# Solenoid-driven Metering Pumps

**QUICK REFERENCE**

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

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

- Introduction
- Pump selection by capacity
- Chemical resistance list
- Solenoid & Motor Pump Overview
- Analytical Instrumentation Overview
- Concept b
- Beta b
- Gamma/ X
- Delta
- Sigma/ X: Sigma/ 1
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- ProMus
- Makro
- D1Cb/c
- DACb
- Dulcometer® Compact
- DMT
- Orlita
- DULCO flex Control
- DulcoFlex
- MicroFlex
- MultiFLEX
- AEgis II
- SlimFlex 5
- Amperometric sensors
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- Potentiostatic sensors
- Conductometric sensors
- Accessories
- ProMixTM-M (In-line Controls)
- ProMixTM-S (Batch & In-line Controls)
- ProMixTM-C
- ProMdryTM
ProMinent® Concept b
Solenoid Diaphragm Metering Pumps

Overview: Concept b

Ideal for basic chemical feed applications
(see page 126 for spare parts and page 139 for control cables)

- Capacity range of 0.19 to 4.33 GPH (0.7 to 16.4 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 61/50 approved liquid ends
ProMinent® Concept b
Solenoid Diaphragm Metering Pumps

Capacity Data

<table>
<thead>
<tr>
<th>Pump Version</th>
<th>Capacity at Maximum Back Pressure</th>
<th>Max. Stroking Rate</th>
<th>mL/Stroke</th>
<th>Pre-Primed Suction Lift</th>
<th>Tubing Connectors</th>
<th>Shipping Weight (approx.) lbs. (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1000</td>
<td>145 (10) 0.19 (0.7) 0.07 180 20 (6) 1/4&quot; x 3/16&quot;</td>
<td>3.97 (1.8)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1601</td>
<td>232 (16) 0.29 (1.1) 0.10 180 20 (6) 1/4&quot; x 3/16&quot;</td>
<td>3.97 (1.8)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1002</td>
<td>145 (10) 0.63 (2.4) 0.18 180 16 (5) 1/4&quot; x 3/16&quot;</td>
<td>3.97 (1.8)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1003</td>
<td>145 (10) 0.79 (3.0) 0.19 240 16 (5) 1/4&quot; x 3/16&quot;</td>
<td>3.97 (1.8)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0704</td>
<td>102 (7) 1.03 (4.0) 0.36 180 13 (4) 1/4&quot; x 3/16&quot;</td>
<td>3.97 (1.8)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0705</td>
<td>102 (7) 1.37 (5.2) 0.38 240 13 (4) 1/4&quot; x 3/16&quot;</td>
<td>3.97 (1.8)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0309</td>
<td>44 (3) 2.38 (9.0) 0.83 180 20 (6) 3/8&quot; x 1/4&quot;</td>
<td>3.97 (1.8)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0215</td>
<td>22 (1.5) 4.33 (16.4) 1.40 180 5 (1.5) 3/8&quot; x 1/4&quot;</td>
<td>3.97 (1.8)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(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 1046731)

NSF 50 certification only applies to NPB0 & NPB2 liquid ends

Materials In Contact With Chemicals

<table>
<thead>
<tr>
<th>Pump head</th>
<th>Valves</th>
<th>O-rings</th>
<th>Balls</th>
</tr>
</thead>
<tbody>
<tr>
<td>PPE</td>
<td>Polypropylene</td>
<td>Polypropylene</td>
<td>EPDM</td>
</tr>
<tr>
<td>PPB</td>
<td>Polypropylene</td>
<td>Polypropylene</td>
<td>Viton®</td>
</tr>
<tr>
<td>NPE</td>
<td>Acrylic</td>
<td>PVC</td>
<td>EPDM</td>
</tr>
<tr>
<td>NPB</td>
<td>Acrylic</td>
<td>PVC</td>
<td>Viton®</td>
</tr>
<tr>
<td>PVT</td>
<td>PVDF</td>
<td>PVDF</td>
<td>PTFE</td>
</tr>
</tbody>
</table>

Pump diaphragm with PTFE-coating.

Note: Viton® is a registered trademark of DuPont Dow Elastomers.
# ProMinent® Concept b
## Solenoid Diaphragm Metering Pumps

### Identcode Ordering System

<table>
<thead>
<tr>
<th>CNPb</th>
<th>Concept PLUS</th>
<th>Capacity</th>
<th>Version</th>
<th>Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1000</td>
<td>0.19 gph (0.7 l/h), 145 psi (10 bar)</td>
<td>0704</td>
<td>1.03 gph (4.0 l/h), 102 psi (7 bar)</td>
<td></td>
</tr>
<tr>
<td>1601</td>
<td>0.29 gph (1.1 l/h), 232 psi (16 bar)</td>
<td>0705</td>
<td>1.37 gph (5.2 l/h), 102 psi (7 bar)</td>
<td></td>
</tr>
<tr>
<td>1002</td>
<td>0.63 gph (2.4 l/h), 145 psi (10 bar)</td>
<td>0309</td>
<td>2.38 gph (9.0 l/h), 44 psi (3 bar)</td>
<td></td>
</tr>
<tr>
<td>1003</td>
<td>0.79 gph (3.0 l/h), 145 psi (10 bar)</td>
<td>0215</td>
<td>4.33 gph (16.4 l/h), 22 psi (1.5 bar)</td>
<td></td>
</tr>
</tbody>
</table>

- **Liquid end material:**
  - PP Polypropylene
  - NP Acryllic/PVC
  - PV PVDF

- **O-rings:**
  - B Viton® seals
  - E EPDM seals
  - T PTFE seals

- **Liquid end version:**
  - 0 Non-bleed version, no valve spring
  - 1 Non-bleed version, with valve spring
  - 2 With bleed valve, no valve spring (except 0704 models)
  - 3 With bleed valve, with valve spring

- **Connection:**
  - M 1/4” x 3/16”
  - N 3/8” x 1/4”

- **Logo:**
  - 0 With ProMinent® logo

- **Power Supply:**
  - A 1 ph 230 V 50/60 Hz (Euro plug)
  - D 1 ph 115 V 50/60 Hz (US plug)
  - 4 1 ph 230 V 50/60 Hz (US plug) (consult factory for pricing)

- **Control Option:**
  - 0 Standard (w/o external control)
  - B With external and level input retrofit kit, fitted, without level switch

- **Accessories:**
  - 1 With accessories (foot valve, injection valve, tubing)

- **Control Variant:**
  - 0 Standard

- **Approval:**
  - 01 CE
  - 07 MET
  - 11 MET + NSF 61
Dimensions in inches (mm).
Ranges given, actual dimension dependent on liquid end material.
Overview: Beta® b

Ideal for basic chemical feed applications (see page 129 for spare parts and page 139 for control cables)

- Capacity range 8.4 gph (32 l/h) max, 363 psi (25 bar) max
- Standard external control via potential-free contacts with pulse step-up and step-down to adapt to existing signal transducers of 64:1 to 1:64
- (Optional) external control via standard 4-20 mA and potential-free contacts with pulse step-up and step-down of 32:1 to 1:32
- 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 b 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 b 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.
The Liquid End

The Beta b 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 BT4b and BT5b.

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.

Power Supply

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

Fault Indicators

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

Relay Outputs

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

Pacing relay
A contact closure is issued with every pump stroke (contact duration 150 ms). This allows a second ProMinent metering pump to be paced synchronously, or to totalize flow with an external stroke counter.
ProMinent® Beta® b
Solenoid Diaphragm Metering Pumps

Specifications (Cont.)

Maximum stroke length: 0.05" (1.25 mm)
Materials of construction:
Housing: Fiberglass reinforced PPE
Diaphragm: PTFE-faced EPDM with plastic core
Liquid end options: Polypropylene, PVDF, Acrylic/PVC, PTFE, 316 SS
Enclosure rating: IP 65
Motor insulation class: F
Power supply: 100-230 VAC, 1 phase, 50/60 Hz, +/- 10%; 12-24 VDC or 24VDC (+/- 10%)
Check valves: Double ball
Metering repeatability: When used according to operating instructions, ±2% under constant conditions and at minimum 30% stroke length
Power cord: 6 ft (2 m)
Relay cable (optional): 6 ft (2 m)

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\text{\scriptsize{DS(on)}}\text{\scriptsize{}}: < 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:
<table>
<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>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>
<tr>
<td>PVDF</td>
<td>149°F (65°C)</td>
<td>212°F (100°C)</td>
</tr>
</tbody>
</table>

Average power drain at maximum stroking rate (Watts) / current drain at pump stroke (Amps)
<table>
<thead>
<tr>
<th>Type</th>
<th>Power Drain</th>
<th>Current Drain</th>
</tr>
</thead>
<tbody>
<tr>
<td>BT4b</td>
<td>17W / 0.7 A or 15 A (peak current for approx. 1 µs)</td>
<td></td>
</tr>
<tr>
<td>BT5b</td>
<td>22W / 1.0 A or 15 A (peak current for approx. 1 µs)</td>
<td></td>
</tr>
</tbody>
</table>

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:
Max. solids size in fluid: With voltage free contact, or with semiconductor sink logic control (NPN), not source logic (PNP). With a residual voltage of <700 mV, the contact load is approximately 0.5 mA at +5 VDC. (Note: Semiconductor contacts that require >700 mV across a closed contact should not be used.) Pump ignores contacts exceeding maximum input rate.

Necessary contact duration: 20 µs
Recommended Viscosity: max. 200 cPs for standard liquid end
max. 500 cPs for valve with springs
max. 50 cPs for auto-degassing metering pumps
max. 3000 cPs for high viscosity
### ProMinent® Beta® b
**Solenoid Diaphragm Metering Pumps**

#### Capacity Data

<table>
<thead>
<tr>
<th>Capacity Data: beta*b</th>
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<tbody>
<tr>
<td><strong>Pump Version</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>PSIG (bar)</strong></td>
</tr>
<tr>
<td>1000</td>
</tr>
<tr>
<td>2001</td>
</tr>
<tr>
<td>1601</td>
</tr>
<tr>
<td>2002</td>
</tr>
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<td>1602</td>
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<td>1604</td>
</tr>
<tr>
<td>0708</td>
</tr>
<tr>
<td>0413</td>
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<tr>
<td>0220</td>
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</tbody>
</table>

#### liquid end materials in contact with media

**Version** | **Liquid End** | **Suction/Discharge valves** | **Seals** | **Valve balls** | **Diaphragm** |
<table>
<thead>
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<th></th>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td><em>PVT</em></td>
<td><em>PVDF</em></td>
<td><em>PVDF</em></td>
<td>PTFE</td>
<td>Ceramic</td>
<td>PTFE</td>
</tr>
<tr>
<td>PPT</td>
<td>Polypolypropylene</td>
<td><em>PVDF</em></td>
<td>PTFE</td>
<td>Ceramic</td>
<td>PTFE</td>
</tr>
<tr>
<td>NPT</td>
<td>Acrylic</td>
<td><em>PVDF</em></td>
<td>PTFE</td>
<td>Ceramic</td>
<td>PTFE</td>
</tr>
<tr>
<td>TTT</td>
<td>PTFE with Carbon</td>
<td>PTFE with Carbon</td>
<td>PTFE</td>
<td>Ceramic</td>
<td>PTFE</td>
</tr>
<tr>
<td>SST</td>
<td>316 Stainless Steel</td>
<td>316 Stainless Steel</td>
<td>PTFE</td>
<td>Ceramic</td>
<td>PTFE</td>
</tr>
</tbody>
</table>

*Highly compatible material suitable for most fluids.
## Identcode Ordering System

<table>
<thead>
<tr>
<th>BT4b</th>
<th>Beta 4b</th>
<th>Beta 5b</th>
</tr>
</thead>
<tbody>
<tr>
<td>Version</td>
<td>Capacity</td>
<td>Version</td>
</tr>
<tr>
<td>1000</td>
<td>0.20 gph (0.74 l/h), 145 psi (10 bar)</td>
<td>1604</td>
</tr>
<tr>
<td>2001</td>
<td>0.25 gph (0.96 l/h), 290 psi (20 bar)</td>
<td>0706</td>
</tr>
<tr>
<td>1601</td>
<td>0.29 gph (1.10 l/h), 222 psi (16 bar)</td>
<td>0413</td>
</tr>
<tr>
<td>2002</td>
<td>0.45 gph (1.70 l/h), 290 psi (20 bar)</td>
<td>0220</td>
</tr>
<tr>
<td>1602</td>
<td>0.58 gph (2.2 l/h), 222 psi (16 bar)</td>
<td>0232</td>
</tr>
</tbody>
</table>

### 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:
1. Non-bleed version, no valve spring, for TT, SS and type 0232 only
2. Non-bleed version, with valve spring, for TT, SS and type 0232 only
3. With deaerator, no valve spring, PP, PV, NP only, not type 0232
4. With deaerator, with valve spring, PP, PV, NP only, not type 0232
5. Version for highly viscous media, only PVT, types 1005, 1065, 0708, 1008, 0413, 0713, 0220, 0420
6. Self-degassing without bypass, only with PV, not for versions 2504 and 0245
7. Auto-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”

### Labeling:
- **0** Standard Housing

### Logo:
- **0** With ProMinent® logo

### Power supply:
- **U** Universal 100-240 V
- **M** 12-24 VDC

### Cable and plug:
- **1** 6 ft Open end
- **A** 6 ft European
- **D** 6 ft USA 115 V
- **U** 6 ft USA 230 V

### Relay:
- **0** No relay
- **1** Fault annunciating relay, drops out
- **4** Option 1 + pacing relay
- **5** Option 3 + pacing relay

### 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** External contact 1:1
- **A** External analog 0-20mA/4-20mA

### Remote stop:
- **0** External controllable
- **0** External controllable frequency = 180 max

### Auxiliary frequency:
- **0** External controllable frequency = 180 max
- **Approval:** 01 CE
ProMinent® Beta® b
Solenoid Diaphragm Metering Pumps

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

With Auto-Degassing Liquid Ends
ProMinent® gamma/ X
Solenoid Diaphragm Metering Pumps

Overview: gamma/ X

The gamma/ X solenoid diaphragm metering pump incorporates a wealth of eXcellent ingenuity! With integrated pressure measurement, it ensures the smooth running of your metering process. The gamma/ X is ideal for all chemical metering applications. (see page 131 for spare parts)

- Capacity range from 0.24 GPH to 11.9 GPH, maximum discharge pressure up to 363 psi
- Simple adjustment of the capacity directly in GPH
- Configurable discharge stroke, continuous or pulsed dosing
- Configurable suction stroke duration
- Stroke rate adjustable from 1 – 12,000 strokes per hour
- Electronic stroke length adjustment, continuous from 0 - 100% (recommended range 30 - 100%)
- Suitable for continuous micro-metering from 1 ml/hr thanks to the innovative solenoid control
- Integrated pressure measurement allows for detection of blocked discharge line, broken discharge lines and air or gas bubbles trapped in the dosing head
- Acrylic/PVC, PVT (PVDF) and Stainless Steel liquid end material versions
- Auto degassing liquid ends in Acrylic/ PVC and PVT
- High viscosity liquid ends (PVT4) for viscosities of up to 3000 cP
- Large backlit graphic display and status LED's
- External control via voltage-free contacts with pulse multiplier/divider function
- External control via standard 4-20 mA signal, and scalable adjustment of mA signal to stroke rate
- Standard internal programmable timer for real-time dependent dosing routines i.e biocides, cooling towers etc.
- Standard pump capable of accepting 2-stage tank level sensor input, flow monitor input, diaphragm rupture sensor input and control cable input.
- NSF/ANSI 61 Approved Liquid ends
- Bluetooth, PROFIBUS, CANbus interface as an optional feature (see page 139 for PROFIBUS)
# ProMinent® gamma/ X

## Solenoid Diaphragm Metering Pumps

### Capacity Data

**Capacity data: gamma/ X**

<table>
<thead>
<tr>
<th>Pump Version</th>
<th>Capacity at Maximum Backpressure</th>
<th>Max. Stroking Rate</th>
<th>Tubing Connectors</th>
<th>Pre-Primed Suction Lift</th>
<th>SS Liquid end connections</th>
<th>Shipping Weight lbs</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>psig (bar) GPH* (l/h) ml/stroke Strokes/min in ft (m)</td>
<td></td>
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<tr>
<td>gamma/ X: with standard liquid ends</td>
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<tr>
<td>1602</td>
<td>232 (16) 0.61 (2.3) 0.19 200 1/4 x 3/16 19.6 (6) 1/4 7.9 9</td>
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<tr>
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</tbody>
</table>

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**gamma/ X metering pumps with high viscosity liquid ends (PVT 4) have a 10 – 20 % lower capacity rating and are not self-priming.**

Positive suction is recommended and pumps supplied with ⅝ MNPT connections.

Permissible ambient temperature: 14 °F to 113 °F | Average power consumption: 78 W | Degree of protection: IP 66

---

**Materials In Contact With Chemicals**

### Liquid end materials in contact with media

<table>
<thead>
<tr>
<th>Pump head</th>
<th>Suction/discharge valve</th>
<th>Ball seat</th>
<th>Seals</th>
<th>Balls</th>
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<tbody>
<tr>
<td>NPE</td>
<td>Clear Acrylic</td>
<td>PVC</td>
<td>EPDM</td>
<td>EPDM</td>
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<tr>
<td>NPB</td>
<td>Clear Acrylic</td>
<td>PVC</td>
<td>FKM</td>
<td>FKM</td>
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<tr>
<td>PVT</td>
<td>PVDF</td>
<td>PVDF</td>
<td>PVDF</td>
<td>PTFE</td>
</tr>
<tr>
<td>SST</td>
<td>Stainless Steel</td>
<td>Stainless Steel</td>
<td>Ceramic</td>
<td>PTFE</td>
</tr>
</tbody>
</table>

Auto-degassing liquid ends in NP with a valve spring made of Hastelloy C and a PVDF valve insert. PVT7 version with PVDF/PTFE wetted parts. Diaphragm with a PTFE face.

Permissible ambient temperature: 14 °F - 113 °F | Average power consumption: 25/30 W | Degree of protection: IP 66/NEMA 4X

FKM = fluoro rubber
**ProMinent® gamma/ X**  
**Solenoid Diaphragm Metering Pumps**

### Specifications

**Maximum stroke length:**  
For 70mm solenoid approx. .05”  
For 85mm solenoid approx. .06”

**Materials of construction**

**Housing:**  
Fibreglass reinforced PPE (Polyphenylene Ether)

**Diaphragm:**  
PTFE faced EPDM with plastic core

**Liquid end options:**  
Acrylic/PVC, PVDF, Stainless Steel

**Enclosure rating:**  
IP 65

**Power supply:**  
100 – 230 VAC 1 Phase 50 / 60 Hz ± 10%

**Power consumption:**  
1602 / 1604 / 0708 / 0414 / 0220 25 W  
2504 / 1009 / 0715 / 0424 / 0245 30 W

**Check valves:**  
Double ball suction / discharge (PVT4 with spring loaded single ball)

**Power cord:**  
6ft

**Relay cable (optional):**  
6ft

**Relay Options**

**Identcode Option 1:**  
Relay contact rated 230 VAC 2 A Max

**Identcode Option 4:**  
Both relay contacts rated 24 V, 100 mA Max

**Identcode Option C:**  
Isolated 4 – 20 mA output can drive up to 300 Ω maximum impedance  
Relay contact rated 24 V 100 mA

**Ambient temperature range**

**In operation:**  
14 °F to 113 °F

**Storage & Transport:**  
-4 °F to 140 °F

**Max. fluid operating temp:**

<table>
<thead>
<tr>
<th>Material</th>
<th>Constant</th>
<th>Short Term*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acrylic/PVC</td>
<td>113 °F</td>
<td>140 °F</td>
</tr>
<tr>
<td>PVDF</td>
<td>113 °F</td>
<td>248 °F</td>
</tr>
<tr>
<td>SS</td>
<td>113 °F</td>
<td>248 °F</td>
</tr>
</tbody>
</table>

*15 minutes at 29 psi maximum

**Climate:**  
95% Relative humidity – non-condensing

**Sound pressure level:**  
LpA < 70 dB according to EN ISO 20361

**Warranty:**  
2 years on pump drive, 1 year on liquid end

**Valve threads:**  
NP / PVT M20 x 1.5 (provided with adapters for tubing)

**Standard production test:**  
All pumps are tested for capacity at maximum pressure prior to shipment

**Max solids size in fluid:**

- Versions 1602 / 1604 / 2504 = 15μ  
- Versions 0708 / 0414 / 0220 / 1009 / 0715 / 0424 / 0245 = 50 μ

**Contact input**

**Minimum pulse duration:**  
20 ms

**Maximum pulse input:**  
25 pulses / second

**Analog Input Impedance:**  
120 Ohms

**Recommended Viscosity:**

- 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
# Identcode Ordering System

## ProMinent® gamma/ X Solenoid Diaphragm Metering Pumps

### Gamma/ X

<table>
<thead>
<tr>
<th>Version</th>
<th>Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1602</td>
<td>0.61 gph (2.3 l/h), 232 psi (16 bar)</td>
</tr>
<tr>
<td>1604</td>
<td>0.95 gph (3.6 l/h), 232 psi (16 bar)</td>
</tr>
<tr>
<td>0708</td>
<td>2.0 gph (7.6 l/h), 102 psi (7 bar)</td>
</tr>
<tr>
<td>0414</td>
<td>3.56 gph (13.5 l/h), 86 psi (6 bar)</td>
</tr>
<tr>
<td>0220</td>
<td>0.2 gph (1.9 l/h), 29 psi (2 bar)</td>
</tr>
<tr>
<td>2504</td>
<td>1.0 gph (3.8 l/h), 363 psi (26 bar)</td>
</tr>
<tr>
<td>1009</td>
<td>2.38 gph (9.0 l/h), 145 psi (10 bar)</td>
</tr>
<tr>
<td>0715</td>
<td>3.83 gph (14.5 l/h), 102 psi (7 bar)</td>
</tr>
<tr>
<td>0424</td>
<td>6.34 gph (24 l/h), 58 psi (4 bar)</td>
</tr>
<tr>
<td>0235</td>
<td>11.9 gph (45 l/h), 29 psi (2 bar)</td>
</tr>
</tbody>
</table>

### Liquid end material:
- **NP**: Clear acrylic / PVDF, for self-degassing version Clear acrylic / PVC
- **PV**: PVDF / PVDF
- **SS**: Stainless Steel
- **TT**: FKM-B/PFTE coated
- **D**: EPDM/PFTE coated
- **T**: PTFE / PTFE coated

### O-rings:
- **PTFE Carbon-loaded**
- **PVDF / PVDF**

### Hydraulic connections:
- **6**: Standard (SS/TT)
- **M**: 1/4" x 3/16"
- **N**: 3/8" x 1/4"
- **O**: 1/2" x 1/4" for 2504 only
- **Q**: 1/2" x 3/8"

### Diaphragm rupture indicator:
- **0**: Without diaphragm rupture indicator
- **1**: With diaphragm rupture indicator, optical sensor

### Electrical Connection:
- **U**: 100-230 V, ±10 %, 50/60 Hz

### Cable and plug with 6ft (2m) power cord, single phase:
- **A**: European plug
- **D**: N. American plug, 115 V

### Relay, pre-set to:
- **0**: Without relay
- **1**: x changeover contact 230 V – 2 A, fault indicating relay N/C
- **2**: x N/O 24 V – 100 mA, such as 1 + pacing relay
- **3**: x N/O 24 V – 100 mA, such as 1 + 4 – 20 mA output
- **4**: Auto degassing module (not available for version 2504)
- **5**: Auto degassing module + fault relay (not available for version 2504), comes with panel

### Control variants:
- **0**: Manual + external, 1 with pulse control
- **1**: Manual + external with pulse control + analogue 04 – 20 mA output
- **2**: Options 3 + 4 week process timer
- **3**: Options 3 + CANopen
- **5**: Options 3 + PROFIBUS DP interface, M12

### Metering Monitor:
- **0**: Pulse signal input

### Bluetooth connection:
- **0**: Not included
- **B**: Included

### Language:
- **EN**: Standard
ProMinent® gamma/ X
Solenoid Diaphragm Metering Pumps

Dimensional Drawings

<table>
<thead>
<tr>
<th>Material design</th>
<th>Type</th>
<th>Ø A</th>
<th>B</th>
<th>C</th>
<th>D</th>
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<tr>
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Overview: gamma/ X

The new gamma/ XL is a solenoid metering pump with predictive intelligence. Thanks to its controlled solenoid drive with sensor-free pressure measurement, it detects hydraulic faults even in the case of minimal deviations – immediately and optimally matching its output to the pressure conditions and properties of the medium while protecting the pump and piping systems from overload situations. The gamma/ XL covers a capacity range of .006 GPD at 363 PSIG to 21.1 GPH at 29 PSIG (depending on pump version). (see page 135 for spare parts)

- Electronic stroke length adjustment via click wheel
- Volume adjustment in GPH or LPH
- Manual, Analog, Contact and Batch modes optional
- Integrated system pressure measurement
- BUS interfaces such as Profibus, CANbus, PROFINET and Modbus
- High visibility of LED-indicator lights
- Large illuminated display
- Analog output for stroke length and stroke rate transmission
- Auto compensates programmed feed rates during back pressure fluctuations
- As low as 1 mL/hr continuous feed rate with regulated solenoid drive
- Turn down ratio up to 40,000:1
- Integrated pressure measurement and display
- Available diaphragm rupture indicator
- Integrated 7-day timer
- Detects Overpressure/ No Pressure (broken discharge line) and gas in the liquid end
- Automatically sets optimal speed and stroke based on GPH settings (when set to automatic)
- New configurable input/output
- gamma/ XL and delta® footprints are identical
## Capacity Data

### gamma/ XL

<table>
<thead>
<tr>
<th>Capacity data: gamma/ XL</th>
<th>Pump Version</th>
<th>Capacity at Maximum Backpressure</th>
<th>Max. Stroking Rate</th>
<th>Tubing Connectors O.D. x I.D</th>
<th>Pre-Primed</th>
<th>Shipping Weight lbs</th>
</tr>
</thead>
<tbody>
<tr>
<td>2508 gamma/ XL: with standard liquid ends</td>
<td>2508</td>
<td>363 (25)</td>
<td>2.0</td>
<td>(8.0)</td>
<td>0.67</td>
<td>200</td>
</tr>
<tr>
<td>1608 gamma/ XL: with standard liquid ends</td>
<td>1608</td>
<td>232 (16)</td>
<td>2.0</td>
<td>(8.0)</td>
<td>0.67</td>
<td>200</td>
</tr>
<tr>
<td>1612 gamma/ XL: with standard liquid ends</td>
<td>1612</td>
<td>232 (16)</td>
<td>3.0</td>
<td>(12)</td>
<td>1.00</td>
<td>200</td>
</tr>
<tr>
<td>1020 gamma/ XL: with standard liquid ends</td>
<td>1020</td>
<td>145 (10)</td>
<td>5.0</td>
<td>(20)</td>
<td>1.70</td>
<td>200</td>
</tr>
<tr>
<td>0730 gamma/ XL: with self-bleeding liquid ends, 2-port without bypass (PVT7)</td>
<td>0730</td>
<td>102 (7)</td>
<td>7.0</td>
<td>(30)</td>
<td>2.50</td>
<td>200</td>
</tr>
<tr>
<td>0450 gamma/ XL: with self-bleeding liquid ends, 2-port without bypass (PVT7)</td>
<td>0450</td>
<td>58 (4)</td>
<td>13.2</td>
<td>(50)</td>
<td>4.20</td>
<td>200</td>
</tr>
<tr>
<td>0280 gamma/ XL: with self-bleeding liquid ends, 2-port without bypass (PVT7)</td>
<td>0280</td>
<td>29 (2)</td>
<td>21.0</td>
<td>(80)</td>
<td>6.70</td>
<td>200</td>
</tr>
</tbody>
</table>

* Capacity data represents minimum values, tested using water at 68 ºF (room temperature)
** Suction lift with pre-primed suction line and liquid end
*** 1/2” MNPT optional

## Materials In Contact With Chemicals

### Liquid end materials in contact with media

<table>
<thead>
<tr>
<th>Version</th>
<th>Liquid End</th>
<th>Suction/discharge valve</th>
<th>Ball seat</th>
<th>Seals</th>
<th>Balls</th>
</tr>
</thead>
<tbody>
<tr>
<td>NPT</td>
<td>Acrylic</td>
<td>PVC</td>
<td>PVDF</td>
<td>PTFE</td>
<td>Ceramic</td>
</tr>
<tr>
<td>PVT</td>
<td>PVDF</td>
<td>PVDF</td>
<td>PVDF</td>
<td>PTFE</td>
<td>Ceramic</td>
</tr>
<tr>
<td>NPE</td>
<td>Acrylic</td>
<td>PVC</td>
<td>PVDF</td>
<td>EPDM</td>
<td>Ceramic</td>
</tr>
<tr>
<td>NPB</td>
<td>Acrylic</td>
<td>PVC</td>
<td>PVDF</td>
<td>PTFE</td>
<td>Ceramic</td>
</tr>
<tr>
<td>SST</td>
<td>316 SST</td>
<td>316 SST</td>
<td>Ceramic</td>
<td>PTFE</td>
<td>Ceramic</td>
</tr>
<tr>
<td>SST(DN10)</td>
<td>316 SST</td>
<td>316 SST</td>
<td>Ceramic with carbon</td>
<td>PTFE</td>
<td>Ceramic</td>
</tr>
</tbody>
</table>

Note: PVT7 versions have PVDF / PTFE wetted parts. Diaphragm with a PTFE face

FKM = fluorine rubber

### Control Elements

1. LCD screen
2. [Menu] key
3. Clickwheel
4. [Priming] key
5. [STOP/START] key
6. [Back] key
7. Fault indicator (red)
8. Warning indicator (yellow)
9. Operating indicator (green)
10. "Config I/O" terminal
11. "Diaphragm rupture indicator" terminal
12. "External control" terminal
13. "Metering monitor" terminal
14. "Level switch" terminal
15. Slot for relays and optional modules
**ProMinent® gamma/ XL**

**Solenoid Diaphragm Metering Pumps**

### Specifications

**Maximum stroke length:** 110 mm solenoid approx. 2mm

**Materials of construction:**

- **Housing**
  - Fiberglass reinforced PPE (Polyphenylene Ether)
- **Diaphragm**
  - PTFE faced EPDM with plastic core
- **Liquid end options**
  - Acrylic/PVC, PVDF, Stainless Steel
- **Enclosure rating**
  - IP 66
- **Power supply**
  - 100 – 230 VAC 1 Phase 50 / 60 Hz ± 10%
- **Power consumption**
  - 2508/ 1608/ 1612/ 1020/ 0730/ 0450/ 0280  78 W
- **Check valves**
  - Double ball suction / discharge (PVT4 with spring loaded single ball)
- **Power cord**
  - 6ft
- **Relay cable (optional)**
  - 6ft

**Relay Options:**

- **Identcode Option 1**
  - Fault indicating relay, N/C 230 V - 6 A Max.
- **Identcode Option 4**
  - Fault indicating relay, N/C 24 V - 1 A Max.
  - Pacing relay, normally open 24 V - 100 mA Max.
- **Identcode Option C**
  - 4 – 20 mA current output
  - Fault indicating relay 24 V - 100 mA Max.

**Ambient temperature range:**

- **In operation**
  - 14 °F to 113 °F
- **Storage & Transport**
  - 14 °F to 122 °F

**Max. fluid operating temp**

<table>
<thead>
<tr>
<th>Material</th>
<th>Constant</th>
<th>Short Term*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acrylic/PVC</td>
<td>104 °F</td>
<td>140 °F</td>
</tr>
<tr>
<td>PVDF</td>
<td>122 °F</td>
<td>248 °F</td>
</tr>
<tr>
<td>SS</td>
<td>122 °F</td>
<td>248 °F</td>
</tr>
</tbody>
</table>

15 minutes at 29 psi maximum

- **Climate:**
  - 95% Relative humidity – non-condensing
- **Sound pressure level:**
  - LpA < 70 dB according to EN ISO 20361
- **Warranty:**
  - 2 years on pump drive, 1 year on liquid end
- **Valve threads:**
  - NP / PVT M20 x 1.5 (provided with adapters for tubing)
- **Standard production test:**
  - All pumps are tested for capacity at maximum pressure prior to shipment

**Contact input:**

- **Minimum pulse duration**
  - 10 ms
- **Maximum pulse input**
  - 50 pulses / second
- **Analog Input Impedance**
  - 120 Ohms
- **Recommended Viscosity**
  - Max. 0-50 cPs for standard liquid end
  - Max. 50-200 cPs for valve with springs
  - Max. 20-500 cPs for auto-degassing liquid ends
  - Max. 500-1000 cPs for high-viscosity liquid ends
## Identcode Ordering System

### ProMinent® gamma/ XL Solenoid Diaphragm Metering Pumps

#### Product Range

<table>
<thead>
<tr>
<th>OXLa</th>
<th>US</th>
<th>1608</th>
<th>PV</th>
<th>T</th>
<th>2</th>
<th>6</th>
<th>0</th>
<th>0</th>
<th>0</th>
<th>U</th>
<th>A</th>
<th>0</th>
<th>0</th>
<th>0</th>
<th>0</th>
<th>EN</th>
</tr>
</thead>
<tbody>
<tr>
<td>North America</td>
<td>2508</td>
<td>2.0 gph (8 l/h), 363 psi (26 bar)</td>
<td>0750</td>
<td>7.0 gph (30 l/h), 102 psi (7 bar)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1608</td>
<td>2.0 gph (8 l/h), 232 psi (16 bar)</td>
<td>0950</td>
<td>13.2 gph (50 l/h), 88 psi (6 bar)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1612</td>
<td>3.17 gph (12 l/h), 232 psi (16 bar)</td>
<td>0950</td>
<td>13.2 gph (50 l/h), 88 psi (6 bar)</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1100</td>
<td>4.8 gph (18 l/h), 146 psi (10 bar)</td>
<td>0950</td>
<td>21.1 gph (80 l/h), 29 psi (2 bar)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Liquid end material:
- PVDF/PVDF, not for pump type 2508
- NP: Clear acrylic/PVC, only for pump types 2508, 1608, 1612, 1020 and 0730
- SS: Stainless Steel

### Diaphragm
- Standard Diaphragm/ Viton-B seal
- Standard Diaphragm/ EPDM seal
- FDA-Compliant O-rings:
  - Liquid end material: PVDF/PVDF, not for pump type 2508
  - NP: Clear acrylic/PVC, only for pump types 2508, 1608, 1612, 1020 and 0730
  - SS: Stainless Steel

### Hydraulic connections:
- 6 Standard connection for SST and PV4 ONLY
- 7 without connection
- M Connection 1/4" x 3/16" USA
- N Connection 3/8" x 1/4" USA
- Q Connection 1/2" x 3/8" USA

### Diaphragm rupture indicator:
- 0 Without diaphragm rupture indicator
- 1 With diaphragm rupture indicator, optical sensor

### Language:
- Standard
- Without

### Accessories:
- 0 Without accessories
- 1 With fast and injection valve

### Control Variants:
- 0 Manual + external 1:1 with pulse control
- 1 x changeover contact 230 V ~ 2 A, fault indicating relay N/C
- 3 Manual + external with pulse control + analogue 0-20 mA
- 4 x NO 24 V ~ 100 mA, such as 1 x pacing relay
- 5 x NO 24 V ~ 100 mA, such as 1 x 4-20 mA output

### Electrical Connection:
- 100-240 V, ±10 %, 50/60 Hz
- U

### Communication:
- Standard
- Without

### Region:
- US

---

PVDF/PVDF, not for pump type 2508
Clear acrylic/PVC, only for pump types 2508, 1608, 1612, 1020 and 0730
Stainless Steel
Standard Diaphragm/ Viton-B seal
FDA-Compliant O-rings:
Liquid end material: PVDF/PVDF, not for pump type 2508
NP: Clear acrylic/PVC, only for pump types 2508, 1608, 1612, 1020 and 0730
SS: Stainless Steel
Standard Diaphragm/ Viton-B seal
Standard Diaphragm/ EPDM seal
FDA-Compliant O-rings:
Liquid end version:
0 Without bleed valve, without valve spring, only with material TT and SS
1 Without bleed valve, with valve spring, only with material TT and SS
2 With bleed valve, without valve spring, only with material NP and PV
3 With bleed valve, with valve spring, only with material NP and PV
4 PV design for higher-viscosity media, only for types 1608, 1612, 1020 and 0730
7 Self-bleeding without bypass, only for types 1608, 1612, 1020 and 0730, only for material NP and PV
Hydraulic connections:
6 Standard connection for SST and PV4 ONLY
7 without connection
M Connection 1/4" x 3/16" USA
N Connection 3/8" x 1/4" USA
Q Connection 1/2" x 3/8" USA
Diaphragm rupture indicator:
0 Without diaphragm rupture indicator
1 With diaphragm rupture indicator, optical sensor
Language:
Standard
Without
Accessories:
0 Without accessories
1 With fast and injection valve
Control Variants:
0 Manual + external 1:1 with pulse control
1 x changeover contact 230 V ~ 2 A, fault indicating relay N/C
3 Manual + external with pulse control + analogue 0-20 mA
4 x NO 24 V ~ 100 mA, such as 1 x pacing relay
5 x NO 24 V ~ 100 mA, such as 1 x 4-20 mA output
Communication:
Standard
Without
Region:
US
---
ProMinent® gamma/ XL
Solenoid Diaphragm Metering Pumps

Dimensional Drawings

<table>
<thead>
<tr>
<th></th>
<th>1608</th>
<th>1612</th>
<th>1020</th>
<th>0703</th>
</tr>
</thead>
<tbody>
<tr>
<td>øA</td>
<td>3.54</td>
<td>3.54</td>
<td>3.54</td>
<td>3.54</td>
</tr>
<tr>
<td>B</td>
<td>4.25</td>
<td>4.33</td>
<td>4.33</td>
<td>4.40</td>
</tr>
<tr>
<td>C (with bleed valve)</td>
<td>~</td>
<td>5.12</td>
<td>5.12</td>
<td>5.20</td>
</tr>
<tr>
<td>C (SER)</td>
<td>5.03</td>
<td>5.12</td>
<td>5.12</td>
<td>5.20</td>
</tr>
<tr>
<td>D</td>
<td>2.50</td>
<td>2.50</td>
<td>2.50</td>
<td>2.50</td>
</tr>
</tbody>
</table>

Note: The above drawing represents the PV liquid end version (see O&M for all other). All measurements are in inches.
Overview: delta® (No Longer Available, for Reference ONLY)

Ideal for applications requiring metering pump accuracy with minimal pulsation
(see page 135 for spare parts and page 139 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 139) 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
ProMinent® delta®
Solenoid Diaphragm Metering Pumps

Capacity Data

Capacity data: delta®

<table>
<thead>
<tr>
<th>Pump Version</th>
<th>Capacity at Maximum Backpressure</th>
<th>Max. strokes/ min.</th>
<th>Pre-primed suct. lift</th>
<th>Suction/Discharge connectors</th>
<th>Shipping weights (higher weights are for SST)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>GPH (L/h)</td>
<td>psig (bar)</td>
<td>spm</td>
<td>ft (m)</td>
<td>in</td>
</tr>
<tr>
<td>2508</td>
<td>2</td>
<td>(7.5)</td>
<td>363 (25)</td>
<td>200</td>
<td>19.6 (5)</td>
</tr>
<tr>
<td>1608</td>
<td>2.1</td>
<td>(7.8)</td>
<td>232 (16)</td>
<td>200</td>
<td>16.4 (5)</td>
</tr>
<tr>
<td>1612</td>
<td>3</td>
<td>(11.3)</td>
<td>232 (16)</td>
<td>200</td>
<td>19.6 (6)</td>
</tr>
<tr>
<td>1020</td>
<td>4.8</td>
<td>(18.0)</td>
<td>145 (10)</td>
<td>200</td>
<td>16.4 (5)</td>
</tr>
<tr>
<td>0730</td>
<td>7.7</td>
<td>(29.2)</td>
<td>102 (7)</td>
<td>200</td>
<td>16.4 (5)</td>
</tr>
<tr>
<td>0450</td>
<td>12.9</td>
<td>(49.0)</td>
<td>58 (4)</td>
<td>200</td>
<td>9.8 (3)</td>
</tr>
<tr>
<td>0280</td>
<td>19.8</td>
<td>(75.0)</td>
<td>29 (2)</td>
<td>200</td>
<td>6.7 (2)</td>
</tr>
</tbody>
</table>

Above capacities and suction lift refer to pumps tested on water at 115 VAC, 60 Hz, and an ambient temperature of 70°F (21°C). Higher specific gravity fluids will reduce suction lift. Higher viscosity fluids will reduce capacity.
¹ (1/2” MNPT optional)

Materials In Contact With Chemicals

Liquid end materials in contact with media

<table>
<thead>
<tr>
<th>Version</th>
<th>Liquid End</th>
<th>valves</th>
<th>Seals</th>
<th>Valve balls</th>
<th>Diaphragm*</th>
</tr>
</thead>
<tbody>
<tr>
<td>*PVT</td>
<td>*PVDF</td>
<td>*PVDF</td>
<td>PTFE</td>
<td>Ceramic</td>
<td>PTFE</td>
</tr>
<tr>
<td>SST</td>
<td>316 SS</td>
<td>316 SS</td>
<td>PTFE</td>
<td>Ceramic</td>
<td>PTFE</td>
</tr>
<tr>
<td>NPE</td>
<td>Acrylic</td>
<td>PVC</td>
<td>EPDM</td>
<td>Ceramic</td>
<td>PTFE</td>
</tr>
<tr>
<td>NPB</td>
<td>Acrylic</td>
<td>PVC</td>
<td>Viton*</td>
<td>Ceramic</td>
<td>PTFE</td>
</tr>
</tbody>
</table>

*Highly compatible material suitable for most fluids.
Viton® is a registered trademark of DuPont Dow Elastomers.
## Identcode Ordering System

<table>
<thead>
<tr>
<th>DLTA</th>
<th>delta Capacity</th>
<th>Version</th>
<th>Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>2508</td>
<td>2.1 gph (7.5 l/h), 362 psi (25 bar)</td>
<td>0730</td>
<td>7.7 gph (29.20 l/h), 101.5 psi (7 bar)</td>
</tr>
<tr>
<td>1608</td>
<td>2.1 gph (7.8 l/h), 232 psi (16 bar)</td>
<td>0450</td>
<td>13 gph (49 l/h), 58 psi (4 bar)</td>
</tr>
<tr>
<td>1612</td>
<td>3.0 gph (11.30 l/h), 232 psi (16 bar)</td>
<td>0280</td>
<td>19.8 gph (75 l/h), 29 psi (2 bar)</td>
</tr>
<tr>
<td>1020</td>
<td>5.05 gph (19.1 l/h), 145 psi (25 bar)</td>
<td>0300</td>
<td>7.7 gph (29.20 l/h), 101.5 psi (7 bar)</td>
</tr>
</tbody>
</table>

**Liquid end materials:**
- PVDF (for models 1608, 1612, 1020, and 0730)
- SS
- NV 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 springs (for SS liquid ends)
- 1 W/o bleed valve, with springs (for SS liquid ends)
- 2 W/o bleed valve, w/o springs
- 3 With bleed valve, w/o 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
- 1 Access Code

**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
- 2 Fault annunciating relay, pulls in
- 3 Option 1 + pacing relay
- 4 Option 3 + 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/divider)
- 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 + Proibus M12 (Relay must be 0)

**Access Code:**
- 0 No Access Code
- 1 Access Code

**Language:**
- EN English

**Pause/Float:**
- 0 Standard

---

**DULCOMETER®**

**DULCOTEST®**

**polymer blending systems**

**solenoid-driven metering pumps**

**motor-driven metering pumps**

**pump spare parts & accessories**

**probes & sensors**

---

2020 - delta®
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)
Dimensions of delta® type 1612 - 0730 SST

dimensions in inches (mm)

Dimensions of delta® type 0450 - 0280 SST

dimensions in inches (mm)
Ideal for explosion-proof applications (see page 134 for spare parts) The ProMinent EXtronic series represents a proven technology for metering liquid media in hazardous areas classified in accordance with Zone 1 and in fire-damp-endangered mining applications.

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

Factory Mutual Hazard Classification

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

CSA Approval

CSA approved for Class 1, Division 1, Groups B, C and D locations. ProMinent EXtronic metering pumps are tested and classified in compliance with harmonized European Standards EN 50014/50018 for “flame-proof enclosure.” They have the highest degree of protection in this type of enclosure class. This approval is recognized by many other countries outside the EC member states.

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

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

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

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

EXBb G for use in gas and fire damp hazardous areas

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

- EEX - Explosion-proof equipment built in accordance with European standards
- [i,a] - Intrinsically safe control input in the case of two independent faults occurring
- d - Flameproof enclosure protection
- IIC - Explosion Group II for all hazardous areas apart from mines (includes IIA and IIB)
- T6 - Temperature class approval for gases and vapours with ignition temperature > 85°C

EXBb M for use in hazardous mining operations

Degree of protection EEx d I/IIC T6

- EEX - Explosion-proof equipment built in accordance with European standards
- d - Flameproof enclosure protection
- IC - Explosion Group I for fire-damp-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 vapours with ignition temperature > 85°C. This is the highest temperature class; it includes T1 to T5.
**ProMinent® EXtronic®**  
**Solenoid Diaphragm Metering Pumps**

### Specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
</table>
| **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: Acrylic/PVC  
                                         | Constant: 113°F (45°C)  
                                         | Short Term: 140°F (60°C)  
                                         | Material: Polypropylene  
                                         | Constant: 122°F (50°C)  
                                         | Short Term: 212°F (100°C)  
                                         | Material: PTFE  
                                         | Constant: 122°F (50°C)  
                                         | Short Term: 248°F (120°C)  
                                         | Material: 316 SS  
                                         | Constant: 122°F (50°C)  
                                         | Short Term: 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 |
## Capacity Data

### ProMinent® EXtronic®
Solenoid Diaphragm Metering Pumps

<table>
<thead>
<tr>
<th>Capacity data: Extronic</th>
<th>Pump Version</th>
<th>Capacity at Max. psig (bar)</th>
<th>GPH (L/h)</th>
<th>mL/Stroke</th>
<th>Capacity at 1/2 Max. psig (bar)</th>
<th>GPH (L/h)</th>
<th>mL/Stroke</th>
<th>Pre-Primed Suction Lift</th>
<th>Max. Stroking Rate</th>
<th>Tubing Connectors O.D. x I.D.</th>
<th>Shipping Weight (higher weights are for SS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>EXBb</td>
<td>1000</td>
<td>145 (10)</td>
<td>0.05 (0.19)</td>
<td>0.03</td>
<td>73 (5)</td>
<td>0.07 (0.27)</td>
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<td>26.5-35.3 (12-16)</td>
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<tr>
<td></td>
<td>1601</td>
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<td>116 (8)</td>
<td>0.34 (1.3)</td>
<td>0.18</td>
<td>16.4 (5)</td>
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<td>1/4 x 3/16</td>
<td>26.5-35.3 (12-16)</td>
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<tr>
<td></td>
<td>2501</td>
<td>363 (25)</td>
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<td>0.15</td>
<td>290 (20)</td>
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<td>16.4 (5)</td>
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<td>1/4 x 3/16</td>
<td>26.5-35.3 (12-16)</td>
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<tr>
<td></td>
<td>1201</td>
<td>174 (12)</td>
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<td>290 (20)</td>
<td>0.53 (2.0)</td>
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<td>1/4 FNPT</td>
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<tr>
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<td>0803</td>
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<td>58 (4)</td>
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<td></td>
<td>0308</td>
<td>44 (3)</td>
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<td>1.2</td>
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<td>16.4 (5)</td>
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<td>35.3-44.1 (16-20)</td>
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<tr>
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<td>0260</td>
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<td>-</td>
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</table>

### EXtronic with Auto-degassing Liquid Ends

<table>
<thead>
<tr>
<th></th>
<th>Pump Version</th>
<th>Capacity at Max. psig (bar)</th>
<th>GPH (L/h)</th>
<th>mL/Stroke</th>
<th>Capacity at 1/2 Max. psig (bar)</th>
<th>GPH (L/h)</th>
<th>mL/Stroke</th>
<th>Pre-Primed Suction Lift</th>
<th>Max. Stroking Rate</th>
<th>Tubing Connectors O.D. x I.D.</th>
<th>Shipping Weight (higher weights are for SS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1601</td>
<td>323 (16)</td>
<td>0.17 (0.66)</td>
<td>0.09</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>5.9 (1.8)</td>
<td>120</td>
<td>1/4 x 3/16</td>
<td>27 (12)</td>
<td></td>
</tr>
<tr>
<td>1201</td>
<td>174 (12)</td>
<td>0.26 (1.0)</td>
<td>0.14</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>6.6 (2.0)</td>
<td>120</td>
<td>1/4 x 3/16</td>
<td>27 (12)</td>
<td></td>
</tr>
<tr>
<td>0803</td>
<td>116 (8)</td>
<td>0.63 (2.4)</td>
<td>0.33</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>9.2 (2.8)</td>
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<td>1/4 x 3/16</td>
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</tr>
<tr>
<td>1002</td>
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<td>-</td>
<td>-</td>
<td>-</td>
<td>6.6 (2.0)</td>
<td>120</td>
<td>1/4 x 3/16</td>
<td>27 (12)</td>
<td></td>
</tr>
</tbody>
</table>

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.

*High Viscosity models are available in the 1002, 1006, 1310 and 0814 models. Liquid end designation is PP4 (Polypropylene/EPDM) Suitable for viscosities to 3500 cps.
# Materials in Contact With Chemicals

<table>
<thead>
<tr>
<th>Version</th>
<th>Liquid End</th>
<th>Suction/Discharge</th>
<th>Seals</th>
<th>Valve balls</th>
<th>Diaphragm</th>
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</thead>
<tbody>
<tr>
<td>PP1</td>
<td>Polypropylene</td>
<td>Polypropylene</td>
<td>EPDM</td>
<td>Ceramic</td>
<td>PTFE</td>
</tr>
<tr>
<td>PP4</td>
<td>Polypropylene</td>
<td>Polypropylene</td>
<td>EPDM</td>
<td>Ceramic</td>
<td>PTFE</td>
</tr>
<tr>
<td>NP1</td>
<td>Acrylic</td>
<td>PVC</td>
<td>Viton®</td>
<td>Ceramic</td>
<td>PTFE</td>
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<tr>
<td>NP3</td>
<td>Acrylic</td>
<td>PVC</td>
<td>Viton®</td>
<td>Ceramic</td>
<td>PTFE</td>
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<td>NS3</td>
<td>Acrylic</td>
<td>PVC</td>
<td>Viton®</td>
<td>Ceramic</td>
<td>PTFE</td>
</tr>
<tr>
<td>PS3</td>
<td>PVC</td>
<td>PVC</td>
<td>Viton®</td>
<td>Ceramic</td>
<td>PTFE</td>
</tr>
<tr>
<td>TT1</td>
<td>PTFE with carbon</td>
<td>PTFE with carbon</td>
<td>PTFE</td>
<td>Ceramic</td>
<td>PTFE</td>
</tr>
<tr>
<td>TTT</td>
<td>PTFE with carbon</td>
<td>PTFE with Carbon</td>
<td>PTFE</td>
<td>Ceramic</td>
<td>PTFE</td>
</tr>
<tr>
<td>SS</td>
<td>316 Stainless steel</td>
<td>316 Stainless Steel</td>
<td>PTFE</td>
<td>Ceramic³</td>
<td>PTFE</td>
</tr>
</tbody>
</table>

1. PP4 with Hastelloy C valve springs.
2. NS3 and PS3 with Hastelloy C valve springs, PVDF valve core. NOTE: Viton® is a registered trademark of DuPont Dow Elastomers.
3. DN 10 and DN 15 valve balls are 316 stainless steel.

---

**Factory Mutual System** approved

- Approved (standard in Canada)
- Approved

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

#### EXBb Enclosure Type:

<table>
<thead>
<tr>
<th>EXBb</th>
<th>Capacity:</th>
<th>Type:</th>
<th>Capacity:</th>
<th>Type:</th>
</tr>
</thead>
<tbody>
<tr>
<td>G</td>
<td>0.05 gph, 145 psi</td>
<td>0613</td>
<td>2.46 gph, 87 psi</td>
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<tr>
<td>1601</td>
<td>0.26 gph, 232 psi</td>
<td>0417</td>
<td>4.6 gph, 50.8 psi</td>
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</tr>
<tr>
<td>1201</td>
<td>0.45 gph, 174 psi</td>
<td></td>
<td>0.26 gph, 363 psi</td>
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</tr>
<tr>
<td>0803</td>
<td>0.98 gph, 116 psi</td>
<td>B</td>
<td>1.11 gph, 363 psi</td>
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</tr>
<tr>
<td>1002</td>
<td>0.61 gph, 145 psi</td>
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<td>2.77 gph, 189 psi</td>
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<td>0814</td>
<td>5.7 gph, 116 psi</td>
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<tr>
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<td>0430</td>
<td>7.13 gph, 50.8</td>
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<tr>
<td>1006</td>
<td>1.59 gph, 145 psi</td>
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<td>15.8 gph, 21.8 psi</td>
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</tr>
</tbody>
</table>

#### Version: Capacity: Version: Capacity:

- **G** Explosion protection
- **M** Fire and explosion protection: permissible liquid end material - PTFE & Stainless Steel

#### 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** Acrylic with PVC check valves & Viton® O-rings
- **NP3** Acrylic with PVC check valves & Viton® O-rings
- **NS3** Auto-degassing Acrylic 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:

- **A** Without springs
- **B** 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 ([a])
- **5** Analog 0-20 mA, intrinsically safe ([a])
- **6** Analog 4-20 mA, intrinsically safe ([a])
- **7** Manual with zero volts ON/OFF
- **8** Manual with zero volts ON/OFF, intrinsically safe ([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
### Dimensions in inches (mm)

<table>
<thead>
<tr>
<th>Pump</th>
<th>A (mm)</th>
<th>B (mm)</th>
<th>C (mm)</th>
<th>D (mm)</th>
<th>E (mm)</th>
<th>F (mm)</th>
<th>G (mm)</th>
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<tbody>
<tr>
<td>1000, 1601, 1201, 0803 NPI</td>
<td>15.4 (391)</td>
<td>5.4 (136)</td>
<td>2.7 (69)</td>
<td>ø70</td>
<td>6 x 4</td>
<td>ø38</td>
<td>9.0 (229)</td>
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<tr>
<td>1002, 0308, 2502/05, 1006 NPI</td>
<td>15.4 (391)</td>
<td>5.4 (136)</td>
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<td>ø85</td>
<td>8 x 5</td>
<td>ø50</td>
<td>9.3 (237)</td>
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<td>ø38</td>
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<td>ø38</td>
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</table>
Special Valves for EXtronic®

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

<table>
<thead>
<tr>
<th>Connector ISO 7 Rp 1/4 SB version for ProMinent EXtronic®</th>
<th>Order No.</th>
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</thead>
<tbody>
<tr>
<td>Connector ISO 7 Rp 1/2 SB version for ProMinent EXtronic®</td>
<td>809301</td>
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</table>

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

<table>
<thead>
<tr>
<th>Connector ISO 7 Rp 1/4 - R 1/2, pre-pressure approx. 7.3 psi</th>
<th>Order No.</th>
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</thead>
<tbody>
<tr>
<td>Connector ISO 7 Rp 1/2 - R 1/2, pre-pressure approx. 7.3 psi</td>
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Adjustable “SB” back pressure valve
Materials: 1.4404; PTFE coated diaphragm. Connector both sides ISO 7 Rp 1/4

<table>
<thead>
<tr>
<th>Operating range approx. 14.5 - 145 psi (1-10 bar), closed version designed for use with flammable materials.</th>
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</tr>
</thead>
<tbody>
<tr>
<td>To generate a constant back pressure for accurate metering with a free outlet. Can also be used as an overflow valve.</td>
<td>924555</td>
</tr>
</tbody>
</table>

PTFE dosing pipe
Carbon-filled, surface resistance <10⁷ Ω

<table>
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<th>Material</th>
<th>Length m</th>
<th>Ext. diam. x int. diam.</th>
<th>Permissible operating press. psi (bar)*</th>
<th>Order No.</th>
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</thead>
<tbody>
<tr>
<td>PTFE Sold by the foot</td>
<td>6.0 x 4.0</td>
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<tr>
<td>PTFE Sold by the foot</td>
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<td>232 (16)</td>
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<td>12.0 x 9.0</td>
<td>130.5 (9)</td>
<td>1024832</td>
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</table>

* 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.

<table>
<thead>
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<th>Normal thread o-rings compounds required.</th>
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<tr>
<td>6 mm - ISO 7 R 1/4</td>
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<tr>
<td>8 mm - ISO 7 R 1/4</td>
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