

ProMinent® gamma/L Metering Pumps

ProMinent®

Features:

- **Continuous stroke length adjustment; measured and displayed in increments of 1% (from 1 to 100%)**
- **Output displayed in U.S. gph or L/h**
- **Direct calibration and built-in warning**
- **Adjustable backpressure control**
- **Flow monitor with adjustable error stroke setting up to 125**
- **Totalized output in U.S. gallons or litres**
- **Control options: manual, contact, batch and/or analog**
- **Pulse multiplier/divider**
- **Manual bleed or auto-degassing liquid ends**
- **High viscosity liquid ends**
- **14 day timer option**
- **External access to relay options**
- **Optional field bus connection**
- **4-20 mA analog output**
- **12-24 VDC low voltage option**



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 backpressures to 253 psig (17.5 bar).

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

The Drive Unit

Pump housing

The 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 gamma/L pump has one size of pump housing.

Solenoid drive

The 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 has only one moving part, the armature. 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. At the end of the armature is the diaphragm. The diaphragm pushes 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.

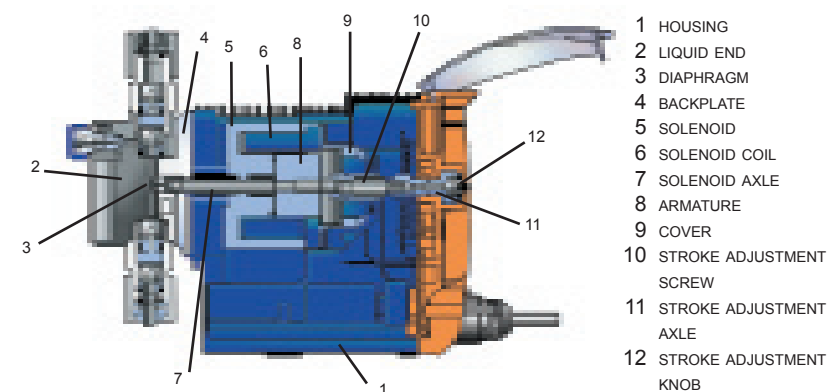
The stroke-length adjusting mechanism is directly connected to the solenoid. Adjustment results in an accurate self-locking stroke length setting.

The Diaphragm

The diaphragm is constructed of fabric-reinforced EPDM elastomer with a plastic core and a 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.

CUTAWAY VIEW OF PROMINENT GAMMA/L SOLENOID-DRIVEN METERING PUMP



ProMinent® gamma/L Metering Pumps

The Liquid End

The gamma/L metering pump liquid ends are available in six material versions:

- **Polypropylene (PP)**
- **PVC (PC)**
- **Acrylic/PVC (NP)**
- **PVDF (PV)**
- **PTFE (TT)**
- **316 Stainless steel (SS)**

Liquid ends are interchangeable with the beta/4 and beta/5 models.

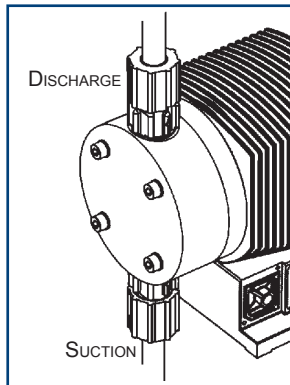
Options include a manual bleed valve for easy priming and continuous bleeding of fluids that tend to off-gas (available with versions 1000-0420 PP, NP and PC liquid ends).

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 or

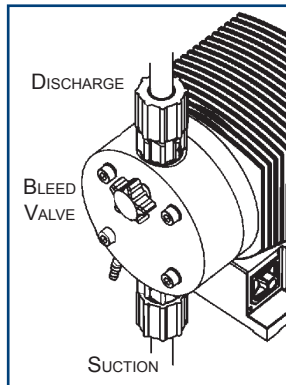
loss of prime.

High viscosity PVDF liquid ends are available for pump versions 1005, 0708, 0413, 0220, 1605, 1008, 0713, and 0420. The 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.

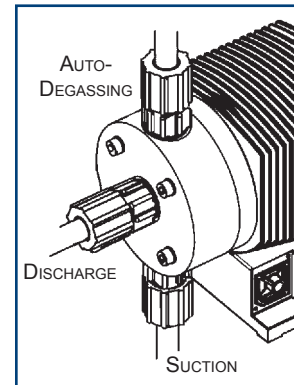
Suction and discharge ports are equipped with double ball check valves for maximum repeatability.



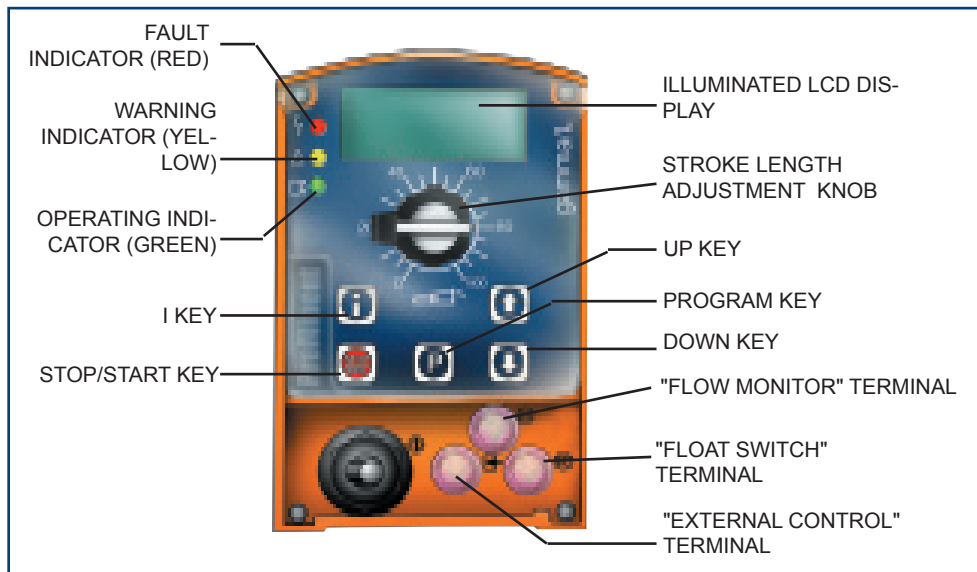
Liquid end without bleed valve



Liquid end with bleed valve



Auto-degassing liquid end



COMPONENTS

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)



gamma/L Microprocessor Control

Basic Control 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 reproducibility 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. Output is accumulated and 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 control mode.

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.

Standard Functions

Calibrate

The pump can be directly calibrated in-line to determine settings. Calibration is maintained within the stroke frequency range of 0-180 spm (up to 650 mL). A warning indicator flashes when adjustments to the stroke volume are made outside the calibrated range of +/- 10%.

Pressure Level

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

Auxiliary

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. (Note: on sizes 0420 and 0232, the flow monitor must be mounted on a discharge bypass line). 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 collective 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

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.

Customize the gamma/ Optional Control Modes and Features

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 0-20 mA or 4-20 mA. Spannable analog control and programming for curve processing is also accessible.

“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

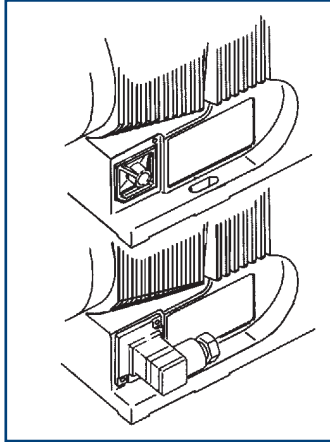
0.01 100 pulses = 1 pump stroke

“Batch” Mode

The Batch mode is a variation of the contact operating mode. A number of strokes can be predetermined up to 65,535 strokes (whole numbers) or the feed quantity can be predetermined. 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.



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

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

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

Timer Relay

The optional integrated 2-week 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 application is 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.

Specifications: gamma/L

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, PVDF, 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 Ω Residual current in OFF-position: < 1 μ A Maximum voltage: 24 VDC Maximum current: < 100 mA (for pacing relay) Switch functions: 15x109 Contact closure: 100 ms (for pacing relay)																						
Analog output signal:	Max. impedance 300 Ω 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) Baudrate: 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:	<table border="1"> <thead> <tr> <th>Material</th> <th>Constant</th> <th>Short Term</th> </tr> </thead> <tbody> <tr> <td>Acrylic/PVC</td> <td>113°F (45°C)</td> <td>140°F (60°C)</td> </tr> <tr> <td>Polypropylene</td> <td>122°F (50°C)</td> <td>212°F (100°C)</td> </tr> <tr> <td>PVC</td> <td>113°F (45°C)</td> <td>140°F (60°C)</td> </tr> <tr> <td>PVDF</td> <td>149°F (65°C)</td> <td>212°F (100°C)</td> </tr> <tr> <td>PTFE</td> <td>122°F (50°C)</td> <td>248°F (120°C)</td> </tr> <tr> <td>316 SS</td> <td>122°F (50°C)</td> <td>248°F (120°C)</td> </tr> </tbody> </table>		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)
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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)																						

Specifications: gamma/L (cont.)

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, PV, PP, PC, 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: 15 μ - Pumps with 1/2" valves: 50 μ
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 Viscosity:	max. 200 cPs for standard liquid end max. 500 cPs for bleed valve (valves with springs) max. 50 cPs for auto-degassing liquid ends max. 3000 cPs for high-viscosity liquid ends

Technical Data: gamma/L

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Pump Version	Capacity at Maximum Backpressure			Capacity at 1/2 Maximum Backpressure			Pre-Primed Suction Lift		Max. Stroking Rate spm	Suction/Discharge Tubing Connectors**	Shipping Weight (higher weights are for SS) lbs. (kg)
	psig (bar)	U.S. GPH (L/h)	mL/stroke	psig (bar)	U.S. GPH (L/h)	mL/stroke	ft. (m)	O.D. x I.D. inches			
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	253 (17.5)	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)	
1602	253 (17.5)	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	253 (17.5)	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*	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	253 (17.5)	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	253 (17.5)	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	253 (17.5)	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)

Above capacities and suction lift refer to pumps tested on water at 115 VAC, 60 Hz, and an ambient temperature of 70°F (20°C). Higher specific gravity fluids will reduce suction lift. Higher viscosity fluids will reduce capacity.

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

* Not available with bleed valve.

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

Liquid end materials

Version	Liquid End	Suction/Discharge valves	Seals	Valve balls	Diaphragm*
PPE	Polypropylene	Polypropylene	EPDM	Ceramic	PTFE
PPB	Polypropylene	Polypropylene	Viton®	Ceramic	PTFE
PCE	PVC	PVC	EPDM	Ceramic	PTFE
PCB	PVC	PVC	Viton®	Ceramic	PTFE
NPE	Acrylic	PVC	EPDM	Ceramic	PTFE
NPB	Acrylic	PVC	Viton®	Ceramic	PTFE
PVT	PVDF	PVDF	PTFE	Ceramic	PTFE
TTT	PTFE with carbon	PTFE with Carbon	PTFE	Ceramic	PTFE
SST	316 Stainless steel	316 Stainless Steel	PTFE	Ceramic	PTFE

Auto-degassing type with Hastelloy C valve spring and PVDF valve seat.

Viton® is a registered trademark of DuPont Dow Elastomers.

*Other materials available for special applications.

Identity Code: gamma/L metering pumps

Series:
GALA gamma/L version a

Pump version:						*Versions available with high viscosity liquid ends
1000	1602	0708*	0220*	1008*	0420*	
1601	1005*	0413*	1605*	0713*	0232	

Liquid end materials:	
PP	polypropylene
PC	PVC
NP	Acrylic/PVC
PV	PVDF
TT	PTFE
SS	SS

Seal:	
E	EPDM seals (PP, PC, NP)
B	Viton® seals (PP, PC, NP)
T	PTFE seals (PVDF, TT, SS)
P	EPDM diaphragm with EPDM seals (PP, PC, NP)
V	Viton® diaphragm with Viton® seals (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; PV except version 0232 PP/PV/PC)
3	With bleed valve, with springs (PP, PC, NP; PV except version 0232 PP/PV/PC)
4	W/o bleed valve, with springs (for high viscosity only)
9	With auto-degassing (PP, NP - except versions 1000, 0232)

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

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 (PVDF high viscosity, TT, SS)
1	Standard (for PP, PC, PV, NP)

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

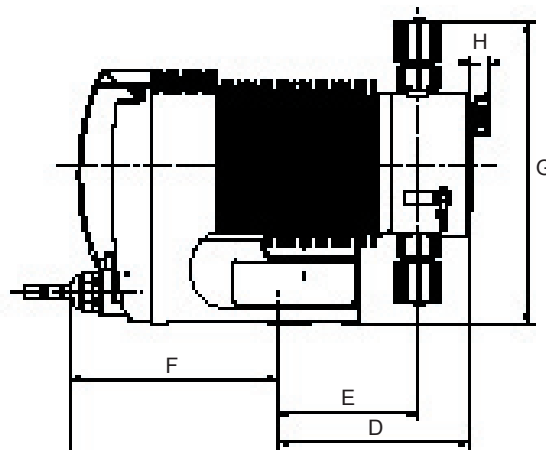
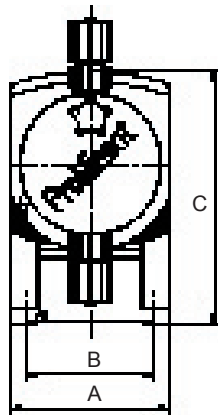
Pause/Float:	
0	Standard

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

Dimensions: gamma/L

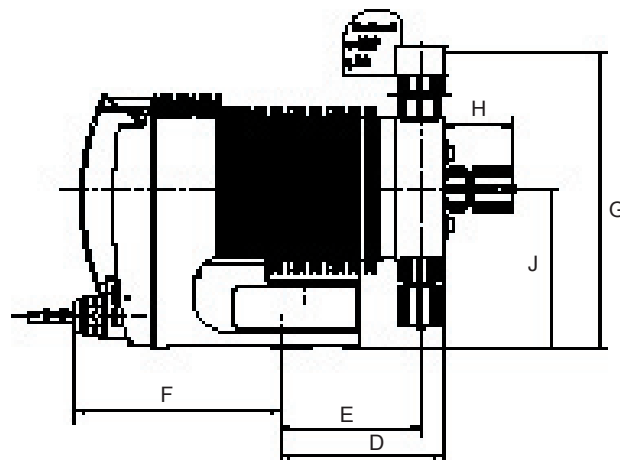
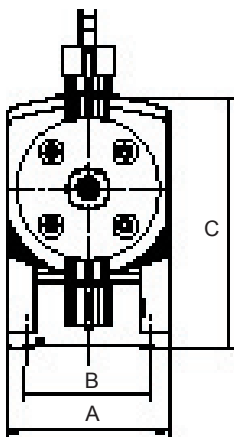
Dimensions in inches (mm).

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)

ProMinent® gamma/L Accessories

Description	Part No.
-------------	----------

Accessory kits

Pump includes tubing, foot valve and injection valve as standard. Accessory kits for gamma/L pumps with tube fittings, including 5 ft. (1.5 m) of suction tubing, 10 ft. (3 m) of discharge tubing, foot valve and injection valve.

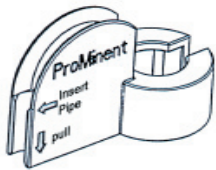
Tubing Size (in.) (select to fit pump)	Material Code	Suction Tubing	Discharge Tubing	Part no.
1/4 x 3/16	PCB/NPB	PE	PE	7809401
1/4 x 3/16	PPE	PE	PE	7809403
1/4 x 3/16	PPB	PE	PE	7809405
1/4 x 3/16	PCE/NPE	PE	PE	7809422
1/4 x 3/16	PVT	PE	PE	1024715
1/2 x 3/8	PCB/NPB	PVC	PE	7809402
1/2 x 3/8	PPE	PVC	PE	7809404
1/2 x 3/8	PPB	PVC	PE	7809406
1/2 x 3/8	PVT	PVC	PE	7809440

PVC 1/2" x 3/8" suction tubing is pliable, allowing foot valve to sink. PE discharge tubing is rigid.

Pressure ratings are: PVC: 7 psig PE: 100 psig.

Tubing, foot valves and injection valves for TT, SS, PVT (high Viscosity) pumps are not available as kits and must be ordered as separate items.

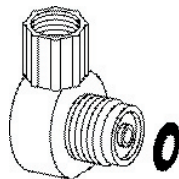
Auto-degassing Accessories



Bypass line fold protector (for soft tubing only)

Fits on top of the beta and gamma/L auto-degassing liquid ends, used to prevent a fold in the bypass line which is fed back to the tank. This is required when using soft tubing, however rigid tubing is standard.

for tubing size (mm): 1/4" x 3/16" (6mm)..... 1001844



Right-angled PVC threaded connector

Connector for the beta and gamma/L auto-degassing liquid ends required when mounting multifunction valves; optionally used to direct discharge flow upwards. Angle union 90°.

Type PCB (PVC/Viton®) 1003318
Type PCE (PVC/EPDM)..... 1003472

Profibus adapter, enclosure rating IP 65

From eurofast 5-pin, M12 x 1 to 9 pin., Sub D-plug, length approx. 11.8" (300 mm)

Y-adapter

2 x M12 x 1 male/female, 9 pin, Sub-D plug 1005838

Adapter

1 x M12 x 1 male, 9 pin, Sub-D plug 1005839

External control cables for gamma/L

Universal control cable

For metering pump control via contact closure (pulse), standard process signal (analog), voltage-free contact for remote pause control, and auxiliary frequency.

For gamma/L with 5-pole round plastic connector and 5-wire cable with loose end.

Universal control cable, 5-pole round connector, 5-wire, 6 ft. (2 m) 1001300
Universal control cable, 5-pole round connector, 5-wire, 16.4 ft. (5 m) 1001301

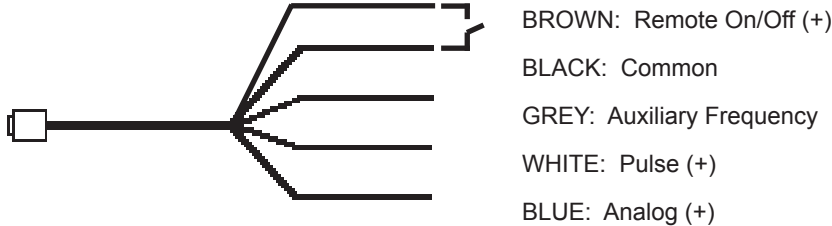
ProMinent® gamma/L Control cables (cont.)

External control cables for gamma/L (cont.)

ON/OFF Control

BROWN and BLACK wires must be connected together via an ON/OFF contact or shorted together. When the contact is closed between the BLACK & BROWN wires, the pump will run. When the contact is open, the pump will stop.

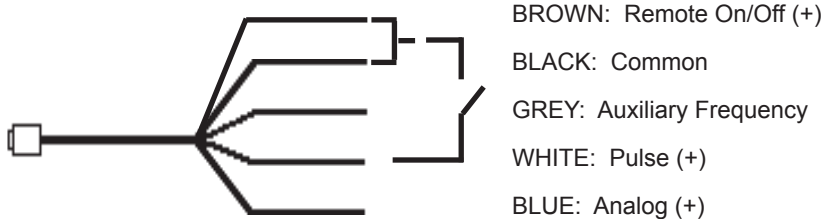
Note: If ON/OFF control is the only control feature being used, WHITE, BLUE & GREY wires are not used and should be cut back.



Pulse Control

Pulse control will allow the pump to run in proportion to a pulsing potential free contact closure.

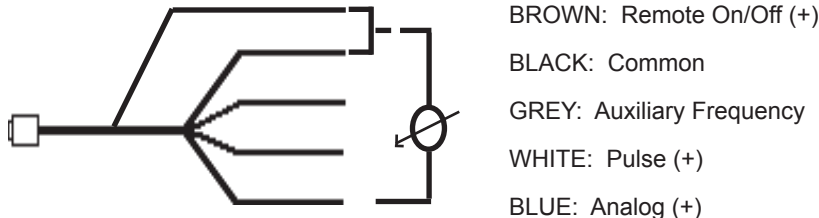
Note: BROWN and BLACK wires have to be connected together via an ON/OFF contact or shorted together. GREY wire is not used and should be cut back.



Analog Control

Analog control runs in proportion to an analog signal such as 4 - 20 mA.

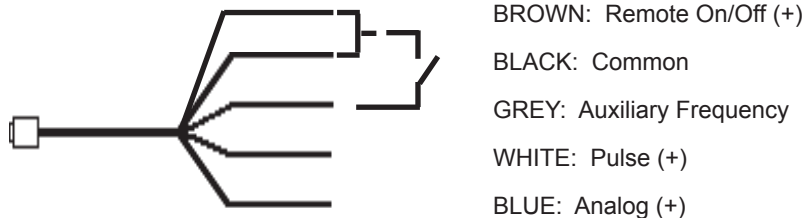
Note: BROWN and BLACK wires must be connected together via an ON/OFF contact or shorted together. The BLACK wire is negative and the BLUE wire is positive. GREY wire is not used and should be cut back.



Auxiliary Frequency

Auxiliary frequency will allow the pump to default to a predetermined stroking frequency regardless of which operating mode the pump is in. The pump defaults to this stroking frequency as long as a contact is closed between the black and grey wires of the universal control cable.

Note: BROWN and BLACK wires must be connected together via an ON/OFF contact or shorted together.



ProMinent® gamma/L Metering monitor

Description	Part No.
-------------	----------

Metering monitor

Adjustable metering monitor “Flow Control”

For gamma/L and with signal transmitter and connecting cable with 4-pole round connector for direct connection with the metering pump.

For monitoring the actual flow output per pump stroke using a plastic encapsulated metal poppet detected by the adjustable proximity sensor. A red LED on the monitor flashes with each pump stroke having sufficient chemical volume. If there is no flow monitored for a predetermined number of strokes (up to 125), the metering pump automatically stops and a red LED on the pump lights. The optional fault relay changes state to issue an alarm or activate a standby pump. The monitor cable will plug into a 4-pole round socket on the pump. Materials: PP or PVC. Enclosure rating: NEMA 4X (IP 65). Maximum operating pressure is 253 psig (17.5 bar).

Threads are M20 x 1.5 Female on inlet side for mounting directly on pump discharge valve, and M20 x 1.5 Male on discharge side for the standard tubing connector that comes with the pump.

Type I = g/L 1000, 1601, 1602, 1005 & 1605

Type II = g/L 0708, 0413, 1008 & 0713

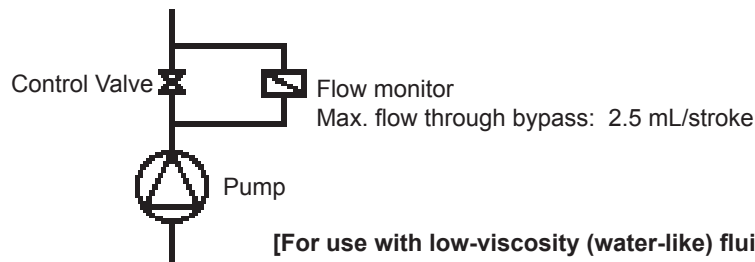
Type III = g/L 0220, 0420 & 0232

Note: On versions 0220, 0420 and 0232, monitor should be mounted on a bypass (as shown below), which will require adapters listed below.

Note: Must mount the flow monitor vertically on the pump.

Bypass Assemblies with Metering monitor for versions 0220/0420/0232:

VC, Viton®, 1/2" FNPT inlet and discharge	7358655
P, EPDM (PVDF bypass), 1/2" FNPT inlet and discharge	7740709
PVC, EPDM (PVDF bypass), 1/2" FNPT inlet and discharge	7358657



Adapter set to connect metering monitor for SS version pumps

Adapter with seals, for use with SS2 liquid ends: 1/4" MNPT x Male M20 x 1.5 adapter, PVDF	7358651
Adapter with seals, for use with SS2 liquid ends: 3/8" MNPT x Male M20 x 1.5 adapter, PVDF	7358659

ProMinent® gamma/L Metering monitors

Description

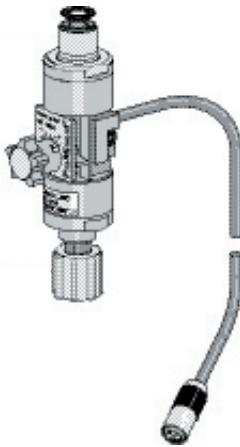
Part No.

Metering monitor

Adjustable metering monitor “Flow Control”

For gamma/L series in material versions PP, PVC, NP and TT. Supplied with connection cable for assembly directly to liquid end.

Monitors individual strokes according to the float and orifice principle. The partial quantity of chemical flowing past the float is adjusted from the total stroke volume via the adjusting screw so that an alarm is actuated if the flow falls below 20%. The user can select the number of incomplete strokes permitted (between 1 and 125) in accordance with the actual process requirements.

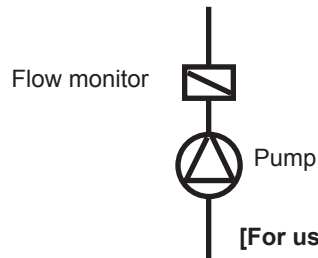


Materials:

Flow meter: PVDF
 Float: PTFE-coated
 Seals: Viton® B/EPDM

Flow Control	Material	for pump type	
Flow Control Size I	PVDF, EPDM	1000, 1601, 1602	1009229
Flow Control type II	PVDF, EPDM	1005, 1605, 0708, 1008, 0413 0713, 0220, 0420, 0232	1009336
Flow Control Size I	PVDF, Viton® B	1000, 1601, 1602	1009335
Flow Control type II	PVDF, Viton® B	1005, 1605, 0708, 1008, 0413 0713, 0220, 0420, 0232	1009338

Viton® is a registered trademark of DuPont Dow Elastomers



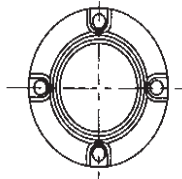
[For use with low-viscosity (water-like) fluids only].

ProMinent® gamma/L Materials

Spare parts kits and Diaphragms

Complete liquid ends include pump head, valves, mounting screws, diaphragm and back plate. Spare parts kits include:

PP, PC, PV, & NP Liquid Ends	TT Liquid Ends	SS Liquid Ends
1 Diaphragm	1 Diaphragm	1 Diaphragm
1 Suction Valve	1 Suction Valve	4 Valve Balls
1 Discharge Valve	1 Discharge Valve	1 Set Seals
1 Adapter Set	1 Adapter Set	4 Ball Seat Discs
2 Valve Balls	2 Valve Balls	
1 Set Seals	1 Set Seals	
	2 Ball Seat Discs	



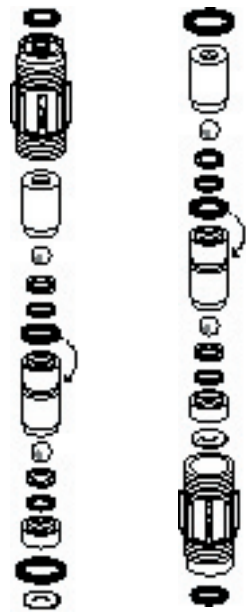
Pump Version	Dim A (mm)	Dim C (mm)
<u>GALa</u>		
1000	30	5.0
1601	30	7.5
1602	35	11.5
1005	46	16.5
0708	46	21.5
0413	55	26.0
0220	77	33.5
1605	46	16.5
1008	46	21.5
0713	55	26.0
0420	77	33.5
0232	91	46.0

Liquid End Version	Material Code	Complete		Spare Valves Only (adapter sets not included)		Diaphragm
		Liquid End	Spare Parts Kit	Suction	Discharge	
1000	PPE	1002057	1001644	792644	740350	1000244
	PPB	1002065	1001652	792646	740351	1000244
	PCE	1002365	1001713	792119	740349	1000244
	NPE	1002193	1001713	792119	740349	1000244
	PCB	1002358	1001721	792026	740348	1000244
	NPB	1002201	1001721	792026	740348	1000244
	TTT	1002345	1001737	809407	809406	1000244
	SST	1002557	1002549	809424	809423	1000244
	PVT	1023134	1023107	1023128	1023127	1000244
	1601	PPE	1002058	1001645	792644	740350
PPB		1002066	1001653	792646	740351	1000245
PCE		1002366	1001714	792119	740349	1000245
NPE		1002194	1001714	792119	740349	1000245
PCB		1002359	1001722	792026	740348	1000245
NPB		1002202	1001722	792026	740348	1000245
TTT		1002346	1001738	809407	809406	1000245
SST		1002558	1002550	809424	809423	1000245
PVT		1023135	1023108	1023128	1023127	1000245
1602		PPE	1002059	1001646	792644	740350
	PPB	1002067	1001654	792646	740351	1000246
	PCE	1002367	1001715	792119	740349	1000246
	NPE	1002195	1001715	792119	740349	1000246
	PCB	1002360	1001723	792026	740348	1000246
	NPB	1002203	1001723	792026	740348	1000246
	TTT	1002347	1001739	809407	809406	1000246
	SST	1002559	1002551	809424	809423	1000246
	PVT	1023136	1023109	1023128	1023127	1000246
	1005	PPE	1002060	1001647	792644	740350
PPB		1002068	1001655	792646	740351	1000247
PCE		1002368	1001716	792119	740349	1000247
NPE		1002196	1001716	792119	740349	1000247
PCB		1002361	1001724	792026	740348	1000247
NPB		1002204	1001724	792026	740348	1000247
PVT HV		1018072	1019066	1002267	1002267	1000247
TTT		1002348	1001740	809407	809406	1000247
SST		1002560	1002552	809424	809423	1000247
PVT		1023137	1023110	1023126	1023125	1000247
0708	PPE	1002061	1001648	1001437	1001441	1000248
	PPB	1002069	1001656	1001436	1001440	1000248
	PCE	1002369	1001717	1001435	1001439	1000248
	NPE	1002197	1001717	1001435	1001439	1000248
	PCB	1002362	1001725	1001434	1001438	1000248
	NPB	1002205	1001725	1001434	1001438	1000248
	PVT HV	1018073	1019067	1002267	1002267	1000248
	TTT	1002349	1001741	809445	809444	1000248
	SST	1002561	1002553	809497	809496	1000248
	PVT	1023138	1023111	1023126	1023125	1000248
0413	PPE	1002062	1001649	1001437	1001441	1000249
	PPB	1002070	1001657	1001436	1001440	1000249
	PCE	1002370	1001718	1001435	1001439	1000249

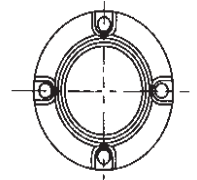
ProMinent® gamma/L Materials (cont.)

Spare parts kits and Diaphragms

Liquid End Version	Material Code	Complete Liquid End	Spare Parts Kit	Spare Valves Only (adapter sets not included)		Diaphragm	
				Suction	Discharge		
0413 (cont.)	NPE	1002198	1001718	1001435	1001439	1000249	
	PCB	1002363	1001726	1001434	1001438	1000249	
	NPB	1002206	1001726	1001434	1001438	1000249	
	PVT HV	1018084	1019069	1002267	1002267	1000249	
	TTT	1002350	1001742	809445	809444	1000249	
	SST	1002562	1002554	809497	809496	1000249	
	PVT	1023139	1023112	1023126	1023125	1000249	
	0220	PPE	1002063	1001650	1001437	1001441	1000250
		PPB	1002071	1001658	1001436	1001440	1000250
		PCE	1002371	1001719	1001435	1001439	1000250
NPE		1002199	1001719	1001435	1001439	1000250	
PCB		1002364	1001727	1001434	1001438	1000250	
NPB		1002207	1001727	1001434	1001438	1000250	
PVT HV		1018085	1019070	1002267	1002267	1000250	
TTT		1002351	1001754	809445	809444	1000250	
SST		1002563	1002555	1002547	1002548	1000250	
PVT		1023140	1023113	1023126	1023125	1000250	
1605	PPE	1002060	1001647	792644	740350	1000247	
	PPB	1002068	1001655	792646	740351	1000247	
	PCE	1002368	1001716	792119	740349	1000247	
	NPE	1002196	1001716	792119	740349	1000247	
	PCB	1002361	1001724	792026	740348	1000247	
	NPB	1002204	1001724	792026	740348	1000247	
	PVT HV	1018072	1019066	1002267	1002267	1000247	
	TTT	1002348	1001740	809407	809406	1000247	
	SST	1002560	1002552	809424	809423	1000247	
	PVT	1023137	1023110	1023126	1023125	1000247	
1008	PPE	1002061	1001648	1001437	1001441	1000248	
	PPB	1002069	1001656	1001436	1001440	1000248	
	PCE	1002369	1001717	1001435	1001439	1000248	
	NPE	1002197	1001717	1001435	1001439	1000248	
	PCB	1002362	1001725	1001434	1001438	1000248	
	NPB	1002205	1001725	1001434	1001438	1000248	
	PVT HV	1018073	1019067	1002267	1002267	1000248	
	TTT	1002349	1001741	809445	809444	1000248	
	SST	1002561	1002553	809497	809496	1000248	
	PVT	1023138	1023111	1023126	1023125	1000248	
0713	PPE	1002062	1001649	1001437	1001441	1000249	
	PPB	1002070	1001657	1001436	1001440	1000249	
	PCE	1002370	1001718	1001435	1001439	1000249	
	NPE	1002198	1001718	1001435	1001439	1000249	
	PCB	1002363	1001726	1001434	1001438	1000249	
	NPB	1002206	1001726	1001434	1001438	1000249	
	PVT HV	1018084	1019069	1002267	1002267	1000249	
	TTT	1002350	1001742	809445	809444	1000249	
	SST	1002562	1002554	809497	809496	1000249	
	PVT	1023139	1023112	1023126	1023125	1000249	
GALa	1000	30	5.0				
	1601	30	7.5				
	1602	35	11.5				
	1005	46	16.5				
	0708	46	21.5				
	0413	55	26.0				
	0220	77	33.5				
	1605	46	16.5				
	1008	46	21.5				
	0713	55	26.0				
0420	PPE	1002063	1001650	1001437	1001441	1000250	
	PPB	1002071	1001658	1001436	1001440	1000250	
	PCE	1002371	1001719	1001435	1001439	1000250	
	NPE	1002199	1001719	1001435	1001439	1000250	
	PCB	1002364	1001727	1001434	1001438	1000250	
	NPB	1002207	1001727	1001434	1001438	1000250	
	PVT HV	1018085	1019070	1002267	1002267	1000250	
	TTT	1002351	1001754	809445	809444	1000250	
	SST	1002563	1002555	1002547	1002548	1000250	
	PVT	1023140	1023113	1023126	1023125	1000250	
0232	PPE	1002064	1001651	1001437	1001441	1000251	
	PPB	1002072	1001659	1001436	1001440	1000251	
	PCE	1002609	1001720	1001435	1001439	1000251	
	NPE	1002200	1001720	1001435	1001439	1000251	
	PCB	1002608	1001728	1001434	1001438	1000251	
	NPB	1002208	1001728	1001434	1001438	1000251	
	TTT	1002352	1001755	809445	809444	1000251	
	SST	1002564	1002556	1002547	1002548	1000251	
	PVT	1023141	1023124	1023126	1023125	1000251	



Discharge Valve 1/2"
Suction Valve 1/2"



Pump Version	Dim A (mm)	Dim C (mm)
GALa		
1000	30	5.0
1601	30	7.5
1602	35	11.5
1005	46	16.5
0708	46	21.5
0413	55	26.0
0220	77	33.5
1605	46	16.5
1008	46	21.5
0713	55	26.0
0420	77	33.5
0232	91	46.0

ProMinent[®] gamma/L auto-degassing Materials

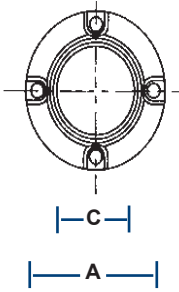
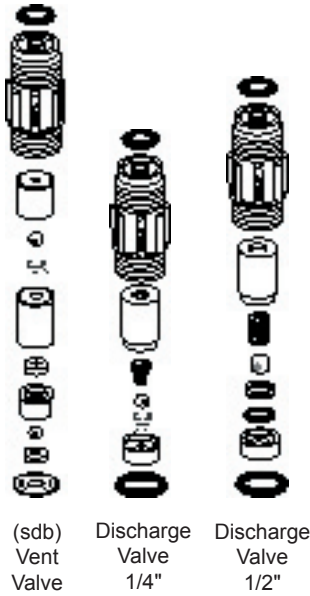
Spare parts kit and Diaphragm

Complete liquid ends include pump head, valves, mounting screws, diaphragm and back plate.
Spare parts kits include:

PP & NP

Liquid Ends

- 1 Diaphragm
- 1 Suction Valve
- 1 Discharge Valve
- 1 Adapter Set
- 2 Valve Balls
- 1 Set Seals
- 1 Vent Valve, Complete



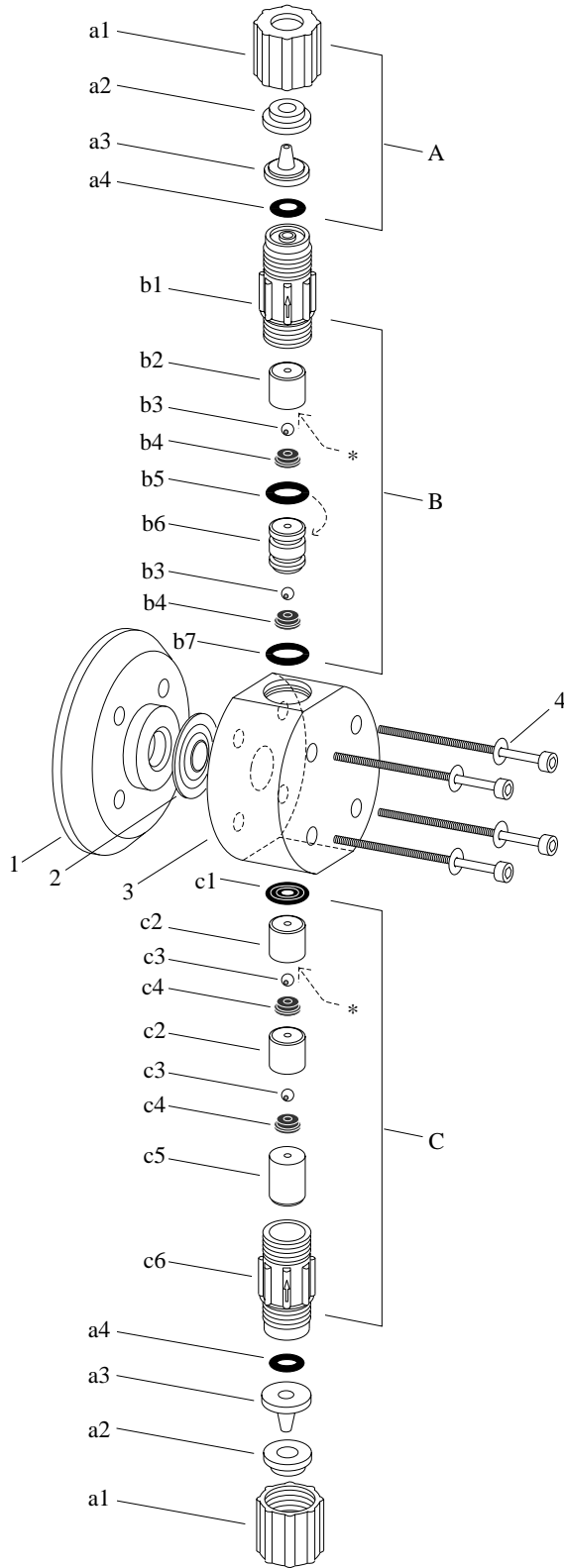
Pump Version Dim A (mm) Dim C (mm)

GALa

1000	30	5.0
1601	30	7.5
1602	35	11.5
1005	46	16.5
0708	46	21.5
0413	55	26.0
0220	77	33.5
1605	46	16.5
1008	46	21.5
0713	55	26.0
0420	77	33.5
0232	91	46.0

Liquid End Version	Material Code	Complete Liquid End	Spare Parts Kit	Spare Valves Only (adapter sets not included)			Diaphragm
				Suction	Discharge	Vent	
<u>GALa</u>							
1601	PPE	1002393	1001756	792644	1001067	1001063	1000245
	PPB	1002392	1001762	792646	1001066	1001062	1000245
	NPE	1002248	1001660	792119	1001065	1001061	1000245
	NPB	1002242	1001666	792026	1001064	1001060	1000245
1602	PPE	1002395	1001757	792644	1001067	1001063	1000246
	PPB	1002394	1001763	792646	1001066	1001062	1000246
	NPE	1002249	1001661	792119	1001065	1001061	1000246
	NPB	1002243	1001667	792026	1001064	1001060	1000246
1005	PPE	1002399	1001758	792644	1001067	1001063	1000247
	PPB	1002398	1001764	792646	1001066	1001062	1000247
	NPE	1002250	1001662	792119	1001065	1001061	1000247
	NPB	1002244	1001668	792026	1001064	1001060	1000247
0708	PPE	1002397	1001759	1001437	1001071	1001063	1000248
	PPB	1002396	1001765	1001436	1001070	1001062	1000248
	NPE	1002251	1001663	1001435	1001069	1001061	1000248
	NPB	1002245	1001669	1001434	1001068	1001060	1000248
0413	PPE	1002401	1001760	1001437	1001071	1001063	1000249
	PPB	1002400	1001766	1001436	1001070	1001062	1000249
	NPE	1002252	1001664	1001435	1001069	1001061	1000249
	NPB	1002246	1001670	1001434	1001068	1001060	1000249
0220	PPE	1002403	1001761	1001437	1001071	1001063	1000250
	PPB	1002402	1001767	1001436	1001070	1001062	1000250
	NPE	1002253	1001665	1001435	1001069	1001061	1000250
	NPB	1002247	1001671	1001434	1001068	1001060	1000250
1605	PPE	1002399	1001758	792644	1001067	1001063	1000247
	PPB	1002398	1001764	792646	1001066	1001062	1000247
	NPE	1002250	1001662	792119	1001065	1001061	1000247
	NPB	1002244	1001668	792026	1001064	1001060	1000247
1008	PPE	1002397	1001759	1001437	1001071	1001063.5	1000248
	PPB	1002396	1001765	1001436	1001070	1001062.7	1000248
	NPE	1002251	1001663	1001435	1001069	1001061.9	1000248
	NPB	1002245	1001669	1001434	1001068	1001060.1	1000248
0713	PPE	1002401	1001760	1001437	1001071	1001063.5	1000249
	PPB	1002400	1001766	1001436	1001070	1001062.7	1000249
	NPE	1002252	1001664	1001435	1001069	1001061.9	1000249
	NPB	1002246	1001670	1001434	1001068	1001060.1	1000249
0420	PPE	1002403	1001761	1001437	1001071	1001063.5	1000250
	PPB	1002402	1001767	1001436	1001070	1001062.7	1000250
	NPE	1002253	1001665	1001435	1001069	1001061.9	1000250
	NPB	1002247	1001671	1001434	1001068	1001060.1	1000250

EXPLODED VIEW



Description	Qty.	Part No.
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1602-2 NPE0 liquid end complete	1	1002075
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1 backplate B1602 70 x 16.5-2	1	1000262
2 diaphragm 35.0 x 11.5	1	1000246
3 dosing head 70 x 16.5-2 NPE0	1	1000286
4 screw M5 x 55 & washer	4	1000268
A connector set 1/4" PCE	1	817060
B discharge valve GALa 1/4" PCE	1	740349
C suct. valve GALa 1/4" PCE	1	792119
* indicates location of spring if needed		

A connector set 1/4" PCE	1	817060
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a1 union nut M20 x 1.5 PVC	2	800518
a2 clamp ring 1/4" ferule	2	800712
a3 tube nozzle 3/16" PVC	2	800520
a4 O-ring 9 x 2.5 EPDM/P	2	1001263

B dis. valve GALa 1/4" PCE	1	740349
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b1 dis. valve body GALa 1/4" PVC ...	1	791880
b2 valve insert 4.7-1 PVC	1	791090
b3 valve ball 4.7mm Ceramic	2	404201
b4 ball seat 3 x 9.5 EPDM/P	2	1001233
b5 O-ring 9 x 2.5 EPDM/P	1	1001263
b6 valve insert (dis.) 4.7-1 PVC	1	791879
b7 O-ring 14 x 2 EPDM/P	1	1001264

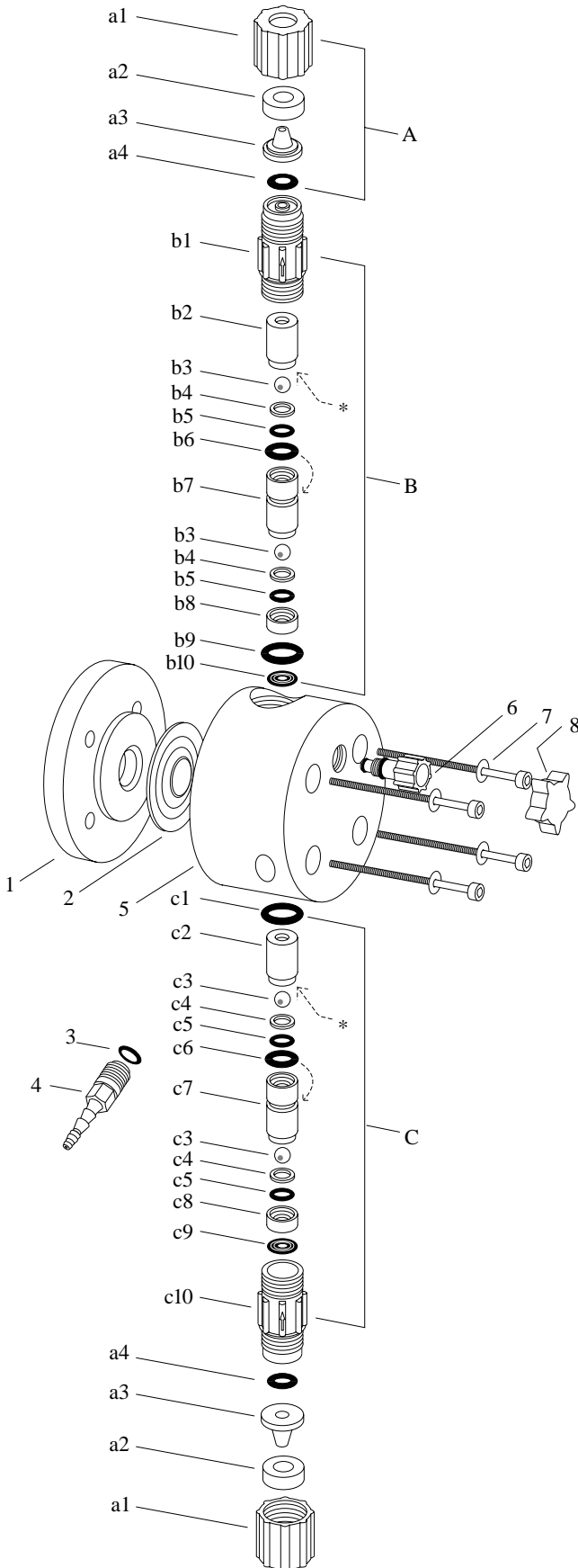
C suct. valve GALa 1/4" PCE	1	792119
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c1 sealing gasket 18 x 2.5 EPDM/P .	1	1001232
c2 valve insert 4.7-1 PVC	2	791090
c3 valve ball 4.7mm Ceramic	2	404201
c4 ball seat 3 x 9.5 EPDM/P	2	1001233
c5 distance sleeve (suct.) PVC	1	791089
c6 suct. valve body GALa 1/4" PVC .	1	800569

Spare Parts Set 1602-2 PCE	1	1001715
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A connector set 1/4" PCE	1	817060
B discharge valve GALa 1/4" PCE ..	1	740349
C suct. valve GALa 1/4" PCE	1	792119
2 diaphragm 35.0 x 11.5	1	1000246
b5 O-ring 9 x 2.5 EPDM/P	3	1001263
b7 O-ring 14 x 2 EPDM/P	1	1001264
c1 sealing gasket 18 x 2.5 EPDM/P .	1	1001232
c3 valve ball 4.7mm Ceramic	2	404201
c4 ball seat 3 x 9.5 EPDM/P	4	1001233

EXPLODED VIEW



Description Qty. Part No.

1008-2 PCE2 liquid end complete 1 1002369

1	backplate B1008 90 x 29-2	1	1000264
2	diaphragm 46.0 x 21.5	1	1000248
3	O-ring 7.65 x 1.78 EPDM/P	1	1001262
4	upper part nozzle PVC	1	1001984
5	dosing head 90 x 29-2 PC2	1	1001696
6	bleed valve complete EPDM	1	809490
7	screw M5 x 55 & washer	4	1000268
8	bleed valve knob PP	1	800832
A	connector set 1/2" PCE	1	740160
B	discharge valve GALa 1/2" PCE	1	1001439
C	suct. valve GALa 1/2" PCE	1	1001435

* indicates location of spring if needed

A connector set 1/2" PCE 1 740160

a1	union nut M20 x 1.5 PVC	2	800518
a2	clamp ring 1/2" ferule	2	800715
a3	tube nozzle 3/8" PVC	2	800523
a4	O-ring 9 x 2.5 EPDM/P	2	1001263

B dis. valve GALa 1/2" PCE 1 1001439

b1	dis. valve body GALa 1/2" PVC ...	1	1000500
b2	valve insert 9.2-2 (top) PVC	1	1000490
b3	valve ball 9.2mm Ceramic	2	404281
b4	ball seat disc PVC	2	140554
b5	O-ring 7.65 x 1.78 EPDM/P	2	1001262
b6	O-ring 9 x 2.5 EPDM/P	1	1001263
b7	valve insert 9.2-2 (lower) PVC	1	1000492
b8	valve lid 9.2-2 PVC	1	1000494
b9	O-ring 14 x 2 EPDM/P	1	1001264
b10	sealing gasket 14 x 1.5 EPDM/P .	1	1001231

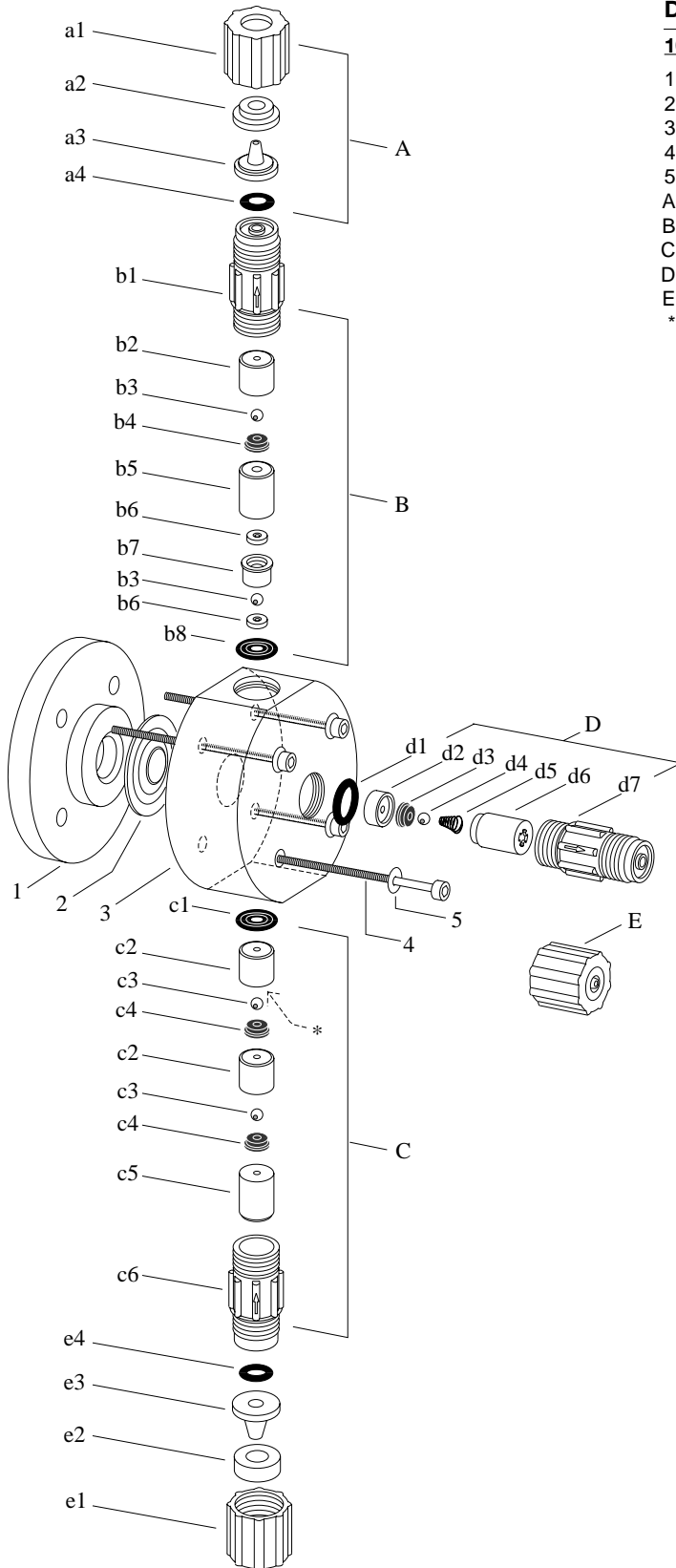
C suct. valve GALa 1/2" PCE 1 1001435

c1	O-ring 14 x 2 EPDM/P	1	1001264
c2	valve insert 9.2-2 (top) PVC	1	1000490
c3	valve ball 9.2mm Ceramic	2	404281
c4	ball seat disc PVC	2	140554
c5	O-ring 7.65 x 1.78 EPDM/P	2	1001262
c6	O-ring 9 x 2.5 EPDM/P	1	1001263
c7	valve insert 9.2-2 (lower) PVC	1	1000492
c8	valve lid 9.2-2 PVC	1	1000494
c9	sealing gasket 14 x 1.5 EPDM/P .	1	1001231
c10	suct. valve body GALa 1/2" PVC .	1	1000498

Spare Parts Set 1008-2 PCE 1 1001717

A	connector set 1/2" PCE	1	740160
B	discharge valve GALa 1/2" PCE ..	1	1001439
C	suct. valve GALa 1/2" PCE	1	1001435
2	diaphragm 46.0 x 21.5	1	1000248
6	O-ring (bleed valve) EPDM/P	3	1001265
b3	valve ball 9.2mm Ceramic	2	404281
b5	O-ring 7.65 x 1.78 EPDM/P	6	1001262
b6	O-ring 9 x 2.5 EPDM/P	4	1001263
b9	O-ring 14 x 2 EPDM/P	2	1001264
b10	sealing gasket 14 x 1.5 EPDM/P .	2	1001231

EXPLODED VIEW



Description	Qty.	Part No.
1005-2 NPB9 liquid end complete	1	1002244
1 backplate B1005 90 x 23-2	1	1000263
2 diaphragm 46.0 x 16.5	1	1000247
3 dosing head 90 x 23-2 NP9	1	1001089
4 screw M5 x 50	4	468075
5 washer	4	462228
A connect. set 1/4" sing. PCB	1	817065
B vent valve sdb GALa 1/4" PCB	1	1001060
C suct. valve GALa 1/4" PCB	1	792026
D discharge valve GALa sdb 1/4" PCB	1	1001064
E connect. set 1/2" sing. PCB	2	817067
* indicates location of spring if needed		

A connector set 1/4" sing. PCB 1 817065

a1 union nut M20 x 1.5 PVC	1	800518
a2 clamp ring 1/4" ferule	1	800712
a3 tube nozzle 3/16" PVC	1	800520
a4 O-ring 9 x 2.5 FPM-B	1	791421

B vent valve sdb GALa 1/4" PCB 1 1001060

b1 vent body sdb GALa 1/4" PVC	1	1001038
b2 valve insert 4.7-1 PVC	1	791090
b3 valve ball 4.7mm Ceramic	2	404201
b4 ball seat 3 x 9.5 FPM-B	1	792759
b5 distance sleeve sdb PVC	1	1001042
b6 ball seat disc 8.95 x 2.1 Ceramic	2	1001589
b7 valve insert sdb PVDF	1	791839
b8 sealing gasket 18 x 2.5 FPM-B	1	791051

C suct. valve GALa 1/4" PCB 1 792026

c1 sealing gasket 18 x 2.5 FPM-B	1	791051
c2 valve insert 4.7-1 PVC	2	791090
c3 valve ball 4.7mm Ceramic	2	404201
c4 ball seat 3 x 9.5 FPM-B	2	792759
c5 distance sleeve (suct.) PVC	1	791089
c6 suct. valve body GALa 1/4" PVC	1	800569

D dis. valve GALa sdb 1/4" PCB 1 1001064

d1 O-ring 14 x 2 FPM-B	1	791628
d2 valve lid sdb 4.7-1 PVC	1	1001047
d3 ball seat 3 x 9.5 FPM-B	1	792759
d4 valve ball 4.7mm Ceramic	1	404201
d5 spring cone Hast.	1	791052
d6 valve insert sdb (dis.) 4.7-1 PVC	1	1001040
d7 dis. body sdb GALa 1/4" PVC	1	1001036

E connect. set 1/2" sing. PCB **2 817067

e1 union nut M20 x 1.5 PVC	1	800518
e2 clamp ring 1/2" ferule	1	800715
e3 tube nozzle 3/8" PVC	1	800523
e4 O-ring 9 x 2.5 FPM-B	1	791421

** sdb sp. parts kits ship with single connector sets.
Quantities reflect # of components in each set.

Spare Parts Set 1005-2 sdb PCB 1 1001668

A connect. set 1/4" sing. PCB	1	817065
B vent valve sdb GALa 1/4" PCB	1	1001060
C suct. valve GALa 1/4" PCB	1	792026
D dis. valve GALa sdb 1/4" PCB	1	1001064
E connect. set 1/2" sing. PCB	2	817067
2 diaphragm 46.0 x 16.5	1	1000247
b4 ball seat 3 x 9.5 FPM-B	4	792759
b8 sealing gasket 18 x 2.5 FPM-B	2	791051
d1 O-ring 14 x 2 FPM-B	1	791628
d4 valve ball 4.7mm Ceramic	4	404201

PART 1 - GENERAL

1.1 GENERAL

- A. This specification covers the supply, installation, and testing of completely functional metering pump feed systems including all necessary accessories and appurtenances as shown on the drawings and described herein. A single chemical metering pump manufacturer shall be responsible for supplying all components of the metering pump feed system.

1.2 QUALITY ASSURANCE

- A. For the purpose of establishing quality assurance, experience, and system reliability, the products described herein are based on those metering pumps manufactured by ProMinent Fluid Controls, Inc. All pumps shall be shop-tested for capacity and pressure prior to shipment with documented results provided.

1.3 WARRANTY

- A. The chemical metering pump manufacturer shall provide a two year warranty on the metering pump mechanical drive and one year on the liquid end.

PART 2 – PRODUCTS

2.1 GENERAL

- A. Manufacturers:
 - 1. ProMinent Fluid Controls, Inc.
 - 2. Pre-approved equal.

2.2 DESCRIPTION

- A. The chemical metering pump(s) shall be microprocessor-controlled, simplex, solenoid-driven, reciprocating, mechanically actuated diaphragm type. All pumping functions shall be set by membrane-switch keypad and status shall be displayed on an illuminated LCD, which is readable at an offset angle of 45 degrees. Keypad will allow for simple scrolling and display of programmed parameters. The housing shall be rated NEMA 4X.
- B. The power supply shall be ___ VAC, ___ Hz, single phase. The microprocessor is to automatically compensate for supply voltage variations within 15% of the rated voltage such that the frequency of the pump remains constant.
- C. The liquid end shall be physically separated from the drive unit by a backplate with weep hole creating an air gap. An elastomer shaft wiper seal shall prevent contamination of the solenoid if the primary diaphragm fails. The diaphragm shall be constructed of a steel core, vulcanized into nylon-reinforced EPDM, with PTFE-faced fluid contact surface.

2.3 LIQUID END ((SELECT ONE))

- The liquid end shall be glass-filled polypropylene with ((EPDM/Viton®)) seals, with built-in coarse valve and needle valve for air bleed, manually adjusted for continuous degassing of process fluid and self-priming against pressure. ((Note-bleeder valve is not available with model type 0232)). The suction and discharge valves shall be of the double ball check design.

Or

- The liquid end shall be PVC with ((EPDM/Viton®)) seals, with built-in coarse valve and needle valve for air bleed, manually adjusted for continuous degassing of process fluid and self-priming against pressure. ((Note-bleeder valve is not available with model type 0232)). The suction and discharge valves shall be of the double ball check design.

Or

- The liquid end shall be Plexiglas (acrylic) with ((EPDM/Viton®)) seals, with built-in coarse valve and needle valve for air bleed, manually adjusted for continuous degassing of process fluid and self-priming against pressure. ((Note-bleeder valve is not available with model type 0232)). The suction and discharge valves shall be PVC, with double ball check design.

Or

- The liquid end shall be of the self-degassing type, with integral automatic air relief valve for self-priming under maximum rated discharge line pressure. The liquid end shall be constructed of ((acrylic/polypropylene)). The suction valve shall be of the double ball check design and discharge valve shall be spring-loaded, horizontally acting single ball design. Note-this liquid end is not available for model types 1000 and 0232.

Or

- The liquid end shall be constructed of carbon-filled PTFE with PTFE seals. The suction and discharge valves shall be of the double ball check design.

Or

- The liquid end shall be constructed of 316 stainless steel with PTFE seals. The suction and discharge valves shall be of the double ball check design.

Or

- The liquid end shall be capable of handling high viscosity fluids, up to 3500 cps. The liquid end shall be constructed of PVDF, with PVDF valves. No other materials of construction shall be acceptable. The suction and discharge valves shall include ceramic oxide balls and the valves shall be spring-loaded with 1 psig springs to allow for positive seating of the valves balls,

2.4 PROGRAMMING AND CONTROL

- A. Stroke length control shall be manually adjusted between 100% and 0% with a stroke adjustment knob on the pump face control. The LCD shall digitally display stroke length setting in 1% increments in the full range between 100% and 0%.
- B. Programming shall allow pump to be calibrated so as to display pump output in gallons/hour or liters/hour. Calibration shall be maintained when stroke length is altered up to plus or minus 10% on the stroke length knob. If stroke length is altered by more than 10%, a yellow warning light will light and a flashing message "calib" will appear.
- C. The pump shall be equipped with the programmable function of pressure levels to allow pump to operate at reduced pressures from the maximum rated pressure of the pump.

- D. The pump shall be equipped with the programmable function of electronic interlocking of the keypad by access code to prevent unauthorized adjustments to the pump.
- E. Keypad shall allow for scrolling and display on LCD such parameters as stroke frequency, stroke length, stroke counter, pump output in gals/hr or L/hr, dosing quantity, mA current input being received by pump, and indication of external mode.
- F. Stroke frequency control shall be manually adjusted by touch keypads, with the set stroke rate displayed on the LCD. The metering pump shall be capable of receiving a pulse input via optional external control cable such that one pulse gives one pump stroke rate. The pump shall be capable of remote ON-OFF operation using the pause function via a voltage free contact relay through an optional control cable. In addition, the pump shall be configured with;

((OPTIONAL SELECTIONS))

- pulse multiplier/divider functionality. The pump shall allow factoring to issue from 1 to 99.99 strokes per pulse input or to issue 1 stroke per 1 to 100 input pulses.
- Or
- analog input functionality. The pump shall accept an analog signal such that stroke frequency is proportional to 0/4-20mA or 20-4/0mA, the choice of which is programmable at the pump. The pump shall allow the setting of a maximum stroke rate, which corresponds to the maximum analog signal, with stroke rate proportional to signal strength below that rate. Programming for curve processing shall also be possible, in which any stroke frequency ratio in proportion to the electrical signal can be configured. Analog to digital converters external to the pump shall not be allowed.
- Or
- pulse multiplier/divider and analog input functionality. The pump shall allow factoring to issue from 1 to 99.99 strokes per pulse input or to issue 1 stroke per 1 to 100 input pulses. The pump shall also accept an analog signal such that stroke frequency is proportional to 0/4-20mA or 20-4/0mA, the choice of which is programmable at the pump. The pump shall allow the setting of a maximum stroke rate, which corresponds to the maximum analog signal, with stroke rate proportional to signal strength below that rate. Programming for curve processing shall also be possible, in which any stroke frequency ratio in proportion to the electrical signal can be configured. Analog to digital converters external to the pump shall not be allowed.
- Or
- programmable timer. The pump shall be configured with an integral, programmable 2-week, 81 event timer to change operational state of the pump. Timers external to the pump are not acceptable.
- Or
- pulse multiplier/divider, analog input, and programmable timer functionality (as described above).
- G. The pump shall be equipped with the programmable function of auxiliary frequency control, allowing for quick priming of the pump or for slug feed after system shutdown. Stroke frequency shall be programmable to a maximum of 180 spm, and the auxiliary frequency function shall be capable of interfacing with a contact closure relay for control purposes.

2.5 FLOW ASSURANCE ((OPTIONAL, SELECT AS REQUIRED))

- A. Low Level Control – A 2-stage float switch shall be supplied to stop pump prior to losing prime and annunciate low level on the pump LCD display.
- B. Flow Monitor – A flow monitor shall be installed on the discharge line to automatically stop pumping and annunciate a fault condition on the pump LCD display upon loss of discharge flow. The pump shall be programmable, between 1 and 125 strokes per minute, to actuate the fault annunciation after flow is lost.
- C. Relay Output – An SPDT relay shall be installed for;

((SELECT ONE))

- fault indication. ((OPTIONAL)) The metering pump shall have an integral relay to allow remote annunciation of a fault condition (i.e. low chemical supply in tank/lack of chemical supply shut down, flow monitor, system faults, and fuse/power supply failure). Configure as ((NO/NC)) contact closure relay.

Or

- both fault indication and pacing relay. ((OPTIONAL)) The metering pump shall have an integral relay to allow remote annunciation of a fault condition (i.e. low chemical supply in tank/lack of chemical supply shut down, flow monitor, system faults, and fuse/power supply failure). Configure as ((NO/NC)) contact closure relay. The metering pump shall also have an integral relay to issue a contact closure with every pump stroke to pace a second pump. The pacing relay shall be electrically isolated via an optical coupler with a semiconductor switch.

Or

- both 4-20mA output and fault indication. ((OPTIONAL)) The analog output function shall be a multiplicative factor of both stroke length % and stroke frequency %, reflecting the real time output capacity of the metering pump. The metering pump shall also have an integral relay to allow remote annunciation of a fault condition (i.e. low chemical supply in tank/lack of chemical supply shut down, flow monitor, system faults, and fuse/power supply failure). Configure as ((NO/NC)) contact closure relay.

Or

- both 4-20mA output and pacing relay. ((OPTIONAL)) The analog output function shall be a multiplicative factor of both stroke length % and stroke frequency %, reflecting the real time output capacity of the metering pump. The metering pump shall also have an integral relay to issue a contact closure with every pump stroke to pace a second metering pump. The pacing relay shall be electrically isolated via an optical coupler with a semiconductor switch.

2.6 ACCESSORIES ((ALL ARE OPTIONAL AND MAY BE INCLUDED AS SEPARATE ITEMS OR AS COMPONENTS OF A PUMP STAND))

- A. The pump shall be mounted on a ((black, UV-protected polypropylene/304 stainless)) support stand suitable for wall, floor or top-of-tank mounting. A single chemical metering pump manufacturer shall be responsible for supplying and assembling all components of the skid, in addition to testing the skid-mounted metering system prior to shipment. The stand shall include the following accessories, pre-piped;

- B. A foot valve and strainer, constructed of materials compatible with chemical to be used, shall be provided with each pump.
- C. An injection valve, constructed of materials compatible with chemical to be used, shall be provided with each pump.
- D. A universal control cable with 5-pole round plastic connector and 5-wire cable with loose ends shall be provided with each pump.
- E. A two-stage float switch compatible with chemical to be used shall be provided with each pump to monitor tank level.
- F. An adjustable discharge flow monitoring device, compatible with chemical to be used, shall be provided with each pump. The flow monitor shall be capable of signaling a fault condition to the pump.
- G. A diaphragm failure detector shall be provided to ((open/close)) a contact for alarm in the event of a diaphragm failure.
- H. An adjustable-pressure, diaphragm-type backpressure/anti-siphon valve, constructed of materials compatible with chemical to be used, shall be provided with each pump.
- I. An in-line, adjustable-pressure, diaphragm-type pressure relief valve, constructed of materials compatible with chemical to be used, shall be provided with each pump.
- J. A pump-mounted, multifunction, fixed-spring pressure diaphragm-type valve for backpressure/anti-siphon protection, pressure relief, priming, and discharge line drain, constructed of PVDF, shall be provided with each pump.
- K. An air-charged, bladder-type pulsation dampener, constructed with materials compatible with chemical to be used, shall be provided with each pump. The pulsation dampener shall be sized to reduce pulsations by at least 90% at full pump capacity.
- L. A clear PVC calibration column with FNPT fitting on top and bottom shall be provided with each pump. The column shall be sized to provide at least 2 minutes draw down at maximum pump capacity.
- M. Fifteen feet of tubing compatible with chemical to be used shall be provided with each pump.

2.7 APPLICATION

- A. Quantity:
- B. Chemical Service:
- C. Capacity (US gph):
- D. Backpressure (psig):

END OF SECTION