

## 1.2 Motor-Driven Metering Pumps

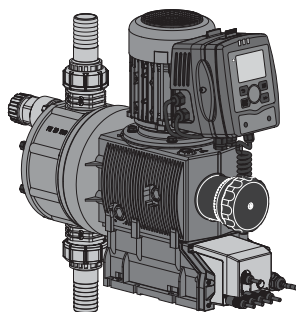
### 1.2.10

### Motor-Driven Metering Pump Sigma X Control Type – Sigma/ 3 - S3Cb

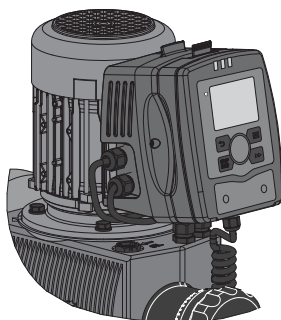
#### The new Sigma X range – reliable, smart and connectible

Capacity range S3Cb: 182 – 1,040 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\_SL\_0203\_SW  
Sigma/ 3 control type



P\_SL\_0200\_SW1

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: 6 mm
- Stroke length adjustment range: 0 – 100%
- Stroke length adjustment: manually using self-locking rotary dial in 1% increments
- Metering reproducibility is better than  $\pm 2\%$  in the 30 – 100% stroke length adjustment range under defined conditions and with correct installation
- Power supply: 1 pH, 100 – 230 V  $\pm 10\%$ , 240 V  $\pm 6\%$ , 50/60 Hz (420 W)
- Degree of protection IP 65
- Fibreglass-reinforced plastic housing
- 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.
- Wetted materials: PVDF, stainless steel 1.4571/1.4404, special materials on request.
- Dosing heads with electro-polished stainless steel for aqueous media are available with hygienically challenging applications.
- We are happy to supply alternative material versions to comply with export conditions for pump capacities of > 600 l/h and PVDF.
- 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

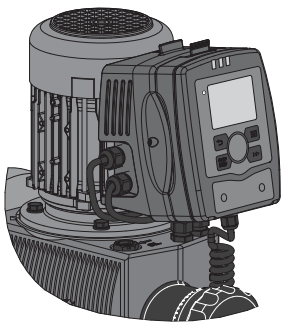
- All industrial applications, either as a stand-alone unit or integrated in a complete system
- Volume-proportional addition of chemicals in water treatment, e.g. sodium-calcium hypochlorite for the disinfection of potable water
- Neutralisation in waste water treatment
- Pulse-controlled metering in 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

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.



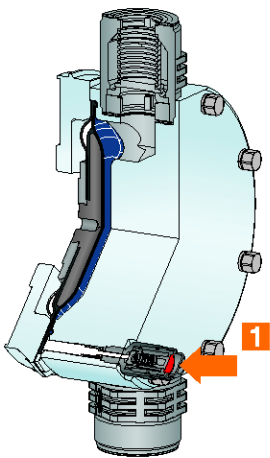
P\_SI\_0200\_SW1

### Multi-layer safety diaphragm

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, enabling 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 on the standard.



P\_SI\_0065\_C1

1: Diaphragm rupture sensor



## 1.2 Motor-Driven Metering Pumps

### Metering profiles

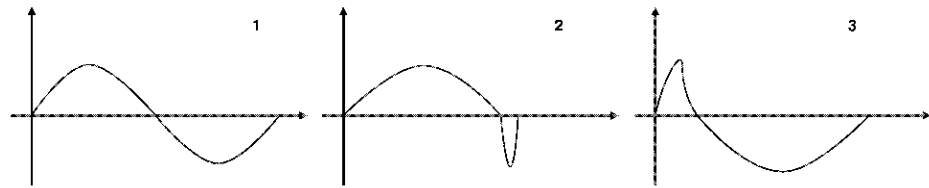
Metering profiles guarantee optimum metering results by adapting the metering behaviour of the metering pump to the application or chemical used.

The combination of frequency and stroke length adjustment permits a wide 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 the behaviour 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



P\_SI\_010x\_SW

### "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 version PV and SS.

Identity code example: S3CbH120145PV F S010UA10S0DE



## 1.2 Motor-Driven Metering Pumps

### Technical Data

Type S3Cb	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
120145 PVT	10	182	33.7	90	145	48.0	5	2	1 1/2-25	22
120145 SST	12	182	33.7	90	174	48.0	5	2	1 1/2-25	26
120190 PVT	10	243	33.7	120	145	64.1	5	2	1 1/2-25	22
120190 SST	12	243	33.7	120	174	64.1	5	2	1 1/2-25	26
120270 PVT	10	365	33.8	180	145	96.4	5	2	1 1/2-25	22
120270 SST	12	365	33.8	180	174	96.4	5	2	1 1/2-25	26
070410 PVT	7	500	95.1	90	102	132.0	4	1	2-32*	24
070410 SST	7	500	95.1	90	102	132.0	4	1	2-32*	29
070580 PVT	7	670	95.1	120	102	176.9	4	1	2-32*	24
070580 SST	7	670	95.1	120	102	176.9	4	1	2-32*	29
040830 PVT	4	1,040	95.1	180	58	274.7	3	1	2-32*	24
040830 SST	4	1,040	95.1	180	58	274.7	3	1	2-32*	29

\* DN32 plate valves with valve spring

### Materials in Contact With the Medium

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

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

\*\* The ball seat is made of PVDF with design "F"

### Motor Data

Identity code specification	Power supply			Remarks
U	1-phase, IP 65	100 – 230 V ±10 % / 240 V ±6 %	50/60 Hz	420 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.



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## Identity Code Ordering System for the Sigma/ 3 Control Type (S3Cb)

<b>S3Cb</b>	<b>Drive type</b>	H Main power end, diaphragm									
	<b>Pump type</b>										
		bar	l/h		bar	l/h		bar	l/h		
		120145	12	182	120270	12	365	070580	7	670	
		120190	12	243	070410	7	500	040830	4	1,040	
	<b>Dosing head material</b>										
	PV	PVDF (max. 10 bar)									
	SS	Stainless steel									
	<b>Seal material</b>										
	T	PTFE seal									
	F	FDA-compliant (only with 12 bar version)									
	<b>Displacement body</b>										
	S	Multi-layer safety diaphragm with optical rupture indicator									
	A	Multi-layer safety diaphragm with electrical signal									
	<b>Dosing head version</b>										
	0	no valve spring (standard)									
	1	with 2 valve springs, Hastelloy C; 0.1 bar (standard for DN 32)									
	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									
	<b>Hydraulic connector</b>										
	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									
	<b>Version</b>										
	0	With ProMinent® Logo									
	1	Without ProMinent® Logo									
	<b>Electric power supply</b>										
	U	1 ph, 100 – 230 V ±10%, 240 V ±6%, 50/60 Hz, 420 W									
	<b>Cable and plug</b>										
	A	2 m Europe				C				2 m Australia	
	B	2 m Swiss				D				2 m USA	
	<b>Relay</b>										
	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)									
	<b>Control versions</b>										
	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) ****									
	<b>Overload switch-off</b>										
	0	without overload switch-off									
	<b>Operating unit (HMI)</b>										
	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)									
	<b>Access code</b>										
	0	without access control									
	1	with access control									

<b>Language</b>	
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 threaded connector in the bypass. Hose nozzle on request

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

\*\*\*\* An HMI order no. 1042549 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.

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



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### 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 Kit for Integrated Relief Valve (S3Ca, S3Cb)

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

### Spare Parts Kits for Integrated Bleed Valve (S3Cb)

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"

	Pump type	For material	Seals	Order no.
ETS	120145, 120190, 120270	PVT/SST	FKM-A/EPDM	1043785
ETS	070410, 070580, 040830	PVT/SST	FKM-A/EPDM	1043786

### Protective Cowling for Operating Unit (HMI)

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 for Operating Unit (HMI)

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



## 1.2 Motor-Driven Metering Pumps

### 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	1092957

### 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

