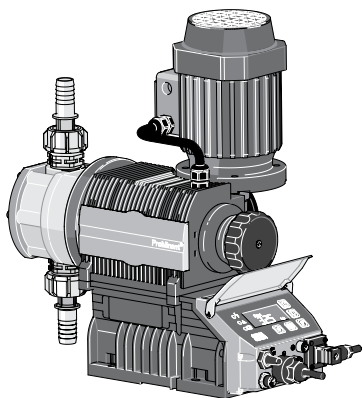


ProMinent® Sigma/ 1 Motor Diaphragm Metering Pumps

Overview: Sigma/ 1



S1Ca

Ideal for Economical mid-range applications

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

The ProMinent® Sigma/ 1 is a mechanically actuated diaphragm metering pump. It has a capacity range of 5.3-38 gph (20-144 l/h) at a max. back pressure of 174-58 psi (12-4 bar). The pump capacity is adjusted by varying the stroke length (4 mm) in 1 % steps via a self locking adjusting knob.

The reproducible metering accuracy is better than ± 2 % providing installation has been correctly carried out, and in the stroke length range of 30-100 %. (Instructions in the operating instructions manual must be followed.)

The stable, corrosion resistant metal and plastic housing is rated IP 65. To facilitate adaptation of the pumps to the widest possible range of processing requirements we offer a choice of three gearbox ratios, three liquid end sizes, two liquid end materials and either contact or analogue signal (e.g. 0/4-20 mA) control options in the form of the S1Ca Sigma controller.

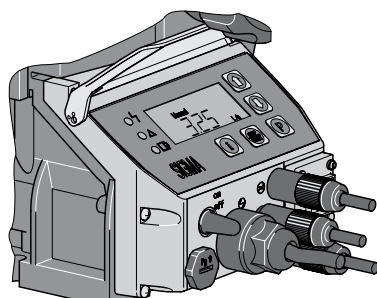
For safety reasons, all motor driven metering pumps must be equipped with adequate protection against electrical overload.

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 the single phase AC motor or a 3 ph. motor.

Different flanges are available so that customers can use their own motor to drive the pump.

Sigma/1 Control Type (S1Ca)



ProMinent® Sigma Controller
pk_2_104

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

The controller has the same control panel 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.

The individual pump functions are simply adjusted using the five programming keys. A backlit LCD indicates the current operating status, LEDs function as operation or fault indicators and fault indicator or pacing relays monitor the pump function.

PROFI® Local or remote control is possible with PROFIBUS® and/or an integrated process timer.



(see [page 138](#))

ProMinent® Sigma/ 1 Motor Diaphragm Metering Pumps

Standard Modes and Functions

Feed rate is determined by stroke length and stroke rate. Stroke length is manually adjustable from 1 to 100% in increments of 1% via the stroke length knob.

Stroke rate can be set to a maximum of 90, 170 or 200 strokes per minute (pump dependent). An illuminated LCD displays stroke length, stroke rate and an accumulative stroke counter, which can be cleared and reset.

Pump capacity output is displayed in either U.S. gph or l/h, set by the operator. Output is accumulated and totalized capacity is also displayed in either U.S. gallons or litres.

The “i” key is used to scroll information screens for stroke rate, stroke length, stroke counter, capacity and totalized capacity. Other information is available depending on control mode.

Control Modes

The control modes available with the Sigma/1 include manual, external contact with pulse control (multiplier/divider), batch, or analog control. The Profibus option includes all control modes, plus fieldbus connection.

In the “Manual” mode, stroke rate is controlled manually. The “Contact” external mode allows adjustments to be made externally (e.g. by means of a pulse-type water meter for proportional chemical feed). Pulse signals are fed into the contact input of the pump by an optional control cable. Each pulse from a water meter or pulse-type controller provides the pump an input to pump at the selected pulse ratio, up to the pump’s maximum stroke rate. Over-stroking the pump is not possible.

Standard Functions

“Calibrate”

The pump can be directly calibrated in-line to actual flow. Calibration is maintained within the stroke frequency range of 90/170/200 spm (model dependent). A warning indicator flashes when adjustments to the stroke volume are made outside the calibrated range of +/- 10%.

“Auxiliary Frequency”

An auxiliary frequency can be programmed. This default stroking rate can be enabled via the optional control cable.

“Flow”

The Sigma/1 series metering pumps will monitor their own output, with an optional adjustable flow monitor. Every fluid discharge is sensed and fed back to the electronic control circuit of the pump. If insufficient fluid is discharged for a predetermined number of strokes (up to 125), the pump automatically stops and the red LED lights. The optional fault relay changes state to issue an alarm or activate a standby pump. Call for availability.

“Float Switch”

An optional two-stage ProMinent float switch can be plugged into the pump to monitor chemical tank levels. An early warning is issued when the allowable minimum level is reached. The pump continues to operate while the display flashes, the yellow LED lights and an optional collective fault relay changes state to issue an alarm. If the liquid level in the supply tank drops another 3/4” (20 mm), the pump automatically shuts down, the LCD displays “Minim” and the red LED lights. The optional fault relay remains activated.

“Pause”

The Sigma/1 series can be remotely started and stopped via a dry contact through the optional control cable.

“Stop”

The Sigma/1 can be stopped by pressing the STOP/START key without disconnecting from the power supply.

“Prime”

Priming is activated by pressing both arrow keys at the same time while the frequency display is showing.

Function and Error Indicators

Three LED lights on the pump faceplate signal operational status. The green light flashes during normal operation, and the yellow light warns of a situation that could lead to a fault (e.g. low chemical). If a fault occurs “error” will appear on the LCD screen and the red LED light appears.

ProMinent® Sigma/ 1 Motor Diaphragm Metering Pumps

Optional Modes and Functions

Optional Control Modes

“Analog” Mode

With this option, the stroking rate of the Sigma/1 is directly proportional to the analog signal. For a custom range setting, the curve feature of the analog input can be selected. With this, the pump response to the analog input can be easily programmed.

“Contact” Mode with Pulse Control

This feature is used to “tune” the pump to contact generators of any kind (e.g. pulse-type water meter or process controller), and eliminate the need for a costly external control unit. The following functions can be selected by means of the keypad.

Pulse step-up (multiply) and step-down (divide)

By simply entering a factor in the 0.01-99.99 range, the step-up or step-down ratio is set.

For example:

Step-up Factor:

99.99 1 pulse = 99.99 pump strokes

10 1 pulse = 10 pump strokes

Step-down Factor:

0.25 4 pulses = 1 pump stroke

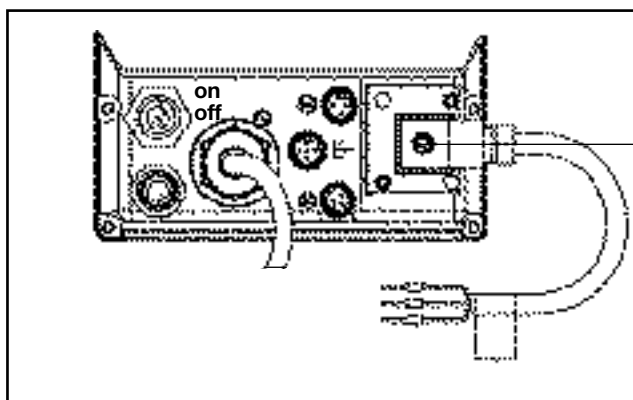
0.01 100 pulses = 1 pump stroke

“Batch” Mode

The Batch mode is a variation of the contact operating mode. A number of strokes can be predetermined up to 65,535 strokes (whole numbers) or the feed quantity can be predetermined. The batch is then initiated by either pressing the “P” key on the pump face or providing a contact to the external control cable.

Access Code

A programmable access code to prevent unauthorized changes to settings is available as an option.



An external panel enables optional relays to be installed on-site.

Relay outputs. . .

Fault annunciating relay

For low tank level (flow switch), loss of flow (flow monitor), loss of analog signal and diaphragm failure detector, system faults and fuse/power supply failure.

Fault annunciating and Pacing relay

In addition to the fault annunciating relay, a contact closure is issued with every pump stroke (contact duration 150 ms). This allows a second ProMinent metering pump to be paced synchronously, or to totalize flow with an external stroke counter.

4-20 mA Analog Output

A 4-20 mA analog output option is available for use with pumps that operate in the manual mode or by a remote 4-20 mA analog reference signal. The 4-20 mA analog output signal is linear to pump frequency multiplied by the percentage of stroke length. The output signal is isolated and can drive up to 300 Ohms impedance. Analog output can be used for status feedback to higher level control systems for closed loop control or for monitoring chemical usage. This option is available in combination with either the fault annunciating or pacing relay.

Timer Relay

The optional integrated 2-week timer offers 81 programmable events. It can be set to hourly, daily, work days, weekend, weekly or two-week periods with switch-on times from 1 second to two weeks. The timer can be programmed to change operation mode, frequency and the function of two relays. All the functions can be programmed independently of one another. Up to 13 delay times can be programmed into the timer function.

The range of applications exceeds that of a “standard timer”. Typical application is disinfection in cooling towers, process water, etc. with the ability to automatically program shock dosages or increase the concentration at a certain interval.

Fieldbus connection

Monitor and control remotely via a SCADA/PLC system using the profibus-DP system.

Note: Relay options not available with profibus. Profibus is not field retrofittable.

ProMinent® Sigma/ 1 Motor Diaphragm Metering Pumps

Specifications

General:

<i>Maximum stroke length:</i>	0.16" (4.0 mm)		
<i>Power cord:</i>	6 foot (2 m) 2 wire + ground (supplied on control versions)		
<i>Stroke frequency control:</i>	S1Ba: Constant speed or optional DC/SCR drive or AC inverter S1Ca: Microprocessor control version with innovative start/stop and variable speed control proportional to set frequency or external control signal.		
<i>Stroke counting:</i>	Standard on S1Ca		
<i>Materials of construction</i>			
<i>Housing:</i>	Glass-filled Luranyl™ (PPE)		
<i>Wetted materials of construction:</i>	Liquid End:	PVDF	316 SS
	Suct./Dis. Connectors:	PVDF	316 SS_
	Seals:	PTFE/Viton®	PTFE/Viton®
	Check Balls:	Ceramic	SS
	Pressure Relief Valves:	PVDF/Viton® O-rings	SS/Viton® O-rings
<i>Drive:</i>	Cam and spring-follower (lost motion)		
<i>Lubrication:</i>	Sealed grease lubricated bearings and gearing		
<i>Warranty:</i>	Two years on drive, one year on liquid end.		
<i>Factory testing:</i>	Each pump is tested for rated flow at maximum pressure.		
<i>Industry Standard:</i>	CE approved, CSA available (standard in Canada)		
<i>Diaphragm materials:</i>	PTFE faced EPDM with Nylon reinforcement and steel core		
<i>Liquid end options:</i>	Polyvinylidene Fluoride (PVDF) or 316 SS, with PTFE faced Viton® seals		
<i>Check valves:</i>	Single ball check, PVDF and SS versions. Optional springs available (Hastelloy C4)		
<i>Repeatability:</i>	When used according to the operating instructions, better than ±2%		
<i>Max. fluid operating temperatures:</i>	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)
<i>Diaphragm failure indication:</i>	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.		
<i>Max. solids size in fluid:</i>	0.3 mm		
<i>Stroke length adjustment:</i>	Manual, in increments of 1%. Motorized stroke length adjustment available.		

Sigma/1 Basic Version

Motor: See available motors in identity code

ProMinent® Sigma/ 1 Motor Diaphragm Metering Pumps

Specifications

Sigma/1 Control Version

Control Function: 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.

Enclosure rating: NEMA 3 (IP 55)

Motor data: Totally enclosed, fan cooled (IP55); class F insulation; IEC frame; 1/8 HP (0.09 kW) 230 V, 3 phase (0.7 A)

Relay load

Fault relay only (options 1 & 3): Contact load: 250 VAC, 2 A, 50/60 Hz
Operating life: > 200,000 switch functions

Fault and pacing relay (options 4 & 5): Contact load: max. 24 V, AC/DC, max. 100 mA
max. 50x10⁶ switch cycles @ 10 V, 10 mA
Contact closure: 100 ms (for pacing relay)

Analog output signal: max. impedance 300 W
Isolated 4-20 mA output signal

Profibus - DP fieldbus options:

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

Pulse contact/remote pause contact: 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).

ProMinent® Sigma/ 1 Motor Diaphragm Metering Pumps

Capacity Data

Sigma/1 Basic Version

Technical data:	60 Hz (1750 RPM) operation					Max. Stroke Rate	Output per Stroke	Max. Suction Lift	Max. Suction Pressure	Suction/ Discharge Connector		Shipping Weight w/Motor
	Capacity at Maximum Pressure											
Pump Version	psig	(bar)	U.S.	(L/h)	Stroke/	mL/	(water)	psig	(bar)	DN	in.	(approx.)
S1Ba HM			GPH		min.	stroke	ft. (m)					lbs. (kg)
12017 PVT	145	(10)	5.3	(20)	88	4	23 (7)	14.5	(1)	10	1/2 MNPT	19.8 (9)
12017 SST	174	(12)	5.3	(20)	88	4	23 (7)	14.5	(1)	10	3/8 FNPT	26.5 (12)
12035 PVT	145	(10)	11.1	(42)	172	4	23 (7)	14.5	(1)	10	1/2 MNPT	19.8 (9)
12035 SST	174	(12)	11.1	(42)	172	4	23 (7)	14.5	(1)	10	3/8 FNPT	26.5 (12)
10050 PVT	145	(10)	15.8	(60)	240	4	23 (7)	14.5	(1)	10	1/2 MNPT	19.8 (9)
10050 SST	145	(10)	15.8	(60)	240	4	23 (7)	14.5	(1)	10	3/8 FNPT	26.5 (12)
10022 PVT	145	(10)	6.8	(26)	88	5.1	19.6 (6)	14.5	(1)	10	1/2 MNPT	19.8 (9)
10022 SST	145	(10)	6.8	(26)	88	5.1	19.6 (6)	14.5	(1)	10	3/8 FNPT	26.5 (12)
10044 PVT	145	(10)	14	(53)	172	5.1	19.6 (6)	14.5	(1)	10	1/2 MNPT	19.8 (9)
10044 SST	145	(10)	14	(53)	172	5.1	19.6 (6)	14.5	(1)	10	3/8 FNPT	26.5 (12)
07065 PVT	102	(7)	20.6	(78)	240	5.1	19.6 (6)	14.5	(1)	10	1/2 MNPT	19.8 (9)
07065 SST	102	(7)	20.6	(78)	240	5.1	19.6 (6)	14.5	(1)	10	3/8 FNPT	26.5 (12)
07042 PVT	102	(7)	13.2	(50)	88	9.7	9.8 (3)	14.5	(1)	15	3/4 MNPT	21 (9.5)
07042 SST	102	(7)	13.2	(50)	88	9.7	9.8 (3)	14.5	(1)	15	1/2 FNPT	29.8(13.5)
04084 PVT	58	(4)	26.7	(101)	172	9.7	9.8 (3)	14.5	(1)	15	3/4 MNPT	21 (9.5)
04084 SST	58	(4)	26.7	(101)	172	9.7	9.8 (3)	14.5	(1)	15	1/2 FNPT	29.8(13.5)
04120 PVT	58	(4)	38	(144)	240	9.7	9.8 (3)	14.5	(1)	15	3/4 MNPT	21 (9.5)
04120 SST	58	(4)	38	(144)	240	9.7	9.8 (3)	14.5	(1)	15	1/2 FNPT	29.8 (13.5)

Sigma/1 Control Version

Technical data:	60 Hz operation				Max.	Output	Max.	Max.	Suction/		Shipping	
	Capacity at Maximum Pressure				Stroke Rate	per Stroke	Suction Lift	Suction Pressure	Discharge Connector		Weight w/Motor	
Pump Version	psig	(bar)	U.S.	(L/h)	Stroke/	mL/	(water)	psig	(bar)	DN	in.	(approx.)
S1Ca HM			GPH		min.	stroke	ft. (m)					lbs. (kg)
12017 PVT	145	(10)	5.3	(20)	90	4	23 (7)	14.5	(1)	10	1/2 MNPT	19.8 (9)
12017 SST	174	(12)	5.3	(20)	90	4	23 (7)	14.5	(1)	10	3/8 FNPT	26.5 (12)
12035 PVT	145	(10)	11.1	(42)	170	4	23 (7)	14.5	(1)	10	1/2 MNPT	19.8 (9)
12035 SST	174	(12)	11.1	(42)	170	4	23 (7)	14.5	(1)	10	3/8 FNPT	26.5 (12)
10050 PVT	145	(10)	13.2	(50)	200	4	23 (7)	14.5	(1)	10	1/2 MNPT	19.8 (9)
10050 SST	145	(10)	13.2	(50)	200	4	23 (7)	14.5	(1)	10	3/8 FNPT	26.5 (12)
10022 PVT	145	(10)	6.8	(26)	90	5.1	19.6 (6)	14.5	(1)	10	1/2 MNPT	19.8 (9)
10022 SST	145	(10)	6.8	(26)	90	5.1	19.6 (6)	14.5	(1)	10	3/8 FNPT	26.5 (12)
10044 PVT	145	(10)	14	(53)	170	5.1	19.6 (6)	14.5	(1)	10	1/2 MNPT	19.8 (9)
10044 SST	145	(10)	14	(53)	170	5.1	19.6 (6)	14.5	(1)	10	3/8 FNPT	26.5 (12)
07065 PVT	102	(7)	17.2	(65)	200	5.1	19.6 (6)	14.5	(1)	10	1/2 MNPT	19.8 (9)
07065 SST	102	(7)	17.2	(65)	200	5.1	19.6 (6)	14.5	(1)	10	3/8 FNPT	26.5 (12)
07042 PVT	102	(7)	13.2	(50)	90	9.7	9.8 (3)	14.5	(1)	15	3/4 MNPT	21 (9.5)
07042 SST	102	(7)	13.2	(50)	90	9.7	9.8 (3)	14.5	(1)	15	1/2 FNPT	29.8(13.5)
04084 PVT	58	(4)	26.7	(101)	170	9.7	9.8 (3)	14.5	(1)	15	3/4 MNPT	21 (9.5)
04084 SST	58	(4)	26.7	(101)	170	9.7	9.8 (3)	14.5	(1)	15	1/2 FNPT	29.8(13.5)
04120 PVT	58	(4)	31.7	(120)	200	9.7	9.8 (3)	14.5	(1)	15	3/4 MNPT	21 (9.5)
04120 SST	58	(4)	31.7	(120)	200	9.7	9.8 (3)	14.5	(1)	15	1/2 FNPT	29.8 (13.5)

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

Materials In Contact With Chemicals

Liquid End	Suction/Discharge connector	Valve	Seals/ ball seat	Balls
PVT	PVDF (Polyvinylidene fluoride)	PVDF (Polyvinylidene fluoride)	PTFE/PTFE	Ceramic
SST	Stainless steel	Stainless steel	PTFE/PTFE	Stainless steel

ProMinent® Sigma/ 1 Motor Diaphragm Metering Pumps

Identcode Ordering System (S1Ba)

S1Ba Sigma/1 Basic Version a

H	Main Drive, Diaphragm	
	Pump version: 12017* 07042 12035* 04084 10050 04120 10022 10044 07065	* For PVDF versions. Max. 145 psig Note: Refer to technical data for capacities and stroke rates
	PV SS	Liquid end material: PVDF 316 Stainless steel
	T	Seal material: PTFE
	0 1	Diaphragm type: Standard diaphragm With double diaphragm and failure monitor (NC contact opens on fault)
	0 1	Liquid end version: Without valve springs With 2 valve springs (Hastelloy C4, 1 psig)
	7 8	Connectors: PVDF clamping nut & insert SS clamping nut & insert
	0	Labeling: Standard with logo
	S M N K 3	Voltage supply: S 3 ph, 230 V/400 V, 50/60 Hz M 1 ph, AC, 230 V, 50/60 Hz N 1 ph, AC, 115 V, 60 Hz K 90 VDC Permanent magnet 3 Explosion Proof**
	0	Enclosure rating: Standard
	0 2	Stroke sensor: 0 Without stroke sensor (Standard) 2 With Pacing relay (Consult Factory)
	0 4 6	Stroke length adjustment: 0 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

**** EXPLOSION PROOF MOTOR (INCLUDING MOUNTING FLANGE):**

1) pn. 7500344

1/3 HP, single ph, AC, 115 V, 60 Hz, EPFC
(class 1 Group C & D or class 2 group F & G T3B)

2) pn. 7746261

1/2 HP, 3 ph, 1D, 208-230/ 460 VAC EPFC
(class 1 Group C & D or class 2 group F & G T3B)

S1Ba H 10044 PV T 0 0 7 0 2 0 0 0

ProMinent®

product

solenoid-driven
metering pumps

motor-driven
solenoid pumps

pump spare parts &
accessories

pump engineering
specifications

analytical
instrumentation

analytical
sensors

ProMinent® Sigma/ 1 Motor Diaphragm Metering Pumps

Identcode Ordering System (S1Ca)

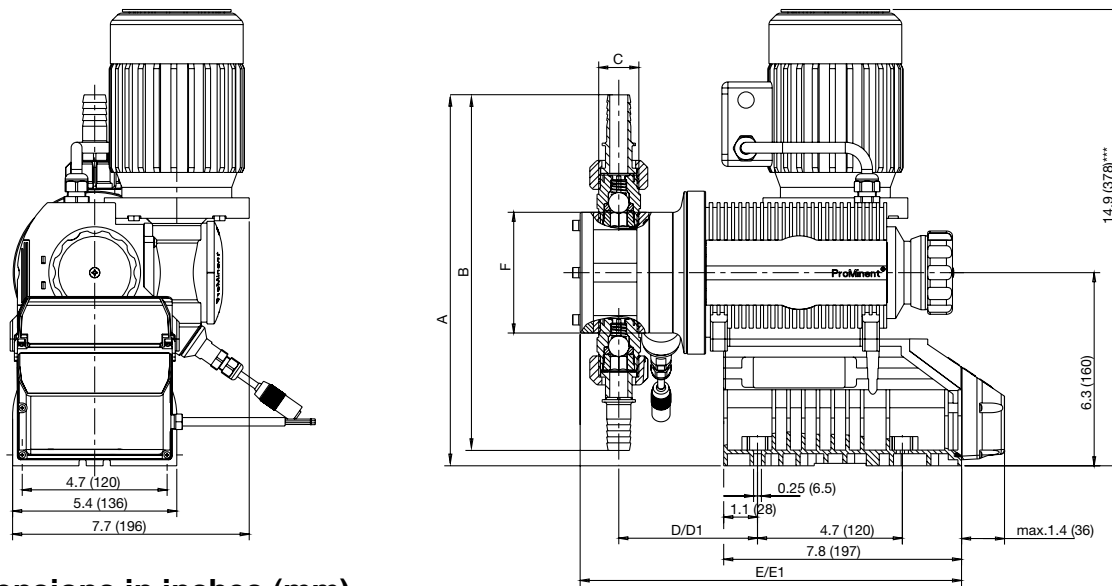
S1Ca Sigma/1 Control Version a

H	Main drive Main drive/Diaphragm	
	Pump version: 12017* 10022 07042 12035* 10044 04084 10050 07065 04120	
	*For PVDF versions, max. 145 psig Note: Refer to technical data for capacities and stroke rates	
	PVT SST	Liquid end materials: PVDF with PTFE gasket 316 Stainless steel with PTFE gasket
	0 1 2	Diaphragm type: 0 Standard diaphragm, PTFE 1 With double diaphragm and failure monitor (NC contact opens on fault) 2 With double diaphragm and failure monitor (alarm & continues to operate)
	0 1	Liquid end version: 0 Without valve springs 1 With 2 valve springs (Hastelloy C4, 1.45 psig)
	7 8	Connectors: 7 PVDF clamping nut & insert 8 SS clamping nut & insert
	0	Labeling: 0 Standard with logo
	U	Voltage supply: 1 ph, 115-230 V \pm 10%, 50/60 Hz
	A D U	Cable and plug with 6 ft (2 m) power cord, single phase: A European plug, 230 V D N. American plug, 115 V U N. American plug, 230 V
	0 1 3 4 5 C D E	Relay: 0 Without relay 1 Fault annunciating relay, drops out 3 Fault annunciating relay, pulls in 4 Option 1 + pacing relay 5 Option 3 + pacing relay C 4-20 mA output, drops out D 4-20 mA output, pulls in E 4-20 mA output, pacing relay
	0 1 4 5 P	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)
	0 1	Access code: 0 No access code 1 Access code
	0 1	Flow monitor: 0 Input for metering monitor signal (pulse) 1 Input for maintained flow switch signal
	C	Stroke length adjustment: C Manual + Calibration

S1Ca H 07042 PVT 0 0 7 0 U D 0 0 0 0 0 C

ProMinent® Sigma/ 1 Motor Diaphragm Metering Pumps

Dimensional Drawing: (S1Ba)



Dimensions in inches (mm)

Type Sigma/1	A	B	Suction/ Discharge Valve Thread C*	D	D1**	E	E1**	F
12017, 12035, 10050, 10022, 10044, 07065 PVT	11 (279)	9.38 (238)	1/2" MNPT	3.54 (90)	4.33 (110)	10.8 (275)	11.6 (295)	3.8 (96)
SST	9.75 (248)	7.13 (181)	3/8" FNPT	3.5 (89)	4.29 (109)	10.8 (275)	11.6 (295)	3.8 (96)
07042, 04084, 04120 PVT	11.38 (289)	10 (254)	3/4" MNPT	3.74 (95)	4.52 (115)	11.2 (285)	12 (305)	4.8 (122)
SST	10.25 (260)	8.13 (206)	1/2" FNPT	3.7 (94)	4.48 (114)	11.2 (285)	12 (305)	4.8 (122)

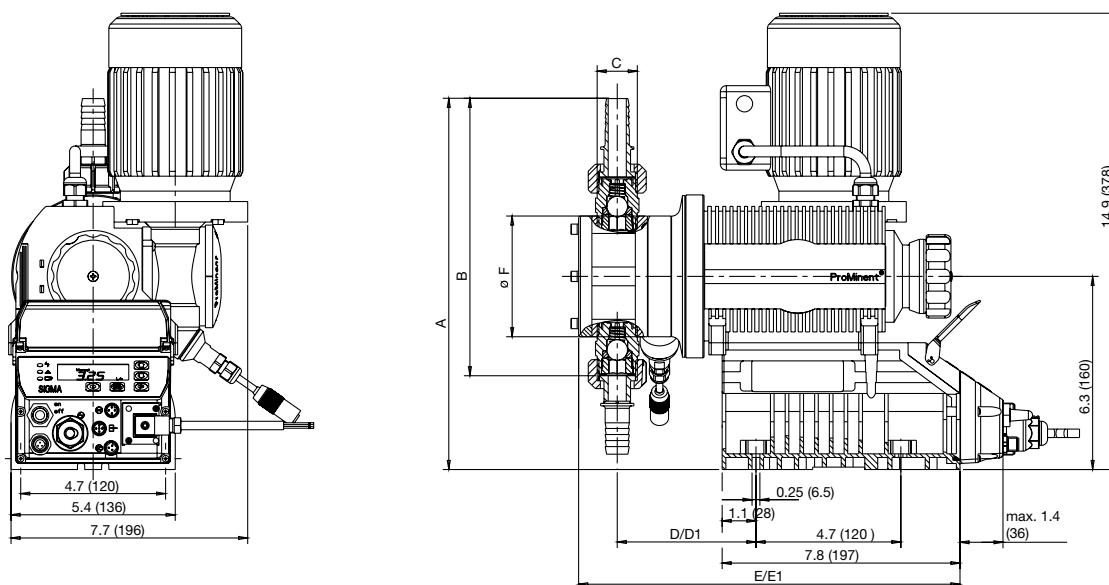
* Piping adapters provided according to technical data.

** Dimensions with diaphragm failure detector.

*** Dimension may vary depending on motor installed.

ProMinent® Sigma/ 1 Motor Diaphragm Metering Pumps

Dimensional Drawing: (S1Ca)



Dimensions in inches (mm)

Type Sigma/1	A	B	Suction/ Discharge Valve Thread C*	D	D1**	E	E1**	F
12017, 12035, 10050, 10022, 10044, 07065 PVT	11 (279)	9.38 (238)	1/2" MNPT	3.54 (90)	4.33 (110)	10.8 (275)	11.6 (295)	3.8 (96)
SST	9.75 (248)	7.13 (181)	3/8" FNPT	3.5 (89)	4.29 (109)	10.8 (275)	11.6 (295)	3.8 (96)
07042, 04084, 04120 PVT	11.38 (289)	10 (254)	3/4" MNPT	3.74 (95)	4.52 (115)	11.2 (285)	12 (305)	4.8 (122)
SST	10.25 (260)	8.13 (206)	1/2" FNPT	3.7 (94)	4.48 (114)	11.2 (285)	12 (305)	4.8 (122)

* Piping adapters provided according to technical data.

** Dimensions with diaphragm failure detector.