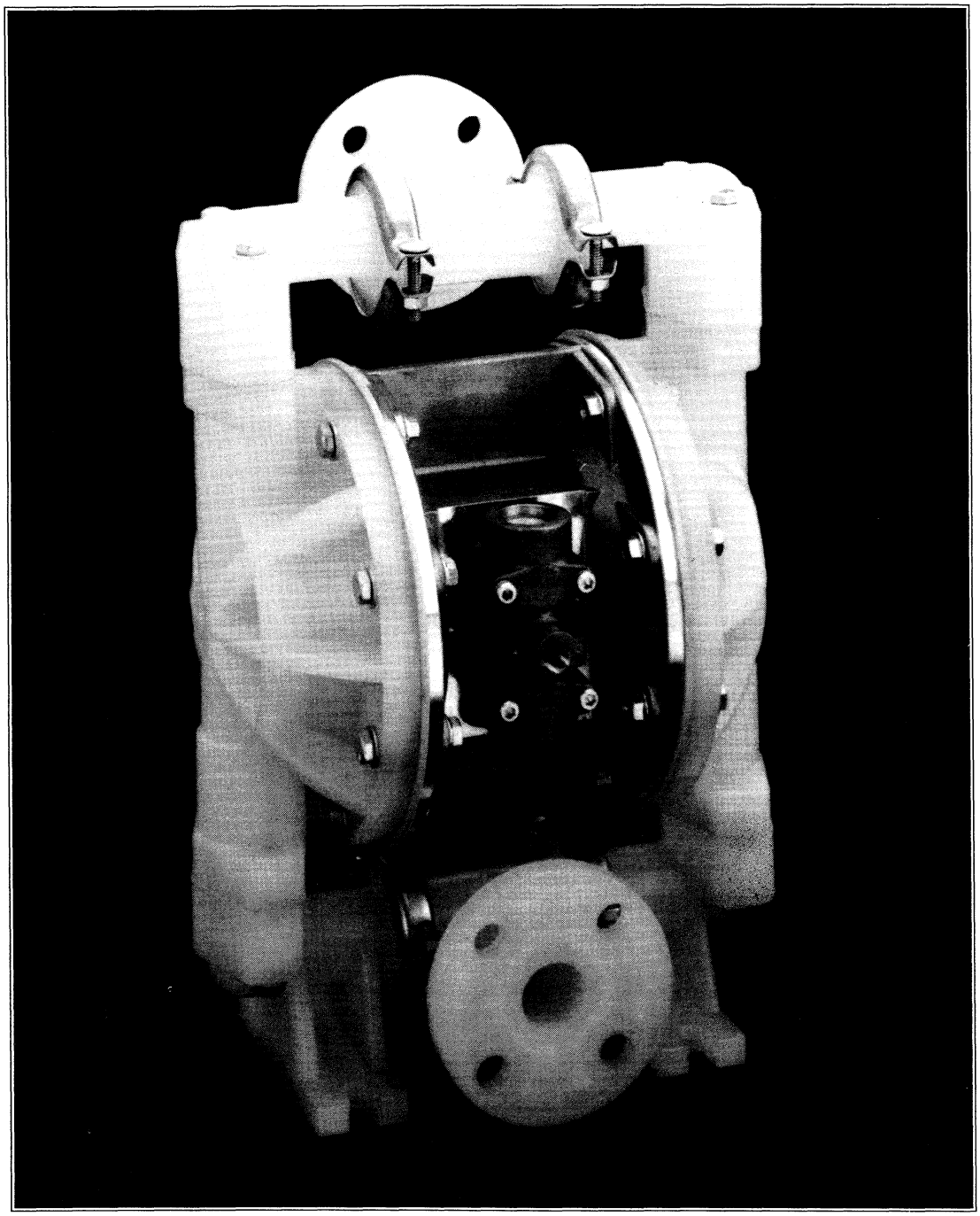
VERSA-MATIC® PUMP

Member of Hydraulic Institute

Operating Instructions



Model
V1P
V1K

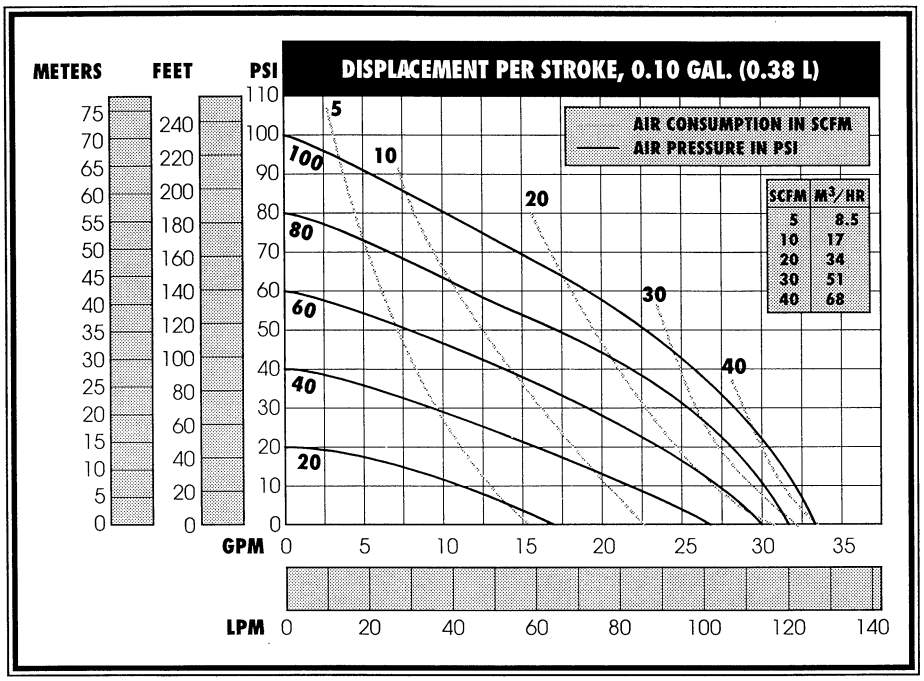
OI-1P, 5/99 Revised

Specifications and Performance

Volumes indicated on chart were determined by actually pumping water into calibrated tanks.

Versa-Matic Model V1P Model V1K

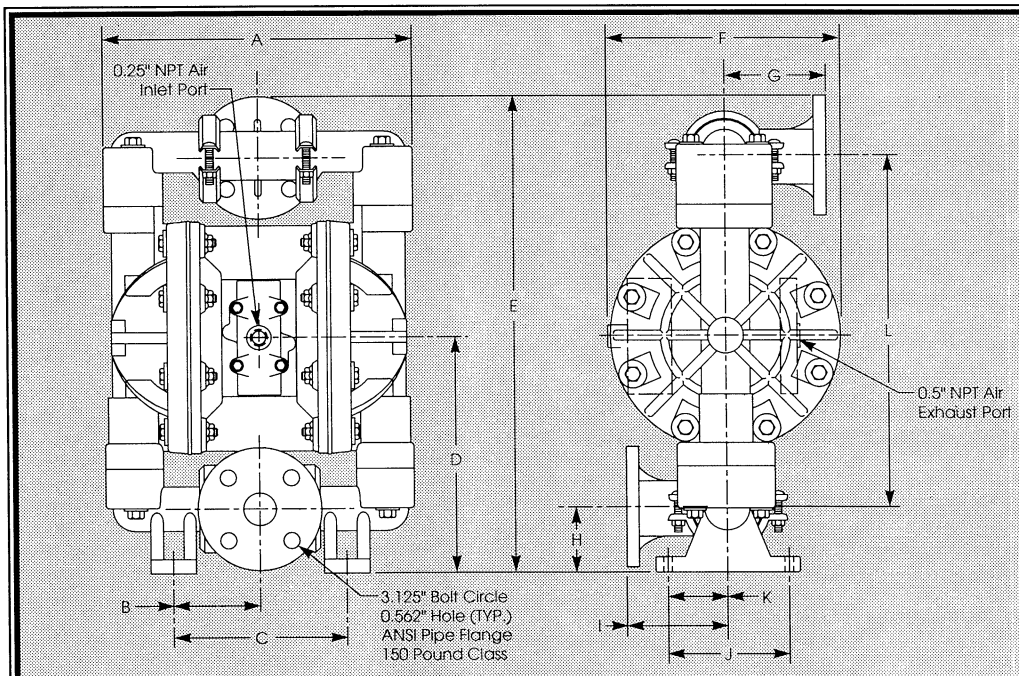
Flow Rate Adjustable To .....0-35 gpm (132 lpm)
Port Size
Inlet .....1" ANSI Flanged
Discharge .....1" ANSI Flanged
Air Inlet .....0.25" NPT
Air Exhaust .....0.50" NPT
Suction Lift .....15' (4.57m) Dry/ 25' (7.62m) Wet
Teflon .....10' (3.048m) Dry/ 20' (6.096m) Wet
Max. Particle Size (Diameter) .....0.125" (3.17mm)
Shipping Weights
Polypropylene .....24 lbs (10.89 kg)
Kynar .....24 lbs (10.89 kg)



Caution: Do not exceed 100 psig (6.8 bars) air supply pressure.

Note: For V1P & V1K pumps fitted with Tef-Matic™ diaphragms, reduce water discharge figures by 20%. Suction lift is reduced to 10' (3.048m) dry and 20' (6.096m) wet.

Teflon® is a registered tradename of E.I. DuPont. Kynar® is a registered tradename of Penwalt Corporation.



DIMENSIONS MODELS V1P/V1K		
ITEM	INCHES	METRIC MM
A	11	279.41
B	3.06	77.72
C	6.12	155.45
D	8.18	207.78
E	16.5	419.12
F	8.18	207.78
G	3.62	91.95
H	2.25	57.15
I	3.62	91.95
J	4.12	104.65
K	2.06	52.32
L	12.37	314.21

VERSA-MATIC® PUMP

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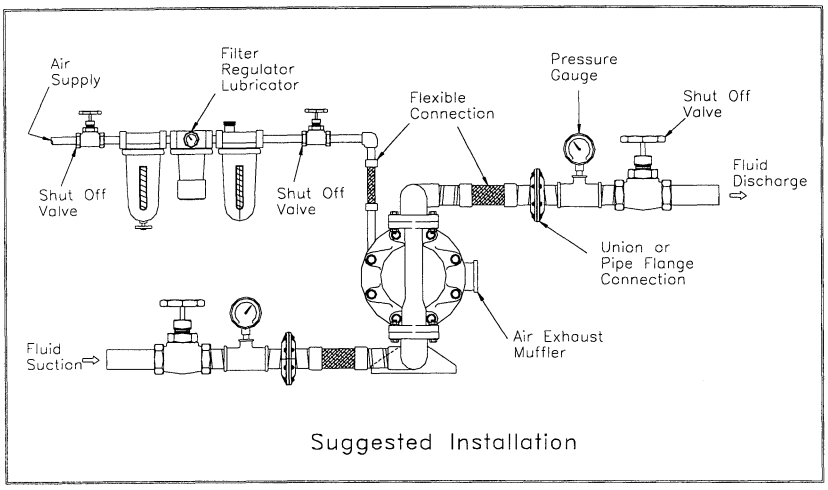
Consult factory for certified drawings

Revised 7/96



Suggested Installation

Caution
Do Not Exceed
100 psig air supply pressure

Installation

The V1 plastic pump comes with a footed base for easy mounting in permanent installations. The pump should be mounted in a vertical position. In permanent installations, the pump should be attached to plant piping using a flexible coupling on both the intake and discharge connections to reduce vibration to the pump and piping. To further reduce vibration, a surge suppresser next to the pump may be used.

Suction pipe size should be at least 1 inches in diameter or even larger if highly viscous fluid is to be pumped. If suction hose is used, it must be of a non-collapsible reinforced type. Discharge piping should be of at least 1 inches. It is critical, especially on the suction side of the pump, that all fittings and connections are air tight or pumping efficiency will be reduced and priming will be difficult.

The air supply line should be at least ½ " in diameter. Make certain the supplying line and compressor are capable of supplying the required pressure and volume of air to operate the pump at the desired flow rate. The quality of the compressed air source should be considered. Air that is contaminated with moisture and dirt may result in erratic pump performance and increased maintenance cost as well as frequent process "down time" when the pump fails to operate properly.

Pump Operation

The pump is powered by compressed air. Compressed air is directed to the pump air chamber by the main air valve. The compressed air is separated from the fluid by a membrane called a diaphragm. The diaphragm in turn applies pressure on the fluid and forces it out of the pump discharge. While this is occurring, the opposite air chamber is de-pressurized and exhausted to atmosphere and fluid is drawn into the pump suction. The cycle again repeats, thus creating a constant reciprocating action which maintains flow through the pump. The flow is always in through the bottom suction connection and out through the top discharge connection. Since the air pressure acts directly on the diaphragms, the pressure applied to the fluid roughly approximates the air supply pressure supplied to the main air valve.

Trouble Shooting

The pump will not run, or runs slowly:

1. Examine the air inlet screen for dirt.
2. Check for a sticking air valve. Remove air valve from the pump and flush with solvent to remove dirt and debris. Check the Air Valve Piston for nicks and scratches. If the Piston is shiny instead of dull black, the Piston and Valve may be worn out and may need replaced. Clean all ports and airways and replace worn out gaskets and O-Rings.
3. Check the Main Shaft for scoring and scratches; replace if needed. Check the Bushing O-Rings. If they are worn, flat or torn this will cause the pump to operate erratically. Versa-Matic recommends replacing the O-rings whenever servicing the main shaft or diaphragms.

The pump runs, but little or no material flows:

1. Check for pump cavitation, slow the pump speed down to match the thickness of the material being pumped.
2. Look for sticking ball checks. If the material being pumped is not compatible with the ball material, the elastomer may swell. Replace the balls and seats with a compatible elastomer type.
3. Make sure all the suction line fittings and connections are air tight.

Air bubbles in pump discharge:

1. Look for ruptured diaphragm. **2.** Check for suction leaks in pump manifolds and piping.

Material comes out of the pump air exhaust:

1. Inspect the diaphragm for rupture. **2.** Check the tightness of the diaphragm plates to the pump shaft.

Safety Warnings

This equipment should only be used by experienced professional mechanics. Observe all safety warnings. Read all safety warnings and operating manuals before using or repairing this Air Operated Diaphragm Pump. (A.O.D. pump)

General Safety

This equipment may generate fluid pressures equal to the air supply pressure. Therefore DO NOT exceed the recommended air supply pressure. 100 psi (6.8 bar) for plastic pumps, 125 psi (8.5 bar) for metallic pumps.

ALWAYS wear safety glasses when using power tools to repair this equipment.

When the pumping system contains dangerous fluids wear protective gloves, glasses etc. when working on or around this equipment.

ALWAYS shut off the air supply and disconnect it from the pump before performing maintenance or repair to the pump.

Do Not put your face or body near the pump air exhaust while the pump is operating.

Bleed all pressure from discharge and suction lines before disconnecting the fluid suction or fluid discharge lines from the pump.

DO NOT operate a pump that is leaking, damaged, corroded or otherwise unable to contain the internal fluid pressure.

ALWAYS make sure safety shut off valves, regulators, pressure relief valves, gauges etc. are working properly before starting the pump.

DO NOT pump incompatible fluids through the pump. Consult your distributor or the factory if you are not sure of compatibility of fluids with the castings and elastomers.

Versa-Matic pumps are designed to operate on compressed air. Other compressed gases have not been tested and may be unsafe to use in A.O.D. pumps.

Before starting a pump make certain the discharge point of the piping system is clear and safe and all person have been warned to stand clear.

Equipment Misuse Hazard

General Safety

Any misuse of this equipment such as over pressurization, modifying parts, pumping incompatible chemicals and fluids, using worn or damaged parts or using gasses other than compressed air to power the pump is not recommended. Any of these circumstance could result in splashing or spraying into the eyes, skin or possible serious bodily injury, fire, explosion or property damage.

Over pressurization

Never exceed the operating pressure recommended for the model pump being used.

Noise

Wear Proper Ear protection when working or standing near A.O.D. pumps. IT IS recommended that a Air Exhaust Muffler is used on this equipment at all time.

Installation Hazards

Do not submerge the pump in liquids that are incompatible with the wetted or non-wetted parts of the pump. If installing in a submerged location extend the air exhaust port above the liquid surface with suitable pipe or hose.

Route exhaust line to safe location away from people and install a Air Exhaust Muffler.

Pump Diaphragm Failure

A.O.D. pumps utilize a elastomeric membrane to separate the pumping liquid from the air supply. When this membrane ruptures pumping fluid may be expelled from the air exhaust port. Always pipe the air exhaust port to a safe location or suitable container if dangerous or volatile liquids are being pumped.

Installation

Never allow the piping system to be supported by the pump manifolds or valve housing. The manifolds and valve housings are not designed to support any structural weight and failure of the pump may result. The use of flexible piping connections is highly recommended.

Temperature limits

Do not exceed the recommended operating temperatures of the pump or pump failure may result.

Moving Parts Hazard

The diaphragm plates (sometimes referred to as piston plates) located inside the pump on either side of the main shaft move when air pressure is supplied to the pump. Therefore, Never attempt to operate the pump with the liquid chambers removed. Moving parts inside the pump can pinch or seriously injure your fingers or other body parts.

Fire or Explosion Hazard

Static electricity can be created by the flow of fluid through the pump or by the reciprocating action of A.O.D. pumps. If the pump is not properly grounded, sparking may occur, and the system may become hazardous. Sparks can ignite fumes or vapor and cause an explosion.

If you experience static sparking or even a slight shock when using the pump do not continue to operate the pump until the pump is properly grounded.

Proper Grounding

Pump, Valves, Discharge and supply lines as well as containers must be grounded. These items must be grounded when handling flammable fluids and when static electricity discharge is a hazard.

1. To ground plastic pumps connect a ground wire to all metallic clamps as well as the air valve body & piston assembly. The ground wire should be connected to a suitable ground location. (figure 1)
2. To ground metallic pumps, connect a ground wire to any accessible point of attachment such as clamp band bolt or mounting base.

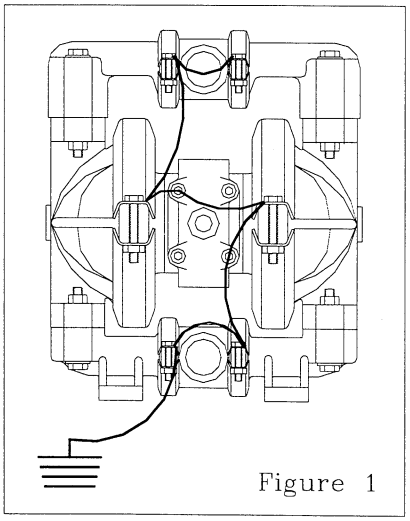


Figure 1

Sound Level Ratings, dB(A)

The following table lists the sound level ratings of Versa-Matic Pumps equipped with factory installed Air Exhaust Mufflers. The readings were obtained with a Pacer Industries model SL-120, sound level indicator "A" scale. Readings were made at a distance of 1 meter from the pump and a height of 1.6 meters above the floor. It is assumed the pumps will be installed at floor level.

Pump series	**dB(A) reading**
V5, 1/2" pump	71.7 dB(A)
V1, 1" pump	76.5 dB(A)
V4, 1-1/4" pump	78.0 dB(A)
V2, 2" pump	74.3 dB(A)
V3. 3" pump	67.1 dB(A)
E2, 2" pump	74.3 dB(A)
E3, 3" pump	67.1 dB(A)
E4, 1-1/4' pump	78.0 dB(A)

Temperature Limitations

Maximum Temperature limitation are based on mechanical stress only. Certain chemicals will reduce the maximum safe operating temperatures of A.O.D pumps. Consult your dealer or Chemical Resistance guide for compatibility and temperature limits.

Metallic Pumps

Metallic pumps can operate past 212°F (100°C). However if you are operating above these limits, consult the factory for assistance.*

Plastic Pumps

Plastic pumps can operate within the following limits:*

Polypropylene: 32°(0°C) to 175°F(79°C)
PVDF (Kynar): 10°F(-12°C) to 225°F(107°C)
Teflon PFA: -20°F(-29°C) to 200°F(93°C)

*Do not exceed the maximum temperature limits of the elastomer type (diaphragms, balls, seats) that is used in your pump.

Temperature limits of various elastomer types

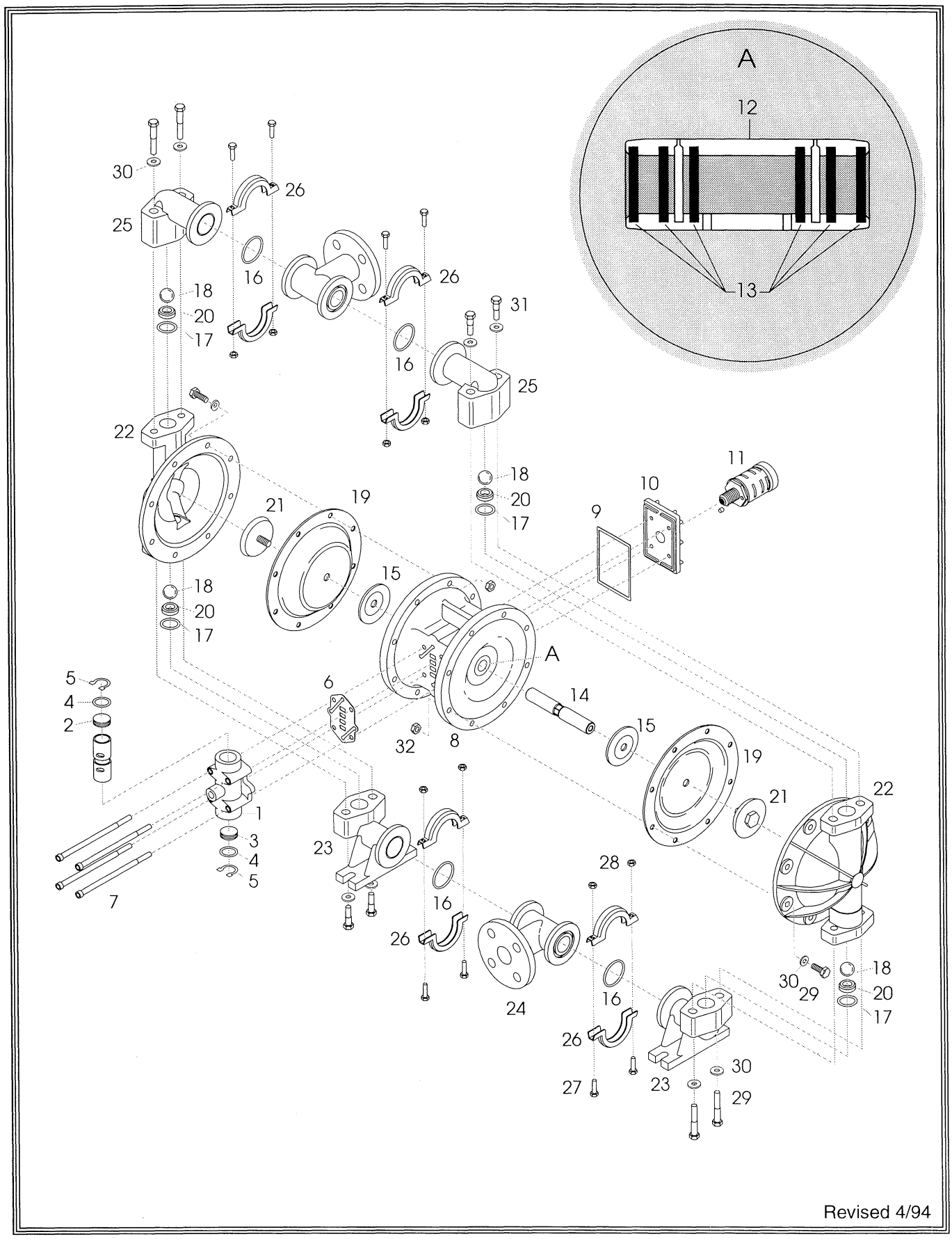
Neoprene: 0°F(-18°C) to 200°F(93°C)
Buna-N: 10°F(-12°C) to 180°F(82°C)
Nordel: -60°F(-51°C) to 280°F(138°C)
Viton: -40°F(-40°C) to 350°F(176°C)
Teflon: 40°F(4°C) to 220°F(105°C)
Polyurethane: 10°F(-12°C) to 170°F(77°C)
XL TPE: -20°F(-29°C) to 300°F(149°C)
FDA Hytrel: -20°F(-29°C) to 220°F(104°C)

V1P/V1K
Assembly Drawing & Parts List (8/97)

Item	Description	Qty	Pump Model Number			
			With Rubber Elastomers		With Teflon Elastomers	
			V1PA Polypropylene	V1KA Kynar	V1PA5 Polypropylene w/Teflon	V1KA5 Kynar w/Teflon
			Applicable Part No.			
1	Valve Body & Piston	1	V180VB			
2	Valve Cap w/Guide	1	PV180R			
3	Valve Cap w/o Guide	1	PV180S			
4	Valve Cap O-Ring	2	V302D			
5	Snap Ring	2	SV180T			
6	Air Valve Gasket	1	V180B			
7	Air Valve Screws	4	V180AS			
8	Center Section	1	V180CS			
9	Muffler Plate Gasket	1	V180MG			
10	Muffler Plate	1	V180M			
11	Muffler	1	VM-0500			
12	Block Bushing	1	V180N			
13	Bushing O-Rings	6	V180J			
14	Shaft	1	AV181A		AV181AT	
15	Inner Diaphragm Plate	2	V181C		V181TI	
16	Manifold O-Ring	4	V188TF			
17	Valve Seat O-Ring	4	V190TES			
18	Valve Ball *	4	V191xx		V191TF	
19	Diaphragm *	2	V183xx-1		V183TF-1	
	Back-up Diaphragm	2	N/R		V183TB	
20	Valve Seat	4	PV190	KV190	PV190	KV190
21	Outer Diaphragm Plate	2	PV181B	KV181B	PV181TO	KV181TO
22	Water Chamber	2	PV185	KV185	PV185	KV185
23	Inlet Elbow	2	PV187	KV187	PV187	KV187
24	Manifold Tee	2	PV188	KV188	PV188	KV188
25	Discharge Elbow	2	PV186	KV186	PV186	KV186
26	Small Clamp	4	SV189			
27	Small Clamp Bolt	8	SV189B			
28	Small Clamp Nut	8	SV169C			
29	Connecting Bolt	20	SV187A			
30	Washer	24	SV189C			
31	Discharge Manifold Bolt	4	SV186A			
32	Flange Nut	16	SV185B			

* When ordering elastomers, elastomer type must be known. Substitute the following to designate elastomer type:

xx = BN - Buna-N ND - Nordel VT - Viton
TF - Teflon XL - TPE XL FG - Hytrel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