

SERVICE & OPERATING MANUAL

Versa-Surge Surge Suppressors for Air-Driven Diaphragm Pumps

Metallic Construction



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VERSA-MATIC PUMP®



VERSA-MATIC PUMP®



- **Nearly surge-free flow.**
- **Steadier pressures.**
- **Less shock to pipes.**

Air-operated diaphragm pumps offer a wide range of benefits not available in any other type of pump. However, in some applications, pulsations in the discharge flow may be undesirable. Pulsation can be virtually eliminated by installing a Versa-Matic Versa-Surge.

At initial and subsequent start-ups . . . air cushion is quickly established by liquid pressure pushing diaphragm upward, permitting entrance of air into air chamber, until the balancing air cushion causes the diaphragm to center at its mid-stroke normal operating position.

During normal continuous operation thereafter . . . the diaphragm always flexes at its mid-range position to absorb discharge pulsations against the adjoining air cushion already established.

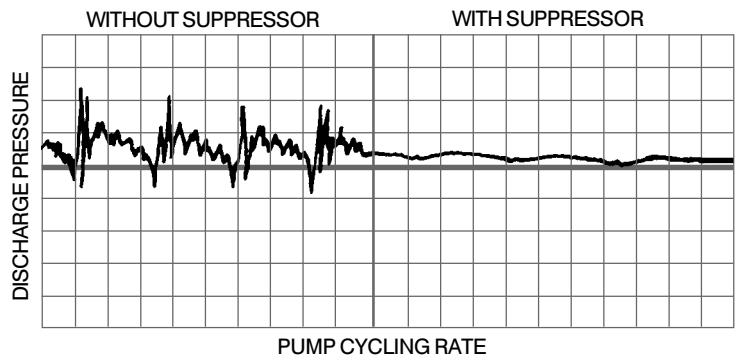
In event of change in pumped liquid pressure . . . the air cushion pressure is automatically increased or decreased as required to compensate for the change . . . always maintaining constant volume of air cushion, and the diaphragm always operating at its mid-position.

When liquid flow stops and liquid pressure is released . . . the air in air chamber is also exhausted to atmosphere.

Versa-Surge

- Automatically maintains a constant volume of air cushion for most effective surge suppression, regardless of pump pressure.
- Automatically self-charging and self-venting to maintain most efficient air cushion pressure . . . no more precharge pressure calculations or guesswork, no manual pressurizing, no periodic pressure checking.
- Air cushion separated from product by flexible diaphragm . . . prevents product aeration.
- External visual indication provides constant evidence of performance.
- Simple to install. Attention-free.

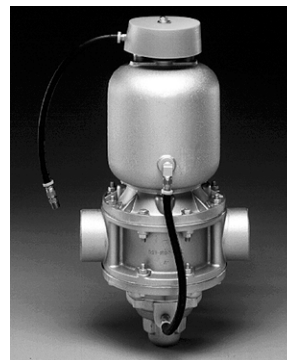
Versa-Surge



Models VTA1 and VTA25
1-inch Versa-Surge for use with 1-inch pumps

Furnished with 13³/₈" air inlet hose whipline. Connection is 1/4" NPT external pipe thread.

Maximum Operating Pressure – 125 psi.



Models VTD1¹/₂ and VTD40
1¹/₂-inch Versa-Surge for use with 1¹/₂-inch pumps

Furnished with 13³/₈" air inlet hose whipline. Connection is 1/4" NPT external pipe thread.

Maximum Operating Pressure – 125 psi.



CE
Models VTA2 and VTA50
2-inch Versa-Surge for use with 1¹/₂, 2-inch pumps

Furnished with 13³/₈" air inlet hose whipline. Connection is 1/4" NPT external pipe thread.

Maximum Operating Pressure – 125 psi.



CE
Models VTA3 and VTA80
3-inch Versa-Surge for use with 3-inch pumps

Furnished with 13³/₈" air inlet hose whipline. Connection is 1/4" NPT external pipe thread.

Maximum Operating Pressure – 125 psi.

Materials of Construction:

Type Code	Diaphragm	Design Level	Wetted Parts	Porting (Internal Tapered Threads)
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Type Code	Diaphragm		Design Level	Wetted Parts	Porting (Internal Tapered Threads)	Porting Flange Style	Shipping Weight lbs./kg
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Surge Suppressor Model VTA1

B-1-A	B	1	A	1" NPT
H-1-A	H	1	A	1" NPT
NG-1-A	NG	1	A	1" NPT
N-1-A	N	1	A	1" NPT
S-1-A	S	1	A	1" NPT
V-1-A	V	1	A	1" NPT
B-1-SS	B	1	SS	1" NPT
F-1-SS	F	1	SS	1" NPT
H-1-SS	H	1	SS	1" NPT
NG-1-SS	NG	1	SS	1" NPT
N-1-SS	N	1	SS	1" NPT
S-1-SS	S	1	SS	1" NPT
V-1-SS	V	1	SS	1" NPT

Surge Suppressor Model VTA25

B-1-A	B		1	A	1" BSPT		14 / 6.35
H-1-A	H		1	A	1" BSPT		14 / 6.35
NG-1-A	NG		1	A	1" BSPT		14 / 6.35
N-1-A	N		1	A	1" BSPT		14 / 6.35
S-1-A	S		1	A	1" BSPT		14 / 6.35
V-1-A	V		1	A	1" BSPT		14 / 6.35
B-1-SS	B		1	SS	1" BSPT		18 / 8.16
F-1-SS	F		1	SS	1" BSPT		18 / 8.16
H-1-SS	H		1	SS	1" BSPT		18 / 8.16
NG-1-SS	NG		1	SS	1" BSPT		18 / 8.16
N-1-SS	N		1	SS	1" BSPT		18 / 8.16
S-1-SS	S		1	SS	1" BSPT		18 / 8.16
V-1-SS	V		1	SS	1" BSPT		18 / 8.16

Surge Suppressor Model VTD1½

B-1-A	B	1	A	1½" NPT
NG-1-A	NG	1	A	1½" NPT
N-1-A	N	1	A	1½" NPT
V-1-A	V	1	A	1½" NPT
B-1-A	B	1	A	1½" NPT
F-1-A	F	1	A	1½" NPT
NG-1-SS	NG	1	SS	1½" NPT
N-1-SS	N	1	SS	1½" NPT
V-1-SS	V	1	SS	1½" NPT

Surge Suppressor Model VTD40

B-1-A	B		1	A	1½" BSPT		28 / 12.7
NG-1-A	NG		1	A	1½" BSPT		28 / 12.7
N-1-A	N		1	A	1½" BSPT		28 / 12.7
V-1-A	V		1	A	1½" BSPT		28 / 12.7
B-1-SS	B		1	SS	1½" BSPT		35 / 15.9
F-1-SS	F		1	SS	1½" BSPT		35 / 15.9
NG-1-SS	NG		1	SS	1½" BSPT		35 / 15.9
N-1-SS	N		1	SS	1½" BSPT		35 / 15.9
V-1-SS	V		1	SS	1½" BSPT		35 / 15.9

Surge Suppressor Model VTA2

B-1-A	B	1	A	2" NPT
I-1-A	I	1	A	2" NPT
NG-1-A	NG	1	A	2" NPT
N-1-A	N	1	A	2" NPT
S-1-A	S	1	A	2" NPT
V-1-A	V	1	A	2" NPT
B-1-CI	B	1	CI	2" NPT
I-1-CI	I	1	CI	2" NPT
NG-1-CI	NG	1	CI	2" NPT
N-1-CI	N	1	SS	2" NPT
S-1-CI	S	1	CI	2" NPT
V-1-CI	V	1	CI	2" NPT
B-1-SS	B	1	SS	2" NPT
F-1-SS	F	1	SS	2" NPT

Surge Suppressor Model VTA50

B-1-A	B		1	A	2" BSPT		28 / 12.7
I-1-A	I		1	A	2" BSPT		28 / 12.7
NG-1-A	NG		1	A	2" BSPT		28 / 12.7
N-1-A	N		1	A	2" BSPT		28 / 12.7
S-1-A	S		1	A	2" BSPT		28 / 12.7
V-1-A	V		1	A	2" BSPT		28 / 12.7
B-1-CI	B		1	CI	2" BSPT		35 / 15.9
I-1-CI	I		1	CI	2" BSPT		35 / 15.9
NG-1-CI	NG		1	CI	2" BSPT		35 / 15.9
N-1-CI	N		1	CI	2" BSPT		35 / 15.9
S-1-CI	S		1	CI	2" BSPT		35 / 15.9
V-1-CI	V		1	CI	2" BSPT		35 / 15.9
B-1-SS	B		1	SS	2" BSPT		35 / 15.9
F-1-SS	F		1	SS	2" BSPT		35 / 15.9

Materials of Construction continued:

Surge Suppressor Model VTA2, continued

Type Code	Diaphragm	Design Level	Wetted Parts	Porting (Internal Tapered Threads)	Porting Flange Style
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NG-1-SS	NG	1	SS	2" NPT	
N-1-SS	N	1	SS	2" NPT	
V-1-SS	V	1	SS	2" NPT	
I-1-HC	I	1	HC	2" NPT	
NG-1-HC	NG	1	HC	2" NPT	
N-1-HC	N	1	HC	2" NPT	
V-1-HC	V	1	HC	2" NPT	

Surge Suppressor Model VTA3

B-1-A	B	1	A	3" NPT	3" ANSI Style
I-1-A	I	1	A	3" NPT	3" ANSI Style
NG-1-A	NG	1	A	3" NPT	3" ANSI Style
N-1-A	N	1	A	3" NPT	3" ANSI Style
V-1-A	V	1	A	3" NPT	3" ANSI Style
B-1-CI	B	1	CI	3" NPT	3" ANSI Style
I-1-CI	I	1	CI	3" NPT	3" ANSI Style
NG-1-CI	NG	1	CI	3" NPT	3" ANSI Style
N-1-CI	N	1	CI	3" NPT	3" ANSI Style
V-1-CI	V	1	CI	3" NPT	3" ANSI Style
B-1-SS	B	1	SS	3" NPT	3" ANSI Style
NG-1-SS	NG	1	SS	3" NPT	3" ANSI Style
N-1-SS	N	1	SS	3" NPT	3" ANSI Style
V-1-SS	V	1	SS	3" NPT	3" ANSI Style

Meaning of

Abbreviations:

Kit available to convert to top porting

A = Aluminum

B = Buna-N

CI = Cast Iron

F = FDA White Nitrile

H = Hytrel®

I = EPDM

N = Neoprene

NG = Neoprene Backup/PTFE Overlay

S = Santoprene®

V = Viton®

SS = Alloy Type 316SS

HC = Alloy "C" (Hastelloy "C" equivalent)

* Most other types available in dual ported design. See price book or consult factory for details.

Viton® & Hytrel® are registered tradenames of E.I. du Pont. Santoprene® is a registered tradename of Monsanto Corp.

Surge Suppressor Model VTA50, continued

Type Code	Diaphragm	Design Level	Wetted Parts	Porting (Internal Tapered Threads)	Porting Flange Style	Shipping Weight lbs./kg
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NG-1-SS	NG	1	SS	2" BSPT		35 / 15.9
N-1-SS	N	1	SS	2" BSPT		35 / 15.9
V-1-SS	V	1	SS	2" BSPT		35 / 15.9
I-1-HC	I	1	HC	2" BSPT		35 / 15.9
NG-1-HC	NG	1	SS	1½" BSPT		35 / 15.9
N-1-HC	N	1	HC	1½" BSPT		35 / 15.9
V-1-HC	V	1	HC	1½" BSPT		35 / 15.9

Surge Suppressor Model VTA80

B-1-A	B	1	A	3" BSPT	PN10 80mm DIN	89 / 40.4
I-1-A	I	1	A	3" BSPT	PN10 80mm DIN	89 / 40.4
NG-1-A	NG	1	A	3" BSPT	PN10 80mm DIN	89 / 40.4
N-1-A	N	1	A	3" BSPT	PN10 80mm DIN	89 / 40.4
V-1-A	V	1	A	3" BSPT	PN10 80mm DIN	89 / 40.4
B-1-CI	B	1	CI	3" BSPT	PN10 80mm DIN	109 / 49.4
I-1-CI	I	1	CI	3" BSPT	PN10 80mm DIN	109 / 49.4
NG-1-CI	NG	1	CI	3" BSPT	PN10 80mm DIN	109 / 49.4
N-1-CI	N	1	CI	3" BSPT	PN10 80mm DIN	109 / 49.4
V-1-CI	V	1	CI	3" BSPT	PN10 80mm DIN	109 / 49.4
B-1-SS	B	1	SS	3" BSPT	PN10 80mm DIN	105 / 47.6
NG-1-SS	NG	1	SS	3" BSPT	PN10 80mm DIN	105 / 47.6
N-1-SS	N	1	SS	3" BSPT	PN10 80mm DIN	105 / 47.6
V-1-SS	V	1	SS	3" BSPT	PN10 80mm DIN	105 / 47.6

MATERIALS

Operating Temperatures

	Operating Temperatures		
	Maximum*	Minimum*	Optimum**
BUNA-N General purpose, oil-resistant. Shows good solvent, oil, water and hydraulic fluid resistance. Should not be used with highly polar solvents like acetone and MEK, ozone, chlorinated hydrocarbons and nitro hydrocarbons.	190°F 88°C	-10°F -23°C	50°F to 140°F 10°C to 60°C
NEOPRENE All purpose. Resistant to vegetable oils. Generally not affected by moderate chemicals, fats, greases and many oils and solvents. Generally attacked by strong oxidizing acids, ketones, esters, nitro hydrocarbons and chlorinated aromatic hydrocarbons.	170°F 77°C	-35°F 37°C	50°F to 130°F 10°C to 54°C
HYTREL® Good on acids, bases, amines, and glycols at room temperature.	190°F 88°C	-10°F -23°C	50°F to 140°F 10°C to 60°C
VIRGIN PTFE Chemically inert, virtually impervious. Very few chemicals are known to chemically react with Teflon®, molten alkali metals, turbulent liquid or gases, fluorine and a few fluoro-chemicals such as chlorine trifluoride or oxygen difluoride which readily liberate free fluorine at elevated temperatures.	212°F+ 100°C+	-35°F -37°C	50°F to 212°F 10°C to 100°C
VITON® Shows good resistance to a wide range of oils and solvents; especially all aliphatic, aromatic and halogenated hydrocarbons, acids, animal and vegetable oils. Hot water or hot aqueous solutions (over 70° F) will attack Viton®.	212°F+ 100°C+	+32°F 0°C	75°F to 212°F 24°C to 100°C
EPDM Shows very good water and chemical resistance. Has poor resistance to oil and solvents, but is fair in ketones and alcohols.	212°F+ 100°C+	-10°F -23°C	50°F to 212°F 10°C to 100°C
SANTOPRENE® Injection molded thermoplastic elastomer with no fabric layer. Long mechanical flex life. Excellent abrasion resistance.	212°F+ 100°C+	-10°F -23°C	50°F to 212°F 10°C to 100°C
SS Alloy Type 316 Stainless Steel equal to or exceeding ASTM specification A743-CF-8M for corrosion resistant iron chromium, iron chromium nickel, and nickel based alloy castings for general applications. Commonly referred to as 316 Stainless Steel in the pump industry.			
C Alloy "C" equal to ASTM A494 CW-12M-1 specification for nickel and nickel alloy castings commonly referred to as Hastelloy "C" alloy in the pump industry. Hastelloy "C" is a registered trademark of the Cabot Corporation.			

*Definite reduction in service life.

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

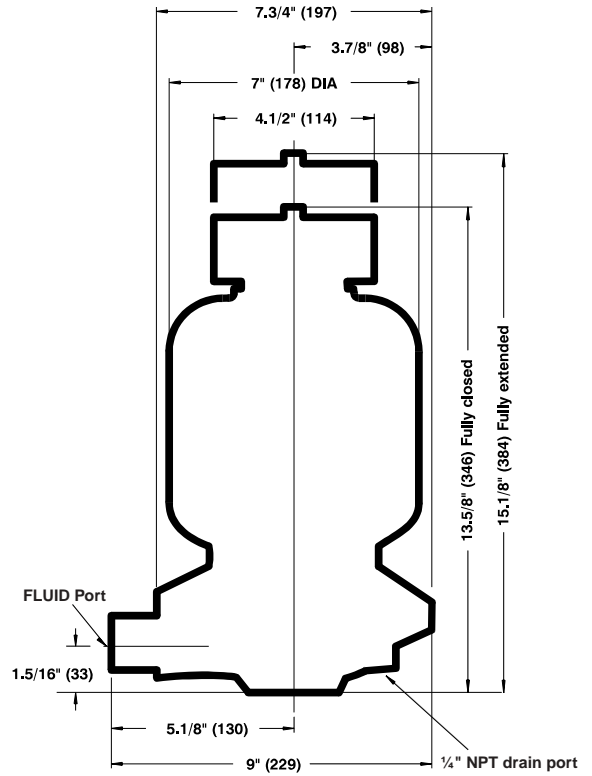
For specific applications, always consult "Chemical Resistance Chart" Technical Bulletin.

Model VTA1

Air Inlet
 1/4" Flexible hose
 x 13.3/8" long supplied
 1/4" NPT (external) fitting
 FLUID Port - 1" NPT

Model VTA25

Air Inlet
 1/4" Flexible hose
 x 13.3/8" long supplied
 1/4" NPT (external) fitting
 FLUID Port - 1" BSP
 tapered thread

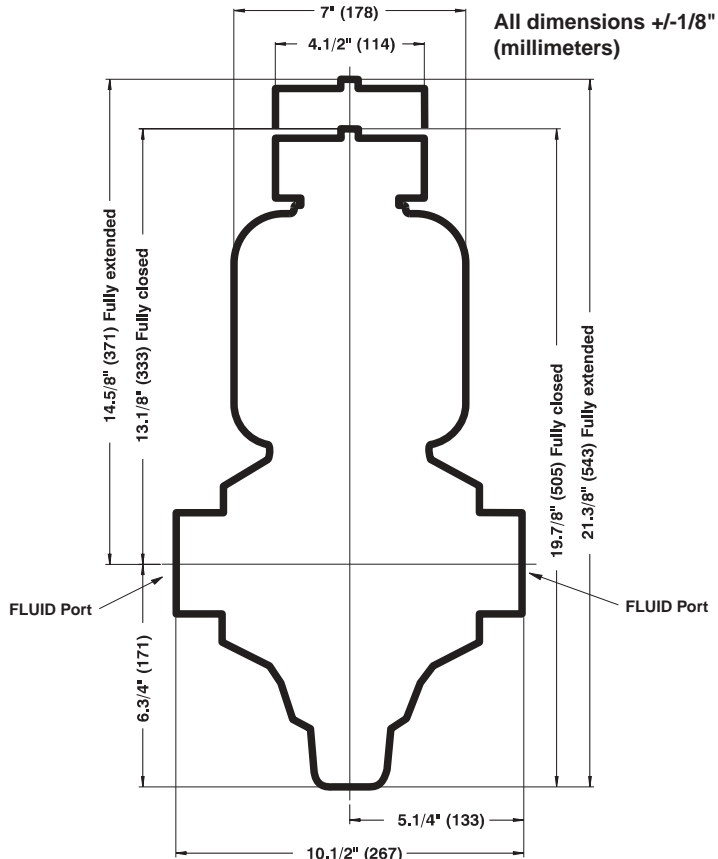


Model VTD1 1/2

Air Inlet
 1/4" Flexible hose
 x 13.3/8" long supplied
 1/4" NPT (external) fitting
 FLUID Port - 1 1/2" NPT

Model VTD40

Air Inlet
 1/4" Flexible hose
 x 13.3/8" long supplied
 1/4" NPT (external) fitting
 FLUID Port - 1 1/2" BSP
 tapered thread



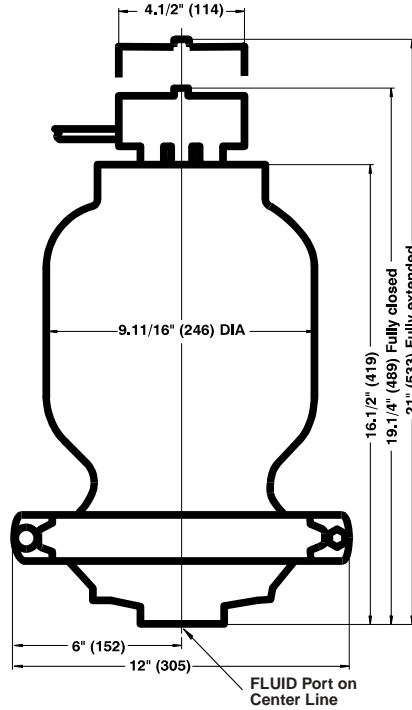
Model VTA2

Air Inlet
 1/4" Flexible hose
 x 13.3/8" long supplied
 1/4" NPT (external) fitting
 1" NPT Fluid Port



Model VTA50

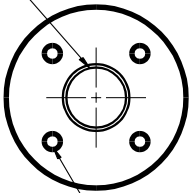
Air Inlet
 1/4" Flexible hose
 x 13.3/8" long supplied
 1/4" NPT (external) fitting
 1" BSP(Tapered) Fluid Port



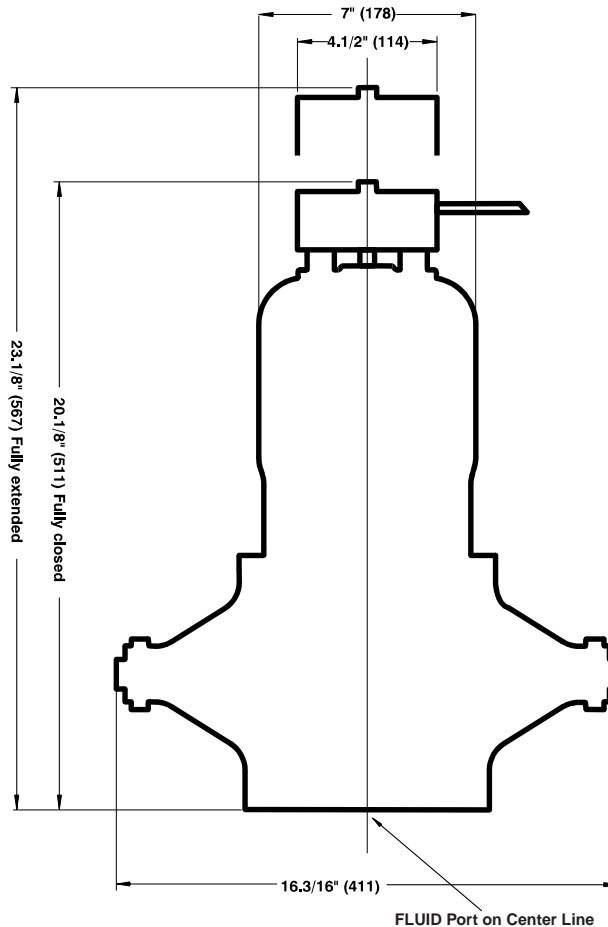
Model VTA3

Air Inlet
 1/4" Flexible hose
 x 13.3/8" long supplied
 1/4" NPT (external) fitting
 FLUID Port - 1" NPT

3" NPT



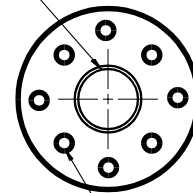
3" 150# FFANSI-style flange
 5/8-11 unc, 2B
 4 holes equally spaced on
 a 6" diameter bolt circle



Model VTA80

Air Inlet
 1/4" Flexible hose
 x 13.3/8" long supplied
 1/4" NPT (external) fitting
 FLUID Port - 1" BSP
 tapered thread

3" BSPT (Tapered)



PN10 80mm DIN Flange
 M16x2 8 holes on a
 160mm diameter Bolt Circle

All dimensions +/- 1/8"
 (millimeters)

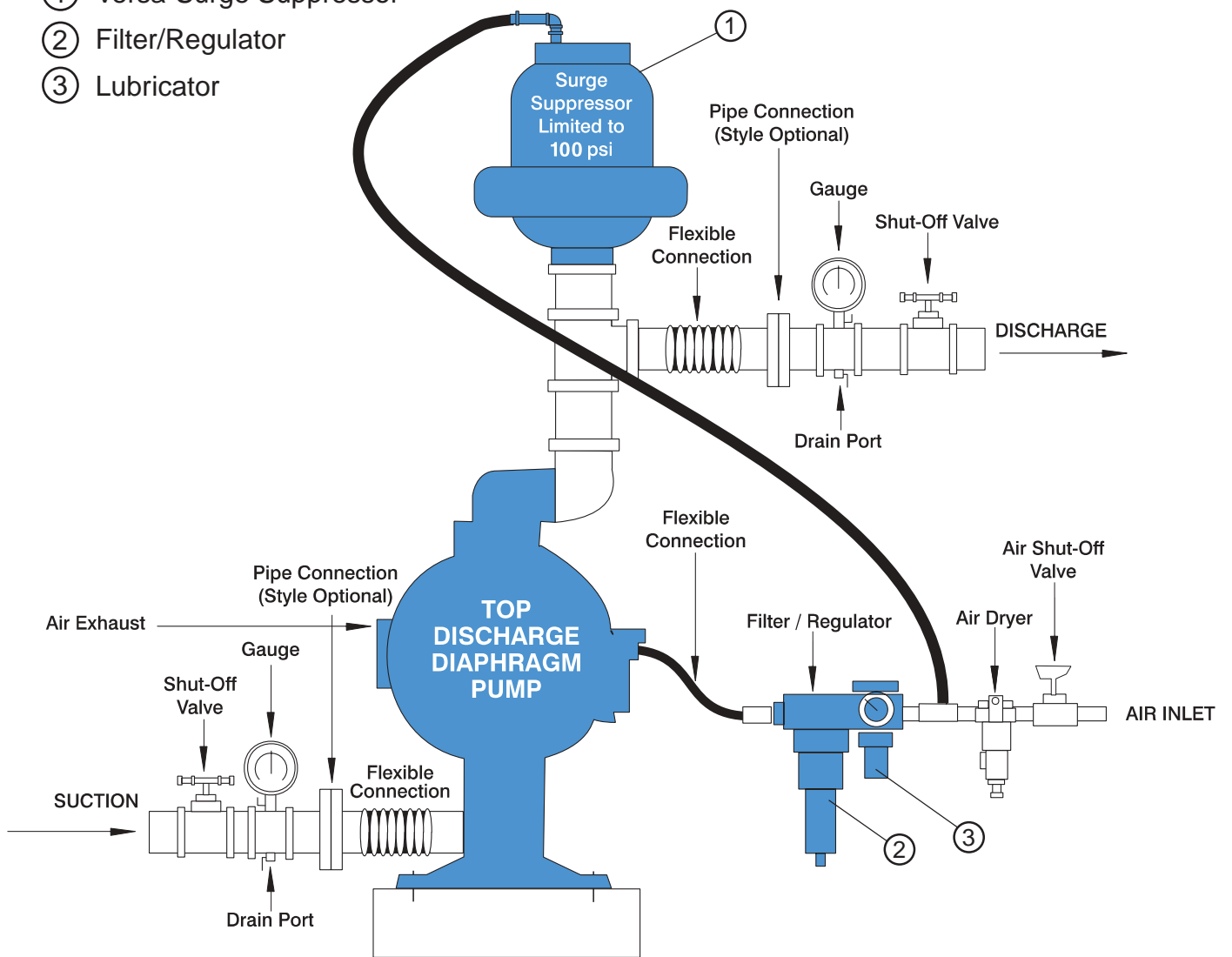
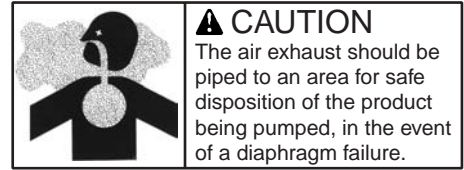
INSTALLATION GUIDE

Top Discharge Ball Valve Unit

VERSA-MATIC
PUMP®

Available from
Versa-Matic Pump

- ① Versa-Surge Suppressor
- ② Filter/Regulator
- ③ Lubricator



VERSA-MATIC PUMP®



SERVICE AND OPERATING MANUAL Versa-Surge Suppressor

Models VTA1/ VTA25/ VTD1 1/2/ VTD40/ VTA2/ VTA50/ VA3/ VTA80

Metallic Construction

OPERATING AND SERVICE INSTRUCTIONS

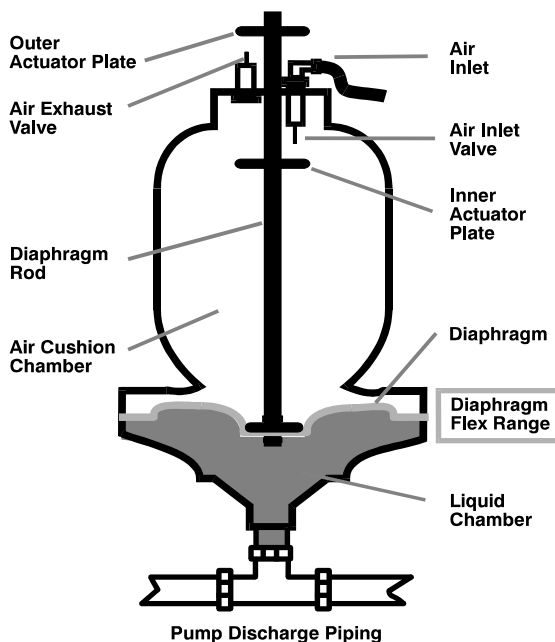
This Versa-Matic Versa-Surge is a completely automatic diaphragm fitted surge suppressor to reduce the flow and pressure pulsations in a pumping system characteristic of reciprocating type pumps.

Principle of Operation: The Surge Suppressor uses a flexible diaphragm to separate a liquid chamber from compressed air chambers. A rod connected to the center of one diaphragm activates the air inlet and exhaust valves, which automatically admit or exhaust air in the air chambers. This maintains the diaphragms in mid-range of stroke for maximum surge suppression.

Installation: Locate the Surge Suppressor in discharge piping as close as possible to the pump. The unit will operate in any position. Connect the air inlet connection to the air supply line having the same air pressure as that at the air inlet connection to the pump. Do not exceed 125 PSI.

Service Instructions: When service is required, it is important to MAKE CERTAIN THAT INLET AIR PRESSURE IS DISCONNECTED. The diaphragms are serviced by simply removing the hex nuts or v-band, and removing the center spool casting. When Virgin PTFE diaphragms are used in conjunction with the elastomeric diaphragms they are placed over the "wetted" sides of each elastomeric diaphragm. Inlet and exhaust air valves are located externally for easy access and service.

Warranty: This unit is guaranteed for a period of five years against defective material and workmanship.



IMPORTANT

Read these safety warnings and instructions in this manual completely, before installation and start-up of the pulsation dampener.

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 pulsation dampener, and void factory warranty.

Minimum are based upon mechanical stress only and may be significantly altered by pumping certain chemicals. Consult engineering guides for chemical compatibilities and temperature limits.

CAUTION



CAUTION

Before surge suppressor operation, inspect all gasketed fasteners for looseness caused by gasket creep.

loose fasteners to prevent leakage. Follow recommended torques stated in this manual.

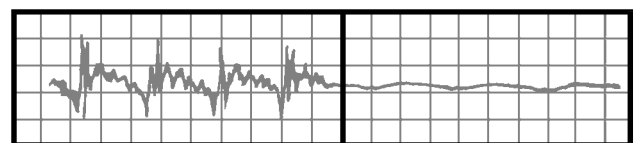


WARNING

Before doing any maintenance on the pulsation dampener, 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.

Pump Cycling Rate



Without Suppressor

With Suppressor

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