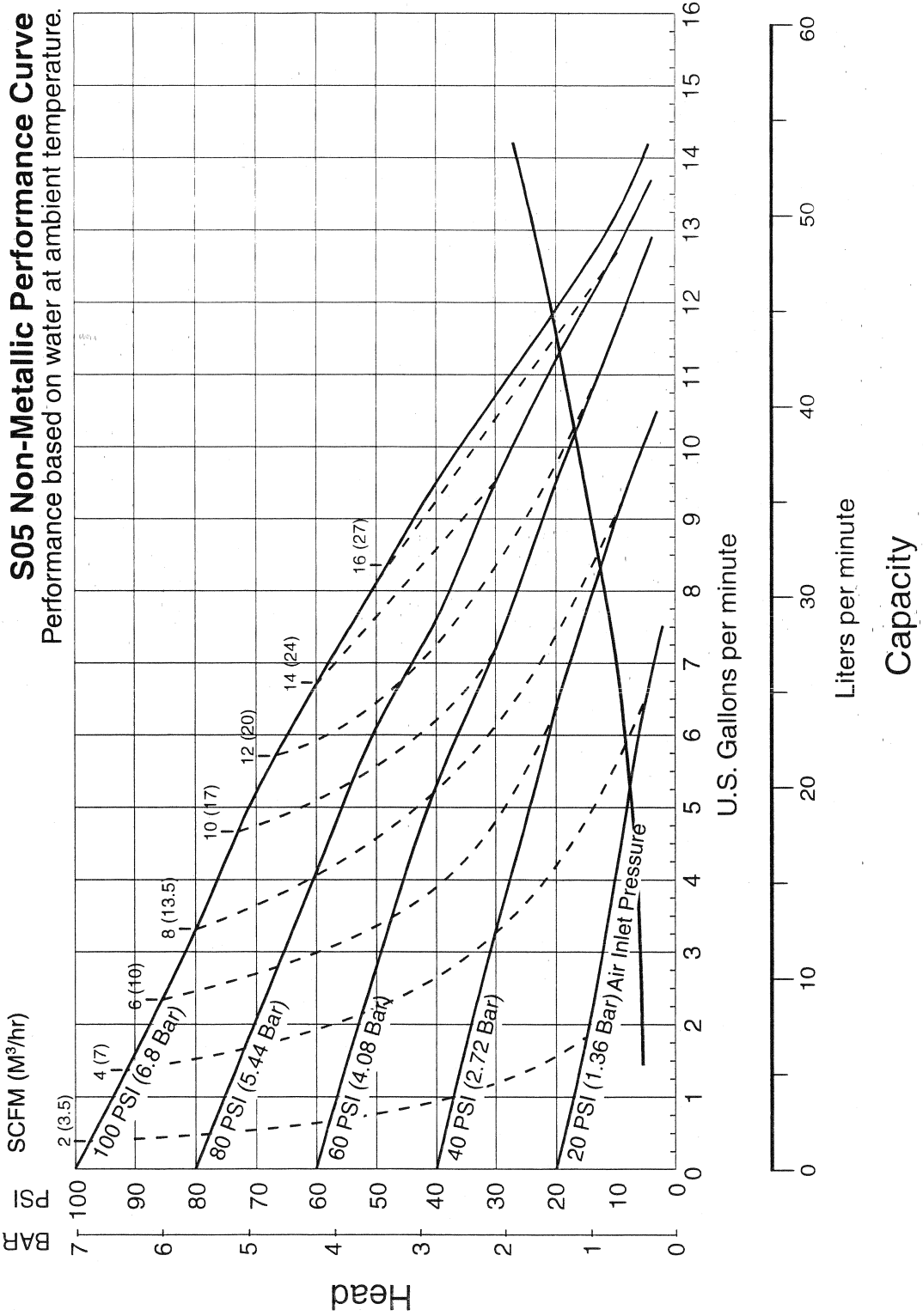
INTAKE/DISCHARGE PIPE SIZE 1/2" NPT (Internal) or 1/2" BSPT (Tapered) 1" NPT (External) or 1" BSPT (Tapered)	CAPACITY 0 to 14 gallons per minute (0 to 52 liters per minute)	AIR VALVE No-lube, no-stall design	SOLIDS-HANDLING Up to .125 in. (3mm)	HEADS UP TO 100 psi or 23 ft. of water (7 Kg/cm <sup>2</sup> or 70 meters)	DISPLACEMENT/STROKE .026 Gallon / .088 liter
<b>CAUTION! Operating temperature limitations are as follows:</b>					
<b>MATERIALS</b>					
Operating Temperatures					
			Maximum*	Minimum*	Optimum**
<b>Buna:</b> 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.					
<b>Conductive Acetal:</b>					
<b>Nylon:</b>					
<b>PVDF:</b>					
<b>Virgin PTFE:</b> 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.					
<b>Polyurethane:</b> High tensile material with excellent abrasion resistance. A general purpose material with excellent resistance to most oils.					
<b>Polpropylene:</b>					
<b>Santoprene®:</b> Injection molded thermoplastic elastomer with no fabric layer. Long mechanical flex life. Excellent abrasion resistance.					

\*Definite reduction in service life.  
\*\*Minimal reduction in service life at ends of range.

For specific applications, always consult "Chemical Resistance Chart" Technical Bulletin

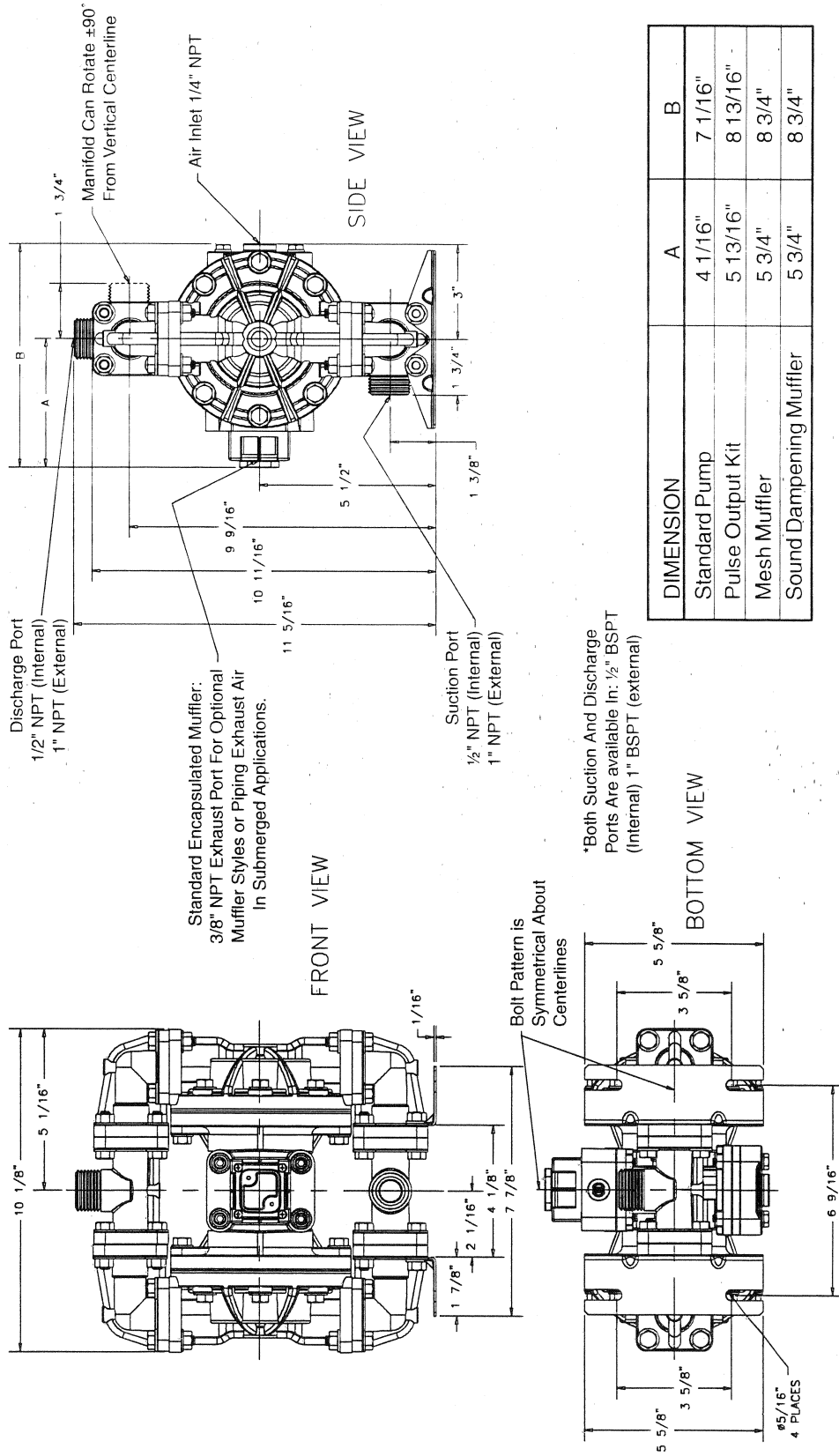
Lincoln pumps are designed to be powered only by compressed air.

# Performance Curve



# Dimensions:

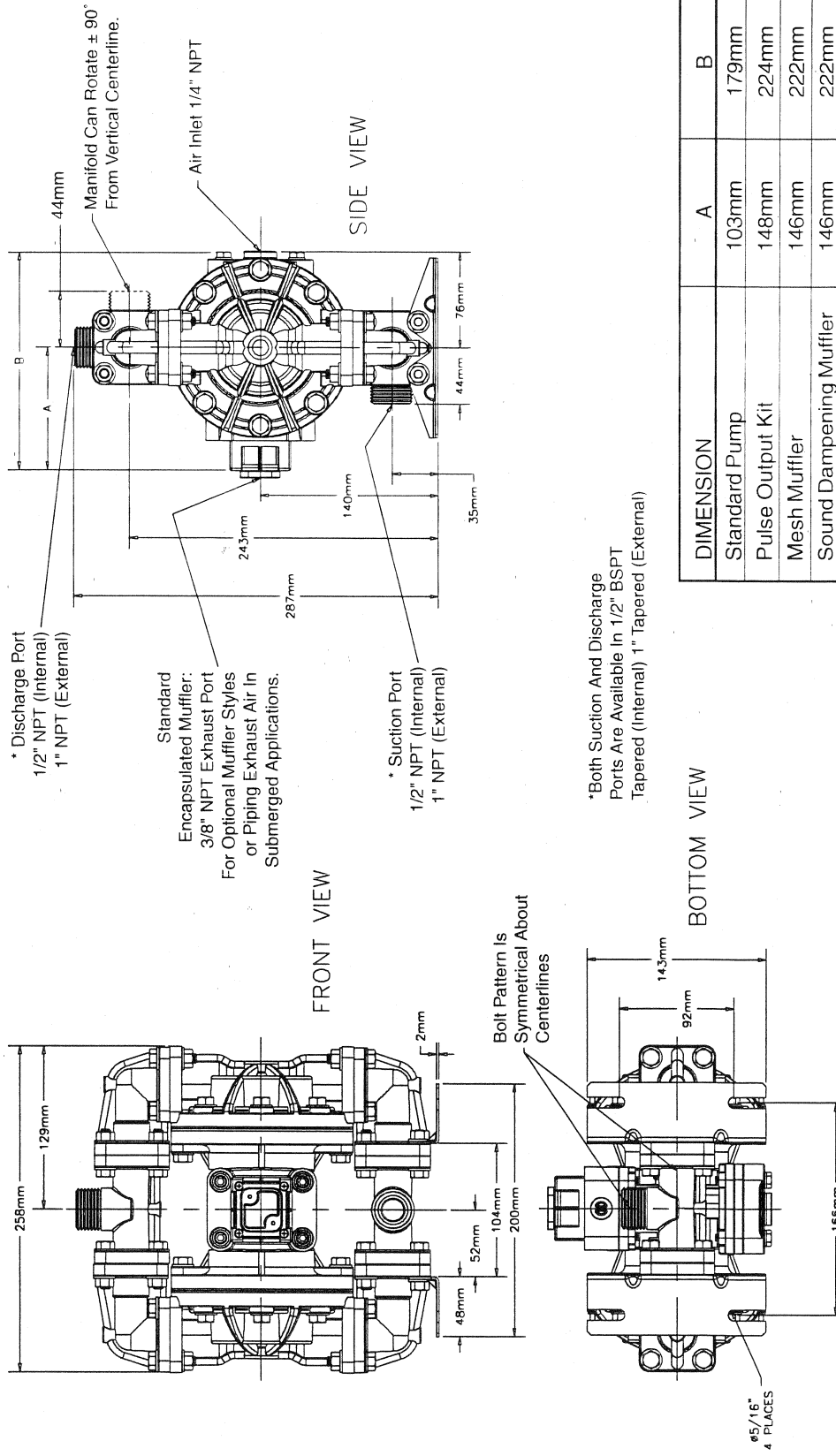
Dimensions in Inches  
Dimensional tolerance:  $\pm 1/8$ "





# Metric Dimensions:

Dimensions in millimeters  
Dimensional tolerance:  $\pm 3\text{mm}$



DIMENSION	A	B
Standard Pump	103mm	179mm
Pulse Output Kit	148mm	224mm
Mesh Muffler	146mm	222mm
Sound Dampening Muffler	146mm	222mm

## 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 Warren Rupp Tranquizer® 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 (available from Warren Rupp) 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.

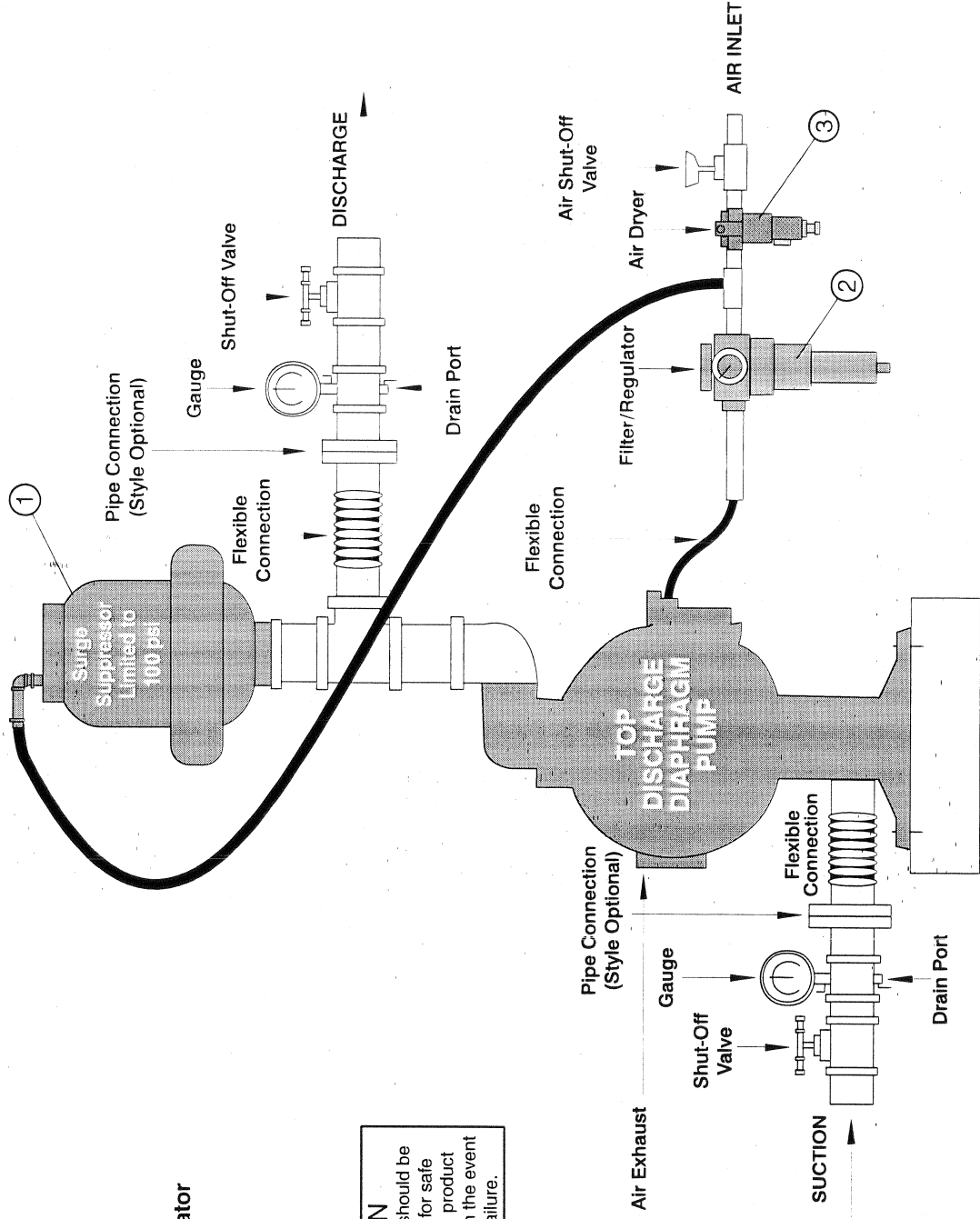
## BETWEEN USES

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.

Available from  
Warren Rupp

- ① DA05 Surge Suppressor
- ② 020-049-000 Filter/Regulator
- ③ 020-049-001 Lubricator

**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 Warren Rupp Tranquilizer® 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 Department 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.

# Recycling

Many components of Non-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.



**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.



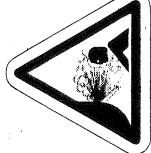
**WARNING**  
This pump is pressurized internally with air pressure during operation. Always make certain that all bolting is in good condition and that all of the correct bolting is reinstalled during assembly.



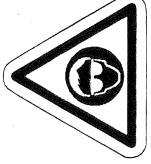
**CAUTION**  
Before pump operation, inspect all gasketed fasteners for looseness caused by gasket creep. Re-torque loose fasteners to prevent leakage. Follow recommended torques stated in this manual.



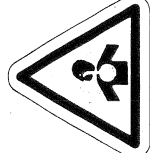
**WARNING**  
When used for toxic or aggressive fluids, the pump should always be flushed clean prior to disassembly.



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

# Material Codes

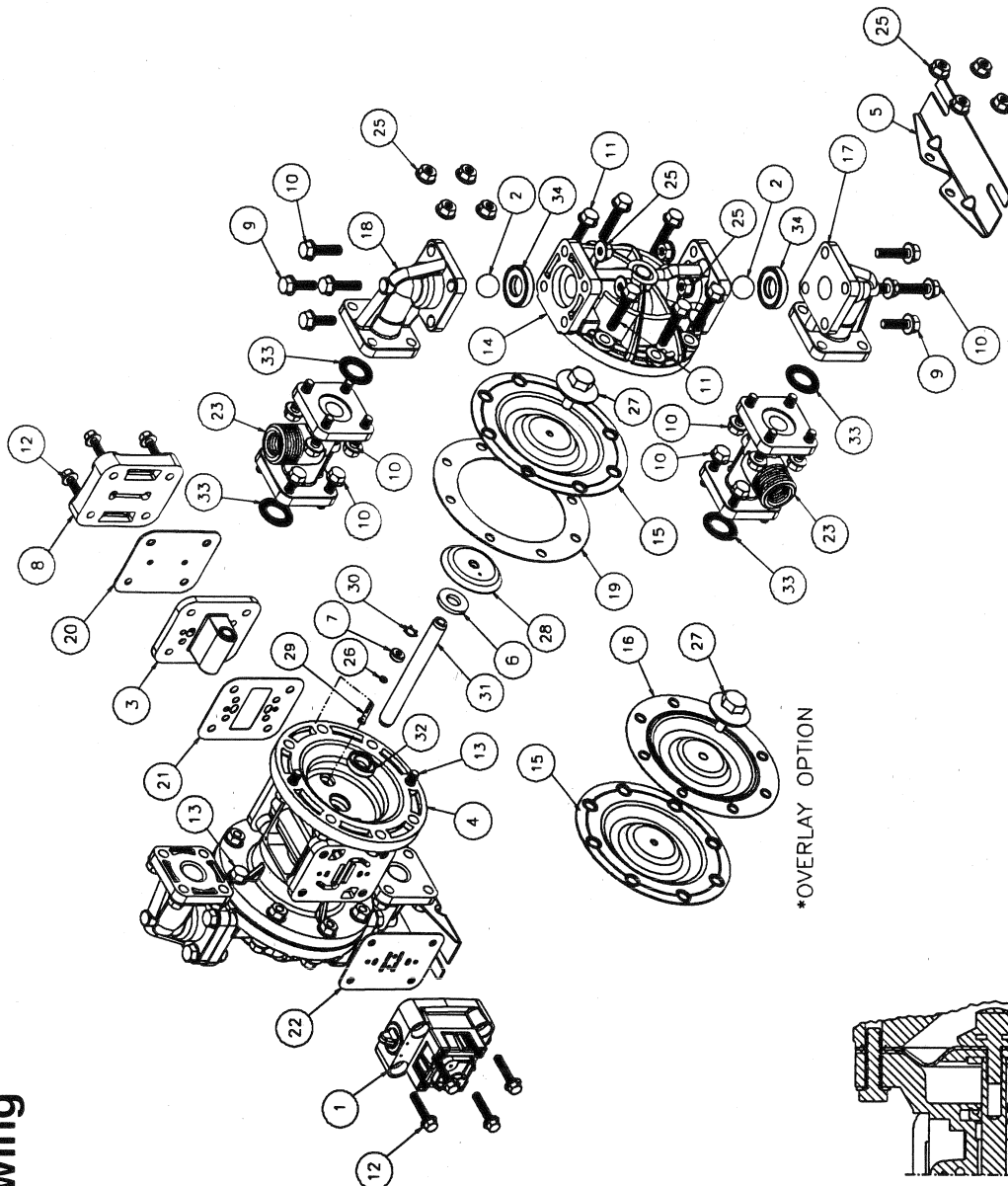
## The Last 3 Digits of Part Number

000 ..... Assembly, sub-assembly, and some purchased items	175 ..... Die Cast Zinc	375 ..... Fluorinated Nitrile	610 ..... PTFE Encapsulated Silicon
010 ..... Cast Iron	180 ..... Copper Alloy	378 ..... High Density Polypropylene	611 ..... PTFE Encapsulated Viton
012 ..... Powder Metal	305 ..... Carbon Steel, Black Epoxy Coated	405 ..... Cellulose Fibre	632 ..... Neoprene/Hytre
015 ..... Ductile Iron	306 ..... Carbon Steel, Black PTFE Coated	408 ..... Cork and Neoprene	633 ..... Viton/PTFE
020 ..... Ferritic Malleable Iron	307 ..... Aluminum, Black Epoxy Coated	425 ..... Compressed Fibre	634 ..... EPDM/PTFE
025 ..... Music Wire	308 ..... Stainless Steel, Black PTFE Coated	426 ..... Blue Gard	635 ..... Neoprene/PTFE
080 ..... Carbon Steel, AISI B-1112	309 ..... Aluminum, Black PTFE Coated	440 ..... Vegetable Fibre	637 ..... PTFE, Viton/PTFE
100 ..... Alloy 20	310 ..... Kynar Coated	465 ..... Fibre	638 ..... PTFE, Hytre/PTFE
110 ..... Alloy Type 316 Stainless Steel	330 ..... Zinc Plated Steel	500 ..... Delrin 500	639 ..... Buna-N/TFE
111 ..... Alloy Type 317 Stainless Steel	331 ..... Chrome Plated Steel	501 ..... Delrin 570	643 ..... Santoprene®/EPDM
112 ..... Alloy "C" (Hastelloy equivalent)	332 ..... Aluminum, Electroless Nickel Plated	502 ..... Conductive Acetal, ESD-800	644 ..... Santoprene®/PTFE
113 ..... Alloy Type 316 Stainless Steel (Hand Polished)	333 ..... Carbon Steel, Electroless Nickel Plated	503 ..... Conductive Acetal, Glass-Filled	656 ..... Santoprene Diaphragm and Check Balls/EPDM Seats
114 ..... 303 Stainless Steel	335 ..... Galvanized Steel	505 ..... Acrylic Resin Plastic	661 ..... EPDM/Santoprene
115 ..... 302/304 Stainless Steel	336 ..... Zinc Plated Yellow Brass	506 ..... Delrin 150	
117 ..... 440-C Stainless Steel (Martensitic)	337 ..... Silver Plated Steel	520 ..... Injection Molded PVDF Natural color	
120 ..... 416 Stainless Steel (Wrought Martensitic)	340 ..... Nickel Plated	540 ..... Nylon	
123 ..... 410 Stainless Steel (Wrought Martensitic)	342 ..... Filled Nylon	541 ..... Nylon	Delrin, Viton and Hytre are registered trademarks of E.I. DuPont.
148 ..... Hardcoat Anodized Aluminum	353 ..... Geolast; Color: Black	542 ..... Nylon	Gylon is a registered trademark of Garlock, Inc.
149 ..... 2024-T4 Aluminum	354 ..... Injection Molded #203-40 Santoprene-Duro 40D +/-5; Color: RED	544 ..... Nylon Injection Molded	
150 ..... 6061-T6 Aluminum	355 ..... Thermal Plastic	550 ..... Polyethylene	Nylatron is a registered trademark of Polymer Corp.
151 ..... 6063-T6 Aluminum	356 ..... Hytre	551 ..... Glass Filled Polypropylene	Santoprene is a registered trademark of Monsanto Corp.
152 ..... 2024-T4 Aluminum (2023-T351)	357 ..... Injection Molded Polyurethane	552 ..... Unfilled Polypropylene	Rulon II is a registered trademark of Dixon Industries Corp.
154 ..... Almag 35 Aluminum	358 ..... Urethane Rubber	555 ..... Polyvinyl Chloride	Hastelloy-C is a registered trademark of Cabot Corp.
155 ..... 356-T6 Aluminum	(Some Applications) (Compression Mold)	556 ..... Black Vinyl	
156 ..... 356-T6 Aluminum	359 ..... Urethane Rubber	570 ..... Rulon II	
157 ..... Die Cast Aluminum Alloy #380	360 ..... Buna-N Rubber. Color coded: RED	580 ..... Rylon	
158 ..... Aluminum Alloy SR-319	361 ..... Buna-N	590 ..... Valox	
159 ..... Anodized Aluminum	363 ..... Viton (Fluorel). Color coded: YELLOW	591 ..... Nylatron G-S	
162 ..... Brass, Yellow, Screw Machine Stock	364 ..... E.P.D.M. Rubber. Color coded: BLUE	592 ..... Nylatron NSB	
165 ..... Cast Bronze, 85-5-5-5	365 ..... Neoprene Rubber. Color coded: GREEN	600 ..... PTFE (virgin material)	
166 ..... Bronze, SAE 660	366 ..... Food Grade Nitrile	601 ..... PTFE (Bronze and moly filled)	
170 ..... Bronze, Bearing Type, Oil Impregnated	368 ..... Food Grade EPDM	602 ..... Filled PTFE	
	370 ..... Butyl Rubber. Color coded: BROWN	603 ..... Blue Gylon	
	371 ..... Phlithane (Tuftane)	604 ..... PTFE	
	374 ..... Carboxylated Nitrile	607 ..... Envelon	
		606 ..... PTFE	

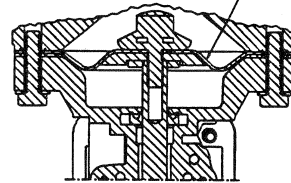
# Composite Repair Parts Drawing

## Available Service And Conversion Kits

- Updated TBA
- AIR END KIT**  
Seals, O-ring, Gaskets, Retaining Rings, Air Valve Assembly and Pilot Valve Assembly
- WET END KIT**  
Buna Diaphragms, Buna Check Balls, PTFE Seats and PTFE Seals
- WET END KIT**  
Santoprene Diaphragms, Nitrile Spacer Gaskets, Santoprene Check Balls, PTFE Seats and PTFE Seals
- WET END KIT**  
Santoprene Diaphragms, PTFE Overlay Diaphragm, PTFE Check Balls, PTFE Seats and PTFE Seals



\*OVERLAY OPTION



DIAPHRAGM CONFIGURATION DETAIL

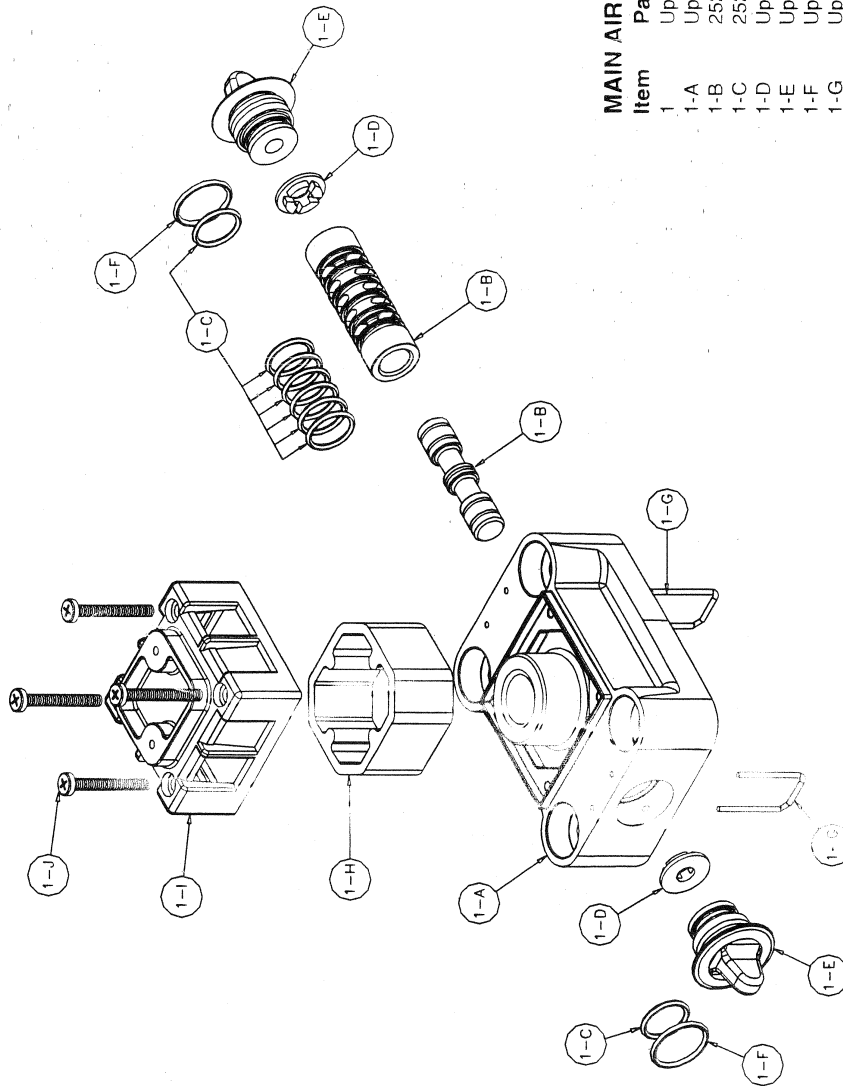
NOTE TO ASSEMBLY  
THE DIAPHRAGM FOR BOTH  
CONFIGURATIONS SHOWN ABOVE ARE TO BE  
INSTALLED WITH CONVOLUTIONS FACING  
TOWARDS CENTER OF PUMP

# Composite Repair Parts List

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



# Air Distribution Valve Assembly Drawing



## MAIN AIR VALVE ASSEMBLY PARTS LIST

Item	Part Number	Description	Qty
1	Updated TBA	Air Valve Assembly	1
1-A	Updated TBA	Body, Air Valve	1
1-B	252929	Sleeve and Spool Set	1
1-C	252927	O-Ring	8
1-D	Updated TBA	Bumper	2
1-E	Updated TBA	End Cap	2
1-F	Updated TBA	O-Ring	2
1-G	Updated TBA	End Cap Retainer	2
1-H	Updated TBA	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 distribution 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 two bumpers (items 1-D) and inspect for wear or damage. 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.

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 the 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 bumper (item 1-D) and 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 it touches the bumper on the opposite end.

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

Fasten the air valve assembly (item 1) and gasket (item 22) to the pump, using the four hex flanged capscrews (item 12).

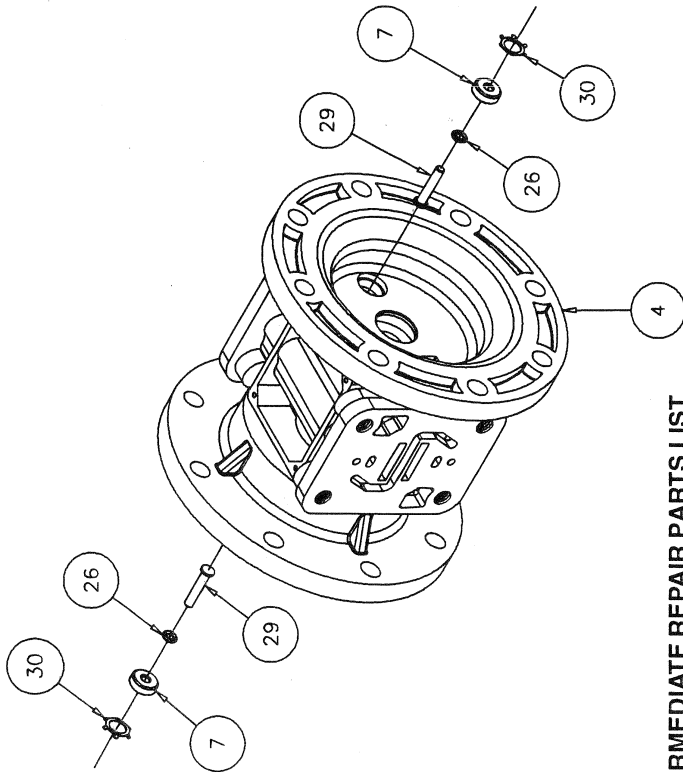
Connect the compressed air line to the pump. The pump is now ready for operation.



## ! 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.

# 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.

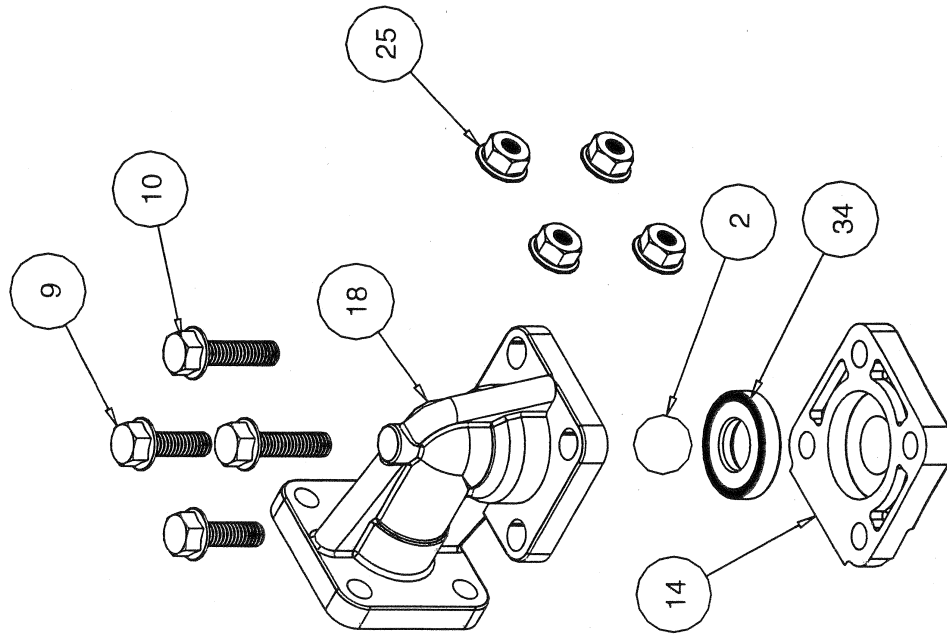
Inspect the two o-rings (26) for cuts and/or wear.



## IMPORTANT

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 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

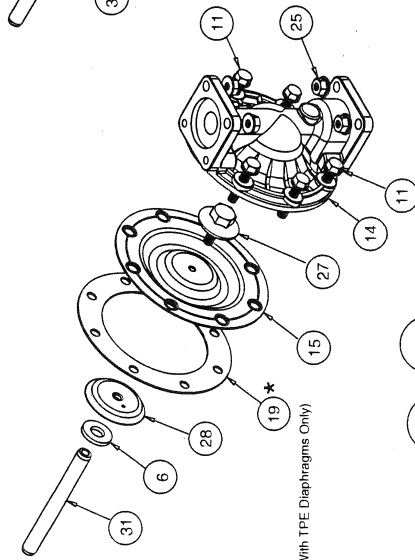


Read these instructions completely, before installation and start-up. It is the responsibility of the purchaser to retain this manual for reference. Failure to comply with the recommendations stated in this manual will damage the pump, and void factory warranty.

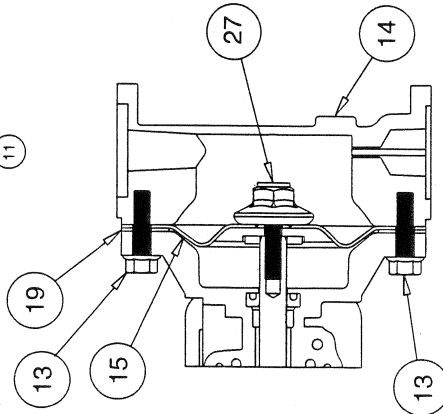
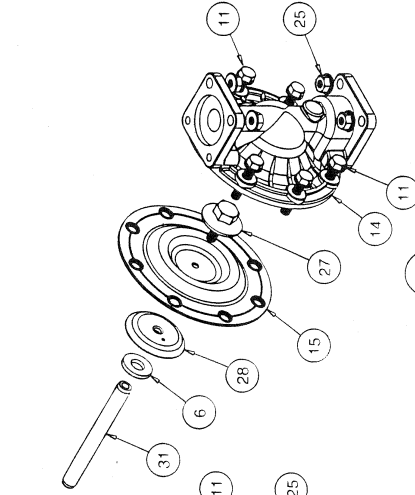
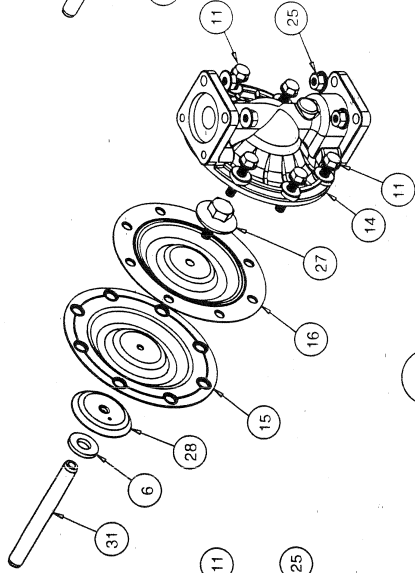
**Diaphragm Service Drawing**

**Diaphragm Service Drawing,  
with Overlay**

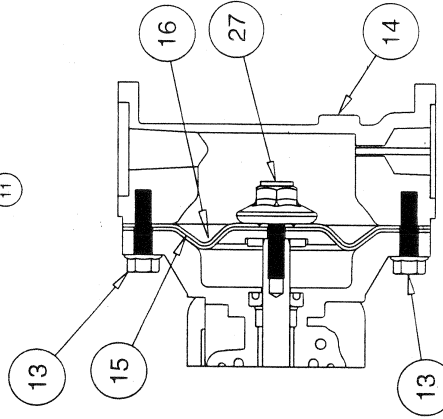
**Diaphragm Service Drawing  
with uniRupp®**



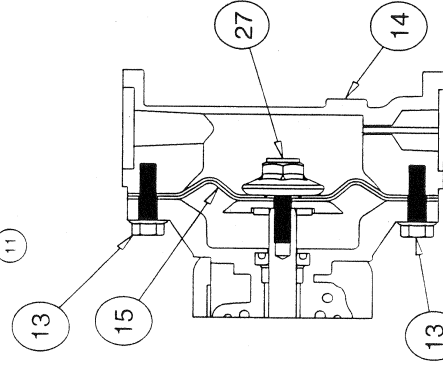
★ (Use With TPE Diaphragms Only)



**Diaphragm Orientation**  
Install diaphragm and spacer  
as shown above.



**Diaphragm Orientation**  
Install diaphragm and overlay  
as shown above.



**Diaphragm Orientation**  
Install diaphragm (286-095-650 only)  
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 31) 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).

## uniRupp® DIAPHRAGM SERVICING

Follow the same procedures described for the standard diaphragm for removal and installation. **Note:** The uniRupp diaphragm is installed in the direction as shown in the lower right illustration above.



## 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.

### PUMPING HAZARDOUS LIQUIDS

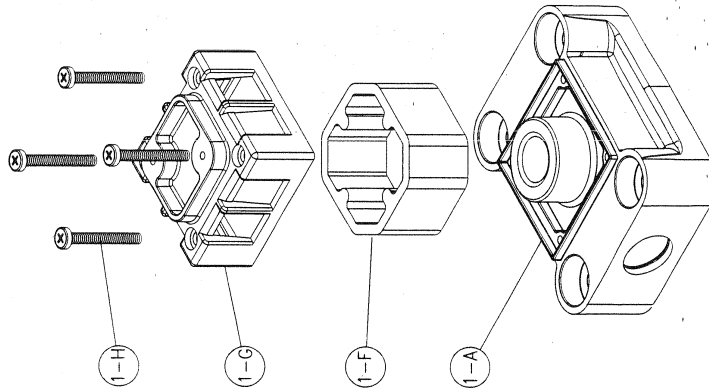
When a diaphragm fails, the pumped liquid or fumes enter the air end of the pump. Fumes are exhausted into the surrounding environment. When pumping hazardous or toxic materials, the exhaust air must be piped to an appropriate area for safe disposal. See illustration #1 at right.

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.

### 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

