## Motor-Driven Metering Pumps

### QUICK REFERENCE

**“motor-driven metering pumps” T.O.C.** IV

### CATALOG SECTION TABS

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<td>extronic</td>
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</table>
Overview: Vario C

Ideal for basic chemical feed applications
(see page 132 for spare parts)

The ProMinent® Vario C motor-driven metering pump is available in the standard version fitted with a 115 V 60 Hz single-phase AC motor or alternatively with a 230/400 V 50/60Hz 3-phase AC motor. The capacity range is from 2.5-20.3 gph (9.6-76.8 l/h) with a maximum back pressure of 145-58 psi (10-4 bar). The pump capacity is adjusted by varying the stroke length (3 mm) in 1 % steps by means of a self-locking adjustment knob.

Under defined conditions and with correct installation, the reproducibility of the metering is better than ± 2 % over the stroke length range from 30 % to 100 % (notes in the operating instructions must be strictly observed).

The sturdy, corrosion-resistant plastic housing provides IP65 protection. A choice of 4 gear ratios, 2 liquid end sizes, 2 liquid end materials (PVDF; SS) allow the pump to be ideally matched to the basic metering duty.

On safety grounds, the electrical installation for all motor-driven metering pumps must incorporate suitable overload devices.

### Capacity Data

<table>
<thead>
<tr>
<th>Pump Type</th>
<th>Capacity at Maximum Back Pressure</th>
<th>Max. Stroke Rate</th>
<th>Max. Inlet Pressure</th>
<th>Max. Suction Lift</th>
<th>Suction/Discharge Connector</th>
<th>Shipping Weight</th>
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<tr>
<td>10008 PVT</td>
<td>145 (10)</td>
<td>2.5 (9.6)</td>
<td>45</td>
<td>2.8</td>
<td>23 (7)</td>
<td>1/2&quot; MNPT</td>
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<tr>
<td>10008 SST</td>
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<td>2.5 (9.6)</td>
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<td>23 (7)</td>
<td>3/8&quot; FNPT</td>
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<tr>
<td>10016 PVT</td>
<td>145 (10)</td>
<td>5.1 (19.2)</td>
<td>92</td>
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<td>1/2&quot; MNPT</td>
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<td>10016 SST</td>
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<td>1/2&quot; MNPT</td>
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<tr>
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<td>12.7 (48)</td>
<td>144</td>
<td>1.7</td>
<td>20 (6)</td>
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### Materials in Contact with Chemicals

<table>
<thead>
<tr>
<th>Liquid end</th>
<th>Suction/discharge connection</th>
<th>Seals</th>
<th>Valve balls</th>
<th>Valve seat</th>
<th>Standard connection</th>
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<td>Ceramic</td>
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<td>PTFE</td>
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# ProMinent® Vario C
## Motor Diaphragm Metering Pumps

### Identcode Ordering System

<table>
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<tr>
<th>VAMc</th>
<th>Vario Diaphragm Metering Pumps, Version C</th>
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<tr>
<td>Pump type:</td>
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<tr>
<td>10008</td>
<td>2.5 gph (9.6 l/h) 145 psi (10 bar)</td>
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<td>10016</td>
<td>5.1 gph (19.2 l/h) 145 psi (10 bar)</td>
</tr>
<tr>
<td>07026</td>
<td>8.2 gph (31.2 l/h) 101.5 psi (7 bar)</td>
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<tr>
<td>07042</td>
<td>13.3 gph (50.4 l/h) 101.5 psi (7 bar)</td>
</tr>
<tr>
<td>07012</td>
<td>3.8 gph (14.4 l/h) 101.5 psi (7 bar)</td>
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<tr>
<td>07024</td>
<td>7.6 gph (28.8 l/h) 101.5 psi (7 bar)</td>
</tr>
<tr>
<td>04039</td>
<td>12.7 gph (48.0 l/h) 58 psi (4 bar)</td>
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<tr>
<td>04063</td>
<td>20.3 gph (76.8 l/h) 58 psi (4 bar)</td>
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<table>
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<thead>
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<tr>
<td>0</td>
<td>no valve spring (standard) PVC</td>
</tr>
<tr>
<td>1</td>
<td>with 2 valve springs, Hastelloy C4</td>
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<thead>
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<td>union nut and PP insert</td>
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<td>3</td>
<td>union nut and PVDF insert</td>
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<td>union nut and stainless steel insert</td>
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<td>7</td>
<td>union nut and PVDF hose Barb</td>
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<td>union nut and stainless steel hose Barb</td>
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<tr>
<td>2</td>
<td>without ProMinent® logo</td>
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<tr>
<td>M</td>
<td>modified</td>
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<td>3 ph, 230 V / 400 V; 50/60 Hz</td>
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<tr>
<td>N</td>
<td>1 ph AC 115 V; AC 60 Hz</td>
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<table>
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<tr>
<td>3</td>
<td>with stroke sensor (Namur)</td>
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<table>
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<tr>
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<td>manual (standard)</td>
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Dimensions in inches (mm).
ProMinent® Sigma/ 1  
Motor Diaphragm Metering Pumps

Overview: Sigma/ 1

Ideal for Economical mid-range applications  
(see page 133 for spare parts and page 138 for control cables)

The ProMinent® Sigma/ 1 is a mechanically actuated diaphragm metering pump. It has a capacity range of 5.3-38 gph (20-144 l/h) at a max. back pressure of 174-58 psi (12-4 bar). The pump capacity is adjusted by varying the stroke length (4 mm) in 1 % steps via a self locking adjusting knob.

The reproducible metering accuracy is better than ±2 % providing installation has been correctly carried out, and in the stroke length range of 30-100 %. (Instructions in the operating instructions manual must be followed.)

The stable, corrosion resistant metal and plastic housing is rated IP 65. To facilitate adaptation of the pumps to the widest possible range of processing requirements we offer a choice of three gearbox ratios, three liquid end sizes, two liquid end materials and either contact or analogue signal (e.g. 0/4-20 mA) control options in the form of the S1Ca Sigma controller.

For safety reasons, all motor driven metering pumps must be equipped with adequate protection against electrical overload.

Sigma/ 1 Basic Type (S1Ba)

The ProMinent® Sigma Basic type is a motor driven metering pump with no internal electronic control system. The ProMinent® S1Ba has a number of different drive options, including the single phase AC motor or a 3 ph. motor.

Different flanges are available so that customers can use their own motor to drive the pump.

Sigma/ 1 Control Type (S1Ca)

The ProMinent® Sigma microprocessor version (standard IP 65) allows rapid and reliable adjustment to fluctuating metering requirements.

The controller has the same control panel as the ProMinent® gamma/ L metering pump. The microprocessor controller of the Sigma pumps, featuring the optimum combination of variable AC frequency combined with digital stroking frequency, ensures exact metering even in the lower minimum range due to individual stroke control.

The individual pump functions are simply adjusted using the five programming keys. A backlit LCD indicates the current operating status, LEDs function as operation or fault indicators and fault indicator or pacing relays monitor the pump function.

Local or remote control is possible with PROFIBUS® and/or an integrated process timer.

(see page 138)
Standard Modes and Functions

Feed rate is determined by stroke length and stroke rate. Stroke length is manually adjustable from 1 to 100% in increments of 1% via the stroke length knob.

Stroke rate can be set to a maximum of 90, 170 or 200 strokes per minute (pump dependent). 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.

Control Modes

The control modes available with the Sigma/1 include manual, external contact with pulse control (multiplier/divider), batch, or analog control. The Profibus option includes all control modes, plus fieldbus connection.

In the “Manual” mode, stroke rate is controlled manually. The “Contact” external 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 provides the pump an input to pump at the selected pulse ratio, 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 actual flow. Calibration is maintained within the stroke frequency range of 90/170/200 spm (model dependent). A warning indicator flashes when adjustments to the stroke volume are made outside the calibrated range of +/- 10%.

“Auxiliary Frequency”
An auxiliary frequency can be programmed. This default stroking rate can be enabled via the optional control cable.

“Flow”
The Sigma/1 series metering pumps will monitor their own output, with an optional adjustable flow monitor. 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.

“Prime”
Priming is activated by pressing both arrow keys at the same time while the frequency display is showing.

Function and Error Indicators

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

**Optional Control Modes**

**“Analog” Mode**

With this option, the stroking rate of the Sigma/1 is directly proportional to the analog signal. For a custom range setting, the curve feature of the analog input can be selected. With this, the pump response to the analog input can be easily programmed.

**“Contact” Mode with Pulse Control**

This feature is used to “tune” the pump 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.

**Access Code**

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

**Relay outputs. . .**

**Fault annunciating relay**

For low tank level (flow switch), loss of flow (flow monitor), loss of analog signal and diaphragm failure detector, 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.
# ProMinent® Sigma/ 1
## Motor Diaphragm Metering Pumps

### Specifications

**General:**
- **Maximum stroke length:** 0.16" (4.0 mm)
- **Power cord:** 6 foot (2 m) 2 wire + ground (supplied on control versions)
- **Stroke frequency control:**
  - S1Ba: Constant speed or optional DC/SCR drive or AC inverter
  - S1Ca: Microprocessor control version with innovative start/stop and variable speed control proportional to set frequency or external control signal.
- **Stroke counting:** Standard on S1Ca
- **Materials of construction**
  - **Housing:** Glass-filled Luranyl™ (PPE)
  - **Wetted materials of construction**
    - **Liquid End:** PVDF, 316 SS
    - **Suct./Dis. Connectors:** PVDF, 316 SS
    - **Seals:** PTFE/Viton®, PTFE/Viton®
    - **Check Balls:** Ceramic, SS
    - **Pressure Relief Valves:** PVDF/Viton® O-rings, SS/Viton® O-rings
- **Drive:** Cam and spring-follower (lost motion)
- **Lubrication:** Sealed grease lubricated bearings and gearing
- **Warranty:** Two years on drive, one year on liquid end.
- **Factory testing:** Each pump is tested for rated flow at maximum pressure.
- **Industry Standard:** CE approved, CSA available (standard in Canada)
- **Diaphragm materials:** PTFE faced EPDM with Nylon reinforcement and steel core
- **Liquid end options:** Polyvinylidene Fluoride (PVDF) or 316 SS, with PTFE faced Viton® seals
- **Check valves:** Single ball check, PVDF and SS versions.
  - Optional springs available (Hastelloy C4)
- **Repeatability:** When used according to the operating instructions, better than ±2%
- **Max. fluid operating temperatures:**
  - Material | Constant | Short Term (Max. Backpressure) | (15 min. @ max.30 psi)
  - PVDF | 149°F (65°C) | 212°F (100°C)
  - 316 SS | 194°F (90°C) | 248°F (120°C)
- **Diaphragm failure indication:** Optional, see accessories. Switch is N.C., opens to indicate failure.
  - Switch rated 250 VAC, 0.3 A inductive or 0.5 A resistive; 30 VDC, 1.0 A resistive.
  - Requires minimum 21 psig (1.5 bar) backpressure on pump. N.O. switch available upon request. Includes double diaphragm leak prevention.
- **Max. solids size in fluid:** 0.3 mm
- **Stroke length adjustment:** Manual, in increments of 1%. Motorized stroke length adjustment available.

**Sigma/1 Basic Version**
- **Motor:** See available motors in identity code
**Sigma/1 Control Version**

**Control Function:** At stroke frequencies equal to or greater than 33%, the integral AC variable frequency drive continuously varies the motor speed in a linear response to the incoming signal. At stroke frequencies less than 33%, the motor starts and stops according to a control algorithm to provide the desired stroke frequency. In the start-stop mode the motor speed is constant at approximately 580 RPM.

**Enclosure rating:** NEMA 3 (IP 55)

**Motor data:** Totally enclosed, fan cooled (IP55); class F insulation; IEC frame; 1/8 HP (0.09 kW) 230 V, 3 phase (0.7 A)

**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: max. 24 V, AC/DC, max. 100 mA  
max. 50x10⁶ switch cycles @ 10 V, 10 mA  
Contact closure: 100 ms (for pacing relay)

**Analog output signal:** max. impedance 300 W  
Isolated 4-20 mA output signal

**Profibus - DP fieldbus**

**options:** Transfer: RS - 485  
Wiring: 2-wired, twisted, shielded  
Length: 3637 ft. (1200 m)/328 ft. (100 m)  
Baudrate: 9600 bits/s; 12 Mbits/s  
No. of participants: 32 with 127 repeaters  
Topology: Line  
Access procedure: Master/master with token ring

**Relay cable (optional):** 6 foot (2 m) 3 wire (SPDT) 250 VAC, 2 A

**Pulse contact/remote pause contact:** With voltage-free contact, or semiconductor sink logic control (not source logic) 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).
## Sigma/1 Basic Version

<table>
<thead>
<tr>
<th>Pump Version</th>
<th>Suction/Discharge Valve</th>
<th>Seals</th>
<th>Ball Material</th>
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<tbody>
<tr>
<td>S1Ba HM</td>
<td>PVDF (Polyvinylidenefluoride)</td>
<td>PTFE/PTFE</td>
<td>Ceramic</td>
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<td></td>
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<tr>
<td></td>
<td>PVDF (Polyvinylidenefluoride)</td>
<td>PTFE/PTFE</td>
<td>Stainless steel</td>
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### Technical Data

<table>
<thead>
<tr>
<th>Pump Version</th>
<th>60 Hz (1750 RPM) Operation</th>
<th>Max. Stroke Rate</th>
<th>Output per Stroke</th>
<th>Max. Suction Lift</th>
<th>Max. Suction Pressure</th>
<th>Suction/Discharge Connector</th>
<th>Shipping Weight w/Motor</th>
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<td>19.8 (9)</td>
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<td>15 1/2 FNPT</td>
<td>29.8 (13.5)</td>
<td></td>
</tr>
</tbody>
</table>

*Flow rates and shipping weights are for 1/8 HP standard motors. Addition of 1/3 HP or 1/2 HP motors may increase output (consult factory for details).

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**Note:** Universal control cable necessary for external Sigma control. (see page 138)
# ProMinent® Sigma/1 Motor Diaphragm Metering Pumps

## Identcode Ordering System (S1Ba)

<table>
<thead>
<tr>
<th>S1Ba</th>
<th>Sigma/1 Basic Version a</th>
</tr>
</thead>
<tbody>
<tr>
<td>H</td>
<td>Main Drive, Diaphragm</td>
</tr>
</tbody>
</table>

### Pump version:
- 12017* 07042
- 12035* 04084
- 10050 04120
- 10022
- 10044
- 07065

* For PVDF versions. Max. 145 psig

**Note:** Refer to technical data for capacities and stroke rates

### Liquid end material:
- PVDF
- SS 316 Stainless steel

### Seal material:
- T PTFE

### Diaphragm type:
- 0 Standard diaphragm
- 1 With double diaphragm and failure monitor (NC contact opens on fault)

### Liquid end version:
- 0 Without valve springs
- 1 With 2 valve springs (Hastelloy C4, 1 psig)

### Connectors:
- 7 PVDF clamping nut & insert
- 8 SS clamping nut & insert

### Labeling:
- 0 Standard with logo

### Voltage supply:
- S 3 ph, 230 V/400 V, 50/60 Hz
- M 1 ph, AC, 230 V, 50/60 Hz
- N 1 ph, AC, 115 V, 60 Hz
- K 90 VDC Permanent magnet
- 3 Explosion Proof**

### Enclosure rating:
- 0 Standard

### Stroke sensor:
- 0 Without stroke sensor (Standard)
- 2 With Pacing relay (Consult Factory)

### Stroke length adjustment:
- 0 Manual (Standard)
- 4 W/ stroke positioning motor 4 - 20 mA, 230 V 50/60 Hz
- 6 W/ stroke positioning motor 4 - 20 mA, 115 V 50/60 Hz

** EXPLOSION PROOF MOTOR (INCLUDING MOUNTING FLANGE):**

1) pn. 7500344
   1/3 HP, single ph, AC, 115 V, 60 Hz, EPFC
   (class 1 Group C & D or class 2 group F & G T3B)

2) pn. 7746261
   1/2 HP, 3 ph, 1D, 208-230/460 VAC EPFC
   (class 1 Group C & D or class 2 group F & G T3B)
## Identcode Ordering System (S1Ca)

<table>
<thead>
<tr>
<th>S1Ca</th>
<th>Sigma/1 Control Version a</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Main drive</td>
</tr>
<tr>
<td></td>
<td>Main drive/Diaphragm</td>
</tr>
</tbody>
</table>

### Pump version:
- 12017* 10022 07042
- 12035* 10044 04084
- 10050 07065 04120

*For PVDF versions, max. 145 psig

**Note:** Refer to technical data for capacities and stroke rates

### Liquid end materials:
- PVDF with PTFE gasket (PVT)
- 316 Stainless steel with PTFE gasket (SST)

### Diaphragm type:
- 0 Standard diaphragm, PTFE
- 1 With double diaphragm and failure monitor (NC contact opens on fault)
- 2 With double diaphragm and failure monitor (alarm & continues to operate)

### Liquid end version:
- 0 Without valve springs
- 1 With 2 valve springs (Hastelloy C4, 1.45 psig)

### Connectors:
- 7 PVDF clamping nut & insert
- 8 SS clamping nut & insert

### Labeling:
- 0 Standard with logo

### Voltage supply:
- U 1 ph, 115-230 V ± 10%, 50/60 Hz

### Cable and plug with 6 ft (2 m) power cord, single phase:
- A European plug, 230 V
- D N. American plug, 115 V
- U N. American plug, 230 V

### Relay:
- 0 Without relay
- 1 Fault annunciating relay, drops out
- 3 Fault annunciating relay, pulls in
- 4 Option 1 + pacing relay
- 5 Option 3 + pacing relay
- C 4-20 mA output, drops out
- D 4-20 mA output, pulls in
- E 4-20 mA output, pacing relay

### Control variants:
- 0 Manual + External with pulse control (multiplier/divider)
- 1 Manual + External with pulse control & analog control
- 4 Option 0 + timer
- 5 Option 1 + timer
- P Option 1 + 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

### Stroke length adjustment:
- C Manual + Calibration
# ProMinent® Sigma/ 1
## Motor Diaphragm Metering Pumps

### Dimensional Drawing: (S1Ba)

**Dimensions in inches (mm)**

<table>
<thead>
<tr>
<th>Type Sigma/1</th>
<th>A (mm)</th>
<th>B (mm)</th>
<th>C* (mm)</th>
<th>D (mm)</th>
<th>D1** (mm)</th>
<th>E (mm)</th>
<th>E1** (mm)</th>
<th>F (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PVT 12017, 12035, 10050, 10022, 10044, 07065</td>
<td>112 (279)</td>
<td>938 (238)</td>
<td>1/2” MNPT 354 (90)</td>
<td>433 (110)</td>
<td>108 (275)</td>
<td>116 (295)</td>
<td>38 (96)</td>
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<tr>
<td>SST</td>
<td>975 (248)</td>
<td>713 (181)</td>
<td>3/8” FNPT 35 (89)</td>
<td>429 (109)</td>
<td>108 (275)</td>
<td>116 (295)</td>
<td>38 (96)</td>
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</tr>
<tr>
<td>PVT 07042, 04084, 04120</td>
<td>1138 (289)</td>
<td>10 (254)</td>
<td>3/4” MNPT 374 (95)</td>
<td>452 (115)</td>
<td>112 (285)</td>
<td>12 (305)</td>
<td>48 (122)</td>
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<tr>
<td>SST</td>
<td>1025 (260)</td>
<td>813 (206)</td>
<td>1/2” FNPT 37 (94)</td>
<td>448 (114)</td>
<td>112 (285)</td>
<td>12 (305)</td>
<td>48 (122)</td>
<td></td>
</tr>
</tbody>
</table>

* Piping adapters provided according to technical data.

** Dimensions with diaphragm failure detector.

*** Dimension may vary depending on motor installed.
**ProMinent® Sigma/1**  
**Motor Diaphragm Metering Pumps**

*Dimensions in inches (mm)*

<table>
<thead>
<tr>
<th>Type Sigma/1</th>
<th>A</th>
<th>B</th>
<th>C*</th>
<th>D</th>
<th>D1**</th>
<th>E</th>
<th>E1**</th>
<th>F</th>
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</thead>
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<tr>
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<td>9.38</td>
<td>1/2&quot; MNPT</td>
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<td>3.8</td>
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<tr>
<td>(279)</td>
<td>(238)</td>
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<td>(90)</td>
<td>(110)</td>
<td>(275)</td>
<td>(295)</td>
<td>(96)</td>
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<td>(114)</td>
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<td>(305)</td>
<td>(122)</td>
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</table>

* Piping adapters provided according to technical data.
** Dimensions with diaphragm failure detector.
ProMinent® Sigma/ 2
Motor Diaphragm Metering Pumps

Overview: Sigma/ 2

Ideal for mid-range applications
(see page 133 for spare parts and page 138 for control cables)

The ProMinent® Sigma/ 2 is a mechanically actuated diaphragm metering pump. It has a capacity range of 15.9 - 111 gph (60-420 l/h) at a maximum backpressure of 232-58 psi (16-4 bar). The pump capacity is adjusted by varying the stroke length (5 mm) in 0.5 % steps via a self locking adjusting knob.

The reproducible metering accuracy is better than ±2 % providing installation has been correctly carried out, and in the stroke length range of 30-100 %. (instructions in the operating instructions manual must be followed.)

The stable, corrosion resistant metal and plastic housing is rated IP 65. To facilitate adaptation of the pumps to the widest possible range of processing requirements we offer a choice of three gearbox ratios, three liquid end sizes, two liquid end materials and either contact or analogue signal (e.g. 0/4-20 mA) control options in the form of the S2Ca Sigma controller.

For safety reasons, all motor driven metering pumps must be equipped with adequate protection against electrical overload.

Sigma/ 2 Basic Type (S2Ba)

The ProMinent® Sigma Basic type is a motor driven metering pump with no internal electronic control system. The ProMinent® S2Ba offers a variety of different drive options in the single phase AC motors (56-C flange). Different flanges are available so that customers can use their own motor to drive the pump.

Sigma/ 2 Control Type (S2Ca)

The ProMinent® Sigma microprocessor version (standard IP 65) allows rapid and reliable adjustment to fluctuating metering requirements.

The controller has the same control panel as the ProMinent® gamma/ L metering pump.

The microprocessor controller of the Sigma pumps, featuring the optimum combination of variable AC frequency combined with digital stroking frequency, ensures exact metering even in the lower minimum range due to individual stroke control.

The individual pump functions are simply adjusted using the five programming keys. A backlit LCD indicates the current operating status, LEDs function as operation or fault indicators and fault indicator or pacing relays monitor the pump function.

Central or decentral adjustment is possible with PROFIBUS® and/or an integrated process timer.

(see page 138)
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.

Stroke rate can be set to a maximum of 90, 170 or 200 strokes per minute (pump dependent). 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.

Control Modes

The control modes available with the Sigma/1 include manual, external contact with pulse control (multiplier/divider), batch, or analog control. The Profibus option includes all control modes, plus fieldbus connection.

In the "Manual" mode, stroke rate is controlled manually. The "Contact" external 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 provides the pump an input to pump at the selected pulse ratio, 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 actual flow. Calibration is maintained within the stroke frequency range of 90/170/200 spm (model dependent). A warning indicator flashes when adjustments to the stroke volume are made outside the calibrated range of +/- 10%.

"Auxiliary Frequency".
An auxiliary frequency can be programmed. This default stroking rate can be enabled via the optional control cable.

"Flow"
The Sigma/1 series metering pumps will monitor their own output, with an optional adjustable flow monitor. 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. Call for availability.

"Pause"
The Sigma/1 series can be remotely started and stopped via a dry contact through the optional control cable.

"Stop"
The Sigma/1 can be stopped by pressing the STOP/START key without disconnecting from the power supply.

"Prime"
Priming is activated by pressing both arrow keys at the same time while the frequency display is showing.

Function and Error Indicators

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

"Analog" Mode
With this option, the stroking rate of the Sigma/1 is directly proportional to the analog signal. For a custom range setting, the curve feature of the analog input can be selected. With this, the pump response to the analog input can be easily programmed.

"Contact" Mode with Pulse Control
This feature is used to "tune" the pump 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.

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

Relay outputs... Fault annunciating relay
For low tank level (flow switch), loss of flow (flow monitor), loss of analog signal and diaphragm failure detector, 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.
ProMinent® Sigma/ 2
Motor Diaphragm Metering Pumps

Specifications

General:
- **Maximum stroke length:** 0.196” (5.0 mm) HM; 0.6” (15 mm) HK
- **Power cord:** 6 foot (2 m) 2 wire + ground (supplied on control versions)
- **Stroke frequency control:**
  - S2Ba: Constant speed or optional DC/SCR drive or AC inverter
  - S2Ca: Microprocessor control version with innovative start/stop and variable speed control proportional to set frequency or external control signal.
- **Stroke counting:** Standard on S2Ca
- **Materials of construction**
  - **Inner casing:** Cast aluminum
  - **Housing:** Glass-filled Luranyl™ (PPE)
- **Wetted materials of construction**
  - **Liquid End:** PVDF, 316 SS
  - **Suct./Dis. Connectors:** PVDF, 316 SS
  - **Seals:** PTFE, PTFE
  - **Check Balls:** Ceramic, SS
- **Drive:** Cam and spring-follower (lost motion)
- **Lubrication:** Oil lubricated
- **Recommended oil:** ISO VG 460, such as Mobil Gear Oil 634; ProMinent Part no. 555325
- **Oil quantity:** Approximately 0.6 quart (550 mL)
- **Recommended oil change interval:** 5,000 hours
- **Warranty:** Two years on drive, one year on liquid end.
- **Industry Standard:** Each pump is tested for rated flow at maximum pressure.

Sigma/2 HM:
- **Diaphragm materials:** PTFE faced EPDM with Nylon reinforcement and steel core
- **Liquid end options:** Polyvinylidene Fluoride (PVDF) or 316 SS, with PTFE seals
- **Check valves:** Single ball check, PVDF and SS versions.
- **Optional springs available** (Hastelloy C4)
- **Repeatability:** When used according to the operating instructions, better than ±2%
- **Max. fluid operating temperatures:**
  - Material: Constant Short Term
  - (Max. Backpressure) (15 min. @ max. 30 psi)
  - PVDF 149°F (65°C) 212°F (100°C)
  - 316 SS 194°F (90°C) 248°F (120°C)
- **Diaphragm failure indication:** Optional, see accessories. Switch is N.C., opens to indicate failure. Switch rated 250 VAC, 0.3 A inductive or 0.5 A resistive; 30 VDC, 1.0 A resistive. Requires minimum 21 psig (1.5 bar) backpressure on pump. N.O. switch available upon request. Includes double diaphragm leak prevention.
- **Separation of drive from liquid end:** An air gap with secondary safety diaphragm separates the drive from the liquid end to prevent cross contamination of oil and process fluid (with or without optional diaphragm failure indication).
- **Max. solids size in fluid:** 0.3 mm
- **Stroke length adjustment:** Manual, in increments of 0.5%. Motorized stroke length adjustment available.

Sigma/2 HK:
- **Piston materials:** Ceramic oxide; packing rings of PTFE, packing spring of 316 SS.
- **Liquid end options:** 316 SS with PTFE seals
- **Check valves:** Double ball, stainless steel; optional springs (Hastelloy C4).
- **Repeatability:** When used according to the operating instructions, better than ±0.5%
- **Max. fluid operating temperatures:**
  - Material: Constant Short Term
  - 316 SS 392°F (200°C) 428°F (220°C)
- **Stroke length adjustment:** Manual, in increments of 0.2%. Motorized stroke length control optional.
**Sigma/2 Basic Version**

- **Motor mounting flange:** Fits all NEMA 56C frame motors (motor not included with pump)
- **Gear ratios and stroke frequencies (with 1725 RPM motor):**
  - 20:1 = 87 SPM, 11:1 = 156 SPM, 7.25:1 = 232 SPM
- **Motor coupling:** Flexible coupling included with pump.
- **Required Motor HP:** 1/3 HP (.25 kW)
- **Full load RPM:** 1750 RPM (60 Hz)
- **Stroke sensor (optional):** Hall effect - requires 5 VDC

**Sigma/2 Control Version**

- **Control Function:** At stroke frequencies equal to or greater than 33%, the integral AC variable frequency drive continuously varies the motor speed in a linear response to the incoming signal. At stroke frequencies less than 33%, the motor starts and stops according to a control algorithm to provide the desired stroke frequency. In the start-stop mode the motor speed is constant at approximately 580 RPM.
- **Enclosure rating:** NEMA 3 (IP 55)
- **Motor data:** Totally enclosed, fan cooled (IP55); class F insulation; Manufacturer ATB; 0.18 kW (0.24 HP) 230 3 phase (1.9 A)
- **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 \( \left( R_{\text{ON}} \right) \): < 8 \( \Omega \)
  - Residual current in OFF-position: <1\( \mu \)A
  - Maximum voltage: 24 VDC
  - Maximum current: < 100 mA (for pacing relay)
  - Switch functions: 750\( \times 10^6 \)
  - Contact closure: 100 ms (for pacing relay)
- **Analog output signal:** max. impedance 300 \( \Omega \)
  - 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
- **Relay cable (optional):** 6 foot (2 m) 3 wire (SPDT) 250 VAC, 2 A
- **Pulse contact/remote pause contact:** With voltage-free contact, or semiconductor sink logic control (not source logic) 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).
- **Max. pulse frequency:** 25 pulses/sec
- **Contact impedance:** 10 kOhm
- **Max. pulse memory:** 65,535 pulses
- **Necessary contact duration:** 20ms
- **Analog - current input burden:** Approximately 120 Ohm
- **Max. allowable input current:** 50 mA
- **Power requirements:** single phase, 115-230 VAC
## Capacity Data

### Sigma/2 Basic Version

<table>
<thead>
<tr>
<th>Pump Version</th>
<th>60 Hz (1750 RPM) operation</th>
<th>Maximum Stroke Rate</th>
<th>Output per Stroke (water)</th>
<th>Max. Suction Lift (water)</th>
<th>Max. Suction Pressure</th>
<th>Suction/Discharge Connector</th>
<th>Shipping Weight w/Motor</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Capacity at Maximum Pressure</td>
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<tr>
<td>16050 PVT</td>
<td>145 (10)</td>
<td>15.9 (60)</td>
<td>87</td>
<td>11.4</td>
<td>23 (7)</td>
<td>44 (3)</td>
<td>15 1/2 MNPT</td>
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<tr>
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<td>15.2 (57)</td>
<td>87</td>
<td>11.4</td>
<td>23 (7)</td>
<td>44 (3)</td>
<td>15 1/2 FNPT</td>
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<tr>
<td>16090 PVT</td>
<td>145 (10)</td>
<td>28.5 (108)</td>
<td>156</td>
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<td>23 (7)</td>
<td>44 (3)</td>
<td>15 3/4 MNPT</td>
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<tr>
<td>16090 SST</td>
<td>232 (12)</td>
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<td>11.4</td>
<td>23 (7)</td>
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<td>15 3/4 FNPT</td>
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<tr>
<td>16130 PVT</td>
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<tr>
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<tr>
<td>07120 SST</td>
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<tr>
<td>04350 PVT</td>
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<td>111 (420)</td>
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<tr>
<td>04350 SST</td>
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<td>111 (420)</td>
<td>232</td>
<td>29.4</td>
<td>16 (5)</td>
<td>15 (1)</td>
<td>25 1 FNPT</td>
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### Sigma/2 Control Version

<table>
<thead>
<tr>
<th>Pump Version</th>
<th>60 Hz operation</th>
<th>Maximum Stroke Rate</th>
<th>Output per Stroke (water)</th>
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<th>Max. Suction Pressure</th>
<th>Suction/Discharge Connector</th>
<th>Shipping Weight w/Motor</th>
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<td>Capacity at Maximum Pressure</td>
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<tr>
<td>16050 PVT</td>
<td>145 (10)</td>
<td>15.9 (60)</td>
<td>90</td>
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<tr>
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<tr>
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<tr>
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<tr>
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<td>15 (1)</td>
<td>25 3/4 MNPT</td>
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<td>27.4</td>
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<td>25 3/4 FNPT</td>
</tr>
<tr>
<td>07220 PVT</td>
<td>100 (7)</td>
<td>69.7 (264)</td>
<td>160</td>
<td>27.7</td>
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<td>15 (1)</td>
<td>25 3/4 MNPT</td>
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<td>69.7 (264)</td>
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<td>27.7</td>
<td>16 (5)</td>
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<td>25 3/4 FNPT</td>
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<tr>
<td>04350 PVT</td>
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<td>16 (5)</td>
<td>15 (1)</td>
<td>25 1 FNPT</td>
</tr>
</tbody>
</table>

**Note:** Universal control cable necessary for external Sigma control. (see page 138)

## Materials In Contact With Chemicals

<table>
<thead>
<tr>
<th>Liquid End</th>
<th>Suction/Discharge connector</th>
<th>Valve</th>
<th>Seals/ ball seat</th>
<th>Balls</th>
</tr>
</thead>
<tbody>
<tr>
<td>PVT</td>
<td>PVDF (Polyvinylidenefluoride)</td>
<td>PVDF (Polyvinylidenefluoride)</td>
<td>PTFE/PTFE</td>
<td>Ceramic/Glass*</td>
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<tr>
<td>SST</td>
<td>Stainless steel</td>
<td>Stainless steel</td>
<td>PTFE/PTFE</td>
<td>Stainless steel</td>
</tr>
</tbody>
</table>

*for 07120, 07220, 04350*
# ProMinent® Sigma/2
Motor Diaphragm Metering Pumps

## Identcode Ordering System (S2Ba)

<table>
<thead>
<tr>
<th>S2Ba</th>
<th>Sigma/2 Basic Version a</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>HM Main Drive, Diaphragm</td>
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</table>

### Pump version:

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<tbody>
<tr>
<td></td>
<td>16050*</td>
<td>16090*</td>
<td>16130*</td>
<td>07120</td>
<td>07220</td>
<td>04350</td>
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* For PVDF versions, max. 145 psig (10 bar)

### Liquid end material:

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<td>PV</td>
<td>PVDF</td>
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<tr>
<td></td>
<td>SS</td>
<td>316 Stainless steel</td>
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### Seal material:

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### Diaphragm type:

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<tr>
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<tr>
<td>1</td>
<td>With double diaphragm and failure detector (NC contact opens on fault)</td>
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### Liquid end version:

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<tbody>
<tr>
<td>0</td>
<td>Without valve springs</td>
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<tr>
<td>1</td>
<td>With 2 valve springs (Hastelloy C4, 1 psi)</td>
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### Connectors:

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<tbody>
<tr>
<td>7</td>
<td>PVDF clamping nut &amp; insert</td>
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<tr>
<td>8</td>
<td>SS clamping nut &amp; insert</td>
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### Labeling:

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### Motor mount:

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### Enclosure rating:

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### Stroke sensor:

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<td>2</td>
<td>With Pacing relay (Consult Factory)</td>
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### Stroke length adjustment:

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<td>4</td>
<td>W/ stroke positioning motor 4 - 20 mA, 230 V 50/60 Hz</td>
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<tr>
<td>6</td>
<td>W/ stroke positioning motor 4 - 20 mA, 115 V 50/60 Hz</td>
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</table>
## Motor Diaphragm Metering Pumps

### S2Ca Sigma/2 Control Version a

#### Main drive
- **Main drive/Diaphragm**

#### Pump version:
- 16050* 07120
- 16090* 07220
- 16130** 04350**
  
* For PVDF versions, max. 145 psig (10 bar)
** Max. 200 strokes per minute

#### Liquid end materials:
- **PVT**  PVDF with PTFE
- **SST** 316 Stainless steel with PTFE

#### Diaphragm type:
- 0 Standard diaphragm, PTFE
- 1 With double diaphragm and failure detector (NC contact opens on fault)
- 2 With double diaphragm and failure detector (alarm & continues to operate)

#### Liquid end version:
- 0 Without valve springs
- 1 With 2 valve springs (Hastelloy C4, 1.45 psig)

#### Connectors:
- 7 PVDF clamping nut & insert
- 8 SS clamping nut & insert

#### Labeling:
- 0 Standard with logo

#### Voltage supply:
- **U** 1 ph, 115-230 V ± 10%, 50/60 Hz

#### Cable and plug with 6 ft (2 m) power cord, single phase:
- **A** European plug, 230 V
- **D** N. American plug, 115 V
- **U** N. American plug, 230 V

#### Relay:
- 0 Without relay
- 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 output
- D Option 3 + 4-20 mA output
- E Pacing relay + 4-20 mA output

#### Control variants:
- 0 Manual + External with pulse control (multiplier/divider)
- 1 Manual + External with pulse control & analog control
- 4 Option 0 + timer
- 5 Option 1 + timer
- P Option 1 + 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

#### Stroke length adjustment:
- C Manual + Calibration
### ProMinent® Sigma/ 2
Motor Diaphragm Metering Pumps

**Dimensional Drawing:** (S2Ba)

---

**Dimensions in inches (mm)**

<table>
<thead>
<tr>
<th>Type Sigma/2</th>
<th>A</th>
<th>B</th>
<th>C*</th>
<th>D</th>
<th>D1**</th>
<th>E</th>
<th>E1**</th>
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<tr>
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<td>6.95</td>
<td>DN 15</td>
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<td>4.9</td>
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<td>07120, 07220, 04350</td>
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<td>14.2</td>
<td>5.8</td>
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</table>

* Piping adapters provided according to technical data.
** Dimensions with diaphragm failure detector.

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* AC motor - dimensions may vary.
### ProMinent® Sigma/2

**Motor Diaphragm Metering Pumps**

**Dimensional Drawing: (S2Ca)**

#### Dimensions in inches (mm)

<table>
<thead>
<tr>
<th>Type Sigma/2</th>
<th>A</th>
<th>B</th>
<th>C*</th>
<th>D</th>
<th>D1**</th>
<th>E</th>
<th>E1**</th>
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<td>(177)</td>
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<td>(101)</td>
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<td></td>
<td>(377)</td>
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<td>(115)</td>
<td>(135)</td>
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<td>(357)</td>
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* Piping adapters provided according to technical data.
** Dimensions with diaphragm failure detector
Overview: Sigma/2 HK

Ideal for high pressure applications requiring significant turndown

The ProMinent® Sigma/2 motor driven plunger metering pump has a high strength metal-lined housing for those components subject to load, and an additional plastic housing to protect against corrosion. It has a capacity range of 0.6-20.1 gph (2.3-76 l/h) at a max. backpressure of 174-4640 psi (12-320 bar). The pump capacity is adjusted by varying the stroke length 0.6 in (15 mm) in 0.2 % steps via a self locking rotary knob. The reproducible metering accuracy is better than ±1 % providing installation has been correctly carried out, and in the stroke length range of 30-100 %. (Follow instructions given in operating instructions manual.)

The rugged, corrosion resistant metal and plastic housing is combined with a choice of three gearbox ratios and four 316 stainless steel liquid end sizes. To facilitate adaptation of the pumps to the widest possible range of processing requirements the S2Ca Sigma controller offers either contact or analogue signal (e.g. 0/4-20 mA) control options.

For safety reasons, all motor driven metering pumps must be equipped with adequate protection against electrical overload.

Sigma/2 HK Basic Type (S2Ba)

The ProMinent® Sigma Basic type is a motor driven metering pump with no internal electronic control system. The ProMinent® S2Ba offers a variety of different drive options in the single phase AC motors (56-C flange). Different flanges are available so that customers can use their own motor to drive the pump.

Sigma/2 HK Control Type (S2Ca)

The ProMinent® Sigma/2 microprocessor version (standard IP 65) allows rapid and reliable adjustment to fluctuating metering requirements.

The control unit has the same control surface as the ProMinent® gamma/ L metering pump. The microprocessor controller of the Sigma pumps, featuring the optimum combination of variable AC frequency combined with digital stroking frequency, ensures exact metering even in the lower minimum range due to individual stroke control.

With five programming keys the individual pump functions are easy to set. A backlit LCD gives information about the prevailing operating status. LEDs along with a fault-indicating or pacing relay act as operating and warning indicators to ensure monitoring of the pump function.
ProMinent® Sigma/2 HK
Plunger Metering Pumps

Specifications

General:
- **Maximum stroke length:** 0.196” (5.0 mm) HM; 0.6” (15 mm) HK
- **Power cord:** 6 foot (2 m) 2 wire + ground (supplied on control versions)
- **Stroke frequency control:** S2Ba: Constant speed or optional DC/SCR drive or AC inverter
  S2Ca: Microprocessor control version with innovative start/stop and variable speed control proportional to set frequency or external control signal.
- **Stroke counting:** Standard on S2Ca
- **Materials of construction**
  - **Inner casing:** Cast aluminum
  - **Housing:** Glass-filled Luranyl™ (PPE)
- **Wetted materials of construction:**
  - **Liquid End:** PVDF
  - **Suct./Dis. Connectors:** PVDF
  - **Seals:** PTFE
  - **Check Balls:** Glass
- **Drive:** Cam and spring-follower (lost motion)
- **Lubrication:** Oil lubricated
- **Recommended oil:** ISO VG 460, such as Mobil Gear Oil 634; ProMinent Part no. 555325
- **Oil quantity:** Approximately 0.6 quart (550 mL)
- **Recommended oil change interval:** 5,000 hours
- **Warranty:** Two years on drive, one year on liquid end.
- **Factory testing:** Each pump is tested for rated flow at maximum pressure.
- **Industry Standard:** CE approved, CSA available (standard in Canada)

Sigma/2 HM:
- **Diaphragm materials:** PTFE faced EPDM with Nylon reinforcement and steel core
- **Liquid end options:** Polyvinylidene Fluoride (PVDF) or 316 SS with PTFE
- **Check valves:** Single ball check, PVDF and SS versions.
  Optional springs available (Hastelloy C4)
- **Repeatability:** When used according to the operating instructions, better than ±2%
- **Max. fluid operating temperatures:**
<table>
<thead>
<tr>
<th>Material</th>
<th>Constant</th>
<th>Short Term</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>(Max. Backpressure)</td>
<td>(15 min. @ max. 30 psi)</td>
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<tr>
<td>PVDF</td>
<td>149°F (65°C)</td>
<td>212°F (100°C)</td>
</tr>
<tr>
<td>316 SS</td>
<td>194°F (90°C)</td>
<td>248°F (120°C)</td>
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</tbody>
</table>
- **Diaphragm failure indication:** Optional, see accessories. Switch is N.C., opens to indicate failure. Switch rated 250 VAC, 0.3 A inductive or 0.5 A resistive; 30 VDC, 1.0 A resistive. Requires minimum 21 psig (1.5 bar) backpressure on pump. N.O. switch available upon request. Includes double diaphragm leak prevention.
- **Separation of drive from liquid end:** An air gap with secondary safety diaphragm separates the drive from the liquid end to prevent cross contamination of oil and process fluid (with or without optional diaphragm failure indication).
- **Max. solids size in fluid:** 0.3 mm
- **Stroke length adjustment:** Manual, in increments of 0.5%. Motorized stroke length adjustment available.

Sigma/2 HK:
- **Piston materials:** Ceramic oxide; packing rings of PTFE, packing spring of 316 SS.
- **Liquid end options:** 316 SS with PTFE seals
- **Check valves:** Double ball, stainless steel; optional springs (Hastelloy C4).
- **Repeatability:** When used according to the operating instructions, better than ±0.5%
- **Max. fluid operating temperatures:**
<table>
<thead>
<tr>
<th>Material</th>
<th>Constant</th>
<th>Short Term</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>316 SS</td>
<td>392°F (200°C)</td>
<td>428°F (220°C)</td>
</tr>
</tbody>
</table>
- **Stroke length adjustment:** Manual, in increments of 0.2%. Motorized stroke length control optional.
## Sigma/2 Basic Version

- **Motor mounting flange:** Fits all NEMA 56C frame motors (motor not included with pump)
- **Gear ratios and stroke frequencies** (with 1725 RPM motor):
  - 20:1 = 87 SPM, 11:1 = 156 SPM, 7.25:1 = 232 SPM
- **Motor coupling:** Flexible coupling included with pump.
- **Required Motor HP:** 1/3 HP (.25 kW)
- **Full load RPM:** 1750 RPM (60 Hz)
- **Stroke sensor (optional):** Hall effect - requires 5 VDC

## Sigma/2 Control Version

- **Control Function:** At stroke frequencies equal to or greater than 33%, the integral AC variable frequency drive continuously varies the motor speed in a linear response to the incoming signal. At stroke frequencies less than 33%, the motor starts and stops according to a control algorithm to provide the desired stroke frequency. In the start-stop mode the motor speed is constant at approximately 580 RPM.
- **Enclosure rating:** NEMA 3 (IP 55)
- **Motor data:** Totally enclosed, fan cooled (IP55); class F insulation; Manufacturer ATB; 0.18 kW (0.24 HP) 230 3 phase (1.9 A)
- **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 ($R_{SO}$): < 8 Ω
  - Residual current in OFF-position: < 1 μA
  - Maximum voltage: 24 VDC
  - Maximum current: < 100 mA (for pacing relay)
  - Switch functions: 750x10^6
  - 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
- **Relay cable (optional):** 6 foot (2 m) 3 wire (SPDT) 250 VAC, 2 A
- **Pulse contact/remote pause contact:**
  - With voltage-free contact, or semiconductor sink logic control (not source logic)
  - 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).
- **Max. pulse frequency:** 25 pulses/sec
- **Contact impedance:** 10 kOhm
- **Max. pulse memory:** 65,535 pulses
- **Necessary contact duration:** 20ms
- **Analog - current input burden:** Approximately 120 Ohm
- **Max. allowable input current:** 50 mA
- **Power requirements:** single phase, 115-230 VAC
## Capacity Data

### Sigma/2 HK Basic Version

<table>
<thead>
<tr>
<th>Technical data:</th>
<th>60 Hz (1750 RPM) operation</th>
<th>Max. Stroke Rate</th>
<th>Output per Stroke</th>
<th>Max. Suction Lift (water)</th>
<th>Max. Suction Pressure</th>
<th>Suction/Discharge Connector</th>
<th>Shipping Weight w/Motor</th>
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<tbody>
<tr>
<td>Pump Version</td>
<td>Capacity at Maximum Pressure</td>
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<tr>
<td>32002 SST</td>
<td>4640 (320)</td>
<td>0.6 (2.3)</td>
<td>84</td>
<td>0.46</td>
<td>16 (5)</td>
<td>2175 (150)</td>
<td>1/4 53 (24)</td>
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<td>23004 SST</td>
<td>3335 (230)</td>
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<td>153</td>
<td>0.52</td>
<td>16 (5)</td>
<td>2175 (150)</td>
<td>1/4 53 (24)</td>
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<td>1450 (100)</td>
<td>2.0 (7.6)</td>
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<td>0.55</td>
<td>16 (5)</td>
<td>2175 (150)</td>
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<td>1.42</td>
<td>13 (4)</td>
<td>870 (60)</td>
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<td>435 (30)</td>
<td>1/4 53 (24)</td>
</tr>
<tr>
<td>04522 SST</td>
<td>652 (45)</td>
<td>7.0 (27.6)</td>
<td>153</td>
<td>2.91</td>
<td>13 (4)</td>
<td>435 (30)</td>
<td>1/4 53 (24)</td>
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<tr>
<td>02534 SST</td>
<td>363 (25)</td>
<td>10.7 (40.8)</td>
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<tr>
<td>04022 SST</td>
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<td>7.0 (26.5)</td>
<td>84</td>
<td>5.26</td>
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<td>218 (15)</td>
<td>3/8 55 (25)</td>
</tr>
<tr>
<td>02541 SST</td>
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<td>13.0 (49.2)</td>
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<td>5.37</td>
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</tr>
<tr>
<td>01264 SST</td>
<td>174 (12)</td>
<td>20.1 (76)</td>
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<td>5.45</td>
<td>13 (4)</td>
<td>218 (15)</td>
<td>3/8 55 (25)</td>
</tr>
</tbody>
</table>

### Sigma/2 HK Control Version

<table>
<thead>
<tr>
<th>Technical data:</th>
<th>60 Hz (1750 RPM) operation</th>
<th>Max. Stroke Rate</th>
<th>Output per Stroke</th>
<th>Max. Suction Lift (water)</th>
<th>Max. Suction Pressure</th>
<th>Suction/Discharge Connector</th>
<th>Shipping Weight w/Motor</th>
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<tbody>
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<td>Pump Version</td>
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<td>Sigma/2C HK</td>
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<td>1.42</td>
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<td>1/4 53 (24)</td>
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<td>13 (4)</td>
<td>218 (15)</td>
<td>3/8 55 (25)</td>
</tr>
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</table>

**Note:** Universal control cable necessary for external Sigma control. (see page 138)

### Materials In Contact With Chemicals

<table>
<thead>
<tr>
<th>Liquid End</th>
<th>Suction/Discharge connector</th>
<th>Seals</th>
<th>Valve Balls</th>
<th>Ball Seat</th>
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<tbody>
<tr>
<td>SST</td>
<td>Stainless steel</td>
<td>SST</td>
<td>PTFE/PTFE</td>
<td>Stainless steel</td>
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</tbody>
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# ProMinent® Sigma/ 2 HK
## Plunger Metering Pumps

### Identcode Ordering System (S2Ba HK)

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<tr>
<th>S2Ba</th>
<th>Sigma Basic Version a</th>
</tr>
</thead>
<tbody>
<tr>
<td>HK</td>
<td>Main drive/Plunger</td>
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<tr>
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<td>Pump version:</td>
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<tr>
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<td></td>
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<tr>
<td></td>
<td>32002 04522</td>
</tr>
<tr>
<td></td>
<td>14006 02541</td>
</tr>
<tr>
<td></td>
<td>07012 10006</td>
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<td></td>
<td>04022 05016</td>
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<td></td>
<td>23004 02334</td>
</tr>
<tr>
<td></td>
<td>10011 01064</td>
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<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Liquid end material:</td>
</tr>
<tr>
<td></td>
<td>SS 316 Stainless steel</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Seal material:</td>
</tr>
<tr>
<td></td>
<td>T PTFE seal</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Plunger assembly:</td>
</tr>
<tr>
<td></td>
<td>4 Plunger (Ceramic)</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Liquid end version:</td>
</tr>
<tr>
<td></td>
<td>0 Without valve springs (Standard)</td>
</tr>
<tr>
<td></td>
<td>1 With 2 valve springs (Hastelloy C4, 1 psig)</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Connectors:</td>
</tr>
<tr>
<td></td>
<td>0 Standard (in accordance with technical data)</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Labeling:</td>
</tr>
<tr>
<td></td>
<td>0 Standard with logo</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Motor mount:</td>
</tr>
<tr>
<td></td>
<td>2 Without motor, with NEMA 56C flange</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Enclosure rating:</td>
</tr>
<tr>
<td></td>
<td>0 Standard</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Stroke sensor:</td>
</tr>
<tr>
<td></td>
<td>0 Without stroke sensor (Standard)</td>
</tr>
<tr>
<td></td>
<td>1 With Pacing relay (consult factory)</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Stroke length adjustment:</td>
</tr>
<tr>
<td></td>
<td>0 Manual</td>
</tr>
<tr>
<td></td>
<td>5 W/ stroke positioning motor 0 - 20 mA, 115 V, 50/60 Hz</td>
</tr>
<tr>
<td></td>
<td>6 W/ stroke positioning motor 4 - 20 mA, 115 V, 50/60 Hz</td>
</tr>
</tbody>
</table>

### Analytical Sensors
- Motor-driven metering pumps
- Solenoid-driven metering pumps
- Pump engineering
- Specifications
- Pump spare parts & accessories
- Product overview
- Motor-driven metering pumps
- Solenoid-driven metering pumps
- ProMinent® product overview
### Identcode Ordering System (S2Ca HK)

#### Main driver/ Plunger

<table>
<thead>
<tr>
<th>HK</th>
<th>32002</th>
<th>04522</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>14006</td>
<td>02541</td>
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<td></td>
<td>07012</td>
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</tr>
<tr>
<td></td>
<td>04022</td>
<td>05016</td>
</tr>
<tr>
<td></td>
<td>23004</td>
<td>02534</td>
</tr>
<tr>
<td></td>
<td>10011</td>
<td>01264</td>
</tr>
</tbody>
</table>

#### Pump version:

- 32002
- 04522
- 14006
- 02541
- 07012
- 10006
- 04022
- 05016
- 23004
- 02534
- 10011
- 01264

#### Liquid end material:

- SS
- 316 Stainless steel

#### Seal material:

- T
- PTFE seal

#### Plunger:

- 4 Plunger (Ceramic)

#### Liquid end version:

- 0 Without valve springs (Standard)
- 1 With 2 valve springs (Hastelloy C4, 1 psig)

#### Connectors:

- 0 Standard (In accordance with technical data)

#### Labeling:

- 0 Standard with logo

#### Voltage supply:

- U 1 ph, 115-230 V ± 10%, 50/60 Hz

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

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

#### Relay:

- 0 Without relay
- 1 Fault annunciating relay, drops out
- 3 Fault annunciating relay, pulls in
- 4 Option 1 + pacing relay
- 5 Option 3 + pacing relay

#### Control variants:

- 0 Manual + External with pulse control (multiplier/divider)
- 1 Manual + External with pulse control & analog control
- 4 Option 0 + timer
- 5 Option 1 + timer
- P Option 1 + 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

#### Stroke length adjustment:

- C Manual + Calibration
The S2Ba HK models offer other motors, and height dimensions may vary.

### Dimensions in inches (mm)

<table>
<thead>
<tr>
<th>Model</th>
<th>Connector</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>G</th>
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</thead>
<tbody>
<tr>
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<td>10.9</td>
<td>8.5</td>
<td>R1/4&quot;</td>
<td>8.5</td>
<td>17.3</td>
<td>3.1</td>
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<tr>
<td>23004</td>
<td>DN 8</td>
<td>(277)</td>
<td>(216)</td>
<td></td>
<td>(217)</td>
<td>(439)</td>
<td>(79.5)</td>
</tr>
<tr>
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<td>(79.5)</td>
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</table>
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<tr>
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</table>
The ProMinent® Sigma/3 microprocessor version (standard IP 65) allows rapid and reliable adjustment to fluctuating metering requirements.

The control unit has the same control surface as the ProMinent® gamma/ L metering pump. The microprocessor controller of the Sigma pumps, featuring the optimum combination of variable AC frequency combined with digital stroking frequency, ensures exact metering even in the lower minimum range due to individual stroke control.

With five programming keys the individual pump functions are easy to set. A backlit LCD gives information about the prevailing operating status. LEDs along with a fault-indicating or pacing relay act as operating and warning indicators to ensure monitoring of the pump function. Central or decentralized adjustment is possible with PROFIBUS® and/or an integrated process timer.

In all motor-driven metering pumps without integrated overload protection, for safety reasons, suitable overload protection must be provided during installation.

The ProMinent® Sigma/3 Basic type is a motor driven metering pump with no internal electronic control system. The ProMinent® S2Ba offers a variety of different drive options in the single phase AC motors (56-C flange). Different flanges are available so that customers can use their own motor to drive the pump.

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ProMinent® Sigma/3
Motor Diaphragm Metering Pumps

Specifications

General:
- Maximum stroke length: 0.236" (6.0 mm)
- Power cord: 6 foot (2 m) 2 wire + ground (supplied on control version)
- Stroke frequency control: S3Ba: Constant speed or optional DC/SCR drive or AC inverter
  S3Ca: Microprocessor control version with innovative start/stop and variable speed control proportional to set frequency or external control signal.
- Stroke counting: Standard on S3Ca
- Materials of construction
  - Inner casing: Cast aluminum
  - Housing: Glass-filled Luranyl™ (PPE)
  - Wetted materials of construction:
    - Liquid End: PVDF, 316 SS
    - Seals: PTFE, SS
    - Check Balls: DN 25 Glass, SS
    - Check Plates: DN 32 Hastelloy C
- Drive: Cam and spring-follower (lost motion)
- Lubrication: Oil lubricated
- Recommended oil: ISO VG 460, such as Mobil Gear Oil 634; ProMinent Part no. 555325
- Oil quantity: Approximately 0.95 quart (900 mL)
- Recommended oil change interval: 5,000 hours
- Warranty: Two years on drive, one year on liquid end.
- Factory testing: Each pump is tested for rated flow at maximum pressure.
- Industry Standard: CE approved, CSA available (standard in Canada)
- Diaphragm materials: PTFE faced EPDM with Nylon reinforcement and steel core
- Liquid end options: Polyvinylidene Fluoride (PVDF) or 316 SS with PTFE
- Check valves: DN 25 valves - Single ball check, PVDF and SS versions.
  Optional springs available (Hastelloy C4)
  DN 32 valves - Plate valves, with Hastelloy C4 plates and springs in both PVDF and SS valves.
- Repeatability: When used according to the operating instructions, better than ±2%
- Max. fluid operating temperatures:
  - PVDF
    - Constant: 149°F (65°C)
    - Short Term (Max. Backpressure, 15 min. at max. 30 psi): 212°F (100°C)
  - 316 SS
    - Constant: 194°F (90°C)
    - Short Term (Max. Backpressure, 15 min. at max. 30 psi): 248°F (120°C)
- Diaphragm failure indication: Optional, see accessories. Switch is N.C., opens to indicate failure. Switch rated 250 VAC, 0.3 A inductive or 0.5 A resistive; 30 VDC, 1.0 A resistive. Requires minimum 21 psig (1.5 bar) backpressure on pump. N.O. switch available upon request. Includes double diaphragm leak prevention.
- Separation of drive from liquid end: An air gap with secondary safety diaphragm separates the drive from the liquid end to prevent cross contamination of oil and process fluid (with or without optional diaphragm failure indication).
- Max. solids size in fluid: 0.3 mm
- Stroke length adjustment: Manual, in increments of 0.5%. Motorized stroke length adjustment available.
Basic Version

Motor mounting flange: Fits all NEMA 56C frame motors (motor not included with pump)

Gear ratios and stroke frequencies (with 1725 RPM motor):
- 20:1 = 86 SPM
- 14:1 = 124 SPM
- 10.1: = 173 SPM

Motor coupling: Flexible coupling included with pump.

Required Motor HP: 3/4 HP (.55 kW)

Full load RPM: 1750 RPM (60 Hz)

Stroke sensor (optional): Hall effect - requires 5 VDC

Control Version

Control Function: At stroke frequencies equal to or greater than 33%, the integral AC variable frequency drive continuously varies the motor speed in a linear response to the incoming signal. At stroke frequencies less than 33%, the motor starts and stops according to a control algorithm to provide the desired stroke frequency. In the start-stop mode the motor speed is constant at approximately 580 RPM.

Enclosure rating: NEMA 3 (IP 55)

Motor data: Totally enclosed, fan cooled (IP55); class F insulation; Manufacturer ATB; 0.37 kW (0.5 HP) 230 3 phase (1.9 A)

Thermal overload protection: Thermal cutout switches off at 284°F (140°C).

Relay cable (optional): 6 foot (2 m) 3 wire (SPDT) 250 VAC, 2 A

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 ($R_{\text{ON}}$): < 8 Ω
- Residual current in OFF-position: <1μA
- Maximum voltage: 24 VDC
- Maximum current: < 100 mA (for pacing relay)
- Switch functions: 750x10⁶
- 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

Pulse contact/
Remote pause contact:
- With voltage-free contact, or semiconductor sink logic control (not source logic) 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).

Max. pulse frequency: 25 pulses/sec
- Contact impedance: 10 kOhm
- Max. pulse memory: 65,535 pulses
- Necessary contact duration: 20ms

Analog - current input burden:
- Approximately 120 Ohm

Max. allowable input current: 50 mA

Power requirements:
- 115 VAC or 230 VAC single phase
# ProMinent® Sigma/3
## Motor Diaphragm Metering Pumps

### Capacity Data

<table>
<thead>
<tr>
<th>Pump type</th>
<th>psig (bar)</th>
<th>U.S. GPH (l/h)</th>
<th>Stroke/min. (S3B/S3C)</th>
<th>mL/stroke</th>
<th>HP</th>
<th>ft. (m)</th>
<th>psig (bar)</th>
<th>in. MNPT</th>
<th>DN</th>
<th>lbs. (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>S3Ba/S3Ca</td>
<td>120145</td>
<td>145 (10)</td>
<td>46 (174)</td>
<td>86/90</td>
<td>31.5</td>
<td>3/4</td>
<td>16 (5)</td>
<td>29 (2)</td>
<td>1</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>120145 SST</td>
<td>174 (12)</td>
<td>46 (174)</td>
<td>86/90</td>
<td>31.5</td>
<td>3/4</td>
<td>16 (5)</td>
<td>29 (2)</td>
<td>1</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>120190</td>
<td>145 (10)</td>
<td>60.2 (228)</td>
<td>124/120</td>
<td>31.5</td>
<td>3/4</td>
<td>16 (5)</td>
<td>29 (2)</td>
<td>1</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>120190 SST</td>
<td>174 (12)</td>
<td>60.2 (228)</td>
<td>124/120</td>
<td>31.5</td>
<td>3/4</td>
<td>16 (5)</td>
<td>29 (2)</td>
<td>1</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>120270 PVT</td>
<td>145 (10)</td>
<td>85.6 (324)</td>
<td>173/180</td>
<td>31.5</td>
<td>3/4</td>
<td>16 (5)</td>
<td>29 (2)</td>
<td>1</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>120270 SST</td>
<td>174 (12)</td>
<td>85.6 (324)</td>
<td>173/180</td>
<td>31.5</td>
<td>3/4</td>
<td>16 (5)</td>
<td>29 (2)</td>
<td>1</td>
<td>25</td>
</tr>
<tr>
<td>070410</td>
<td>100 (7)</td>
<td>130 (492)</td>
<td>86/90</td>
<td>95.1</td>
<td>3/4</td>
<td>13 (4)</td>
<td>14.5 (1)</td>
<td>1-1/2</td>
<td>32</td>
<td>53 (24)</td>
</tr>
<tr>
<td>070410 SST</td>
<td>100 (7)</td>
<td>130 (492)</td>
<td>86/90</td>
<td>95.1</td>
<td>3/4</td>
<td>13 (4)</td>
<td>14.5 (1)</td>
<td>1-1/2</td>
<td>32</td>
<td>64 (29)</td>
</tr>
<tr>
<td>070580 PVT</td>
<td>100 (7)</td>
<td>184 (696)</td>
<td>124/120</td>
<td>95.1</td>
<td>3/4</td>
<td>13 (4)</td>
<td>14.5 (1)</td>
<td>1-1/2</td>
<td>32</td>
<td>53 (24)</td>
</tr>
<tr>
<td>070580 SST</td>
<td>100 (7)</td>
<td>184 (696)</td>
<td>124/120</td>
<td>95.1</td>
<td>3/4</td>
<td>13 (4)</td>
<td>14.5 (1)</td>
<td>1-1/2</td>
<td>32</td>
<td>64 (29)</td>
</tr>
<tr>
<td>040830 PVT</td>
<td>58 (4)</td>
<td>264 (1000)</td>
<td>173/180</td>
<td>95.1</td>
<td>3/4</td>
<td>10 (3)</td>
<td>14.5 (1)</td>
<td>1-1/2</td>
<td>32</td>
<td>53 (24)</td>
</tr>
<tr>
<td>040830 SST</td>
<td>58 (4)</td>
<td>264 (1000)</td>
<td>173/180</td>
<td>95.1</td>
<td>3/4</td>
<td>10 (3)</td>
<td>14.5 (1)</td>
<td>1-1/2</td>
<td>32</td>
<td>64 (29)</td>
</tr>
</tbody>
</table>

**Note:** Universal control cable necessary for external Sigma control. (see page 138)

## Materials In Contact With Chemical

### Material

<table>
<thead>
<tr>
<th>Material</th>
<th>Suction/discharge connector Liquid end</th>
<th>Seals</th>
<th>Valve balls</th>
<th>Valve seats</th>
<th>DN 25</th>
<th>Valve seats</th>
<th>DN 32 Valve Plate/ Spring</th>
<th>Valve seats</th>
</tr>
</thead>
<tbody>
<tr>
<td>PVT</td>
<td>PVDF (Polyvinylidene fluoride)</td>
<td>PTFE</td>
<td>Glass</td>
<td>PTFE</td>
<td></td>
<td></td>
<td>Ceramic/ Hast. C + CTFE**</td>
<td>PTFE</td>
</tr>
<tr>
<td>SST</td>
<td>Stainless steel</td>
<td>PTFE</td>
<td>Stainless steel</td>
<td>PTFE</td>
<td></td>
<td></td>
<td>Stainless steel</td>
<td>PTFE</td>
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</table>
## Identcode Ordering System (S3Ba)

<table>
<thead>
<tr>
<th>S3Ba</th>
<th>Sigma/3 Basic Version a</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>H</td>
</tr>
</tbody>
</table>

### Main Drive, Diaphragm

#### Pump version:
- 120145
- 120190
- 120270
- 070410
- 070580
- 040830

#### Liquid end material:
- PVDF
- 316 Stainless steel

#### Seal material:
- PTFE

#### Diaphragm type:
- 0: Standard diaphragm
- 1: With double diaphragm and failure detector (NC contact opens on fault)

#### Liquid end version:
- 0: Without valve springs
- 1: With 2 valve springs (Hastelloy C4, 1 psig) (standard for 070410, 070580, 040830)

#### Connectors:
- 7: PVDF clamping nut & insert
- 8: SS clamping nut & insert

#### Labeling:
- 0: Standard with logo

#### Motor mount:
- 2: Without motor, with NEMA 56C flange

#### Enclosure rating:
- 0: Standard

#### Stroke sensor:
- 0: Without stroke sensor (Standard)
- 2: With Pacing relay (Consult Factory)

#### Stroke length adjustment:
- 0: Manual (Standard)
- 4: W/ stroke positioning motor 4 - 20 mA, 230 V 50/60 Hz
- 6: W/ stroke positioning motor 4 - 20 mA, 115 V 50/60 Hz
### ProMinent® Sigma/3 Motor Diaphragm Metering Pumps

#### Identcode Ordering System (S3Ca)

<table>
<thead>
<tr>
<th>S3Ca</th>
<th>Sigma/3 Control Version a</th>
</tr>
</thead>
<tbody>
<tr>
<td>H</td>
<td>Main drive/Diaphragm</td>
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</tbody>
</table>

**Pump version:**

<table>
<thead>
<tr>
<th>120145</th>
<th>070410</th>
<th>120190</th>
<th>070580</th>
<th>120270</th>
<th>040830</th>
</tr>
</thead>
</table>

**Liquid end material:**

| PVT | PVDF with PTFE |
| SST | 316 Stainless steel with PTFE |

**Diaphragm type:**

- 0: Standard diaphragm, PTFE
- 1: With double diaphragm and failure detector (NC contact opens on fault)
- 2: With double diaphragm and failure detector (alarm & continues to operate)

**Liquid end version:**

- 0: Without valve springs
- 1: With 2 valve springs (Hastelloy C4, 1.45 psig) (standard for 070410, 070580, 040830)

**Connectors:**

- 7: PVDF clamping nut & insert
- 8: SS clamping nut & insert

**Labeling:**

- 0: Standard with logo

**Voltage supply:**

- W: 1 ph, 115-230V ± 10%, 50/60 Hz

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

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

**Relay:**

- 0: Without relay (For Profibus only)
- 1: Fault annihilating relay, drops out (Standard)
- 3: Fault annihilating relay, pulls in
- 4: Option 1 + pacing relay
- 5: Option 3 + pacing relay
- C: Option 1 + 4-20 mA output
- D: Option 3 + 4-20 mA output
- E: Pacing relay + 4-20 mA output

**Control Variants:**

- 0: Manual + External with pulse control (multiplier/divider)
- 1: Manual + External with pulse control & analog control
- 4: Option 0 + timer
- 5: Option 1 + timer
- P: Option 1+ 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

**Stroke Length Adjustment:**

- C: Manual + Calibration
### Dimensions in inches (mm)

<table>
<thead>
<tr>
<th>Type Sigma/3</th>
<th>A (in)</th>
<th>B (in)</th>
<th>C (^{*}) (in)</th>
<th>D (in)</th>
<th>D (^{**}) (in)</th>
<th>E (in)</th>
<th>E (^{**}) (in)</th>
<th>F (in)</th>
</tr>
</thead>
<tbody>
<tr>
<td>121045, 120190, 120270 PVT</td>
<td>14.1 (358)</td>
<td>14.3 (364)</td>
<td>1(^{*}) MNPT (120)</td>
<td>4.7 (120)</td>
<td>5.5 (140)</td>
<td>13.6 (346)</td>
<td>14.4 (366)</td>
<td>6.1 (156)</td>
</tr>
<tr>
<td>SST</td>
<td>14.1 (358)</td>
<td>14.3 (364)</td>
<td>1(^{*}) MNPT (121)</td>
<td>4.8 (121)</td>
<td>5.6 (141)</td>
<td>13.7 (349)</td>
<td>14.5 (369)</td>
<td>6.1 (156)</td>
</tr>
<tr>
<td>070410, 070580, 040830 PVT</td>
<td>15.9 (403)</td>
<td>17.8 (453)</td>
<td>1-1/2(^{*}) MNPT (127)</td>
<td>5.0 (127)</td>
<td>5.7 (147)</td>
<td>14.0 (358)</td>
<td>14.8 (378)</td>
<td>8.1 (206)</td>
</tr>
<tr>
<td>SST</td>
<td>15.3 (387)</td>
<td>16.9 (430)</td>
<td>1-1/2(^{*}) MNPT (127)</td>
<td>5.0 (127)</td>
<td>5.7 (147)</td>
<td>14.0 (358)</td>
<td>14.8 (378)</td>
<td>8.1 (206)</td>
</tr>
</tbody>
</table>

\(^{*}\) Piping adapters provided according to technical data.

\(^{**}\) Dimensions with diaphragm failure detector.
### Dimensions in inches (mm)

<table>
<thead>
<tr>
<th>Type Sigma/3</th>
<th>A</th>
<th>B</th>
<th>C*</th>
<th>D</th>
<th>D1**</th>
<th>E</th>
<th>E1**</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>121045, 120190, 120270</td>
<td>14.1</td>
<td>14.3</td>
<td>1&quot; MNPT</td>
<td>4.7</td>
<td>5.5</td>
<td>13.6</td>
<td>14.4</td>
<td>6.1</td>
</tr>
<tr>
<td>PVT</td>
<td>(358)</td>
<td>(364)</td>
<td></td>
<td>(120)</td>
<td>(140)</td>
<td>(346)</td>
<td>(366)</td>
<td>(156)</td>
</tr>
<tr>
<td>SST</td>
<td>14.1</td>
<td>14.3</td>
<td>1&quot; MNPT</td>
<td>4.8</td>
<td>5.6</td>
<td>13.7</td>
<td>14.5</td>
<td>6.1</td>
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<tr>
<td></td>
<td>(358)</td>
<td>(364)</td>
<td></td>
<td>(121)</td>
<td>(141)</td>
<td>(349)</td>
<td>(369)</td>
<td>(156)</td>
</tr>
<tr>
<td>070410, 070580, 040830</td>
<td>15.9</td>
<td>17.8</td>
<td>1-1/2&quot; MNPT</td>
<td>5.0</td>
<td>5.7</td>
<td>14.0</td>
<td>14.8</td>
<td>8.1</td>
</tr>
<tr>
<td>PVT</td>
<td>(403)</td>
<td>(453)</td>
<td></td>
<td>(127)</td>
<td>(147)</td>
<td>(358)</td>
<td>(378)</td>
<td>(206)</td>
</tr>
<tr>
<td>SST</td>
<td>15.3</td>
<td>16.9</td>
<td>1-1/2&quot; MNPT</td>
<td>5.0</td>
<td>5.7</td>
<td>14.0</td>
<td>14.8</td>
<td>8.1</td>
</tr>
<tr>
<td></td>
<td>(387)</td>
<td>(430)</td>
<td></td>
<td>(127)</td>
<td>(147)</td>
<td>(358)</td>
<td>(378)</td>
<td>(206)</td>
</tr>
</tbody>
</table>

* Piping adapters provided according to technical data.
** Dimensions with diaphragm failure detector.
High pressure chemical process metering
(see page 135 for spare parts)

The ProMus is a motor driven metering pump with a hydraulically actuated diaphragm. The drive case and the hydraulic unit are filled with a liquid that functions as a hydraulic coupling. A plunger connects the drive case with the hydraulic unit. The dosing diaphragm separates the hydraulic part of the pump from the dosing unit. The movement of the diaphragm depends on the amount of liquid displaced by the plunger.

ProMus Design Specifications

The ProMinent ProMus is a motor driven metering pump incorporating a hydraulically balanced Teflon diaphragm. The drive case is cast iron incorporating a worm gear set (5 Ratios available) driving a rotating eccentric. The locking stroke adjuster varies the flow from 100% to 0% in 1% increments. The pump is built in accordance to API 675 standards. The hydraulic system transfers the rotating eccentric motion to diaphragm movement by way of a reciprocating plunger (8 plunger diameters available). The plunger and diaphragm are hydraulically coupled (no mechanical connection). Coupling compliance is precisely controlled by a mechanically actuated replenishment valve, which senses diaphragm position to admit coupling fluid as required. The coupling fluid is automatically degassed to maintain accuracy and drive case is protected from overload by a simple acting relief valve. The hydraulic system is separated from the fluid end by a Teflon diaphragm completely isolating the pumped fluid from the surroundings. The liquid end is currently available in PVDF, Stainless Steel, Hastelloy C and Alloy 20.

ProMus Benefits

- Flow rates from 0.23 gph (0.87 L/h) to 101 gph (382 L/h) and Pressures up to 3500 psi (241 bar)
- Hydraulically actuated diaphragm ensuring a sealed pumping system for corrosive or toxic chemicals with superior leak protection
- Built in accordance to API 675 standards suitable for heavy industrial applications and specifications
- Robust cast iron drive construction ideal for applications such as boiler feeds, catalyst feed, dye injection and petrochemicals
- Flexible design for a wide range of applications including water treatment and high pressure chemical refining
- Fast and easy field maintenance with minimal downtime
ProMinent® ProMus
Hydraulic Diaphragm Metering Pumps

Specifications

Pump type: Hydraulically actuated diaphragm type liquid end
Maximum stroke length: 20mm
Materials of construction:
  Housing: Cast iron
  Diaphragm: Flat Teflon
Required Motor HP: 1/2 HP (if 12.5:1 gear is selected 3/4 hp might be used)
Full load RPM: 1725
Drive: Uses a hydraulic piston and mechanically actuated
  Oil replenishment valve to transfer the reciprocating
  Motion to a flat Teflon diaphragm
Gear ratios: 5 gear ratios; 12.5:1, 15:1, 30:1, 40:1, 50:1*, 100:1*
  Note: minimum stroke rate is 29 spm
Motor mounting flange: Fits all NEMA 56 C frame motors
  (Optional IEC 71 with B5 flange)
Motor coupling: Direct coupled to worm gear shaft
Check valves: PVDF/PTFE: size 17 double inlet & outlet; sizes 30/40 single inlet & outlet
  Metal: 1) single inlet & outlet
  2) double inlet & outlet
  3) single inlet & double outlet
  (Double ball needed for pressures over 500 psi)
Repeatability: Steady state flow accuracy is +/- 1% over turndown
  Ratio of 10:1
Max fluid operating temp: constant: 195 F (90 C) short term 250 F (120 C)
Max solids size: 0.3mm; if larger than this provisions must be made to remove them prior to suction inlet
Max viscosity: 200 mPas
Recommend oil: Mobilube SCH 75w-90 ProMinent PN: 1005823
Oil quantity: 1.5 quart (1.42 l)
Oil change interval: Every 5000 hours
Stroke length adjustment: Manual adjustment.
  Automatic stroke length adjustment via 4 to 20 mA available as an option
Pressure relief: Integrated pressure relief to protect pump. External pressure relief must be used
  to protect system
Warranty: 2 years on drive, 1 year on liquid end
Factory testing: each pump is tested for capacity at rated pressure
Maximum inlet pressure: 14.5 psi (1 bar)

*50:1 and 100:1 are not available for 50 Hz operation
### Capacity Data

<table>
<thead>
<tr>
<th>Size</th>
<th>Plunger (in.)</th>
<th>Capacity at Max. Gear Stroke Max. Rpm</th>
<th>Capacity at Max. Backpressure</th>
<th>At 60 Hz (1750 rpm)</th>
<th>At 50 Hz (1458 rpm)</th>
<th>Typical Suct./Dis. Connection</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>psig Bar</td>
<td>psig Bar</td>
<td>PSIG Bar</td>
</tr>
<tr>
<td></td>
<td></td>
<td>GPH (l/h) U.S. Stroke/Bar / GPH (l/h) U.S. Stroke/Bar / GPH (l/h) U.S. Stroke/Max.</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>min. Bar</td>
<td>min. Bar</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Size 17</td>
<td>3/8&quot;</td>
<td>230 16 350 241</td>
<td>0.2 (0.87) 100 18 - - - - -</td>
<td>3/8&quot;</td>
<td>230 16 350 241</td>
<td>0.2 (0.87) 100 18 - - - - -</td>
</tr>
<tr>
<td>Size 17</td>
<td>5/8&quot;</td>
<td>230 16 2080 143</td>
<td>1.8 (6.8) 50 35 - - - - -</td>
<td>5/8&quot;</td>
<td>230 16 2080 143</td>
<td>1.8 (6.8) 50 35 - - - - -</td>
</tr>
<tr>
<td>Size 17</td>
<td>7/16&quot;</td>
<td>230 16 350 241</td>
<td>0.3 (1.2) 30 58 - - - - -</td>
<td>7/16&quot;</td>
<td>230 16 350 241</td>
<td>0.3 (1.2) 30 58 - - - - -</td>
</tr>
<tr>
<td>Size 17</td>
<td>1-1/8&quot;</td>
<td>230 16 350 241</td>
<td>3.3 (12.5) 12.5 138 2.77 10.72 115 1/4 1/4</td>
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<td>3.3 (12.5) 12.5 138 2.77 10.72 115 1/4 1/4</td>
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<tr>
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<td>1-3/4&quot;</td>
<td>230 16 2080 143</td>
<td>1.8 (6.8) 50 35 - - - - -</td>
<td>1-3/4&quot;</td>
<td>230 16 2080 143</td>
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<td>2&quot;</td>
<td>230 16 2080 143</td>
<td>1.8 (6.8) 50 35 - - - - -</td>
<td>2&quot;</td>
<td>230 16 2080 143</td>
<td>1.8 (6.8) 50 35 - - - - -</td>
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<tr>
<td>Size 17</td>
<td>2-1/4&quot;</td>
<td>230 16 2080 143</td>
<td>1.8 (6.8) 50 35 - - - - -</td>
<td>2-1/4&quot;</td>
<td>230 16 2080 143</td>
<td>1.8 (6.8) 50 35 - - - - -</td>
</tr>
<tr>
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<td>2-1/4&quot;</td>
<td>230 16 2080 143</td>
<td>1.8 (6.8) 50 35 - - - - -</td>
<td>2-1/4&quot;</td>
<td>230 16 2080 143</td>
<td>1.8 (6.8) 50 35 - - - - -</td>
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<td>1.8 (6.8) 50 35 - - - - -</td>
<td>2-1/4&quot;</td>
<td>230 16 2080 143</td>
<td>1.8 (6.8) 50 35 - - - - -</td>
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</table>

- not available for 50 Hz operation

### Materials In Contact With Chemicals

<table>
<thead>
<tr>
<th>Material</th>
<th>Liquid End</th>
<th>Suction/Discharge connector</th>
<th>Seals/ball seat</th>
<th>Valve Balls</th>
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<tbody>
<tr>
<td>SS</td>
<td>stainless steel</td>
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<td>PTFE/SS</td>
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<tr>
<td>A2</td>
<td>alloy 20</td>
<td>alloy 20</td>
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<tr>
<td>HC</td>
<td>hastelloy C</td>
<td>hastelloy C</td>
<td>PTFE/HC</td>
<td>hastelloy C</td>
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<tr>
<td>PVT</td>
<td>PVDF</td>
<td>PVDF</td>
<td>PTFE/PVDF</td>
<td>ceramic</td>
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</tbody>
</table>
## Hydraulic Diaphragm Metering Pumps

### Identcode Ordering System ProMus

#### Pump version:
- **17A**: Size 17 liquid end with 3/8" Plunger
- **17B**: Size 17 liquid end with 7/16" Plunger
- **30A**: Size 30 liquid end with 5/8" Plunger
- **30B**: Size 30 liquid end with 13/16" Plunger
- **30C**: Size 30 liquid end with 1-1/8" Plunger
- **40A**: Size 40 liquid end with 1-3/4" Plunger
- **40B**: Size 40 liquid end with 2" Plunger
- **40C**: Size 40 liquid end with 2-1/4" Plunger

#### Liquid end material:
- **SS1**: 316 Stainless steel Single ball check
- **SS2**: 316 Stainless steel Double ball check (*Needed for applications above 500 psi)
- **SS3**: 316 St. steel Single inlet, double outlet (Recommended for Flooded suction w/ discharge pressure above 500 psi)
- **HC1**: Hastelloy C Single ball check
- **HC2**: Hastelloy C Double ball check (Needed for applications above 500 psi)
- **HC3**: Hastelloy C Single inlet, double outlet (Recommended for Flooded suction with discharge pressure above 500 psi)
- **A21**: Alloy 20 single ball check
- **A22**: Alloy 20 Double ball check (Needed for applications above 500 psi)
- **A23**: Alloy 20 Single inlet, double outlet (Recommended for Flooded suction with discharge pressure above 500 psi)
- **PVT**: PVDF/PTFE size 17 double inlet & outlet; sizes 30/40 single inlet & outlet

#### Connectors:
- **0**: NPT
- **1**: BSP taper
- **7**: MNPT PVDF Standard (PVT LE only)

#### Gear ratio:
- **01**: 12.5:1 56C
- **02**: 15:1 56C
- **03**: 30:1 56C
- **04**: 40:1 56C
- **05**: 50:1 56C
- **06**: 12.5:1 IEC (IEC 71 with B5 flange)
- **07**: 15:1 IEC (IEC 71 with B5 flange)
- **08**: 30:1 IEC (IEC 71 with B5 flange)
- **09**: 40:1 IEC (IEC 71 with B5 flange)
- **11**: 100:1 (17A/ 3/8 plunger only) 56C

#### Motor:
- **X**: No motor included
- **D**: Standard motor (1/2 HP, 115V, single phase, TEFC, NEMA 56C)

#### Base:
- **0**: Standard Base

#### Stroke adjustment:
- **1**: Manual stroke adjustment
- **7**: Explosion proof stroke positioning motor

#### Internal relief valve:
- **A**: 3500 psi/size 17
- **B**: 2080 psi/size 17
- **C**: 1230 psi/size 17
- **D**: 640 psi/size 17
- **E**: 300 psi/size 17
- **F**: 2080 psi/size 30
- **G**: 1230 psi/size 30
- **H**: 640 psi/size 30
- **I**: 265 psi/size 30 & 40
- **J**: 200 psi/size 30 & 40
- **K**: 160 psi (30B, C & 40)

#### Hydraulic oil:
- **0**: Standard
Complete this data sheet and fax it to ProMinent Pittsburgh at (412) 787-0704 or ProMinent Canada at (519) 836-5226 for a review of the system hydraulics and recommendations on pump and accessory specifications.

<table>
<thead>
<tr>
<th>Data required to size ProMus Pump:</th>
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<tbody>
<tr>
<td>Desired capacity min./max. GPH (l/h)</td>
</tr>
<tr>
<td>Available power supply V, Hz, phase</td>
</tr>
<tr>
<td>Working temperature min./max. °F (°C)</td>
</tr>
<tr>
<td>Description of process fluid</td>
</tr>
<tr>
<td>Concentration %</td>
</tr>
<tr>
<td>Solids content %</td>
</tr>
<tr>
<td>Absolute viscosity, cP</td>
</tr>
<tr>
<td>Vapor pressure at working temperature psig (bar)</td>
</tr>
<tr>
<td>Remarks (e.g. abrasive, developing gases and fumes, flammable, corrosive)</td>
</tr>
<tr>
<td>Suction conditions:</td>
</tr>
<tr>
<td>Suction lift min./max., or ft. (m)</td>
</tr>
<tr>
<td>Positive suction head min./max., or ft. (m)</td>
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<tr>
<td>Pressure in chemical tank psig (bar)</td>
</tr>
<tr>
<td>Length of suction line ft. (m)</td>
</tr>
<tr>
<td>Size (I.D.) of suction line in. (mm)</td>
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<tr>
<td>Number of valves and fittings in suction line</td>
</tr>
<tr>
<td>Discharge conditions:</td>
</tr>
<tr>
<td>Back-pressure min./max. psig (bar)</td>
</tr>
<tr>
<td>Discharge head min./max. ft. (m)</td>
</tr>
<tr>
<td>Negative discharge head min./max. ft. (m)</td>
</tr>
<tr>
<td>Length of discharge line ft. (m)</td>
</tr>
<tr>
<td>Size (I.D.) of discharge line in. (mm)</td>
</tr>
<tr>
<td>Number of valves and fittings in discharge line</td>
</tr>
</tbody>
</table>
ProMinent® ProMus
Hydraulic Diaphragm Metering Pumps

Dimensional Drawing: Size 17A/B (Metal)

ProMinent® ProMus
Hydraulic Diaphragm Metering Pumps

Solenoid-driven metering pumps

Motor-driven metering pumps

Pump spare parts & accessories

Pump engineering specifications

Analytical instrumentation

Analytical sensors

Product overview

Outline Plastic 17 Less Motor

Customer

Pittsburgh, PA USA
WWW.PROMINENT.US
PROMINENT FLUID CONTROLS LTD. PROMINENT FLUID CONTROLS, INC.
400 Southgate Drive. PBC Park West
Guelph, Ontario, Canada Pittsburgh, PA 15275 USA
519-829-3800 519-829-3828 412-787-3940 412-787-7054
DESIGNED BY
APPROVED BY
DRAWN BY
SCALE
CHECKED BY
DATE
SHEET SIZE
DIN No.

600-01
1

600-01
1

850104-00-600-01

112

3/20/2009 - ProMus
ProMinent® ProMus
Hydraulic Diaphragm Metering Pumps

Dimensional Drawing: Size 30B/C (Metal)

---

**Solenoid-driven metering pumps**

**Motor-driven metering pumps**

**Pump spare parts & accessories**

**Pump engineering specifications**

**Analytical instrumentation**

**Analytical sensors**

**Product overview**

---

**Customer**

**Job No**

**Purchase Order No**

**Title**

**Outline ProMus 30 H & 1/4 Plunger Less Motor**

**Engineers Seal**

**ProMinent®**

---

**ProMus 30B 30C**

<table>
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<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
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<tr>
<td>1</td>
<td>5.37 (136.5)</td>
<td>3.13 (79.4)</td>
<td>3.13 (79.4)</td>
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<tr>
<td>2</td>
<td>4.11 (104.5)</td>
<td>4.32 (109.8)</td>
<td>4.32 (109.8)</td>
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<tr>
<td>3</td>
<td>5.37 (136.5)</td>
<td>3.13 (79.4)</td>
<td>4.32 (109.8)</td>
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**Scale**: 1:1

**Date**: 03/09/06

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**Sheet Size**: A

**Drawing No**: 850102-00-600-01

**Page**: 1/1
ProMinent® ProMus
Hydraulic Diaphragm Metering Pumps

Dimensional Drawing: Size 40A/B/C (Metal)

Plunger Diameters 1"", 2"" & 2½"

Sixth Place in the Ident Code

ProMus
40A SS
40B A2
40C HC

3/16 Diameter 4 holes

5/4 Diameter 8 holes

Breather Vent
Relief/Air Bleed
Observation Port
Relief Adjusting Screw
Relief Valve Tower
8 Liquid End Bolts
90-120 Ft-lbs Torque (lubricated)

56C or IEC 71 with BS Flange

Oil Drain

Oil Level
ProMinent® ProMus
Hydraulic Diaphragm Metering Pumps

Dimensional Drawing: Size 40 (Plastic)

Plunger Diameters $1_{3}^\frac{1}{2}$, 2', & 2_{1}^\frac{1}{2}$

Sixth Place in the Ident Code

ProMus
40A
40B
PV
1

40C

PD

3.79
[96.3]

\frac{3}{16} Diameter
4 holes

Set Screw
Access

8 Liquid End Bolts
35 Ft-lbs Torque
(lubricated)

Relief Adjusting Screw
Relief Valve Tower

Breather Vent

56C or IEC 71 with BS Flange

Oil Drain

13.04
[33.2]

7.10
[180.4]

5.25
[133.4]

6.25
[159.7]

5.47
[138.9]

6.00
[152.4]

10.84
[275.3]

1.33
[33.9]

2.06
[52.4]

2.63
[66.7]

2.65
[67.4]

7.00
[177.8]

3.66
[92.9]

6.60
[167.6]

\frac{3}{16} M N P T

CUSTOMER

PURCHASE ORDER No

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A

DRAWN

CHECKED

04/15/08

SCALE

1:15

DRAWN

DESIGNED

QUALIFIED

APPROVED

REV

PAGE

850106-00-600-01

1

118
ProMinent® Makro TZ
Diaphragm Metering Pumps

Overview: Makro TZ

Ideal for high volume and high pressure applications
(see page 135 for spare parts)

The ProMinent® Makro TZMb is a mechanically or hydraulically actuated motor driven diaphragm metering pump.

The stroke length can be adjusted by means of the shift ring mechanism from 0-10 mm (TZMb), with 0.5 % accuracy. The 5-speed gearbox is encased in a cast, seawater resistant, acrylic resin lacquered housing. Liquid ends are available in different material combinations to suit differing applications. The suction lift varies according to the density and viscosity of the medium, the dimension of the pipework and the pump stroke rate. Reproducibility of metering is better than ±2 % in the stroke length range from 30 % -100 % subject to defined conditions and correct installation. (You must follow the instructions in the operating instruction manual).

ProMinent® Makro TZ TZMbA Add-On Pumps

The ProMinent® Makro TZ main diaphragm metering pump can be converted to a duplex or triplex pump with the ProMinent® Makro TZ add-on diaphragm pump (several add-on pumps can be operated at reduced back pressure). Multiplex pumps can also be retrofitted by the operator; all the necessary components and fittings are included with the TZMbA. Different stroke rates can be achieved with the add-on pump independently of the main pump as each TZMbA has its own reducing gear. The main power end can be fitted for this purpose with a more powerful drive motor. A base frame is required when using add-on power ends.

ProMinent® Makro TZ
Double Head Version TZMbD/TZMbB

The double head version of the ProMinent® Makro TZ is similar to the simplex pump. It is, however, fitted with a second liquid end.

The liquid ends work in push-pull mode by means of a coupling element in the gearbox.
**Identcode Ordering System (TZMb)**

<table>
<thead>
<tr>
<th>TZMb</th>
<th>Motor-Driven Metering Pump TZMb Makro TZ 10</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(mechanically driven add-on diaphragm pump)</td>
</tr>
</tbody>
</table>

**Drive type**
- **H** Main drive
- **A** Add-on power end
- **D** Double main drive
- **B** Double add-on power end

**Pump type:**
- 120260 070430 040840
- 120340 070570 041100
- 120430 070720 041400
- 120510 070880 041670
- 120650 071070

**Liquid end material:**
- PC PVC
- PP Polypropylene
- SS Stainless steel
- TT PTFE + 25% carbon

**Seal material:**
- T PTFE

**Positive displacement element:**
- 1 Standard composite diaphragm with rupture indicator

**Liquid end version:**
- 0 No valve springs
- 1 With valve springs

**Hydraulic connection:**
- 0 Standard connection
- 1 PVC union nut and insert
- 2 PP union nut and insert
- 3 PVDF union nut and insert
- 4 SS union nut and insert

**Version:**
- 0 with ProMinent® logo
- 1 No ProMinent® logo
- A 0 with ProMinent® logo, with frame, simplex
- B 0 with ProMinent® logo, with frame, duplex
- C 0 with ProMinent® logo, with frame, triplex
- M Modified

**Electrical power supply:**
- S 3 ph. 230/400 V 50/60 Hz (dual-wound)
- P 3 ph. 230/400 V 60 Hz (Exe, Exde)
- R Variable speed motor 4 pole 230/400 V
- V Variable speed motor with integral speed changer
- Z Speed control kit
- 4 No motor, with 56 C flange
- 7 No motor, with 120/80 flange
- 8 No motor, with 160/90 flange
- 9 No motor, with 200/90 flange

**Enclosure rating:**
- 0 IP 55 (Standard) ISO class F
- A ATEX power end

**Stroke sensor:**
- 0 No stroke sensor
- 1 With stroke sensor (Namur)

**Stroke length adjustment:**
- 0 0 Stroke length adjustment, man.
- 1 230 V stroke actuator
- 2 115 V stroke actuator
- 3 230 V 0-20 mA stroke controller
- 4 230 V 4-20 mA stroke controller
- 5 115 V 0-20 mA stroke controller
- 6 115 V 4-20 mA stroke controller

**Applications:**
- 0 Standard
# ProMinent® Makro TZ Diaphragm Metering Pumps

## Capacity Data (TZMbH)

**with 1800 rpm motor at 60 Hz**

<table>
<thead>
<tr>
<th>Pump type</th>
<th>gph</th>
<th>l/h</th>
<th>psi</th>
<th>bar</th>
<th>ml/ stroke</th>
<th>strokes/min</th>
<th>ft (m)</th>
<th>in (DN)</th>
<th>lb (kg)</th>
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<tbody>
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<td></td>
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<td>60</td>
<td>86</td>
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<td>1 (25)</td>
<td>101.4/119 (46/54)</td>
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<td>1 1/2 (32)</td>
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<td>2 (40)</td>
<td>123.5/176.4 (56/80)</td>
</tr>
</tbody>
</table>

**Stroke length 10 mm**

The admissible priming pressure on the suction side is 50 % of the maximum back pressure.

## Materials In Contact With Chemical In Version

<table>
<thead>
<tr>
<th>Pump Head</th>
<th>Suction/ Discharge Connector</th>
<th>DN 25 Ball Valves</th>
<th>DN 32/DN 40 Plate Valves**</th>
<th>Valve Seat</th>
<th>Valve Plate/ Valve Spring</th>
<th>Valve Seat</th>
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</thead>
<tbody>
<tr>
<td>PPT Polypropylene</td>
<td>PVDF</td>
<td>PTFE</td>
<td>Ceramic</td>
<td>PTFE</td>
<td>PTFE Ceramic/ Hast. C + CTFE**</td>
<td>PTFE</td>
</tr>
<tr>
<td>PCT PVC</td>
<td>PVDF</td>
<td>PTFE</td>
<td>Ceramic</td>
<td>PTFE</td>
<td>PTFE Ceramic/ Hast. C + CTFE**</td>
<td>PTFE</td>
</tr>
<tr>
<td>TTT PTFE with carbon</td>
<td>PTFE with carbon</td>
<td>PTFE</td>
<td>Ceramic</td>
<td>PTFE</td>
<td>PTFE Ceramic/ Hast. C + CTFE**</td>
<td>PTFE</td>
</tr>
<tr>
<td>SST Stainless steel</td>
<td>Stainless steel</td>
<td>PTFE</td>
<td>Stainless steel</td>
<td>PTFE</td>
<td>PTFE Stainless steel Hast. C + CTFE*</td>
<td>PTFE</td>
</tr>
</tbody>
</table>

Multi-layer safety diaphragm with PTFE coating.

** The valve spring is coated with CTFE (similar to PTFE)
Custom designs available to order.