Three operating instruction manuals are required for the safe and correct operation of the ProMinent® Sigma SBKa and SCKa piston metering pumps.

- this product-specific “Operating Instructions Manual Sigma Piston Metering Pump”
- the “Operating Instruction Manual Sigma/2”
- and the “General Operating Instructions ProMinent® Motor-Driven Metering Pumps and Hydraulic Accessories”;

All three are valid only when read in conjunction with one another!

Please read through operating instructions carefully before use. Do not discard.

The operator shall be liable for any damage caused by installation or operating errors!
Table of contents

<table>
<thead>
<tr>
<th>Device description Identity code</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Safety instructions</td>
<td>6</td>
</tr>
<tr>
<td>1.1 Correct use of equipment</td>
<td>7</td>
</tr>
<tr>
<td>1.2 Safety equipment</td>
<td>7</td>
</tr>
<tr>
<td>2 Product description</td>
<td>8</td>
</tr>
<tr>
<td>2.1 Identification of the pump type</td>
<td>8</td>
</tr>
<tr>
<td>2.2 Design/function description</td>
<td>8</td>
</tr>
<tr>
<td>2.2.1 Section drawing SBKa/SCKa</td>
<td>8</td>
</tr>
<tr>
<td>2.2.2 Illustration of the stroke action</td>
<td>9</td>
</tr>
<tr>
<td>2.2.3 Feed rate diagram</td>
<td>10</td>
</tr>
<tr>
<td>2.2.4 Liquid end function description</td>
<td>13</td>
</tr>
<tr>
<td>3 Technical data</td>
<td>14</td>
</tr>
<tr>
<td>3.1 Technical data Sigma</td>
<td>14</td>
</tr>
<tr>
<td>3.1.1 Performance data</td>
<td>14</td>
</tr>
<tr>
<td>3.1.2 Dimension sheet Sigma SBKa</td>
<td>17</td>
</tr>
<tr>
<td>3.1.3 Dimension sheet Sigma SCKa</td>
<td>17</td>
</tr>
<tr>
<td>4 Installation, hydraulic</td>
<td>19</td>
</tr>
<tr>
<td>5 Commission/Maintenance</td>
<td>20</td>
</tr>
<tr>
<td>5.1 Commissioning</td>
<td>20</td>
</tr>
<tr>
<td>5.2 Maintenance</td>
<td>20</td>
</tr>
<tr>
<td>6 Repair</td>
<td>21</td>
</tr>
<tr>
<td>6.1 Liquid end</td>
<td>22</td>
</tr>
<tr>
<td>6.2 Servicing double ball valves</td>
<td>23</td>
</tr>
<tr>
<td>7 Spare parts</td>
<td>25</td>
</tr>
<tr>
<td>Appendix</td>
<td>26</td>
</tr>
<tr>
<td>Exploded view of the liquid end</td>
<td>26</td>
</tr>
<tr>
<td>Declaration of Conformity</td>
<td>27</td>
</tr>
</tbody>
</table>
Please state the Identcode and serial number, which you will find on the nameplate, with any query or spare parts order. This will enable clear identification of the pump type and material variants.

### Identcode Ordering System

Please state the Identcode and serial number, which you will find on the nameplate, with any query or spare parts order. This will enable clear identification of the pump type and material variants.

<table>
<thead>
<tr>
<th>SBKα</th>
<th>Sigma Base Model (SBKα)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HK</td>
<td>main drive, piston</td>
</tr>
</tbody>
</table>

#### Pump type:
(digits 1 - 3 = back pressure [bar], digits 4 + 5 = feed rate [L/H])
- 32002 07012
- 32004 04222
- 10006 02534
- 14006 04022
- 00111 02541
- 10011 02541
- 05016 01264

#### Liquid end material:
- SS stainless steel

#### Seal material:
- T PTFE seal

#### Displacement elements:
- 4 pistons (ceramic oxide)

#### Liquid end version:
- 0 without valve springs (standard)
- 1 with 2 valve springs, Hastelloy C/0.1 bar

#### Hydraulic connection:
- standard threaded connection (in accordance with technical data)

#### Enclosure rating (motor):
- 0 IP 55 (standard)
- 1 Exe-design (II 2G EEx e II T3)
- 2 Exde-design (II 2G EEx de IIC T4)
- A ATEX drive

#### Stroke sensor:
- 0 without stroke sensor (standard)
- 2 pacing relay (reed relay)
- 3 stroke sensors (NAMUR) for explosive area, intrinsically safe

#### Stroke length adjustment:
- 0 manual (standard)
- 1 with servomotor 230 V/50/60 Hz
- 2 with servomotor 115 V/50/60 Hz
- 3 with variable speed motor 0...20 size, mA 230 V/50/60 Hz
- 4 with variable speed motor 4...20 size, mA 230 V/50/60 Hz
- 5 with variable speed motor 0...20 size, mA 115 V/50/60 Hz
- 6 with variable speed motor 4...20 size, mA 115 V/50/60 Hz
Please state the Identcode and serial number, which you will find on the nameplate, with any query or spare parts order. This will enable clear identification of the pump type and material variants.

<table>
<thead>
<tr>
<th>SCKa</th>
<th>Sigma controller type (SCKa)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>main drive, piston</td>
</tr>
<tr>
<td></td>
<td><strong>Pump type:</strong> digits 1 - 3 = back pressure [bar], digits 4 + 5 = feed rate [l/h]</td>
</tr>
<tr>
<td>32002</td>
<td>320 bar, 2.3 l/h</td>
</tr>
<tr>
<td>32004</td>
<td>230 bar, 4.8 l/h</td>
</tr>
<tr>
<td>10006</td>
<td>100 bar, 6.4 l/h</td>
</tr>
<tr>
<td>14006</td>
<td>140 bar, 7.1 l/h</td>
</tr>
<tr>
<td>10011</td>
<td>100 bar, 13.1 l/h</td>
</tr>
<tr>
<td>05016</td>
<td>50 bar, 16.7 l/h</td>
</tr>
<tr>
<td>07012</td>
<td>70 bar, 14.8 l/h</td>
</tr>
<tr>
<td>34502</td>
<td>45 bar, 26.7 l/h</td>
</tr>
<tr>
<td>03534</td>
<td>25 bar, 34.1 l/h</td>
</tr>
<tr>
<td>34023</td>
<td>40 bar, 26.5 l/h</td>
</tr>
<tr>
<td>03541</td>
<td>25 bar, 49.2 l/h</td>
</tr>
<tr>
<td>01264</td>
<td>12 bar, 64.2 l/h</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Liquid end material:</th>
<th>SS stainless steel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seal material:</td>
<td>T PTFE seal</td>
</tr>
<tr>
<td>Plunger:</td>
<td>4 pistons (ceramic oxide)</td>
</tr>
<tr>
<td>Liquid end version:</td>
<td>0 without valve springs (standard)</td>
</tr>
<tr>
<td></td>
<td>1 with 2 valve springs, Hastelloy C, 0.1 bar</td>
</tr>
<tr>
<td>Hydraulic connection:</td>
<td>standard threaded connection (in accordance with technical data)</td>
</tr>
<tr>
<td>Version:</td>
<td>0 with ProMinent® logo</td>
</tr>
<tr>
<td></td>
<td>1 without ProMinent® logo</td>
</tr>
<tr>
<td>E1, power supply:</td>
<td>U 1 ph 100-230 V ±10 %, 50/60 Hz</td>
</tr>
<tr>
<td>Cables and connectors:</td>
<td>A 2 M Europe</td>
</tr>
<tr>
<td></td>
<td>B 2 M Swiss</td>
</tr>
<tr>
<td></td>
<td>C 2 M Australian</td>
</tr>
<tr>
<td></td>
<td>D 2 M USA</td>
</tr>
<tr>
<td>Relays:</td>
<td>0 without relay</td>
</tr>
<tr>
<td></td>
<td>1 fault-indicating relay N/C</td>
</tr>
<tr>
<td></td>
<td>3 fault-indicating relay N/O</td>
</tr>
<tr>
<td></td>
<td>4 as 1 + pacing relay</td>
</tr>
<tr>
<td></td>
<td>5 as 3 + pacing relay</td>
</tr>
<tr>
<td>Control variant:</td>
<td>0 manual + external pulse control + analogue</td>
</tr>
<tr>
<td></td>
<td>1 manual + external + pulse control + analogue</td>
</tr>
<tr>
<td></td>
<td>4 as 0 + process timer</td>
</tr>
<tr>
<td></td>
<td>5 as 1 + process timer + analogue</td>
</tr>
<tr>
<td>Access code:</td>
<td>0 without access code</td>
</tr>
<tr>
<td></td>
<td>1 with access code</td>
</tr>
<tr>
<td>Dosing monitor:</td>
<td>0 input with pulse evaluation</td>
</tr>
<tr>
<td></td>
<td>1 input with count, evaluation</td>
</tr>
<tr>
<td>Stroke length adjustment:</td>
<td>0 manual</td>
</tr>
</tbody>
</table>

Pr:Minent®
1 Safety instructions

General instructions for use

This operating instructions manual describes the special features of the Sigma piston metering pump.

WARNING
You must follow the instructions in this operating instructions manual, the “Sigma/2 Operating Instructions Manual” and the “General Operating Instructions Manual for ProMinent® Motor Driven Metering Pumps and Hydraulic Accessories” before assembly, installation and maintenance!

Please read through the following instructions for use carefully. They will help you to make the best use of the operating instructions manual.

The following are particularly highlighted in the text:

• numbered points

► practical instructions

Operating instructions:

IMPORTANT
Notes are intended to make your work easier.

and safety instructions with pictographs:

WARNING
 describes a potentially hazardous situation. If not avoided, could put your life at risk or result in serious injury.

CAUTION
 describes a potentially hazardous situation. If not avoided, could result in slight or minor injury or damage to property.

ATTENTION
 describes a potentially damaging situation. If not avoided, could result in damage to property.
1.1 Correct use

- This pump is a fluid pump and is designed for metering liquid media within the specified capacity range.
- In potentially explosive operating sites in zone 1, device category II 2G of the explosion group II C, the pump may only be operated with the corresponding rating plate and the corresponding EU declaration of conformity for potentially explosive operating sites pursuant to the directive 94/9/EU according to the European standards. The explosion group, category and type of protection stated on the plate must correspond or be superior to the conditions given in the planned area of application.
- Observe the general constraints with regard to viscosity limits, chemical resistance and density.
- All other uses or modifications are prohibited!
- The pump is not suitable for metering gaseous media or solids!
- Pumps without corresponding rating plate and the corresponding EU declaration of conformity for potentially explosive operating sites may never be operated in potentially explosive operating sites.
- Observe material resistances when metering chemicals. See the resistance lists in the latest Product Catalogue or at www.prominent.de.
- Pumps with piston liquid ends are not suitable for metering life-threatening liquids.
- They must not be operated in any other than the conditions described in section 3.
- It is essential that you read this operating instruction manual and "Operating Instructions Sigma/2" together with the "General Operating Instructions for ProMinent® Metering Pumps and Hydraulic Accessories" concerning assembly, installation and maintenance!
- The pump must be operated by appropriately trained and authorised personnel!
- You are obliged to observe the information in the operating instructions on the various performance phases of the device!

1.2 Safety equipment

Fig.1: Safety cover, two piece (*)
2 Product description

2.1 Identification of the pump type

Fig. 2

The identcode and serial number are specified along with the usual basic technical data. State both numbers when contacting customer services in order to ensure clear identification of the pump type.

2.2 Design/function description

2.2.1 Section drawing SBKa/SCKa

Fig. 3

1 Motor
3 Eccentric cam
4 Push rod
5 Reciprocator
6 Stroke adjustment knob
7 Axis
8 Uptake fork
10 Gearbox venting plug
2.2.2 Illustration of the stroke action

Set the piston metering pump Sigma stroke length depending on the required feed rate.

IMPORTANT
- Select a stroke length as large as possible for viscous media!
- Select a stroke length as large as possible for outgassing media!
- Select a stroke length as large as possible for a good mixture!
- Do not adjust the stroke length below 10% (30% for delivery unit FK 08) to obtain an accurate metering for volume-proportional metering.
2.2.3 Feed rate diagram
2.2.4 Liquid end function description

Piston liquid end function description
The heart of the liquid end is a highly resistant piston (4) made of coated stainless steel. When the piston (4) moves into the liquid end, the suction valve (1) closes and the metering chemical flows out of the liquid end through the pressure valve (3). When the piston moves in the opposite direction, the pressure valve (3) closes due to the vacuum in the liquid end and fresh metering medium flows through the suction valve (1) into the liquid end.
The piston’s seal surfaces can be flushed by means of the flushing ring (6).
### Technical data

#### 3.1 Technical data Sigma piston metering pump

#### 3.1.1 Performance data

**Technical data SBKa at 50 Hz operation**

<table>
<thead>
<tr>
<th>Pump type</th>
<th>Feed rate at max. back pressure</th>
<th>No. of strokes at max. back pr.</th>
<th><em>priming pressure</em></th>
<th>Admission suction lift</th>
<th>Connection suction/discharge side</th>
<th>Shipping weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sigma HK</td>
<td>bar psi l/h strokes/min WC bar</td>
<td>Rp kg</td>
<td>Up to 50 % from max. adm. back pressure</td>
<td>1/4 24</td>
<td>1/4 24</td>
<td></td>
</tr>
<tr>
<td>32002</td>
<td>320 1.9 0.46 71 5</td>
<td>129 5</td>
<td>4</td>
<td>5 1/4 24</td>
<td>1/4 24</td>
<td></td>
</tr>
<tr>
<td>23004</td>
<td>230 4.0 0.52</td>
<td>129 5</td>
<td>4</td>
<td>5 1/4 24</td>
<td>1/4 24</td>
<td></td>
</tr>
<tr>
<td>10006</td>
<td>100 6.4 0.55</td>
<td>195 5</td>
<td>4</td>
<td>5 1/4 24</td>
<td>1/4 24</td>
<td></td>
</tr>
<tr>
<td>14006</td>
<td>140 6.1 1.42</td>
<td>71 4</td>
<td>4</td>
<td>1/4 24</td>
<td>1/4 24</td>
<td></td>
</tr>
<tr>
<td>10011</td>
<td>100 11.0 1.43</td>
<td>129 4</td>
<td>4</td>
<td>1/4 24</td>
<td>1/4 24</td>
<td></td>
</tr>
<tr>
<td>05016</td>
<td>50 16.7 1.43</td>
<td>195 4</td>
<td>4</td>
<td>1/4 24</td>
<td>1/4 24</td>
<td></td>
</tr>
<tr>
<td>07012</td>
<td>70 12.4 2.90</td>
<td>71 4</td>
<td>4</td>
<td>1/4 24</td>
<td>1/4 24</td>
<td></td>
</tr>
<tr>
<td>04522</td>
<td>45 22.5 2.91</td>
<td>129 4</td>
<td>4</td>
<td>1/4 24</td>
<td>1/4 24</td>
<td></td>
</tr>
<tr>
<td>02534</td>
<td>25 34.1 2.92</td>
<td>195 4</td>
<td>4</td>
<td>1/4 24</td>
<td>1/4 24</td>
<td></td>
</tr>
<tr>
<td>04022</td>
<td>40 22.4 5.26</td>
<td>71 4</td>
<td>4</td>
<td>3/8 25</td>
<td>3/8 25</td>
<td></td>
</tr>
<tr>
<td>02541</td>
<td>25 41.5 5.37</td>
<td>129 4</td>
<td>4</td>
<td>3/8 25</td>
<td>3/8 25</td>
<td></td>
</tr>
<tr>
<td>01264</td>
<td>12 64.0 5.45</td>
<td>195 4</td>
<td>4</td>
<td>3/8 25</td>
<td>3/8 25</td>
<td></td>
</tr>
</tbody>
</table>

**Technical data SBKa at 60 Hz operation**

<table>
<thead>
<tr>
<th>Pump type</th>
<th>Feed rate at max. back pressure</th>
<th>No. of strokes at max. back pr.</th>
<th><em>priming pressure</em></th>
<th>Admission suction lift</th>
<th>Connection suction/discharge side</th>
<th>Shipping weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sigma HK</td>
<td>bar psi l/h strokes/min WC bar</td>
<td>Rp kg</td>
<td>Up to 50 % from max. adm. back pressure</td>
<td>1/4 24</td>
<td>1/4 24</td>
<td></td>
</tr>
<tr>
<td>32002</td>
<td>320 4627 2.3 0.6</td>
<td>84 5</td>
<td>4</td>
<td>1/4 24</td>
<td>1/4 24</td>
<td></td>
</tr>
<tr>
<td>23004</td>
<td>230 3335 4.8 1.2</td>
<td>154 5</td>
<td>4</td>
<td>1/4 24</td>
<td>1/4 24</td>
<td></td>
</tr>
<tr>
<td>10006</td>
<td>100 1450 7.6 2.0</td>
<td>233 5</td>
<td>4</td>
<td>1/4 24</td>
<td>1/4 24</td>
<td></td>
</tr>
<tr>
<td>14006</td>
<td>140 2030 7.1 1.8</td>
<td>84 4</td>
<td>4</td>
<td>1/4 24</td>
<td>1/4 24</td>
<td></td>
</tr>
<tr>
<td>10011</td>
<td>100 1450 13.1 3.4</td>
<td>153 4</td>
<td>4</td>
<td>1/4 24</td>
<td>1/4 24</td>
<td></td>
</tr>
<tr>
<td>05016</td>
<td>50 725 20.0 5.2</td>
<td>233 4</td>
<td>4</td>
<td>1/4 24</td>
<td>1/4 24</td>
<td></td>
</tr>
<tr>
<td>07012</td>
<td>70 1015 14.8 3.9</td>
<td>85 4</td>
<td>4</td>
<td>1/4 24</td>
<td>1/4 24</td>
<td></td>
</tr>
<tr>
<td>04522</td>
<td>45 652 26.7 7.0</td>
<td>153 4</td>
<td>4</td>
<td>1/4 24</td>
<td>1/4 24</td>
<td></td>
</tr>
<tr>
<td>02534</td>
<td>25 363 40.8 10.78</td>
<td>233 4</td>
<td>4</td>
<td>1/4 24</td>
<td>1/4 24</td>
<td></td>
</tr>
<tr>
<td>04022</td>
<td>40 560 26.5 7.0</td>
<td>84 4</td>
<td>4</td>
<td>3/8 25</td>
<td>3/8 25</td>
<td></td>
</tr>
<tr>
<td>02541</td>
<td>25 363 49.2 18.0</td>
<td>153 4</td>
<td>4</td>
<td>3/8 25</td>
<td>3/8 25</td>
<td></td>
</tr>
<tr>
<td>01264</td>
<td>12 174 76.0 20.1</td>
<td>233 4</td>
<td>4</td>
<td>3/8 25</td>
<td>3/8 25</td>
<td></td>
</tr>
</tbody>
</table>

The performance data applies in relation to water at 20 °C.

* The suction lift was determined with full liquid end and full suction pipe for water and correctly sized suction line cross section.
Technical data SCKs at 60 Hz operation

<table>
<thead>
<tr>
<th>Pump type</th>
<th>Sigma HK</th>
<th>Feed rate at max. back pressure</th>
<th>No. of strokes at max. back pr.</th>
<th>*priming pressure</th>
<th>Adm. suction lift</th>
<th>Connection succion/discharge side</th>
<th>Shipping weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>32002</td>
<td>100</td>
<td>1450</td>
<td>1.9</td>
<td>90</td>
<td>4</td>
<td>1/4-8</td>
<td>26</td>
</tr>
<tr>
<td>23004</td>
<td>100</td>
<td>1450</td>
<td>3.3</td>
<td>140</td>
<td>5</td>
<td>1/4-8</td>
<td>26</td>
</tr>
<tr>
<td>10006</td>
<td>100</td>
<td>1450</td>
<td>6.8</td>
<td>200</td>
<td>5</td>
<td>1/4-8</td>
<td>26</td>
</tr>
<tr>
<td>14006</td>
<td>140</td>
<td>2303</td>
<td>4.3</td>
<td>90</td>
<td>4</td>
<td>1/4-8</td>
<td>26</td>
</tr>
<tr>
<td>10011</td>
<td>100</td>
<td>1450</td>
<td>11</td>
<td>140</td>
<td>4</td>
<td>1/4-8</td>
<td>26</td>
</tr>
<tr>
<td>05016</td>
<td>50</td>
<td>725</td>
<td>17.1</td>
<td>200</td>
<td>4</td>
<td>1/4-8</td>
<td>26</td>
</tr>
<tr>
<td>07012</td>
<td>70</td>
<td>1015</td>
<td>12.4</td>
<td>90</td>
<td>4</td>
<td>1/4-8</td>
<td>26</td>
</tr>
<tr>
<td>04522</td>
<td>45</td>
<td>652</td>
<td>22.5</td>
<td>140</td>
<td>4</td>
<td>1/4-8</td>
<td>26</td>
</tr>
<tr>
<td>02534</td>
<td>25</td>
<td>363</td>
<td>34.2</td>
<td>200</td>
<td>4</td>
<td>1/4-8</td>
<td>26</td>
</tr>
<tr>
<td>04022</td>
<td>40</td>
<td>585</td>
<td>22.4</td>
<td>90</td>
<td>4</td>
<td>3/8-10</td>
<td>27</td>
</tr>
<tr>
<td>02541</td>
<td>25</td>
<td>363</td>
<td>41.5</td>
<td>140</td>
<td>4</td>
<td>3/8-10</td>
<td>27</td>
</tr>
<tr>
<td>01254</td>
<td>12</td>
<td>174</td>
<td>60.9</td>
<td>200</td>
<td>4</td>
<td>3/8-10</td>
<td>27</td>
</tr>
</tbody>
</table>

The performance data applies in relation to water at 20°C.

* The suction lift was determined with full liquid end and full suction pipe for water and correctly sized suction line cross section.

Viscosity

- The liquid ends are suitable for a maximum viscosity of:
  - 200 mPa s with valves without valve springs
  - 500 mPa s with valves with valve springs
  - 1000 mPa s with accordingly designed installation
  - > 1000 mPa s with accordingly designed installation and in consultation with ProMinent

Materials in contact with chemicals

<table>
<thead>
<tr>
<th>Liquid end</th>
<th>Suction/discharge connectors</th>
<th>Seals</th>
<th>Closing elements</th>
<th>Ball seat</th>
<th>Pistons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stainless steel 1.4571/1.4404</td>
<td>Stainless steel 1.4571/1.4404</td>
<td>PTFE and/or PTFE with graphite</td>
<td>Oxide ceramic</td>
<td>Stainless steel 1.4571/1.4404</td>
<td>Stainless steel/ ceramic</td>
</tr>
</tbody>
</table>

Temperature details:
- Admissible storage temperature: -10 ... 50°C
- Admissible ambient temperature: -10 ... 40°C

Maximum medium temperature:
150°C long term, at max. back pressure

Accuracy
- The reproducibility of the feed rate is ± 0.5 % at (±1 % for FK 08 liquid end):
  - stroke length at least 10 % (30 % for FK 08 liquid end)
  - metering liquid - water
  - temperature 20°C
  - back pressure min. 1 bar
  - constant conditions.

If this metering reproducibility is not achieved check the installation.
Technical data

Supplement for modified version:

(Identity code item "Version": "M-modified")

[Affix sticker with modified data here!]
3.1.2 Dimension sheet Sigma SBKa

Fig. 7

3.1.3 Dimension sheet Sigma SCKa

Fig. 8
## Technical data

### Table for dimensions sheets Sigma/2 HK (dimensions in mm)

<table>
<thead>
<tr>
<th>Pump type</th>
<th>liquid end</th>
<th>A SBKa</th>
<th>A SCKa</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>32002</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>R 1/4&quot; (DN 8)</td>
</tr>
<tr>
<td>23004</td>
<td></td>
<td>252</td>
<td>267</td>
<td>164</td>
<td></td>
</tr>
<tr>
<td>20006</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14006</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>R 1/4&quot; (DN 8)</td>
</tr>
<tr>
<td>10011</td>
<td></td>
<td>252</td>
<td>267</td>
<td>164</td>
<td></td>
</tr>
<tr>
<td>05016</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>07012</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>R 1/4&quot; (DN 8)</td>
</tr>
<tr>
<td>04522</td>
<td></td>
<td>252</td>
<td>267</td>
<td>164</td>
<td></td>
</tr>
<tr>
<td>02534</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>04022</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>R 3/8&quot; (DN 8)</td>
</tr>
<tr>
<td>02541</td>
<td></td>
<td>254</td>
<td>269</td>
<td>174</td>
<td></td>
</tr>
<tr>
<td>01264</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Supplementary table for dimension sheet SBKas (dimensions in mm)

<table>
<thead>
<tr>
<th>Type</th>
<th>Standard motor</th>
<th>Motor controllable</th>
<th>EEExe motor</th>
<th>EExde motor</th>
<th>Motor with frequency converter</th>
<th>1-ph. motor</th>
</tr>
</thead>
<tbody>
<tr>
<td>all</td>
<td>L</td>
<td>L</td>
<td>L</td>
<td>L</td>
<td>L</td>
<td>L</td>
</tr>
</tbody>
</table>
4 Installation, hydraulic

WARNING
- EX pump only: Always observe the “Important supplements for dosing pumps in EX areas” section of the “General Operating Instruction for ProMinent Motor-Driven Metering Pumps and Hydraulic Accessories”!
- The liquid ends may contain traces of water from the factory tests. Remove all traces before installation if using with media which should not come into contact with water!
- Blow out liquid end with compressed air to remove water, then flush out the suction connector with a suitable rinsing agent.
- Connect discharge lines in such a way that maximum pressures during the discharge stroke do not exceed the maximum admissible operating pressure of the equipment and the pump.

ATTENTION
- If metering media with particle sizes larger than 0.3 mm you must fit a filter in the suction line.
- Reproducible metering is only possible at a constant back pressure over 1 bar. If metering via an atmospheric pressure outlet, use a ball check valve to generate a back pressure of approx. 1.5 bar.

Priming pressure
Viscosity The liquid ends are suitable for a maximum viscosity of:
- 200 mPa s with valves without valve springs
- 500 mPa s with valves with valve springs
- 1000 mPa s with accordingly designed installation
- > 1000 mPa s with accordingly designed installation and in consultation with ProMinent

ATTENTION
If you do not fit a flushing assembly ensure that no dust or foreign bodies can pass through the upper hose nozzle.
The liquid end may otherwise be damaged.
Fit e.g. sealing plug (Order No.399688).

Connecting flushing assembly

ATTENTION
- The flushing medium pressure must not exceed maximum 0.5 bar!
- The flushing medium must be compatible with the metering chemical and the liquid end materials.
- In the case of very aggressive and toxic media or media with minimal lubricating characteristics you must connect a flushing assembly.
  ▶ Connect the flushing assembly to the hose nozzles via two hoses.
5 Commissioning/Maintenance

5.1 Commissioning

WARNING

• EX pump only: Always observe the “Important supplements for dosing pumps in EX areas” section of the “General Operating Instruction for ProMinent® Motor-Driven Metering Pumps and Hydraulic Accessories”!

ATTENTION

• The pump is designed for metering liquid media within the specified capacity range.
• Observe constraints if you encounter greater medium viscosity or density!
• Ensure that liquid end materials are resistant to the metering medium! (see ProMinent® resistance list in the Product Catalogue or at www.prominent.de)
• The pump may not be operated in any other than the environmental conditions described in the “Technical data” section!
• If metering media with particle sizes larger than 0.3 mm you must fit a filter in the suction line!

Checking oil level

Check that the oil level in the pump reaches the height of the oil inspection glass. In this way you can ensure that the pump has not lost oil or suffered damage in transit due to unprofessional transportation.

5.2 Maintenance

WARNING

• EX pump only: Always observe the “Important supplements for dosing pumps in EX areas” section of the “General Operating Instruction for ProMinent® Motor-Driven Metering Pumps and Hydraulic Accessories”!
• Always depressurise suction and discharge lines before working on the pump!
• If used with hazardous or unknown media, always wear appropriate personal protection equipment before working on the liquid end!
• Only specially trained or authorised personnel may service metering pumps and their peripherals!
• If present, always switch off external fans, servomotors or other additional equipment. Check that equipment is disconnected from the power supply.
• Secure equipment to ensure that it cannot be turned on by unauthorised personnel during maintenance or repair work on the pump!

IMPORTANT

Keep a spare part kits in stock for maintenance work!
(part number see “Spare parts”)
Maintenance

After every 3 months check:
- firm seating of discharge valve and suction valve
- firm seating of discharge line (discharge and suction side)
- the oil level
- that the pump is feeding correctly (run for short period at max capacity - observe max. admissible operating pressure!)
- that the piston liquid end is not leaking

If subject to heavy use (e.g. continuous operation) we recommend reducing the intervals between services.

The piston packing rings are consumables; their service life depends on the following parameters:
- system back pressure
- operating temperature
- characteristics of the metering medium.
Abrasive and in particular contaminated media will shorten the service life of piston packings.
In this case we recommend checking the piston packings for leaks more frequently.

After approx. 5000 operating hours:
- change the gear oil.
Mobilgear gear oil 634 VG 460, ProMinent Part No.555325 (1 liter oil can).
Oil quantity: approx.0.5 l

6 Repair

► Stop the pump so that you can reach both the nuts on the push rod with a spanner.

WARNING

- EX pump only: Always observe the “Important supplements for dosing pumps in EX areas” section of the “General Operating Instruction for ProMinent Motor-Driven Metering Pumps and Hydraulic Accessories”!
- Protect yourself from the metering medium if hazardous!
- Always depressurise suction and discharge line before working on the pump!
- If used with hazardous and unknown media, always empty and rinse the liquid end before maintenance or repair work!
- If used with hazardous or unknown media, always wear appropriate personal protection equipment before working on the liquid end!
- Secure equipment to ensure that it cannot be turned on by unauthorised personnel during maintenance or repair work on the pump!
- Only send the equipment for repair or maintenance in a cleaned condition and with the liquid end flushed. However, should any safety precautions be necessary even after careful draining and cleaning of the equipment, the required information must be listed in the Safety Declaration!
- The Safety Declaration forms part of the inspection/repair contract.
- Maintenance or repair work will only be carried out if a Safety Declaration - correctly and fully completed by an authorised and qualified member of the Operator’s staff - is available.
- A copy of the form is included in the “General operating instructions for ProMinent motor-driven dosing pumps and hydraulic accessories” or can be downloaded at www.prominent.com.
6.1 Liquid end

**ATTENTION**
The piston is vulnerable to breakage.
Please take this into account when carrying out repairs.

**Dismantling liquid end**
- If applicable: remove flushing hoses from hose nozzles (31)
- Remove the upper safety cover from the lantern
- Slacken the locking nut on the push rod and detach the piston (2) from the push rod (See Fig. 9).

**ATTENTION**
Do not let the piston drop out!

**Servicing liquid end**
- Remove piston (2)
- Slacken the screws (25) on the liquid end flange and lift off liquid end flange (3)
- Slacken the screws (27) on the guide ring (5) and remove
- Remove the flushing ring (4), the V-packing collar (20), the disc (6) and spring (16)
- Clean the sealed compartment thoroughly
- Dispose of the V-collar packing (20), the O-ring (21) from the flushing ring, the FOI-Ring (23)
  and the guide band (24)
- Clean the other dismantled parts.
- Reassemble the parts in reverse order
- Insert the springs (16) and the disc (6) into the liquid end
ATTENTION

Do not damage the sealing lips on the V-packing collar (20)!
Push the V-packing collar (20) into the liquid end (the thicker ring is inserted last).
V-shaped rings - position with the open side towards the liquid end
(similar to the FOI-ring (item. 23 in Fig. 10))

- Draw a new O-ring (21) onto the flushing ring (4)
- Press a new FOI-sealing ring (21) into the flushing ring (4) (observe direction - see Fig. 10)
- Push the flushing ring (4) into the liquid end
- Place the guide ring (5) with a new guide band (24) onto the liquid end and screw tight (5 Nm).
- Now tighten the screws (27)
- Place the liquid end flange (3) onto the liquid end and screw tight (7 Nm)
- Push the piston (2) carefully into the liquid end.

Assembling liquid end
- Fasten the liquid end to the drive flange with the retaining screw (26) (pressure valve at the top!)
- Check that the small O-ring is positioned at the end of the push rod
- Screw the piston (2) firmly to the push rod
- Clamp the safety cover into the lantern
- (If applicable: install flushing hoses onto hose nozzles).

6.2 Servicing double ball valves

Cleaning a pressure valve:

- Always clean the discharge and suction valves one after another. They are not differentiated from one another by arrows.
- Use only new parts which fit your valve (in design, shape and chemical resistance).

Dismantling pressure valve:
- Unscrew the pressure valve out of the liquid end, rinse and dismantle
- Rinse and clean all parts
- Replace worn parts and seals.

Assembling pressure valve:

- Check the alignment of the valve seats (2) when assembling. The valve seats (2) have a finely finished side which serves as the ball valve while the other side works as a ball cage and spring guide. The finely finished side of all valve seats must be pointing in the direction of flow (arrow!)
- The spare part kits contain 2 valve seats rather than 3 for each valve as the top valve seat in the drawings can still perform even if it is out of alignment.
Repair

Fig. 11

1. Valve body
2. Valve seat
3. Valve ball
4. Valve bush
5. Seal
6. Spring (optional)
7. Insert disc
8. Seal (liquid end)

Slide in turn into the valve body (1):
- a seal (5) and a valve seat (2) (check direction!)
- a seal (5) and a valve bush (4)
- (if applicable: slide a spring (6) into the spring guide of the valve seat (2))
- a ball (3)
- a seal (5) and the second valve seat (2) (direction!)
- a seal (5) and the second valve bush (4)
- (if applicable: slide the second spring into the spring guide of the valve seat)
- the second ball
- a seal (5), the third valve seat (direction!) and another seal (5)

Place the insert disc (7) with the nose facing the stuffing box

IMPORTANT

The gap between the edge of the valve body and the insert disc is determined by the design!

Place the large seal (8) between the insert disc (7) and the liquid end
Grease the thread of the valve
Screw the valve to the stop.
Cleaning a suction valve: Suction valves are dismantled, cleaned and reassembled in precisely the same way as for discharge valves. Note however, when reassembling, that the valve seats (2) point in the opposite direction. (The finely finished side of all valve seats (2) must point in the direction of flow (arrow))

7 Spare parts
Spare part kits Sigma HK comprising (see fig. overleaf):
1 piston, ceramic
4 valve balls
4 ball seat discs
2 PTFE/graphite V-packing collars
2 piston guide bands
14 flat seals
1 O-ring
1 FOI sealing ring

<table>
<thead>
<tr>
<th>Order no.</th>
<th>Spare part kits</th>
</tr>
</thead>
<tbody>
<tr>
<td>1001572</td>
<td>FK 08 for Sigma HK</td>
</tr>
<tr>
<td>910470</td>
<td>FK 12.5 for Sigma HK</td>
</tr>
<tr>
<td>910471</td>
<td>FK 25 for Sigma HK</td>
</tr>
<tr>
<td>910472</td>
<td>FK 50 for Sigma HK</td>
</tr>
</tbody>
</table>
Appendix

Exploded view of the liquid end

Fig. 13

* The items listed are the components of the spare part kits
** Optional accessories (not in the spare part kits)
We reserve the right to make technical changes.
EC Declaration of Conformity

We, ProMinent Dosiertechnik GmbH
Im Schuhmachergewann 5 - 11
D - 69123 Heidelberg

hereby declare that, on the basis of its functional concept and design and in the version brought into circulation by us, the product specified in the following complies with the relevant, fundamental safety and health stipulations laid down by EC regulations. Any modification to the product not approved by us will invalidate this declaration.

Product description: Metering pump, Series Sigma

Product type: SBKa... / SCKa...

Serial number: see type identification plate on device

Relevant EC regulations:
- EC - machine regulation (98/37/EC)
- EC - low voltage regulation (2006/95/EC)
- EC - EMC - regulation (2004/108/EC)

Harmonised standards used, in particular:
- EN ISO 12100-1, EN ISO 12100-2, EN 809, EN 60335-1, EN 60335-2-41, EN 61010, EN 60204-1, EN 60034-5, EN 60529, EN 55014-1/2, EN 61000-3-2/3, EN 61000-6-2, EN 61800-3

Date/manufacturer’s signature: 06.10.2008

The undersigned: Joachim Schall, Head of R&D