

1.2 Motor-Driven Metering Pumps

1.2.5 Motor-Driven Metering Pump Sigma/ 1 (Basic type)

The robust pump for safe and reliable use

Capacity range 17 – 144 l/h, 12 – 4 bar

The Sigma/ 1 Basic is an extremely robust motor-driven metering pump with patented multi-layer safety diaphragm for excellent process reliability. It offers a wide range of power end designs, such as three-phase or 1-phase AC motors, also for use in areas at risk from explosion.



The Sigma/ 1 diaphragm metering pump, together with pumps of type Sigma/ 2 and Sigma/ 3, represents 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.

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 to protect the pump from overloading.
- Reliable operation by bleed option during the suction process.

Flexible adaptation to the process:

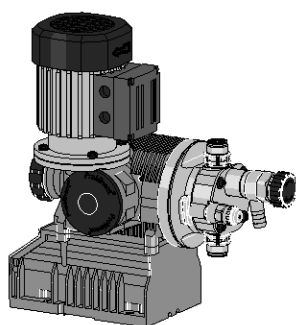
- The entire Sigma product range is available as standard in a "Physiologically safe in respect of wetted materials" design.
- Metering pumps with electro-polished stainless steel metering head enable them to be used in hygienically challenging applications.
- Adaptation to specific installation situations,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

Technical Details

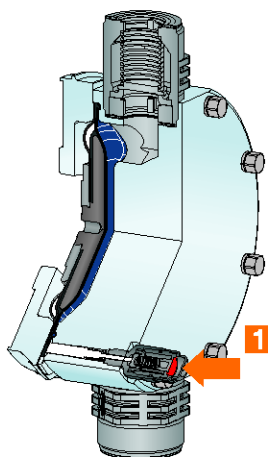
- Stroke length: 4 mm.
- Stroke length adjustment range: 0 – 100%.
- Stroke length adjustment: manually by self-locking rotary dial in 1 % increments (optionally with actuator or control drive).
- Metering reproducibility is better than ±2% in the 30 – 100% stroke length adjustment range under defined 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 areas at risk from explosion and different flange designs for use in customer-specific motors.
- For use in 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.
- Fibreglass-reinforced plastic housing.
- Liquid end on left is available as standard.
- For reasons of safety, provide suitable overload protection mechanisms when installing all mechanically deflected diaphragm metering pumps.

Field of application

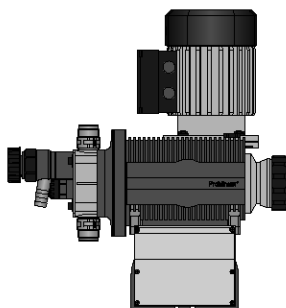
- Volume-proportional addition of chemicals in water treatment, e.g. sodium-calcium hypochlorite for the disinfection of potable water
- Addition of chemicals depending on the measured value, e.g. metering of acid and alkali for pH neutralisation in waste water treatment
- Time-controlled addition of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



P_SL_0128_SW
Sigma/ 1 Basic version



P_SL_0065_C1
1: Diaphragm rupture sensor



P_SL_0152_SW
Sigma/ 1 liquid end on left



1.2 Motor-Driven Metering Pumps

Control of Sigma Basic type (S1Ba)

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 kΩ, degree of protection IP 65.

Control drive: Electronically regulated actuator 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 current input 0/4-20 mA corresponds to stroke length 0 – 100%, switch-over for manual / automatic operation, stroke adjustment in manual mode, electronic stroke length position display, 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 with frequency converter (identity code specification Z)

The speed control, assembled, consists of a frequency converter and a variable speed motor with 0.09 kW (Sigma 1 Ba), 0.37 kW (Sigma 2 Ba) or 0.55 kW (Sigma 3 Ba).

"Physiologically Safe (FDA) in Respect of Wetted Materials" Version

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

FDA guidelines:

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

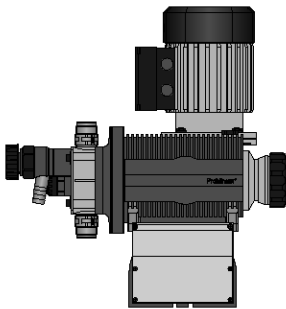
Available for material version PV and SS.

Identity code example: S1BaH04084PV F S000S000

Sigma / 1 Basic Type version "left liquid end "

This version offers additional adaptability to special installation situations, e.g. in combination with storage tanks, brackets, etc.

Identity code example: S1BaH07042PVTS00 5 S000



P_SI_0152_SW

Sigma / 1 liquid end on left

1.2 Motor-Driven Metering Pumps

Technical Data

Type S1Ba	With 1500 rpm motor at 50 Hz				With 1800 rpm motor at 60 Hz			Suc- tion lift	Perm. pre- pressure suction side	Connection, suction/dis- charge side	Ship- ping 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				
12017 PVT	10	17	3.8	73	145	20.4/5.3	88	7	1	3/4-10	9
12017 SST	12	17	3.8	73	174	20.4/5.3	88	7	1	3/4-10	12
12035 PVT	10	35	4.0	143	145	42.0/11.0	172	7	1	3/4-10	9
12035 SST	12	35	4.0	143	174	42.0/11.0	172	7	1	3/4-10	12
10050 PVT	10	50	4.0	205	145	60.0/15.8	246	7	1	3/4-10	9
10050 SST	10	50	4.0	205	145	60.0/15.8	246	7	1	3/4-10	12
10022 PVT	10	22	5.0	73	145	26.4/6.9	88	6	1	3/4-10	9
10022 SST	10	22	5.0	73	145	26.4/6.9	88	6	1	3/4-10	12
10044 PVT	10	44	5.1	143	145	52.8/13.9	172	6	1	3/4-10	9
10044 SST	10	44	5.1	143	145	52.8/13.9	172	6	1	3/4-10	12
07065 PVT	7	65	5.2	205	102	78.0/20.6	246	6	1	3/4-10	9
07065 SST	7	65	5.2	205	102	78.0/20.6	246	6	1	3/4-10	12
07042 PVT	7	42	9.5	73	102	50.4/13.3	88	3	1	1-15	10
07042 SST	7	42	9.5	73	102	50.4/13.3	88	3	1	1-15	14
04084 PVT	4	84	9.7	143	58	100.8/26.6	172	3	1	1-15	10
04084 SST	4	84	9.7	143	58	100.8/26.6	172	3	1	1-15	14
04120 PVT	4	120	9.7	205	58	144.0/38.0	246	3	1	1-15	10
04120 SST	4	120	9.7	205	58	144.0/38.0	246	3	1	1-15	14

Performance data for TTT, see type PVT

Materials in Contact With the Medium

Material	Dosing head	Suction/pressure connector	Seals/ball seat	Balls	Integral relief valve
PVT	PVDF	PVDF	PTFE/PTFE	Ceramic	PVDF/FKM or EPDM
SST	Stainless steel 1.4404	Stainless steel 1.4581	PTFE/PTFE	Stainless steel 1.4404	Stainless steel/FKM or EPDM
TTT*	PTFE + 25% carbon	PTFE + 25% carbon	PTFE/PTFE	Ceramic	-

* specifically for areas at risk from explosion

With "F" sealing material design – "physiologically safe - FDA", the ball seat is made of PVDF

Motor Data

Identity code specification	Power supply	Δ/Y	Remarks
S	3-phase, IP 55	220 – 240 V/380 – 420 V	50 Hz 0.09 kW
		265 – 280 V/440 – 480 V	60 Hz 0.09 kW
T	3-phase, IP 55	220 – 240 V/380 – 420 V	50 Hz 0.09 kW with PTC, speed control range 1:5
		265 – 280 V/440 – 480 V	60 Hz 0.09 kW
R	3-phase, IP 55	220 – 240 V/380 – 420 V	50 Hz 0.09 kW with PTC, speed adjustment range 1:20 with external fan (1-phase 230 V; 50/60 Hz, 20 W)
M	1-phase AC, IP 55	230 V ± 5 %	50/60 Hz 0.12 kW
N	1-phase AC, IP 55	115 V ± 5 %	60 Hz 0.12 kW
L1	3-phase, II2GEElllT3	220 – 240 V/380 – 420 V	50 Hz 0.12 kW
L2	3-phase, II2GEElllCT4	220 – 240 V/380 – 420 V	50 Hz 0.18 kW with PTC, speed control range 1:5
P1	3-phase, II2GEElllT3	250 – 280 V/440 – 480 V	60 Hz 0.12 kW
P2	3-phase, II2GEElllCT4	250 – 280 V/440 – 480 V	60 Hz 0.18 kW with PTC, speed control range 1:5

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/ 1 Basic Type (S1Ba)

S1Ba	Drive type					
H	Main drive, diaphragm					
Pump type						
	bar	l/h		bar	l/h	
12017	12	17	07065	7	65	
12035	12	35	07042	7	42	
10050	10	50	04084	4	84	
10022	10	22	04120	4	120	
10044	10	44				
Material of liquid end						
PV	PVDF (max. 10 bar)					
SS	Stainless steel					
TT	PTFE + 25% carbon (max. 10 bar)					
Seal material						
T	PTFE seal					
F	FDA-compliant					
Diaphragm						
S	Multi-layer safety diaphragm with optical rupture indicator					
A	Multi-layer safety diaphragm with rupture signalling (contact)					
Liquid end version						
0	No spring					
1	With 2 valve springs, Hastelloy C, 0.1 bar					
4**	With pressure relief valve, FKM seal, no valve spring, only with PV and SS					
5**	With pressure relief valve, FKM seal with valve springs, 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 spring, only with PV and SS					
Hydraulic connection						
0	Standard					
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 (standard)					
1	Without ProMinent® logo					
M	Modified					
5	Left liquid end					
Electrical power supply						
S	3 ph, 230 V/400 V 50/60 Hz, 0.09 kW					
T	3 ph, 230 V/400 V 50/60 Hz, 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, 50/60 Hz (variable speed motor + FC)					
M	1 ph, AC, 230 V/50/60 Hz, 0.09 kW					
N	1 ph, AC 115 V 60 Hz, 0.09 kW					
L	3 ph, 230 V/400 V, 50 Hz, (Exe, Exd)					
P	3 ph, 265 V/440 V, 60 Hz, (Exe, Exd)					
2	No motor, C 42 flange (NEMA)					
3	No motor, B 5, size 56 (DIN)					
Enclosure rating						
0	IP 55 (standard)					
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 (reed relay)					
3	Stroke sensor (Namur) for hazardous locations					
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 with the PVDF and TTT version.

** Standard with tube nozzle in the bypass. Threaded connection on request.

*** Internal thread of insert SS DN10-Rp 3/8, DN15-Rp 1/2

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



1.2 Motor-Driven Metering Pumps

Spare Parts

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

Scope of delivery with PVT material version:

- 1 diaphragm
- 2 valves, complete
- 2 valve balls
- 2 ball seats
- 4 composite seals
- 1 elastomer sealing set (EPDM, FKM-B)

Scope of delivery with SST material version:

- 1 diaphragm
- 2 valve balls
- 4 complete sealing sets (cover rings, ball seat discs)
- 4 composite seals

Spare Parts Kit for Sigma/ 1 for Design With Multi-layer Safety Diaphragm

(For identity code: Type 12017, 12035, 10050)

Liquid end	Materials in contact with the medium		Order no.
FM 50 - DN 10	PVT	–	1035964
FM 50 - DN 10	TTT	with 2 valves cpl.	1077570
FM 50 - DN 10	SST	–	1035966
FM 50 - DN 10	SST	with 2 valves cpl.	1035965

(For identity code: Type 10022, 10044, 07065)

Liquid end	Materials in contact with the medium		Order no.
FM 65 - DN 10	PVT	–	1035967
FM 65 - DN 10	TTT	with 2 valves cpl.	1077571
FM 65 - DN 10	SST	–	1035969
FM 65 - DN 10	SST	with 2 valves cpl.	1035968

(For identity code: Type 07042, 04084, 04120)

Liquid end	Materials in contact with the medium		Order no.
FM 120 - DN 15	PVT	–	1035961
FM 120 - DN 15	TTT	with 2 valves cpl.	1077572
FM 120 - DN 15	SST	–	1035963
FM 120 - DN 15	SST	with 2 valves cpl.	1035962

Spare Parts Kits for Sigma/ 1 for Design With Old Diaphragm

(For Identity code: Type 12017, 12035, 10050)

Liquid end	Materials in contact with the medium		Order no.
FM 50 - DN 10	PVT	–	1010541
FM 50 - DN 10	SST	–	1010554
FM 50 - DN 10	SST	with 2 valves cpl.	1010555

(For Identity code: Type 10022, 10044, 07065)

Liquid end	Materials in contact with the medium		Order no.
FM 65 - DN 10	PVT	–	1010542
FM 65 - DN 10	SST	–	1010556
FM 65 - DN 10	SST	with 2 valves cpl.	1010557

(For Identity code: Type 07042, 04084, 04120)

Liquid end	Materials in contact with the medium		Order no.
FM 120 - DN 15	PVT	–	1010543
FM 120 - DN 15	SST	–	1010558
FM 120 - DN 15	SST	with 2 valves cpl.	1010559



1.2 Motor-Driven Metering Pumps

Spare Parts Kit for Sigma/ 1 for FDA Design (Physiologically Safe)

(For Identity code: Type 12017, 12035, 10050)

Liquid end	Materials in contact with the medium		Order no.
FM 50 - DN 10	PVT	–	1046466
FM 50 - DN 10	SST	without valve	1046468
FM 50 - DN 10	SST	with valve	1046467

(For Identity code: Type 10022, 10044, 07065)

Liquid end	Materials in contact with the medium		Order no.
FM 65 - DN 10	PVT	–	1046469
FM 65 - DN 10	SST	without valve	1046471
FM 65 - DN 10	SST	with valve	1046470

(For Identity code: Type 07042, 04084, 04120)

Liquid end	Materials in contact with the medium		Order no.
FM 120 - DN 15	PVT	–	1046453
FM 120 - DN 15	SST	without valve	1046465
FM 120 - DN 15	SST	with valve	1046464

Multi-layer Safety Diaphragm (Standard)

	Order no.
FM 50 (type 12017; 12035; 10050)	1030114
FM 65 (type 10022; 10044; 07065)	1030115
FM 120 (type 07042; 04084; 04120)	1035828

Metering Diaphragm (Old Version)

	Order no.
Sigma/ 1 FM 50 (12017; 12035; 10050)	1010279
Sigma/ 1 FM 65 (10022; 10044; 07065)	1010282
Sigma/ 1 FM 120 (07042; 04084; 04120)	1010285

Spare Parts Kits for Integrated Relief Valve

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

	For material	Seals	Order no.
Spare parts kits for integrated relief valve 4 bar	PVT/SST	FKM-A/EPDM	1031199
Spare parts kits for integrated relief valve 7 bar	PVT/SST	FKM-A/EPDM	1031200
Spare parts kits for integrated relief valve 10 bar	PVT/SST	FKM-A/EPDM	1031201
Spare parts kits for integrated relief valve 12 bar	PVT/SST	FKM-A/EPDM	1031202

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

