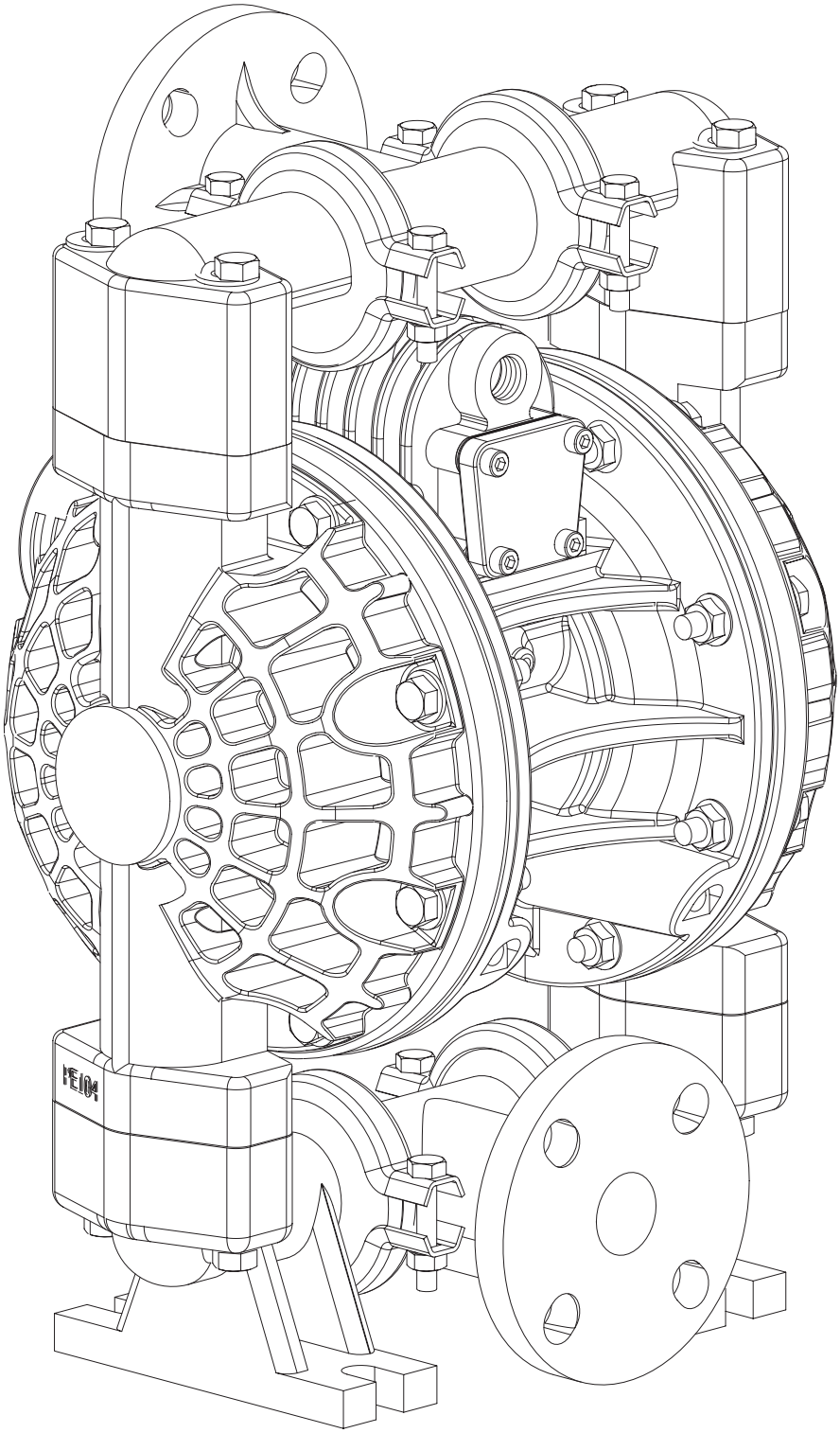
E1 1" Bolted Plastic Pumps
With Metallic Center Sections
Operating Instructions

VERSA-MATIC PUMP

Member of Hydraulic Institute



E1 Polypropylene

E1 Kynar

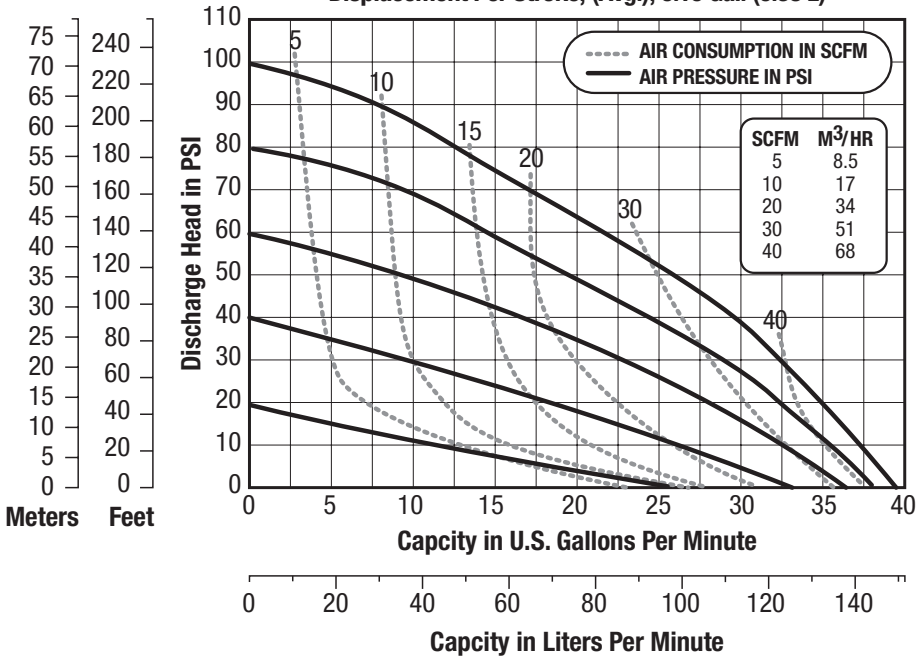
IDEX CORPORATION

SPECIFICATIONS AND PERFORMANCE

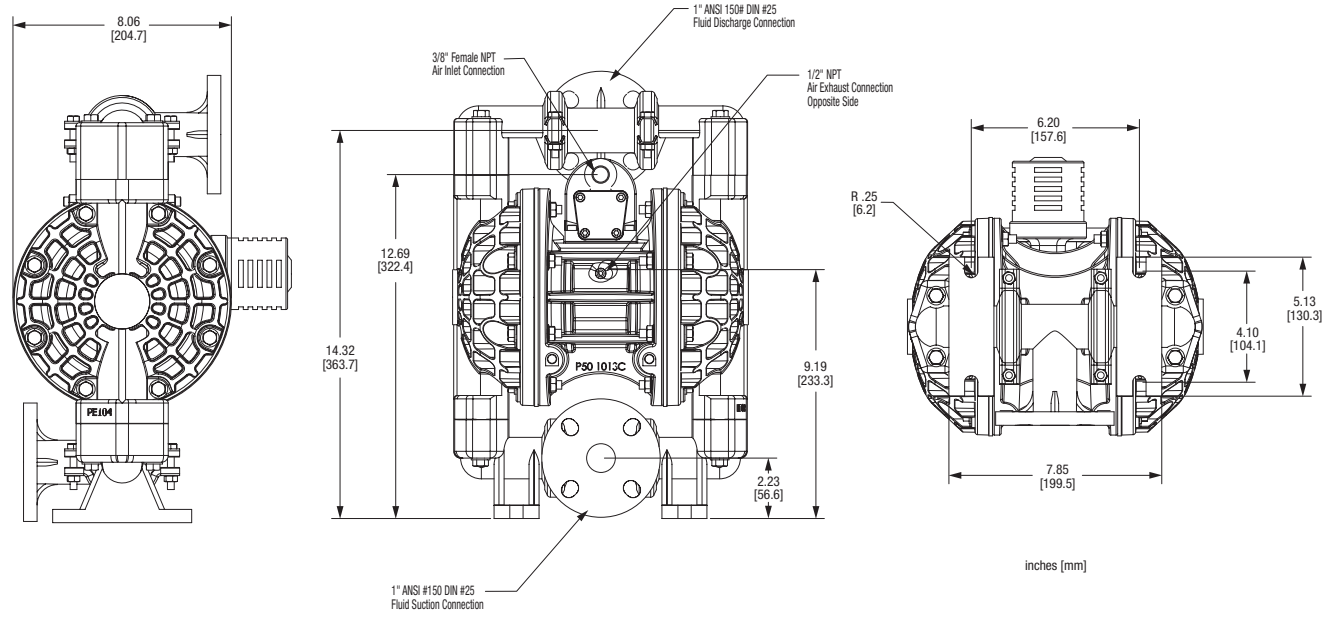
Versa-Matic Model
E1 Bolted 1" Pump

Flow Rate
Adjustable to . . . . . 0-35 gpm (132 lpm)
Port Size
Inlet . . . . . 1.0" ANSI/DIN Flanged
Discharge . . . . . 1.0" ANSI/DIN Flanged
Air Inlet . . . . . 0.375" NPT
Air Exhaust . . . . . 0.50" NPT
Suction Lift
Rubber . . . . . 15' (4.57 m) Dry
. . . . . 25' (7.62 m) Wet
Teflon . . . . . 10' (3.05 m) Dry
. . . . . 20' (6.10 m) Wet
Max. Particle Size (Dia.) . . 0.125" (3 mm)
dB(A) Reading . . . . . 67.1 dB(A)
Shipping Weights
Polypropylene . . . . . 24 lbs (10.90 kg)
Kynar . . . . . 25 lbs (11.34 kg)

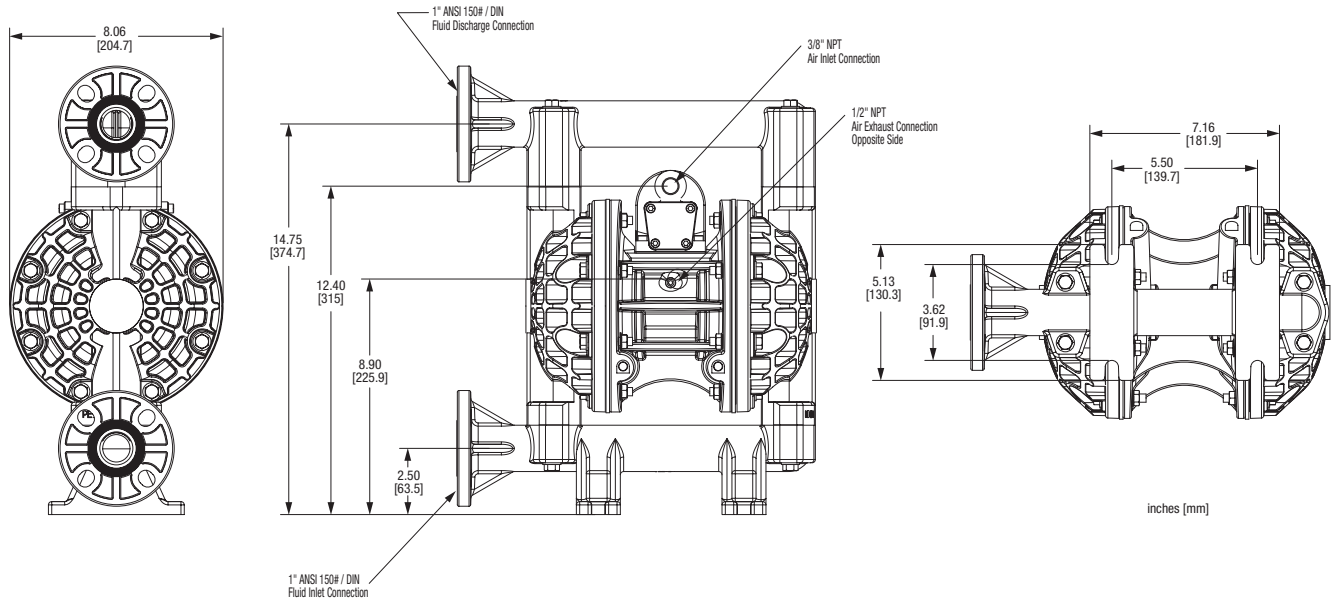
Caution: do not exceed 100 psig (6.9 bar) liquid or air supply pressure.



E1 1" Bolted Plastic Pump — Standard Center Ports



E1 1" Bolted Plastic Pump — Optional Side Ports



SAFETY WARNINGS

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 could result in death, serious bodily injury and/or property damage including damage to the pump and/or voiding the factory warranty.

Correct pump selection is crucial to the pump operation. Please assure pressure, temperature and chemical compatibility before installation. Please consult Versa-Matic Pump, Engineering Specifications, Chemical Compatibility Chart, or your distributor if in doubt about any application.

Operating Limitations for Various Elastomers

Neoprene	0°F (-18°C) to 200°F (93°C)
Buna-N	10°F (-12°C) to180°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)

Operating Limitations for Plastic Pumps

Kynar (PVDF)	10°F (-12°C) to 225°F (107°C)
Polypropylene	32°F (0°C) to 175°F (79°C)

Maximum temperature limits are based upon mechanical stress only. Certain chemicals and environment conditions significantly reduce maximum safe temperature limits.

Before pump operation, inspect all gasketed fasteners for looseness caused by gasket creep. Re-torque all loose fasteners to prevent leakage. Follow recommended torques stated in this manual. Failure of the sealing components creates the possibility of jetting or forceful discharge of pumped material at a potentially harmful velocity.

Be certain that approved eye protection and protective clothing are always worn during installation, service, maintenance or when in the vicinity of the pump. Failure to follow these recommendations may result in serious injury or death.

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

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.

Noise levels can exceed 85 dBA. Take precautions to prevent personal injury due to excessive pump noise.

Do not exceed pump maximum operating pressure (found on label and/or operating manual.)

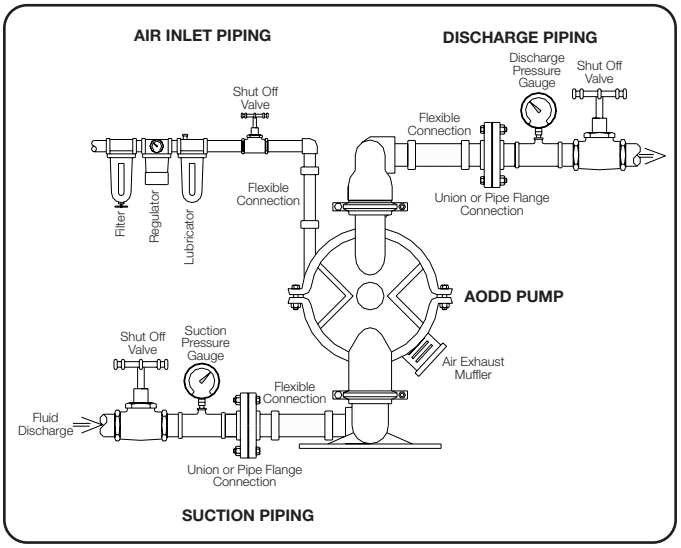
Before doing any maintenance or repair on this pump, be certain all pressure is completely vented for the pump, suction, discharge, piping, and all other openings.

In the event of a diaphragm rupture, pumped material may enter the air end of the pump and be discharged into the atmosphere. If pumping a product that is hazardous or toxic, the air exhaust must be piped to an appropriate area for safe disposition.

INSTALLATION, OPERATION AND MAINTENANCE

Installation

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 suppressor next to the pump may be used.



Suction pipe size should be at least the same diameter as the inlet connection size, 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 the same diameter as the discharge connection. 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.

Make certain the air supply line and connections 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.

Recommended Piping Connections

Pump Size	Minimum Air Line Size	Minimum Suction Line Size
1/2"	1/2"	1/2"
1"	1/2"	1"
1-1/2"	1/2"	1-1/2"
2"	1/2"	2"
3"	3/4"	3"

E1 Bolted Plastic Pump Torque Settings

Manifold Bolts	165 in-lbs (18.6 N-m)
Water Chamber Bolts	160 in-lbs (18.1 N-m)
Diaphragm Plates — Rubber	10 ft-lbs (13.6 N-m)
Diaphragm Plates — Teflon	10 ft-lbs (13.6 N-m)
Air Valve Cap Screws	30 in-lbs (3.4 N-m)

Elastomer Suffix Codes

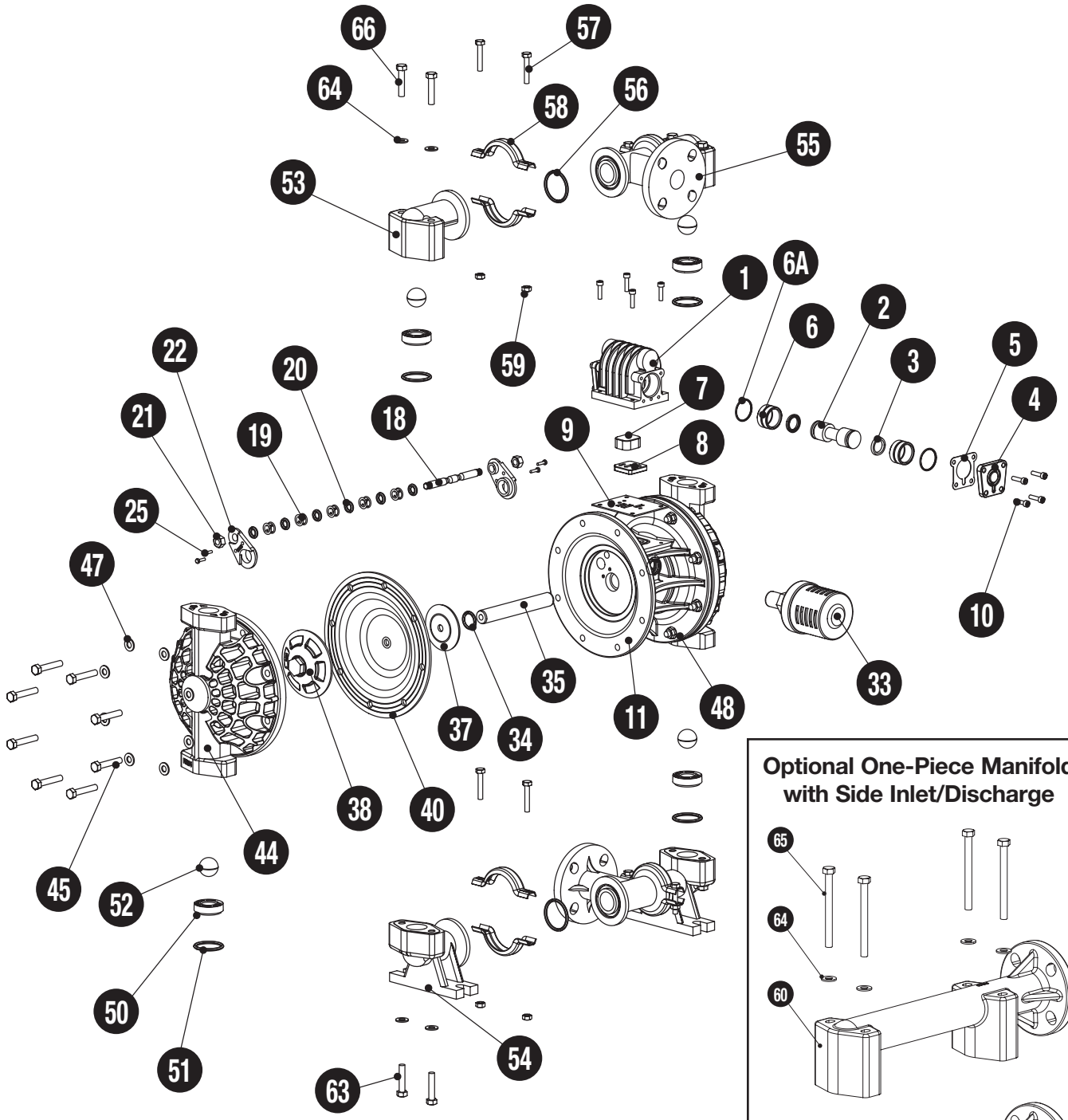
Suffix Code	Material
A	Acetal
BN	Buna-N, Nitrile
N	Neoprene
ND	Nordel, EPDM
TF	Teflon
FG	Hytrel
XL	XL, Santoprene
VT	Viton
TX	Bonded Teflon

PARTS LIST

AIR VALVE ASSEMBLY					
Item	Description	Qty	Aluminum		
1	Valve Body	1	P50-102A		
2	Valve Spool	1	P98-104		
3	Valve Spool U-cup	2	P098-104A		
4	End Cap	2	P98-300		
5	End Cap Gasket	2	P98-110		
6	Bearing Sleeve	2	P98-103		
6A	Bearing Sleeve O-ring	2	P98-103A		
7	Air Diverter	1	P98-105		
8	Valve Insert	1	P98-106		
9	Valve Gasket	1	P98-111		
10	Valve Cap Screw	12	P24-208		
AIR END ASSEMBLY					
Item	Description	Qty	Aluminum		
11	Center Section	1	P50-101SC		
18	Pilot Shaft	1	P50-112		
19	Pilot Shaft Spacer	5	P24-106		
20	Pilot Shaft O-Ring	6	P24-107		
21	Nut	2	P24-108		
22	Shaft Retainer	2	E101B		
25	Shaft Retainer Screw	4	P24-208		
33	Muffler	1	VTM-4		
	Grounding Strap (not shown)	1	E518 (Poly Conductive model only)		
DIAPHRAGM ASSEMBLY					
Item	Description	Qty	TPE Rugged	Teflon Bonded	Teflon 2-Piece
34	Main Shaft O-Ring	2	P50-403	P50-403	P50-403
35	Main Shaft	1	P50-107	P50-108	P50-108
37	Inner Diaphragm Plate	2	V181C	V181TI	V181TI
38	Outer Diaphragm Plate	2	PE113, KE113	PV181TO, KV181TO	PV181TO, KV181TO
40	Diaphragm	2	V183BN-1, V183N-1, V183ND-1, V183TPEXL-1, V183TPEFG-1, V183VT	V183TX	V183TF-1
41	Back-up Diaphragm	2	N/A	N/A	V183TB
WET END ASSEMBLY					
Item	Description	Qty	Polypropylene	Kynar	Poly Conductive
44	Water Chamber	2	PE104	KE104	PE104-ATEX
45	Water Chamber Bolt	16	SV187A	SV187A	SV187A
47	Water Chamber Washer	16	SV189C	SV189C	SV189C
48	Water Chamber Nut	16	SV185B	SV185B	SV185B
50	Valve Seat	4	PE108	KE108	PE108-ATEX
51	Valve Seat O-Ring	4	V90BN, V90ND, V90VT, V190TES		
52	Valve Ball	4	V191BN, V191N, V191ND, V191TF, V191TPEFG, V191TPEXL, V191VT		
Port Option 1: Center port					
53	Manifold Discharge Elbow	2	PV186	KV186	N/A
54	Manifold Inlet Elbow	2	PV187	KV187	N/A
55	Manifold Tee	2	PV188	KV188	N/A
56	Manifold Tee O-Ring	4	V188BN, V188ND, V188VT, V188XL		N/A
57	Manifold Tee Bolt	8	SV189B	SV189B	N/A
58	Manifold Tee Clamp	8	SV189	SV189	N/A
59	Manifold Tee Nut	8	SV162C	SV162C	N/A
63	Inlet Manifold Bolt	4	E120A	E120A	N/A
64	Manifold Washer	8	SV189C	SV189C	N/A
66	Discharge Manifold Bolt	4	E120B	E120B	N/A
Port Option 2: Side port					
60	Discharge Manifold	1	PE120	KE120	PE120-ATEX
61	Inlet Manifold	1	PE120F	KE120F	PE120F-ATEX
63	Inlet Manifold Bolt	8	E120A	E120A	E120A
64	Manifold Washer	8	SV189C	SV189C	SV189C
65	Discharge Manifold Bolt	8	E120B	E120B	E120B

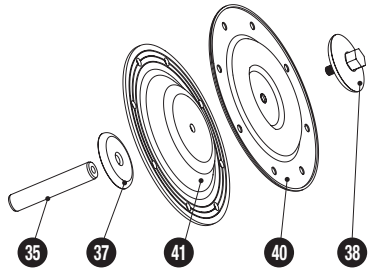
EXPLODED VIEWS

Exploded View shows Rugged Diaphragm and Three-Piece Manifold for Plastic Pump



Optional One-Piece Manifold with Side Inlet/Discharge

Teflon Diaphragms



REPAIR & MAINTENANCE KITS

AIR VALVE KIT		
E1A AV KIT		
Part #	Description	Qty.
P98-104A	U-Cup Seal	2
P98-103	Sleeve Bearing	2
P98-103A	Sleeve O-ring	2
P98-105	Air Diverter	1
P98-106	Valve Insert	1
P98-111	Gasket, Valve	1
P98-110	Gasket, End Cap	2

PILOT VALVE KIT		
E1A PV KIT		
Part #	Description	Qty.
P50-119	Spacer, Pilot Shaft	2
P24-106	Ring, Pilot Valve	5
P24-107	O-ring, Pilot Valve	6
P24-108	Stop Nut	2
P50-403	Bushing O-ring	2
E101B	Shaft Retainer	2
P24-208	Cap Screw	4

MAINTENANCE KIT - Rubber		
E1-CMK-MS-RMB		
Part #	**Description**	**Qty.**
P50-119	Spacer, Pilot Shaft	2
P24-106	Ring, Pilot Valve	5
P24-107	O-ring, Pilot Valve	6
P24-108	Stop Nut	2
P50-403	Bushing O-ring	2
P50-107	Shaft	1
P50-112	Pilot Shaft	1
P98-104	Spool	1
E101B	Shaft Retainer	2
P24-108	Stop Nut	2
P98-103	Sleeve Bearing	2
P98-103A	Sleeve O-ring	2
P98-111	Gasket, Valve	1
P98-110	Gasket, End Cap	2
VTM-4	Muffler	1
P24-208	Cap Screw	4

MAINTENANCE KIT - Teflon		
E1-CMK-MS-TMB		
Part #	**Description**	**Qty.**
P50-119	Spacer, Pilot Shaft	2
P24-106	Ring, Pilot Valve	5
P24-107	O-ring, Pilot Valve	6
P24-108	Stop Nut	2
P50-403	Bushing O-ring	2
P50-108	Shaft	1
P50-112	Pilot Shaft	1
P98-104	Spool	1
E101B	Shaft Retainer	2
P24-108	Stop Nut	2
P98-103	Sleeve Bearing	2
P98-103A	Sleeve O-ring	2
P98-111	Gasket, Valve	1
P98-110	Gasket, End Cap	2
VTM-4	Muffler	1
P24-208	Cap Screw	4

ATEX INFORMATION

Products:

1. Elima-Matic and Ultra-Matic Pumps

II 2 G / II 3 G EEx c T4/T5

Group II, category 2 and 3, gas explosive atmosphere, constructional safety ignition protection, Temperature rating “T4” for fluids up to 130ºC and “T5” for fluid up to 95ºC. Temperatures are not to exceed the ATEX ratings.

2. Elima-Matic Cast Iron Pumps with Stainless Steel Air Ends

II M2 EEx c I T4/T5

Group I, category M2, constructional safety ignition protection, Temperature rating “T4” for fluids up to 130ºC and “T5” for fluid up to 95ºC. Temperatures are not to exceed the ATEX ratings.

This includes the various sizes, elastomers and threading options. See Model Sheet for Details.

Constructed after 2003

CAUTION: USE CARE WHEN PUMPING HOT FLUIDS

Versa-Matic Pump Company
6017 Enterprise Drive
Export, PA 15632-8969
(724) 327-7867
(724)327-4300 — fax

www.versamatic.com

Local Authorized Distributer:

Teflon® is a registered trademarks of DuPont.
Versa-Dome®, Versa-Matic®, Versa-Tuff® and Versa-Rugged VR™ are registered tradenames and trademarks of IDEX Corporation.

VERSA-MATIC® PUMP COMPANY
A Unit of IDEX Corporation
6017 Enterprise Drive
Export, PA 15632-8969

(724) 327-7867
Fax: (724) 327-4300
www.versamatic.com

IDEX CORPORATION