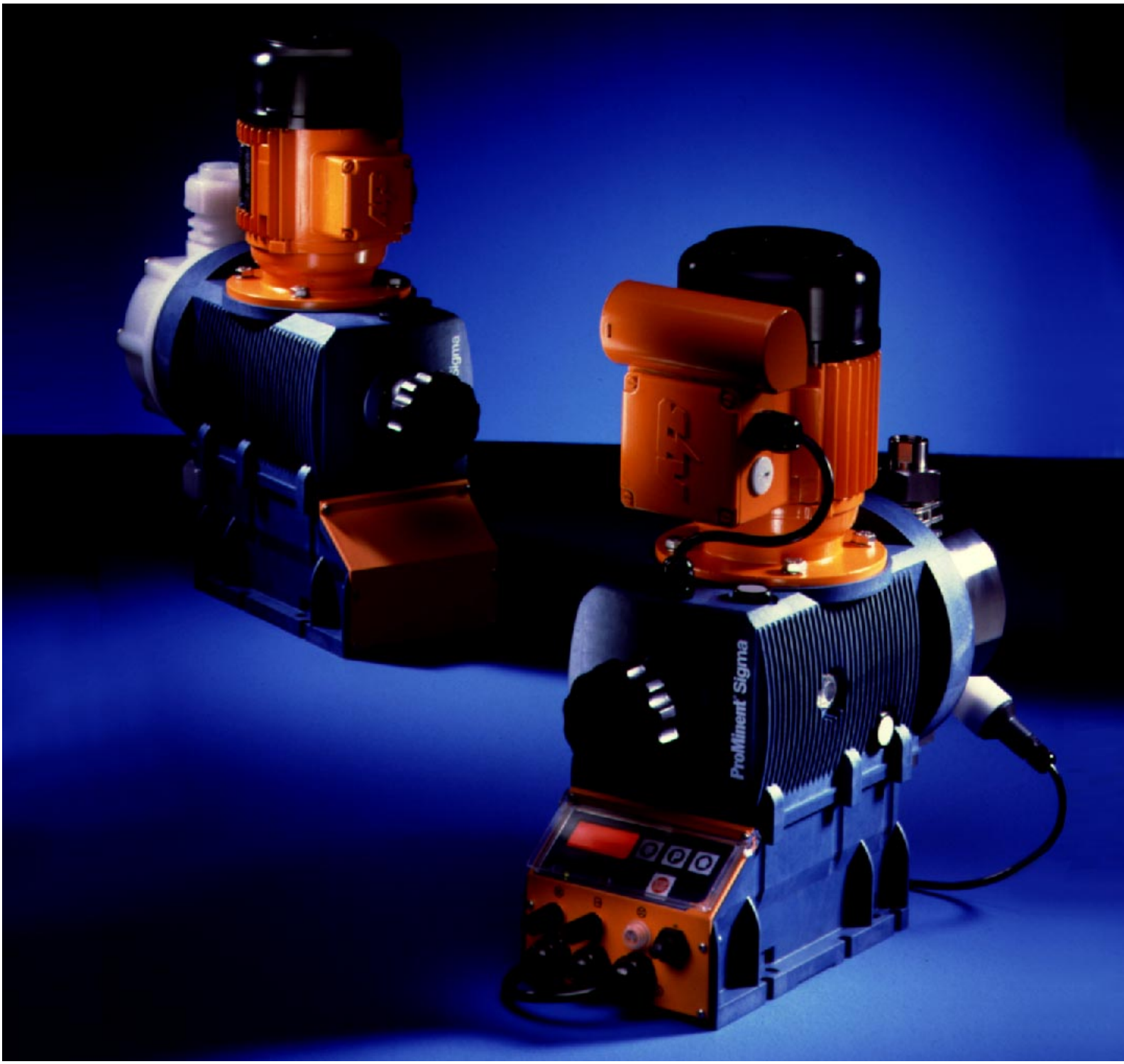
ProMinent® Sigma
MOTOR-DRIVEN METERING PUMPS



CE Available

Available (standard in Canada)

The SICa metering pumps are registered according to DIN-VDE 0700 and are protected against radio interference class B according to DIN-VDE 0871.

ProMinent®

High Performance and Hosts of Applications

The ProMinent Sigma is a motor-driven, mechanically actuated diaphragm-type (HM) or packed plunger-type (HK) metering pump. The Sigma series combines a rugged metal inner casing for all components subjected to mechanical stress, with a corrosion resistant plastic outer housing.

The Sigma HM series includes three gear ratios and two liquid end sizes that provide maximum capacities ranging from 15.2 to 111 gph (57 to 420 L/h) at maximum backpressures of 174 to 58 psig (12 to 4 bar). The Sigma HK series includes three gear ratios and four liquid end sizes that provide maximum capacities ranging from 0.6 to 20.1 gph (2.3 to 76 L/h) at maximum backpressures of 4640 to 174 psig (320 to 12 bar). The capacities can be infinitely varied in steps of 0.5% (in the HM) and 0.2% (in the HK) by adjustment of the self-locking stroke length adjusting knob (accomplished when the pump is on or off), or via optional stroke positioning motor. Maximum stroke length is 0.2" (5 mm) in the HM and 0.6" (15 mm) in the HK .

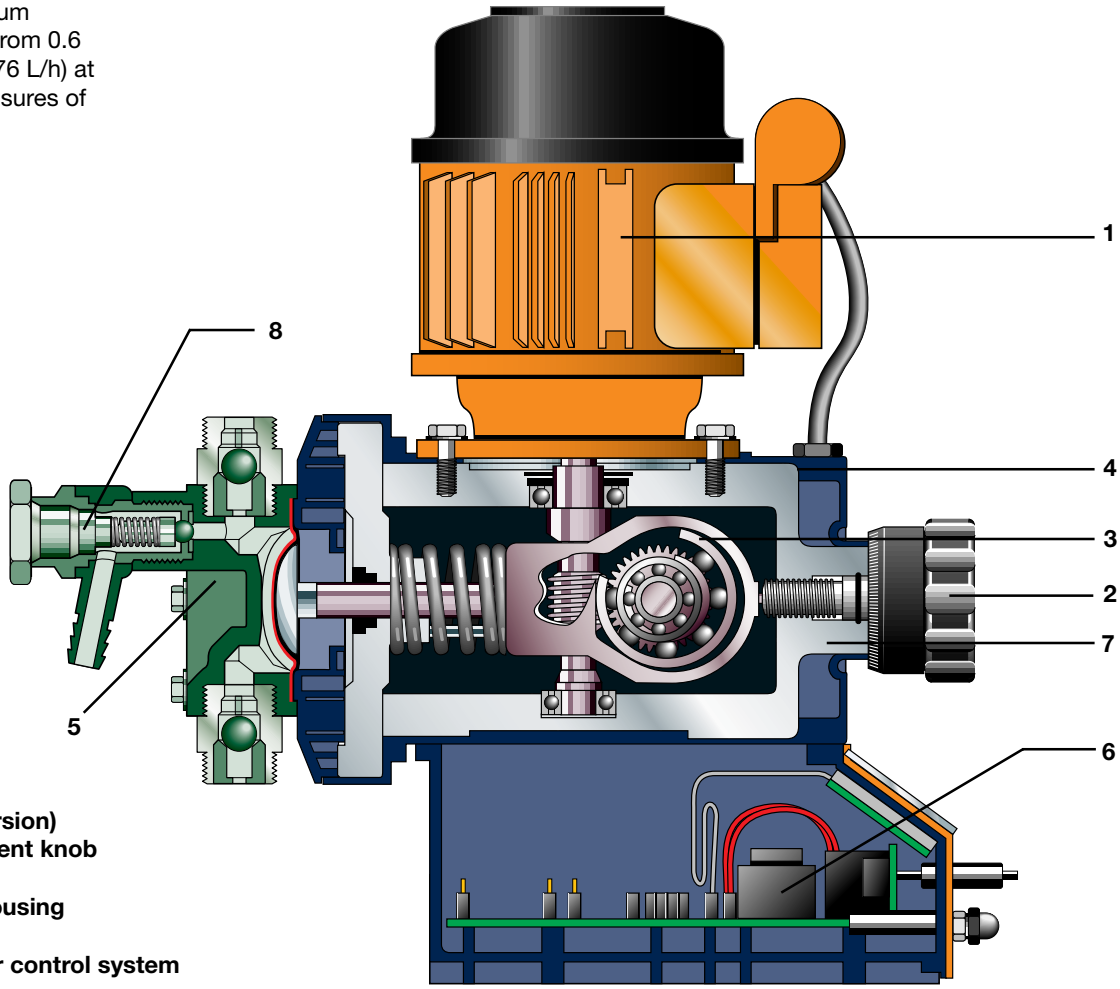
Under defined conditions and with correct installation, the repeatability is better than ±2% (HM) and ±1% (HK) in the stroke length of 30% - 100%.

Sigma SIBa

The Sigma basic version is driven by a close-coupled standard C-faced 1/3 HP electric motor (not included with pump). The pump may be operated manually by adjusting the stroke length knob (displacement per stroke). Automatic control of displacement per stroke via analog (0/4 - 20 mA) or 3P signal is possible with optional motorized stroke positioning systems. Control of stroke frequency at local panel or via analog signal is possible with optional variable speed drives (DC/SCR or AC inverter).

Sigma SICa

The Sigma control version features the same microprocessor control interface as the ProMinent gamma/b metering pump. Functions include digital setting of stroke frequency, batch delivery and external control by pulse or analog signal. The individual pump functions are conveniently set with program buttons and an illuminated LCD provides information on the operating status. An integral TEFC motor is included with SICa pumps.



1. **Motor (SICa version)**
2. **Stroke adjustment knob**
3. **Gearing**
4. **Plastic outer housing**
5. **Liquid end**
6. **Microprocessor control system (SICa version)**
7. **Metal inner housing**
8. **Integrated pressure relief/priming valve**

Versions: Basic or Microprocessor Control

Sigma SIBa Basic Version

The ProMinent Sigma basic version (SIBa) is a motor-operated metering pump without internal electronics. Any NEMA 56C 1750 rpm motor can be supplied for the SIBa pump, including explosion-proof or inverter duty AC motors. The motor is not included with SIBa pumps and must by ordered separately.

Variable Speed Drives

ProMinent offers a variety of AC inverters and DC SCR drives for use with the Sigma pump, providing manual local speed control or automatic external speed control in proportion to a 4-20 mA or other analog signal.

Stroke length controllers are available for automatic stroke length adjustment in proportion to an external 4-20 mA or 3P relay signal.

ProMinent® Sigma Basic Version (SIBa)

Sigma SICa Control Version

The microprocessor electronics offer an operator interface similar to the ProMinent gamma/b metering pump and a motor control system similar to the Vario metering pump.

Includes microprocessor control, user interface and display.

The individual pump functions are easily set with four program buttons. An illuminated LCD provides information on the operating status. Two LEDs serve as operation and fault indicators. In manual mode, the stroke rate can be digitally set from 1 stroke per minute up to the pump's maximum rate.

Contact mode of the pump control features output in proportion to process-dependent external contact (pulse) signals. A pulse multiplier/divider function facilitates adaptation to existing contact generators, such as water meters or process controllers, to the required stroke rate per external contact or to the required contact rate per stroke. This allows batch delivery of a predetermined quantity of fluid with a single contact.

The input connections for flow monitoring and a two-stage tank level switch are integrated as standard in every unit for use with those optional accessories.

An optional fault annunciating relay can be used to notify operators of fault conditions.

In conjunction with an analog flow meter or process controller, the optional analog version offers the ability of controlling the capacity of the pump proportional to a 0/4-20 mA signal. The maximum output set in manual mode becomes the maximum output in analog to exactly match required output to the signal generator.

Pump operation can be effortlessly changed on site from continuous operation to external contact or analog mode and vice versa.

The versatile functions of the pump are complemented by a power switch and a dry contact ON/OFF circuit which can pause the pump via opening a remote contact. For example, in starting the metering pump in conjunction with a main water pump and holding the metering in pause when the water pump stops.

ProMinent® Sigma SICa with microprocessor control.

Liquid End Features and Options

The standard materials for the liquid end are PVDF or 316 stainless steel, both with PTFE seals.

Sigma HM Diaphragm

The Sigma HM is designed with a concave liquid end and a convex DEVELOPAN diaphragm. This curved seal allows precise metering of media with various viscosities and reduces stress for long diaphragm life.

Features include:

- High-quality, nylon fabric-reinforced EPDM vulcanized onto a steel core.
- PTFE-facing on the liquid contact surface for an extended service life.
- Chemical resistance against virtually all process fluids.
- Operation within a wide range of temperatures.

Diaphragm Failure Monitor

As an option, the pump can be equipped with a diaphragm failure monitor. This option includes a PVDF spacer and backer diaphragm behind the primary diaphragm. If the primary diaphragm fails, a NC diaphragm-isolated pressure switch opens, based on a minimum backpressure of 21 psig (1.5 bar). The backer diaphragm prevents fluid from entering the pump drive or from leaking out of the pump.

The diaphragm failure is signalled on the SICa HM models' LCD display, the pump is stopped; with Sigma SIBa HM models, a contact is opened to allow fault annunciation, or to stop the pump.

Integrated Pressure Relief/Priming Valve

An integrated pressure relief/priming valve is optional. The metering pump and discharge line are effectively protected against overload and subsequent damage without the need for intricate installation. Note: Not intended for corrosive or chrystalizing chemistry.

The valve features a fixed spring tension sized for the pump's rated pressure and is not adjustable except to open for priming.

Sigma HK Packed-plunger

The Sigma HK features a hard-wearing, chemical resistant, precision plunger made from ceramic oxide. The plunger is sealed with pretensioned Viton packing rings made from special PTFE. A flushing ring, with integrated seals, allows any leakage to be flushed, eliminating fugitive emissions.

ProMinent® Sigma HM fitted with PVDF liquid end and diaphragm failure monitor.

ProMinent® Sigma HK fitted with 316 SS Packed plunger liquid end.

Application Examples

Schematic drawing of pH-dependent metering

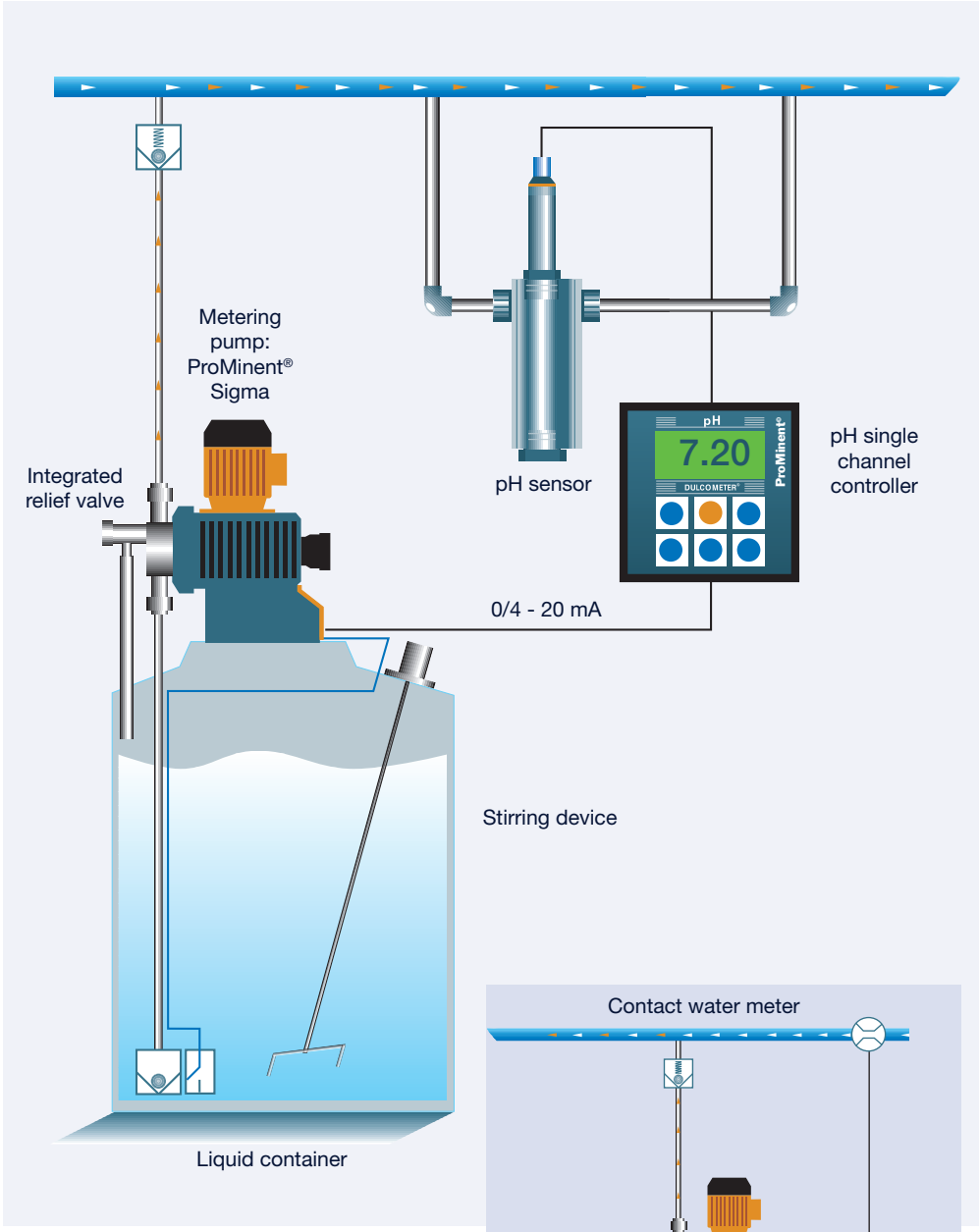
Example 1: one-side neutralization in industrial wastewater treatment. Dependant upon the pH value, the pH controller sends to the Sigma microprocessor version an analog signal (0/4 - 20 mA) or a frequency signal (potential-free contacts). The Sigma doses chemical (e.g. acid or base) proportionally to the input control signal to maintain a set pH value.

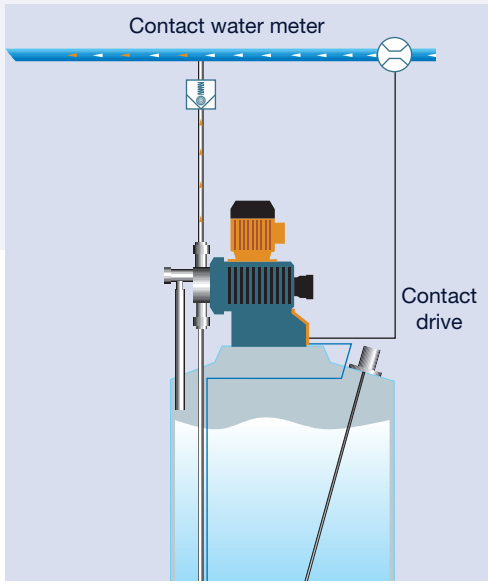
Schematic drawing of flow-dependent metering

Example 2: flow proportional dosing of sodium hypochlorite in drinking water. As water flow increases or decreases, so does the analog signal or pulse rate from the water meter to the Sigma pump, ensuring that the proportion of chemical to water is always constant, regardless of changes in flow.

Applications

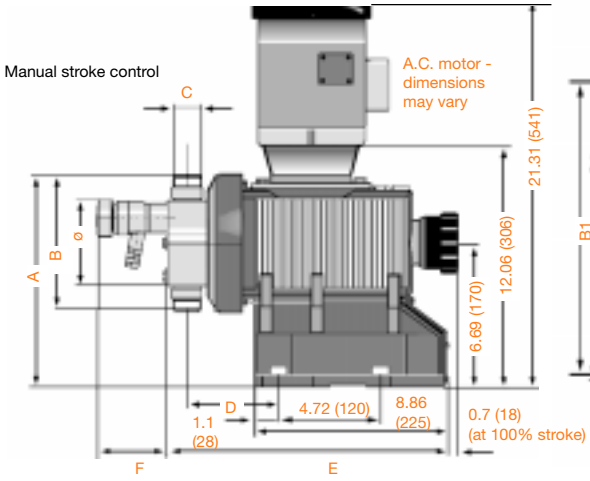
- Water treatment
  - Process water
  - Potable water
  - Circulating water
  - Wastewater
- Food and beverage industry
- Chemical industry
- Pulp and Paper industry
- Textile industry



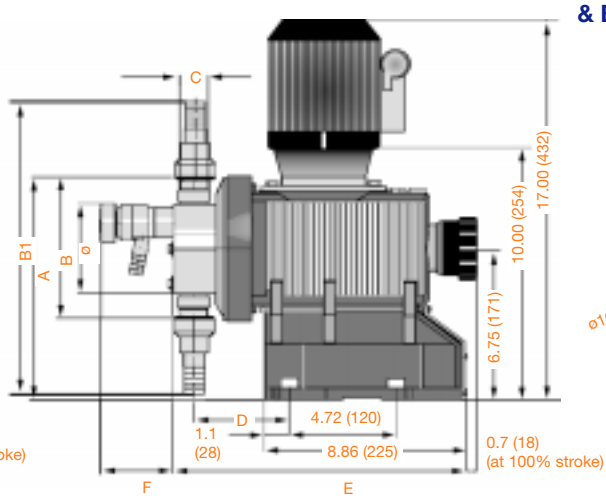


Dimensions

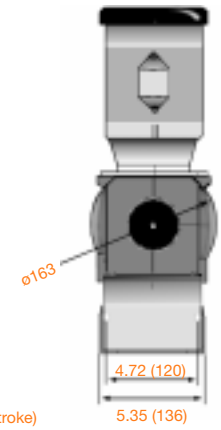
Sigma HM (SIBa)



Sigma HM (SICa)



Sigma HM Control & Basic Face



Version / Material	A SIBA/SICA	B**	B1**	Suction/Discharge Valve Thread* C	Half Union Pipe Adapter	D	D1†	E SIBa/SICa	E1†	F††	ø
12050,12090, 12130 (liquid end FM 130)											
PVT	9.9 / 9.25	6.4	10.1	DN15	MNPT	5.1	5.9	12.9 / 14.0	13.7	3.2	4.8
	(251) / (235)	(162)	(257)	1/4		(130)	(150)	(327) / (356)	(347)	(82)	(122)
SST	9.9 / 9.25	6.4	8.0	DN15	FNPT	5.1	5.9	12.9 / 14.0	13.7	3.5	4.8
	(251) / (235)	(162)	(203)	1/4		(130)	(150)	(327) / (356)	(347)	(89)	(122)
07120, 07220, 04350 (liquid end FM 350)											
PVT	11.1 / 10.45	8.8	14.0	DN25	MNPT	5.3	6.1	13.3 / 14.4	14.1	3.2	6.1
	(282) / (265)	(224)	(356)	3/8		(136)	(156)	(338) / (366)	(358)	(81)	(156)
07120, 07220	11.1 / 10.45	5.5	10.3	DN25	MNPT	8.2	9.9	13.3 / 17.3	14.1	3.5	6.9
SST	(282) / (265)	(140)	(262)	3/8		(208)	(241)	(338) / (439)	(358)	(89)	(175)
04350	11.1 / 10.45	5.5	14.0	DN25	MNPT	8.2	9.9	13.3 / 17.3	14.1	3.5	6.9
SST	(282) / (265)	(140)	(356)	3/8		(208)	(241)	(338) / (439)	(358)	(89)	(175)

* Piping adapters provided according to technical data.
** Dimension B illustrates clamping nut dimensions. Dimension B1 illustrates piping adapter dimensions.

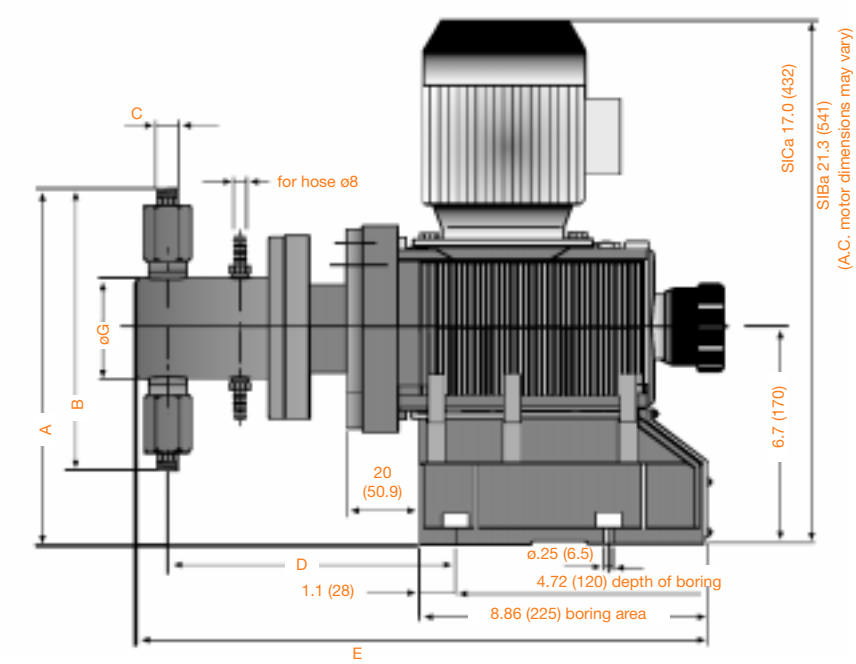
† Dimensions D1 & E1 refer to pumps with optional diaphragm failure detector.
†† Applies only to pumps with integral pressure relief/priming valve.

Technical Data: Sigma HM Diaphragm Pumps [60 Hz (1750 RPM) operation]

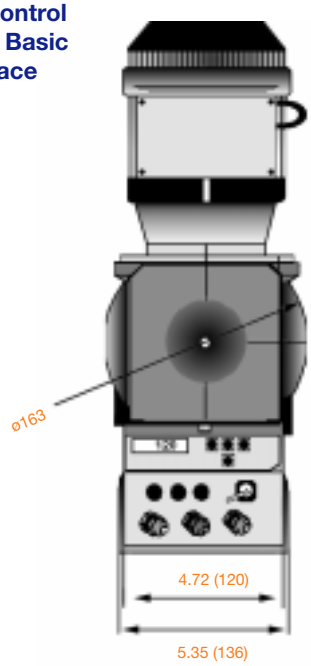
Pump Version	Capacity at Maximum Pressure				Max. Stroke Rate	Output per Stroke	Max. Suction Lift (water)		Max. Suction Pressure		Suction/ Discharge Connector		Shipping Weight w/Motor	
Sigma	psig	(bar)	U.S. GPH	(L/h)	Stroke/ min.	mL/ stroke	ft.	(m)	psig	(bar)	DN	in.	lbs.	(kg.)
12050 PVT	145	(10)	15.9	(60)	87	11.4	23	(7)	44	(3)	15	1/2 MNPT	33	(15)
12050 SST	174	(12)	15.2	(57)	87	11.4	23	(7)	44	(3)	15	1/2 FNPT	44	(20)
12090 PVT	145	(10)	28.6	(108)	156	11.4	23	(7)	44	(3)	15	3/4 MNPT	33	(15)
12090 SST	174	(12)	27	(103)	156	11.4	23	(7)	44	(3)	15	1/2 FNPT	44	(20)
12130 PVT	145	(10)	41	(156)	232	10.9	23	(7)	44	(3)	15	3/4 MNPT	33	(15)
12130 SST	174	(12)	39.6	(150)	232	10.9	23	(7)	44	(3)	15	1/2 FNPT	44	(20)
07120 PVT	100	(7)	38	(144)	87	27.4	16	(5)	15	(1)	25	3/4 MNPT	35	(16)
07120 SST	100	(7)	38	(144)	87	27.4	16	(5)	15	(1)	25	3/4 MNPT	53	(24)
07220 PVT	100	(7)	69.7	(264)	156	27.7	16	(5)	15	(1)	25	3/4 MNPT	35	(16)
07220 SST	100	(7)	69.7	(264)	156	27.7	16	(5)	15	(1)	25	3/4 MNPT	53	(24)
04350 PVT	58	(4)	111	(420)	232	29.4	16	(5)	15	(1)	25	1 MNPT	35	(16)
04350 SST	58	(4)	111	(420)	232	29.4	16	(5)	15	(1)	25	1 MNPT	53	(24)

Dimensions

Sigma HK (SIBa HK & SICa HK)



Sigma HK Control & Basic Face



Model	Connector	A	B	C	D	E	G
32002, 23004,10006	1/4"	11.5 (292)	8.5 (216)	1/4	6.3 (161)	17.2 (438)	3.2 (80)
14006, 10011, 05016	1/4"	11.5 (292)	8.5 (216)	1/4	6.3 (161)	17.2 (438)	3.2 (80)
07012, 04522, 02534	1/4"	11.5 (292)	8.5 (216)	1/4	6.3 (161)	17.2 (438)	3.2 (80)
04022, 02541, 01264	3/8"	11.6 (294)	8.9 (226)	3/8	6.3 (161)	17.2 (438)	3.2 (80)

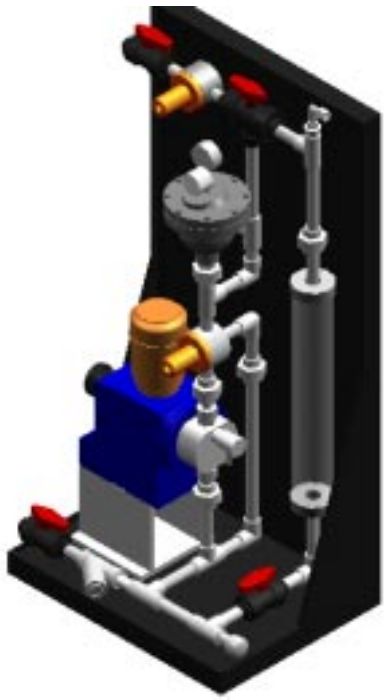
Technical Data: Sigma HK Plunger Pumps [60 Hz (1750 RPM) operation]

Pump Version	Capacity at Maximum Pressure				Max. Stroke Rate	Output per Stroke	Max. Suction Lift (water)		Max. Suction Pressure		Suction/ Discharge Connector	Shipping Weight w/Motor	
Sigma (kg.)	psig	(bar)	U.S.	(L/h)	Stroke/	mL/	ft.	(m)	psig	(bar)	in.	lbs.	
32002 SST	4640	(320)	0.6	(2.3)	84	0.46	16	(5)	2175	(150)	1/4	53	(24)
23004 SST	3335	(230)	1.2	(4.8)	154	0.52	16	(5)	2175	(150)	1/4	53	(24)
10006 SST	1450	(100)	2.0	(7.6)	233	0.55	16	(5)	2175	(150)	1/4	53	(24)
14006 SST	2030	(140)	1.8	(7.1)	84	1.42	13	(4)	870	(60)	1/4	53	(24)
10011 SST	1450	(100)	3.4	(13.1)	154	1.43	13	(4)	870	(60)	1/4	53	(24)
05016 SST	725	(50)	5.2	(20)	233	1.43	13	(4)	870	(60)	1/4	53	(24)
07012 SST	1015	(70)	3.9	(14.8)	84	2.90	13	(4)	435	(30)	1/4	53	(24)
04522 SST	652	(45)	7.0	(27.6)	154	2.91	13	(4)	435	(30)	1/4	53	(24)
02534 SST	362	(25)	10.7	(40.8)	233	2.92	13	(4)	435	(30)	1/4	53	(24)
04022 SST	580	(40)	7.0	(26.5)	84	5.26	13	(4)	218	(15)	3/8	55	(25)
02541 SST	362	(25)	13.0	(49.2)	154	5.37	13	(4)	218	(15)	3/8	55	(25)
01264 SST	174	(12)	20.1	(76)	233	5.45	13	(4)	218	(15)	3/8	55	(25)

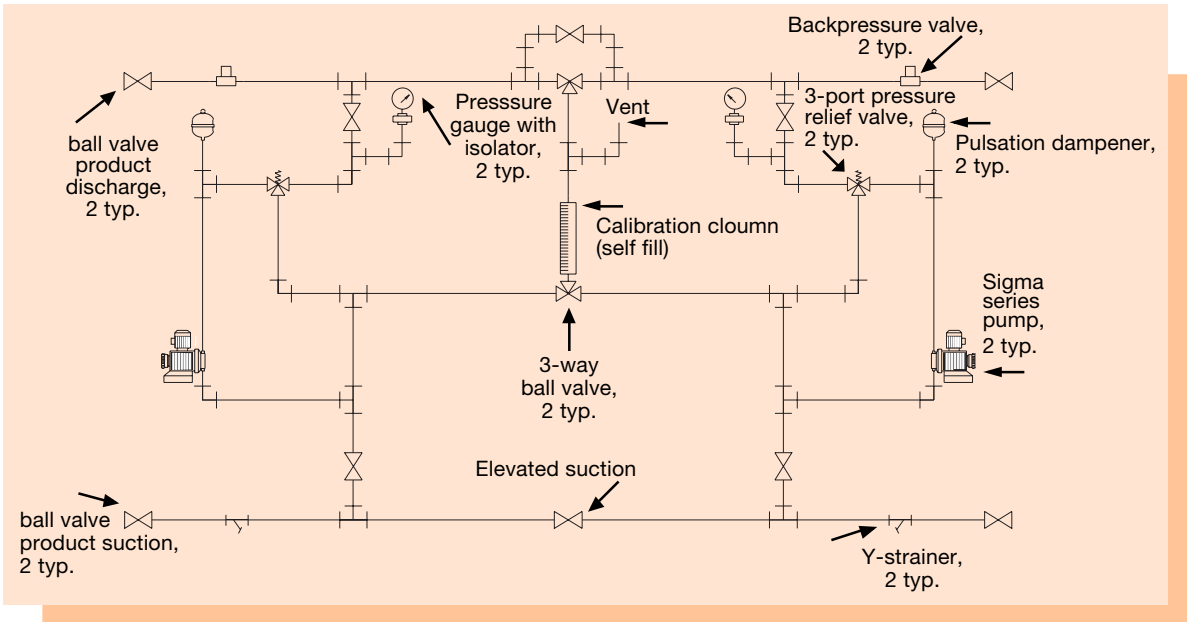
Pre-engineered Packaged Systems

Standard pre-engineered metering packages available with the Sigma series pumps include the single metering pump (M1) and dual metering pump (M2) dosing systems.

ProMinent also offers customized systems built to specification. For more information, contact ProMinent or your local Representative.



- Systems are corrosion-resistant, self contained units with chemical metering pump(s), piping, fittings, and optional accessories.
- Engineering services include process design, P&ID development, CAD drawings, general arrangements, shop electrical drawings, as built, custom operation instructions and maintenance manuals.
- Production capabilities include threaded, welded and thermal fusion joining systems for pipe; system assembly; wiring and equipment support and testing (with criteria for electrical, control, mechanical and aesthetic features).
- All systems are factory assembled and tested prior to shipment.
- Standard options:
  - Pipeline size
  - Stand material
  - Calibration column
  - Backpressure valve
  - Pulsation dampener
  - Pressure gauge
  - Flow monitor
  - Sediment strainer



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