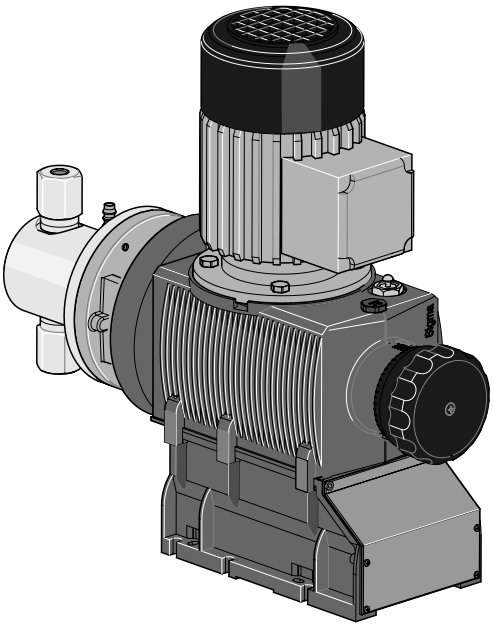
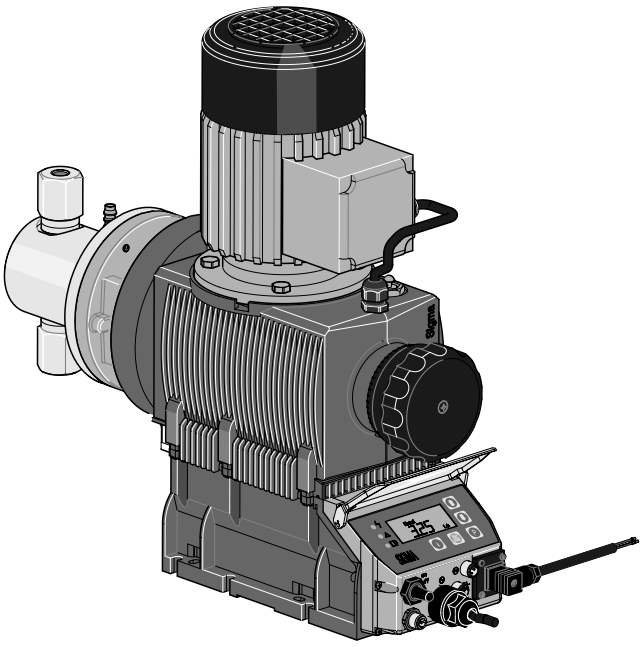
Operating Instructions Manual

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





Please affix nameplate here.

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.

Part No. 987281 ProMinent Dosiertechnik GmbH · 69123 Heidelberg · Germany BA SI 011 05/02 GB

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

ProMinent Dosiertechnik GmbH
Im Schuhmachergewann 5-11
69123 Heidelberg
Postfach 101760 · 69007 Heidelberg
Germany
info@prominent.de
www.prominent.de

Subject to revision
Printed in the F.R. Germany

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.

S2Ba **Sigma Base Model (S2Ba HK)**

HK main drive, piston

Pump type: (digits 1 - 3 = back pressure [bar], digits 4 + 5 = feed rate [L/H])

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

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:
0 standard threaded connection (in accordance with technical data)

Version:
0 with ProMinent® logo (standard)
1 without ProMinent® logo

El. power supply:
S S 3 ph,230 V/400 V 50/60 Hz,0.18 kW
M 1 ph ,alternating current,230 V 50/60 Hz,0.18 kW
N 1 ph, alternating current,115 V 60 Hz,0.18 kW
L 3 ph,230 V/400 V50 Hz,(EExe,EExde) ,0.18 kW
P 3 ph,230 V/400 V60 Hz,(EExe,EExde) ,0.18 kW
R variable speed motor 3 ph,230/400 V,0.37 kW
V variable speed motor with integr. speed changer 1 ph,230 V50/60 Hz
Z speed controller set.1 ph,230 V;50/60 Hz
1 without motor, with B 14 flange, size 71 (DIN)
2 without motor, with C 56 flange (NEMA)
3 without motor, B 5,size.63 (DIN)

Enclosure rating (motor) :
0 IP 55 (standard)
1 Exe-design (EExe II T3)
2 Exde-design (EExde IIC T4)

Stroke sensor:
0 without stroke sensor (standard)
2 pacing relay (reed relay)
3 stroke sensors (Namur) for explosive area

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

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.

S2Ca | **Sigma controller type (S2Ca HK)**

HK | main drive, piston

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:
SS | stainless steel

Seal material:
T | PTFE seal

Plunger:
4 | pistons (oxide ceramic)

Liquid end version:
0 | without valve springs (standard)
1 | with 2 valve springs, Hastelloy C;0.1 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

S2Ca	**HK**	___	**SS**	**T**	**4**	___	**0**	___	___	___	___	___	___	___	**0**

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

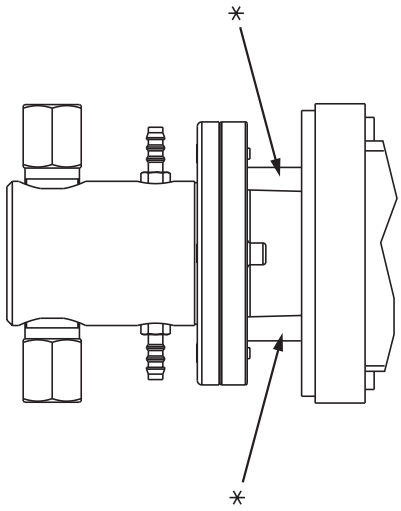


Fig.1: Safety cover, two piece (*)

2 Product description

2.1 Identification of the pump type

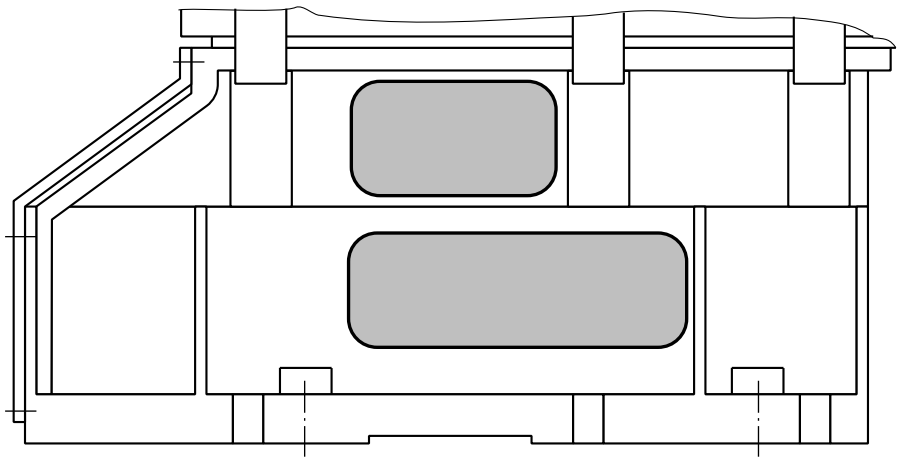
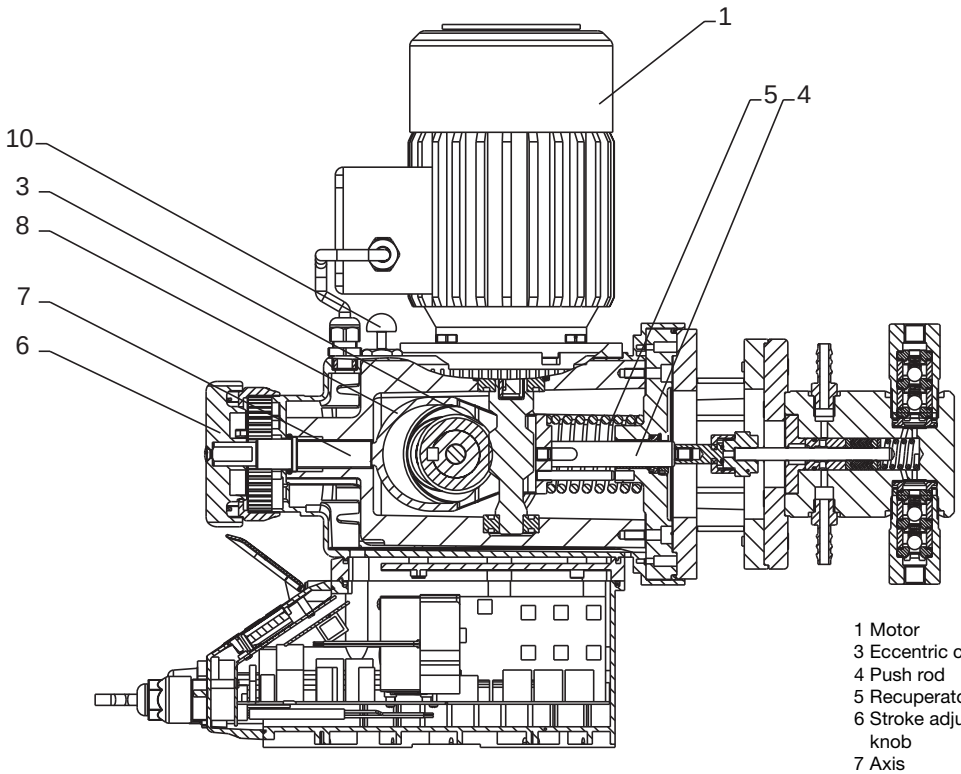


Fig. 2

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



1 Motor
3 Eccentric cam
4 Push rod
5 Recuperator
6 Stroke adjustment knob
7 Axis
8 Uptake fork
10 Gearbox venting plug

Fig. 3

2.2.2 Illustration of the stroke action

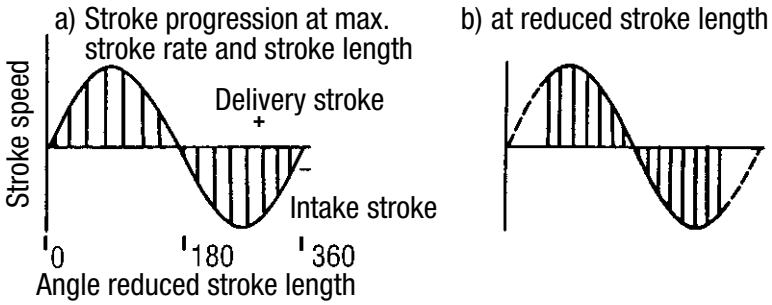


Fig. 4

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

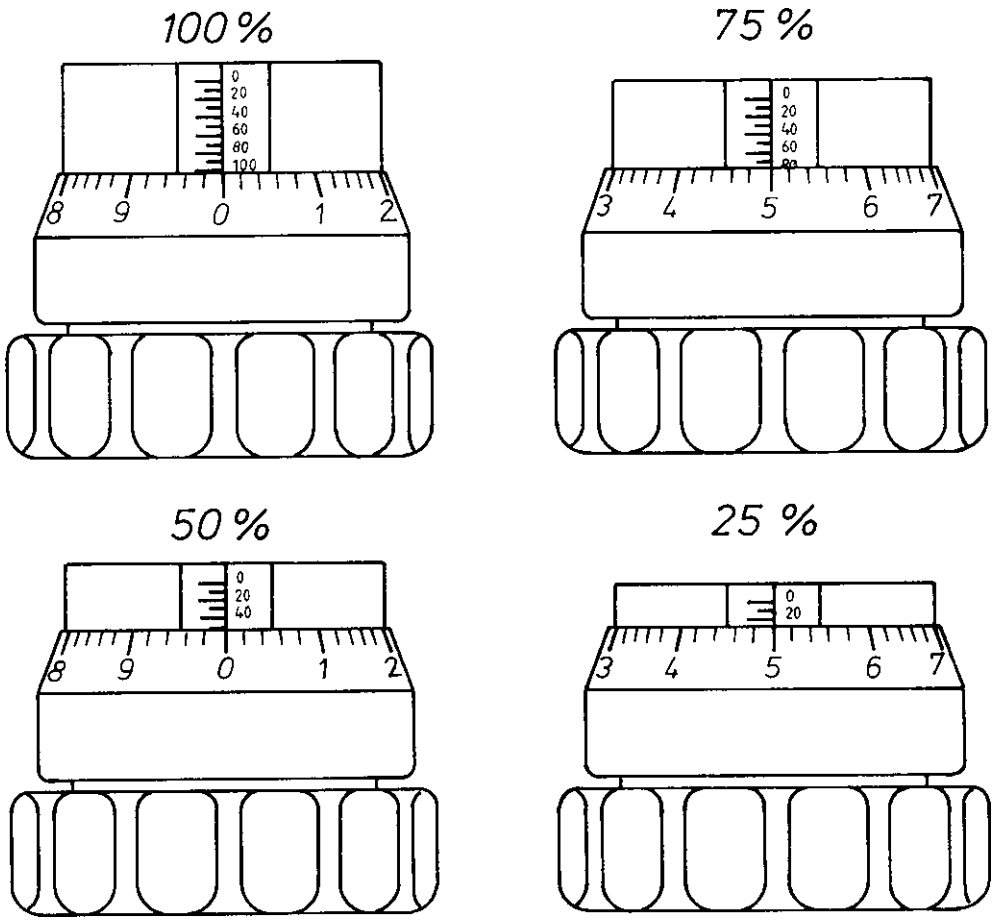
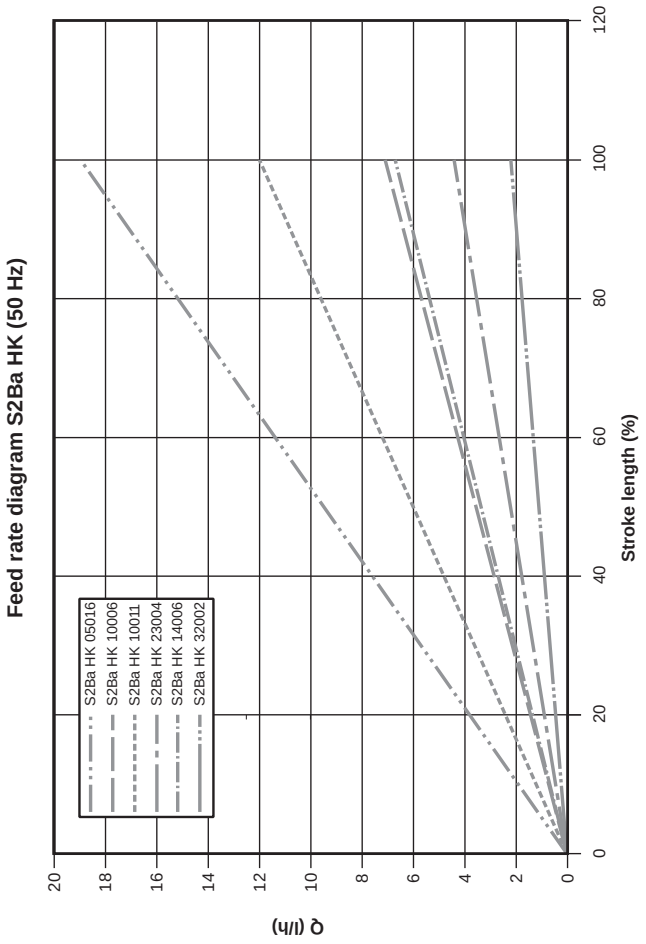


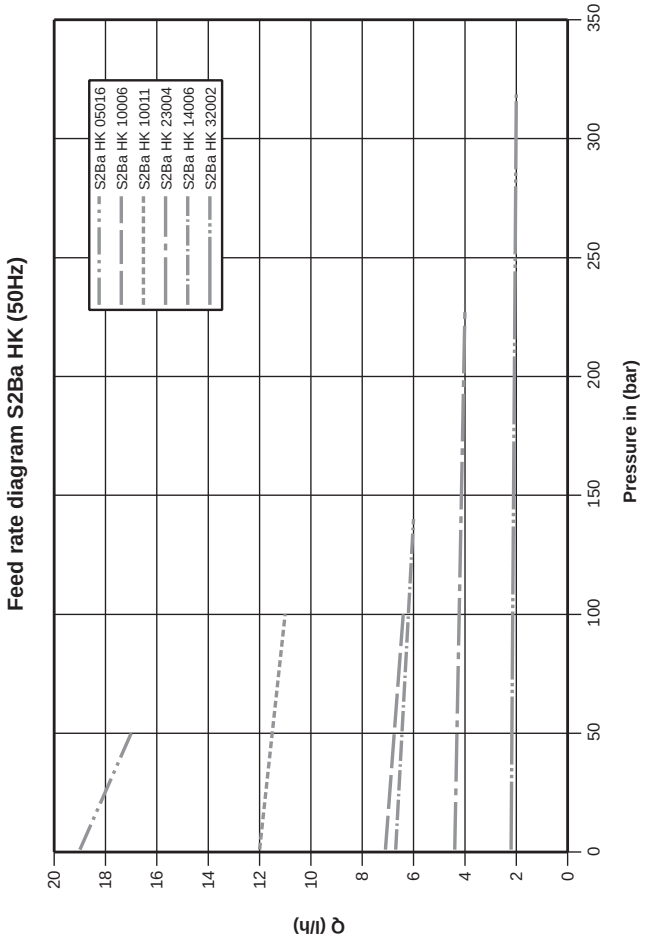
Fig. 5

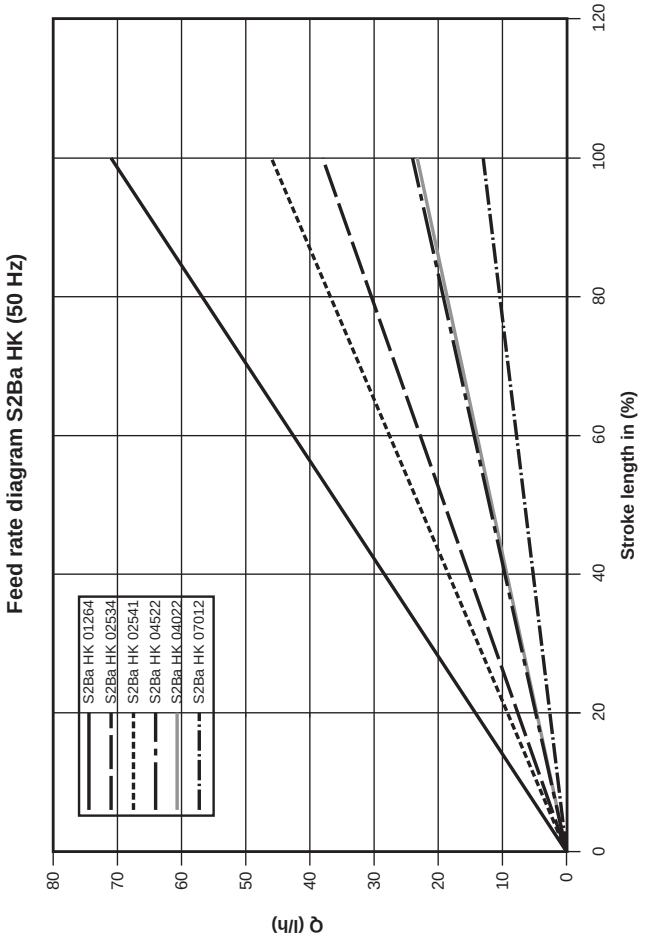
IMPORTANT

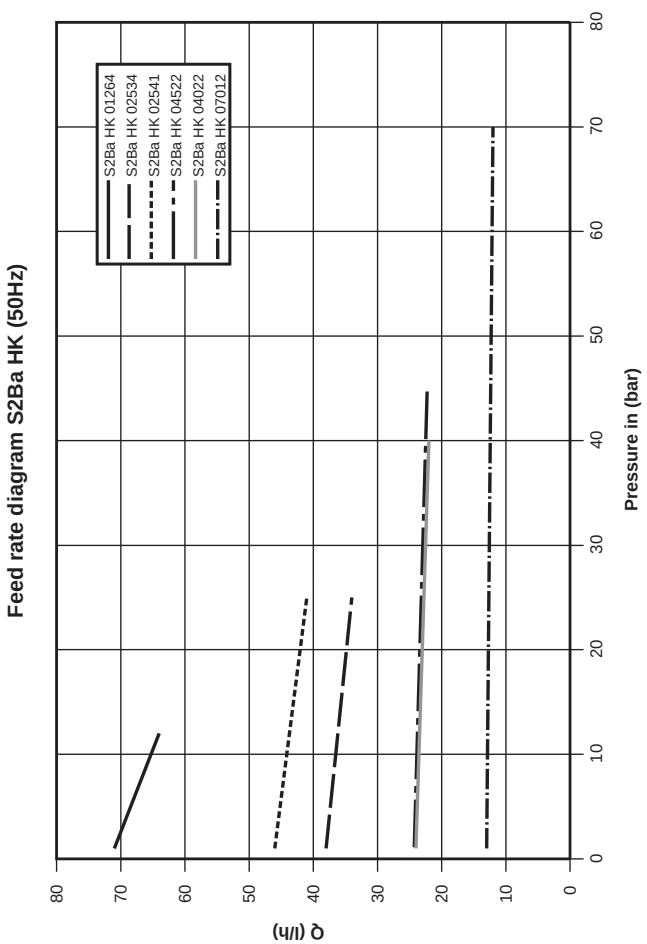
Select small stroke length and high stroke rate to ensure good mixing.
For highly viscous media, select large stroke length and low stroke rate.

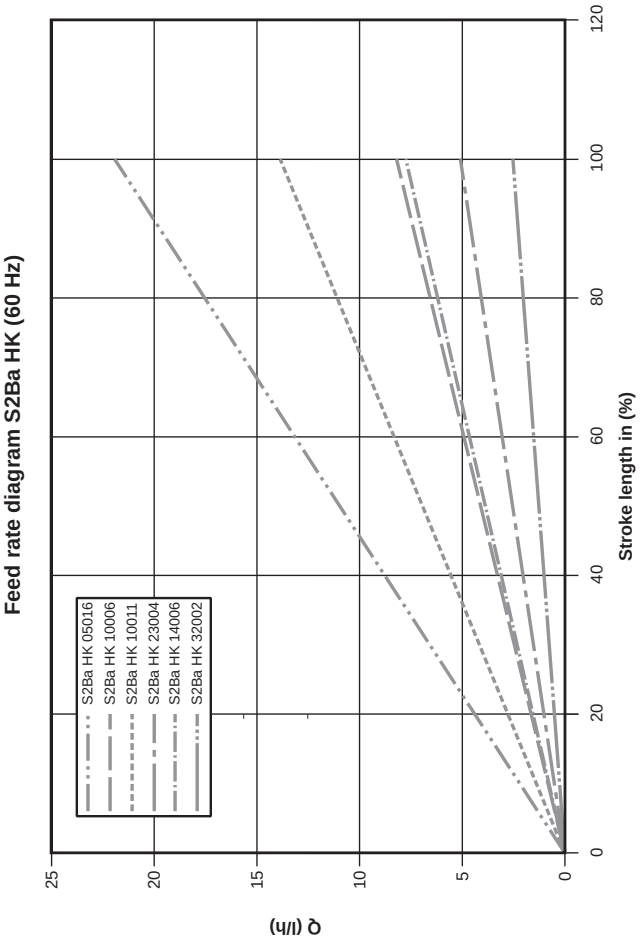
2.2.3 Feed rate diagram

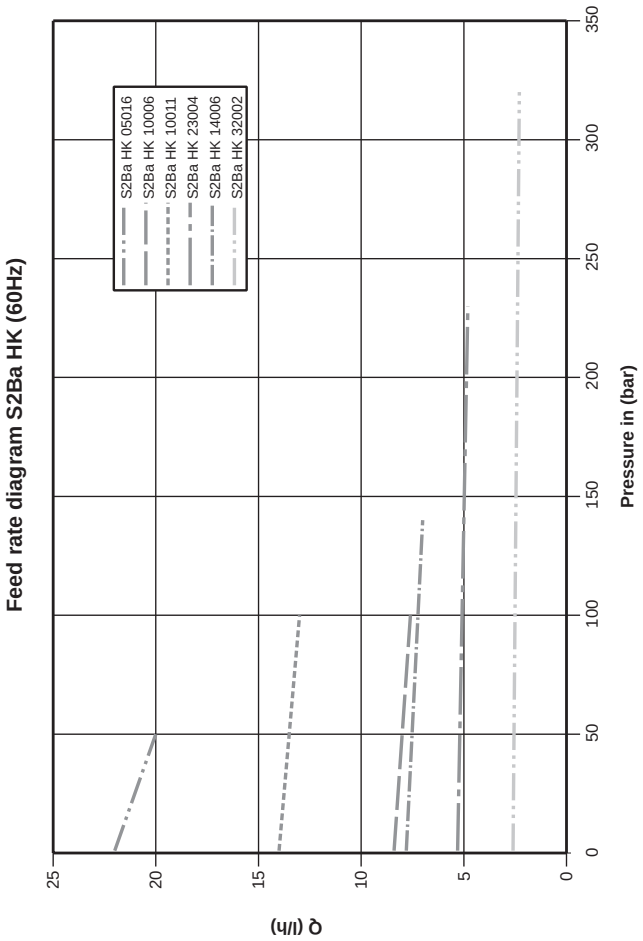


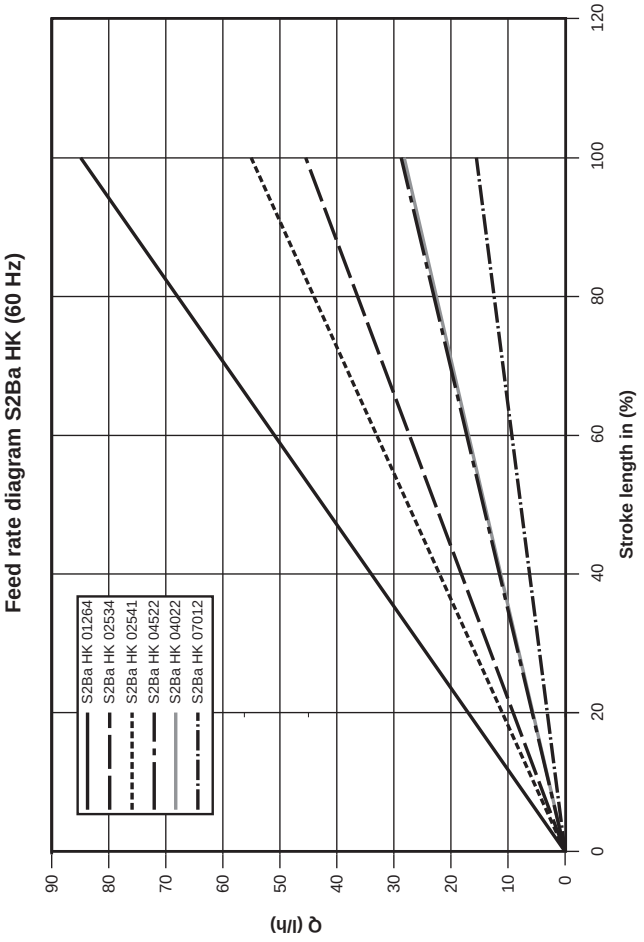


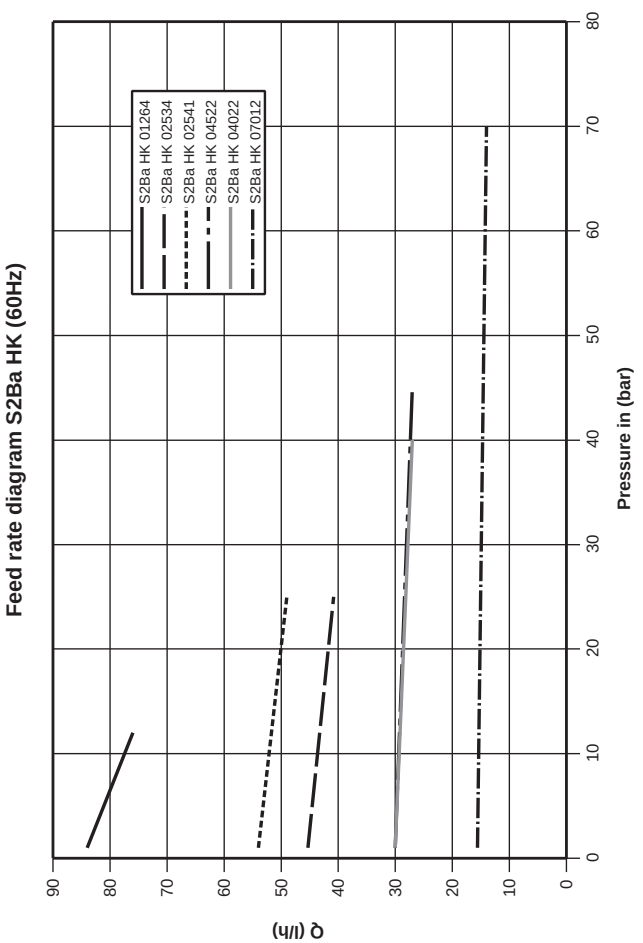





Feed rate diagram S2Ba HK (60 Hz)
Q (l/h)
Stroke length in (%)
S2Ba HK 05016
S2Ba HK 10006
S2Ba HK 10011
S2Ba HK 23004
S2Ba HK 14006
S2Ba HK 32002


Feed rate diagram S2Ba HK (60Hz)
Q (l/h)
Pressure in (bar)
S2Ba HK 05016
S2Ba HK 10006
S2Ba HK 10011
S2Ba HK 23004
S2Ba HK 14006
S2Ba HK 32002


Feed rate diagram S2Ba HK (60 Hz)
Q (l/h)
Stroke length in (%)
S2Ba HK 01264
S2Ba HK 02534
S2Ba HK 02541
S2Ba HK 04522
S2Ba HK 04022
S2Ba HK 07012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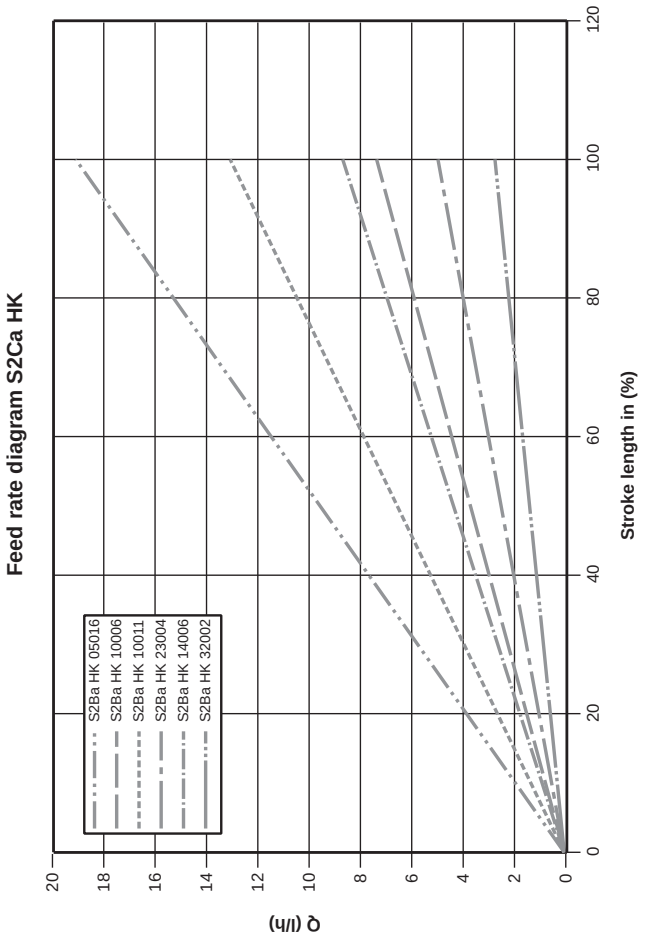
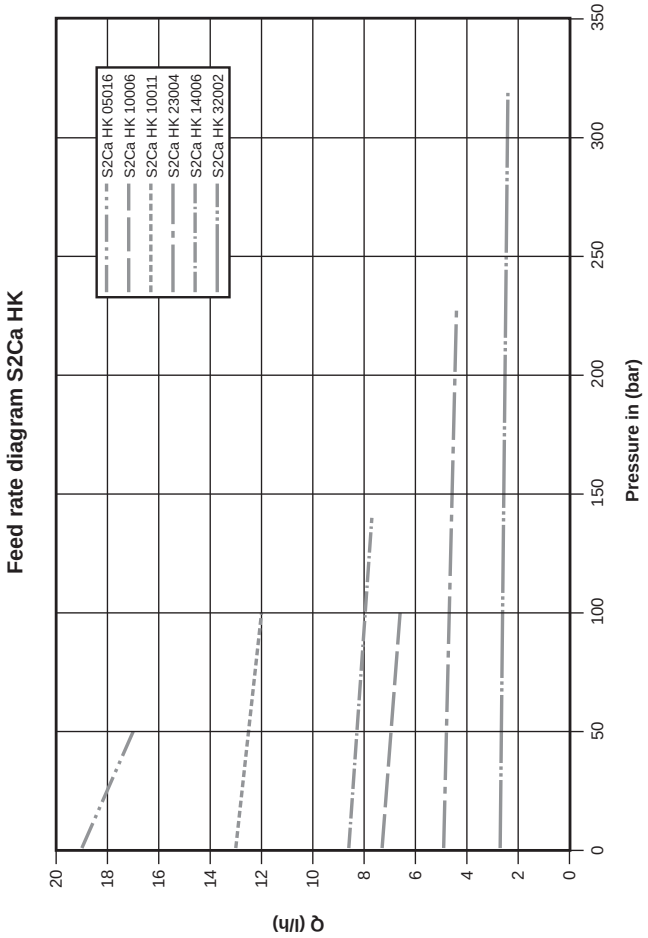
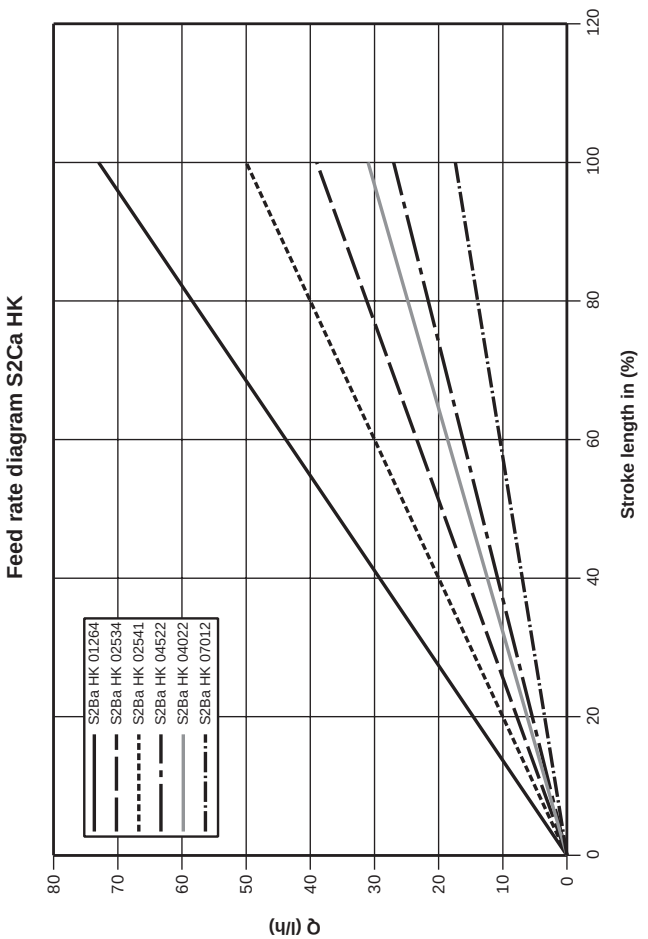
S2Ba HK 07012


Feed rate diagram S2Ca HK
Stroke length in (%)
Q (l/h)
S2Ba HK 05016
S2Ba HK 10006
S2Ba HK 10011
S2Ba HK 23004
S2Ba HK 14006
S2Ba HK 32002


Feed rate diagram S2Ca HK
Pressure in (bar)
Q (l/h)
S2Ca HK 05016
S2Ca HK 10006
S2Ca HK 10011
S2Ca HK 23004
S2Ca HK 14006
S2Ca HK 32002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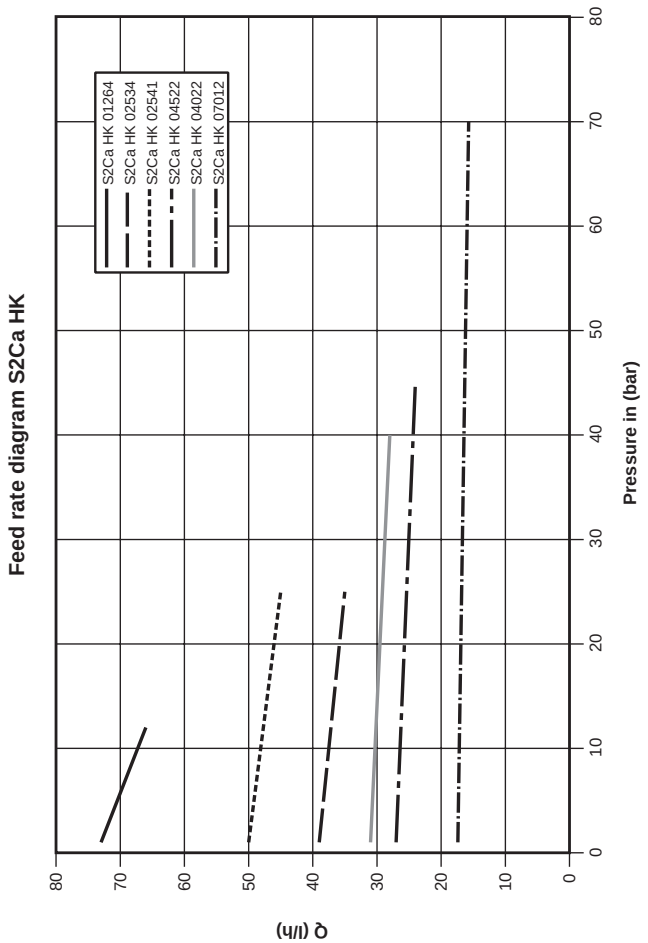
S2Ba HK 02541
S2Ba HK 04522
S2Ba HK 04022
S2Ba HK 07012


Feed rate diagram S2Ca HK
Pressure in (bar)
Q (l/h)
S2Ca HK 01264
S2Ca HK 02534
S2Ca HK 02541
S2Ca HK 04522
S2Ca HK 04022
S2Ca HK 07012

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).

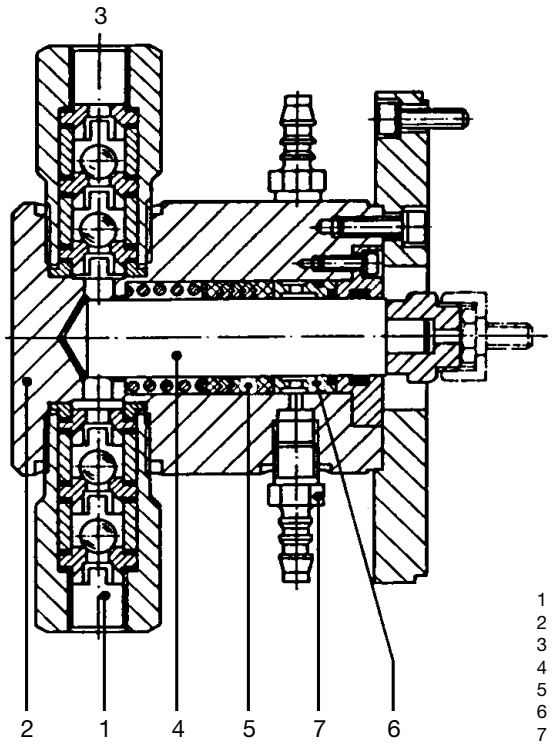


Fig. 6

3 Technical data

3.1 Technical data Sigma/ 2 HK

3.1.1 Performance data

Technical data S2Ba at 50 Hz operation

	Feed rate at max. back pressure			No. of strokes at max. back pr.	*priming pressure	Adm. suction lift suction side	Connection suction/ discharge side	Shipping weight
Pump type Sigma/ 2 HK	bar	psi	l/h	strokes/min	WC	bar	Rp	kg
32002	320	1.9	0.46	71	5		1/4	24
23004	230	4.0	0.52	129	5		1/4	24
10006	100	6.4	0.55	195	5	Up to 50 % from max. adm. back pressure	1/4	24
14006	140	6.1	1.42	71	4		1/4	24
10011	100	11.0	1.43	129	4		1/4	24
05016	50	16.7	1.43	195	4		1/4	24
07012	70	12.4	2.90	71	4		1/4	24
04522	45	22.5	2.91	129	4		1/4	24
02534	25	34.1	2.92	195	4		1/4	24
04022	40	22.4	5.26	71	4		3/8	25
02541	25	41.5	5.37	129	4		3/8	25
01264	12	64.0	5.45	195	4		3/8	25

Technical data S2Ba at 60 Hz operation

	Feed rate at max. back pressure				No. of strokes at max. back pr.	*priming pressure	Adm. suction lift suction side	Connection suction/ discharge side	Shipping weight
Pump type Sigma/ 2 HK	bar	psi	l/h	gph	strokes/ min	WC	bar	Rp	kg
32002	320	4627	2.3	0.6	84	5		1/4	24
23004	230	3335	4.8	1.2	154	5		1/4	24
10006	100	1450	7.6	2.0	233	5	Up to 50 % from max. adm. back pressure	1/4	24
14006	140	2030	7.1	1.8	84	4		1/4	24
10011	100	1450	13.1	3.4	153	4		1/4	24
05016	50	725	20.0	5.2	233	4		1/4	24
07012	70	1015	14.8	3.9	85	4		1/4	24
04522	45	652	26.7	7.0	153	4		1/4	24
02534	25	363	40.8	10.78	233	4		1/4	24
04022	40	580	26.5	7.0	84	4		3/8	25
02541	25	363	49.2	18.0	153	4		3/8	25
01264	12	174	76.0	20.1	233	4		3/8	25

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

	Feed rate at max. back pressure			No. of strokes at max. back pr.	*priming pressure	Adm. suction lift suction side	Connection suction/ discharge side	Shipping weight
Pump type Sigma/ 2 HK	**bar**	**psi**	**l/h**	**strokes/ min**	**WC**	**bar**	**RG"-DN**	**kg**
32002	320	4627	1.9	90	5		1/4-8	26
23004	230	3335	4.3	140	5		1/4-8	26
10006	100	1450	6.8	200	5		1/4-8	26
14006	140	2030	6.1	90	4		1/4-8	26
10011	100	1450	11	140	4		1/4-8	26
05016	50	725	17.1	200	4		1/4-8	26
07012	70	1015	12.4	90	4		1/4-8	26
04522	45	652	22.5	140	4		1/4-8	26
02534	25	363	34.2	200	4		3/8-10	26
04022	40	580	22.4	90	4		3/8-10	27
02541	25	363	41.5	140	4		3/8-10	27
01264	12	174	60.9	200	4		3/8-10	27

Up to 50 % from max. adm. back pressure

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

Liquid end	Suction/discharge connectors	Seals	Closing elements	Pistons
Stainless steel 1.4571/1.4404	Stainless steel 1.4571/1.4404	PTFE and/or PTFE with graphite	Oxide ceramic	Stainless steel/ ceramic

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

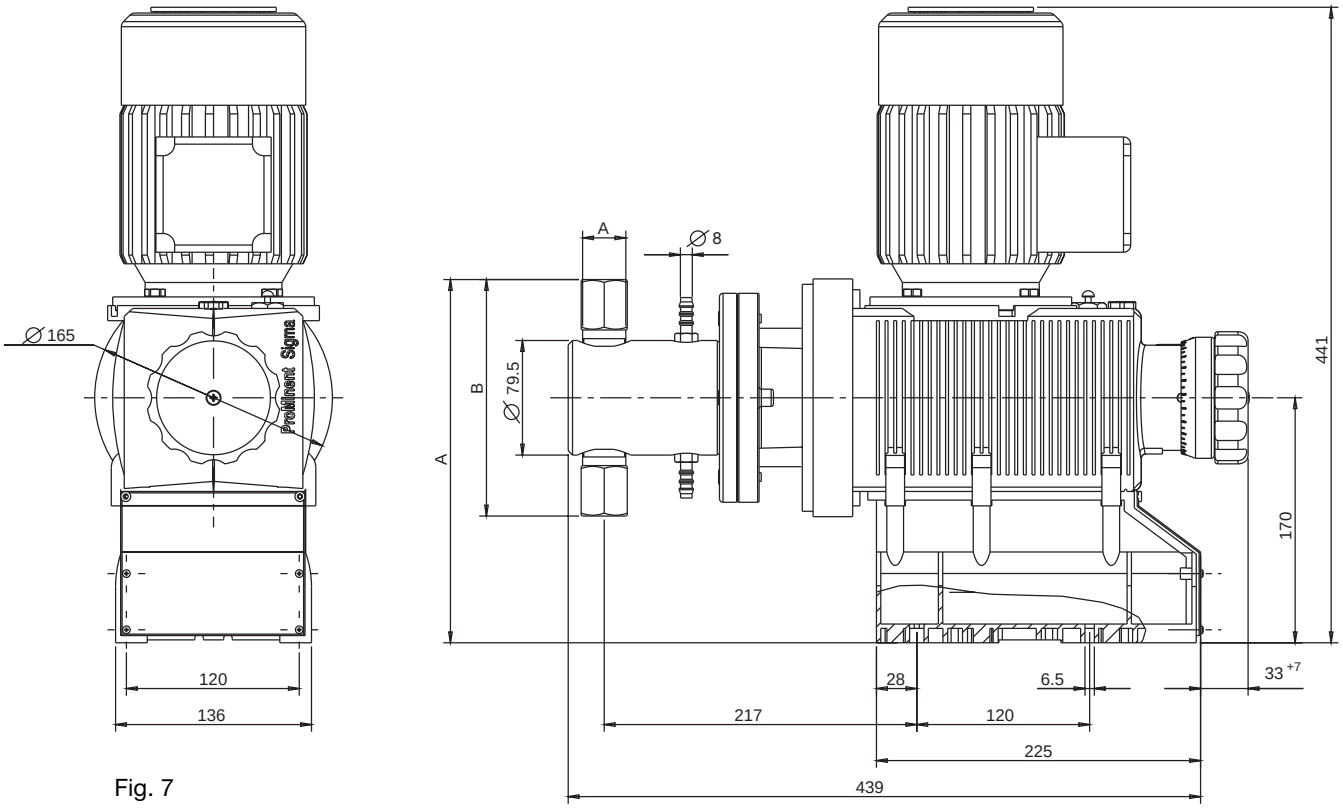


Fig. 7

3.1.3 Dimension sheet Sigma/ 2 S2Ca HK

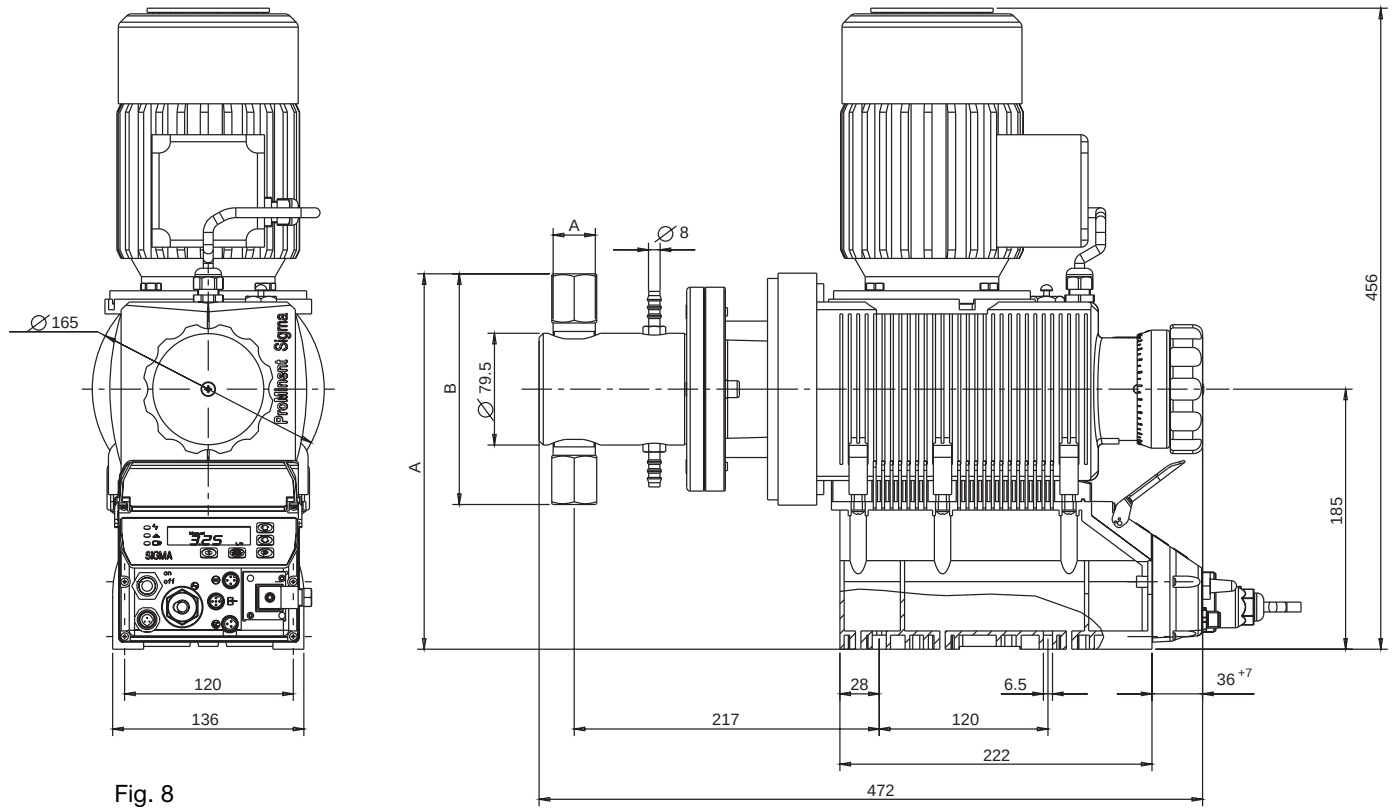


Fig. 8

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

Pump type	liquid end	Connection	A S2Ba	A S2Ca	B	C
32002 23004 10006	FK 08	DN8	252	267	164.1	R 1/4"
14006 10011 5016	FK 12.5	DN8	252	267	164.1	R 1/4"
7012 4522 2534	FK 25	DN8	252	267	164.1	R 1/4"
4022 2541 1264	FK 50	DN10	254	269	174.1	R 3/8 "

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.**

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

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

NOTICE

- **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!

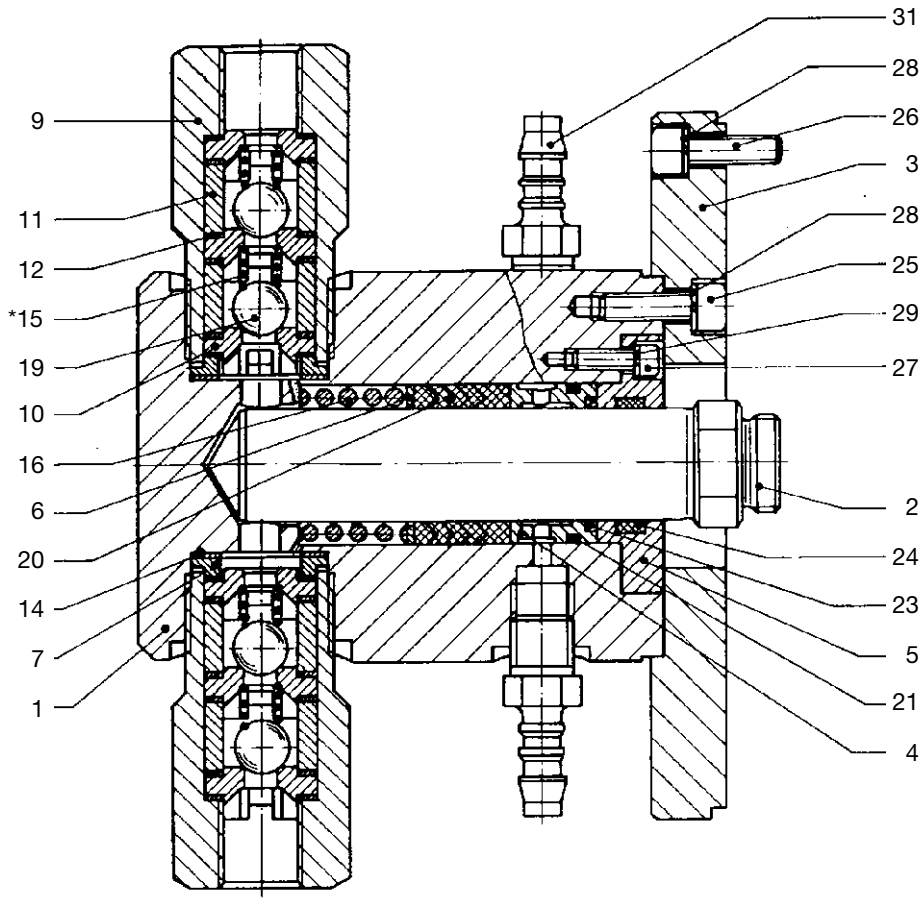


Fig. 9

- ▶ 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 is 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.

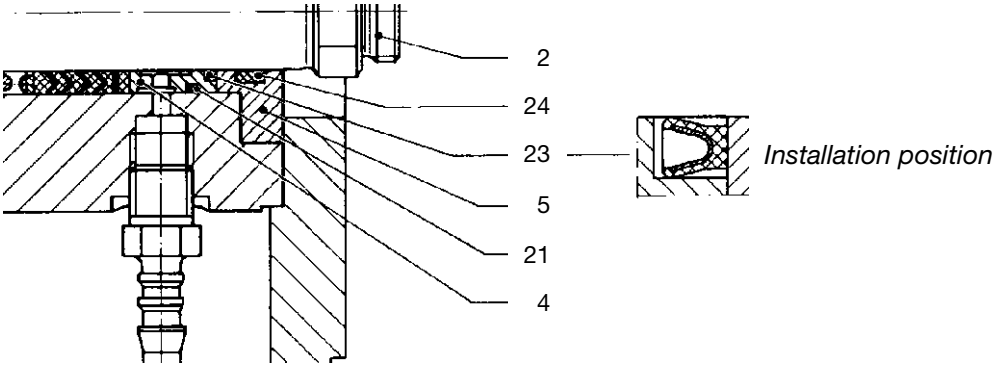


Fig. 10

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.

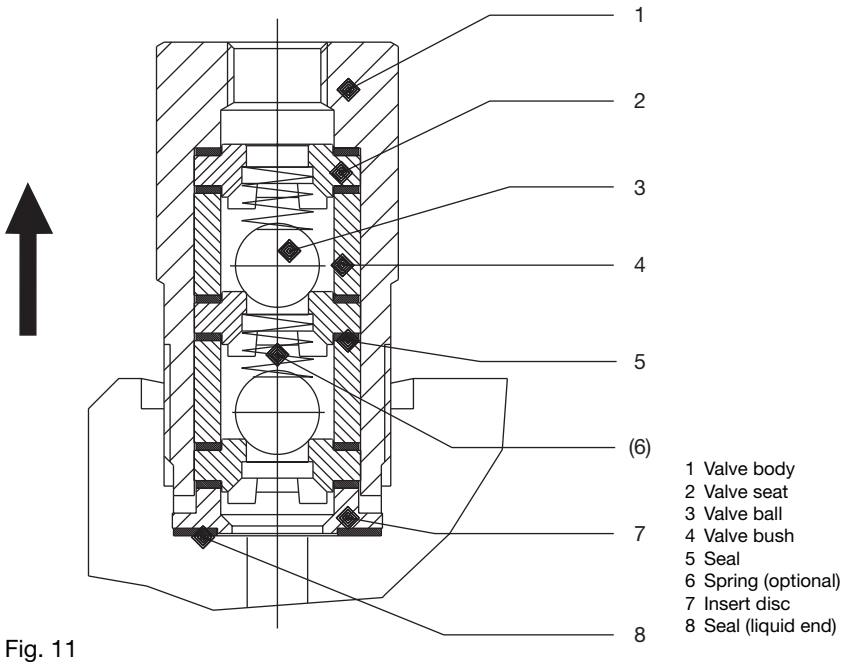


Fig. 11

▶ 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

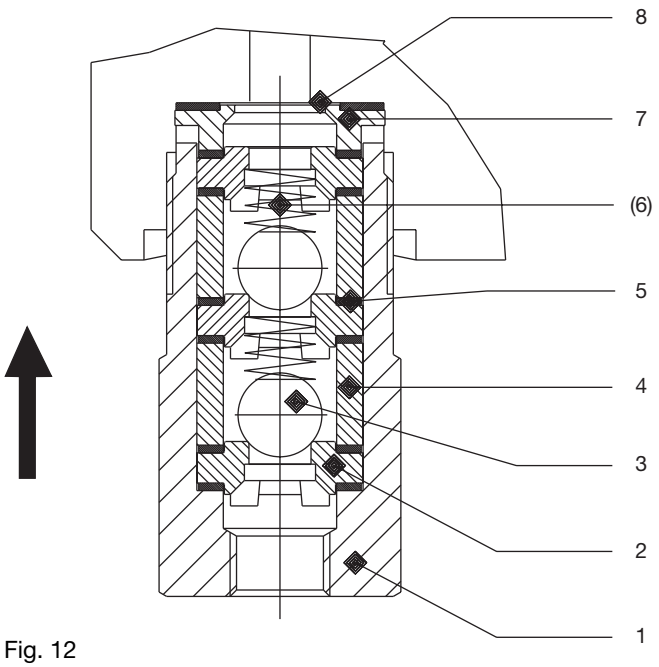
IMPORTANT

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)!



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

Fig. 12

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

	Order no.
applies to Identcode: 32002, 23004, 10006 **FK 08 for Sigma HK**	1001572
applies to Identcode: 14006, 10011, 05016 **FK 12.5 for Sigma HK**	910470.4
applies to Identcode: 07012, 04522, 02534 **FK 25 for Sigma HK**	910471.2
applies to Identcode: 04022, 02541, 01264 **FK 50 for Sigma HK**	910472.0

Appendix

Exploded view of the liquid end

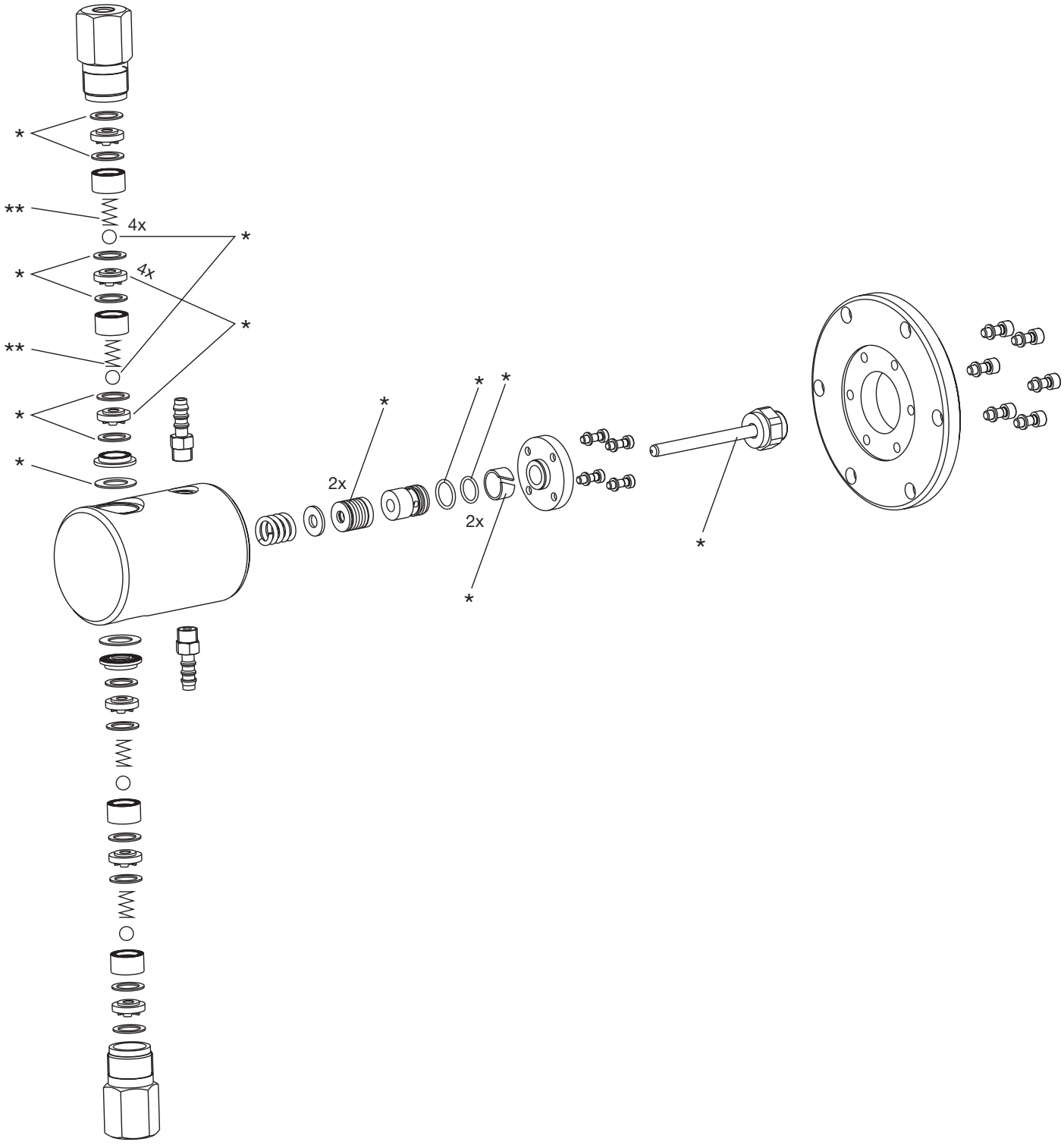


Fig. 13

*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.