"Solenoid-Driven Metering Pumps" T.O.C. III

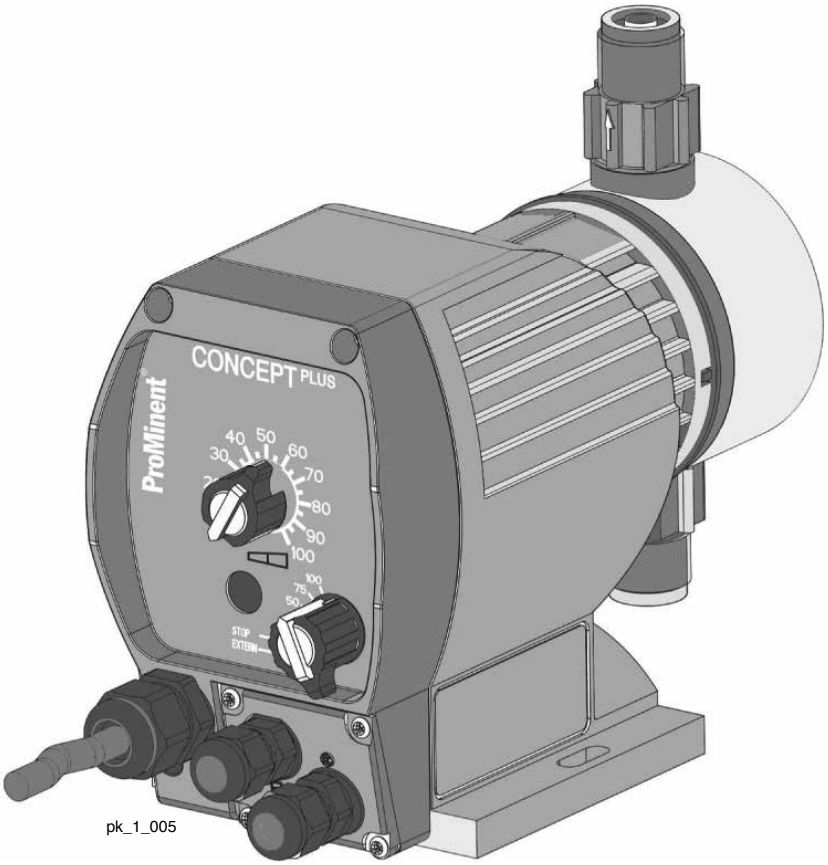
CATALOG SECTION TABS

ProMinent® Concept PLUS
Solenoid Diaphragm Metering Pumps

Overview: Concept PLUS

Ideal for basic chemical feed applications
(see *page 121* 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



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ProMinent® Concept PLUS Solenoid Diaphragm Metering Pumps

Capacity Data

Pump Version	Capacity at Maximum Back Pressure psig	(bar)	U.S. GPH	(L/h)	mL/ stroke	Max. Stroking Rate spm	Pre-Primed Suction Lift ft.	(m)	Tubing Connectors O.D. x I.D. (in.)	Shipping Weight (approx.) lbs.	(kg)
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)

(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).

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

Materials In Contact With Chemicals

	Pump head	Valves	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

Pump diaphram with PTFE-coating.

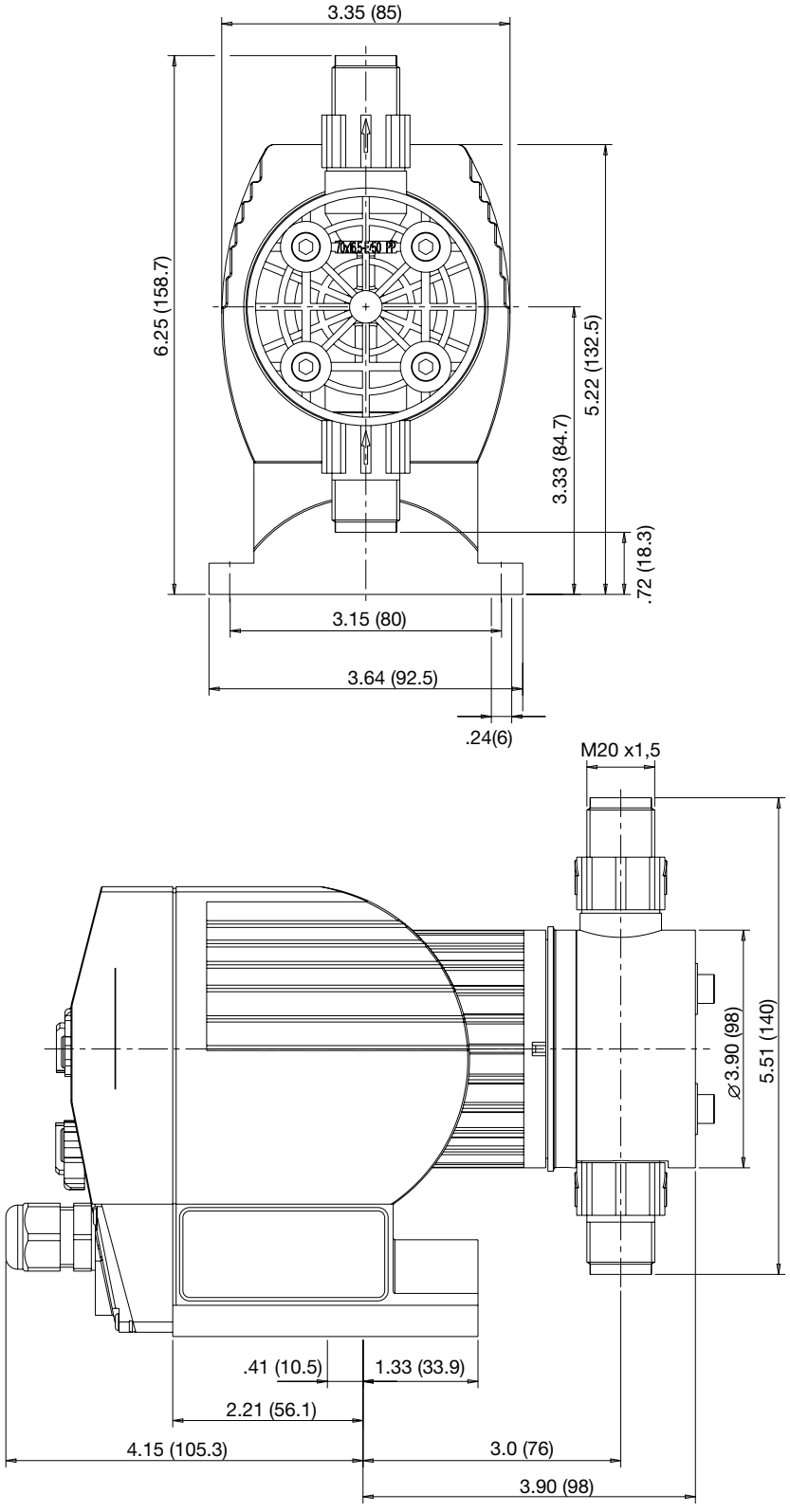
Note: Viton® is a registered trademark of DuPont Dow Elastomers.

ProMinent® Concept PLUS
Solenoid Diaphragm Metering Pumps

Identcode Ordering System

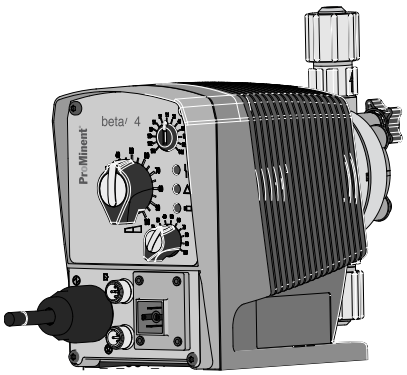
CNPa	**Concept PLUS**										
	Version	**Capacity**					**Version**	**Capacity**			
	1000	0.16 gph (0.6 l/h), 145 psi (10 bar)					0704	1.17 gph (4.4 l/h), 102 psi (7 bar)			
	1601	0.26 gph (1.0 l/h), 232 psi (16 bar)					0705	1.37 gph (5.2 l/h), 101 psi (7bar)			
	1002	0.53 gph (2.0 l/h), 145 psi (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	Acryllic/PVC								
		PV	PVDF								
			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							
				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**	

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 121 for spare parts and page 134 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).

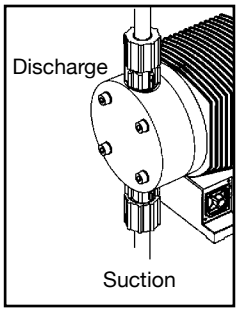
Some liquid ends are interchangeable between the BT4a and BT5a.

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).

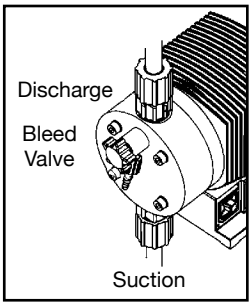
Automatic degassing liquid ends are available for PP and NP versions (except 1000 and 0232). This style liquid end discharges from the center and degasses from the top to prevent air build-up in the chamber.

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.

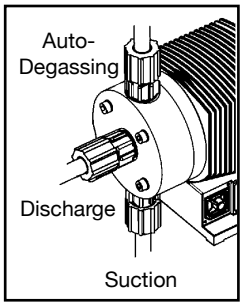
Suction and discharge ports are equipped with double-ball check valves for superior repeatability.



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

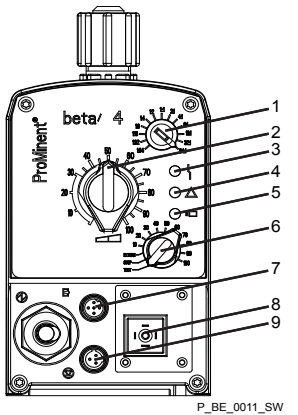
Three LED lights indicate operational status. A green light flashes during normal operation; a yellow light warns of low chemical; and a red light indicates lack of chemical or an operational error.

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.

1 Pulse Control Switch
2 Stroke Length Adjustment Knob
3 Fault Indicator (red)
4 Warning Indicator (yellow)
5 Operating Indicator (green)
6 Multifunctional Switch
7 "External Control" Terminal
8 Relay Connection (optional)
9 "Level Switch" Terminal



c UL us Recognized
CE Available

NSF
Certified to NSF/ANSI 61

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_{DSOn}): < 8 Ω Residual current in OFF-position: <1µA 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 Viscocity:	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

Pump Version	Capacity at Max Backpressure psig	(bar)	U.S. GPH	(l/h)	ml/ stroke	Capacity at 1/2 Max Backpressure psig	(bar)	U.S. GPH	(l/h)	mL/ stroke	Pre-Primed Suction Lift ft	(m)	Max. Stroke Rate spm	Tubing Connectors[2] O.D. x I.D. inches	Shipping Weight (higher weights are for SS) lbs	(kg)
BT4b																
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	6.4-7.9	(2.9-3.6)
2001[3]	290	(20)	0.29	(1.1)	0.10	145	(10)	0.37	(1.40)	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)	0.10	116	(8)	0.37	(1.40)	0.13	19.6	(6)	180	1/4 x 3/16	6.4-7.9	(2.9-3.6
2002[3]	290	(20)	0.58	(2.2)	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)	0.58	(2.2)	0.19	116	(8)	0.66	(2.5)	0.24	19.6	(6)	180	1/4 x 3/16	6.4-7.9	(2.9-3.6)
1604	232	(16)	0.95	(3.6)	0.33	116	(8)	1.13	(4.3)	0.40	19.6	(6)	180	1/4 x 3/16	6.8-8.6	(3.1-3.9)
0708	101	(7)	1.9	(7.1)	0.66	50.5	(3.5)	2.22	(8.4)	0.78	19.6	(6)	180	1/2 x 3/8	6.8-8.6	(3.1-3.9)
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	6.8-8.6	(3.1-3.9)
0220	29	(2)	5.0	(19.0)	1.76	14.5	(1)	5.52	(20.9)	1.94	6.5	(2)	180	1/2 x 3/8	7.3-9.7	(3.3-4.4)
BT5b																
2504[3]	363	(25)	0.77	(2.9)	0.27	181	(12.5)	0.97	(3.7)	0.34	19.6	(6)	180	8 x 4 mm	9.9-11.7	(4.5-5.3)
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	9.9-11.7	(4.5-5.3)
0713	101	(7)	2.9	(11.0)	1.02	50.5	(3.5)	3.46	(13.1)	1.21	13.1	(4)	180	1/2 x 3/8	9.9-11.7	(4.5-5.3)
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	10.4-12.8	(4.7-5.8)
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)
With auto-degassing liquid ends																
BT4b																
1601	232	(16)	0.16	(0.59)	0.06	116	(8)	0.21	(0.80)	0.07	5.9	(1.8)	180	1/4 x 3/16	6.4	(2.9)
1602	232	(16)	0.37	(1.4)	0.13	116	(8)	0.46	(1.74)	0.174	6.9	(2.1)	180	1/4 x 3/16	6.4	(2.9)
1604	232	(16)	0.71	(2.7)	0.25	116	(8)	.95	(3.6)	0.33	8.8	(2.7)	180	1/4 x 3/16	6.8	(3.1)
0708	101	(7)	1.74	(6.6)	0.61	50.8	(3.5)	1.98	(7.5)	0.69	6.5	(2.0)	180	1/2 x 3/8	6.8	(3.1)
0413	58	(4)	2.8	(10.8)	1.00	29	(2)	3.3	(12.6)	1.17	6.5	(2.0)	180	1/2 x 3/8	6.8	(3.1)
0220	29	(2)	4.3	(16.2)	1.50	14.5	(1)	4.7	(18.0)	1.67	6.5	(2.0)	180	1/2 x 3/8	7.3	(3.3)
BT5b																
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	9.9	(4.5)
0713	101	(7)	2.77	(10.5)	0.97	51	(3.5)	3.2	(12.3)	1.14	8.2	(2.5)	180	1/2 x 3/8	9.9	(4.5)
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	10.4	(4.7)

*(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.

Universal control cable necessary for external Beta control. (see page 134)

Materials In Contact With Chemicals

	Pump Head	Suction/Pressure Connector	O-rings	Balls
PPE[5]	Polypropylene	Polypropylene	EPDM	ceramic
PPB[5]	Polypropylene	Polypropylene	Viton®	ceramic
NPE[4,5]	Acrylic	PVC	EPDM	ceramic
NPB[4,5]	Acrylic	PVC	Viton®	ceramic
PVT[4]	PVDF	PVDF	PTFE	ceramic
TTT	PTFE with carbon	PTFE with carbon	PTFE	ceramic
SST	316 stainless steel	316 stainless steel	PTFE	ceramic
NPT[4]	Acrylic	PVDF	PTFE	ceramic
PPT	Polypropylene	Polypropylene	PTFE	ceramic

[4] NSF/ANSI 61 approved
[5] Only available in self de-gassing models
Note: Viton® is a registered trademark of DuPont Dow Elastomers.

ProMinent® Beta® b
Solenoid Diaphragm Metering Pumps

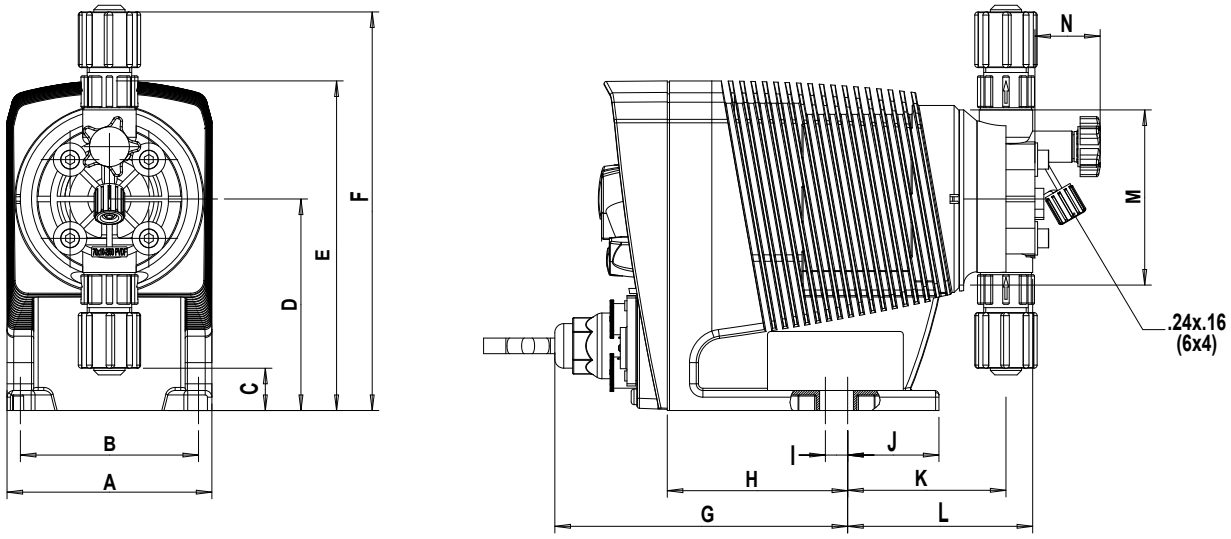
Identcode Ordering System

BT4b	Beta 4b												Beta 5b	
	Version	**Capacity**											**Version**	**Capacity**
	1000	0.20 gph (0.74 l/h), 145 psi (10 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)											1008	1.80 gph (6.80 l/h), 145 psi (10 bar)
	1601	0.29 gph (1.10 l/h), 232 psi (16 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)											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

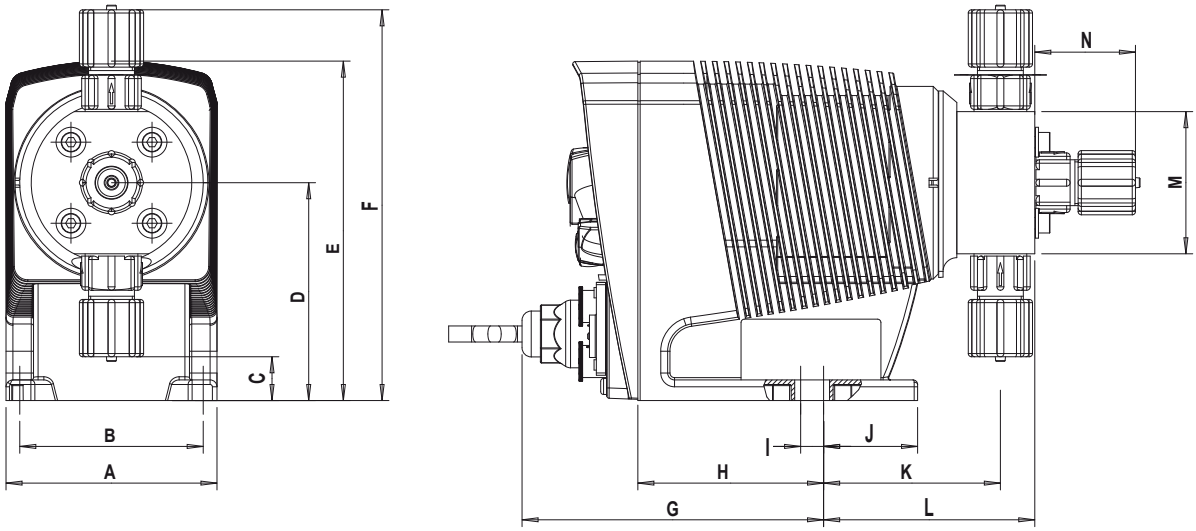
Dimensional Drawings

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 121 for spare parts and page 134 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 134)*
- 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.

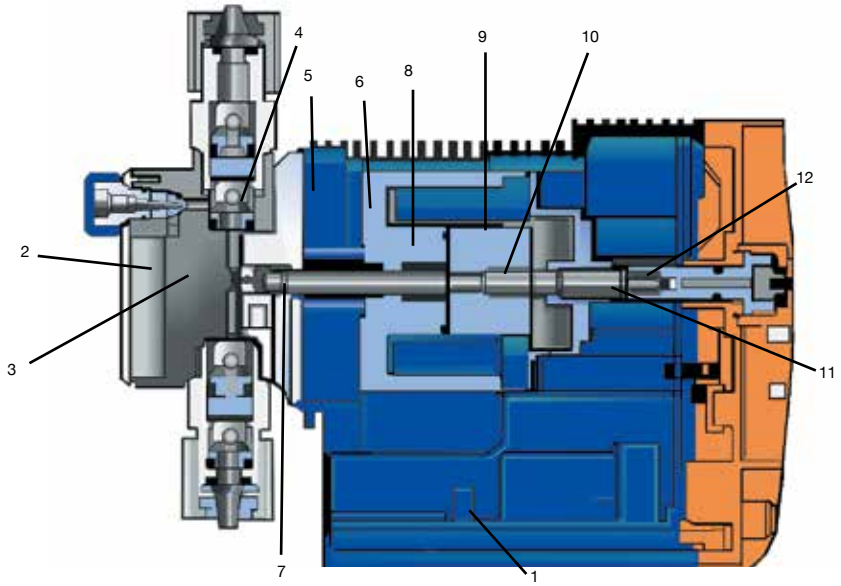
In the event of a diaphragm rupture, the liquid end has a weep hole on the bottom of the backplate to direct chemical out of the pump and away from the solenoid. An optional diaphragm failure detector can be used to stop the pump and indicate a fault.

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



1. Housing
2. Liquid end
3. Diaphragm
4. Backplate
5. Solenoid
6. Solenoid coil
7. Solenoid axle
8. Armature
9. Cover
10. Stroke adjustment screw
11. Stroke adjustment axle
12. Stroke adjustment knob

ProMinent® gamma/ L Solenoid Diaphragm Metering Pumps

Overview: gamma/ L

The Liquid End

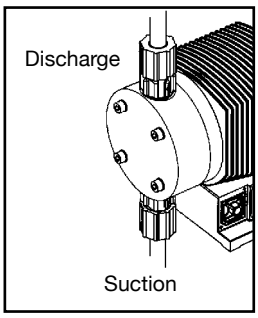
The gamma/ L metering pump liquid ends are available in five material versions: Polypropylene (PP), Kynar (PVDF), Acrylic/PVC (NP), PTFE (TT), and 316 Stainless steel (SS).

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).

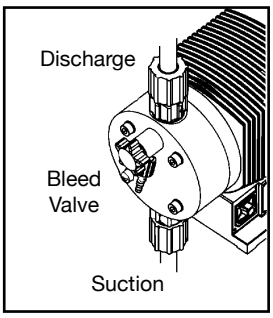
Automatic degassing liquid ends are available for PP and NP versions (except 1000 and 0232). This style liquid end discharges from the center and degasses from the top to prevent air build-up in the chamber.

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.

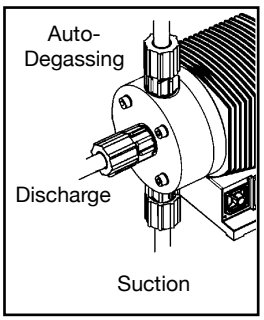
Suction and discharge ports are equipped with double-ball check valves for superior repeatability.



Liquid end without bleed valve



Liquid end with bleed valve



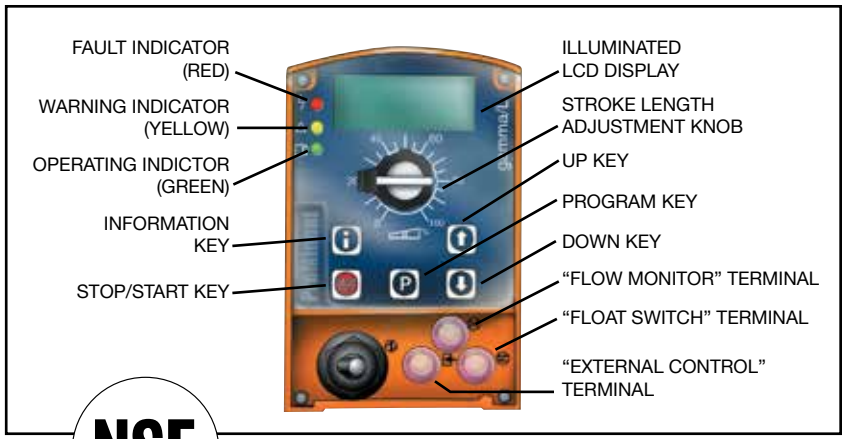
Auto-degassing liquid end

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.

NSF
Certified to NSF/ANSI 61

c UL us Recognized
CE Available

Standard Modes and Functions

Feed rate is determined by stroke length and stroke rate. Stroke length is manually adjustable from 1 to100% 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, externalcontact 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 134 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.

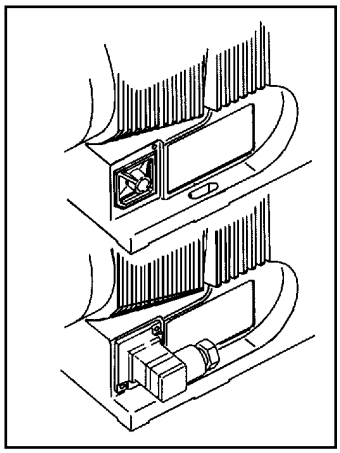
Relay outputs

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 isloated 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	Mode dependent
Stroke rate (frequency)	Accumulative strokes (*N)
Stroke length (percent)	Accumulative quantity (*gal or *L)
Stroke counter (N)	mA current (mA)
Capacity (gph or l/h)	Pulse factor / Memory (*)
Dosing quantity (gal or L)	Indication of external mode (EXT)

ProMinent® gamma/ L Solenoid Diaphragm Metering Pumps

Specifications

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, PVC, 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 24 VDC (+/- 10%)
Check valves:	Double ball
Metering repeatability:	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%.
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: 24 V, 2 A, 50/60 Hz Operating life: > 200,000 switch functions Residual impedance in ON-position (R_{DSOn}): < 8 W Residual current in OFF-position: <1mA Maximum voltage: 24 VDC Maximum current: < 100 mA (for pacing relay) Switch functions: $15x10^9$ Contact closure: 100 µs (for pacing relay)
Analog output signal:	Max. impedance 300 W Isolated 4-20 mA output signal
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)
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)

Average power drain at maximum stroke rate (Watts) / current drain at pump stroke (Amps)	
1000, 1601, 1602, 1005, 0708, 0413, & 0220:	17W / 0.7 A or 15 A (peak current for approx. 1 µs)
1605, 1008, 0713, 0420 & 0230:	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 in United States and Canada, CE available, NSF/ANSI 61
Valve threads:	NP, PP, PVT, and TT Versions: M20 x 1.5 (provided with tubing adapters)
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 <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.
Necessary contact duration:	20 µS
Recommended Viscocity:	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

Pump Version	Capacity at Maximum Backpressure					Capacity at 1/2 Maximum Backpressure					Pre-Primed Suction Lift		Max. Stroking Rate	Tubing Connectors[2] O.D. x I.D.	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)	spm	inches	lbs	(kg)
gamma/ L with 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)	0.10	145	(10)	0.37	(1.40)	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)	0.10	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)	0.58	(2.2)	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)	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	(3.5)	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)	5.0	(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	(3.5)	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)
gamma/ L with 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)	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	(3.5)	1.98	(7.5)	0.69	6.5	(2.0)	180	1/2 x 3/8	7.7	(3.5)
0413	58	(4)	2.8	(10.8)	1.00	29	(2)	3.3	(12.6)	1.17	6.5	(2.0)	180	1/2 x 3/8	7.9	(3.6)
0220	29	(2)	4.3	(16.2)	1.50	14.5	(1)	4.7	(18.0)	1.67	6.5	(2.0)	180	1/2 x 3/8	7.9	(3.6)
1605	232	(16)	0.87	(3.3)	0.31	126	(8.75)	1.00	(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	(3.5)	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" MNPTor 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.
Universal control cable necessary for external Beta control. (see page 134)

Materials In Contact With Chemicals

	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® gamma/ L
Solenoid Diaphragm Metering Pumps

Identcode Ordering System

GALa **Gamma/ L**

Version	Capacity	Version	Capacity	Version	Capacity
2001	0.26 gph (0.96 l/h), 290 psi (20 bar)	1005*	1.1 gph (4.4 l/h), 145 psi (10 bar)	0220*	5.0 gph (19.0 l/h), 29 psi (2 bar)
1601	0.29 gph (1.1 l/h), 253 psi (17.5 bar)	1008*	1.8 gph (6.8 l/h), 145 psi (10 bar)	0232	8.4 gph (32.0 l/h), 29 psi (2 bar)
2002	0.53 gph (1.7 l/h), 290 psi (20 bar)	0708*	1.9 gph (7.1 l/h), 101 psi (7 bar)		
1602	0.55 gph (2.1 l/h), 232 psi (17.5 bar)	0713*	2.9 gph (11.0 l/h), 101 psi (7 bar)		
1605*	1.1 gph (4.1 l/h), 253 psi (17.5 bar)	0413*	3.2 gph (12.3 l/h), 58 psi (4 bar)		
1000	0.19 gph (0.74 l/h), 145 psi (10 bar)	0420*	4.5 gph (17.1 l/h), 58 psi (4 bar)		

***Versions available with high viscosity liquid ends**

Liquid end material:

PP	Polypropylene/PVDF, for self-degassing version Polypropylene/Polypropylene
PC	PVC
NP	Acrylic glass/PVDF, for self-degassing version Acrylic glass/PVC
PV	PVDF/PVDF
TT	PTFE/PTFE
SS	Stainless Steel

O-rings:

E	EDPM o-rings (PP, NP)
B	Viton® o-rings (PP, NP)
T	PTFE o-rings (PVDF, TT, SS)
P	EPDM diaphragm with DPDM o-rings (PP, NP)
V	Viton® diaphragm with Viton o-rings (PP, NP)

Viton® is a registered trademark of DuPont Dow Elastomers

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 bleed valve, no valve spring, PP, PV, NP only, not type 0232
3	With bleed valve, 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
6	1/2" x 3/8" tube fittings
B	special-connection 3/8" x 1/4"

NOTE: Connector option 6 **must** be used on all pumps with standard 1/2" x 3/8" tubing connections, and it may be used on pumps with 1/4" x 3/16" tubing connectors. Use option 0 on all pumps with standard NPT connections and for high viscosity.

Logo:

0	Standard, with logo

Electrical Connection (± 10%):

M	12-24 VDC (versions 1000-0220)
N	24 VDC (versions 1605-0232)
U	Universal 100-240 V

Cable and plug with 6ft (2m) power cord, single phase:

A	European plug
D	N. American plug, 115 V
U	N. American plug, 230 V
1	Open ended (for low voltage options M and N)

Relay:

0	Without relay (Required with Profibus)
1	Fault annunciating relay, drops out
3	Fault annunciating relay, pulls in
4	Option 1 + pacing relay
5	Option 3 + pacing relay
C	Option 1 + 4-20 mA analog output
D	Option 3 + 4-20 mA analog output
E	Pacing relay + 4-20 mA analog output

Accessories:

0	Not included (for PVDF, TT, SS)
1	With foot and injection valve, 5 ft PVC suction tubing, 10 ft PE discharge tubing

Control Variants:

0	Manual + External 1:1
1	Manual + External with pulse control (multiplier/divider)
2	Manual + External 1:1 with analog control
3	Manual + External with pulse control & analog control
4	Option 0 + Timer
5	Option 3 + Timer
P	Option 3 + PROFIBUS (Relay must be 0)

Access Code:

0	No Access Code
1	Access Code

Flow Monitor:

0	Input for metering monitor signal (pulse)

Pause/Float:

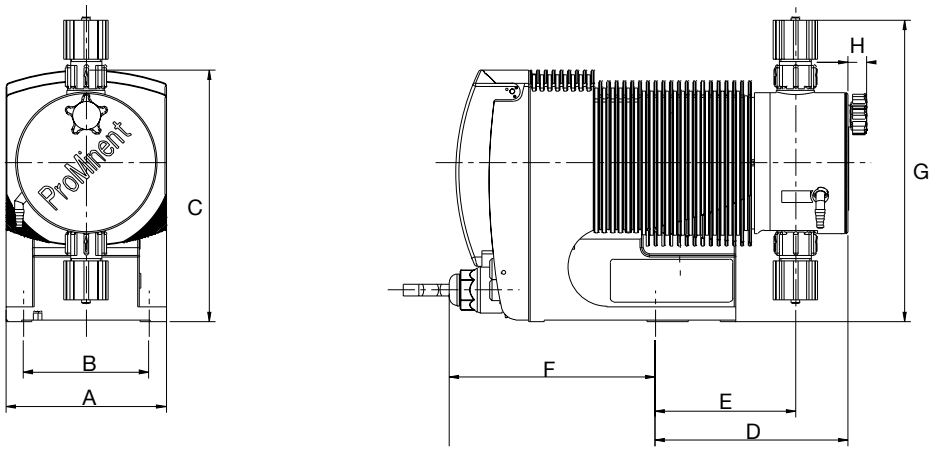
0	Standard

GALa	**1601**	**SS**	**T**	**1**	**0**	**0**	**U**	**D**	**1**	**0**	**3**	**0**	**0**	**0**	

ProMinent® gamma/ L
Solenoid Diaphragm Metering Pumps

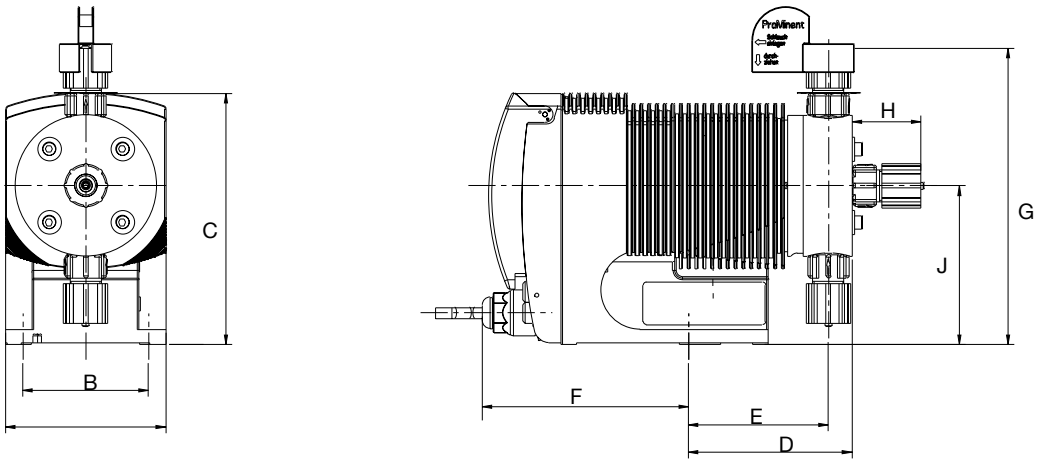
Dimensional Drawings

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)

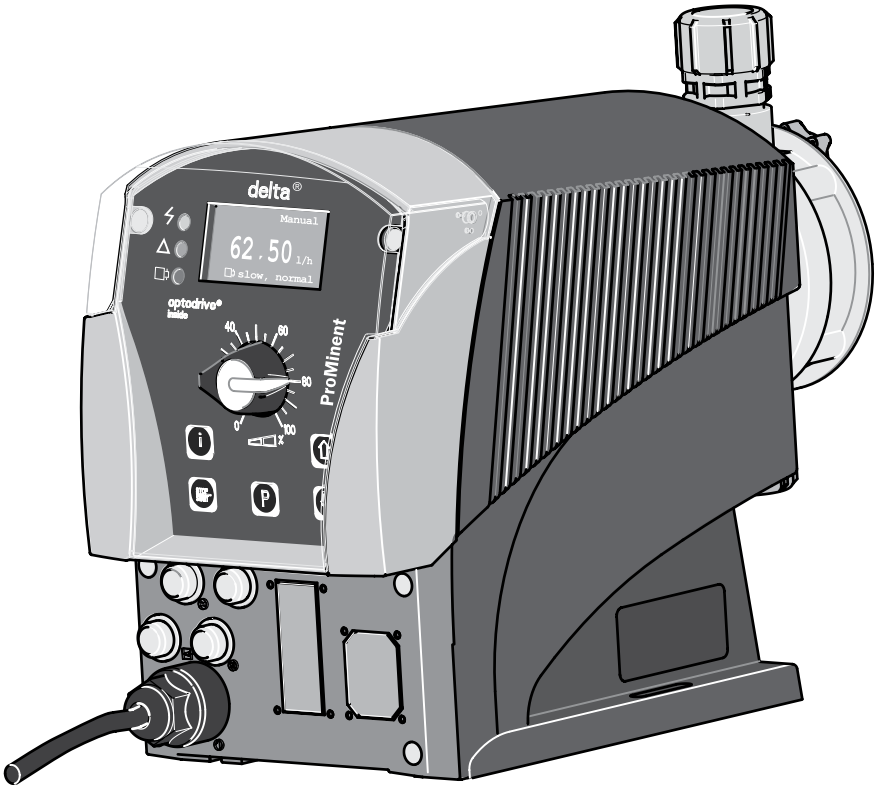
ProMinent® delta®
Solenoid Diaphragm Metering Pumps

Overview: delta®

Ideal for applications requiring metering pump accuracy with minimal pulsation

(see page 127 for spare parts and page 134 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 134)* 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



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ProMinent® delta®
Solenoid Diaphragm Metering Pumps

Capacity Data

Capacity at Maximum Backpressure

delta® Type Pump	gph	(l/h)	psig	(bar)	Max. strokes/ min	Pre-primed suction lift ft	(m)	Suction/Discharge connectors in	Shipping weights (higher weights are for SS) lbs	(kg)
2508	2.0	(7.5)	363	(25)	200	19.6	(6)	3/8" x 1/2"	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	3.0	(11.3)	232	(16)	200	19.6	(6)	3/8" x 1/4"	22-24	(10-11)
1020	5.0	(19.1)	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*	22-24	(10-11)
0280	19.8	(75.0)	29	(2)	200	6.7	(2)	5/8" ID hose barb standard*	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).

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.
** (1/2" MNPT optional)*
*** (1/2" MNPT discharge side only)*
Note: Universal control cable necessary for external delta control. *(see page 134)*

Materials In Contact With Chemicals

	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® delta®
Solenoid Diaphragm Metering Pumps

Identcode Ordering System

DLTA delta

Version	Capacity	Version	Capacity
2508	2.1 gph (7.5 l/h), 362 psi (25 bar)	0703	7.7 gph (29.20 l/h), 101.5 psi (7 bar)
1608	2.1 gph (7.8 l/h), 232 psi (16 bar)	0450	13 gph (49 l/h), 58 psi (4 bar)
1612	3.0 gph (11.30 l/h), 232 psi (16 bar)	0280	19.8 gph (75 l/h), 29 psi (2 bar)
1020	5.05 gph (19.1 l/h), 145 psi (25 bar)		

Liquid end materials:

PV	PVDF (for models 1608, 1612, 1020, and 0730)
SS	SS
NP	Acrylic glass/PVC (for pump type 2508, 1608, 1612, 1020 & 0730)

O-rings:

T	PTFE seals
E	EPDM o-ring (NP only)
B	Viton® o-rings (NP only)

Liquid end version:

0	W/o bleed valve, w/o spings (for SS liquid ends)
1	W/o bleed valve, with springs (for SS liquid ends)
2	With bleed valve, w/o springs
3	With bleed valve, with springs
4	W/o bleed valve, with springs (for high viscosity only)
X	W/o liquid end

Connection:

0	1/2" x 3/8" tubing (for models 1020 & 0730); 5/8" hose barb (for models 0450 & 0280); 3/8" x 1/4" tubing (for models 1608 & 1612)
6	1/2" MNPT Connections (for models 0450, 0280 & 2508)

Diaphragm failure indicator:

0	Without diaphragm failure indicator
1	With diaphragm failure indicator

Logo:

0	Standard, with ProMinent® logo

Electrical connection (± 10%):

U	115-230 V, 50/60 Hz

Cable and plug with 6 ft (2 m) power cord, single phase:

A	European plug
D	N. American plug, 115 V
U	N. American plug, 230V

Relay:

0	Without relay (Required with PROFIBUS)
1	Fault annunciating relay, drops out
3	Fault annunciating relay, pulls in
4	Option 1 + pacing relay
5	Option 3 + pacing relay
A	Alarm indication + pump shut off
C	Option 1 + 4-20 mA analog output + fault output (24V 100 mA max.)
G	Auto-degassing valve + fault relay (not available for version 2508)

Accessories:

0	Not included
1	Foot Valve, Inj Valve, 15' Tubing (3/8" x 1/4") PVC (for model 1608)
1	Foot Valve, Inj Valve, 15' Tubing (3/8" x 1/4") PVDF (for model 1612)
1	Foot Valve, Inj Valve, 15' Tubing (1/2" x 3/8") PVC (for model 1020)
1	Foot Valve, Inj Valve, 15' Tubing (1/2" x 3/8") PVDF (for model 0730)
1	Foot Valve, Inj Valve, 5' Suction Tubing (1/2" x 3/8") PVC (1/2" MNPT on Discharge) (for model 2508)
1	FV, IV, 15' House (5/8" ID) PVDF (for models 0450 & 0280)

Control Variants:

0	Manual + External contact (multiplier/divier)
3	Manual + External with pulse control & analog control
4	Option 0 + 14 day timer
5	Option 3 + 14 day timer
M	with pH,ORP and chlorine control module
R	Option 3 + Profibus M12 (Relay must be 0)

Access Code:

0	No Access Code
1	Access Code

Language:

EN	English

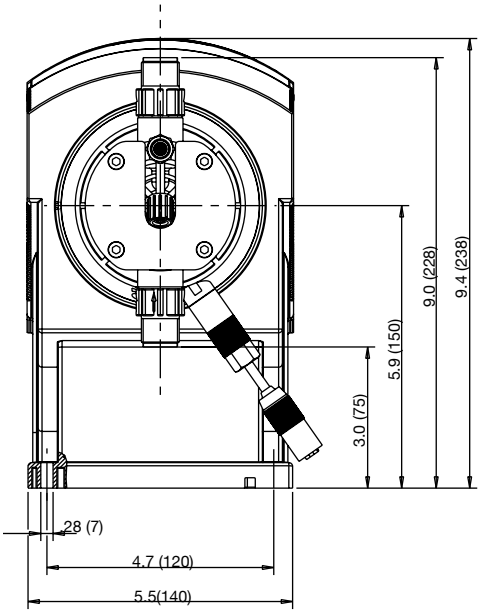
Pause/Float:

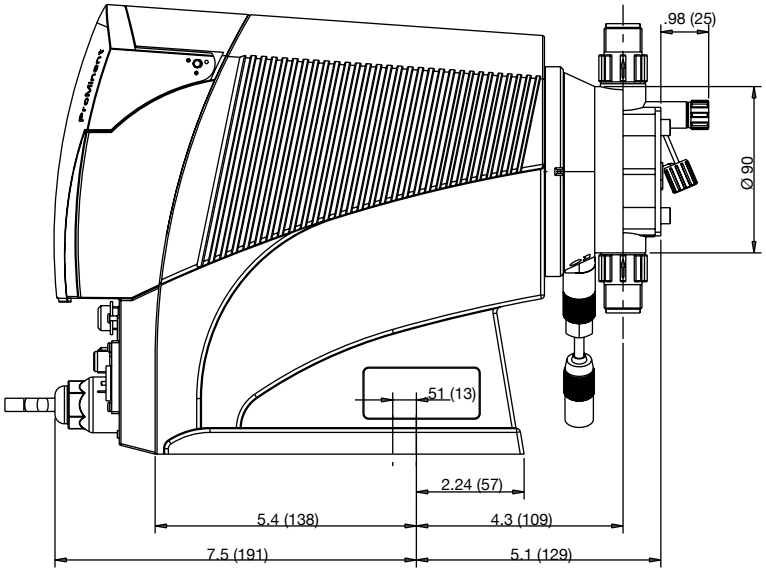
0	Standard

DLTA	2508	PV	0	0	0	0	0	U	A	0	0	0	0	EN	0	

Dimensions in inches (mm).
Ranges given, actual dimension dependent on liquid end material.

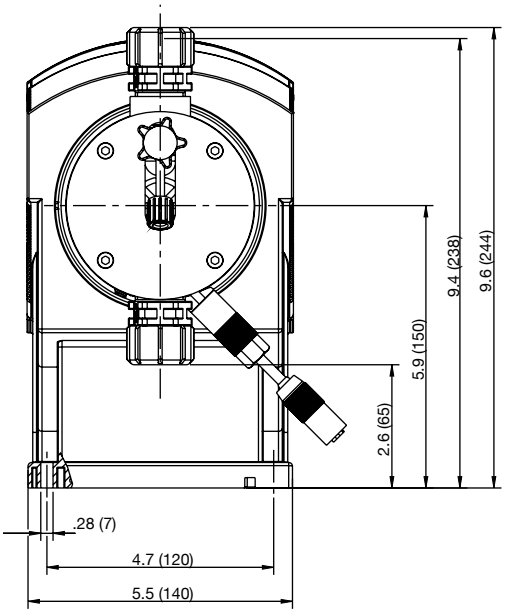
Dimensions of delta® type 1612 - 0730 PVT

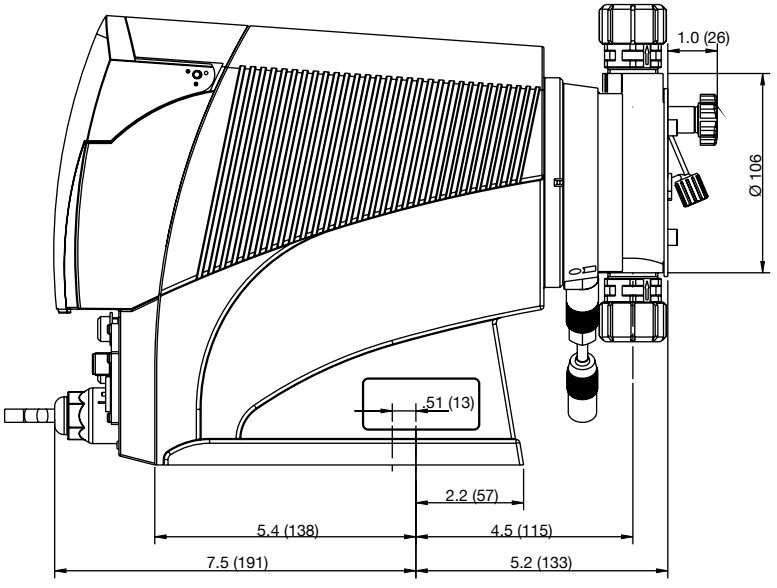




dimensions in inches (mm)

Dimensions of delta® type 0450 - 0280 PVT



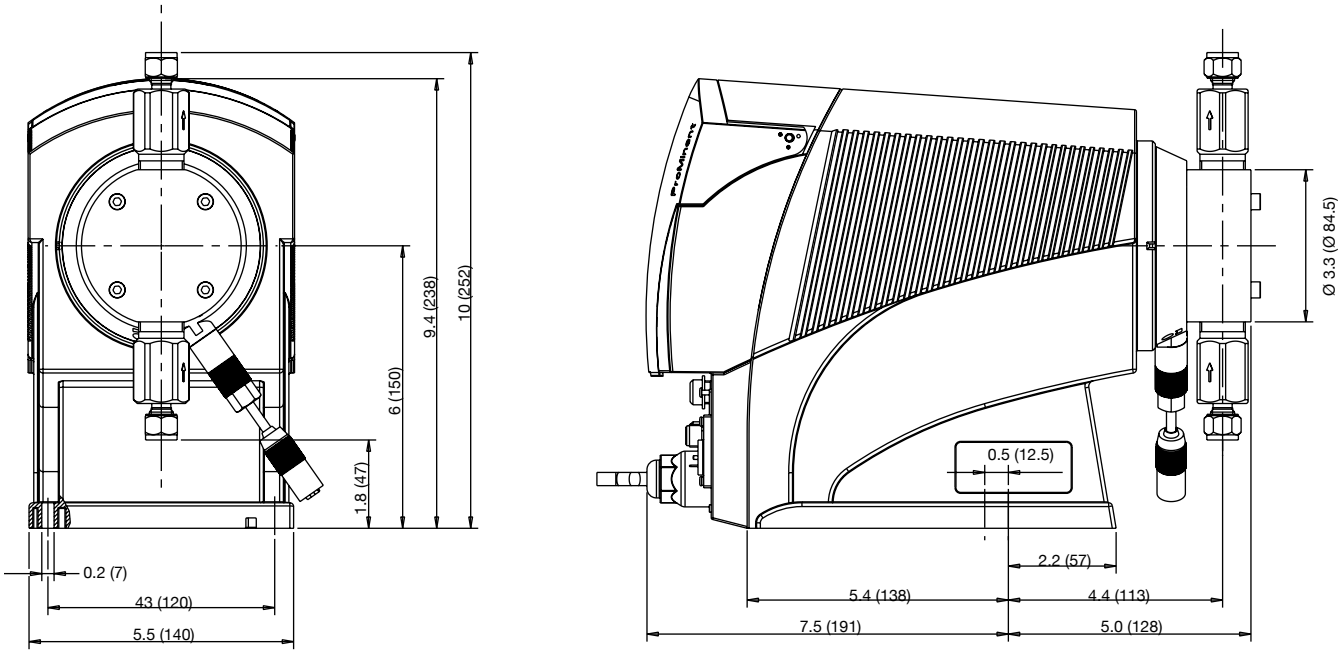


dimensions in inches (mm)

ProMinent® delta®
Solenoid Diaphragm Metering Pumps

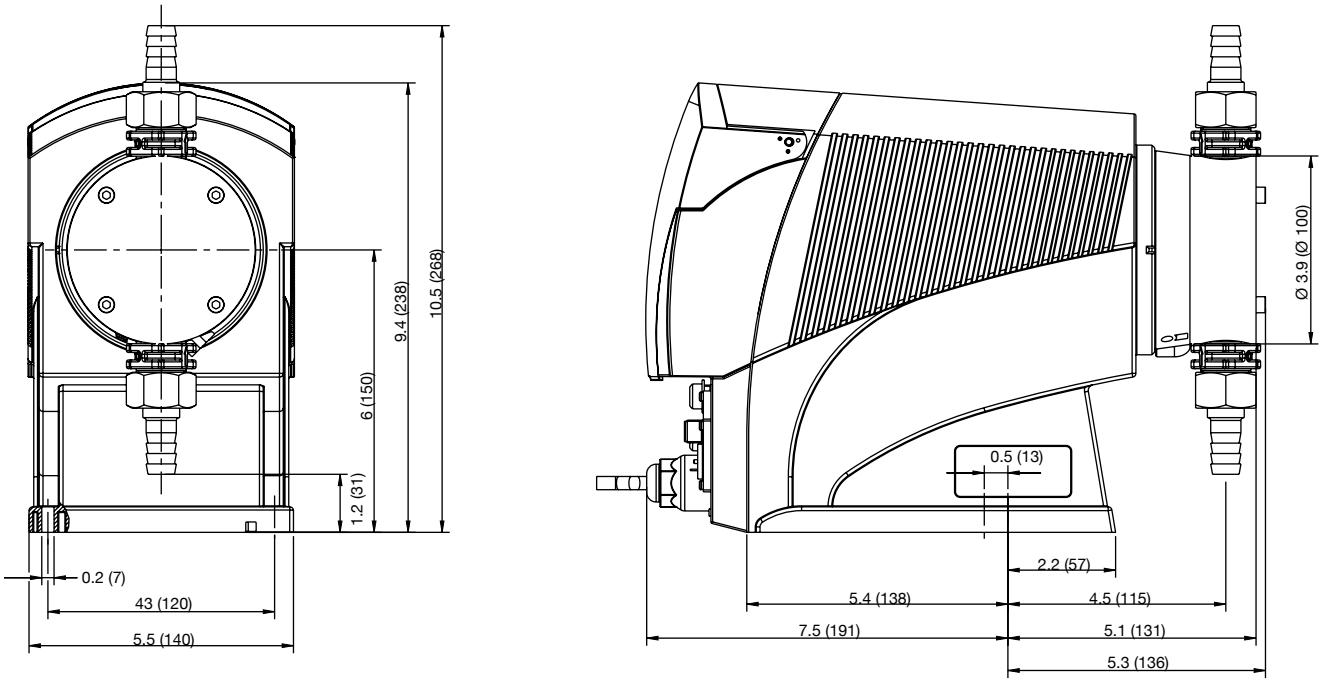
Dimensional Drawings

Dimensions of delta® type 1612 - 0730 SST



dimensions in inches (mm)

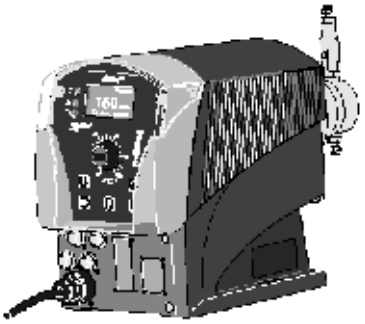
Dimensions of delta® type 0450 - 0280 SST



dimensions in inches (mm)

ProMinent® mikro delta® Piston Metering Pumps

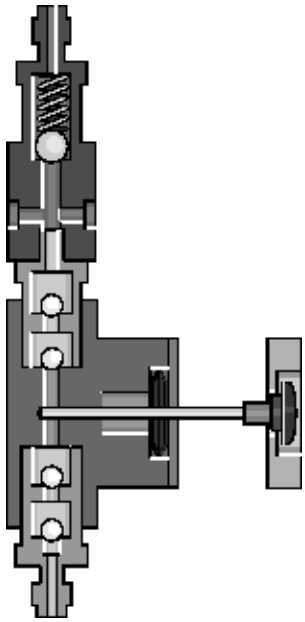
Overview: mikro delta®



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: ± 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 134)* 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



pk_1_010
Liquid end

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 ft	(m)	Suction/Discharge connectors mm	Shipping weights (higher weights are for SS) 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 134)*

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® mikro delta® Piston Metering Pumps

Identcode Ordering System

MDLa — **mikro delta® series, version a**

Version	Capacity	Version	Capacity
100150	145 ml/h, 145 psi (10 bar) *Only TT	400600	580 ml/h, 580 psi (40 bar) *Only SS
600150	145 ml/h, 870 psi (60 bar) *Only SS	101500	1,480 ml/h, 145 psi (10 bar) *Only TT
100600	580 ml/h, 145 psi (10 bar) *Only TT	201500	1,480 ml/h, 290 psi (20 bar) *Only TT

Liquid end materials:

SS	Stainless steel
TT	PTFE with 25 % carbon

O-rings:

T	PTFE pure white
G	PTFE with graphite

Liquid end version:

0	no valve spring
1	with valve spring

Connection:

0	Standard according to technical data

Logo:

	with ProMinent®-Logo
	no ProMinent®-Logo

Power Supply (± 10%):

U	115-230 V, 50/60 Hz

Cable and plug with 6 ft (2 m) power cord, single phase:

A	European plug
D	N. American plug, 115 V
U	N. American plug, 230 V

Relay:

0	no relay
1	Fault indicating relay, normally energized, 1x changeover contact, 230 V - 8 A
3	Fault indicating relay, normally de-energized, 1 x changeover contact, 230 V - 8
4	A as 1 + pacing relay, 24 V - 100 mA
5	as 3 + pacing relay, 24 V - 100 mA

Accessories:

	no accessories

Control versions:

0	manual+external contact with pulse control
3	manual+external contact w/ pulse control+analogue 0/4-20 mA
4	as 0 + Process Timer (1 month)
5	as 3 + Process Timer (1 month)
C	CANopen
R	as 3 + PROFIBUS®-interface, M12

Security:

0	no access code
1	with access code

Language:

EN	English

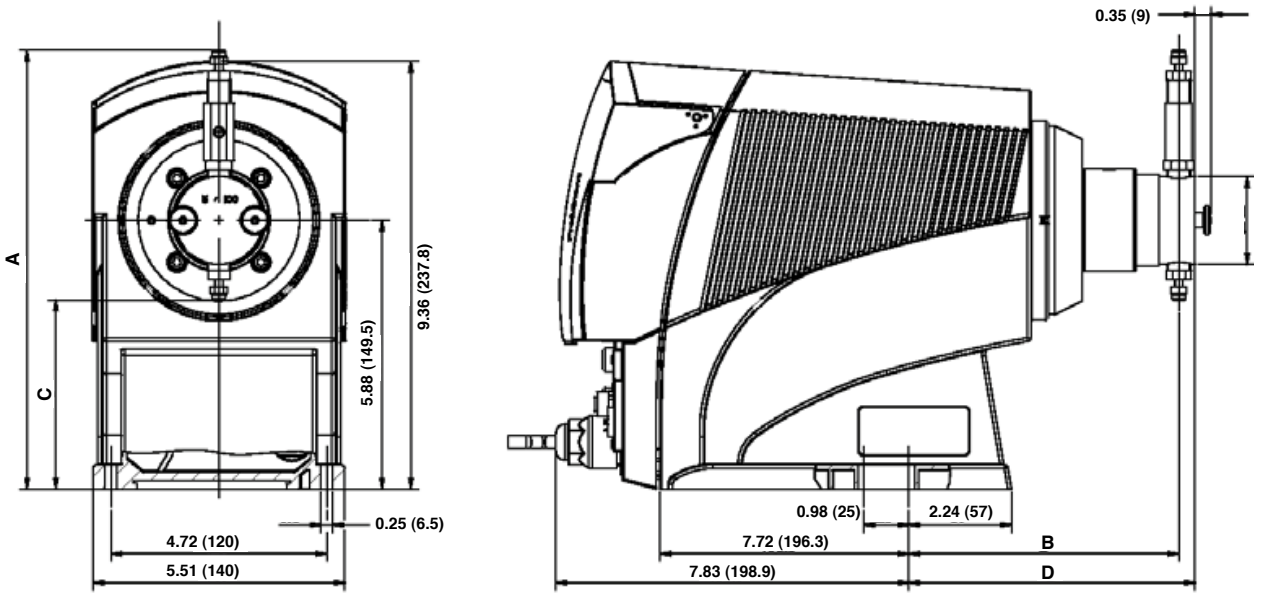
Pause/Float:

0	Standard

MDLa	**100150**	**SS**	**T**	**0**	**0**	**0**	**U**	**D**	**0**	**0**	**0**	**0**	**EN**	**0**	

ProMinent® mikro delta® Piston Metering Pumps

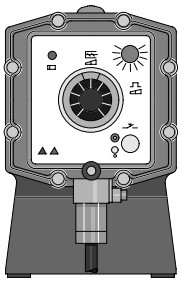
Dimensional Drawings



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

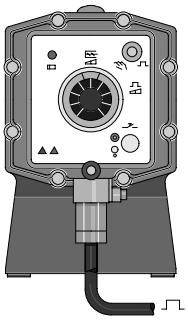
Overview: EXtronic®



pk_1_020

Control type “Internal”

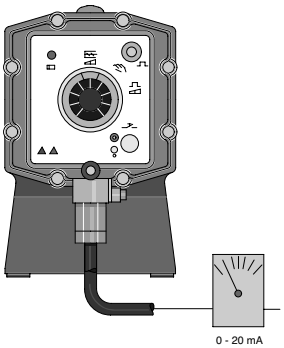
Stroke length adjustment 1:10, stroking rate adjustment 1:25, total adjustment range 1:250.



pk_1_019

Control type: “External Contact”

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



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 126 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 conjection 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 enclsoure 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

Maximum stroke length: 0.026” (0.65 mm) for pump models 1000
0.049” (1.25 mm) for all other models

Materials of construction
Housing: Epoxy coated die cast aluminum
Diaphragm: PTFE faced EPDM with steel core

Liquid end options: Polypropylene, Acrylic/PVC, PTFE, 316 SS, high-viscosity Polypropylene

Enclosure rating: (IP 65); insulation class F

Power supply: 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.

Thermal protection: Yes

Check valves: all models double ball except single ball on PP4 (HV) models

Repeatability: When used according to operating instructions, ±2%;
For type 1601 with self-degassing liquid end, ±5%.

Power cord: 6 ft. (2 m) 2 wire plus ground (no plug)

External control cable: 6 ft. (2 m) 2 wire

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)

Max. allowable input current: 50 mA

Warranty: Two years on drive; one year on liquid end.

Industry standards: Factory mutual (explosion-proof, intrinsically safe), CSA approved and CE approved. EN 50014/50018; VDE 0170/0171-5.78,

Standard Production Test: **100% tested for rated pressure and volume**

Max. solids size in fluid: Pumps with 1/4” valves: 15µ; pumps with 1/2” valve: 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 20 mA at +10 VDC. (*Note*: Semiconductor contacts that require >700 mV across a closed contact should not be used).

Necessary contact duration: 100 ms

ProMinent® EXtronic® Solenoid Diaphragm Metering Pumps

Capacity Data

Pump Version	Capacity at max. backpressure psig (bar)	GPH (L/h)	mL/ stroke	Max. stroke rate spm	Connectors Tube/NPT fitting PP/ NP/NS/PS/TT inches	Capacity at 1/2 max. backpressure psig (bar)	gph (L/h)	mL/ stroke	SS1	SS2	SB1	Suction lift ft. (m)	PP/NP/TT-S weight lbs. (kg)
1000	145 (10)	0.05 (0.19)	0.027	120	1/4 x 3/16	72.5 (5)	0.07 (0.27)	0.038	6mm Swage	1/4" FNPT	1/4" FNPT	4.9 (1.5)	27-36 (12-16)
2501	363 (25)	0.26 (1.0)	0.15	120	1/4 x 3/16	290 (20)	0.29 (1.1)	0.17	6 mm Swage	1/4" FNPT	1/4" FNPT	19.7 (6)	39 (18)
1601	232 (16)	0.26 (1.0)	0.14	120	1/4 x 3/16	116 (8)	0.34 (1.3)	0.18	6mm Swage	1/4" FNPT	1/4" FNPT	19.7 (6)	27-36 (12-16)
1201	174 (12)	0.45 (1.7)	0.23	120	1/4 x 3/16	87 (6)	0.53 (2.0)	0.28	6mm Swage	1/4" FNPT	1/4" FNPT	19.7 (6)	27-36 (12-16)
0803	116 (8)	0.98 (3.7)	0.51	120	1/4 x 3/16	58 (4)	1.03 (3.9)	0.54	6mm Swage	1/4" FNPT	1/4" FNPT	9.8 (3)	27-36 (12-16)
1002	145 (10)	0.61 (2.3)	0.31	120	1/2 x 3/8	72.5 (5)	0.71 (2.7)	0.38	8mm Swage	1/4" FNPT	1/4" FNPT	19.7 (6)	27-36 (12-16)
0308	43.5 (3)	2.27 (8.6)	1.2	120	1/2 x 3/8	21.8 (1.5)	2.72 (10.3)	1.43	8mm Swage	1/4" FNPT	1/4" FNPT	19.7 (6)	27-36 (12-16)
2502	363 (25)	0.53 (2.0)	0.28	120	1/2 x 3/8	290 (20)	0.58 (2.2)	0.31	8mm Swage	1/4" FNPT	1/4" FNPT	19.7 (6)	29-38 (13-17)
1006	145 (10)	1.59 (6.00)	0.83	120	1/2 x 3/8	72.5 (5)	1.90 (7.2)	1.00	8mm Swage	1/4" FNPT	1/4" FNPT	19.7 (6)	29-34 (13-15)
0613	87 (6)	3.46 (13)	1.82	120	1/2 x 3/8	43.5 (3)	3.94 (14.9)	2.07	8mm Swage	1/4" FNPT	1/4" FNPT	18.0 (5.5)	29-38 (13-17)
0417	50.8 (3.5)	4.60 (17.4)	2.42	120	1/2 x 3/8	29.0 (2)	4.73 (17.9)	2.49	12mm Swage	1/4" FNPT	1/4" FNPT	14.0 (4.5)	29-38 (13-17)
2505	363 (25)	1.11 (4.2)	0.64	110	1/2 x 3/8	290 (20)	1.27 (4.8)	0.73	12mm Swage	1/4" FNPT	1/4" FNPT	19.7 (6)	36-45 (16-20)
1310	189 (13)	2.77 (10.5)	1.59	110	1/2 x 3/8	87 (6)	3.14 (11.9)	1.80	12mm Swage	1/4" FNPT	1/4" FNPT	19.7 (6)	36-45 (16-20)
0814	116 (8)	3.70 (14.0)	2.12	110	1/2 x 3/8	58 (4)	4.07 (15.4)	2.33	12mm Swage	1/4" FNPT	1/4" FNPT	19.7 (6)	36-45 (16-20)
0430	50.8 (3.5)	7.13 (27.0)	4.09	110	1/2" MNPT	29.0 (2)	7.79 (29.5)	4.47	3/8" FNPT		3/8" FNPT	16.4 (5)	36-45 (16-20)
0260	21.8 (1.5)	15.8 (60.0)	9.09	110	3/4" MNPT				1/2" FNPT		1/2" FNPT	4.9 (1.5)	36-45 (16-20)

EXtronic Models for High Viscosity Fluids

1002	145 (10)	0.61 (2.3)	0.31	120	1/2" MNPT	72.5 (5)	0.71 (2.7)	0.38				0 (0)	27 (12)
1006	145 (10)	1.59 (6.0)	0.83	120	3/4" MNPT	72.5 (5)	1.90 (7.2)	1.00				0 (0)	29 (13)
1310	145 (10)	2.77 (11.0)	1.59	110	3/4" MNPT	72.5 (5)	3.14 (11.9)	1.80				0 (0)	36 (16)
0814	116 (8)	3.70 (14.0)	2.12	110	3/4" MNPT	58 (4)	4.07 15.4)	2.33				0 (0)	36 (16)

EXtronic Models with Auto-degassing Liquid Ends

Pump Version NS/PS EXBb	Capacity at Maximum Backpressure psig	(bar)	U.S. GPH	(L/h)	mL/ stroke	Max. Stroking Rate spm	Connectors Tube/NPT fitting PP/ NP/NS/PS/TT inches	Suction Lift ft.	(m)	Shipping Weight 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).

(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" MNPTor 5/8" hose barb. Positive suction recommended.

ProMinent® EXtronic® Solenoid Diaphragm Metering Pumps

Materials in Contact With Chemicals

	Liquid End	Suction/Discharge Connector	O-rings	Valve Balls (6 - 12 mm)	Balls (DN 10 and DN 15)
PP1	Polypropylene	Polypropylene	EPDM	ceramic	Borosilicate glass
PP4*	Polypropylene	Polypropylene	EPDM	-	ceramic
NP1	Acrylic	PVC	Viton®	ceramic	Borosilicate glass
NP3	Acrylic	PVC	Viton®	ceramic	-
NS3**	Acrylic	PVC	Viton®	ceramic	-
PS3**	PVC	PVC	Viton®	ceramic	-
TT1	PTFE with carbon	PTFE with carbon	PTFE	ceramic	ceramic
SS..	316 stainless steel	316 stainless steel	PTFE	ceramic	316 stainless steel

* PP4 with Hastelloy C valve springs.
** NS3 and PS3 with Hastelloy C valve springs, PVDF valve core.

Note: Viton® is a registered trademark of DuPont Dow Elastomers.
Metering pump comes with 6 ft. power cable (plug not included)

Factory Mutual System approved

Approved (standard in Canada)

CE Approved

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

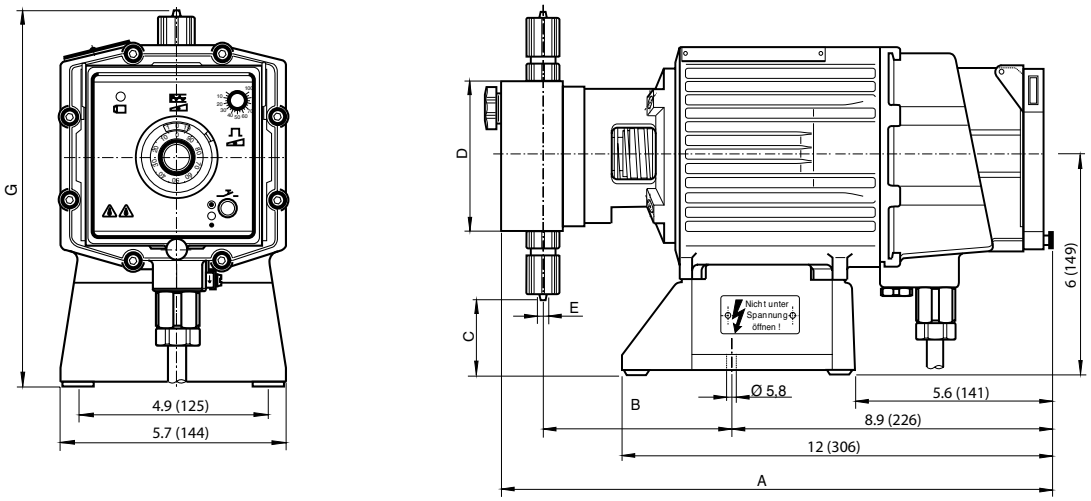
ProMinent® EXtronic® Solenoid Diaphragm Metering Pumps

Identcode Ordering System

EXBb	Enclosure Type:								
	G	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 avaiable 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]		*Intrinsically safe only with E=Ex protection	
					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

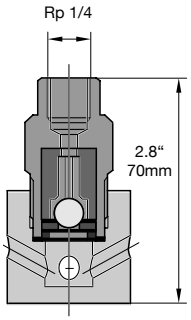
Dimensional Drawings



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)

Special Valves for EXtronic®



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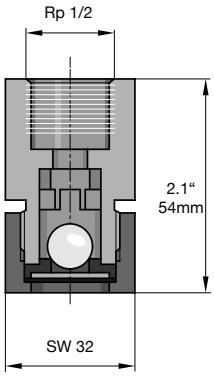

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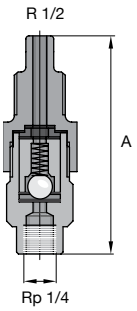

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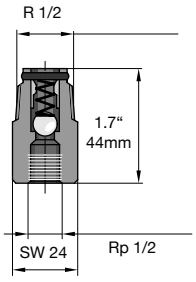

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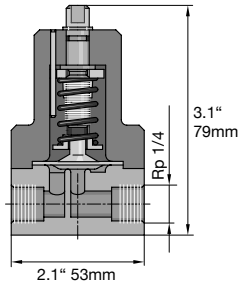

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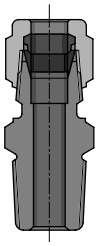

pk_1_028

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 $<10^7$ Ω

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