ProMinent® gamma/ L
Solenoid Diaphragm Metering Pumps

Overview: gamma/ L

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

(see page 127 for spare parts, page 138 for accessory kits and page 138 for control cables)

- Capacity range 0.2-8.4 gph, 232-29 psi (0.74-32 l/h, 16-2 bar)
- Continuous stroke length adjustment from 0-100 %
- Supplied in PP, Acrylic/PVC, PTFE, PVDF, stainless steel
- Patented bleeding 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 stroking 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

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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 232 psig (16 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, with a NEMA 4X enclosure rating to protect against corrosion, dust and water. A removable hood covers the faceplate.

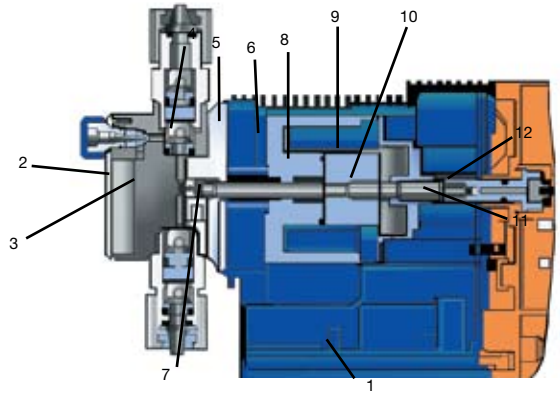
The solenoid drive unit houses a short-stroke solenoid with a maximum stroke length 0.05" (1.25mm). It is equipped with a noise suppressing mechanism for quiet operation and the armature is the only moving part. The gamma/L series offers two solenoid sizes.

Operating on pulse action, each pulse generates a magnetic field in the solenoid coil. This magnetic field moves the armature forward, which has the diaphragm attached to the end. The diaphragm moves into the dosing head cavity forcing chemical out of the discharge valve. When the magnetic field is de-energized, a spring returns the armature and diaphragm to their original positions. 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 monitor can be used to stop the pump and indicate a problem.

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

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

Diaphragm

The diaphragm is constructed of fabric-reinforced EPDM elastomer with a plastic core and PTFE-facing. It is chemically resistant against virtually all process fluids and can be used over a wide temperature range.

The gamma/L diaphragm is convex. The curved shape contributes to more precise metering and alleviates stress placed on the diaphragm by reducing liquid end dead volume.

ProMinent® gamma/ L
Solenoid Diaphragm Metering Pumps

The Liquid End

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

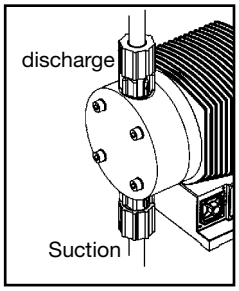
Some liquid ends are interchangeable.

Options include a manual bleed valve for easy priming and auto degassing for fluids that tend to off-gas (available with versions PP, NP). Optionally this is available for the PVT versions.

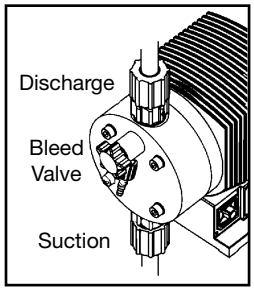
Automatic degassing liquid ends are available for PP and NP versions (except 1000 and 0232). This new-style liquid end discharges from the center and degasses from the top to prevent air build-up in the chamber.

High viscosity PVDF liquid ends are available for pump versions 1005, 0708, 0413, 0220, 1605, 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 so flooded suction is recommended.

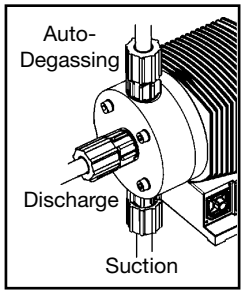
Suction and discharge ports are equipped with double ball check valves for superior repeatability.



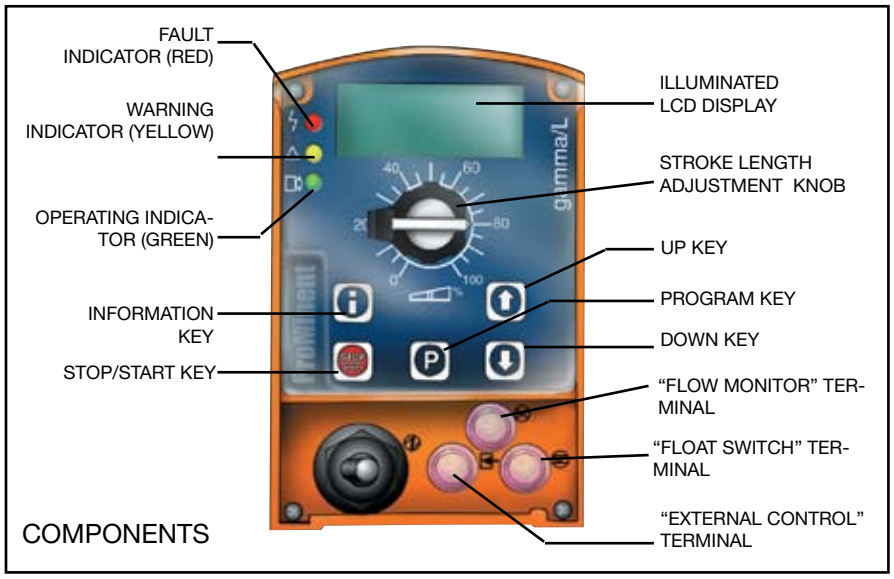
Liquid end without bleed valve



Liquid end with bleed valve



Auto-degassing liquid end



COMPONENTS

c UL us Recognized

CE Available

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 stroke counter, which 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

Four 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*)

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 max. 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 lights. 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 lights 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 lights. 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 key without disconnecting from the main power supply.

“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 appears.

Optional Modes and Functions

Optional Control Modes

"Analog" Mode

With this option, the stroking 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 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 eliminate 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 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. . .

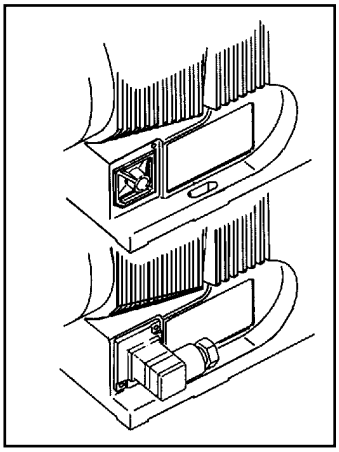
Fault annunciating relay

For low tank level (flow 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.

4-20 mA Analog Output



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

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, work days, 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

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:	NEMA 4X (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
Repeatability of the metering:	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 foot (2 m)
Relay cable (optional):	6 foot (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 ms (for pacing relay)
Analog output signal:	Max. impedence 300 W Isolated 4-20 mA output signal
Profibus - DP fieldbus options:	Transfer: RS - 485 Wiring: 2-wired, twisted, shielded Length: 3637 ft. (1200 m)/328 ft. (100 m) Baud rate: 9600 bits/s; 12 Mbits/s No. of participants: 32 with 127 repeaters Topology: Line Access procedure: Master/master with token ring
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 stroking 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 ms)**
1605, 1008, 0713, 0420 & 0230 :	**22W / 1.0 A or 15 A (peak current for approx. 1 ms)**
Service factor:	1.15
Warranty:	2 years on drive, 1 year on liquid end
Industry standards:	UL Recognized in United States and Canada, CE available
Valve threads:	NP, PP, PC, PVT, 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, and will not remember.**
Necessary contact duration:	>20 mS
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	Suction/Discharge Tubing Connectors**	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	O.D. x I.D. inches	lbs.	(kg)
GALa																
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)
1601	232	(16)	0.29	(1.1)	0.10	116	(8)	0.37	(1.4)	0.13	19.6	(6)	180	1/4 x 3/16	7.5-8.6	(3.4-3.9)
1602	232	(16)	0.55	(2.1)	0.19	116	(8)	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	116	(8)	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*	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	9.9-13.9	(4.5-6.3)
GALa with auto-degassing liquid ends																
1601	232	(16)	0.16	(0.59)	0.055	116	(8)	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	116	(8)	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	116	(8)	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)

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.

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. Flooded suction is recommended.

* Not available with bleed valve in PP version.

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

Note: Universal control cable necessary for external Gamma/ L control. (see *page 138*)

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 no. 1.4404	stainless steel no. 1.4404	PTFE	ceramic

Auto-degassing version available in PP and NP only. Supplied with Hastelloy valve springs, PVDF valve core. Pump diaphram 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 a**

Pump version:

1000	1602	0708*	0220*	1008*	0420*
1601	1005*	0413*	1605*	0713*	0232

*Versions available with high viscosity liquid ends

Liquid end materials:

PP	Polypropylene
PC	PVC
NP	Acrylic/PVC
PV	PVDF
TT	PTFE
SS	SS

Seal:

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

Viton® is a registered trademark of DuPont Dow Elastomers

Liquid end version:

0	W/o bleed valve, w/o springs (TT, SS and version 0232)
1	W/o bleed valve, with springs (TT, SS and version 0232)
2	With bleed valve, w/o springs (PP, PC, NP; except version 0232 PP)
3	With bleed valve, with springs (PP, PC, NP; except version 0232 PP)
4	W/o bleed valve, with springs (for high viscosity only)
9	With auto-degassing (PP, NP - except versions 1000, 0232)

Connection:

0	Standard according to technical data
6	1/2" x 3/8" tube fittings

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.

Labeling:

0	Standard, with logo

Electrical connection (± 10%):

M	12-24 VDC (versions 1000-0220)
N	24 VDC (versions 1605-0232)
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
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	Standard (for PP, PC, NP and PVT)

Control Variants: (Pulse control is needed to run the batch mode)

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)
1	Input for maintained flow switch signal

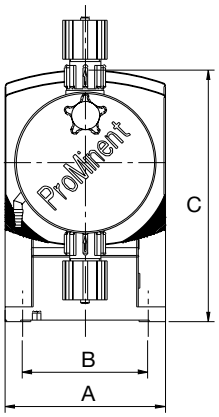
Pause/Float:

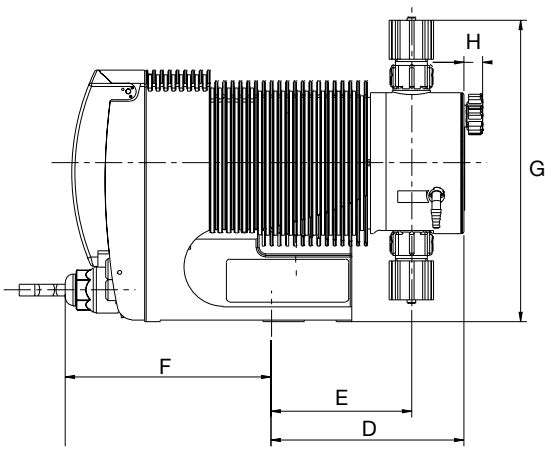
0	Standard

GALA 1602 NP B 2 0 0 U D 0 1 0 0 0 0

Dimensional Drawings

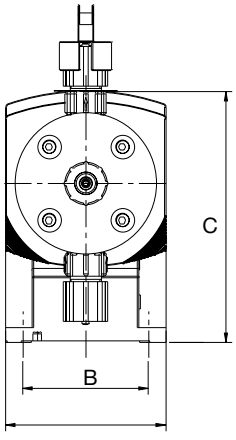
Dimensions in inches (mm).
Ranges given, actual dimension dependant on liquid end material.

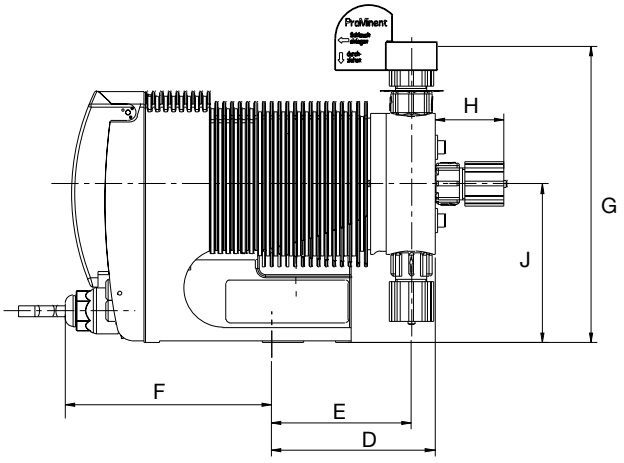




Pump	A	B	C	D	E	F	G	H
GALa	4.0 (102)	3.1 (80)	6.3 (160)	3.3-4.3 (85-110)	2.8-3.1 (71-80)	5.8 (147)	6.4-8.5 (162-217)	0.5-0.6 (12-14)

With Auto-Degassing Liquid Ends





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