Operating Instructions Manual
ProMinent® Sigma/ 2 HK Piston Metering Pump
S2Ba HK (Basic Model)
S2Ca HK (Control Model)

Three operating instruction manuals are required for the safe and correct operation of the ProMinent® Sigma/ 2 HK S2Ba and S2Ca piston metering pumps:
this product-specific “Operating Instructions Manual ProMinent® Sigma/ 2 HK Piston Metering Pump”,
the “Operating Instruction Manual ProMinent® 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 guarantee is void if the equipment is subject to misuse.
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</tr>
</tbody>
</table>
Identity Code Ordering System

The nameplate affixed to the title page is identical to that on your pump, enabling clear identification of the correct pump operating instructions manual.

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.

### Identity Code Ordering System

<table>
<thead>
<tr>
<th>S2Ba</th>
<th>Sigma Base Model (S2Ba HK)</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])

<table>
<thead>
<tr>
<th>Identcode</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>32002 07012</td>
<td>HK main drive, piston</td>
</tr>
<tr>
<td>23004 04522</td>
<td>HK main drive, piston</td>
</tr>
<tr>
<td>10006 02534</td>
<td>HK main drive, piston</td>
</tr>
<tr>
<td>14006 04022</td>
<td>HK main drive, piston</td>
</tr>
<tr>
<td>10011 02541</td>
<td>HK main drive, piston</td>
</tr>
<tr>
<td>08016 01264</td>
<td>HK main drive, piston</td>
</tr>
</tbody>
</table>

#### Liquid end material:

- SS stainless steel

#### Seal material:

- T PTFE seal

#### Displacement elements:

- 4 pistons (oxide ceramic)

#### 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)

#### Version:

- 0 with ProMinent® logo (standard)
- 1 without ProMinent® logo

#### El. power supply:

<table>
<thead>
<tr>
<th>Description</th>
<th>Voltage/Hz</th>
<th>Power</th>
</tr>
</thead>
<tbody>
<tr>
<td>S</td>
<td>3 ph, 230 V/400 V 50/60 Hz</td>
<td>0.18 kW</td>
</tr>
<tr>
<td>M</td>
<td>1 ph, alternating current, 230 V 50/60 Hz</td>
<td>0.18 kW</td>
</tr>
<tr>
<td>N</td>
<td>1 ph, alternating current, 115 V 60 Hz</td>
<td>0.18 kW</td>
</tr>
<tr>
<td>L</td>
<td>3 ph, 230 V/400 V 50 Hz, (EExe, EExde)</td>
<td>0.18 kW</td>
</tr>
<tr>
<td>P</td>
<td>3 ph, 230 V/400 V 60 Hz, (EExe, EExde)</td>
<td>0.18 kW</td>
</tr>
<tr>
<td>R</td>
<td>variable speed motor 3 ph, 230/400 V, 0.37 kW</td>
<td></td>
</tr>
<tr>
<td>V</td>
<td>variable speed motor with integr. speed changer 1 ph, 230 V/50/60 Hz</td>
<td></td>
</tr>
<tr>
<td>Z</td>
<td>speed controller set 1 ph, 230 V/50/60 Hz</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>without motor, with B 14 flange, size 71 (DIN)</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>without motor, with C 56 flange (NEMA)</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>without motor, B 5, size 63 (DIN)</td>
<td></td>
</tr>
</tbody>
</table>

#### Enclosure rating (motor):

<table>
<thead>
<tr>
<th>Description</th>
<th>Rating</th>
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<tbody>
<tr>
<td>0</td>
<td>IP 55 (standard)</td>
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<tr>
<td>1</td>
<td>EExe-design (EEEx II T3)</td>
</tr>
<tr>
<td>2</td>
<td>EExde-design (EEExde IIC T4)</td>
</tr>
</tbody>
</table>

#### Stroke sensor:

<table>
<thead>
<tr>
<th>Description</th>
<th>Sensor Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>without stroke sensor (standard)</td>
</tr>
<tr>
<td>2</td>
<td>pacing relay (reed relay)</td>
</tr>
<tr>
<td>3</td>
<td>stroke sensors (Namur) for explosive area</td>
</tr>
</tbody>
</table>

#### Stroke length adjustment:

<table>
<thead>
<tr>
<th>Description</th>
<th>Adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>manual (standard)</td>
</tr>
<tr>
<td>1</td>
<td>with servomotor, 230 V/50/60 Hz</td>
</tr>
<tr>
<td>2</td>
<td>with servomotor, 115 V/50/60 Hz</td>
</tr>
<tr>
<td>3</td>
<td>with variable speed motor 0...20 size, mA 230 V/50/60 Hz</td>
</tr>
<tr>
<td>4</td>
<td>with variable speed motor 4...20 size, mA 230 V/50/60 Hz</td>
</tr>
<tr>
<td>5</td>
<td>with variable speed motor 0...20 size, mA 115 V/50/60 Hz</td>
</tr>
<tr>
<td>6</td>
<td>with variable speed motor 4...20 size, mA 115 V/50/60 Hz</td>
</tr>
</tbody>
</table>

---

S2Ba HK SS T 4 0
Identity Code Ordering System

The nameplate affixed to the title page is identical to that on your pump, enabling clear identification of the correct pump operating instructions manual.

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>S2Ca</th>
<th>Sigma controller type (S2Ca HK)</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: 320 bar, 2.3 l/h
  - 23004: 320 bar, 4.8 l/h
  - 10006: 100 bar, 6.4 l/h
  - 14006: 140 bar, 7.1 l/h
  - 10011: 100 bar, 13.1 l/h
  - 05016: 50 bar, 16.7 l/h
  - 07012: 70 bar, 14.8 l/h
  - 04522: 45 bar, 26.7 l/h
  - 02534: 25 bar, 34.1 l/h
  - 04022: 40 bar, 26.5 l/h
  - 02541: 25 bar, 49.2 l/h
  - 01264: 12 bar, 64 l/h

- **Liquid end material:** stainless steel
- **Seal material:** PTFE seal
- **Plunger:** 4 pistons (oxide ceramic)
- **Liquid end version:**
  - 0: without valve springs (standard)
  - 1: with 2 valve springs, Hastelloy C0.1 bar
- **Hydraulic connection:**
  - 0: standard threaded connection (in accordance with technical data)

- **Version:**
  - 0: with ProMinent® logo
  - 1: without ProMinent® logo

- **El. power supply:**
  - A: 1 ph 200-230 V ±10 %, 50/60 Hz
  - C: 1 ph 115-127 V ±10 %, 50/60 Hz
  - W: 1 ph 115-230 V ±10 %, 50/60 Hz

- **Cables and connectors:**
  - A: 2 M Europe
  - B: 2 M Swiss
  - C: 2 M Australian
  - D: 2 M USA

- **Relays:**
  - 0: without relay
  - 1: fault indicating relay N/C
  - 3: fault-indicating relay N/O
  - 4: as 1 + pacing relay
  - 5: as 3 + pacing relay

- **Control variant:**
  - 0: manual + external with pulse control
  - 1: man. + external + pulse control + analogue
  - P: PROFIBUS®

- **Access code:**
  - 0: without access code
  - 1: with access code

- **Dosing monitor:**
  - 0: input with pulse evaluation
  - 1: input with cont. evaluation

- **Stroke length adjustment:**
  - 0: manual
1 Safety instructions

General instructions for use

This operating instructions manual describes the special features of the Sigma/2 HK piston metering pump.

**NOTICE**

You must follow the instructions in this operating instructions manual, the “ProMinent® 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, will place you in danger of your life and could result in serious injury.

**CAUTION**

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

**NOTICE**

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!

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!

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.

The pump is not suitable for metering flammable liquids!

It must not be operated in any other than the conditions described in section 3.

The pump must be operated by appropriately trained and authorised personnel!

1.2 Safety equipment

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

*
2 Product description

2.1 Identification of the pump type

Fig. 2

The identity code 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 S2Ba/S2Ca HK

Fig. 3

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

Set the Sigma HK stroke length depending on the required feed rate.

Fig. 4

a) Stroke progression at max. stroke rate and stroke length

b) at reduced stroke length

Fig. 5

100%

75%

50%

25%

IMPORTANT

Select small stroke length and high stroke rate to ensure good mixing.
For highly viscous media, select large stroke length and low stroke rate.
2.2.3 Feed rate diagram
Feed rate diagram S2Ca HK

Stroke length in (%)

Pressure in (bar)

Product description
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).

Fig. 6
### Technical data

#### 3.1 Technical data Sigma/ 2 HK

#### 3.1.1 Performance data

**Technical data S2Ba at 50 Hz operation**

<table>
<thead>
<tr>
<th>Pump type Sigma/ 2 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 suction side</th>
<th>Connection suction/ discharge side</th>
<th>Shipping weight</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>bar</td>
<td>psi</td>
<td>l/h</td>
<td>strokes/min</td>
<td>WC</td>
<td>bar</td>
</tr>
<tr>
<td>32002</td>
<td>320</td>
<td>1.9</td>
<td>0.46</td>
<td>71</td>
<td>5</td>
<td>1/4</td>
</tr>
<tr>
<td>23004</td>
<td>230</td>
<td>4.0</td>
<td>0.52</td>
<td>129</td>
<td>5</td>
<td>1/4</td>
</tr>
<tr>
<td>10006</td>
<td>100</td>
<td>6.4</td>
<td>0.55</td>
<td>195</td>
<td>5</td>
<td>1/4</td>
</tr>
<tr>
<td>14006</td>
<td>140</td>
<td>6.1</td>
<td>1.42</td>
<td>71</td>
<td>4</td>
<td>1/4</td>
</tr>
<tr>
<td>10011</td>
<td>100</td>
<td>11.0</td>
<td>1.43</td>
<td>129</td>
<td>4</td>
<td>1/4</td>
</tr>
<tr>
<td>05016</td>
<td>50</td>
<td>16.7</td>
<td>1.43</td>
<td>195</td>
<td>4</td>
<td>1/4</td>
</tr>
<tr>
<td>07012</td>
<td>70</td>
<td>12.4</td>
<td>2.90</td>
<td>71</td>
<td>4</td>
<td>1/4</td>
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<tr>
<td>04522</td>
<td>45</td>
<td>22.5</td>
<td>2.91</td>
<td>129</td>
<td>4</td>
<td>1/4</td>
</tr>
<tr>
<td>02534</td>
<td>25</td>
<td>34.1</td>
<td>2.92</td>
<td>195</td>
<td>4</td>
<td>1/4</td>
</tr>
<tr>
<td>04022</td>
<td>40</td>
<td>22.4</td>
<td>5.26</td>
<td>71</td>
<td>4</td>
<td>1/4</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 S2Ca at 60 Hz operation

<table>
<thead>
<tr>
<th>Pump type Sigma/2 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 suction side</th>
<th>Connection suction/discharge side</th>
<th>Shipping weight</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>bar</td>
<td>psi</td>
<td>l/h</td>
<td>strokes/ min</td>
<td>WC</td>
<td>bar</td>
</tr>
<tr>
<td>32002</td>
<td>320</td>
<td>4627</td>
<td>1.9</td>
<td>90</td>
<td>5</td>
<td>1/4-8</td>
</tr>
<tr>
<td>23004</td>
<td>230</td>
<td>3335</td>
<td>4.3</td>
<td>140</td>
<td>5</td>
<td>1/4-8</td>
</tr>
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<td>10006</td>
<td>100</td>
<td>1450</td>
<td>6.8</td>
<td>200</td>
<td>5</td>
<td>1/4-8</td>
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<tr>
<td>14006</td>
<td>140</td>
<td>2030</td>
<td>6.1</td>
<td>90</td>
<td>4</td>
<td>1/4-8</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>
</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>
</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>
</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>
</tr>
<tr>
<td>02534</td>
<td>25</td>
<td>363</td>
<td>34.2</td>
<td>200</td>
<td>4</td>
<td>3/8-10</td>
</tr>
<tr>
<td>04022</td>
<td>40</td>
<td>580</td>
<td>22.4</td>
<td>90</td>
<td>4</td>
<td>3/8-10</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>
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<tr>
<td>01264</td>
<td>12</td>
<td>174</td>
<td>60.9</td>
<td>200</td>
<td>4</td>
<td>3/8-10</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>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/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.
3.1.2 Dimension sheet Sigma/ 2 S2Ba HK

3.1.3 Dimension sheet Sigma/ 2 S2Ca HK
<table>
<thead>
<tr>
<th>Pump type</th>
<th>liquid end</th>
<th>Connection</th>
<th>A S2Ba</th>
<th>A S2Ca</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>32002</td>
<td>FK 08</td>
<td>DN8</td>
<td>252</td>
<td>267</td>
<td>164.1</td>
<td>R 1/4&quot;</td>
</tr>
<tr>
<td>23004</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
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<td></td>
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<td></td>
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<td>14006</td>
<td>FK 12.5</td>
<td>DN8</td>
<td>252</td>
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<td>R 1/4&quot;</td>
</tr>
<tr>
<td>10011</td>
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<td>DN8</td>
<td>252</td>
<td>267</td>
<td>164.1</td>
<td>R 1/4&quot;</td>
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4 Installation, hydraulic

**WARNING**
- 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.

**NOTICE**
- 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.

**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

**NOTICE**
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. 359585).

**Connecting flushing assembly**

- 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

**NOTICE**

- 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**

- Always depressurise suction and discharge lines before working on the pump!
- If used with hazardous or 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!
- 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 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**

- 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!

6.1 Liquid end

**NOTICE**

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).

**NOTICE**

Do not let the piston drop out!

![Fig. 9](image-url)
Repair

- Remove the retaining screws (26) from the liquid end.
- remove the liquid end and set down on a firm, level base with the label side upwards.

**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

**NOTICE**

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.

![Installation position](image)

**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: **IMPORTANT**
- 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: **IMPORTANT**
- 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.

► 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)!

![Fig. 12](image-url)
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

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applies to Identcode: 32002, 23004, 10006
applies to Identcode: 14006, 10011, 05016
applies to Identcode: 07012, 04522, 02534
applies to Identcode: 04022, 02541, 01264
Appendix

Exploded view of the liquid end

* 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.