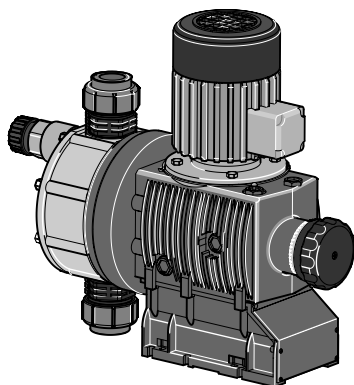


ProMinent® Sigma/ 3 Motor Diaphragm Metering Pumps

Overview: Sigma/ 3



pk_2_071

Ideal for applications requiring automation, large turndown and/or feed verification

(see [page 133](#) for spare parts and [page 138](#) for control cables)

The ProMinent® Sigma/ 3 is a mechanically actuated diaphragm metering pump. The capacity range extends from 46-264 gph (174-1000 l/h) at a max backpressure of 174-58 psi (12-4 bar). The feed rate is adjustable by altering the stroke length (6 mm) in 0.5 % increments by means of a self-locking rotating knob.

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).

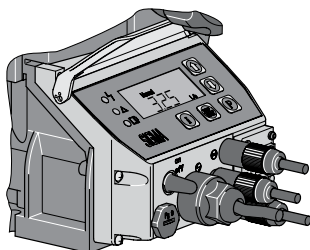
The stable, corrosion-resistant metal and plastic housing is combined with four gear ratios, two liquid end sizes and two liquid end materials. The optional control via switch or analogue signal (e.g. 0/4-20 mA) for the Sigma (S3Ca) controller type means that the pump is highly adaptable, even to fluctuating metering requirements.

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

Sigma/ 3 Basic Type (S3Ba)

The ProMinent® Sigma Basic type is a motor driven metering pump with no internal electronic control system. The ProMinent® S2Ba offers a variety of different drive options in the single phase AC motors (56-C flange). Different flanges are available so that customers can use their own motor to drive the pump.

Sigma/ 3 Control Type (S3Ca)



pk_2_104

The ProMinent® Sigma/ 3 microprocessor version (standard IP 65) allows rapid and reliable adjustment to fluctuating metering requirements.

The control unit has the same control surface as the ProMinent® gamma/ L metering pump.

The microprocessor controller of the Sigma pumps, featuring the optimum combination of variable AC frequency combined with digital stroking frequency, ensures exact metering even in the lower minimum range due to individual stroke control.

With five programming keys the individual pump functions are easy to set. A backlit LCD gives information about the prevailing operating status. LEDs along with a fault-indicating or pacing relay act as operating and warning indicators to ensure monitoring of the pump function.

PROFI® Central or decentral adjustment is possible with PROFIBUS® and/or an integrated process timer.



(see [page 138](#))

pk_2_003

ProMinent® Sigma/ 3 Motor Diaphragm Metering Pumps

Specifications

General:

Maximum stroke length:	0.236" (6.0 mm)		
Power cord:	6 foot (2 m) 2 wire + ground (supplied on control version)		
Stroke frequency control:	S3Ba: Constant speed or optional DC/SCR drive or AC inverter S3Ca: Microprocessor control version with innovative start/stop and variable speed control proportional to set frequency or external control signal.		
Stroke counting:	Standard on S3Ca		
Materials of construction			
Inner casing:	Cast aluminum		
Housing:	Glass-filled Luranyl™ (PPE)		
Wetted materials of construction:	Liquid End:	PVDF	316 SS
Suct./Dis. Connectors:	PVDF	316 SS	
	Seals:	PTFE	PTFE
	Check Balls: DN 25	Glass	SS
	Check Plates: DN 32	Hastelloy C	Hastelloy C
Drive:	Cam and spring-follower (lost motion)		
Lubrication:	Oil lubricated		
Recommended oil:	ISO VG 460, such as Mobil Gear Oil 634; ProMinent Part no. 555325		
Oil quantity:	Approximately 0.95 quart (900 mL)		
Recommended oil change interval:	5,000 hours		
Warranty:	Two years on drive, one year on liquid end.		
Factory testing:	Each pump is tested for rated flow at maximum pressure.		
Industry Standard:	CE approved, CSA available (standard in Canada)		
Diaphragm materials:	PTFE faced EPDM with Nylon reinforcement and steel core		
Liquid end options:	Polyvinylidene Fluoride (PVDF) or 316 SS with PTFE		
Check valves:	DN 25 valves - Single ball check, PVDF and SS versions. Optional springs available (Hastelloy C4) DN 32 valves - Plate valves, with Hastelloy C4 plates and springs in both PVDF and SS valves.		
Repeatability:	When used according to the operating instructions, better than ±2%		
Max. fluid operating temperatures:	Material	Constant (Max. Backpressure)	Short Term_ (15 min. @ max.30 psi)
	PVDF	149°F (65°C)	212°F (100°C)
	316 SS	194°F (90°C)	248°F (120°C)
Diaphragm failure indication:	Optional, see accessories. Switch is N.C., opens to indicate failure. Switch rated 250 VAC, 0.3 A inductive or 0.5 A resistive; 30 VDC, 1.0 A resistive. Requires minimum 21 psig (1.5 bar) backpressure on pump. N.O. switch available upon request. Includes double diaphragm leak prevention.		
Separation of drive from liquid end:	An air gap with secondary safety diaphragm separates the drive from the liquid end to prevent cross contamination of oil and process fluid (with or without optional diaphragm failure indication).		
Max. solids size in fluid:	0.3 mm		
Stroke length adjustment:	Manual, in increments of 0.5%. Motorized stroke length adjustment available.		

ProMinent® Sigma/ 3 Motor Diaphragm Metering Pumps

Specifications

Basic Version

Motor mounting flange:	Fits all NEMA 56C frame motors (motor not included with pump)
Gear ratios and stroke frequencies (with 1725 RPM motor):	20:1 = 86 SPM, 14:1 = 124 SPM, 10.1: = 173 SPM
Motor coupling:	Flexible coupling included with pump.
Required Motor HP:	3/4 HP (.55 kW)
Full load RPM:	1750 RPM (60 Hz)
Stroke sensor (optional):	Hall effect - requires 5 VDC

Control Version

<i>Control Function:</i>	At stroke frequencies equal to or greater than 33%, the integral AC variable frequency drive continuously varies the motor speed in a linear response to the incoming signal. At stroke frequencies less than 33%, the motor starts and stops according to a control algorithm to provide the desired stroke frequency. In the start-stop mode the motor speed is constant at approximately 580 RPM.
<i>Enclosure rating:</i>	NEMA 3 (IP 55)
<i>Motor data:</i>	Totally enclosed, fan cooled (IP55); class F insulation; Manufacturer ATB; 0.37 kW (0.5 HP) 230 3 phase (1.9 A)
<i>Thermal overload protection:</i>	Thermal cutout switches off at 284°F (140°C).
<i>Relay cable (optional):</i>	6 foot (2 m) 3 wire (SPDT) 250 VAC, 2 A
<i>Relay load</i>	
<i>Fault relay only (options 1 & 3):</i>	Contact load: 250 VAC, 2 A, 50/60 Hz Operating life: > 200,000 switch functions
<i>Fault and pacing relay (options 4 & 5):</i>	Contact load: 24 V, 2 A, 50/60 Hz Operating life: > 200,000 switch functions Residual impedance in ON-position ($R_{DS(on)}$): < 8 Ω Residual current in OFF-position: < 1 μ A Maximum voltage: 24 VDC Maximum current: < 100 mA (for pacing relay) Switch functions: 750x10 ⁶ Contact closure: 100 ms (for pacing relay)
<i>Analog output signal:</i>	max. impedance 300 Ω Isolated 4-20 mA output signal
<i>Profibus - DP fieldbus options:</i>	Transfer: RS - 485 Wiring: 2-wired, twisted, shielded Length: 3637 ft. (1200 m)/328 ft. (100 m) Baudrate: 9600 bits/s; 12 Mbits/s No. of participants: 32 with 127 repeaters Topology: Line Access procedure: Master/master with token ring
<i>Pulse contact/ Remote pause contact:</i>	With voltage-free contact, or semiconductor sink logic control (not source logic) with a residual voltage of <700 mV. The contact load is approximately 0.5 mA at + 5 VDC. (Note: Semiconductor contacts that require >700 mV across a closed contact should not be used).
<i>Max. pulse frequency:</i>	25 pulses/sec
<i>Contact impedance:</i>	10 kOhm
<i>Max. pulse memory:</i>	65,535 pulses
<i>Necessary contact duration:</i>	20ms
<i>Analog - current input burden:</i>	Approximately 120 Ohm
<i>Max. allowable input current:</i>	50 mA
<i>Power requirements:</i>	115 VAC or 230 VAC single phase

ProMinent® Sigma/ 3 Motor Diaphragm Metering Pumps

Capacity Data

Capacity at Maximum Backpressure					Max. Stroke Rate	Output per Stroke	Recomm. Motor HP	Max Suction Lift (water)	Max. Suction Pressure	Suction/ Discharge Connector	Approximate Shipping Weight w/ Motor	
Pump type S3Ba/S3Ca	psig	(bar)	U.S. GPH	Stroke/min. (S3B/S3C)	Stroke/min. (S3B/S3C)	mL/ stroke	HP	ft. (m)	psig (bar)	in. DN MNPT	lbs. (kg)	
120145 PVT	145	(10)	46	(174)	86/90	31.5	3/4	16 (5)	29 (2)	1 25	49 (22)	
120145 SST	174	(12)	46	(174)	86/90	31.5	3/4	16 (5)	29 (2)	1 25	57 (26)	
120190 PVT	145	(10)	60.2	(228)	124/120	31.5	3/4	16 (5)	29 (2)	1 25	49 (22)	
120190 SST	174	(12)	60.2	(228)	124/120	31.5	3/4	16 (5)	29 (2)	1 25	57 (26)	
120270 PVT	145	(10)	85.6	(324)	173/180	31.5	3/4	16 (5)	29 (2)	1 25	49 (22)	
120270 SST	174	(12)	85.6	(324)	173/180	31.5	3/4	16 (5)	29 (2)	1 25	57 (26)	
070410 PVT	100	(7)	130	(492)	86/90	95.1	3/4	13 (4)	14.5 (1)	1-1/2 32	53 (24)	
070410 SST	100	(7)	130	(492)	86/90	95.1	3/4	13 (4)	14.5 (1)	1-1/2 32	64 (29)	
070580 PVT	100	(7)	184	(696)	124/120	95.1	3/4	13 (4)	14.5 (1)	1-1/2 32	53 (24)	
070580 SST	100	(7)	184	(696)	124/120	95.1	3/4	13 (4)	14.5 (1)	1-1/2 32	64 (29)	
040830 PVT	58	(4)	264	(1000)	173/180	95.1	3/4	10 (3)	14.5 (1)	1-1/2 32	53 (24)	
040830 SST	58	(4)	264	(1000)	173/180	95.1	3/4	10 (3)	14.5 (1)	1-1/2 32	64 (29)	

Note: Universal control cable necessary for external Sigma control. (see [page 138](#))

Materials In Contact With Chemical

Material	Suction/discharge connector	Seals	DN 25		Seals	DN 32	
	Liquid end		Valve balls	Valve seats		Valve Plate/ Spring	Valve seats
PVT	PVDF (Polyvinylidene fluoride)	PTFE	Glass	PTFE	PTFE	Ceramic/ Hast. C + CTFE**	PTFE
SST	Stainless steel	PTFE	Stainless steel	PTFE	PTFE	Stainless steel	PTFE

ProMinent® Sigma/ 3 Motor Diaphragm Metering Pumps

Identcode Ordering System (S3Ba)

S3Ba Sigma/3 Basic Version a

H	Main Drive, Diaphragm											
	Pump version: 120145 120190 120270 070410 070580 040830											
	PV	Liquid end material: PVDF										
	SS	316 Stainless steel										
	T	Seal material: PTFE										
		0	Diaphragm type: Standard diaphragm									
		1	With double diaphragm and failure detector (NC contact opens on fault)									
			0	Liquid end version: Without valve springs								
			1	With 2 valve springs (Hastelloy C4, 1 psig) (standard for 070410, 070580, 040830)								
				7	Connectors: PVDF clamping nut & insert							
				8	SS clamping nut & insert							
				0	Labeling: Standard with logo							
					2	Motor mount: Without motor, with NEMA 56C flange						
						0	Enclosure rating: Standard					
							0	Stroke sensor: Without stroke sensor (Standard)				
							2	With Pacing relay (Consult Factory)				
								0	Stroke length adjustment: Manual (Standard)			
								4	W/ stroke positioning motor 4 - 20 mA, 230 V 50/60 Hz			
								6	W/ stroke positioning motor 4 - 20 mA, 115 V 50/60 Hz			
S3Ba	H	120145	PV	T	0	0	7	0	2	0	0	0

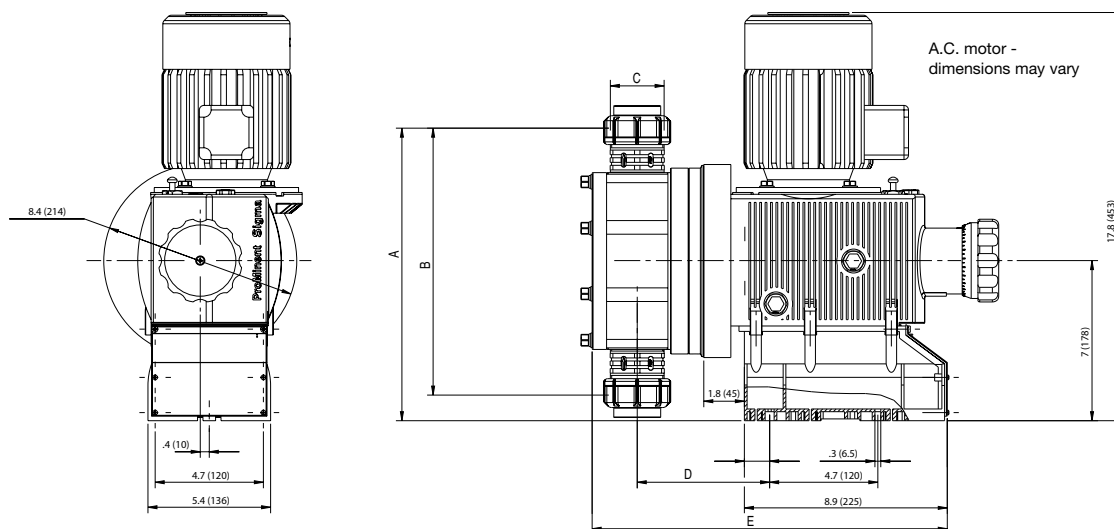
ProMinent® Sigma/ 3 Motor Diaphragm Metering Pumps

Identcode Ordering System (S3Ca)

S3Ca Sigma/3 Control Version a															
H	Main drive/Diaphragm														
	Pump version: 120145 070410 120190 070580 120270 040830														
	PVT	Liquid end material: PVDF with PTFE													
	SST	316 Stainless steel with PTFE													
			Diaphragm type: 0 Standard diaphragm, PTFE 1 With double diaphragm and failure detector (NC contact opens on fault) 2 With double diaphragm and failure detector (alarm & continues to operate)												
				Liquid end version: 0 Without valve springs 1 With 2 valve springs (Hastelloy C4, 1.45 psig) (standard for 070410, 070580, 040830)											
					Connectors: 7 PVDF clamping nut & insert 8 SS clamping nut & insert										
						Labeling: 0 Standard with logo									
							Voltage supply: W 1 ph, 115-230V ± 10%, 50/60 Hz								
								Cable and plug with 6 ft (2 m) power cord, single phase: A European plug, 230V D N. American plug, 115 V U N. American plug, 230 V							
									Relay: 0 Without relay (For Profibus only) 1 Fault annunciating relay, drops out (Standard) 3 Fault annunciating relay, pulls in 4 Option 1 + pacing relay 5 Option 3 + pacing relay C Option 1 + 4-20 mA output D Option 3 + 4-20 mA output E Pacing relay + 4-20 mA output						
										Control Variants: 0 Manual + External with pulse control (multiplier/divider) 1 Manual + External with pulse control & analog control 4 Option 0 + timer 5 Option 1 + timer P Option 1+ Profibus (Relay must be 0)					
											Access Code: 0 No Access Code 1 Access Code				
												Flow Monitor: 0 Input for metering monitor signal (pulse) 1 Input for maintained flow switch signal			
													Stroke Length Adjustment: C Manual + Calibration		
S3Ca	H	040830	PVT	0	0	7	0	U	D	0	0	0	0	0	C

ProMinent® Sigma/ 3 Motor Diaphragm Metering Pumps

Dimensional Drawing: (S3Ba)



Dimensions in inches (mm)

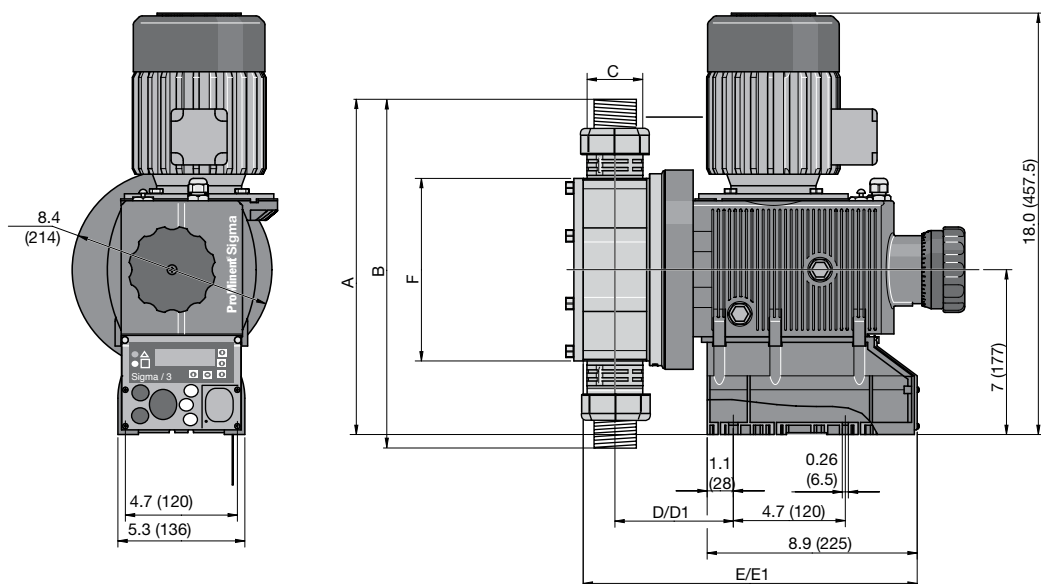
Type Sigma/3	A	B	Suction/ Discharge Valve Thread C*	D	D1**	E	E1**	F
121045, 120190, 120270								
PVT	14.1 (358)	14.3 (364)	1" MNPT	4.7 (120)	5.5 (140)	13.6 (346)	14.4 (366)	6.1 (156)
SST	14.1 (358)	14.3 (364)	1" MNPT	4.8 (121)	5.6 (141)	13.7 (349)	14.5 (369)	6.1 (156)
070410, 070580, 040830								
PVT	15.9 (403)	17.8 (453)	1-1/2" MNPT	5.0 (127)	5.7 (147)	14.0 (358)	14.8 (378)	8.1 (206)
SST	15.3 (387)	16.9 (430)	1-1/2" MNPT	5.0 (127)	5.7 (147)	14.0 (358)	14.8 (378)	8.1 (206)

* Piping adapters provided according to technical data.

** Dimensions with diaphragm failure detector.

ProMinent® Sigma/ 3 Motor Diaphragm Metering Pumps

Dimensional Drawing: (S3Ca)



Dimensions in inches (mm)

Type Sigma/3	A	B	Suction/ Discharge Valve Thread C*	D	D1**	E	E1**	F
121045, 120190, 120270								
PVT	14.1 (358)	14.3 (364)	1" MNPT	4.7 (120)	5.5 (140)	13.6 (346)	14.4 (366)	6.1 (156)
SST	14.1 (358)	14.3 (364)	1" MNPT	4.8 (121)	5.6 (141)	13.7 (349)	14.5 (369)	6.1 (156)
070410, 070580, 040830								
PVT	15.9 (403)	17.8 (453)	1-1/2" MNPT	5.0 (127)	5.7 (147)	14.0 (358)	14.8 (378)	8.1 (206)
SST	15.3 (387)	16.9 (430)	1-1/2" MNPT	5.0 (127)	5.7 (147)	14.0 (358)	14.8 (378)	8.1 (206)

* Piping adapters provided according to technical data.

** Dimensions with diaphragm failure detector.