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PLAST-O-MATIC PRODUCT DATA

CATALOG VPA-4

Air Operated Chemical Filling & Metering Pumps

Air Operated, Positive Displacement, Single Acting*



Plast-O-Matic's chemical metering pumps are explosion-proof and self priming. They are designed to deliver exact quantities of highly corrosive or ultra-pure liquids such as sulphuric acid, hydrochloric acid, chlorine, caustics, and demineralized water.

Utilization of Plast-O-Matic pumps in automating chemical handling systems can increase employee safety, eliminate waste and error, ensure a better end product, and reduce overall operating costs.

Available in:

- PVC
- Polypropylene
- PVDF (Kynar®)

OPERATION:

Plast-O-Matic chemical metering pumps are designed with 4 chambers: a liquid chamber, a vented chamber, and two air operating chambers. Movement within the chambers is controlled by the reciprocating action of the pump's shaft and piston assembly. The assembly is operated and controlled by a 4-way air valve (an accessory item listed on page 4) which alternately introduces and exhausts air pressure on both sides of the air piston. The 4-way valve would receive its on-off electrical signal from an independent electrical timer or similar device, not supplied with the pump. This action also causes the liquid piston to reciprocate. On the down stroke of the liquid piston a vacuum is created in the liquid chamber which opens the inlet check valve diaphragm and holds the outlet check diaphragm closed. This operation permits the liquid chamber to fill itself (self-priming). On the up stroke the liquid in the chamber is pressurized by the piston movement. This opens the outlet check valve diaphragm and holds the inlet check valve diaphragm closed. This action discharges the liquid out of the pump.

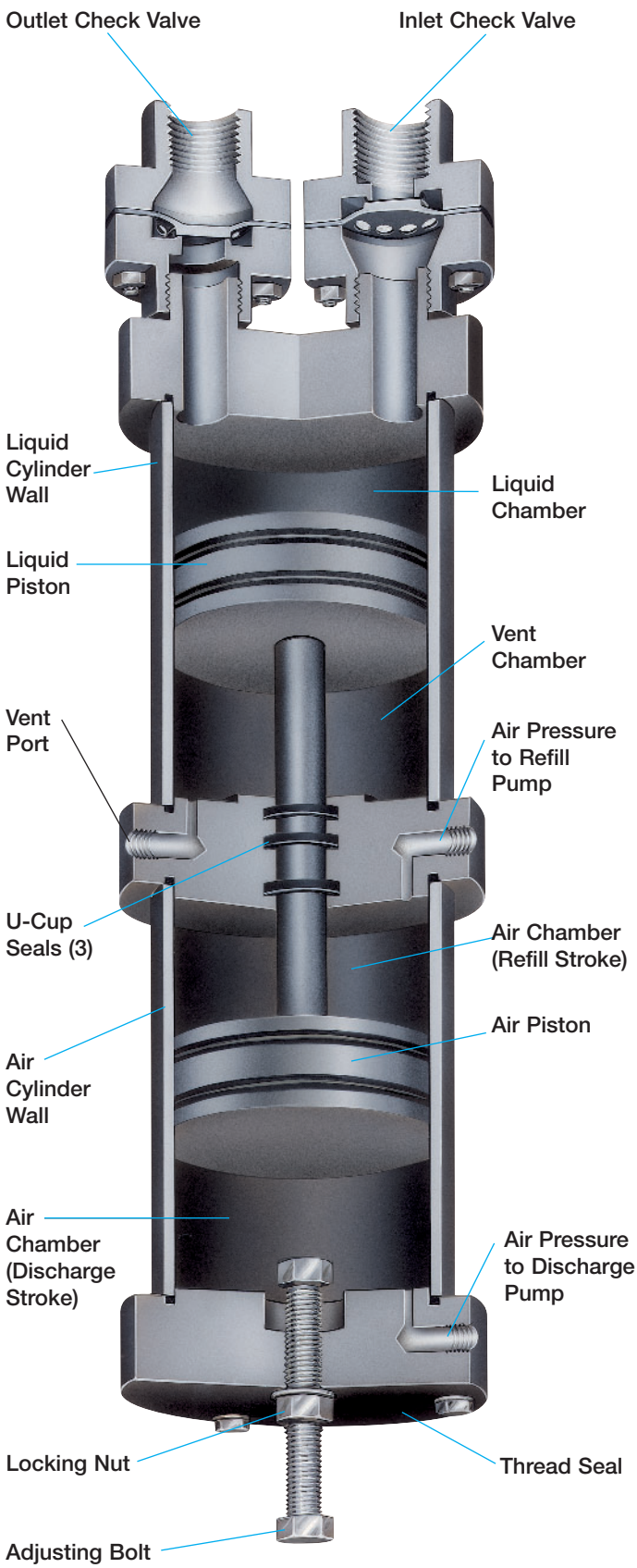
All Plast-O-Matic chemical metering pumps are positive displacement pumps thus any re-adjustments to the adjusting bolts will result in a change in discharge quantity. By turning the bolt further into the lower air chamber the travel of the shaft and piston assembly is restricted creating a shorter discharge stroke and reducing discharge quantity.

For selection of the proper sized 4-way air solenoid valves, please refer to page 4. Specification on air consumption and required air pressures are also listed on page 4.

***NOTE:** This brochure is written for a single acting metering pump. These pumps are also available optionally as double acting (liquid discharge from both ends) For more information consult factory.

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PRESSURE RATING CONSIDERATIONS FOR ALL MODELS



Capacity & Accuracy:

Plast-O-Matic chemical metering pumps are available with maximum per cycle capabilities of 7 ounces, 10 ounces, 32 ounces and 128 ounces. A cycle is one up and down stroke of the piston assembly. They can be cycled up to 10 times per minute when pumping water or liquids of similar specific gravities and viscosities. The per cycle discharge capacity can be adjusted from its maximum to 20% of its maximum. For example: the 128 ounce pump can be adjusted to discharge anywhere between 25 and 128 ounces per stroke.

While the pump discharge adjustment is simple, it is recommended that the discharge amount be physically measured. Once the measured amount is set and checked the accuracy of the discharge repeatability is approximately 1/2 of 1%.

Installation:

Plast-O-Matic chemical metering pumps should always be installed vertically (see Cycle Life section) with the pump inlet never more than 20 feet above the end of the suction line. Mounting brackets are supplied with all pumps. To eliminate siphoning through the pump, the end of the discharge line should always be higher than the liquid source. To obtain the longest cycle life, it is imperative that the operating air supply line be lubricated and filtered to eliminate foreign matter from entering and scoring the cylinder walls.

As with all Plast-O-Matic products, these pumps, when properly installed and calibrated should offer you the maximum in dependable operation. In this regard, special attention should be made to adhere to the installation and maintenance instructions shipped with each Plast-O-Matic chemical metering pump.

Fail Dry® Design:

Plast-O-Matic chemical metering pumps feature a patented Fail-Dry® design concept of having a vented chamber separating two sealed sections of a valve or, as in this case, a pump. In the event of a liquid piston seal failure, the vented chamber and U-cup seals will cause the by-passing liquid to exit at the vent port. With the vent piped to a remote location, the pump will remain functioning even after a primary seal failure, thereby keeping the process or system operating until a maintenance can be scheduled avoiding costly emergency shutdown.

Materials of Construction:

Pump bodies, shaft and piston assemblies, and cylinder walls are constructed of TYPE 1, GRADE1 PVC (Polyvinyl Chloride). Polypropylene, and Kynar PVDF also available on request. Optional stainless steel cylinder walls are available. for chemicals compatible with 304 stainless steel. A choice of two standard elastomer seals is offered – EPDM and FKM (fluorocarbon rubber). Optional PTFE cap seals are offered for applications where severe seal rubbing occurs. Pump tie rods and their fasteners, adjusting bolts, locking nuts, as well as inlet and outlet check fasteners, are 303 stainless steel. Mounting brackets are zinc plated steel.

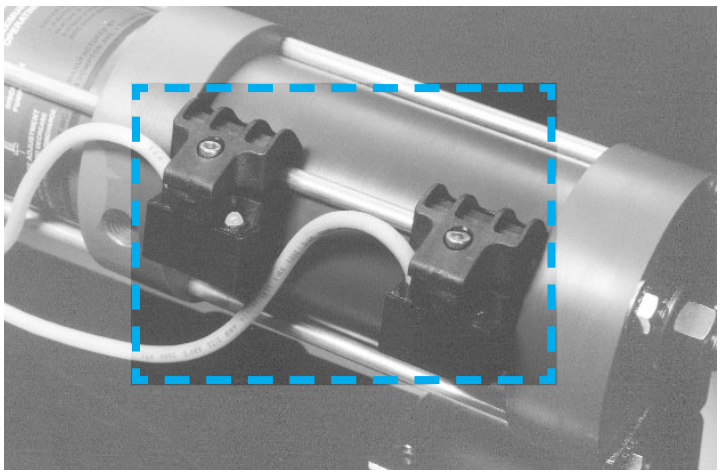
Cycle Life:

Tests conducted in our laboratory pumping tap water indicate the life expectancy of pumps with PVC cylinder walls to be between 100,000 and 300,000 cycles. With stainless steel cylinder walls life expectancy is over 1,000,000 cycles. To ensure the best cycle figures pumps must always be mounted vertically. When gritty liquids are being pumped it is recommended that the pumps be mounted with the liquid side down to allow sediment to settle without scoring the cylinder walls. The optional PTFE cap seals do not increase cycle life with PVC cylinders unless there is an unusual rubbing problem with the O-rings. There is a cycle life improvement with the PTFE cap seals in stainless cylinders.

Viscosity:

The maximum liquid viscosity recommended (at 0.9 specific gravity @ 65°F) is 85,000 SSU, which is equivalent to 17,000 centipoise or 19,000 centistokes. At these viscosity values the pumping time required to complete a cycle is as follows: 1 cycle/minute with 25 PSI air supply, 3.4 cycles/minute with 75 PSI air, and 4.3 cycles/minute with 100 PSI air. (Test media: honey, which is 17,000 centipoise at room temperature.)

PROXIMITY SENSORS FOR SERIES VPA METERING PUMPS



External switches with standard cable affixed to air cylinder side of Series VPA Metering Pump.

Standard Proximity Switch Specification

Switch Type:	Reed Switch, MOV, LED. 2 wire
Function:	Normally-Open SPST
Switching Voltage:	5-240V AC/DC 50/60 Hz
Switching Current:	1 Amp max./0.05 Amp min.
Switching Power:	30 Watts max.
Switching Speed:	0.6 ms operate/0.05 ms release
Voltage Drop:	3 volts
Cable:	9" standard PVC electrical cable
Part Numbering:	Add “-RS” suffix to VPA part number

Proximity sensors are available to verify position on all metering pump sizes. These can be used to power a relay, signal a computer, or other process control. Switches are ideal to certify that the pump has discharged or retracted, or both.

Within the pump, a magnetic band is added to the piston head on the air side (non-wetted) and is a factory-installed item. The external sensors can be installed and positioned in the field.

Standard style reed switch, 5-240 VAC or DC, features Indicator Lights, NEMA 6 wash down compatible, normally-open, MOV surge suppression, thermoplastic (Ultem) housing, PVC wire and stainless steel fasteners. Universal clamp attaches to tie rods on pump cylinders. Proximity Switches are CSA listed for use with certified electrical equipment.

For custom switch information, consult factory.

PUMP SPECIFICATIONS & PART NUMBERS

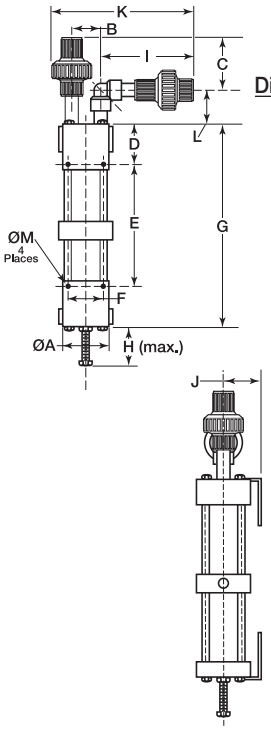
Nominal Stroke Capacity		Inlet & Outlet Pipe Size	Nominal Pumping Capacity**		Min. Cylinder Operating Pressure		Max. Cylinder Operating Pressure		Air Cylinder Consumption** (C.F.M.) at Different Air Line Pressures				Cylinder Wall Material	Series VPA Part Number	
Oz.	CM^3	(NPT)	GPM	CM^3/Sec	PSI	Bars	PSI	Bars	40 PSI	60PSI	80 PSI	100 PSI		EPDM	FKM
7	207.0	1/2"	.55	34.7	20	1.38	100	6.90	.55	.77	.99	1.21	PVC	VPA7P-EP	VPA7P-V
7	207.0	1/2"	.55	34.7	20	1.38	100	6.90	.55	.77	.99	1.21	Stainless	VPA7S-EP	VPA7S-V
10	295.7	1/2"	.79	49.8	20	1.38	100	6.90	.75	1.05	1.35	1.65	PVC	VPA10P-EP	VPA10P-V
10	295.7	1/2"	.79	49.8	20	1.38	100	6.90	.75	1.05	1.35	1.65	Stainless	VPA10S-EP	VPA10S-V
32	946.2	3/4"	2.50	157.8	20	1.38	100	6.90	2.78	3.06	4.44	5.55	PVC	VPA32P-EP	VPA32P-V
32	946.2	3/4"	2.50	157.8	20	1.38	100	6.90	2.78	3.06	4.44	5.55	Stainless	VPA32S-EP	VPA32S-V
128	3785.0	1"	10.00	631.0	10	.69	40	2.76	11.00	—	—	—	PVC	VPA128P-EP	VPA128P-V
128	3785.0	1"	10.00	631.0	10	.69	40	2.76	11.00	—	—	—	Stainless	VPA128S-EP	VPA128S-V

**Based on Ten (10) Cycles per Minute Pumping Water

NOTE: To order a metering pump with PTFE cap seals, add "–TC" after the part number; for example VPA32S-V-TC.

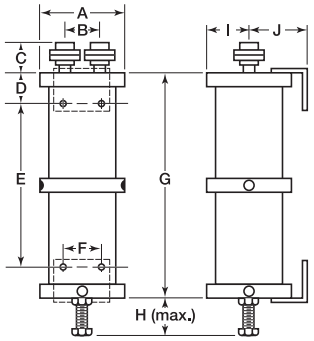
PUMP DIMENSIONS

VPA7 AND VPA10

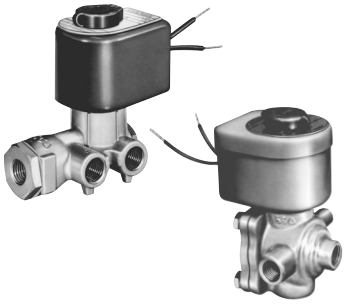


Pump Dimensions	VPA7 Inches	VPA7 MM	VPA10 Inches	VPA10 MM
A	3 1/2 Dia	88.9	3 1/2 Dia.	88.9
B	1 7/8	47.6	1 7/8	47.6
C	5 3/4	146.0	5 3/4	146.0
D	2 9/16	65.0	2 9/16	65.0
E	7 7/8	200.0	9 13/16	249.2
F	2 3/8	60.3	2 3/8	60.3
G	13 1/16	331.7	14 15/16	379.4
H	3 9/16	90.4	4 1/16	103.1
I	6 1/16	153.9	6 1/16	153.9
J	2 3/8	60.3	2 3/8	60.3
K	9 3/16	233.3	9 3/16	233.3
L	2 5/16	58.7	2 5/16	58.7
M	5/16	7.9	5/16	7.9

VPA32 AND VPA128



Pump Dimensions	VPA32 Inches	VPA32 MM	VPA128 Inches	VPA128 MM
A	5 1/2 Dia.	139.7	8 3/4 Sq	222.3
B	3 1/8	79.3	5 1/2	139.7
C	4 1/8	104.7	4 3/4	120.6
D	2 1/2	63.5	2 1/4	57.0
E	12	304.8	13 13/16	650.8
F	2 3/8	60.3	9 3/4	247.6
G	17	431.8	18 5/16	465.1
H	5 1/8	13.1	5 3/4	146.0
I	2 3/4	69.9	4 3/16	111.1
J	3 1/2	88.9	6	152.4



ACCESSORY 4-WAY AIR SOLENOID VALVES

Port Size	Orifice Size	Cv Factor	Body & Seal Materials	Coil Specs.	Recommended For Pumps	Valve Part Numbers General Purpose	Valve Part Numbers Explosion-Proof
1/4" NPT	1/16" Dia.	.036	Forged Brass Buna-N	11 Watt Class A	VPA7 VPA10	8345G1	——
1/4" NPT	1/16" Dia.	.036	Forged Brass Buna-N	11 Watt Class A	VPA7 VPA10	——	EF8345G1
1/4" NPT	3/16" Dia.	.700	Forged Brass Buna-N	20 Watt Class F	VPA32 VPA128	8342G1	——
1/4" NPT	3/16" Dia.	.700	Forged Brass Buna-N	20 Watt Class F	VPA32 VPA128	——	EF8342C1

Instructions for Automatic Operation: The 4-way air solenoid valve which directs air flow to the metering pump must be alternately cycled on and off to achieve the back and forth movement of the pump's piston assembly. A control system (timers, counters, switches, etc.) is needed for this function and is not supplied by Plast-O-Matic.

Photos are representative. Appearance may vary based on size/materials.

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