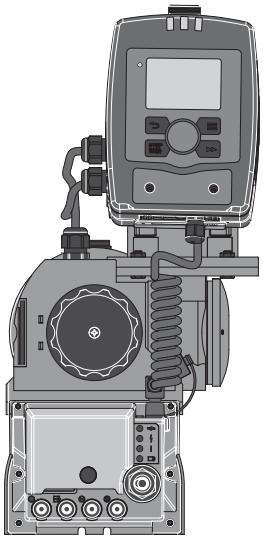
1.2.6 Motor-Driven Metering Pump Sigma X Control Type – Sigma/ 1 - S1Cb

The new Sigma X range – reliable, smart and connectible

Capacity range S1Cb: 21 – 117 l/h, 12 – 4 bar

The Sigma control type is a smart motor-driven metering pump that is setting new standards in terms of productivity, reliability and safety.



P_SI_0201_SW
Sigma/ 1 control type

The Sigma X diaphragm metering pump covers a capacity range of 21 to 1,040 l/h in versions S1Cb, S2Cb and S3Cb. Its patented multi-layer safety diaphragm guarantees maximum process reliability. Efficient protection of the power end from overloading by means of an integral frequency converter with microprocessor control(ler).

One highlight is the standardised operating concept with click wheel and 4 additional operating keys on a removable operating unit. A large illuminated LCD and a 3-LED display for operating, warning and error messages, visible from all sides, offers additional operating convenience.

The Sigma, like all smart ProMinent metering pumps, can be flexibly connected to various bus systems.

It has a large adjustment range thanks to a combination of frequency and stroke length adjustment. The pump works with high precision across the entire frequency range. Accurate and complication-free metering of viscous and gaseous media by adjustment of the movement profile.

Operating statuses are simply remotely transmitted via an additional output or relay module. A built-in timer, included as standard, controls time-dependent metering cycles.

Relevant spare parts can be shown in the display. The integral log book significantly improves process management, optimisation and troubleshooting.

Your benefits

- Safe: 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 and reliable operation by means of a bleed option during the metering process.
- External control is scalable via potential-free contacts with pulse step-up and step-down, batch mode or via a 0/4-20 mA standard signal.
- Flexibly connectible: Connection to process management systems via integral PROFIBUS®, CANopen interface.
- Integral log book saves up to 300 events and simplifies troubleshooting and analysis of the cause.

Technical Details

- Stroke length: 4 mm
- Stroke length adjustment range: 0 – 100%
- Stroke length adjustment: manually using self-locking rotary dial in 1% increments
- 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)
- Power supply: 1 pH, 100 – 230 V ±10%, 240 V ±6%, 50/60 Hz (220 W)
- Degree of protection IP 65
- Fibreglass-reinforced plastic housing
- The liquid end on the left of the standard version can be selected for special installation situations or in combination with storage tanks, brackets etc.
- Settable manual or external contact mode, factor with external contact control 99:1 – 1:99; batch mode with max. 99,999 strokes/start pulse.
- Metering profiles for optimum metering results.
- Display of wear parts in the Service menu.
- Connector for 2-stage level switch.
- Connection to PROFINET using the ProMinent DULCOnvert PROFIBUS®-PROFINET converter.
- Time-dependent control of the metering volume via integral timer.
- Relay module with 1 x switchover contact, 230 V – 8 A
- Relay module with 2 x On, 24 V – 100 mA
- Output / relay module: 0/4- 20 mA analogue output for remote transmission of the stroke rate plus relay module with 1 x On, 24 V – 100 mA
- The Sigma product range is available in a "Physiologically safe in respect of wetted materials" design.
- Dosing heads with electro-polished stainless steel for aqueous media are available with hygienically challenging applications.
- Customised designs are available on request.

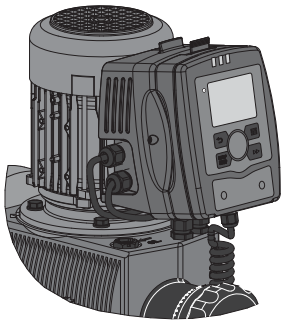
For reasons of safety, provide suitable overload protection mechanisms when installing all mechanically deflected diaphragm metering pumps.

1.2 Motor-Driven Metering Pumps

Field of application

- All industrial applications, either as a stand-alone unit or integrated in a complete system
- Volume-proportional addition of chemicals in water treatment, e.g. sodium-calcium hypochlorite for the disinfection of potable water
- Neutralisation in waste water treatment
- Pulse-controlled metering in the bottling of different volumes e.g. glycerin filling of manometers
- With an integrated timer as a control unit for simple processes, e.g. biocide metering in cooling water

Operating unit



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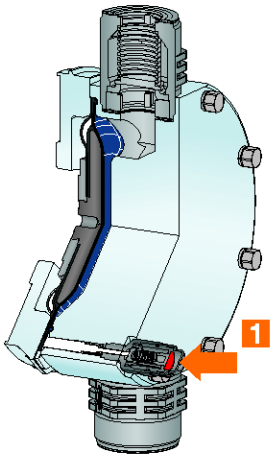
One highlight is the standardised operating concept with gamma and Sigma metering pumps with click wheel and 4 additional operating keys on a removable operating unit. A large illuminated LCD and a 3-LED display for operating, warning and error messages, visible from all sides, offers additional operating convenience.

The Sigma metering pump (control type), like all smart ProMinent metering pumps, can be flexibly connected to various bus systems. Operating statuses are simply remotely transmitted via an additional output or relay module. A built-in timer, included as standard, controls time-dependent metering cycles.

Relevant spare parts can be shown in the display. The integral log book significantly improves process management, optimisation and troubleshooting.

Multi-layer safety diaphragm



P_SI_0065_C1

1: Diaphragm rupture sensor

The Sigma X represents a durable motor-driven metering pump with integral control and patented multi-layer safety diaphragm, standing out on account of its 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 multi-layer safety diaphragm with optical (optionally electric) signalling.

An additional rear PTFE layer prevents medium from leaking in the event of a diaphragm rupture. In the event of a diaphragm rupture, a simple contact is mechanically triggered by the multi-layer diaphragm. The dosing head remains leak-free during this time, ensuring emergency operation. Simpler technology than the double diaphragm system and independent of the feed chemical, hence a benefit for maintenance / service.

The optical diaphragm rupture warning system is available in the standard scope of delivery.

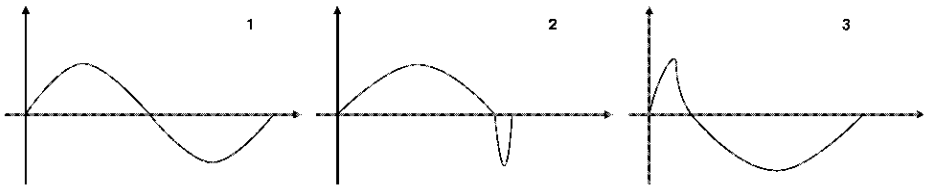
Metering profiles

Metering profiles guarantee optimum metering results by adapting the metering behaviour of the metering pump to the application or chemical used.

The combination of frequency and stroke length adjustment permits a large adjustment range, with the pump working with excellent precision over the entire frequency range. Adjustment of the movement profile also guarantees precise and trouble-free metering even with viscous and gaseous media.

The stroke motion of the displacement body is continually recorded and regulated so that the stroke is made in line with the desired metering profile. The pump can be operated in normal mode (Diagram 1), with optimised discharge stroke (Diagram 2) or with optimised suction stroke (Diagram 3).

Three typical metering profiles are shown schematically with progress over time.



1 Diagram 1: Discharge stroke, suction stroke equal
2 Diagram 2: long discharge stroke, short suction stroke
3 Diagram 3: short discharge stroke, long suction stroke

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

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

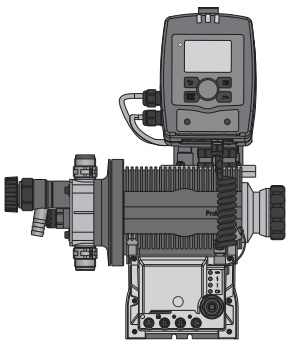
Available for material versions PV and SS.

Identity code example: S1CbH07042PV **F** S010S0DE.

Sigma/ X (Control) design "liquid end on left"

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

Identity code example: S1CbH07042PVTS01 **5** UA1000DE



P_SI_0199_SW
Sigma / 1 Control type design, liquid end on left

1.2 Motor-Driven Metering Pumps

Technical Data

Type S1Cb	Delivery rate at max. back pressure			Max. stroke rate	Delivery rate at max. back pressure		Suction lift	Perm. pre-pressure suction side	Connection, suction/ discharge side	Shipping weight
	bar	l/h	ml/ stroke	Strokes/ min	psi	gph (US)	m WC	bar	G–DN	kg
12017 PVT	10	21	3.8	90	145	5.5	7	1	3/4–10	9
12017 SST	12	21	3.8	90	174	5.5	7	1	3/4–10	12
12035 PVT	10	42	4.0	170	145	11.1	7	1	3/4–10	9
12035 SST	12	42	4.0	170	174	11.1	7	1	3/4–10	12
10050 PVT	10	49	4.0	200	145	12.9	7	1	3/4–10	9
10050 SST	10	49	4.0	200	145	12.9	7	1	3/4–10	12
10022 PVT	10	27	5.0	90	145	7.1	6	1	3/4–10	9
10022 SST	10	27	5.0	90	145	7.1	6	1	3/4–10	12
10044 PVT	10	53	5.1	170	145	14.0	6	1	3/4–10	9
10044 SST	10	53	5.1	170	145	14.0	6	1	3/4–10	12
07065 PVT	7	63	5.2	200	102	16.6	6	1	3/4–10	9
07065 SST	7	63	5.2	200	102	16.6	6	1	3/4–10	12
07042 PVT	7	52	9.5	90	102	13.7	3	1	1–15	10
07042 SST	7	52	9.5	90	102	13.7	3	1	1–15	14
04084 SST	4	101	9.7	170	58	26.7	3	1	1–15	14
04084 PVT	4	101	9.7	170	58	26.7	3	1	1–15	10
04120 PVT	4	117	9.7	200	58	30.9	3	1	1–15	10
04120 SST	4	117	9.7	200	58	30.9	3	1	1–15	14

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

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

Motor Data

Identity code specification		Power supply			Remarks
U	1-phase, IP 65	100 – 230 V ±10 % / 240 V ±6 %	50/60 Hz	220 W	

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.

1.2 Motor-Driven Metering Pumps

Identity Code Ordering System for the Sigma/ 1 Control Type (S1Cb)

S1Cb – Drive type

H – Main power end, diaphragm

Pump type

	bar	l/h		bar	l/h		bar	l/h
12017	12	21	10022	10	27	07042	7	52
12035	12	42	10044	10	53	04084	4	101
10050	10	49	07065	7	63	04120	4	117

Dosing head material

PV	PVDF (max. 10 bar)
SS	Stainless steel

Seal material

T	PTFE seal
F	FDA-compliant

Displacement body

S	Multi-layer safety diaphragm with optical rupture indicator
A	Multi-layer safety diaphragm with electrical signal

Dosing head version

0	no valve spring (standard)
1	with 2 valve springs, Hastelloy C; 0.1 bar
2	with bleed valve, FKM seal, no valve spring
3	with bleed valve, FKM seal, with valve spring
4**	with relief valve, FPM seal, no valve springs
5**	with relief valve, FPM seal, with valve springs
6**	with relief valve, EPDM seal, no valve springs
7**	with relief valve, EPDM seal, with valve springs
8	with bleed valve, EPDM seal, no valve spring
9	with bleed valve, EPDM seal, with valve spring

Hydraulic connector

0	Standard connection
1	Union nut and PVC insert
2	Union nut and PP insert
3	Union nut and PVDF insert
4	Union nut and stainless steel*** insert
7	Union nut and PVDF tube nozzle
8	Union nut and stainless steel tube nozzle
9	Union nut and stainless steel welding sleeve

Version

0	With ProMinent® Logo
1	Without ProMinent® Logo
5	Left liquid end

Electric power supply

U	1 ph, 100 – 230 V ±10%, 240 V ±6%, 50/60 Hz, 110 W

Cable and plug

A	2 m Europe	C	2 m Australia
B	2 m Swiss	D	2 m USA

Relay

0	No relay
1	Fault indicating relay (230 V, 8 A)
3	Fault indicating relay (24 V, 100 mA) + pacing relay (24 V, 100 mA)
8	0/4-20 mA analogue output + fault indicating / pacing relay (24 V - 100 mA)

Control versions

0	Manual + external contact with pulse control
1	as 0 + analogue + metering profiles
6	as 1 + PROFIBUS® DP interface, M 12
7	as 1 + CANopen (CiA 402, M12 plug), pump without operating unit (HMI) ****

Overload switch-off

0	without overload switch-off

Operating unit (HMI)

0	Operating unit with Click Wheel (0.5 m cable)
4	Operating unit with Click Wheel + 2 m cable
5	Operating unit with Click Wheel + 5 m cable
6	Operating unit with Click Wheel + 10 m cable
X	without operating unit (HMI)

Access code

0	without access control
1	with access control

Language

DE	german
EN	english
ES	spanish
FR	french
IT	Italian
NL	Dutch
PL	Polish
PT	Portuguese
CS	Czech
RU	Russian

* 10 bar with PVDF 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

**** An HMI order no. 1042550 is required for manual operation, e.g. with the failure of the CAN bus

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

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

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

Spare Parts Kits for Integrated Relief Valve (S1Ca, S1Cb)

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

Spare Parts Kits for Integrated Bleed Valve (S1Cb)

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

For identity code specification "Dosing head version" with characteristic "2", "3", "8", "9"

	For material	Seals	Order no.
ETS	PVT/SST	FKM-A/EPDM	1043785

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

Protective cowling

Protection of the operating unit (HMI) of Sigma metering pumps against contamination; made from transparent silicone rubber. For Sigma X control types S1Cb, S2Cb and S3Cb.

	Order no.
Protective cowling for operating unit (S1Cb, S2Cb, S3Cb)	1083680

Wall bracket

Wall bracket with operating lever for wall mounting of the operating unit (HMI) without any fittings. For Sigma control types S1Cb / S2Cb / S3Cb.

	Order no.
Wall bracket for operating unit (S1Cb, S2Cb, S3Cb)	1036683

Extension cable for operating unit (HMI)

	Order no.
Connecting cable - CAN M12 5-pole 1 m	1022139
Connecting cable - CAN M12 5-pole 2 m	1022140
Connecting cable - CAN M12 5-pole 5 m	1022141
Connecting cable - CAN M12 5-pin. 10 m	1046383

Accessories of CANopen operation

An operating unit is needed for the manual operation of a CANopen pump.

	Order no.
Operating unit (HMI) Sigma X - S1Cb	1092956

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