2.3 ProMinent® Sigma/ 3 Diaphragm Metering Pumps

2.1.1 ProMinent® Sigma/ 3 Diaphragm Metering Pumps

Sigma/ 3 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 145 - 1003 l/h at a max. back pressure of 12 to 4 bar. Stroke length 6mm.

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/ 3 control type (S3Cb)

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.

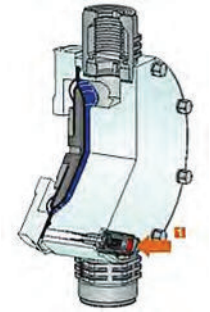
The task of the control is to measure the movement and speed profile in conjunction with the power demand. This leads to a real reduction in the actually required power, which means an increase in efficiency.

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/ 3 basic type (S3Ba)

The ProMinent® Sigma Basic type is a motor driven Metering Pump with no internal electronic control system. The ProMinent® S3Ba 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.

2.3 ProMinent® Sigma/ 3 Diaphragm Metering Pumps

2.3.2 Technical Data for Sigma/ 3

	at 50 Hz				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 S3BaH	**bar**	**l/h**	**ml/ stroke**	**strokes/ min.**	**bar**	**l/h**	**strokes/ min.**	**mWG**	**bar**	**DN**		**kg**
120145 PVT	10	146	33.7	72	10	182	90	5	2	25	1-1/2" / 25mm	22
120145 SST	12	146	33.7	72	12	182	90	5	2	25	1-1/2" / 25mm	26
120190 PVT	10	208	33.7	103	10	243	120	5	2	25	1-1/2" / 25mm	22
120190 SST	12	208	33.7	103	12	243	120	5	2	25	1-1/2" / 25mm	26
120270 PVT	10	292	33.8	144	10	365	180	5	2	25	1-1/2" / 25mm	22
120270 SST	12	292	33.8	144	12	365	180	5	2	25	1-1/2" / 25mm	26
120330 PVT	10	365	33.8	180	10	-	-	5	2	25	1-1/2" / 25mm	22
120330 SST	12	365	33.8	180	12	-	-	5	2	25	1-1/2" / 25mm	26
070410 PVT	7	410	95.1	72	7	500	90	4	1	32	2" / 32mm	24
070410 SST	7	410	95.1	72	7	500	90	4	1	32	2" / 32mm	29
070580 PVT	7	580	95.1	103	7	670	120	4	1	32	2" / 32mm	24
070580 SST	7	580	95.1	103	7	670	120	4	1	32	2" / 32mm	29
040830 PVT	4	830	95.1	144	4	1040	180	3	1	32	2" / 32mm	24
040830 SST	4	830	95.1	144	4	1040	180	3	1	32	2" / 32mm	29
041030 PVT	4	1030	95.1	180	4	-	-	3	1	32	2" / 32mm	24
041030 SST	4	1030	95.1	180	4	-	-	3	1	32	2" / 32mm	29

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

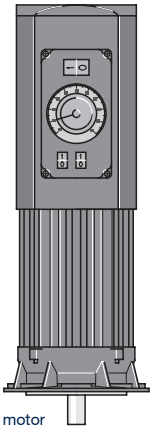
Liquid End Materials in Contact with Dosing Chemical

Liquid End	Suction/Discharge connector	Valve		Seals	Balls	Integrated Pressure Bleed Valve
PVT	PVDF (polyvinylidene fluoride)	PVDF (polyvinylidene fluoride)	PTFE	glass		PVDF/Viton® or EPDM
Note: Large PVDF Liquid Ends have Hastalloy C valve discs and Hastalloy C springs which are coated with CTFE (similar to PTFE)						
SST	stainless steel no. 1.4571	stainless steel no. 1.4571	PTFE	stainless steel no. 1.4401		stainless steel/Viton®

Viton® is a registered trademark of DuPont Dow Elastomers.

Motor Data

3 ph IP 55	230 V/400 V	50/60 Hz	0.37 kW	S
3 ph IP 55	230 V/400 V	50/60 Hz	0.55 kW	S for S3Cb
1 ph AC	230 V	50/60 Hz	0.55 kW	M
1 ph AC	115 V	60 Hz	0.55 kW	N
3 ph EXe or EXde	230 V/400 V	50 Hz	0.37 kW	L
3 ph EXe or EXde	230 V/400 V	60 Hz	0.37 kW	P
3 ph IP 55	230 V/400 V	50/60 Hz	0.55 kW	R
1 ph IP 55	230 V	50/60 Hz	0.55 kW	V



Variable speed motor

Sigma Basic Type Control Functions (S3Ba)

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

2.2 ProMinent® Sigma/ 3 Diaphragm Metering Pumps

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

S3Ba **Sigma Basic Type (S3Ba) at 50Hz** **Prices $**

H Main Drive, diaphragm

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

120145*	12 bar; 145 l/h	***for PVDF max. 10 bar**	**PVDF**
120190*	12 bar; 190 l/h		**SS**
120270*	12 bar; 270 l/h		
120330*	12 bar; 330 l/h		
070410	7 bar; 410 l/h	***DN32 Hastalloy C valve discs and springs***	**PVDF**
070580	7 bar; 580 l/h	***DN32 Hastalloy C valve discs and springs***	**SS**
040830	4 bar; 830 l/h	***DN32 Hastalloy C valve discs and springs***	
041030	4 bar; 1030 l/h		

Liquid end material with PTFE Seal:

PVT	PVDF (max 10 bar)
SST	Stainless steel

Diaphragm:

S	Multilayer safety diaphragm with visual rupture indicator
A	Multilayer safety diaphragm with visual rupture signaling; pump stops
H	Diaphragm for Hygienic Head

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

0	No valve springs (standard)	
1	With 2 valve springs, Hastelloy C 4: 0.1 bar	***NC for DN32***
4	With relief valve, Viton® seal, no valve springs	
5	With relief valve, Viton® seal and valve springs	***for DN32***
H	Hygienic head with tri-clamp connection (maximum 10 bar), contact Sydney	

Hydraulic connector:

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

Version:

0	With ProMinent® logo (standard)
F	Physiologically harmless (FDA)
M	Modified

Power supply:

S	3 ph, 230 V/400 V, 0.37 kW (standard)
M	1 ph, 230 V 0.55 kW
N	1 ph, 115 V
L	3 ph, 230 V/400 V, 0.37 kW, 50Hz, (EExe, EExde)
P	3 ph, 230 V/400 V, 0.37 kW, 60Hz, (EExe, EExde)
R	3ph, variable speed motor 4 pol. 230/400 V
V (0)	var. speed motor with integral speed control 230/1/50
V (2)	var. speed motor with integral speed control Exd

Enclosure rating:

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

Stroke sensor:

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

Stroke length adjustment:

0	Manual
1	With stroke positioning motor, 230V/50/60Hz
2	With stroke positioning motor, 115V/50/60Hz
4	With stroke control motor, 4...20 mA 230 V/50/60Hz
6	With stroke control motor, 4...20 mA 115 V/50/60Hz

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 - 120145 - 120190 - 120270 - 120330
25mm PVC solvent weld male and 4 EPDM flat gaskets
070410 - 070580 - 040830 - 041030
32mm PVC solvent weld socket and 4 EPDM flat gaskets

P1 as P0 but with Viton® Flat Gaskets

240 volt motor supplied with power cord.

S3Ba	H	120145	PVT	A	0	1	0	S	0	0	0	P1

2.3 ProMinent® Sigma/ 3 Diaphragm Metering Pumps

2.3.4 Identity Code Ordering System for Sigma (S3Cb)

S3Cb — **Sigma Control Type (S3Cb)** — **Prices $**

H Main power end, diaphragm

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

120145	12 bar; 160 l/h	**Notice:**	PVDF
120190	12 bar; 220 l/h	S3Cb pump types: 60 Hz performance data applies	SS
120270	12 bar; 330 l/h	(as 60 Hz operation) but max. 173 strokes/min.	
070410	7 bar; 500 l/h	Note: ***DN32 Hastalloy C valve discs and springs***	PVDF
070580	7 bar; 670 l/h	Note: ***DN32 Hastalloy C valve discs and springs***	SS
040830	4 bar; 1040 l/h	Note: ***DN32 Hastalloy C valve discs and springs***	for PVDF max. 10 bar

Liquid end material with PTFE Seal:

PVT PVDF (max 10 bar)

SST Stainless steel

Diaphragm:

S Multilayer safety diaphragm with visual rupture indicator

A Multilayer safety diaphragm with rupture signalling; pump stops

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

0 No valve springs

1 With 2 valve springs, Hastelloy C 4: 0.1 bar ***NC for DN32***

4 With relief valve, Viton® seal, no valve springs

5 With relief valve, Viton® seal and valve springs STD ***for DN32***

Hydraulic connector:

1 Union nut and PVC Solvent Weld

3 Union nut and PVDF male BSP

4 Union nut & stainless steel insert *inc. w/SS pump*

7 Union nut and PVDF Hosetail

Version:

0 With ProMinent® logo (standard)

F Physiologically harmless (FDA)

M Modified

Electrical Power supply:

U 1 ph 100 - 230 V ±10% 50 Hz

Cable and plug:

C 2 m Australian

Relays:

0 No relay (Standard)

1 Fault relay (230V - 8A)

3 Fault + pacing relay (24V - 100mA)

8 As 1 + 4-20 mA output

Control Variant:

0 Manual + External Control + Pulse Control

1 Manual + External Control + Pulse Control + analog + metering profiles

5 As 1 + Process Timer

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 + 0.5 m cable

1 HMI + 2.0 m cable

2 HMI + 5.0 m cable

X Without HMI

Dosing Monitor:

0 Without access code

1 With access code

Language:

EN English

Prepack Option

P* See options

Relays Type		Cable
1 -	1029311	c/w cable
3 -	1029310	1002011
8 -	1031273	1002011

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 - 120145 - 120190 - 120270
25mm PVC solvent weld male and 4 EPDM flat gaskets & CANBUS cable if required.

070410 - 070580 - 040830
32mm PVC solvent weld socket and 4 EPDM flat gaskets & CANBUS cable if required.

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.

S3Cb H 120270 PVT S 0 1 0 U C 0 0 0 1 0 EN P2

2.3 ProMinent® Sigma/ 3 Spares for Diaphragm Metering Pumps

2.3.5 Spare Parts Kits

The spare parts kits generally contain the consumable components for the liquid ends.

PVT version

1 pump diaphragm
1 suction valve
1 discharge valve
2 valve balls or valve discs with spring for DN32
1 seal set (PTFE Gaskets, ball seats, ball seat housings)

SST version

1 pump diaphragm
2 valve balls or valve discs with spring for DN32
1 seal set (PTFE Gaskets, ball seat discs)

Spare parts kits Sigma/ 3 with new multilayer safety diaphragm

Type 120145, 120190, 120270, 120330		Part No.
Liquid end FM 330 - DN 25	PVT	1034678
	PVT - FDA	1046478
	SST	1034679
	SST - FDA	1046479
	SST (with 2 valve set)	1034680
Type 070410, 070580, 040830, 041030		
Liquid end FM 1000 - DN 32	PVT	1034681
	SST	1034682
	SST (with 2 valve set)	1034683

Spare Parts Kits for versions with old standard/double diaphragm

Type 120145, 120190, 120270, 120330		Part No.
Liquid end FM 330 - DN 25	PVT	1005308
	SST	1005310.
	SST (with 2 valve set)	1005312
Type 070410, 070580, 040830, 041030		
Liquid end FM 1000 - DN 32	PVT	1020032
	SST	1005311
	SST (with 2 valve set)	1005313

Pump Diaphragms (old version)

FM 330	Type 120145, 120190, 120270, 120330	1004604
FM 1000	Type 070410, 070580, 040830, 041030	1002835

Multilayer Safety Diaphragm

FM 330	Type 120145, 120190, 120270, 120330	1029604
FM 1000	Type 070410, 070580, 040830, 041030	1029603

Suction - Discharge Valves PVT

Sigma/3	120145, 120190, 120270, 120330	DN25	740615
Sigma/ 3	070410, 070580, 040830, 041030	DN32	1020031

PTFE Moulding Gasket

Sigma/ 3	120145, 120190, 120270, 120330 DN10 *(Bleed Valve)*	1019364
Sigma/ 3	120145, 120190, 120270, 120330 DN25	1019367
Sigma/ 3	Type 070410, 070580, 040830, 041030 DN15 *(Bleed Valve)*	1019365
Sigma/3	Type 070410, 070580, 040830, 041030 DN32	1019353