

**VERSA-MATIC  
PUMP**

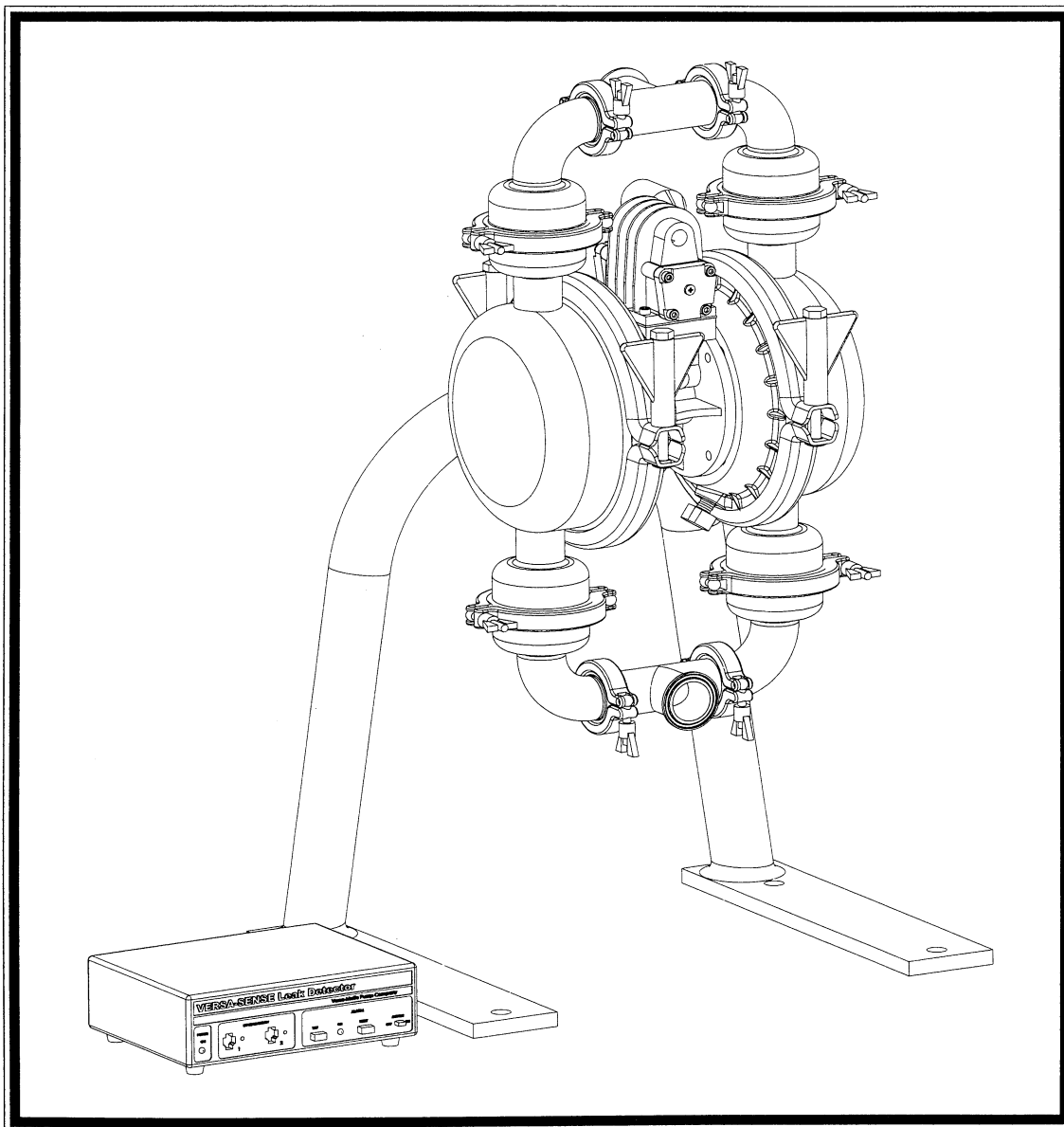


**IDEX**  
IDEX CORPORATION

Member of

*Hydraulic*  
INSTITUTE

# Operating Instructions



**Model E4  
Sanitary-  
3A**

OI-E43A 07/01

E4 Sanitary 3A

# The Elima-Matic® Sanitary Pump

The Elima-Matic sanitary pump has been designed to the 3A Sanitary Standards for Air or Hydraulically Driven Diaphragm Pumps for Milk and Milk Products, Number 44-01. These standards have been formulated by the International Association of Milk, Food, and Environmental Sanitarians (IAMFES), the United States Public Health Service (USPHS) and the Dairy Industry Committee (DIC). The Versa-Matic 3A Sanitary Pump has been reviewed by the 3A Symbol Council and found to meet or exceed the standards set forth by these committees.

The Elima-Matic sanitary pump is constructed of 316 stainless steel with a surface finish of 32 microinch (0.8 micrometer) or better on both the product contact surfaces and the external surfaces. The sanitary pump features tri-clamp connections on both the inlet and discharge ports, as well as wing nut fasteners on all connections to allow for quick assembly and disassembly. The pump stand also aids in easy assembly and disassembly of the pump and allows for 180-degree rotation of the pump for easy draining.

The Elima-Matic sanitary pump does not utilize any valve seats or o-rings, only a removable ball cage. The fewer parts and smooth, flow-through design will not damage the product being pumped and will allow the passage of solids up to 3/8" in diameter. Finally, the Versa-Sense leak detection system protects the pumped product from contamination and eliminates lengthy down-times by terminating the pumping action and alerting users in the event of a diaphragm failure.

Initially issued March 19, 1999



Authorization No. 1012

## This Is To Certify That

VERSA-MATIC PUMP

6017 Enterprise Drive, Export, PA 15632-8969

is hereby authorized to continue to apply the 3-A symbol to the models of equipment, conforming to the 3-A Sanitary Standards for Air, Hydraulically, or Mechanically Driven Diaphragm Pumps for  
Milk and Milk Products (44-02)

, set forth below:

**Model Designations** E4SJ7X7S0-3A-230-LL, E4SJ7X7S0-3A-SL, E4SJ7X7S0-3A-115-LL,  
E4SJ7X7S0-3A-115-SL, E4SJ5T5S0-3A-230-LL, E4SJ5T5S0-3A-230-SL, E4SJ5T5S0-3A-115-LL,  
E4SJ5T5S0-3A-115-SL

for the twelve months ending March 18, 2000

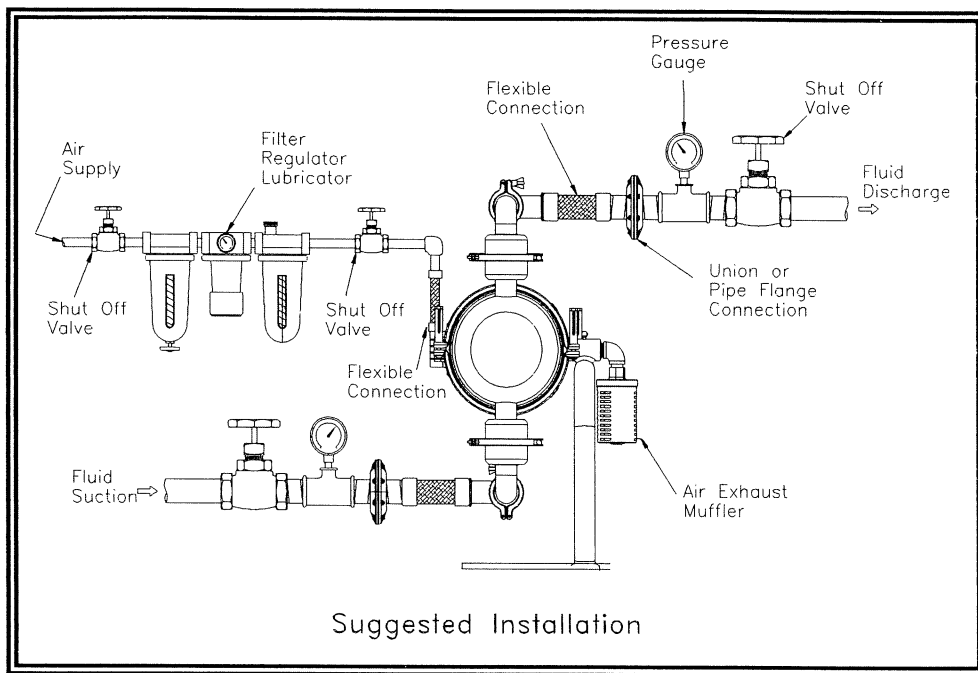
Date of issuance: March 19, 1999, Secretary.

**3-A SANITARY STANDARDS SYMBOL ADMINISTRATIVE COUNCIL**

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The issuance of this authorization for the use of the 3-A symbol is based upon the voluntary certification, by the applicant for it, that the equipment listed above complies fully with the 3-A Sanitary Standards designated. Legal responsibility for compliance is solely that of the holder of this Certificate of Authorization, and the 3-A Sanitary Standards Symbol Administrative Council does not warrant that the holder of an authorization at all times complies with the provisions of the said 3-A Sanitary Standards. This in no way affects the responsibility of the 3-A Sanitary Standards Symbol Administrative Council to take appropriate action in cases in which evidence of non-compliance has been established.





**CAUTION!**  
**Do Not Exceed**  
**125 PSI Air**  
**Supply Pressure.**

**Installation**

The 3A Sanitary Pump should be installed in an area that is readily accessible. A clear work area should be maintained around the pump to facilitate easy cleaning, maintenance, and inspection. In permanent installations, the pump should be attached to plant piping using a flexible coupling on both the intake and the 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 1-1/2 inches in diameter or 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 1-1/2 inches. It is critical, especially on the suction side of the pump, that all fittings and connections are airtight or pumping efficiency will be reduced and priming will be difficult.

The air supply line should be at least 1/2 inch in diameter. Make certain the supply line and compressor are capable of supplying the required pressure and volume of air needed 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 depressurized and exhausted to atmosphere and fluid is drawn into the pump suction. The cycle again repeats, thus creating a constant reciprocating action that 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 valve.

## **Troubleshooting**

### **The pump will not run, or runs slowly:**

1. Examine the air inlet screen for debris.
2. Check for a sticking air valve. Remove the air valve from the pump and flush with solvent to remove dirt and/or debris. Check the spool and sleeve for nicks and scratches. If the spool is shiny instead of dull black, the spool and sleeve may be worn out and may need to be replaced. Clean all ports and airways and replace worn out gaskets and o-rings.
3. Check pilot shaft and main shaft for scoring and scratches; replace if needed. Replace the pilot shaft and main shaft o-rings if they are worn, flat or torn.

### **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 tight.

### **Air bubbles in pump discharge:**

1. Look for a 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.

## **Inspection and Cleaning**

The Elima-Matic Sanitary Pump can be cleaned using several techniques. However, It is important to follow guidelines set by the IAMFES, the USPHS, and the DIC and/or internal rules for inspection, cleaning, and sanitization.

If the pump is to be steam cleaned, disconnect the suction line from the pump. Connect the steam line to the pump inlet. Maintain the flow of steam through the pump for at least five minutes after the temperature at the outlet has reached 200°F (94 °C).

Hot water may also be used. Pump water that is maintained at minimum of 170 °F (77 °C) through the pump for at least five minutes. Please note that the maximum cleaning temperature of the pump is 220 °F (104 °C).

Chemical cleaning may also be used in sanitizing the pump. Be sure to consult your distributor or the manufacturer to verify that the elastomer(s) used in the pump are compatible with the chemicals being used in the cleaning process.

## MAINTENANCE AND TROUBLESHOOTING

### Cleaning

Clean the tip of the sensor probe with a soft, dry cloth. If liquid cleaner is used, rinse and dry thoroughly before resuming operation. Keep the Versa-Sense control unit enclosure clean by using a mild detergent. Never immerse or use excess fluid.

### Fuse Replacement

The 115 VAC Versa-Sense Leak Detector uses a 10-A Slo-Blo fuse which is located in the fuse holder on the rear panel. Replace only with the correct fuse.

### Troubleshooting

The following chart will help identify most problems which can be corrected by the operator.

SYMPTOM	CAUSE	REMEDY
POWER ON indicator does not illuminate with Power ON-OFF switch in ON position	Fuse blown	Replace Fuse
	Power cord not plugged into active power source	Plug power cord in
Alarm LIGHT illuminates but audible alarm does not sound	Audible alarm switch not set to ON position	Set switch to ON position
Alarm does not activate for a fault condition	Detector not connected	Connect detector
	Sensitivity set too low	Increase sensitivity
	Detector inoperative	Replace sensor probe
RESET button does not reset unit when depressed	Fault not cleared	Clear fault
	Sensitivity set too high	Lower sensitivity
	Reset button failure	Return unit for servicing

NOTE: When using the Versa-Sense Leak detector it is recommended that the cleanest, driest air possible be used. If excess moisture is present in the compressed air, be sure to adjust the sensitivity of the sensor probes accordingly (See *the Sensitivity Adjustment Section*). The accuracy and reliability of the leak detection unit will be adversely affected if the air supply contains excess moisture and/or debris.

## **Installation and Set-up of the Versa-Sense Leak Detector**

Before installing the Versa-Sense Leak Detector, it is recommended that a sensitivity check be performed with the media that is to be pumped.

### **Sensitivity Check**

1. Connect a sensor probe to one of the front INPUT Connectors.
2. Place the fluid to be pumped one drop at a time on the tip of the sensor probe. DO NOT drop the media from more than one inch.
3. Check number of drops required to activate alarm. Pre-set factory setting should activate the alarm with less than 1 ml of water. If activation level is not as desired, refer to the sensitivity adjustment section.
4. After activating the alarm, momentarily press then release the RESET button, Alarm condition should still be present.
5. Wipe the surface of the sensor probe clean with a dry cloth and momentarily press then release the RESET button. Alarm condition should terminate.

### **Sensitivity Adjustment**

Generally, no sensitivity adjustment of the Versa-Sense Leak Detector is required. However various liquids or environmental conditions such as temperature and humidity may require adjustment of the sensitivity controls. The sensitivity adjustment is accessed through the small hole adjacent to each input connector.

If the factory default setting for sensitivity is not activating the alarm, or is falsely activating the alarm, adjust the input sensitivity with one channel connected at a time. Turn the sensitivity control clockwise to increase the sensitivity (fewer drops will activate) or counterclockwise to decrease sensitivity.

**NOTE:** If the sensitivity is increased so much that the red ALARM ON indicator illuminates, the RESET button must be depressed each time the sensitivity is decreased until the indicator returns to the non-alarm condition. Normal sensitivity adjustment is between one-quarter and two turns counterclockwise from the activation point. The activation point is defined as the sensitivity set when the ALARM ON indicator just illuminates.

### **Installation**

1. Turn the power ON/OFF switch at the rear of the control unit to the OFF position.
2. Connect valves, alarms, etc. to the main, auxiliary, and contact closure connections at the rear of the unit.
3. Insert one sensor probe into each of the pump air chambers through the threaded boss provided. The tip of the sensor probe MUST NOT go past the inner wall of the air chamber. This is important so that the diaphragm will not wear on the sensor probe while the pump is cycling.
4. Connect the end of the sensor probe to the control unit. Only one sensor probe can be connected to each channel. (A maximum of two sensor probes can be maintained with one Versa-Sense control unit.)
5. Set the audible alarm to either the ON or OFF position: whichever is desired.
6. Set the rear panel power ON/OFF switch to the ON position and check that the front panel green POWER ON indicator is lit. The equipment should now be operating normally.
7. If an alarm condition exists, proceed to the sensitivity adjustment section.

## 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 (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: 125 psi (8.5 bar).

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

When pumping systems contain 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 on the pump.

DO NOT put your face or body near the pump air exhaust while the pump is operating.

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

### 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 circumstances could result in splashing or spraying into the eyes or skin, possible serious bodily injury, fire, explosion or property damage.

#### Installation Hazards

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.

#### Noise

Wear proper ear protection when working or standing near A.O.D. pumps. It is recommended that an Air Exhaust Muffler is used on this equipment at all times.

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 that the discharge point of the piping system is clear and safe and all persons have been warned to stand clear.

#### Pump Diaphragm Failure

A.O.D. Pumps utilize an 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.

#### Over-Pressurization

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

#### 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. To ground metallic pumps, connect a ground wire to any accessible point of attachment such as the clamp band bolt or pump stand.

### **Sound Level Ratings**

The 3A Sanitary Pump, with a factory installed Air Exhaust Muffler, is found to have a sound level rating of 81 dB(A). Measurements were taken using a Pacer Industries model SL-120, sound level indicator "A" scale. With the pump located at floor level, readings were taken at a distance of 1 meter from the pump and a height of 1.6 meters above the floor.

### **Temperature Limitations**

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

### **Temperature Limitations of the Elastomer Types:**

Teflon: 40 °F(4 °C) to 220 °F(105 °C)

FDA Hytrel: -20 °F(-29 °C) to 220 °F(105 °C)

Acetal: 32 °F (0 °C) to 240 °F (116 °C)

**Versa-Matic Pump Company**  
**Model E4, 3A Sanitary Pump Parts List (1/99)**

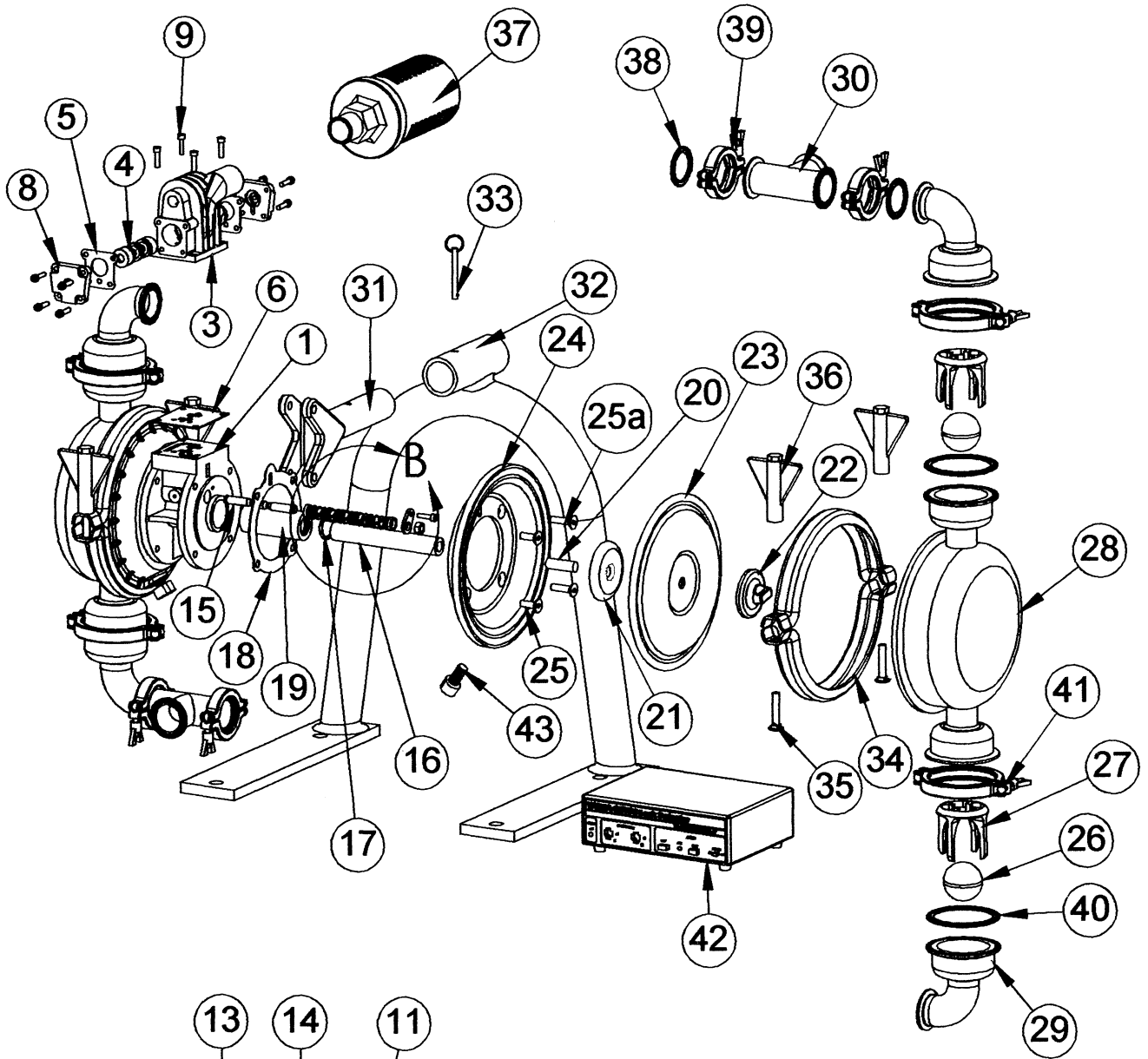
Item	Description	Qty.	With Food Grade Elastomers (Sanitary pumps only)		With Teflon Elastomers	
			Applicable Part Number			
1	Elima-Matic Center Section	1			P31-401NP	
2	E4 Valve Assembly(items 3 thru 10)	1			P31-200NP	
3	E4 Valve Body	1			P31-201NP	
4	Spool	1			P50-104	
4a	Glyd-Ring Assembly	3			P50-104C	
5	Gasket, End Cap	2			P50-110	
6	Gasket, Valve	1			P31-202	
8	End Cap	2			P50-300TC	
9	Cap Screw	14			P24-208	
10	Stop Nut	2			P24-108	
11	Retainer, Pilot Shaft	2			P50-109NP	
12	Spacer, Pilot Shaft	2			P50-119	
13	O-Ring, Pilot Valve	6			P24-107	
14	Ring, Pilot Valve	5			P24-106	
15	Pilot Shaft	1			P50-112	
16	Shaft	1		P31-103		P31-102
17	Bushing O-Ring	2			P24-403	
18	Air Chamber Gasket	2			P31-109	
19	Bushing	1			P31-402	
20	Shaft Stud	2			V161F	
21	Inner Diaphragm Plate	2		V161CNP		V161TINP
22	Outer Diaphragm Plate	2		SVB161-3A		3A161TO
23	Diaphragm	2		V163FG		V163TX
24	Air Chamber	2			P31-1013ANP	
25	Air Chamber Bolt	4			P31-404	
25b	Air Chamber Bolt	4			P31-404B	
26	Valve Ball	4		V171TPEFG		V171TF
27	Ball Cage	4			P31-252	
28	Water Chamber	2			P29-165	
29	Manifold Elbow	4			P29-167	
30	Manifold "tee"	2			P29-168	
31	Stand Attachment	1			P31-651NP	
32	Pump Stand	1			P29-650CP	
33	Locking Pin	1			P29-652	
34	Large Clamp Band	4			SP31-110A	
35	Large Clamp Band Bolt	4			SP31-110B	
36	Large Clamp Band Wing Nut	4			FG39C	
37	Air Exhaust Muffler	1			VM-0750	
38	1-1/2" Tri-Clamp Gasket	4			V273	
39	1-1/2" Tri-Clamp	4			V273A	
40	3" Tri-Clamp Gasket	4			V274	
41	3" Tri-Clamp	4			V274A	
42	Leak Detector Control Unit	1			P29-750*	
43	Leak Detector Sensor Probe	2			P29-751**	

\*The Versa-Sense Leak Detector Control Unit is available in (2) Models:

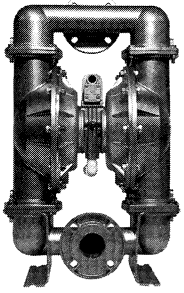
P29-750: 115V Unit  
P29-753: 230V Unit

\*\*The Versa-Sense Leak Detector Sensor Probes are available in (3) Models:

P29-751: FDA rated Acetal, 3' Leads  
P29-752: FDA rated Acetal, 10' Leads  
P29-752TF: Teflon, 10' Leads



DETAIL B

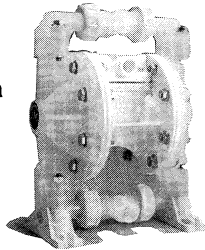


**ELIMA-MATIC®  
ANTI-STALLING PUMPS**

- Virtually eliminates pump stalling caused by air valve system freeze-ups
- Anti-stalling, non-icing, lubrication-free air valve system.
- Available in 1/2", 1", 1 1/4", 2" and 3" sizes
- Wide selection of materials of construction—including 1/2", 1" and 2" plastic models

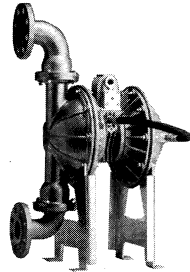
**PLASTIC PUMPS FOR SOLVENTS AND CHEMICALS**

- Exceptional corrosion resistance
- Wide selection of materials of construction for wetted and non-wetted parts
- Leak free bolted construction
- Also available in 1/2", 1", 1 1/2" and 2" with the Elima-Matic anti-stalling air valve system



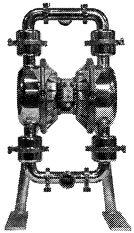
**Elima-Matic 2:1 High Pressure Pump**

- Cast in 150lbs ANSI/DIN flanges
- Constructed of 316 stainless steel
- Can create discharge pressure over 200 psi
- Leak-Free bolted design



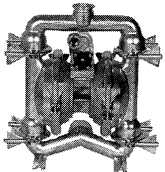
**FOOD AND SANITARY PUMPS  
SANITARY PUMPS**

- FDA approved for use with milk and milk products
- Constructed of 316 stainless steel
- Surface finish of 32 micro-inch or better
- Removable ball cages
- Easy clean Tri-clamp® connections



**FOOD PROCESSING PUMPS**

- Constructed of 316 stainless steel
- FDA approved
- Tri-clamp® connections
- Over-sized clamp wing nuts for disassembly



**VERSA-MATIC PUMP**

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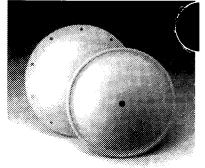
[www.versamatic.com](http://www.versamatic.com)

*\* Life cycle may vary according to extreme start-up conditions, chemicals and abrasive fluids. To prolong diaphragm life, Versa-Matic recommends a gradual increase in air supply on pump start-up.*

*Elima-Matic®, Versa-Dome®, Versa-Matic® and VR™ are registered trademarks or trademarks of Versa-Matic Tool, Inc. Some Versa-Matic Tool, Inc. products are subject to patent pending applications and issued patents. Elima-Matic U.S. Patent No. 5,326,234. Hytrel®, Nordel®, Teflon® and Viton® are registered trademarks of DuPont. Tri-Clamp® is a registered Trademark of the Tri-Clamp, Inc. Wilden® is a registered Trademark of Wilden Pump and Engineering Co.*

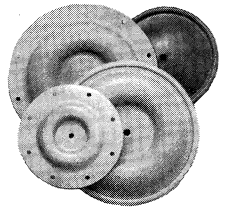
**VERSA-DOME® DIAPHRAGMS**

- The simple, smooth design eliminates complex angles allowing for 3 to 4 times the flex life of standard diaphragms.
- So flexible they can be installed and removed without the use of pry bars
- Has lower start up pressure than standard diaphragm.
- Available Neoprene, Buna-N, Hytrel, Nordel®, Viton® and XL.
- For use in Versa-Matic and Wilden 1/2", 2", 3" pumps.



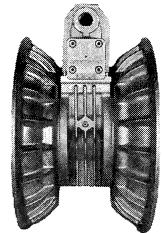
**VERSA-TUFF TEFLON DIAPHRAGMS**

- Single piece diaphragm combining the chemical resistance of Teflon with the flex life of rubber.\*
- Three times the burst strength of ordinary Teflon overlays
- More flexible and 100% bonded to the reinforced rubber backing
- Diaphragms can be placed into Wilden® M4 and M8 pumps



**GENUINE VERSA-MATIC REPLACEMENT PARTS AND RETRO FIT CENTER SECTIONS**

- Upgrade V-series and Wilden® M4, M8, and M15 pumps with an Elima-Matic retro fit center section
- For complete repair of Versa-Matic pumps and Wilden® M4, M8 and M15 metallic pumps
- Cost-saving elastomer kits for any Versa-Matic pump or Wilden® M1, M2, M4, M8 and M15 pumps
- Diaphragm and elastomer repair kits available in Buna-N, Neoprene, Nordel®, Teflon®, Viton®, Thermo Plastics Hytrel®, and XL



Your local authorized distributor:

