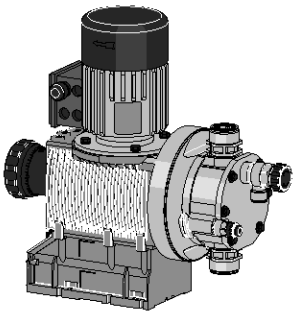
1.2.9 Motor-Driven Metering Pump Sigma/ 3 (Basic Type)

The robust pump for safe and reliable use

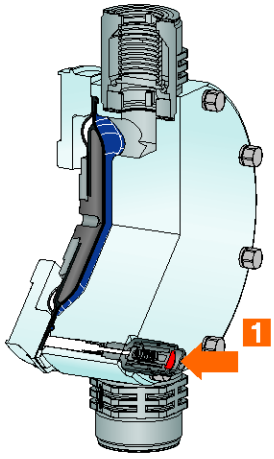
Capacity range 146 – 1,030 l/h, 12 – 4 bar

The patented multi-layer safety diaphragm for excellent process reliability is just one feature of the extremely robust motor-driven metering pump Sigma/3 Basic. It also offers a wide range of power end versions, such as three-phase or 1-phase AC motors, also for use in ATEX areas.

The Sigma/ 3 diaphragm metering pump together with pumps of type Sigma/ 1 and Sigma/ 2 represent an integrated product range. They cover the capacity range from 17 to 1,030 l/h, with a consistent operating concept, control concept and spare parts management. A wide range of power end versions is available, including some for use in areas at risk from explosion.



P_SI_0132_SW
Sigma/ 3



P_SI_0065_C1
1: Diaphragm rupture sensor

Your benefits

Excellent process reliability:

- In the event of an accident, the feed chemical does not escape to the outside nor into the pump's power end, thanks to the patented multi-layer safety diaphragm with optical (optionally electric) signalling
- Integrated relief valve protects the pump against overloading
- Reliable operation by bleed option during the suction process

Flexible adaptation to the process:

- The entire Sigma product range is available as standard in a "Physiologically safe in respect of wetted materials" design.
- Metering pumps with electro-polished stainless steel metering head enable them to be used in hygienically challenging applications
- Wide range of power end versions, also for use in areas at risk from explosion, and different flange designs for the use of customised motors
- Customised designs are available on request

Technical Details

- Stroke length: 6 mm,
- Stroke length adjustment range: 0 – 100%
- Stroke length adjustment: manually by self-locking rotary dial in 1 % increments (optionally with actuator or control drive)
- Metering reproducibility is better than ± 2% in the 30 – 100 % stroke length adjustment range under defined conditions and with correct installation.
- Wetted materials: PVDF, stainless steel 1.4571/1.4404, special materials on request
- Patented multi-layer safety diaphragm with optical diaphragm rupture display (optionally with diaphragm rupture warning system via a contact)
- Integrated hydraulic relief and bleed valve
- A wide range of power end versions is available: Three-phase standard motor, 1-phase AC motor, motors for use in Exe and Exde areas and different flange designs for use in customer-specific motors
- For areas at risk from explosion II 2G Ex h IIC T3 Gb X or II 2G Ex h IIC T4 Gb X (optional)
- Degree of protection IP 55
- Highly rigid fibreglass-reinforced plastic housing with excellent chemical resistance
- For reasons of safety, provide suitable overload protection mechanisms when installing all mechanically deflected diaphragm metering pumps.

Field of application

- Volume-proportional addition of chemicals in water treatment, e.g. sodium-calcium hypochlorite for the disinfection of potable water
- Addition of chemicals depending on the measured value, e.g. metering of acid and alkali for pH neutralisation in waste water treatment
- Time-controlled addition of chemicals in the cooling water circuit
- Pulse-controlled metering in the bottling of different volumes e.g. glycerin filling of manometers

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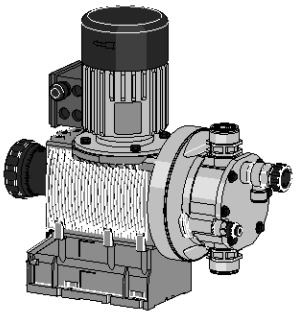
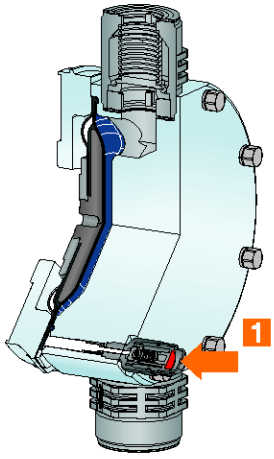


P_SI_0132_SW
Sigma/ 3



P_SI_0065_C1
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Field of application

- Volume-proportional addition of chemicals in water treatment, e.g. sodium-calcium hypochlorite for the disinfection of potable water
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- Time-controlled addition of chemicals in the cooling water circuit
- Pulse-controlled metering in the bottling of different volumes e.g. glycerin filling of manometers

Sigma Basic Type Control Functions (S3Ba)

Stroke length actuator/controller

Actuator: Electronically regulated actuator with contactless position detection for automatic stroke length adjustment, actuating period approx. 1 second for 1% stroke length, return potentiometer 1 kOhm, degree of protection IP 65.

Control drive: Electronically regulated actuated with position detection, with no contact with the media, consisting of an actuator and integral servo controller for stroke length adjustment via a standard signal. Standard signal current input 0/4-20 mA corresponds to stroke length 0 - 100 %. Switch-over for manual / automatic operation, stroke adjustment in manual mode, electronic position display of stroke length, wide-range voltage power unit 85 - 265 V 50/60 Hz, degree of protection Ip65, actual value output 0/4-20 mA for remote display.

Speed controllers in metal housing (identity code characteristic Z)

The speed controller assembly consists of a speed controller and a 0.55 kW variable speed motor.

"Physiologically safe (FDA) in respect of wetted materials" design “F”

All wetted materials in the "Physiologically safe (FDA) in respect of wetted materials" design comply with the FDA guidelines (Version F).

FDA guidelines:

- Material PTFE: FDA-No. 21 CFR § 177.1550
- Material PVDF: FDA-No. 21 CFR § 177.2510

Available for material version PV and SS and DN 25 ball valve.

Identity code example: S3BaH120330PV **F** S000S000

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Identity code example: S3BaH120330PV **F** S000S000

1.2 Motor-Driven Metering Pumps

Technical Data

Type S3Ba	With 1500 rpm motor at 50 Hz				With 1800 rpm motor at 60 Hz			Suction lift	Perm. pre-pressure suction side	Connection, suction/discharge side	Shipping weight
	Delivery rate at max. back pressure			Max. stroke rate	Delivery rate at max. back pressure		Max. stroke rate				
	bar	l/h	ml/stroke	Strokes/min	psi	l/h/gph (US)	Strokes/min	m WC	bar	G–DN	kg
120145 PVT	10	146	33.7	72	145	174/45.9	86	5	2	1 1/2–25	22
120145 SST	12	146	33.7	72	174	174/45.9	86	5	2	1 1/2–25	26
120190 PVT	10	208	33.7	103	145	251/66.3	124	5	2	1 1/2–25	22
120190 SST	12	208	33.7	103	174	251/66.3	124	5	2	1 1/2–25	26
120270 PVT	10	292	33.8	144	145	351/92.7	173	5	2	1 1/2–25	22
120270 SST	12	292	33.8	144	174	351/92.7	173	5	2	1 1/2–25	26
120330 PVT*	10	365	33.8	180	–		–	5	2	1 1/2–25	22
120330 SST*	12	365	33.8	180	–		–	5	2	1 1/2–25	26
070410 PVT	7	410	95.1	72	102	492/129.9	86	4	1	2–32–**	24
070410 SST	7	410	95.1	72	102	492/129.9	86	4	1	2–32–**	29
070580 PVT	7	580	95.1	103	102	696/183.8	124	4	1	2–32–**	24
070580 SST	7	580	95.1	103	102	696/183.8	124	4	1	2–32–**	29
040830 PVT	4	830	95.1	144	58	1,000/264.1	173	3	1	2–32–**	24
040830 SST	4	830	95.1	144	58	1,000/264.1	173	3	1	2–32–**	29
041030 PVT*	4	1,030	95.1	180	–		–	3	1	2–32–**	24
041030 SST*	4	1,030	95.1	180	–		–	3	1	2–32–**	29

Performance data for TTT, see type PVT; * only available for 50 Hz.; ** DN32 plate valves with valve spring

Materials in Contact With the Medium

		DN 25 ball valves			DN 32 plate valves			
Material	Seals	Suction/pressure connector on dosing head	Valve balls	Valve seats	Suction/pressure connector on dosing head	Valve plates/ valve springs	Valve seats	Integral relief valve
PVT	PTFE	PVDF	Glass	PTFE**	PVDF	Ceramic/ Hast C. + CTFE*	PTFE	PVDF/FKM or EPDM
SST	PTFE	Stainless steel 1.4581	Stainless steel 1.4404	PTFE**	Stainless steel 1.4581	Stainless steel 1.4404/ Hast. C	PTFE	Stainless steel/ FKM or EPDM
TTT***	PTFE	PTFE + 25% carbon	Ceramic	PTFE**	PVDF	Ceramic/ Hast C. + CTFE*	PTFE	–

* The valve spring is coated with CTFE (resistance similar to PTFE)

** On design "F", the ball seat is made of PVDF, only for DN 25 ball valves

*** Specifically for areas at risk from explosion DN25: PTFE + 25% carbon; DN32 plate valves: PVDF

Motor Data

Identity code specification	Power supply	Δ/Y			Remarks
S	3-phase, IP 55	220 – 240 V/380 – 420 V 250 – 280 V/440 – 480 V	50 Hz 60 Hz	0.37 kW 0.37 kW	
T	3-phase, IP 55	220 – 240 V/380 – 420 V 250 – 280 V/440 – 480 V	50 Hz 60 Hz	0.37 kW	with PTC, speed control range 1:5
R	3-phase, IP 55	220 – 240 V/380 – 420 V	50 Hz	0.55 kW	with PTC, speed adjustment range 1:20 with external fan (1-phase 230 V; 50/60Hz, 134 W)
M	1-phase AC, IP 55	230 V ± 5 %	50/60 Hz	0.55 kW	
N	1-phase AC, IP 55	115 V ± 5 %	60 Hz	0.55 kW	
L1	3-phase, II2GEExeIIT3	220 – 240 V/380 – 420 V	50 Hz	0.37 kW	
L2	3-phase, II2GEExdIICT4	220 – 240 V/380 – 420 V	50 Hz	0.37 kW	with PTC, speed control range 1:5
P1	3-phase, II2GEExeIIT3	250 – 280 V/440 – 480 V	60 Hz	0.37 kW	
P2	3-phase, II2GEExdIICT4	250 – 280 V/440 – 480 V	60 Hz	0.37 kW	with PTC, speed control range 1:5
V2	3-phase, II2GEExdIICT4	400 V ± 10 %	50/60 Hz	0.55 kW	Ex-variable speed motor with integrated frequency converter. Mains feed: 3-phase + neutral + earth, adjustment range 1:10

Motor data sheets can be requested for more information. Motors for Sigma basic pumps, special motors or special motor flanges are available on request. Motors less than 0.75 kW and motors designed for speed-controllable operation are not subject to the IE3 standard in compliance with the Ecodesign Directive 2009/125/EC.

Information for use in areas at risk from explosion

Only use pumps with the appropriate labelling in line with the ATEX Directive 2014/34/EU in premises at risk from explosion. Ensure that the explosion group, category and degree of protection specified on the label corresponds to or is better than the conditions prevalent in the intended field of application.

1.2 Motor-Driven Metering Pumps

Identity Code Ordering System for Sigma/ 3 Basic Type (S3Ba)

S3Ba — Drive type

H — Main drive, diaphragm

Pump type

	bar	l/h		bar	l/h		bar	l/h		bar	l/h
120145	12	146	120270	12	292	070410	7	410	040830	4	830
120190	12	208	120330	12	365	070580	7	580	041030	4	1,030

Liquid end material

PV	PVDF (max. 10 bar)
SS	Stainless steel
TT	PTFE + 25% carbon (max. 10 bar)

Seals material

T	PTFE seal
F	FDA-compliant (only with 12 bar version)

Diaphragm

S	Multi-layer safety diaphragm with optical rupture indicator
A	Multi-layer safety diaphragm with rupture signalling (contact)

Liquid end version

0	No valve springs
1	With 2 valve springs, Hastelloy C 4; 0.1 bar (standard for DN 32)
4**	With pressure relief valve, FKM seal, no valve springs, only with PV and SS
5**	With pressure relief valve, FKM seal with valve springs (standard at DN 32), only with PV and SS
6**	With pressure relief valve, EPDM seal, without valve spring, only with PV and SS
7**	With pressure relief valve, EPDM seal, with valve springs (standard at DN 32), only with PV and SS

Hydraulic connection

0	Standard threaded connector (as technical data)
1	Union nut and PVC insert
2	Union nut and PP insert
3	Union nut and PVDF insert
4	Union nut and SS insert***
7	Union nut and PVDF hose nozzle
8	Union nut and SS hose nozzle
9	Union nut and stainless steel hose nozzle

Version

0	With ProMinent® logo
1	Without ProMinent® logo
M	Modified

Electrical power supply

S	3 ph, 230 V/400 V
T	3 ph, 230 V/400 V, with PTC
R	Variable speed motor 3 ph, 230/400 V, with PTC, with external fan 1 ph 230 V 50/60 Hz
Z	Speed control compl 1 ph 230 V//400 V (variable speed motor + FC)
M	1-phase, 230 V, 50/60 Hz
N	1-phase, 115 V, 60 Hz (not for pump type 041030)
L	3 ph, 230 V/400 V, 0.37 kW, 50 Hz, (Exe, Exd)
P	3 ph, 265 V/440 V, 0.37 kW, 60 Hz, (Exe, Exd)
V (2)	Variable speed motor with integr. FC Exd (delivery with frame)
1	No motor, with B5 flange, size 80 (DIN)
2	No motor, with C56 NEMA flange
3	No motor, with B5 flange, size 71 (DIN)

Enclosure rating

0	IP 55
1	Ex-design ATEX-T3 (EX specification: II 2G Ex h IIC T3 Gb X)
2	Ex-design ATEX-T4 (EX specification: III 2G Ex h IIC T4 Gb X)

Stroke sensor

0	No stroke sensor (standard)
2	Pacing relay (read relay)
3	Stroke sensor (Namur) for explosion-proof application

Stroke length adjustment

0	Manual (standard)
1	with servomotor, 85…265 V AC 50/60 Hz
3	with stroke control motor 0...20 mA 85…265 V AC 50/60 Hz
4	with stroke control motor 4...20 mA 85…265 V AC 50/60 Hz

* 10 bar for the PVDF and TTT version

** Standard with threaded connector in the bypass. Hose nozzle on request

*** Internal thread of the insert SS DN25-Rp 1, DN32-Rp 1 1/4

On request, electropolished dosing heads (≤ Ra 0.8 µm) are available.

We are happy to supply alternative material versions to comply with export conditions for pump capacities > 600 l/h and PVDF.

Spare Parts

The spare parts kit generally includes the wear parts for the liquid ends.

Scope of delivery with PVT/ TTT material version:

- 1 diaphragm
- 2 complete valves
- 2 valve balls and/or valve plate with spring for DN 32
- 1 elastomer sealing set (EPDM, FKM-B)
- 2 ball seat housings
- 2 ball seat discs
- 4 composite seals

Scope of delivery with SST material version:

- 1 diaphragm
- 2 valve balls and/or valve plate with spring for DN 32
- 2 ball seat discs
- 4 composite seals

Spare Parts Kits Sigma/ 3 for Design With Multi-layer Safety Diaphragm

(For Identity code: type 120145, 120190, 120270, 120330)

Liquid end	Materials in contact with the medium		Order no.
FM 330 - DN 25	PVT	–	1034678
FM 330 - DN 25	TTT	with 2 valves cpl.	1077575
FM 330 - DN 25	SST	–	1034679
FM 330 - DN 25	SST	with 2 valves cpl.	1034680

(For Identity code: type 070410, 070580, 040830, 041030)

Liquid end	Materials in contact with the medium		Order no.
FM 1000 - DN 32	PVT/PPT/PCT	–	1034681
FM 1000 - DN 32	SST	–	1034682
FM 1000 - DN 32	SST	with 2 valves cpl.	1034683

Spare Parts Kits for Sigma/ 3 for Design With Old Diaphragm

(Applies to identity code: Type 120145, 120190, 120270, 120330)

Liquid end	Materials in contact with the medium		Order no.
FM 330 - DN 25	PVT	–	1005308
FM 330 - DN 25	SST	–	1005310
FM 330 - DN 25	SST	with 2 valves cpl.	1005312

(Applies to identity code: Type 070410, 070580, 040830, 041030)

Liquid end	Materials in contact with the medium		Order no.
FM 1000 - DN 32	PVT/PPT/PCT	–	1020032
FM 1000 - DN 32	SST	–	1005311
FM 1000 - DN 32	SST	with 2 valves cpl.	1005313

Spare Parts Kit for Sigma/ 3 With FDA Design (Physiologically Safe)

(For Identity code: type 120145, 120190, 120270, 120330)

Liquid end	Materials in contact with the medium		Order no.
FM 330 - DN 25	PVT	–	1046478
FM 330 - DN 25	SST	without valve	1046479
FM 330 - DN 25	SST	with valve	1046480

1.2 Motor-Driven Metering Pumps

Multi-layer Safety Diaphragm (Standard)

	Order no.
FM 330 identity code: type 120145, 120190, 120270, 120330	1029604
FM 1000 identity code: type 070410, 070580, 040830, 041030	1029603

Metering Diaphragm (Old Version)

	Order no.
FM 330 Identity code: Type 120145, 120190, 120270, 120330	1004604
FM 1000 Identity code: Type 070410, 070580, 040830, 041030	1002835

Spare Parts Kits for Integrated Relief Valve

Consisting of two compression springs made from Hastelloy C and four FKM-A O-rings each

	For material	Seals	Order no.
Spare parts kit for relief valve 4 bar	PVT/SST	FKM-A/EPDM	1031204
Spare parts kit for relief valve 7 bar	PVT/SST	FKM-A/EPDM	1031205
Spare parts kits for integrated relief valve 10 bar	PVT	FKM-A/EPDM	1031201
Spare parts kits for integrated relief valve 12 bar	SST	FKM-A/EPDM	1031202

Gear Oil

	Volume l	Order no.
Mobilgear 634 VG 460 gear oil	1	1004542

Accessories

- Foot Valves see page
- Injection Valves see page
- Connector Parts, Seals, Hoses see page → 1-189
- Suction Lances/Suction Assemblies see page → 1-183
- Speed Controllers see page → 1-203
- Metering monitor Flow Control set up for motor-driven metering pumps see page → 1-198

Spare Parts

- Custom Accessories See page