2.1 ProMinent® Sigma/ 1 Diaphragm Metering Pumps

2.1.1 ProMinent® Sigma/ 1 Diaphragm Metering Pumps

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Sigma/ 1 Diaphragm Metering Pumps

The Sigma/1 motor diaphragm metering pumps are produced with a high-strength inner housing for parts subject to load as well as an additional plastic housing to protect against corrosion. The capacity range extends from 17 - 144 l/h at a max. back pressure of 12 to 4 bar. Stroke length 4mm.

Under defined conditions and when installed correctly, the reproducibility of the metering is better than ±2% at a stroke length of between 30 % and 100 % (instructions in the operating instructions manual must be followed).

In all motor-driven metering pumps without integrated overload protection, for safety reasons, suitable overload protection must be provided during installation.

Sigma/ 1 control type (S1Cb)

Detachable operating unit (HMI)

The optional control via contact or analog signals (e.g. 0/4 - 20 mA) for the Sigma control type results in good adaptability, even to fluctuating metering requirements.

The microprocessor control is an optimum combination of speed control and stop & go operation, i.e. it works in a wide control field with customised fine adjustment. Moreover it enables an optimum metering result thanks to the metering behaviour of the metering pump being matched to the chemicals or application.

The task of the control is to measure the movement and speed profile in conjunction with the power demand. This leads to a real reduction in the actually required power, which means an increase in efficiency.

Moreover, the analysis of the power demand makes possible an internal overload switching off of the metering pump, i.e. an integral pressure relief function for pump protection without an additional hydraulic assembly such as relief valves and manometer.

Sigma/ 1 basic type (S1Ba)

The ProMinent• Sigma Basic type is a motor driven Metering Pump with no internal electronic control system. The ProMinent• S1Ba has a number of different drive options, including single and 3 ph. motor (standard IP55), or the three phase AC motor for use in hazardous Exe and EXde areas.
Different flanges are always available so that customers can use their own motor to drive the pump.

Diaphragm Rupture Warning System

Diaphragm rupture warning system.
The liquid end has a patented multilayer safety diaphragm as standard and a visual diaphragm rupture indicator. The diaphragm is coated on both sides with PTFE film. This coating ensures that no leakage to the outside occurs even if the diaphragm ruptures. If the diaphragm ruptures, feed chemical enters between the diaphragm layers and thus triggers a mechanical indication or an alarm via the sensor area.

This concept ensures reliable metering - even under critical operating conditions.

Si1Ba with Stroke length controller

Sigma Basic Type Control Functions (S1Ba)

Stroke length actuator/controller
Actuator for automatic stroke length adjustment, actuating period approx. 1 sec for 1% stroke length, 1k Ohm response signal potentiometer, enclosure rating IP 54.
Controller consists of actuator with servomotor and integrated servo control for stroke length adjustment via a standard signal. Standard signal input 0/4-20 mA, corresponds to stroke length 0 - 100 %. Automatic/manual operation selection key for manual stroke adjustment. Mechanical status display of actual stroke length value output 0/4-20 mA for remote display.

Variable speed motors with integrated speed controller (identcode characteristic V)
Power supply 1 ph 230 V, 50/60 Hz, 0.18 kW
External control with 0/4-20 mA

Speed Controllers
Speed controllers in metal housing (identcode characteristic Z)
The speed controller assembly consists of a speed controller and a 0.09 kW variable speed

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2.1.2 Technical Data for Sigma Pumps

	at 50 Hz				S1Cb at 60 Hz							
	Pump Capacity at Max. Back Pressure			Max. Stroke Freq.	Pump Capacity at Max. Back Pressure		Stroking rate at max. back-pressure	Suction Lift	Adm. Priming Pressure Suction Side		Connector Suction/ Discharge Side	Shipping Weight
Pump type S1Ba	**bar**	**l/h**	**ml/ stroke**	**strokes/ min.**	**bar S1Cb**	**l/h**	**strokes/ min.**	**mWG**	**bar**	**DN**	**Optional BSPM / Hosetail**	**kg**
12017 PVT	10	17	3.9	73	10	21	87	7	1	10	1/2" / 16mm	9
12017 SST	12	17	3.9	73	12	21	87	7	1	10	1/2" / 16mm	12
12035 PVT	10	35	4.0	143	10	42	172	7	1	10	1/2" / 16mm	9
12035 SST	12	35	4.0	143	12	42	172	7	1	10	1/2" / 16mm	12
10050 PVT	10	50	4.0	205	10	49	200	7	1	10	1/2" / 16mm	9
10050 SST	10	50	4.0	205	10	49	200	7	1	10	1/2" / 16mm	12
10022 PVT	10	22	5.1	73	10	27	87	6	1	10	1/2" / 16mm	9
10022 SST	10	22	5.1	73	10	27	87	6	1	10	1/2" / 16mm	12
10044 PVT	10	44	5.1	143	10	53	172	6	1	10	1/2" / 16mm	9
10044 SST	10	44	5.1	143	10	53	172	6	1	10	1/2" / 16mm	12
07065 PVT	7	65	5.1	205	7	63	200	6	1	10	1/2" / 16mm	9
07065 SST	7	65	5.1	205	7	63	200	6	1	10	1/2" / 16mm	12
07042 PVT	7	42	9.7	73	7	52	87	3	1	15	3/4" / 20mm	9.5
07042 SST	7	42	9.7	73	7	52	87	3	1	15	3/4" / 20mm	13.5
04084 PVT	4	84	9.7	143	4	101	172	3	1	15	3/4" / 20mm	9.5
04084 SST	4	84	9.7	143	4	101	172	3	1	15	3/4" / 20mm	13.5
04120 PVT	4	120	9.7	205	4	117	200	3	1	15	3/4" / 20mm	9.5
04120 SST	4	120	9.7	205	4	117	200	3	1	15	3/4" / 20mm	13.5

Note: All pumps that are fitted with integral PRV must have the outlet piped to an appropriate place.

Materials in Contact with Chemicals

Liquid End	Suction/Discharge connector	Valve	Seals	Balls	Integrated Pressure Bleed Valve
PVT	PVDF (Polyvinylidenefluoride)	PVDF (Polyvinylidenefluoride)	PTFE	ceramic	PVDF/Viton® or EPDM
SST	stainless steel no. 1.4404/1.4581	stainless steel no. 1.4404	PTFE	stainless steel no. 1.4404	stainless steel/Viton®

Motor Data for S1B

Identity code	Power supply	Δ / Y			Remarks
S	3 ph, 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 ph, IP 55	220-240 V/380-420 V	50 Hz	0.09 kW	with PTC, speed adjustment range 1:5
		265-280 V/440-480 V	60 Hz	0.09 kW	
R	3 ph, IP 55	220-240 V/380-420 V	50 Hz	0.09 kW	with PTC, speed adjustment range 1:20 w/external fan 1ph 230 V; 50/60Hz
V0	1 ph, IP 55	230 V ±10 %	50/60 Hz	0.18 kW	Variable speed motor with integrated frequency converter control range 1:20
M	1 ph AC, IP 55	230 V ±5%	50/60 Hz	0.12 kW	
N	1 ph AC, IP 55	115 V ±5 %	60 Hz	0.12 kW	
L1	3 ph, II2GEExeIIT3	220-240 V/380-420 V	50 Hz	0.12 kW	
L2	3 ph, II2GEExdIICT4	220-240 V/380-420 V	50 Hz	0.18 kW	With PTC, speed adjustment range 1:5
P1	3 ph, II2GEExeIIT3	250-280 V/440-480 V	60 Hz	0.12 kW	
P2	3 ph, II2GEExdIICT4	250-280 V/440-480 V	60 Hz	0.18 kW	With PTC, speed adjustment range 1:5

Motor data sheets can be requested for more information. 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 IEC2 standard in compliance with the Ecodesign Directive 2005/32/EC.
Information for use in areas at risk from explosion: Only use pumps with the appropriate labelling in line with the ATEX Directive 94/9/EC 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

2.1 ProMinent® Sigma/ 1 Diaphragm Metering Pumps

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2.1.3 Identity Code Ordering System for Basic Type Sigma (S1Ba)

S1BaH **Sigma Basic Type (S1Ba)**

Pump type: (Figures 1 + 2 = back pressure [bar], figures 3 - 5 = feed rate [l/h]):

12017*	12 bar; 17 l/h		PVDF
12035*	12 bar; 35 l/h		SS
10050	10 bar; 50 l/h		
10022	10 bar; 22 l/h		PVDF
10044	10 bar; 44 l/h		SS
07065	7 bar; 65 l/h		
07042	7 bar; 42 l/h		PVDF
04084	4 bar; 84 l/h		SS
04120	4 bar; 120 l/h	* for PVDF max. 10 bar	

Liquid end material with PTFE Seal:

PVT	PVDF (max 10 bar)
SST	Stainless steel - select this option if using Hygenic Head option

Diaphragm:

S	Multi-layer safety diaphragm with optical rupture display
A	Multi-layer safety diaphragm with electrical rupture signal
H	Diaphragm for Hygenic Head

Liquid end version: **PVDF** **SS**

0	No springs
1	With 2 valve springs, Hastelloy C 4; 0.1 bar
4	With bleed valve, Viton· seal, no valve spring
5	With bleed valve, Viton· seal and valve spring
H	Hygenic Head with Tri-Clamp connection (maximum 10 bar), contact Sydney

Hydraulic connector:

1	Union nut and PVC Solvent Weld
2	Union nut and PVC Male BSP
3	Union nut and PVDF Male BSP
4	Union nut and stainless steel insert *inc. w/SS pump*
5	Union nut and PVC Hosetail
7	Union nut and PVDF Hosetail

Version

0	With ProMinent·logo (standard)
F	Physiologically harmless (FDA)
M	Modified
5	Liquid End Left ... *Note: only available ex Germany*

Power supply:

S	3 ph, 400 V; 50 Hz; 0.09 kW
M	1 ph. AC, 230 V; 50 Hz; 0.12 kW
N	1 ph, AC 115 V; 60 Hz
L	3 ph, 400 V, 50Hz, (EExe, EExde) see below
P	3 ph, 400 V, 60Hz, (EExe, EExde) see below
R	3ph, variable speed motor 4 pol. 230/400 V 0.09kW
V (0)	var. speed motor with integral speed control 230/1/50
2	No Motor, with C 42 flange (NEMA)
3	No Motor, with flange size 56; B5 (DIN)

Enclosure rating:

0	IP 55 (standard) 0
1	Exe motor version (ATEX-T3)
2	Exd motor version (ATEX-T4)

Stroke sensor:

0	No stroke sensor (standard)
2	Pacing relay (reed relay)
3	Stroke Sensor (Namur for EX area)

Stroke length adjustment:

0	Manual
1	Stroke positioning motor,230V/50/Hz
4	Stroke control motor, 4-20 mA 230 V/50Hz

Prepack Option

P*	See Options	-

Note: PRV/Bleed valve available on request.
The preferred option is relief valve in-line.

Prepack option P* for PVDF
P0 - 12017 - 12035 - 10050 - 10022 - 10044 - 07065
4 EPDM flat gaskets
Refer page 2.36 for fitting sizes
07042 - 04084 - 04120
4 EPDM flat gaskets
Refer page 2.36 for fitting sizes
P1 as P0 but with Viton® Flat Gaskets
240 volt motor supplied with power cord.

S1BaH 12050 PVT S 0 1 0 S 0 0 0 P0

2.1 ProMinent® Sigma/ 1 Diaphragm Metering Pumps

DN10
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2.1.4 Identity Code Ordering System for Sigma (S1Cb)

S1CbH **Sigma Control Type (S1Cb)**

Pump type (Figures 1 + 2 = back pressure [bar], figures 3 - 5 = feed rate [l/h]):

12017*	12 bar; 21 l/h		PVDF
12035*	12 bar; 42 l/h		SS
10050	10 bar; 49 l/h		
10022	10 bar; 27 l/h		PVDF
10044	10 bar; 53 l/h		SS
07065	7 bar; 63 l/h		
07042	7 bar; 52 l/h		PVDF
04084	4 bar; 101 l/h		SS
04120	4 bar; 117 l/h	*for PVDF max. 10 bar	

Liquid end material with PTFE Seal

PVT	PVDF (max 10 bar)
SST	Stainless steel

Diaphragm

S	Multi-layer safety diaphragm with optical rupture display
A	Multi-layer safety diaphragm with electrical rupture signal "Pump stops"

Liquid end version

		PVDF	SS
0	No bleed valve and springs		
1	No bleed valve, with 2 valve springs, Hastelloy C 4; 0.1 bar		
4	With relief valve, Viton· seal, no valve spring		
5	With relief valve, Viton· seal and valve spring		

Hydraulic connector

1	Union nut and PVC Solvent Weld
2	Union nut and PVC Male BSP
3	Union nut and PVDF Male BSP
4	Union nut and stainless steel insert *inc. w/ss pump*
5	Union nut and PVC Hosetail
7	Union nut and PVDF Hosetail

Version

0	With ProMinent® logo (standard)
F	Physiologically harmless (FDA)
M	Modified
5	Liquid end left ... *Note: only available ex Germany*

Electrical Power supply

U	1 ph, 100 - 240 V; 50 Hz

Power Cable and Plug

C	2m Australia

Relays

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

Control Variant

0	Manual + External Control + Pulse Control
1	Manual + External Control + Pulse Control + analog + metering profiles
6	As 1 + PROFIBUS® DP M12
7	As 1 + CANopen **

Overload switch-off

0	Without overload switch-off
1	With overload switch-off - **exPDT only**

Operating Unit (HMI)

S	HMI + 0.5m cable	
1	HMI + 2.0m cable	
2	HMI + 5.0m cable	
X	Without HMI	-

Dosing Monitor:

0	Without access code
1	With access code

Language:

EN	English

Prepack Option

P*	See options

Note: PRV/Bleed valve available on request.
The preferred option is relief valve in-line.

Note: *If PROFIBUS® is specified refer to page 3.19 to determine which PROFIBUS® cables, adaptors and terminators are required. Also if PROFIBUS® option is selected NO relays can be fitted.*

Prepack option P* for PVDF

P0 - 12017 - 12035 - 10050 - 10022 - 10044 - 07065
4 EPDM flat gaskets & CANBUS cable if required.
Refer page 2.36 for fitting sizes
07042 - 04084 - 04120
4 EPDM flat gaskets & CANBUS cable if required.
Refer page 2.36 for fitting sizes

P1	as P0 but with Viton® Flat Gaskets
P2	As P0 but with a 2.0m control cable
P5	As P2 but with a 5.0m control cable
PX	As P2 but with a 10.0m control cable
PA	As P1 but with a 2.0m control cable
PB	As P1 but with a 5.0m control cable
PC	As P1 but with a 10.0m control cable

Note: for SS pumps as per P2, P5 & P7 but only require control cables ... prices also as above.

S1CbH 10050 PVT S 0 1 0 U C 0 1 0 1 0 EN P2

2.1 ProMinent® Sigma/ 1 Spares for Diaphragm Metering Pumps

2.1.5 Spare Parts Kits

The spare parts kits contain all components for maintenance of liquid ends.

PVT version

1 pump diaphragm
1 suction valve
1 discharge valve
2 valve balls
1 seal set (PTFE Gaskets, ball seats, ball seat housings).

SST version

1 pump diaphragm
2 valve balls
1 seal set (PTFE Gaskets, ball seat discs).

Spare Parts Kits for versions with new multilayer safety diaphragm

Type 12017, 120035, 10050		Part No.
Liquid end FM 50 - DN 10	PVT	1035964
	PVT - FDA	1046466
	SST	1035966
	SST - FDA	1046468
	SST (with 2 valve sets)	1035965

Type 10022, 10044, 07065		Part No.
Liquid end FM 65 - DN 10	PVT	1035967
	PVT - FDA	1046469
	SST	1035969
	SST - FDA	1046471
	SST (with 2 valve sets)	1035968

Type 07042, 04084, 04120		Part No.
Liquid end FM 120 - DN 15	PVT	1035961
	PVT - FDA	1046453
	SST	1035963
	SST - FDA	1046465
	SST (with 2 valve sets)	1035962

Spare Parts Kits for versions with old standard diaphragm

Type 12017, 120035, 10050		Part No.
Liquid end FM 50 - DN 10	PVT	1010541
	SST	1010554
	SST (with 2 valve sets)	1010555

Type 10022, 10044, 07065		Part No.
Liquid end FM 65 - DN 10	PVT	1010542
	SST	1010556
	SST (with 2 valve sets)	1010557

Type 07042, 04084, 04120		Part No.
Liquid end FM 120 - DN 15	PVT	1010543
	SST	1010558
	SST (with 2 valve sets)	1010559

Multilayer Safety Diaphragms - current

Sigma/ 1 FM 50	Type: 12017, 120035, 10050	1030114
Sigma/ 1 FM 65	Type: 10022, 10044, 07065	1030115
Sigma/ 1 FM 120	Type: 07042, 04084, 04120	1035828

Pump Diaphragms (standard diaphragm) old		**Part No.**
Sigma/ 1 FM 50	Type: 12017, 120035, 10050	1010279
Sigma/ 1 FM 65	Type: 10022, 10044, 07065	1010282
Sigma/ 1 FM 120	Type: 07042, 04084, 04120	1010285

Suction - Discharge Valves PVT		**Part No.**
Sigma/ 1	12017, 120035, 10050 DN10	1002267
Sigma/ 1	10022, 10044, 07065 DN10	1002267
Sigma/ 1	07042, 04084, 04120 DN15	792517

PTFE Moulding Gasket		**Part No.**
Sigma/ 1	12017, 120035, 10050 DN10	1019364
Sigma/ 1	10022, 10044, 07065 DN10	1019364
Sigma/ 1	07042, 04084, 04120 DN15	1019365

Visual Diaphragm Failure Indicator	1033323