

Solenoid-driven Metering Pumps

QUICK REFERENCE

“Solenoid-Driven Metering Pumps” T.O.C.

III

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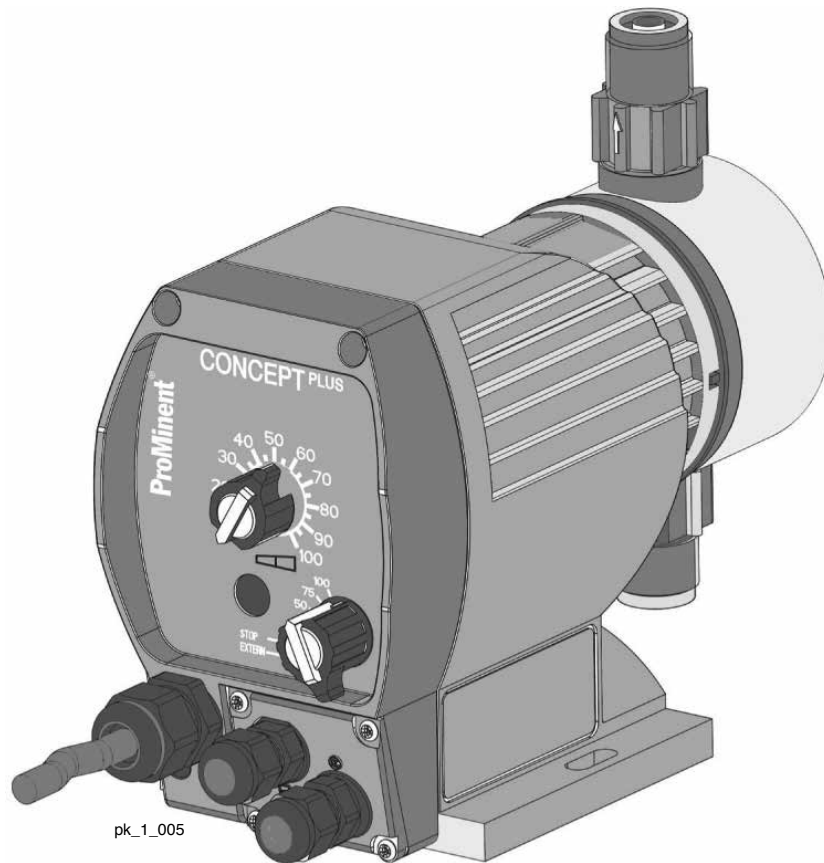
ProMinent® Concept^{PLUS} Solenoid Diaphragm Metering Pumps

Overview: Concept^{PLUS}

Ideal for basic chemical feed applications

(see [page 125](#) for spare parts)

- Capacity range of 0.20 to 3.94 gph (0.74 to 14.9 l/h) at pressures up to 232 psi (16 bar)
- Continuous stroke length adjustment from 0-100% (recommended 30-100%)
- Fixed frequency settings @ 0, 25, 50, 75, and 100%
- Low cost opens up opportunities in the most basic applications
- NP, PP, and PVT liquid ends
- Integral bleed valve simplifies priming and prevents “loss of prime”
- Common applications: Cooling towers, chlorination, and metal finishing
- NSF/ANSI 61 approved



pk_1_005

ProMinent® Concept^{PLUS} Solenoid Diaphragm Metering Pumps

Capacity Data

Capacity data: Concept plus

Pump Version	Capacity at Maximum Back Pressure					Max. Stroking Rate	Pre-Primed Suction Lift		Tubing Connectors O.D. x I.D.	Shipping Weight (approx.)	
	psig	(bar)	GPH	(L/h)	mL/stroke	spm	ft	(m)	in	lbs	(kg)
CNPA											
1000	145	(10)	0.16	(0.6)	0.07	180	20	(6)	1/4 x 3/16	3.97	(1.8)
1601	232	(16)	0.26	(1.0)	0.10	240	20	(6)	1/4 x 3/16	3.97	(1.8)
1002	145	(10)	0.53	(2.0)	0.19	180	16	(5)	1/4 x 3/16	3.97	(1.8)
1003	145	(10)	0.71	(2.7)	0.19	240	16	(5)	1/4 x 3/16	3.97	(1.8)
0704	102	(7)	1.17	(4.4)	0.41	180	13	(4)	1/4 x 3/16	3.97	(1.8)
0705	101	(7)	1.37	(5.2)	0.38	240	13	(4)	1/4 x 3/16	3.97	(1.8)
0308	43.5	(3)	2.10	(8.0)	0.79	180	20	(6)	3/8 x 1/4	3.97	(1.8)
0215	29	(1.5)	3.17	(13.5)	1.40	180	5	(1.5)	3/8 x 1/4	3.97	(1.8)

External pulse contact retrofit available as an option (P/N 1022000)

(Note: Above capacities and suction lift refer to pumps tested on water at 115 VAC, 60 Hz, and an ambient temperature of 70°F (20°C). Higher specific gravity fluids will reduce suction lift. Capacities will be slightly reduced from published ratings if pumps are skid mounted).

Materials In Contact With Chemicals

Liquid end materials in contact with media

	Liquid End	Suction/Discharge valves	Seals	Valve balls	Diaphragm*
PPE	Polypropylene	Polypropylene	EPDM	Ceramic	PTFE
PPB	Polypropylene	Polypropylene	Viton®	Ceramic	PTFE
NPE	Acrylic	PVC	EPDM	Ceramic	PTFE
NPB	Acrylic	PVC	Viton®	Ceramic	PTFE
PVT	PVDF	PVDF	PTFE	Ceramic	PTFE

*Highly compatible material suitable for most fluids.

Viton® is a registered trademark of DuPont Dow Elastomers.

ProMinent® Concept^{PLUS} Solenoid Diaphragm Metering Pumps

Identcode Ordering System

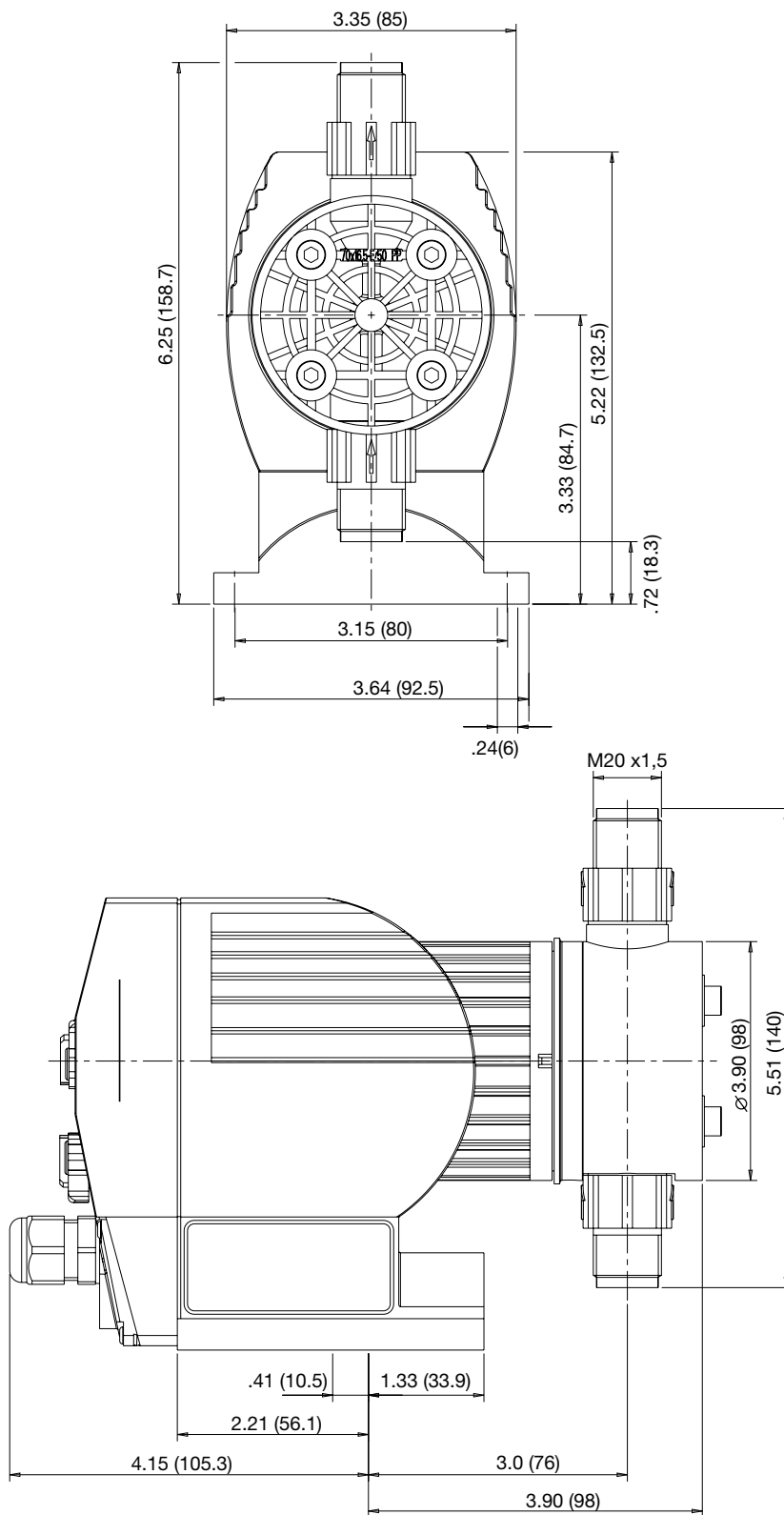
CNPa	Concept PLUS											
	Version	Capacity					Version	Capacity				
	1000	0.16 gph (0.6 l/h), 145 psi (10 bar)					0704	1.17 gph (4.4 l/h), 102 psi (7 bar)				
	1601	0.26 gph (1.0 l/h), 232 psi (16 bar)					0705	1.37 gph (5.2 l/h), 101 psi (7bar)				
	1002	0.53 gph (2.0 l/h), 145 psi (10 bar)					0308	2.10 gph (8.0 l/h), 43.5 psi (3 bar)				
	1003	0.71 gph (2.7 l/h), 145 psi (10 bar)					0215	3.17 gph (12 l/h), 29 psi (2 bar)				
	Liquid end material:											
	PP	Polypropylene										
	NP	Acrylic/PVC										
	PV	PVDF										
	O-rings:											
	B	Viton® seals										
	E	EPDM seals										
	T	PTFE seals										
	Liquid end version:											
	0	Non-bleed version, no valve spring										
	1	Non-bleed version, with valve spring										
	2	With bleed valve, no valve spring (except 0704 models)										
	3	With bleed valve, with valve spring										
	Connection:											
	0	Standard according to technical data										
	B	Special connection 3/8" x 1/4"										
	Logo:											
	0	With ProMinent® logo										
	2	Without ProMinent® logo										
	Power Supply:											
	A	1 ph 230 V 50/60 Hz (Euro plug)										
	D	1 ph 115 V 50/60 Hz (US plug)										
	U	1 ph 230 V 50/60 Hz (US plug) (consult factory for pricing)										
	Control Option:											
0	Standard (w/o external control)											
B	Pulse control											
Accessories:												
1	With accessories (foot valve, injection valve, tubing)											
Approval:												
0	CSA											
CNPa	1000	PP	B	2	0	0	A	B	1	0		

ProMinent® Concept^{PLUS} Solenoid Diaphragm Metering Pumps

Dimensional Drawings

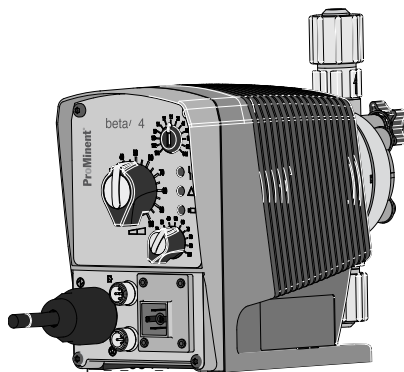
Dimensions in inches (mm).

Ranges given, actual dimension dependent on liquid end material.



ProMinent® Beta® b Solenoid Diaphragm Metering Pumps

Overview: Beta® b



Ideal for basic chemical feed applications

(see [page 125](#) for spare parts and [page 138](#) for control cables)

- Capacity range 8.4 gph (32 l/h) max, 363 psi (25 bar) max
- External contact input for pulse control with a range of 1:64-64:1
- Continuous stroke length adjustment from 0-100% (recommended 30-100%)
- Supplied in PP, Acrylic/PVC, PTFE, PVDF, SS
- Patented coarse/fine deaeration for PP, and Acrylic/PVC
- Auto-degassing liquid end in Acrylic/PVC
- HV liquid end for highly viscous media (suitable for viscosities to 3000 cPs)
- 10-setting stroke frequency adjustment from 10-100%
- External control via voltage-free contacts
- Connector for two-stage level switch
- 12-24 V DC, 24 V AC low voltage version
- LED's for operation status
- NSF/ANSI 61 approved

ProMinent® solenoid-driven metering pumps consist of two main components: the pump drive unit and the liquid end. The Beta series offers two drive (solenoid) sizes: Beta/4 (BT4b) and Beta/5 (BT5b). Operating principles and options are identical, and both units offer maximum backpressure up to 363 psig (17.5 bar). Capacity range for the Beta/4 is 0.19 to 5 gph (0.74 to 19 l/h); Beta/5 is 0.80 to 8.4 gph (2.9 to 32 l/h).

Feed rate is determined by stroke length and stroking rate: stroke length can be varied from 0 to 100% with an adjustment ratio of 10:1. The stroke length is set manually by the adjustment knob on the front of the pump.

Stroke rate can be adjusted in 10% increments between 10 and 100% via the multifunction switch. This switch is also used to select voltage-free On/Off external pulse contact, pump stop, or test (for priming).

Specifications

Drive Unit

The pump housing is constructed of fiberglass-reinforced PPE plastic to protect against corrosion, dust, and water.

The solenoid drive unit houses a short-stroke solenoid with a maximum stroke length of 0.05" (1.25 mm). It is equipped with a noise suppressing mechanism for quiet operation and the armature is the only moving part.

Operating on pulse action, each pulse generates a magnetic field in the solenoid coil. This magnetic field moves the armature, which in turn moves the diaphragm. The diaphragm pushes into the dosing head and cavity forces chemical out of the discharge valve. When the magnetic field is de-energized, a spring returns the armature and diaphragm to their original position. This return movement draws chemical into the dosing head cavity through the suction valve.

In the event of a diaphragm rupture, the liquid end has a weep hole on the bottom of the backplate to direct chemical out of the pump and away from the solenoid. An optional diaphragm failure detector can be used to stop the pump and indicate a fault.

The stroke-length adjusting mechanism is connected directly to the solenoid. Adjustment results in an accurate self-locking stroke-length setting.

Diaphragm

The diaphragm is constructed of fabric-reinforced EPDM elastomer with a plastic core and PTFE-facing. It is chemically resistant to virtually all process fluids and can be used over a wide temperature range. The Beta pump is designed with a convex diaphragm. The curved shape provides precise metering and alleviates stress placed on the diaphragm by reducing liquid end dead volume.

ProMinent® Beta® b Solenoid Diaphragm Metering Pumps

Specifications (Cont.)

The Liquid End

The Beta metering pump liquid ends are available in five material versions: Polypropylene (PP), Kynar (PVDF), Acrylic/PVC (NP), PTFE (TT), and 316 Stainless steel (SS).

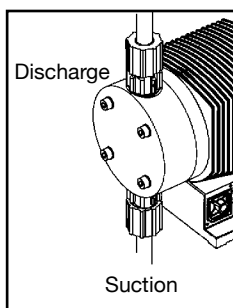
Some liquid ends are interchangeable between the BT4a and BT5a.

Options include a manual bleed valve with needle valve for easy priming, and continuous bleed of fluids that tend to off-gas (available with versions PP, PVT, and NP liquid ends).

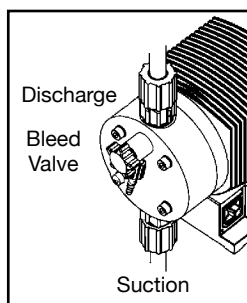
Automatic degassing liquid ends are available for PP and NP versions (except 1000 and 0232). This style liquid end discharges from the center and degasses from the top to prevent air build-up in the chamber.

High viscosity PVDF liquid ends are available for pump versions 1005, 0708, 0413, 0220, 1008, 0713, and 0420. Their metering capacity is 10-20% less than standard pump versions and recommended viscosity is up to 3000 cPs. The HV liquid ends are not self-priming; flooded suction is recommended.

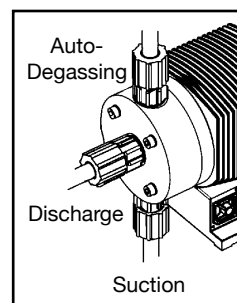
Suction and discharge ports are equipped with double-ball check valves for superior repeatability.



Liquid end without bleed valve



Liquid end with bleed valve



Auto-degassing liquid end

Power Supply

The Beta metering pumps accept a universal 100-230 volt power supply (+/- 10%), single phase, 50/60 Hz, with a 1.15 service factor. Performance is identical whether operated on 50 Hz or 60 Hz power. The power cord is detachable.

Fault Indicators

Three LED lights indicate operational status. A green light flashes during normal operation; a yellow light warns of low chemical; and a red light indicates lack of chemical or an operational error.

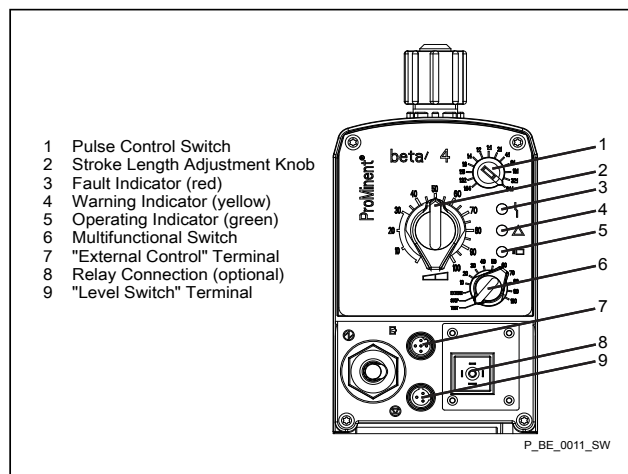
Relay Outputs

Fault annunciating relay

For low tank level (level switch), processor fault, and fuse/power supply failure.

Pacing relay

A contact closure is issued with every pump stroke (contact duration 150 ms). This allows a second ProMinent metering pump to be paced synchronously, or to totalize flow with an external stroke counter.



ProMinent® Beta® b Solenoid Diaphragm Metering Pumps

Specifications (Cont.)

Maximum stroke length:	0.05" (1.25 mm)		
Materials of construction			
Housing:	Fiberglass reinforced PPE		
Diaphragm:	PTFE-faced EPDM with plastic core		
Liquid end options:	Polypropylene, PVDF, Acrylic/PVC, PTFE, 316 SS		
Enclosure rating:	IP 65		
Motor insulation class:	F		
Power supply:	100-230 VAC, 1 phase, 50/60 Hz, +/- 10%; 12-24 VDC or 24VDC (+/- 10%)		
Check valves:	Double ball		
Metering repeatability:	When used according to operating instructions, ±2% under constant conditions and at minimum 30% stroke length		
Power cord:	6 ft (2 m)		
Relay cable (optional):	6 ft (2 m)		
Relay load			
Fault relay only (options 1 & 3):	Contact load: 250 VAC, 2 A, 50/60 Hz Operating life: > 200,000 switch functions		
Fault and pacing relay (options 4 & 5):	Contact load: 250 VAC/DC, 2 A, 50/60 Hz Operating life: > 200,000 switch functions Residual impedance in ON-position ($R_{DS(on)}$): < 8 Ω Residual current in OFF-position: < 1 μA Maximum current: < 100 mA Maximum voltage: 24 VDC Switch functions: 15x10 ⁹ Contact closure: 100 μs (for pacing relay)		
Ambient temperature range:	14°F (-10°C) to 113°F (45°C)		
Max. fluid operating temperatures:	Material	Constant	Short Term
	Acrylic/PVC	113°F (45°C)	140°F (60°C)
	Polypropylene	122°F (50°C)	212°F (100°C)
	PTFE	122°F (50°C)	248°F (120°C)
	316 SS	122°F (50°C)	248°F (120°C)
	PVDF	149°F (65°C)	212°F (100°C)
Average power drain at maximum stroking rate (Watts) / current drain at pump stroke (Amps)			
BT4a:	17W / 0.7 A or 15 A (peak current for approx. 1 μs)		
BT5a:	22W / 1.0 A or 15 A (peak current for approx. 1 μs)		
Service factor:	1.15		
Warranty:	2 years on drive, 1 year on liquid end (extended warranties available)		
Industry standards:	UL recognized, CE available for U.S.A. and Canada, NSF/ANSI 61		
Valve threads:	Metric thread for PP, NP, PVT, and TT versions. 1/2" MNPT connections are available in all materials.		
Standard Production Test:	All pumps are tested for capacity at maximum pressure prior to shipment.		
Max. solids size in fluid:	Pumps with 1/4" valves: 15μ - Pumps with 1/2" valves: 50μ		
Controlling contact (pulse):	With voltage free contact, or with semiconductor sink logic control (NPN), not source logic (PNP). With a residual voltage of <700 mV, the contact load is approximately 0.5 mA at +5 VDC. (Note: Semiconductor contacts that require >700 mV across a closed contact should not be used.) Pump ignores contacts exceeding maximum input rate.		
Necessary contact duration:	20 μs		
Recommended Viscosity:	max. 200 cPs for standard liquid end max. 500 cPs for valve with springs max. 50 cPs for auto-degassing metering pumps max. 3000 cPs for high viscosity		

ProMinent® Beta® b Solenoid Diaphragm Metering Pumps

Capacity Data

Capacity Data: beta®b

Pump Version	Capacity at Max. Backpressure					Capacity at 1/2 Max. Backpressure					Pre-Primed	Max. Strok- ing Rate	Tubing Connectors ²	Shipping Weight (higher weights are for SS)	
	psig	(bar)	U.S. GPH	(L/h)	mL/ stroke	psig	(bar)	U.S. GPH	(L/h)	mL/ stroke	ft	(m)	O.D. x I.D. in	lbs	(kg)
BT4b															
1000	145	(10)	0.2	(0.74)	0.07	73	(5)	0.22	(0.82)	0.08	19.6	(6.0)	1/4 x 3/16	6.4-7.9	(2.9-3.6)
2001 ³	290	(20)	0.25	(0.96)	0.1	145	(10)	0.4	(1.50)	0.13	19.6	(6.0)	1/4 x 3/16	6.4-7.9	(2.9-3.6)
1601	232	(16)	0.29	(1.10)	0.1	116	(8)	0.37	(1.40)	0.13	19.6	(6.0)	1/4 x 3/16	6.4-7.9	(2.9-3.6)
2002 ³	290	(20)	0.45	(1.70)	0.19	145	(10)	0.74	(2.80)	0.24	19.6	(6.0)	1/4 x 3/16	6.4-7.9	(2.9-3.6)
1602	232	(16)	0.58	(2.20)	0.19	116	(8)	0.66	(2.50)	0.24	19.6	(6.0)	1/4 x 3/16	6.4-7.9	(2.9-3.6)
1604	232	(16)	0.95	(3.60)	0.33	116	(8)	1.14	(4.30)	0.4	19.6	(6.0)	1/4 x 3/16	6.8-8.6	(3.1-3.9)
0708	101	(7)	1.88	(7.10)	0.66	50.5	(4)	2.22	(8.40)	0.78	19.6	(6.0)	1/2 x 3/8	6.8-8.6	(3.1-3.9)
0413	58	(4)	3.25	(12.30)	1.14	29	(2)	3.75	(14.20)	1.31	9.8	(3.0)	1/2 x 3/8	6.8-8.6	(3.1-3.9)
0220	29	(2)	5.02	(19.00)	1.76	14.5	(1)	5.52	(20.90)	1.94	6.5	(2.0)	1/2 x 3/8	7.3-9.7	(3.3-4.4)
BT5b															
25043	363	(25)	0.77	(2.90)	0.27	181	(13)	0.98	(3.70)	0.34	19.6	(6.0)	(8 x 4mm)	9.9-11.7	(4.5-5.3)
1008	145	(10)	1.8	(6.80)	0.63	73	(5)	2.19	(8.30)	0.76	19.6	(6.0)	1/2 x 3/8	9.9-11.7	(4.5-5.3)
0713	101	(7)	2.91	(11.00)	1.02	50.5	(4)	3.46	(13.10)	1.21	13.1	(4.0)	1/2 x 3/8	9.9-11.7	(4.5-5.3)
0420	58	(4)	4.52	(17.10)	1.58	29	(2)	5.05	(19.10)	1.77	9.8	(3.0)	1/2 x 3/8	10.4-12.8	(4.7-5.8)
0232 ¹	29	(2)	8.45	(32.00)	2.96	14.5	(1)	9.56	(36.20)	3.35	6.5	(2.0)	1/2 x 3/8	11.2-14.6	(5.1-6.6)
BT4b: auto-degassing liquid ends															
1601	232	(16)	0.16	(0.59)	0.06	116	(8)	0.21	(0.80)	0.07	5.9	(1.8)	1/4 x 3/16	6.4	(2.9)
1602	232	(16)	0.37	(1.40)	0.13	116	(8)	0.46	(1.74)	0.174	6.9	(2.1)	1/4 x 3/16	6.4	(2.9)
1604	232	(16)	0.71	(2.70)	0.25	116	(8)	0.95	(3.60)	0.33	8.8	(2.7)	1/4 x 3/16	6.8	(3.1)
0708	101	(7)	1.74	(6.60)	0.61	50.8	(4)	1.98	(7.50)	0.69	6.5	(2.0)	1/2 x 3/8	6.8	(3.1)
0413	58	(4)	2.85	(10.80)	1	29	(2)	3.33	(12.60)	1.17	6.5	(2.0)	1/2 x 3/8	6.8	(3.1)
0220	29	(2)	4.28	(16.20)	1.5	14.5	(1)	4.76	(18.00)	1.67	6.5	(2.0)	1/2 x 3/8	7.3	(3.3)
BT5b: auto-degassing liquid ends															
1008	145	(10)	1.66	(6.30)	0.58	73	(5)	1.98	(7.50)	0.69	9.8	(3.0)	1/2 x 3/8	9.9	(4.5)
0713	101	(7)	2.77	(10.50)	0.97	51	(4)	3.25	(12.30)	1.14	8.2	(2.5)	1/2 x 3/8	9.9	(4.5)
0420	58	(4)	4.12	(15.60)	1.44	29	(2)	4.6	(17.40)	1.61	8.2	(2.5)	1/2 x 3/8	10.4	(4.7)

Above capacities and suction lift refer to pumps tested on water at 115 VAC, 60 Hz, and an ambient temperature of 70°F (21°C).

Higher specific gravity fluids will reduce suction lift. Higher viscosity fluids will reduce capacity.

Liquid ends for highly viscous media have 10-20% less metering capacity and are not self-priming. Standard connectors are 1/2" MNPT or 5/8" hose barb. Positive suction recommended.

¹ Not available with bleed valve.

² SS versions use 1/4" female threads except models 0220, 0420, and 0232 which use 3/8" female threads.

³ Only available in SS and Acrylic liquid ends

Universal control cable necessary for external Beta control. (see [page 138](#))

Materials In Contact With Chemicals

Liquid end materials in contact with media

Version	Liquid End	Suction/Discharge valves	Seals	Valve balls	Diaphragm*
*PVT	*PVDF	*PVDF	PTFE	Ceramic	PTFE
PPT	Polypropylene	*PVDF	PTFE	Ceramic	PTFE
NPT	Acrylic	*PVDF	PTFE	Ceramic	PTFE
TTT	PTFE with Carbon	PTFE with Carbon	PTFE	Ceramic	PTFE
SST	316 Stainless Steel	316 Stainless Steel	PTFE	Ceramic	PTFE

*Highly compatible material suitable for most fluids.

ProMinent® Beta® b Solenoid Diaphragm Metering Pumps

Identcode Ordering System

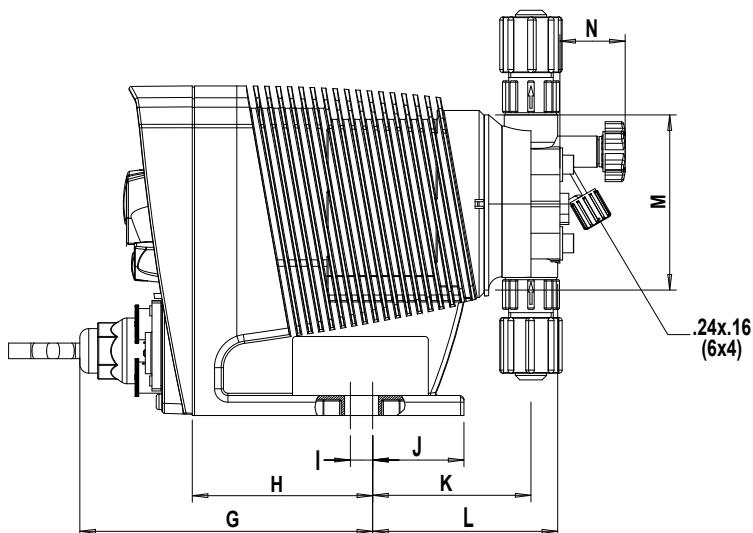
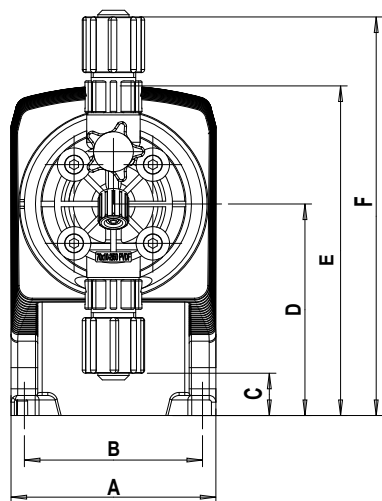
BT4b	Beta 4b										Beta 5b					
	Version	Capacity					Version	Capacity					Version	Capacity		
	1000	0.20 gph (0.74 l/h), 145 psi (10 bar)					1604	0.95 gph (3.60 l/h), 232 psi (16 bar)					2504	0.77 gph (2.90 l/h), 363 psi (25 bar)		
	2001	0.25 gph (0.96 l/h), 290 psi, (20 bar)					0708	1.88 gph (7.10 l/h), 102 psi (7 bar)					1008	1.80 gph (6.80 l/h), 145 psi (10 bar)		
	1601	0.29 gph (1.10 l/h), 232 psi (16 bar)					0413	3.25 gph (12.30 l/h), 58 psi (4 bar)					0713	2.91 gph (11.00 l/h), 102 psi (7 bar)		
	2002	0.45 gph (1.70 l/h), 290 psi (20 bar)					0220	5.02 gph (19.0 l/h), 29 psi (2 bar)					0420	4.52 gph (17.10 l/h), 58 psi (4 bar)		
	1602	0.58 gph (2.2 l/h), 232 psi (16 bar)										0232	8.45 gph (32.00 l/h), 29 psi (2 bar)			
	Liquid end material:															
	PP	Polypropylene/PVDF, for self-degassing version Polypropylene/Polypropylene														
	NP	Acrylic glass/PVDF, for self-degassing version Acrylic glass/PVC														
	PV	PVDF/PVDF														
	TT	PTFE/PTFE														
	SS	Stainless steel														
	O-rings:															
	E	EPDM/PTFE coated, only for PP and NP self-degassing														
B	FPM-B/PTFE coated, only on PP and NP self-degassing															
T	PTFE/PTFE coated															
P	Diaphragm and seal EPDM															
Liquid end version:																
0	Non-bleed version, no valve spring, for TT, SS and type 0232 only															
1	Non-bleed version, with valve spring, for TT, SS and type 0232 only															
2	With deaerator, no valve spring, PP, PV, NP only, not type 0232															
3	With deaerator, with valve spring, PP, PV, NP only, not type 0232															
4	Version for highly viscous media, only PVT, types 1005, 1605, 0708, 1008, 0413, 0713, 0220, 0420															
9	Self-degassing for PP, NP only, not for types 1000 and 0232															
Hydraulic connections:																
0	Standard according to technical data															
B	special-connection 3/8" x 1/4"															
Logo:																
0	With ProMinent® logo															
Power supply:																
U	Universal 100-240 V															
M	12-24 VDC															
Cable and plug:																
A	6 ft European															
D	6 ft USA 115 V															
U	6 ft USA 230 V															
Relay:																
0	No relay															
1	Fault indicating relay, normally energized, 1 x changeover contact 230 V - 2 A															
3	Fault indicating relay, normally de-energized, 1 x changeover contact 230 V - 2 A															
4	As 1 + pacing relay 2 x normally open contacts 24 V - 100 mA															
5	As 3 + pacing relay 2 x normally open contacts 24 V - 100 mA															
Accessories:																
0	No accessories															
1	With foot and injection valve, 5 ft PVC suction tubing, 10 ft PE discharge tubing															
Control type:																
0	No lock															
1	With lock: manual operation locked when external cable plugged in															
Control variants:																
0	Standard															
BT4b	1000	PP	E	0	0	0	U	A	0	0	0	0				

ProMinent® Beta® b Solenoid Diaphragm Metering Pumps

Dimensional Drawings

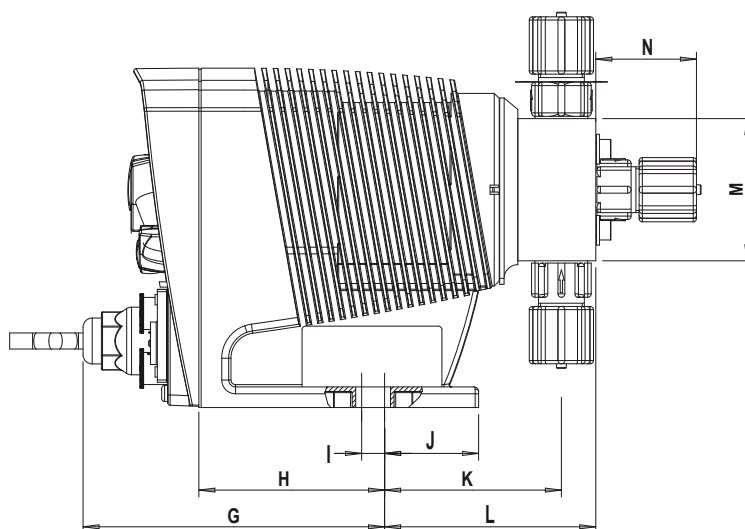
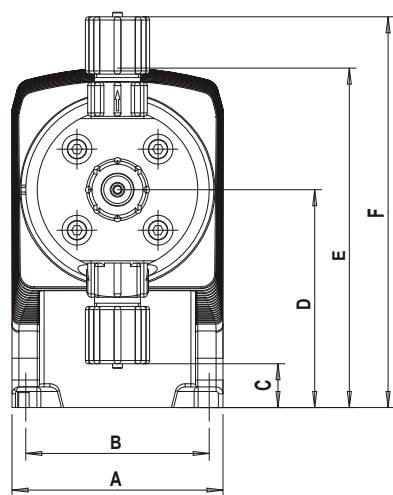
Dimensions in inches (mm).

Ranges given, actual dimension dependent on liquid end material.



Pump	A	B	C	D	E	F	G	H	I	J	K	L	M	N
BT4	3.6 (92)	3.1 (80)	.13-.75 (3.2-19)	3.7 (95)	5.8 (148)	7.0-7.8 (179-199)	5.2 (131.5)	3.2 (81)	.39 (10)	1.4 (36)	2.8-3.0 (71-76)	3.2-3.7 (83-93)	2.8-4.3 (Ø 90-Ø 110)	1.1 29.3
BT5	4.0 (102)	3.1 (80)	.13-.75 (3.2-19)	4.0 (101)	6.0 (153)	7.0-7.8 (179-199)	5.3 (135.5)	3.3 (85)	.59 (15)	1.6 (41)	2.8-3.0 (71-76)	3.2-3.7 (83-93)	2.8-4.3 (Ø 90-Ø 110)	1.1 29.3

With Auto-Degassing Liquid Ends



Pump	A	B	C	D	E	F	G	H	I	J	K	L	M	N
BT4	3.6 (92)	3.1 (80)	.30-.75 (7.5-19)	3.7 (95)	5.8 (148)	6.7-7.42 (170.5-188.5)	5.2 (131.5)	3.2 (81)	.39 (10)	1.4 (36)	2.9-3.0 (74-77)	3.5-4.2 (89-105.5)	2.8-3.5 (Ø 90-Ø 70)	1.73 43.9
BT5	4.0 (102)	3.1 (80)	.30-.75 (7.5-19)	4.0 (101)	6.0 (153)	6.7-7.42 (170.5-188.5)	5.3 (135.5)	3.3 (85)	.59 (15)	1.6 (41)	2.9-3.0 (74-77)	3.5-4.2 (89-105.5)	2.8-3.5 (Ø 90-Ø 70)	1.73 43.9

ProMinent® gamma/ L Solenoid Diaphragm Metering Pumps

Overview: gamma/ L

Ideal for applications requiring automation, large turndown and/or feed verification

(see [page 125](#) for spare parts and [page 138](#) for control cables)

- Capacity range 8.4 gph (32 l/h) max, 290 psi (20 bar) max
- Continuous stroke length adjustment from 0-100%
- Supplied in PP, Acrylic/PVC, PTFE, PVDF, SS
- Patented bleed valve on PP, PVDF, and Acrylic/PVC versions
- Auto-degassing liquid end version in Acrylic/PVC
- HV liquid end for highly viscous media (suitable for viscosities to 3000 cPs)
- Digitally accurate stroke rate via keypad and large LCD display
- Select feed rate display in strokes/min. or gph
- Programmable pressure levels
- Flow monitor input
- External Control: Voltage free contact, pulse m/d and/or 4-20 mA input
- Interface for PROFIBUS® DP ([see page 138](#))
- Two-stage float switch connector
- Optional 14-day programmable timer with software for PC programming
- 12-24 V DC, 24 V AC low voltage version
- LED's for operational status
- Concentration entry option for proportional flow metering
- NSF/ANSI 61 approved



pk_1_005

ProMinent® gamma/ L Solenoid Diaphragm Metering Pumps

Overview: gamma/ L

The gamma/L is a diaphragm-type, solenoid-driven, microprocessor based metering pump with maximum capacities to 8.4 gph (32.0 L/h) and maximum backpressure to 290 psig (20 bar).

ProMinent® solenoid-driven metering pumps consist of two main components: the pump drive unit and the liquid end.

Drive Unit

The pump housing is constructed of fiberglass-reinforced PPE plastic to protect against corrosion, dust, and water.

The solenoid drive unit houses a short-stroke solenoid with a maximum stroke length of 0.05" (1.25 mm). It is equipped with a noise suppressing mechanism for quiet operation and the armature is the only moving part.

Operating on pulse action, each pulse generates a magnetic field in the solenoid coil. This magnetic field moves the armature, which in turn moves the diaphragm. The diaphragm pushes into the dosing head and cavity forces chemical out of the discharge valve. When the magnetic field is de-energized, a spring returns the armature and diaphragm to their original position. This return movement draws chemical into the dosing head cavity through the suction valve.

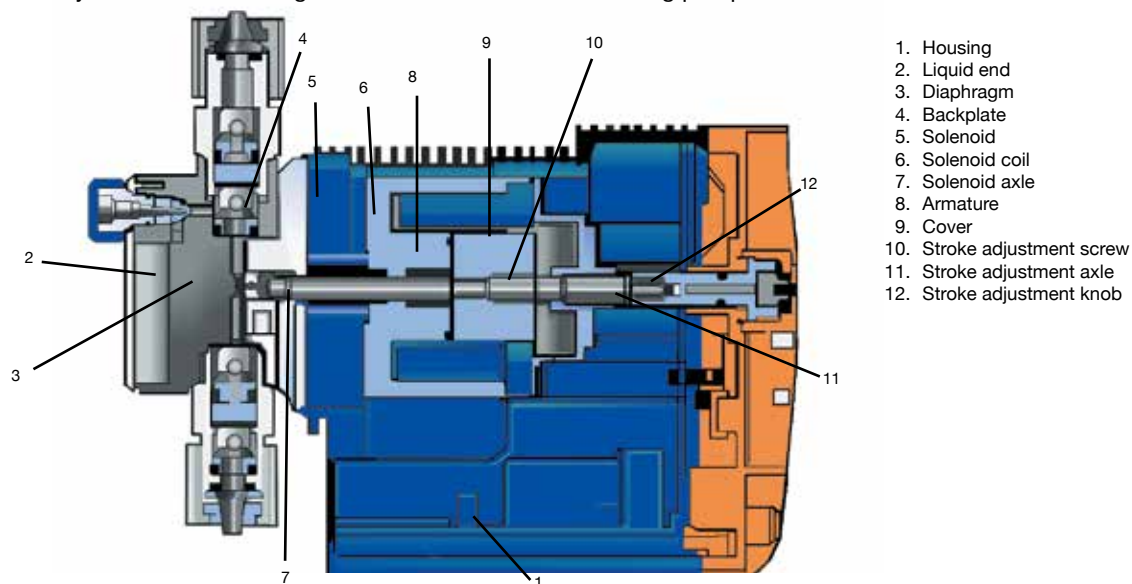
In the event of a diaphragm rupture, the liquid end has a weep hole on the bottom of the backplate to direct chemical out of the pump and away from the solenoid. An optional diaphragm failure detector can be used to stop the pump and indicate a fault.

The stroke-length adjusting mechanism is connected directly to the solenoid. Adjustment results in an accurate self-locking stroke-length setting.

Diaphragm

The diaphragm is constructed of fabric-reinforced EPDM elastomer with a plastic core and PTFE-facing. It is chemically resistant to virtually all process fluids and can be used over a wide temperature range. The gamma/ L pump is designed with a convex diaphragm. The curved shape provides precise metering and alleviates stress placed on the diaphragm by reducing liquid end dead volume.

Cutaway view of ProMinent gamma/ L solenoid-driven metering pump



ProMinent® gamma/ L Solenoid Diaphragm Metering Pumps

Overview: gamma/ L

The Liquid End

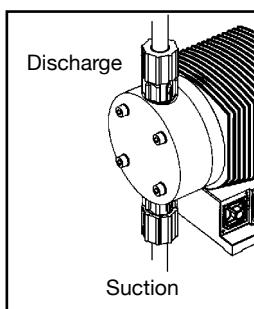
The gamma/ L metering pump liquid ends are available in five material versions: Polypropylene (PP), Kynar (PVDF), Acrylic/PVC (NP), PTFE (TT), and 316 Stainless steel (SS).

Options include a manual bleed valve with needle valve for easy priming, and continuous bleed of fluids that tend to off-gas (available with versions PP, PVT, and NP liquid ends).

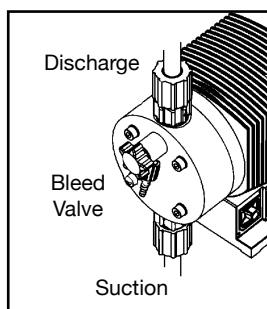
Automatic degassing liquid ends are available for PP and NP versions (except 1000 and 0232). This style liquid end discharges from the center and degasses from the top to prevent air build-up in the chamber.

High viscosity PVDF liquid ends are available for pump versions 1005, 0708, 0413, 0220, 1008, 0713, and 0420. Their metering capacity is 10-20% less than standard pump versions and recommended viscosity is up to 3000 cPs. The HV liquid ends are not self-priming; flooded suction is recommended.

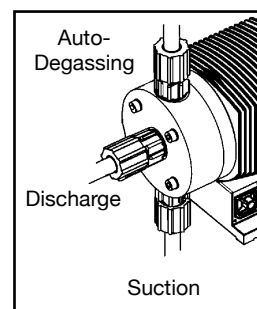
Suction and discharge ports are equipped with double-ball check valves for superior repeatability.



Liquid end without bleed valve



Liquid end with bleed valve



Auto-degassing liquid end

Power Supply

The gamma/ L metering pumps accept a universal 100-230 volt power supply (+/- 10%), single phase, 50/60 Hz, with a 1.15 service factor. Performance is identical whether operated on 50 Hz or 60 Hz power. The power cord is detachable.

Fault Indicators

Three LED lights indicate operational status. A green light flashes during normal operation; a yellow light warns of low chemical; and a red light indicates lack of chemical or an operational error.

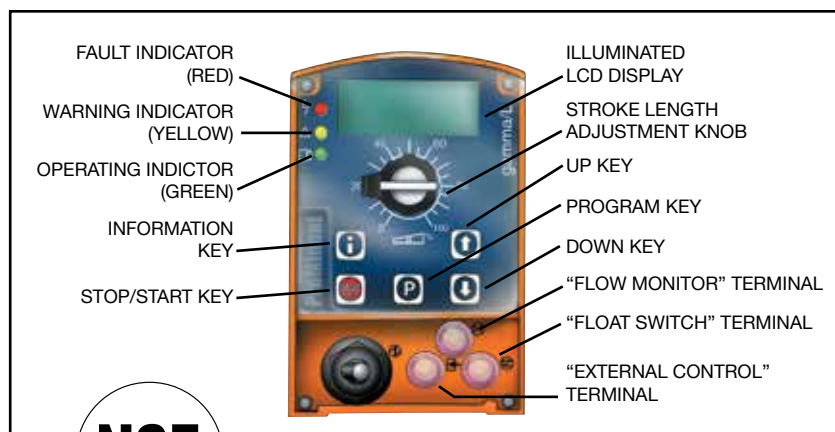
Relay Outputs

Fault annunciating relay

For low tank level (level switch), processor fault, fuse/power supply failure, Flow monitor, Analog (loss of signal), and Calibration

Pacing relay

A contact closure is issued with every pump stroke (contact duration 150 ms). This allows a second ProMinent metering pump to be paced synchronously, or to totalize flow with an external stroke counter.



ProMinent® gamma/ L Solenoid Diaphragm Metering Pumps

Standard Modes and Functions

Feed rate is determined by stroke length and stroke rate. Stroke length is manually adjustable from 1 to 100% in increments of 1% via the stroke length knob. Optimum repeatability is between 30-100% or 50-100% when using an auto-degassing liquid end.

Stroke rate can be set to a maximum of 180 strokes per minute. An illuminated LCD displays stroke length, stroke rate and an accumulative strokecounter, that can be cleared and reset.

Pump capacity output is displayed in either U.S. gph or l/h, set by the operator. Totalized capacity is also displayed in either U.S. gallons or litres.

The “i” key is used to scroll information screens for stroke rate, stroke length, stroke counter, capacity and totalized capacity. Other information is available depending on options ordered.

Basic Control Modes

Five control modes are available with the gamma/ L: manual, external contact 1:1, external contact with pulse control (multiplier/divider), batch or analog control. The basic version includes manual and external contact 1:1. The PROFIBUS® option includes all control modes, plus fieldbus connection.

In the “Manual” mode, stroke rate is controlled manually. The “Contact” external 1:1 mode allows adjustments to be made externally (e.g. by means of a pulse-type water meter for proportional chemical feed). Pulse signals are fed into the contact input of the pump by an optional control cable. Each pulse from a water meter or pulse-type controller produces one pump stroke, up to the pump’s maximum stroke rate. Over-stroking the pump is not possible.

Note: Universal Control Cable necessary for all gamma/ L control capabilities. (See Accessories [page 138 cables](#))

Standard Functions

“Calibrate”

The pump can be directly calibrated in-line to determine output on standard liquid ends and 50% to 100% on auto-degassing liquid ends. A warning indicator flashes when adjustments to the stroke volume are made outside the calibrated range of (+/- 10%) of stroke length.

“Pressure Level”

Backpressure control can be adjusted depending on maximum psig of pump version.

“Auxiliary Frequency”

An auxiliary frequency can be programmed. This default value can be enabled via an optional control cable.

“Flow”

The gamma/ L series metering pumps will monitor their own output with the optional adjustable flow monitor connected to the discharge valve. Every fluid discharge is sensed and fed back to the electronic control circuit of the pump. If insufficient fluid is discharged for a predetermined number of strokes (up to 125), the pump automatically stops and the red LED illuminates. The optional fault relay changes state to issue an alarm or activate a standby pump.

“Float Switch”

An optional two-stage ProMinent float switch can be plugged into the pump to monitor chemical levels in the source tank. An early warning is issued when the allowable minimum level is reached. The pump continues to operate while the display flashes, the yellow LED illuminates and an optional fault relay changes state to issue an alarm. If the liquid level in the supply tank drops another 3/4” (20 mm), the pump automatically shuts down, the LCD displays “Minim” and the red LED illuminates. The optional fault relay remains activated.

“Pause”

The gamma/ L series can be switched on or off via a dry contact through the optional control cable. This function operates only via the “external control” terminal.

“Stop”

The gamma/ L can be stopped by pressing the STOP/START.

“Prime”

Priming is activated by pressing both arrow keys at the same time.

Function and Errors Indicators

Three LED lights on the pump faceplate signal operational status. The green light flashes during normal operation and the yellow light warns of a situation that could lead to a fault (e.g., low chemical). If a fault occurs “ERROR” will appear on the LCD screen and the red LED light is illuminated.

ProMinent® gamma/ L Solenoid Diaphragm Metering Pumps

Optional Modes and Functions

Optional Control Modes

“Analog” Mode

With this option, the stroke rate of the gamma/L is directly proportional to the analog signal. The maximum number of strokes per minute corresponding to the analog signal range can be selected by the operator. Input signals can be set to 4-20 mA, or a custom curve.

“Contact” Mode with Pulse Control

This feature is used to “tune” the gamma/L to contact generators of any kind (e.g., pulse-type water meter or process controller), and eliminates the need for a costly external control unit. The following functions can be selected by means of the keypad.

Pulse step-up (multiply) and step-down (divide)

By simply entering a factor in the 0.01-99.99 range, the step-up or step-down ratio is set.

For example:

Step-up Factor:

99.99 1 pulse = 99.99 pump strokes

10 1 pulse = 10 pump strokes

Step-down Factor:

0.25 4 pulses = 1 pump stroke

0.01 100 pulses = 1 pump stroke

“Batch” Mode

The Batch mode is a variation of the contact operating mode. A specific number of strokes can be entered up to 65,535 strokes (whole numbers) or the feed quantity can be entered. The batch is then initiated by either pressing the “P” key on the pump face or providing a contact to the external control cable. Note: Pulse control is needed to run the batch mode.

Access Code

A programmable access code to prevent unauthorized changes to settings is available as an option.

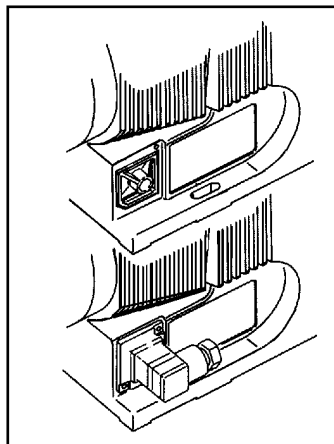
Relay outputs

Fault annunciating relay

For low tank level (float switch), loss of flow (flow monitor), system faults and fuse/power supply failure.

Fault annunciating and Pacing relay

In addition to the fault annunciating relay, a contact closure is issued with every pump stroke (contact duration 150 ms). This allows a second ProMinent metering pump to be paced synchronously, or to totalize flow with an external stroke counter.



An external panel in the base of the pump enables optional relays to be installed on-site.

4-20 mA Analog Output

A 4-20 mA analog output option is available for use with pumps that operate in the manual mode or by a

remote 4-20 mA analog signal. The 4-20 mA analog output signal is linear to pump frequency multiplied by the percentage of stroke length. The output signal is isolated and can drive up to 300 Ohms impedance. Analog output can be used for status feedback to higher level control systems for closed loop control or for monitoring chemical usage. This option is available in combination with either the fault annunciating or pacing relay.

Timer Relay

The optional integrated 14-day timer offers 81 programmable events. It can be set to hourly, daily, workdays, weekend, weekly or two-week periods with switch-on times from 1 second to two weeks. The timer can be programmed to change operation mode, frequency, and the function of two relays. All the functions can be programmed independently of one another. Up to 13 delay times can be programmed into the timer function.

The range of applications exceeds that of a “standard timer”. Typical applications are disinfection in cooling towers, process water, etc., with the ability to automatically program shock dosages or increase the concentration at a certain interval.

Fieldbus connection

Monitor and control remotely via a SCADA/PLC system using the PROFIBUS®-DP system.

Note: Relay options not available with PROFIBUS®. PROFIBUS® is not field retrofittable.

INFORMATION DISPLAYS



All modes

Stroke rate (frequency)
Stroke length (percent)
Stroke counter (N)
Capacity (gph or l/h)
Dosing quantity (gal or L)

Mode dependent

Accumulative strokes (*N)
Accumulative quantity (*gal or *L)
mA current (mA)
Pulse factor / Memory (*)
Indication of external mode (EXT)

ProMinent® gamma/ L Solenoid Diaphragm Metering Pumps

Specifications

<i>Maximum stroke length:</i>	0.05" (1.25 mm)		
<i>Materials of construction</i>			
<i>Housing:</i>	Fiberglass reinforced PPE		
<i>Diaphragm:</i>	PTFE-faced EPDM with plastic core		
<i>Liquid end options:</i>	Polypropylene, PVDF, Acrylic/PVC, PTFE, 316 SS		
<i>Enclosure rating:</i>	IP 65		
<i>Motor insulation class:</i>	F		
<i>Power supply:</i>	100-230 VAC, 1 phase, 50/60 Hz, +/- 10%; 12-24 VDC or 24 VDC (+/- 10%)		
<i>Check valves:</i>	Double ball		
<i>Metering repeatability:</i>	When used according to operating instructions, ±2% under constant conditions and at minimum 30% stroke length. The minimum stroke length with auto-degassing liquid end is 50%.		
<i>Power cord:</i>	6 ft (2 m)		
<i>Relay cable (optional):</i>	6 ft (2 m)		
<i>Relay load</i>			
<i>Fault relay only (options 1 & 3):</i>	Contact load: 250 VAC, 2 A, 50/60 Hz Operating life: > 200,000 switch functions		
<i>Fault and pacing relay (Options 4 & 5):</i>	Contact load: 24 V, 2 A, 50/60 Hz Operating life: > 200,000 switch functions Residual impedance in ON-position ($R_{DS(ON)}$): < 8 W Residual current in OFF-position: < 1mA Maximum voltage: 24 VDC Maximum current: < 100 mA (for pacing relay) Switch functions: 15×10^9 Contact closure: 100 μ s (for pacing relay)		
<i>Analog output signal:</i>	Max. impedance 300 W Isolated 4-20 mA output signal		
<i>Ambient temperature range:</i>	14°F (-10°C) to 113°F (45°C)		
<i>Max. fluid operating temperatures:</i>	Material	Constant	Short Term
	Acrylic/PVC	113°F (45°C)	140°F (60°C)
	Polypropylene	122°F (50°C)	212°F (100°C)
	PVC	113°F (45°C)	140°F (60°C)
	PVDF	149°F (65°C)	212°F (100°C)
	PTFE	122°F (50°C)	248°F (120°C)
	316 SS	122°F (50°C)	248°F (120°C)
<i>Average power drain at maximum stroke rate (Watts) / current drain at pump stroke (Amps)</i>			
1000, 1601, 1602, 1005,	17W / 0.7 A or 15 A (peak current for approx. 1 μ s)		
0708, 0413, & 0220:	22W / 1.0 A or 15 A (peak current for approx. 1 μ s)		
1605, 1008, 0713, 0420 & 0230:			
<i>Service factor:</i>	1.15		
<i>Warranty:</i>	2 years on drive, 1 year on liquid end (extended warranties available)		
<i>Industry standards:</i>	UL Recognized in United States and Canada, CE available, NSF/ANSI 61		
<i>Valve threads:</i>	NP, PP, PVT, and TT Versions: M20 x 1.5 (provided with tubing adapters)		
<i>Standard Production Test:</i>	All pumps are tested for capacity at maximum pressure prior to shipment.		
<i>Max. solids size in fluid:</i>	Pumps with 1/4" valves: 15 μ - Pumps with 1/2" valves: 50 μ		
<i>Controlling contact (pulse):</i>	With voltage free contact, or with semiconductor sink logic control (NPN), not source logic (PNP). With a residual voltage of <0.7 V, the contact load is approximately 0.5 mA at +5 VDC. (Note: Semiconductor contacts that require >0.7 V across a closed contact should not be used.) Pump ignores contacts exceeding maximum input rate.		
<i>Necessary contact duration:</i>	20 μ S		
<i>Recommended Viscosity:</i>	max. 200 cPs for standard liquid end max. 500 cPs for valve with springs max. 50 cPs for auto-degassing liquid ends max. 3000 cPs for high-viscosity liquid ends		

ProMinent® gamma/ L Solenoid Diaphragm Metering Pumps

Capacity Data

Capacity Data: gamma/ L

Pump											Pre-Primed		Max.	Tubing	Shipping Weight	
Version	Capacity at Max. Backpressure					Capacity at 1/2 Max. Backpressure					Suction	Stroking	Connectors ²	(higher weights are for SS)		
	U.S.				mL/			U.S.	mL/		Lift		Rate	O.D. x I.D.		
	psig	(bar)	GPH	(L/h)	stroke	psig	(bar)	GPH	LI/h	stroke	ft	(m)	spm	in	lbs	(kg)
Standard liquid ends																
1000	145	(10)	0.19	(0.74)	0.07	73	(5)	0.21	(0.82)	0.08	19.6	(6)	180	1/4 x 3/16	7.5-8.6	(3.4-3.9)
2001 ³	290	(20)	0.29	(1.1)	0.1	145	(10)	0.37	(1.4)	0.13	19.6	(6)	180	1/4 x 3/16	6.4-7.9	(2.9-3.6)
1601	232	(16)	0.29	(1.1)	0.1	126	(8.75)	0.37	(1.4)	0.13	19.6	(6)	180	1/4 x 3/16	7.5-8.6	(3.4-3.9)
2002 ³	290	(20)	0.45	(1.7)	0.19	145	(10)	0.66	(2.5)	0.24	19.6	(6)	180	1/4 x 3/16	6.4-7.9	(2.9-3.6)
1602	232	(16)	0.55	(2.1)	0.19	126	(8.75)	0.66	(2.5)	0.24	19.6	(6)	180	1/4 x 3/16	7.5-8.8	(3.4-4.0)
1005	145	(10)	1.1	(4.4)	0.41	73	(5)	1.32	(5)	0.46	19.6	(6)	180	1/2 x 3/8	7.7-9.0	(3.5-4.1)
0708	101	(7)	1.9	(7.1)	0.66	50.5	(3.50)	2.22	(8.4)	0.78	19.6	(6)	180	1/2 x 3/8	7.7-11.0	(3.5-5.0)
0413	58	(4)	3.2	(12.3)	1.14	29	(2)	3.75	(14.2)	1.31	9.8	(3)	180	1/2 x 3/8	7.7-11.0	(3.5-5.0)
0220	29	(2)	5	(19.0)	1.76	14.5	(1)	5.52	(20.9)	1.94	6.5	(2)	180	1/2 x 3/8	7.7-11.0	(3.5-5.0)
1605	232	(16)	1.1	(4.1)	0.38	126	(8.75)	1.29	(4.9)	0.45	19.6	(6)	180	1/2 x 3/8	9.3-10.8	(4.2-4.9)
1008	145	(10)	1.8	(6.8)	0.63	73	(5)	2.19	(8.3)	0.76	19.6	(6)	180	1/2 x 3/8	9.5-12.8	(4.3-5.8)
0713	101	(7)	2.9	(11.0)	1.02	50.5	(3.50)	3.46	(13.1)	1.21	13.1	(4)	180	1/2 x 3/8	9.5-12.8	(4.3-5.8)
0420	58	(4)	4.5	(17.1)	1.58	29	(2)	5.04	(19.1)	1.77	9.8	(3)	180	1/2 x 3/8	9.5-12.8	(4.3-5.8)
0232 ¹	29	(2)	8.4	(32.0)	2.96	14.5	(1)	9.56	(36.2)	3.35	6.5	(2)	180	1/2 x 3/8	11.2-14.6	(5.1-6.6)
Auto-degassing liquid ends																
1601	232	(16)	0.16	(0.59)	0.055	126	(8.75)	0.21	(0.78)	0.07	5.9	(1.8)	180	1/4 x 3/16	7.7	(3.5)
1602	232	(16)	0.37	(1.4)	0.13	126	(8.75)	0.45	(1.7)	0.16	6.9	(2.1)	180	1/4 x 3/16	7.7	(3.5)
1005	145	(10)	0.95	(3.6)	0.33	73	(5)	1.05	(4)	0.37	8.8	(2.7)	180	1/2 x 3/8	7.7	(3.5)
0708	101	(7)	1.74	(6.6)	0.61	50.5	(3.50)	1.98	(7.5)	0.69	6.5	(2)	180	1/2 x 3/8	7.7	(3.5)
0413	58	(4)	2.8	(10.8)	1	29	(2)	3.3	(12.6)	1.17	6.5	(2)	180	1/2 x 3/8	7.9	(3.6)
0220	29	(2)	4.3	(16.2)	1.5	14.5	(1)	4.7	(18.0)	1.67	6.5	(2)	180	1/2 x 3/8	7.9	(3.6)
1605	232	(16)	0.87	(3.3)	0.31	126	(8.75)	1	(3.8)	0.35	9.8	(3)	180	1/2 x 3/8	9.5	(4.3)
1008	145	(10)	1.66	(6.3)	0.58	73	(5)	1.98	(7.5)	0.69	9.8	(3)	180	1/2 x 3/8	9.5	(4.3)
0713	101	(7)	2.77	(10.5)	0.97	50.5	(3.50)	3.2	(12.3)	1.14	8.2	(2.5)	180	1/2 x 3/8	9.5	(4.3)
0420	58	(4)	4.12	(15.6)	1.44	29	(2)	4.6	(17.4)	1.61	8.2	(2.5)	180	1/2 x 3/8	9.5	(4.3)

(Note: Above capacities and suction lift refer to pumps tested on water at 115 VAC, 60 Hz, and an ambient temperature of 70°F (20°C). Higher specific gravity fluids will reduce suction lift. Capacities will be slightly reduced from published ratings if pumps are skid mounted.)

Higher viscosity fluids will reduce capacity. Liquid ends for highly viscous media have 10-20% less metering capacity and are not self-priming.

Standard connectors are 1/2" MNPT or 5/8" hose barb. Positive suction is recommended.

¹ Not available with bleed valve.

² SS versions use 1/4" female threads except models 0220, 0420, and 0232 which use 3/8" female threads.

³ Only available in SS and Acrylic liquid ends.

Materials In Contact With Chemicals

Liquid end materials in contact with media

	Pump head	Suction/Pressure connector	O-rings	Balls
PPE	Polypropylene	Polypropylene	EPDM	ceramic
PPB	Polypropylene	Polypropylene	Viton®	ceramic
NPE	Acrylic	PVC	EPDM	ceramic
NPB	Acrylic	PVC	Viton®	ceramic
PVT	PVDF	PVDF	PTFE	ceramic
TTT	PTFE with carbon	PTFE with carbon	PTFE	ceramic
SST	stainless steel	stainless steel	PTFE	ceramic

Auto-degassing version available in PP and NP only. Supplied with Hastelloy C valve springs, PVDF valve core.

Pump diaphragm with PTFE-coating.

Note: Viton® is a registered trademark of DuPont Dow Elastomers.

ProMinent®

solenoid-driven metering pumps

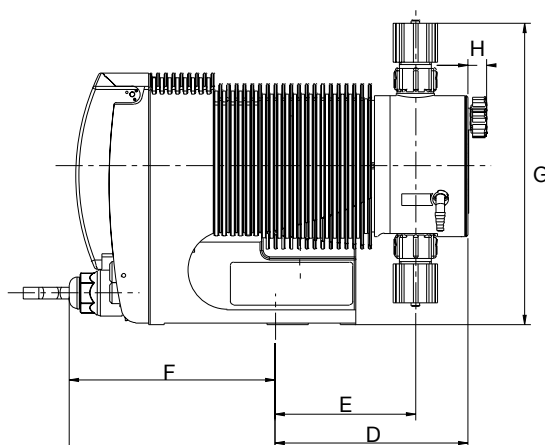
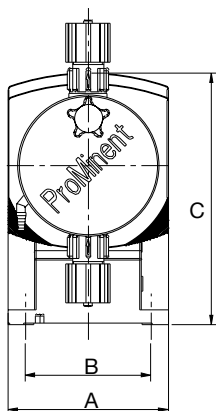
05/01/2015 - gamma/ L

ProMinent® gamma/ L Solenoid Diaphragm Metering Pumps

Dimensional Drawings

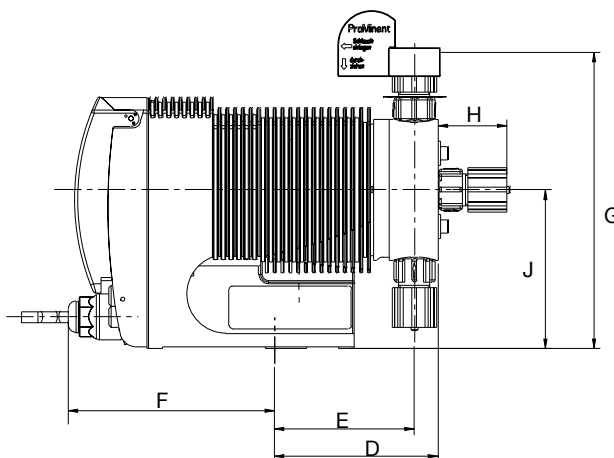
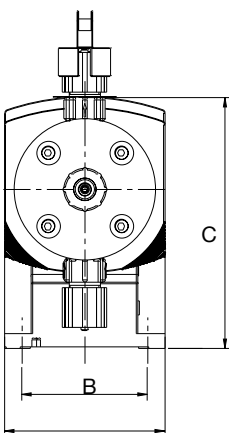
Dimensions in inches (mm).

Ranges given, actual dimension dependant on liquid end material.



Pump	A	B	C	D	E	F	G	H
GALa	4.0	3.1	6.3	3.3-4.3	2.8-3.1	5.8	6.4-8.5	0.5-0.6
	(102)	(80)	(160)	(85-110)	(71-80)	(147)	(162-217)	(12-14)

With Auto-Degassing Liquid Ends



Pump	A	B	C	D	E	F	G	H	J
GALa	4.0	3.1	6.3	3.5-3.6	2.9-3.0	5.8	6.7-7.4	1.7	4.0
	(102)	(80)	(160)	(89-92)	(74-77)	(147)	(177-189)	(44)	(101)

ProMinent® delta® Solenoid Diaphragm Metering Pumps

Overview: delta®

Ideal for applications requiring metering pump accuracy with minimal pulsation

(see [page 131](#) for spare parts and [page 138](#) for control cables)

- Continuous or pulsating dosing
- Configurable suction and delivery stroke duration
- Pump can be adapted to the dosing media
- Integrated optoGuard monitoring detects blocked dosing points, broken dosing lines and air or gas bubbles trapped in the dosing head
- Capacities: 2.0 gph (7.5 lph) to 19.8 gph (75.0 l/h)
- Stroke length continuously adjustable from 0 - 100% (recommended range 30 - 100%)
- Acrylic, PVDF and stainless steel material versions
- Patented bleed
- Optional detection and indication of diaphragm failure
- Adjustment and display of pump delivery from the keypad with choice of display in l/h or strokes/min
- Optional external auto-degassing solenoid kit available for outgassing media
- Large backlit graphic display
- External control options via voltage-free contacts with optional increase/reduce speed pulse
- Optional external control via standard 0/4-20 mA signal
- Interfaces for PROFIBUS® DP ([see page 138](#)) or CAN bus system
- 14-day process timer option for time and event-dependent dosing duties
- Connections for 2 stage-level switch and flow monitor
- 3 LED displays for operation and warning and error message in plain text
- Optional concentration input for volume-proportional dosing
- NSF/ANSI 61 approved



pk_1_131_2

ProMinent® delta® Solenoid Diaphragm Metering Pumps

Capacity Data

Capacity data: delta®

Pump Version	Capacity at Maximum Backpressure				Max. strokes/ min.	Pre-primed suct. lift		Suction/Discharge connectors	Shipping weights (higher weights are for SST)	
	GPH	(L/h)	psig	(bar)		ft	(m)		lbs	(kg)
2508	2	(7.5)	363	(25)	200	19.6	(5)	3/8" x 1/2" (1/2" MNPT dis. only)	22-24	(10-11)
1608	2.1	(7.8)	232	(16)	200	16.4	(5)	3/8" x 1/4"	22-24	(10-11)
1612	3	(11.3)	232	(16)	200	19.6	(6)	3/8" x 1/4"	22-24	(10-11)
1020	4.8	(18.0)	145	(10)	200	16.4	(5)	1/2" x 3/8"	22-24	(10-11)
0730	7.7	(29.2)	102	(7)	200	16.4	(5)	1/2" x 3/8"	22-24	(10-11)
0450	12.9	(49.0)	58	(4)	200	9.8	(3)	5/8" ID hose barb standard ¹	22-24	(10-11)
0280	19.8	(75.0)	29	(2)	200	6.7	(2)	5/8" ID hose barb standard ¹	22-24	(10-11)

Above capacities and suction lift refer to pumps tested on water at 115 VAC, 60 Hz, and an ambient temperature of 70°F (21°C).
Higher specific gravity fluids will reduce suction lift. Higher viscosity fluids will reduce capacity.

¹ (1/2" MNPT optional)

Materials In Contact With Chemicals

Liquid end materials in contact with media

Version	Liquid End	valves	Seals	Valve balls	Diaphragm*
*PVT	*PVDF	*PVDF	PTFE	Ceramic	PTFE
SST	316 SS	316 SS	PTFE	Ceramic	PTFE
NPE	Acrylic	PVC	EPDM	Ceramic	PTFE
NPB	Acrylic	PVC	Viton®	Ceramic	PTFE

*Highly compatible material suitable for most fluids.

Viton® is a registered trademark of DuPont Dow Elastomers.

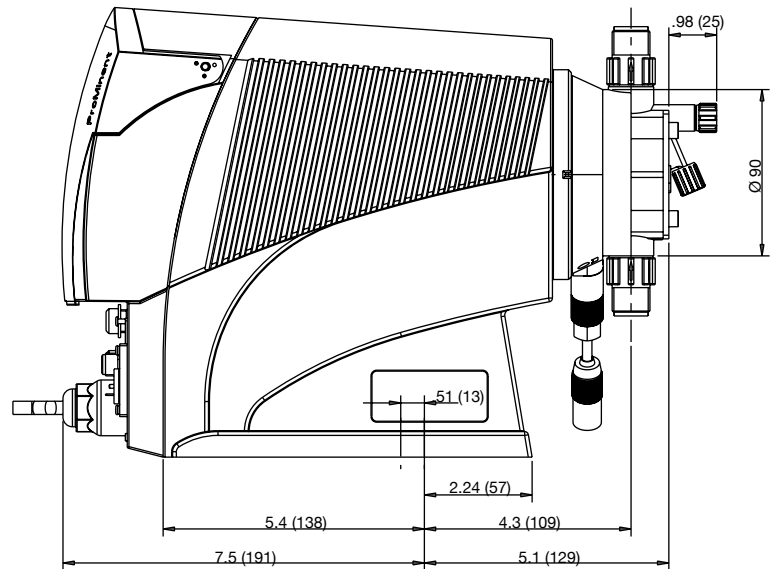
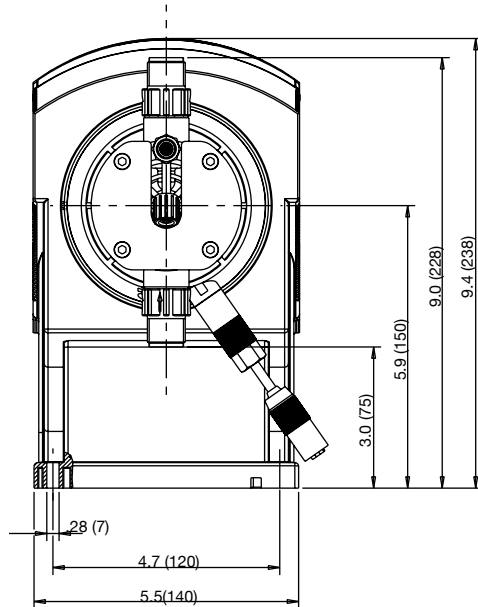
ProMinent® delta® Solenoid Diaphragm Metering Pumps

Dimensional Drawings

Dimensions in inches (mm).

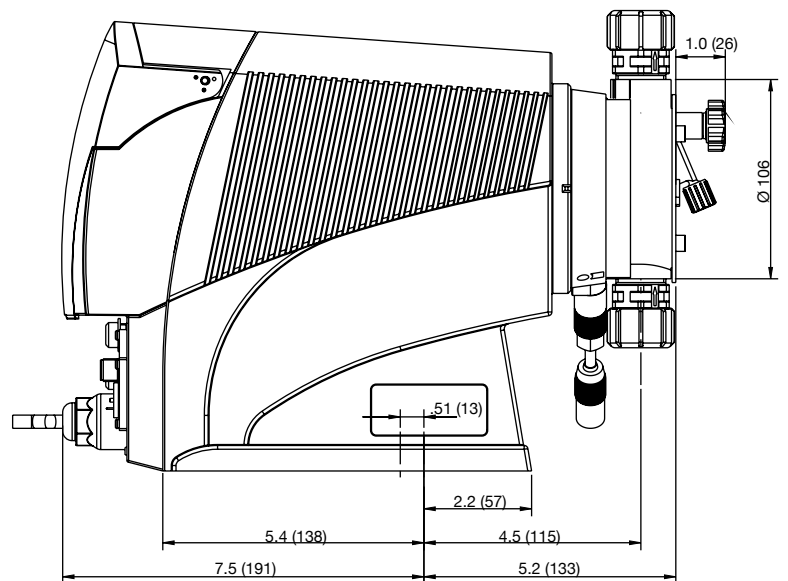
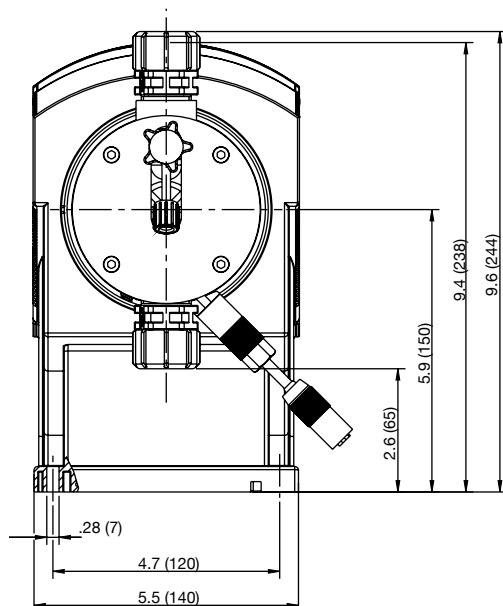
Ranges given, actual dimension dependent on liquid end material.

Dimensions of delta® type 1612 - 0730 PVT



dimensions in inches (mm)

Dimensions of delta® type 0450 - 0280 PVT

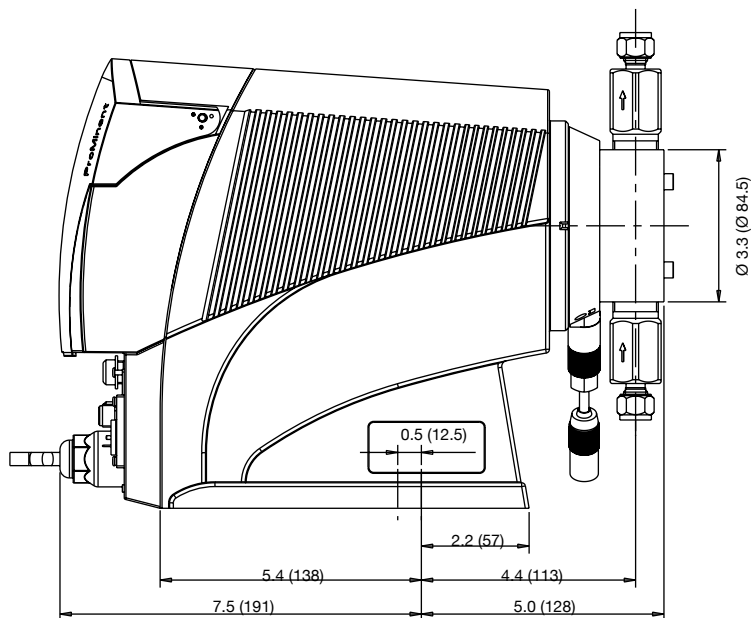
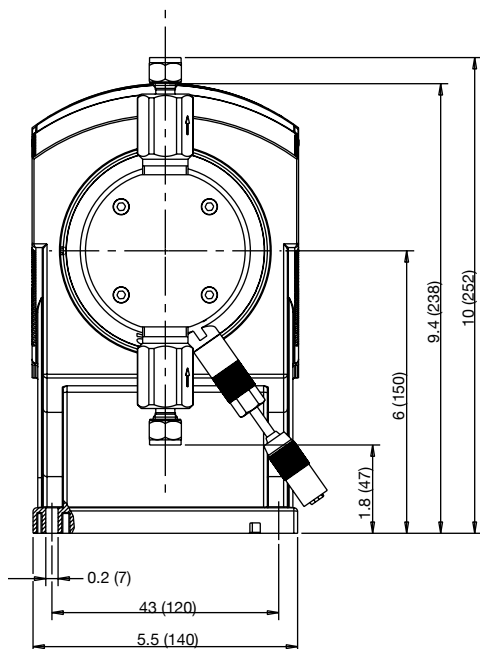


dimensions in inches (mm)

ProMinent® delta® Solenoid Diaphragm Metering Pumps

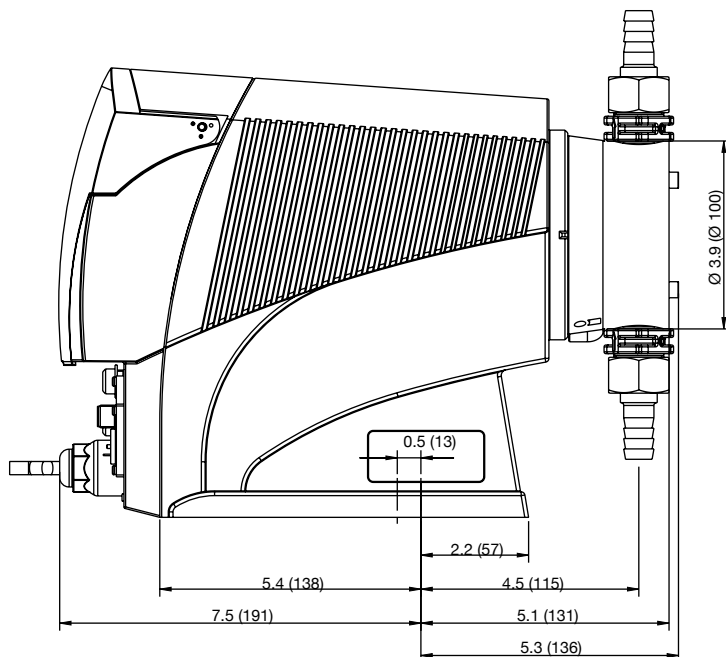
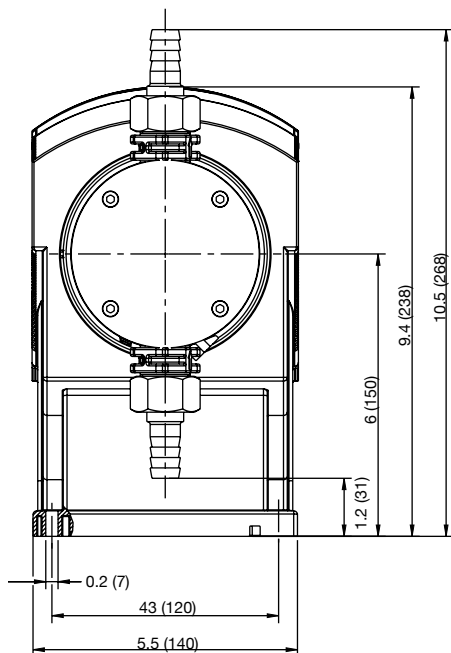
Dimensional Drawings

Dimensions of delta® type 1612 - 0730 SST



dimensions in inches (mm)

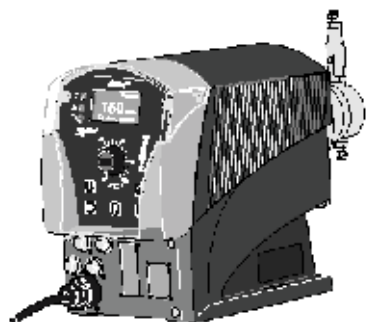
Dimensions of delta® type 0450 - 0280 SST



dimensions in inches (mm)

ProMinent® mikro delta® Piston Metering Pumps

Overview: mikro delta®



Ideal for applications requiring metering pump accuracy with minimal pulsation

- Feed rate range 0.04 gph (150 ml/h) to 0.4 gph (1500 ml/h)
- Stroke volume 1 - 250 µl
- Material versions PTFE and stainless steel
- Metering reproducibility: $\pm 0,5 \%$
- Continuous or pulsing operation
- Adaptation of the pump to the feed chemical
- Continuous stroke length adjustment from 0 - 100 %
- Adjustment and display of the feed rate, either as strokes/min or ml/h via the keyboard
- Large illuminated graphic display
- External activation via potential-free contacts with pulse step-up and step-down
- External activation by standard signal 0/4-20 mA (optional)
- Interface for PROFIBUS® or CANopen (optional)
- Interfaces for PROFIBUS® DP ([see page 138](#)) or CAN bus system
- 1 month process timer for time- and event-dependent metering tasks (optional)
- Connection for 2-stage level switch
- Optional concentration input for volume-proportional dosing
- 3 LED display for operation, warning and error messages in plain text
- Concentration input for volume-proportional metering

Further technical details on request

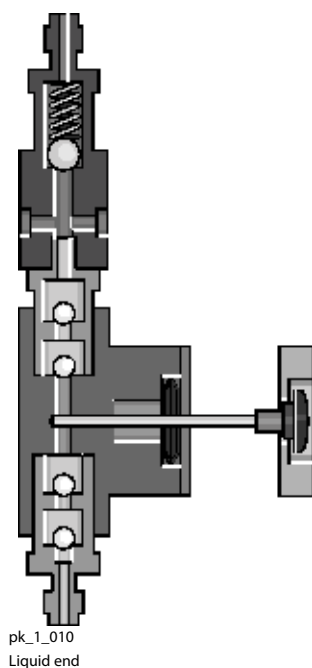
The mikro delta® is a solenoid-driven precision piston metering pump for dosing solutions in millilitre range. The controlled solenoid drive enables continuous dosing of smallest amounts and single stroke dosing up to a volume of 1 µl/stroke.

The maximum stroke length of the modified delta® solenoid drive is 5 mm. The stroke frequency is infinitely

adjustable from 1 stroke/h up to 100 strokes/min. A nearly continuous dosing can be realised from approx. 20 strokes/h, this corresponds to a stroke length of 3 minutes.

By means of the piston-type liquid ends of the preceding pump series mikro G/5 the same delivery rates are reached at half stroke length and double stroke frequency, however at higher pressure from 60 to 20 bar for stainless steel liquid ends and 10 bar for PTFE liquid ends.

The mikro delta® is available in three sizes with piston diameters of 2.5, 5 and 8 mm at a maximum stroke volume of 25, 100 and 250 µl. The sealing material is either PTFE pure white or PTFE with carbon. The material PTFE with carbon is recommended when the media to be dosed has no lubricating properties itself and traces of carbon have no disadvantage for the process. Double ball valves made of Ruby/Ceramic and the integrated back pressure valve ensure constant and pressure independent dosing from zero up to a maximum back pressure of 60 bar with a reproducibility better than 0.5 %. The dosing capacity is 1 – 250 µl/stroke and 0.001 – 1,500 ml/h



ProMinent® mikro delta® Piston Metering Pumps

Capacity Data

Capacity at Maximum Backpressure

mikro delta® Pump Type	ml/h	psig	(bar)	µl/ stroke	Pre-primed suct. lift		Suction/Discharge connectors mm	Shipping weights (higher weights are for SS)	
					ft	(m)		lbs	(kg)
100150 TT	145	145	(10)	24.2	19.6	(6)	1.75 x 1.15	22-24	(10-11)
100600 TT	580	145	(10)	96.7	19.6	(6)	1.75 x 1.15	22-24	(10-11)
101500 TT	1,480	145	(10)	246.7	13.1	(4)	3.20 x 2.40	22-24	(10-11)
600150 SS	145	870	(60)	24.2	19.6	(6)	1.75 x 1.15	22-24	(10-11)
400600 SS	580	580	(40)	96.7	19.6	(6)	1.75 x 1.15	22-24	(10-11)
201500 SS	1,480	290	(20)	246.7	13.1	(4)	3.20 x 2.40	22-24	(10-11)

(Note: Above capacities and suction lift refer to pumps tested on water at 115 VAC, 60 Hz, and an ambient temperature of 70°F (20°C). Higher specific gravity fluids will reduce suction lift. Capacities will be slightly reduced from published ratings if pumps are skid mounted).

Note: Universal control cable necessary for external delta control. [\(see page 138\)](#)

Materials In Contact With Chemicals

Version	Dosing Head	Suction/Pressure connection	Valve balls	Valve seats	Plunger	Gaskets
TTT	PTFE / carbon	PTFE / carbon	ruby	ceramic	ceramic	PTFE, White
TTG	PTFE / carbon	PTFE / carbon	ruby	ceramic	ceramic	PTFE, Graphite
SST	SS 1.4571	PTFE / carbon	ruby	ceramic	ceramic	PTFE, Graphite
SSG	SS 1.4571	PTFE / carbon	ruby	ceramic	ceramic	PTFE, Graphite

Spare Parts

Spare Plunger

Type	Part no.
100150/600150	803149
100600/400600	803181
101500/201500	803182

PTFE Packing (White)

Type	Part no.
100150/600150	485431
100600/400600	485430
101500/201500	485432

PTFE Packing (Graphite)

Type	Part no.
100150/600150	485428
100600/400600	485427
101500/201500	485429

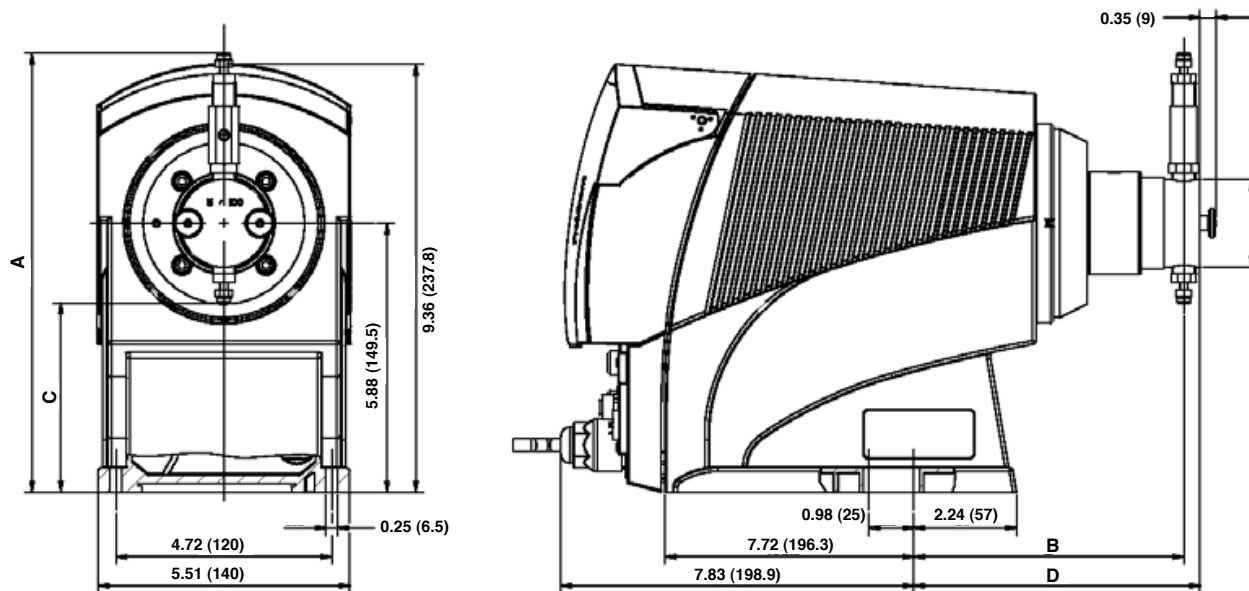
ProMinent®

**solenoid-driven
metering pumps**

05/01/2015 - delta®

ProMinent® mikro delta® Piston Metering Pumps

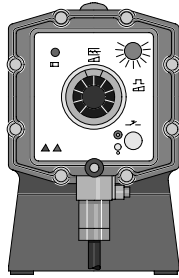
Dimensional Drawings



Type	A in (mm)	B in (mm)	C in (mm)	D in (mm)	E Ø in (mm)
Version TT					
100150	9.60 (243.9)	5.90 (150.1)	4.13 (105.1)	6.26 (159.1)	1.92 (49)
100600	9.60 (243.9)	5.90 (150.1)	4.13 (105.1)	6.26 (159.1)	1.92 (49)
101500	10.08 (256.2)	5.90 (150.1)	3.63 (92.3)	6.34 (161.1)	1.92 (49)
Version SS					
600150	10.08 (256.2)	5.90 (150.1)	3.63 (92.3)	6.34 (161.1)	1.92 (49)
400600	10.02 (254.7)	5.90 (150.1)	3.89 (99.0)	6.26 (159.1)	1.92 (49)
201500	10.08 (256.2)	5.90 (150.1)	3.63 (92.3)	6.34 (161.1)	1.92 (49)

ProMinent® EXtronic® Solenoid Diaphragm Metering Pumps

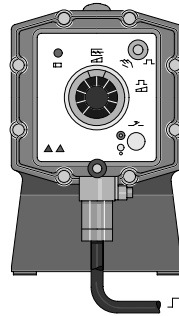
Overview: EXtronic®



pk_1_020

Control type "Internal"

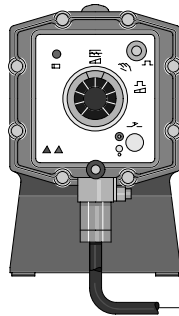
Stroke length adjustment 1:10, stroking rate adjustment 1:25, total adjustment range 1:250.



pk_1_019

Control type: "External Contact"

Stroke length adjustment 1:10, stroking rate control 0-100 % dependant upon external switch contacts. *)



0 - 20 mA

pk_1_018

Control type: "Analogue"

Stroke length adjustment 1:10, Stoke frequency control 0-100 % proportional to analogue signal 0/4-20 mA. *)

*) The electrical cables for mains connection, contact or analogue control are already connected to the pump. Observe all instructions concerning connecting and activating electrical systems.

Ideal for explosion-proof applications

(see [page 130](#) for spare parts)

The ProMinent EXtronic series represents a proven technology for metering liquid media in hazardous areas classified in accordance with Zone 1 and in fire-damp-endangered mining applications.

- The new microprocessor control compensates for fluctuations in the power supply. Automatic switchover from 50 Hz to 60 Hz operation with no change in capacity.
- Operating voltage of 500V increases the scope of application for ProMinent EXtronic (e.g. in conjunction with the new EXBb M version for fire-damp-endangered areas in mining applications).
- The short-stroke solenoid drive is combined with liquid ends from the ProMinent gamma series. The material version SB material is recommended for use with flammable media.
- The control inputs "External Contact", "Analog", and "Zero Volts ON/OFF" are intrinsically safe for the EXBb-registered in accordance with EN 50020.
- The 2501 SSM/SBM type is available with diaphragm failure detection
- The capacity range extends from 0.06 gph (0.19 L/h) to 15.8 gph (60 L/h) at backpressures of up to maximum 363 psig (25 bar).

Factory Mutual Hazard Classification

Factory Mutual Research Corporation has certified that EXtronic series pumps are in compliance with explosion-proof classifications Class 1, Division 1, Groups B, C and D indoor hazardous locations; and with intrinsically safe output connections for Class 1, Division 1, Groups A, B, C, and D hazardous locations. Installation must be in accordance with manufacturer's instructions and the National Electrical Code.

CSA Approval

CSA approved for Class 1, Division 1, Groups B, C and D locations.

ProMinent EXtronic metering pumps are tested and classified in compliance with harmonized European Standards EN 50014/50018 for "flame-proof enclosure." They have the highest degree of protection in this type of enclosure class. This approval is recognized by many other countries outside the EC member states.

The short-stroke solenoid and electronic control are integrated in the pump housing. The enclosure rating in accordance with DIN 40050, even with the front cover open.

The liquid end is equipped with a registered multi-layer (Teflon coated) pump diaphragm. The liquid end is made of Acrylic, Polypropylene (PP), PTFE-Teflon, 316 stainless steel and SB for flammable chemicals to ensure maximum operating safety.

Self-bleeding liquid ends made of Acrylic (NS) and PVC (PS) are available for off-gassing fluids.

The micrometering adjusting knob for the stroke length enables precision setting of the capacity and ensures a high degree of repeatability. A comprehensive range of explosion-proof ancillary equipment and pump accessories is available.

EXBb G for use in gas and fire damp hazardous areas

Degree of protection EEx [i,a] d IIC T6

EEX - Explosion-proof equipment built in accordance with European standards

[i,a] - Intrinsically safe control input in the case of two independent faults occurring

d - Flameproof enclosure protection

IIC - Explosion Group II for all hazardous areas apart from mines (includes IIA and IIB)

T6 - Temperature class approval for gases and vapours with ignition temperature > 85°C

EXBb M for use in hazardous mining operations

Degree of protection EEX d I/IIC T6

EEX - Explosion-proof equipment built in accordance with European standards

d - Flameproof enclosure protection

IC - Explosion Group I for firedamp-endangered mines

IIC - Explosion Group II for all other hazardous areas apart from mines (includes IIA and IIB)

T6 - Temperature class approval for gases and vapors with ignition temperature > 85°C.

This is the highest temperature class; it includes T1 to T5.

ProMinent® EXtronic® Solenoid Diaphragm Metering Pumps

Specifications

<i>Maximum stroke length:</i>	0.026" (0.65 mm) for pump models 1000 0.049" (1.25 mm) for all other models		
<i>Materials of construction</i>			
<i>Housing:</i>	Epoxy coated die cast aluminum		
<i>Diaphragm:</i>	PTFE faced EPDM with steel core		
<i>Liquid end options:</i>	Polypropylene, Acrylic/PVC, PTFE, 316 SS, high-viscosity Polypropylene		
<i>Enclosure rating:</i>	(IP 65); insulation class F		
<i>Power supply:</i>	500V ±6%, 50/60 Hz 230V ±10%, 50/60 Hz 115V ±10%, 50/60 Hz Mean power input at max. stroke frequency (W)/peak current consumption for metering stroke (A) at 230V, 50/60 Hz EXBb Type 1000, 1601, 1201, 0803, 1002, 0308: 23/25 W/0.9 A at 120 strokes/min. EXBb Type 2502, 1006, 0613, 0417: 54/61 W/2.1 A at 120 strokes/min. EXBb Type 2505, 1310, 1014, 0430, 0260: 77/83 W/3.1 A at 110 strokes/min.		
<i>Thermal protection:</i>	Yes		
<i>Check valves:</i>	all models double ball except single ball on PP4 (HV) models		
<i>Repeatability:</i>	When used according to operating instructions, ±2%; For type 1601 with self-degassing liquid end, ±5%.		
<i>Power cord:</i>	6 ft. (2 m) 2 wire plus ground (no plug)		
<i>External control cable:</i>	6 ft. (2 m) 2 wire		
<i>Ambient temperature range:</i>	14°F (-10°C) to 113°F (45°C)		
<i>Max. fluid operating temperatures:</i>	Material	Constant	Short Term
	Acrylic/PVC	113°F (45°C)	140°F (60°C)
	Polypropylene	122°F (50°C)	212°F (100°C)
	PTFE	122°F (50°C)	248°F (120°C)
	316 SS	122°F (50°C)	248°F (120°C)
<i>Max. allowable input current:</i>	50 mA		
<i>Warranty:</i>	Two years on drive; one year on liquid end.		
<i>Industry standards:</i>	Factory mutual (explosion-proof, intrinsically safe), CSA approved and CE approved. EN 50014/50018; VDE 0170/0171-5.78,		
<i>Standard Production Test:</i>	100% tested for rated pressure and volume		
<i>Max. solids size in fluid:</i>	Pumps with 1/4" valves: 15µ; pumps with 1/2" valve: 50µ		
<i>Controlling contact (pulse):</i>	With voltage free contact, or with semiconductor sink logic control (NPN), not source logic (PNP); with a residual voltage of <700 mV, the contact load is approximately 20 mA at +10 VDC. (Note: Semiconductor contacts that require >700 mV across a closed contact should not be used).		
<i>Necessary contact duration:</i>	100 ms		

ProMinent® EXtronic® Solenoid Diaphragm Metering Pumps

Capacity Data

Capacity data: EXtronic®

Pump Version	Capacity at Max. Backpressure				Capacity at 1/2 Max. Backpressure				Pre-Primed Suction Lift	Max. Strokings Rate	Tubing Connectors ² O.D. x I.D.	Shipping Weight (higher weights are for SS)	
EXBb	psig (bar)	GPH (L/h)	mL/stroke	psig (bar)	GPH (L/h)	mL/stroke	ft (m)	spm	in	lbs (kg)			
1000	145 (10)	0.05 (0.23)	0.03	73 (5)	0.07 (0.3)	0.04	19.6 (6)	120	1/4 x 3/16	26.5-35.3 (12-16)			
2501	363 (25)	0.26 (1.0)	0.15	290 (20)	0.29 (1.1)	0.17	19.6 (6)	120	1/4 x 3/16	39.7 (18)			
1601	232 (16)	0.26 (1.0)	0.14	116 (8)	0.34 (1.3)	0.18	19.6 (6)	120	1/4 x 3/16	26.5-35.3 (12-16)			
1201	174 (12)	0.45 (1.7)	0.23	87 (6)	0.53 (2.0)	0.28	19.6 (6)	120	1/4 x 3/16	26.5-35.3 (12-16)			
2502	363 (25)	0.53 (2.0)	0.28	290 (20)	0.58 (2.2)	0.31	5.9 (1.8)	120	1/4 FNPT	28.7-37.5 (13-17)			
1002 ¹	145 (10)	0.61 (2.3)	0.31	73 (5)	0.71 (2.7)	0.38	19.6 (6)	120	1/2 x 3/8	26.5-35.3 (12-16)			
0803	116 (8)	0.98 (3.7)	0.51	58 (4)	1.03 (3.9)	0.54	19.6 (6)	120	1/4 x 3/16	26.5-35.3 (12-16)			
2505	363 (25)	1.11 (4.2)	0.64	290 (20)	1.27 (4.8)	0.73	6.5 (2)	110	1/4 FNPT	35.3-44.1 (16-20)			
1006 ¹	145 (10)	1.59 (6.0)	0.83	73 (5)	1.9 (7.2)	1	6.9 (2.1)	120	1/2 x 3/8	28.7-37.5 (13-17)			
0308	44 (3)	2.27 (8.6)	1.2	22 (1.5)	2.72 (10.3)	1.43	9.8 (3)	120	1/2 x 3/8	26.5-35.3 (12-16)			
1310 ¹	188 (13)	2.77 (10.5)	1.59	87 (6)	3.14 (11.9)	1.8	6.5 (2)	110	1/2 x 3/8	35.3-44.1 (16-20)			
0613	87 (6)	3.46 (13.1)	1.82	44 (3)	3.94 (14.9)	2.07	8.8 (2.7)	120	1/2 x 3/8	28.7-37.5 (13-17)			
0814	116 (8)	3.7 (14.0)	2.12	58 (4)	4.07 (15.4)	2.33	9.8 (3)	110	1/2 x 3/8	35.3-44.1 (16-20)			
0417	51 (3.5)	4.6 (17.4)	2.42	29 (2)	4.73 (17.9)	2.49	6.5 (2)	120	1/2 x 3/8	28.7-37.5 (13-17)			
0814 ¹	116 (8)	3.7 (14.0)	2.12	58 (4)	4.07 (15.4)	2.33	9.8 (3)	110	1/2 x 3/8	35.3-44.1 (16-20)			
0430	51 (3.5)	7.13 (27.0)	4.09	29 (2)	7.79 (29.5)	4.47	9.8 (3)	110	DN 10	35.3-44.1 (16-20)			
0260	22 (1.5)	15.85 (60.0)	9.09	- (-)	- (-)	-	8.2 (2.5)	110	DN 15	35.3-44.1 (16-20)			

Above capacities and suction lift refer to pumps tested on water at 115 VAC, 60 Hz, and an ambient temperature of 70°F (20°C).

Higher specific gravity fluids will reduce suction lift. Higher viscosity fluids will reduce capacity.

Liquid ends for highly viscous media have 10-20% less metering capacity and are not self-priming. Standard connectors are 1/2" MNPT or 5/8" hose barb. Positive suction is recommended.

¹ High Viscosity models are available in the 1002, 1006, 1310 and 0814 models. Liquid end designation is PP4 (Polypropylene/EPDM)

Suitable for viscosities to 3500 cps

² SS versions use 1/4" female threads except models 0220, 0420, and 0232 which use 3/8" female threads.

Capacity data: EXtronic® with Auto-degassing Liquid Ends

Pump Version	Capacity at Maximum Backpressure					Max. Strokings Rate	Connectors	Suction Lift		Shipping Weight	
NS/PS EXBb	psig	(bar)	GPH	(L/h)	mL/stroke	spm	Tube/NPT fitting PP/ NP/NS/PS/TT	ft	(m)	lbs	(kg)
1601	232	(16)	0.17	(0.7)	0.09	120	1/4 x 3/16	5.9	(1.8)	27	(12)
1201	174	(12)	0.26	(1.0)	0.14	120	1/4 x 3/16	6.6	(2.0)	27	(12)
0803	116	(8)	0.63	(2.4)	0.33	120	1/4 x 3/16	9.2	(2.8)	27	(12)
1002	145	(10)	0.48	(1.8)	0.25	120	1/4 x 3/16	6.6	(2.0)	27	(12)

Shipping Weight for EXBb Fireproof M Version is an additional 32 lbs. (14 kg).

ProMinent® EXtronic® Solenoid Diaphragm Metering Pumps

Materials in Contact With Chemicals

Version	Liquid End	Suction/Discharge	Seals	Valve balls	Diaphragm
PP1	Polypropylene	Polypropylene	EPDM	Ceramic	PTFE
PP4 ¹	Polypropylene	Polypropylene	EPDM	Ceramic	PTFE
NP1	Acrylic	PVC	Viton®	Ceramic	PTFE
NP3	Acrylic	PVC	Viton®	Ceramic	PTFE
NS3 ²	Acrylic	PVC	Viton®	Ceramic	PTFE
PS3 ²	PVC	PVC	Viton®	Ceramic	PTFE
TT1	PTFE with carbon	PTFE with carbon	PTFE	Ceramic	PTFE
TTT	PTFE with carbon	PTFE with Carbon	PTFE	Ceramic	PTFE
SS	316 Stainless steel	316 Stainless Steel	PTFE	Ceramic ³	PTFE

¹ PP4 with Hastelloy C valve springs.

² NS3 and PS3 with Hastelloy C valve springs, PVDF valve core. NOTE: Viton® is a registered trademark of DuPont Dow Elastomers.

³ DN 10 and DN 15 valve balls are 316 stainless steel

Factory Mutual System approved



Approved
(standard in Canada)



Approved

The EXtronic metering pumps are registered according to DIN-VDE 0170/0171-5.78.

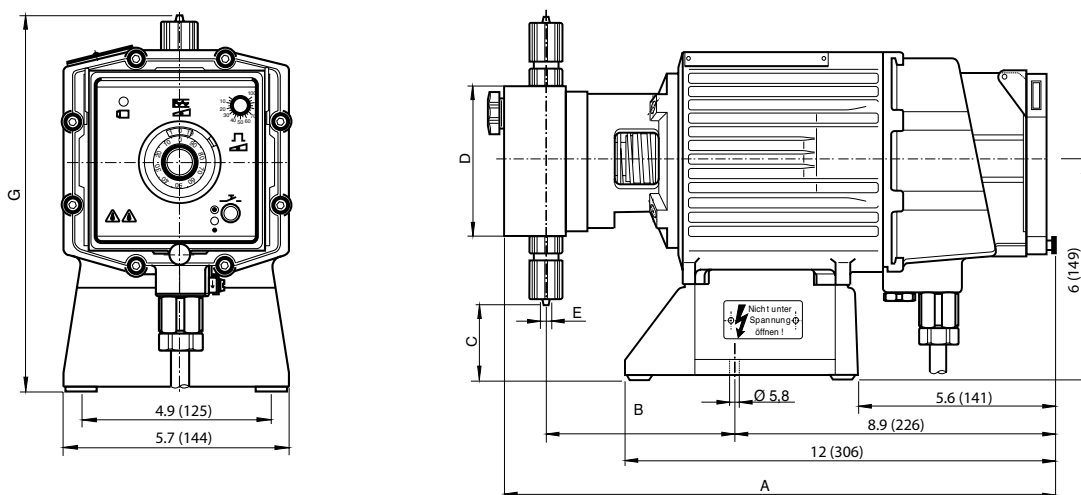
ProMinent® EXtronic® Solenoid Diaphragm Metering Pumps

Identcode Ordering System

EXBb	Enclosure Type:							
G M	G	Explosion protection						
	M	Fire and explosion protection: permissible liquid end material - PTFE & Stainless Steel						
	Version: Capacity:		Version: Capacity:					
	1000	0.05 gph, 145 psi	0613	3.46 gph, 87 psi				*Type 2502 & 2505 only available in SS and SB
	1601	0.26 gph, 232 psi	0417	4.6 gph, 50.8 psi				**Type 1310 only available in NP, PP4, SS and SB
	1201	0.45 gph, 174 psi	2501***	0.26 gph, 363 psi				***Type 2501 available in SSM and SBM only
	0803	0.98 gph, 116 psi	2505*	1.11 gph, 363 psi				❖Type 0430 & 0260 not available in SS2
	1002	0.61 gph, 145 psi	1310**	2.77 gph, 189 psi				
	0308	2.27 gph, 43.5 psi	0814	3.7 gph, 116 psi				
	2502*	0.53 gph, 363 psi	0430❖	7.13 gph, 50.8				
	1006	1.59 gph, 145 psi	0260❖	15.8 gph, 21.8 psi				
	Liquid end materials:							
	PP1	Polypropylene with EPDM O-rings						
	PP4	Polypropylene for high viscosity fluid with enlarged ports, with EPDM O-rings & Hastelloy C valve springs (Only for type 1002, 1006, 1310 & 0814)						
	NP1	Arcylic with PVC check valves & Viton® O-rings						
	NP3	Arcylic with PVC check valves & Viton® O-rings						
	NS3	Auto-degassing Arcylic with Viton® O-rings (Only for type 1601, 1201, 0803 & 1002)						
	PS3	Auto-degassing PVC with Viton® O-rings (Only for type 1601, 1201, 0803 & 1002)						
	TT1	Carbon-reinforced PTFE with PTFE O-rings						
	SS1	316 SS with PTFE O-rings (Only for types 0430 & 0260)						
	SS2	316 SS with PTFE O-rings, 1/4" FNPT thread						
	SB1	316 SS with PTFE O-rings, R 1/4" internal thread, R 1/2" for type 0260 (Recommended for combustible media)						
	SSM	as SS1, with diaphragm failure indicator, type 2501 only						
	SBM	as SB1, with diaphragm failure indicator, type 2501 only						
	Valve springs:							
0	Without springs							
1	With 2 springs, 316 SS, 1.4 psig (0.1 bar)							
Electrical connection:								
A	230 V 50/60 Hz 1 phase							
B	115 V 50/60 Hz 1 phase							
D	100 V 50/60 Hz 1 phase							
E	500 V 50/60 Hz 1 phase							
Control type:								
0	Stroke rate adjustment via potentiometer							
1	External contact							
2	Analog 0-20 mA							
3	Analog 4-20 mA							
4*	External contact, intrinsically safe [i,a]							
5*	Analog 0-20 mA, intrinsically safe [i,a]							
6*	Analog 4-20 mA, intrinsically safe [i,a]							
7	Manual with zero volts ON/OFF							
8	Manual with zero volts ON/OFF, intrinsically safe [i,a]							
Control variant:								
0	With potentiometer (Only for control type 0)							
1	With momentary contact push-button switch for maximum stroke rate (Not for control type 0)							
2	With spring-return change-over switch for maximum frequency rate (not for control type 0)							
Approval/Language:								
0	BVS - Europe, German, 100 V - 500 V							
1	BVS - Europe, English, 100 V - 500 V							
2	FM - USA, English, 115 V 230 V							
3	CSA - Canada, English, 115 V, 230 V							
EXBb	G	1000	PP1	0	A	0	0	0

ProMinent® EXtronic® Solenoid Diaphragm Metering Pumps

Dimensional Drawings

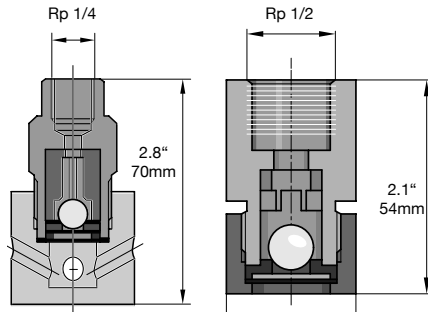


Dimensions in inches (mm)

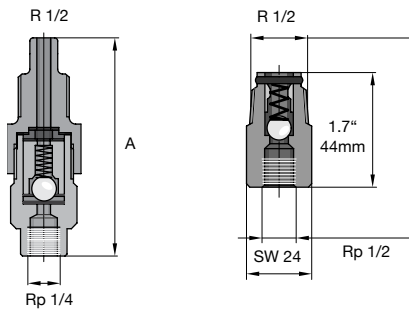
Pump		A	B	C	D	E	F	G
1000, 1601, 1201, 0803	NP1	15.4 (391)	5.4 (136)	2.7 (69)	ø70	6 x 4	ø38	9.0 (229)
1002, 0308, 2502/05, 1006	NP1	15.4 (391)	5.4 (136)	2.4 (61)	ø85	8 x 5	ø50	9.3 (237)
1310, 0613	NP1	15.4 (391)	5.4 (136)	2.0 (52)	ø100	8 x 5	ø66	9.6 (244)
0814, 0417	NP1	15.4 (391)	5.4 (136)	2.0 (52)	ø100	12 x 9	ø66	9.6 (244)
0430	NP1	15.0 (381)	5.4 (137)	1.8 (46)	ø135	DN 10	ø117	12.0 (304)
0260	NP1	15.7 (398)	5.6 (142)	.63 (16)	ø135	DN 15	ø117	12.4 (314)
1000, 1601, 1201, 0803	PP1	15.5 (393)	5.4 (136)	2.6 (67)	ø70	6 x 4	ø38	9.3 (236)
1002, 0308, 1006	PP1	15.5 (393)	5.4 (136)	2.6 (67)	ø70	8 x 5	ø50	9.3 (236)
0613	PP1	15.5 (393)	5.4 (136)	2.2 (57)	ø90	8 x 5	ø66	9.7 (246)
0814, 0417	PP1	15.5 (393)	5.4 (136)	2.2 (57)	ø90	8 x 5	ø66	9.7 (246)
0430	PP1	15.0 (381)	5.4 (137)	1.8 (46)	ø135	DN 10	ø117	12.0 (304)
0260	PP1	15.7 (398)	5.6 (142)	.63 (16)	ø135	DN 15	ø117	12.4 (314)
1002	PP4	15.3 (389)	5.4 (138)	1.8 (46)	ø85	DN 10	ø50	8.7 (222)
1006	PP4	15.3 (398)	5.7 (145)	3.0 (76)	ø85	DN 15	ø50	8.7 (222)
1310	PP4	15.3 (398)	5.7 (145)	3.0 (76)	ø85	DN 15	ø50	8.7 (222)
1014	PP4	15.3 (398)	5.7 (145)	2.7 (69)	ø100	DN 15	ø66	9.1 (229)
1000, 1601, 1202	TT1	14.9 (378)	5.3 (134)	2.9 (75)	ø60	6 x 4	ø38	8.8 (223)
0803	TT1	14.9 (378)	5.3 (134)	2.8 (70)	ø70	6 x 4	ø38	9.0 (228)
1002, 0308, 1006	TT1	15.3 (388)	5.3 (138)	1.3 (32)	ø95	8 x 5	ø66	10.5 (266)
0613	TT1	15.3 (388)	5.4 (138)	1.3 (32)	ø95	8 x 5	ø66	10.5 (266)
0814, 0417	TT1	15.3 (388)	5.4 (138)	1.3 (32)	ø95	12 x 9	ø66	10.5 (266)
0430	TT1	15.3 (388)	5.4 (137)	1.4 (35)	ø135	DN 10	ø117	10.4 (263)
0260	TT1	15.7 (398)	5.6 (142)	1.2 (31)	ø135	DN 15	ø117	10.6 (268)
1000, 1601, 1202	SS1	14.8 (376)	5.3 (134)	3.3 (84)	ø60	6 x 5	ø38	8.4 (214)
0803	SS1	14.8 (376)	5.3 (134)	3.1 (79)	ø70	6 x 5	ø38	8.6 (219)
1002, 0308, 2502/05, 1006	SS1	15.2 (386)	5.4 (138)	1.9 (48)	ø80	8 x 7	ø50	9.8 (250)
1310, 0613	SS1	15.2 (386)	5.4 (138)	1.5 (39)	ø95	8 x 7	ø66	10.2 (259)
0814, 0417	SS1	15.2 (386)	5.4 (138)	1.5 (39)	ø95	12 x 10	ø66	10.2 (259)
0430	SS1	15.2 (386)	5.4 (137)	1.4 (35)	ø135	DN 10	ø117	10.4 (263)
0260	SS1	15.4 (390)	5.6 (142)	1.1 (28)	ø135	DN 15	ø117	10.7 (271)
1000	SB1	14.7 (373)	5.3 (134)	3.4 (87)	ø70	R1/4"	ø38	8.3 (211)
1601, 1202, 0803	SB1	14.7 (373)	5.3 (134)	3.1 (79)	ø85	R1/4"	ø38	8.6 (219)
1002, 0308, 2502/05, 1006	SB1	15.0 (381)	5.4 (138)	2.2 (56)	ø80	R1/4"	ø50	9.5 (242)
1310, 0613	SB1	15.0 (381)	5.4 (138)	1.9 (48)	ø95	R1/4"	ø66	9.8 (250)
0814, 0417	SB1	15.0 (381)	5.4 (138)	1.9 (48)	ø95	R1/4"	ø66	9.8 (250)
0430	SB1	15.0 (381)	5.4 (138)	.87 (22)	ø145	R1/4"	ø117	10.8 (275)
0260	SB1	15.1 (383)	5.5 (139)	1.1 (27)	ø145	R1/2"	ø117	11.0 (279)
1601, 1202, 0803	NS3	15.1 (383)	5.4 (136)	2.6 (67)	s. Abb.	6 x 4	ø38	9.6 (243)
1002	NS3	15.1 (383)	5.4 (136)	2.6 (67)	s. Abb.	6 x 4	ø50	9.6 (243)
1601, 1202, 0803	NS3	15.1 (383)	5.4 (136)	2.6 (67)	s. Abb.	6 x 4	ø38	9.6 (243)
1002	NS3	15.1 (383)	5.4 (136)	2.6 (67)	s. Abb.	6 x 4	ø50	9.6 (243)

ProMinent® EXtronic® Solenoid Diaphragm Metering Pumps

Special Valves for EXtronic®

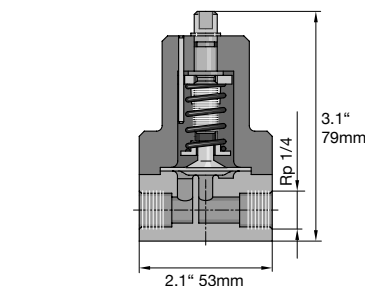


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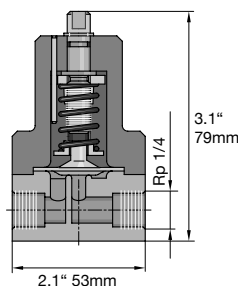
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Stainless steel 1.4404 "SB" foot valve

With filter and ball check valve, designed for use with flammable materials.

Materials: 1.4404/1.4401/PTFE/ceramic

Order No.

Connector ISO 7 Rp 1/4 SB version for ProMinent EXtronic® 809301

Connector ISO 7 Rp 1/2 SB version for ProMinent EXtronic® 924561

Stainless steel 1.4404 "SB" injection valve

Spring loaded ball check valve designed for use with flammable materials.

Materials: 1.4404/1.4401/Hastelloy C/PTFE/ceramic

Order No.

Connector ISO 7 Rp 1/4 - R 1/2, pre-pressure approx. 7.3 psi 809302

Connector ISO 7 Rp 1/2 - R 1/2, pre-pressure approx. 7.3 psi 924560

Adjustable "SB" back pressure valve

Materials: 1.4404; PTFE coated diaphragm. Connector both sides ISO 7 Rp 1/4

Order No.

Operating range approx. 14.5 - 145 psi (1-10 bar),
closed version designed for use with flammable materials. 924555

To generate a constant back pressure for accurate metering with a free outlet. Can also be used as an overflow valve.

PTFE dosing pipe

Carbon-filled, surface resistance $<10^7 \Omega$

Material	Length m	Ext. diam. x int. diam.	Permissible operating press. psi (bar)*	Order No.
PTFE	Sold by the foot	6.0 x 4.0	174 (12)	1024831
PTFE	Sold by the foot	8.0 x 5.0	232 (16)	1024830
PTFE	Sold by the foot	12.0 x 9.0	130.5 (9)	1024832

* permissible operating pressure at 68°F (20 °C) in accordance with EN ISO 7751, 1/4 of the bursting pressure, assuming chemical resistance and correct connection.

Additional ancillary equipment, i.e. foot valves, injection valves and back pressure valves in the usual material combinations, identical to gamma ancillary equipment and/or for connector DN 15 Vario ancillary equipment, see section 2.14.

Stainless steel straight threaded connectors

Swagelok system in stainless steel SS 316 (1.4401) for connection of pipework to liquid ends and valves with internal thread and for SB version.

Normal thread o-rings compounds required.

Order No.

6 mm - ISO 7 R 1/4 359526

8 mm - ISO 7 R 1/4 359527



