

Metering pumps, components, metering systems and controllers

METERING | MEASUREMENT CONTROL | TREATMENT | DISINFECTION | IMPLEMENTATION

**THE NEW LINE-UP FOR
2020 IS HERE**



○ Sigma X



○ DULCO Flex

○ Gamma XL



○ DULCOnneX



○ GMXa



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Online resources for all your chemical metering needs.

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Customer Service/Ordering Information/Contact Us

Our Customer Service Department will gladly be of assistance to you, even if you are not yet our customer. **Simply phone or email us.**

For Customers in Canada

We have customer service representatives available 8:30 am-5:00 pm EST (excluding statutory holidays)

Service	Telephone	Menu Option	eMail
Pre Sales Support	1 - 888 - 709 - 9933	Option 1	sales-can@prominent.com
Post Sales Support	1 - 888 - 709 - 9933	Option 2	support@prominent.ca
Repair	1 - 888 - 709 - 9933	Option 2	support@prominent.ca

For Customers from other Countries, please contact your local ProMinent Subsidiary.

The Identcode ordering system

Many ProMinent products featured in this catalogue are available using the identcode system. By transposing the codes that correspond with the product code, and the option code assigned to each option, to the bottom of the chart, you build the identcode for the product you require.

S2Cb	Drive Type																	
	HM	Main Drive, Diaphragm																
		Version: Capacity:																
		16050	61 l/h, 145 psi	07120	150 l/h, 102 psi													
		16090	109 l/h, 145 psi	07220	271 l/h, 102 psi	* For SST versions. Maximum 232 psi												
		16130	131 l/h, 145 psi	04350	353 l/h, 58 psi													
		Liquid end material:																
		PV	PVDF															
		SS	316 Stainless Steel															
		Seal:																
		T	PTFE seal															
		Diaphragm type:																
		A	Safety diaphragm w/ pump stop function															
		S	Safety diaphragm w/ visual indicator (Standard)															
		Liquid end options:																
		0	Without valve springs															
		1	With 2 valve springs (Hastelloy C4, 1 psig) (For viscosities between 500-3,000 cPs)															
		Hydraulic connections:																
		0	Standard Connections (PVDF if pump has a PVT head, 316SS if pump has SST)															
		7	PVDF Hose Barbs															
		Version:																
		0	Standard with logo															
		F	With physiological safety, FDA															
		Electrical Connection (± 10%):																
		U	1 ph, 115-230 V ± 10%, 50/60 Hz															
		Cable and plug with 6 ft (2 m) power cord, single phase:																
		A	European plug, 230 V (CSA not provided for this pump)															
		D	N. American plug, 115 V															
		U	N. American plug, 230 V															
		Relay:																
		0	No relay															
		1	Fault Relay															
		3	Fault Relay + Pacing Relay															
		8	4-20 mA output + fault or pacing relay ***															
		Control variant:																
		0	Manual + External with pulse control (multiplier/divider)															
		1	Manual + External with pulse controls & analog control															
		5	Option 1 + Timer															
		6	Option 1 + PROFIBUS															
		7	Option 1 + CANopen**															
		Over pressure switch-off																
		0	without overpressure switch-off															
		1	with 4 bar overpressure switch-off*															
		2	with 7 bar overpressure switch-off*															
		3	with 10 bar overpressure switch-off*															
		Operating unit (HMI)																
		S	HMI (0.5 m cable) (Standard)															
		1	HMI + 2 M cable															
		2	HMI + 5 M cable															
		3	HMI + 10 M cable															
		X	Without HMI															
		Access Code:																
		0	No access code															
		1	Access code															
		Language:																
		DE	German															
		EN	English															
		ES	Spanish															
		ES	French															
S2Cb	HM	16050	PV	T	A	0	0	0	0	U	A	0	0	0	0	S	1	EN

Footnote

*** A Flow Monitor is a recommended accessory for these options for flow verification.
 ** Pump must be ordered without a HMI
 * Available early 2015

IdentCode

Introduction

Pump Installation Guide

Selection, installation, operation & accessories guidelines

When selecting, installing and operating a pump with accessories, the following guidelines should be followed:

When selecting a pump, make allowances for extra capacity and working pressure, especially if the *fluid viscosity* is higher than that of water (note: Capacities in manuals pertain specifically to water at fixed pressures).

If in doubt about the *chemical compatibility* of the liquid end materials, valves, valve balls, O-rings, suction and discharge lines and accessories, refer to the Chemical Resistance List.

The site of the metering pump should be easily accessible. The metering pump should be protected against the risk of being damaged mechanically. *High ambient temperatures, radiating heat and direct sunlight* should be avoided, if possible.

The metering pump should be provided with a *power supply* of its own. If connected in parallel to other equipment, the metering pump should be switched on and off by separate contacts, e.g. by relays or contactors. If the metering pump is paced externally, the maximum input pulse rate should match the maximum stroking rate.

All pumps are *self-priming*. The suction lift varies between 5 and 20 ft. (1.5 and 6 m), depending on the pump type (refer to Technical Data). The reduced suction lift for media having a specific gravity (density) higher than 1 can be evaluated as follows:

Effective suction lift = suction lift of water in ft (pump capacity data) / S.G. of chemical

Note: Suction lift decreases with high altitude. Contact factory for pump selection.

Accessories and tips. . .

- The suction line should be. . .
 - as short as possible.
 - sloping upwards to eliminate vapor pockets.
- The discharge line should have. . .
 - a drain valve when corrosive media is to be handled.

Installation Tip:

- Draining is achieved by means of a tee and bleed valve, or an adjustable pressure relief valve in the discharge line.

- A foot valve with ball check valve, ceramic weight and strainer facilitates. . .

- priming.
- prevents loss of prime.
- protects the liquid end against coarse impurities.

Installation Tip:

- Must install vertically, slightly above the bottom of the tank; directly under pump taking pump maximum suction lift into account.

Note: Pump capacity is effected if not installed properly or if plugged.

- Positive suction head (flooded suction)

- Recommended with media which tend to develop gases.
- Recommended with media which has high viscosity.

Installation Tips:

- Degassing pump must be used on suction lift applications, not flooded suction.
- Metering pump can be located at and fed from the foot of the supply tank.

- A ball-check-type injection valve

- Prevents back flow.

Installation Tip:

- Should be at the end of the discharge line; Teflon injection valves are not spring-loaded and must be oriented vertically into bottom of pipe for ball to seat.

Note: Pumps will not give consistent results without backpressure; our injection valve provides minimum backpressure when pumping into atmosphere.

- Backpressure valve

- Adjustable spring tension on a diaphragm.
- Ensures accurate metering and prevents siphoning.

Installation Tips:

- Must be in the discharge line or mounted onto the pump in the following cases:
 - ✓ When the discharge head is negligible (open-end discharge).
 - ✓ The metering pump discharges into a vacuum system or the positive suction head exceeds the discharge head.

Note: At least 15 psig differential pressure is required to provide repeatability of metering.

Introduction

Pump Installation Guide

– Pulsation dampener

- Bladder type cavity with pressure gauge.
- Required for very long discharge lines.
- Required when high-viscosity media are handled.
- Required when a smooth flow profile is required.

Installation Tips:

- Should be as close to the pump as possible.
- Set pressure at 80% of discharge line pressure.
- No further than 12 inches from the metering pump discharge, in direction of flow.

Note: Backpressure valve is required at point of injection, downstream of pulsation dampener. Consult ProMinent for verifications when discharge lines are greater than 100 feet.

– Pressure relief valve

- In form of an adjustable backpressure valve or 3-port relief valve.
- Protects metering pump against "dead head" (pumping against a closed valve).

Installation Tip:

- Must be close to the pump, upstream of the backpressure valve, for system protection.

Application Suggestions:

- Where the discharge line is hard piped.
- When pumping into high pressures.

- Where the discharge line has several check valves installed.

Note: Recommended for all motor-driven pumps.

– Viscous fluids

- Require valve springs to ensure balls seat properly.

Installation Tips:

- Should be spring-loaded for viscous media.
- The suction piping should be sized up by one pipe size and a pulsation dampener used.
- Select PVT4 series pumps with special liquid ends for extremely high viscosities. Positive suction recommended.

– Calibration column

- Draw down, graduated cylinder.
- Useful for setting up metering pump to reach desired capacity.
- Single pump dosing package can be equipped with a self-filling calibration assembly for application where the pump is installed above the tank (eliminates chemical handling).

Installation Tip:

- Easy to install off the suction side of the metering pump with a ball valve to isolate from the tank.

Standard System Configuration



- Gravity Fill column sized to suit 30 second design flow
- Chemically resistant 15-150 PSIG adjustable back pressure valve (True Union Connection)
- Chemically resistant 15-150 PSIG adjustable pressure relief valve (True Union Connection)
- Pressure Indicator with diaphragm isolation
- True Union 3-piece ball valves
- Discharge connection with adapter to site piping / tubing

Introduction

Pump Selection by Capacity

ProMinent Pump Model	Capacity				Max. PSIG	Std. MNPT Fittings (in.)	Manual Freq Adj	Pulse		Analog 4-20mA
	GPD	Lph	gph	cc/Min				1:1	M/D	
beta/4b 1000	5	0.74	0.20	12	145	1/4" x 3/16"	0-180	STD	STD	N/A
beta/4b 1601	7	1.1	0.29	18	232	1/4" x 3/16"	0-180	STD	STD	N/A
beta/4b 2001	7	1.1	0.29	18	290	1/4" x 3/16"	0-180	STD	STD	N/A
beta/4b 1602	14	2.2	0.58	36	232	1/4" x 3/16"	0-180	STD	STD	N/A
beta/b 2002	14	2.2	0.58	48	290	1/4" x 3/16"	0-180	STD	STD	N/A
gamma/X 1602	14	2.30	.60	38	232	1/4 x 3/16	0-200	STD	STD	STD
beta/5 b 2504	18	2.9	0.77	49	363	8 x 4 mm	0-180	STD	STD	N/A
gamma/X 1604	23	3.60	.95	60	232	1/4 x 3/16	0-200	STD	STD	STD
gamma/X 2504	24	3.80	1	64	363	8 x 4***	0-200	STD	STD	STD
beta/4 b 1604	24	3.8	1.0	63	232	1/2" x 3/8"	0-180	STD	STD	N/A
ProMus (17) 3/8" Plunger	24	3.8	1.0	63	3500	1/4" FNPT	29-58	N/A	N/A	OPT
ProMus (17) 7/16" Plunger	33	5.2	1.4	87	3500	1/4" FNPT	29-58	N/A	N/A	OPT
beta/5b 1008	43	6.8	1.8	114	145	1/2" x 3/8"	0-180	STD	STD	N/A
beta/4b 0708	46	7.1	1.9	120	101	1/2" x 3/8"	0-180	STD	STD	N/A
gamma/X 0708	48	7.60	2	126	101	1/2 x 3/8	0-200	STD	STD	STD
gamma/X 1009	58	9.00	2.4	150	145	1/2 x 3/8	0-200	STD	STD	STD
ProMus (17) 3/8" Plunger	59	9.2	2.4	151	3500	1/4" FNPT	29-138	N/A	N/A	OPT
beta/5b 0713	70	11.0	2.9	183	101	1/2" x 3/8"	0-180	STD	STD	N/A
ProMus (30) 5/8" Plunger	72	11.3	3.0	189	2080	1/4" FNPT	29-58	N/A	N/A	OPT
beta/4 b 0413	77	12.3	3.2	202	58	1/2" x 3/8"	0-180	STD	STD	N/A
delta 1612	77	11.3	3.0	202	232	1/2" x 3/8"	0-200	STD	OPT	OPT
ProMus (17) 7/16" Plunger	80	12.5	3.3	208	3500	1/4" FNPT	29-138	N/A	N/A	OPT
gamma/X 0414	86.4	13.5	3.6	226	58	1/2 x 3/8	0-200	STD	STD	STD
ProMus (30) 13/16" Plunger	91	14.3	3.8	240	1230	3/8" FNPT	29-43	N/A	N/A	OPT
gamma/X 0715	94	14.50	3.9	242	101	1/2 x 3/8	0-200	STD	STD	STD
beta/5b 0420	108	17.1	4.5	284	58	1/2" x 3/8"	0-180	STD	STD	N/A
beta/4 b 0220	120	19.0	5.0	315	29	1/2" x 3/8"	0-180	STD	STD	N/A
gamma/X 0220	125	19.70	5.2	328	29	1/2 x 3/8	0-200	STD	STD	STD
Sigma/1 HM 12017	124	20.0	5.3	334	145	1/2"	0-88	STD	OPT	OPT
delta 1020	127	19.1	5.0	334	145	1/2" x 3/8"	0-200	STD	OPT	OPT
gamma/X 0220	125	19.70	5.2	328	29	1/2 x 3/8	0-200	STD	STD	STD
Sigma/1 HM 10022	164	26.0	6.9	434	145	1/2"	0-88	STD	OPT	OPT
ProMus (30) 5/8" Plunger	173	27.2	7.2	454	2080	1/4" FNPT	29-138*	N/A	N/A	OPT
delta 0730	190	29.2	7.7	498	102	1/2" x 3/8"	0-200	STD	OPT	OPT
beta/5b 0232	202	32.0	8.5	530	29	1/2" x 3/8"	0-180	STD	STD	N/A
Sigma/1 HM 12035	266	42.0	11.1	700	145	1/2"	0-172	STD	OPT	OPT
gamma/X 0245	283	45.00	11.8	740	29	1/2 x 3/8	0-200	STD	STD	STD
delta 0450	317	49.0	12.9	833	58	1/2"	0-200	STD	OPT	OPT
Sigma/1 HM 10044	336	53.0	14.0	884	145	1/2"	0-172	STD	OPT	OPT
Sigma/2 HM 12050	382	60.0	15.9	1003	145	1/2"	0-87	STD	OPT	OPT
delta 0280	506	75.0	19.8	1331	29	1/2"	0-200	STD	OPT	OPT
ProMus (30) 1-1/8" Plunger	506	79.8	21.1	1331	640	3/8" FNPT	29-115**	N/A	N/A	OPT
ProMus (40) 1-3/4" Plunger	614	97.0	25.6	1615	265	3/4" FNPT	29-58**	N/A	N/A	OPT
Sigma/2 HM 12090	686	108.0	28.5	1804	145	3/4"	0-156	STD	OPT	OPT
Sigma/2 HM 07120	912	144.0	38.0	2397	100	3/4"	0-87	STD	OPT	OPT
Sigma/3 HM 120190	1445	228.0	60.2	3798	145	1"	0-124	STD	OPT	OPT
ProMus (40) 2" Plunger	1603	253.0	66.8	4214	200	3/4" FNPT	29-115**	N/A	N/A	OPT
Sigma/2 HM 07220	1673	264.0	69.7	4397	100	3/4"	0-156	STD	OPT	OPT
ProMus (40) 2-1/4" Plunger	2030	328.0	86.6	5337	160	3/4" FNPT	29-115**	N/A	N/A	OPT
Sigma/3 HM 120270	2054	324.0	85.6	5400	145	1"	0-173	STD	OPT	OPT
Sigma/2 HM 04350	2200	350.0	92.5	5833	58	1"	0-232	STD	OPT	OPT
ProMus (40) 2-1/4" Plunger	2436	384.0	101.4	6404	160	3/4" FNPT	29-138**	N/A	N/A	OPT
Sigma/3 HM 070410	3120	492.0	130.0	8200	100	1-1/2"	0-86	STD	OPT	OPT
Sigma/3 HM 070580	4416	696.0	183.9	11600	100	1-1/2"	0-124	STD	OPT	OPT
Sigma/3 HM 040830	6336	1000.0	264.2	16670	58	1-1/2"	0-173	STD	OPT	OPT

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Introduction

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Resistance of liquid end materials against common chemicals at standard temperature 68°F (20°C). (May differ at other temperatures)

s	= saturated aqueous solution	n	= unknown resistance] resp. to aqueous solutions
+/0	= conditional resistance	=>	= refer to . . .	
+	= good resistance	A.C.	= any concentration	
0	= limited resistance	S	= saturated solution	
-	= no resistance	Conc.	= concentrated	
+(x%)	= good resistance to x% concentration	D	= weak solution	
*	= With glued fittings, please check the resistance of the glue.			

These classifications are the results of practical experience of the manufacturers of the raw materials. Since the resistance of the materials depends also on other factors (operating conditions, surface quality, etc.), this list cannot be more than a general information for which no responsibility is accepted. It should be particularly noted that, as a rule, the aggressiveness of a mixture is different from that of its individual components. In cases of doubt, suitable tests should be performed.

N.B. PTFE is resistant against most chemicals and solvents (excluding fluorine, metallic sodium and other alkali metals).

PVDF is resistant against most chemicals (excluding ketones, esters).

Chemical	Formula	CONC.	Acrylic	PVC	316 SS	PE	PP	Viton®	EPDM	PVDF	Teflon
Acetaldehyde	CH ₃ CHO	100%	-	-	+	+	0	-	+/-	+	+
Acetamide	CH ₃ CONH ₂	S	+	+	+	+	+	0	+	+	+
Acetic Acid	CH ₃ COOH	100%	-	+(50%)	+	+(70%)	+	-	0	+	+
Acetic Anhydride	(CH ₃ CO) ₂ O	100%	-	-	+	0	0	-	+/-	-	+
Acetone	CH ₃ COCH ₃	100%	-	-	+	+	+	-	-	0	+
Acetophenone	C ₆ H ₅ COCH ₃	100%	-	n	+	+	+	-	+	+	+
Acetyl Chloride	CH ₃ COCl	100%	-	+	0	-	-	+	-	-	+
Acetylacetone	C ₅ H ₈ O ₂	100%	-	-	+	+	+	-	+	-	+
Acetylene Dichloride=>	Dichloroethylene										
Acetylene Tetrachloride=>	Tetrachloroethane										
Acrylonitrile	CH ₂ =CH-CN	100%	-	-	+	+	+	-	-	+	+
Adipic Acid	C ₆ H ₁₀ O ₄	S	+	+	+	+	+	+	+	+	+
Allyl Alcohol	CH ₂ CHCH ₂ OH	96%	-	0	+	+	+	-	+	+	+
Aluminum Acetate	Al (CH ₃ COO) ₃	S	+	+	+	+	+	+	+	+	+
Aluminum Bromide	AlBr ₃	S	+	+	n	+	+	+	+	+	+
Aluminum Chloride	AlCl ₃	S	+	+	-	+	+	+	+	+	+
Aluminum Fluoride	AlF ₃	10%	+	+	-	+	+	+	+	+	+
Aluminum Hydroxide	Al (OH) ₃	S	+	+	+	+	+	+	+	+	+
Aluminum Nitrate	Al (NO ₃) ₃	S	+	+	+	+	+	+	+	+	+
Aluminum Phosphate	AlPO ₄	S	+	+	+	+	+	+	+	+	+
Aluminum Sulfate	Al (SO ₄) ₃	S	+	+	+	+	+	+	+	+	+
Ammonium Acetate	CH ₃ COONH ₄	S	+	+/-	+	+	+	+	+	+	+
Ammonium Aluminum Sulfate	NH ₄ Al(SO ₄) ₂	S	+	+	+	+	+	+	+	+	+
Ammonium Bicarbonate	NH ₄ HCO ₃	S	+	+	+	+	+	+	+	+	+
Ammonium Carbonate	(NH ₄) ₂ CO ₃	40%	+	+	+	+	+	+	+	+	+
Ammonium Chloride	NH ₄ Cl	S	+	+	-	+	+	+	+	+	+
Ammonium Fluoride	NH ₄ F	S	+	0	0	+	+	+	+	+	+
Ammonium Hydrogen Carbonate	NH ₄ HCO ₃	A.C.	+	+	+	+	+	+	+	+	+
Ammonium Hydroxide	NH ₄ OH	S	+	+	+	+	+	-	+	+	+
Ammonium Nitrate	NH ₄ NO ₃	S	+	+	+	+	+	+	+	+	+
Ammonium Oxalate	(NH ₄) ₂ C ₂ O ₄	S	+	+	+	+	+	+	+	+	+
Ammonium Perchlorate	NH ₄ ClO ₄	10%	+	+	+	+	+	+	+	+	+
Ammonium Peroxodisulfate	(NH ₄) ₂ S ₂ O ₈	S	+	+	+(5%)	+	+	+	+	+	+
Ammonium Persulfate	(NH ₄) ₂ S ₂ O ₈	A.C.	+	+	+	+	+	+	+	+	+
Ammonium Phosphate	(NH ₄) ₃ PO ₄	A.C.	+	+	+(10%)	+	+	+	+	+	+
Ammonium Sulfate	(NH ₄) ₂ SO ₄	A.C.	+	+	+(10%)	+	+	+	+	+	+
Ammonium Sulfide	(NH ₄) ₂ S	S	+	+	n	+	+	+	+	+	+
Amyl Alcohol	C ₅ H ₁₁ OH	100%	+	+	+	+	+	-	+	+	+
Aniline	C ₆ H ₅ NH ₂	100%	-	-	+	+	+	-	+/-	+	+
Aniline Hydrochloride	C ₆ H ₅ NH ₂ HCl	S	n	+	-	+	+	+/-	+/-	+	+
Antimony Trichloride	SbCl ₃	S	+	+	-	+	+	+	+	+	+
Aqua Regia	3HCl+HNO ₃	100%	-	+	-	-	-	-	0	+	+
Arsenic Acid	H ₃ AsO ₄	S	+	+	+	+	+	+	+	+	+
Barium Carbonate	BaCO ₃	S	+	+	+	+	+	+	+	+	+
Barium Chloride	BaCl ₂	S	+	+	-	+	+	+	+	+	+
Barium Hydroxide	Ba(OH) ₂	S	+	+	+	+	+	+	+	+	+
Barium Nitrate	Ba(NO ₃) ₂	A.C.	+	+	+	+	+	+	+	+	+
Barium Sulfate	BaSO ₄	A.C.	+	+	+	+	+	+	+	+	+
Barium Sulfide	BaS	A.C.	+	+	+	+	+	+	+	+	+
Beer	-	100%	+	+	+	+	+	+	+	+	+

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N.B. PTFE is resistant against most chemicals and solvents (excluding fluorine, metallic sodium and other alkali metals).
PVDF is resistant against most chemicals (excluding ketones, esters).

Chemical	Formula	CONC.	Acrylic	PVC	316 SS	PE	PP	Viton®	EPDM	PVDF	Teflon
Benzaldehyde	C ₆ H ₅ CHO	100%	-	-	+	0	+	+	+	+	+
Benzene	C ₆ H ₆	100%	-	-	+	0	0	0	-	+	+
Benzene Sulfonic Acid	C ₆ H ₅ SO ₃ H	10%	n	n	+	n	+	+	-	+	+
Benzoic Acid	C ₆ H ₅ COOH	S	+	+	+	+	+	+	+	+	+
Benzoyl Chloride	C ₆ H ₅ COCl	100%	-	n	0	0	0	+	+	n	+
Benzyl Alcohol	C ₆ H ₅ CH ₂ OH	100%	-	-	+	+	+	+	-	+	+
Benzyl Benzoate	C ₆ H ₅ COOC ₆ H ₅	100%	-	-	+	0	+	+	-	0	+
Benzyl Chloride	C ₆ H ₅ CH ₂ Cl	90%	-	n	+	0	0	+	-	+	+
Bleach=>	Sodium Hypochlorite										
Bleaching Powder	Ca(OCl) ₂	S	+	+	-	+	+	+	+	+	+
Borax	Na ₂ B ₄ O ₇	A.C.	+	+	+	+	+	+	+	+	+
Boric Acid	H ₃ BO ₃	S	+	+	+	+	+	+	+	+	+
Brine		S	+	+/-	+/-	+	+	+	+	+	+
Bromine	Br ₂	100%	-	-	-	-	-	-	-	+	+
Bromine Liquid	Br ₂	100%	-	-	-	-	-	-	-	+	+
Bromine Water		S	-	+	-	-	-	-	-	+	+
Bromo Benzene	C ₆ H ₅ Br	100%	n	n	+	0	0	0	-	+	+
Bromochloro Methane	CH ₂ BrCl	100%	-	-	+	0	-	n	+/-	+	+
Bromochlorotrifluoroethane	HCClBrCF ₃	100%	-	-	+	0	0	+	-	+	+
Butanediol	HOC ₄ H ₉ OH	10%	n	+	+	+	+	0	+	+	+
Butanetriol	C ₄ H ₉ O ₃	S	+	+	+	+	+	0	+	+	+
Butanol	C ₄ H ₉ OH	100%	-	+	+	+	+	0	+/-	+	+
Butyl Acetate	CH ₃ COOC ₄ H ₉	100%	-	-	+	-	0	-	+/-	+	+
Butyl Acrylate	C ₄ H ₉ O ₂	100%	-	-	+	+	+	-	-	+	+
Butyl Amine	C ₄ H ₉ NH ₂	100%	n	n	+	+	n	-	-	0	+
Butyl Benzoate	C ₆ H ₅ COOC ₄ H ₉	100%	-	-	+	0	0	+	+	n	+
Butyl Ether	(C ₄ H ₉) ₂ O	100%	-	-	+	+	+	-	0	+	+
Butyl Mercaptan	C ₄ H ₉ SH	100%	n	n	n	n	n	+	-	+	+
Butyl Oleate	C ₂₂ H ₄₂ O ₂	100%	n	n	+	n	n	+	+/-	+	+
Butyl Stearate	C ₂₂ H ₄₄ O ₂	100%	0	n	+	n	n	+	-	+	+
Butylaldehyde	C ₄ H ₇ CHO	100%	-	n	+	+	+	-	+/-	n	+
Butyric Acid	C ₃ H ₇ COOH	100%	+(5%)	+(20%)	+	+	+	+	+	+	+
Calcium Acetate	(CH ₃ COO) ₂ Ca	S	+	+	+	+	+	+	+	+	+
Calcium Bisulfite	Ca(HSO ₃) ₂	S	+	+	+	+	+	+	+	+	+
Calcium Carbonate	CaCO ₃	A.C.	+	+	+	+	+	+	+	+	+
Calcium Chloride	CaCl ₂	S	+	+	-	+	+	+	+	+	+
Calcium Cyanide	Ca(CN) ₂	S	+	+	n	+	+	+	+	+	+
Calcium Hydrogen Sulfite	CaHSO ₃	S	+	+	+	+	+	+	+	+	+
*Calcium Hydroxide	Ca(OH) ₂	S	+	+	+	+	+	+	+	+	+
Calcium Hypochlorite	Ca(OCl) ₂	S	+	+	-	+	0	0	+	+	+
Calcium Nitrate	Ca(NO ₃) ₂	S	+	+(50%)	+	+	+(50%)	+	+	+	+
Calcium Phosphate	Ca ₃ (PO ₄) ₂	S	+	+	+	+	+	+	+	+	+
Calcium Sulfate	CaSO ₄	S	+	+	+	+	+	+	+	+	+
Calcium Sulfide	CaS	S	+	+	n	+	+	+	+	+	+
Calcium Sulfite	CaSO ₃	S	+	+	+	+	+	+	+	+	+
Calcium Thiosulfate	CaS ₂ O ₃	S	+	+	-	+	+	+	+	+	+
Camphor	C ₁₀ H ₁₆ O	100%	-	-	+	-	+	0	-	+	+
Carbolic Acid (see Phenol)	C ₆ H ₅ OH	100%	-	0	+	0	+	+	-	+	+
Carbon Disulfide	CS ₂	100%	-	-	+	0	0	+	-	+	+
Carbon Tetrachloride	CCl ₄	100%	0	-	+	0	-	+	-	+	+
Carbonic Acid	H ₂ CO ₃	S	+	+	+	+	+	+	+	+	+

* Requires flushing.

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+(x%) = good resistance to x% concentration

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n = unknown resistance

=> = refer to . . .

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S = saturated solution

Conc. = concentrated

D = weak solution

resp. to aqueous solutions

N.B. PTFE is resistant against most chemicals and solvents (excluding fluorine, metallic sodium and other alkali metals).

PVDF is resistant against most chemicals (excluding ketones, esters).

Chemical	Formula	CONC.	Acrylic	PVC	316 SS	PE	PP	Viton®	EPDM	PVDF	Teflon
Caustic Soda=>	Sodium Hydroxide										
Chloric Acid	HClO ₃	20%	+	+	-	+10%	-	0	0	+	+
Chlorine Dioxide Solution	ClO ₂ +H ₂ O	0.5%	0	+	-	0	0	0	-	+	+
Chloroacetic Acid	CH ₂ ClCOOH	A.C.	-	-	-	-	+	+	+	+	+
Chlorine Water	Cl ₂ +H ₂ O	S	+	+	-	0	0	+	+	+	+
Chlorobenzene	C ₆ H ₅ Cl	100%	-	-	+	0	+	+	-	+	+
Chloroethanol	ClCH ₂ CH ₂ OH	100%	-	-	+	+	+	-	0	0	+
Chloroethylbenzene	C ₆ H ₄ ClC ₂ H ₅	100%	-	-	+	0	0	0	-	n	+
Chlorophenol	C ₆ H ₄ OHCl	100%	n	n	+	+	+	n	-	+	+
Chlorotoluene	C ₇ H ₈ Cl	100%	-	-	+	n	n	+	-	+	+
Chloroacetone	ClCH ₂ COCH ₃	100%	-	-	+	n	n	-	+	n	+
Chlorobutadiene	C ₄ H ₆ Cl	100%	-	-	+	n	n	+	-	n	+
Chloroform	CHCl ₃	100%	-	-	+	-	0	+	-	+	+
Chlorohydrin	C ₂ H ₄ O ₂ Cl	100%	n	n	+	+	+	+	0	-	+
Chloroprene=>	Chlorobutadiene										
Chlorosulfonic Acid	SO ₂ (OH)Cl	100%	-	-	-	-	-	-	-	-	+
Chrome Sulfate	Cr ₂ (SO ₄) ₃	S	+	+	+	+	+	+	+	+	+
Chromic Acid	H ₂ CrO ₄	50%	-	+	+(10%)	+	0	+	-	+	+
Chromic Sulfuric Acid	K ₂ CrO ₄ +H ₂ SO ₄	S	-	+	n	-	-	n	n	+	+
Citric Acid	C ₆ H ₈ O ₇	S	+	+	+	+	+	+	+	+	+
Cobalt Chloride	CoCl ₂	S	+	+	-	+	+	+	+	+	+
Copper II Acetate	Cu(CH ₃ COO) ₂	S	+	+	+	+	+	+	+	+	+
Copper II Arsenite	Cu ₃ (AsO ₃) ₂	S	+	+	+	+	+	+	+	+	+
Copper II Carbonate	CuCO ₃	S	+	+	+	+	+	+	+	+	+
Copper II Chloride	CuCl ₂	S	+	+	+(1%)	+	+	+	+	+	+
Copper II Cyanide	Cu(CN) ₂	S	+	+	+	+	+	+	+	+	+
Copper II Fluoride	CuF ₂	S	+	+	+	+	+	+	+	+	+
Copper II Nitrate	Cu(NO ₃) ₂	S	+	+	+	+	+	+	+	+	+
Copper II Sulfate	CuSO ₄	S	+	+	+	+	+	+	+	+	+
Cresole	C ₆ H ₄ CH ₃ OH	100%	0	0	+	+	+	+	-	+	+
Crotonaldehyde	CH ₃ CH=CHCHO	100%	n	-	+	+	+	-	+	+	+
Cyclohexane	C ₆ H ₁₂	100%	+	-	+	+	+	+	-	+	+
Cyclohexanol	C ₆ H ₁₁ OH	100%	0	+/0	+	+	+	+	-	+	+
Cyclohexanone	C ₆ H ₁₀ O	100%	-	-	+	+	+	-	+/0	+	+
Cyclohexyl Alcohol=>	Cyclohexanol										
Cyclohexylamine	C ₆ H ₁₃ N	100%	0	0	+	n	n	-	n	n	+
Decahydronaphthalene	C ₁₀ H ₁₈	100%	-	+/0	n	0	0	0	-	+	+
Decalin=>	Decahydronaphthalene										
Diisononyl Phthalate	C ₂₆ H ₄₂ O ₄	100%	-	-	+	+	+	n	n	+	+
Diacetone Alcohol	C ₆ H ₁₂ O ₂	100%	-	-	+	+	+	-	+	+	+
Diamine Ethylene	(CH ₂ NH ₂) ₂	100%	n	0	0	+	+	-	+	+	+
Dibromoethane	C ₂ H ₄ Br ₂	100%	-	-	+	-	n	+	-	+	+
Dibutyl Ether	C ₈ H ₁₈ O	100%	0	-	+	0	0	-	0	+	+
Dibutyl Phthalate	C ₁₆ H ₂₂ O ₄	100%	-	-	+	0	+	+	+/0	+	+
Dibutylamine	(C ₄ H ₉) ₂ NH	100%	n	n	+	+	+	-	-	+	+
Dichloro Acetic Acid	Cl ₂ CHCOOH	100%	-	+	+	+	+	-	+	+	+
Dichloro Benzene	C ₆ H ₄ Cl ₂	100%	-	-	+	0	0	+	-	+	+
Dichloro Butane	C ₄ H ₈ Cl ₂	100%	-	-	+	0	0	+	-	+	+
Dichloro Butene	C ₄ H ₆ Cl ₂	100%	-	-	+	0	0	0	-	+	+
Dextrose	C ₆ H ₁₂ O ₆	A.C.	+	+	+	+	+	+	+	+	+
Dichloroethane	C ₂ H ₄ Cl ₂	100%	-	-	+	-	0	+	-	+	+
Dichloroethylene	C ₂ H ₂ Cl ₂	100%	-	-	+	-	0	0	-	+	+
Dichloroisopropyl Ether	(C ₃ H ₆ Cl) ₂ O	100%	-	-	+	0	0	0	0	n	+
Dicyclohexylamine	C ₁₂ H ₂₃ N	100%	0	0	+	+	+	-	+	n	+

Introduction

Chemical Resistance List

Resistance of liquid end materials against common chemicals at standard temperature 68°F (20°C). (May differ at other temperatures)

s	= saturated aqueous solution	n	= unknown resistance		
+/o	= conditional resistance	=>	= refer to . . .		
+	= good resistance	A.C.	= any concentration		
o	= limited resistance	S	= saturated solution		resp. to aqueous solutions
-	= no resistance	Conc.	= concentrated		
+(x%)	= good resistance to x% concentration	D	= weak solution		
*	= With glued fittings please check the resistance of the glue				

N.B. PTFE is resistant against most chemicals and solvents (excluding fluorine, metallic sodium and other alkali metals).

PVDF is resistant against most chemicals (excluding ketones, esters).

Chemical	Formula	CONC.	Acrylic	PVC	316 SS	PE	PP	Viton®	EPDM	PVDF	Teflon
Diethylamine	(C ₂ H ₅) ₂ NH	100%	-	-	+	0	+	-	+	+	+
Diethylene Glycol	C ₄ H ₁₀ O ₃	100%	+	+	+	+	+	+	+	+	+
Diethyleneglydolethyl Ether	C ₈ H ₁₈ O ₃	100%	n	n	+	+	+	n	+/0	+	+
Diethyl Ether	(C ₂ H ₅) ₂ O	100%	-	-	+	0	0	-	-	+	+
Diglycolic Acid	C ₄ H ₆ O ₅	30%	+	+	+	+	+	+	n	+	+
Diethyl Phthalate	C ₂₀ H ₂₆ O ₄	100%	-	-	+	+	+	-	n	+	+
Diisobutylketone	C ₈ H ₁₆ O	100%	-	-	+	+	+	-	+	+	+
Diisopropylketone	C ₇ H ₁₄ O	100%	-	-	+	+	+	-	+	+	+
Dimethyl Carbonate	(CH ₃ O) ₂ CO	100%	n	n	+	-	+	+	-	+	+
Dimethyl Phthalate	C ₁₀ H ₁₀ O ₄	100%	-	-	+	+	+	-	+/0	+	+
Dimethylformamide	HCON(CH ₃) ₂	100%	-	-	+	+	+	-	+	-	+
Dimethylhydrazine	H ₂ NN(CH ₃) ₂	100%	n	n	+	+	+	-	+	+	+
Diethyl Phthalate	C ₆ H ₄ (COOC ₂ H ₅) ₂	100%	-	-	+	+	+	-	+/0	+	+
Dioxane	C ₄ H ₈ O ₂	100%	-	-	+	+	0	-	+/0	0	+
Dimethyl Formic Amide	HCON(CH ₃) ₂	100%	-	-	-	0	+	0	0	-	+
Disodium Hydrogen Phosphate	Na ₂ HPO ₄	S	+	+	+	+	+	+	+	+	+
Disulfur Dichloride	S ₂ Cl ₂	100%	+	+	+	+	+	+	-	+	+
DMF=>	Dimethylformamide										
Engine Oils		100%	n	+/0	+	+	+	+	-	+	+
Ethanol	C ₂ H ₅ OH	100%	-	+	+	+	+	-	+	+	+
Ethanol Amine	HOC ₂ H ₄ NH ₂	100%	0	n	+	+	+	-	+/0	+	+
Ethyl Acetate	CH ₃ COOC ₂ H ₅	100%	-	-	+	+	+35%	-	+/0	-	+
Ethyl Acrylate	C ₆ H ₉ COOC ₂ H ₅	100%	-	-	+	+	+	-	+/0	0	+
Ethyl Benzene	C ₈ H ₉ C ₂ H ₅	100%	-	-	+	0	0	0	-	+	+
Ethyl Benzoate	C ₆ H ₅ COOC ₂ H ₅	100%	n	-	+	+	+	+	-	0	+
Ethyl Bromide	C ₂ H ₅ Br	100%	n	n	n	+	+	+	-	+	+
Ethyl Chloride	C ₂ H ₅ Cl	100%	-	-	+	-	-	+	-	+	+
Ethyl Chloroacetate	ClCH ₂ COOC ₂ H ₅	100%	-	0	+	+	+	+	-	+	+
Ethyl Chlorocarbonate	ClCO ₂ C ₂ H ₅	100%	n	n	n	n	n	+	-	n	+
Ethylacetylacetate	C ₈ H ₁₀ O ₃	100%	n	-	+	+	+	+	-	+	+
Ethylacrylic Acid	C ₄ H ₇ COOH	100%	n	n	+	+	+	n	+/0	+	+
Ethylene Dibromide	C ₂ H ₄ Br ₂	100%	-	-	+	-	0	+	-	+	+
Ethylene Dichloride	C ₂ H ₄ Cl ₂	100%	-	-	+	-	0	+	-	+	+
Ethylene Glycol	C ₂ H ₄ (OH) ₂	100%	+	+	+	+	+	+	+	+	+
Ethylenglycol Ethylether	HOC ₂ H ₄ OC ₂ H ₅	100%	n	n	+	+	+	n	+/0	+	+
Ethylhexanol	C ₈ H ₁₆ O	100%	n	+/0	+	+	+	+	+	+	+
Fatty Acids	-	100%	0	0	+	+	+	+	0	+	+
Ferric Chloride	FeCl ₃	S	+	+	-	+	+	+	+	+	+
Ferric Nitrate	Fe(NO ₃) ₃	S	+	+	+	+	+	+	+	+	+
Ferric Phosphate	FePO ₄	S	+	+	+	+	+	+	+	+	+
Ferric Sulfate	Fe ₂ (SO ₄) ₃	S	+	+	0	+	+	+	+	+	+
Ferrous Chloride	FeCl ₂	S	+	+	-	+	+	+	+	+	+
Ferrous Sulfate	FeSO ₄	S	+	+	+	+	+	+	+	+	+
Fluoro Benzene	C ₆ H ₅ F	100%	-	-	+	0	+	0	-	+	+
Fluoroboric Acid	HF ₄	35%	+	+	0	+	+	+	+	+	+
Formaldehyde	CH ₂ O	40%	+	+	+	+	+	-	+/0	+	+
Formamide	HCONH ₂	100%	+	-	+	+	+	+	+	+	+
Formic Acid	HCOOH	S	-	+/0	+	+	+	-	-	+	+
Freon 12,13,22,114,115	-	100%	-	+	-	-	-	-	-	0	+
Furan	C ₄ H ₄ O	100%	-	-	+	+	+	-	n	-	+
Furane Aldehyde	C ₅ H ₄ O ₂	100%	n	n	n	n	n	-	+/0	0	+
Furfuryl Alcohol	OC ₄ H ₃ CH ₂ OH	100%	-	-	+	+	+	n	+/0	0	+

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resp. to aqueous solutions

N.B. PTFE is resistant against most chemicals and solvents (excluding fluorine, metallic sodium and other alkali metals).

PVDF is resistant against most chemicals (excluding ketones, esters).

Chemical	Formula	CONC.	Acrylic	PVC	316 SS	PE	PP	Viton®	EPDM	PVDF	Teflon
Gallic Acid	$C_6H_2(OH)_3COOH$	5%	+	+	+	+	+	+	+/-	+	+
Gasoline	-	100%	-	-	+	+	+	+	-	+	+
Glucose	$C_6H_{12}O_6$	S	+	+	+	+	+	+	+	+	+
Glycerol Triacetate	$C_9H_{15}CH_3COO)_3$	100%	n	n	+	+	+	-	+	+	+
Glycerol	$C_3H_5(OH)_3$	100%	+	+	+	+	+	+	+	+	+
Glycine	NH_2CH_2COOH	10%	+	+	+	+	+	+	+	+	+
Glycol	$C_2H_4(OH)_2$	100%	+	+	+	+	+	+	+	+	+
Glycolic Acid	$CH_2OH COOH$	70%	+	+(37%)	-	+	+	+	+	+	+
Heptane	C_7H_{16}	100%	+	+	+	+	+	+	-	+	+
Hexanal	$C_6H_{11}CHO$	100%	n	n	+	+	+	-	+/-	+	+
Hexane	C_6H_{14}	100%	+	+	+	+	+	+	-	+	+
Hexanol	$C_6H_{11}OH$	100%	-	-	+	+	+	n	+	+	+
Hexene	C_6H_{12}	100%	n	+	+	+	+	+	-	+	+
Hydrazine Hydrate	$N_2H_4 \cdot H_2O$	S	+	+	+	+	+	n	+	+	+
Hydrazine	N_2H_4	Conc.	0	0	+	+	+	+	+	+	+
Hydrobromic Acid	HBr	50%	+	+	-	+	+	-	+	+	+
Hydrochloric Acid	HCl	38%	+(32%)	+	-	+	+	-	+	+	+
Hydrofluoric Acid	HF	80%	-	+(40%)*	-	+(40%)	+(40%)	+	0	+	+
Hydrofluosilicic Acid	H_2SiF_6	30%	+	+	0	+	+	+	+	+	+
Hydrogen Cyanide	HCN	S	+	+	+	+	+	+	+	+	+
Hydrogen Peroxide	H_2O_2	90%	+(40%)	+(40%)	+	+	+(30%)	+(30%)	+(30%)	+	+
Hydroiodic Acid	HI	S	+	+	-	+	+	-	n	+	+
Hydroquinone	$C_6H_4(OH)_2$	S	+	+	+	+	+	+	-	+	+
Hydrogen Sulfide	H_2S	S	+	+	0	+	+	+	+	+	+
Hydroxylamine Sulfate	$(NH_2OH)_2 \cdot H_2SO_4$	10%	+	+	+	+	+	+	+	+	+
Hypochlorous Acid	HOCl	S	+	+	-	0	0	+	+/-	+	+
Iodine	I_2	S	0	-	-	0	+	+	+/-	+	+
Isobutyl Alcohol	$C_4H_9CH(OH)CH_3$	100%	-	+	+	+	+	+	+	+	+
Isopropyl Chloride	$CH_3CHClCH_3$	80%	-	-	+	0	0	+	-	+	+
Isopropyl Acetate	$CH_3COOCH(CH_3)_2$	100%	-	-	+	+	+	-	+/-	+	+
Isopropyl Alcohol	$(CH_3)_2CHOH$	100%	0	+/-	+	+	+	+	+	+	+
Isopropyl Benzene	$C_6H_5CH(CH_3)_2$	100%	-	-	+	0	0	+	-	+	+
Isopropyl Ether	$C_6H_{14}O$	100%	-	-	+	0	0	-	-	+	+
Isopropanol=>	Isopropyl Alcohol										
Lactic Acid	$C_3H_5O_3$	100%	-	+	+/-	+	+	+	+(10%)	+	+
Lead II Acetate	$Pb(CH_3COO)_2$	S	+	+	+	+	+	+	+	+	+
Lead Nitrate	$Pb(NO_3)_2$	50%	+	+	+	+	+	+	+	+	+
Lead Sulfate	$PbSO_4$	S	+	+	+	+	+	+	+	+	+
Lead Tetraethyl	$Pb(C_2H_5)_4$	100%	0	+	+	+	+	+	-	+	+
Lime Milk=>	Calcium Hydroxide										
*Lime Slurry	$Ca(OH)_2$	S	+	+	+	+	+	+	+	+	+
Lithium Bromide	LiBr	S	+	+	+	+	+	+	+	+	+
Lithium Chloride	LiCl	S	+	+	+	+	+	+	+	+	+
Magnesium Carbonate	$MgCO_3$	S	+	+	+	+	+	+	+	+	+
Magnesium Chloride	$MgCl_2$	S	+	+	0	+	+	+	+	+	+
*Magnesium Hydroxide	$Mg(OH)_2$	S	+	+	+	+	+	+	+	+	+
Magnesium Nitrate	$Mg(NO_3)_2$	S	+	+	+	+	+	+	+	+	+
Magnesium Sulfate	$MgSO_4$	S	+	+	+	+	+	+	+	+	+
Maleic Acid	$C_4H_2O_4$	S	+	+	+	+	+	+	+	+	+
Malic Acid	$C_4H_6O_5$	S	+	+	+	+	+	+	+	+	+
Manganese II Chloride	$MnCl_2$	S	+	+	+	+	+	+	+	+	+

*Requires flushing.

Introduction

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Resistance of liquid end materials against common chemicals at standard temperature 68°F (20°C). (May differ at other temperatures)

s = saturated aqueous solution

+/o = conditional resistance

+ = good resistance

o = limited resistance

- = no resistance

+(x%) = good resistance to x% concentration

* = With glued fittings please check the resistance of the glue

n = unknown resistance

=> = refer to . . .

A.C. = any concentration

S = saturated solution

Conc. = concentrated

D = weak solution

resp. to aqueous solutions

N.B. PTFE is resistant against most chemicals and solvents (excluding fluorine, metallic sodium and other alkali metals).

PVDF is resistant against most chemicals (excluding ketones, esters).

Chemical	Formula	CONC.	Acrylic	PVC	316 SS	PE	PP	Viton®	EPDM	PVDF	Teflon
Manganese Sulfate	MnSO ₄	S	+	+	+	+	+	+	+	+	+
Mercuric Chloride	HgCl ₂	S	-	+	-	+	+	+	+	+	+
Mercury	Hg	100%	+	+	+	+	+	+	+	+	+
Mercury II Chloride	HgCl ₂	S	+	+	-	+	+	+	+	+	+
Mercury II Cyanide	Hg(CN) ₂	S	+	+	+	+	+	+	+	+	+
Mercury II Nitrate	Hg(NO ₃) ₂	S	+	+	+	+	+	+	+	+	+
Mesityl Oxide	C ₆ H ₁₀ O	100%	-	-	+	n	n	-	+/-	n	+
Methacrylic Acid	C ₃ H ₅ COOH	100%	n	n	+	+	+	0	+/-	+	+
Methanol	CH ₃ OH	100%	-	+	+	+	+	+	+	+	+
Methoxybutanol	CH ₃ O(CH ₂) ₄ OH	100%	-	-	+	+	+	+	0	+	+
Methyl Acetate	CH ₃ COOCH ₃	60%	-	-	+	+	+	-	+/-	+	+
Methyl Acrylate	C ₂ H ₃ COOCH ₃	100%	-	-	+	+	+	-	+/-	+	+
Methyl Benzoate	C ₆ H ₅ COOCH ₃	100%	-	-	+	+	+	+	-	0	+
Methyl Catechol	C ₆ H ₃ (OH) ₂ CH ₃	S	+	+	+	+	+	+	-	+	+
Methyl Cellulose		S	+	+	+	+	+	+	+	+	+
Methyl Chloroacetate	ClCH ₂ COOCH ₃	100%	-	0	+	+	+	0	-	+	+
Methyl Cyclopentane	C ₅ H ₉ CH ₃	100%	+	+	+	+	+	+	-	+	+
Methyl Dichloroacetate	Cl ₂ CHCOOCH ₃	100%	-	-	+	+	+	-	n	n	+
Methyl Ethyl Ketone (MEK)	CH ₃ COC ₂ H ₅	100%	-	-	+	+	+	-	+	-	+
Methyl Glycol	C ₃ H ₈ O ₂	100%	+	+	+	+	+	-	+/-	+	+
Methyl Isobutyl Ketone	CH ₃ COC ₄ H ₉	100%	-	-	+	+	+	-	0	-	+
Methyl Isopropyl Ketone	CH ₃ COC ₃ H ₇	100%	-	-	+	+	+	-	+/-	-	+
Methyl Methacrylate	C ₃ H ₅ COOCH ₃	100%	-	-	+	+	+	-	-	+	+
Methyl Oleate	C ₁₇ H ₃₃ COOCH ₃	100%	n	n	+	+	+	+	+/-	+	+
Methyl Salicylate	HOC ₆ H ₄ COOCH ₃	100%	-	-	+	+	+	n	+/-	+	+
Methylacetyl Acetate	C ₅ H ₈ O ₃	100%	-	-	+	+	+	-	+/-	+	+
Methylamine	CH ₃ NH ₂	32%	+	0	+	+	+	-	+	0	+
Methylene Chloride	CH ₂ Cl ₂	100%	-	-	0	-	0	+	-	0	+
Milk	-	-	+	+	+	+	+	+	+	+	+
Morpholine	C ₄ H ₉ NO	100%	-	-	+	+	+	n	n	+	+
Naphthalene	C ₁₀ H ₈	S	-	-	+	-	+	+	-	+	+
Nickel II Acetate	(CH ₃ COO) ₂ Ni	S	+	+	+	+	+	-	+	+	+
Nickel Chloride	NiCl ₂	S	+	+	-	+	+	+	+	+	+
Nickel Nitrate	Ni(NO ₃) ₂	S	+	+	+	+	+	+	+	+	+
Nickel Sulfate	NiSO ₄	S	+	+	+	+	+	+	+	+	+
Nitric Acid	HNO ₃	99%	n	+(50%)	+(90%)	+(50%)	+(50%)	+(65%)	+(40%)	0	+
Nitro Benzene	C ₆ H ₅ NO ₂	100%	-	-	+	-	+	-	-	+	+
Nitro Methane	CH ₃ NO ₂	100%	-	-	+	+	+	-	+/-	0	+
Nitro Propane	(CH ₃) ₂ CHNO ₂	100%	-	-	+	+	+	-	+/-	n	+
Nitro Toluene	C ₆ H ₄ NO ₂ CH ₃	100%	-	-	+	+	+	0	-	+	+
Oxalic Acid	(COOH) ₂	S	+	+	+(10%)	+	+	+	+	+	+
Octane	C ₈ H ₁₈	100%	+	+	+	+	+	+	-	+	+
Octanol	C ₈ H ₁₇ OH	100%	-	-	+	+	+	+	+	+	+
Octyl Cresole	C ₁₈ H ₂₄ O	100%	-	-	+	+	+	0	n	+	+
Oleum	H ₂ SO ₄ +SO ₃	10%	n	-	+	-	-	+	-	-	+
Perchloric Acid	HClO ₄	70%	-	+(10%)	-	+	+(10%)	+	+/-	+	+
Pentane	C ₅ H ₁₂	100%	+	+	+	+	+	+	-	+	+
Pentanol=>	Amyl Alcohol										
Peracetic Acid	C ₂ H ₄ O ₃	50%	-	0	+	0	0	+	0	+	+
Petroleum Ether	C _n H _{2n+2}	100%	+	+/-	+	+	+	+	-	+	+
Phenol	C ₆ H ₅ OH	100%	-	-	+	+	+	+	-	+	+
Phenyl Ethyl Ether	C ₆ H ₅ OC ₂ H ₅	100%	-	-	+	+	+	-	-	n	+
Phenyl Hydrazine	C ₆ H ₅ NHNH ₂	100%	-	-	+	0	0	0	-	+	+
Phosphoric Acid	H ₃ PO ₄	85%	+(50%)	+	+	+	+	+	+	+	+

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Chemical	Formula	CONC.	Acrylic	PVC	316 SS	PE	PP	Viton®	EPDM	PVDF	Teflon
Phosphorous Oxychloride	POCl ₃	100%	-	-	n	+	+	+	+	+	+
Phosphorous Trichloride	PCl ₃	100%	-	-	+	+	+	0	0	+	+
Phthalic Acid	C ₆ H ₄ (COOH) ₂	S	+	+	+	+	+	+	+	+	+
Picric Acid	C ₆ H ₂ (NO ₃) ₃ OH	S	+	+	+	+	+	+	+	+	+
Piperidine	C ₅ H ₁₁ N	100%	-	-	+	n	n	-	-	n	+
Polyphosphate =>	Sodium Tripolyphosphate										
Potassium Acetate	CH ₃ COOK	S	+	+	+	+	+	+	+	+	+
Potassium Aluminum Sulfate	KAl(SO ₄) ₂	S	+	+	+	+	+	+	+	+	+
Potassium Bicarbonate	KHCO ₃	40%	+	+	+	+	+	+	+	+	+
Potassium Bifluoride	KHF ₂	S	n	+	+	+	+	+	+	+	+
Potassium Bisulfate	KHSO ₄	5%	+	+	+	+	+	+	+	+	+
Potassium Bitartrate	KC ₄ H ₅ O ₆	S	+	+	+	+	+	+	+	+	+
Potassium Borate	KBO ₂	S	+	+	+	+	+	+	+	+	+
Potassium Bromate	KBrO ₃	S	+	+	+	+	+	+	+	+	+
Potassium Bromide	KBr	S	+	+	+(10%)	+	+	+	+	+	+
Potassium Carbonate	K ₂ CO ₃	S	+	+	+	+	+	+	+	+	+
Potassium Chlorate	KClO ₃	S	+	+	+	+	+	+	+	+	+
Potassium Chloride	KCl	S	+	+	-	+	+	+	+	+	+
Potassium Chromate	K ₂ CrO ₄	10%	+	+	+	+	+	+	+	+	+
Potassium Chrome Sulfate	KCr(SO ₄) ₂	S	+	+	+	+	+	+	+	+	+
Potassium Cyanate	KOCN	S	+	+	+	+	+	+	+	+	+
Potassium Cyanide	KCN	S	+	+	+(5%)	+	+	+	+	+	+
Potassium Cyanoferrate II	K ₃ Fe(CN) ₆	S	+	+	+	+	+	+	+	+	+
Potassium Cyanoferrate III	K ₃ Fe(CN) ₆	S	+	+	+	+	+	+	+	+	+
Potassium Dichromate	K ₂ Cr ₂ O ₇	S	+	+	+(25%)	+	+	+	+	+	+
Potassium Ferricyanide	K ₃ Fe(CN) ₆	S	+	+	+	+	+	+	+	+	+
Potassium Ferrocyanide	K ₄ Fe(CN) ₆	S	+	+	+	+	+	+	+	+	+
Potassium Fluoride	KF	S	+	+	+	+	+	+	+	+	+
Potassium Hydroxide	KOH	50%	n	+	+	+	+	-	+	+	+
Potassium Iodide	KI	S	+	+	+	+	+	+	+	+	+
Potassium Nitrate	KNO ₃	S	+	+	+	+	+	+	+	+	+
Potassium Perchlorate	KClO ₄	S	+	+	n	+	+	+	+	+	+
Potassium Permanganate	KMnO ₄	S	+	+	+	+	+	+	+	+	+
Potassium Persulfate	K ₂ SO ₈	S	+	+	+	+	+	+	+	+	+
Potassium Phosphate	KH ₂ PO ₄	S	+	+	+	+	+	+	+	+	+
Potassium Sulfate	K ₂ SO ₄	S	+	+	+	+	+	+	+	+	+
Potassium Sulfite	K ₂ SO ₃	S	+	+	+	+	+	+	+	+	+
Propanol	C ₂ H ₇ OH	100%	-	+	+	+	+	+	+	+	+
Propionic Acid	C ₂ H ₅ COOH	100%	0	+	+	+	+	+	+	+	+
Propionitrile	CH ₃ CH ₂ CN	100%	n	n	+	+	+	+	-	+	+
Propyl Acetate	CH ₃ COOC ₃ H ₇	100%	-	-	+	+	+	-	+/-	+	+
Propylene Glycol	CH ₃ CHOHCH ₂ OH	100%	+	+	+	+	+	+	+	+	+
Pyridine	C ₅ H ₅ N	100%	-	-	+	+	0	-	-	-	+
Pyrrole	C ₄ H ₄ N	100%	n	n	+	+	+	-	-	n	+
Salicylic Acid	HOC ₆ H ₄ COOH	S	+	+	+	+	+	+	+	+	+
Sea Water	-		+	+	0	+	+	+	+	+	+
Silic Acid	SiO ₂ +H ₂ O	S	+	+	+	+	+	+	+	+	+
Silver Bromide	AgBr	S	+	+	+/0	+	+	+	+	+	+
Silver Chloride	AgCl	S	+	+	-	+	+	+	+	+	+
Silver Nitrate	AgNO ₃	S	+	+	+	+	+	+	-	+	+
Soda Ash=>	Sodium Carbonate										
Sodium Acetate	CH ₃ COONa	S	+	+	+	+	+	+	+	+	+
Sodium Benzoate	C ₆ H ₅ COONa	S	+	+	+	+	+	+	+	+	+
Sodium Bicarbonate	NaHCO ₃	S	+	+	+	+	+	+	+	+	+
Sodium Bisulfate	NaHSO ₄	S	+	+	+	+	+	+	+	+	+
Sodium Bisulfite	NaHSO ₃	S	+	+	+	+	+	+	+	+	+

Introduction

Chemical Resistance List

Resistance of liquid end materials against common chemicals at standard temperature 20°C (68°F). (May differ at other temperatures)

s = saturated aqueous solution

+/o = conditional resistance

+ = good resistance

o = limited resistance

- = no resistance

+(x%) = good resistance to x% concentration

* = With glued fittings, please check the resistance of the glue.

n = unknown resistance

=> = refer to . . .

A.C. = any concentration

S = saturated solution

Conc. = concentrated

D = weak solution

resp. to aqueous solutions

N.B. PTFE is resistant against most chemicals and solvents (excluding fluorine, metallic sodium and other alkali metals).

PVDF is resistant against most chemicals (excluding ketones, esters).

Chemical	Formula	CONC.	Acrylic	PVC	316 SS	PE	PP	Viton®	EPDM	PVDF	Teflon
Sodium Borate	NaBO ₂	S	+	+	+	+	+	+	+	+	+
Sodium Bromate	NaBrO ₃	S	+	+	+	+	+	+	+	+	+
Sodium Bromide	NaBr	S	+	+	+	+	+	+	+	+	+
Sodium Carbonate	Na ₂ CO ₃	S	+	+	+/0	+	+	+	+	+	+
Sodium Chlorate	NaClO ₃	S	+	+	+	+	+	+	+	+	+
Sodium Chloride	NaCl	S	+	+	-	+	+	+	+	+	+
Sodium Chlorite	NaClO ₂	24%	+	+	+(10%)	+	+	+	+	+	+
Sodium Chromate	Na ₂ CrO ₄	S	+	+	+	+	+	+	+	+	+
Sodium Cyanide	NaCN	S	+	+	+	+	+	+	+	+	+
Sodium Dichromate	NaCr ₂ O ₇	S	+	+	+	+	+	+	+	+	+
Sodium Dithionite	Na ₂ S ₂ O ₄	S	+	+10%	+	+10%	+10%	n	n	+	+
Sodium Fluoride	NaF	S	+	+	+(10%)	+	+	+	+	+	+
Sodium Hydrogen Sulfate	NaHSO ₄	S	+	+	+	+	+	+	+	+	+
Sodium Hydrogen Sulfide	NaHSO ₃	S	+	+	+	+	+	+	+	+	+
Sodium Hydroxide	NaOH	50%	+	+	+	+	+	-	+	+	+
Sodium Hypochlorite	NaOCl	12-15%	+	+	-	+	0	+	+	+	+
Sodium Iodide	NaI	S	+	+	+	+	+	+	+	+	+
Sodium Metaphosphate	(NaPO ₃) _n	S	+	+	+	+	+	+	+	+	+
Sodium Nitrate	NaNO ₃	S	+	+	+	+	+	+	+	+	+
Sodium Nitrite	NaNO ₂	S	+	+	+	+	+	+	+	+	+
Sodium Oxalate	Na ₂ C ₂ O ₄	S	+	+	+	+	+	+	+	+	+
Sodium Perborate	NaBO ₂ *H ₂ O ₂	S	+	+/0	+	+	+	+	+	+	+
Sodium Perchlorate	NaClO ₄	S	+	+	+(10%)	+	+	+	+	+	+
Sodium Peroxide	Na ₂ O ₂	S	+	+	+	-	+	+	+	+	+
Sodium Persulfate	Na ₂ S ₂ O ₈	S	n	+	+	+	+	+	+	+	+
Sodium Pyrosulfite	Na ₂ S ₂ O ₅	S	+	+	+	+	+	n	n	+	+
Sodium Salicylate	C ₆ H ₄ (OH)COONa	S	+	+/0	+	+	+	+	+	+	+
Sodium Silicate	Na ₂ SiO ₃	S	+	+	+	+	+	+	+	+	+
Sodium Sulfate	Na ₂ SO ₄	S	+	+	+	+	+	+	+	+	+
Sodium Sulfide	Na ₂ S	S	+	+	+	+	+	+	+	+	+
Sodium Sulfite	Na ₂ SO ₃	S	+	+	+(50%)	+	+	+	+	+	+
Sodium Tetraborate	Na ₂ B ₄ O ₇ *10H ₂ O	S	+	+	+	+	+	+	+	+	+
Sodium Thiosulfate	Na ₂ S ₂ O ₃	S	+	+	+(25%)	+	+	+	+	+	+
Sodium Tripolyphosphate	Na ₃ P ₃ O ₁₀	S	+	+	+	+	+	+/0	+	+	+
Stannic Chloride	SnCl ₄	100%	+	+	-	+	+	+	+	+	+
Stannous Chloride	SnCl ₂	S	+	+	-	+	+	+	+	+	+
Starch	(C ₆ H ₁₀ O ₅) _n	S	+	+	+	+	+	+	+	+	+
Stearic Acid	C ₁₇ H ₃₅ COOH	100%	+	+	+	+	+	+	-	+	+
Styrene	C ₆ H ₅ CHCH ₂	100%	-	-	+	0	0	0	-	+	+
Succinic Acid	C ₄ H ₆ O ₄	S	+	+	+	+	+	+	+	+	+
Sugar Syrup		S	+	+	+	+	+	+	+	+	+
Sulfuric Acid	H ₂ SO ₄	98%	+30%	+50%	+20%	+80%	+85%	+	+	+	+
Sulfurous Acid	H ₂ SO ₃	A.C.	+	+	+(10%)	+	+	+	+	+	+
Sulfuryl Chloride	SO ₂ Cl ₂	100%	-	-	n	-	-	+	0	n	+
Tannic Acid	C ₇₆ H ₅₂ O ₄₆	50%	+	+	+	+	+	+	+	+	+
Tartaric Acid	C ₄ H ₆ O ₆	S	+(50%)	+	+	+	+	+	+/0	+	+
Tetrachloroethane	C ₂ H ₂ Cl ₄	100%	-	-	+	0	0	0	-	+	+
Tetrachloroethene	C ₂ Cl ₄	100%	-	-	+	0	0	0	-	+	+
Tetrahydrofuran	C ₄ H ₈ O	100%	-	-	+	0	0	-	-	-	+
Tetrahydro Naphthalene	C ₁₀ H ₈	100%	-	-	+	0	-	+	-	+	+
Thionyl Chloride	SOCl ₂	100%	-	-	n	-	-	+	+	-	+
Thiophene	C ₄ H ₄ S	100%	n	-	+	0	0	-	-	n	+
Tin II Chloride	SnCl ₂	S	+	0	-	+	+	+	+	+	+
Tin II Sulfate	SnSO ₄	S	+	+	+	+	+	+	+	+	+
Tin IV Chloride	SnCl ₄	S	n	+	-	+	+	+	+	+	+

Introduction

Chemical Resistance List

Resistance of liquid end materials against common chemicals at standard temperature 68°F (20°C). (May differ at other temperatures)

s	= saturated aqueous solution	n	= unknown resistance] resp. to aqueous solutions
+/o	= conditional resistance	=>	= refer to . . .	
+	= good resistance	A.C.	= any concentration	
o	= limited resistance	S	= saturated solution	
-	= no resistance	Conc.	= concentrated	
+(x%)	= good resistance to x% concentration	D	= weak solution	
*	= With glued fittings, please check the resistance of the glue.			

N.B. PTFE is resistant against most chemicals and solvents (excluding fluorine, metallic sodium and other alkali metals).

PVDF is resistant against most chemicals (excluding ketones, esters).

Chemical	Formula	CONC.	Acrylic	PVC	316 SS	PE	PP	Viton®	EPDM	PVDF	Teflon
Titanium Tetrachloride	TiCl ₄	100%	n	n	n	n	n	0	-	+	+
Toluene	C ₆ H ₅ CH ₃	100%	-	-	+	0	0	0	-	+	+
Toluene Diisocyanate	C ₇ H ₆ (NCO) ₂	100%	n	n	+	+	+	-	+/-	n	+
Tributyl Phosphate	(C ₄ H ₉) ₃ PO ₄	100%	n	-	+	+	+	-	+	+	+
Trichloroacetaldehyde Hydr.	CCl ₃ CH(OH) ₂	S	-	-	+	+	0	0	0	-	+
Trichloroethane	CCl ₃ CH ₃	100%	-	-	+	0	0	+	-	+	+
Trichloroethene	C ₂ HCl ₃	100%	-	-	+/-	0	0	0	-	+	+
Trichloroethylene	C ₂ HCl ₃	100%	-	-	+	0	0	0	-	+	+
Trichloroacetic Acid	CCl ₃ COOH	50%	-	+	-	+	+	-	0	+	+
Tricresyl Phosphate	(C ₇ H ₇ O) ₃ PO	90%	n	-	+	+	+	0	+	n	+
Triethanolamine	N(C ₂ H ₄ OH) ₃	100%	-	0	+	+	+	-	+/-	+	+
Trioctyl Phosphate	(C ₈ H ₁₇) ₃ PO ₄	100%	n	-	+	+	+	0	+	+	+
Trisodium Phosphate	Na ₃ PO ₄	S	+	+	+	+	+	+	+	+	+
Urea	CO(NH ₂) ₂	S	+	+/-	+	+	+	+	+	+	+
Vinyl Acetate	CH ₂ CHOOCCCH ₃	100%	-	-	+	0	-	0	-	+	+
Xylene	C ₆ H ₄ (CH ₃) ₂	100%	-	-	+	0	-	0	-	0	+
Zinc Acetate	(CH ₃ COO) ₂ Zn	S	+	+	+	+	+	-	+	+	+
Zinc Chloride	ZnCl ₂	S	+	+	-	+	+	+	+	+	+
Zinc Sulfate	ZnSO ₄	S	+	+	+	+	+	+	+	+	+

ProMinent Liquid-End Materials in Contact with Chemical

Version	Liquid End	Suction/Discharge	valves Seals	Valve balls	Diaphragm
PPE	Polypropylene	Polypropylene	EPDM	Ceramic	PTFE
PPB*	Polypropylene	Polypropylene	Viton®	Ceramic	PTFE
PCE*	PVC	PVC	EPDM	Ceramic	PTFE
PCB	PVC	PVC	Viton®	Ceramic	PTFE
NPE*	Acrylic	PVC	EPDM	Ceramic	PTFE
NPB	Acrylic	PVC	Viton®	Ceramic	PTFE
PVT	PVDF	PVDF	PTFE	Ceramic	PTFE
TTT*	PTFE with carbon	PTFE with Carbon	PTFE	Ceramic	PTFE
SST	316 Stainless steel	316 Stainless Steel	PTFE	Ceramic	PTFE

Auto-degassing type with Hastelloy C valve spring and PVDF valve seat.

Viton® is a registered trademark of DuPont Dow Elastomers.

*Special Order Combinations, delivery will be longer (approx.. 2 weeks)

NOTE: NSF is only for Beta, Gala & Delta pump models

Introduction

ProMinent® Canada Warranty

TERMS AND CONDITIONS

(1) **OFFER AND ACCEPTANCE:** This Acknowledgement/Offer to Sell is not an acceptance of the terms and conditions of any offer or order of Purchaser and any such offer or order is expressly rejected. This Acknowledgement/Offer to Sell is an offer by ProMinent Fluid Controls Ltd. ("Seller") to Purchaser and acceptance of the offer contained herein is expressly limited to its terms. Upon acceptance by Purchaser this Acknowledgement/Offer to Sell shall be the final written expression of agreement between Seller and Purchaser, constituting the entire contract between them and superseding all previous communications, either verbal or written. This Acknowledgment/Offer to Sell and the contract resulting from it ("the Contract") may be modified only in writing signed by an authorized officer of Seller. Reference herein to any order or other communication of Purchaser is only for the purpose of identification.

(2) **WARRANTY REMEDY DISCLAIMER:** The warranties set out in this clause shall be conditional upon fulfillment of the Purchaser's contractual obligations, including all terms of payment. Seller warrants that pump drive units and Dulcometer Controllers will be of good workmanship and material for two (2) years from date of shipment by Seller. For sales of liquid ends, Bellozon, Bonozon, pump accessories, standard engineered products, custom design items, Seller offers one (1) year warranty from date of shipment by Seller. Sensors, Membrane Caps, Buffer Solutions and other consumables are not covered by any warranty. For all items supplied by but not manufactured by Seller, warranty will be as supplied by others. If Purchaser claims that goods are defective, they must permit Seller's Personnel to inspect goods on Purchaser's property, if Seller deems necessary. Purchaser shall not return goods to Seller without prior written approval of such by Seller. All goods must be returned "PREPAID". After inspection and if claim is valid, replacement or repaired goods will be returned to Purchaser "PREPAID" via Seller's choice of expediting. THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS, IMPLIED AND STATUTORY AND IS STRICTLY LIMITED TO ITS TERMS. SELLER MAKES NO WARRANTY OF MERCHANTABILITY OR OF FITNESS FOR ANY PARTICULAR PURPOSE. The warranties set out in this clause shall be conditional upon the fulfillment of the purchasers contractual obligations, including all terms of payment. The warranty provided for herein shall not apply to any goods that become defective for the following reason: (a) unsuitable or unreasonable use; (b) faulty assembly, installation or servicing by the Purchaser or any third party; (c) faulty or careless handling.

(3) **DISCLAIMER OF TORT LIABILITY:** PURCHASER SPECIFICALLY UNDERSTANDS AND AGREES THAT SELLER SHALL NOT BE LIABLE IN TORT, WHETHER BASED ON NEGLIGENCE, STRICT LIABILITY OR ANY OTHER THEORY OF TORT LIABILITY, FOR ANY ACTION OR FAILURE TO ACT IN RESPECT TO THE MANUFACTURE, PREPARATION FOR SALE OR DELIVERY OF THE GOODS. IT IS THE PARTIES' INTENT AND THE INTENT OF THIS PARAGRAPH TO ABSOLVE AND PROTECT SELLER FROM ANY AND ALL TORT LIABILITY.

(4) **EXCLUSIVE REMEDY:** PURCHASER SPECIFICALLY UNDERSTANDS AND AGREES THAT PURCHASER'S SOLE AND EXCLUSIVE REMEDY FOR BREACH OF WARRANTY, TORTIOUS CONDUCT OR ANY OTHER CAUSE OF ACTION AGAINST SELLER SHALL BE THE REMEDY PROVIDED IN PARAGRAPH 2, ABOVE.

(5) **EXCLUSION OF CONSEQUENTIAL DAMAGES:** PURCHASER SPECIFICALLY UNDERSTANDS AND AGREES THAT UNDER NO CIRCUMSTANCES WILL SELLER BE LIABLE TO PURCHASER FOR ECONOMIC SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES OR LOSSES OF ANY KIND WHATSOEVER, INCLUDING BUT NOT LIMITED TO, LOSS OF ANTICIPATED PROFITS AND ANY OTHER LOSS CAUSED BY REASON OF THE NON-OPERATION OF THE GOODS THIS EXCLUSION IS APPLICABLE TO CLAIMS FOR BREACH OF WARRANTY, TORTIOUS CONDUCT OR ANY OTHER CAUSE OF ACTION AGAINST SELLER.

(6) **PRICES:** The price of the goods, as quoted above is subject to change without notice. The actual sales price shall be Seller's price in effect at the date Seller receives notification of Purchaser's acceptance of the offer contained herein. Purchaser shall pay, in addition to the actual sales price, all excise, privilege, occupational sales use, personal property and other taxes, and in the event that same are paid by Seller, Purchaser will reimburse Seller for the cost thereof, forthwith upon demand. Terms of payment are cash on delivery unless otherwise provided herein. Invoices unpaid after 30 days are subject to a 1.5 % per month finance service charge. All prices are F.O.B. Guelph, Ontario, and subject to change without prior notice.

Shipments will be insured only upon request by customer. ProMinent will not accept goods for return without an Authorization Number or if received collect. PLEASE NOTE: The following products are non returnable for credit; probes, Extronic Pumps, Makro HK & HMM Pumps, Chlorine Dioxide Generators, and Ozone Generators (This policy does not pertain to

product
overviewsolenoid-driven
metering pumpsmotor-driven
metering pumpspump spare parts &
accessoriesDULCOMETER®
instrumentationDULCOTEST®
sensorsstandard & custom
systems

ProMinent® Canada Warranty

TERMS AND CONDITIONS continued

faulty equipment). A restocking charge may apply to all returned goods. Minimum billing of \$25.00 applies to all orders placed.

(7) **RISK OF LOSS:** Purchaser assumes and shall bear the entire risk of loss of or damage to the goods sold hereunder from any cause whatsoever from the time it is delivered F.O.B. Seller's facility and no such loss or damage to the goods or any part thereof shall relieve the Purchaser from its obligations hereunder.

(8) **CANCELLATION:**

a) The Contract is not subject to cancellation by Purchaser unless Purchaser obtains written approval of such from Seller. If the Contract is cancelled, Purchaser shall pay all reasonable charges, as invoiced by Seller, for expenses incurred by Seller prior to cancellation.

b) All unreleased orders must be shipped and invoiced within six (6) months of initial placement or said orders will be cancelled and appropriate charges applied. Please note that "ON HOLD" orders are subject to all published price increases.

(9) **SHIPMENT, FORCE MAJEURE:** Time of shipment shall be subject to "Force Majeure" which term is hereby declared to include all circumstances and actions whatsoever beyond the direct and immediate control of Seller among which, but not exclusive of others, are the following: Acts of God, war and riot, intervention of authorities or agencies of government including but not limited to agencies concerned with the preservation of the environment, embargoes, vandalism, sabotage, strikes, lockouts, or other industrial disturbances; shortages or delay in supply of fuel, power, raw materials or component parts; and the unavailability of means of transportation. Seller shall not be liable for any loss or damage caused to Purchaser nor shall Purchaser be entitled to cancel the Contract because the time of shipment is not met due to Force Majeure. Upon the happening of an event of Force Majeure as set out above, the Seller, at its sole option, may terminate this contract in whole or in part. The Seller shall also have the right of rescission in the event that it becomes known to the Seller that the Purchaser's financial condition is such that the Purchaser does not reasonably appear to have the ability to pay the Seller for the goods ordered herein. In the event that the Seller intends to exercise its right of rescission upon the happening of the events noted above, the Seller shall immediately give the Purchaser written notice of the exercise of its right of rescission. The Purchaser shall not be entitled to any claim for damages as a result of the Seller's exercise of its right of rescission.

(10) **SECURITY INTEREST:** In consideration of the Seller agreeing to sell the goods to the purchaser and in order to secure payment of the purchase price, the Purchaser hereby grants to the Seller, and the Seller hereby reserves, a security interest and a purchase money security interest in the goods and all substitutions, replacements and additions thereto and the proceeds thereof. The goods set out on the reverse side hereof shall remain personal property and shall not become part of the freehold of Purchaser.

(11) **DEFAULT:** If the Purchaser defaults in any payment of compliance with the terms hereof, or if a proceeding in bankruptcy, receivership or insolvency, be instituted against the Purchaser or its property, or the Seller deems the goods provided for hereunder in danger of misuse or confiscation, the Seller may retain any partial payments which have been made hereunder as liquidated damages and not as a penalty, and the Seller shall have the right, at its election, to declare the unpaid balance, together with any other amount for which the Purchaser shall have become obligated hereunder to be immediately due and payable, and the Seller or any office or duly authorized representative of the Seller may take immediate possession of the goods. The Seller may, to the extent permitted by law, resell the goods at public or private sale at any location, without demand for performance, with or without notice of advertisement, with or without such property at the place of sale, and upon such terms as the Seller may expressly bid at any such public sale for such goods.

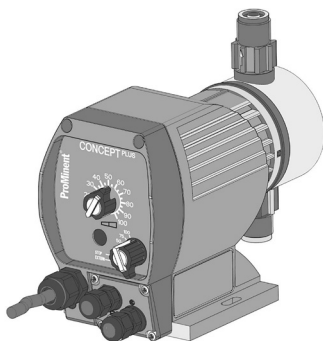
(12) **APPLICABLE LAW:** This agreement shall be governed by the laws of the Province of Ontario and the law of Canada applicable therein, and the parties hereto do hereby irrevocably attorn to the jurisdiction of the courts of the Province of Ontario.

(13) **CHOICE OF LANGUAGE:** The parties hereto have requested and agreed that this agreement be drawn up in the English language. Les parties aux présentes ont demandé et convenu que le présent contrat soit rédigé en Anglais.

ProMinent Fluid Controls Ltd. (Canada)
490 Southgate Drive, Guelph, ON N1G 4P5
Tel: 1-888-709-9933 | (519) 836-5692
Fax: (519) 836-5226
eMail: sales-can@prominent.com
www. prominent.ca

Solenoid-Driven Metering Pump Overview

Concept^{PLUS}

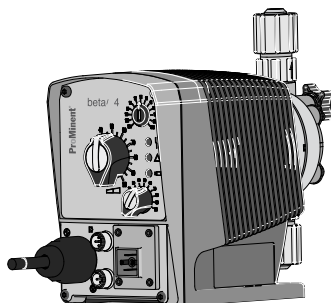


Ideal for basic chemical feed applications

[\(see page 30 for complete details\)](#)

- Solenoid driven diaphragm pump
- Capacities: 0.74 L/h to 21.9 L/h
- Maximum pressure: 232 psi
- Turndown: 40:1
- Manual, external contact pulse 1:1 operation, remote start/stop
- Stroke length: 0-100% (30% minimum recommend for most repeatable accuracy)
- Stroke Frequency: 5 distinct settings (0, 25%, 50%, 75% and 100%)
- Liquid ends: NP and PVT
- Auto degassing liquids available
- Adjustable bleed valve with fine adjustment for continuous degassing
- NSF/ANSI 61 approved

Beta[®]



Ideal for most chemical feed applications

[\(see page 34 for complete details\)](#)

- Solenoid driven diaphragm pump
- Capacities: 0.74 L/h to 8.4 gph (32 L/h)
- Maximum pressure: 363 psi
- Turndown: 100:1
- External contact input for pulse control with a range of 1:32 to 32:1
- External control of pump speed via a 4 – 20mA signal
- Stroke length: 0-100% (30% minimum recommend for most repeatable accuracy)
- Stroke Frequency: 10 distinct settings @ 10% increments
- Liquid ends: NP, PVT and SST
- Auto degassing and high viscosity (HV) available
- NSF/ANSI 61 approved

gamma/ X



Ideal for applications requiring high turn down ratio and intelligent metering

[“gamma/ X” on page 41](#)

- Capacity range from 1 ml / hr to 45 l / hr, maximum discharge pressure up to 363 psi
- Simple adjustment of the capacity directly in l/hr
- Configurable discharge stroke, continuous or pulsed dosing
- Configurable suction stroke duration
- Stroke rate adjustable from 1 – 12,000 strokes per hour
- Electronic stroke length adjustment, continuous from 0 - 100% (recommended range 30 - 100%)
- Integrated pressure measurement allows for detection of metering problems
- Acrylic/PVC, PVT (PVDF) and Stainless Steel liquid end material versions
- Auto degassing liquid ends in Acrylic/ PVC and PVT
- High viscosity liquid ends (PVT4) for viscosities of up to 3000 cP
- External control via voltage-free contacts with pulse multiplier/divider function
- External control via standard 4-20 mA signal, and scalable adjustment of mA signal to stroke rate
- Standard internal programmable timer for real-time dependent dosing routines i.e biocides,
- Bluetooth interface as a standard feature
- NSF/ANSI 61 Approved Liquid ends

Solenoid-Driven Metering Pump Overview

Gamma/ XL



Ideal for applications requiring high turndown ratio and intelligent metering

[“gamma/ XL” on page 47](#)

- Capacity range from 5ml/hr to 80 l/hr maximum discharge pressure to 363 psi
- Simple adjustment of the capacity directly in l/h or gph
- Independently configurable suction and discharge stroke profiles
- Stroke rate adjustable from 1 – 12,000 strokes per hour
- Electronic stroke length adjustment continuously variable from 0 – 100%, recommended minimum 30%
- Integrated pressure measurement allows for identification of metering problems
- Acrylic/PVC, PVT (PVDF) and Stainless steel liquid end material versions
- High viscosity liquid ends (PVT4) for viscosities of up to 3000 cP
- External control via voltage free contacts with pulse multiplier / divider function as standard feature
- External control via standard 4 – 20 mA signal and scalable adjustment of mA signal to stroke rate as standard feature
- Integral timer for real time dependent dosing routines, i.e. biocide dosing as standard feature
- New configurable input / output port for various functions

DULCO flex control

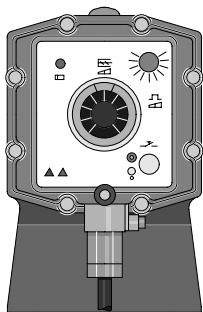


The peristaltic pump with all the advantages of a metering pump

[\(see page 57 for complete details\)](#)

- Capacity range from 10 ml/hr to 30 l/hr
- Simple adjustment of the capacity in l/hr or gph
- Easily pumps very gaseous media without air-locking
- Suitable for viscosities of up to 10,000 cP
- 2 different tube materials, TPV (Santoprene) and PUR (Polyurethane)
- External control via voltage free contacts with pulse multiplier / divider function
- External control via standard 4 – 20 mA signal and scalable adjustment of mA signal to stroke rate.
- Standard integral timer for real time dependent dosing routines, i.e. biocide dosing
- New configurable input / output port for various functions

EXtronic®



Ideal for explosion proof applications

[\(see page 64 for complete details\)](#)

- Solenoid driven diaphragm pump designed for ex-proof applications
- Capacities: 0.05 gph (0.19 L/h) to 15.9 gph (60 L/h)
- Class 1, Div 1, Groups B, C and D
- Maximum pressure: 363 psi
- Turndown: 1,200:1
- Manual, external contact pulse and analog operation
- Stroke length: 0-100% (30% minimum recommend for most repeatable accuracy)
- Stroke Frequency: 0 to 120 spm via potentiometer
- Liquid ends: NP, PP, TT and SST
- Auto degassing and high viscosity (HV) available

ProMinent® DULCOnneX - the total solution for your digital fluid management

Total process monitoring - any time, anywhere



Improved process safety, reliability and transparency due to real-time monitoring, individual alarms and automated reports.



ProMinent's DULCOnneX is the smart overall solution for digitally networking your system components. The DULCOnneX is based on robustly networked products that can be individually adapted to operating conditions. As all the components of a system are networked, metering pumps, disinfection systems, controllers and sensors can interact in an optimised manner – increasing process reliability and system efficiency.

Location-independent system monitoring in real time

You always have all the key data and measured values about your pump installations in sight at all times with DULCOnneX. Monitor the status of your system in real time and benefit from continuous documentation. Check your unit data safely and reliably when you're out and about. Simply use the terminal device of your choice: smartphone, tablet or PC. Configurable alarms and messages inform you of relevant events 24/7.

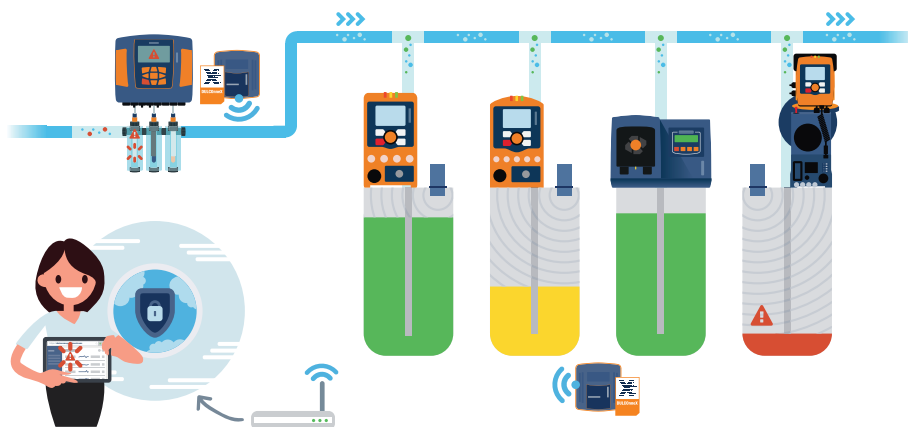
Be in a position to act promptly at all times with DULCOnneX. Whether industrial and process water, cooling water, potable water or swimming pool water – DULCOnneX supports you in ensuring the reliable treatment of your fluids.

Reference - chemical metering

Whether you are concerned about conformity with regulatory requirements governing the metering of chemicals, or about guaranteeing efficient and effective metering: DULCOnneX continuously provides you with automatic evidence of the metering performed by the connected metering pumps.

Using individually configurable alarms, DULCOnneX monitors a series of pump parameters on your behalf, from the metering volume to any error and warning messages that occur. E-mail notifications allow you to react immediately to potential faults, thereby guaranteeing seamless processes. By networking the liquid level measurement to the metering stations you can avoid shortages in the metering of hydrogen peroxide, sulfuric acid, chloride dioxide, flocculants or corrosion inhibitors, among others.

DULCOnneX also continuously logs the operating parameters of all connected components and makes them available to you in the form of value diagrams and summarised reports to ensure that you always retain an overview of your processes.



ProMinent® DULCOnneX - the total solution for your digital fluid management

The benefits with DULCOnneX



- **Complete overview of all your devices and installations** – any time and from anywhere
- **Reliable saving of your complete value history** including alarms and warnings that occur
- **Individual alarms by e-mail** – Keep up to date at all times
- **Continuous logging and automatic reports** – Documentation and evidence of correct operation
- **Clear visualisation** – Graphic display of value and parameter combinations
- **Access via the web** – Simply use any of your smart devices with an installed browser. You do not need an additional app nor a permanent link to the connected device.



The DULCOnneX platform can be accessed at <https://dulconnex.prominent.com>. Please contact us for a demonstration and e-mail your questions directly to us at dulconnex@prominent.com. We'd be delighted to help you further.

Privacy and data security

The architecture of DULCOnneX is already designed to achieve maximum safety and reliably protect your data. For example, there is a systematic separation of user-specific data and measured values. In addition, all measured values are anonymised internally and the entire system is regularly inspected by professional IT safety service providers for possible safety gaps.

Examples of relevant safety measures:

- Encryption in accordance with the latest state of the art
- Multiple redundant data memories
- Systematic control of the equipment ownership

Constantly growing portfolio of supported devices

We are continuously working at full throttle to extend our range of solutions. Below are just some of the devices and systems supported as standard to date. We also support the connection of additional components via flexibly combinable modules with digital or analogue inputs. This enables older devices to be connected (such as the chlorine dioxide system Bello Zon® CDLb) or other manufacturers' components (e.g., liquid level gauges, water meters, gas detectors).

■ Pumps

- gamma/ X
- gamma/ XL
- DULCO flex Control – DFXa
- DULCO flex Control – DFYa
- Sigma X

■ Controllers

- AEGIS II / SlimFLEX 5a
- DULCOMETER® diaLog DACb

■ Disinfection systems

- UV systems Dulcodes LP/MP
- Chlorine dioxide system Bello Zon® CDKd and CDVd

■ Standard signals via dedicated modules

- Digital inputs (relays, also with counter)
- Analog inputs (4...20 mA)



ProMinent® DULCOnneX - the total solution for your digital fluid management

DULCOnnex gateway

Our DULCOnneX gateway enables all smart products to be connected to our web-based fluid management platform.

The pre-requisite for the correct operation of DULCOnneX is a “DULCOnneX gateway” compatible with the relevant product, this communicates with the “DULCOnneX platform” via a Wi-Fi internet connection provided by the customer.



	Devices	Order no.
DULCOnneX gateway AGIb	AEGIS II	1098723
DULCOnneX gateway DACb	DULCOMETER® diaLog DACb	1098756
DULCOnneX gateway GMX, GXL	gamma/ X, gamma/ XL, DULCO flex Control DFXa, DULCO flex Control DFYa, DULCOMARIN® II, I and M modules Sigma X	1098754
DULCOnneX gateway SXCB	gamma/ X, Sigma X,	1098755
DULCOnneX gateway UVCb	Dulcodes LP/MP, gamma/ X, Sigma X	1098757

ProMinent® Concept^{PLUS} Solenoid Diaphragm Metering Pumps

Overview: Concept^{PLUS}



Features & Benefits

- Affordability (low operation and installation costs)
- Durability (universally compatible PVDF liquid ends with Self Degassing capabilities)
- Versatility - compact construction ideal for floor, tank or wall mounted installations
- Capacity range of 0.74 - 21.9 lph (0.2 - 5.79 gph), at pressures 232-21 psi

It's compact construction and features make it ideal for use in flow proportional or on - off control applications. It easily mounts onto a tank or wall mount bracket and fits into chlorination applications as well as grinding, milling, car-wash and finishing processes.

Adjustment of the pump capacity is possible via stroke volume in the range of 10-100% and can be set at 1 of the 4 stroke frequency settings. This gives an adjustment ratio of 1:40. In addition to manually setting the stroke frequency, the pump can also be set up for external control for use with contact water meters for flow proportional chemical addition or accept a signal from any control system which can provide a voltage free pacing signal.

Unlimited flexibility means saving on storage costs. The PVDF material combination is available for dosing heads, providing a solution for almost every water treatment chemical.

CONCEPTPLUS offers uncompromising quality and reliability at the best possible price.

Concept Pump Model Numbers

Without External Control

CNPb 0704 PVT7 M0D010 - Part Number 1076476
 CNPb 1002 PVT7 M0D010 - Part Number 1076477
 CNPb 0705 PVT7 M0D010 - Part Number 1080865
 CNPb 0309 PVT7 Q0D010 - Part Number 1080867

With External Control

CNPb 0704 PVT7 M0DC10 - Part Number 1077471
 CNPb 1002 PVT7 M0DC10 - Part Number 1077472
 CNPb 0705 PVT7 M0DC10 - Part Number 1080866
 CNPb 0309 PVT7 Q0DC10 - Part Number 1080868

ProMinent® Concept^{PLUS} Solenoid Diaphragm Metering Pumps

Capacity Data

Pump Type CNPb	Pump Capacity at Maximum Back Pressure			Output mL/stroke	Maximum Stroke Frequency Stroke/min	Maximum Suction Lift (water)		Suction/ Discharge Tube Connections O.D. x I.D. in.	Shipping Weight (approx.)	
	psig	U.S. GPH	L/H			ft.	m		lbs.	kg
1000	145	0.19	0.74	0.07	180	20.0	6	1/4 x 3/16	4.0	1.8
1601	232	0.29	1.10	0.10	180	20.0	6	1/4 X 3/16	4.0	1.8
1002	145	0.55	2.10	0.19	180	16.7	5	1/4 x 3/16	4.0	1.8
0704	102	1.03	3.90	0.36	180	13.3	4	1/4 x 3/16	4.0	1.8
0309	43	2.25	9.0	0.79	180	6.7	2	1/2 x 3/8	4.0	1.8
0215	21	3.94	16.4	1.38	180	5.0	1.5	1/2 x 3/8	4.0	1.8
1001	145	0.26	1.00	0.07	240	20.0	6	1/4 x 3/16	4.0	1.8
1602	232	0.40	1.50	0.10	240	20.0	6	1/4 x 3/16	4.0	1.8
1003	145	0.79	3.00	0.21	240	16.7	5	1/4 x 3/16	4.0	1.8
0705	102	1.38	5.20	0.36	240	13.3	4	1/4 x 3/16	4.0	1.8
0312	43	3.17	12.00	0.83	240	6.7	2	1/2 x 3/8	4.0	1.8
0223	21	5.79	21.90	1.5	240	5.0	1.5	1/2 x 3/8	4.0	1.8
CNPb Metering Pumps with Self Bleeding PVT7 Liquid End										
1002	145	0.48	1.80	0.17	180	6.0	1.8	1/4 X 3/16	4.0	1.8
0704	102	0.79	3.00	0.28	180	6.0	1.8	1/4 X 3/16	4.0	1.8
0309	43	2.38	9.00	0.83	180	6.0	1.8	1/2 X 3/8	4.0	1.8
0215	21	3.49	13.2	1.22	180	6.0	1.8	1/2 x 3/8	4.0	1.8
1003	145	0.63	2.40	0.17	240	6.0	1.8	1/4 x 3/16	4.0	1.8
0705	102	1.11	4.20	0.29	240	6.0	1.8	1/4 x 3/16	4.0	1.8
0312	43	3.41	12.90	0.83	240	6.0	1.8	1/2 x 3/8	4.0	1.8
0223	21	4.92	18.60	1.29	240	6.0	1.8	1/2 x 3/8	4.0	1.8

Suction lifts with a filled suction line and filled liquid end

Priming lifts with clean and moist valves, feed chemical water (20 °C), at 100% stroke length, max. stroke rate, free outlet or opened bleed valve and correctly installed piping.

(Note: Above capacities and suction lift refer to pumps tested on water at 115 VAC, 60 Hz, and an ambient temperature of 20°C). Higher specific gravity fluids will reduce suction lift. Capacities will be slightly reduced from published ratings if pumps are skid mounted).



ProMinent® Concept^{PLUS} Solenoid Diaphragm Metering Pumps

Identcode Ordering System: ConceptPLUS (CNPb)

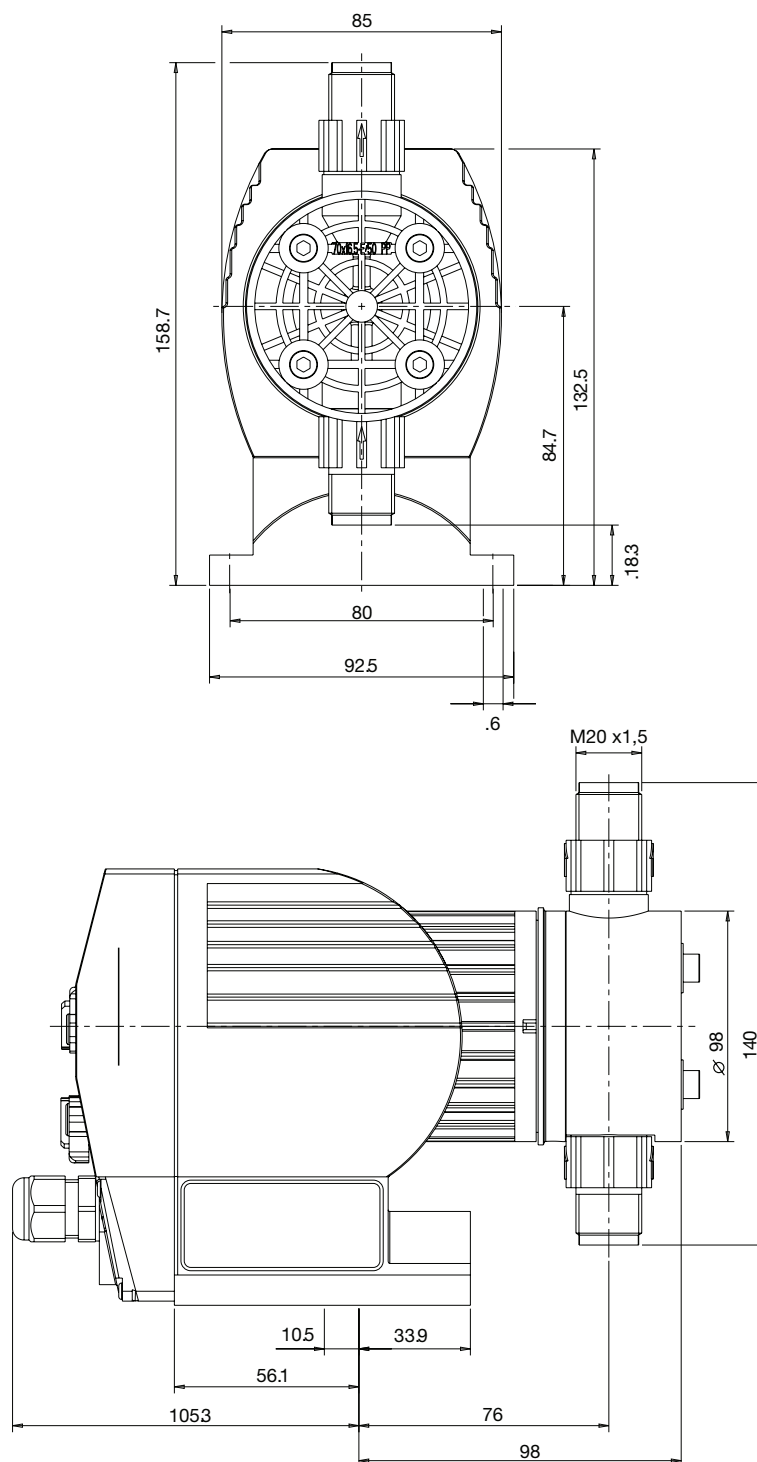
CNPb	Concept PLUS 180 SPM Version										
	Version	Capacity									
	1000	0.74 l/h, 145 psi									
	1601	1.1 l/h, 232 psi									
	1002	2.1 l/h, 145 psi									
	0704	3.9 l/h, 102 psi									
	0309	9.0 l/h, 43.5 psi									
	0215	16.4 l/h, 29 psi									
	Concept PLUS 240 SPM Version										
	1001	1.0 l/h, 145 psi									
	1602	1.5 l/h, 232 psi									
	1003	3.0 l/h, 145 psi									
	0705	5.2 l/h, 102 psi									
	0312	12.0 l/h, 43 psi									
	0223	21.9 l/h, 21 psi									
	Liquid end material:										
	NP	Acrylic/PVC									
	PV	PVDF									
	Seals / Diaphragm Material:										
	E	EPDM O-Rings for NP Liquid-End, PTFE faced diaphragm									
	B	FPM O-Rings for NP Liquid-End, PTFE faced diaphragm									
	T	PTFE seals for PV liquid end, PTFE faced diaphragm									
	Liquid end version:										
	2	With bleed valve, no valve spring									
	3	With bleed valve, with valve spring									
	7	Auto degassing without bypass, only for PV versions 1002, 0704, 0309, 0215									
	Connection:										
	M	Connection for 1/4" x 3/16" tubing									
	N	Connection for 3/8" x 1/4" tubing									
	Q	Connection for 1/2" x 3/8" tubing									
	Logo:										
	0	With ProMinent® logo									
	Power Supply:										
	D	Canada / USA 115 VC power cord 2m									
	External Cables:										
	0	Standard (w/o external control)									
	B	External control cable installed									
	Accessories:										
	1	With accessories (foot valve, injection valve, tubing)									
	Control Version:										
	0	External contact / Pause									
CNPb	1000	NP	B	2	0	0	D	B	1	0	

ProMinent® Concept^{PLUS} Solenoid Diaphragm Metering Pumps

Dimensional Drawings

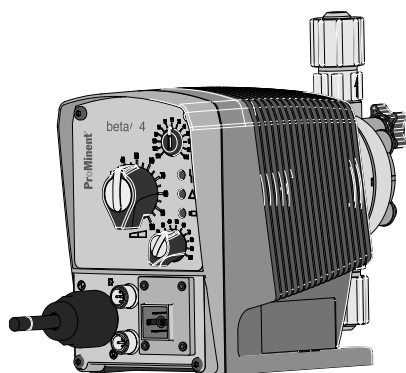
Dimensions in mm.

Ranges given, actual dimension dependent on liquid end material.



ProMinent® Beta® b Solenoid Diaphragm Metering Pumps

Overview: Beta® b



Ideal for most chemical feed applications

(see [page 134](#) for spare parts and [page 153](#) for control cables)

- External contact input for pulse control with a range of 1:32 - 32:1
- External control of pump speed via a 4 – 20mA signal
- Continuous stroke length adjustment from 0-100% (recommended 30-100%)
- Supplied in Acrylic/PVC, PVDF, SS
- Patented coarse/fine deaeration for Acrylic/PVC
- Auto-degassing liquid end in Acrylic/PVC
- Auto-degassing liquid end in PVT 7 version
- HV liquid end for highly viscous media (suitable for viscosities to 3000 cPs)
- 10-setting stroke frequency adjustment from 10-100%
- External remote control via a voltage-free contact
- Connector for two-stage level switch
- 12 – 24 VDC low voltage version available as an option
- LED's for operation status
- NSF/ANSI 61 approved

ProMinent® solenoid-driven metering pumps consist of two main components: the pump drive unit and the liquid end. The Beta series offers two drive (solenoid) sizes: Beta/4 (BT4b) and Beta/5 (BT5b). Operating principles and options are identical, and both units offer maximum backpressure up to 363 psig (25 bar). Capacity range for the Beta/4 is 0.74 to 19 L/h; Beta/5 is 2.9 to 32 L/h.

Feed rate is determined by stroke length and stroking rate: stroke length can be varied from 0 to 100% with a recommended range of 30% – 100%. The stroke length is set manually by the adjustment knob on the front of the pump.

Stroke rate can be adjusted in 10% increments between 10 and 100% via the multifunction switch. This switch is also used to select voltage-free On/Off external pulse contact, pump stop, or test (for priming).

Built in pulse multiplier/divider selector switch on pump face for external pulse control.

Specifications

Drive Unit

The pump housing is constructed of fiberglass-reinforced PPE plastic to protect against corrosion, dust and water spray (IP65).

The solenoid drive unit houses a short-stroke solenoid with a maximum stroke length of 0.05" (1.25 mm). It is equipped with a noise suppressing mechanism for quiet operation and the armature is the only moving part.

Operating on pulse action, each pulse generates a magnetic field in the solenoid coil. This magnetic field moves the armature, which in turn moves the diaphragm. The diaphragm pushes into the dosing head and cavity forces chemical out of the discharge valve. When the magnetic field is de-energized, a spring returns the armature and diaphragm to their original position. This return movement draws chemical into the dosing head cavity through the suction valve.

In the event of a diaphragm rupture, the liquid end has a weep hole on the bottom of the backplate to direct chemical out of the pump and away from the solenoid. An optional diaphragm failure detector can be used to stop the pump and indicate a fault.

The stroke-length adjusting mechanism is connected directly to the solenoid. Adjustment results in an accurate self-locking stroke-length setting.

Diaphragm

The diaphragm is constructed of fabric-reinforced EPDM elastomer with a plastic core and PTFE-facing. It is chemically resistant to virtually all process fluids and can be used over a wide temperature range. The Beta pump is designed with a convex diaphragm. The curved shape provides precise metering and alleviates stress placed on the diaphragm by reducing liquid end dead volume.

ProMinent® Beta® b Solenoid Diaphragm Metering Pumps

Specifications (Cont.)

The Liquid End

The Beta metering pump liquid ends are available in three material versions: Kynar (PVDF), Acrylic/PVC (NP), and 316 Stainless steel (SS).

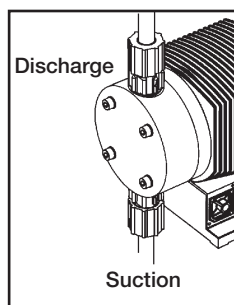
Some liquid ends are interchangeable between the BT4b and BT5b.

Options include a manual bleed valve with needle valve for easy priming, and continuous bleed of fluids that tend to off-gas (available with versions PVT, and NP liquid ends).

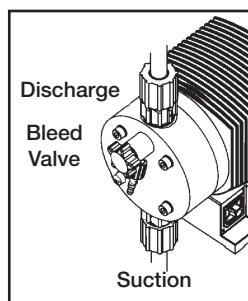
Automatic degassing liquid ends are available for NP versions (except 1000 and 0232). This style liquid end discharges from the center and degasses from the top to prevent air build-up in the chamber. PVT7 version displaces gas to the discharge line.

High viscosity PVDF liquid ends are available for pump versions 1005, 0708, 0413, 0220, 1008, 0713, and 0420. Their metering capacity is 10-20% less than standard pump versions and recommended viscosity is up to 3000 cPs. The HV liquid ends are not self-priming; flooded suction is recommended.

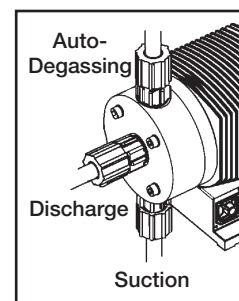
Suction and discharge ports are equipped with double-ball check valves for superior repeatability.



Liquid end without bleed valve



Liquid end with bleed valve



Auto-degassing liquid end NPB9/NPE9

Power Supply

The Beta metering pumps accept a universal 100-230 volt power supply, (+/- 10%), single phase, 50/60 Hz, with a 1.15 service factor. Performance is identical whether operated on 50 Hz or 60 Hz power. The power cord is detachable.

Fault Indicators

Three LED lights indicate operational status. A green light flashes during normal operation; a yellow light warns of low chemical; and a red light indicates lack of chemical or an operational error.

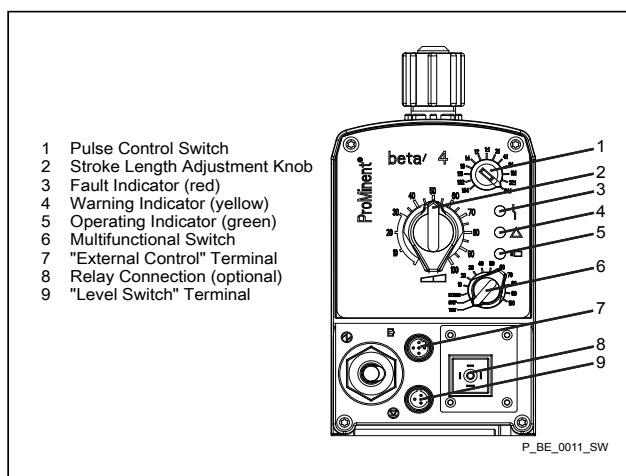
Relay Outputs

Fault annunciating relay

For low tank level (level switch), processor fault, and fuse/power supply failure.

Pacing relay

A contact closure is issued with every pump stroke (contact duration 100 ms). This allows a second ProMinent metering pump to be paced synchronously, or to totalize flow with an external stroke counter.



ProMinent® Beta® b Solenoid Diaphragm Metering Pumps

Specifications (Cont.)

<i>Maximum stroke length:</i>	0.05" (1.25 mm)
<i>Materials of construction</i>	
<i>Housing:</i>	Fiberglass reinforced PPE
<i>Diaphragm:</i>	PTFE-faced EPDM with plastic core
<i>Liquid end options:</i>	PVDF, Acrylic/PVC, 316 SS
<i>Enclosure rating:</i>	IP 65
<i>Insulation class:</i>	F
<i>Power supply:</i>	100-230 VAC, 1 phase, 50/60 Hz, +/- 10%; 12-24 VDC or 24VDC (+/- 10%)
<i>Check valves:</i>	Standard with double ball checks, high viscosity liquid ends PVT4 with spring loaded single ball checks
<i>Metering repeatability:</i>	When used according to operating instructions, ±2% under constant conditions and at minimum 30% stroke length
<i>Power cord:</i>	6 ft (2 m)
<i>Relay cable (optional):</i>	6 ft (2 m)
<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>	Maximum voltage: 24 VDC Maximum current: 100 mA Pacing relay contact duration 100 ms
<i>Ambient temperature range:</i>	-10°C to 45°C

<i>Max. fluid operating temperatures:</i>	Material	Constant	Short Term
	PVDF	65°C	100°C
	Acrylic/PVC	45°C	60°C
	316 SS	50°C	120°C
	PVDF	65°C	100°C

<i>Power (Amps)</i>	
BT4b:	15W
BT5b:	21W
<i>Service factor:</i>	1.15
<i>Warranty:</i>	2 years on drive, 1 year on liquid end
<i>Industry standards:</i>	CSA Inspection for Canada, UL recognized. NSF/ANSI 61 liquid ends
<i>Valve threads:</i>	NP/PVT with M20 x 1.5 thread, provided with adapters for tubing.
<i>Standard Production Test:</i>	All pumps are tested for capacity at maximum pressure prior to shipment.
<i>Max. solids size in fluid:</i>	Pumps with 1/4" valves: 15µ - Pumps with 1/2" valves: 50µ
<i>Controlling contact (pulse):</i>	With voltage free contact, or with semiconductor sink logic control (NPN), not source logic (PNP). 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.) Pump ignores contacts exceeding maximum input rate.
Contact Input	
<i>Minimum pulse duration:</i>	20 ms
<i>Maximum pulse input:</i>	25 pulses/second
<i>Analog Input Impedance:</i>	120 Ohms
<i>Viscosity limits:</i>	max. 200 cPs for standard liquid end max. 500 cPs for valve with springs max. 50 cPs for auto-degassing metering pumps max. 3000 cPs for high viscosity

ProMinent® Beta® b Solenoid Diaphragm Metering Pumps

Capacity Data

Pump Version	Capacity at Max Backpressure			Capacity at 1/2 Max Backpressure			Pre-Primed Suction Lift**		Max. Stroke Rate	Tubing Connectors ² O.D. x I.D. inches	Shipping Weight	
	psig	L/h	ml/ stroke	psig	L/h	ml/ stroke	ft	m			spm	NP/PVT kg
Beta pumps with standard liquid ends												
BT4b												
1000	145	0.74	0.07	73	0.82	0.08	19.6	6	180	1/4 x 3/16	2.5	3.0
1601	232	1.1	0.10	116	1.40	0.13	19.6	6	180	1/4 x 3/16	2.9	3.6
1602	232	2.2	0.19	116	2.5	0.24	19.6	6	180	1/4 x 3/16	2.9	3.6
1604	232	3.6	0.33	116	4.3	0.40	19.6	6	180	1/4 x 3/16	3.1	3.9
0708	101	7.1	0.66	50.5	8.4	0.78	19.6	6	180	1/2 x 3/8	3.1	3.9
0413	58	12.3	1.14	29	14.2	1.31	9.8	3	180	1/2 x 3/8	3.1	3.9
0220	29	19.0	1.76	14.5	20.9	1.94	6.5	2	180	1/2 x 3/8	3.3	4.4
BT5b												
2504 ³	363	2.9	0.27	181	3.7	0.34	19.6	6	180	8 x 4 mm	4.5	5.3
1008	145	6.8	0.63	73	8.3	0.76	19.6	6	180	1/2 x 3/8	4.5	5.3
0713	101	11.0	1.02	50.5	13.1	1.21	13.1	4	180	1/2 x 3/8	4.5	5.3
0420	58	17.1	1.58	29	19.1	1.77	9.8	3	180	1/2 x 3/8	4.7	5.8
0232 ¹	29	32.0	2.96	14.5	36.2	3.35	6.5	2	180	1/2 x 3/8	5.1	6.6
Beta pumps with auto degassing liquid ends NPB9/NPE9												
BT4b												
1601	232	0.59	0.06	116	0.80	0.07	5.9	1.8	180	1/4 x 3/16	2.9	
1602	232	1.4	0.13	116	1.74	0.174	6.9	2.1	180	1/4 x 3/16	2.9	
1604	232	2.7	0.25	116	3.6	0.33	8.8	2.7	180	1/4 x 3/16	3.1	
0708	101	6.6	0.61	50.8	7.5	0.69	6.5	2.0	180	1/2 x 3/8	3.1	
0413	58	10.8	1.00	29	12.6	1.17	6.5	2.0	180	1/2 x 3/8	3.1	
0220	29	16.2	1.50	14.5	18.0	1.67	6.5	2.0	180	1/2 x 3/8	3.3	
BT5b												
1008	145	6.3	0.58	73	7.5	0.69	9.8	3	180	1/2 x 3/8	4.5	
0713	101	10.5	0.97	51	12.3	1.14	8.2	2.5	180	1/2 x 3/8	4.5	
0420	58	15.6	1.44	29	17.4	1.61	8.2	2.5	180	1/2 x 3/8	4.7	
Beta pumps with auto degassing liquid ends PVT7												
BT4b												
1602	145	1.4	0.13	116	1.7	0.16		1.8	180	1/4 x 3/16	2.9	
1604	145	2.7	0.25	116	3.6	0.33		1.8	180	1/4 x 3/16	3.1	
0708	101	6.6	0.61	50	7.5	0.69		1.8	180	1/2 x 3/8	3.1	
0413	58	10.8	1	29	12.6	1.17		1.8	180	1/2 x 3/8	3.1	
0220	29	16.2	1.5	14.5	18	1.67		1.8	180	1/2 x 3/8	3.3	
BT5b												
1008	145	6.3	0.58	73	7.5	0.69		1.8	180	1/2 x 3/8	4.5	
0713	101	10.5	0.97	50	12.3	1.14		1.8	180	1/2 x 3/8	4.5	
0420	58	15.6	1.44	29	17.4	1.61		1.8	180	1/2 x 3/8	4.7	

Beta metering pumps with high viscosity liquid ends (PVT4) have a 10 – 20% lower capacity rating than standard liquid ends and are not self priming. Positive suction is recommended and pumps are supplied with 1/2" MNPT connections.

¹ Not available with bleed valve.

² SS versions use 1/4" female threads except models 0220, 0420, and 0232 which use 3/8" female threads.

³ Only available in SS and Acrylic liquid ends.

*The given performance data represents guaranteed minimum values, tested using water as the medium at 20°C.

**Suction lift with suction line and dosing head filled, for auto degassing liquid ends with air in the suction line.

[Universal control cable necessary for external control. see page 144](#)

ProMinent® Beta® b Solenoid Diaphragm Metering Pumps

Identcode Ordering System: Beta 4b (BT4b)

BT4b Beta4 Version b															
Version:		Capacity:		Version:		Capacity:									
	1000	0.74 l/h, 145 psi			0708	7.1 l/h, 101 psi									
	1601	1.1 l/h, 232 psi			0413	12.3 l/h, 58 psi									
	1602	2.2 l/h, 232 psi			0220	19 l/h, 29 psi									
	1604	3.6 l/h, 232 psi													
Liquid end material:															
NP		Acrylic/PVC													
PV		PVDF/PVDF													
SS		Stainless steel 1.4404/1.4404													
O-rings:															
E		EPDM o- rings for NP liquid end, PTFE faced diaphragm													
B		Viton o- rings for NP liquid end, PTFE faced diaphragm													
T		PTFE seals for PV and SS liquid ends, PTFE faced diaphragm													
S		Diaphragm with Viton coating for silicate applications, Viton o-rings with NP, PTFE seals for PV and SS													
Liquid end version:															
0		Non-bleed version, no valve spring, for SS													
1		Non-bleed version, with valve spring, for SS													
2		With bleed valve, no valve spring, PV, NP only,													
3		With bleed valve, with valve spring, PV, NP only,													
4		Version for highly viscous media, only PVT, types 1604, 0708, 0413, 0220													
7		Auto degassing without bypass, only with PV versions 1602, 1604, 0708, 0413, 0220													
9		Auto degassing with bypass, only with NP versions 1601, 1602, 1604, 00708, 0413 and 0220													
Hydraulic connections:															
6		Standard for SST per technical data													
M		¼" x 3/16" tubing recommended or models 1000, 1601, 1602, 1604													
N		3/8" x ¼" tubing													
Q		½" x 3/8" tubing recommended for models 0708, 0413, 0220													
Version:															
0		Standard													
Logo:															
0		With ProMinent® logo													
Power supply:															
U		100-230 V ± 10%, 50/60 Hz													
M		12-24 V DC													
Cable and plug:															
D		2 m Canada/USA 115V plug													
U		2m Canada/USA 230V plug													
Relay:															
0		No relay													
1		Fault indicating relay, normally energized, 1 x changeover contact 230 V - 2 A													
3		Fault indicating relay, normally de-energized, 1 x changeover contact 230 V - 2 A													
4		As 1 + pacing relay, both contacts rated 24 V 100 mA max													
5		As 3 + pacing relay, both contacts rated 24 V 100 mA max													
Accessories:															
0		No accessories included with for SS & PVT4 materials													
1		Accessories included as standard (NP & PVT2*)													
Control type:															
0		No lock													
1		With lock: manual operation locked when external cable plugged in													
Control variants:															
A		Manual + external with pulse control + analog 4 - 20 mA pump speed control													
Options on request															
BT4b	1000	NP	E	0	0	0	0	0	U	D	0	0	0	A	00

* Accessories include (1) foot valve and (1) injection valve in materials to match selected liquid-end materials. 5ft of suction tubing and 10 ft of discharge tubing is supplied in PVC materials only. Teflon tubing is available but needs to be ordered separately (please see Tubing section of the catalogue).

ProMinent® Beta® b Solenoid Diaphragm Metering Pumps

Identcode Ordering System: Beta 5b (BT5b)

ProMinent®

BT5b	Beta®5 Version b																
	Version		Capacity				Version		Capacity								
	2504		2.9 l/h, 362 psi					0420		17.1 l/h, 58 psi							
	1008		6.8 l/h, 145 psi					0232		32.0 l/h, 29 psi							
	0713		11.0 l/h, 101 psi														
	Liquid end material:																
	NP	Acrylic/PVC															
	PV	PVDF/PVDF															
	SS	Stainless steel															
	O-rings:																
	E	EPDM o-rings for NP liquid end, PTFE faced diaphragm															
	B	Viton o-rings for NP liquid end, PTFE faced diaphragm															
	T	PTFE seals for PV and SS liquid ends, PTFE faced diaphragm															
	S	Diaphragm with Viton coating for silicate applications, Viton o-rings with NP, PTFE seals for PV and SS															
	Liquid end version:																
	0	Non-bleed version, no valve spring, for SS															
	1	Non-bleed version, with valve spring, for SS															
	2	With bleed valve, no valve spring, PV, NP only															
	3	With bleed valve, with valve spring, PV, NP only															
	4	Version for highly viscous media, only PVT, types 1008, 0713, 0420															
	7	Auto degassing without bypass, only with PV versions 1008, 0713 and 0420															
	9	Auto degassing with bypass, only with NP versions 1008, 0713 and 0420															
	Hydraulic connections:																
	6	Standard for SST per technical data															
	N	3/8" x 1/4" tubing															
	Q	1/2" x 3/8" tubing recommended for models 1008,0713,0420, 0232															
	O	8 x 4 mm PTFE for 2504 NPB/NPE															
	Version:																
	0	Standard															
	Logo:																
	0	With ProMinent® logo															
	Power supply:																
	U	100-230 V ± 10%, 50/60 Hz															
	N	24 V DC															
	Cable and plug:																
	D	2m Canada/USA 115V plug															
	U	2m Canada/USA 230V plug															
	Relay:																
	0	No relay															
	1	Fault indicating relay, normally energized, 1 x changeover contact 230 V - 2 A															
	3	Fault indicating relay, normally de-energized, 1 x changeover contact 230 V - 2 A															
	4	As 1 + pacing relay, both contacts rated 24 V - 100 mA max.															
	5	As 3 + pacing relay, both contacts rated 24 V - 100 mA max.															
	Accessories:																
	0	No accessories included with for SS & PVT4 materials															
	1	Accessories included as standard (NP & PVT2)*															
	Control type:																
	0	No lock															
	1	With lock: manual operation locked when external cable plugged in															
	Control variants:																
A	Manual + external with pulse control + analog 4 - 20 mA pump speed control																
Options on request:																	
00	No options																
BT5b	1008	NP	E	0	0	0	0	U	0	0	0	0	0	A	0		

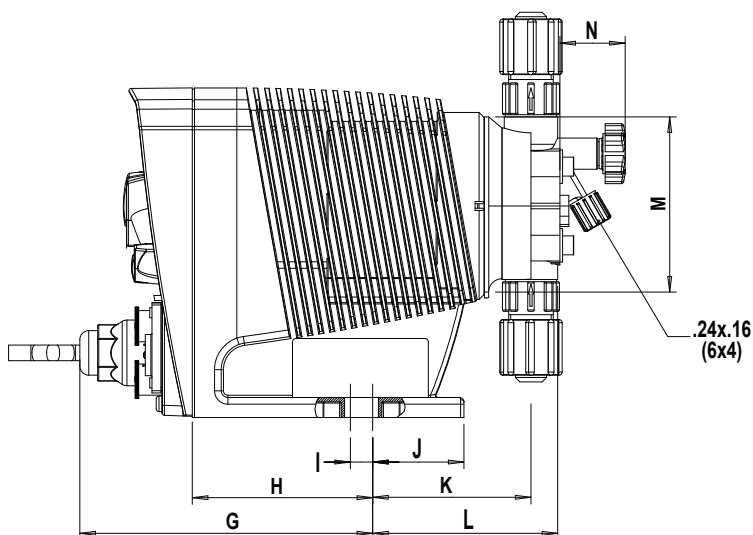
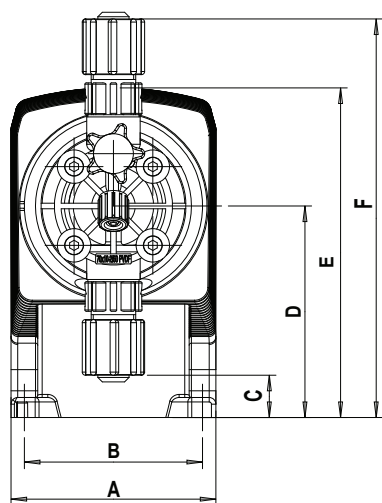
* Accessories include (1) foot valve and (1) injection valve in materials to match selected liquid-end materials. 5ft of suction tubing and 10 ft of discharge tubing is supplied in PVC materials only. Teflon tubing is available but needs to be ordered separately (please see Tubing section of the catalogue).

ProMinent® Beta® b Solenoid Diaphragm Metering Pumps

Dimensional Drawings

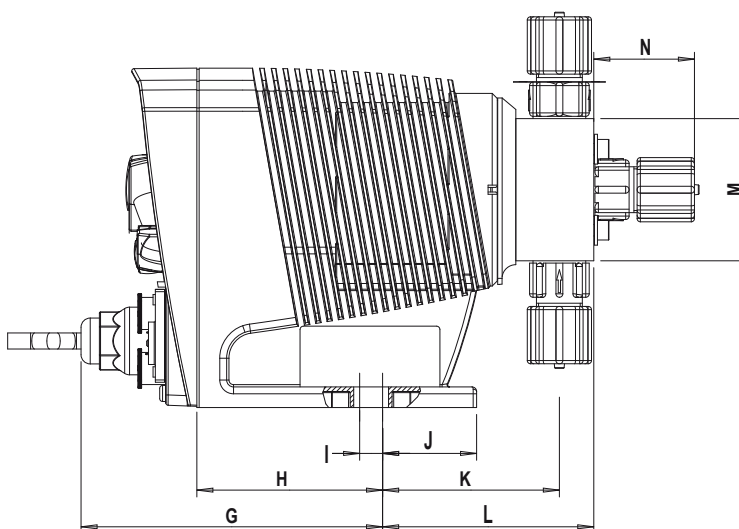
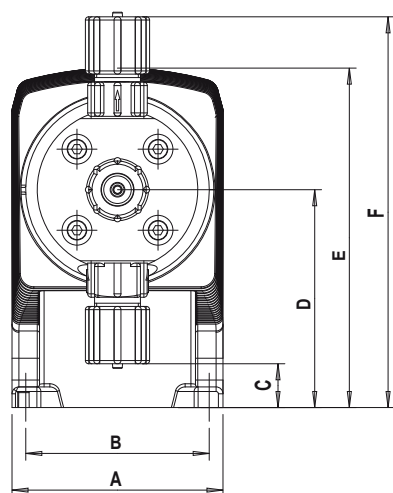
All dimensions shown in mm.

Ranges given, actual dimension dependent on liquid end material.



Pump	A	B	C	D	E	F	G	H	I	J	K	L	M	N
BT4	92	80	3.2-19	95	148	179-199	131.5	81	10	36	71-76	83-93	Ø 90-Ø 110	29.3
BT5	102	80	3.2-19	101	153	179-199	135.5	85	15	41	71-76	83-93	Ø 90-Ø 110	29.3

With Auto-Degassing Liquid Ends NPB9/NPE9



Pump	A	B	C	D	E	F	G	H	I	J	K	L	M	N
BT4	92	80	7.5-19	95	148	170.5-188.5	131.5	81	10	36	74-77	89-105.5	Ø 90-Ø 70	43.9
BT5	102	80	7.5-19	101	153	170.5-188.5	135.5	85	15	41	74-77	89-105.5	Ø 90-Ø 70	43.9

ProMinent® gamma/ X Solenoid Diaphragm Metering Pumps

Overview: gamma/ X

linent®

The solenoid diaphragm metering pump gamma/ X incorporates a wealth of eXcellent ingenuity! With integrated pressure measurement, it ensures the smooth running of your metering process. The gamma/ X is ideal for all chemical metering applications.

[\(see page 137 for spare parts and page 153 for control cables\)](#)

- Capacity range from 1 ml / hr to 45 l / hr, maximum discharge pressure up to 363 psi
- Simple adjustment of the capacity directly in l/hr
- Configurable discharge stroke, continuous or pulsed dosing
- Configurable suction stroke duration
- Stroke rate adjustable from 1 – 12,000 strokes per hour
- Electronic stroke length adjustment, continuous from 0 - 100% (recommended range 30 - 100%)
- Suitable for continuous micro-metering from 1 ml/hr thanks to the innovative solenoid control
- Integrated pressure measurement allows for detection of blocked discharge line, broken discharge line and air or gas bubbles trapped in the dosing head
- Acrylic/PVC, PVT (PVDF) and Stainless Steel liquid end material versions
- Auto degassing liquid ends in Acrylic/ PVC and PVT
- High viscosity liquid ends (PVT4) for viscosities of up to 3000 cP
- Large backlit graphic display and status LED's with 360° visibility
- External control via voltage-free contacts with pulse multiplier/divider function
- External control via standard 4-20 mA signal, and scalable adjustment of mA signal to stroke rate
- Standard internal programmable timer for real-time dependent dosing routines i.e biocides, cooling towers etc.
- Standard pump capable of accepting 2 stage tank level sensor input, flow monitor input, diaphragm rupture sensor input and control cable input.
- NSF/ANSI 61 Approved Liquid ends
- Bluetooth option available



product
overview

solenoid-driven
metering pumps

motor-driven
metering pumps

pump spare parts &
accessories

DULCOMETER®
instrumentation

DULCOTEST®
sensors

standard & custom
systems

ProMinent® gamma/ X Solenoid Diaphragm Metering Pumps

Specifications

Maximum stroke length:	For 70mm solenoid approx. 1.3 mm For 85mm solenoid approx. 1.5 mm		
Materials of construction			
Housing:	Fibreglass reinforced PPE (Polyphenylene Ether)		
Diaphragm:	PTFE faced EPDM with plastic core		
Liquid end options:	Acrylic/PVC, PVDF, Stainless Steel		
Enclosure rating:	IP 66 / NEMA 4X		
Power supply:	100 – 230 VAC 1 Phase 50 / 60 Hz ± 10%		
Power consumption:	1602 / 1604 / 0708 / 0414 / 0220 25 W 2504 / 1009 / 0715 / 0424 / 0245 30 W		
Internal Fuse:	CSA approved 2.5 AT, 5mm x 20 mm Part # 732413		
Check valves:	Double ball suction / discharge (PVT4 with spring loaded single ball)		
Power cord:	6ft (2m) CSA Approved		
Relay cable (optional):	6ft (2m) standard length		
Relay Options			
Identcode Option 1:	Relay contact rated 230 VAC 2 A Max		
Identcode Option 4:	Both relay contacts rated 24 V, 100 mA Max		
Identcode Option C:	Isolated 4 – 20 mA output can drive up to 250 Ω maximum impedance Relay contact rated 24 V 100 mA		
Ambient temperature range			
In operation:	-10°C to 45°C		
Storage & Transport:	-20°C to 60°C		
Max. fluid operating temperatures:	Material	Constant	Short Term*
	Acrylic/PVC	45°C	60°C
	PVDF	45°C	120°C
	SS	45°C	120°C
	*15 minutes at 29 psi maximum		
Climate:	95% Relative humidity – non-condensing		
Sound pressure level:	LpA < 70 dB according to EN ISO 20361		
Warranty:	2 years on pump drive, 1 year on liquid end		
Valve threads:	NP / PVT M20 x 1.5 (provided with adapters for tubing)		
Standard production test:	All pumps are tested for capacity at maximum pressure prior to shipment		
Max solids size in fluid:	Versions 1602 / 1604 / 2504 = 15µ Versions 0708 / 0414 / 0220 / 1009 / 0715 / 0424 / 0245 = 50 µ		
Contact input			
Minimum pulse duration:	20 ms		
Maximum pulse input:	25 pulses / second		
Analog Input Impedance:	120 Ohms		
Recommended Viscosity:	Max. 200 cPs for standard liquid end Max. 500 cPs for valve with springs Max. 50 cPs for auto-degassing liquid ends Max. 3000 cPs for high-viscosity liquid ends (higher possible)		

ProMinent® gamma/ X Solenoid Diaphragm Metering Pumps

Capacity Data

Pump Version (GMXa)	Capacity at Maximum Backpressure			Pre-Primed Suction Lift		Max. Stroking Rate	Tubing Connections O.D. X I.D.	SS Liquid end connections FNPT	Shipping Weight	
	psig	L/h*	ml/stroke	ft**	m**	spm	inches	inches	NP/PV kg	SS kg
gamma/ X standard liquid ends										
1602	232	2.30	0.19	19.6	6	200	1/4 x 3/16	1/4	3.6	4.1
1604	232	3.60	0.30	19.6	6	200	1/4 x 3/16	1/4	3.6	4.1
0708	101	7.60	0.63	19.6	6	200	1/2 x 3/8	1/4	3.7	5.0
0414	58	13.5	1.13	9.8	3	200	1/2 x 3/8	1/4	3.7	5.0
0220	29	19.70	1.64	6.5	2	200	1/2 x 3/8	3/8	3.7	5.0
2504	363	3.80	0.32	19.6	6	200	8 x 4***	1/4	4.9	5.5
1009	145	9.00	0.75	19.6	6	200	1/2 x 3/8	1/4	5.1	6.5
0715	101	14.50	1.21	13.1	4	200	1/2 x 3/8	1/4	5.1	6.5
0424	58	24.00	2.00	9.8	3	200	1/2 x 3/8	3/8	5.1	6.5
0245	29	45.00	3.70	6.5	2	200	1/2 x 3/8	3/8	5.2	7.0

gamma/ X metering pumps with auto degassing liquid ends NPB9 / NPE9										
1602	232	1.30	0.11	6.9	2.1	200	1/4 x 3/16	-	3.6	-
1604	232	2.40	0.21	8.8	2.7	200	1/4 x 3/16	-	3.6	-
0708	101	6.80	0.57	6.5	2	200	1/2 x 3/8	-	3.7	-
0414	58	12.00	1.00	6.5	2	200	1/2 x 3/8	-	3.7	-
0220	29	18.00	1.50	6.5	2	200	1/2 x 3/8	-	3.7	-
1009	145	8.00	0.67	9.8	3	200	1/2 x 3/8	-	5.1	-
0715	101	12.00	1.00	8.2	2.5	200	1/2 x 3/8	-	5.1	-
0424	58	20.00	1.67	8.2	2.5	200	1/2 x 3/8	-	5.1	-

Capacity at Max Pressure			Capacity at 1/2 Max Pressure			Pre-Primed Suction Lift		Max. Stroking Rate	Tubing Connections O.D. X I.D.	Shipping Weight
psi	l/hr	ml/stroke	psi	l/hr	ml/stroke	ft**	m**	spm	inches	kg
gamma/ X metering pumps with auto degassing liquid ends PVT7										
1602	145	0.9	0.08	-	-	6	1.8	200	1/4 x 3/16	3.6
1604	145	1.60	0.13	-	-	6	1.8	200	1/4 x 3/16	3.6
0708	101	5.7	0.48	50	6.6	0.67	6	1.8	1/2 x 3/8	3.7
0414	58	12	1.00	29	13.8	1.17	6	1.8	1/2 x 3/8	3.7
0220	29	17.4	1.45	14.5	18.9	1.66	6	1.8	1/2 x 3/8	3.7
1009	145	6.0	0.50	73	7.8	0.80	6	1.8	1/2 x 3/8	5.1
0715	101	12.9	1.08	50	14.1	1.21	6	1.8	1/2 x 3/8	5.1
0424	58	19.2	1.60	29	21.6	1.90	6	1.8	1/2 x 3/8	5.1

gamma/X metering pumps with high viscosity liquid ends (PVT 4) have a 10 – 20 % lower capacity rating and are not self priming. Positive suction is recommended and pumps supplied with 1/2" MNPT connections.

* The given performance data represents guaranteed minimum values, tested using water as the medium at room temperature.

** Suction lift with suction line and dosing head filled, for auto degassing liquid ends with air in the suction line

*** NP version supplied with high pressure rated 8 x 4 PTFE discharge tubing

All data refers to water at 20 °C.

Materials in contact with the chemical					
	Dosing head	Suction/Discharge valves	Ball seat	Seals	Balls
NPE	Clear acrylic	PVC	EPDM	EPDM	Ceramic
NPB	Clear acrylic	PVC	FKM	FKM	Ceramic
PVT	PVDF	PVDF	PVDF	PTFE	Ceramic
SST	Stainless steel material no. 1.4404	Stainless steel material no. 1.4404	Ceramic	PTFE	Ceramic

Auto degassing liquid ends in NP with a valve spring of Hastelloy C and PVDF valve insert. PVT7 versions with PVDF / PTFE wetted parts. Diaphragm with PTFE face.

FKM = fluorine rubber

Permissible ambient temperature: -10 °C to +45 °C

Average power consumption: 25 / 30 W

Degree of protection: IP 66, NEMA 4X

Scope of supply

Metering pump with power cable, connection set for tubing, connection as per table.

ProMinent® gamma/ X Solenoid Diaphragm Metering Pumps

Identcode Ordering System: Gamma/X (GMXa)

GMXa		Capacity			
Version	psi	l/h	Version	psi	l/h
1602	232	2.3	2504	363	3.8
1604	232	3.6	1009	145	9.0
0708	101	7.6	0715	101	14.5
0414	58	13.5	0424	58	24.0
0220	29	19.7	0245	29	45.0
Liquid end/valve material					
NP	Acrylic glass / PVC				
PV	PVDF/PVDF				
SS	Stainless steel 1.4404/1.4404				
Seal/diaphragm material					
E	EPDM o-rings for NP Liquid end, PTFE faced diaphragm				
B	Viton o-rings for NP liquid end, PTFE faced diaphragm				
T	PTFE seals for PV and SS liquid ends, PTFE faced diaphragm				
S	Diaphragm with Viton coating for silicate applications, Viton o-rings with NP, PTFE seals with PV and SS				
Liquid end version					
0	Non-bleed version, no valve springs, only for PV and NP version 0245 and all SS versions				
1	Non-bleed version, with valve springs, only for PV and NP version 0245 and all SS versions				
2	Bleed function, with bleed valve, no valve springs, only for NP and PV, not for version 0245 PV				
3	Bleed function, with bleed valve and valve springs, only for NP and PV, not for version 0245 PV				
4	Version for viscous media, only with PV versions 1604, 0708, 0414,1009, 0715, 0424				
7	Auto degassing without bypass, only with PV, not for versions 2504 and 0245				
9	Auto degassing with bypass, only with NP, not for versions 2504 and 0245				
Hydraulic connections					
M	Connection for 1/4" x 3/16" tubing				
N	Connection for 3/8" x 1/4" tubing				
O	Connection for 2504 high pressure tubing				
Q	Connection for 1/2" x 3/8" tubing				
6	Connection for SS and PVT4 pumps as per technical data				
Diaphragm rupture indicator					
0	Without diaphragm rupture indicator				
1	With diaphragm rupture indicator, optical sensor				
Version					
0	Standard				
Logo					
0	Standard with ProMinent® logo				
Power supply					
U	100-230 V ± 10%, 50/60 Hz				
Cable and plug					
D	Canada / USA 115 V power cord 2m (6ft)				
Relay					
0	Without relay				
1	Fault relay with C, NO, NC contacts rated 230 V 2A				
4	2 x contacts, rated 24 V, 100 mA, fault and pacing configurable				
C	1 contact rated 24V, 100 mA configurable and 4 – 20 mA ouput				
F*	Auto degassing module (not available for version 2504 / 0245)				
G*	Auto degassing module + fault relay (not available for version 2504 / 0245), G option control panel part #7903561 needs to be ordered separately				
Accessories					
0	Not included, with PVT4 or SS version pumps				
1	With Footvalve, Injection valve, 5ft suction tubing and 10 ft discharge tubing for NP and PV (not PVT4) as per technical data				
Control version					
3	Manual + external with pulse control + analog 4 – 20 mA				
C**	Option 3 + CANopen interface				
E**	Option 3 + Profinet				
R**	Option 3 + Profibus DP				
M**	Option 3 + Modbus RTU				
Flow monitor					
0	Input for flow monitor / DFMA signal				
Bluetooth Connection					
B	With Bluetooth				
O	Without Bluetooth				
Language					
EN	English				
FR	French				

* F and G Option not available for GMXa 2504 and GMXa 0245 models

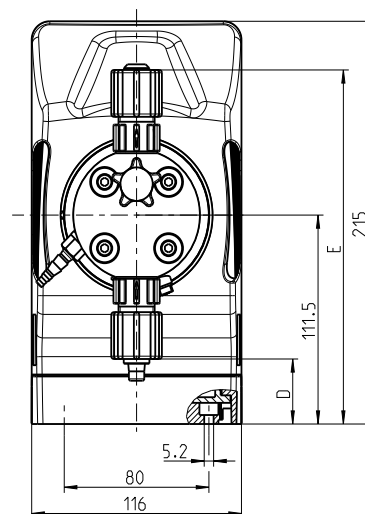
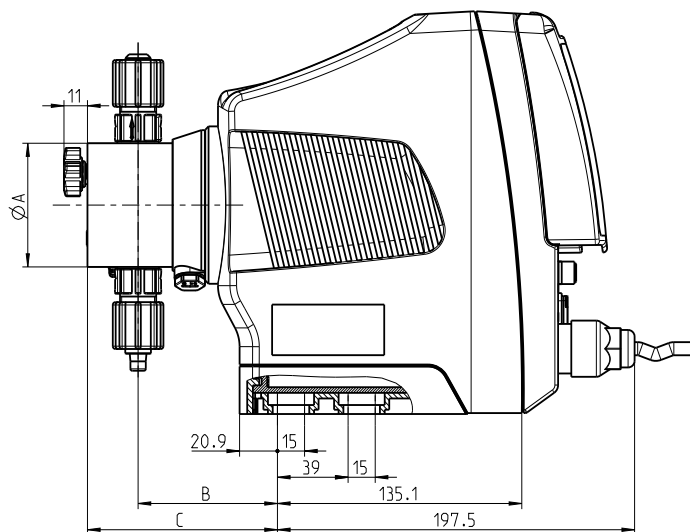
** No relay option can be selected with these choices.

ProMinent® gamma/ X Solenoid Diaphragm Metering Pumps

Dimensional Drawings

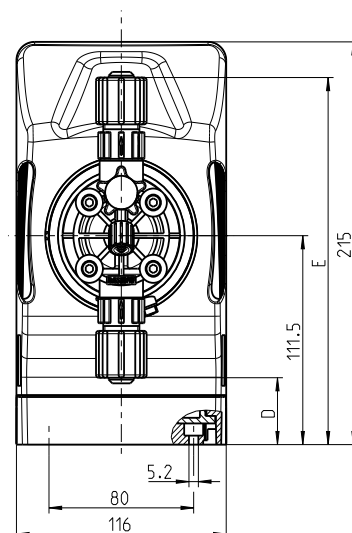
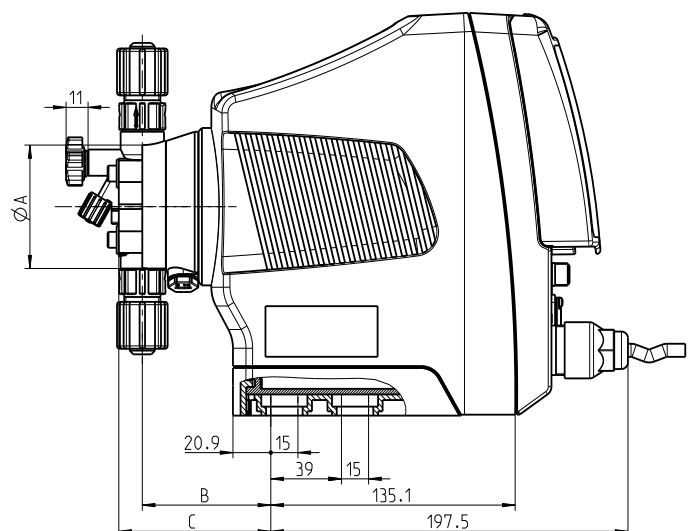
Material design NPB / NPE.

Type	ØA	B	C (m.E.)	C (o.E.)	D	E
0245	110	76	105	91	14	210
0424; 0220	90	76	104	91	23	200
0715; 0414	90	76	104	91	23	200
1009; 0708	90	74	102	91	23	200
1604	70	77	105	92	33	191
1602	70	77	105	92	33	191



Material design PVT.

Type	ØA	B	C (m.E.)	C (o.E.)	D	E
0245	110	76	-	93	14	209
0424; 0220	90	79	90	-	25	203
0715; 0414	90	73	90	-	25	203
1009; 0708	90	75	92	-	25	203
1604	70	71	84	-	36	196
1602	70	71	84	-	36	196

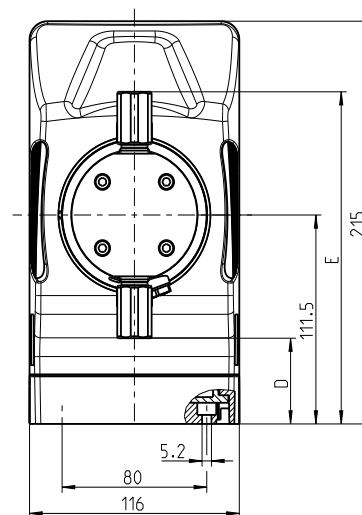
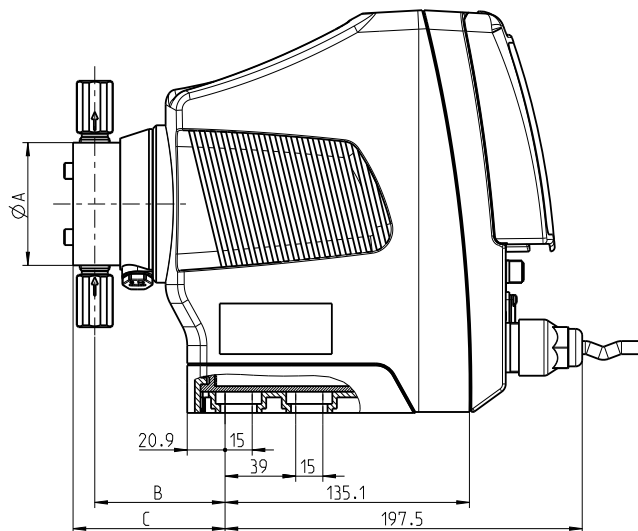


ProMinent® gamma/ X Solenoid Diaphragm Metering Pumps

Dimensional Drawings

Material design SST.

Type	ØA	B	C (o.E.)	D	E
0245	100	78	95	6	217
0424; 0220	85	77	94	13	210
0715; 0414	85	77	94	13	210
1009; 0708	85	79	94	13	210
1604	70	72	84	46	178
1602	70	72	84	46	178



ProMinent® gamma/ XL Solenoid Diaphragm Metering Pumps

Overview: gamma/ XL

The solenoid driven diaphragm metering pump gamma/ XL incorporates a wealth of features. It is a smart connectible metering pump that sets new standards in terms of interface, productivity, reliability and integration to process. It is an enhancement to the proven gamma/X pump and covers a capacity range of 8 – 80 l/hr at pressures of 363 – 29 psi. The pump is adjusted using a click wheel and 4 operating keys. It can also be connected to our web based DULConnex fluid management program, the operator can then use this to monitor the metering process in real time to avoid downtime and automatically generate report.

[\(see page 137 for spare parts and page 153 for control cables\)](#)

- Simple adjustment of the capacity directly in either l/hr or in speed and % stroke length
- Integrated pressure measurement and display
- Optional Bluetooth or Wi-Fi connection for simplifying configuration and accessing process data
- Capacity adjustment range of 1:40,000
- Direct input of the required final concentration (ppm) with volume-proportional metering in concentration mode
- Virtually wear-free solenoid drive
- Suitable for continuous micro-metering from approx. 5 ml/h, due to the controlled solenoid drive
- Detection of hydraulic malfunctions, such as air in the pump head, too low or high discharge pressure.
- Configurable discharge stroke performance
- Configurable suction stroke duration
- Integrated log book for the last 300 events, warnings, alarms etc.
- External control via potential-free contacts with integrated pulse multiplier / divider
- External control via 4 - 20 mA standard signal, scalable
- Integrated 1-week/1-month timer
- Guaranteed metering by means of automatic bleeding
- Connection to process control systems via a BUS interface, such as PROFIBUS®, PROFINET®, CANbus or Wi-Fi



Technical Details

- Illuminated 3" LCD and 3-LED display for operating, warning and error messages, visible from all around the pump
- Stroke rate adjustable from 1 – 12,000 strokes per hour
- Electronic stroke length adjustment continuously variable 0 – 100%, recommended 30 – 100%
- Pulse multiplier / divider range 99:1 – 1:99
- Batch operation with max. 99,999 strokes/start pulse
- Connector for 2-stage level switch, or new continuous level measurement
- Additional port, for 3 digital switches configurable as inputs or outputs



ProMinent® gamma/ XL Solenoid Diaphragm Metering Pumps

Specifications: gamma/ XL

Maximum stroke length:	All GMXa XL solenoids are 110 mm and approx. 2 mm		
Materials of construction			
Housing:	Fibreglass reinforced PPE (Polyphenylene Ether)		
Diaphragm:	PTFE faced EPDM with plastic core		
Liquid end options:	Acrylic/PVC, PVDF, Stainless Steel		
Enclosure rating:	IP 66 / NEMA 4X		
Power supply:	100 – 230 VAC 1 Phase 50 / 60 Hz ± 10%		
Power consumption:	All models 78W		
Internal Fuse:	CSA approved Part #		
Check valves:	Double ball suction / discharge (PVT4 with spring loaded single ball)		
Power cord:	2m CSA Approved		
Relay cable (optional):	2m standard length		
Relay Options			
Identcode Option 1:	Relay contact rated 230 VAC 2 A Max		
Identcode Option 4:	Both relay contacts rated 24 V, 100 mA Max		
Identcode Option C:	Isolated 4 – 20 mA output can drive up to 250 Ω maximum impedance Relay contact rated 24 V 100 mA		
Ambient temperature range			
In operation:	-10°C to 45°C		
Storage & Transport:	-20°C to 60°C		
Max. fluid operating temperatures:	Material	Constant	Short Term*
	Acrylic/PVC	45°C	60°C
	PVDF	45°C	120°C
	SS	45°C	120°C
	*15 minutes at 29 psi maximum		
Climate:	95% Relative humidity – non-condensing		
Sound pressure level:	LpA < 70 dB according to EN ISO 20361		
Warranty:	2 years on pump drive, 1 year on liquid end		
Valve threads:	NP / PVT M20 x 1.5 (provided with adapters for tubing)		
Standard production test:	All pumps are tested for capacity at maximum pressure prior to shipment		
Max solids size in fluid:	Versions 1608 / 2508	= 15µ	
	Versions 1612, 1020, 0730	= 50µ	
	Versions 0450, 0280	= 0.3 mm	
Contact input			
Minimum pulse duration:	20 ms		
Maximum pulse input:	25 pulses / second		
Analog Input Impedance:	120 Ohms		
Recommended Viscosity:	Max. 200 cPs for standard liquid end Max. 500 cPs for valve with springs Max. 50 cPs for auto-degassing liquid ends Max. 3000 cPs for high-viscosity liquid ends (higher possible)		

ProMinent® gamma/ XL Solenoid Diaphragm Metering Pumps

Capacity Data

Pump Version (GXLA)	Capacity at Maximum Backpressure			Pre-Primed Suction Lift		Max. Stroking Rate	Tubing Connections O.D. X I.D.	SS Liquid end connections FNPT	Shipping Weight	
	psig	L/h*	ml/stroke	ft**	m**		inches	inches	NP/PV kg	SS kg
gamma/ XL standard liquid ends										
2508	363	8.0	0.67	16.4	5	200	8 x 4***	1/4	10	11
1608	232	8.0	0.67	16.4	5	200	1/2 x 3/8	1/4	10	11
1612	232	12.0	1.00	19.6	6	200	1/2 x 3/8	1/4	10	11
1020	145	20.0	1.70	16.4	5	200	1/2 x 3/8	1/4	10	11
0730	101	30.0	2.50	16.4	5	200	1/2 x 3/8	3/8	10	11
0450	58	50.0	4.20	9.8	3	200	1/2" MNPT as standard****	3/8	10	11
0280	29	80.0	6.70	6.7	2	200	1/2" MNPT as standard****	3/8	10	11

Capacity at Max Pressure				Pre-Primed Suction Lift		Max. Stroking Rate	Tubing Connections	Shipping Weight
psi	l/hr	ml/stroke	ft**	m**	O.D. X I.D.			
gamma/ XL metering pumps with auto degassing liquid ends PVT7								
1608	145	7	0.6	6	1.8	200	½ x 3/8	10
1612	145	10	0.8	6	1.8	200	½ x 3/8	10
1020	145	15	1.25	6	1.8	200	½ x 3/8	10
0730	101	27.5	2.3	6	1.8	200	½ x 3/8	10

gamma/XL metering pumps with high viscosity liquid ends (PVT 4) have a 10 – 20 % lower capacity rating and are not self priming. Positive suction is recommended and pumps supplied with 1/2" MNPT connections.

* The given performance data represents guaranteed minimum values, tested using water as the medium at room temperature.

** Suction lift with suction line and dosing head filled, for auto degassing liquid ends with air in the suction line

*** NP version supplied with high pressure rated 8 x 4 PTFE discharge tubing

**** 5/8" ID hose barb optional

All data refers to water at 20 °C.

Materials in contact with the chemical					
	Dosing head	Suction/Discharge valves	Ball seat	Seals	Balls
NPE	Clear acrylic	PVC	EPDM	EPDM	Ceramic
NPB	Clear acrylic	PVC	FKM	FKM	Ceramic
PVT	PVDF	PVDF	PVDF	PTFE	Ceramic
SST	Stainless steel material no. 1.4404	Stainless steel material no. 1.4404	Ceramic	PTFE	Ceramic

Auto degassing liquid ends. PVT7 versions with PVDF / PTFE wetted parts.
Diaphragm with PTFE face.

FKM = fluorine rubber

Permissible ambient temperature: -10 °C to +45 °C

Average power consumption: 78 W

Degree of protection: IP 66, NEMA 4X

Scope of supply

Metering pump with power cable, connection set for tubing, connection as per table.

ProMinent® gamma/ XL Solenoid Diaphragm Metering Pumps

Identcode Ordering System: Gamma/XL (GXLa)

GXLa												
Regional Design												
US	Canada / USA											
	Type	Capacity										
		psi	l/h		psi	l/h						
	2508	363	8	0730	101	30						
	1608	232	8	0450	58	50						
	1612	232	12	0280	29	80						
	1020	145	20									
Liquid end/valve material												
PV	PVDF/PVDF not for pump type 2508											
NP	Acrylic / PVC, only for pump types 2508, 1608, 1612, 1020 and 0730 - PVT only											
SS	Stainless steel / Stainless steel - all sizes											
Diaphragm material												
T	Only with PV and SS											
F	FDA-compliant design, only for PV and SS											
Liquid end version												
0	without bleed valve, without valve spring, only with material SS											
1	without bleed valve, with valve spring, only with material SS											
2	with bleed valve, without valve spring, only with material NP and PV											
3	with bleed valve, with valve spring, only with material NP and PV											
4	HV design for higher-viscosity media, only for types 1608, 1612, 1020 and 0730 – PVT only											
7	without bypass, only for types 1608, 1612, 1020 and 0730, only for material NP and PV auto degassing											
Hydraulic connections												
O	Standard connection in line with technical data											
6	Standard for SST & 0450 / 0280 as per technical data											
N	3/8" x 1/4" tubing											
Q	1/2" x 3/8" tubing recommended for models 1608 / 1612 / 1020 / 0730											
F	8 x 4 mm PTFE for 2508 NPB/NPE											
Diaphragm rupture indicator												
0	Without diaphragm rupture indicator											
1	With diaphragm rupture indicator, optical sensor											
Version												
0	Standard											
Logo												
0	Standard											
Power supply												
U	100-230 V ± 10%, 50/60 Hz											
Cable and plug												
D	2 m Canada / USA power cord											
Relay												
0	Without relay											
1	Fault relay with C, NO, NC contacts rated 230 V 2A											
4	2 x contacts, rated 24 V, 100 mA, fault and pacing configurable											
C	1 contact rated 24V, 100 mA configurable and 4 – 20 mA output											
F*	Auto degassing module (not available for version 2508 / 0280)											
G*	Auto degassing module + fault relay (not available for version 2508 / 0280)											
G option control panel part #7903561 needs to be ordered separately												
Accessories												
0	No accessories											
1	With Footvalve, Injection valve, 5 ft suction tubing and 10 ft discharge											
Control version												
3	Manual + external with pulse control + analog 4 – 20 mA											
C**	Option 3 + CANopen interface											
E**	Option 3 + PROFINET® interface, M12											
M**	Option 3 + Modbus RTU											
R**	Option 3 + PROFIBUS® interface, M12											
Communication												
0	without interface											
B	with Bluetooth											
W	With Wi-Fi Module											
Language												
EN	English											
FR	French											

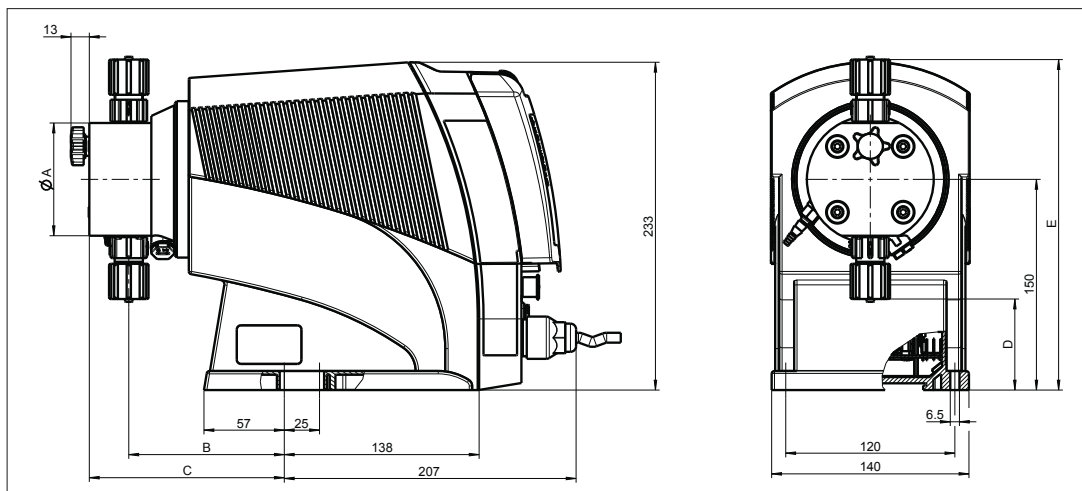
* F and G Option not available for GXLa 2508 and GXLa 0280 models

** No relay option can be selected with these choices.

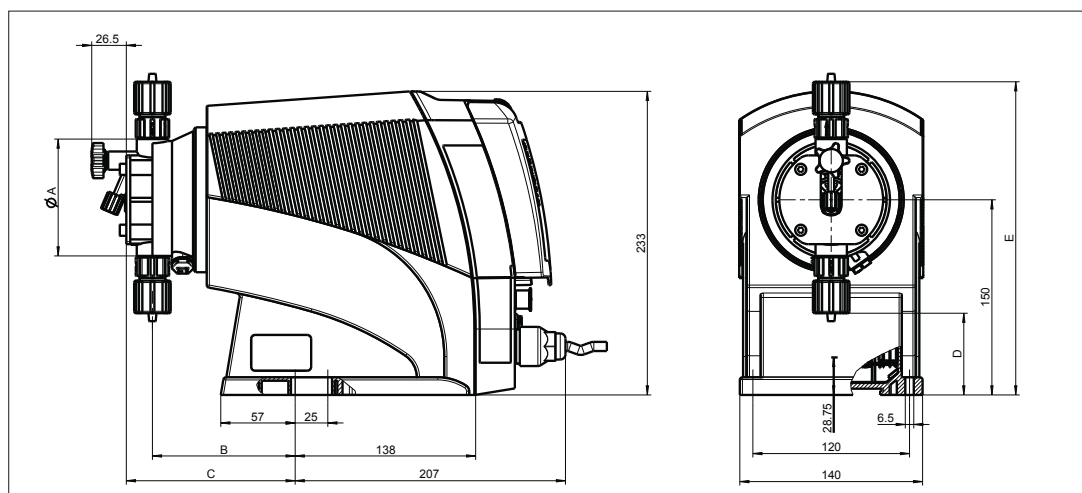
ProMinent® gamma/ XL Solenoid Diaphragm Metering Pumps

Dimensional Drawings

Dimensional drawing gamma/ XL, material versions 1608 / 2508 / 1612 / 1020 / 0730 NPB2 and NPE 2



	2508	1608	1612	1020	0730
ØA	90	90	90	90	90
B	110	110	110	112	112
C (with bleed valve)	138	138	138	140	140
C (without bleed valve)	125	125	125	127	127
D	63	63	60	54	53
E	235	235	239	245	246

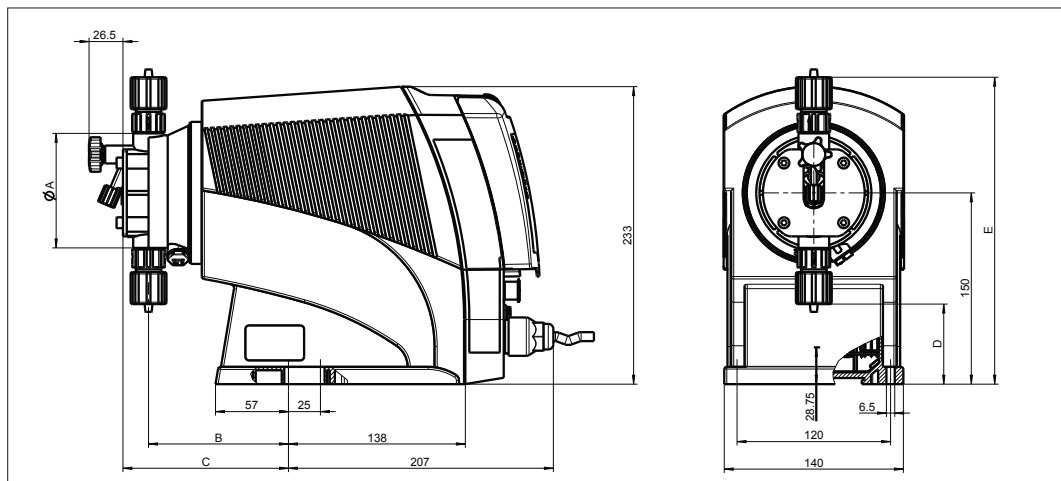


	1608	1612	1020	0730
ØA	90	90	90	90
B	108	110	110	112
C (with bleed valve)	-	130	130	132
C (SER)	128	130	130	132
D	63	63	63	63
E	240	240	240	240

ProMinent® gamma/ XL Solenoid Diaphragm Metering Pumps

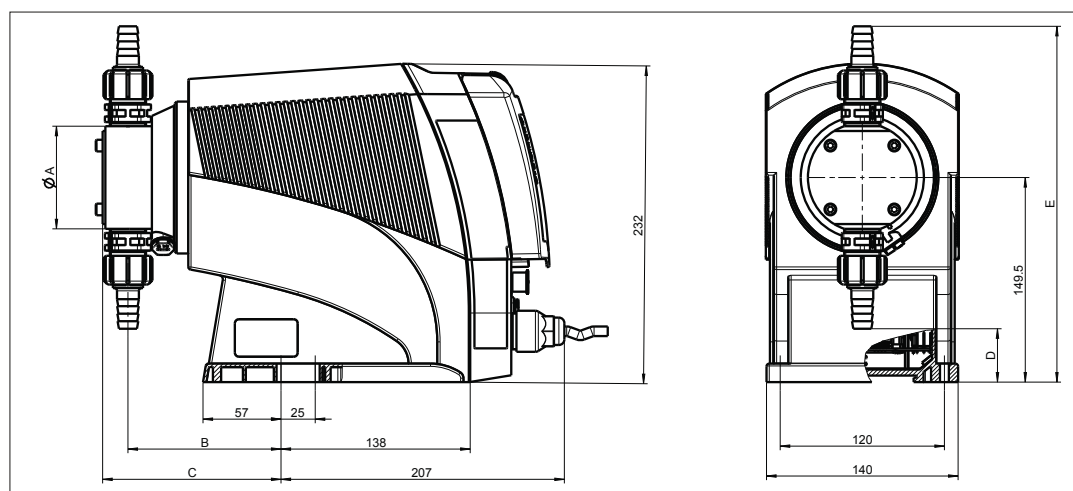
Dimensional Drawings

Dimensional drawing gamma/ XL, material version 1608 / 1612 / 1020 / 0730 PV2 and PVT7



	1608	1612	1020	0730
ØA	90	90	90	90
B	108	110	110	112
C (with bleed valve)	-	130	130	132
C (SER)	128	130	130	132
D	63	63	63	63
E	240	240	240	240

Dimensional drawing gamma/ XL, material version 1608 / 1612 / 1020 / 0730 PVT4 HV

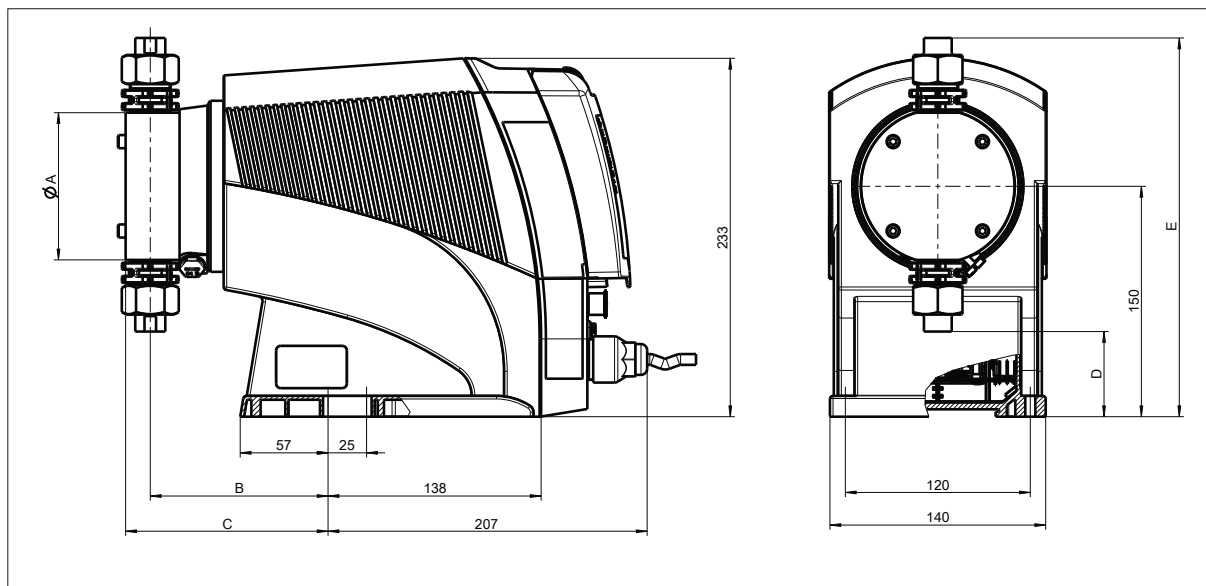


	1608	1612	1020	0730
ØA	80	80	80	85
B	112	113	113	114
C	131	131	131	132
D	39	34	34	31
E	260	260	260	263

ProMinent® gamma/ XL Solenoid Diaphragm Metering Pumps

Dimensional Drawings

Dimensional drawing gamma/ XL, material version 0450 / 0280 SST0 DN10



	0450	0280
ØA	100	100
B	115	115
C	132	132
D	55	55
E	246	246

ProMinent® DULCO Flex DFXa Control Peristaltic Metering Pumps

Overview: DULCO flex Control

The new DULCO flex Control is an intelligent peristaltic metering pump that is valve-free and has the accuracy of a diaphragm pump. Applications include gaseous, highly viscous, abrasive and shear-sensitive fluids.

The liquid end of the pump is designed for a quick and simple replacement of the tubing, utilizing a unique exchange process. The pump display provides precise instructions on the steps required for the tube replacement. High-performance tubing consists of a SPT (Santoprene) or VPT (Polyurethane) material that provides excellent chemical resistance and a long service life.

The DULCO flex Control is powered by a brushless DC motor and will provide continuous metering from 10 ml/hr to 30 l/hr at pressures up to 100 psi. Additional features such as communication protocol includes PROFIBUS, CANbus, Modbus and PROFINET will be available early 2020.

Your Benefits

- Volume adjustment in LPH or GPH
- Manual, Analog, Contact and Batch modes as standard
- High visibility of 3 x LED-indicator lights
- Large 3" illuminated display
- New configurable input/output port
- CIP (cleaning in place) enabled
- Turn down ratio 3,000:1
- Reverse flow is possible
- Dosing head can be aligned in four directions:
 - Left, Right, Up and Down
- Integrated timer
- Viscosities to 10,000 cPs
- DULCOnneX-enabled



ProMinent® DULCO Flex DFXa Control Peristaltic Metering Pumps

Capacity Data

Capacity data: DULCO flex Control

Pump Version	Capacity at Maximum Backpressure * (L/h)	Max. speed rpm	Connector size in	Pre-primed suct. lift * m	Shipping weight kg
0730	30	100	1/2" x 3/8"	5	5.8
0530	30	100	1/2" x 3/8"	5	5.8

Tube material:

SPT (Santoprene): available with pump versions 0730 and 0530

VPT (Polyurethane): available with pump version 0530 only

Tube connectors: PVDF/PTFE

Metering reproducibility: ± 2% with retracted tube (after approx. 200 revolutions) **Turndown:** 3,000:1

Electrical connection: 100 -230 V ± 10%, 50/60 Hz

Nominal power: approx. 45 W

Degree of protection: IP 66, NEMA 4X Indoor

Permissible ambient temperature: - 10°C ...+ 45°C

Standard relay module: 1 x switch over contact rated 24V 100 mA and 1 x 4 - 20 mA output

* Values are based on tests with water at 20°C

Complete Pumps And Spare Parts

Complete Pump Models

	Part Number
DULCOflex 0730 SPT pump with 100 psi Santoprene tube	1107955
DULCOflex 0530 SPT pump with 72 psi Santoprene tube	1107956
DULCOflex 0530 VPT pump with 72 psi Polyurethane tube	1107957

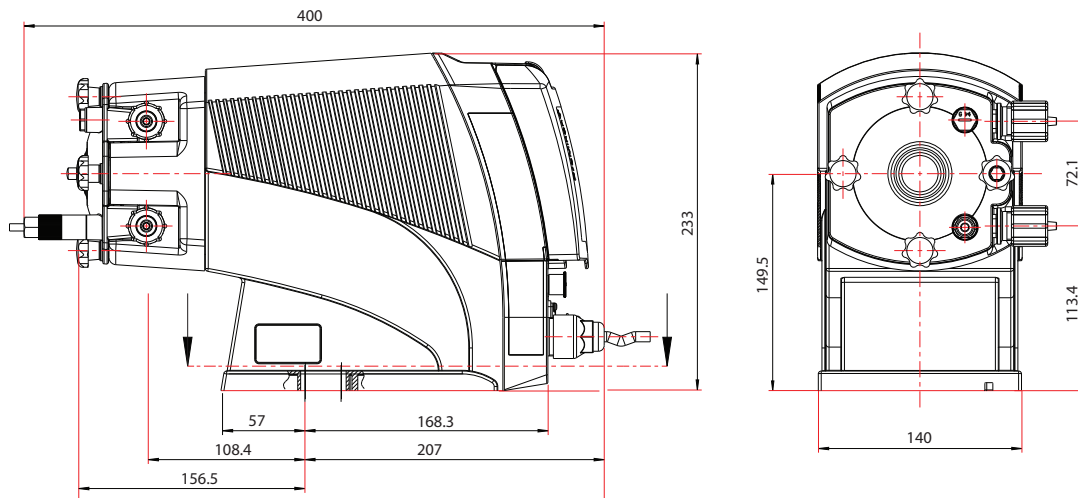
Spare Parts Kits - Includes complete tube and connection set:

	Part Number
0730 SPT 100 psi Santoprene kit	1108952
0530 SPT 72 psi Santoprene kit	1108975
0530 VPT 72 psi Polyurethane kit	1110171

Replacement Parts

	Part Number
Rotor complete	1103249
Spare screw kit DFXa	1104952
Tube rupture sensor with 0.8m cable	1044477

Dimensional Drawings



ProMinent® DULCO Flex DFXa Control Peristaltic Metering Pumps

Specifications

Materials of construction:

Housing	PPE (Polyphenylene Ether) + 20% Glass fibre
Dosing head	PA6 50% Glass bead
Rotor	PPS 40% Glass fibre
Pump tube	SPT = Santoprene or VPT = Polyurethane
Tube Connection	PVDF
Seal (wetted)	PTFE
Enclosure rating	IP 66, NEMA 4X Indoor

Power supply 100 – 230 VAC 1 Phase 50 / 60 Hz ± 10%

Power cord: CSA Approved 2m cable

Standard relay option: Fault relay max 24 V 100 mA contact rating and
4 - 20 mA output signal - max load 250 Ohms

Relay cable 2m standard

Ambient temperature range:

In operation -10°C to 45°C

Storage & Transport -10°C to 50°C

Feed chemical -10°C to 45°C

Climate: 95% Relative humidity – non-condensing

Sound pressure level: LpA < 70 dB according to EN ISO 20361

Warranty: 2 years on pump drive electronics,

Valve threads: M20 x 1.5 provided with adapters for 1/2" x 3/8" tubing

Contact Input

Minimum pulse duration: 20 ms

Maximum pulse input: 25 pulses / second

Analog Input Impedance: 120 Ohms

Configurable Input / Output

Min pulse duration: 10 ms

Max pulse input: 50 pulses / second

Max load as output: 30 V max, 300 mA max current per output

Identcode Ordering System

standard & custom
systems

57

ProMinent® DULCO Flex Control - DFYa Peristaltic Metering Pumps

Overview: DULCO flex Control - DFYa

The peristaltic pump DULCO flex Control - DFYa combines the properties of top products from the ProMinent product range

Feed rate of 5.5 l/h to 410 l/h at up to 116 psi back pressure



The valveless peristaltic pump DULCO flex Control, the DFYa, guarantees precise, linear and reproducible metering in all process conditions. It meters gaseous, viscous, shear-sensitive media, containing particles, with ease – ProMinent is therefore setting new standards in peristaltic metering.

The new metering pump DFYa, the big brother of the DFXa, adds an intelligent peristaltic pump to the top capacity range of the ProMinent portfolio.

The new generation of peristaltic metering pumps is now controlled electronically. It meters without the need for a valve, with precision previously impossible. All the benefits of a peristaltic pump are retained, which is why gaseous, high-viscosity, abrasive or shear-sensitive fluids, fluids containing particulate, can also be perfectly metered with the DFYa.

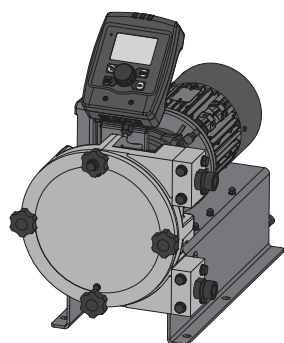
As with the DFXa, hose replacement, the DFYa is also assisted by the pump. When the hose needs to be changed, the pump displays exact instructions for the steps to be followed and automatically moves into the correct positions for hose replacement. The different hose materials (NR, NBR, NBR-A, EPDM Hypalon) enable the DFYa to work with a very wide range of media to be metered.

The peristaltic pump DFYa is simple to operate from the intuitive user interface with 4 keys and the click wheel. The DFYa thus joins the remaining ProMinent product range of intelligent metering pumps, which all share the same menu structure and user interface.

The new peristaltic metering pump is even IoT-capable. This means that it is fully connectible and can be connected to ProMinent's in-house developed DULCOnneX platform, which enables it to work even smarter.

Your Benefits

- Operation by contact, batch, manual, analog or BUS control
- Adjustment of the metering rate directly in l/h or gph
- Connection to process control systems via a BUS interface, such as PROFIBUS®, Profinet or CANbus
- No problems with very gaseous media or air locks
- Simple, menu-guided hose change
- Reversible direction of rotation
- Direct input of the required final concentration in concentration mode with flow proportional metering
- Automatic mode – volume settings only (l/h, ml/contact etc.)
- Pump can run dry
- Suitable for viscosities of up to 40,000 mPas
- Sole contact with media is the hose



P_DX_0073_SW1



Technical Details

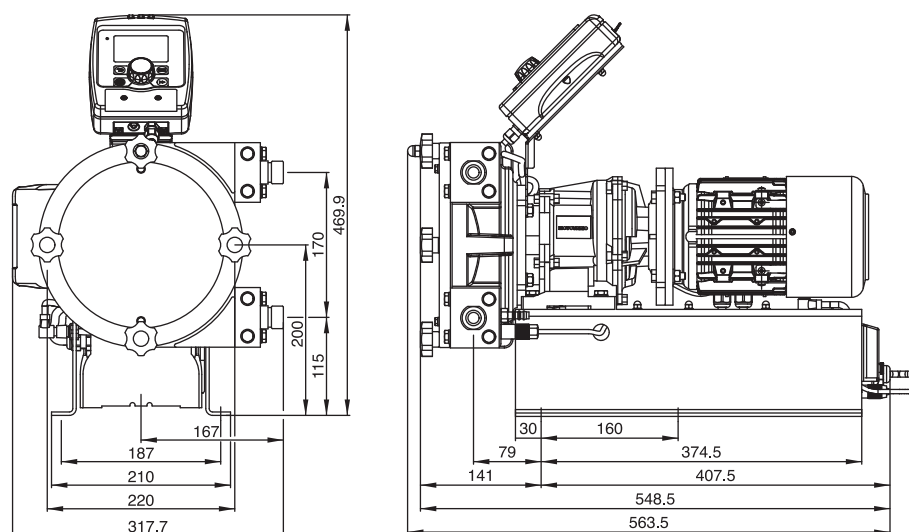
- Illuminated 3" LCD and 3-LED display for operating, warning and error messages, visible from all sides
- Adjustable feed rate between 5.5 l/h and 410 l/h
- Batch operation with max. 999.9 l per pulse
- Connector for 2-stage level switch
- Standard relay output and 4 - 20 mA output,
- Standard hose rupture detection
- DULCOnneX-compatible

Field of Application

- Mining
- Potable water and waste water industry
- Chemical industry
- Paper industry
- Food and beverage industry

ProMinent® DULCO Flex Control - DFYa Peristaltic Metering Pumps

Capacity Data



Dimensional drawing of DFYa, dimensions in mm

Technical Data

Type	Maximum back pressure	Pump capacity	Max. speed	Suction lift	Intake head
	PSI		rpm	m WC	m WC
08410	116	410 l/h \pm 10 %	80	8	8
04410	58	410 l/h \pm 10 %	80	8	8
02410	29	410 l/h \pm 10 %	80	8	8

Hose material:	NR, NBR, EPDM, NBR-A, Hypalon
Self-priming:	Up to 8 m
Rollers/shoes:	Rollers
Metering reproducibility:	\pm 2% with retracted hose after 500 revolutions
Electrical connection:	100 – 230 VAC \pm 10 % 50/60 Hz
Electrical power consumption:	Max. 400 W
Degree of protection:	IP 55
Weight:	30 kg
Permissible ambient temperature:	0 ... 45 °C

All data refers to water at 20 °C.

Spare parts for DULCO flex Control - DFYa

	Order no.
Hose NR	1037164
Hose NBR	1037165
Hose EPDM	1037166
Hose NBR-A	1037168
Hose HYPALON	1037171
Silicone grease 0.5 kg	1037255

ProMinent® DULCO Flex Control - DFYa Peristaltic Metering Pumps

Identcode Ordering System

DFYa	Type	Capacity	psi	l/h
	08410	116	410	
	04410	58	410	
	02410	29	410	
Hose Material				
	O	NR		
	B	NBR		
	E	EPDM		
	A	NBR-A Food Safe		
	H	Hypalon		
Dosing Head Orientation				
	R	Right		
Hydraulic connector				
	B	3/4" MNPT Stainless Steel AISI 304		
	E	3/4" MNPT PVDF		
	F	3/4" MNPT PVC		
	G	1" Stainless Steel Tri Clamp AISI 316		
Hose Rupture Alarm				
	1	With hose rupture alarm as standard		
Design				
	P	ProMinent design		
Special Version				
	0	Standard		
	H	Chemical Version -Halar coated housing		
Logo				
	0	Standard with logo		
Power Supply				
	U	Universal 100–230 V ± 10 %, 50/60 Hz		
Cable and plug				
	D	Canada / USA 2m CSA Approved power cord		
Relay Function				
	8	1 x Fault Indicating relay rated 24V - 100 mA and 4-20 mA output		
Accessories				
	0	No accessories		
Control version				
	1	Manual + external pulse control + analog control		
	6	Profibus with M12 Connection		
	7	CANopen		
Operating unit				
	0	HMI with Click Wheel 0.5 m standard		
	4	HMI with Click Wheel 2 m		
	5	HMI with Click Wheel 5 m		
	6	HMI with Click Wheel 10 m		
Access code				
	1	With access control		
Communication				
	0	none		
Language				
	EN	English		
Certification				
	07	cMETus or CSA Inspection		
Documentation language				
	EN	English		

product
overviewsolenoid-driven
metering pumpsmotor-driven
metering pumpspump spare parts &
accessoriesDULCOMETER®
instrumentationDULCOTEST®
sensorsstandard & custom
systems

VerderFlex® Industrial Hose Pumps

Overview: VerderFlex® Industrial Hose Pumps

The Verderflex range of industrial hose pumps are a high quality family of peristaltic pumping solutions. These pumps reduce downtime, minimize maintenance costs and provide easy to operate and reliable solutions in difficult pumping situations.

Advantages of Verderflex industrial hose pumps

- Operating pressures to 232 PSI and flow rates up to 90,000 litres / hour
- Specially designed hose construction to reduce fatigue, resulting in longer hose service life
- Simplified disaster proof hose connection for easy maintenance
- Close coupled drive design or long coupled option with bearing housing
- Dry running - the pump will run dry without damage
- Rigid pump housing design for heat dissipation and strength
- All pumps are supplied with a 2 year warranty covering any defects in workmanship and material under normal use

How does a peristaltic pump work?

The principle of the peristaltic hose pump is based on alternating compression and relaxation of the hose drawing the contents into the hose, operating in a similar way to our throat and intestines.

The medium to be pumped does not come into contact with any moving parts and is totally contained within a robust, heavy-duty hose, which consists of an inner layer, 2-6 reinforcement layers and an outer layer. A rotating shoe passes along the length of the hose compressing it totally closed and upon restitution of the hose a strong vacuum is formed which draws the product in and along the hose without any product slip.

This pumping action makes the pump suitable for accurate dosing applications and pressure ratings up to 232 PSI.

Without any seals, or valves a Verderflex peristaltic pump is ideal for handling:

- Abrasive fluids
- Corrosive fluids
- Viscous fluids
- Shear sensitive fluids
- High density fluids
- High Solid content fluids



■ VerderFlex VF Series



■ VerderFlex DURA Series

VerderFlex® Industrial Hose Pumps

VerderFlex® VF Series Industrial Hose Pumps



VerderFlex VF Series

Verderflex® VF Pump Models

Pump Type	Part No.	Maximum Pressure Rating	Maximum Continuous Duty	Maximum Intermittent Duty †	Lubrication Required for Hose Change	Material of Inserts**	Connections***	Max. Viscosity
VF65	7903787	218 psi	17,000 L/h at 50 rpm	27,200 L/h at 80 rpm	25 Litre	316SS	2-1/2 "	17,000 cPs
VF80	7903788	218 psi	26,600 L/h at 40 rpm	40,000 L/h at 60 rpm	35 Litre	316SS	3"	27,000 cPs
VF100	7903071	218 psi	33,000 L/h at 30 rpm	55,000 L/h at 50 rpm	60 Litre	316SS	4"	35,000 cPs
VF125	7903703	218 psi	50,000 L/h at 25 rpm	90,000 L/h at 45 rpm	80 Litre	316SS	5"	47,000 cPs

VerderFlex® VF Series Industrial Hose Pumps Accessories

Verder Pump Type	Hoses					Flange Sealing Kit	Lubricant Required**	
	Natural rubber	EPDM	Hypalon	Nitrile Rubber	Buna Food Grade NBR		Part # and Description	Qty.
VF65	7903007	7903237	*	7903233	*	7903277	7903716 - Verder Lube CB - 12 Litre Bottle	2
VF80	7903214	7903010	*	1051154	*	7903244	7903716 - Verder Lube CB - 12 Litre Bottle	3
VF100	7903006	7903073	*	*	7903072	7904517	7903717 - Verder Lube CB - 20 Litre Bottle	3
VF125	1078772	7903704	*	1082392	*	7904710	7903717 - Verder Lube CB - 20 Litre Bottle	4
Markings	White	Red	Green	Yellow	Yellow/White			

VerderFlex® Industrial Hose Pumps

VerderFlex® DURA Series Industrial Hose Pumps



VerderFlex DURA Series

VerderFlex® DURA Pump Models

Pump Type	Part No.	Maximum Pressure Rating (psi)	Maximum Continuous Duty	Maximum Intermittent Duty†	Lubrication Required for Hose Change	Material of inserts**	Connections	Max. Viscosity
Dura 5	1103621	72 psi *	16.3 l/hr (50 rpm)	22.5 l/hr (70 rpm)	1/4 Litre	316SS	1/2"	5,100 cPs
Dura 7	1103622	72 psi *	28 l/hr (50 rpm)	39 l/hr (70 rpm)	1/4 Litre	316SS	1/2"	4,500 cPs
Dura 10	1079004	87 psi *	195 l/hr (140 rpm)	222 l/hr (160 rpm)	1/4 Litre	316SS	1/2"	4,500 cPs
Dura 15	1078200	87 psi *	547 l/hr (120 rpm)	593 l/hr (130 rpm)	1/2 Litre	316SS	3/4"	5,000 cPs
Dura 25	1079006	87 psi *	1,876 l/hr (110 rpm)	2,387 l/hr (140 rpm)	2 Litre	316SS	1"	6,000 cPs
Dura 35	1079007	87 psi *	3,920 l/hr (100 rpm)	5,292 l/hr (135 rpm)	2-1/2 Litre	316SS	1-1/2"	7,500 cPs
Dura 45		232 psi	8,160 l/hr (80 rpm)	12,240 l/hr (120 rpm)	10 litre	316SS	2"	11,000 cPs
Dura 55		232 psi	11,520 l/hr (60 rpm)	13,440 l/hr (70 rpm)	15 litres	316SS	2-1/2"	15,000 cPs

* Can do up to 174 psi in certain applications, please consult factory

** Polypropylene & KYNAR Inserts Available, Please Consult Factory

*** Port flange are universal 304SS port flanges, capable of connecting to a ANSI 150# RF flange

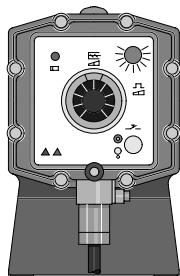
† Intermittent Duty is Defined as running for one hour and then off for one hour (please see pump technical data sheet located in the manual)

VerderFlex® DURA Pump Accessories

Pump Type	Hoses					Flange Sealing Kit	Lubricant Required**		
	Natural rubber	EPDM	Hypalon	Nitrile Rubber	Buna Rubber	Food Grade NBR	Part # and Description	Qty.	Volume Required
Dura 5	7903796	N/A	1051678	1051679	N/A	None required	7903790 VSil 1 litre bottle	1	1/4 litre
Dura 7	1051684	N/A	1051685	1051686	N/A	None required	7903790 VSil 1 litre bottle	1	1/4 litre
Dura 10	7903732	7903735	7903744	7903738	7903741	None required	7903790 VSil 1 litre bottle	1	1/4 litre
Dura 15	7903733	7903736	7903745	7903739	7903742	None required	7903790 VSil 1 litre bottle	1	1/2 litre
Dura 25	7903734	7903737	7903746	7903740	7903743	None required	7903714 VL CB 1 litre bottle	2	2 litres
Dura 35	7903800	7904526	7904527	N/A	N/A	None required	7903714 VL CB 1 litre bottle	3	2.5 litres
Dura 45	7904734	1094850	N/A	1089270	N/A	1079113	7903716 VL CB 12 litre bottle	1	10 litres
Dura 55	1051687	1051688	1051690	1051689	N/A	1079114	7903717 VL CB 20 litre bottle	1	15 litres

ProMinent® EXtronic® Solenoid Diaphragm Metering Pumps

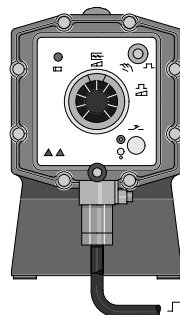
Overview: EXtronic®



pk_1_020

Control type "Internal"

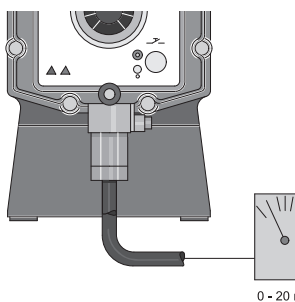
Stroke length adjustment 1:10, stroking rate adjustment 1:25, total adjustment range 1:250.



pk_1_019

Control type: "External Contact"

Stroke length adjustment 1:10, stroking rate control 0-100 % dependant upon external switch contacts. *)



0 - 20 l

pk_1_018

Control type: "Analogue"

Stroke length adjustment 1:10, Stoke frequency control 0-100 % proportional to analogue signal 0/4-20 mA. *)

*) The electrical cables for mains connection, contact or analogue control are already connected to the pump. Observe all instructions concerning connecting and activating electrical systems.

Ideal for explosion-proof applications

(see [page 136](#) for spare parts)

The ProMinent EXtronic series represents a proven technology for metering liquid media in hazardous areas classified in accordance with Zone 1 and in fire-damp-endangered mining applications.

- The new microprocessor control compensates for fluctuations in the power supply. Automatic switchover from 50 Hz to 60 Hz operation with no change in capacity.
- Operating voltage of 500V increases the scope of application for ProMinent EXtronic (e.g. in conjunction with the new EXBb M version for fire-damp-endangered areas in mining applications).
- The short-stroke solenoid drive is combined with liquid ends from the ProMinent gamma series. The material version SB material is recommended for use with flammable media.
- The control inputs "External Contact", "Analog", and "Zero Volts ON/OFF" are intrinsically safe for the EXBb-registered in accordance with EN 50020.
- The 2501 SSM/SBM type is available with diaphragm failure detection
- The capacity range extends from 0.06 gph (0.19 L/h) to 15.8 gph (60 L/h) at backpressures of up to maximum 363 psig (25 bar).

Factory Mutual Hazard Classification

Factory Mutual Research Corporation has certified that EXtronic series pumps are in compliance with explosion-proof classifications Class 1, Division 1, Groups B, C and D indoor hazardous locations; and with intrinsically safe output connections for Class 1, Division 1, Groups A, B, C, and D hazardous locations. Installation must be in accordance with manufacturer's instructions and the National Electrical Code.

CSA Approval

CSA approved for Class 1, Division 1, Groups B, C and D locations.

ProMinent EXtronic metering pumps are tested and classified in compliance with harmonized European Standards EN 50014/50018 for "flame-proof enclosure." They have the highest degree of protection in this type of enclosure class. This approval is recognized by many other countries outside the EC member states.

The short-stroke solenoid and electronic control are integrated in the pump housing. The enclosure rating in accordance with DIN 40050, even with the front cover open.

The liquid end is equipped with a registered multi-layer (Teflon coated) pump diaphragm. The liquid end is made of Acrylic, Polypropylene (PP), PTFE-Teflon, 316 stainless steel and SB for flammable chemicals to ensure maximum operating safety.

Self-bleeding liquid ends made of Acrylic (NS) and PVC (PS) are available for off-gassing fluids.

The micrometering adjusting knob for the stroke length enables precision setting of the capacity and ensures a high degree of repeatability. A comprehensive range of explosion-proof ancillary equipment and pump accessories is available.

EXBb G for use in gas and fire damp hazardous areas

Degree of protection EEx [i,a] d IIC T6

EEX - Explosion-proof equipment built in accordance with European standards

[i,a] - Intrinsically safe control input in the case of two independent faults occurring

d - Flameproof enclosure protection

IIC - Explosion Group II for all hazardous areas apart from mines (includes IIA and IIB)

T6 - Temperature class approval for gases and vapours with ignition temperature > 85°C

EXBb M for use in hazardous mining operations

Degree of protection EEX d I/IIC T6

EEX - Explosion-proof equipment built in accordance with European standards

d - Flameproof enclosure protection

IC - Explosion Group I for firedamp-endangered mines

IIC - Explosion Group II for all other hazardous areas apart from mines (includes IIA and IIB)

T6 - Temperature class approval for gases and vapors with ignition temperature > 85°C. This is the highest temperature class; it includes T1 to T5.

ProMinent® EXtronic® Solenoid Diaphragm Metering Pumps

Specifications

Maximum stroke length:	0.026" (0.65 mm) for pump models 1000 0.049" (1.25 mm) for all other models		
Materials of construction			
Housing:	Epoxy coated die cast aluminum / Available Bronze housing for mining application		
Diaphragm:	PTFE faced EPDM with steel core		
Liquid end options:	Polypropylene, Acrylic/PVC, PTFE, 316 SS, high-viscosity Polypropylene		
Enclosure rating:	(IP 65); insulation class F		
Power supply:	500V ±6%, 50/60 Hz 230V ±10%, 50/60 Hz 115V ±10%, 50/60 Hz Mean power input at max. stroke frequency (W)/peak current consumption for metering stroke (A) at 230V, 50/60 Hz EXBb Type 1000, 1601, 1201, 0803, 1002, 0308: 23/25 W/0.9 A at 120 strokes/min. EXBb Type 2502, 1006, 0613, 0417: 54/61 W/2.1 A at 120 strokes/min. EXBb Type 2505, 1310, 1014, 0430, 0260: 77/83 W/3.1 A at 110 strokes/min.		
Thermal protection:	Yes		
Check valves:	all models double ball except single ball on PP4 (HV) models		
Repeatability:	When used according to operating instructions, ±2%; For type 1601 with self-degassing liquid end, ±5%.		
Power cord:	6 ft. (2 m) 2 wire plus ground (no plug)		
External control cable:	6 ft. (2 m) 2 wire		
Ambient temperature range:	14°F (-10°C) to 113°F (45°C)		
Max. fluid operating temperatures:	Material	Constant	Short Term
	Acrylic/PVC	113°F (45°C)	140°F (60°C)
	Polypropylene	122°F (50°C)	212°F (100°C)
	PTFE	122°F (50°C)	248°F (120°C)
	316 SS	122°F (50°C)	248°F (120°C)
Max. allowable input current:	50 mA		
Warranty:	Two years on drive; one year on liquid end.		
Industry standards:	Factory mutual (explosion-proof, intrinsically safe), CSA approved and CE approved. EN 50014/50018; VDE 0170/0171-5.78,		
Standard Production Test:	100% tested for rated pressure and volume		
Max. solids size in fluid:	Pumps with 1/4" valves: 15µ; pumps with 1/2" valve: 50µ		
Controlling contact (pulse):	With voltage free contact, or with semiconductor sink logic control (NPN), not source logic (PNP); with a residual voltage of <700 mV, the contact load is approximately 20 mA at +10 VDC. (Note: Semiconductor contacts that require >700 mV across a closed contact should not be used).		
Necessary contact duration:	100 ms		

ProMinent® EXtronic® Solenoid Diaphragm Metering Pumps

Capacity Data

Pump Version	Capacity at max. backpressure			Max. stroke rate spm	Connectors Tube/NPT fitting PP/ NP/NS/PS/TT inches	Capacity at 1/2 max. backpressure			SS2	SB1	Suction lift ft. (m)	PP/NP/TT-S weight lbs. (kg)
	psig (bar)	GPH (L/h)	mL/stroke			psig (bar)	gph (L/h)	mL/stroke				
1000	145 (10)	0.05 (0.19)	0.027	120	1/4 x 3/16	72.5 (5)	0.07 (0.27)	0.038	1/4" FNPT	1/4" FNPT	4.9 (1.5)	27-36 (12-16)
2501	363 (25)	0.26 (1.14)	0.15	120	1/4 x 3/16	290 (20)	0.29 (1.1)	0.17	1/4" FNPT	1/4" FNPT	19.7 (6)	39 (18)
1601	232 (16)	0.26 (1.0)	0.14	120	1/4 x 3/16	116 (8)	0.34 (1.3)	0.18	1/4" FNPT	1/4" FNPT	19.7 (6)	27-36 (12-16)
1201	174 (12)	0.45 (1.7)	0.23	120	1/4 x 3/16	87 (6)	0.53 (2.0)	0.28	1/4" FNPT	1/4" FNPT	19.7 (6)	27-36 (12-16)
0803	116 (8)	0.98 (3.7)	0.51	120	1/4 x 3/16	58 (4)	1.03 (3.9)	0.54	1/4" FNPT	1/4" FNPT	9.8 (3)	27-36 (12-16)
1002	145 (10)	0.61 (2.3)	0.31	120	1/2 x 3/8	72.5 (5)	0.71 (2.7)	0.38	1/4" FNPT	1/4" FNPT	19.7 (6)	27-36 (12-16)
0308	43.5 (3)	2.27 (8.6)	1.2	120	1/2 x 3/8	21.8 (1.5)	2.72 (10.3)	1.43	1/4" FNPT	1/4" FNPT	19.7 (6)	27-36 (12-16)
2502	363 (25)	0.53 (2.0)	0.28	120	1/2 x 3/8	290 (20)	0.58 (2.2)	0.31	1/4" FNPT	1/4" FNPT	19.7 (6)	29-38 (13-17)
1006	145 (10)	1.59 (6.00)	0.83	120	1/2 x 3/8	72.5 (5)	1.90 (7.2)	1.00	1/4" FNPT	1/4" FNPT	19.7 (6)	29-34 (13-15)
0613	87 (6)	3.46 (13)	1.82	120	1/2 x 3/8	43.5 (3)	3.94 (14.9)	2.07	1/4" FNPT	1/4" FNPT	18.0 (5.5)	29-38 (13-17)
0417	50.8 (3.5)	4.60 (17.4)	2.42	120	1/2 x 3/8	29.0 (2)	4.73 (17.9)	2.49	1/4" FNPT	1/4" FNPT	14.0 (4.5)	29-38 (13-17)
2505	363 (25)	1.11 (4.2)	0.64	110	1/2 x 3/8	290 (20)	1.27 (4.8)	0.73	1/4" FNPT	1/4" FNPT	19.7 (6)	36-45 (16-20)
1310	189 (13)	2.77 (10.5)	1.59	110	1/2 x 3/8	87 (6)	3.14 (11.9)	1.80	1/4" FNPT	1/4" FNPT	19.7 (6)	36-45 (16-20)
0814	116 (8)	3.70 (14.0)	2.12	110	1/2 x 3/8	58 (4)	4.07 (15.4)	2.33	1/4" FNPT	1/4" FNPT	19.7 (6)	36-45 (16-20)
0430	50.8 (3.5)	7.13 (27.0)	4.09	110	1/2" MNPT	29.0 (2)	7.79 (29.5)	4.47	3/8" FNPT		16.4 (5)	36-45 (16-20)
0260	21.8 (1.5)	15.8 (60.0)	9.09	110	3/4" MNPT				1/2" FNPT		4.9 (1.5)	36-45 (16-20)

EXtronic Models for High Viscosity Fluids

1002	145 (10)	0.61 (2.3)	0.31	120	1/2" MNPT	72.5 (5)	0.71 (2.7)	0.38			0 (0)	27 (12)
1006	145 (10)	1.59 (6.0)	0.83	120	1/2" MNPT	72.5 (5)	1.90 (7.2)	1.00			0 (0)	29 (13)
1310	145 (10)	2.77 (10.5)	1.59	110	3/4" MNPT	72.5 (5)	3.14 (11.9)	1.80			0 (0)	36 (16)
0814	116 (8)	3.70 (14.0)	2.12	110	3/4" MNPT	58 (4)	4.07 (15.4)	2.33			0 (0)	36 (16)

Higher viscosity fluids will reduce capacity. Liquid ends for highly viscous media have 10-20% less metering capacity and are not self-priming.

EXtronic Models with Auto-degassing Liquid Ends

Pump Version NS/PS EXBb	Capacity at Maximum Backpressure				Max. Stroking Rate spm	Connectors Tube/NPT fitting PP/ NP/NS/PS/TT inches	Suction Lift ft. (m)	Shipping Weight lbs. (kg)
	psig (bar)	U.S. GPH (L/h)	mL/ stroke					
1601	232 (16)	0.17 (0.7)	0.09		120	1/4 x 3/16	5.9 (1.8)	27 (12)
1201	174 (12)	0.26 (1.0)	0.14		120	1/4 x 3/16	6.6 (2.0)	27 (12)
0803	116 (8)	0.63 (2.4)	0.33		120	1/4 x 3/16	9.2 (2.8)	27 (12)
1002	145 (10)	0.48 (1.8)	0.25		120	1/4 x 3/16	6.6 (2.0)	27 (12)

Shipping Weight for EXBb Fireproof M Version is an additional 32 lbs. (14 kg).

(Note: Above capacities and suction lift refer to pumps tested on water at 115 VAC, 60 Hz, and an ambient temperature of 70°F (20°C). Higher specific gravity fluids will reduce suction lift. Capacities will be slightly reduced from published ratings if pumps are skid mounted).

Standard connectors are 1/2" MNPT or 5/8" hose barb. Positive suction recommended.

Pump Turn Down Ratio: 330-360:1* (Based on manufacturers recommended minimum stroke length setting - 30%) * When controller via 4-20mA

ProMinent® EXtronic® Solenoid Diaphragm Metering Pumps

Materials in Contact With Chemicals

	Liquid End	Suction/Discharge Connector	O-rings	Valve Balls (6 - 12 mm)	Balls (DN 10 and DN 15)
PP1	Polypropylene	Polypropylene	EPDM	ceramic	Borosilicate glass
PP4*	Polypropylene	Polypropylene	EPDM	-	ceramic
NP1	Acrylic	PVC	Viton®	ceramic	Borosilicate glass
NP3	Acrylic	PVC	Viton®	ceramic	-
NS3**	Acrylic	PVC	Viton®	ceramic	-
PS3**	PVC	PVC	Viton®	ceramic	-
TT1	PTFE with carbon	PTFE with carbon	PTFE	ceramic	ceramic
SS..	316 stainless steel	316 stainless steel	PTFE	ceramic	316 stainless steel

* PP4 with Hastelloy C valve springs.

** NS3 and PS3 with Hastelloy C valve springs, PVDF valve core.

Note: Viton® is a registered trademark of DuPont Dow Elastomers.

Metering pump comes with 6 ft. power cable (plug not included)

Factory Mutual System approved



Approved
(standard in Canada)



Approved

The EXtronic metering pumps are registered according to DIN-VDE 0170/0171-5.78.

ProMinent® EXtronic® Solenoid Diaphragm Metering Pumps

Identcode Ordering System: EXtronic (EXBb)

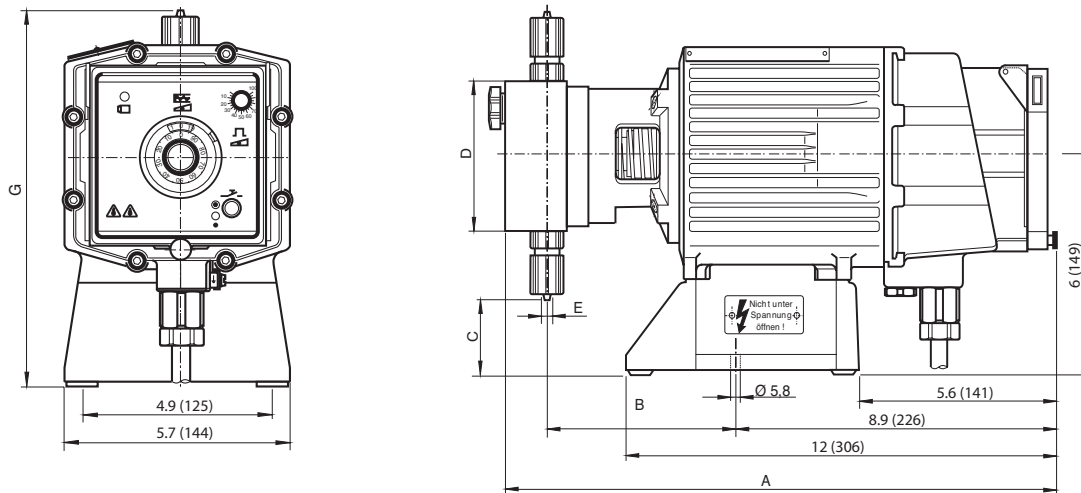
EXBb										Enclosure Type:									
	G	Explosion protection																	
	M	Fire and explosion protection: permissible liquid end material - PTFE & Stainless Steel																	
	Version Capacity:				Version Capacity:														
	1000	0.19 lph, 145 psi	0613	13.0 lph, 87 psi	*Type 2502 & 2505 only available in SS and SB														
	1601	1.0 lph, 232 psi	0417	17.4 lph, 50.8 psi	**Type 1310 only available in NP, PP4, SS and SB														
	1201	1.7 lph, 174 psi	2501***	1.14 lph, 363 psi	***Type 2501 available in SSM and SBM only														
	0803	3.7 lph, 116 psi	2505*	4.2 lph, 363 psi	❖Type 0430 & 0260 not available in SS2														
	1002	2.3 lph, 145 psi	1310**	10.5 lph, 189 psi															
	0308	8.6 lph, 43.5 psi	0814	14.0 lph, 116 psi															
	2502*	2.0 lph, 363 psi	0430❖	27.0 lph, 50.8															
	1006	6.0 lph, 145 psi	0260❖	60.0 lph, 21.8 psi															
	Liquid end materials:																		
	PP1	Polypropylene with EPDM O-rings																	
	PP4	Polypropylene for high viscosity fluid with enlarged ports, with EPDM O-rings & Hastelloy C valve springs (Only for type 1002, 1006, 1310 & 0814)																	
	NP1	Arcylic with PVC check valves & Viton® O-rings																	
	NP3	Arcylic with PVC check valves & Viton® O-rings																	
	NS3	Auto-degassing Arcylic with Viton® O-rings (Only for type 1601, 1201, 0803 & 1002)																	
	PS3	Auto-degassing PVC with Viton® O-rings (Only for type 1601, 1201, 0803 & 1002)																	
	TT1	Carbon-reinforced PTFE with PTFE O-rings																	
	S2M	316 SS with PTFE seals, 1/4" FNPT thread, except 0430, 0260																	
	SB1	316 SS with PTFE seals, for 0430, 0260 models *see note below																	
	Valve springs:																		
	0	Without springs																	
	1	With 2 springs, 316 SS, 1.4 psig (0.1 bar)																	
	Electrical connection:																		
A	230 V 50/60 Hz 1 phase																		
B	115 V 50/60 Hz 1 phase																		
D	100 V 50/60 Hz 1 phase																		
E	500 V 50/60 Hz 1 phase																		
Control type:																			
0	Stroke rate adjustment via potentiometer																		
1	External contact																		
2	Analog 0-20 mA																		
3	Analog 4-20 mA																		
Control variant:																			
0	With potentiometer (Only for control type 0)																		
1	With momentary contact push-button switch for maximum stroke rate (Not for control type 0)																		
2	With spring-return change-over switch for maximum frequency rate (not for control type 0)																		
Approval/Language:																			
0	BVS - Europe, German, 100 V - 500 V																		
1	BVS - Europe, English, 100 V - 500 V																		
2	FM - USA, English, 115 V 230 V																		
3	CSA - Canada, English, 115 V, 230 V																		
EXBb	G	1000	PP1	0	A	0	0	0	0										

*Note: 0430 requires 2x part # 792143 inserts 3/8" FNPT

*Note: 0260 requires 2x part # 792144 inserts 1/2" FNPT

ProMinent® EXtronic® Solenoid Diaphragm Metering Pumps

Dimensional Drawings

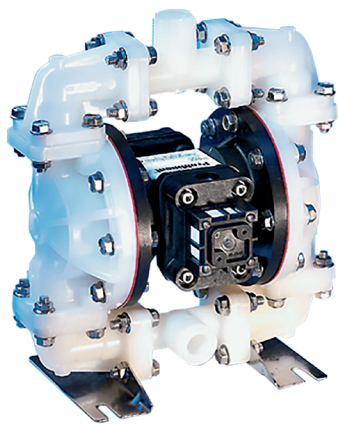


Dimensions in inches (mm)

Pump		A	B	C	D	E	F	G
1000, 1601, 1201, 0803	NP1	15.4 (391)	5.4 (136)	2.7 (69)	ø70	6 x 4	ø38	9.0 (229)
1002, 0308, 2502/05, 1006	NP1	15.4 (391)	5.4 (136)	2.4 (61)	ø85	8 x 5	ø50	9.3 (237)
1310, 0613	NP1	15.4 (391)	5.4 (136)	2.0 (52)	ø100	8 x 5	ø66	9.6 (244)
0814, 0417	NP1	15.4 (391)	5.4 (136)	2.0 (52)	ø100	12 x 9	ø66	9.6 (244)
0430	NP1	15.0 (381)	5.4 (137)	1.8 (46)	ø135	DN 10	ø117	12.0 (304)
0260	NP1	15.7 (398)	5.6 (142)	.63 (16)	ø135	DN 15	ø117	12.4 (314)
1000, 1601, 1201, 0803	PP1	15.5 (393)	5.4 (136)	2.6 (67)	ø70	6 x 4	ø38	9.3 (236)
1002, 0308, 1006	PP1	15.5 (393)	5.4 (136)	2.6 (67)	ø70	8 x 5	ø50	9.3 (236)
0613	PP1	15.5 (393)	5.4 (136)	2.2 (57)	ø90	8 x 5	ø66	9.7 (246)
0814, 0417	PP1	15.5 (393)	5.4 (136)	2.2 (57)	ø90	8 x 5	ø66	9.7 (246)
0430	PP1	15.0 (381)	5.4 (137)	1.8 (46)	ø135	DN 10	ø117	12.0 (304)
0260	PP1	15.7 (398)	5.6 (142)	.63 (16)	ø135	DN 15	ø117	12.4 (314)
1002	PP4	15.3 (389)	5.4 (138)	1.8 (46)	ø85	DN 10	ø50	8.7 (222)
1006	PP4	15.3 (398)	5.7 (145)	3.0 (76)	ø85	DN 15	ø50	8.7 (222)
1310	PP4	15.3 (398)	5.7 (145)	3.0 (76)	ø85	DN 15	ø50	8.7 (222)
1014	PP4	15.3 (398)	5.7 (145)	2.7 (69)	ø100	DN 15	ø66	9.1 (229)
1000, 1601, 1202	TT1	14.9 (378)	5.3 (134)	2.9 (75)	ø60	6 x 4	ø38	8.8 (223)
0803	TT1	14.9 (378)	5.3 (134)	2.8 (70)	ø70	6 x 4	ø38	9.0 (228)
1002, 0308, 1006	TT1	15.3 (388)	5.3 (138)	1.3 (32)	ø95	8 x 5	ø66	10.5 (266)
0613	TT1	15.3 (388)	5.4 (138)	1.3 (32)	ø95	8 x 5	ø66	10.5 (266)
0814, 0417	TT1	15.3 (388)	5.4 (138)	1.3 (32)	ø95	12 x 9	ø66	10.5 (266)
0430	TT1	15.3 (388)	5.4 (137)	1.4 (35)	ø135	DN 10	ø117	10.4 (263)
0260	TT1	15.7 (398)	5.6 (142)	1.2 (31)	ø135	DN 15	ø117	10.6 (268)
1000, 1601, 1202	SS1	14.8 (376)	5.3 (134)	3.3 (84)	ø60	6 x 5	ø38	8.4 (214)
0803	SS1	14.8 (376)	5.3 (134)	3.1 (79)	ø70	6 x 5	ø38	8.6 (219)
1002, 0308, 2502/05, 1006	SS1	15.2 (386)	5.4 (138)	1.9 (48)	ø80	8 x 7	ø50	9.8 (250)
1310, 0613	SS1	15.2 (386)	5.4 (138)	1.5 (39)	ø95	8 x 7	ø66	10.2 (259)
0814, 0417	SS1	15.2 (386)	5.4 (138)	1.5 (39)	ø95	12 x 10	ø66	10.2 (259)
0430	SS1	15.2 (386)	5.4 (137)	1.4 (35)	ø135	DN 10	ø117	10.4 (263)
0260	SS1	15.4 (390)	5.6 (142)	1.1 (28)	ø135	DN 15	ø117	10.7 (271)
1000	SB1	14.7 (373)	5.3 (134)	3.4 (87)	ø70	R1/4"	ø38	8.3 (211)
1601, 1202, 0803	SB1	14.7 (373)	5.3 (134)	3.1 (79)	ø85	R1/4"	ø38	8.6 (219)
1002, 0308, 2502/05, 1006	SB1	15.0 (381)	5.4 (138)	2.2 (56)	ø80	R1/4"	ø50	9.5 (242)
1310, 0613	SB1	15.0 (381)	5.4 (138)	1.9 (48)	ø95	R1/4"	ø66	9.8 (250)
0814, 0417	SB1	15.0 (381)	5.4 (138)	1.9 (48)	ø95	R1/4"	ø66	9.8 (250)
0430	SB1	15.0 (381)	5.4 (138)	.87 (22)	ø145	R1/4"	ø117	10.8 (275)
0260	SB1	15.1 (383)	5.5 (139)	1.1 (27)	ø145	R1/2"	ø117	11.0 (279)
1601, 1202, 0803	NS3	15.1 (383)	5.4 (136)	2.6 (67)	s. Abb.	6 x 4	ø38	9.6 (243)
1002	NS3	15.1 (383)	5.4 (136)	2.6 (67)	s. Abb.	6 x 4	ø50	9.6 (243)
1601, 1202, 0803	NS3	15.1 (383)	5.4 (136)	2.6 (67)	s. Abb.	6 x 4	ø38	9.6 (243)
1002	NS3	15.1 (383)	5.4 (136)	2.6 (67)	s. Abb.	6 x 4	ø50	9.6 (243)

ProMinent® Duodos Compressed Air Driven Dual-Diaphragm Pumps

Overview: Duodos



ProMinent® Duodos pumps are air-driven dual-diaphragm pumps for liquid media. As they are air driven they require no electric components. The feed rate can be changed by changing the pressure in the air supply. The air controller is designed for oil-free operation.

The maintenance-free air control valve ensures trouble free operation and guarantees restarting. There are no pressure relief valves required, the pump simply stops if the backpressure is too high and start automatically once the pressure has fallen.

ProMinent® Duodos pumps are self-priming and are ideal for pumping viscous and highly sensitive media.

ProMinent® Duodos pumps can pump up to approx. 10 m³/h or a feed rate of 70 m. As the feed rate depends heavily on back pressure the feed characteristic must be monitored carefully. Check the material compatibility when choosing the pump. You should also take into account density, viscosity, suspended solids and temperature of the feed media.

The following material options are available:

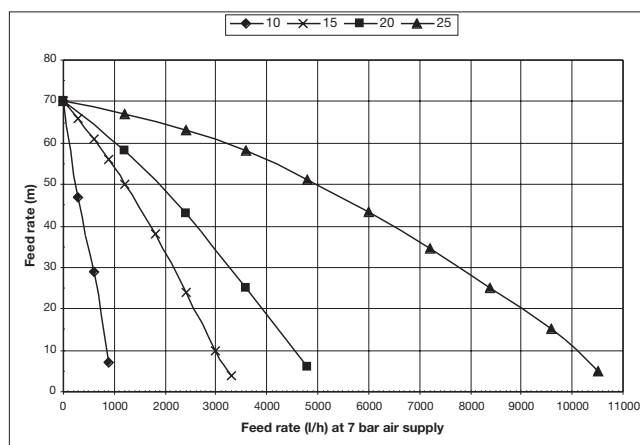
- PP pump bodies with Santoprene diaphragms and valves
- PVDF pump bodies with PTFE diaphragms and valves

Duodos PP:

Type	Feed rate L/h	Air consumption m³/h	Order no.
Duodos 10 PP	0 – 900	0.5 – 11	7902684
Duodos 15 PP	0 – 3120	3.5 – 27	7902685
Duodos 20 PP	0 – 5220	7 – 34	7902686
Duodos 25 PP	0 – 10200	8.5 – 77	7902687

Duodos PVDF:

Type	Feed rate L/h	Air consumption m³/h	Order no.
Duodos 10 PVDF	0 – 900	0.5 – 11	7902688
Duodos 15 PVDF	0 – 3120	3.5 – 27	7902689
Duodos 20 PVDF	0 – 5220	7 – 34	7902690
Duodos 25 PVDF	0 – 10200	8.5 – 77	7902691



ProMinent® Duodos Compressed Air Driven Dual-Diaphragm Pumps

Spare part kits: Duodos

Type	Order no.
Spare part kits, air drive for Duodos 10	1010810
Spare part kits, air drive for Duodos 15/20	1010811
Spare part kits, air drive for Duodos 25	7902694
Spare part kits, liquid end for Duodos 10 PP	1010801
Spare part kits, liquid end for Duodos 15 PP	1010802
Spare part kits, liquid end for Duodos 20 PP	1010803
Spare part kits, liquid end for Duodos 25 PP	7902695
Spare part kits liquid end for Duodos 10 PVDF	1010806
Spare part kits liquid end for Duodos 15 PVDF	1010807
Spare part kits liquid end for Duodos 20 PVDF	1010808
Spare part kits liquid end for Duodos 25 PVDF	7902696

Duodos Accessories:

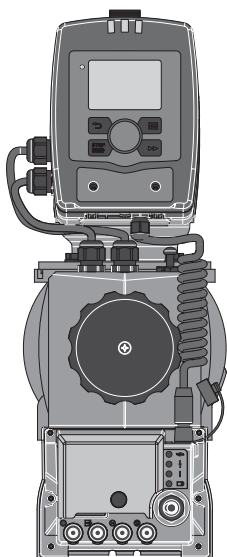
Pressure Regulator: 1/4" Process Connection, 2-150psi Range (includes a 160psi pressure gauge), -40 - 160F temperature range.	7903808
1/2" Solenoid Valve, 316SS, 120VAC, 60Hz, 12W	7903635
1/2" Ball Valve, 316SS for SS Tubing	7901416
Duodos 15 Pump Shelf (PE)	7903813
Duodos 10 Pump Shelf (PE)	7903643

Technical Data: Duodos

Type	Min. Temperature (°C)	Max. Temperature (°C)	Max. viscosity mPas	Suspended solids max. Ø	Suction capacity dry/wet
Duodos 10 PP	5	66	2160	1 mm	1.7 m / 7.7 m
Duodos 10 PVDF	- 13	93	2160	1 mm	1.7 m / 7.7 m
Duodos 15 PP	5	65	2160	3 mm	3.6 m / 8.2 m
Duodos 15 PVDF	- 13	93	2160	3 mm	2.3 m / 8.2 m
Duodos 20 PP	5	65	2160	4 mm	1.8 m / 8.2 m
Duodos 20 PVDF	- 13	93	2160	4 mm	2.1 m / 8.2 m
Duodos 25 PP	5	65	2160	6 mm	5.1 m / 8.2 m
Duodos 25 PVDF	- 13	93	2160	6 mm	5.4 m / 8.2 m

Motor-Driven Metering Pump Overview

Sigma/1



Economical mid-range applications

[\(see page 78 for complete details\)](#)

- Mechanical diaphragm pump
- Maximum pressure: 174 psi
- Stroke length: 0-100% (30% minimum recommend for most repeatable accuracy)
- Liquid ends: PVT and SST

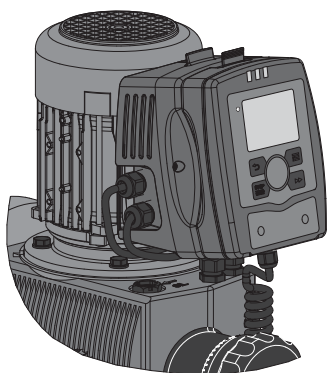
Basic Version

- Capacities: 20 L/h to 144 L/h
- Maximum pressure: 174 psi
- Turndown: 10:1

Control Version

- Microprocessor driven
- Capacities: 21 L/h to 117 L/h
- Turndown: up to 2000:1
- Stroke Frequency varies by model: digital from 1 to 90, 170, 200 spm
- Manual, external contact pulse with multiplier/divider and analog operation
- Displays L/h (gph) and totalized flow (gallons or litres)
- Flow verification
- Programmable timer as standard
- Profibus interface - PROFINET available via DULConvert module

Sigma/2



Picture 2B

Economical mid-range applications

[see page 88 for more information](#)

- Mechanical diaphragm pump
- Maximum pressure: 232 psi
- Stroke length: 0-100% (30% minimum recommend for most repeatable accuracy)
- Liquid ends: PVT and SST

Basic Version

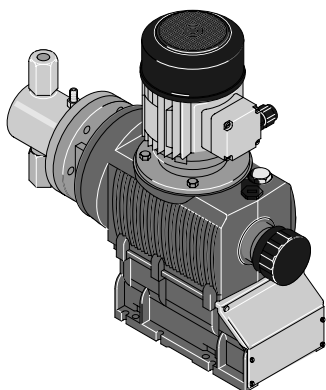
- Capacities: 160 L/h to 420 L/h
- Standard 56-C flange. Motor not included
- Turndown: 100:1 with variable speed motor
- Stroke Frequency: Only with SCR or VFD

Control Version

- Capacities: 61 L/h to 353 L/h
- Includes 115/230 V motor
- Turndown: up to 2000:1
- Stroke Frequency varies by model: digital from 1 to 90, 160, 200 spm
- Manual, external contact pulse with multiplier/divider and analog operation
- Displays L/h (gph) and totalized flow (gallons or litres)
- Flow verification
- Programmable timer as standard
- Profibus interface - PROFINET available via DULConvert module

Motor-Driven Metering Pump Overview

Sigma/2 HK



Ideal for high pressure applications requiring significant turndown

[\(see page 98 for complete details\)](#)

- Motor driven packed plunger pump
- Maximum pressure: 4600 psi
- Stroke length: 0-100% (30% minimum recommend for most repeatable accuracy)
- Liquid ends: SST

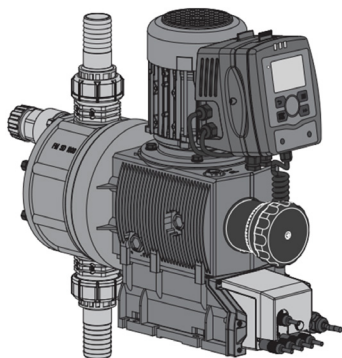
Basic Version

- Capacities: 2.3 L/h to 76 L/h
- Standard 56-C flange. Motor not included.
- Turndown: 100:1 with variable speed motor
- Stroke Frequency: Only with SCR or VFD

Control Version

- Capacities: 2.3 L/h to 65.4 L/h
- Includes 115/230 V motor
- Turndown: up to 2000:1
- Stroke Frequency varies by model: digital from 1 to 90, 160, 200 spm
- Manual, external contact pulse with multiplier/divider and analog operation
- Displays L/h (gph) and totalized flow (gallons or litres)

Sigma/3



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

[\(see page 106 for complete details\)](#)

- Mechanical diaphragm pump
- Maximum pressure: 174 psi
- Stroke length: 0-100% (30% minimum recommend for most repeatable accuracy)
- Liquid ends: PVT and SST

Basic Version

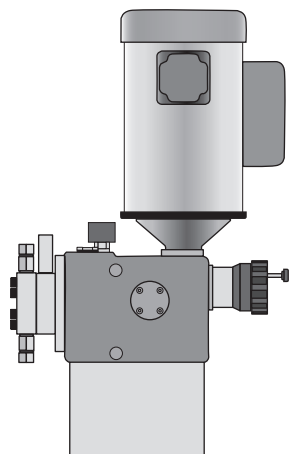
- Standard 56-C flange. Motor not included
- Capacities: 174 L/h to 1000 L/h
- Turndown: 100:1 with variable speed motor
- Stroke Frequency: Only with SCR or VFD

Control Version

- Capacities: 182 L/h to 1040 L/h
- Turndown: up to 1800:1
- Stroke Frequency varies by model: digital from 1 to 90, 120, 180 spm
- Manual, external contact pulse with multiplier/divider and analog operation
- Displays L/h (gph) and totalized flow (gallons or litres)
- Flow verification
- Programmable timer as standard
- Profibus interface - PROFINET available via DULCOnvert module

Motor-Driven Metering Pump Overview

ProMus

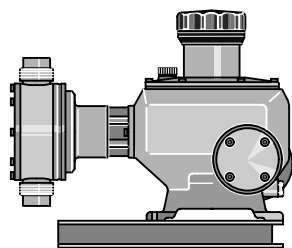


High pressure chemical process metering

[\(see page 116 for complete details\)](#)

- Hydraulic diaphragm pump
- Capacities: 0.61 gph (2.3 L/h) to 101.5 gph (384.2 L/h)
- Maximum pressure: 3500 psi
- Built in accordance to API 675
- Turndown: 100:1 with variable speed motor
- 115/60/1 motor included
- Stroke length: 0-100% (30% minimum recommend for most repeatable accuracy)
- Stroke Frequency: Only with SCR or VFD
- Liquid ends: PVT, SST, Hastelloy C and Alloy 20

Makro TZb



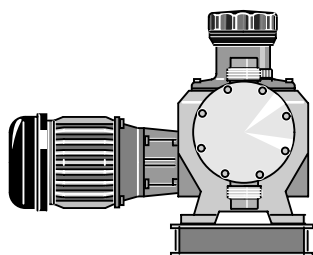
Ideal for high volume and high pressure applications

[\(see page 120 for complete details\)](#)

- Available with add-on and multi-head designs
- Capacities: 2.6 gph (10 L/h) to 529 gph (2004 L/h)
- Turndown: 100:1 with variable speed motor
- Motor not included
- Stroke length: 0-100% (30% minimum recommend for most repeatable accuracy)
- Stroke Frequency: Only with SCR or VFD
- Liquid ends: PP, PVC, TT, SST

TZMb

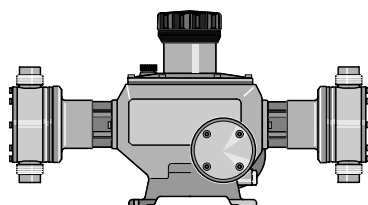
- Mechanical diaphragm pump
- Models: 82 gph (312 L/h) to 529 gph (2004 L/h)
- Maximum pressure: 174 psi



TZKb

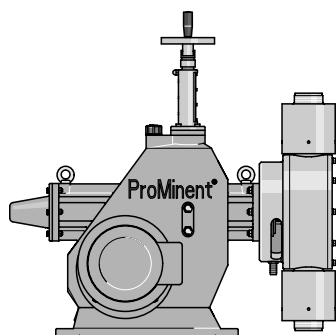
[\(Call factory for more information\)](#)

- Mechanical packed plunger pump
- Models: 2.6 gph (10 L/h) to 301 gph (1141 L/h)
- Maximum pressure: 4627 psi
- SST only



Motor-Driven Metering Pump Overview

Makro/ 5



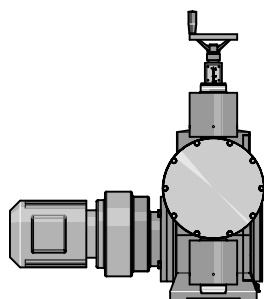
Ideal for high volume/ high pressure applications

(Call factory for more information)

- Capacities: 11 gph (44 L/h) to 1618 gph (6108 L/h)
- Available with add-on and multi-head designs
- Turndown: 100:1 with variable speed motor
- Motor included
- Stroke length: 0-100% (30% minimum recommend for most repeatable accuracy)
- Stroke Frequency: Only with SCR or VFD
- Liquid ends: PP, PVC, TT, SST

M5Ma

- Mechanical diaphragm pump
- Models: 482 gph (1812 L/h) to 1076 gph (4064 L/h)
- Maximum pressure: 58 psi

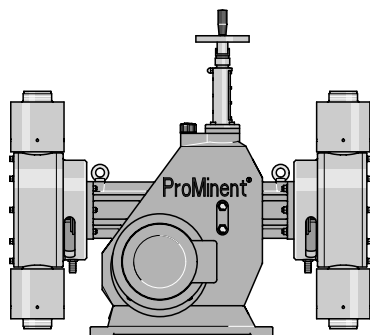


M5Ha

- Hydraulic diaphragm pump
- Models: 142 gph (537 L/h) to 1618 gph (6108 L/h)
- Maximum pressure: 362 psi

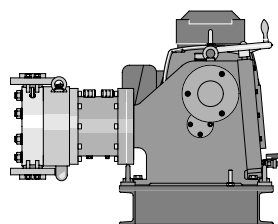
M5Ka

- Mechanical packed plunger pump
- Models: 11 gph (44 L/h) to 1593 gph (6014 L/h)
- Maximum pressure: 4640psi
- SST only

product
overviewsolenoid-driven
metering pumpsmotor-driven
metering pumpspump spare parts &
accessoriesDULCOMETER®
instrumentationDULCOTEST®
sensorsstandard & custom
systems

Motor-Driven Metering Pump Overview

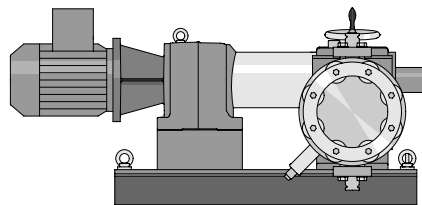
ORLITA®



Ideal for high volume applications
(Call factory for more information)

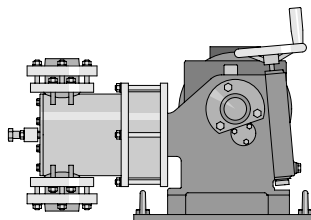
MfS

- Hydraulic diaphragm pump
- Capacities: 0.5 gph (2 L/h) to 7500 gph (28,400 L/h)
- Maximum pressure: 10,000 psi (700 bar)
- Built in accordance to API 675



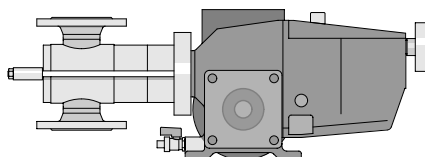
MhS

- Hydraulic diaphragm pump
- Capacities: 0.26 gph (1 L/h) to 200 gph (757 L/h)
- Maximum pressure: 44,000 psi (3000 bar)
- Stainless steel diaphragm
- Built in accordance to API 675



PS

- Plunger metering pump
- Capacities: 0.26 gph (1 L/h) to 9,800 gph (2,600 L/h)
- Maximum pressure: 5,800 psi (400 bar)
- Stainless steel only
- Built in accordance to API 675



DR

- Valveless rotary piston pump
- Capacities: 0.26 gph (1 L/h) to 1,100 gph (4,000 L/h)
- Maximum pressure: 5800 psi (400 bar)
- Stainless steel only

product overview

solenoid-driven metering pumps

motor-driven metering pumps

pump spare parts & accessories

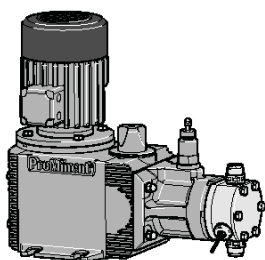
DULCOMETER® instrumentation

DULCOTEST® sensors

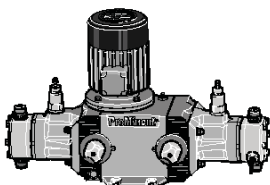
standard & custom systems

Motor-Driven Metering Pump Overview

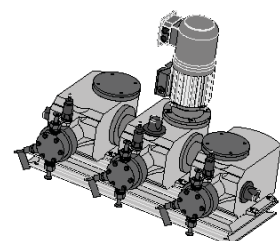
Hydro



pk_2_074



pk_2_073



P_PZ_0001_SW1

High pressure chemical process metering

[\(see page 123 for complete details\)](#)

The Hydro Hydraulic Diaphragm Metering Pumps are adjustable to a large range of requirements thanks to its modular concept: single or double head version (optional), 4 gear reductions, 2 liquid end sizes and 3 liquid end materials. In addition the Hydro offers an internal pressure relief valve as well as multi-layer diaphragm with rupture detection for added safety.

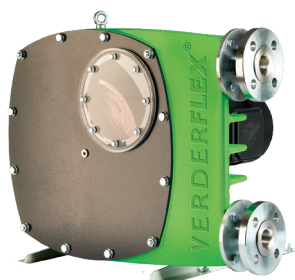
Advantages

- High process safety: multi-layer diaphragm with integrated diaphragm rupture detection as well as integrated hydraulics relief valve.
- High process quality: metering reproducibility better than ± 1 %
- Further application area, adjustable to capacity requirement and medium to be dosed
- Available as single or double-head version
- In double-head versions the liquid ends are operated in push-pull manner (boxer principle)
- Each liquid end is equipped with a separate stroke length adjustment device so that each liquid end can be operated at an independent feed rate.
- Stroke length: 0.59" (15 mm), adjustable with 1% accuracy
- Manual stroke length adjustment with optional actuator or speed controller
- Gear housing: cast aluminum
- Liquid end materials: PVDF, stainless steel, Hastelloy C
- Multi-layer diaphragm with integrated diaphragm rupture signaling
- Reproducibility of metering at defined conditions and correct installation better than ± 1 % (stroke length area 20 - 100 %)
- Preset pressure relief valve integrated in hydraulics

Verderflex® Industrial Hose Pumps

[\(see page 61 for complete details\)](#)

The VERDERFLEX product group consists of a well-balanced high quality range of industrial hose pumps for heavy-duty applications. As with all series of VERDERFLEX pumps, current emphasis is on reduced downtime with minimal maintenance, easy operation and continuous quality improvement.



Advantages of VERDERFLEX

- Specially designed hose construction to postpone fatigue, resulting in longer service life of the hose
- Close coupled drive design
- Rigid pump housing design for heat dispersion and strength
- Simplified hose connection for easier maintenance and disaster proof pump design
- Channels for complete drainage prior to maintenance

Verderflex® Dura Industrial Hose Pump

[\(see page 63 for complete details\)](#)

The DURA series form a new generation of smaller hose pumps; the DURA 5, DURA 7, DURA10, DURA15, DURA25, DURA 35, DURA 45 and DURA 55, based on an innovative long coupled design with close coupled advantages. The features of this pump surpass all other hose pumps giving Verder the world's most reliable, robust pump with exceptional dosing features.



- Longer hose life
- Quick & easy maintenance
- High levels of accuracy ± 3 % and repeatability ± 1 %
- Long coupled design with close coupled advantages
- Up to 25% reduction in operational noise.

ProMinent® Sigma X Range of Diaphragm Metering Pumps Sigma/ 1 Metering Pumps

Overview: Sigma/ 1

Ideal for Economical mid-range applications

(see [page 143](#) for spare parts and [page 153](#) for control cables)

The Sigma X range of diaphragm metering pumps covers a capacity range of 21 – 1040 l/hr through versions Sigma 1, Sigma 2 and Sigma 3.

A new standardised feature carrying on from the solenoid pump range is the introduction of the click wheel and 4 push buttons for programming the control version of the pumps. The larger illuminated LCD on the HMI offers operating convenience and the 3 LED's on top of the HMI give status indication for operating, warning and errors and are visible from all around the pump.

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

The reproducible metering accuracy is better than $\pm 2\%$ 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 analog signal (e.g., 0/4-20 mA) control options.

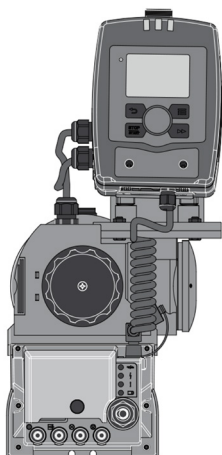
For safety reasons, all motor-driven metering pumps must be equipped with adequate protection against electrical overload.

All PVDF versions are NSF/ANSI 61 approved.

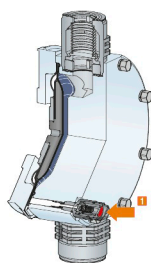
Diaphragm Failure Indication

The delivery unit has a patented multilayer safety diaphragm as standard and a visual diaphragm rupture indicator. The diaphragm is coated with PTFE film on both sides, from the drive and working side. This guarantees that no discharge to the outside occur if the diaphragm ruptures. When the diaphragm ruptures, feed chemical enters between the diaphragm layers and triggers a mechanical indication or an alarm via the sensor area. This concept ensures reliable metering - even under critical operating conditions.

In connection with the S1Cb, continued metering, or alternatively, a stopping of the metering pump can be selected.



S1Cb



Sigma/ 1 Basic Type (S1Ba)

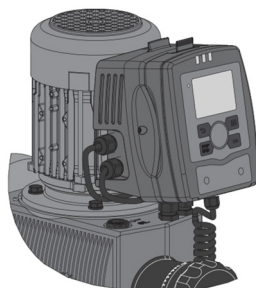
The ProMinent® Sigma Basic type is a motor-driven metering pump with no internal electronic control system. The ProMinent® S1Ba has a number of different drive options, including the single phase AC motor or a 3 phase motor.

Sigma/1 Control Type (S1Cb)

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

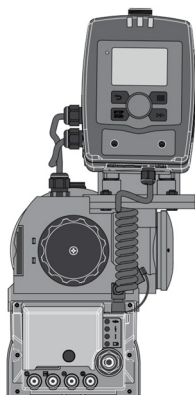
The microprocessor controller of the Sigma X range of pumps features the optimum combination of variable AC frequency controlled stroking with digital stroking frequency, this ensures exact metering even when down in the low speed range due to the individual stroking characteristic.

Local or remote control is possible with PROFIBUS® ([page 153](#)) and/or an integrated process timer.



ProMinent® Sigma X Range of Diaphragm Metering Pumps Sigma/ 1 Metering Pumps

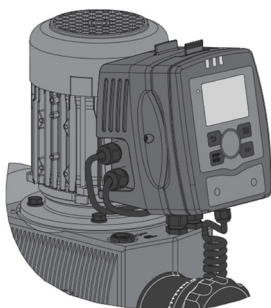
Sigma/ 1 control type (S1Cb)



P_SI_0129_SW

- Removable HMI operating unit with large illuminated LCD
- Metering profiles for optimum metering results
- Energy-optimised motor control for enhanced efficiency
- Control versions: Analog, external contact, pulse control (batch) PROFIBUS®, CAN bus, process Timer

Detachable operating unit (HMI)



The operating unit (HMI) can be attached directly to the metering pump or mounted on the wall alongside the pump or completely removed. This provides the operator with a wide range of options for the integration of a metering system into the overall system that it is readily accessible and easy to use. Moreover, the removable operating unit offers additional protection against unauthorised operation of the metering pump or against changing of the pump settings.

The individual functions of the metering pump can be easily selected and adjusted via the click wheel and 4 push buttons. The larger illuminated LCD on the HMI offers operating convenience and the 3 LED's on top of the HMI give status indication for operating, warning and errors and are visible from all around the pump.

Differences S1Ba/S1Ca to S1Ba/S1Cb

The basic version of the pump S1Ba is identical, no changes are made. From S1Ca to S1Cb, the mounting connections and liquid end connections are the same. The S1Cb is 4mm taller than the S1Ca, this is due to the new HMI. The front housing with power cord and cable connections is 6mm longer.

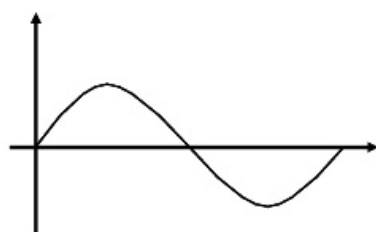
ProMinent® Sigma X Range of Diaphragm Metering Pumps Sigma/ 1 Metering Pumps

Overview: Sigma/ 1 Diaphragm Metering Profiles

Metering profiles ensure optimum metering results, thanks to the behaviour of the metering pump being matched to the chemicals or application.

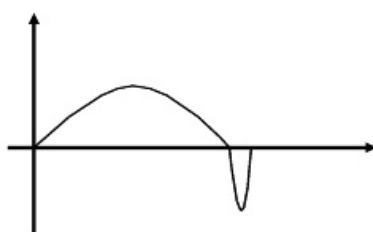
The stroke movement of the diaphragm pump is continuously measured and controlled, so that the stroke is executed according to the desired metering profile. The pump can be operated in normal mode (Diagram 1), with optimised discharge stroke (Diagram 2) or with optimised suction stroke (Diagram 3). Three typical metering profiles are shown schematically with the behaviour over time.

In normal operating mode the time behaviour for the suction stroke and the discharge stroke is similar



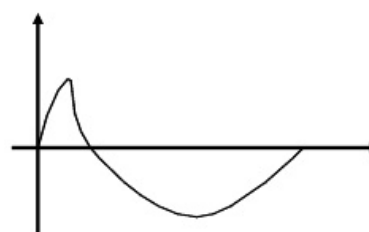
P_SI_0102_SW

Diagram 1: discharge stroke, suction stroke equal



P_SI_0103_SW

Diagram 2: long discharge stroke, short suction stroke



P_SI_0104_SW

Diagram 3: short discharge stroke, long suction stroke

(Diagram 2) the discharge stroke is extended while the suction stroke is performed as quickly as possible. This setting is, for example, useful for applications that require optimized chemical mixing.

(Diagram 3) In the mode with the optimized suction stroke, the suction stroke is carried out as slowly as possible, which permits precise and trouble-free metering of viscous and gaseous media. This setting should also be chosen to minimise the NPSH value.

“Physiologically safe (FDA) in respect of wetted materials” version.

A version of the pump liquid end is available with the Identcode selection **“Version” F**. This will provide a pump with all wetted materials complying with the “Physiologically safe (FDA) in respect of wetted materials”.

FDA guidelines:

- Material PTFE: FDA No. 21 CFR § 177.1550
- Material PVDF: FDA No. 21 CFR § 177.2510

Available for material version PVT and SST.

ProMinent® Sigma X Range of Diaphragm Metering Pumps Sigma/ 1 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, that 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 totaled capacity is also displayed in either U.S. gallons or litres.

The click wheel and 4 push buttons are used to scroll through the menu screens and select functions, the lower part of the display can be customised to show additional relevant operating information.

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 with 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”

An optional flow monitor can be used to monitor the pump stroke volume each time the pump strokes, each pump stroke volume is measured via the flow monitor and confirmed back to the pump control. If insufficient fluid is discharged for a pre-determined number of strokes (up to 125) the pump can generate a warning fault and continue to run or stop. If selected, the optional fault relay can change state and generate an alarm. Important, the recommended operation for the Sigma pump and flow monitor is for use with contact mode, use with Manual or Analog mode can cause errors due to the change in pump discharge stroke impulse / duration.

“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 illuminates 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 a low level symbol and the red LED illuminates. 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 the Prime button, you can determine the amount of ‘Priming Time’ by adjusting in the Menu – Settings – Priming Time – then adjustable via the clickwheel.

Function and Error Indicators

Three LED lights on the pump HMI 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 a symbol will appear on the HMI display specific to the fault and the red LED illuminates.



ProMinent® Sigma X Range of Diaphragm Metering Pumps Sigma/ 1 Metering Pumps

Modes and Functions

Control Modes

“Analog” Mode

With this feature, 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 click wheel / push button.

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

By simply entering a factor in the 0.01-100 range, the step-up or step-down ratio is set.

For example:

Step-up Factor:

100 1 pulse = 100 pump strokes

10 1 pulse = 10 pump strokes

Step-down Factor:

0.25 4 pulses = 1 pump stroke

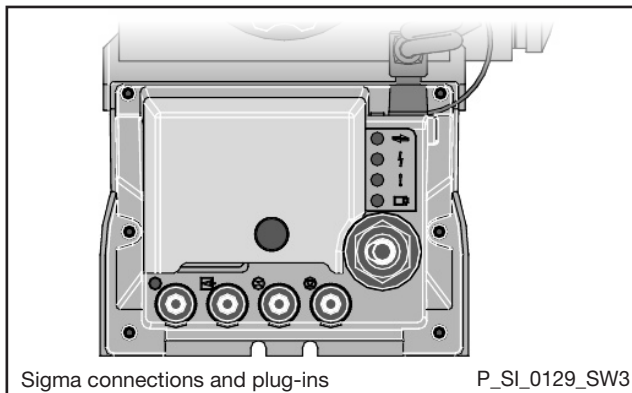
0.01 100 pulses = 1 pump stroke

“Batch” Mode

The Batch mode is a variation of the contact operating mode. A number of strokes can be predetermined up to 99,999 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.



Sigma connections and plug-ins

P_SI_0129_SW3

Relay outputs

Option 1 : Fault Annunciating Relay

This relay is fully programmable on the HMI to be a fault or warning relay and can be configured for normally energized or normally de-energised operation. Fault or warning indications can be given for low tank level (level switch), loss of flow (flow monitor), loss of analog input signal, diaphragm rupture (sensor), system faults and fuse / power supply failure. Additional functions can be set depending on pump options.

Option 3 : Fault & Pacing Relay

These relays are programmable on the HMI, in addition to the fault relay , there is an additional relay that generates a contact closure with each pump stroke (contact duration 150 ms). This signal can be used to allows a second ProMinent metering pump to be paced synchronously, to totalize flow with an external stroke counter or to send stroke confirmation to a PLC.

Option 8 : 4 – 20 mA Output and Fault or Pacing Relay

In addition to having either a fault or pacing relay as per above, there is also a 4 – 20 mA output signal that is available at can be programmed to correspond to either, strokes per

minute, capacity or selected capacity at 20 mA. The 4 – 20 mA output is an isolated powered signal, can drive up to 300 Ohms impedance and is untional in all 4 operating modes.

Timer Function

The pump comes with an integrated timer as a standard feature. With this you can create up to 32 commands (program lines) that allow you to start, stop the pump at predetermined times, change operating mode and activate / deactivate the pump relay etc. For the timed operation, this can be selected as hourly, daily, weekdays, weekend weekly or monthly. The set up is done via the click wheel and push buttons.”

Profibus®

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

CANopen option is also available.

ProMinent® Sigma X Range of Diaphragm Metering Pumps Sigma/ 1 Metering Pumps

Specifications

General:

Maximum stroke length:	4.0 mm		
Power cord:	2 m, CSA approved cord on Control versions, Basic version without power cord		
Stroke frequency control:	S1Ba: Constant speed or optional DC/SCR drive or AC inverter S1Cb: Microprocessor control version with innovative start/stop and variable speed control proportional to set frequency or external control signal.		
Stroke counting:	Standard on S1Cb		
Materials of construction			
Housing:	Glass-filled Luranyl™ (PPE)		
Wetted materials of construction:	Liquid End:	PVDF	316 SS
	Suct./Dis. Connectors:	PVDF	316 SS
	Seals:	PTFE/Viton®	PTFE/Viton®
	Check Balls:	Ceramic	SS
Drive:	Cam and spring-follower (lost motion)		
Lubrication:	Sealed grease lubricated bearings and gearing		
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, cMETus, NSF/ANSI 61		
Diaphragm materials:	PTFE faced EPDM with Nylon reinforcement and steel core		
Liquid end options:	Polyvinylidene Fluoride (PVDF) or 316 SS, with PTFE faced Viton® seals		
Check valves:	Single ball check, PVDF and SS versions. Optional springs available in Hastelloy C		
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	65°C	100°C
	316 SS	90°C	120°C
Diaphragm failure indication:	Visual indicator is standard. The pump has a patented multilayer safety diaphragm as standard and a visual diaphragm rupture indicator.		
Max. solids size in fluid:	0.3 mm		
Stroke length adjustment:	Manual, in increments of 1%. Motorized stroke length adjustment is available for S1Ba.		
Viscosity:	1-500 cPs Standard liquid end (PVTS0, A0) 500-3000 cPs Standard liquid end with springs (PVTS1, A1)* * Slower stroke rate recommended		
Sigma/1 Basic Version			
Motor:	See available motors in Identcode Motors on the basic version (S1Ba) are supplied without a power cord, the motor requires external overload protection		

ProMinent® Sigma X Range of Diaphragm Metering Pumps Sigma/ 1 Metering Pumps

Specifications (Cont.)

Sigma/1 Control Version

Control Function: At stroke frequencies equal to or greater than 25%, the integral AC variable frequency drive continuously varies the motor speed in a linear response to the incoming signal. At stroke frequencies less than 25%, the motor starts and stops according to a control algorithm to provide the desired stroke frequency.

Enclosure rating: (IP 65)

Motor data: Totally enclosed, fan cooled (IP55); class F insulation; IEC frame; 1/8 HP (0.09 kW) , 3 phase. Full motor data sheet in operating instructions.

Relay load

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

Fault and pacing relay (option 3): Contact load: max. 24 V, AC/DC, max. 100 mA
maximum 50x10⁶ switch cycles @ 10 V, 10 mA
Contact closure: 100 ms (for pacing relay)

Analog output signal (option 8): maximum impedance 300 Ohms
Isolated 4-20 mA output signal

Relay cable (optional): 2 m, 3 wire (SPDT) 250 VAC, 2 A

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.)

Max. pulse frequency: 25 pulses/sec

Contact impedance: 10 kOhm

Max. pulse memory: 99,999 pulses

Necessary contact duration: 20ms

Analog - current input burden: Approximately 120 Ohm

Max. allowable input current: 50 mA

Power requirements: Single phase, 100-230 VAC \pm 10%, 50/60 Hz

Capacity Data Notice

(The following capacities and suction lift refer to pumps tested on water at 115 VAC, 60 Hz, and an ambient temperature of 20° C. Higher specific gravity fluids will reduce suction lift. Capacities will be slightly reduced from published ratings if pumps are skid mounted).

ProMinent® Sigma X Range of Diaphragm Metering Pumps Sigma/ 1 Metering Pumps

Capacity Data

Technical data:	60 Hz (1800 RPM) operation *Capacity at Maximum Pressure		Max. Stroke Rate	Output per Stroke	Max. Suction Lift	Max. Suction Pressure	Suction / Discharge Connector		Shipping Weight w/ Motor
Pump Version S1Ba H	psig	L/h	Stroke/ min	ml/ stroke	Water m	psig	DN	in	approx. kg
12017 PVT	145	20	88	4	7	14.5	10	1/2 MNPT	9
12017 SST	174	20	88	4	7	14.5	10	3/8 FNPT	12
12035 PVT	145	42	172	4	7	14.5	10	1/2 MNPT	9
12035 SST	174	42	172	4	7	14.5	10	3/8 FNPT	12
10050 PVT	145	60	246	4	7	14.5	10	1/2 MNPT	9
10050 SST	145	60	246	4	7	14.5	10	3/8 FNPT	12
10022 PVT	145	26	88	5.1	6	14.5	10	1/2 MNPT	9
10022 SST	145	26	88	5.1	6	14.5	10	3/8 FNPT	12
10044 PVT	145	53	172	5.1	6	14.5	10	1/2 MNPT	9
10044 SST	145	53	172	5.1	6	14.5	10	3/8 FNPT	12
07065 PVT	102	78	246	5.1	6	14.5	10	1/2 MNPT	9
07065 SST	102	78	246	5.1	6	14.5	10	3/8 FNPT	12
07042 PVT	102	50	88	9.7	3	14.5	15	3/4 MNPT	10
07042 SST	102	50	88	9.7	3	14.5	15	1/2 FNPT	14
04084 PVT	58	101	172	9.7	3	14.5	15	3/4 MNPT	10
04084 SST	58	101	172	9.7	3	14.5	15	1/2 FNPT	14
04120 PVT	58	144	246	9.7	3	14.5	15	3/4 MNPT	10
04120 SST	58	144	246	9.7	3	14.5	15	1/2 FNPT	14

* Flow rates and shipping weights are for 1/8 HP standard motors. Addition of 1/3 HP or 1/2 HP motors may increase output (consult factory for details.)

Sigma/1 Control Version

Technical data:	60 Hz (1800 RPM) operation *Capacity at Maximum Pressure		Max. Stroke Rate	Output per Stroke	Max. Suction Lift	Max. Suction Pressure	Suction / Discharge Connector		Shipping Weight w/ Motor
Pump Version S1Cb H	psig	L/h	Stroke/ min	ml/ stroke	Water m	psig	DN	in	approx. kg
12017 PVT	145	21	90	4	7	14.5	10	1/2 MNPT	9
12017 SST	174	21	90	4	7	14.5	10	3/8 FNPT	12
12035 PVT	145	42	170	4	7	14.5	10	1/2 MNPT	9
12035 SST	174	42	170	4	7	14.5	10	3/8 FNPT	12
10050 PVT	145	49	200	4	7	14.5	10	1/2 MNPT	9
10050 SST	145	49	200	4	7	14.5	10	3/8 FNPT	12
10022 PVT	145	27	90	5.1	6	14.5	10	1/2 MNPT	9
10022 SST	145	27	90	5.1	6	14.5	10	3/8 FNPT	12
10044 PVT	145	53	170	5.1	6	14.5	10	1/2 MNPT	9
10044 SST	145	53	170	5.1	6	14.5	10	3/8 FNPT	12
07065 PVT	102	63	200	5.1	6	14.5	10	1/2 MNPT	9
07065 SST	102	63	200	5.1	6	14.5	10	3/8 FNPT	12
07042 PVT	102	52	90	9.7	3	14.5	15	3/4 MNPT	10
07042 SST	102	52	90	9.7	3	14.5	15	1/2 FNPT	14
04084 PVT	58	101	170	9.7	3	14.5	15	3/4 MNPT	10
04084 SST	58	101	170	9.7	3	14.5	15	1/2 FNPT	14
04120 PVT	58	117	200	9.7	3	14.5	15	3/4 MNPT	10
04120 SST	58	117	200	9.7	3	14.5	15	1/2 FNPT	14

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

In Version "F" the ball seat is made of PVDF.

ProMinent® Sigma X Range of Diaphragm Metering Pumps

Sigma/ 1 Metering Pumps

Identcode Ordering System: Sigma/ 1 Basic (S1Ba)

S1Ba	Drive Type:												
	H	Main Drive, Diaphragm											
		Verison: Capacity:											
		12017*	20 l/h, 145 psi	07065	78 l/h, 102 psi	<div>* For SST versions. Maximum 174 psi</div> <div>NOTE: Refer to technical data for capacities and stroke rates</div>							
		12035*	42 l/h, 145 psi	07042	50 l/h, 102 psi								
		10050	60 l/h, 145 psi	04084	101 l/h, 58 psi								
		10022	26 l/h, 145 psi	04120	144 l/h, 58 psi								
		10044	53 l/h, 145 psi										
		Liquid end material:											
		PV	PVDF										
		SS	316 Stainless Steel										
		Seal:											
		T	PTFE seal										
		F	FDA Compliant										
		Diaphragm type:											
		A	Multilayer safety diaphragm wih rupture indication (contact)										
		S	Multilayer safety diaphragm wih visual rupture indication										
		Liquid end version:											
		0	Without valve springs										
		1	With 2 valve springs (Hastelloy C4, 1 psig) (For viscosities between 500-3,000 cPs)										
		Hydraulic connections:											
		7	PVDF union nut & threaded insert										
		8	SS union nut & threaded insert										
		Version:											
		0	Standard with logo										
		5	Liquid End left										
		Electrical Connection : Motor Supplied Without Power Cord, Requires External Overload Protection											
		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												
Enclosure rating:													
0	Standard												
Stroke sensor:													
0	Without stroke sensor (Standard)												
Stroke length adjustment:													
0	Manual (Standard)												
1	with 3P stroke positioning motor, 85 - 265 VAC 50/60 Hz												
4	with stroke positioning motor, 4-20 mA 85 - 265 VAC 50/60 Hz												
S1Ba	H	12017	PV	T	0	0	7	0	N	0	0	0	

ProMinent® Sigma X Range of Diaphragm Metering Pumps Sigma/ 1 Metering Pumps

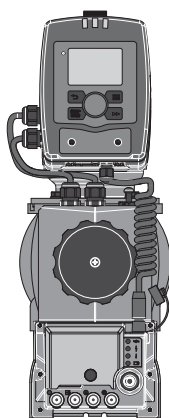
Identcode Ordering System: Sigma/ 1 Control (S1Cb)

S1Cb	Drive Type																
	H	Main Drive, Diaphragm															
	Version: Capacity:																
	12017*	21 l/h, 145 psi	07065	63 l/h, 102 psi													
	12035*	42 l/h, 145 psi	07042	52 l/h, 102 psi													
	10050	49 l/h, 145 psi	04084	101 l/h, 58 psi	* For SST versions. Maximum 174 psi												
	10022	27 l/h, 145 psi	04120	117 l/h, 58 psi	NOTE: Refer to technical data for capacities and stroke rates												
	10044	53 l/h, 145 psi															
	Liquid end material:																
	PV	PVDF (maximum 145 psi)															
	SS	316 Stainless Steel															
	Seal:																
	T	PTFE seal															
	F	FDA Compliant															
	Diaphragm type:																
	A	Multilayer safety diaphragm with rupture indication (contact) and pump stop															
	S	Multilayer safety diaphragm with visual rupture indication															
	Liquid end version:																
	0	Without valve springs															
	1	With 2 valve springs (Hastelloy C4, 1 psig) (For viscosities between 500-3,000 cPs)															
	Hydraulic connections:																
	7	PVDF union nut and threaded insert															
	8	SS union nut and threaded insert															
	Version:																
	0	Standard with logo															
	5	Liquid End Left															
	Electrical Connection (± 10%):																
	U	1 ph, 115-230 V (± 10%), 50/60 Hz															
	Cable and plug with 2 m power cord, single phase:																
	D	2m CANADA / USA, 115 V															
	U	2m CANADA / USA, 230 V															
	Relay:																
	0	No relay															
	1	Fault Relay															
	3	Fault Relay + Pacing Relay, both contacts rated 24 V, 100 mA															
	8	4-20 mA output + Fault or Pacing contact rated 24 V, 100 mA															
	Control variant:																
	1	Manual + External with pulse controls & analog control															
	6	Option 1 + PROFIBUS															
	Over pressure switch-off																
	0	without overpressure switch-off															
	Operating unit (HMI)																
	0	HMI with click wheel and 0.5 m cable															
	4	HMI with click wheel and 2.0 m cable															
	5	HMI with click wheel and 5.0 m cable															
	6	HMI with click wheel and 10.0 m cable															
	X	Without HMI															
Access Code:																	
0	No access code																
1	Access code																
Language:																	
	EN	English															
	FR	French															
S1Cb	H	12017	PV	T	A	0	7	0	U	D	0	0	0	1	0	EN	

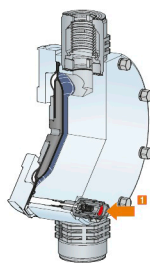
ProMinent® Sigma X Range of Diaphragm Metering Pumps

Sigma/ 2 Metering Pumps

Overview: Sigma/ 2



P_SI_0131_SW



P_SI_0130_SW

Ideal for Economical mid-range applications

(see [page 143](#) for spare parts and [page 153](#) for control cables)

The Sigma X range of diaphragm metering pumps covers a capacity range of 21 – 1040 l/hr through versions Sigma 1, Sigma 2 and Sigma 3.

A new standardised feature carrying on from the solenoid pump range is the introduction of the click wheel and 4 push buttons for programming the control version of the pumps. The larger illuminated LCD on the HMI offers operating convenience and the 3 LED's on top of the HMI give status indication for operating, warning and errors and are visible from all around the pump.

The ProMinent® Sigma/ 2 is a mechanically actuated diaphragm metering pump. It has a capacity range of 60-420 L/h at a maximum back pressure of 58-232 psi. The pump capacity is adjusted by varying the stroke length (5 mm) in 1% increments via a self-locking adjusting knob.

The reproducible metering accuracy is better than $\pm 2\%$ 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, two liquid end sizes, two liquid end materials and either contact or analog signal (e.g., 0/4-20 mA) control options.

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

All PVDF versions are NSF/ANSI 61 approved.

Diaphragm Failure Indication

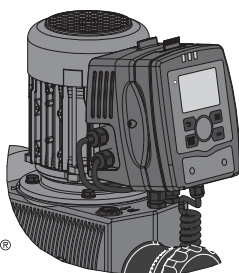
The liquid end has a patented multilayer safety diaphragm as standard and a visual diaphragm rupture indicator. The diaphragm is coated with PTFE film on both sides, from the drive and working side. This guarantees that no discharge to the outside occur if the diaphragm ruptures. When the diaphragm ruptures, feed chemical enters between the diaphragm layers and triggers a mechanical indication of an alarm via the sensor area. This concept ensures reliable metering - even under critical operating conditions.

In connection with the S2Cb, continued metering, or alternatively, a stopping of the metering pump can be selected in conjunction with the identcode selection "A" under diaphragm type.

Sigma/ 2 Basic Type (S2Ba)

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/ 2 Control Type (S2Cb)



P_SI_00999_SW3

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

The microprocessor controller of the Sigma pumps, featuring the optimum combination of variable AC frequency combined with digital stroking frequency, this ensures exact metering even when down in the low speed range due to the individual stroking characteristic.

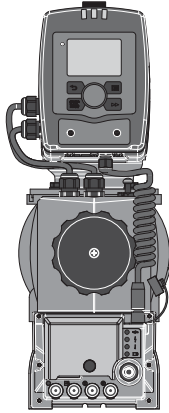
The individual functions of the metering pump can be easily selected and adjusted via the click wheel and 4 push buttons. The larger illuminated LCD on the HMI offers operating convenience and the 3 LED's on top of the HMI give status indication for operating, warning and errors and are visible from all around the pump.

Local or remote control is possible with PROFIBUS® ([see page 153](#)) and/or an integrated process timer.



ProMinent® Sigma X Range of Diaphragm Metering Pumps Sigma/ 2 Metering Pumps

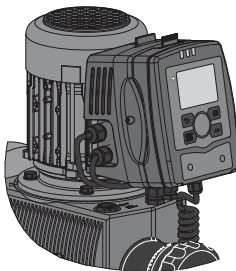
Sigma/ 2 control type (S2Cb)



P_SI_0129_SW

- Removable HMI operating unit with large illuminated LCD
- Metering profiles for optimum metering results
- Energy-optimised motor control for enhanced efficiency
- Control versions: Analog, external contact, pulse control (batch) PROFIBUS®, CAN bus, process Timer

Detachable operating unit (HMI)



P_SI_00999_SW3

The operating unit (HMI) can be attached directly to the metering pump or mounted on the wall alongside the pump or completely removed. This provides the operator with a wide range of options for the integration of a metering system into the overall system that it is readily accessible and easy to use. Moreover, the removable operating unit offers additional protection against unauthorised operation of the metering pump or against changing of the pump settings.

The individual functions of the metering pump can be easily selected and adjusted via the click wheel and 4 push buttons. The larger illuminated LCD on the HMI offers operating convenience and the 3 LED's on top of the HMI give status indication for operating, warning and errors and are visible from all around the pump.

Differences S2Ba/S2Ca to S2Ba/S2Cb

The basic version of the pump S2Ba remains as the S2Ba. There are no changes made to this pump.

From the S2Ca to S2Cb, the new S2Cb liquid end sits 14 mm lower due to the removal of the heat sink between the upper/lower housings. For applications with rigid piping and a S2Ca is being replaced with an equivalent S2Cb, there is a base plate available to accommodate this difference, Part # 1044841. The mounting connections and liquid end centrelines will be identical using this base plate.

The S2Cb is 5 mm taller than the S2Ca. This is due to the new HMI. The front housing with power cord and cable connections is 6mm longer.

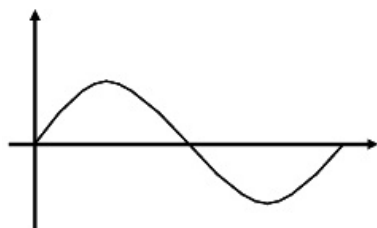
ProMinent® Sigma X Range of Diaphragm Metering Pumps Sigma/ 2 Metering Pumps

Overview: Sigma/ 2 Diaphragm Metering Profiles

Metering profiles ensure optimum metering results, thanks to the behaviour of the metering pump being matched to the chemicals or application.

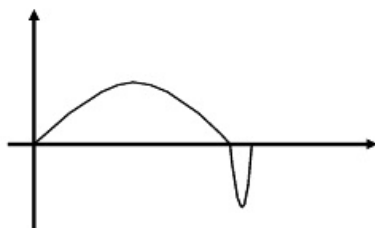
The stroke movement of the diaphragm pump is continuously measured and controlled, so that the stroke is executed according to the desired metering profile. The pump can be operated in normal mode (Diagram 1), with optimised discharge stroke (Diagram 2) or with optimised suction stroke (Diagram 3). Three typical metering profiles are shown schematically with the behaviour over time.

In normal operating mode the time behaviour for the suction stroke and the discharge stroke is similar



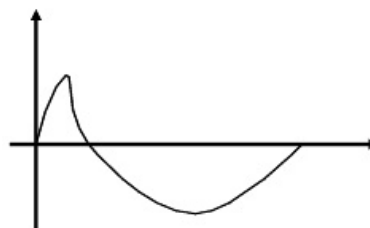
P_SI_0102_SW

Diagram 1: discharge stroke, suction stroke equal



P_SI_0103_SW

Diagram 2: long discharge stroke, short suction stroke



P_SI_0104_SW

Diagram 3: short discharge stroke, long suction stroke

(Diagram 2) the discharge stroke is extended while the suction stroke is performed as quickly as possible. This setting is, for example, useful for applications that require optimized chemical mixing.

(Diagram 3) In the mode with the optimized suction stroke, the suction stroke is carried out as slowly as possible, which permits precise and trouble-free metering of viscous and gaseous media. This setting should also be chosen to minimise the NPSH value.

Automatic excess pressure switch-off as a pump protection function

The metering pump control also measures the movement and speed profile in conjunction with the power demand. The power supply can be limited to the actual power required and hence the efficiency increased using this data.

Analysis of the power requirement leads to automatic pressure monitoring of the metering pump. This facilitates the internal overload shutdown of the metering pump. The overload shutdown is not a replacement for the system having its own protection device.

“Physiologically safe (FDA) in respect of wetted materials” version.

A version of the pump liquid end is available with the Identcode selection **“Version” F**. This will provide a pump with all wetted materials complying with the “Physiologically safe (FDA) in respect of wetted materials”.

FDA guidelines:

- Material PTFE: FDA No. 21 CFR § 177.1550
- Material PVDF: FDA No. 21 CFR § 177.2510

Available for material version PVT and SST.

ProMinent® Sigma X Range of Diaphragm Metering Pumps Sigma/ 2 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, 160, or 200 strokes per minute (pump dependent). An illuminated LCD displays stroke length, stroke rate and an accumulative stroke counter, that 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 totaled capacity is also displayed in either U.S. gallons or litres.

The click wheel and 4 push buttons are used to scroll through the menu screens and select functions, the lower part of the display can be customised to show additional relevant operating information.

Control Modes

The control modes available with the Sigma/2 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 with 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 90/160/200 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”

An optional flow monitor can be used to monitor the pump stroke volume each time the pump strokes, each pump stroke volume is measured via the flow monitor and confirmed back to the pump control. If insufficient fluid is discharged for a pre-determined number of strokes (up to 125) the pump can generate a warning fault and continue to run or stop. If selected, the optional fault relay can change state and generate an alarm. Important, the recommended operation for the Sigma pump and flow monitor is for use with contact mode, if used with Manual or Analog mode can cause errors due to the change in pump discharge stroke impulse / duration.

“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 illuminates 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 low level symbol and the red LED illuminates. The optional fault relay remains activated.

“Pause”

The Sigma/2 series can be remotely started and stopped via a dry contact through the optional control cable.

“Stop”

The Sigma/2 can be stopped by pressing the STOP/START key without disconnecting from the power supply.

“Prime”

Priming is activated by pressing the Prime button, you can determine the amount of ‘Priming Time’ by adjust-ing in the Menu – Settings – Priming Time – then adjustable via the clickwheel.

Function and Error Indicators

Three LED lights on top of the pump HMI 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 a symbol will appear on the HMI display specific to the fault and the red LED illuminates.



ProMinent® Sigma X Range of Diaphragm Metering Pumps Sigma/ 2 Metering Pumps

Modes and Functions

Optional Control Modes

“Analog” Mode

With this feature, the stroking rate of the Sigma/2 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. The following functions can be selected by means of click wheel / push button.

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

By simply entering a factor in the 0.01-100 range, the step-up or step-down ratio is set.

For example:

Step-up Factor:

100 1 pulse = 100 pump strokes
10 1 pulse = 10 pump strokes

Step-down Factor:

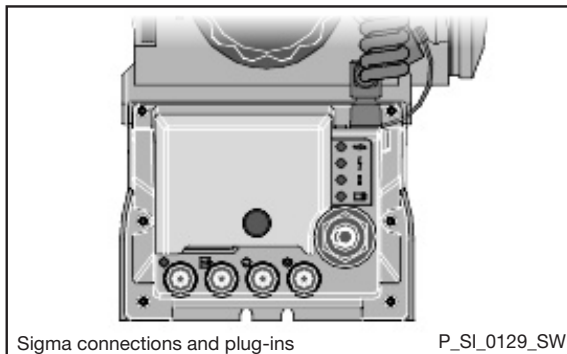
0.25 4 pulses = 1 pump stroke
0.01 100 pulses = 1 pump stroke

“Batch” Mode

The Batch mode is a variation of the contact operating mode. A number of strokes can be predetermined up to 99,999 strokes (whole numbers) or the feed quantity can be predetermined. The batch is then initiated by either turning the clickwheel to the “Push” display and pushing the clickwheel 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.



Relay outputs

Option 1 : Fault Annunciating Relay

This relay is fully programmable on the HMI to be a fault or warning relay and can be configured for normally energized or normally de-energised operation. Fault or warning indications can be given for low tank level (level switch), loss of flow (flow monitor), loss of analog input signal, diaphragm rupture (sensor), system faults and fuse / power supply failure. Additional functions can be set depending on pump options.

Option 3 : Fault & Pacing Relay

These relays are programmable on the HMI, in addition to the fault relay, there is an additional relay that generates a contact closure with each pump stroke (contact duration 150 ms). This signal can be used to pace a second ProMinent metering pump synchronously, to totalize flow with an external stroke counter or to send stroke confirmation to a PLC.

Option 8 : 4 – 20 mA Output and Fault or Pacing Relay

In addition to having either a fault or pacing relay as per above, there is also a 4 – 20 mA output signal that is available that can be programmed to correspond to either, strokes per minute, capacity or selected capacity at 20 mA. The 4 – 20 mA output is an isolated powered signal, can drive up to 300 Ohms impedance and is functional in all 4 operating Modes.

Timer Function

The pump comes with an integrated timer as a standard feature. With this you can create up to 32 commands (program lines) that allow you to start, stop the pump at predetermined times, change operating mode and activate / deactivate the pump relay etc. For the timed operation, this can be selected as hourly, daily, weekdays, weekend weekly or monthly. The set up is done via the click wheel and push buttons.

Profibus®

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

CANopen is also available as an option.

ProMinent® Sigma X Range of Diaphragm Metering Pumps Sigma/ 2 Metering Pumps

Specifications

General:

Maximum stroke length:	5.0 mm HM;		
Power cord:	2 m, 2 wire + ground (supplied on control versions)		
Stroke frequency control:	S2Ba: Constant speed or optional DC/SCR drive or AC inverter S2Cb: Microprocessor control version with innovative start/stop and variable speed control proportional to set frequency or external control signal.		
Stroke counting:	Standard on S2Cb		
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:	Ceramic	SS
Drive:	Cam and spring-follower (lost motion)		
Lubrication:	Oil lubricated		
Recommended oil:	ISO VG 460, such as Mobil Gear Oil 634		
Oil quantity:	Approximately 550 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, cMETus, NSF/ANSI 61		
Viscosity:	1-500 cPs Standard liquid end (PVTS0, A0 or B0) 500-3000 cPs Standard liquid end with springs (PVTS1, A1 or B1)		

Sigma/2 HM:

Diaphragm materials:	PTFE faced EPDM with Nylon reinforcement and steel core		
Liquid end options:	Polyvinylidene Fluoride (PVDF) or 316 SS, with PTFE seals		
Check valves:	Single ball check, PVDF and SS versions. Optional springs available in Hastelloy C		
Repeatability:	When used according to the operating instructions, better than $\pm 2\%$		
Max. fluid operating temperatures:	Material	Constant (Max. Backpressure)	Short Term (15 min. @ max.30 psi)
	PVDF	65°C	100°C
	316 SS	90°C	120°C
Diaphragm failure indication:	Visual indicator is standard. The liquid end has a patented multilayer safety diaphragm as standard and a visual diaphragm rupture indicator.		
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 1%. Motorized stroke length adjustment is available for S2Ba.		

ProMinent® Sigma X Range of Diaphragm Metering Pumps Sigma/ 2 Metering Pumps

Specifications

Sigma/ 2 Basic Version

Motor mounting flange:	Fits all NEMA 56C frame motors (motor not included with pump)
Motor coupling:	Flexible coupling included with pump
Required Motor HP:	1/3 HP (0.25 kW)
Full load RPM:	1750 RPM (60 Hz)

Sigma/ 2 Control Version

Control Function:	At stroke frequencies equal to or greater than 25%, the integral AC variable frequency drive continuously varies the motor speed in a linear response to the incoming signal. At stroke frequencies less than 25%, the motor starts and stops according to a control algorithm to provide the desired stroke frequency.
Enclosure rating:	IP 65
Motor data:	Totally enclosed, fan cooled (IP55); class F insulation; Manufacturer ATB; 0.25 kW (1/3 HP) 3 phase. Full motor data sheet in operating instructions.
Relay load	
Fault relay only (option 1):	Contact load: 250 VAC, 50/60 Hz, 100 mA max Operating life: > 200,000 switch functions
Fault and pacing relay (options 3):	Contact load: 24 V, 50/60 Hz, 100 mA max Operating life: > 200,000 switch functions Contact closure: 100 ms (for pacing relay)
Analog output signal:	max. impedance 300 Ω
Option 8	Isolated 4-20 mA output signal
Max. pulse frequency:	25 pulses/sec
Contact impedance:	10 kOhm
Max. pulse memory:	99,999 pulses
Necessary contact duration:	20ms
Analog - current input burden:	Approximately 120 Ohm
Max. allowable input current:	50 mA
Power requirements:	single phase, 100-230 VAC, +/- 10% 50/60 Hz

ProMinent® Sigma X Range of Diaphragm Metering Pumps

Sigma/ 2 Metering Pumps

Capacity Data

Sigma/2 Basic Version

Technical data:	60 Hz (1800 RPM) operation Capacity at Maximum Pressure			Max. Stroke Rate	Output per Stroke	Max. Suction Lift (water)	Max. Suction Pressure	Suction/ Discharge Connector		Shipping Weight w/Motor
Pump Version S2Ba H	psig	U.S. gph	L/h	Stroke/ min	mL/ stroke	m	psig	DN	in	kg
16050 PVT	145	15.9	60	87	11.4	7	44	15	1/2 MNPT	15
16050 SST	232	15.0	57	87	11.4	7	44	15	1/2 FNPT	20
16090 PVT	145	28.0	106	158	11.4	7	44	15	3/4 MNPT	15
16090 SST	232	25.9	98	158	11.4	7	44	15	1/2 FNPT	20
16130 PVT	145	41.2	156	238	10.9	7	44	15	3/4 MNPT	15
16130 SST	232	39.1	148	238	10.9	7	44	15	1/2 FNPT	20
07120 PVT	102	39.6	150	87	27.4	5	15	25	3/4 MNPT	16
07120 SST	102	39.6	150	87	27.4	5	15	25	3/4 MNPT	24
07220 PVT	102	69.7	264	158	27.7	5	15	25	3/4 MNPT	16
07220 SST	102	69.7	264	158	27.7	5	15	25	3/4 MNPT	24
04350 PVT	58	111	420	238	29.4	5	15	25	1 MNPT	16
04350 SST	58	111	420	238	29.4	5	15	25	1 MNPT	24

Sigma/2 Control Version

Technical data:	60 Hz (1800 RPM) operation Capacity at Maximum Pressure			Max. Stroke Rate	Output per Stroke	Max. Suction Lift (water)	Max. Suction Pressure	Suction/ Discharge Connector		Shipping Weight w/Motor
Pump Version S2Cb H	psig	U.S. gph	L/h	Stroke/ min	mL/ stroke	m	psig	DN	in	kg
16050 PVT	145	15.9	61	90	11.4	7	44	15	1/2 MNPT	15
16050 SST	232	14.8	56	90	11.4	7	44	15	1/2 FNPT	20
16090 PVT	145	28.8	109	160	11.4	7	44	15	3/4 MNPT	15
16090 SST	232	26.1	99	160	11.4	7	44	15	1/2 FNPT	20
16130 PVT	145	34.6	131	200	10.9	7	44	15	3/4 MNPT	15
16130 SST	232	34.1	129	200	10.9	7	44	15	1/2 FNPT	20
07120 PVT	102	39.6	150	90	27.4	5	15	25	3/4 MNPT	16
07120 SST	102	39.6	150	90	27.4	5	15	25	3/4 MNPT	24
07220 PVT	102	71.6	271	160	27.7	5	15	25	3/4 MNPT	16
07220 SST	102	71.6	271	160	27.7	5	15	25	3/4 MNPT	24
04350 PVT	58	93.3	353	200	29.4	5	15	25	1 MNPT	16
04350 SST	58	93.3	353	200	29.4	5	15	25	1 MNPT	24

(Note: Capacities and suction lift refer to pumps tested on water at 115 VAC, 60 Hz, and an ambient temperature of 20° C. Higher specific gravity fluids will reduce suction lift. Capacities will be slightly reduced from published ratings if pumps are skid mounted).

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

In Version "F" the ball seat is made of PVDF.

ProMinent® Sigma X Range of Diaphragm Metering Pumps Sigma/ 2 Metering Pumps

Identcode Ordering System: Sigma/ 2 Basic (S2Ba)

S2Ba	Drive Type											
	H	Main Drive, Diaphragm	Version: Capacity:									
			16050*	60 l/h, 145 psi	07120	150 l/h, 102 psi						
			16090*	106 l/h, 145 psi	07220	264 l/h, 102 psi						
			16130*	156 l/h, 145 psi	04350	420 l/h, 58 psi	* For SST versions. Maximum 32 psi					
			Liquid end material:									
			PV	PVDF								
			SS	316 Stainless Steel								
			Seal:									
			T	PTFE seal								
			F	FDA Compliant								
			Diaphragm type:									
			A	Multilayer safety diaphragm with rupture indication (contact)								
			S	Multilayer safety diaphragm with visual rupture indicator								
			Liquid end version:									
			0	Without valve springs								
			1	With 2 valve springs (Hastelloy C4, 1 psig) (For viscosities between 500-3,000 cPs)								
			Hydraulic connections:									
			7	PVDF union nut & threaded insert								
			8	SS union nut & threaded insert								
			Version:									
			0	Standard with logo								
			Motor mount:									
			2	Without motor, with NEMA 56C flange								
			Enclosure rating:									
			0	Standard								
			Stroke sensor:									
			0	Without stroke sensor (Standard)								
			Stroke length adjustment:									
0	Manual (Standard)											
1	With 3P stroke positioning motor, 85 - 265 VAC 50/60 Hz											
4	With stroke positioning motor, 4-20 mA, 85 - 265 VAC 50/60 Hz											
S2Ba	H	12050	PV	T	A	0	7	0	2	0	0	0

ProMinent® Sigma X Range of Diaphragm Metering Pumps Sigma/ 2 Metering Pumps

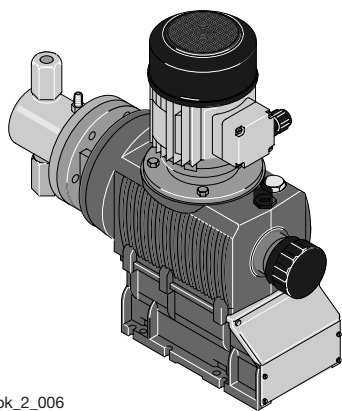
Identcode Ordering System: Sigma/ 2 Control (S2Cb)

S2Cb	Drive Type																
	H	Main Drive, Diaphragm															
		Version: Capacity:															
		16050*	61 l/h, 145 psi	07120	150 l/h, 102 psi												
		16090*	109 l/h, 145 psi	07220	271 l/h, 102 psi												
		16130*	131 l/h, 145 psi	04350	353 l/h, 58 psi												
		* For SST versions. Maximum 232 psi															
		Liquid end material:															
		PV	PVDF														
		SS	316 Stainless Steel														
		Seal:															
		T	PTFE seal														
		F	FDA Compliant														
		Diaphragm type:															
		A	Multilayer safety diaphragm with rupture indication (contact) and pump stop														
		S	Multilayer safety diaphragm with visual rupture indication														
		Liquid end options:															
		0	Without valve springs														
		1	With 2 valve springs (Hastelloy C4, 1 psig) (For viscosities between 500-3,000 cPs)														
		Hydraulic connections:															
		7	PVDF union nut and threaded insert														
		8	SS union nut and threaded insert														
		Version:															
		0	Standard with logo														
		Electrical Connection (± 10 %):															
		U	1 ph, 115-230 V ± 10%, 50/60 Hz														
		Cable and plug with 2 m power cord, single phase:															
		D	N. American plug, 115 V														
		U	N. American plug, 230 V														
		Relay:															
		0	No relay														
		1	Fault Relay														
		3	Fault Relay + Pacing Relay, both contacts rated 24 V, 100 mA														
		8	4-20 mA output + Fault or Pacing contact rated 24 V, 100 mA														
		Control variant:															
		1	Manual + External with pulse controls & analog control														
		6	Option 1 + PROFIBUS														
		Over pressure switch-off															
		0	without overpressure switch-off														
		1	with 4 bar overpressure switch-off*														
		2	with 7 bar overpressure switch-off*														
		3	with 10 bar overpressure switch-off*														
		Operating unit (HMI)															
		0	HMI with click wheel and 0.5 m cable														
		4	HMI with click wheel and 2.0 m cable														
		5	HMI with click wheel and 5.0 m cable														
		6	HMI with click wheel and 10.0 m cable														
		X	Without HMI														
Access Code:																	
0	No access code																
1	Access code																
Language:																	
EN	English																
FR	French																
S2Cb	H	16050	PV	T	A	0	0	0	0	U	A	0	0	0	S	1	EN

** As available

ProMinent® Sigma/ 2 HK Plunger Metering Pumps

Overview: Sigma/2 HK



pk_2_006

Ideal for high pressure applications requiring significant turndown

The ProMinent® Sigma/ 2 HK is a motor driven plunger metering pump has a high strength metal-lined housing for those components subject to load, and an additional plastic housing to protect against corrosion. It has a capacity range of 2.3-76 L/h at a maximum back pressure of 4641-174 psi. The pump capacity is adjusted by varying the stroke length in .2% increments via a self-locking adjusting knob.

The reproducible metering accuracy is better than $\pm 1\%$ providing installation has been correctly carried out, and in the stroke length range of 10-100%. (Instructions in the operating instructions manual must be followed.)

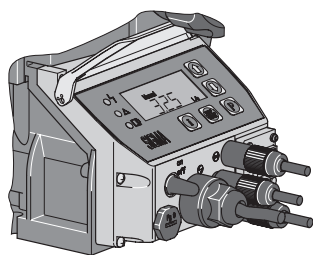
The stable, corrosion resistant metal and plastic housing is rated IP 65. To facilitate adaptation of the pumps to the widest possible range of processing requirements we offer a choice of three gearbox ratios, four liquid end sizes, either contact or analog signal (e.g., 0/4-20 mA) control options in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

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

Sigma/ 2 HK Basic Type (SBKa)

The ProMinent® Sigma Basic type is a motor-driven metering pump with no internal electronic control system. The ProMinent® SBA has a number of different drive options, including the single phase AC motor or a 3 phase motor.

Sigma/ 2 HK Control Type (SCKa)



pk_2_104

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

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, LED's function as operation or fault indicators and fault indicator or pacing relays monitor the pump function.

ProMinent® Sigma/ 2 HK Plunger Metering Pumps

Specifications

General:

Maximum stroke length:	0.6" (15 mm) HK	
Power cord:	6 feet (2 m) 2 wire + ground (supplied on control versions)	
Stroke frequency control:	SBKa: Constant speed or optional DC/SCR drive or AC inverter SCKa: Microprocessor control version with innovative start/stop and variable speed control proportional to set frequency or external control signal.	
Stroke counting:	Standard on SCKa HK	
Materials of construction		
Inner casing:	Cast aluminum	
Housing:	Glass-filled Luranyl™ (PPE)	
Wetted materials of construction:	Liquid End:	316 SS
	Suct./Dis. Connectors:	316 SS
	Seals:	PTFE
	Valve Balls:	Ceramic
Drive:	Cam and spring-follower (lost motion)	
Lubrication:	Oil lubricated	
Recommended oil:	ISO VG 460, such as Mobil Gear Oil 634	
Oil quantity:	Approximately 0.6 quart (550 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)	

Sigma/ 2 HK:

Piston materials:	Ceramic oxide; packing rings of PTFE, packing spring of 316 SS		
Liquid end options:	316 SS with PTFE seals		
Check valves:	Double ball, ceramic; optional springs (Hastelloy C).		
Repeatability:	When used according to the operating instructions, better than ±1%		
Max. fluid operating temperatures:	Material	Constant	Short Term
	316 SS	392°F (200°C)	428°F (220°C)
Stroke length adjustment:	Manual, in increments of 0.2%. Motorized stroke length control is optional.		

ProMinent® Sigma/ 2 HK Plunger Metering Pumps

Specifications

Sigma/2 HK Basic Version

Motor mounting flange:	Fits all NEMA 56C frame motors (motor not included with pump)
Motor coupling:	Flexible coupling included with pump.
Required Motor HP:	1/3 HP (.25 kW)
Full load RPM:	1750 RPM (60 Hz)
Stroke sensor (optional):	Hall effect - requires 5 VDC

Sigma/ 2 HK 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:	IP 55
Motor data:	Totally enclosed, fan cooled (IP55); class F insulation; Manufacturer ATB; 0.18 kW (0.24 HP) 230 3 phase (1.9 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: 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)
Analog output signal:	maximum impedance 300 Ω 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
Relay cable (optional):	6 feet (2 m) 3 wire (SPDT) 250 VAC, 2 A
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.)
Max. pulse frequency:	25 pulses/sec
Contact impedance:	10 kOhm
Max. pulse memory:	65,535 pulses
Necessary contact duration:	20ms
Analog - current input burden:	Approximately 120 Ohm
Max. allowable input current:	50 mA
Power requirements:	single phase, 115-230 VAC

ProMinent® Sigma/ 2 HK Plunger Metering Pumps

Capacity Data

Sigma/2 HK Basic Version

Technical data:	60 Hz (1750 RPM) operation Capacity at Maximum Pressure		Max. Stroke Rate	Output per stroke	Max. Suction Lift (water)	Suction / Discharge Connector	Shipping Weight w/ Motor
Pump Version SBKa HK	psig	L/h	Stroke/ min	ml/ stroke	m	in FNPT	kg
32002 SST	4640	2.3	84	0.46	5	1/4	24
23004 SST	3335	4.8	154	0.52	5	1/4	24
10006 SST	1450	7.6	233	0.55	5	1/4	24
14006 SST	2030	7.1	84	1.42	4	1/4	24
10011 SST	1450	13.1	154	1.43	4	1/4	24
05016 SST	725	20	233	1.43	4	1/4	24
07012 SST	1015	14.8	84	2.9	4	1/4	24
04522 SST	652	27.6	154	2.91	4	1/4	24
02534 SST	363	40.8	233	2.92	4	1/4	24
04022 SST	580	26.5	84	5.26	4	3/8	25
02541 SST	363	49.2	154	5.37	4	3/8	25
01264 SST	174	76	233	5.45	4	3/8	25

Sigma/ 2 HK Control Version

Technical data:	60 Hz (1750 RPM) operation Capacity at Maximum Pressure		Max. Stroke Rate	Output per stroke	Max. Suction Lift (water)	Suction / Discharge Connector	Shipping Weight w/ Motor
Pump Version SCKa HK	psig	L/h	Stroke/ min	ml/ stroke	m	in FNPT	kg
32002 SST	4640	2.3	84	0.46	5	1/4	24
23004 SST	3335	4.8	154	0.52	5	1/4	24
10006 SST	1450	7.6	233	0.55	5	1/4	24
14006 SST	2030	7.1	84	1.42	4	1/4	24
10011 SST	1450	13.1	154	1.43	4	1/4	24
05016 SST	725	20	233	1.43	4	1/4	24
07012 SST	1015	14.8	84	2.9	4	1/4	24
04522 SST	652	27.6	154	2.91	4	1/4	24
02534 SST	363	40.8	233	2.92	4	1/4	24
04022 SST	580	26.5	84	5.26	4	3/8	25
02541 SST	363	49.2	154	5.37	4	3/8	25
01264 SST	174	76	233	5.45	4	3/8	25

(Note: Capacities and suction lift refer to pumps tested on water at 115 VAC, 60 Hz, and an ambient temperature of 20°C. Higher specific gravity fluids will reduce suction lift. Capacities will be slightly reduced from published ratings if pumps are skid mounted).

Materials In Contact With Chemicals

	Liquid End	Suction/ Discharge connector	Seals	Valve Balls	Ball Seat
SST	Stainless steel	Stainless steel	PTFE/PTFE	Ceramic	Stainless steel

ProMinent® Sigma/ 2 HK Plunger Metering Pumps

Identcode Ordering System: Sigma/ 2 Basic (SBKa HK)

SBKa	Drive Type											
	HK	Main Drive/Plunger										
		Version Capacity:										
		32002	2.3 l/h, 4640 psi	04522	27.6 l/h, 652 psi							
		14006	7.1 l/h, 2030 psi	02541	49.2 l/h, 363 psi							
		07012	14.8 l/h, 1015 psi	10006	7.6 l/h, 1450 psi							
		04022	26.5 l/h, 580 psi	05016	20 l/h, 725 psi							
		23004	4.8 l/h, 3335 psi	02534	40.8 l/h, 363 psi							
		10011	13.1 l/h, 1450 psi	01264	76 l/h, 174 psi							
		Liquid end material:										
		SS	316 Stainless Steel									
		Seal:										
		T	PTFE seal									
		Plunger assembly:										
		4	Plunger (Ceramic)									
		Liquid end version:										
		0	Without valve springs									
		1	With 2 valve springs (Hastelloy C4, 1 psig)									
		Hydraulic connections:										
		0	Standard (In accordance with technical data)									
		Logo:										
		0	Standard with logo									
		Motor mount:										
		2	Without motor, with NEMA 56C flange									
		Enclosure rating:										
		0	Standard									
		Stroke sensor:										
		0	Without stroke sensor (Standard)									
		Stroke length adjustment:										
		0	Manual (Standard)									
		1	with 3P stroke positioning motor, 230 V 50/60 Hz									
		2	with 3P stroke positioning motor, 115 V 50/60 Hz									
		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									
SBKa	HK	32002	SS	T	4	0	0	0	2	0	0	0

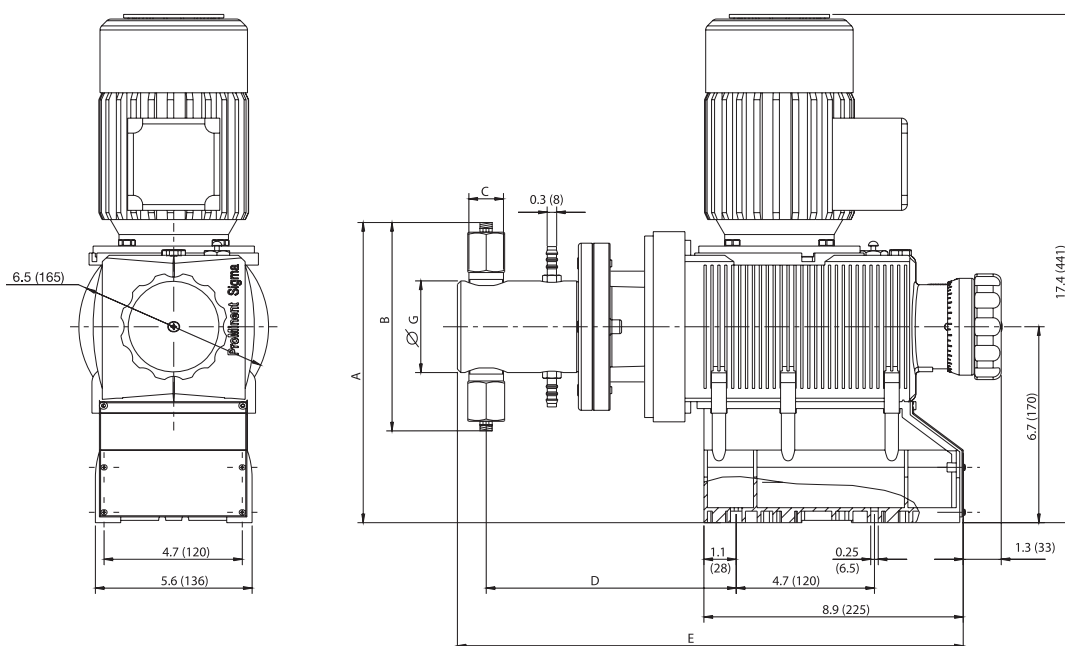
ProMinent® Sigma/ 2 HK Plunger Metering Pumps

Identcode Ordering System: Sigma/ 2 Control (SCKa HK)

SCKa	Drive Type															
	HK	Main drive/Plunger														
		Version:Capacity:														
		32002	2.3 l/h, 4640 psi	04522	27.6 l/h, 652 psi											
		14006	7.1 l/h, 2030 psi	02541	49.2 l/h, 363 psi											
		07012	14.8 l/h, 1015 psi	10006	6.5 l/h, 1450 psi											
		04022	26.5 l/h, 580 psi	05016	17.2 l/h, 725 psi											
		23004	4.8 l/h, 3335 psi	02534	35.0 l/h, 363 psi											
		10011	13.1 l/h, 1450 psi	01264	65.4 l/h, 174 psi											
		Liquid end material:														
		SS	316 Stainless Steel													
		Seal material:														
		T	PTFE seal													
		Plunger:														
		4	Plunger (Ceramic)													
		Liquid end version:														
		0	Without valve springs													
		1	With 2 valve springs (Hastelloy C, 1 psig)													
		Hydraulic connections:														
		0	Standard (In accordance with technical data)													
		Logo:														
		0	Standard with logo													
		Electrical Connection:														
		U	1 ph, 115-230 V ± 10%, 50/60 Hz													
		Cable and plug with 6 ft (2 m) power cord, single phase:														
		D	6 ft (2m) USA													
		U	6 ft (2m) USA, 230 V													
		Relay:														
		0	No relay													
		1	Fault annunciating relay, drops out													
		3	Fault annunciating relay, pulls in													
		4	Option 1 + pacing relay													
		5	Option 3 + pacing relay													
		Control variant:														
		0	Manual + External with pulse control (multiplier/divider)													
		1	Manual + External with pulse controls & analog control													
		Access Code:														
		0	No access code													
		1	Access code													
		Flow monitor:														
		0	Input for metering monitor signal (pulse)													
		Stroke length adjustment:														
0		Manual														
SCKa	HK	32002	SS	T	4	0	0	0	U	D	0	0	0	0	0	

ProMinent® Sigma/ 2 HK Plunger Metering Pumps

Dimensional Drawing: (SBKa HK)



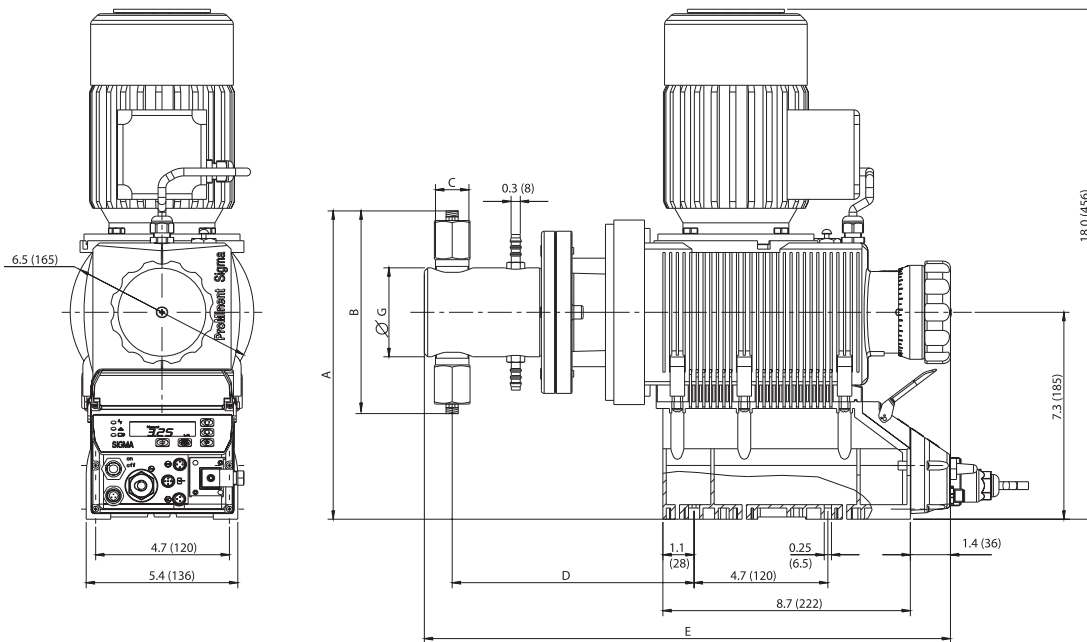
The SBKa HK models offer other motors, and height dimensions may vary.

Dimensions in inches (mm)

Model	Connector	A	B	C	D	E	ØG
32002	1/4"	10.9	8.5	R1/4"	8.5	17.3	3.1
23004	DN 8	(277)	(216)		(217)	(439)	(79.5)
10006							
14006	1/4"	10.9	8.5	R1/4"	8.5	17.3	3.1
10011	DN 8	(277)	(216)		(217)	(439)	(79.5)
05016							
07012	1/4"	10.9	8.5	R1/4"	8.5	17.3	3.1
04522	DN 8	(277)	(216)		(217)	(439)	(79.5)
02534							
04022	3/8"	11	8.8	R3/8"	8.5	17.3	3.1
02541	DN 10	(279)	(223)		(217)	(439)	(79.5)
01264							

ProMinent® Sigma/ 2 HK Plunger Metering Pumps

Dimensional Drawing: (SCKa HK)



The SCKa HK models offer other motors, and height dimensions may vary.

Dimensions in inches (mm)

Model	Connector	A	B	C	D	E	ØG
32002	1/4"	11.5	8.5	R1/4"	8.5	17.3	3.1
23004	DN 8	(292)	(216)		(217)	(439)	(79.5)
10006							
14006	1/4"	11.5	8.5	R1/4"	8.5	17.3	3.1
10011	DN 8	(292)	(216)		(217)	(439)	(79.5)
05016							
07012	1/4"	11.5	8.5	R1/4"	8.5	17.3	3.1
04522	DN 8	(292)	(216)		(217)	(439)	(79.5)
02534							
04022	3/8"	11.6	8.8	R3/8"	8.5	17.3	3.1
02541	DN 10	(294)	(223)		(217)	(439)	(79.5)
01264							

ProMinent® Sigma X Range of Diaphragm Metering Pumps

Sigma/ 3 Metering Pumps

Overview: Sigma/ 3

Ideal for economical mid-range applications

(see [page 143](#) for spare parts and [page 153](#) for control cables)

The Sigma X range of diaphragm metering pumps covers a capacity range of 21 – 1040 l/hr through versions Sigma 1, Sigma 2 and Sigma 3.

A new standardised feature carrying on from the solenoid pump range is the introduction of the click wheel and 4 push buttons for programming the control version of the pumps. The larger illuminated LCD on the HMI offers operating convenience and the 3 LED's on top of the HMI give status indication for operating, warning and errors and are visible from all around the pump.

The ProMinent® Sigma/ 3 is a mechanically actuated diaphragm metering pump. It has a capacity range of 174-1040 L/h at a maximum back pressure of 58-174 psi. The pump capacity is adjusted by varying the stroke length (6 mm) in 1% increments via a self-locking adjusting knob.

The reproducible metering accuracy is better than $\pm 2\%$ 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, two liquid end sizes, two liquid end materials and either contact or analog signal (e.g., 0/4-20 mA) control options.

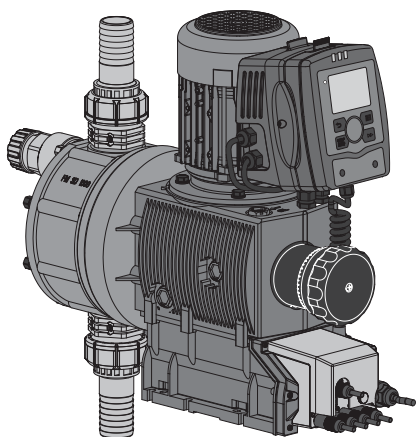
For safety reasons, all motor-driven metering pumps must be equipped with adequate protection against electrical overload.

All PVDF versions are NSF/ANSI 61 approved.

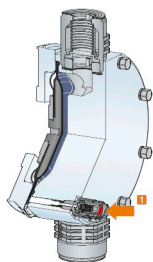
Diaphragm Failure Indication (A)

The liquid end has a patented multilayer safety diaphragm as standard and a visual diaphragm rupture indicator. The diaphragm is coated with PTFE film on both sides, from the drive and working side. This guarantees that no discharge to the outside occur if the diaphragm ruptures. When the diaphragm ruptures, feed chemical enters between the diaphragm layers and triggers a mechanical indication of an alarm via the sensor area. This concept ensures reliable metering - even under critical operating conditions.

In connection with the S3Cb, continued metering, or alternatively, a stopping of the metering pump can be selected in conjunction with the identcode selection "A" under diaphragm type.



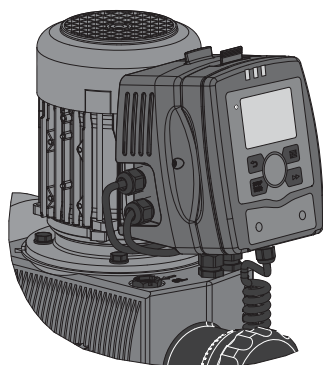
S3Cb



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 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 (S3Cb)



P_SI_00999_SW3

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

The microprocessor controller of the Sigma X range of pumps features the optimum combination of variable AC frequency combined with digital stroking frequency, this ensures exact metering even when down in the low speed range due to the individual stroking characteristic.

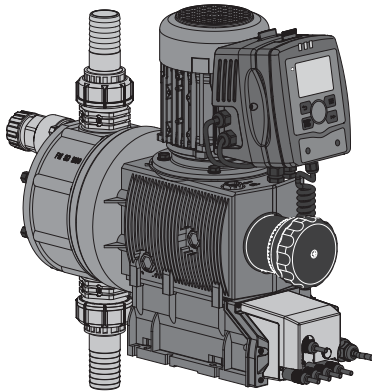
The individual functions of the metering pump can be easily selected and adjusted via the click wheel and 4 push buttons. The larger illuminated LCD on the HMI offers operating convenience and the 3 LED's on top of the HMI give status indication for operating, warning and errors and are visible from all around the pump.

Local or remote control is possible with PROFIBUS® ([see page 153](#)) and/or an integrated process timer.



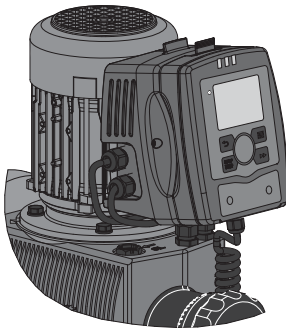
ProMinent® Sigma X Range of Diaphragm Metering Pumps Sigma/ 3 Metering Pumps

Sigma/ 3 control type (S3Cb)



- Removable HMI operating unit with large illuminated LCD
- Metering profiles for optimum metering results
- Energy-optimised motor control for enhanced efficiency
- Control versions: Analog, external contact, pulse control (batch) PROFIBUS®, CAN bus, process Timer

Detachable operating unit (HMI)



The operating unit (HMI) can be attached directly to the metering pump or mounted on the wall alongside the pump or completely removed. This provides the operator with a wide range of options for the integration of a metering system into the overall system that it is readily accessible and easy to use. Moreover, the removable operating unit offers additional protection against unauthorised operation of the metering pump or against changing of the pump settings.

The individual functions of the metering pump can be easily selected and adjusted via the click wheel and 4 push buttons. The larger illuminated LCD on the HMI offers operating convenience and the 3 LED's on top of the HMI give status indication for operating, warning and errors and are visible from all around the pump.

Differences S3Ba/S3Ca to S3Ba/S3Cb

The basic version of the pump S3Ba remains as the S3Ba. There are no changes made to this pump.

From the S3Ca to S3Cb, the mounting connections and liquid end centrelines are the same. The S3Cb is 3 mm taller than the S3Ca. This is due to the new HMI. The front housing with power cord and cable connections is 6mm longer.

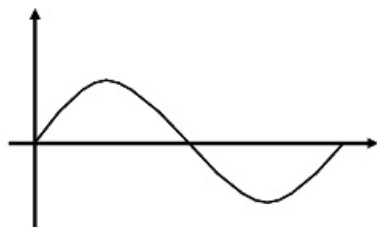
ProMinent® Sigma X Range of Diaphragm Metering Pumps Sigma/ 3 Metering Pumps

Overview: Sigma/ 3 Diaphragm Metering Profiles

Metering profiles ensure optimum metering results, thanks to the behaviour of the metering pump being matched to the chemicals or application.

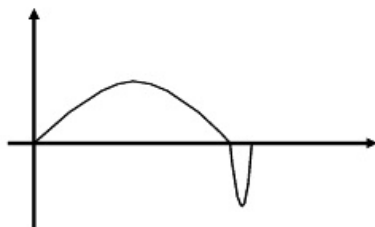
The stroke movement of the diaphragm pump is continuously measured and controlled, so that the stroke is executed according to the desired metering profile. The pump can be operated in normal mode (Diagram 1), with optimised discharge stroke (Diagram 2) or with optimised suction stroke (Diagram 3). Three typical metering profiles are shown schematically with the behaviour over time.

In normal operating mode the time behaviour for the suction stroke and the discharge stroke is similar



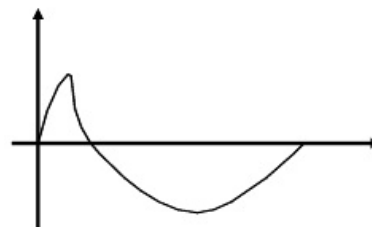
P_SI_0102_SW

Diagram 1: discharge stroke, suction stroke equal



P_SI_0103_SW

Diagram 2: long discharge stroke, short suction stroke



P_SI_0104_SW

Diagram 3: short discharge stroke, long suction stroke

(Diagram 2) the discharge stroke is extended while the suction stroke is performed as quickly as possible. This setting is, for example, useful for applications that require optimized chemical mixing.

(Diagram 3) In the mode with the optimized suction stroke, the suction stroke is carried out as slowly as possible, which permits precise and trouble-free metering of viscous and gaseous media. This setting should also be chosen to minimise the NPSH value.

Automatic excess pressure switch-off as a pump protection function

The metering pump control also measures the movement and speed profile in conjunction with the power demand. The power supply can be limited to the actual power required and hence the efficiency increased using this data.

Analysis of the power requirement leads to automatic pressure monitoring of the metering pump. This facilitates the internal overload shutdown of the metering pump. The overload shutdown is not a replacement for the system having its own protection device.

“Physiologically safe (FDA) in respect of wetted materials” version.

A version of the pump liquid end is available with the Identcode selection **“Version” F**. This will provide a pump with all wetted materials complying with the “Physiologically safe (FDA) in respect of wetted materials”.

FDA guidelines:

- Material PTFE: FDA No. 21 CFR § 177.1550
- Material PVDF: FDA No. 21 CFR § 177.2510

Available for material version PVT and SST.

ProMinent® Sigma X Range of Diaphragm Metering Pumps Sigma/ 3 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, 120, or 180 strokes per minute (pump dependent). An illuminated LCD displays stroke length, stroke rate and an accumulative stroke counter, that 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 click wheel and 4 push buttons are used to scroll through the menu screens and select functions, the lower part of the display can be customised to show additional relevant operating information.

Control Modes

The control modes available with the Sigma/3 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 with 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 90/120/180 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"

An optional flow monitor can be used to monitor the pump stroke volume each time the pump strokes, each pump stroke volume is measured via the flow monitor and confirmed back to the pump control. If insufficient fluid is discharged for a pre-determined number of strokes (up to 125) the pump can generate a warning fault and continue to run or stop. If selected, the optional fault relay can change state and generate an alarm. Important, the recommended operation for the Sigma pump and flow monitor is for use with contact mode, if used with Manual or Analog mode can cause errors due to the change in pump discharge stroke impulse / duration.

"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 illuminates 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 a low level symbol and the red LED illuminates. The optional fault relay remains activated.

"Pause"

The Sigma/3 series can be remotely started and stopped via a dry contact through the optional control cable.

"Stop"

The Sigma/3 can be stopped by pressing the STOP/START key without disconnecting from the power supply.

"Prime"

Priming is activated by pressing the Prime button, you can determine the amount of 'Priming Time' by adjust-ing in the Menu – Settings – Priming Time – then adjustable via the clickwheel.

Function and Error Indicators

Three LED lights on top of the pump HMI 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 a symbol will appear on the HMI display specific to the fault and the red LED illuminates.



ProMinent® Sigma X Range of Diaphragm Metering Pumps Sigma/ 3 Metering Pumps

Modes and Functions

Control Modes

“Analog” Mode

With this feature, the stroking rate of the Sigma/3 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. The following functions can be selected by means of click wheel / push button.

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

By simply entering a factor in the 0.01-100 range, the step-up or step-down ratio is set.

For example:

Step-up Factor:

100 1 pulse = 100 pump strokes

10 1 pulse = 10 pump strokes

Step-down Factor:

0.25 4 pulses = 1 pump stroke

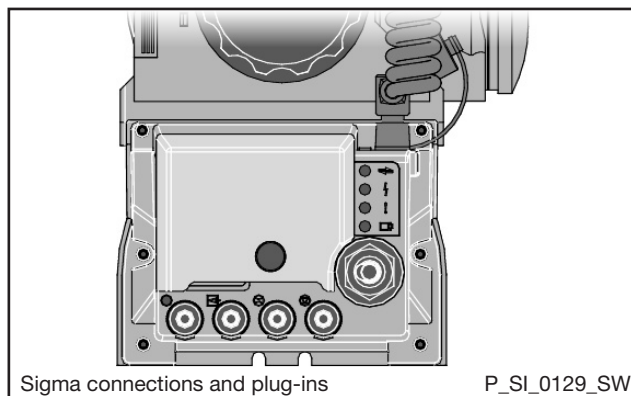
0.01 100 pulses = 1 pump stroke

“Batch” Mode

The Batch mode is a variation of the contact operating mode. A number of strokes can be predetermined up to 99,999 strokes (whole numbers) or the feed quantity can be predetermined. The batch is then initiated by either turning the clickwheel to the “Push” display and pushing the clickwheel 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.



Relay outputs

Option 1 : Fault Annunciating Relay

This relay is fully programmable on the HMI to be a fault or warning relay and can be configured for normally energized or normally de-energized operation. Fault or warning indications can be given for low tank level (level switch), loss of flow (flow monitor), loss of analog input signal, diaphragm rupture (sensor), system faults and fuse / power supply failure. Additional functions can be set depending on pump options.

Option 3 : Fault & Pacing Relay

These relays are programmable on the HMI, in addition to the fault relay, there is an additional relay that generates a contact closure with each pump stroke (contact duration 150 ms). This signal can be used to pace a second ProMinent metering pump synchronously to totalize flow with an external stroke counter or to send stroke confirmation to a PLC.

Option 8 : 4 – 20 mA Output and Fault or Pacing Relay

In addition to having either a fault or pacing relay as per above, there is also a 4 – 20 mA output signal that is available that can be programmed to correspond to either, strokes per minute, capacity or selected capacity at 20 mA. The 4 – 20 mA output is an isolated powered signal, can drive up to 300 Ohms impedance and is functional in all 4 operating Modes.

Timer Function

The pump comes with an integrated timer as a standard feature. With this you can create up to 32 commands (program lines) that allow you to start, stop the pump at predetermined times, change operating mode and activate / deactivate the pump relay etc. For the timed operation, this can be selected as hourly, daily, weekdays, weekend weekly or monthly. The set up is done via the click wheel and push buttons.

Profibus®

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

CANopen is also available as an option.

ProMinent® Sigma X Range of Diaphragm Metering Pumps Sigma/ 3 Metering Pumps

Specifications

General:

Maximum stroke length:	6.0 mm		
Power cord:	2 m, 2 wire + ground (supplied on control version)		
Stroke frequency control:	S3Ba: Constant speed or optional DC/SCR drive or AC inverter S3Cb: Microprocessor control version with innovative start/stop and variable speed control proportional to set frequency or external control signal.		
Stroke counting:	Standard on S3Cb		
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	Ceramic / CTFE.Hast. C	SS/Hast. C
Drive:	Cam and spring-follower (lost motion)		
Lubrication:	Oil lubricated		
Recommended oil:	ISO VG 460, such as Mobil Gear Oil 634		
Oil quantity:	Approximately 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, cMETus), NSF/ANSI 61		
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	65°C	100°C
	316 SS	90°C	120°C
Diaphragm failure indication:	Visual indicator is standard. The liquid end has a patented multilayer safety diaphragm as standard and a visual diaphragm rupture indicator.		
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 1%. Motorized stroke length adjustment available for S3Ba.		
Viscosity:	1-200 cPs Standard liquid end 500-3000 cPs Standard liquid end with springs		

ProMinent® Sigma X Range of Diaphragm Metering Pumps Sigma/ 3 Metering Pumps

Specifications

Basic Version

Motor mounting flange:	Fits all NEMA 56C frame motors (motor not included with pump)
Motor coupling:	Flexible coupling included with pump.
Required Motor HP:	¾ HP (.55 kW)
Full load RPM:	1750 RPM (60 Hz)

Control Version

Control Function:	At stroke frequencies equal to or greater than 25%, the integral AC variable frequency drive continuously varies the motor speed in a linear response to the incoming signal. At stroke frequencies less than 25%, the motor starts and stops according to a control algorithm to provide the desired stroke frequency.
Enclosure rating:	IP 65
Motor data:	Totally enclosed, fan cooled (IP55); class F insulation; Manufacturer ATB; 0.55 kW (3/4 HP) 3 phase. Full motor data sheet in operating instructions.
Relay load	
Fault relay only (options 1):	Contact load: 250 VAC, 2 A, 50/60 Hz Operating life: > 200,000 switch functions
Fault and pacing relay (options 3):	Contact load: 24 V, 100 mA max, 50/60 Hz Operating life: > 200,000 switch functions Contact closure: 100 ms (for pacing relay)
Analog output signal:	max. impedance 300 Ω
Option 8	Isolated 4-20 mA output signal
Max. pulse frequency:	25 pulses/sec
Contact impedance:	10 kOhm
Max. pulse memory:	99,999 pulses
Necessary contact duration:	20ms
Analog - current input burden:	Approximately 120 Ohm
Max. allowable input current:	50 mA
Power requirements:	115 VAC - 230 VAC single phase +/- 10%

ProMinent® Sigma X Range of Diaphragm Metering Pumps

Sigma/ 3 Metering Pumps

Capacity Data

Sigma/3 Basic Version

Technical Data:	60 Hz (1800 RPM) operation Capacity at Maximum Pressure			Max. Stroke Rate	Output per Stroke	Max. Suction Lift (water)	Max. Suction Pressure	Suction/ Discharge Connector		Shipping Weight w/Motor
Pump Version S3Ba H	psig	U.S. gph	L/h	Stroke/ min	mL/ stroke	m	psig	DN	in	kg
120145 PVT	145	46	174	86	33.7	5	29	25	1	22
120145 SST	174	46	174	86	33.7	5	29	25	1	26
120190 PVT	145	66.3	251	124	33.7	5	29	25	1	22
120190 SST	174	66.3	251	124	33.7	5	29	25	1	26
120270 PVT	145	92.7	351	173	33.8	5	29	25	1	22
120270 SST	174	92.7	351	173	33.8	5	29	25	1	26
070410 PVT	102	130.0	492	86	95.1	4	15	32	1½	24
070410 SST	102	130.0	492	86	95.1	4	15	32	1½	29
070580 PVT	102	184	696	124	95.1	4	15	32	1½	24
070580 SST	102	184	696	124	95.1	4	15	32	1½	29
040830 PVT	58	264	1000	173	95.1	3	15	32	1½	24
040830 SST	58	264	1000	173	95.1	3	15	32	1½	29

Sigma/3 Control Version

Technical Data:	60 Hz (1800 RPM) operation Capacity at Maximum Pressure				Max. Stroke Rate	Output per Stroke	Max. Suc- tion Lift (water)	Max. Suction Pressure	Suction/ Discharge Connector		Shipping Weight w/Motor
Pump Version S3Cb H	psig	U.S. gph	L/h	Stroke/ min		mL/ stroke	m	psig	DN	in MNPT	(kg)
120145 PVT	145	48.0	182	90		33.7	5	29	25	1	22
120145 SST	174	48.0	182	90		33.7	5	29	25	1	26
120190 PVT	145	64.2	243	120		33.7	5	29	25	1	22
120190 SST	174	64.2	243	120		33.7	5	29	25	1	26
120270 PVT	145	96.4	365	180		33.8	5	29	25	1	22
120270 SST	174	96.4	365	180		33.8	5	29	25	1	26
070410 PVT	102	132.0	500	90		95.1	4	15	32	1½	24
070410 SST	102	132.0	500	90		95.1	4	15	32	1½	29
070580 PVT	102	177.0	670	120		95.1	4	15	32	1½	24
070580 SST	102	177.0	670	120		95.1	4	15	32	1½	29
040830 PVT	58	274.8	1040	180		95.1	3	15	32	1½	24
040830 SST	58	274.8	1040	180		95.1	3	15	32	1½	29

Note: Capacities and suction lift refer to pumps tested on water at 115 VAC, 60 Hz, and an ambient temperature of 20°C. Higher specific gravity fluids will reduce suction lift. Capacities will be slightly reduced from published ratings if pumps are skid mounted.

Materials In Contact With Chemical

Material	Suction/discharge connector Liquid end	Seals	DN 25 Valve balls	Valve seats	Seals	DN 32 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

In Version "F" the ball seat is made of PVDF.

** The valve spring is coated with CTFE (resistance similar to PTFE)

ProMinent® Sigma X Range of Diaphragm Metering Pumps

Sigma/ 3 Metering Pumps

Identcode Ordering System: Sigma/ 3 Basic (S3Ba)

S3Ba Drive												
Type	H	Main Drive, Diaphragm										
Version:		Capacity:										
120145*	174 l/h, 145 psi,	070410	492 l/h, 102 psi	* For SST versions. Maximum 174 psi								
120190*	251 l/h, 145 psi	070580	696 l/h, 102 psi									
120270*	351 l/h, 145 psi	040830	1000 l/h, 58 psi									
Liquid end material:												
PV	PVDF											
SS	316 Stainless Steel											
Seal:												
T	PTFE											
F	FDA Compliant											
Diaphragm type:												
A	Multilayer safety diaphragm with rupture indication (contact)											
S	Multilayer safety diaphragm with visual rupture indication											
Liquid end version:												
0	Without valve springs											
1	With 2 valve springs (Hastelloy C4, 1 psig) (For viscosities between 500-3,000 cPs)											
Hydraulic connections:												
7	PVDF union nut & threaded insert											
8	SS union nut & threaded insert											
Version:												
0	Standard with logo											
Motor mount:												
2	Without motor, with NEMA 56C flange											
Enclosure rating:												
0	Standard											
Stroke sensor:												
0	Without stroke sensor (Standard)											
2	With Pacing relay (Consult Factory)											
Stroke length adjustment:												
1	with 3P stroke positioning motor, 85 - 265 VAC50/60 Hz											
4	with stroke positioning motor, 4-20 mA, 85 - 265 VAC 50/60 Hz											
S3Ba	H	120145	PV	T	0	0	7	0	2	0	0	0

ProMinent® Sigma X Range of Diaphragm Metering Pumps Sigma/ 3 Metering Pumps

Identcode Ordering System: Sigma/ 3 Control (S3Cb)

S3Cb	Drive Type																	
	H	Main drive/Diaphragm																
		Version:		Capacity:														
		120145*		182 l/h, 145 psi		070410		500 l/h, 102 psi										
		120190*		243 l/h, 145 psi		070580		670 l/h, 102 psi	*For SST versions. Maximum 174 psi									
		120270*		365 l/h, 145 psi		040830		1040 l/h, 58 psi										
		Liquid end material:																
		PV	PVDF															
		SS	316 Stainless steel															
		Seal:																
		T	PTFE seal															
		T	FDA Compliant															
		Diaphragm type:																
		A	Multilayer safety diaphragm with rupture indication (contact)															
		S	Multilayer safety diaphragm with visual rupture indication															
		Liquid end version:																
		0	Without valve springs															
		1	With 2 valve springs (Hastelloy C4, 1 psig) (For viscosities between 500-3,000 cPs)															
		Hydraulic connections:																
		7	PVDF union nut and threaded insert															
		8	SS union nut and threaded insert															
		Version:																
		0	Standard with logo															
		Electrical Connection (± 10%):																
		U	1 ph, 115-230 V ± 10%, 50/60 Hz															
		Cable and plug with 2 m power cord, single phase:																
		D	N. American plug, 115 V															
		U	N. American plug, 230 V															
		Relay:																
		0	No Relay															
		1	Fault Relay															
		3	Fault Relay + Pacing Relay, both contacts rated 24 V, 100 mA															
		8	4-20 mA output + Fault or Pacing contact rated 24 V, 100 mA															
		Control variant:																
		1	Manual + External with pulse controls & analog control															
		6	Option 1 + PROFIBUS															
		Over pressure switch-off																
		0	without overpressure switch-off															
		Operating unit (HMI)																
		0	HMI with click wheel and 0.5 m cable															
		4	HMI with click wheel and 2.0 m cable															
		5	HMI with click wheel and 5.0 m cable															
		6	HMI with click wheel and 10.0 m cable															
		X	Without HMI															
		Access Code:																
		0	No access code															
		1	Access code															
		Language:																
		EN	English															
FR	French																	
S3Cb	H	120145	PV	T	0	0	7	0	W	A	0	0	0	S	0	EN		

ProMinent® ProMus Hydraulic Diaphragm Metering Pumps

Overview: ProMus

High pressure chemical process metering

(see [page 147](#) for spare parts)

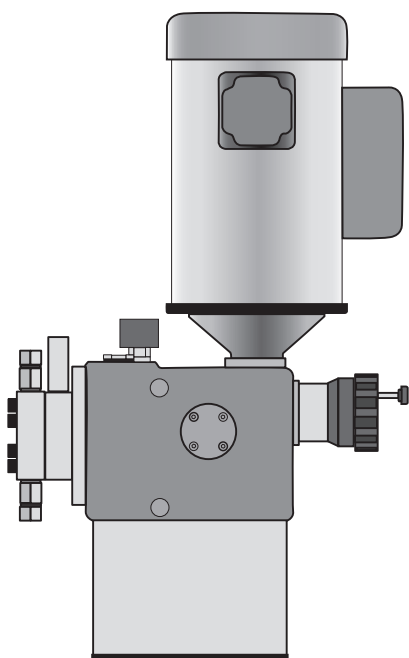
The ProMus is a motor driven metering pump with a hydraulically actuated diaphragm. The drive case and the hydraulic unit are filled with a liquid that functions as a hydraulic coupling. A plunger connects the drive case with the hydraulic unit. The dosing diaphragm separates the hydraulic part of the pump from the dosing unit. The movement of the diaphragm depends on the amount of liquid displaced by the plunger.

ProMus Design Specifications

The ProMinent ProMus is a motor driven metering pump incorporating a hydraulically balanced Teflon diaphragm. The drive case is cast iron incorporating a worm gear set (5 Ratios available) driving a rotating eccentric. The locking stroke adjuster varies the flow from 100% to 0% in 1% increments. The pump is built in accordance to API 675 standards. The hydraulic system transfers the rotating eccentric motion to diaphragm movement by way of a reciprocating plunger (8 plunger diameters available). The plunger and diaphragm are hydraulically coupled (no mechanical connection). Coupling compliance is precisely controlled by a mechanically actuated replenishment valve, which senses diaphragm position to admit coupling fluid as required. The coupling fluid is automatically degassed to maintain accuracy and drive case is protected from overload by a simple acting relief valve. The hydraulic system is separated from the fluid end by a Teflon diaphragm completely isolating the pumped fluid from the surroundings. The liquid end is currently available in PVDF, Stainless Steel, Hastelloy C and Alloy 20.

ProMus Benefits

- Flow rates from 0.23 gph (0.87 L/h) to 101 gph (382 L/h) and Pressures up to 3500 psi (241 bar)
- Hydraulically actuated diaphragm ensuring a sealed pumping system for corrosive or toxic chemicals with superior leak protection
- Built in accordance to API 675 standards suitable for heavy industrial applications and specifications
- Robust cast iron drive construction ideal for applications such as boiler feeds, catalyst feed, dye injection and petrochemicals
- Flexible design for a wide range of applications including water treatment and high pressure chemical refining
- Fast and easy field maintenance with minimal downtime



ProMinent® ProMus Hydraulic Diaphragm Metering Pumps

Specifications

Pump type:	Hydraulically actuated diaphragm type liquid end		
Maximum stroke length:	20mm		
Materials of construction:			
Housing:	Cast iron		
Diaphragm:	Flat Teflon		
Required Motor HP:	1/2 HP (if 12.5:1 gear is selected 3/4 hp might be used) **		
Full load RPM:	1725		
Drive:	Uses a hydraulic piston and mechanically actuated Oil replenishment valve to transfer the reciprocating Motion to a flat Teflon diaphragm		
Gear ratios:	5 gear ratios; 12.5:1, 15:1, 30:1, 40:1, 50:1*, 100:1* Note: minimum stroke rate is 35 spm		
VDF Use:	If using a VFD, please refer to the recommendations noted on page 86.		
Motor mounting flange:	Fits all NEMA 56 C frame motors (Optional IEC 71 with B5 flange)		
Motor coupling:	Direct coupled to worm gear shaft		
Check valves:	PVDF/PTFE: size 17 double inlet & outlet; sizes 30/40 single inlet & outlet Metal: 1) single inlet & outlet 2) double inlet & outlet 3) single inlet & double outlet (Double ball needed for pressures over 500 psi)		
Repeatability:	Steady state flow accuracy is +/- 1% over turndown Ratio of 10:1		
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)
Max solids size :	0.3mm; if larger than this provisions must be made to remove them prior to suction inlet		
Max viscosity:	200 mPas / 200 cPs		
Recommend oil:	Mobilube SCH 75w-90		
Oil quantity:	1.5 quart (1.42 l)		
Oil change interval:	Every 5000 hours		
Stroke length adjustment:	Manual adjustment. Automatic stroke length adjustment via 4 to 20 mA available as an option		
Pressure relief:	Integrated pressure relief to protect pump. External pressure relief must be used to protect system		
Warranty:	2 years on drive, 1 year on liquid end		
Factory testing:	each pump is tested for capacity at rated pressure		
Maximum inlet pressure:	14.5 psi (1 bar)		

*50:1 and 100:1 are not available for 50 Hz operation

** 3/4HP is a must for the 12.5:1 gears. The pump needs a higher torque and will run hot if 1/2HP is used

ProMinent® ProMus Hydraulic Diaphragm Metering Pumps

Capacity Data

At 60 Hz (1750 rpm)						Capacity at Max. Backpressure	Gear Ratio	Max. Stroke Rate	At 50 Hz (1458 rpm) Capacity at Max. Backpressure			Typical suct./dis. Connection		
		psig	Bar	psig	Bar	U.S.			U.S			FNPT/ BSP	MNPT/ BSP	
Plunger (in.)		(PVDF)	(PVDF)	(metal)	(metal)	GPH	(L/h)	spm	GPH	(L/h)	spm	(metal)	(PVDF)	
Size 17	3/8"	230	16	3500	241	0.2	(0.87)	100:1	18*	-	-	-	-	-
	3/8"	230	16	3500	241	0.61	(2.3)	50:1	35*	-	-	-	-	-
	3/8"	230	16	3500	241	0.76	(2.8)	40:1	43*	0.63	2.45	36	1/4	1/4
	3/8"	230	16	3500	241	1.02	(3.8)	30:1	58*	0.85	3.29	48	1/4	1/4
	3/8"	230	16	3500	241	2.03	(7.6)	15:1	115	1.69	6.56	96	1/4	1/4
	3/8"	230	16	3500	241	2.44	(9.2)	12.5:1	138	2.03	7.88	115	1/4	1/4
	7/16"	230	16	3500	241	0.83	(3.1)	50:1	35*	-	-	-	-	-
	7/16"	230	16	3500	241	1.04	(3.9)	40:1	43*	0.87	3.36	36	1/4	1/4
	7/16"	230	16	3500	241	1.38	(5.2)	30:1	58*	1.15	4.46	48	1/4	1/4
	7/16"	230	16	3500	241	2.77	(10.4)	15:1	115	2.31	8.94	96	1/4	1/4
7/16"	230	16	3500	241	3.32	(12.5)	12.5:1	138	2.77	10.72	115	1/4	1/4	
Size 30	5/8"	230	16	2080	143	1.8	(6.8)	50:1	35*	-	-	-	-	-
	5/8"	230	16	2080	143	2.2	(8.5)	40:1	43*	1.87	7.26	36	1/4	1/2
	5/8"	230	16	2080	143	3.0	(11.3)	30:1	58*	2.50	9.68	48	1/4	1/2
	5/8"	230	16	2080	143	6.0	(22.7)	15:1	115	5.00	19.37	96	1/4	1/2
	5/8"	230	16	2080	143	7.2	(27.2)	12.5:1	138	6.00	23.24	115	1/4	1/2
	13/16"	230	16	1230	85	3.0	(11.5)	50:1	35*	-	-	-	-	-
	13/16"	230	16	1230	85	3.8	(14.3)	40:1	43*	3.17	12.27	36	3/8	1/2
	13/16"	230	16	1230	85	5.1	(19.1)	30:1	58*	4.22	16.37	48	3/8	1/2
	13/16"	230	16	1230	85	10.1	(38.2)	15:1	115	8.45	32.73	96	3/8	1/2
	13/16"	230	16	1230	85	12.2	(46.1)	12.5:1	138	10.14	39.28	115	3/8	1/2
	1-1/8"	230	16	640	44	6.3	(24.0)	50:1	35*	-	-	-	-	-
	1-1/8"	230	16	640	44	7.9	(30.0)	40:1	43*	6.61	25.61	36	3/8	1/2
	1-1/8"	230	16	640	44	10.6	(40.1)	30:1	58*	8.81	34.14	48	3/8	1/2
	1-1/8"	230	16	640	44	21.1	(79.8)	15:1	115	17.62	68.29	96	3/8	1/2
1-1/8"	230	16	640	44	25.4	(96.1)	12.5:1	138	21.15	81.95	115	3/8	1/2	
Size 40	1-3/4"	230	16	265	18	15.4	(58.2)	50:1	35*	-	-	-	-	-
	1-3/4"	230	16	265	18	19.2	(72.6)	40:1	43*	15.99	61.97	36	3/4	3/4
	1-3/4"	230	16	265	18	25.6	(96.9)	30:1	58*	21.32	82.62	48	3/4	3/4
	1-3/4"	230	16	265	18	51.2	(193.8)	15:1	115	42.64	165.24	96	3/4	3/4
	1-3/4"	230	16	265	18	61.4	(232.4)	12.5:1	138	51.17	198.29	115	3/4	3/4
	2"	200	14	200	14	20.1	(76.0)	50:1	35*	-	-	-	-	-
	2"	200	14	200	14	25.1	(95.0)	40:1	43*	20.89	80.94	36	3/4	3/4
	2"	200	14	200	14	33.4	(126.4)	30:1	58*	27.85	107.91	48	3/4	3/4
	2"	200	14	200	14	66.8	(252.8)	15:1	115	55.70	215.83	96	3/4	3/4
	2"	200	14	200	14	80.2	(303.5)	12.5:1	138	66.84	258.99	115	3/4	3/4
	2-1/4"	160	11	160	11	25.4	(96.1)	50:1	35*	-	-	-	-	-
	2-1/4"	160	11	160	11	31.7	(119.9)	40:1	43*	26.43	102.43	36	3/4	3/4
	2-1/4"	160	11	160	11	42.3	(160.1)	30:1	58*	35.25	136.58	48	3/4	3/4
	2-1/4"	160	11	160	11	84.6	(327.8)	15:1	115	70.49	273.16	96	3/4	3/4
	2-1/4"	160	11	160	11	101.5	(384.2)	12.5:1	138	84.59	327.79	115	3/4	3/4

- not available for 50 Hz operation

(Note: Capacities and suction lift refer to pumps tested on water at 115 VAC, 60 Hz, and an ambient temperature of 70°F (20°C). Higher specific gravity fluids will reduce suction lift. Capacities will be slightly reduced from published ratings if pumps are skid mounted).

NOTE: It is not recommended to use a VDF with the pumps above noted with the asterisks (); for the others, if using a VFD, 35 spm is the minimum recommended stroking rate for the pump. In addition, the motor should be upsized to a 3/4 HP for increased torque. Refer to page 158 for motor selection. When the pump operates at a lower stroke rate (frequency), the pump motor does not have enough torque to operate the internal components properly.

Materials In Contact With Chemicals

Material	Liquid End	Suction/Discharge connector	Seals/ball seat	Valve Balls
SS	stainless steel	stainless steel	PTFE/SS	stainless steel
A2	alloy 20	alloy 20	PTFE/A2	alloy 20
HC	hastelloy C	hastelloy C	PTFE/HC	hastelloy C
PVT	PVDF	PVDF	PTFE/PVDF	ceramic

ProMinent® ProMus Hydraulic Diaphragm Metering Pumps

Identcode Ordering System: ProMus

ProMinent®

ProMus1	Pump Version:										
	17A	Size 17 liquid end with 3/8" Plunger	30C	Size 30 liquid end with 1-1/8" Plunger							
	17B	Size 17 liquid end with 7/16" Plunger	40A	Size 40 liquid end with 1-3/4" Plunger							
	30A	Size 30 liquid end with 5/8" Plunger	40B	Size 40 liquid end with 2" Plunger							
	30B	Size 30 liquid end with 13/16" Plunger	40C	Size 40 liquid end with 2-1/4" Plunger							
	Liquid end material:										
	SS1	316 Stainless steel Single ball check									
	SS2	316 Stainless steel Double ball check (*Needed for applications above 500 psi)(not available Size 40)									
	SS3	316 St. steel Single inlet, Double outlet (Rcmd. for Flooded suction w/ discharge pressure above 500psi)									
	PVT	PVDF/PTFE size 17 Double inlet & outlet; sizes 30/40 Single inlet & outlet									
	Connectors:										
	0	NPT									
	7	MNPT PVDF Standard (PVT LE only)									
	Gear ratio:										
	01	12.5:1 56C									
	02	15:1 56C									
	03	30:1 56C									
	04	40:1 56C									
	05	50:1 56C									
	06	12.5:1 IEC (IEC 71 with B5 flange)									
	07	15:1 IEC (IEC 71 with B5 flange)									
	08	30:1 IEC (IEC 71 with B5 flange)									
	09	40:1 IEC (IEC 71 with B5 flange)									
	10	50:1 IEC (IEC 71 with B5 flange)									
	11	100:1 (17A 3/8 plunger only) 56C									
	Motor:										
	X	No motor included									
	Base:										
	0	Standard Base									
	Stroke Adjustment:										
	1	Manual stroke adjustment									
	7	Explosion proof NEMA 7									
	Internal relief valve:										
	A	3500 psi/size 17									
	B	2080 psi/size 17									
	C	1230 psi/size 17									
	D	640 psi/size 17									
	E	300 psi/size 17									
	F	2080 psi/size 30									
	G	1230 psi/size 30									
	H	640 psi/size 30									
	I	265 psi/sizes 30 & 40									
J	200 psi/sizes 30 & 40										
K	160 psi (30B, C & 40)										
Hydraulic oil:											
0	Standard										
ProMus1	17A	SS1	0	01	X	0	1	A	0		

product
overview

solenoid-driven
metering pumps

motor-driven
metering pumps

pump spare parts &
accessories

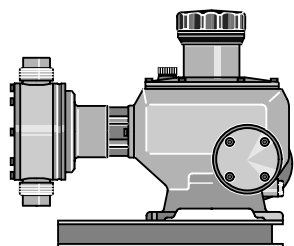
DULCOMETER®
instrumentation

DULCOTEST®
sensors

standard & custom
systems

ProMinent® Makro TZ Diaphragm Metering Pumps

Overview: Makro TZ

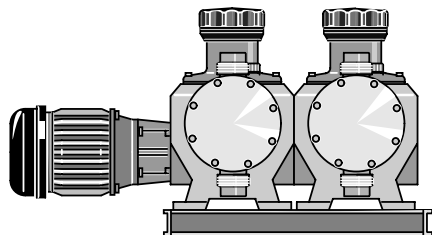


Ideal for high volume and high pressure applications

[\(see page 148 for spare parts\)](#)

The ProMinent® Makro TZMb is a mechanically or hydraulically actuated motor driven diaphragm metering pump.

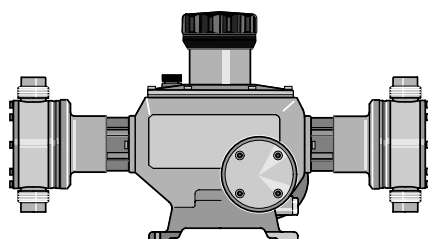
The stroke length can be adjusted by means of the shift ring mechanism from 0-10 mm (TZMb), with 0.5 % accuracy. There are 4 different gear ratios available, each is encased in a cast, seawater resistant, acrylic resin lacquered housing. Liquid ends are available in different material combinations to suit differing applications. The suction lift varies according to the density and viscosity of the medium, the dimension of the pipework and the pump stroke rate. Reproducibility of metering is better than ± 2 % in the stroke length range from 30 % -100 % subject to defined conditions and correct installation. (Refer to details in the operating instruction manual).



pk_2_013

ProMinent® Makro TZ TZMbA Add-On Pumps

The ProMinent® Makro TZ main diaphragm metering pump can be converted to a duplex or triplex pump with the ProMinent® Makro TZ add-on diaphragm pump (several add-on pumps can be operated at reduced back pressure). Multiplex pumps can also be retrofitted by the operator; all the necessary components and fittings are included with the TZMbA. Different stroke rates can be achieved with the add-on pump independently of the main pump as each TZMbA has its own reducing gear. The main power end can be fitted for this purpose with a more powerful drive motor. A base frame is required when using add-on power ends.



pk_2_014

ProMinent® Makro TZ Double Head Version TZMbD/TZMbB

The double head version of the ProMinent® Makro TZ is similar to the simplex pump. It is, however, fitted with a second liquid end.

The liquid ends work in push-pull mode by means of a coupling element in the gearbox.

ProMinent® Makro TZ Diaphragm Metering Pumps

Identcode Ordering System: Makro TZ (TZMb)

TZMb	Drive Type:													
	H	Main Drive												
	A	Add on unit												
	D	Double head main drive												
	B	Double head add on unit												
	B	Double head add on unit												
	Pump Type:													
	120260	312 L/hr, 174 psi	070720	864 L/hr, 100 psi										
	120340	408 L/hr, 174 psi	070860	1032 L/hr, 100 psi										
	120430	516 L/hr, 174 psi	040840	1008 L/hr, 58 psi										
	120510	622 L/hr, 174 psi	041100	1320 L/hr, 58 psi										
	070430	516 L/hr, 100 psi	041400	1680 L/hr, 58 psi										
	070570	684 L/hr, 100 psi	041670	2004 L/hr, 58 psi										
	Liquid end material:													
	PC	PVC												
	PP	Polypropylene												
	SS	Stainless Steel												
	TT	PTFE + 25% carbon												
	Seal material:													
	T	PTFE												
	Diaphragm:													
	1	Multi-layer safety diaphragm with rupture indicator												
	Liquid end version:													
	0	No valve springs												
	1	With valve springs												
	Hydraulic connection:													
	0	Standard connection				3	PVDF union nut and insert							
	1	PVC union nut and insert				4	SS union nut and insert							
	2	PP union nut and insert												
	Versions:													
	0	with ProMinent® logo												
	2	No ProMinent® logo												
	A	with ProMinent® logo, with frame, simplex												
	B	with ProMinent® logo, with frame, duplex												
	C	with ProMinent® logo, with frame, triplex												
M	Modified (Used for none standard requests (e.g. Documentation))													
Electrical power supply:														
0	add-on drive unit, without electrical connection													
4	No motor, with 56 C flange (Requires 1.5 HP motor)													
Enclosure rating:														
0	IP 55 (Standard) ISO class F													
Stroke sensor:														
0	No stroke sensor													
1	With stroke sensor (Namur)													
Stroke length adjustment:														
0	Stroke length adjustment, man.													
1	230 V stroke actuator													
2	115 V stroke actuator													
3	230 V 0-20 mA stroke controller													
4	230 V 4-20 mA stroke controller													
5	115 V 0-20 mA stroke controller													
6	115 V 4-20 mA stroke controller													
Applications														
0	Standard													
TZMb	H	120260	PC	T	1	0	0	0	0	0	0	0	0	

If using a non-fractional motor, coupling part # 7500019 is required for the motor shaft

* Pump supplied with 143/145 TC flange

ProMinent® Makro TZ Diaphragm Metering Pumps

Capacity Data (TZMbH)

with 1800 rpm motor at 60 Hz

Pump Capacity

at Max. backpressure

Max. Stroke Frequency - Suction Lift Connection Suction Discharge Side Shipping Weight PP, PC/TT,SS

Pump type	gph	L/h	psi	bar	ml/ stroke	strokes/ min.	ft (m)	in (DN)	lb (kg)
TZMbH									
120260	82	312	174	12	60	86	13.1 (4)	1" MNPT (25)	102/119 (46/54)
120340	108	408	174	12	60	115	13.1 (4)	1" MNPT (25)	102/119 (46/54)
120430	136	516	174	12	60	144	13.1 (4)	1" MNPT (25)	102/119 (46/54)
120510	162	612	174	12	60	173	13.1 (4)	1" MNPT (25)	102/119 (46/54)
070430	136	516	100	7	99	86	11.5 (3.5)	1 ½" MNPT (32)	110/141 (50/64)
070570	180	684	100	7	99	115	11.5 (3.5)	1 ½" MNPT (32)	110/141 (50/64)
070720	228	864	100	7	99	144	11.5 (3.5)	1 ½" MNPT (32)	110/141 (50/64)
070860	272	1032	100	7	99	173	11.5 (3.5)	1 ½" MNPT (32)	110/141 (50/64)
040840	266	1008	58	4	194	86	9.8 (3)	1 ½" MNPT (40)	124/177 (56/80)
041100	348	1320	58	4	194	115	9.8 (3)	1 ½" MNPT (40)	124/177 (56/80)
041400	443	1680	58	4	194	144	9.8 (3)	1 ½" MNPT (40)	124/177 (56/80)
041670	529	2004	58	4	194	173	9.8 (3)	1 ½" MNPT (40)	124/ 177 (56/80)

Stroke length 10 mm

The admissible priming pressure on the suction side is 50 % of the maximum back pressure.

(Note: Capacities and suction lift refer to pumps tested on water at 115 VAC, 60 Hz, and an ambient temperature of 70°F

(20°C). Higher specific gravity fluids will reduce suction lift. Capacities will be slightly reduced from published ratings if pumps are skid mounted).

Materials In Contact With Chemical In Version

		DN 25 Ball Valves		DN 32/DN 40 Plate Valves**			
Pump Head	Suction/ Dis-charge Connector	Seals	Valve Balls	Valve Seat	Seals	Valve Plate/ Valve Spring	Valve Seat
PPT Polypropylene	PVDF	PTFE	Ceramic	PTFE	PTFE	Ceramic/ Hast. C + CTFE**	PTFE
PCT PVC	PVDF	PTFE	Ceramic	PTFE	PTFE	Ceramic/ Hast. C + CTFE**	PTFE
TTT PTFE with carbon	PTFE with carbon	PTFE	Ceramic	PTFE	PTFE	Ceramic/ Hast. C + CTFE**	PTFE
SST Stainless steel	Stainless steel	PTFE	Stainless steel	PTFE	PTFE	Stainless steel Hast. C + CTFE*	PTFE

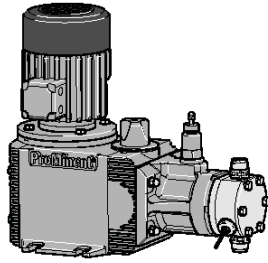
Multi-layer safety diaphragm with PTFE coating.

** The valve spring is coated with CTFE (similar to PTFE)

Custom designs available to order.

ProMinent® Hydro Hydraulic Diaphragm Metering Pumps

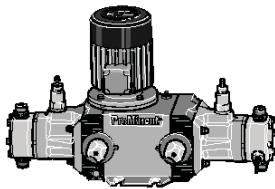
Overview: ProMinent® Hydro Hydraulic Diaphragm Metering Pumps



pk_2_074

Hydro main pump H

The hydraulic diaphragm metering pump is a motor-driven metering pump operated as standard with a 0.37/0.75/1.1 kW wide range AC motor, 230/400 V, 50/60 Hz, degree of protection IP 55, insulation class F. The stroke length is 15/20 mm and can be adjusted with 1% accuracy. The aluminum housing is respectively combined with 4 reduction gear systems, 2 dosing head sizes and 2 dosing head materials. All pump types are equipped as standard with a fixed-setting pressure relief valve that is integrated in the hydraulics and a multi-layer diaphragm with a diaphragm rupture warning system. The reproducibility of the metering is better than $\pm 1\%$ in the stroke length range of 20% -100 % given defined conditions and correct installation. (The notes in the operating instructions must be observed.)



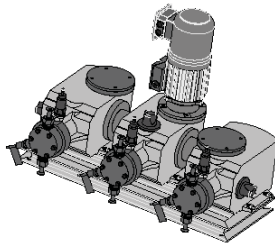
pk_2_073

Hydro double-head version

The double-head version is fitted with a second liquid end which operates on a push-pull action (Boxer principle). Each liquid end is provided with a separate stroke length-adjusting knob so that each liquid end can operate at an independent feed rate.

Hydro add-on pumps

For the Hydro add-on pumps the same basic instructions apply as for the simplex pumps. A main power end can be combined with an add-on power end in both simplex and duplex forms.



P_PZ_0001_SW1

Hydro Triplex

The Hydro Triplex pump comprises a main drive (arranged centrally) and 2 add-on drives. Typical applications for Triplex pumps include metering applications in medium to upper pressure levels with pulsation reduction. The pulsation damping features are produced by the offset discharge stroke (120° out of phase).

Hydro Pump Controller

Stroke length actuator/controller

Actuator with stroke positioning motor for automatic stroke length adjustment. Setting time approx. 1 sec. for 1 % stroke length, fitted with limit switches for min./max. settings. Resistance potentiometer 1 k Ohm for scanning the current setting. Enclosure rating IP 54.

Viscosity (at lowest temperature):

1 - 200 cPs	With no valve springs
201-500 cPs	With valve springs
500 - 2,000 cPs	High viscosity (HV) head

General notes:

1. Pump requires a minimum differential pressure of 1.5 bar (21psi)
2. Internal relief valve is for pump protection only! A pressure relief valve is strongly recommended to be used on the process side of the pump.
3. It is also strongly recommended to use a pulsation dampener and back pressure valve with this pump.

ProMinent® Hydro/2 Hydraulic Diaphragm Metering Pumps

Technical Data: Hydro/2 Hydraulic Diaphragm Metering Pumps

	At 60 Hz (1750 rpm) Capacity at Max. Backpressure				Max. Stroke Rate	Output/Stroke	Max. Suction Lift (water)		Max. Suction Pressure		Suction/Discharge Connector*		Approximate Shipping Weight w/o Motor	
	psig	bar	U.S. GPH	L/h	Stroke/min.	mL/stroke	ft.	m	psig	bar	in.	DN	lbs.	kg
Version HP2aH**														
100003 SST	1,450	100	1.0	3.6	72	1	10	3	14.5	1	1/4	—		
100006 SST	1,450	100	1.8	7.0	150	1	10	3	14.5	1	1/4	—		
100007 SST	1,450	100	2.1	8.0	180	1	10	3	14.5	1	1/4	—		
100009 SST	1,450	100	2.9	11.0	224	1	10	3	14.5	1	1/4	—		
064007 PVDF	232	16	2.2	8.4	72	2	10	3	14.5	1	1/2	10	47.5	21.5
064007 SST	928	64	2.2	8.4	72	2	10	3	14.5	1	3/8	10	50.0	22.7
064015 PVDF	232	16	4.7	18	150	2	10	3	14.5	1	1/2	10	47.5	21.5
064015 SST	928	64	4.7	18	150	2	10	3	14.5	1	3/8	10	50.0	22.7
064018 PVDF	232	16	5.5	21	180	2	10	3	14.5	1	1/2	10	47.5	21.5
064018 SST	928	64	5.5	21	180	2	10	3	14.5	1	3/8	10	50.0	22.7
064022	919	64	6.9	26	224	2	10	3	14.5	1	3/8	10	68	31
025019 PVDF	232	16	6	23	72	5.3	10	3	14.5	1	1/2	10	47.5	21.5
025019 SST	362	25	6	23	72	5.3	10	3	14.5	1	3/8	10	50.0	22.7
025040 PVDF	232	16	12.6	48	150	5.3	10	3	14.5	1	1/2	10	47.5	21.5
025040 SST	362	25	12.6	48	150	5.3	10	3	14.5	1	3/8	10	50.0	22.7
025048 PVDF	232	16	15.3	58	180	5.3	10	3	14.5	1	1/2	10	47.5	21.5
025048 SST	362	25	15.3	58	180	5.3	10	3	14.5	1	3/8	10	50.0	22.7
025060	362	25	19.0	72	224	5.3	10	3	14.5	1	3/8	10	68	31

* PVDF valves require MNPT connectors and SST valves require FNPT connectors.

** High viscosity liquid ends are available for viscosities of 500-2000 cPs and higher on the Hydro/2 025019, 025040, 025048 and 025060 versions.

Note: Motors are not included. The Hydro/2 requires a 1/2 HP motor. NEMA 56C flange is standard.

Materials in contact with medium

Material	Liquid End	Suction/Discharge connector	Seals/ball seat	Valve Balls
SST	stainless steel no. 1.4571/1.4404	stainless steel no. 1.4581	PTFE/ZrO2	stainless steel
PVT	PVDF (Polyvinylidenfluoride)	PVDF (Polyvinylidenfluoride)	PTFE/PTFE	ceramic
HCT	Hast. C	Hast. C	PTFE/Hast. C	ceramic

ProMinent® Hydro/2 Hydraulic Diaphragm Metering Pumps

Identcode Ordering System: Hydro/2 (HP2a)

ProMinent®

HP2a

Drive Type

H

D

E

F

A

B

T

Main drive

Main drive, Double-head version

Main drive for add on drive

Main drive, Double-head version for add-on drive

Add-on drive

Double-head version add-on drive

Triplex: 3 drives and 3 identical liquid ends

Type*	Capacity:			Type*	Capacity:			Type*	Capacity:		
	bar	l/h	PSI		bar	l/h	PSI		bar	l/h	PSI
100003	100	3.6	1450	064007	64	8.4	928	025019	25	23	362
100006	100	7	1450	064015	64	18	928	025040	25	48	362
100007	100	8	1450	064018	64	21	928	025048	25	58	362
100009	100	11	1450	064022	64	26	928	025060	25	72	362
Material Liquid end											
SS		Stainless steel 1.4404/1.4404									
PV		PVDF (only for 025019 - 025060, 064007 - 064022)									
HC		Hastelloy C									
Sealing material*											
T		PTFE									
Displacement body*											
0		Standard multilayer diaphragm with rupture indicator									
Liquid end version											
0		No valve springs (standard)									
1		With valve springs									
D		Double ball valve (only for SST and HCT)									
H		HV version (only for 025019-025060)									
Hydraulic connection											
0		Standard threaded connector									
F		With ANSI flange									
Version											
0		With ProMinent® logo									
M		Modified									
Electrical power supply (1/2 HP Motor Required)											
4		No motor, with C 56 flange, (NEMA)									
0		Add on drive									
Enclosure rating											
0		IP 55 (standard)									
Stroke sensor											
0		No stroke sensor (standard)									
Stroke length adjustment											
0		Manual (standard)									
1		With stroke positioning motor, 230 V/50/60 Hz									
2		With stroke positioning motor, 115 V/60 Hz									
A		With stroke control motor 0...20 mA 230 V/50/60									
B		With stroke control motor 4...20 mA 230 V/50/60									
C		With stroke control motor 0...20 mA 115 V/60 Hz									
D		With stroke control motor 4...20 mA 115 V/60 Hz									
Hydraulic oil											
0		Standard									
1		Food products grade									
2		Low temperature to -25 °C									

* PVT max. 25 bar

product
overview

solenoid-driven
metering pumps

motor-driven
metering pumps

pump spare parts &
accessories

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ProMinent® Hydro/3 Hydraulic Diaphragm Metering Pumps

Technical Data: Hydro/3 Hydraulic Diaphragm Metering Pumps

	At 60 Hz (1750 rpm) Capacity at Max. Backpressure				Max. Stroke Rate	Output/ Stroke	Max. Suction Lift (water)		Max. Suction Pressure		Suction/ Discharge Connector*		Approximate Shipping Weight w/o Motor	
	psig	bar	U.S. GPH	L/h	Stroke/ min.	mL/ stroke	ft.	m	psig	bar	in.	DN	lbs.	kg

Version HP3aH**

100010 SST	1450	100	3.2	12	72	2.8	10	3	14.5	1	3/8	—	90	41
100021 SST	1450	100	6.6	25	150	2.8	10	3	14.5	1	3/8	—	90	41
100025 SST	1450	100	7.9	30	180	2.8	10	3	14.5	1	3/8	—	90	41
100031 SST	1450	100	9.8	37	224	2.8	10	3	14.5	1	3/8	—	90	41
064019 PVDF	362	25	6	23	72	5.3	10	3	14.5	1	1/2	10	90	41
064019 SST	928	64	6	23	72	5.3	10	3	14.5	1	3/8	10	90	41
064040 PVDF	362	25	12.6	48	150	5.3	10	3	14.5	1	1/2	10	90	41
064040 SST	928	64	12.6	48	150	5.3	10	3	14.5	1	3/8	10	90	41
064048 PVDF	362	25	15.3	58	180	5.3	10	3	14.5	1	1/2	10	90	41
064048 SST	928	64	15.3	58	180	5.3	10	3	14.5	1	3/8	10	90	41
064060 PVDF	362	25	19	72	224	5.3	10	3	14.5	1	3/4	10	90	41
064060 SST	928	64	19	72	224	5.3	10	3	14.5	1	3/4	10	90	41
025048 PVDF	362	25	15.3	58	72	13.4	10	3	14.5	1	3/4	15	90	41
025048 SST	362	25	15.3	58	72	13.4	10	3	14.5	1	1/2	15	90	41
025100 PVDF	362	25	31.7	120	150	13.4	10	3	14.5	1	3/4	15	90	41
025100 SST	362	25	31.7	120	150	13.4	10	3	14.5	1	1/2	15	90	41
025120 PVDF	362	25	38.0	144	180	13.4	10	3	14.5	1	3/4	15	90	41
025120 SST	362	25	38.0	144	180	13.4	10	3	14.5	1	1/2	15	90	41
025150 PVDF	362	25	47.6	180	224	13.4	10	3	14.5	1	3/4	15	90	41
025150 SST	362	25	47.6	180	224	13.4	10	3	14.5	1	1/2	15	90	41

* PVDF valves require MNPT connectors and SST valves require FNPT connectors.

** High viscosity liquid ends are available for viscosities of 500 - 2000 cPs on the Hydro/3 025048, 025100 and 025120 versions.

Delivery is 4-6 weeks. Call factory for more information.

Note: Motors are not included. The Hydro/3 requires a 1 HP motor. NEMA 56C flange is standard.

*** Connections sizes change for pumps with high viscosity (HV) liquid-ends: 064040 to 064060 are 1" MNPT; 025048 to 025150 are 1.5" MNPT.

Materials in contact with medium

Material	Liquid End	Suction/Discharge connector	Seals/ball seat	Valve Balls
SST	stainless steel no. 1.4571/1.4404	stainless steel no. 1.4581	PTFE/ZrO2	stainless steel
PVT	PVDF (Polyvinylidenfluoride)	PVDF (Polyvinylidenfluoride)	PTFE/PTFE	ceramic
HCT	Hast. C	Hast. C	PTFE/Hast. C	ceramic

ProMinent® Hydro/3 Hydraulic Diaphragm Metering Pumps

Identcode Ordering System: Hydro/3 (HP3a)

HP3a	Drive Type														
	H	Main drive													
	D	Main drive, Double-head version													
	E	Main drive for add on drive													
	F	Main drive, Double-head version for add-on drive													
	A	Add-on drive													
	B	Double-head version add-on drive													
	T	Triplex: 3 drives and 3 identical liquid ends													
	Type*		Capacity:			Type*		Capacity:			Type*		Capacity:		
			bar	l/h	psi			bar	l/h	psi			bar	l/h	psi
	100010	100	12	1450	064019	64	23	928	025048	25	58	362			
	100021	100	25	1450	064040	64	48	928	025100	25	120	362			
	100025	100	30	1450	064048	64	58	928	025120	25	144	362			
	100031	100	37	1450	064060	64	72	928	025150	25	180	362			
	Material Liquid end														
	SS		Stainless steel 1.4404/1.4404												
	PV		PVDF (max. 25 bar, only for 025048 - 025150, 064019 - 064060)												
	HC		Hastelloy C												
	Sealing material*														
	T		PTFE												
	Displacement body*														
	0		Standard multilayer diaphragm with rupture indicator												
	Liquid end version														
	0		No valve springs (standard)												
	1		With valve springs												
D		Double ball valve (for 100010-100031, 064019-064060, only for SST and HCT)													
H		HV-Version													
Hydraulic connection															
0		Standard threaded connector													
F		With ANSI flange													
Version															
0		With ProMinent® logo													
M		Modified													
Electrical power supply (1 HP Motor Required)															
4		No motor, with NEMA 143 Flange													
0		Add on drive													
Enclosure rating															
0		IP 55 (standard)													
Stroke sensor															
0		No stroke sensor (standard)													
Stroke length adjustment															
0		Manual (standard)													
1		With stroke positioning motor, 230 V/50/60 Hz													
2		With stroke positioning motor, 115 V/60 Hz													
A		With stroke control motor 0...20 mA 230 V/50/60 Hz													
B		With stroke control motor 4...20 mA 230 V/50/60 Hz													
C		With stroke control motor 0...20 mA 115 V/60 Hz													
D		With stroke control motor 4...20 mA 115 V/60 Hz													
Hydraulic oil															
0		Standard													
1		Food products grade													
2		Low temperature to -25 °C													

* PVT max. 25 bar

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ProMinent® Hydro/4 Hydraulic Diaphragm Metering Pumps

Technical Data: Hydro/4 Hydraulic Diaphragm Metering Pumps

	At 60 Hz (1750 rpm) Capacity at Max. Backpressure				Max. Stroke Rate	Output/ Stroke	Max. Suction Lift (water)		Max. Suction Pressure		Suction/ Discharge Connector		Approximate Shipping Weight w/o Motor	
	psig	bar	L/h	U.S. GPH	Stroke/ min.	mL/ stroke	ft.	m	psig	bar	MNPT in.	DN	lbs.	kg
Version HP4aH														
250130**	363	25	155.0	40.9	86	30	10	3	14.5	1	1	25	152	69
250190**	363	25	230.0	60.8	124	30	10	3	14.5	1	1	25	152	69
250250**	363	25	300.0	79.3	164	30	10	3	14.5	1	1	25	152	69
250350**	363	25	420.0	111.1	225	30	10	3	14.5	1	1	25	152	69
160210	232	16	250.0	66.0	86	48	10	3	14.5	1	1	25	167	76
160300	232	16	360.0	95.1	124	48	10	3	14.5	1	1	25	167	76
160400	232	16	480.0	126.8	164	48	10	3	14.5	1	1	25	167	76
160550	232	16	660.0	174.4	225	48	10	3	14.5	1	1 1/2	32	167	76
100330	145	10	400.0	105.7	86	78	10	3	14.5	1	1 1/2	32	192	87
100480	145	10	580.0	153.2	124	78	10	3	14.5	1	1 1/2	32	192	87
100635	145	10	760.0	200.8	164	78	10	3	14.5	1	1 1/2	32	192	87
100880	145	10	1,050.0	277.4	225	78	10	3	14.5	1	1 1/2	32	192	87
070465	102	7	560.0	147.9	86	109	10	3	14.5	1	1 1/2	40	212	96
070670	102	7	805.0	212.7	124	109	10	3	14.5	1	1 1/2	40	212	96
070890	102	7	1,070.0	282.7	164	109	10	3	14.5	1	1 1/2	40	212	96
071230	102	7	1,450.0	383.0	225	109	10	3	14.5	1	1 1/2	40	212	96

** PVT and SST 25 bar.

Note: Motors are not included. The Hydro 4 requires a 1.5 HP Motor. NEMA 143/145TC frame is standard.

Materials in contact with medium

Material	Liquid End	Suction/Discharge connector	Seals/ball seat	Valve Balls
SST	stainless steel no. 1.4571/1.4404	stainless steel no. 1.4581	PTFE/ZrO2	stainless steel
PVT	PVDF (Polyvinylidenfluoride)	PVDF (Polyvinylidenfluoride)	PTFE/PTFE	ceramic
HCT	Hast. C	Hast. C	PTFE/Hast. C	ceramic

ProMinent® Hydro/4 Hydraulic Diaphragm Metering Pumps

Identcode Ordering System: Hydro/4 (HP4a)

HP4a	Drive Type															
	H	Main drive														
	D	Main drive, Double-head version														
	E	Main drive for add on drive														
	F	Main drive, Double-head version for add-on drive														
	A	Add-on drive														
	B	Double-head version add-on drive														
	T	Triplex: 3 drives and 3 identical liquid ends														
	Type*	Capacity:			Type*	Capacity:			Type*	Capacity:			Type*	Capacity:		
		bar	l/h	psi		bar	l/h	psi		bar	l/h	psi		bar	l/h	psi
	250130	25	155	363	160210	16	250	232	100330	10	400	145	070465	7	560	102
	250190	25	230	363	160300	16	360	232	100480	10	580	145	070670	7	805	102
	250250	25	300	363	160400	16	480	232	100635	10	760	145	070890	7	1070	102
	250350	25	420	363	160550	16	660	232	100880	10	1,050	145	071230	7	1,450	102
	Material Liquid end															
	SS		Stainless steel													
	PV		PVDF													
	HC		Hastelloy C													
	Sealing material*															
	T		PTFE													
	Displacement body*															
	0		Standard multilayer diaphragm with rupture indicator													
	Liquid end version															
	0		No valve springs (standard)													
	1		With valve springs													
	Hydraulic connection															
	0		Standard threaded connector													
	F		With ANSI flange													
	Version															
	0		With ProMinent® logo													
	M		Modified													
	Electrical power supply (1.5 HP Motor Required)															
	4		No motor, with NEMA 143/145 Flange													
	0		Add on drive													
	Enclosure rating															
	0		IP 55 (standard)													
	Stroke sensor															
	0		No stroke sensor (standard)													
	Stroke length adjustment															
	0		Manual (standard)													
1		With stroke positioning motor, 230 V/50/60 Hz														
2		With stroke positioning motor, 115 V/60 Hz														
A		With stroke control motor 0...20 mA 230 V/50/60 Hz														
B		With stroke control motor 4...20 mA 230 V/50/60 Hz														
C		With stroke control motor 0...20 mA 115 V/60 Hz														
D		With stroke control motor 4...20 mA 115 V/60 Hz														
Hydraulic oil																
0		Standard														
1		Food products grade														
2		Low temperature to -25 °C														

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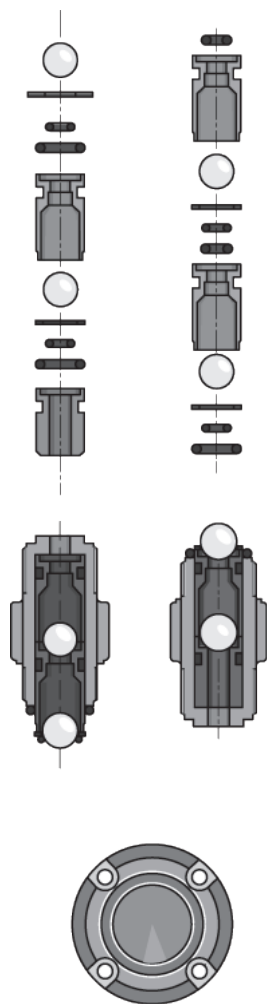
Solenoid Pump Spare Parts

concept^{PLUS}

Complete liquid ends include pump head, valves, mounting screws, diaphragm and backplate. Spare parts kits include:

PP, PC, PV, & NP Liquid Ends

- 1 Diaphragm
- 1 Suction Valve
- 1 Discharge Valve
- 1 Connector Sets
- 2 Valve Balls
- 1 Set O-rings



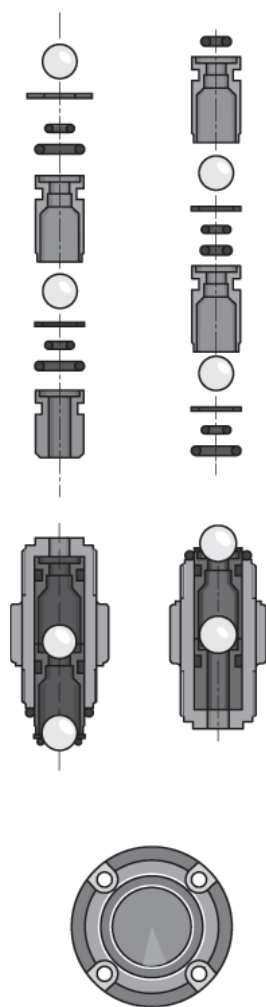
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Concept ^{PLUS} Model	Liquid Kit	Spare Parts Valves	Suction Valves	Discharge Valves	Diaphragm
CNPb 1000PPE2	1024508	1001644	792644	740350	1000244
CNPb 1000NPB2	1024594	1001721	792026	740348	1000244
CNPb 1000PVT2	1027095	1023107	1023128	1023127	1000244
CNPb 1601PPE2	1024507	1001645	792644	740350	1000245
CNPb 1601NPB2	1024595	1001722	792026	740348	1000245
CNPb 1601PVT2	1027096	1023108	1023128	1023127	1000245
CNPb 1002PPE2	1024506	1001646	792644	740350	1000246
CNPb 1002NPB2	1024596	1001723	792026	740348	1000246
CNPb 1002PVT2	1027097	1023109	1023128	1023127	1000246
CNPb 0704PPE0	1022854	1022866	1022827	1022844	1020672
CNPb 0704NPB2	1024597	1025430	792026	740348	1020672
CNPb 0704PVT2	1027731	1027732	1023128	1023127	1020672
CNPb 0309PPE2	1024505	1001648	1001437	1001441	1000248
CNPb 0309NPB2	1024598	1001725	1001434	1001438	1000248
CNPb 0309PVT2	1027005	1023111	1023126	1023125	1000248
CNPb 0215PPE2	1024504	1001649	1001437	1001441	1000249
CNPb 01002PVT7	1048390	1047830	1023128	1047828	1000246
CNPb 0704PVT7	1048391	1047858	1023128	1047828	1020672
CNPb 0309PVT7	1048392	1047832	1023126	1047829	1000248
CNPb 0215PVT7	1048393	1047833	1023126	1047829	1000249

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Solenoid Pump Spare Parts

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Complete liquid ends include pump head, valves, mounting screws, diaphragm and backplate. Spare parts kits include:

PP, PC, PV, & NP Liquid Ends

- 1 Diaphragm
- 1 Suction Valve
- 1 Discharge Valve
- 1 Connector Sets
- 2 Valve Balls
- 1 Set O-rings

TT Liquid Ends

- 1 Diaphragm
- 1 Suction Valve
- 1 Discharge Valve
- 1 Connector Sets
- 2 Valve Balls
- 1 Set O-rings
- 2 Ball Seat Discs

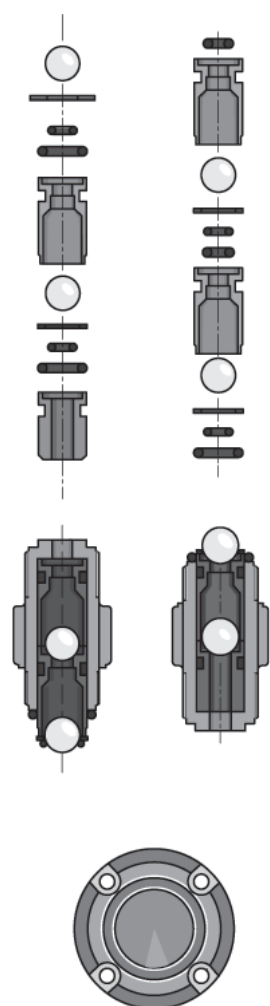
SS Liquid Ends

- 1 Diaphragm
- 4 Valve Balls
- 1 Set O-rings
- 4 Ball Seat Discs

Liquid End Version	Material Code	Complete Liquid End	Spare Parts Kit	Spare Valves Only (connector sets not included)		
				Suction	Discharge	Diaphragm
1000	PPE	1002057	1001644	792644	740350	1000244
	PPB	1002065	1001652	792646	740351	1000244
	PCE	1002365	1001713	792119	740349	1000244
	NPE	1002193	1001713	792119	740349	1000244
	PCB	1002358	1001721	792026	740348	1000244
	NPB	1002201	1001721	792026	740348	1000244
	TTT	1002345	1001737	809407	809406	1000244
	SST	1002557	1002549	809424	809423	1000244
	PVT	1023134	1023107	1023128	1023127	1000244
1601	PPE	1002058	1001645	792644	740350	1000245
	PPB	1002066	1001653	792646	740351	1000245
	PCE	1002366	1001714	792119	740349	1000245
	NPE	1002194	1001714	792119	740349	1000245
	PCB	1002359	1001722	792026	740348	1000245
	NPB	1002202	1001722	792026	740348	1000245
	TTT	1002346	1001738	809407	809406	1000245
	SST	1002558	1002550	809424	809423	1000245
	PVT	1023135	1023108	1023128	1023127	1000245
1602	PPE	1002059	1001646	792644	740350	1000246
	PPB	1002067	1001654	792646	740351	1000246
	PCE	1002367	1001715	792119	740349	1000246
	NPE	1002195	1001715	792119	740349	1000246
	PCB	1002360	1001723	792026	740348	1000246
	NPB	1002203	1001723	792026	740348	1000246
	TTT	1002347	1001739	809407	809406	1000246
	SST	1002559	1002551	809424	809423	1000246
	PVT	1023136	1023109	1023128	1023127	1000246
1005	PPE	1002060	1001647	792644	740350	1000247
	PPB	1002068	1001655	792646	740351	1000247
	PCE	1002368	1001716	792119	740349	1000247
	NPE	1002196	1001716	792119	740349	1000247
	PCB	1002361	1001724	792026	740348	1000247
	NPB	1002204	1001724	792026	740348	1000247
	PVT HV	1018072	1019066	1002267	1002267	1000247
	TTT	1002348	1001740	809407	809406	1000247
	SST	1002560	1002552	809424	809423	1000247
	PVT	1023137	1023110	1023128	1023127	1000247
0708	PPE	1002061	1001648	1001437	1001441	1000248
	PPB	1002069	1001656	1001436	1001440	1000248
	PCE	1002369	1001717	1001435	1001439	1000248
	NPE	1002197	1001717	1001435	1001439	1000248
	PCB	1002362	1001725	1001434	1001438	1000248
	NPB	1002205	1001725	1001434	1001438	1000248
	PVT HV	1018073	1019067	1002267	1002267	1000248
	TTT	1002349	1001741	809445	809444	1000248
	SST	1002561	1002553	809497	809496	1000248
	PVT	1023138	1023111	1023126	1023125	1000248
0413	PPE	1002062	1001649	1001437	1001441	1000249
	PPB	1002070	1001657	1001436	1001440	1000249
	PCE	1002370	1001718	1001435	1001439	1000249

Solenoid Pump Spare Parts

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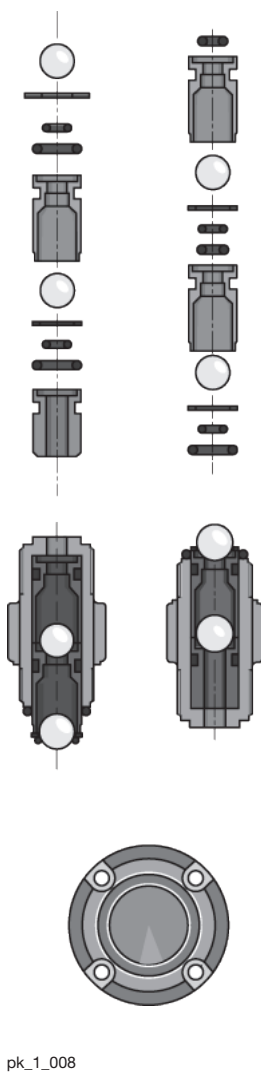


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Liquid End Version	Material Code	Complete Liquid End	Spare Parts Kit	Spare Valves Only (connector sets not included)		
				Suction	Discharge	Diaphragm
0413 (cont.)	NPE	1002198	1001718	1001435	1001439	1000249
	PCB	1002363	1001726	1001434	1001438	1000249
	NPB	1002206	1001726	1001434	1001438	1000249
	PVT HV	1018084	1019069	1002267	1002267	1000249
	TTT	1002350	1001742	809445	809444	1000249
	SST	1002562	1002554	809497	809496	1000249
	PVT	1023139	1023112	1023126	1023125	1000249
0220	PPE	1002063	1001650	1001437	1001441	1000250
	PPB	1002071	1001658	1001436	1001440	1000250
	PCE	1002371	1001719	1001435	1001439	1000250
	NPE	1002199	1001719	1001435	1001439	1000250
	PCB	1002364	1001727	1001434	1001438	1000250
	NPB	1002207	1001727	1001434	1001438	1000250
	PVT HV	1018085	1019070	1002267	1002267	1000250
	TTT	1002351	1001754	809445	809444	1000250
	SST	1002563	1002555	1002547	1002548	1000250
	PVT	1023140	1023113	1023126	1023125	1000250
1605	PPE	1002060	1001647	792644	740350	1000247
	PPB	1002068	1001655	792646	740351	1000247
	PCE	1002368	1001716	792119	740349	1000247
	NPE	1002196	1001716	792119	740349	1000247
	PCB	1002361	1001724	792026	740348	1000247
	NPB	1002204	1001724	792026	740348	1000247
	PVT HV	1018072	1019066	1002267	1002267	1000247
	TTT	1002348	1001740	809407	809406	1000247
	SST	1002560	1002552	809424	809423	1000247
	PVT	1023137	1023110	1023128	1023127	1000247
1008	PPE	1002061	1001648	1001437	1001441	1000248
	PPB	1002069	1001656	1001436	1001440	1000248
	PCE	1002369	1001717	1001435	1001439	1000248
	NPE	1002197	1001717	1001435	1001439	1000248
	PCB	1002362	1001725	1001434	1001438	1000248
	NPB	1002205	1001725	1001434	1001438	1000248
	PVT HV	1018073	1019067	1002267	1002267	1000248
	TTT	1002349	1001741	809445	809444	1000248
	SST	1002561	1002553	809497	809496	1000248
	PVT	1023138	1023111	1023126	1023125	1000248
0713	PPE	1002062	1001649	1001437	1001441	1000249
	PPB	1002070	1001657	1001436	1001440	1000249
	PCE	1002370	1001718	1001435	1001439	1000249
	NPE	1002198	1001718	1001435	1001439	1000249
	PCB	1002363	1001726	1001434	1001438	1000249
	NPB	1002206	1001726	1001434	1001438	1000249
	PVT HV	1018084	1019069	1002267	1002267	1000249
	TTT	1002350	1001742	809445	809444	1000249
	SST	1002562	1002554	809497	809496	1000249
	PVT	1023139	1023112	1023126	1023125	1000249
0420	PPE	1002063	1001650	1001437	1001441	1000250
	PPB	1002071	1001658	1001436	1001440	1000250
	PCE	1002371	1001719	1001435	1001439	1000250
	NPE	1002199	1001719	1001435	1001439	1000250
	PCB	1002364	1001727	1001434	1001438	1000250
	NPB	1002207	1001727	1001434	1001438	1000250
	PVT HV	1018085	1019070	1002267	1002267	1000250
	TTT	1002351	1001754	809445	809444	1000250
	SST	1002563	1002555	1002547	1002548	1000250
	PVT	1023140	1023113	1023126	1023125	1000250
0232	PPE	1002064	1001651	1001437	1001441	1000251
	PPB	1002072	1001659	1001436	1001440	1000251
	PCE	1002609	1001720	1001435	1001439	1000251
	NPE	1002200	1001720	1001435	1001439	1000251
	PCB	1002608	1001728	1001434	1001438	1000251
	NPB	1002208	1001728	1001434	1001438	1000251
	TTT	1002352	1001755	809445	809444	1000251
	SST	1002564	1002556	1002547	1002548	1000251
	PVT	1023141	1023124	1023126	1023125	1000251

Solenoid Pump Spare Parts

beta/a and gamma/L Auto-degassing



For Auto-degassing pumps.

Complete liquid ends include pump head, valves, mounting screws, diaphragm and back plate. Spare parts kits include:

PP & NP

Liquid Ends

- | | |
|-------------------|------------------------|
| 1 Diaphragm | 2 Valve Balls |
| 1 Suction Valve | 1 Set O-rings |
| 1 Discharge Valve | 1 Vent Valve, Complete |
| 1 Connector Sets | |

Liquid End Version	Material Code	Complete Liquid End	Spare Parts Kit	Spare Valves Only (connector sets not included)			Diaphragm
				Suction	Discharge	Vent	
GALa							
1601	PPE9	1002393	1001756	792644	1001067	1001063	1000245
	PPB9	1002392	1001762	792646	1001066	1001062	1000245
	NPE9	1002248	1001660	792119	1001065	1001061	1000245
	NPB9	1002242	1001666	792026	1001064	1001060	1000245
1602	PPE9	1002395	1001757	792644	1001067	1001063	1000246
	PPB9	1002394	1001763	792646	1001066	1001062	1000246
	NPE9	1002249	1001661	792119	1001065	1001061	1000246
	NPB9	1002243	1001667	792026	1001064	1001060	1000246
1005	PPE9	1002399	1001758	792644	1001067	1001063	1000247
	PPB9	1002398	1001764	792646	1001066	1001062	1000247
	NPE9	1002250	1001662	792119	1001065	1001061	1000247
	NPB9	1002244	1001668	792026	1001064	1001060	1000247
0708	PPE9	1002397	1001759	1001437	1001071	1001063	1000248
	PPB9	1002396	1001765	1001436	1001070	1001062	1000248
	NPE9	1002251	1001663	1001435	1001069	1001061	1000248
	NPB9	1002245	1001669	1001434	1001068	1001060	1000248
0413	PPE9	1002401	1001760	1001437	1001071	1001063	1000249
	PPB9	1002400	1001766	1001436	1001070	1001062	1000249
	NPE9	1002252	1001664	1001435	1001069	1001061	1000249
	NPB9	1002246	1001670	1001434	1001068	1001060	1000249
0220	PPE9	1002403	1001761	1001437	1001071	1001063	1000250
	PPB9	1002402	1001767	1001436	1001070	1001062	1000250
	NPE9	1002253	1001665	1001435	1001069	1001061	1000250
	NPB9	1002247	1001671	1001434	1001068	1001060	1000250
1605	PPE9	1002399	1001758	792644	1001067	1001063	1000247
	PPB9	1002398	1001764	792646	1001066	1001062	1000247
	NPE9	1002250	1001662	792119	1001065	1001061	1000247
	NPB9	1002244	1001668	792026	1001064	1001060	1000247
1008	PPE9	1002397	1001759	1001437	1001071	1001063.5	1000248
	PPB9	1002396	1001765	1001436	1001070	1001062.7	1000248
	NPE9	1002251	1001663	1001435	1001069	1001061.9	1000248
	NPB9	1002245	1001669	1001434	1001068	1001060.1	1000248
0713	PPE9	1002401	1001760	1001437	1001071	1001063.5	1000249
	PPB9	1002400	1001766	1001436	1001070	1001062.7	1000249
	NPE9	1002252	1001664	1001435	1001069	1001061.9	1000249
	NPB9	1002246	1001670	1001434	1001068	1001060.1	1000249
0420	PPE9	1002403	1001761	1001437	1001071	1001063.5	1000250
	PPB9	1002402	1001767	1001436	1001070	1001062.7	1000250
	NPE9	1002253	1001665	1001435	1001069	1001061.9	1000250
	NPB9	1002247	1001671	1001434	1001068	1001060.1	1000250

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Solenoid Pump Spare Parts

beta/b

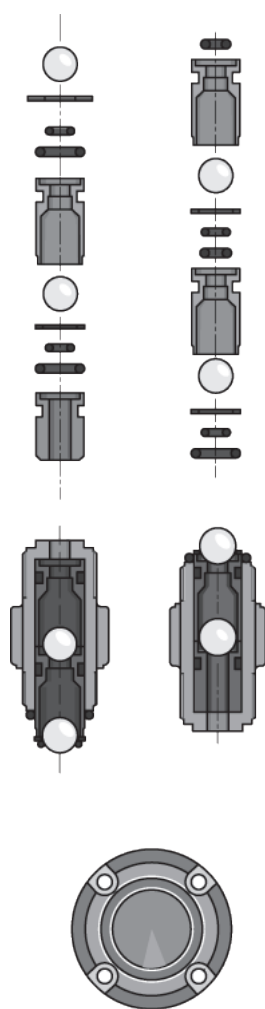
Complete liquid ends include pump head, valves, mounting screws, diaphragm and backplate. Spare parts kits include:

PV, & NP**Liquid Ends**

1 Diaphragm
1 Suction Valve
1 Discharge Valve
1 Connector Sets
2 Valve Balls
1 Set O-rings

SS**Liquid Ends**

1 Diaphragm
4 Valve Balls
1 Set O-rings
4 Ball Seat Discs



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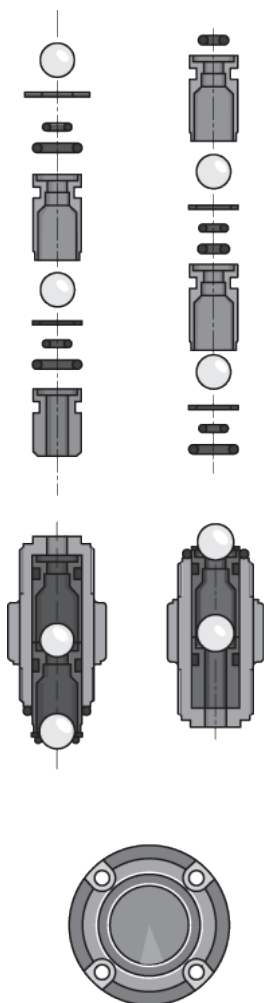
Liquid End Version	Material Code	Complete Liquid End	Spare Parts Kit	Spare Valves Only (connector sets not included)		
				Suction	Discharge	Diaphragm
1000	PVT	1023134	1023107	1023128	1023127	1000244
	SST	1002557	1002549	809424	809423	1000244
	NPE	1002193	1001713	792119	740349	1000244
	NPB	1002201	1001721	792026	740348	1000244
1601	PVT	1023135	1023108	1023128	1023127	1000245
	SST	1002558	1002550	809424	809423	1000245
	NPE	1002194	1001714	792119	740349	1000245
	NPB	1002202	1001722	792026	740348	1000245
1602	PVT	1023136	1023109	1023128	1023127	1000246
	SST	1002559	1002551	809424	809423	1000246
	NPE	1002195	1001715	792119	740349	1000246
	NPB	1002203	1001723	792026	740348	1000246
1604	PVT	1035298	1035332	1023128	1023127	1034612
	SST	1035325	1035331	809424	809423	1034612
	PVT HV	1035326	1035342	x	x	1034612
	NPE	1002196	1001716	792119	740349	1034612
	NPB	1002204	1001724	792026	740348	1034612
0708	PVT	1023138	1023111	1023126	1023125	1000248
	SST	1002561	1002553	809497	809496	1000248
	PVT HV	1018073	1019067	1002267	1002267	1000248
	NPE	1002197	1001717	1001435	1001439	1000248
	NPB	1002205	1001725	1001434	1001438	1000248
0413	PVT	1023139	1023112	1023126	1023125	1000249
	SST	1002562	1002554	809497	809496	1000249
	PVT HV	1018084	1019069	1002267	1002267	1000249
	NPE	1002198	1001718	1001435	1001439	1000249
	NPB	1002206	1001726	1001434	1001438	1000249
0220	PVT	1023140	1023113	1023126	1023125	1000250
	SST	1002563	1002555	1002547	1002548	1000250
	PVT HV	1018085	1019070	1002267	1002267	1000250
	NPE	1002199	1001719	1001435	1001439	1000250
	NPB	1002207	1001727	1001434	1001438	1000250
2504	SST	1035325	1035331	809424	809423	1034612
	NPE	1002196	1001716	792119	740349	1034612
	NPB	1002204	1001724	792026	740348	1034612
1008	PVT	1023138	1023111	1023126	1023125	1000248
	SST	1002561	1002553	809497	809496	1000248
	PVT HV	1018073	1019067	1002267	1002267	1000248
	NPE	1002197	1001717	1001435	1001439	1000248
	NPB	1002205	1001725	1001434	1001438	1000248

Solenoid Pump Spare Parts

beta/b continued

Liquid End Version	Material Code	Complete Liquid End	Spare Parts Kit	Spare Valves Only (connector sets not included)		
				Suction	Discharge	Diaphragm
0713	PVT	1023139	1023112	1023126	1023125	1000249
	SST	1002562	1002554	809497	809496	1000249
	PVT HV	1018084	1019069	1002267	1002267	1000249
	NPE	1002198	1001718	1001435	1001439	1000249
	NPB	1002206	1001726	1001434	1001438	1000249
0420	PVT	1023140	1023113	1023126	1023125	1000250
	SST	1002563	1002555	1002547	1002548	1000250
	PVT HV	1018085	1019070	1002267	1002267	1000250
	NPE	1002199	1001719	1001435	1001439	1000250
	NPB	1002207	1001727	1001434	1001438	1000250
0232	PVT	1023141	1023124	1023124	1023125	1000251
	SST	1002564	1002556	1002547	1002548	1000251
	NPE	1002200	1001720	1001435	1001439	1000251
	NPB	1002208	1001728	1001434	1001438	1000251

Spare Parts For beta/b Auto-degassing NPB/NPE9 and PVT7



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For Auto-degassing pumps.

Complete liquid ends include pump head, valves, mounting screws, diaphragm and back plate. Spare parts kits include:

PP & NP Liquid Ends (Only with NP versions)

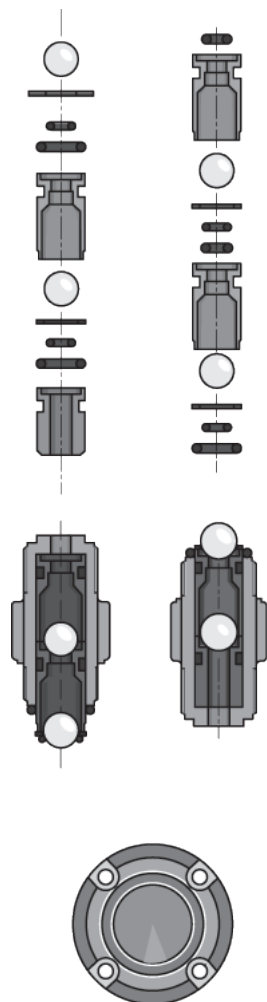
1 Diaphragm 1 Suction Valve 1 Discharge Valve 2 Valve Balls
1 Connector Sets 1 Set O-rings 1 Vent Valve, Complete

Liquid End Version	Material Code	Complete Liquid End	Spare Parts Kit	Spare Valves Only (connector sets not included)			Diaphragm
				Suction	Discharge	Vent	
1601	NPE9	1002248	1001660	792119	1001065	1001061	1000245
	NPB9	1002242	1001666	792026	1001064	1001060	1000245
	PPE9	1002393	1001756	792644	1001067	1001063	1000245
	PPB9	1002392	1001762	792646	1001066	1001062	1000245
	PVT7	1047830					1000246
1602	NPE	1002249	1001661	792119	1001065	1001061	1000246
	NPB9	1002243	1001667	792026	1001064	1001060	1000246
	PPE9	1002395	1001757	792644	1001067	1001063	1000246
	PPB9	1002394	1001763	792646	1001066	1001062	1000246
	PVT7	1047830					1000246
1604	NPE9	1035299	1035333	792119	1001065	1001061	1034612
	NPB9	1035300	1035334	792026	1001064	1001060	1034612
	PPE9	1035301	1035335	792644	1001067	1001063	1034612
	PPB9	1035302	1035336	792646	1001066	1001062	1034612
	PVT7	1047858					1034612
0708	NPE9	1002251	1001663	1001435	1001069	1001061	1000248
	NPB9	1002245	1001669	1001434	1001068	1001060	1000248
	PPE9	1002397	1001759	1001437	1001071	1001063	1000248
	PPB9	1002396	1001765	1001436	1001070	1001062	1000248
	PVT7	1047832					1000248
0413	NPE9	1002252	1001664	1001435	1001069	1001061	1000249
	NPB9	1002246	1001670	1001434	1001068	1001060	1000249
	PPE9	1002401	1001760	1001437	1001071	1001063	1000249
	PPB9	1002400	1001766	1001436	1001070	1001062	1000249
	PVT7	1047833					1000249
0220	NPE9	1002253	1001665	1001435	1001069	1001061	1000250
	NPB9	1002247	1001671	1001434	1001068	1001060	1000250
	PPE9	1002403	1001761	1001437	1001071	1001063	1000250
	PPB9	1002402	1001767	1001436	1001070	1001062	1000250
	PVT7	1047837					1000250
1008	NPE9	1002251	1001663	1001435	1001069	1001061	1000248
	NPB9	1002245	1001669	1001434	1001068	1001060	1000248
	PPE9	1002397	1001759	1001437	1001071	1001063	1000248
	PPB9	1002396	1001765	1001436	1001070	1001062	1000248
	PVT7	1047832					1000248
0713	NPE9	1002252	1001664	1001435	1001069	1001061	1000249
	NPB9	1002246	1001670	1001434	1001068	1001060	1000249
	PPE9	1002401	1001760	1001437	1001071	1001063	1000249
	PPB9	1002400	1001766	1001436	1001070	1001062	1000249
	PVT7	1047833					1000249
0420	NPE9	1002253	1001665	1001435	1001069	1001061	1000250
	NPB9	1002247	1001671	1001434	1001068	1001060	1000250
	PPE9	1002403	1001761	1001437	1001071	1001063	1000250
	PPB9	1002402	1001767	1001436	1001070	1001062	1000250
	PVT7	1047837					1000250

Solenoid Pump Spare Parts

EXtronic

EXtronic Spare Parts Kits

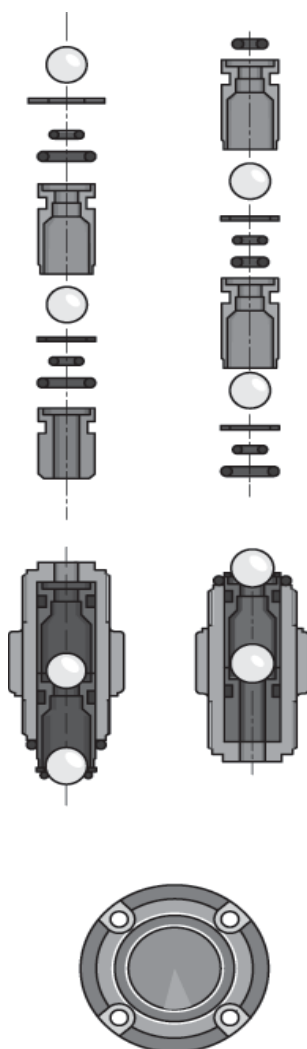


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Liquid end version	Material Code	Spare Parts Kit	Diaphragm
1000	PP1	740357	811452
	NP3	740354	811452
	TT	912674	811452
	SS2	912675	811452
1601	PP1	740361	811453
	NP3	740358	811453
	NS3/PS3	792033	811453
	TT	912678	811453
	SS2	912679	811453
1201	PP1	740380	811454
	NP3	740362	811454
	NS3/PS3	792034	811454
	TT	912682	811454
	SS2	912683	811454
0803	PP1	740384	1002510
	NP3	740381	1002510
	NS3/PS3	792035	1002510
	TT	912686	1002510
	SS2	912687	1002510
1002/2502	PP1	740388	811456
	NP3	740385	811456
	NS3/PS3	792036	811456
	TT	912690	811456
	SS2	912691	811456
	HV/PP4 (Type 1002)	910174	811456
0308/1006/2505	PP1	740497	1002511
	NP1	740498	1002511
	TT	912694	1002511
	SS2	912695	1002511
	HV/PP4 (Type 1006)	910940	1002511
0613/1310	PP1	740504	811458
	NP1	740505	811458
	TT1	912698	811458
	SS2	912699	811458
	HV/PP4 (Type 1310)	910942	811458
0417/0814	PP1	740501	811459
	NP1	740502	811459
	TT	910978	811459
	SS2	910980	811459
	HV/PP4 (Type 0814)	910944	811459
0430/0230-DN 10	PP1	740507	811460
	NP1	740508	811460
	TT	910994	811460
	SS1	910996	811460
0260			811461

Solenoid Pump Spare Parts

Spare Parts Kit For gamma/ X Liquid Ends



Spare parts kits for gamma/ X, consisting of:

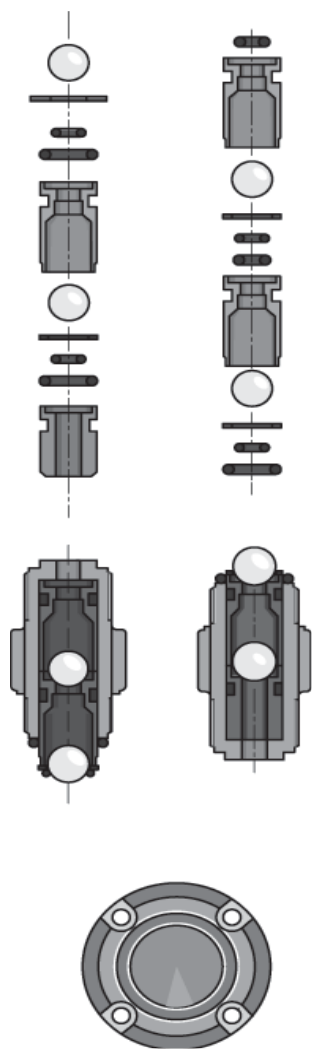
- 1 Diaphragm
- 1 Suction valve, complete *
- 1 Discharge valve complete *
- 2 Valve balls
- 1 Set of seals
- 1 Connection set

*Suction and discharge valve's not included with stainless steel version.

Liquid End Version	Material Code	Spare Parts Kit	Diaphragm	Liquid Ends
1602	NPB	1001723	1000246	1051071
	NPE	1001715	1000246	1051073
	PVT	1023109	1000246	1050994
	SST	1002551	1000246	1076128
1604	NPB	1039986	1034612	1051163
	NPE	1039988	1034612	1050966
	PVT	1035332	1034612	1050995
	PVT4	1035342	1034612	1051000
	SST	1035341	1034612	1051005
2504	NPB	1039986	1034612	1051163
	NPE	1039988	1034612	1051175
	SST	1035341	1034612	1051005
0708/1009	NPB	1001725	1000248	1050950
	NPE	1001717	1000248	1050967
	PVT	1023111	1000248	1050996
	PVT4	1019067	1000248	1051001
	SST	1002553	1000248	1051006
0414/ 0715	NPB	1001726	1000249	1050951
	NPE	1001718	1000249	1050968
	PVT	1023112	1000249	1050997
	PVT4	1019069	1000249	1051002
	SST	1002554	1000249	1051007
0220/0424	NPB	1051107	1045456	1050952
	NPE	1051118	1045456	1050969
	PVT	1051129	1045456	1050998
	PVT4	1051134	1045456	1051003
	SST	1002555	1045456	1051008
0245	NPB	1051108	1045443	1050953
	NPE	1051119	1045443	1050970
	PVT	1051130	1045443	1050999
	SST	1051146	1045443	1051009

Solenoid Pump Spare Parts

Spare Parts Kit For gamma/ X Auto Degassing NPB9/NPE9 Liquid Ends



Spare parts kits consisting of:

- 1 pump diaphragm
- 1 suction valve complete
- 1 discharge valve complete
- 1 bleed valve complete
- 2 valve balls
- 1 set of seals
- 1 connection set

Liquid End Version	Material Code	Complete Liquid End	Spare Parts Kit	Diaphragm
1602	NPB9	1076042	1001667	1000246
	NPE9	1076084	1001661	1000246
1604	NPB9	1076043	1035334	1034612
	NPE9	1076085	1035333	1034612
0708/1009	NPB9	1076039	1001669	1000248
	NPE9	1076083	1001663	1000248
0414/ 0715	NPB9	1076037	1001670	1000249
	NPE9	1076082	1001664	1000249
0220/0424	NPB9	1076036	1051113	1045456
	NPE9	1076081	1051124	1045456

Spare Parts Kit For gamma/ X Auto Degassing PVT7 Liquid Ends

Spare parts kits consisting of:

- 1 pump diaphragm
- 1 suction valve complete
- 1 discharge valve complete
- 2 valve balls
- 1 set of seals
- 1 connection set

Liquid End Version	Material Code	Complete Liquid End	Spare Parts Kit	Diaphragm
1602	PVT7	1076026	1047830	1000246
1604	PVT7	1076027	1047858	1034612
0708/1009	PVT7	1076023	1047832	1000248
0414/0715	PVT7	1076021	1047833	1000249
0220/0424	PVT7	1076020	1051111	1045456

Solenoid Pump Spare Parts

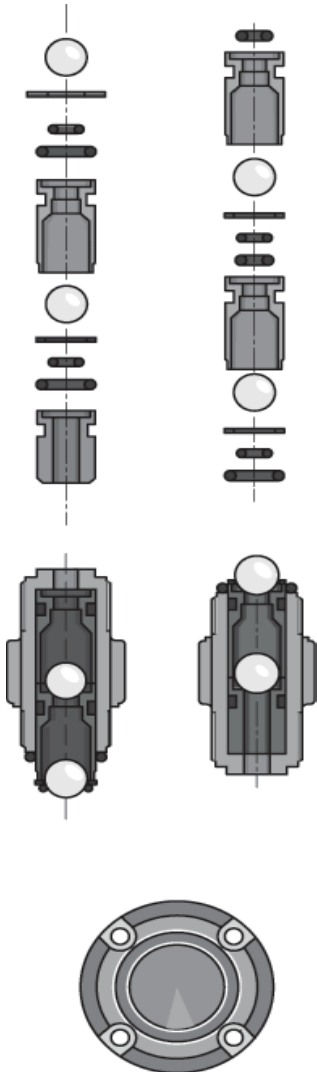
Spare Parts Kit For gamma/XL Liquid Ends

Spare parts kits for GXLa pumps, consisting of:

- 1 diaphragm
- 1 suction valve
- 1 discharge valve
- 1 connection set

Note: Stainless steel version

without suction and discharge valves, only seals & diaphragm



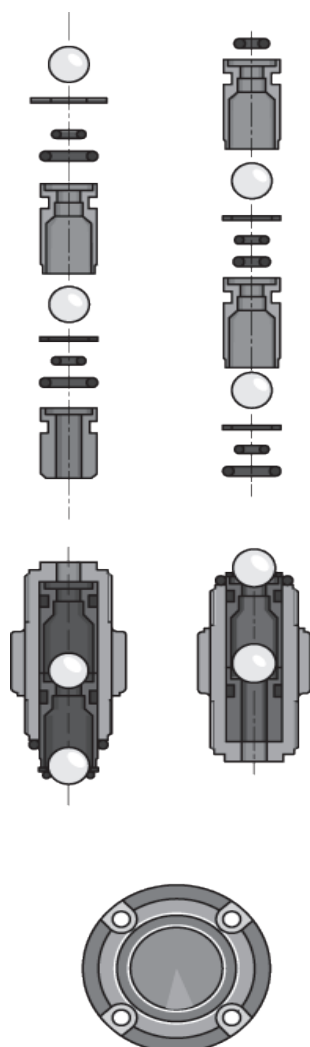
Liquid End Version	Material Code	Complete Liquid End	Spare Parts Kit	Suc Valve	Dis Valve	Diaphragm
1608	NPE2	1110647	1111655	792119	740349	1030353
	NPB2	1110645	1111656	792026	740348	1030353
	PVT2	1110652	1111654	1023128	1023127	1030353
	PVT4	1110653	1019066	1002667	1002667	1030353
	SST0	1110655	1030226	809424	809423	1030353
2508	NPE2	1110753	1111658	792119	740349	1030353
	NPB2	1110751	1111659	792026	740348	1030353
	SST0	1030228	1030226	809424	809423	1030353
1612	NPE2	1110722	1111660	1001435	1001439	1000248
	NPB2	1110719	1111661	1001434	1001438	1000248
	PVT2	1110747	1111662	1023126	1023125	1000248
	PVT4	1110748	1019067	1002267	1002267	1000248
	SST0	1110750	1027086	809497	809496	1000248
1020	NPE2	1110635	1030537	1001435	1001439	1000249
	NPB2	1030543	1030526	1001434	1001438	1000249
	PVT2	1110640	1111664	1023126	1023125	1000249
	PVT4	1110641	1019069	1002667	1002667	1000249
	SST0	1110643	1027087	809497	809496	1000249
0730	NPE2	1110607	1110407	1001435	1001439	1045456
	NPB2	1110605	1110406	1001434	1001438	1045456
	PVT2	1110612	1110409	1023126	1023125	1045456
	PVT4	1111494	1111457	1002667	1002667	1045456
	SST0	1110614	1027088	1002547	1002548	1045456
0450	PVT2	1110540	1110404	1002267	1002267	1045443
	SST0	1110541	1110405	809459	809459	1045443
0280	PVT2	1110537	1110401	1002267	1002267	1059691
	SST0	1110538	1110402	809459	809459	1059691

Auto Degassing Liquid Ends PVT7

1608	PVT7	1110654	1111657	1023128	1047828	1030353
1612	PVT7	1110749	1111663	1023126	1047829	1000248
1020	PVT7	1110642	1111665	1023126	1047829	1000249
0730	PVT7	1110613	1110410	1023126	1047829	1045456

Solenoid Pump Spare Parts

delta®



Spare parts kits for delta®, consisting of:

- 1 diaphragm
- 1 suction valve set
- 1 discharge valve set
- 2 ball valves
- 1 set of O-rings
- 1 connector set

Liquid End Version	Material Code	Complete Liquid End	Spare Parts Kit	Diaphragm
1608	NPE	1030619	1030620	1030353
	NPB	1030610	1030611	1030353
	PVT	1030227	1030225	1030353
	PVT4	1033354	1019066	1030353
	SST	1030228	1030226	1030353
2508	NPE	1030619	1030620	1030353
	NPB	1030610	1030611	1030353
	SST	1030228	1030226	1030353
1612	NPE	1030540	1030536	1000248
	NPB	1030542	1030525	1000248
	PVT2	1025140	1027081	1000248
	PVT4	1033355	1019067	1000248
	SST	1027074	1027086	1000248
1020	NPE	1030541	1030537	1000249
	NPB	1030543	1030526	1000249
	PVT2	1025141	1027082	1000249
	PVT4	1033356	1019069	1000249
	SST	1027075	1027087	1000249
0730	NPE	1030618	1030621	1000250
	NPB	1030609	1030612	1000250
	PVT	1025142	1027083	1000250
	PVT4	1033357	1019070	1000250
	SST	1027076	1027088	1000250
0450	PVT	1025143	1027084	1000251
	SST	1027077	1027089	1000251
0280	PVT	1025184	1027085	1025075
	SST	1027078	1027090	1025075

Note: Stainless steel version without suction and discharge valve sets.

Accessories:

G Option Solenoid Valve (24VDC):	1076131
1 Pump G Option Panel:	7903561
2 Pump G Option Panel:	7903583
Special Diaphragm (ffkm) for old 110VAC solenoids (For Use With PAA):	7904425
Diaphragm Rupture Sensor	1044477

Part to convert a Delta with relay to a G option Delta:

Requires a fault relay to be already installed on pump.	
Qty. 1 1 Pump G Option Panel	7903561
Qty. 1 Exhaust Relay for Delta G Option	1030459
Qty. 1 Exhaust Solenoid Valve (24VDC), PVDF	1076131
Qty. 4 Screws for Relay	1021533
Qty. 1 Pump Relay Cable (4-pin)	1002013

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Special Order Diaphragms

Special Order Diaphragms

The regular Pump PTFE-faced diaphragms are only suited on a limited basis for the dosing of silicate-containing media e.g. Sodium Silicate. The problem is that microcrystals from the chemical penetrate the PTFE-face in the area of the flexing zone and tear it. A circular cut around the diaphragm core is generated and the PTFE-face removes, subsequently the Elastomer sheeting of the diaphragm ruptures.

A diaphragm has been developed specifically tailored for this application. Here the PTFE-face is protected by an additional Elastomer sheeting against the attack of the micro-crystals. These diaphragms are available for the ProMinent Beta & Gala pumps. There is a surcharge for these new diaphragms. See the following table with Part #'s

SOLENOID PUMPS:

Part #	Description Pump	Series	Type
1024168	Diaphragm 30.0 x 7.5 PTFE / Viton	Beta / Gala	1601
1024169	Diaphragm 35.0 x 11.5 PTFE / Viton	Beta / Gala	1602
1024170	Diaphragm 46.0 x 16.5 PTFE / Viton	Beta / Gala / Delta	1605/1005/1608
1024171	Diaphragm 46.0 x 21.5 PTFE / Viton	Beta / Gala / Delta	1008/0708/1612
1024172	Diaphragm 55.0 x 26.0 PTFE / Viton	Beta / Gala / Delta	0713/0413/1020
1024173	Diaphragm 77.0 x 33.5 PTFE / Viton	Beta / Gala / Delta	0420/0220/0730

MOTOR DRIVEN PUMPS:

NOTE: Only for use with old style Sigma pump SxCa versions.

ProMinent pump diaphragm made from a steel core with Viton® facing. Particularly suited for media tending to crystalize, such as silicate.

Viton® for pump type:	Max. working pressure	Part No.
Sigma/1 12017, 12035, 10050	87 psi (6 bar)	1010281
Sigma/1 10022, 10044, 07065	87 psi (6 bar)	1010284
Sigma/1 07042, 04084, 04120	87 psi (6 bar)	1010287
Sigma/2 12050, 12090, 12130	87 psi (6 bar)	1018953
Sigma/2 07120, 07220, 04350	87 psi (6 bar)	1018984
Sigma/3 120145, 120190, 120270, 120330	87 psi (6 bar)	1006564
Sigma/3 070410, 070580, 040830, 041030	87 psi (6 bar)	1006566
Meta/Makro 130	87 psi (6 bar)	7811470
Meta/Makro 260	87 psi (6 bar)	7811471

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Motor Pump Spare Parts

Vario C

Spare parts kit for PVT version include:

- 1 pump diaphragm
- 1 suction valve set
- 1 discharge valve set
- 2 valve balls
- 1 set of seals (packing rings, ball seat housings)

Spare parts kit for SST version include:

- 1 pump diaphragm
- 2 valve balls
- 1 set of seals (packing rings, flat seals, ball seat)

Vario spare parts kit

(applicable for Identity Code:
Type VAMc 10008, 10016, 07026, 07042)

Liquid End Version	Material Code	Part No.
Liquid end FM 042 - DN 10	PVT	1003641
	SST	910751

(applicable for Identity Code:
Type VAMc 07012, 07024, 04039, 04063)

Liquid End Version	Material Code	Part No.
Liquid end FM 063 - DN 10	PVT	1003642
	SST	910756

Pump diaphragms

Liquid End Version	Part No.
Vario with FM 042 Type VAMc 10008, 10016, 07026, 07042	811458
Vario with FM 063 Type VAMc 07012, 07024, 04039, 04063	811459

Motor Pump Spare Parts

Sigma 1,2 & 3 (New Multi-layer safety diaphragm) PVT/SSTS/A or B

Complete liquid ends include pump head, valves, mounting screws, diaphragm and backplate. Clamping nuts and inserts are not included with complete liquid ends, complete valves or spare parts kits. Spare parts kits include:

PVT Liquid ends

1 Diaphragm
1 Suction valve
1 Discharge valve
2 Valve balls
1 Set of o-rings

SST Liquid ends

1 Diaphragm
2 Valve balls
1 Set of o-rings, complete
(sleeve rings, ball seat rings)

Material Code	Liquid End Complete	Spare Parts Kit	Valve Complete	Diaphragm
12017, 12035, 10050 with Liquid end FM 50				
PVT	1030104	1035964	1002267	1030114
SST	1030106	1035966*	809459	1030114
10022, 10044, 07065 with Liquid end FM 65				
PVT	1030105	1035967	1002267	1030115
SST	1030107	1035969*	809459	1030115
07042, 04084, 04120, with Liquid end FM 120				
PVT	1036214	1035961	792517	1035828
SST	1036215	1035963	809404	1035828
16050 with Liquid end FM 130				
PVT	1029763	1035951	792517	1029771
SST	1029764	1035957*	809404	1029771
16090, 16130 with Liquid end FM 130				
PVT	7781515	1035951	792517	1029771
SST	1029764	1035957*	809404	1029771
07120, 07220 with Liquid end FM 350				
PVT	1029761	1035953	740615	1033422
SST	1029762	1035960*	803708	1033422
04350 with Liquid end FM 350				
PVT	7781516	1035953	740615	1033422
SST	7781517	1035960*	803708	1033422
120145, 120190, 120270, with Liquid end FM 330 - DN 25				
PVT	1029585	1034678	740615	1029604
SST	1029586	1034679*	803708	1029604
070410, 070580, 040830, with Liquid end FM 1000 - DN 32				
PVT	1029578	1034681	1020031	1029603
SST	1029587	1034682*	1002811	1029603

*SS complete without spare valves

*Sigma/3 070410, 070580 & 040830 have disks in place of balls

Vario with FM 063 Type VAMc 07012, 07024, 04039, 04063 811459

Diaphragm Failure:

Visual:

1033323 Visual Diaphragm Failure Indicator

Springs:

1035746 Spring for Locking Piston: Sigma 1
1006796 Spring for Locking Piston: Sigma 2 & 3

Pins:

1035518 Locking Piston: Sigma FM 120 & 130
1035519 Locking Piston: Sigma FM 330 & 350
1035520 Locking Piston: Sigma FM 1000
1035895 Locking Piston: Sigma FM 50 & 65

Cable for Alarm output if diaphragm fails:

1034312 Cable with failure indicator (pump needs to be programmed for this option, alarm relay needed for output)

Protective cowling

Protection of the operating unit (HMI) of Sigma metering pumps against contamination; made from transparent silicone plastic. For Sigma control types S1Cb / S2Cb / S3Cb.

Protective cowling for operating unit (S1Cb, S2Cb, S3Cb) 1036724

Wall bracket

Wall bracket with operating lever for wall mounting of the operating unit (HMI) without any fittings. For Sigma control types S1Cb / S2Cb / S3

Wall bracket for operating unit (S1Cb, S2Cb, S3Cb) 1036683

For replacement of S2Ca with S2Cb, a spacer is required

for applications with rigid pipe for maintaining installation dimensions 1044841

Motor Pump Spare Parts

Sigma 1, 2 & 3 Version F with physiological safety spare parts kits

Sigma 1 Spare Parts Kit for FDA version

Applies to identcode: Type 12017, 12035, 10050

Liquid end	Materials in contact with medium	Part no.
FM 50 - DN 10	PVT	1046466
FM 50 - DN 10	SST (without valves)	1046468
FM 50 - DN 10	SST (with valves)	1046467

Applies to identcode: Type 10022, 10044, 07065

Liquid end	Materials in contact with medium	Part no.
FM 65 - DN 10	PVT	1046469
FM 65 - DN 10	SST (without valves)	1046471
FM 65 - DN 10	SST (with valves)	1046470

Applies to identcode: Type 07042, 04084, 04120

Liquid end	Materials in contact with medium	Part no.
FM 120 - DN 15	PVT	1046453
FM 120 - DN 15	SST (without valves)	1046465
FM 120 - DN 15	SST (with valves)	1046464

Sigma 2 Spare Parts Kit for FDA version

Applies to identcode: Type 16050, 16090, 16130, 12050, 12090, 12130

Liquid end	Materials in contact with medium	Part no.
FM 130 - DN 15	PVT	1046472
FM 130 - DN 15	SST (without valves)	1046473
FM 130 - DN 15	SST (with valves)	1046474

Applies to identcode: Type 07120, 07220, 04350

Liquid end	Materials in contact with medium	Part no.
FM 350 - DN 25	PVT	1046475
FM 350 - DN 25	SST (without valves)	1046476
FM 350 - DN 25	SST (with valves)	1046477

Sigma 3 Spare Parts Kit for FDA version

Applies to identcode: Type 120145, 120190, 120270, 120330

Liquid end	Materials in contact with medium	Part no.
FM 330 - DN 25	PVT	1046478
FM 330 - DN 25	SST (without valves)	1046479
FM 330 - DN 25	SST (with valves)	1046480

Motor Pump Spare Parts

Sigma 1, 2 & 3 (Old Style Standard diaphragm) PVT/SST0

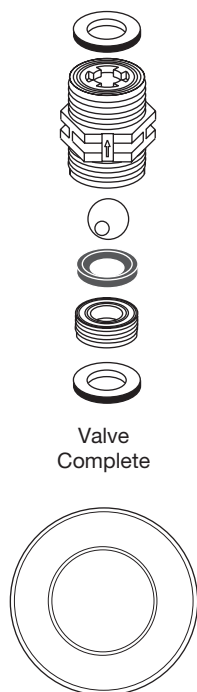
Complete liquid ends include pump head, valves, mounting screws, diaphragm and backplate. Clamping nuts and inserts are not included with complete liquid ends, complete valves or spare parts kits. Spare parts kits include:

PVT Liquid ends

- 1 Diaphragm
- 1 Suction valve
- 1 Discharge valve
- 2 Valve balls
- 1 Set of o-rings

SST Liquid ends

- 1 Diaphragm
- 2 Valve balls
- 1 Set of o-rings, complete (sleeve rings, ball seat rings)



Material Code	Liquid End Complete	Spare Parts Kit	Valve Complete	Diaphragm
12017, 12035, 10050 with Liquid end FM 50				
PVT	1010560	1010541	1002267	1010279
SST	1010561	1010555	809459	1010279
SST*		1010554		1010279
10022, 10044, 07065 with Liquid end FM 65				
PVT	1010562	1010542	1002267	1010282
SST	1010563	1010557	809459	1010282
SST*		1010556		1010282
07042, 04084, 04120 with Liquid end FM 120				
PVT	1010565	1010543	792517	1010285
SST	1010566	1010559	809404	1010285
SST*		1010558		1010285
12050 with Liquid end FM 130				
PVT	792755	740324	792517	792495
SST	792761	740328	809404	792495
SST*		740326		
12090, 12130 with Liquid end FM 130				
PVT	7792755	740324	792517	792495
SST	792761	740328	809404	792495
SST*		740326		
07120, 07220 with Liquid end FM 350				
PVT	792756	740325	740615	792496
SST	792762	740329	803708	792496
SST*		740327		
04350 with Liquid end FM 350				
PVT	7792756	740325	740615	792496
SST	792762	740329	803708	792496
SST*		740327		
120145, 120190, 120270, with Liquid end FM 330 - DN 25				
PVT	1005298	1005308	740615	1004604
SST	1005300	1005312	803708	1004604
SST*		1005310		1004604
070410, 070580, 040830, with Liquid end FM 1000 - DN 32				
PVT	1005297	1005309	1020031	1002835
SST	1005299	1005313	1002811	1002835
SST*		1005311		1002835

*SS complete without spare valves

Liquid End Version	Material Code	Complete Liquid End	Spare Parts Kit	Valve Complete Suction (Spare valves only)	Valve Complete Discharge	Packing set
Sigma HK						
08 (For pump versions 32002, 23004, & 10006)	S	1000584	1001572	803792	803793	1000565
12.5 (For pump versions 14006, 10011, & 05016)	S	910420	910470	803792	803793	485401
25 (For pump versions 07012, 04522, & 02534)	S	910421	910471	803792	803793	485402
50 (For pump versions 04022, 02541, & 01264)	S	910422	910472	803794	803795	485403

Motor Pump Spare Parts

Meta

Complete liquid ends include pump head, valves, mounting screws, diaphragm and backplate. Spare parts kits include:

Standard kit for PP, TT and PVC material versions:

- 1 Pump diaphragm
- 1 Suction valve, complete
- 1 Discharge valve, complete
- 2 Valve balls
- 1 Set of o-rings (complete w/O-rings & ball-seat discs)

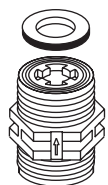
Standard kit for SS (316 stainless steel) version:

- 1 Pump diaphragm
- 2 Valve balls
- 1 Set of o-rings (complete w/sleeve rings & ball-seat discs)

Standard kit for MTKa version:

- 1 Pump diaphragm
- 4 Valve balls
- 4 Ball-seat discs
- 2 PTFE/graphite piston packing rings
- 2 Piston guides
- 14 Flat o-rings
- 2 O-rings

Note: Union nut and NPT inserts are not included in the spare parts kit.



MTMa
Valve
Complete

Liquid End Version	Material Code	Complete Liquid End	Spare Parts Kit	Valve Complete	Diaphragm
Meta MTMaH/MTMaA					
130 (For pump versions 12065, 12086, 12108 & 12130)	PCA	910402	910454	803703	811470
	PCE	7910402	7910454	7803703	811470
	PPE	910401	910451	803701	811470
	TTT	910403	910457	803705	811470
	SST	910404	910474	803707	811470
	SST	910404	910460*	803707	811470
260 (For pump versions 10130, 09173, 07216, 06260, 10173, 10216, 10260, 10200, 10263 & 10330)	PCA	910408	910455	803703	811471
	PCE	7910409	7910455	7803703	811471
	PPE	910407	910452	803701	811471
	TTT	910409	910458	803705	811471
	SST	910410	910475	803707	811471
	SST	910410	910461*	803707	811471
	[†] PPT 6 mm	7910407	1001570	792518	811471
	[†] PCT 6 mm	7910408	1001570	792518	811471
530 (For pump versions 05265, 04253, 03441, 03530, 05540, 05530, 04400, 04527, 03662, & 03790)	PCA	910414	910456	803704	811472
	PCE	7910415	7910456	7803705	811472
	PPE	910413	910453	803702	811472
	TTT	910415	910459	803706	811472
	SST	910416	910476	803708	811472
	SST	910416	910462*	803708	811472
	^{††} PPT 6 mm	7910413	1001568	740615	811472
	^{††} PCT 6 mm	7910414	1001568	740615	811472

*SS complete without spare valves

[†]For pump versions 10200, 10263, 10333

^{††}For pump versions 04400, 04527, 03662

Liquid End Version	Material Code	Complete Liquid End	Spare Parts Kit	Valve Complete Suction (Spare valves only)	Valve Complete Discharge	Packing set
Meta MTKaH/MTKaA						
12.5 (For pump versions 10812, 21012, 21606, 24006, 16208, 22508, 12190 & 21610)	SS	910420	910470	803792	803793	485401
25 (For pump versions 10213, 11313, 07617, 10617, 06122, 10222, 05126 & 09926)	SS	910421	910471	803792	803793	485402
50 (For pump versions 05425, 06025, 04033, 05633, 03241, 05441, 02749 & 05249)	SS	910422	910472	803794	803795	485403

Motor Pump Spare Parts

ProMus

Description	Part No.
Rebuild Kit for Manual Stroke Adjuster	852751
Rebuild Kit for Nema 7 Electric Stroke Adjuster	852753
Rebuild Kit for Sz 17 Hydraulics 3/8 Plunger	853755
Rebuild Kit for Sz 17 Hydraulics 7/16 Plunger	853756
Rebuild Kit for Sz 30 Hydraulics 5/8 Plunger	854756
Rebuild Kit for Sz 30 Hydraulics 13/16 Plunger	854757
Rebuild Kit for Sz 30 Hydraulics 1 1/8 Plunger	854758
Rebuild Kit for Sz 40 Hydraulics 1 3/4 Plunger	855754
Rebuild Kit for Sz 40 Hydraulics 2 Plunger	855755
Rebuild Kit for Sz 40 Hydraulics 2 1/4 Plunger	855756
Liquid End Spare Parts Kits Size 17	
Spare Parts Kit for Size 17 with 316 SS single ball	853502
Spare Parts Kit for Size 17 with 316 SS double ball for suct. & disch.	853503
Spare Parts Kit for Size 17 with 316 SS double ball for disch.	853505
Spare Parts Kit for Size 17 with Alloy 20 single ball	853582
Spare Parts Kit for Size 17 with Alloy 20 double ball for suct. & disch.	853583
Spare Parts Kit for Size 17 with Alloy 20 double ball for disch.	853585
Spare Parts Kit for Size 17 with Hastelloy C single ball	853662
Spare Parts Kit for Size 17 with Hastelloy C double ball for suct. & disch.	853663
Spare Parts Kit for Size 17 with Hastelloy C double ball for disch.	853665
Spare Parts Kit for Size 17 with PVT double ball	853908
Liquid End Spare Parts Kits Size 30	
Spare Parts Kit for Size 30 with 316 SS single ball	854501
Spare Parts Kit for Size 30 with 316 SS double ball for suct. & disch.	854503
Spare Parts Kit for Size 30 with 316 SS double ball for disch., 30/17	854505
Spare Parts Kit for Size 30 with 316 SS double ball for disch., 30/30	854507
Spare Parts Kit for Size 30 with 316 SS double ball for suct. & disch., 30/17	854509
Spare Parts Kit for Size 30 with Alloy 20 single ball	854601
Spare Parts Kit for Size 30 with Alloy 20 double ball for suct. & disch., 30/30	854603
Spare Parts Kit for Size 30 with Alloy 20 double ball for disch., 30/17	854605
Spare Parts Kit for Size 30 with Alloy 20 double ball for disch., 30/30	854607
Spare Parts Kit for Size 30 with Alloy 20 double ball for suct. & disch., 30/17	854609
Spare Parts Kit for Size 30 with Hastelloy C single ball	854801
Spare Parts Kit for Size 30 with Hastelloy C double ball for suct. & disch., 30/30	854803
Spare Parts Kit for Size 30 with Hastelloy C double ball for disch., 30/17	854805
Spare Parts Kit for Size 30 with Hastelloy C double ball for disch., 30/30	854807
Spare Parts Kit for Size 30 with Hastelloy C double ball for suct. & disch., 30/17	854809
Spare Parts Kit for Size 30 with PVT single ball	854908
Liquid End Spare Parts Kits Size 40	
Spare Parts Kit for Size 40 with 316 SS single ball	855501
Spare Parts Kit for Size 40 with Alloy 20 single ball	855504
Spare Parts Kit for Size 40 with Hastelloy C single ball	855507
Spare Parts Kit for Size 40 with PVT single ball	855908

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Motor Pump Spare Parts

Makro TZMa

Spare parts kits for ProMinent Makro series metering pumps include pump diaphragm, valve balls, valve components and all required o-rings.

Standard kit for PP, NP-Acrylic and PVC material versions:

- 1 Pump diaphragm
- 1 Suction valve, complete
- 1 Discharge valve, complete
- 2 Valve balls
- 1 Set of o-rings, complete

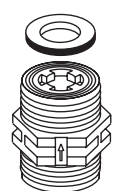

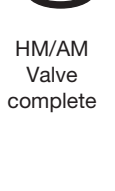
Standard kit for TT-PTFE material version:

- 1 Pump diaphragm
- 1 Suction valve, complete
- 1 Discharge valve, complete
- 2 Valve balls
- 2 Ball-seat discs or valve assembly
- 1 Set of o-rings, complete

Standard kit for SS (stainless steel) version:

- 1 Pump diaphragm
- 2 Valve balls
- 1 Set of o-rings, complete

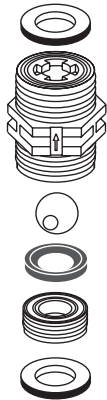
Note: Union nut and NPT inserts are not included in the spare parts kit.

	Liquid end Type	Material Code	Complete Liquid end	Spare Parts Kit	Valve Complete	Diaphragm
	FM-130 DN 20	PPE	910401	910451	803701	811470
		PCB	910402	910454	803703	811470
		TTT	910403	910457	803705	811470
		SST	910404	910474 910460*	803707	811470
	FM-260 DN 20	PPE	910407	910452	803701	811471
		PCB	910408	910455	803703	811471
		TTT	910409	910458	803705	811471
		SST	910410	910475 910461*	803708	811471
	FM-530 DN 25	PPE	910413	910453	740615	811472
		PCB	910414	910456	740615	811472
		TTT	910415	910459	740615	811472
		SST	910416	910476 910462*	803708	811472
HM/AM Valve complete	FM-1500 & 2100 DN 40	PPE	1001245	1001573	1023799	811473
		PCB	1001244	1001574	1023799	811473
		TTT	1001246	1001575	1023799	811473
		SST	1001247	1001577 1001576*	1004178	811473
	FMH-70-20	PPE		911903	1023799	1007298
		PCB		911901	1023799	1007298
		TTT		911905	1023799	1007298
		SST		911907 911908*	1004178	1007298
	FMH-90-20	PPE		911904	1023799	1007298
		PCB		911902	1023799	1007298
		TTT		911906	1023799	1007298
		SST		911909 911910*	1004178	1007298

*SS with 2 valves, complete

Motor Pump Spare Parts

Makro TZMb



Material Code	Spare Parts Kit	Suction/Discharge Valves	Diaphragm
<u>120260, 120340, 120430, 120510, 120650 (FM670 - DN25)</u>			
PCT/PPT/TTT	1025164	740615	1022887
SST	1022896	803708	1022887
SST*	1022895	-	1022887
<u>070430, 070570, 070720, 070860, 071070</u>			
PCT/PPT/TTT	1025167	1020031	1022900
SST	1022917	1002811	1022900
SST*	1022916	-	1022900
<u>040840, 041100, 041400, 041670, 042100</u>			
PCT/PPT/TTT	1025169	1023799	1022921
SST	1022930	1004178	1022921
SST*	1022929	-	1022921

* Without Checkvalves

ProMinent® Hydro Hydraulic Diaphragm Metering Pumps

Hydro Spare Parts Kits

The spare parts kits generally include liquid end consumables.
Supplied as standard for SST/HCT stainless steel material version
 1 metering diaphragm
 2 valve balls
 1 seal set
Supplied as standard for PVT material version
 1 metering diaphragm
 1 suction connector set
 1 discharge connector set
 2 valve balls
 1 seal set

Spare parts kits Hydro/ 2

Applies to identcode: Type 100009, 100007, 100006, 100003, 064022, 064018, 064015, 064007

Delivery unit	Materials in contact with medium	Order no.
FMH 25 - DN 10	PVT	1005548
	SST	1005549
	HCT	1009571
	SST (with valve set)	1005550
	SST (for double ball valves)	1029260

Applies to identcode: Type 025060, 025048, 025040, 025019

Delivery unit	Materials in contact with medium	Order no.
FMH 60 - DN 10	PVT	1005552
	SST	1005553
	HCT	1009573
	SST (with valve set)	1005554
	SST (for double ball valves)	1005555

Spare parts kits Hydro/ 3

Applies to identcode: Type 100031, 100025, 100021, 100010, 064060, 064048, 064040, 064019

Delivery unit	Materials in contact with medium	Order no.
FMH 60 - DN 10	PVT	1005552
	SST	1005553
	HCT	1009573
	SST (with valve set)	1005554
	SST (for double ball valves)	1005555

Applies to identcode: Type 025150, 025120, 025100, 025048

Delivery unit	Materials in contact with medium	Order no.
FMH 60 - DN 10	PVT	1005556
	SST	1005557
	HCT	1009575
	SST (with valve set)	1005558

ProMinent® Hydro Hydraulic Diaphragm Metering Pumps

Spare parts kits Hydro/ 4

Applies to identcode: Type 250130, 250190, 250250, 250350

Delivery unit	Materials in contact with medium	Order no.
FMH 400 - DN 25	PVT with valve	1023057
	SST without valve	1040812
	SST with valve	1040813
	HCT without valve	1040860
	HCT with valve	1022716

Applies to identcode: Type 160210, 160300, 160400, 160550

Delivery unit	Materials in contact with medium	Order no.
FMH 625 - DN 32	PVT with valve	1040863
	SST without valve	1040824
	SST with valve	1040825
	HCT without valve	1040861
	HCT with valve	1040862

Applies to identcode: Type 100330, 100480, 100635, 100880

Delivery unit	Materials in contact with medium	Order no.
FMH 1000 - DN 32	PVT with valve	1040866
	SST without valve	1040826
	SST with valve	1040827
	HCT without valve	1040864
	HCT with valve	1040865

Applies to identcode: Type 0704650, 070670, 070890, 071230

Delivery unit	Materials in contact with medium	Order no.
FMH 1400 - DN 40	PVT with valve	1040869
	SST without valve	1040828
	SST with valve	1040829
	HCT without valve	1040867
	HCT with valve	1040868

ProMinent® Hydro Hydraulic Diaphragm Metering Pumps

Diaphragms: Hydro Hydraulic Diaphragm Metering Pumps

Hydro/ 2 PTFE dosing diaphragms / 1.4404

Delivery unit	Order no.
FMH 25 applies to identcode (SST): 100009, 100007, 100006, 100003, 064022, 064018, 064015, 064007	1005545
FMH 60 applies to identcode (SST): 025060, 025048, 025040, 025019	1005546

Hydro/ 2 Pump diaphragms PTFE/Hast. C coated

Delivery unit	Order no.
FMH 25 Applies to identcode (PVT/HCT): 064022, 064018, 064015, 064007	1005545
FMH 60 Applies to identcode: 025060, 025048, 025040, 025019	1006482

Hydro/ 3 pump diaphragm PTFE/1.4404

Delivery unit	Order no.
FMH 60 Applies to identcode (SST): 064060, 064048, 064040, 064019, 100031, 100025, 100021, 100010	1005546
FMH 150 Applies to identcode (SST): 025150, 025120, 025100, 025048	1005547

Hydro/ 3 pump diaphragm PTFE/Hastelloy C coated

Delivery unit	Order no.
FMH 60 Applies to identcode (PVT/HCT): 064060, 064048, 064040, 064019	1006482
FMH 150 Applies to identcode (PVT/HCT): 025150, 025120, 025100, 025048	1006483

Hydro/ 4 metering diaphragm PTFE/1.4404

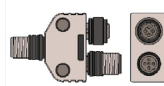
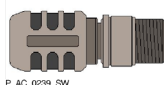

Delivery unit	Order no.
FMH 400 Identity code 250130, 250190, 250250, 250350	1040808
FMH 625 Identity code 160210, 160300, 160400, 160550	1040809
FMH 1000 Identity code 100330, 100480, 100635, 100880	1040810
FMH 1400 Identity code 0704650, 070670, 070890, 071230	1040811

Hydro/ 4 metering diaphragm PTFE/Hast.C coated

Delivery unit	Order no.
FMH 400 Identity code 250130, 250190, 250250, 250350	1040874
FMH 625 Identity code 160210, 160300, 160400, 160550	1040875
FMH 1000 Identity code 100330, 100480, 100635, 100880	1040876
FMH 1400 Identity code 0704650, 070670, 070890, 071230	1040877

Pump & Systems Accessories

PROFIBUS® Adapters

	Description	Connection	Part No.
 P_AC_0230_SW_1	PROFIBUS® Y-adapter	M12 x 1	1036621
 P_AC_0239_SW	PROFIBUS® termination resistance, plug-in	M12 x 1	1036622
 P_AC_230_SW	Y-adapter 2 x M12 x 1 M	M12 x 1 MF	1040956
	PROFIBUS® termination assembly, comprising a Y-plug and terminating resistor		1040955

Control Cables

Required for external control of ProMinent metering pumps including:

Beta 4b / Beta 5b / GMXa / GXL a / DFXa / S1Cb / S2Cb / S3Cb

Description	Part No.
Universal control cable, 5-wire, 6 ft. (2 m)	1001300
Universal control cable, 5-wire, 15 ft. (5 m)	1001301
Universal control cable, 5-wire, 30 ft. (10 m)	1001302
Universal control cable, 5-wire, 150 ft. (50 m)	1032811
For custom lengths:	
Turck Connector (Plugs into pump):	7900549
Cable (specify length required):	7902181 x feet

[See "Control Cable Diagrams" on page 154](#)

Configurable Input / Output Cables

Cable for the new configurable input / output feature on GXL a and DFXa pumps.

This allows access for the control of the process timer or for additional selectable warning or alarm messages

Connection to port on the front of the pump.

	Part No.
Control cable for configurable inputs and outputs, 4-wire 2 m	1094091
Control cable for configurable inputs and outputs, 4-wire 5 m	1094093
Control cable for configurable inputs and outputs, 4-wire 10 m	1094092

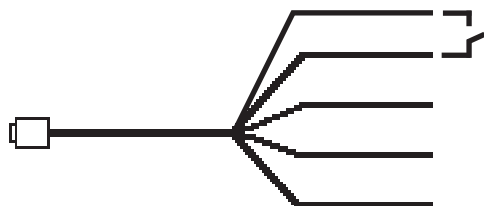
Pump & Systems Accessories

Control Cable Diagrams

Remote On/Off

BROWN and BLACK wires must be connected together via an ON/OFF contact or shorted together. When the contact is closed between the BLACK & BROWN wires, the pump will run. When the contact is open, the pump will stop.

***Note:** If ON/OFF control is the only control feature being used, WHITE, BLUE & GREY wires are not used and should be cut back.



BROWN: Remote On/Off*

BLACK: Common*

GREY: Auxiliary Frequency

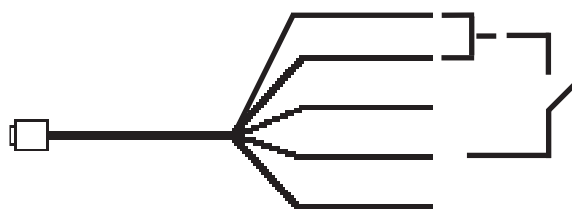
WHITE: Pulse

BLUE: Analog

Pulse Control

Pulse control will allow the pump to run in proportion to a pulsing potential free contact closure.

***Note:** BROWN and BLACK wires have to be connected together via an ON/OFF contact or shorted together. If the GREY wire is not used it should be cut back. The BLUE wire is not used and should be cut back.



BROWN: Remote On/Off*

BLACK: Common (PC)*

GREY: Auxiliary Frequency

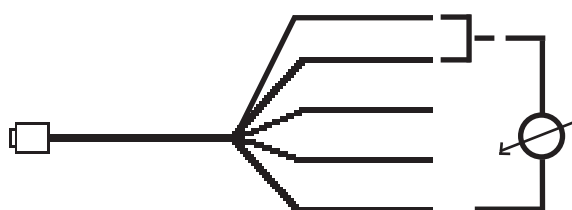
WHITE: Pulse (PC)

BLUE: Analog

Analog Control

Analog control runs in proportion to an analog signal such as 4 - 20 mA.

***Note:** BROWN and BLACK wires must be connected together via an ON/OFF contact or shorted together. The BLACK wire is negative and the BLUE wire is positive. If GREY wire is not used it should be cut back. The WHITE wire is not used and should be cut back.



BROWN: Remote On/Off*

BLACK: Common (-)*

GREY: Auxiliary Frequency

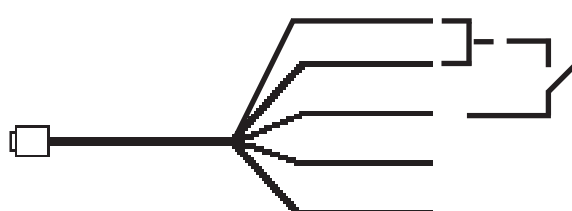
WHITE: Pulse

BLUE: Analog (+)

Auxiliary Frequency

Auxiliary frequency will allow the pump to default to a predetermined stroking frequency regardless of which operating mode the pump is in. The pump defaults to this stroking frequency as long as a contact is closed between the black and grey wires of the universal control cable.

***Note:** BROWN and BLACK wires must be connected together via an ON/OFF contact or shorted together.



BROWN: Remote On/Off*

BLACK: Common (AUX)*

GREY: Auxiliary Frequency (AUX)

WHITE: Pulse

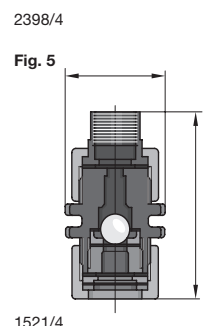
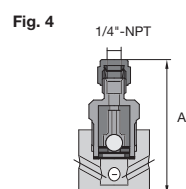
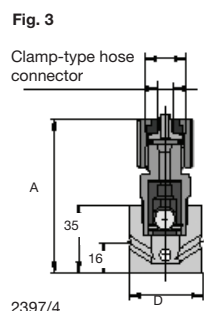
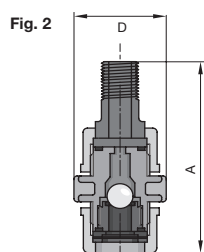
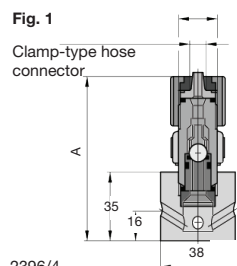
BLUE: Analog

Pump & Systems Accessories

Foot Valves (Solenoid Pumps)

To be installed at the inlet of the suction line to improve priming and protect pump against coarse impurities. With ceramic* weight, strainer and ball check valve (must be mounted vertically for ball check function).

*For Fluids with a High Viscosity, ProMinent Recommends a Flooded Suction



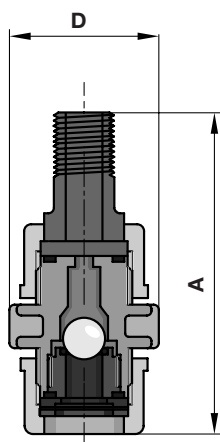
	Dimensions inches (mm)		
	Dim "A"	Dim "D"	Part No.
Polypropylene			
Valve body of PP, o-rings of EPDM (PP1, PPE)			
Connection 1/4" x 3/16" tubing (Fig 1)	3-1/4 (83)	1-3/8 (35)	924558
Connection 1/2" x 3/8" tubing (Fig 1)	3-1/4 (83)	1-3/8 (35)	924566
Connection 1/2" MNPT for 0423/0230 (Fig 2)	3-7/8 (98)	1-3/8 (35)	809465
Connection 3/8" PPE Foot Valve			7924552
Valve body of PP, o-rings of Viton® (PP2, PPB)			
Connection 1/4" x 3/16" tubing (Fig 1)	3-1/4 (83)	1-3/8 (35)	7924558
Connection 1/2" x 3/8" tubing (Fig 1)	3-1/4 (83)	1-3/8 (35)	7809470
Connection 1/2" MNPT for 0423/0230 (Fig 2)	3-7/8 (98)	1-3/8 (35)	7809465
Connection 3/8" PPB Foot Valve			7924553
Valve body of PP, o-rings of EPDM-high viscosity (PP4)			
Connection 1/2" MNPT (Fig 2)	4 (102)	1-5/8 (42)	7924516
Valve body of PP, o-rings of Viton®-high viscosity (PP5)			
Connection 1/2" MNPT (Fig 2)	4 (102)	1-5/8 (42)	7809471
PVC			
Valve body of PVC, o-rings of EPDM			
Connection 1/4" x 3/16" tubing (Fig 1)	3-1/8 (79)	1-3/8 (35)	7924547
Connection 1/2" x 3/8" tubing (Fig 1)	3-1/4 (83)	1-3/8 (35)	7924549
Connection 1/2" MNPT (Fig 2)	3-7/8 (98)	1-3/8 (35)	7809464
Connection 3/8" NPE Foot Valve			7924550
Valve body of PVC, o-rings of Viton®			
Connection 1/4" x 3/16" tubing (Fig 1)	3-1/8 (79)	1-3/8 (35)	924557
Connection 1/2" x 3/8" tubing (Fig 1)	3-1/4 (83)	1-3/8 (35)	924565
Connection 1/2" MNPT (Fig 2)	3-7/8 (98)	1-3/8 (35)	809464
Connection 3/8" NPB Foot Valve			7924551
PVDF			
Valve body of PVDF, seals of PTFE			
Connection 1/4" x 3/16" tubing (Fig 1)	3-1/8 (79)	1-3/8 (35)	1024705
Connection 1/2" x 3/8" tubing (Fig 1)	3-1/4 (83)	1-3/8 (35)	1024827
FDA compliant version 1/2" x 1/4" tubing connections			1081422
PTFE			
Valve body and seals of PTFE (TT1)			
Connection 1/4" x 3/16" tubing (Fig 3)	3-1/4 (83)	1-1/2 (38)	809455
Connection 1/2" x 3/8" tubing (Fig 3)	3-1/2 (89)	1-1/2 (38)	809473
Connection 1/2" MNPT (not illustrated)	3-7/8 (98)	1-1/2 (38)	809466
SS			
Valve body of stainless steel, seals of PTFE			
Connection 1/4"FNPT (SS2) (Fig 4)	2-5/8 (67)	1-1/2 (38)	809301
Connection 3/8" FNPT (SS1) (Fig 5)	2-5/8 (67)	1-1/2 (38)	809467
*Note: For fluoride, (hydrofluosilicic acid) or when plastic is required to replace standard ceramic weight.			
PVC foot valve weight			7404007
Viton® is a registered trademark of Dupont Dow Elastomers			

Pump & Systems Accessories

Foot Valves (Motor Driven Pumps)

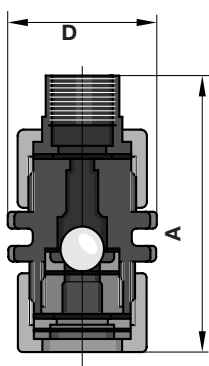
*For Fluids with a High Viscosity, ProMinent Recommends a Flooded Suction

Fig. 1



2165/4

Fig. 2



1521/4

Polypropylene (Fig. 1) - Valve body of PP, o-rings of EPDM (PP1)

Connection	Dimensions inches (mm)		Part No.
	Dim "A"	Dim "D"	
1/2" MNPT (DN 10) (delta, Sigma 1 and Sigma 2)	3-7/8 (98)	1-1/2 (38)	809465
3/4" MNPT (DN 15) (Sigma 1 and Sigma 2)	4 (102)	1-3/4 (44)	924516
3/4" MNPT (DN 20) (Sigma 2)	5 (127)	2-1/4 (57)	803721
1" MNPT (DN 25) (Sigma 2, Sigma 3 and Makro)	5-1/4 (133)	2-1/2 (63)	803722
1-1/2" MNPT (DN 40) (Sigma 3 and Makro)	6-1/2 (165)	3-1/2 (89)	1029475

PVC (Fig. 1) - Valve body of PVC, o-rings of Viton® (NP1)

1/2" MNPT (DN 10) (delta, Sigma 1 and Sigma 2)	3-7/8 (98)	1-1/2 (38)	809464
3/4" MNPT (DN 15) (Sigma 1 and Sigma 2)	4 (102)	1-3/4 (44)	924515
3/4" MNPT (DN 20) (Sigma 2)	5 (127)	2-1/4 (57)	803723
1" MNPT (DN 25) (Sigma 2, Sigma 3 and Makro)	5-1/4 (133)	2-1/2 (63)	803724

PTFE/PTFE (Fig. 1) Valve body and seals of PTFE (TT1)

1/2" MNPT (DN 10) (delta, Sigma 1 and Sigma 2) (PTFE/PTFE)	3-7/8 (98)	1-3/8 (35)	809466
3/4" MNPT (DN 15) (Sigma 1 and Sigma 2) (PTFE/PTFE)	4-1/8 (105)	1-3/4 (44)	924517
3/4" MNPT (DN 20) (Sigma 2) (PTFE/PTFE)	4-3/4 (121)	2-1/4 (57)	803725
1" MNPT (DN 25) (Sigma 2, Sigma 3 and Makro) (PTFE/PTFE)	5-3/8 (137)	2-1/2 (63)	803726
1-1/2" MNPT (DN 40) (Sigma 3 and Makro) (PTFE/PTFE)	6-1/2 (165)	3-1/2 (89)	1004205

PVDF/PTFE (Fig. 1) Valve body of PVDF and seals of PTFE

1/2" MNPT (DN 15) (delta, Sigma 1 and Sigma 2) (PVDF/PVDF)	3-7/8 (98)	1-3/8 (35)	7803720
3/4" MNPT (DN 15) (Sigma 1 and Sigma 2) (PVDF/PVDF)	4-1/8 (105)	1-3/4 (44)	7803721
3/4" MNPT (DN 25) (Sigma 2, Sigma 3 and Makro) (PVDF/PVDF)	4-3/4 (121)	2-1/4 (57)	7803722
1" MNPT (DN 25) (Sigma 2, Sigma 3 and Makro) (PVDF/PVDF)	5-3/8 (137)	2-1/2 (63)	7803723
1-1/2" MNPT (DN 32) (PVDF/PVDF)			1006434
1-1/2" MNPT (DN 40) (Sigma 3 and Makro)	6-1/2 (165)	3-1/2 (89)	1029475
1/2" Hose Barb (DN10 Delta, Beta/Gal HV)			1029471

SS - Valve body of stainless steel, seals of PTFE

3/8" FNPT (DN 10) (delta, Sigma 1 and Sigma 2)	2-3/4 (70)	1-1/2 (38)	809467
1/2" FNPT (DN 15) (Sigma 1 and Sigma 2)	3 (76)	1-3/4 (44)	924518
3/4" MNPT (DN 20) (Sigma 2)	4-1/2 (114)	2-1/8 (54)	803727
1" MNPT (DN 25) (Sigma 2, Sigma 3 and Makro)	5-1/8 (130)	2-1/2 (63)	803728
1-1/2" MNPT (DN 32)			1006435
1/4" FNPT	2-3/4 (70)	1-1/2 (38)	803730
3/8" FNPT	2-3/4 (70)	1-1/2 (38)	803731

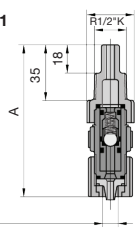
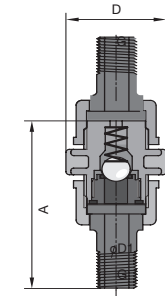
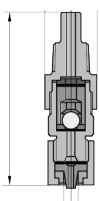
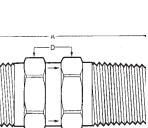
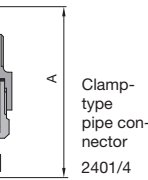
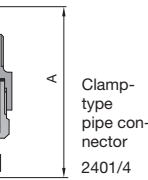
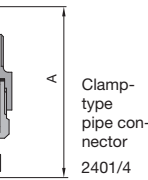
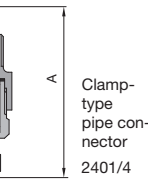
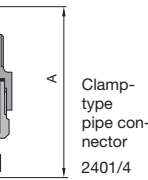
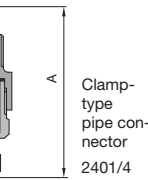
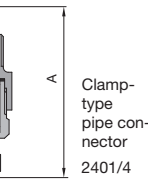
* See Figure 1, ** See Figure 2

Pump & Systems Accessories

Injection Valves (Solenoid Pumps)

To connect the pump discharge line to the point of injection for installation in any position, except PTFE version without spring to be installed in a vertical position discharging upward. All valves except PTFE include a 7 psig Hastelloy-C spring.

Caution: Injection valves and injection lances should not be used as isolating elements or for antisiphon protection!

		Dim "A"		Part No.
		inches	(mm)	
Fig. 1  Clamp-type hose connector 2399/4	Polypropylene			
	Valve body of PP, o-rings of EPDM (PP1, PPE)			
	Connection 1/4" x 3/16" tubing x 1/2" MNPT injection end (Fig 1)	3-7/8	(98)	924681
	Connection 1/2" x 3/8" tubing x 1/2" MNPT injection end (Fig 1)	3-7/8	(98)	924596
Fig. 2  1447/4	Connection 1/2" MNPT (Fig 2)	5-1/4	(133)	809461
	Connection 3/8" PPE Injection Valve			7924586
	Valve body of PP, o-rings of Viton® (PP2, PPB)			
	Connection 1/4" x 3/16" tubing x 1/2" MNPT injection end (Fig 1)	3-7/8	(98)	7924681
Fig. 3  Clamp-type hose connector 2400/4	Connection 1/2" x 3/8" tubing x 1/2" MNPT injection end (Fig 1)	3-7/8	(98)	7809478
	Connection 1/2" MNPT (Fig 2)	5-1/4	(133)	7809461
	Connection 3/8" PPB Injection Valve			7924587
	Valve body of PP, o-rings of EPDM-high viscosity (PP4)			
Fig. 4  1447/4	Connection 1/2" MNPT for PP4 (Fig 2)	5-3/8	(137)	7924521
	Valve body of PP, o-rings of Viton®-high viscosity (PP5)			
	Connection 1/2" MNPT for PP5 (Fig 2)	5-3/8	(137)	7809462
	PVC			
Fig. 5  Clamp-type pipe connector 2401/4	Valve body of PVC, o-rings of EPDM			
	Connection 1/4" x 3/16" tubing x 1/2" MNPT injection end (Fig 1)	3-3/4	(95)	7924580
	Connection 1/2" x 3/8" tubing x 1/2" MNPT injection end (Fig 1)	3-7/8	(98)	7924582
	Connection 1/2" MNPT (Fig 2)	5-3/8	(137)	7809460
Fig. 6  1447/4	Connection 3/8" NPE Injection Valve			7924583
	Valve body of PVC, o-rings of Viton®			
	Connection 1/4" x 3/16" tubing x 1/2" MNPT injection end (Fig 1)	3-3/4	(95)	924680
	Connection 1/2" x 3/8" tubing x 1/2" MNPT injection end (Fig 1)	3-7/8	(98)	924595
Fig. 7  1447/4	Connection 1/2" MNPT (Fig 2)	5-3/8	(137)	809460
	Connection 3/8" NPB Injection Valve			7924584
	PTFE			
	Body and o-rings of PTFE			
Fig. 8  1447/4	Connection 1/4" x 3/16" tubing x 1/2" MNPT injection end (Fig 3)	4-1/8	(105)	809488
	Connection 1/2" x 3/8" tubing x 1/2" MNPT injection end (Fig 3)	4-1/4	(108)	809481
	Connection 1/2" MNPT (not illustrated)			809462
	SS			
Fig. 9  1447/4	Valve body of stainless steel, seals of PTFE (SS1 & SS2)			
	Poppet check valve , connection 1/4" MNPT x 1/4" MNPT, spring-loaded, adjustable by internal hex nut from 3-50 psig (Fig 4)	1-5/8	(42)	7914587
	Optional adapter for above valve 1/4" FNPT x 1/2" MNPT (Fig 5)			7914588
	Ball check valve , connection 1/4" FNPT inlet to 1/2" MNPT discharge, 7 psig spring (Fig 5)	3-1/2	(89)	924597
Fig. 10  1447/4	Ball check valve , connection 3/8" FNPT inlet to 1/2" MNPT discharge, 7 psig spring (not illustrated) (SS1)	3-1/2	(89)	809463
	PVDF			
	Valve body of PVDF, seals of PTFE			
	Connection 1/4" x 3/16" tubing x 1/2" MNPT injection end (Fig 1)	3-3/4	(95)	1024708
Fig. 11  1447/4	Connection 1/2" x 3/8" tubing x 1/2" MNPT injection end (Fig 1)	3-7/8	(98)	1024714
	FDA compliant version 1/2" x 1/4" tubing connections x 1/2" MNPT			1081423

Pump & Systems Accessories

Injection Valves (Motor Driven Pumps)

Injection valves

To connect the pump discharge line to the point of injection for installation in any position, except PTFE version without spring to be installed in a vertical position discharging upward. All valves except PTFE and Sigma/Meta/Makro HK have 7 psig (0.5 bar) Hastelloy-C spring.

Caution: Injection valves and injection lances should not be used as isolating elements or for antisiphon protection!

Fig. 1

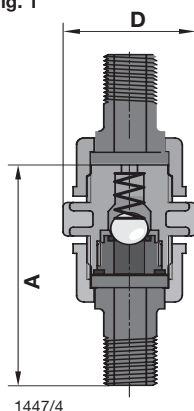


Fig. 2

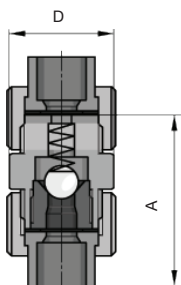
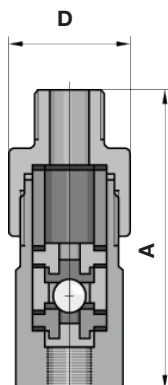


Fig. 3



Threaded Connection	Dimensions inches (mm)		Part No.
	Dim "A"	Dim "D"	

Polypropylene (Fig. 1) Valve body of PP, o-rings of EPDM (PP1)

1/2" MNPT (DN 10)	5-1/4 (133)	1-1/2 (38)	809461
3/4" MNPT (DN 15)	5-3/8 (137)	1-3/4 (44)	924521
3/4" MNPT (DN 20)	6-3/4 (171)	2-1/4 (57)	803710
1" MNPT (DN 25)	7-1/8 (181)	2-3/8 (60)	803711
1-1/2" MNPT (DN 40)	8-1/4 (210)	3-1/2 (89)	804761

PVC (Fig. 1) - Valve body of PVC, o-rings of Viton® (NP)

1/2" MNPT (DN 10)	5-3/8 (137)	1-1/2 (38)	809460
3/4" MNPT (DN 15)	5-3/8 (137)	1-5/8 (42)	924520
3/4" MNPT (DN 20)	6-3/4 (171)	2-1/4 (57)	803712
1" MNPT (DN 25)	7-1/8 (181)	2-3/8 (60)	803713
1-1/2" MNPT (DN 40)	8-1/4 (210)	3-1/2 (89)	804760

PTFE/PTFE (Fig. 1) - Valve body and seals of PTFE (TT1)

1/2" MNPT (DN 10)	(PTFE/PTFE)	4-7/8 (124)	1-3/8 (35)	809462
3/4" MNPT (DN 15)	(PTFE/PTFE)	5-1/2 (140)	1-3/4 (44)	924522
3/4" MNPT (DN 20)	(PTFE/PTFE)	6-7/8 (175)	2-1/4 (57)	803714
1" MNPT (DN 25)	(PTFE/PTFE)	7-1/4 (184)	2-1/2 (63)	803715
1-1/2" MNPT (DN 40)	(PTFE/PTFE)	8-1/4 (210)	3-1/2 (89)	804762

PVDF/PTFE (Fig. 1) - Valve body of PVDF and seals of PTFE

1/2" MNPT (DN 15)	(PVDF/PVDF)	4-7/8 (124)	1-3/8 (35)	7803724
3/4" MNPT (DN 15)	(PVDF/PVDF)	5-1/2 (140)	1-3/4 (44)	7803725
3/4" MNPT (DN 25)	(PVDF/PVDF)	6-7/8 (175)	2-1/4 (57)	7803726
1" MNPT (DN 25)	(PVDF/PVDF)	7-1/4 (184)	2-1/2 (63)	7803727
1-1/2" MNPT (DN 32)	(PVDF/PVDF)			1002783

SS - Valve body of stainless steel, seals of PTFE

3/8" FNPT (DN 10)	3-1/8 (79)	1-3/8 (35)	809463
1/2" FNPT (DN 15)	3-1/2 (89)	1-3/4 (44)	924523
3/4" MNPT (DN 20)	6-1/2 (165)	2-1/8 (54)	803716
1" MNPT (DN 25)	7-1/4 (184)	2-1/2 (63)	803717
1-1/2" MNPT (DN 40)	8-1/4 (210)	3-1/8 (79)	804763
1-1/2" MNPT (DN 32)			1002801

High pressure valves for HK pumps (Fig. 3)

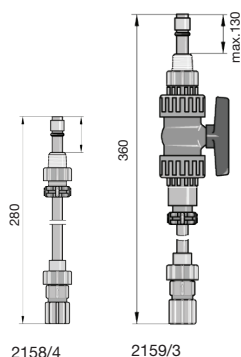
1/4" MNPT by 1/2" MNPT (DN 8)	4 (83)	1-5/8 (42)	803732
3/8" MNPT by 1/2" MNPT (DN 10)	4 (83)	1-5/8 (42)	803733

Pump & Systems Accessories

Injection Lances and Corporation Stop

Length of insertion variable from 3/4" to 6-1/2" (20 mm...165 mm) for large diameter pipes. Consisting of spring-loaded ball check injection valve, adjustable insertion pipe and elastomeric sleeve over injection port for backflow prevention. Materials: Hastelloy C spring, Ceramic valve ball, EPDM and silicon o-rings. Max. working pressure 87 psig (6 bar). Requires 1/2" FNPT pipe tap.

Note: For units with isolating valve, the valve may not be closed until the insertion pipe has been pulled out through the valve. Call factory for 3/4" and 1" connection.



Polypropylene (EPDM o-rings)

Connections: 1/2"x 3/8" & 1/4"x 3/16" tubing options to 1/2" MNPT

Part No.

1021530

same, but with ball-type isolating valve (Corporation Stop)

Connections: 1/2"x 3/8" & 1/4"x 3/16" tubing options to 1/2" MNPT

1021531

PVC (Viton® o-rings)

Connections: 1/2"x 3/8" & 1/4"x 3/16" tubing options to 1/2" MNPT

1021528

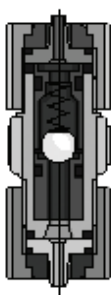
same, but with ball-type isolating valve (Corporation Stop)

Connections: 1/2"x 3/8" & 1/4"x 3/16" tubing options to 1/2" MNPT

1021529

Note: For brass 3/4" and 1" corporation stops, please call factory.

In-line check valve for tubing



1856/4

Polypropylene

With connectors on both ends for installation in flexible tubing, valve body of PP, o-rings of EPDM, with valve ball, spring-loaded with Hastelloy C spring, 7 psig (0.5 bar).

By using different Connector Sets, different sizes of tubing from 1/4" to 1/2" can be connected with each other.

Connection for tubing 1/4" x 3/16"

Part No.

809434

Connection for tubing 1/2" x 3/8"

809436

PVC

With connectors on both ends for installation in flexible tubing, valve body of PVC, o-rings of Viton®, with valve ball, spring-loaded with Hastelloy C spring, 7 psig (0.5 bar).

By using different Connector Sets, different sizes of tubing from 1/4" to 1/2" can be connected with each other.

Connection for tubing 1/4" x 3/16"

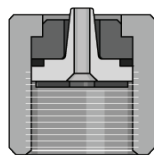
809417

Connection for tubing 1/2" x 3/8"

809415

Pump & Systems Accessories

Connector Sets



2181/4

European Size Guide:

Some connections are listed by European connections which are as follows:

6x4 = 1/4" OD x 3/16" ID

8x4 = 3/8" OD x 1/4" ID

12x9 = 1/2" OD x 3/8" ID

Description

PVC/Viton® for Tube type 1/4" x 3/16"
 PVC/Viton® for Tube type 1/2" x 3/8"
 PVC/Viton® for Tube type 1/4" x 1/2"
 PVC/Viton® for Tube type 3/8" x 1/4"
 PVC/EPDM for Tube type 1/4" x 3/16"
 PVC/EPDM for Tube type 1/2" x 3/8"
 PVC/EPDM for Tube type 3/8" x 1/4"
 PTFE for Tube type 1/4" x 3/16"
 PTFE for Tube type 1/2" x 3/8"
 PVDF/PTFE for Tube type 1/4" x 3/16"
 PVDF/PTFE for Tube type 1/2" x 3/8"
 PVDF /PTFE/ FKM/EPDM for Tube type 1/2" x 3/8"
 PVDF/PTFE for Tube type 3/8" x 1/4"
 PVDF/PTFE for Tube type 3/8" x 1/4" (single only)
 PVDF/PTFE for 8 x 4 high pressure tubing (single only)

Part No.

817050
 817055
 817068
 7817051
 790871
 740160
 7817049
 817201
 791199
 1023246
 1024584
 1035655
 7781457
 7500416
 1033148

Suction and Discharge Tubing

1052/4



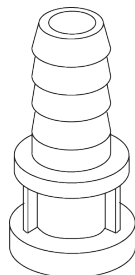
Max. Operating . Pressure Rating (psig)

PVC soft 1/4" x 3/16" (for suction side only)	7	7037004
PVC soft 1/2" x 3/8" (for suction side only)	7	7037009
PVC fabric reinforced 1/2" x 3/8"	250 @ 20 °C	7902938
PE 1/4" x 3/16"	150	7037005
PE 1/2" x 3/8"	100	7037010
PE 3/8" x 1/4" rigid		7037011
Teflon (FEP) 1/4" x 3/16"	100	7037426
Teflon (FEP) 1/2" x 3/8"	100	7037428
Teflon 8mm x 4mm	363	1033166
8"x4" High Pressure Tubing Kit (5m of Tubing, 1 x Inserts, 2 x clamp rings)	363	1033150

Hose

5/8" ID Teflon Hose (for 1/2", DN Pumps)	7904898
5/8" ID PVC Braided Hose (For 1/2", DN 10 pumps)	7037017
3/4" ID PVC Braided Hose (For 3/4", DN15 pumps)	7037041
1" ID PVC Braided Hose (For 3/4" & 1", DN 25 pumps)	7741322

Hose Barbs



Material (all 1/2" DN 10)

PVDF	1002288
PP	800657
PVC	800554
PTFE	811572
316 SS	810536

Material (all 3/4" DN 15)

PVDF	740632
PP	800655
PVC	811407
PTFE	811424
316 SS	810567

Material (all 1" DN 25)

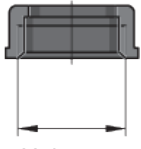
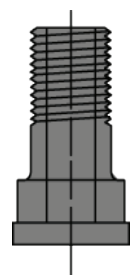
PVDF	1005560
PVC	811409

Material (all 1-1/2" DN 32)

PVDF	1005106
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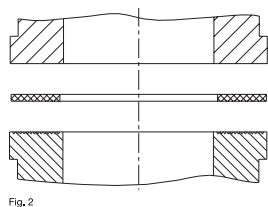
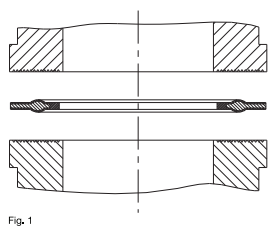
Pump & Systems Accessories

Union Nuts & Inserts

		Union Nut	Threaded Insert	Union Nut	Insert	Union Nut	Threaded Insert
	Pump	Material	Material	Thread	Thread	Part No.	Part No.
 1031/4 Union nut	High Viscosity	PP	PP	DN 10	1/2" MNPT	358613	7358402
	Makro	PP	PP	DN 20	3/4" MNPT	358615	1017381
	Makro	PP	PP	DN 25	1" MNPT	358616	1017382
	Makro	PP	PP	DN 40	1-1/2" MNPT	358618	7358611
	Makro	PVC	PVC	DN 20	3/4" MNPT	356564	1017381
	Makro	PVC	PVC	DN 25	1" MNPT	356565	1017382
	Makro	PVC	PVC	DN 40	1-1/2" MNPT	356567	7358613
	Makro	PVDF	PVDF	DN 20	3/4" MNPT	358815	1017381
	Makro	PVDF	PVDF	DN 25	1" MNPT	358816	1017382
	Makro	PVDF	PVDF	DN 40	1-1/2" MNPT	358818	7358615
 1486/4 Threaded insert	Delta, Beta/Gala HV	PVDF	PVDF	DN 10	1/2" MNPT	358813	7358634
	& Sigma	PVDF	PVDF	DN 15	3/4" MNPT	358814	1017380
	Sigma	PVDF	PVDF	DN 15	1/2" MNPT	358814	7358641
	Sigma	PVDF	PVDF	DN 20	3/4" MNPT	358815	1017381
	Sigma	PVDF	PVDF	DN 25	3/4" MNPT	358816	7358645
	Sigma	PVDF	PVDF	DN 25	1" MNPT	358816	1017382
	Sigma/3	PVDF	PVDF	DN 32	1-1/2" MNPT	1003639	1017383
	Sigma	SS	SS	DN 10	3/8" FNPT	805270	7805285
	Sigma	SS	SS	DN 15	1/2" FNPT	805271	7805286
	Makro	SS	SS	DN 20	3/4" MNPT	805272	7358609
	Sigma	SS	SS	DN 25	3/4" MNPT	805273	7358646
	Makro/Sigma	SS	SS	DN 25	1" MNPT	805273	7358610
	Sigma/3	SS	SS	DN 32	1-1/2" MNPT	805274	7358648
	Makro	SS	SS	DN 40	1-1/2" MNPT	805275	7358617

Seals

These gaskets sit between the suction/discharge valve and the insert/hose barb



Molded composite seal

M20 x 1.5
DN10
DN15
DN20
DN25
DN32
DN40
DN50

PTFE, P/N

1021686
1019364
1019365
1019366
1019367
1019353
1019368
1019369

Flat Seal

M20 x 1.5
DN10
DN15
DN25
DN32
DN40
DN50

Viton®, P/N*

1024792
1019315
1019317
1019319
1019321
1019323
1019325

EPDM, P/N

1024791
1019314
1019316
1019318
1019320
1019322
1019324

* Flat Viton seal identified with a green mark

Pump & Systems Accessories

Gaskets

Solenoid Pump Gaskets:

All gaskets are the same size for all CNPA, Beta & Gala, with PP, NP or PC heads:

791495 = EPDM

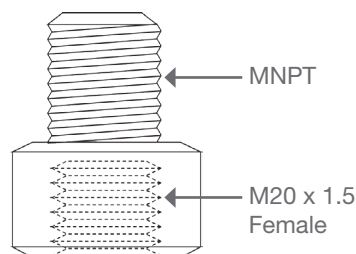
791421 = Viton

Gaskets for Solenoid Pumps (For PVT2):

Colour	Mark	Material	Part #
White	No Mark	PTFE	483911
Black	No Mark	EPDM	1024791
Black	Green	Viton	1024792

Tubing Adapters

Adapters

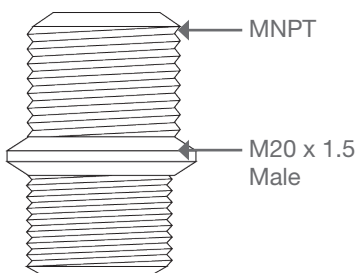


M20 x 1.5 Female by 1/2" MNPT

PVC	7359009
PVDF	7901791
PTFE	7356677

M20 x 1.5 by 1/2" Male Spigot

PVC	7902223
CPVC (Special Order)	7904690
PVDF	7741834



M20 x 1.5 Male by 1/2" MNPT

PVC	7152222
PVDF	7358660

M20 x 1.5 Male by 1/2" Spigot

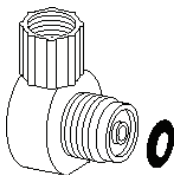
PVC	7740130
CPVC (Special Order)	7745158
PVDF (Special Order)	7745598

Pump Adapters:

			Part No.
MALE GAMMA	x	1/2" FNPT PVC	7152223
FEMALE GAMMA	x	1/2" FNPT PVC	7152224
MALE GAMMA	x	1/4" MNPT PVC	7152226
MALE GAMMA	x	1/4" FNPT PVC	7152227
FEMALE GAMMA	x	1/4" FNPT PVC	7152228
FEMALE GAMMA	x	1/4" MNPT PVC	7152229
MALE GAMMA	x	1/2" MALE SPIG PVC	7740130
MALE GAMMA	x	1/4" FNPT (PVDF)	7358224

Pump & Systems Accessories

Tubing Adapters continued



Right-angled PVC threaded connector

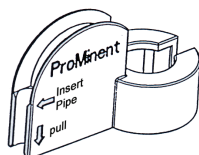
Connector for the beta and gamma/L auto-degassing liquid ends required when mounting multifunction valves; optionally used to direct discharge flow upwards. Angle union 90°.

Type PCB (PVC/Viton®)

1003318

Type PCE (PVC/EPDM)

1003472



Tubing fold preventer

Fits on top of the beta and gamma/L auto-degassing liquid ends, used to prevent a fold in the bypass line which is fed back to the tank. This is required when using soft tubing, however rigid tubing is standard.

for tubing size (mm)

1/4" x 3/16" (6mm)

1001844

DN Spig Adapters

Allows you to go from a DN valve face to PVC Pipe. Eliminates the standard NPT threads (remove nut and MNPT insert from pump valve, add DN Spigot, shown below, which sits on valve and then replace nut only to form compression).

	Part No.
DN10 x 1/2" ADAPTER SPIG PVC	7900203
DN15 x 3/4" SPIG ADAPTER PVC	7901120
DN20 x 3/4" ADAPTER SPIG PVC	7900204
DN25 x 1" ADAPTER SPIG PVC	7900205
DN32 x 1.5" ADAPTER SPIG PVC	7904865

*See "Seals" on page 161 for gasket options (between valve & spig)

Par Flange Adapters

Allows you to go from a standard Gamma connection on a solenoid pump to a SS tubing connection for systems piping.

	Part No.
18" Long x 3/8" Tube 316SS x Parflange Fitting	7900309

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Pump & Systems Accessories

Backpressure Valves

Pressure Relief Valves

Backpressure, antisiphon and pressure relief valves



In-line pressure relief valve (3 port)



Backpressure valve (2 port)



Backpressure valve on tee for pressure relief

Backpressure (2-port) valves may be used in-line to provide a constant discharge pressure for protection from siphoning, or they may be teed off of the discharge line for pressure relief, discharging back to the source tank or to the pump suction line to create a bypass.

Pressure relief (3-port) valves are mounted in the discharge line, featuring a separate relief port which discharges back to the source tank or to the pump suction line to create a bypass.

Backpressure valves provide several functions: they improve repeatability by providing a constant discharge pressure; they provide antisiphon protection for discharge into pressurized water lines or vacuums, or where suction head exceeds discharge head; and they minimize pulsation when used in conjunction with a pulsation dampener.

In-line backpressure/antisiphon and pressure relief valves

These adjustable backpressure (2-port) and pressure relief (3-port) valves have FNPT ports and require tubing adapters for use with flexible tubing.

Can be adjusted with screwdriver.

Technical data Size:

Pressure Adjustment:
0-150 psig (0-10.3 bar)

Flow rates @ 45 psig (3.1 bar):

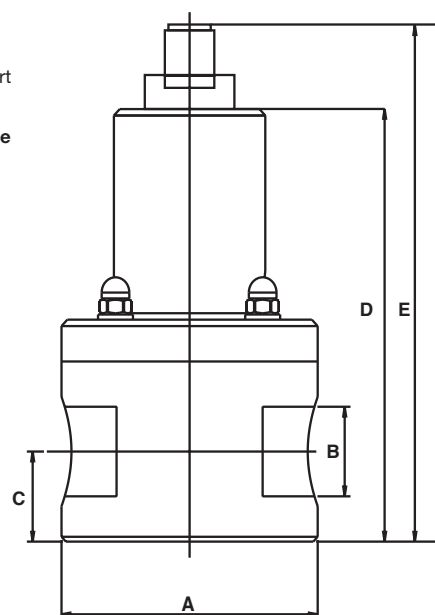
1/4" - 132 U.S. gph (500 L/h)
1/2" - 132 U.S. gph (500 L/h)

Flow rates @ 150 psig:

1/2" (PP, PVC) - 200 U.S. gph (757 L/h)
1/2" (PVDF, TT, SS) - 300 U.S. gph (1135 L/h)
3/4" - 300 U.S. gph (1135 L/h)
1" - 500 U.S. gph (1893 L/h)
1-1/2" - 900 U.S. gph (3407 L/h)
2" - 1200 U.S. gph (4542 L/h)

Max. Temperature:

PP - 195°F (90°C)
PVC - 140°F (60°C)
PTFE - 250°F (121°C)
PVDF - 250°F (121°C)
316 Stainless - 250°F (121°C)



Dimensions in inches (mm)

A	B	C	D	E
2.6 (65)	1/4 NPT	1.2 (31)	4.9 (125)	6.2 (158)
2.6 (65)	1/2 NPT	1.2 (31)	4.9 (125)	6.2 (158)
3.5 (88)	3/4 NPT	1.1 (28)	5.4 (136)	6.7 (169)
3.9 (98)	1 NPT	1.4 (36)	5.7 (145)	7.0 (178)
4.6 (118)	1-1/2 NPT	2.2 (56)	9.0 (229.5)	10.3 (260.5)
4.6 (118)	2 NPT	2.2 (56)	9.0 (229.5)	10.3 (260.5)

Pump & Systems Accessories

Backpressure Valves

Pressure Relief Valves

1/4" FNPT valves

Material

PP	1009444	
PVC	1009445	
PVDF	1009446	
316 SS	1009447	

Tubing Adapters

(1 required per valve): 1/4" x 3/16" tubing x 1/4" MNPT

PP/EPDM

PP/Viton®

PVC/EPDM

PVC/Viton®

Backpressure Valve (2-port)

Pressure Relief Valve (3-port)

Part No.

7500060
7500058
7500064
7500062

1/2" FNPT valves

Material

PP	1006846	
PVC	1006850	
PVDF	1006854	
316 SS	1008796	

Tubing Adapters

(1 required per valve port): 1/2" x 3/8" tubing x 1/2" MNPT

PP/EPDM

PP/Viton®

PVC/Viton®

Backpressure Valve (2-port)

Pressure Relief Valve (3-port)

Part No.

7500061
7500059
7500063

3/4" FNPT valves

Material

PP	1006847	
PVC	1006851	
PVDF	1006855	
316 SS	1008797	

1" FNPT valves

PP	1006848	
PVC	1006852	
PVDF	1006856	
316 SS	1008798	

1-1/2" FNPT valves

PP	1006849	
PVC	1006853	
PVDF	1006857	
316 SS	7302243	

Spare Parts Sets

Contains 1 of each: compression spring, diaphragm, spring plate, and pressure adj. disc.

SPK 1/4" - 1/2"	1035446	1035446
SPK 3/4" - 1"	1035447	1035447
SPK 1-1/2" - 2"	1035448	1035448

Spare diaphragms

1/4" - 1/2" valve PTFE/EPDM	1006813	1006813
3/4" - 1" valve PTFE/EPDM	1006814	1006814
1-1/2" - 2" valve PTFE/EPDM	1006815	1006815

Black Rubber Caps

Cover for 1/4" to 1/2" valves		741100
Cover for 3/4" to 1" valves		1006820
Cover for 1-1/2" to 2" valves		1006821

product overview

solenoid-driven metering pumps

motor-driven metering pumps

pump spare parts & accessories

DULCOMETER® instrumentation

DULCOTEST® sensors

standard & custom systems

Pump & Systems Accessories

Back Pressure/Pressure Relief Valves Continued

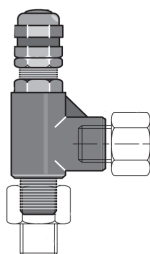
Socket Weld Valves

1/4" Socket Valves		
Material	Backpressure Valve (2-port)	Pressure Relief Valve (3-port)
PVC	1019891	1019892
PVDF	1019893	1019894
1/2" Socket Valves		
Material	Backpressure Valve (2-port)	Pressure Relief Valve (3-port)
PVC	1019883	1019884
PVDF	1019895	1019896
3/4" Socket Valves		
Material	Backpressure Valve (2-port)	Pressure Relief Valve (3-port)
PVC	1019885	1019886
PVDF	1019897	1019898
1" Socket Valves		
Material	Backpressure Valve (2-port)	Pressure Relief Valve (3-port)
PVC	1019887	1019888
PVDF	1019899	1019900
1-1/2" Socket Valves		
Material	Backpressure Valve (2-port)	Pressure Relief Valve (2-port)
PVC	1019889	1019889
PVDF	1019901	1019901
2" Socket Valves		
Material	Backpressure Valve (2-port)	Pressure Relief Valve (2-port)
PVC	1019891	1019891
PVDF	1019905	1019905

Pump & Systems Accessories

High Pressure Relief Valves

Pressure relief valves



1112/4

High pressure relief valve, adjustable, 1/4" and 1/2" NPT for Sigma/ Meta/Makro HK and ProMus pumps

Can also be used as a backpressure valve for < 30 gph (113 L/h).

These valves are without springs, which must be ordered separately.

Materials: Stainless steel/Viton®

Connection: 1/4" NPT male and female thread

Part No.

7202505

Materials: Stainless steel/EPDM

Connection: 1/4" NPT male and female thread

7744507

Spring: psig (bar)

Color:

50 - 350 (3.5 - 25)

blue

7202519

350 - 750 (25 - 50)

yellow

7202520

750 - 1500 (50 - 100)

violet

7202525

1500 - 2250 (100 - 155)

orange

7202524

2250 - 3000 (155 - 205)

brown

7202523

3000 - 4000 (205 - 275)

white

7202522

4000 - 5000 (275 - 340)

red

7202521

Materials: Stainless steel/Viton®

Connection: 1/2" NPT male and female thread

7744508

Materials: Stainless steel/EPDM

Connection: 1/2" NPT male and female thread

7744509

Spring: psig (bar)

Color:

50 - 350 (3.5 - 25)

blue

7744510

350 - 750 (25 - 50)

yellow

7744511

750 - 1500 (50 - 100)

violet

7744512

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sensorsstandard & custom
systems

Pump & Systems Accessories

Pulsation Dampeners

Pulsation dampeners operate on the principle that gas is compressible and fluid is not. The pulsation dampener consists of an air chamber containing compressed air, a fluid chamber connected to the pump's suction or discharge line, and a bladder or bellows which separates the air and fluid.

Some models are flow-through design, with two ports so they can be mounted directly on the pump suction or discharge line. Other models are single port design, to be teed off of the pump suction or discharge line. Flow-through models may also be used in a tee if one port is capped.

All models feature a Schrader (bicycle) valve and pressure gauge for charging the air chamber on-site.

PVDF/Nordel pulsation dampeners are recommended for sodium hydroxide (caustic) applications. Viton® pulsation dampeners are recommended for sodium hypochlorite applications.

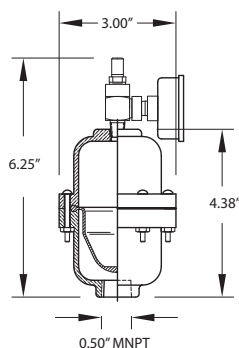
Multiply the pump's displacement per stroke (mL) times 26 to get minimum pulsation dampener volume (mL) to achieve 90% reduction in pulsation.

We recommend using pressure relief valves with the pulsation dampeners.

General Specifications

Maximum pressure:	150 psig (polypro, PVDF and PTFE), 300 psig (SS)	
Temperature range:		
Nordel bladder:	-60°F to 280°F	(-51°C to 138°C)
Viton® bladder:	30°F to 350°F	(-1°C to 177°C)
HYPALON® bladder:	-20°F to 275°F	(-29°C to 135°C)
PTFE bellows:	40°F to 220°F	(4°C to 104°C)
Polypro housing :	32°F to 175°F	(0°C to 79°C)
PVC housing:	32°F to 140°F	(0°C to 60°C)
PVDF housing:	10°F to 250°F	(-12°C to 121°C)
PTFE housing:	-20°F to 125°F	(-29°C to 52°C)
SS housing:	32°F to 200°F	(0°C to 93°C)

*Teflon bellows are smaller in volume



10 CU IN
(164 mL)

131 mL (8 cu. in.) Models

SS housing: 3/8" FNPT, 1 port	
PTFE bellows	
PVDF housing: 1/2" FNPT, 1 port	
PTFE bellows	

164 mL (10 cu. in.) Models

PVC Housing, Viton Bladder 1/2" FNPT, 1 Port	
CPVC housing: 1/2" FNPT, 1 port	
Nordel bladder (EPDM)	
Viton® bladder	
HYPALON® bladder	
Polypro housing: 1/2" FNPT, 1 port	
Nordel bladder (EPDM)	
PVDF housing: 1/2" FNPT, 1 port	
Nordel bladder (EPDM)	
Viton® bladder	

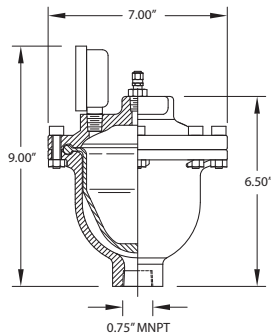
Shipping Wt. lbs. (kg)	Model	Bladder size	Part No.
3 (1.4)	CTS1020 T	III	7253205
1 (0.9)	CTK1005 T 5	III	7744101
1 (0.9)	RC 10PVC V50	III	7253216
1 (0.9)	RC-10X-E50	III	7744096
1 (0.9)	RC-10X-V50	III	7744097
1 (0.9)	RC-10X-H50	III	7744098
1 (0.9)	CTP1005 ND 5	III	7744102
1 (0.9)	CTK1005 ND 5	III	7744100
1 (0.9)	CTK1005 V 5	III	7744099

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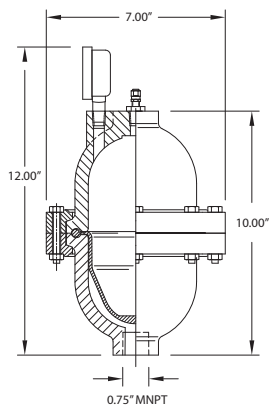
Pump & Systems Accessories

Pulsation Dampeners

Pulsation dampeners (cont.)



**36 CU IN
(600 mL)**



**85 CU IN
(1393 mL)**

600 mL (36 cu. in.) Models

PVC housing: 3/4" FNPT, 1 port
 Nordel bladder
 Viton® bladder
 HYPALON® bladder
 PTFE bellows

Polypro housing: 3/4" FNPT, 1 port

Nordel bladder
 PVDF housing: 3/4" FNPT, 1 port
 PTFE bellows
 Viton® bladder

SS housing: 3/4" FNPT, 1 port
 Viton® bladder
 PTFE bellows

1147 mL (70 cu. in.) Models

PVC housing: 3/4" FNPT, 1 port
 PTFE bellows

SS housing: 3/4" FNPT, 1 port
 PTFE bellows

PVDF housing: 3/4" FNPT, 1 port
 PTFE bellows

1393 mL (85 cu. in.) Models

PVC housing: 3/4" FNPT, 1 port
 Nordel bladder
 Viton® bladder
 HYPALON® bladder

PVDF housing: 3/4" FNPT, 1 port
 Nordel bladder (EPDM)
 Viton® bladder

1998 mL (122 cu. in.) Models

PVC housing: 2" FNPT, 1 port
 PTFE bellows

2867 mL (175 cu. in.) Models

PVC housing: 2" FNPT, 1 port
 HYPALON® bladder

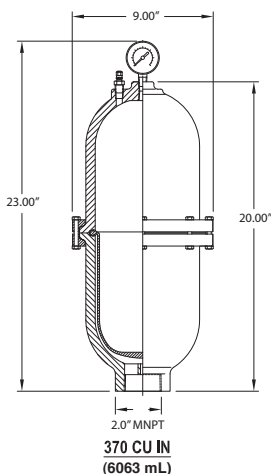
Shipping Wt. lbs (kg)	Model	Bladder Size	Part No.
7 (3.2)	CT1311 ND	II	7253232
7 (3.2)	CT1311 V	II	7253233
7 (3.2)	CT1311 H	II	7740946
7 (3.2)	CT1311 T	II	7744211
6 (2.7)	CT1301 ND	II	7253230
7 (3.2)	CT1401 T	II	7253234
7 (3.2)	CT1401 V	II	7253235
11 (5.0)	CT3120 V	II	7253238
11 (5.0)	CT3120 T	II	7253237
10 (4.5)	CT311 T	II	7253229
14 (6.4)	CT3020 T	II	7253206
8 (3.6)	CT401 T	II	7253219
6 (2.7)	CT311 ND	II	7253221
6 (2.7)	CT311 V	II	7253220
6 (2.7)	CT311 H	II	7740947
7 (3.2)	CT401 ND	II	7253209
8 (3.6)	CT401 V	II	7253210
16 (7.3)	CT911 T	I	7253228
13 (5.9)	CT911 H	I	7740948

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Pump & Systems Accessories

Pulsation Dampeners

Pulsation dampeners (cont.)



5822 mL (355 cu. in.) Models

PVC housing: 2" FNPT, 1 port
PTFE bellows
PVDF housing: 2" FNPT, 1 port
PTFE bellows
SS housing: 2" FNPT, 1 port (Fig. 4)
PTFE bellows

Shipping Wt. lbs (kg)	Model	Bladder Size	Part No.
18 (8.2)	CT111 T	I	7253227
21 (9.5)	CT201 T	I	7253215
40 (18.1)	CT2400 T	I	7253211

6063 mL (370 cu. in.) Models

PVC housing: 2" FNPT, 1 port (Fig. 4)
Nordel bladder
Viton® bladder
Polypro housing: 2" FNPT, 1 port (Fig. 4)
Viton® bladder

16 (7.3)	CT111 ND	I	7253222
16 (7.3)	CT111 V	I	7253218
15 (6.8)	CT101 V	I	7253213

Note: Other sizes and materials available upon request.

High pressure (1000psi) pulsation dampeners

66 mL (4 cu. in.) Models

316 Stainless Steel housing: 3/8" FNPT, 1 port (not illustrated)
Nordel bladder (EPDM)

Model	Bladder Size	Part No.
H1120 ND	III	7744387

164 mL (10 cu. in.) Models

Hastelloy C housing: 3/8" FNPT, 1 port (not illustrated)
Viton® bladder
316 Stainless Steel housing: 3/8" FNPT, 1 port (not illustrated)
Nordel bladder (EPDM)

H1080 V	III	7744382
H1020 ND	III	7744388

600 mL (36 cu. in.) Models

316 Stainless Steel housing: 3/8" FNPT, 1 port (not illustrated)
Nordel bladder (EPDM)

H3120 ND	II	7744389
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Pump & Systems Accessories

Pulsation Dampeners

	Model	Bladder Size	Part No.
Nordel (EPDM) bladders	1000-28	III	7740208
	401-28	II	7740202
	201-28	I	7740205
Viton bladders	1000-31	III	7740209
	401-25	II	7740203
	201-25	I	7740206
Hypalon bladders	1000-30	III	7740959
	401-30	II	7740960
	201-30	I	7740961
PTFE bellows	301-10	II	7740204
	101-10	I	7740207

High pressure charging hose

Charging hose consists of an 8 foot (2.4 m) length of 5000 psi hose with a 1/4" NPT (M) fitting at one end, for connection to a nitrogen bottle regulator and a charging adapter with purge valve and gauge at the other end.

	Model	Part No.
1/4" air inlet and 1/8" fill valve	701-00	7744376

Inlet stabilizers

An inlet stabilizer will improve flow conditions to the inlet side of a pump and protect and extend the service life of all inlet system components. Inlet stabilizers must be mounted as close to the pump's inlet connection as possible, and no more than 10 pipe diameters away. All units include a 30-0-30 vacuum/pressure gauge, air venturi, and ball valve for charging bladder chamber. Units must be sized similar to pulsation dampeners, i.e. $26 \times (\text{mL/stroke}) = \text{minimum required inlet stabilizer volume}$. **Note:** Requires a compressed air supply be available for initial bladder charging and periodic readjustment as necessary.

	Model	Size	Part No.
1393 mL (85 cu. in.) Models (for 3/4" models)			
PVC housing:			
Viton® bladder	J3111V	II	7740859
HYPALON® bladder	J3111H	II	7744305
Nordel bladder (EPDM)	J3111ND	II	7744306
PVDF housing:			
Viton® bladder	J401V	II	7740860
6063 mL (370 cu. in.) Models (for 2" models)			
PVC housing:			
Viton® bladder	J1111V	I	7744307
HYPALON® bladder	J1111H	I	7744308
Nordel bladder (EPDM)	J1111ND	I	7744309
PVDF housing:			
Viton® bladder	J201V	I	7744310

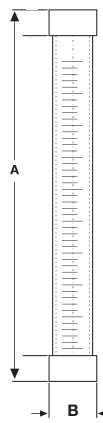
Materials shown are in contact with process fluid.
Other material and sizes are available. Please consult factory.

Pump & Systems Accessories

Calibration Columns

Calibration columns

Clear PVC calibration columns

	Cylinder size	Fitting size	Dimensions (inches)		Threaded base removable top	Threaded both ends
			A	B		
	100 mL	1/2" NPT	10.75	1.39	7500137	7500127
	250 mL	1/2" NPT	11.51	1.89	7500138	7500128
	500 mL	1/2" NPT	12.75	2.39	7500139	7500129
	1000 mL	1/2" NPT	16.75	2.77	7500130	7500135
	2000 mL	1" FNPT	20.67	3.52	7500140	7500131
	4000 mL	1" FNPT	22.66	4.52	7500141	7500132
	10,000 mL	2" FNPT	23.16	6.91	7500134	7500133
	20,000 mL	2" FNPT	42.69	6.91	7500142	7500136

Typical Application of calibration columns

Column w/removable top

Note: Top must be removed during calibration to allow for venting.

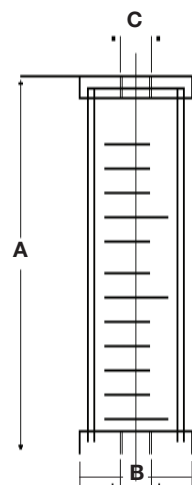
Column threaded both ends

Note: If plumbed as shown, it is recommended that a tee be installed after column for venting.



Borosilicate Glass calibration columns with Viton® o-rings for Sulfuric Acid Applications

Glass cylinder with acrylic outer shield and 1/2" (316 SS) or 3/4" (PVDF, PVC) thick end flanges. All cylinders are bolted together using stainless steel rods with Viton O-rings for the glass seal and Buna N O-rings for the acrylic seal.

	Cylinder size	Fitting size	Dimensions (inches)			Part No.
			A	B	C	
	100 mL	1/2" PVDF	10.0	3.0	1/2	7500152
	100 mL	1/2" SS	9.5	3.0	1/2	7500153
	250 mL	1/2" PVDF	12.5	3.5	1/2	7500155
	250 mL	1/2" SS	12.0	3.5	1/2	7500156
	500 mL	1/2" PVDF	14.5	4.0	1/2	7500158
	500 mL	1/2" SS	14.0	4.0	1/2	7500159
	1000 mL	1/2" PVDF	16.75	4.75	1/2	7500161
	1000 mL	1/2" SS	16.25	4.75	1/2	7500162
	2000 mL	1" PVDF	18.75	5.5	1	7500164
	2000 mL	1" SS	18.25	5.5	1	7500165
	4000 mL	1" PVDF	22.5	6.5	1	7500167
	4000 mL	1" SS	22.0	6.5	1	7500168

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Pump & Systems Accessories

DulcoFlow® Ultrasonic Flow Monitor

Ultrasonic Flow Meter DulcoFlow®

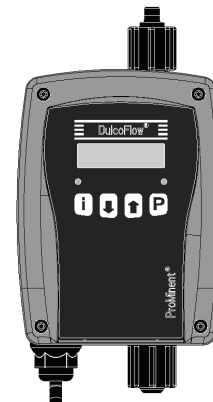
Used for the measurement of pulsing flows ranging from 0.01-50 L/h. All parts that come into contact with the chemical are made from PVDF, ensuring that even aggressive feed chemicals can be measured without a problem. The device is installed approximately 30 cm downstream of the pump in the metering line. Interfering influences, such as air bubbles, are detected and transmitted to the DulcoFlow® unit as an error message. The use of the delta is only with the metering characteristic "FAST".

In addition the recording and measurement of flow, the flow meter DulcoFlow® can also be used to monitor individual metering strokes, if "Contact output" is selected for signal output in the identity code. In this case, the device is calibrated to the stroke volume set on the pump. A lower and an upper limit can be entered and if the figure falls below or exceeds these limits, no feedback is transmitted to the pump. As a result, this generates an error message.

The device is designed for wall mounting.

- The cumulative volume can be calculated in gallons or litres
- Direct display of the flow and number of strokes recorded
- 2 LEDs for stroke feedback and operating status
- Analog output or frequency output for flow volume
- Contact output for direct connection to the metering pump (single stroke monitoring)

Note: This unit will only work with solenoid pumps. Slow stroking GMXa / GXL a pumps should have stroke frequency kept above 70 spm



Technical data

	Type 05	Type 08
Measuring range:	Up to 13 L/hr	Up to 50 L/hr
Maximum Pressure:	232 psi	232 psi
Smallest Measuring Volume:	.03 ml/stroke	.05 ml/stroke

Data

Accuracy:	< 2%
Stroke Feedback	1 Pulse, 1 Stroke
mA output max load:	400 Ω
Pressure Range:	min. 45 - 232 psi max.
Temp Range:	-10 ° C to 45 ° C
Max. viscosity:	2000 cP
Dimensions:	160.5 mm x 121 mm x 121.6 mm H x W x D

Identcode Ordering System: DulcoFlow (DFMA)

DFMA	Series Version:						
	05	Beta1000 - 0413/0713, GMXa 1602 - 0414/0715 GXL a 1608 - 1612					
	08	Beta 1604 - 0420, GMXa 1604 - 0424, GXL a 1020 - 0450					
		Seal Material:					
		T	PTFE				
		V	FKM				
		E	EPDM				
			Connection:				
			1	1/4" x 3/16"			
			2	3/8" x 1/4"			
			3	1/2" x 3/8"			
				Electrical Connection:			
			D	N. American Plug 115 V			
				Signal Output:			
				3	Dual Output (pulse and 4-20mA output)		
					Design:		
					0	with ProMinent logo	
						Accessories: (Standard)	
					0	without accessories (Standard)	
DFMA	05	T	1	D	0	0	0

*For Pump with a 1/2" MNPT connection (GXL a 0450, and pumps with a PVT4 Liquid-End) a pump adapter is required (7152223 - 1/2" FNPT x Male M20)

Pump & Systems Accessories

Metering Monitors

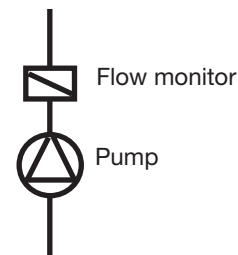
Adjustable metering monitor “Flow Control”

Supplied with connection cable for assembly directly to liquid end. Monitors individual strokes according to the float and orifice principle. The partial quantity of chemical flowing past the float is adjusted from the total stroke volume via the adjusting screw so that an alarm relay is actuated if the flow falls 20%. The user can select the number of incomplete strokes permitted (between 1 and 125) in accordance with the actual process requirements.

The ProMinent flow monitor works best if the pump stroke length is higher than 80%.

Please Note:

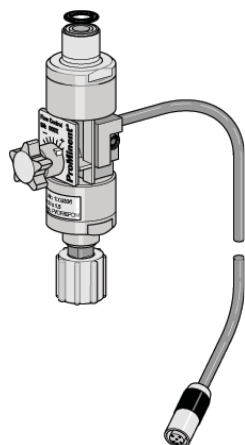
1. Not recommended for off-gassing media (see next page)
2. ProMinent recommends using this accessory in conjunction with the alarm relay on the pump.



[For use with low-viscosity (water-like) fluids only].

Materials:

Flow meter: PVDF
 Float: PTFE-coated
 O-rings: Viton® B/EPDM



For gamma/L series in material versions PP, PVDF, NP and TT.

Flow Control	Material	Pump type	Part No.
Flow Control type I	PVDF, EPDM	GMXa 1602	1009229
Flow Control type II	PVDF, EPDM	GMXa 1604 - 0245 GXL a 1608 - 0730	1009336
Flow Control type I	PVDF, Viton® B	GMXa 1602	1009335
Flow Control type II	PVDF, Viton® B	GMXa 1604 - 0245 GXL a 1608 - 0730	1009338

Flow control for Suction Side.

Flow Control	Material	Pump type	Part No.
Size II	PVDF, EPDM	GMXa 1604 - 0245 GXL a 1608 - 0730	1036407
	PVDF, FKM	GMXa 1604 - 0245 GXL a 1608 - 0730	1036409
Size III	PVDF, EPDM	GXL a 0450, 0280	1036439
	PVDF, FKM	GXL a 0450, 0280	1936440

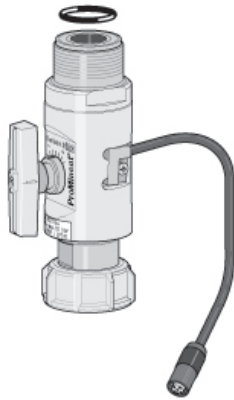
Pump type and operating pressure

Pump Type	Medium Operating Pressure	Stroke length	Max Permissible operating pressure	Stroke length
1602	116 psi	> 50%	232 psi	> 60%
1604	116 psi	> 30%	232 psi	> 50%
0708	58 psi	> 30%	102 psi	> 40%
1009	73 psi	> 30%	145 psi	> 40%
0414	29 psi	> 30%	58 psi	> 30%
0715	58 psi	> 30%	102 psi	> 30%
0220	14 psi	> 30%	29 psi	> 30%
0424	29 psi	> 30%	58 psi	> 30%

Pump & Systems Accessories

Metering Monitors

For Sigma HM with connection cable for assembly to liquid end.*



Flow Control	Material	Pump type	Part No.
Flow Control type III (Sigma/ 1)	PVDF, EPDM	12017, 10022, 12035, 10044 10050, 07065	1021168
	PVDF, Viton® B	12017, 10022, 12035, 10044 10050, 07065	1021169
Flow Control type III (Sigma/ 1 & 2)	PVDF, EPDM	07042, 04084, 04120, 12050 12090, 12130	1021170
	PVDF, Viton® B	07042, 04084, 04120, 12050 12090, 12130	1021171
Flow Control type IV (Sigma/ 2 & 3)	PVDF, EPDM	07120, 04350, 120145, 120190 120270, 07220	1021164
	PVDF, Viton® B	07120, 04350, 120145, 120190 120270, 07220	1021165
Flow Control type V (Sigma/ 3)	PVDF, EPDM	07410,07580, 04830	1021166
	PVDF, Viton® B	07410,07580, 04830	1021167

*Suitable for pump operating at a constant speed above 50 SPM or on contact mode.

Pump & Systems Accessories

gamma/L Metering monitor

Adjustable metering monitor "Flow Control"

For gamma/L and with signal transmitter and connecting cable with 4-pole round connector for direct connection with the metering pump.

For monitoring the actual flow output per pump stroke using a plastic encapsulated metal poppet detected by the adjustable proximity sensor. A red LED on the monitor flashes with each pump stroke having sufficient chemical volume. If there is no flow monitored for a predetermined number of strokes (up to 125), the metering pump automatically stops and a red LED on the pump lights. The optional fault relay changes state to issue an alarm or activate a standby pump. The monitor cable will plug into a 4-pole round socket on the pump. Materials: PP or PVC. Enclosure rating: NEMA 4X (IP 65). Maximum operating pressure is 253 psig (17.5 bar).

PASSMASS | ARM

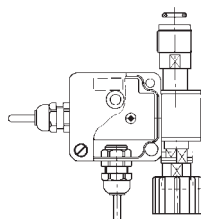


FIG. 1

Threads are M20 x 1.5 Female on inlet side for mounting directly on pump discharge valve, and M20 x 1.5 Male on discharge side for the standard tubing connector that comes with the pump.

Metering monitor for PP/NP/TT version pumps: (FIG. 1)

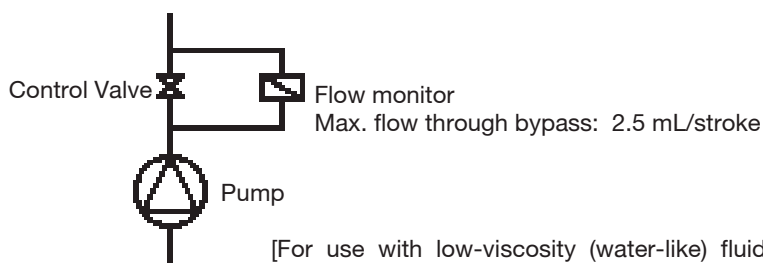
Flow Control type I PP, EPDM, M20 x 1.5	792076
Flow Control type II PP, EPDM, M20 x 1.5	792077
Flow Control type III PP, EPDM, M20 x 1.5	792078
Flow Control type I PVC, EPDM, M20 x 1.5	7792073
Flow Control type II PVC, EPDM, M20 x 1.5	7792074
Flow Control type III PVC, EPDM, M20 x 1.5	7792075
Flow Control type I PVC, Viton®, M20 x 1.5	792073
Flow Control type II PVC, Viton®, M20 x 1.5	792074
Flow Control type III PVC, Viton®, M20 x 1.5	792075
Type I = g/L 1000, 1601, 1602, 1005 & 1605	
Type II = g/L 0708, 0413, 1008 & 0713	
Type III = g/L 0220, 0420 & 0232	

Note: On versions 0220, 0420 and 0232, monitor should be mounted on a bypass (as shown below), which will require adapters listed below.

Note: Must mount the flow monitor vertically on the pump.

Bypass Assemblies with Metering monitor for versions 0220/0420/0232:

PVC, Viton®, 1/2" FNPT inlet and discharge	7358655
PP, EPDM (PVDF bypass), 1/2" FNPT inlet and discharge	7740709
PVC, EPDM (PVDF bypass), 1/2" FNPT inlet and discharge	7358657



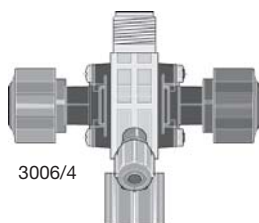
[For use with low-viscosity (water-like) fluids only].

Adapter set to connect metering monitor for SS version pumps

Adapter with seals, for use with SS2 liquid ends: 1/4" MNPT x Male M20 x 1.5 adapter, PVDF	7358651
Adapter with seals, for use with SS2 liquid ends: 3/8" MNPT x Male M20 x 1.5 adapter, PVDF	7358659

Pump & Systems Accessories

Multifunction Valve



3006/4

ProMinent's multifunction valve is operated by means of smooth-action rotary knobs which automatically return to their initial position when released. Made of PVDF, it can be used in feed systems for virtually all chemicals. The multifunction valve is mounted directly on the liquid end of the pump for backpressure, antisiphon, pressure relief, priming, and draining the discharge line. The inlet thread is female M20 x 1.5 and the discharge is male M20 x 1.5.

ProMinent's multifunction valve has the following functions:

- Backpressure valve, opening pressure approximately 22 psi
- Relief valve, opening pressure approximately 87, 145 or 232 psi
- Admission aid in existing backpressure, no need to de-pressurize pipes
- Pressure relief, e.g. prior to servicing

Warning: Backpressure valves are not intended as completely sealed units!

Materials in contact with chemicals:

Valve body	PVDF
Diaphragm	PTFE-coated
O-rings	Viton® or EPDM
DN 10 adapter	PVC

Technical data:

Type	Relief opening pressure	Part No.
Size I	232 psi	792011
Size I	145 psi	791715
Size I	87 psi	740427
Size II	145 psi	792203
Size II	87 psi	740427
Size III (DN 10)	145 psi	792215

Note: Multifunction valves mounted to stainless steel liquid ends require below adapters. **Cannot adjust pressure; fixed factory setting.*

Selection - Sizes For Pump Types

Size I	Beta®, type 1000, 1601, 1602, 1604, 1605, 1005, 1008, 0708, 0413, 0220 gamma/ X type 1602, 1604, 1009, 0708, 0414, 0220 gamma/ XL type 1608, 1612
Size II	Beta®, type 1605, 1008, 0713, 0420, 0232 gamma/ X type 1009, 0715, 0424, 0245 gamma/XL type 1020, 0730
Size III	gamma/ XL type 0450, 0280

Connector Set for SS version pumps

Adapter with o-rings, for use with SS2 liquid ends: 1/4" MNPT x Male M20 x 1.5 adapter, PVDF	7358651
Adapter with o-rings, for use with SS2 liquid ends: 3/8" MNPT x Male M20 x 1.5 adapter, PVDF	7358659

Accessories:

O-Rings for top of Multi-Function Valves:	
EPDM O-Ring	1001264
Viton® O-Ring	791639

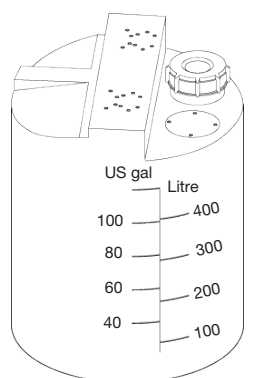
* Viton® is a registered trademark of DuPont Dow Elastomers

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Pump & Systems Accessories

Tanks

Chemical tanks



15, 26, 70, 132 gallon capacity

Made of translucent UV-stabilized polyethylene, with gallon/litre scale, screw cap. Mounting platforms for ProMinent metering pumps and mixers. All tanks are Specifically developed to maximize toughness. These tanks are impact, stress, and chemical resistant. Maximum allowable temperature 40°C.

Tank opening (screw cap) diameter for 15 - 132 gal.: 6.5".

Tank opening (screw cap) diameter for 220 and 300 gal.: 5-1/4".

Capacity		O.D.		Height		Empty Weight		Part No.
gallon (litre)		in.	(mm)	in.	(mm)	lb.	(kg)	
15	(60)	18	(445)	22	(559)	11	(5.0)	791994
26	(100)	20	(500)	30	(760)	17	(7.7)	1001490
70	(250)	26	(661)	42.5	(11079.5)	37	(17)	1023175
132	(500)	32	(820)	47	(1190)	54	(24.5)	791997
300	(1100)	43	(1092)	59	(1499)	70	(31.7)	7809687

Note: pump mounting kit needed for all tanks (part no. 7500124)

Accessories for Tanks:

Lock and key for screw-on cap	200683
Lid for ProMinent tanks: 60, 100 & 250:	
(lid)	740709
(Gasket for lid) (EPDM)	792890

PVC tank drain fitting with plug

1/2" FNPT as an additional connection for chemical tanks. To be used as an open drain with plug or for addition of optional 1/2" ball valve fitting. Fits 1 3/8" opening.

	Part No.
PVC with Viton® seal	7745806
PVC with EPDM seal	7741398

3/4" FNPT as an additional connection for chemical tanks. To be used as an open drain with plug or for addition of optional 3/4" ball valve fitting. Fits 1-3/8" opening.

Socket x Thread - PVC with Viton® seal	7745802
Socket x Thread - PVC with EPDM seal	7741477
Thread x Thread - PVC with Viton® seal	7745807
Thread x Thread - PVC with EPDM seal	7745797

PVC ball valve

1/2" PVC ball valve with 1/2" FNPT connections for all chemical tanks with 1/2" PVC tank drain fittings.

PVC with Viton® seal	7152161
PVC with EPDM seal	7901183

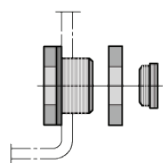
3/4" PVC ball valve with 3/4" FNPT connections for all chemical tanks with 3/4" PVC tank drain fittings.

PVC with Viton® seal	7152164
PVC with EPDM seal	7152163

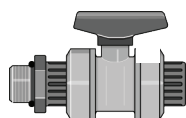
PVC Nipples

MNPT x MNPT Nipples to connect tank bulkhead fitting to ball valve.

1/2" x 6" Long Nipple, PVC, Sch. 80	7260007
3/4" x 6" Long Nipple, PVC, Sch. 80	7741508



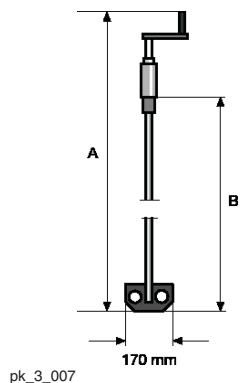
1077/4



2424/4

Pump & Systems Accessories

Mixers

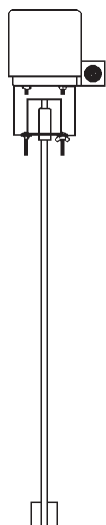


PP Hand mixers

With crank, completely assembled

	A mm	B mm	Part No.
For tank 60 L	670	465	914701
For tank 100 L	855	650	914738
For tank 140 L	965	765	914702
For tank 250 and 500 L	1,175	965	914703
For tank 1000 L	1,240	1,040	714705

Fig. 1



Canada Mixers

High speed mixer for water-like fluids in 15, 26 or 66 gallon tanks (Fig. 1) :

Motor: 1/20 HP

Mount: includes mounting bracket

Shaft: 316 SS shaft and propeller

7356679

High speed mixer for water-like fluids in 132 to 300 gallon tanks (Fig. 2) :

Motor: 1/4 HP

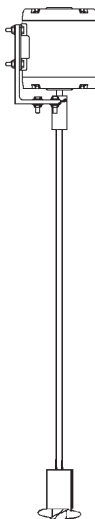
Mount: includes PVC mounting flange

Shaft: 316 SS shaft and propeller

7818565

Note: Both mixers for Canada only.

Fig. 2



Pump & Systems Accessories

Float Switches

Float switches, two stage Float switch, two-stage: for control version pumps
(includes ceramic weight - do not use ceramic weight for fluoride service)

To monitor the fluid level in the chemical tank. Two-stage function, first stage is early warning annunciation, second stage will shut down pump after an additional drop in the fluid level of approximately 30 mm.

With 3-pole round connector, suitable for direct connection to ProMinent gamma series.

Technical data:

Max. contact load 60 V, 0.3 A, 5 W/5 VA, temperature range -25°C to 75°C.

Materials:

PP body, foamed PP float 21 mm dia., PE cable

PP with 3-pole round connector	cable length	2 m	7142093
		5 m	7142095

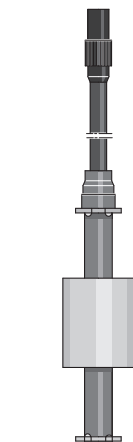
PVC body, foamed PP float 21 mm dia., PE cable

PVC with 3-pole round connector	cable length	2 m	7142043
		5 m	7142038

PVDF body, foamed PVDF float 25 mm dia., PE cable

PVDF with 3-pole round connector	cable length	2 m	7792639
		5 m	7792640

Part No.

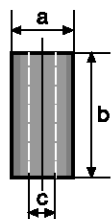


2380/4

Ceramic weight & bracket for 2 stage float switch

Ceramic weight and bracket for two-stage float switches with round connector. The float / retaining clips need to be removed before assembly to the float switch then reinstalled.

1019244



a = 25 mm b = 50 mm C = 10 mm

Note: Not for use in fluoride application (e.g. hydrofluosilicic acid).

Pump & Systems Accessories

Float Switches

Float switches, single stage Float switch, single-stage: for Concept^{PLUS}
(includes ceramic weight – do not use ceramic weight for fluoride service)



2820/4

For minimum level indication with simultaneous shutdown of the metering pump.

Technical data:

Max. contact load 60 V, 0.3 A, 5 W/5 VA, temperature range -13°F to 167°F (-25°C to 75°C).

Materials:

PVDF body, PVDF float 1" (25 mm) dia., PE cable

PVDF with flat connector

cable length 6 ft. (2 m)
15 ft. (5 m)

Part No.

1034695
1034696

Requires Control Option A to be installed on pump. Shown a second-to-last option on pump model number (e.g. DA1).

Can be simply retrofitted on site by installing part number: 1022099.

Float switch weights



1086/4

Ceramic weight

1.53" dia. x 1.26" with oval opening .51" x 1.06"
(39 mm x 32 mm) (13 mm x 27 mm)

404003

Note: Not for use in fluoride applications (e.g. hydrofluosilicic acid), use PVC weight.

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Pump & Systems Accessories

Float Switches

Float switches, two stage for Control version pumps

Float switch, two-stage (includes ceramic weight - do not use ceramic weight for fluoride service)

To monitor the fluid level in the chemical tank. Two-stage function, first stage is early warning annunciation, second stage will shut down pump after an additional drop in the fluid level of approximately 30 mm.

With 3-pole round connector, suitable for direct connection to ProMinent Vario series.

Technical data:

Max. contact load 60 V, 0.3 A, 5 W/5 VA, temperature range -25°C to 75°C.

Materials:

PP body, foamed PP float 7/8" (21 mm) dia., PE cable

PP with 3-pole round connector

cable length 6 ft. (2 m)
15 ft. (5 m)

Part No.

7142093
7142095

PVC body, foamed PP float 7/8" (21 mm) dia., PE cable

PVC with 3-pole round connector

cable length 6 ft. (2 m)
15 ft. (5 m)

7142043
7142038

PVDF body, foamed PVDF float 1" (25 mm) dia., PE cable

PVDF with 3-pole round connector

cable length 6 ft. (2 m)
15 ft. (5 m)

7142006
7142007



2380/4

Float switches, single stage for Makro and Sigma basic pumps

Float switch, single-stage (includes ceramic weight - do not use ceramic weight for fluoride service)

For minimum level indication in source tank. May be used to stop pump at motor starter or variable speed drive, or trigger alarm. May be used with relay combination.

Technical Data:

Max. contact load 60 V, 0.3 A, 5 W/5 VA, temperature range -25°C to 75°C.

Materials:

PP body, foamed PP float 7/8" (21 mm) dia., PE cable

PP with 2 loose cable ends

cable length 15 ft. (5 m)

Part No.

790412

PVC body, foamed PP float 7/8" (21 mm) dia., PE cable

PVC with flat connector

cable length 15 ft. (5 m)

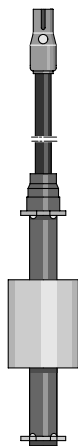
790468

PVDF body, PVDF float 1" (25 mm) dia., PE cable

PVDF with flat connector

cable length 15 ft. (5 m)

790472



2820/4

Float switch weights

PVC weight

For bottom of foot valve for fluoride applications.

7404007

For fluoride, (hydrofluosilicic acid) or when plastic is required to replace standard ceramic weight.

Pump & Systems Accessories

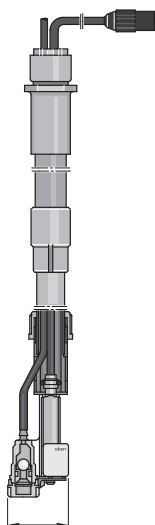
Suction Assemblies

Suction assemblies, two-stage: for beta, gamma/ L and delta pumps

Including foot valve, rigid supporting pipe, suction line and float switch with 6 ft. (2 m) cable. For use in drums or tanks with mixers, which could tangle flexible suction tubing or float switch cables.

two-stage: with 3-pole *round connector*, for early warning and eventual pump shut-down for gamma.

PP version: EPDM o-rings, PE suction line



Adjustable PP suction assembly, with bulkhead fitting for 1" opening and 2-stage float switch

For ProMinent pumps with PP foot valve, PE suction hose, PP supporting pipe and union. PP two-stage float switch with 3-pole round connector

Adjustable length (foot valve to bulkhead)

26" to 41" (660 mm to 1040 mm) for 26 - 220 gallon (140 - 830 L) tanks

Requires 1.0" hole in top of tank for bulkhead fitting

PP version

Suction line

1/4" x 3/16"

1/2" x 3/8"

Part No.

790368

790370

2798/R

PVC version

Suction Assembly

1/2" x 3/8"

1/4" x 3/16"

Part No.

790364

790362

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Suction Assemblies

Suction assemblies, single-stage: for Concept^{PLUS}

Including foot valve, rigid supporting pipe, suction line and float switch with 6 ft. (2 m) cable. For use in drums or tanks with mixers, which could tangle flexible suction tubing or float switch cables.

PP version: PP float switch, PE suction line

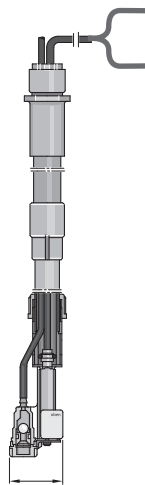
PVC version: PVC float switch, PE suction line

Adjustable PP suction assembly, with bulkhead fitting for 1" opening and single-stage float switch for tanks

With PP foot valve, PE suction hose, PP supporting pipe and union.

Size II 26" to 41" (660 mm to 1040 mm) for 26 - 220 gal. (140 - 830 L) tank

Requires 1.0" hole in top of tank for bulkhead fitting



2798/F

PP version

Part No.

Suction line

1/4" x 3/16"

790356

1/2" x 3/8"

790358

PVC version

Part No.

Suction line

1/4" x 3/16"

790350

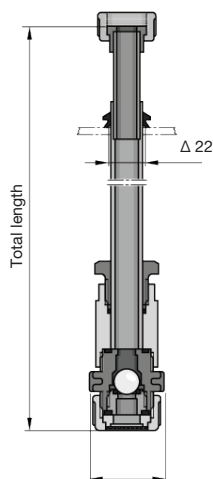
1/2" x 3/8"

790352

Pump & Systems Accessories

Suction Assemblies

Suction assemblies: for Sigma Basic and Makro pumps



Note: This fitting is a compression fitting, pipe can be cut to desired length.

2801/3

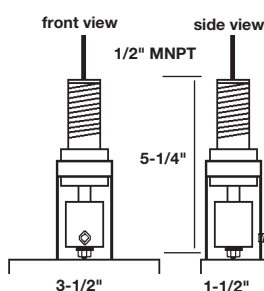
PP without float switch

Size of connection		Max. tank size gallons (litres)	Max. length inches (mm)	Part No.
PP-DN 10 - 1/2"	Sigma	220 (830)	up to 52" (1320)	790389
PP-DN 15 - 3/4"	Sigma	220 (830)	up to 52" (1320)	790394
PP-DN 20 - 3/4"	Makro	220 (830)	up to 52" (1320)	790395
PP-DN 25 - 1"	Sigma/Makro	220 (830)	up to 52" (1320)	790396
PP-DN 32 - 1-1/2"	Sigma	-	-	1005524

PVC without float switch

Size of connection		Max. tank size gallons (litres)	Max. length inches (mm)	Part No.
PVC-DN 10 - 1/2"	Sigma	220 (830)	up to 52" (1320)	790387
PVC-DN 15 - 3/4"	Sigma	220 (830)	up to 52" (1320)	790391
PVC-DN 20 - 3/4"	Makro	220 (830)	up to 52" (1320)	790392
PVC-DN 25 - 1"	Sigma/Makro	220 (830)	up to 52" (1320)	790393
PVC-DN 32 - 1-1/2"	Sigma	-	-	1005525

Diaphragm-failure Detector



Diaphragm-failure detector

To trip an alarm and/or switch the metering pump off in case of diaphrag failure. In a failure, fluid drains out a weep hole in the backplate, through a tube to the detector column. The float switch in the column trips with 10 mL of fluid. Comprising of a float switch PVC/PE, clear PVC column, tube connectors and connecting tube. Switch closure, max. contact rating 60 VAC, 300 mA, 5 W.

1/2" MNPT conduit connection. Shipped with loose ends on cable.

N/O
N/C

Part No.
7803640
7803650



Signal horn

115 V, 60 Hz, 95 dB, NEMA 4X (e.g. in conjunction with fault annunciating relay or relay combination)

7705004



Amber signal strobe light

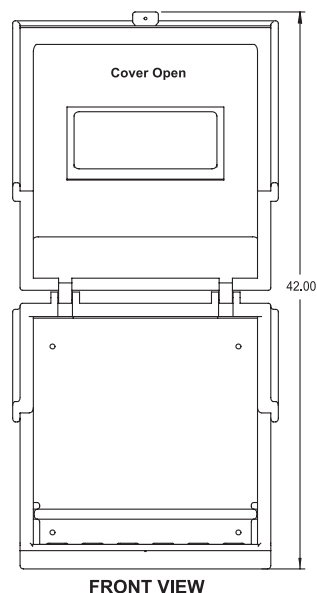
115 V, 60 Hz, NEMA 4X (e.g. for use in conjunction with fault annunciating relay or relay combination)

7914785

Pump & Systems Accessories

Pump Shelves and Stands

Pump Shelf with Containment



Safely contains up to 2 ProMinent® pumps and adds spill containment protection. Can be purchased with or without protective cover. Pump tubing can be run through holes on either side of shelf base. Cover includes viewing window. Cannot be used for hard piped applications.

Materials of Construction: Polyethylene

Description

Part Numbers

Shipping weight (w/o pumps): 15 lbs.

Shelf w/cover

7500374

Height: 19"

Width: 19"

Depth: 16.5"

Hinge: Plated Steel

Drain: 1/4" FNPT

System Metering Pump Shelves:

1 Pump ProSIP-S 7905135

2 Pump ProSIP-S 7904337

1 Pump ProSIP-M Sigma Riser (6.5" High) 1028759

1 Pump ProSIP-M Sigma Riser (10" High) 1028760

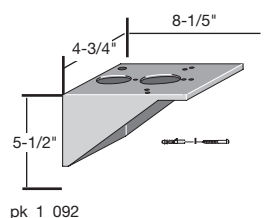
Polymer System Metering Pump Shelves:

ProMix-S Polymer Pump Shelf 7746680

AODD Pump Shelves:

Duodos 10 Pump Shelf (single pump) 7903643

Duodos 15 Pump Shelf (single pump) 7903813



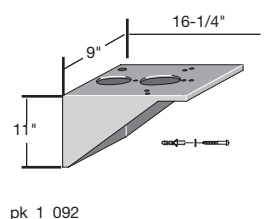
Wall mounting bracket for solenoid pumps

Part No.

Made of fiberglass-reinforced PPE, with wall-plugs and screws, accepting a concept, gamma and beta. Pumps can be mounted either parallel or perpendicular to the wall.

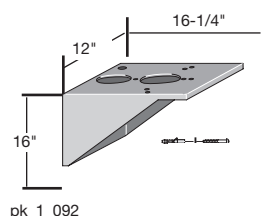
810164

*Gamma X pumps need to be installed at 90 degrees.



Wall mounting bracket for Gamma XL pump

1028798

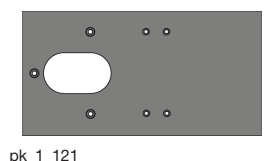


Wall mounting bracket for Sigma pumps

Polypro wall bracket mounts pumps so that diaphragm is parallel to the wall.

Sigma 3 7803799

Sigma 1 & 2 1028798



Adapter plate

With fixtures, for vertical wall-mounting of Concept, Beta or Gala pumps with auto-degassing liquid ends. Used with PPE wall console.

PP adapter plate

1003030

Pump & Systems Accessories

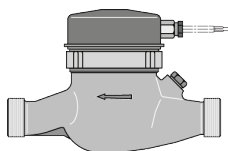
Water Meters

Pulse-type water meters, 3/4"...2" NPT fittings – Litre Scale

Maximum operating pressure: 145psi

Max. working temperature 40°C, max. contact load 100 mA, 24 V

Max. flow rate = Q_{max} , nominal flow rate = Q_n



1137/4

Min/Max Flow Rate (m³/h)	Connections in.	Overall length w/o unions mm	Standard K factor	Part No.
0.1 - 5	3/4"	190 mm (7.5")	1	1082278
0.24 - 12	1"	260 mm (10.2")	1	1082279
0.4 - 20	1-1/2"	300 mm (11.8")	1	1082557
0.6 - 30	2"	270 mm (10.6")	1	1082558

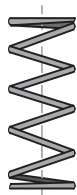
Note: Price includes connection set.

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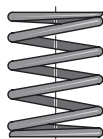
Valve Springs

Fig. 1



pk_1_103

Fig. 2



pk_1_104

You may spring-load the valve balls in the pump suction and/or discharge valves to improve the valve function and increase the repeatability. Particularly recommended when pumping viscous fluids of more than 50 cPs (mPa).

Discharge valve springs may be used instead of an external backpressure valve to improve repeatability when discharging to an open tank. Suction valve springs in excess of 1 psig (0.05 bar) make priming difficult; and in excess of 7 psig (0.5 bar) makes pumping impossible, except where suction pressure exceeds spring pressure.

Not recommended for antisiphon protection – use a diaphragm-type backpressure valve for antisiphon protection. There is no labour charge for installing the valve springs into the pump valves or injection valves, when purchased together and requested on the PO

1psi Springs Needed for Pump Valves

7 psi & Higher Springs Are Only For Injection Valves

Viscosity:

Solenoid Pumps: Springs should be used with Chemicals with a viscosity 200 - 500 cPs (HV pumps should be used for chemicals between 500 - 3,000 cPs)

Sigma Pumps: Springs should be used with Chemicals with a viscosity 200 - 3000 cPs

Pump & Systems Accessories

Valve Springs

Pump Models (suction & discharge valves)	Pressure Rating		Construction	Part #
	PSIG	BAR		
Solenoid Pumps:				
CNPb (1000, 1601, 0704 & 1002)	1	0.05	Stainless Steel	469406
	1	0.05	Hastelloy C	1004327
CNPb (0309 & 0215)	1	0.05	Stainless Steel	469403
Beta/ GMXa (1000, 1601, 1602, 1604, 2504) [fig. 1]	1	0.05	Stainless Steel	469406
Beta/ GMXa (0220, 0232, 0245, 0413, 0414, 0424, 0708, 0713, 0715, 1008, 1009) [fig. 2]	1	0.05	Stainless Steel	469403
	14	1	Hastelloy C	469413
	14	1	PVDF-coated Hast-C	818536
Delta Models (1608 & 2508)	1	0.05	Stainless Steel	469406
Delta Models (1612, 1020, 0730)	1	0.05	Stainless Steel	469403
Delta Models (0450 & 0280)	1	0.05	Hastelloy C	469114
Beta/ GMXa discharge valves for degassing pumps only NPB9/NPE9				
Beta/ GMXa (1601, 1602, 1604)	1	0.05	Hastelloy C	1004327
Beta/ GMXa (0220, 0413, 0414, 0420, 0424, 0708, 0713, 0715, 1008, 1009)	7	0.5	Hastelloy C	1004326

Motor Driven Pumps:				
Sigma DN 10 Valves (12017, 12035, 10050, 10022, 10044, 07065)	1	0.05	Hastelloy C	469114
Sigma DN 15 Valves (07042, 04084, 04120, 12050, 12090, 12130)	1	0.05	Hastelloy C	469107
Meta DN 20 Valves	1	0.05	Hastelloy C	469451
Sigma/Meta DN 25 Valves (07120, 07220, 04350, 120145, 120190, 120270)	1	0.05	Hastelloy C	469452
Sigma DN 32 Valves (070410, 070580, 040830)	1	0.05	Hastelloy C	1018512

Injection Valves:				
For all 1/2", 3/8" & 1/4" injections valves part #'s (924681, 924596, 924680, 924595, 1024708 & 1024714)	7	0.5	Hastelloy C	469404
	7	0.5	PVDF Coated Hastelloy C	818590
	29	2	Hastelloy C	469410
Sigma DN 10 Valves (12017, 12035, 10050, 10022, 10044, 07065)	7	0.5	Hastelloy C	469115
	7	0.5	PVDF Coated Hastelloy C	818515
	14	1	Hastelloy C	469119
Sigma DN 15 Valves (07042, 04084, 04120, 12050, 12090, 12130)	7	0.5	Hastelloy C	469108
	7	0.5	PVDF Coated Hastelloy C	818516
	14	1	Hastelloy C	469116
Sigma DN 20 Valves (Meta)	7	0.5	Hastelloy C	469409
	7	0.5	PVDF Coated Hastelloy C	818517
	14	1	Hastelloy C	469135
Sigma DN 25 Valves (07120, 07220, 04350, 120145, 120190, 120270)	7	0.5	Hastelloy C	469414
	7	0.5	PVDF Coated Hastelloy C	818518
	14	1	Hastelloy C	469136
Sigma DN 32 Valves (070410, 070580, 040830)	7	0.5	Hastelloy C	1002799
Makro DN 40 Valves	7	0.5	Hastelloy C	469104
	7	0.5	PVDF Coated Hastelloy C	818519
	14	1	Hastelloy C	469137

Pump & Systems Accessories

Motors - Canadian

CSA Approved Motors (AC)

Motors for use in Non-Hazardous Applications

ProMinent P/N	Horse Power	Volatage (VAC)	Phase	Hz	Service Factor (SF)	Frame	RPM	VFD Rated?	Turndown Ratio (CT)	Area Classification	Enclosure
7901317	1/3HP	115/208-230	1	60	1.15	56C	1800	No	N/A	Non-Hazardous	TEFC
7902404	1/3 HP	208-230/460	3	60	1.0 Inverter Duty	56C	1800	Yes	10-1 CT	Non-Hazardous	TEFC
7901323	1/3 HP	575	3	60	1.0 Inverter Duty	56C	1800	Yes	10-1 CT	Non-Hazardous	TEFC
7901318	1/2 HP	115/208-230	1	60	1.15	56C	1800	No	N/A	Non-Hazardous	TEFC
7901330	1/2 HP	208-230/460	3	60	1.0 Inverter Duty	56C	1800	Yes	10-1 CT	Non-Hazardous	TEFC
7901324	1/2 HP	575	3	60	1.0 Inverter Duty	56C	1800	Yes	10-1 CT	Non-Hazardous	TEFC
7901319	3/4 HP	115/208-230	1	60	1.15	56C	1800	No	N/A	Non-Hazardous	TEFC
7901331	3/4 HP	208-230/460	3	60	1.0 Inverter Duty	56C	1800	Yes	10-1 CT	Non-Hazardous	TEFC
7901325	3/4 HP	575	3	60	1.0 Inverter Duty	56C	1800	Yes	10-1 CT	Non-Hazardous	TEFC
7901320	1 HP	115/208-230	1	60	1.15	56C	1800	No	N/A	Non-Hazardous	TEFC
7901332	1 HP	208-230/460	3	60	1.0 Inverter Duty	56C	1800	Yes	10-1 CT	Non-Hazardous	TEFC
7901326	1 HP	575	3	60	1.0 Inverter Duty	56C	1800	Yes	10-1 CT	Non-Hazardous	TEFC
7901321	1.5 HP	115/280-230	1	60	1.15	56C	1800	No	N/A	Non-Hazardous	TEFC
7901333	1.5 HP	208-230/460	3	60	1.0 Inverter Duty	56C	3600	Yes	10-1CT	Non-Hazardous	TEFC
7901327	1.5 HP	575	3	60	1.0 Inverter Duty	56C	1800	Yes	10-1CT	Non-Hazardous	TEFC
7901334	3 HP	208-230/460	3	60	1.0 Inverter Duty	182TC	1800	Yes	20-1CT	Non-Hazardous	TEFC
7901328	3 HP	575	3	60	1.0 Inverter Duty	182TC	1800	Yes	20-1CT	Non-Hazardous	TEFC

Motors for use in Class 1, Group C & D Applications

ProMinent P/N	Horse Power	Volatage (VAC)	Phase	Hz	Service Factor (SF)	Frame	RPM	VFD Rated?	Turndown Ratio (CT)	Area Classification	Enclosure
7901335	1/3 HP	115/208-230	1	60	1.15 Continuous Duty	56C	1800	No	N/A	Class 1, Group C & D	TEFC
7901339	1/3 HP	208-230/460	3	60	1.15 Continuous Duty	56C	1800	No	N/A	Class 1, Group C & D	TEFC
7901340	1/3 HP	575	3	60	1.15 Continuous Duty	56C	1800	No	N/A	Class 1, Group C & D	TEFC
7901336	1/2 HP	115/208-230	1	60	1.15 Continuous Duty	56C	1800	No	N/A	Class 1, Group C & D	TEFC
7901341	1/2 HP	208-230/460	3	60	1.15 Continuous Duty	56C	1800	No	N/A	Class 1, Group C & D	TEFC
7901342	1/2 HP	575	3	60	1.15 Continuous Duty	56C	1800	No	N/A	Class 1, Group C & D	TEFC
7901337	3/4 HP	115/208-230	1	60	1.15 Continuous Duty	56C	1800	No	N/A	Class 1, Group C & D	TEFC
7901343	3/4 HP	208-230/460	3	60	1.15 Continuous Duty	56C	1800	No	N/A	Class 1, Group C & D	TEFC
7901344	3/4 HP	575	3	60	1.15 Continuous Duty	56C	1800	No	N/A	Class 1, Group C & D	TEFC
7901338	1 HP	115/208-230	1	60	1.15 Continuous Duty	56C	1800	No	N/A	Class 1, Group C & D	TEFC
7901345	1 HP	208-230/460	3	60	1.15 Continuous Duty	56C	1800	No	N/A	Class 1, Group C & D	TEFC
7901346	1 HP	575	3	60	1.15 Continuous Duty	56C	1800	No	N/A	Class 1, Group C & D	TEFC
7901347	1.5 HP	208-230/460	3	60	1.0 Inverter Duty	145TC	1800	Yes	20-1 CT	Class 1, Group C & D	TEFC
7901348	1.5HP	575	3	60	1.0 Inverter Duty	145TC	1800	Yes	20-1 CT	Class 1, Group C & D	TEFC

Miscellaneous

Motor Flange Adapter: 182/184 to 56C (used for mounting non-fractional motors onto a 56C frame pump)

Half Coupling for 5/8" Shaft

Half Coupling for 7/8" Shaft

7951144

7500017

7500019

Pump & Systems Accessories

Variable Speed Drives - Canadian

Variable Speed Drives (VFD) for AC Motors

Provides variable motor speed with three phase AC Motors by adjusting the frequency (Hz) output to the motor. The motor is not included with the inverter. Not suitable for use in a classified area. Push button keypad and display for Hertz, RPM, % Frequency.

The following Variable Frequency Drives (VFD's) offers the following standard features:

- Power Supply: as noted +10%, -15%, 50/60 Hz +/- 2 Hz
- 150 % current overload capacity for 60 seconds
- Operator Interface: Built-in detachable LED keypad
- VFD sized for Constant Torque Application;
- VFD has a NEMA 4X enclosure
- Indoors application

For more technical details, please refer to the operating instructions.

All Inverter AC output voltage is 3 phase

Motor sizes (Hp)	Supply voltage	Part no.
0.33, 0.5, 0.75, 1, 1.5	230 V/ 60 Hz/ 3 phase	1051539
3	230 V/ 60 Hz/ 3 phase	1051540
0.33, 0.5, 0.75, 1	460 V/ 60 Hz/ 3 phase	1051541
1.5	460 V/ 60 Hz/ 3 phase	7501086
3	460 V/ 60 Hz/ 3 phase	7501199
0.33, 0.5, 0.75, 1	575 V/ 60 Hz/ 3 phase	1051542
1.5	575 V/ 60 Hz/ 3 phase	1051543
3	575 V/ 60 Hz/ 3 phase	1051574

Economy KB Penta AC Drive (CSA Approved))

This lower cost AC inverter can control motor speed on AC motors up to 1 HP. It has a selectable 115 VAC or 230 VAC input and generates a 230 VAC 3 phase 3.6 A output. Features include switch selectable manual / auto operation, Manual speed control via local potentiometer and Auto speed control via a 4 – 20 mA input. Motor is not included with the drive, select the motor from the AC Inverter Duty Rated Motor list.

Dimensions (mm) 241 x 140 x 148 (H x W x D)

Economy KB Penta AC Drive

7902410

product
overviewsolenoid-driven
metering pumpsmotor-driven
metering pumpspump spare parts &
accessoriesDULCOMETER®
instrumentationDULCOTEST®
sensorsstandard & custom
systems

Pump & Systems Accessories

DC Motors

DC Motors (CSA Approved)

DC motors

Permanent magnet 1750 RPM.

<u>Horsepower</u>	<u>Enclosure</u>	<u>Frame</u>	<u>AC Voltage</u>	<u>Part no.</u>
1/3 HP	TEFC	0 – 90 VDC	56 C	7902413
1/2 HP	TEFC	0 – 90 VDC	56 C	7902412
3/4 HP	TEFC	0 – 90 VDC	56 C	7356703
1-1/2 HP	TEFC	0 – 180 VDC	56 C	7902411

The SCR control does not come with a motor. Select the required DC motor from the DC motor list.

The KB Penta DC Drive is used to control the DC voltage to DC motors. This controls the speed of the motor. The DC voltage is variable from 0 – 90 VDC or 0 – 180 VDC which represents 0 to approximately 1750 RPM motor speed. Features of this drive include: Manual –OFF – Auto selector switch; Speed pot for manual motor speed control; Auto motor speed control via an isolated 4 – 20 mA input. Single phase line input voltage is selectable as 120 VAC (for 0 – 1 HP motors 0 – 90 VDC) or 230 VAC (for 0 – 2 HP motors 0 – 180 VDC).

For motors 0 – 1 HP, 120 VAC in 0 – 90 VDC out

For motors 0 – 2 HP, 230 VAC in 0 – 180 VDC out

KB Penta DC Drive SCR Controller

7356704

Pump & Systems Accessories

Stroke-positioning Motors (Servo Motor)

Stroke positioning motors must be field wired to remove power when the pump drive motor is stopped. For automatic stroke-length control with positioning motor, controlled by a standard process signal.

With standard process signal input 4-20 mA, corresponding to 0-100% stroke length.

Power supply: 115 V or 230 V, 60 Hz, 1 phase.

Manual/automatic mode selector switch.

Spring-return switch for manual stroke-length adjustment.

Mechanical stroke-length indicator.

Positioning time about 1 second per 1% stroke length

Stroke-positioning control system 4-20 mA

	110 V	230 V
Sigma 1	7781491	-
Sigma/2 HM (5 mm)	1018894	1018893
Sigma/3	1006504	1006505
Sigma/2 HK	1018890	1018889
Makro	1020798	-
ProMus (Nema 7) — Class 1, Division II	852752	852752

PLEASE NOTE:

Not recommended for control version Sigma pumps.

The servo motor could become damaged if you're running the pump at lower frequencies and trying to turn the stroke length via servo. The scenario creates too much resistance on the servo motor.

This isn't a problem with basic version metering pumps* as there always running at maximum stroke frequency, which makes it easy to turn the stroke length.

* If using a Variable Frequency Drive (VFD) then it's not recommended to install a servo motor for the same reasons as listed above.

Pump & Systems Accessories

Valve Balls

Valve Balls

	Material	Dimensions in. (mm)		Part No.
For use with 4.8 mm valve	PTFE	1/4"	(4.8)	7404205
	SS	1/4"	(4.8)	7404233
	Ceramic	1/4"	(4.8)	404201
For use with 9.5 mm valve only	PTFE	1/2"	(9.5)	7404206
	SS	1/2"	(9.5)	7404240
For use with 9.2 mm (standard) valve	Ceramic	1/2"	(9.2)	404281

Special valve balls

For metering pumps and accessories if standard materials are unsuitable.

No.



11.1 mm dia. for DN 10 (Vario/ Sigma)

Part

PTFE (1/2" MNPT connection)

7404207

Ceramic (1/2" MNPT connection)

404277

SS (3/8" FNPT connection)

404243



16 mm dia. for DN 15 (Vario/ Sigma)

PTFE (3/4" MNPT connection)

7404208

Ceramic (3/4" MNPT connection)

404275

SS (1/2" FNPT connection)

404244

pk_1_102

20 mm dia. for valve dia. 3/4" DN 20 (Meta, Makro)

PTFE

404256

Ceramic

404273

SS

404246

25 mm dia. for valve dia. 1" DN 25 (Sigma, Meta, Makro)

PTFE

404257

Ceramic

404274

SS

404247

38.1 mm dia. for valve dia. 1-1/2" DN 40 (Makro)

PTFE

404261

Ceramic

404278

SS

7404260

Pump & Systems Accessories

Deaeration Valve Assembly

Introduction

Some chemicals "off-gas" (ie. decompose) when the pump is sitting idle; the gas accumulates and may cause the pump to lose prime. ProMinent's deaeration valve assembly can help evacuate gases accumulated in the liquid end of the pump automatically even against system backpressure.

The deaeration valve assembly operates by allowing any accumulated gases to exit, through the bleed valve. A small amount of liquid along with the expelled gases are channeled through the bleed valve and bypassed back to the supply tank. When gas is present in the deaeration valve the resistance to flow through the bleed valve is relatively low. When the deaeration valve becomes full of liquid the resistance to flow through the deaeration valve increases dramatically, forcing the majority of the liquid to pass through the main discharge line.

Installation

A. General

Must be used in suction lift applications only

Install the pump in accordance with the instructions contained in the pump operating manual. The deaeration valve assembly must be installed directly on the outlet side of the discharge check valve.

B. Routing of Bypass Line

The bypass line should be routed back to the top of the chemical storage tank. Install the pump so the bypass line is not submerged in the chemical. It is not recommended to pipe into the calibration columns because they will overflow after a short period.

Warning: install the bypass line so any bypassed air/gas is not rerouted into the suction line.

C. Calibration

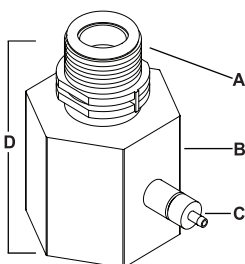
In calibrating the pump, use a graduated cylinder as the fluid source. You must collect any fluid returned through the bypass during the calibration and subtract it from the quantity drawn into the suction line.

Maintenance

- Ensure the pump connections are correct and tight
- Maintain a clean liquid end with no buildup of chemical crystalline material. Especially check the bleed valve and discharge ball checks.

Replacing the bleeder valve O-ring:

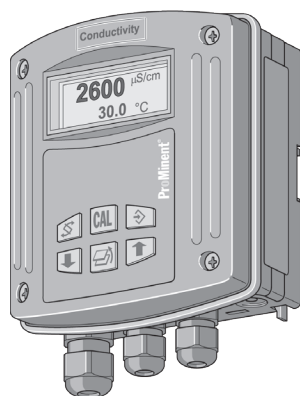
- Unscrew the bleeder valve and carefully remove the O-ring with a small screwdriver
- Fit a new O-ring into the valve port and screw in the bleeder valve and tighten to 2.2-2.6 ft. lb. torque



Size	Valve MNPT/ PVT (A)	Deaeration Valve/CPVC (B)	Air Relief Valve (C)	Deaeration Valve Complete (D)
DN 10	1002267	7740147	914596	7744259
DN 15	792517	7744695	914596	7744260
DN 20	792518	7744248	914596	7744249
DN 25	740615	7744986	914596	7744987
DN 32	1020031	7745133	914596	7745134

Analytical Instrumentation Overview

DMT



Single process variable transmitter

[\(see page 200 for complete details\)](#)

- Measures pH, ORP, chlorine, conductivity and temperature
- Menu driven calibration
- Automatic buffer recognition (pH)
- Two-wire technology
- 12-40 VDC, loop powered
- One current analog signal output
- IP65 wall mounted unit

Dulcometer Compact



Microprocessor based single process variable analyzer

[\(see page 202 for complete details\)](#)

- Measured variables pH and ORP (can be changed on the controller) [CI coming soon]
- Operation independent of the operating language (use of abbreviations, such as CAL, PARAM, CONFIG, ERROR)
- Illuminated display
- 3 LED display operating state (relay 1 / 2 active, Error)
- Sensor monitoring for pH
- P and PID control characteristics
- Selectable control direction (raise or lower measured value)
- Pulse frequency relay for control of metering pump
- Power relay can be configured as an alarm, limit value or pulse width modulated control output for metering pumps (connection function or switch on operating voltage)
- Analog output 4-20 mA can be configured as a writer output or control output
- Digital input to switch off the control or to process a sample water limit contact by remote control
- Temperature sensor input (Pt 1000) for temperature compensation of the pH and chlorine value

Dulcometer Dialog DACb



Multi-parameter measurement and control device

[\(see page 204 for complete details\)](#)

- Basic controller has 2 channels
- Optional third measuring channel via mV and mA inputs
- Free combination of 15 selectable measured variables
- Two 2-way PID controllers with 4 metering pump outputs
- Temperature compensation of measured variables pH, conductivity, Chlorine Dioxide and Fluoride
- Control variables monitored by time to avoid incorrect metering
- Data logger for measured values, control variables, calibration data and events

Analytical Instrumentation Overview

DDC



Microprocessor based multi-variable disinfection analyzer

[\(see page 207 for complete details\)](#)

- Controls or measures up to 5 different variables
Free chlorine, Total chlorine, pH, ORP, temperature
- Display of combined chlorine
- Menu driven calibration with limit and control settings
- Integrated videographic recorder
- LAN interface
- OPC server
- 64MB SD card
- CAN bus chlorine sensors
- Intelligent analyzer with dosing time restrictions
- 5 contact inputs

Cooling Tower and Boiler Controllers



Wide range of controllers for water treatment applications

[\(see page 228 for complete details\)](#)

- Controls pH, ORP and Conductivity
- NEMA 4X enclosure
- Web Browser accessible
- Trackster 3 software
- Analog inputs and outputs
- Relay output and digital input options
- MODBUS option
- Ethernet
- Control multiple Towers and Boilers
- Flow switch
- CSA, CE

ProMinent® Dulcometer® Controllers

Overview: Dulcometer® Controllers

An Introduction to Process Measurement and Control

Process control in water treatment involves measurement of a variable related to water quality, combined with automation of chemical feed equipment or other physical/chemical processes to keep the measured value as close as possible to the desired setpoint or between high and low control limits.

ProMinent's approach combines the functions of an analyzer and a controller into one instrument, dedicated to a specific water quality parameter to simplify calibration and operation.

Each ProMinent DULCOTEST® sensor measures a specific water quality parameter and sends an electronic signal back to a DULCOMETER® controller. The operator calibrates that sensor to a known standard. It then displays any changes that are measured in that parameter within the sensor's range.

Measured Value Outputs

Up to three outputs are available. DULCOMETER® controllers offer the ability to continuously record measured values to document water quality or to send to another control device. Analog 4-20 mA or 0-20 mA measured value outputs are proportional to the measuring range of the sensor or spannable to provide greater detail within a smaller range, for connection to a chart recorder, datalogger or distributed control system [

Control Outputs

Different control outputs are available to control virtually any type of actuating device.

Setpoint relays change state (open or close contact) when the measured value drops below or exceeds the setpoint to start a process control device or alarm, and shut it off when the setpoint is reached.

Analog control outputs (4-20 or 0-20 mA) can drive a variable speed

analog control device, such as a DC SCR drive or AC inverter, according to the control action used.

Pulse outputs are brief contact closures to pace pulse-input metering pumps corresponding to the control action used).

Modulating relay outputs cause a relay to open and close according to the control action used.

These are used with solenoid valves or constant-speed motor-driven metering pumps. Minimum on-times may be set to prevent overheating of motors.

3P relays provide two relay outputs to control a bi-directional actuator (such as a stroke length controller on a metering pump) with provision for feedback potentiometer from the actuator to display the position according to the control action used.

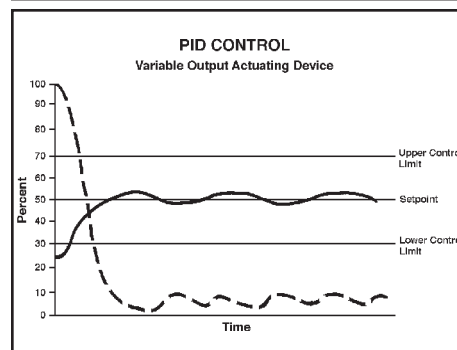
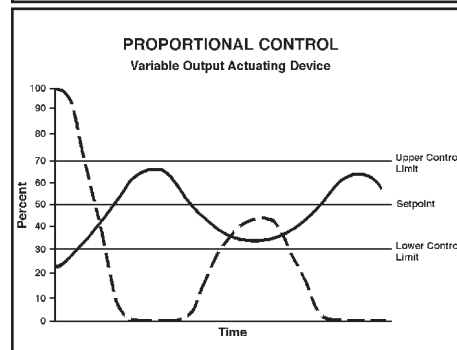
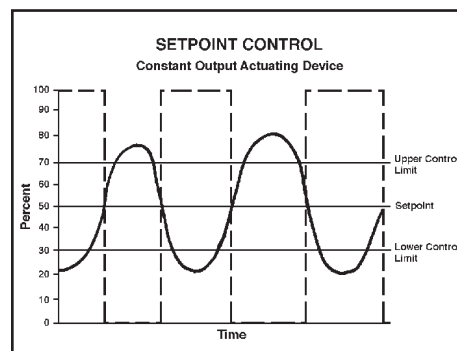
Control Actions

A variety of control actions are available to suit the application and budget. Any variable control output listed above may be used with any of the control actions listed below.

CONTROL ACTION RESPONSE IN ONCE-THROUGH SYSTEMS

Note: Actuating device output increases measured value in example (e.g. chlorine feed)

— Measured value (as percent of measurement range)
- - - Actuating device output (as percent)



Setpoint Control

Setpoint control uses a setpoint relay to start a constant output pump or open a solenoid valve when the measured value drops below (or exceeds) the setpoint. Once the measured value reaches setpoint again, the pump stops or the valve closes. This always results in overshooting the setpoint because of the lag time between the point of chemical addition and the point of measurement. This can waste chemicals and cause excessive variation on either side of the setpoint. It is suited only for closed systems or batch applications where tight control is not required.

ProMinent® Dulcometer® Controllers

Overview: Dulcometer® Controllers

Proportional Control

Proportional control gives an output that is directly proportional to the measured value's deviation from the setpoint. The farther from setpoint, the greater the output of the actuating device, and the closer to setpoint, the lesser the output. Proportional control is suitable for closed systems or batch applications where more precise control is required. The proportional bandwidth may be spanned to set the distance from setpoint at which the actuating device is operating at maximum output. A small bandwidth results in maximum output at a measured value close to setpoint, and may cause overshooting. A large bandwidth may result in long time periods required until the setpoint is reached.

PID Control

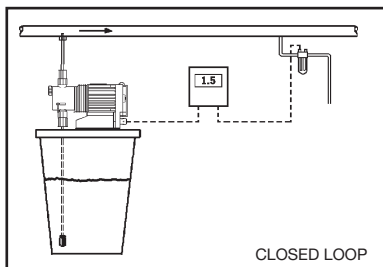
PID control combines proportional, integral and derivative control actions, or any combination thereof.

Integral control considers the time interval of deviation and increases output when the deviation exceeds a programmed time interval. Derivative control considers the rate of change of deviation and increases the output when the rate of deviation exceeds a programmed rate. PID control ensures the least deviation from setpoint possible).

Control Techniques

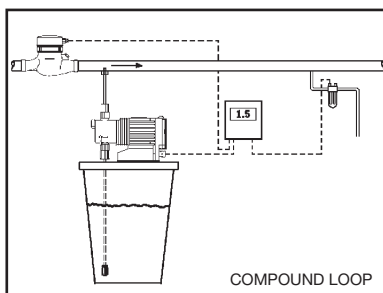
The control technique used depends on the location of the sensor in relation to the actuating device, the presence of other inputs which may effect the measured value, or the requirement for secondary actuating devices to handle large swings. Some common control techniques are described below.

Closed loop control is where the sensor is located downstream of the actuating device and measures changes caused by the device. The controller varies the device's output to maintain the desired setpoint. This is usually used in recirculating or batch applications, or once-through systems with con-



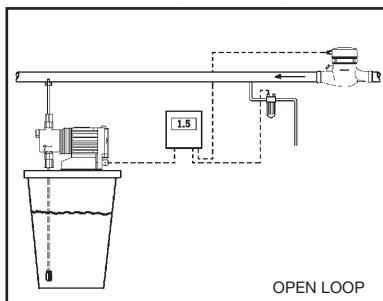
stant flow rate. The sensor must be located far enough downstream to ensure that any physical/chemical changes are complete, whether measuring pH, oxidant residuals or other variables.

Compound loop control combines the closed loop signal from the sensor with a second (disturbance)



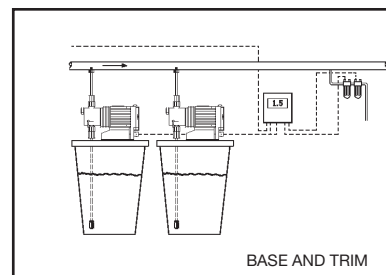
input, normally water flow rate, and changes the actuating device's output in response to both variables. This is typically used in once-through applications with varying flow rates.

With open loop control, the sensor is upstream of the actuating device and a control signal changes the



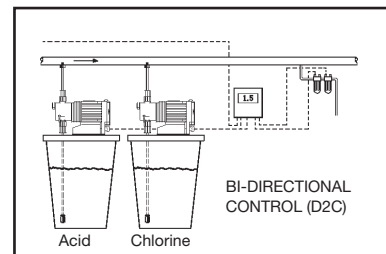
actuating device's output. Usually, this is only used when the resulting measured value would be outside of the sensor's measuring range.

Base and trim control uses two actuating devices to bring large fluctuations into control very quickly, yet provide tight control under normal operation. A variable output actuating device is normally used with proportional or PID control for the trim or fine tuning. A constant output device would be started by a setpoint relay for the base load



to make fast changes in the event of large fluctuations that the trim device cannot handle.

Bi-directional control of two opposing actuating devices, such as pumps for acid and base in a pH control application, is possible with one controller. To prevent repeated corrections caused by overshooting on both sides, a dead-band may be programmed (between two setpoints) in which both actuating devices are stopped.



PROPORTIONAL CONTROL ONLY (BATCH LINE)

ProMinent® DMT Transmitters

Overview: DMT

DULCOMETER® DMT type transmitters are compact 2-wire transmitters for measured variables pH, redox, chlorine, conductive conductivity, temperature.

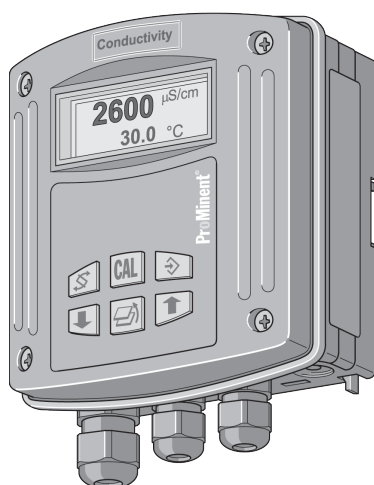
Easily combined with programmable memory controllers.

Summary of advantages:

- Reliable measurement
- High level of operating safety, e.g. probe monitoring (pH), electrical isolation
- Simple flexible installation
- Full text user guidance
- Automatic buffer recognition (pH)
- Autoranging (conductivity)
- Compact design
- Switch between pH, redox and temperature

Applications: process control, food and beverage industry, chemical and pharmaceutical industries, water treatment, waste water treatment, power plant

Technical Data: DMT



pk_5_001



Measurement range:	pH -1.00 - 15.00 -1200...+1200 mV redox voltage 0.01...50.0 ppm/l chlorine -20 - +150 °C 1 µS/cm - 200 mS/cm (autoranging)
Cell constant:	0.006...12.0/cm for conductivity
Resolution:	pH 0.01 1 mV 0.1 % from measurement range for chlorine 0.1 °C Conductivity 1/1000 of display value (min. 0.001 µS/cm)
Reproducibility:	0.5 % from measurement range
Measurement input:	mV terminal (pH, redox); input resistance >5 x 10 ¹¹ Ω Chlorine terminal (DMT chlorine probes) Pt 100/1000 terminal Conductivity terminal (2 or 4 wire connector)
Correction variable:	Temperature via Pt 100/1000 (pH, chlorine, conductivity)
Correction range:	chlorine: 5 - 45 °C, pH: 0 - 100 °C, Cond: 0 - 100 °C
Current output:	4 - 20 mA, fault current 23 mA
Supply voltage:	16 - 40 V DC
Feed voltage:	2-wire transmitter, 16 - 40 V DC, nominal 24 V PROFIBUS® DP version, 16 - 30 V DC, nominal 24 V communication interface:
Communication interface:	PROFIBUS® DP (wall-mounted version only)
Ambient temperature:	-5 - +55 °C
Climatic conditions:	up to 95 % relative humidity (non-condensing)
Enclosure rating:	IP 65 (wall/pipe mounted) IP 54 (control panel installation)
Display:	graphical display
Housing:	PPE
Dimensions:	125 x 135 x 75 mm (WxHxD)
Weight:	approx. 450 g

A complete measuring station comprises the following:

- Measuring transducer DMTa (see Identcode)
- In-line probe housing: DGMa..., DLG III ..., immersible in-line probe housing
- Chlorine sensor
- Assembly set for chlorine sensor
- pH sensor
- Redox sensor
- Temperature sensor Pt 100 /Pt 1000
- Conductivity sensor
- Sensor cable
- PROFIBUS®-DP connection accessories

ProMinent® DMT Transmitters

Identcode Ordering System: DMT

DMT	Version:												
	A												
		Type of Mounting:											
		W	Wall mounted (also rail mounted)										
		S	Control panel installation¹										
		Logo:											
		0	With ProMinent® logo										
		Electrical connection:											
		9	Ring main 4-20 mA (two wire technology), operating voltage 16-40 V DC, nominal 24 V DC										
		5	PROFIBUS® DP, operating voltage 16 - 30 V DC, nominal 24 V DC (only if communication interface = PROFIBUS® DP) - Special Order from Germany										
		Communication interface:											
		0	None										
		4	PROFIBUS® DP (assembly type W only) - Special Order from Germany										
		Measured variable 1:											
		P	pH										
		R	Redox										
		T	Temperature										
		C	Chlorine										
		L	Conductivity										
		Measured variable 2 (Correcting value):											
		1	Temperature Pt 1000 / Pt 100										
		0	None (in the case of measured variable T)										
		Enclosure rating:											
		0	Standard										
		Language:											
		E	English										
		Presetting A, probe:											
		0	Standard ProMinent® buffer solution pH 4-7-10										
		Presetting B, probe:											
		0	Autom. Temperature measurement (standard)										
		1	Manual temperature measurement										
		2	Autom./manual temperature measurement										
		9	No temperature measurement										
		Presetting C, output:											
		0	Prop. Measured variable (standard)										
		4	4 mA constant current										
		Presetting C:											
		0	Standard										
DMT	A	W	0	9	0	P	1	0	E	0	0	0	0

AC Adapter Needs to be Ordered Separately Part # 7500039

product
overview

solenoid-driven
metering pumps

motor-driven
metering pumps

pump spare parts &
accessories

DULCOMETER®
instrumentation

DULCOTEST®
sensors

standard & custom
systems

ProMinent® Compact Controller

Overview: Compact



The Measuring Transducer DULCOMETER® Compact with control function for the measured variables pH, redox and conductivity provides basic functions for applications in water treatment. It has a fixed configuration with the following features.

Summary of advantages:

- Measured variables pH or ORP (can be changed on the controller)
- Conductivity (inductive or conductive as per Identcode) can be displayed in TDS, salinity, resistance or standard conductivity units
- Operation independent of the operating language (use of abbreviations, such as CAL, PARAM, CONFIG, ERROR)
- Illuminated display
- 3 LED display operating state (relay 1 / 2 active, Error)
- Sensor monitoring for pH
- P and PID control characteristics
- Selectable control direction (raise or lower measured value)
- Pulse frequency relay for control of metering pump
- Power relay can be configured as an alarm, limit value or pulse width modulated control output for metering pumps (connection function or switch on operating voltage)
- Analog output 4-20 mA can be configured as a recording output or control output
- Digital input to switch off the control or to process a sample water limit contact by remote control
- Temperature sensor input (Pt 1000) for temperature compensation of the pH or conductivity value

Applications

- Waste water treatment
- Treatment of drinking water
- Swimming pool water treatment

Technical Data: Compact

Measurement range:	pH: 0.00 - 14 ORP: -1000 - +1000 mV Conductive conductivity: 1 µS/cm ... 20 mS/cm (auto-ranging) Inductive conductivity with ICT 1: 200 µS/cm ... 1000 mS/cm (auto-ranging) Inductive conductivity with ICT 2: 20 µS/cm ... 2000 mS/cm (auto-ranging)
Resolution:	pH: 0.01 pH ORP: 1 mV Conductivity: 0.1 µS/cm (depends on the measuring range) Temperature for pH and conductivity via Pt 1000
Correction variable:	
Correction range:	0 - 120 °C
Control characteristic:	PID
Control:	1-way controller with selectable control direction (raise/lower)
Signal current output:	1 x 4-20 mA galvanically isolated max. load 200 Ω Range and assignment (measured or actuating variable) can be set
Control outputs:	1 pulse frequency output for control of the metering pump 1 relay (alarm or limit value relay or pulse length control) 1 x analog output 4-20 mA
Electrical connection:	90 - 253 V ~
Ambient temperature:	-10 - +60 °C
Enclosure rating:	IP 67
Dimensions:	135 x 125 x 75 mm (H x W x D)
Weight:	0.5 kg

ProMinent® Compact Controller

Identcode Ordering System: Compact

DCCa Type of Mounting:									
DCCa	W	Wall/pipe mounting IP 67							
	S	With mounting kit for control panel mounting IP 54							
	Version:								
	OO	With ProMinent® logo							
	Operating voltage:								
	6	90 ... 253 V, 48/63 Hz							
	Measured variable								
	CO	Free Chlorine							
	PR	pH/ORP (switchable)							
	L3	Conductive conductivity (unit designation: COND_C)							
	L6	Inductive conductivity (unit designation: COND_I)							
	Hardware extension								
	0	none							
	Certifications								
	O1	CE (Standard) / CSA Special Inspection							
	Certificates								
	0	None							
	Language:								
	EN	English							
	FR	French							
DCCa	W	OO	6	PR	0	O1	0	EN	

ProMinent® dialog DACb Controller

Overview: diaLog DACb Multi-parameter Controller



The DULCOMETER® diaLog DACb multi-parameter controller is the latest controller platform from ProMinent. New for 2018, it replaces the DACa controller and offers additional features. The diaLog DACb can also be installed in a control cabinet using the optional mounting kit. The diaLog DACb has been specifically developed for the continuous measurement and control of liquid parameters in water treatment processes, environmental technology and industry.

The DULCOMETER® diaLog DACb multi-parameter controller is available in a basic version with two measuring channels and has an option for a 3rd channel. It can work with conventional analog sensors and actuators. The diaLog DACb controller intelligently closes the control circuit between ProMinent® DULCOTEST® sensors and ProMinent® metering pumps offering special functions, as required in water treatment.

Typical applications

- Potable water and waste water treatment
- Industrial and process water treatment
- Swimming pool water treatment
- 2 measuring channels as standard
- 3rd measuring channel as an option
- Conductivity measurement now available

Basic Controller (Standard)

- 2 measuring channels with 15 freely selectable measured variables per identcode input.
- The measured variables conductive conductivity is available via identcode selection.
- PID controller with frequency-based metering pump control for 4 metering pumps.
- 2 analog outputs for measured value, correction variable or control.
- 4 digital inputs for sample water fault detection, pause and parameter switching.
- 2 relays with limit value or control functions.
- Alarm relay
- Measured variables and language selection during commissioning.
- Temperature compensation for the various measured variables.
- 24 operating languages
- Data and event logger with SD card. Measured values, calibration log and error log saved on SD card.
- Future upgrade of the software functions by means of an activation key or firmware update.
- Disturbance variable (flow) via frequency input
- PROFIBUS® DP, ModBus RTU, LAN/WLAN web access per identcode.

Optional 3rd Channel (identcode selectable)

- Third complete measuring channel with mV or mA input.
- Disturbance variable processing (flow) via mA or frequency.
- 3 additional digital inputs
- 3rd mA output
- PROFIBUS® DP.
- ModBus RTU.
- LAN/WLAN web access. (Available 2nd QTR 2018)

ProMinent® dialog DACb Controller

Technical Data: diaLog DACb Multi-parameter Controller

Technical Data Measuring range

mV connection type:
pH: 0.00 ... 14.00
ORP voltage: -1,500 ... +1,500 mV
mA input possibilities (measuring ranges corresponding to the sensors):
Chlorine, Chlorine dioxide, Chlorite, Bromine, Ozone
Hydrogen peroxide (PER sensor)
Hydrogen peroxide (PEROX sensor with converter)
Peracetic acid
Dissolved oxygen
pH – mA input via transducer part # 809126
ORP – mA input via transducer part # 809127
Fluoride - require transducer, reference electrode and temp sensor
Temperature: via Pt 100/Pt 1000, measuring range 0 ... 150 °C
Conductivity : via conductive conductivity sensor

Resolution

pH: 0.01
ORP voltage: 1 mV
Temperature: 0.1 °C
Amperometric sensors : 0.001/0.01 ppm, 0.01 vol. %, 0.1 vol. %

Accuracy

0.3 % based on the full-scale reading

Measurement input

pH/ORP (input resistance > 0.5 x 10¹² Ω)

Correction variable

Temperature via Pt 100/Pt 1000 for pH, Chlorine Dioxide (CDP) sensor and Fluoride

Correction range

0 ... 100 °C

pH compensation range for chlorine

CLE 3 and CLE 3.1 pH 6.5 ... 8.5 For CBR Sensor pH 6.5 ... 9.5

Disturbance signals

Flow via mA or frequency

Control characteristic

P/PID control

Control

2 x bidirectional control

Analog output

3 x 4 ... 20 mA isolated outputs max. load 450 Ω, range and function configurable

Control outputs

2 x 2 pulse frequency outputs to control metering pumps
2 relays (limit value, 3-point step or pulse length control)

Alarm relay

250 V ~3 A, 700 VA contact type changeover contact

Electrical connection

90-253 V, 50/60 Hz, 25 VA

Ambient temperature

0 ... 50 °C (for indoor installation or with protective housing)

Enclosure rating

Wall mounted : IP 67 based on NEMA 4X; Cabinet mounting : IP 54

Tests and approvals

CE, CSA Special Inspection

Housing material

PC with flame retardant housing

Dimensions

250 x 220 x 122 mm (WxHxD)

Weight

1.3 kg

The complete measuring station comprises

- Measuring transducer / controller DACb (see identity code)
- Sensor Holders: DGMa..., DLG III ..., immersion fitting
- pH sensor (depending on identity code)
- Redox sensor (depending on identity code)
- Chlorine, Chlorine Dioxide, Chlorite, Bromine, Dissolved Oxygen Sensor
- Transducer for pH or redox (for cable lengths > 10m)
- Sensor cable

ProMinent® dialog DACb Controller

Identcode: diaLog DACb Multi-parameter Controller

DACb	Version
	W00 Wall mounted 500 Panel Mounted
	Operating voltage
4	24 V DC
6	90 - 253 VAC 50/60 Hz
	Main Board (2 x Inputs Possible)
VA	2 channels, mV/mA measuring input, e.g. pH/chlorine,
AA	2 channels, mA/mA measuring input, e.g. chlorine dioxide / chlorite
VV	2 channels, mV/mV measuring input, e.g. pH/pH, 2 pumps PID
L3	2 channels, conductive conductivity sensor inputs
	IOS Board (Channel 3 option)
0	none
4	3rd Measurement channel with mA output and additional features
	Software presets
0	No presets, manually configured (Standard)
	Connection of the measured variables
0	All sensor inputs via terminal (mV and mA)
1	1 x mV input as SN 6 coaxial connector (only for pH and ORP via mV)
2	2 x mV input as SN 6 coaxial connector (only for pH and ORP via mV)
3	3 x mV input as SN 6 coaxial connector (only for pH and ORP via mV)
	Connection of digital sensors / actuators
0	None
	Communication
0	None
A	Modbus RTU connection via terminal
B	Profibus DP-V1 connection via terminal
E	LAN with web server, M12 connection
G	Profinet 2 x M12 connection
	Data logger
1	Data logger with SD card can log all measured variables, control outputs and digital inputs, calibration and error log. Logging rate 10 – 3600 seconds and exportable via SD card as CSV file.
	Hardware extension
0	None
	Approvals
01	CE & CSA Special Inspection
	Certificates
0	None
	Documentation language
EN	English
FR	French
DACb	W00 6 VA 0 0 1 0 E 1 0 01 0 EN

Accessories: diaLog DACb Multi-parameter Controller

	Order no.
Cable combination coax 0.8 m - pre-assembled*	1024105
Cable combination coax 2 m- SN6 - pre-assembled*	1024106
Cable combination coax 5 m- SN6 - pre-assembled*	1024107
SN6 connection, refitting, DACb	1036885
Coaxial cable Ø 5 mm, 0.8 m - SS	305077
Coaxial cable Ø 5 mm, 2.0 m - SS	304955
Coaxial cable Ø 5 mm, 5.0 m - SS	304956
Fitting kit for DACb control panel installation	1041095

ProMinent® DDC Analyzers

Overview: DDC



pk_5_045

The Multi-channel Measuring and Control System DULCOMARIN® II has the following features:

- 5.7", 1/4 VGA color display for ease of operation
- Integrated data logger with screen recorder: Directly view the measured data on the controller
- SD card and card reader included: simply transmit measured data to the PC as standard
- Control of one to 16 drinking water systems or filtration circuits in swimming pools
- CAN bus system: Simple wiring and can be subsequently upgraded
- Visualization*: Simple with embedded web server* and standard web browser
- LAN port*: Simple connection to PC or PC network or internet
- Operation possible using Apple® iPod or iPad (WLAN access point needed)
- Intelligent sensors: with CANopen bus, save the sensor data and stay within the optimum measuring range thanks to auto ranging
- Intelligent metering pumps: using CANopen bus obtain information on operating parameters, such as for instance: chemicals levels and pump capacity in the metering range of 0.19-272 gph (0.74 - 1,030 L/h)
- Standby metering pump for disinfectant (automatic switchover in the event of low level and pump malfunction)

Area of application drinking water (and general applications)

Using a power input module (I module), the following measuring parameters can be measured via 4-20 mA and displayed. These values are also available on the data logger/screen recorder, the web and OPC server:

- Flow (as disturbance variable for pH and chlorine control)
- UV intensity
- Conductivity
- Chlorine dioxide
- Chlorite
- Ammonia
- Fluoride

Pt100 resistance thermometer via a transducer

Display and control of free chlorine and total available chlorine

OPC server*: Simple connection to superordinate visualization systems

*optional

Area of application swimming pools

Remote calibration possible using Apple® iPod or iPad (WLAN access point needed)

Energy and chemical savings thanks to new EcoMode

Integral filter control

Bound chlorine: is reliably minimized via controller output and corresponding systems

OPC server*: Simple connection to superordinate visualization systems

Control of pool temperature via standard temperature controller (Pt100x needed)

High chlorination or night setback by means of contact via second parameter set

The decentralized modular DULCOMARIN® II system is designed for use in public swimming pools in compliance with DIN 19643. The system can be configured to meet the demand for a compact DULCOMARIN® II compact system or as a decentralized modular system DULCOMARIN® II DULCO®-Net.

The areas of application are determined in the identcode

Every drinking water measurement system or every filtration circuit features its own on-site calibration option for all measured variables.

What is the Eco!Mode operating mode?

Eco!Mode enables the circulation capacity to be reduced if the DIN hygienic parameters pH, redox, free and bound chlorine are within the permitted limits.

A circulation pump with frequency converter with an analog input is needed for this.

This reduction can be enabled depending on the DIN hygienic parameters, time and activation via a remote control input. A combination of the criteria is also possible. If the DIN hygienic parameters can no longer be met, then the circulation capacity is raised again to nominal capacity.

Lowering the pump capacity saves energy, thereby reducing CO₂ emissions.

Furthermore, when a set redox potential is reached, for instance 780 mV, signaling good disinfection of the water, then chlorine metering is either reduced gradually or in one step. If the DIN hygienic parameters can no longer be met, then chlorine metering is raised again to its standard set point.

What is a web server?

A web server is a software application that is implemented by the DULCOMARIN® II.

The web server provides web pages with information about measurements, control, sensor calibration and controller configuration to a PC with web browser (e.g. Microsoft® Internet Explorer).

The web server can be used to provide simple visualization of the DULCOMARIN® II without special visualization software being needed on the PC. The web server is independent of the PC operating system.

The DULCOMARIN® II is connected to a PC via a LAN/Ethernet port and the connection can be made directly, via a network or via the internet. The cables needed for direct connection to a PC or network are included.

Commercially available standard network components can be used for the cabling, router and WLAN access points etc.

The same information is available via the web server as on the DULCOMARIN® II itself, for instance the set points of all control variables can be changed, the various controller can be switched off and the pool/system names can be entered. Exceptions to this are the controller settings and bus configuration that can only be entered directly on the controller itself.

What is OPC?

OPC stands for Openness, Productivity, Collaboration (formerly OLE for Process Control) and designates a uniform and manufacturer-independent software interface. OPC Data Access (OPC DA) is based on Windows technology COM (Component Object Model) and DCOM (Distributed Component Object Model). In contrast, OPC XML is based on the internet standards XML, SOAP, and HTTP.

OPC is used wherever sensors, controllers, and controls from various manufacturers are used to form a common, flexible network. Without OPC, two devices require precise knowledge of the communication options of the other device to be able to exchange data. Extensions and replacement are therefore correspondingly difficult. With OPC, an OPC-compliant driver for each device has to be written only once. Ideally this driver is provided by the manufacturer. An OPC driver can be integrated easily in any major control and monitoring system without needing much in the way of adaptation.

ProMinent provides an OPC server/driver for the Multi-channel Measuring and Control System DULCOMARIN® II.

The examples shown below are suitable for applications in drinking water treatment and swimming pool systems.

The multi-channel measuring and control system DULCOMARIN®II is suitable to control 1 to 16 filtration circuits or drinking water systems. The following bus modules are available for the control:

M module (measurement and controlling):

- Measurement and control of the pH value
- Measurement and display (optional control) of the ORP
- Measurement and display of the temperature of the sample water
- Sample water monitoring
- Measurement of free chlorine
- Measurement of combined chlorine (optional, calculated from total chlorine and free chlorine)

Chlorine sensors:

- Measurement of free chlorine and temperature
- Measurement of total available chlorine and temperature
- Measurement of combined chlorine as differential chlorine measurement

A module (controlling of metering pumps, analog outputs):

- 3 frequency outputs to control metering pumps for pH correction, disinfection and flocculent metering
- 3 contact inputs to process pump alarm relays or tank fill level monitoring
- 4 freely programmable analog outputs 4-20 mA for pH, ORP, free chlorine, combined chlorine or temperature

P module (controlling of peristaltic pumps, power supply of bus modules):

- Power relay pulse length control for pH value (e.g. controlling of peristaltic pump)
- Power relay pulse length control of disinfectant (e.g. controlling of chlorine electrolysis plant)
- Power relay limit value output to minimize combined chlorine
- Alarm relay
- Power supply of bus modules

N module (power supply of bus modules):

- Power supply of bus modules with no further function

R module (controlling of chlorine gas metering units):

- Controlling of a chlorine gas metering unit and processing of a position feedback potentiometer (0-10 kΩ) (only possible as external module)

Metering pumps with CANopen interface of the type Beta®, delta®, Sigma/ 1, Sigma/ 2, and Sigma/ 3

- Direct connection to the bus
- When using Beta®/4aCANopen metering pumps, the A module is not required (provided no current outputs are required).

I module (current input module)

- 2 current inputs active/passive (e.g. to connect 2-wire measuring transducers)
- 1 current inputs passive (e.g. to connect a magnetically-inductive flow meter)
- 2 digital inputs for sample water alarm and pause control

G module (limit value and alarm module)

- 2 potential-free changeover relays to signal alarm states
- Connected to other units via the main bus cable using the T-distributor and 0.5m CAN connection cable supplied

ProMinent® DDC Analyzers

Technical Data: DDC

Measurement range:	pH: -1 - 15 Redox: -1200 - +1200 mV Chlorine free: 0.01 - 10 ppm Chlorine total: 0.01 - 10 ppm Combined chlorine: 0.01 - 2 ppm
Temperature:	Pt 100 or Pt 1000, 28 to 302 °F (-20 to +150 °C)
Resolution:	0.01 pH / 1 mV / 0.01 ppm / 0.1 °C
Reproducibility:	0.5 % of the measurement range (at 25 °C)
Measurement inputs:	pH and Redox via terminal mV Chlorine via CANopen Bus
Control type:	P/PI/PID-control
Control:	Acid or alkali, chlorine
Digital inputs:	Voltage free inputs (sample water, pause, 3 pump faults)
Signal current outputs:	4 x 0/4-20 mA (electrically isolated for each measured variable) Max. burden 600 Ω , range adjustable
Control outputs:	Reed contacts, acid, alkali and chlorine (pulse rate for actuation of metering pumps) 2 relays (pulse length) make/break switches for actuation of solenoid valves or peristaltic pumps 250 V~, 3 A
Alarm relay:	250 V ~3 A, 700 VA make/break switches
Interfaces:	LAN, RS 232 as configuration interfaces, SD-expansion slot (for SD cards)
Power supply:	85 - 265 V~, 50/60 Hz
Ambient temp. :	23 to 118°F (-5 to 45 °C)
Storage temp. :	14 to 158°F (-10 to 70 °C)
Enclosure rating:	IP 65
Climate:	Admissible relative humidity: 95% non condensing DIN IEC 60068-2-30
Dimensions:	342 x 227 x 78 mm (WxHxD)

Guaranteed CANopen specifications, all devices:

All devices meet the standardized CAN specification for hardware 2.0 (ISO99-1, ISO99-2). This includes the CAN protocol (ISO 11898-1) and details about the physical application layer in accordance with ISO 11898-2 (high speed CAN to 1Mbit/sec.) and ISO 11898-3 (Low speed CAN to 125kBit/sec).

The device complies with the CAN-Open specification CiA-DS401, the basis of the European standard EN50325-4. It complies with the controller device profile CiA-404.

ProMinent® DDC Analyzers

Identcode Ordering System: DDC/DXCa

DULCOMARIN® II DXC range

DXCa	Mounting type										
	W	Wall mounted (IP 65)									
	S	Control cabinet (IP 54)									
		Version									
		0	with operating elements								
		D	with operating elements for use in drinking water/disinfection applications								
		Communication interfaces									
		0	None								
		5	Embedded Web Server, LAN including 5m LAN patch cable 1:1, LAN coupling, 5m crossover cable ¹								
		6	OPC server + embedded web server, LAN including 5m LAN patch cable 1:1, LAN coupling, 5m crossover cable ¹								
		Options									
		0	None								
		1	Videographic recorder with data logger including SD card and USB card reader for PC								
		Module 1:									
		M	M module, measurement module for pH, ORP, temperature								
		A	A module, control module: 3 pump and 4 analog outputs								
		I	I module, current input module, 3 mA, 2 digital inputs								
		Module 2:									
		0	Not in use								
		A	A module, control module: 3 pump and 4 analog outputs								
		M	M module, measuring module pH, ORP, temperature								
		I	I module, current input module, 3 mA, 2 digital inputs								
		Module 3:									
		P	P module, mains power module, 1 alarm relay, 3 solenoid valve relays								
		N	N module, mains power module without relay								
		Application:									
		S	Swimming pool								
		D	Drinking water/disinfection								
		Preset language:									
		EN	English								
		Approvals:									
		01	CE-mark								
DXCa	W	0	0	0	0	M	0	P	S	EN	1

The Identcode describes the **DULCOMARIN® II compact** controller.

- ¹ The supplied cable is intended for the connection to a hub, switch, router, or Internet.
For a direct connection of the DULCOMARIN® II to a PC/MAC, the supplied LAN coupling and the crossover cable cat. 5 are required.
The maximum LAN cable length is approx. 100 m.
To operate the Web server on a PC we recommend using Microsoft Internet Explorer 5 or higher as browser.
The following components are supplied in the DXCa package:
1 T-distributor, 1 connecting cable CAN,
1 termination resistor coupling and
1 termination resistor plug,
1 SC card, 1 card reader for PC.

Important note when ordering multi-channel measuring and control systems for drinking water and pool water applications:

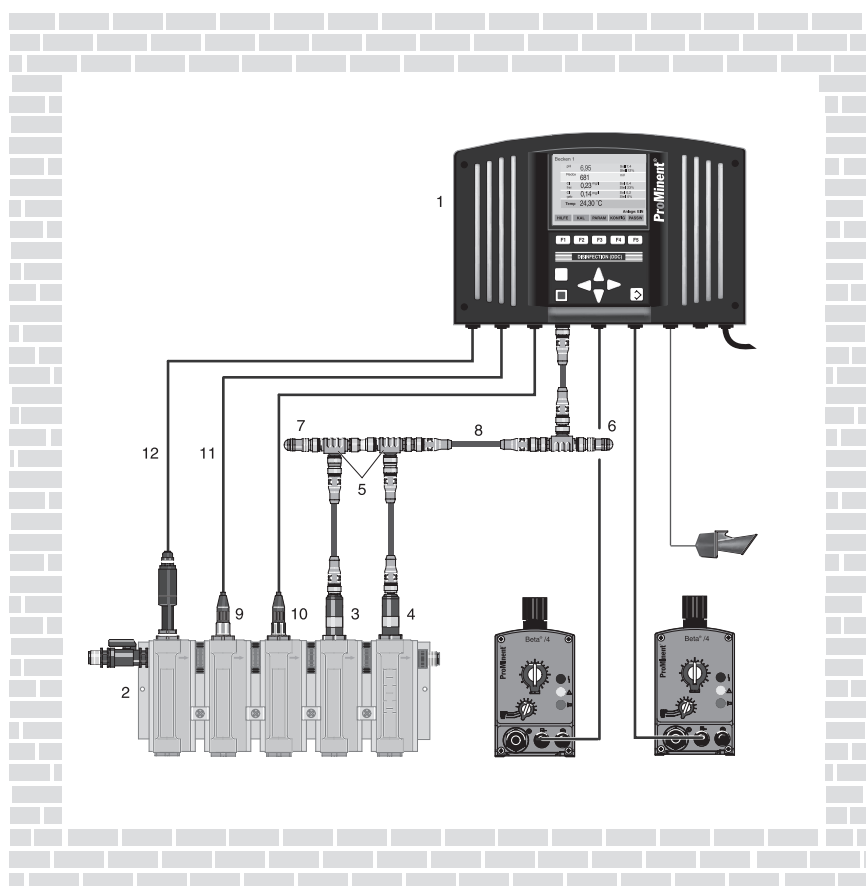
Drinking water application: In the identcode, a "D" for "Drinking water/disinfection" must be selected under "Version" and "Application". The description "System" will appear in the controller menu for the different drinking water lines.

Swimming pool water applications: In the identcode, a "0" for "with operating elements" must be selected under "Version" and the an "S" for "Swimming pool" under "Application". The description "Tank" will appear in the controller menu for the different filter circuits.

All adjustment options and the use of the different modules are identical with both applications.

ProMinent® DDC Analyzers

Configuration



pk_5_020

The measurement and control system shown above for a single system comprises the following components (without metering equipment):

Item	Quantity	Name	Part No.
1	1	DULCOMETER® (DDC) central unit with actuator and measurement modules DXCa W 0 0 0 M A P 0 EN 01	
2	1	DULCOTEST® in-line probe housing DGMa 3 2 2 T 0 0 0	
3	1	Chlorine sensor CTE 1-CAN-10 ppm	1023427
4	1	Chlorine sensor CLE 3.1-CAN-10 ppm	1023426
5	3	T-distributors M12 5 pole CAN	1022155
6	1	Load resistor M12-coupler	1022154
7	1	Load resistor M12-plug	1022592
8	5	Connecting cable - CAN M12 5 (pole). 1.5 ft (0.5 m)	1022137
9	1	pH electrode	As per application
10	1	Redox electrode	As per application
11	2	Coaxial cable, 6 ft. (2 m) - SN6 - pre-assembled*	1024106
12	6 ft. (2 m)	2 wire cable	7740215

* other lengths available

ProMinent® DDC Analyzers

DULCO®-Net

The DULCOMETER® (DDC) DULCO®-Net control system uses the CANopen – BUS as the medium for transmission of the data between the measurement and actuator units and the sensors and the central unit.

In its maximum expanded form the system can control up to 16 systems, i.e. 16 measurement units and 16 dosing units and corresponding sensors can be operated from a single central unit.

For this purpose a central unit is combined with the number of measurement and dosing units required for the application.

A M12 T-distributor is required for connection to any CANopen device (sensors module, actuator module, metering pumps and chlorine sensors). This connects the device to the main bus via a stub cable.

The sum of the lengths of all stub cables in a CANopen system cannot exceed 45 ft. (15 m.)

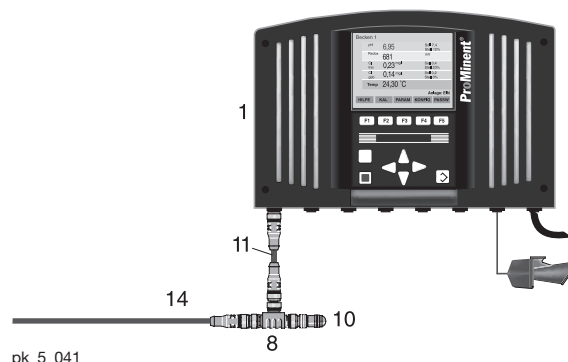
DULCOMETER® (DDC) DULCO®-Net and compact can both be easily expanded later.

What components make up a DULCOMETER® (DDC) DULCO®-Net system?

A DULCOMETER® (DDC) DULCO®-Net system comprises:

- One central unit **and** an individual combination of the following components:
- Measurement unit
- Dosing unit without main power module
- Dosing unit with main power module (optional)
- Chlorine gas dosing unit

Central unit



The central unit can be installed anywhere, e.g. in a control room or in the office. It serves as an input/output module (for viewing and configuring individual modules) and has the following functions: screen recorder, interface, Embedded Web Server and power supply. The central unit may optionally incorporate a sensor and an actuator module. The central unit is connected with the other units via the main Bus. CAN connection cables are used for this purpose. The main Bus of the first unit must be connected with a M 12 load resistor coupling and the final unit with a M 12 load resistor plug.

A unit always consists of a module, a T-connector and a CAN stub connection cable, 1.5 ft. (0.5 m) long.

The central unit in the above example comprises the following components:

Item	Quantity	Name	Part No.
1	1	DULCOMETER® (DDC) Central unit DXCa W 0 5 1 M A P 0 EN	
8	1	T-distributor M12 5 pole. CAN	1022155
1	1	Connecting cable - CAN M12 5 pole. 0.5 m	1022137
14	1	Connecting cable - CAN M12 5 pole 5 m	1022141
10	1	M 12 load resistor coupling	1022154

ProMinent® DDC Analyzers

DULCO®-Net

The multi-channel measuring and control system DULCOMARIN®II DULCO®-Net in the maximum configuration can control 16 drinking water systems/filtration circuits, i.e. the required external modules for 16 pools can be connected to the central unit and operated. The following options are given.

Measurement and controlling of:

- Up to 16 times:
- pH value
- ORP
- free chlorine
- combined chlorine (calculated)
- Temperature of the sample water

Additionally in the drinking water application (via I module):

- Flow rate (as disturbance for pH and chlorine control)
- UV intensity
- Conductivity
- Chlorine dioxide
- Chlorite
- Ammonia
- Fluoride
- Pt100 resistance thermometer via transducer

Other inputs and outputs:

Up to 16 times:

3 frequency outputs to control metering pumps for pH correction, disinfection and flocculent metering

3 contact inputs to process pump alarm relays or tank fill level monitoring

4 freely programmable analogue outputs 0/4-20 mA (for pH, ORP, free chlorine, combined chlorine or temperature)

3 power relays pulse length control of pH value, of the disinfectant and minimization of combined chlorine (e.g. controlling of a peristaltic pump and chlorine electrolysis plant and UV plant)

Controlling of a chlorine gas metering unit

3 Beta®/4CANopen metering pumps

Developed by Bosch and known from the automotive industry, the very fail safe CAN bus with CANopen protocol is used to transfer data between the different bus modules. The maximum length of the main bus train is 400 meters.

For connecting any bus module (M module, A module, P module, N Module, Beta®/4CANopen metering pumps and CAN chlorine sensors), a T-distributor is used which connects the units with the main bus train via a spur line.

T-distributor and spur line are included in the modules' delivery scope.

All bus modules are supplied with 24 V operating voltage via the CAN bus (except Beta®/4CANopen metering pumps, P modules, N modules. These require a separate power supply).

For this reason, additional P or N modules that supply operating voltage for the bus modules on the bus are required depending on the size of the installation (number of filtration circuits to be controlled). The central unit always includes a power supply unit (N or P module).

How many additional N or P modules do you require?

Number filtration circuits	Additional N or P modules	Number filtration circuits	Additional N or P modules
1	-	9	4
2	-	10	5
3	1	11	5
4	2	12	6
5	2	13	6
6	3	14	7
7	3	15	7
8	4	16	8

The DULCOMARIN®II compact and DULCO®-Net can be upgraded subsequently by simply connecting bus modules

ProMinent® DDC Analyzers

DULCO®-Net

Which components are included in a DULCOMARIN®II DULCO®-Net system?

A DULCOMARIN®II DULCO®-Net system consists of one:

Central unit DXCa with controls and the individual combination of the following components:

M module: DXMaM (measurement and controlling)

A module: DXMaA (controlling of metering pumps, analog outputs)

P module: (module in DXCa housing to supply power to modules and alarm relays, power relays to control e.g. peristaltic pumps)

N Module: DXMaN (power supply of external modules with no further function)

R module: DXMaR (controlling of chlorine gas metering units with position feedback processing)

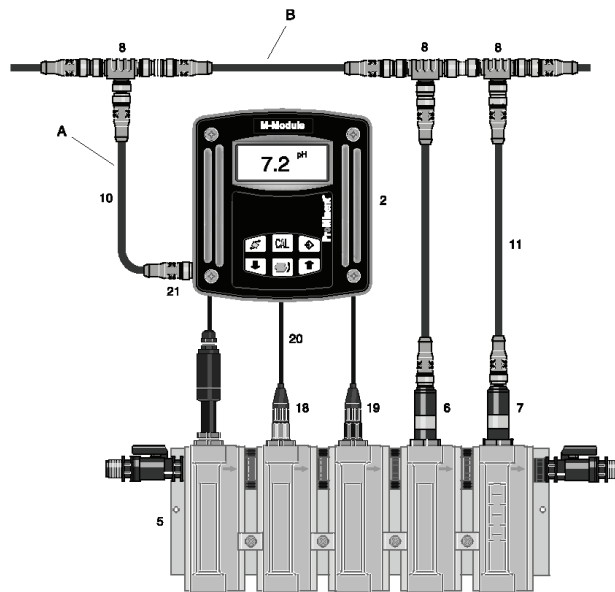
I module: (processing of sensor signals above 4-20 mA)

The maximum main bus length is 16 inches!

ProMinent® DDC Analyzers

M Module (Measuring Module)

- A Stub cable
B Main BUS cable



pk_5_042

The M module with its illuminated graphic display and keypad displays the measured values and allows all sensors for the corresponding filter circuit to be calibrated on site.

The following measurements can be taken:

- pH value
- ORP potential
- **free chlorine** and **total available chlorine** (optional or combined chlorine is (calculated) and **sample water temperature** using the **temperature probe in the chlorine sensor** or optionally using a separate **Pt100/Pt1000 resistance thermometer**

The M module has 3 digital inputs* for:

- sample water monitoring
- controlling breaks in filter backwashing
- Parameter changeover for Eco!Mode
- The M module is connected to the other bus modules via the main bus cable, using the T-distributor supplied and the 0.5 m CAN connection cable.

The M module in the above example comprises the following components:

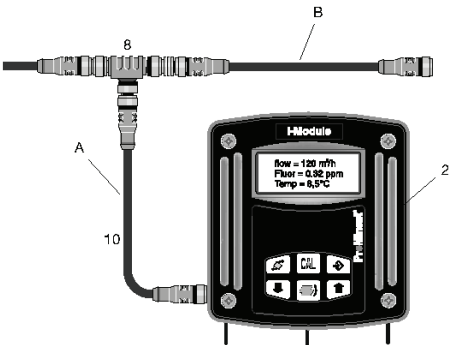
Item	Number	Name	Part No.
2	1	M module DXMa M W 0 S EN 01	DXMa M W 0 S DE 01
5	1	In-line probe housing DGMa 3 2 2 T 0 0 0	DGMa 3 2 2 T 0 0 0
6	1	Chlorine sensor CTE 1-CAN-10 ppm	1023427
7	1	Chlorine sensor CLE 3.1-CAN-10 ppm	1023426
8	3	T-distributors M12 5 pole CAN	included in delivery
10	1	Connecting cable - CAN M12 5 (pole) 0.5 m	included in delivery
11	2	Connection cable - CAN M12 5 (pole) 0.5 m	included in delivery
18	1	pH sensor PHES 112 SE	150702
		PHES 112 SE	150092
19	1	ORP sensor RHES-Pt-SE	150703
20	2	Cable combination coax 2m-SN6-pre-assembled*	1024106
21	2m	Signal lead, sold by the meter 2 x 0.25 mm ² Ø 4 mm	725122

* other lengths available

ProMinent® DDC Analyzers

I Module (Current Input Module)

- A Stub cable
B Main BUS cable



AP_DC_001_SW

The I module with its illuminated graphic display and keypad is a current input module capable of processing 3 standard signals from sensors and two digital signals.

It can be used together with the multi-channel controller DULCOMARIN® II in drinking water and swimming pool applications. All measured variables are available in the screenwriter and web and OPC®server.

Two analog inputs are provided as 2-wire inputs and one as passive input.

The inputs can process the following values as 4-20 mA standard signals:

- Turbidity
- Flow
- UV intensity
- Conductivity (via DMTa transducer)
- Chlorine dioxide*
- Chlorite
- Ammonia
- Fluoride
- Pt100 resistance thermometer via a transducer
- Dissolved oxygen
- Hydrogen peroxide *

The I module has 2 digital inputs for:

- sample water monitoring and
- pause control

The flow information can be used as an interference variable for the control of chlorine, pH correction and chlorine dioxide.

* these measured variables can also be controlled

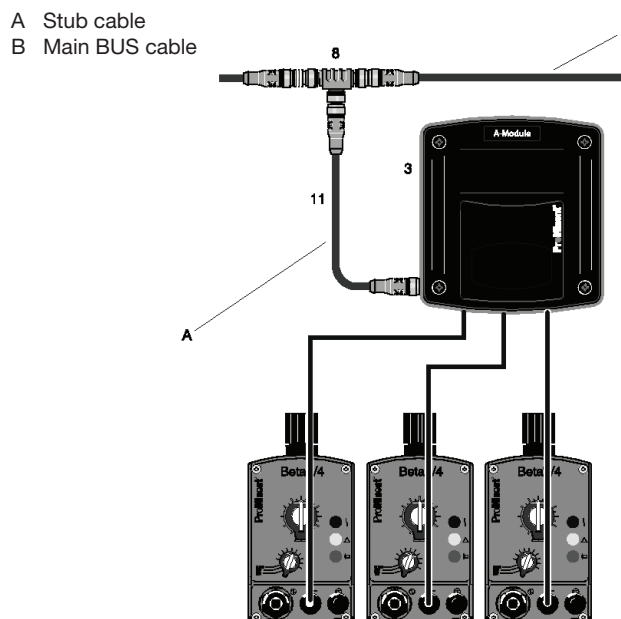
The I module is connected to other bus modules via the main bus cable using the T-distributor and 0.5 m CAN connection cable supplied.

The I module in the above example consists of the following components:

Item	Number	Name	Part No.
2	1	I module DXMa I W 0 D EN 01	-
8	1	T-distributors M12 5P CAN	included in delivery
10	1	Connecting cable - CAN, M12, 5 (pole), 0.5 m	included in delivery

ProMinent® DDC Analyzers

Actuator Module



pk_5_043

The A module permits the control of up to three metering pumps via pulse frequency. Possible metering combinations are:

- pH lowering and disinfectant and flocculent or
- pH raising and disinfectant and flocculent or
- pH lowering and pH raising and disinfectant

It includes 3 digital inputs to evaluate the alarm relay of metering pumps, 4 freely programmable standard signal outputs 0/4-20 mA to document measured values, or as control outputs.

For this connection, the T-distributor and the CAN connecting cable 0.5 m include in the scope of delivery are used.

To be noted: If Beta®/4CANopen metering pumps are used, no A modules are required!

The A module in the above example consists of the following components (without metering equipment):

Item	Quantity	Designation	Order No.
3	1	A module DXMa A W 20 00 01	
8	1	T-distributor M12 5P CAN	included in delivery
11	1	Connecting cable - CAN M12 5 (pole) 1.5 ft. (0.5 m)	included in delivery

The A module is connected to other units via the main bus train.

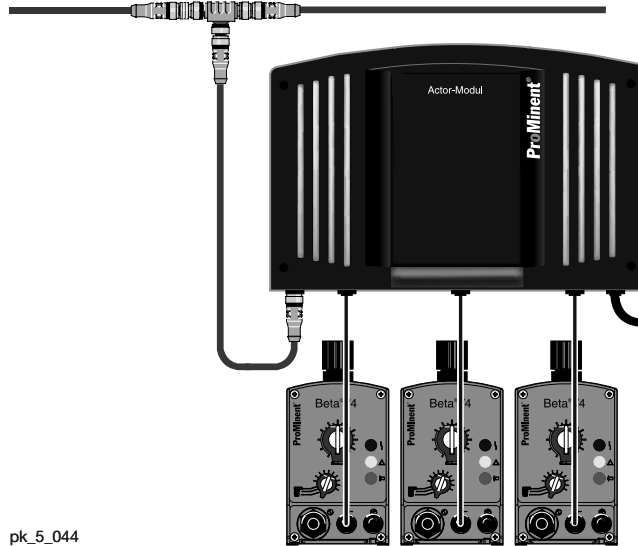
For connection to units which are not electrically isolated (e.g. PLC), an isolating amplifier, e.g. order no. 1033536, is required!

ProMinent® DDC Analyzers

The Combination Module

Actuator module with power supply:

- A Stub cable
- B Main BUS cable



pk_5_044

Combination A module and P module

Up to three different modules can be connected to the combination module (DXCa without controls). The function of the combination module is based on the function of the individual modules (see description above). The modules in the combination module are operated via the DXCa central unit.

The module is connected to the other bus modules via the main bus cable using the T-distributor supplied and the 0.5 m CAN connection cable.

See the table below for the various fitting options:

Module position 1	Module position 2	Module position 3
M module	M module	P module
M module	M module	N module
A module	A module	P module
A module	A module	N module
M module	A module	P module
M module	A module	N module

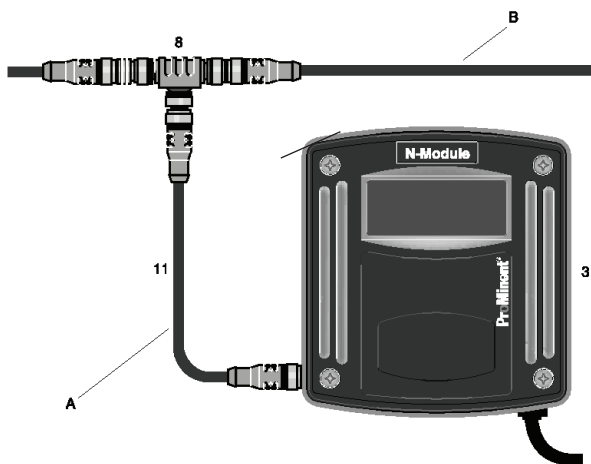
The combination in the above example consists of the following components (without chemical fluid handling):

Item	Number	Name	Order No.
3	1	Control module DXCa W 2 0 0 0 A P S 00 01	
8	1	T-distributor M12 5 pole CAN	included in delivery
11	1	Connecting cable - CAN M12 5 pole 1.5 ft. (0.5 m)	included in delivery

ProMinent® DDC Analyzers

N Module (Power Supply Module)

- A Stub cable
B Main BUS cable



pk_5_043_C_power

The N module (power supply) is used to supply the bus modules with power and has no further function.

The number of N modules required can be seen from the table below. If P modules are used in a system, the number of N modules is reduced accordingly. The central unit always includes a power supply unit (N or P module).

How many additional N or P modules do you require?

Number filtration circuits	Additional N or P modules	Number filtration circuits	Additional N or P modules
1	-	9	4
2	-	10	5
3	1	11	5
4	2	12	6
5	2	13	6
6	3	14	7
7	3	15	7
8	4	16	8

The N module requires power supply for operation and is connected to the other bus modules via the main bus train. For this connection, the T-distributor and the CAN connecting cable 0.5 m included in the scope of delivery are used.

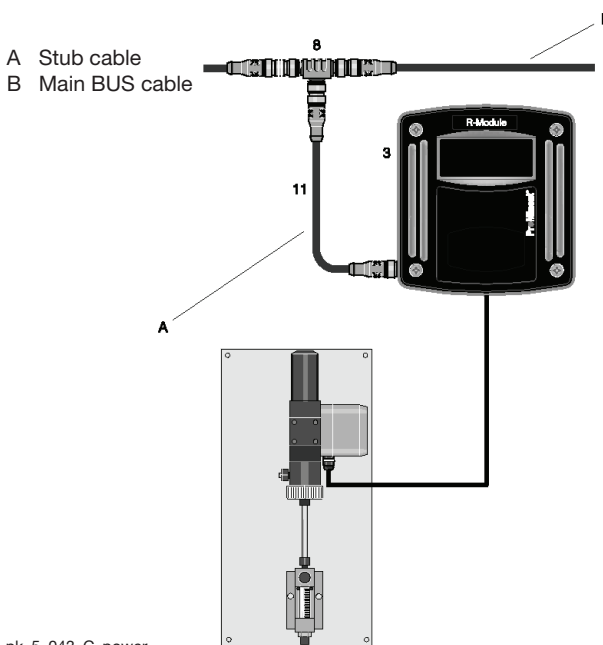
The power module in the above example comprises the following components:

Item	Number	Designation	Part No.
3	1	Power-module DXMa N W 2 0 00 01	
8	1	T-distributor M12 5 Pol. CAN	included in delivery
11	1	Connecting cable - CAN M12 5 (pole) 1.5 ft. (0.5 m)	included in delivery

If you have any questions, please contact our sales department.

ProMinent® DDC Analyzers

R Module (Control Module For Chlorine Gas Metering Units)



The R module permits the control of chlorine gas metering units which are equipped with a position feedback potentiometer.

It includes 2 power relays for opening and closing and an input for a position feedback potentiometer 1-10 kΩ.

The R module is connected to other units via the main bus train.

For this connection, the T-distributor and the CAN connecting cable 0.5 m included in the scope of delivery are used.

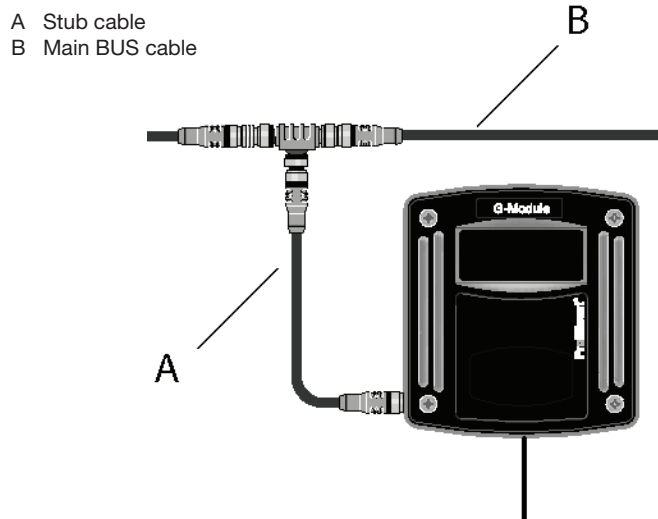
The R module in the above example consists the following components (without chlorine gas metering unit):

Item	Number	Designation	Part No.
3	1	R module DXMa R W 2 0 0 0 01	
8	1	T-distributor M12 5 P CAN	included in delivery
11	1	Connecting cable - CAN, M12, 5 (pole) 1.5 ft. (0.5 m)	included in delivery

If you have any questions, please contact our sales department.

ProMinent® DDC Analyzers

G Module (Limit Value and Alarm Module)



P_DM_0024_SW3

The G module is a limit value and alarm emitting module with 2 potential-free changeover relays to signal alarm states. Each of the two relays has ten different setting options to monitor measured values for minimum and maximum values and, should the values exceed or fall below these limits, this then effects the relay. Both relays have the same setting options, thereby enabling for pre-warnings or shutdowns to be generated by the use of different delay periods.

The G module is connected to the other units via the main bus cable using the T-distributor and 0.5m CAN connection cable supplied.

The G module in the above example consists the following components:

Item	Number	Designation	Order No.
3	1	G module DXMa R W 2 0 0 0 01	
8	1	T-distributor M12 5 pin CAN	included in delivery
11	1	Connecting cable - CAN, M12, 5 pin 1.5 ft. (0.5 m)	included in delivery

If you have any questions, please contact our sales department.

ProMinent® DDC Analyzers

Identcode Ordering System: CANopen Modules (DXMa)

Measurement Module for DULCOMARIN® II Series DXM

DXMa	Module:					
	M	M module, measuring module: pH, ORP, temperature				
	A	A module, control module: 3 pump and 4 analog outputs				
	R	R module, control module: chlorine gas metering unit with feedback				
	N	N module, mains power module without relay				
	P	P module, mains power module with relay, only mounting type "O"				
	I	I module, current input module, 3 mA inputs, 2 digital inputs				
	G	G module				
	Installation:					
	0	No housing, only P module (IP 00)				
	W	Wall mounting (IP 65)				
	E	Retrofit module (installation module for DXCa, IP 20)				
	Version:					
	0	With controls (only M module, mounting type W)				
	2	Without controls				
	3	Without controls (only mounting type "E" and "H")				
	Application:					
	0	Standard				
	S	Swimming pool (only M module)				
	D	Drinking water/disinfection (only I module)				
Language default:						
EN	English					
Approvals:						
00	No approval, only P module without housing					
01	CE mark					
DXMa	M	0	0	0	EN	0

Please note the following:

Upgrade modules for existing systems require a software update for the existing system. A Software Update Kit is needed to avoid any possible incompatibility between the different modules.

The update kit is free of charge and one is also needed when ordering more than one upgrade module. The kit includes a SD memory card with the current software for the DULCOMARIN II and a description about how to perform the software update.

Order No.

Update kit/DXC and modules

1031284

ProMinent® DDC Analyzers

Spare parts and upgrade sets

Internal spare parts and upgrade sets for the DULCOMARIN® II cannot be ordered using the part number printed on the modules!

Modules have to be fully replaced (the exception to this is the N module).

The electrical unit for the central unit can only be replaced by a complete processor spare part.

Please use only the following identcodes when ordering identcodes:

Replacement central units

Replacement central unit: DXCAC001000#DE01 (without communications interface, # = please state "S" for applications in swimming pools and "D" for applications relating to drinking water).

Replacement central unit: DXCAC051000#DE01 (with web server, # = please state "S" for applications in swimming pools and "D" for applications relating to drinking water).

Replacement central unit: DXCAC061000#DE01 (with OPC and web server, # = please state "S" for applications in swimming pools and "D" for applications relating to drinking water).

External modules (replacement or upgrade modules):

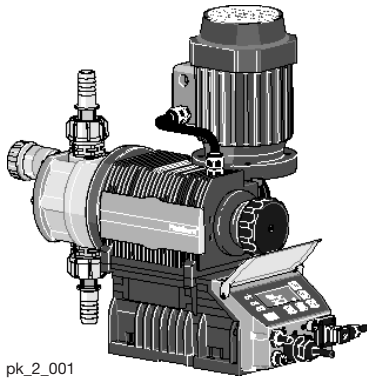
- M module: DXMa M W 0 S EN 01 (with display)
- A module: DXMa AW2 0 00 01 (without display)
- N module: DXMa N W 2 0 00 01 (without display)
- R module: DXMa R W2 0 00 01 (without display)
- G module: DXMa G W2 0 00 01 (without display)
- P module: DXCa W 2 00 00 PS 00 01 (without display in large DXC housing)
- I module: DXMa I W 0 D D E 01 (with display)
- I module: DXMa I W 2 D 0 0 0 1 (without display)

Internal modules (replacement or upgrade modules):

- M module: DXMa M E3S 00 01
- A module: DXMa A E30 00 01
- P module: DXMa P03 00 00
- I module: DXMa I E 3 D 00 01
- N module: Order no. 732485, electrical set DXMaN 24 V/1A

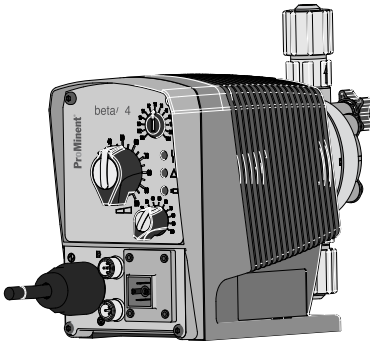
ProMinent® DDC Analyzers

Diaphragm Metering pumps compatible with CANopen bus

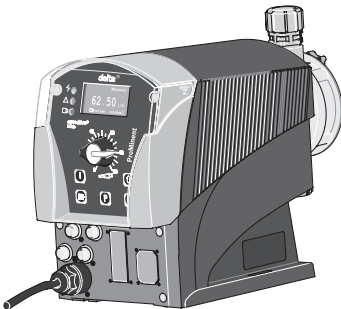


pk_2_001

- CANopen bus interface for DULCOMARIN® II
- Beta, Delta, Sigma
- Stroke length continuously adjustable between 0-100% (recommended 30-100%)
- Transmission of the stroke length setting from DULCOMARIN II
- Material versions PP, plexiglass/PVC, PVT
- Patented coarse / fine bleed valve for PP and plexiglass/PVC
- Self-bleeding liquid end version in PP and plexiglass/PVC
- Port for 2-phase level switch
- Version for extra-low voltage 12/24 V DC, 24 V AC
- 4 LED display for operation, warning and error messages
- Alarm for stroke length changes $> \pm 10\%$
- Transmission of level alarm without alarm relay via the bus



P_BE_0002_SW
Beta®



P_DE_0002_SW
delta®

ProMinent® DDC Analyzers

Complete System

Number and type of modules required for a given number of pools

Number filtration circuits	Central unit DXCa	P module	M module	A module	Additional N or P module (power supply)	Sensor free chlorine unit)	Sensor total chlorine - (optional)
1	1	1	1	1	-	1	1
2	1	1	2	2	-	2	2
3	1	1	3	3	1	3	3
4	1	1	4	4	2	4	4
5	1	1	5	5	2	5	5
6	1	1	6	6	3	6	6
7	1	1	7	7	3	7	7
8	1	1	8	8	4	8	8
9	1	1	9	9	4	9	9
10	1	1	10	10	5	10	10
11	1	1	11	11	5	11	11
12	1	1	12	12	6	12	12
13	1	1	13	13	6	13	13
14	1	1	14	14	7	14	14
15	1	1	15	15	7	15	15
16	1	1	16	16	8	16	16

* No A module if metering pumps with CANopen are used.

The above modules include all CAN bus connecting elements (T-distributor and spur line).

The T-distributors can also be directly coupled.

For distributed systems, CAN cable must be ordered by the meter with the by the meter connecting kit.

Order no.

CAN (by the meter) - connection kit*

1026589

Connecting cable - CAN (by the meter)*

1022160

* The CAN by-the-meter connecting kit consists of a CAN coupling M12 5P and a CAN connector M12 5P and a wiring diagram.

The by-the-meter connecting cable can be configured into a cable of individual length using the CAN by-the-meter connecting kit.

One CAN by-the-meter connecting kit is required for each cable to be configured.

The connecting cables CAN M12 5P 0.5m ?(pump 1 m) supplied with the sensors and modules must be used for the spur lines.

If you have any questions, please contact our sales department.

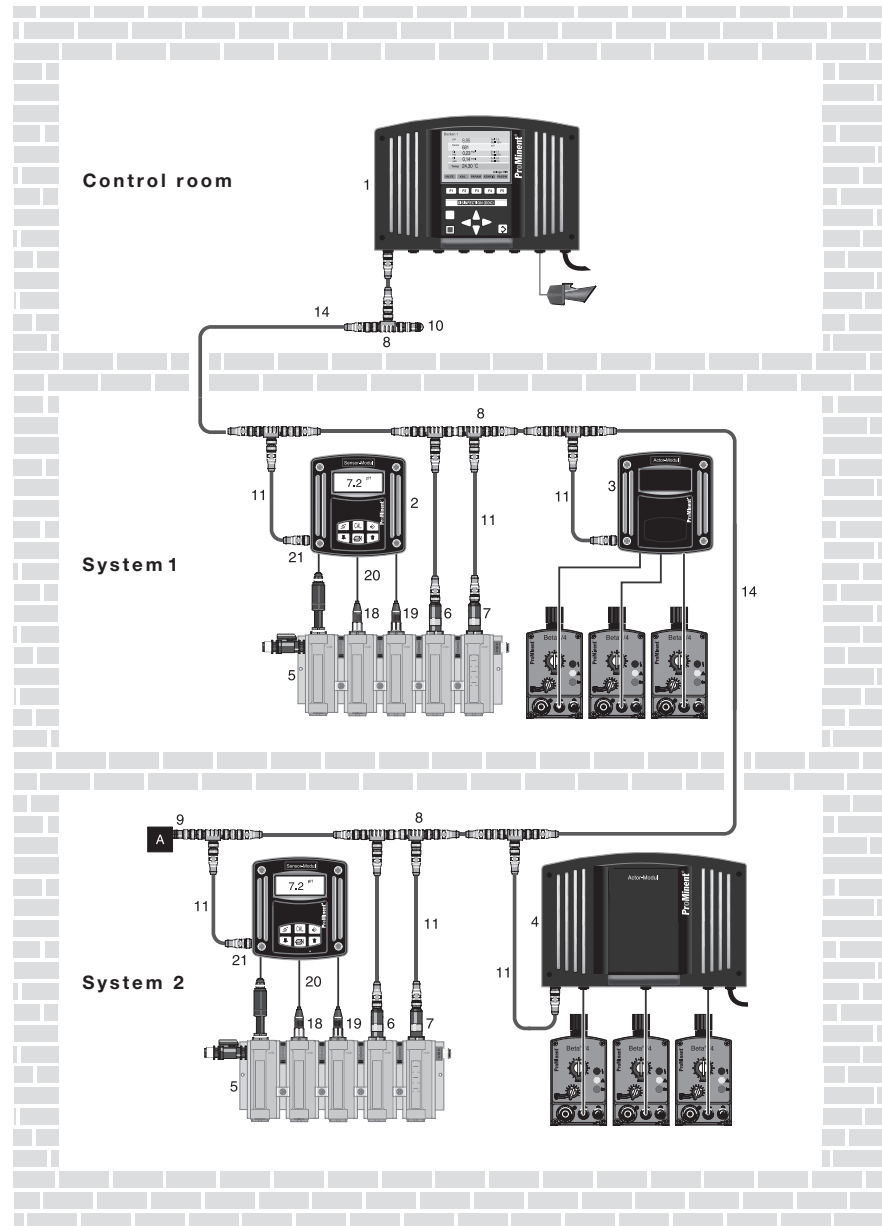
Caution:

The maximum main bus length (not including stubs) may be 400 m at the most.

ProMinent® DDC Analyzers

Complete System

Example of configuration for two control systems:



pk_5_022

ProMinent® Cooling Tower & Boiler Controllers

MicroFLEX Controllers



ProMinent's microFLEX controller is the perfect economical solution that provides the latest in water management technology for Cooling Towers and Boilers. The microFLEX water treatment controller offers a worry-free thermal flow switch that does not require any user adjustments. It also integrates built-in diagnostics with real-time monitoring in a compact design (5.9"W x 5.9"H x 3.5"D).

Features

- **Models:** Boiler, Cooling, Condensate diverter, Closed loop – reverse conductivity
- **Inhibitor Modes:** Bleed & Feed, Bleed then Feed, Percent Time, Meter Volume
- **Inputs:** Conductivity, Meter, System status
- **Outputs:** Two Powered Relays
- **Standard:** Single point calibration, 2 Line – 16 Character LCD, Built-In Diagnostics NEMA 4X Enclosure, CE Approved, 5 Key Universal Keypad
- **Options:** Web Browser Interface for remote view and configuration or Dry contact alarm or 4-20mA out on conductivity

Identcode Ordering System: MicroFLEX (MO2)

MO2	Series Version:				
	A	MicroFLEX 2 Controller Version A: Two relay controller with conductivity and temperature inputs, single inhibitor feed based on water meter input, bleed or % time with overfeed protection, flow switch/status input, 2 line display and 5 key universal keypad.			
		Application:			
		COIN	Cooling Tower (Requires Sensor 7760021)		
		BBIN	Boiler (Requires Sensor 77600741)		
		CLAH	Closed loop reverse conductivity (Requires Sensor 7760021)		
		CMAH	Condensate monitor (Requires Sensor 77600740)		
		Expansion Option:			
		XX	None		
		CL	4-20 mA output on conductivity		
		LB	Ethernet networking		
		AR	Dry contact alarm relay		
		Remote communications:			
		0	None		
		Approvals:			
			01	Standard	
MO2	A	COIN	XX	0	01

ProMinent® Cooling Tower & Boiler Controllers

Identcode Ordering System: MultiFLEX (MO5/M5)

M05 Series Version:

A MultiFLEX 5 Controller Version A: Includes 5 universally controlled powered (120/240VAC) relays, 6 status/water meter digital inputs, 7 analog input/output channels, a 4 line 20 character back lit display, 5 key universal keypad and an Ethernet port with Browser communications. Can be programmed for cooling, boiler, process or mixture of all on one unit.																																																																																				
Application:																																																																																				
B Boiler T Tower, combination, or monitor X Custom application with factory configuration																																																																																				
I/O Expansion Slot 'A' and 'B'. (*options marked are tower only):																																																																																				
<table border="1"> <tr> <td>XX</td> <td>None</td> <td>RR *</td> <td>Dual ORP - Control</td> </tr> <tr> <td>B1</td> <td>Single boiler conductivity with blowdown relay</td> <td>O2 *</td> <td>Dual ORP - Monitor</td> </tr> <tr> <td>BM</td> <td>Single boiler conductivity - monitor</td> <td>OP *</td> <td>ORP and pH - Relay</td> </tr> <tr> <td>B2</td> <td>Dual boiler conductivity with blowdown relay</td> <td>MM *</td> <td>ORP and pH - Monitor</td> </tr> <tr> <td>BB</td> <td>Dual boiler conductivity - monitor</td> <td>CR *</td> <td>Single Corrosion Rate</td> </tr> <tr> <td>CC</td> <td>Boiler condensate conductivity/temp - relay</td> <td>DC *</td> <td>Dual Corrosion Rate</td> </tr> <tr> <td>CN</td> <td>Boiler condensate conductivity/temp - monitor</td> <td>CI</td> <td>Single 4-20 mA Input - Relay</td> </tr> <tr> <td>PC</td> <td>Single boiler condensate pH - control</td> <td>IM</td> <td>Single 4-20 mA input - Monitor</td> </tr> <tr> <td>PN</td> <td>Single boiler condensate pH - monitor</td> <td>2I</td> <td>Dual 4-20 mA Input 1 relay</td> </tr> <tr> <td>CO *</td> <td>Cooling tower conductivity/temp - relay</td> <td>I2</td> <td>Dual 4-20 mA Input 2 relays</td> </tr> <tr> <td>CM *</td> <td>Cooling tower conductivity/temp - monitor</td> <td>2M</td> <td>Dual 4-20 mA Input Monitor</td> </tr> <tr> <td>PH *</td> <td>Single cooling tower pH - control</td> <td>II</td> <td>Dual 4-20 mA input (isolated) 1 Control</td> </tr> <tr> <td>PM *</td> <td>Single cooling tower pH - monitor</td> <td>I3</td> <td>Dual 4-20 mA input (isolated) 2 Control</td> </tr> <tr> <td>PP *</td> <td>Dual cooling tower pH - control</td> <td>I4</td> <td>Dual 4-20 mA input (isolated) Monitor</td> </tr> <tr> <td>P2 *</td> <td>Dual Cooling Tower pH - Monitor</td> <td>IO</td> <td>Single 4-20 mA output</td> </tr> <tr> <td>PT *</td> <td>Single pH/Temp (temperature compensated pH)</td> <td>OO</td> <td>Dual 4-20 mA output</td> </tr> <tr> <td>OR *</td> <td>Single ORP - Control</td> <td>RS</td> <td>Rate to Stroke driver</td> </tr> <tr> <td>OM *</td> <td>Single ORP - Monitor</td> <td></td> <td></td> </tr> </table>													XX	None	RR *	Dual ORP - Control	B1	Single boiler conductivity with blowdown relay	O2 *	Dual ORP - Monitor	BM	Single boiler conductivity - monitor	OP *	ORP and pH - Relay	B2	Dual boiler conductivity with blowdown relay	MM *	ORP and pH - Monitor	BB	Dual boiler conductivity - monitor	CR *	Single Corrosion Rate	CC	Boiler condensate conductivity/temp - relay	DC *	Dual Corrosion Rate	CN	Boiler condensate conductivity/temp - monitor	CI	Single 4-20 mA Input - Relay	PC	Single boiler condensate pH - control	IM	Single 4-20 mA input - Monitor	PN	Single boiler condensate pH - monitor	2I	Dual 4-20 mA Input 1 relay	CO *	Cooling tower conductivity/temp - relay	I2	Dual 4-20 mA Input 2 relays	CM *	Cooling tower conductivity/temp - monitor	2M	Dual 4-20 mA Input Monitor	PH *	Single cooling tower pH - control	II	Dual 4-20 mA input (isolated) 1 Control	PM *	Single cooling tower pH - monitor	I3	Dual 4-20 mA input (isolated) 2 Control	PP *	Dual cooling tower pH - control	I4	Dual 4-20 mA input (isolated) Monitor	P2 *	Dual Cooling Tower pH - Monitor	IO	Single 4-20 mA output	PT *	Single pH/Temp (temperature compensated pH)	OO	Dual 4-20 mA output	OR *	Single ORP - Control	RS	Rate to Stroke driver	OM *	Single ORP - Monitor		
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PN	Single boiler condensate pH - monitor	2I	Dual 4-20 mA Input 1 relay																																																																																	
CO *	Cooling tower conductivity/temp - relay	I2	Dual 4-20 mA Input 2 relays																																																																																	
CM *	Cooling tower conductivity/temp - monitor	2M	Dual 4-20 mA Input Monitor																																																																																	
PH *	Single cooling tower pH - control	II	Dual 4-20 mA input (isolated) 1 Control																																																																																	
PM *	Single cooling tower pH - monitor	I3	Dual 4-20 mA input (isolated) 2 Control																																																																																	
PP *	Dual cooling tower pH - control	I4	Dual 4-20 mA input (isolated) Monitor																																																																																	
P2 *	Dual Cooling Tower pH - Monitor	IO	Single 4-20 mA output																																																																																	
PT *	Single pH/Temp (temperature compensated pH)	OO	Dual 4-20 mA output																																																																																	
OR *	Single ORP - Control	RS	Rate to Stroke driver																																																																																	
OM *	Single ORP - Monitor																																																																																			
I/O Expansion Slot 'C' and 'D':																																																																																				
XX Use same selection options as expansion slot 'A' and 'B'																																																																																				
I/O Expansion Slot 'E' and 'F':																																																																																				
XX Use same selection options as expansion slot 'A' and 'B'																																																																																				
I/O Expansion Slot 'G':																																																																																				
XX Same choices as Slot A/B except only single expansion card options allowed																																																																																				
Pre-wired power relay plug box: (RECEPTICAL BOX FOR PLUGS)																																																																																				
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P	Phone modem communications with data logging																																																																																			
Feed verifications: (FLOW SENSOR ORDERED SEPERATELY)																																																																																				
<table border="1"> <tr> <td>0</td> <td>Standard enclosure 7.5"W x 11.3"H</td> <td>3</td> <td>Feed verification (3)</td> </tr> <tr> <td>1</td> <td>Feed verification (1)</td> <td>4</td> <td>Feed verification (4)</td> </tr> <tr> <td>2</td> <td>Feed verification (2)</td> <td></td> <td></td> </tr> </table>													0	Standard enclosure 7.5"W x 11.3"H	3	Feed verification (3)	1	Feed verification (1)	4	Feed verification (4)	2	Feed verification (2)																																																														
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Operating Voltage:																																																																																				
<table border="1"> <tr> <td>A</td> <td>115 VAC 50/60 Hz</td> </tr> <tr> <td>B</td> <td>230 VAC 50/60 Hz</td> </tr> </table>													A	115 VAC 50/60 Hz	B	230 VAC 50/60 Hz																																																																				
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ProMinent® Cooling Tower & Boiler Controllers

AEGIS II Controllers



ProMinent's AEGIS controller provides treatment of cooling tower water in evaporative and boiler water treatment.

The AEGIS II Controller continuously measures and controls the conductivity and biocide concentration to pipework and heat exchangers clean.

The AEGIS II Controller records all the necessary measurement parameters for cooling water treatment and controls the functions necessary for smooth operation:

- Electrolytic conductivity - controls bleeding
- Corrosion measurement - determines whether enough corrosion inhibitor is being metered
- pH measurement - measures and controls the pH
- Biocide measurement (e.g. chlorine) - measures and controls the biocide concentration

Your benefits:

- Biocide metering is timer-controlled
- The online measurement and control of the biocide concentration can be continuous if required
- Serial web interface for unit configuration and remote maintenance. WLAN/WiFi is an option
- Bleed lock: blocks bleeding after biocide metering has taken place
- Forced bleeding: performs bleeding before biocide metering
- Operating status displayed by 10 status LEDs

Technical Details:

- Protection class: IP 65
- 8 digital status inputs
- mA input for flow signal and temperature input
- 2 serial sensor inputs
- 3 plug-in module positions: Plug-in modules for 2 each of mA outputs, pH/ORP inputs, mA inputs for amperometric sensors and serial sensor inputs
- 5 outputs for output relay
- 4 pulse frequency outputs

Field of application:

- Controller bleeding in evaporative cooling systems
- Volume-proportional control or regulation of the metering of corrosion inhibitors, de-foamers and dispersants
- Measurement and control of the inhibitor concentration through the use of a fluorescence sensor
- pH measurement and optional pH control
- Metering of up to 2 biocides based on time or measured values
- Boiler water treatment

Retrofit Modules for the AEGIS II Controller for subsequent extension functions

	Part No.
module 2X mA output	734143
module 2X mA input	734126
module 2X mV/temp input	1081805
module 2X serial sensor	734285
module 2X cond/temperature	734223
module 2X mV/temp mA input	1081872
module 2X corrosion	734265

ProMinent®

product
overview

solenoid-driven
metering pumps

DULCOMETER®
instrumentation

DULCOTEST[®]
sensors

standard & custom
systems

231

ProMinent® Cooling Tower & Boiler Controllers

Aquatrac Accessories

Analog Sensors	Controller Choice	Part No.
ORP Sensor Package - Chlorination with cable, Tee and probe holder	B,C, D	7760768
ORP Electrode, flat faced double junction 100 psi @175°F - cable required PN 1036595	B,C,D	7761399
PHED Sensor Package with cable, Tee and probe holder	B,C,D	7760729
pH Electrode, flat faced double junction 100 psi @ 175°F - cable required PN 1036595	B,C,D	7760998
Conductivity/Temperature Electrode 125 psi @125°F with Tee - Cooling applications	B,C,D	7760200
Conductivity/Temperature/Thermal Flow Switch CTF (Cooling)	A,B,D	7760021
Corrosion Rate Electrode, Admiralty (min flow 4 LPM, Temp. 0-52°C, Max. pressure 100psi)	C,D	7760748
Corrosion Rate Electrode, Carbon Steel (min flow 4 LPM, Temp. 0-52°C, Max. pressure 100psi)	C,D	7760746
Corrosion Rate Electrode, Copper (min flow 4 LPM, Temp. 0-52°C, Max. pressure 100psi)	C,D	7760747
Corrosion Rate Electrode, Cupro-Nickle (min flow 4 LPM, Temp. 0-52°C, Max. pressure 100psi)	C,D	7760750
Corrosion Rate Electrode, Stainless Steel (min flow 4 LPM, Temp. 0-52°C, Max. pressure 100psi)	C,D	7760749
Corrosion Rate Electrode, Zinc (min flow 4 LPM, Temp. 0-52°C, Max. pressure 100psi)	C,D	7760745
Thermal Flow Switch 100psi @125°F	A,B,C,D	7760175
Conductivity Electrode 3/4" NPT 250psi steam max (Boiler - standard sensor)	A,C,D	7760002
Conductivity/Temperature Electrode 250psi steam max 3/4" NPT 4 wire (Condensate)	A,C,D	7760191
pH Electrode, 1/2" NPT SS, 230°F max (Condensate)	B,C,D	7760465
High Pressure Flow Switch 1.5GPM, 400 psi max 3/4" NPT , Bronze	A,B,C,D	7760203

Water Meters

3/4" Contacting head water meter, 3/4" MNPT	B,C,D	7304434
1" Contacting head water meter, 1" MNPT	B,C,D	7304435
1 1/2" Contacting head water meter, 1-1/2" MNPT	B,C,D	7304436
2" Contacting head water meter, 2" MNPT	B,C,D	7304438

Solenoids and Valves

1/2" Solenoid valve for cooling application. 150 psi max	A B,C,D	7760212
3/4" Solenoid valve for cooling application. 150 psi max	A,B,C,D	7760213
1" Solenoid valve for cooling application. 150 psi max	A,B,C,D	7760214
Needle valve 1/2", rated 250 psi steam, color coded shaft, numbered handle	A,B,C,D	7760006
Orifice Union, 1/2" NPT, 250 psi steam, with four orifice plates	A,B,C,D	7760109
Motorized blowdown valve 1/2"NPT, 120VAC, 250psi steam	A,B,C,D	7760217
Motorized blowdown valve 3/4"NPT, 120VAC, 250psi steam	A,B,C,D	7760218
Motorized blowdown assembly, 1/2"NPT, 120VAC 250psi steam w/needle valve and T	A,B,D	7760013

A - microFLEX B - SlimFlex C - multiFLEX D - AEGIS

LogR: Single Channel Corrosion Rate Monitor

Carbon Steel Sensor Package (Includes Monitor, sensor & 3/4" Sentry "T" fitting)	7760788
Copper Sensor Package (Includes Monitor, sensor & 3/4" Sentry "T" fitting)	7760788
Admiralty Sensor Package (Includes Monitor, sensor & 3/4" Sentry "T" fitting)	7760790:

LogR Accessories:

24VDC power adapter	7760791
LPR sensor only (no tips)	7760792:
Transmitter module	7760793
3/4" entry "T" fitting	7760794
Admiralty Brass Spare Tip Set	7760238
Carbon Steel Spare Tip Set	7760240
Copper Spare Tip Set	7760241

ProMinent® Portable DT Photometer

Overview: Photometer

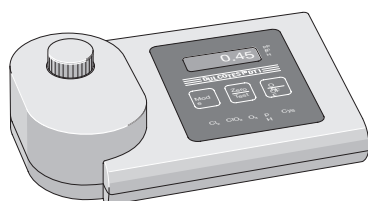
Photometer DT1, DT2, DT3 and DT4

- Portable compact Photometer
- Simple to operate with support text
- Reliable, simple measurement of chlorine, chlorine dioxide, fluoride, chlorite, H₂O₂, bromine, ozone, pH and cyanuric acid
- Self-diagnostic

Applications:

swimming pool, drinking water, process water

Technical Data



pk_5_021

Measurement range of DT1B:	0.05...6.0 mg/l free chlorine (DPD 1) + total chlorine (DPD3) 0.1...13.0 mg/l bromine (DPD 1) 0.05...11 mg/l chlorine dioxide (DPD 1) 0.03...4.0 mg/l ozone (DPD 4) pH 6.5...8.4 (phenol red) 1...80 mg/l cyanuric acid
Measurement range of DT2C:	0.05...2.0 mg/l fluoride 0.05...6.0 mg/l free chlorine and total chlorine 0.05...11.0 mg/l chlorine dioxide
Measurement ranges, DT3B:	1 - 50 / 40 - 500 mg/l hydrogen peroxide
Measurement ranges, DT4B:	0.03 - 2.5 mg/l chlorite, 0.05 - 11 mg/l chlorine dioxide, 0.05 - 6 mg/l chlorine
Measuring tolerance:	Dependent upon measured value and measuring method
Battery:	9 V battery (approx. 600 x 4-minute measurement cycles)
Ambient temperature:	41 - 104° F (5 - 40 °C)
Relative humidity:	30 - 90 % (non-condensing)
Housing material:	ABS
Keypad:	Polycarbonate
Dimensions:	7.5 x 4.3 x 2.2 in (190 x 110 x 55 mm (LxWxH))
Weight:	approx. 1 lb. (0.4 kg)

Part No.

Type DT1B photometer , complete with carrying case	1039315
Type DT2C photometer , complete with carrying case	1039316
Type DT3B photometer , complete with carrying case	1039317
Type DT4B photometer , complete with carrying case	1039318

Photometers supplied with accessories, container vessels and reagents.

Consumable items:

Part No.

DPD 1 buffer, 15 ml	1002857
DPD 1 reagent, 15 ml	1002858
DPD 3 solution, 15 ml	1002859
Phenol red tablets R 175 (100 in each)	305532
Cyanuric acid tablets R 263 (100 in each)	305531
SPADNS reagent, 250 ml for fluoride detection	1010381
Calibration standard fluoride 1 mg/l for calibration of photometer (fluoride detection)	1010382
3 spare cells: round cells with covers for DPD phenol red and cyanuric acid detection (DT1 and DT2B)	1039744
3 spare cells for fluoride detection (DT2A and B)	1010396
DPD reagents set, 15 ml each: 3 x DPD 1 buffer, 1 x DPD 1 reagent, 2 x DPD 3 solution	1007567
Chlorine dioxide tablets Nr. 1 R 127	1039732
Chlorine dioxide tablets Nr. 2 R 128	1039733

Spare parts

Chlorite meter:

Foamer for expulsion of chlorine dioxide (DT4)	1022754
3 spare cuvettes for chlorite determination	1007566

H₂O₂ meter:

Reagent for H ₂ O ₂ (DT3), 15 ml	1023636
(Hazardous Material: Special Shipping Charges will apply, please contact ProMinent)	
Spare cuvettes, 5 No., for H ₂ O ₂ (DT3)	1024072

ProMinent® DULCOTEST® Sensors

Overview: Sensors

DULCOTEST® Sensors

DULCOTEST® sensors supply exact, reliable and application-specific measured values in real time for the purpose of effectively monitoring or controlling processes. The sensors can be optimally integrated in the ProMinent® control circuit together with controllers and metering pumps. Many different types of fitting are available for optimum integration in specific processes. The measurement methods

- Potentiometry (pH, ORP, Fluoride)
- Amperometry (disinfectant)
- Conductivity (salinity, alkalinity, acidity)

cover the most important measurement parameters found in water treatment applications. The sensors are stable in the long term, require minimum maintenance and are easy to install, calibrate and service.

Potentiometric DULCOTEST® Sensors

The DULCOTEST® pH and ORP sensors represent a comprehensive range of sensors for solving all measurement tasks. The range of applications extends from simple use in water treatment systems through to industrial process applications with demanding requirements in terms of temperature, pressure as well as resistance to soiling and chemicals.

- Long service life ensured by premium glass quality and an optimum combination of automated and manual production
- Precise and reliable measurement for efficient processes and maximum process reliability
- Tailored process integration guaranteed by special versions with individual installation lengths, cable lengths and connectors
- Short delivery and storage times ensure optimum electrode life

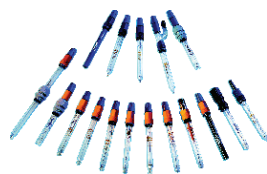
Amperometric DULCOTEST® Sensors

The amperometric sensors of the DULCOTEST® product line supply measured values for the most diverse range of disinfectants such as e.g. chlorine, bromine, chlorine dioxide, ozone. The selective and exact measured values ensure maximum process reliability and are made available round the clock in real time either for monitoring or controlling applications. ProMinent sets standards with its sensor systems: Innovative sensors such as for chlorite, total chlorine, peracetic acid, hydrogen peroxide and dissolved oxygen enhance the product range. The sensors are available for different measuring ranges, in different connection variants for DULCOMETER® measuring and control devices and as special versions for specific applications.

DULCOTEST® Sensors for Electrolytic Conductivity

The comprehensive product line of DULCOTEST® conductivity sensors ensures the right sensor is selected with optimum price/performance ratio in applications ranging from simple water treatment through to intricate industrial process waste water processing. 27 different types of sensor tailored to the most diverse range of requirements: Measuring range, temperature, chemical resistance, soiling compatibility and process integration

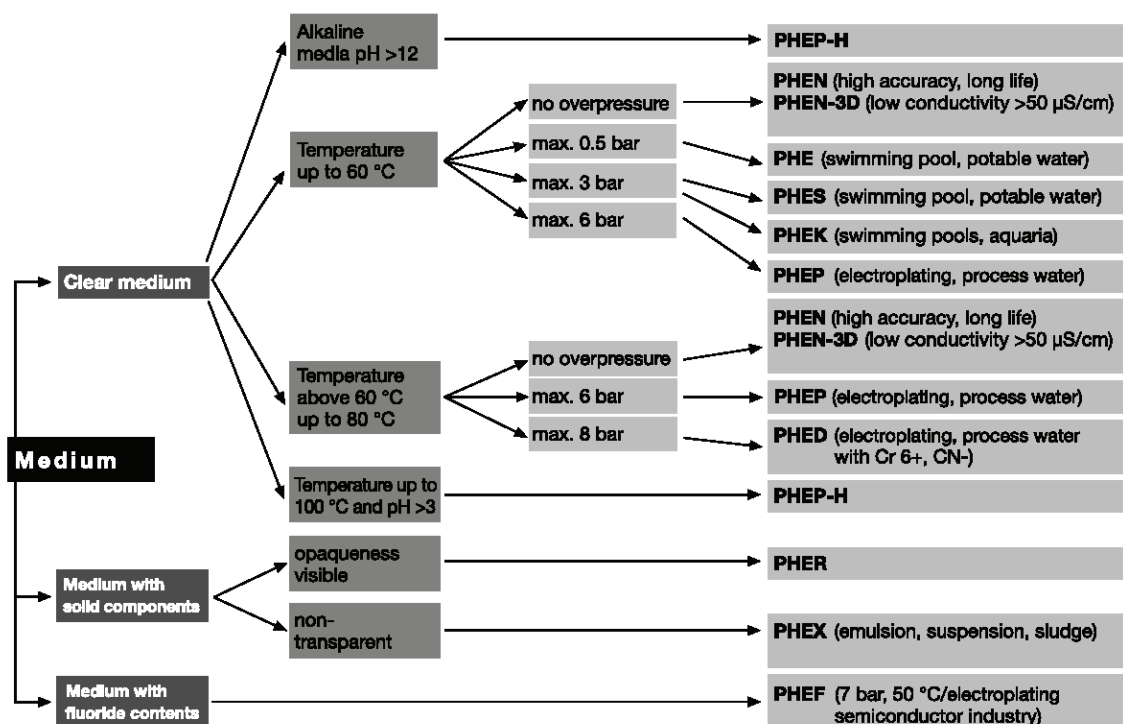
- From simple conductometric 2-electrodes through to inductive high-end sensors
- Precise and reliable measurement for efficient process control and maximum process reliability
- Long service life and long maintenance intervals reduce downtimes and increase the availability of the measured values
- Completely preassembled fitting and sensor sets for simple, fast and flawless installation



ProMinent® DULCOTEST® Sensors

Overview: Sensors

Selection Guide DULCOTEST® pH Sensors



Selection Guide: Amperometric Sensors

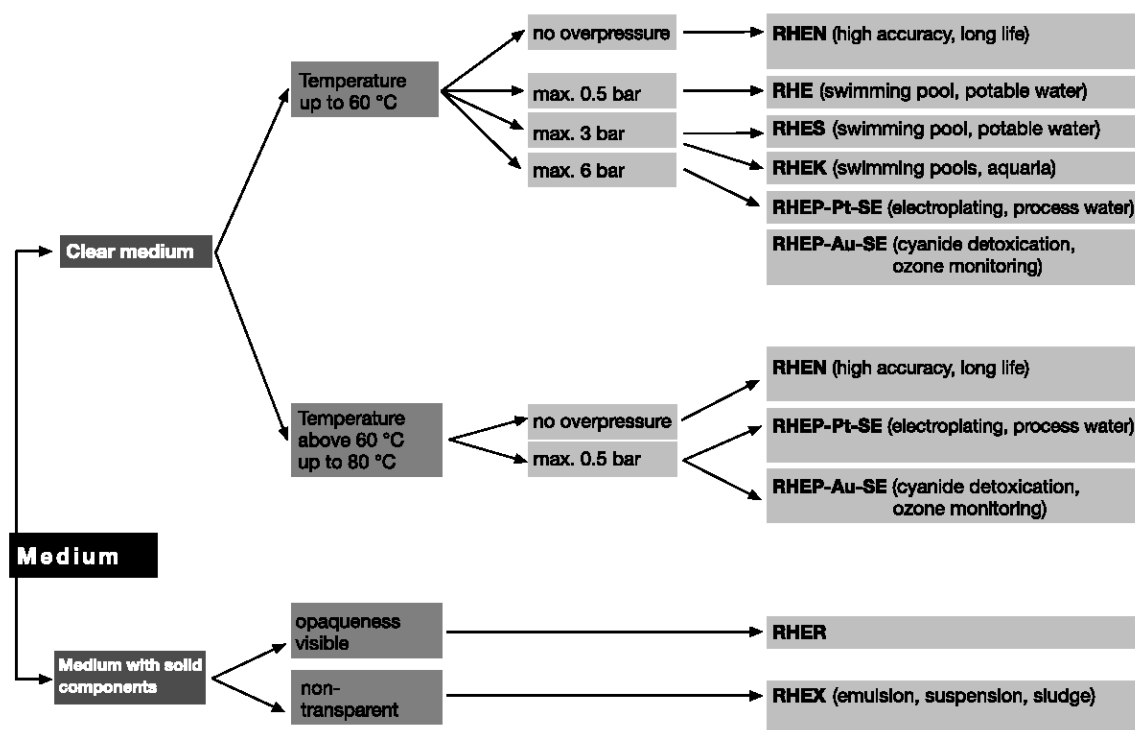
Measured variable	Applications	Measuring range	Connection to DULCOMETER®
Free chlorine	Drinking water, swimming pool	0.01–100 ppm	DAC, D1C, D2C
Free chlorine	Drinking water, swimming pool water, in situ electrolysis (without diaphragm)	0.02–10 ppm	DAC, D1C, D2C
Free chlorine	Hot water up to 70 °C (legionella), in situ electrolysis (without diaphragm)	0.02–2 ppm	DAC, D1C, D2C
Free chlorine	Drinking water, swimming pool	0.01–50 ppm	DMT
Free chlorine	Drinking water, swimming pool	0.01–10 ppm	DULCOMARIN® II
Free chlorine	Cooling water, process water, waste water, water with higher pH values (stable)	0.01–10 ppm	DAC, D1C, D2C
Total chlorine	Swimming pool water with chlorine-organic disinfectants	0.02–10 ppm	DAC, D1C, D2C
Total chlorine	Swimming pool water with chlorine-organic disinfectants	0.01–10 ppm	DULCOMARIN® II
Total chlorine	Drinking, service, process and cooling water	0.01–10 ppm	DAC, D1C, D2C
Total chlorine	Drinking, service, process and cooling water	0.01–10 ppm	DMT
Total chlorine	Drinking, service, process and cooling water	0.01–10 ppm	DULCOMARIN® II
Combined chlorine	Swimming pool water	0.02–2 ppm	DAC, D2C
Combined chlorine	Swimming pool water	0.01–10 ppm	DULCOMARIN® II

ProMinent® DULCOTEST® Sensors

Overview: Sensors

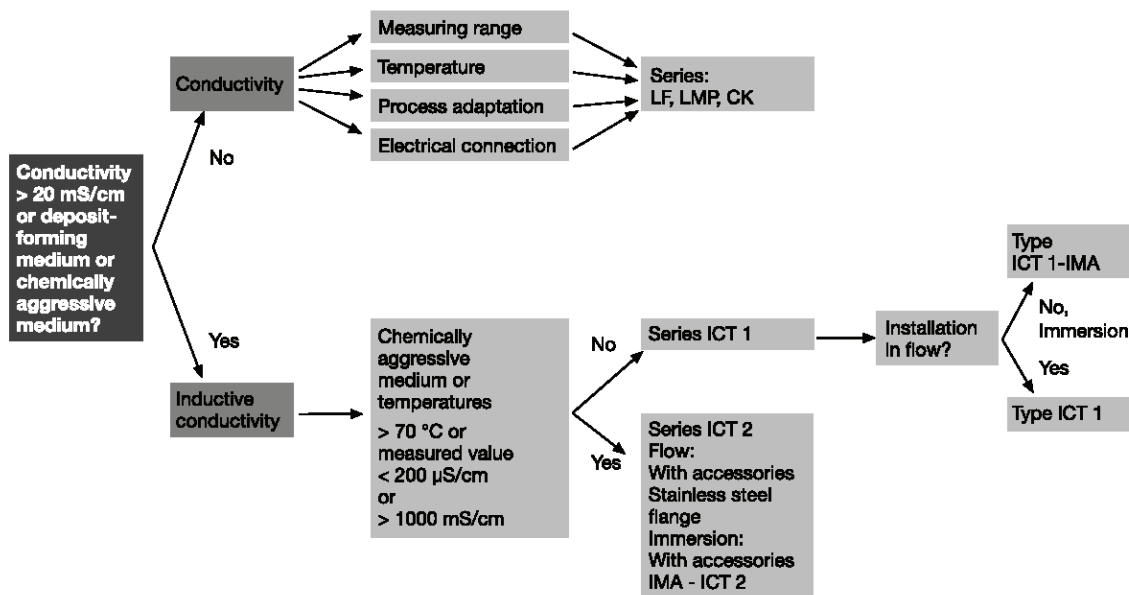
Measured variable	Applications	Measuring range	Connection to DULCOMETER®
Total available bromine	Cooling water, swimming pool water, whirlpool water, bromine with bromorganic disinfectants (e.g. BCDMH)	0.2–10 ppm	DAC, D1C
Total available bromine	Cooling water, swimming pool water, whirlpool water, bromine with inorganic bromine compounds (e.g. NaBr/HOCl)	0.2–10 ppm	DAC, D1C
Total available bromine	Cooling water, swimming pool water, whirlpool water with mine compounds	0.02–10 ppm	DULCOMARIN® II
Free and bound bromine	Cooling water, process water, waste water, water with higher pH values (stable)	0.02–20 ppm	DAC, D1C
Chlorine dioxide	Drinking water	0.01–10 ppm	DAC, D1C, D2C, DULCOMARIN® II
Chlorine dioxide	Bottle washer system	0.02–2 ppm	DAC, D1C, D2C, DULCOMARIN® II
Chlorine dioxide	Hot water up to 60 °C, cooling water, waste water, irrigation water	0.01–10 ppm	DAC, D1C, D2C, DULCOMARIN® II
Chlorite	Drinking, wash water	0.02–2 ppm	DAC, D1C, DULCOMARIN® II
Ozone	Drinking, service, process, swimming pool water	0.02–2 ppm	DAC, D1C
Dissolved oxygen	Drinking, surface water	2–20 ppm	DAC, D1C
Dissolved oxygen	Activated sludge tank, sewage treatment plant	0.1–10 ppm	DAC, D1C
Peracetic acid	CIP, antiseptic food filling process	1–2,000 ppm	DAC, D1C
Hydrogen peroxide	Clear water, fast control	1–2,000 ppm	PEROX controller
Hydrogen peroxide	Process, swimming pool water	0.5–2,000 ppm	DAC, D1CA

Selection Guide DULCOTEST® ORP Sensors



Overview: Sensors

Selection Guide DULCOTEST® Conductivity Sensors



ProMinent® DULCOTEST® Sensors

pH Sensors With SN6 or Vario Pin

Series:

PHE pH sensor

Properties:

- X with solid electrolyte and circular gap diaphragm
- K with plastic sensor shaft
- N refillable KCl electrode
- E Puncture electrode
- R with PTFE circular diaphragm
- P pressure rated to 87 psi
- D 2 ceramics diaphragms (double junction)
- S swimming pool electrode
- F resistant to hydrofluoric acid

Blank: standard gel-filled electrode

Special equipment:

- T With integral temperature sensor
- H Temperature to 100°C, alkaline resistant
- L vertical to horizontal installation

pH measuring range:

112 pH measuring range: 1 - 12

012 pH measuring range: 1 - 12

314 pH measuring range: 3 - 14

Electrical connection to electrode:

- S Plug for coax connector SN6
- V Vario Pin plug

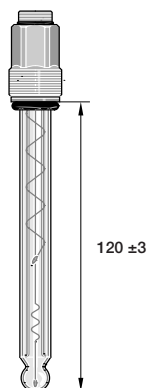
Internal thread:

- E Internal thread PG 13.5 for installation
- L without, laboratory electrode refillable with KCl

Diaphragm:

3D 3 ceramics diaphragms

PHE X T 112 S E 3D



PHES 112 SE

pH range: 1-12

Temperature: 0-60 °C

Max. pressure: 7 psi

Min. conductivity: >150 µS/cm

Diaphragm: Ceramic

Installation length: 120 ± 3 mm, thread PG 13.5

Typical applications: Swimming pool, atmospheric pressure installation, potable water, lightly contaminated waste water.

Part No.

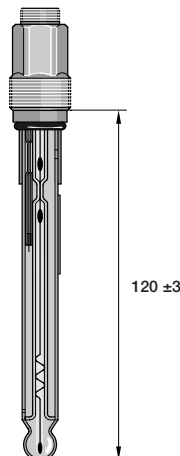
PHES 112 SE

150702

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ProMinent® DULCOTEST® Sensors

pH Combination Sensors With SN6



pk_6_019

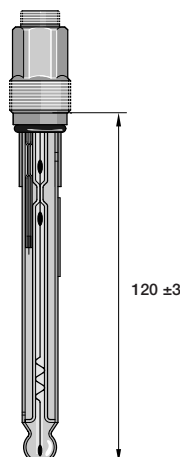
PHEP 112 SE

pH range: 1-12
 Temperature: 0-80 °C
 Max. pressure: 87 psi
 Min. conductivity: >150 µS/cm
 Diaphragm: Ceramic
 Installation length: 120 ±3 mm, thread PG 13.5
 Mounting hole: min 14.5 mm
 Typical uses: Swimming pools under pressure for higher temperatures and pressures, potable and industrial water, lightly soiled wastewater and the electroplating and chemical industries

PHEP 112 SE

Part No.

150041



pk_6_019

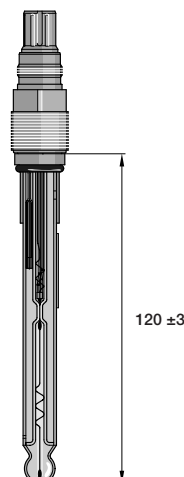
PHEP-H 314 SE

pH range: 3-14 (Note: use below pH 3 shortens the service life)
 Temperature: 0-100 °C
 Max. pressure: 87 psi at 25 °C
 43.5 psi at 100 °C
 Min. conductivity: 150 µS/cm
 Diaphragm: ceramic
 Insertion length: 120 ±3 mm, screw-in thread PG 13.5
 Shank diameter: 12 mm min. diam.
 Typical applications: monitoring or control of chemical processes with neutral to highly-alkaline media and temperatures up to 100 °C

PHEP-H 314 SE

Part No.

1024882



pk_6_068

PHEPT 112 VE*

Technical data and conditions for use as type PHEP 112 SE, however, with integrated Pt 100 enclosed in glass shaft and Vario Pin plug with gold plated contacts.

PHEPT 112 VE

Part No.

1004571

*This sensor needs a special cable, see vario plug connectors under the standard sn6 cables in the catalogue.

ProMinent® DULCOTEST® Sensors

pH Combination Sensors With SN6

PHER 112 SE

pH range: 1-12

Temperature: 0-80 °C

Max. pressure: 87 psi

Min. conductivity: >50 µS/cm

Electrolyte with solid KCl supply (salt rings in the reference electrolyte)

Diaphragm: PTFE ring diaphragm

Installation Length: 120 ±3 mm

Typical applications: Municipal and industrial wastewater, process water, water in the chemical and paper manufacturing industries. General, for water with suspended solid content.

	Part No.
PHER 112 SE	1001586

PHEX 112 SE

pH range: 1-12

Temperature: 0-100 °C

Max. pressure: 232 psi at 25 °C; 87 psi at 100 °C

Min. conductivity: >500 µS/cm

Diaphragm: Circular gap diaphragm (solid electrolyte)

Installation length: 120 ±3 mm

Typical applications: Waste water, industrial water, process chemistry, emulsions, suspensions, fluids containing protein and Sulphide (not for Chlorine/Fluoride or when subject to temperature fluctuations). In general, for water with a high suspended solid content. Not suitable for use in clear water

	Part No.
PHEX 112 SE	305096
PHEX 112 SE Same as above but length 225 ±3 mm	150061

PHEI 112 SE

Benefits

Solid high-grade plastic housing with integrated process connection for direct installation in the process

with ½" and ¾" NPT thread

Large dirt-repellent Teflon diaphragm protects against unwanted blocking of the reference

Double junction reference system for stability with chemically polluted water

Large electrolyte reservoir for long service life

pH range 1 ... 12

Temperature 0 ... 80 °C

Max. pressure 87 psi

Min. conductivity 50 µS/cm

Electrolyte gel containing potassium chloride with a large KCl reservoir of gel

Diaphragm PTFE ring diaphragm

Sensor shaft Plastic

Installation +25° above horizontal

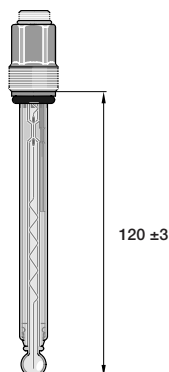
Thread ½" and ¾" NPT thread

Electrical connection SN6 plug-in head, rotatable with a ProMinent cable

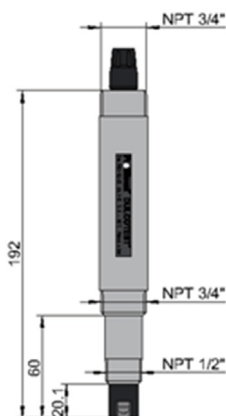
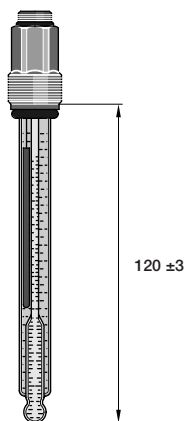
Typical applications : potable, industrial water, lightly contaminated wastewater, cooling tower water.

	Part No.
PHEI 112 SE	1076610

pk_6_018

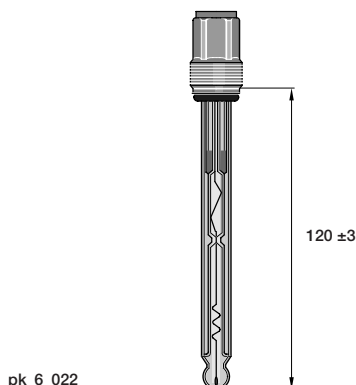


pk_6_017



ProMinent® DULCOTEST® Sensors

pH Combination Sensors With SN6



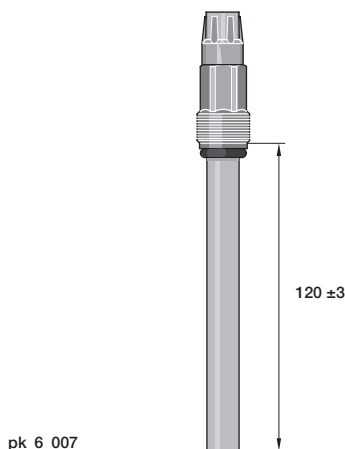
PHED 112 SE

pH range: 1-12
 Temperature: 0-80 °C
 Max. pressure: 116 psi
 Min. conductivity: >150 µS/cm
 Diaphragm: Double junction
 Installation length: 120 ±3 mm
 Typical applications: Potable, industrial water, lightly contaminated waste water, cooling tower water

Part No.

PHED 112 SE

741036



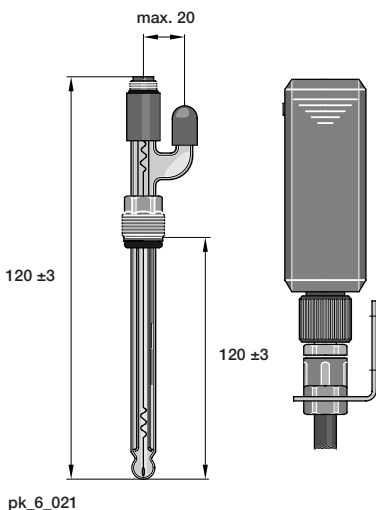
PHEF 012 SE

pH range: 1-12
 Temperature: 0-50 °C
 Max. pressure: 100 psi
 Min. conductivity: >150 µS/cm
 Diaphragm: HDPE ring diaphragm, flat (Double Junction)
 Glass membrane: flat membrane glass, largely resistant to hydrofluoric acid solutions
 Electrode shaft: epoxy
 Typical applications: achieves a significantly longer service life in hydrofluoric acidic fluids as compared to standard pH electrodes, e.g. in wastewaters from the chip industry or electroplating applications.
 The electrode is protected against dirt by the flat glass membrane and the circumferential flat PE diaphragm.

Part No.

PHEF 012 SE

1010511



PHEN 112 SE

pH range: 1-12
 Temperature: 0-80 °C
 Max. pressure: Atmospheric pressure
 Min. conductivity: >150 µS/cm
 Diaphragm: Ceramic
 KCl electrolyte, refillable
 Installation Length: 120 ±3 mm
 Typical applications: Waste water
 Supplied without PE storage container and tubing

Part No.

PHEN 112 SE

305090

Accessories:

PE storage container with connectors and tubing

305058

We recommend installation approx. 1.5 - 3 ft. (0.5-1 m) above sample fluid level

KCl solution 3 molar

250 ml

791440

KCl solution 3 molar

1000 ml

791441

ProMinent® DULCOTEST® Sensors

pH Combination Sensors With SN6

PHEN 112 SE 3D

As PHEN 112 SE but

Min. conductivity: >50 µS/cm

Diaphragm: 3 ceramic diaphragms

Typical applications: As PHEN but for lower conductivity

Part No.

PHEN 112 SE 3D

150078

pH range: 0-12

Temperature: 0-80 °C

Max. pressure: Atmospheric pressure operation

Min. conductivity: >150 µS/cm

Diaphragm: Ceramic

KCl electrolyte, refillable

No internal mounting thread

Typical applications: Manual measurement in laboratory

Part No.

PHEN 112 SL

305078

As above but

Min. conductivity: >50 µS/cm

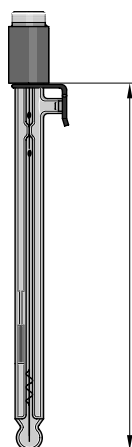
Diaphragm: 3 ceramic diaphragms

Typical applications: Laboratory, lower conductivity

Part No.

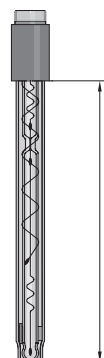
PHEN 112 SL 3D

791508



160 ± 3

pk_6_020



125 ± 3

pk_6_023

PHEK 112 SE

pH range 1-12

Temperature: 0-60 °C

Max. pressure: Atmospheric pressure operation

Min. conductivity: >150 µS/cm

Diaphragm: Glass fiber

No internal mounting thread, plastic shaft

Typical applications: Hand-held measurement in swimming pool, potable water

Part No.

PHEK 112 SE

305051

PHEK-L 112 SE

pH range 1-12

Temperature: 0-60 °C

Max. pressure: 44 psi

Min. conductivity: 150 µS/cm

Diaphragm: Ceramic

Shaft material: Polycarbonate

Installation dimensions: length: 120mm, diameter: 12mm

Installation position: vertically to horizontally (0-90°)

Typical applications: swimming pool at elevated sample pressures, drinking water, slightly contaminated industrial water and wastewater, aquariums.

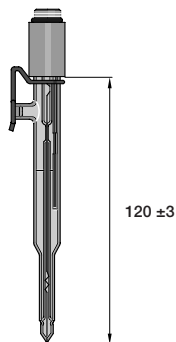
Part No.

PHEK-L 112 SE

1034918

ProMinent® DULCOTEST® Sensors

pH Combination Sensors With SN6



PHEE 112 S

pH range: 1-12

Temperature: 0-60 °C

Max. pressure: Atmospheric pressure operation

Diaphragm: 3 ceramic diaphragms

No internal mounting thread

Typical applications: pH measurement in foodstuffs, e.g. meat, cheese
non sterilisable

	Part No.
PHEE 112 S	791094
Accessories	
Cleaning fluid Pepsin/hydrochloric acid 250 ml	791443

ProMinent® Tuff Tip® Sensors

pH & ORP Tuff Tip® Combination Electrode

Tuff Tip
Electrode

This series of low cost electrodes are designed for reliable pH measurements either in-line or in submersible applications. The simplified construction, designed with the user in mind, does not require electrolyte replenishment or any component replacement. The sensor is housed in a molded, chemically resistant CPVC body with Viton® O-Rings. Complete encapsulation eliminates process intrusion. The sensor features a Magna-Sens® peripheral ceramic junction along with a Tuff Tip® guarded tip with self cleaning features. The Magna-Sens double junction provides a longer life in process solutions containing ammonia, chlorine, cyanides, sulfides, or other poisoning ions.

The Tuff Tip pH electrodes are available with integral temperature compensation and an optional 316 stainless steel solution ground.

Installation is easily achieved through a wide variety of mounting configurations. Featured are ¾ Inch (MNPT) front and rear facing process connections for submersion or flow through applications.

Features

- Disposable Design
- Rugged Tuff Tip® Guarded Electrode Tip
- Double Junction Reference
- Magna-Sens® Reference Junction
- Self Cleaning
- CPVC Housing
- Compatible With Most Analyzers
- ORP: Platinum Band or Gold Disc

Specifications

pH Range: 0-14 pH

Temperature Rating: 0°C to 80°C

Maximum Pressure: 100 PSIG at 60°C

Wetted Materials: Glass & CPVC

Cable Length: Custom lengths available (4 weeks delivery)

Process Connections: ¾ Inch MNPT

pH Probes	Part No.
pH Tuff Tip Electrode Detachable (No Cable)*	7902550
pH Tuff Tip Electrode c/w 15' Attached Cable	7902593
pH Tuff Tip Electrode c/w 20' Attached Cable	7903449
pH Tuff Tip Electrode c/w 50' Attached Cable	7902549
ProMinent Part Number (ORP Probes):	Part No.
ORP Tuff Tip Electrode, Detachable (No Cable)*	7904410
ORP Tuff Tip Electrode c/w 10' Attached Cable	7903418
*Cables (Probe to Controller): 2 x SN 6 Coax	Part No.
6 ft. (2 m)	304955
15 ft. (5 m)	304956
30 ft. (10 m)	304957

Kynar is a Trademark of Pennwalt Corp.

Viton is a Trademark of E.I. du Pont de Nemours & Co.

Teflon is a Trademark of E.I. du Pont de Nemours & Co.

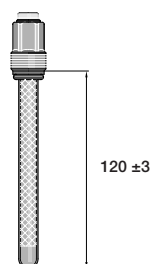
Magna-Sens is a Trademark of pHoenix Electrode Co.

Tuff Tip is a Trademark of pHoenix Electrode Co.

ProMinent® DULCOTEST® Sensors

Temperature Sensors

pk_6_026



Platinum resistance thermometer, glass-jacketed, installed length 120 mm; with push-and-twist connector for SN6 coax connector, and mounting thread PG 13.5; temperature range 0-100°C; maximum working pressure: 145 psig. Without cable and holder.

	Part No.
Pt 100 SE	305063
Pt 1000 SE	1002856

Typical applications:

Temperature measurement and temperature correction of pH, conductivity, Typical applications: Temperature measurement and temperature correction of pH, conductivity, chlorine dioxide (CDP sensor) hydrogen peroxide peracetic acid and Fluoride measurements.

The PT 100 has 100 Ω of resistance at 0°C and 138.5 Ω at 100°C

Whereas the PT 1000 has 1000 Ω at 0°C and 1385 Ω at 100°C

Note:

- The ProMinent Compact Controller must use the PT 1000 sensor.
- The old WS controllers (discontinued in the mid '90's) can only use the PT 100 sensors
- PT 1000 sensors are less influenced by resistance than the PT 100 sensors
- The Pt 100 sensor is also for the DACa, DACb

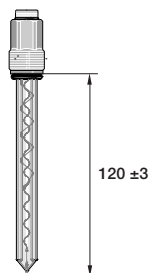
ORP Identcode Description

Identity Code Description (Type description)

	RHEX	Pt	SE
ORP-combination probe			E: internal mounting thread PG 13.5
X: with solid electrolyte and circular gap diaphragm			S: connector for SN6 coax plug
K: with strong plastic shaft			Pt: Platinum electrode (pin)
P: pressure rated to 87 psi			Au: Gold electrode (pin)
R: with PTFE ring diaphragm			
N: refillable KCl electrode			
S: swimming pool electrode			
Blank: standard gel-filled electrode			

ORP Combination Sensors With SN6

pk_6_031



RHES-Pt-SE

Temperature: 0-60 °C

Max. pressure: 7 psi

Min. conductivity: >150 μ S/cm

Diaphragm: Ceramic

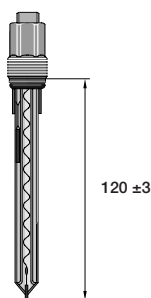
Installation length: 120 \pm 3 mm

Typical applications: Swimming pool, atmospheric pressure installation, potable water, lightly contaminated water

	Part No.
RHES-Pt-SE	150703

ProMinent® DULCOTEST® Sensors

ORP Combination Sensors With SN6



pk_6_035

RHEP-Pt-SE

Temperature: 0-80 °C
 Max. pressure: 87 psi
 Min. conductivity: >150 µS/cm
 Diaphragm: Ceramic
 Installation length: 120 ±3 mm
 Mounting hole: min. Ø 14.5 mm

Typical applications: Swimming pools under pressure, potable and industrial water, lightly soiled wastewater, the electroplating and chemical industries, for higher temperatures and pressures.
 Not suitable for media containing ozone

Part No.

RHEP-Pt-SE

150094

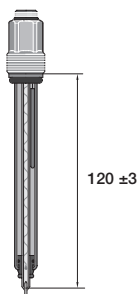
RHEP-Au-SE

Technical data as type RHEP-Pt-SE, but with gold pin electrode.
 Typical application: cyanide detoxification, ozone monitoring.
 Not suitable for media containing chlorine

Part No.

RHEP-Au-SE

1003875



pk_6_034

RHER-Pt-SE

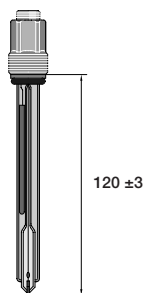
Temperature: 0-80 °C
 Max. pressure: 87 psi
 Min. conductivity: >50 µS/cm
 Electrolyte with KCl supplement (salt rings in the reference electrolyte)
 Diaphragm: PTFE ring diaphragm
 Installation length: 120 ±3 mm

Typical applications: Municipal and industrial waste water, drinking and industrial water, chemical industry, paper manufacture, food industry. General, for water with distinct suspended solid content.

Part No.

RHER-Pt-SE

1002534



pk_6_033

RHEX-Pt-SE

Temperature: 0-100 °C
 Max. pressure: 232 psi at 25 °C; 87 psi at 100 °C
 Min. conductivity: >500 µS/cm
 Diaphragm: circular gap (solid electrolyte)
 Installation length: 120 ±3 mm

Typical applications: Waste water, industrial water, process chemistry, emulsions, suspensions, fluids containing protein and Sulphide (not Chlorine/Fluoride or when subject to temperature fluctuations). In general, for water with high suspended solid content.
 Not suitable for clear media

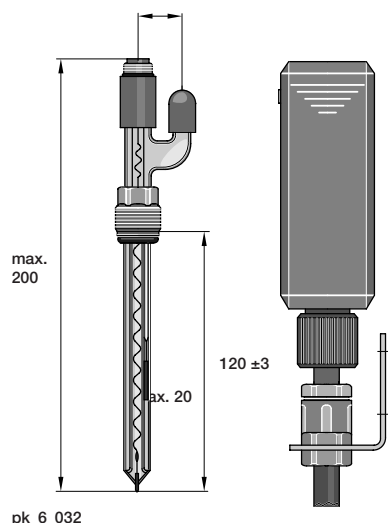
Part No.

RHEX-Pt-SE

305097

ProMinent® DULCOTEST® Sensors

ORP Combination Sensors With SN6



RHEN-Pt-SE

Temperature: 0-80 °C
 Max. pressure: Atmospheric pressure operation
 Min. conductivity: >150 µS/cm
 Diaphragm: Ceramic
 KCl electrolyte, refillable
 Installation length: 120 ± 3 mm
 Typical applications: Waste water
 Supplied without PE storage container and tubing

Part No.

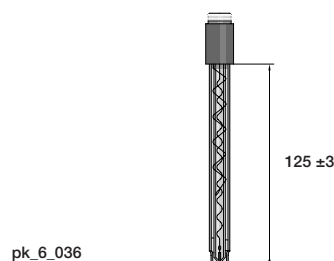
RHEN-Pt-SE	305091
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Accessories:

PE storage container with connectors and tubing	305058
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We recommend installation approx. 0.5-1 m above sample fluid level.

KCl solution 3 molar	250 ml	791440
KCl solution 3 molar	1000 ml	791441

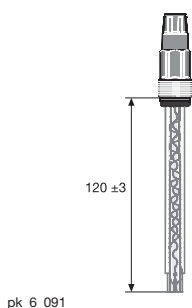


RHEK-Pt-S

Temperature: 0-60 °C
 Max. pressure: Atmospheric pressure operation
 Min. conductivity: >150 µS/cm
 Diaphragm: Glass fibre
 No internal thread
 Typical applications: Manual measurements of e.g. swimming pool, potable water etc.

Part No.

RHEK-Pt-S	305052
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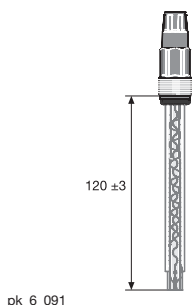


RHEK-Pt-SE

Temperature: 0-60 °C
 Max. pressure: 44 psi
 Min. conductivity: 150 µS/cm
 Diaphragm: Ceramic
 Thread: PG 13.5
 Typical applications: Swimming pool at elevated sample water pressures, drinking water, lightly contaminated waste water.

Part No.

RHEK-Pt-SE	1028459
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RHEK-L-Pt-SE

Temperature: 0-60 °C
 Max. pressure: 44 psi
 Min. conductivity: 150 µS/cm
 Diaphragm: Ceramic
 Electrode shaft: Polycarbonate
 Dimensions: length: 120mm, diameter 12mm
 Installation position: vertically to horizontally (0-90°)
 Thread: PG 13.5
 Typical applications: swimming pool at elevated sample water pressures, drinking water, slightly contaminated wastewater.

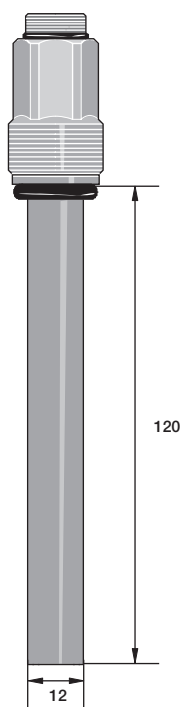
Part No.

RHEK-L-Pt-SE	1034919
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ProMinent® DULCOTEST® Sensors

Fluoride Sensors

DULCOTEST® Fluoride electrodes are ion-selective electrodes based on the potentiometric measurement principle. They are designed for determining the concentration of Fluoride anions in aqueous solutions. These electrodes have been optimised for use in monitoring the fluoridation of potable water in waterworks. Corresponding conditions must be observed.



pk_6_095

FLEP 010

A 4-20 mA measurement transducer, a reference electrode and a temperature sensor for temperature compensation are required as well as the Fluoride electrode. Measured variable: Fluoride ion concentration

Reference method: DT2A and DT2B Photometers, see page 214

Measurement range with measurement transducer: 0.05-10.00 ppm

pH range: 5.5-9.5

Temp. range: 1-35 °C

Max. Pressure: 100 psi (no pressure surges)

Sample flow: recommended 20 L/h: 10 - 200 L/h

Conductivity range: > 100 µS/cm

Response time T95 (open): < 30 s (for conc. > 0.5 ppm)

Enclosure rating: NEMA 4

Shelf life: approx. 6 months

Length when fitted: 120 mm

Shaft diameter: 12 mm

Typical application: Monitoring Fluoride in potable water

Measurement and control equipment: DAC

in-line probe housing: DLG IV

Part No.

FLEP 010 (Fluoride sensor)*	1028279
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Accessories

4-20 mA measurement transducer FPV1**	1028280
Sensor cable	7740215
Reference electrode, REFP-SE	1018458
Temperature sensor, Pt 100	305063
Polishing paste	559810

* replaces Fluoride sensor (part no. 1010311)

** replaces transducer (part no. 1009962)

IMPORTANT NOTE:

There are 2 types of Fluoride sensors, call them the old one and the new one, each needs its own transducer - they are not interchangeable. The new one has the advantage of being able to measure at a higher pH up to 9.5 - the old sensor up to pH 8.5

Old Fluoride sensor	FLE 010 SE	1010311
Old Fluoride transducer	F V1	1009962
New Fluoride sensor	FLEP 010 SE	1028279
New Fluoride transducer	FP V1	1028280

In both cases the reference electrode and Pt 100 sensor are the same. If you wish to upgrade your older version Fluoride Package to the latest version, you will need to order a new sensor and transducer and upgrade your D1C firmware by sending back to the factory (there will be a charge for this).

ProMinent® DULCOTEST® Sensors

DULCOTROL® Fluoride measuring system



Reliable online monitoring of Fluoride in potable water and waste water

Part#: 1010603

The main components of the compact online measuring system for Fluoride are a sensor, fitting and measuring instrument. The DULCOTROL® product is available both as a standalone component and as a fully panel-mounted measuring point.

The measuring system for a measuring range of 0.5 to 10 ppm is used in areas where Fluoride is added to potable water to monitor Fluoride values in line with statutory limits. There is also a version for a measuring range of 0.5 to 100 ppm for monitoring waste water. This is particularly well suited to facilities producing semiconductors and solar cells in countries where a maximum concentration of Fluoride discharge is prescribed by law. Continuously measuring the Fluoride ensures round-the-clock monitoring and avoids costly and lengthy lab measurements.

The integrated temperature compensation and pH-tolerant measurement ensures accurate results even with fluctuations in temperature and pH. Compared with Fluoride analysers which only function sequentially, the online sensor-based measuring system from ProMinent® is a more reliable monitor, cheaper and requires less maintenance: the electro-chemical verification method requires no reagents – no transfer of samples and no dirt-sensitive optics. The Fluoride-selective, potentiometric electrode produces a voltage signal proportional to the concentration of Fluoride. This is converted into a disturbance-free 4 to 20 mA signal in the measuring transducer and is transferred to the measuring unit.

This is the only product of its type available on the market to offer a high pH range of up to 9.5.

Benefits

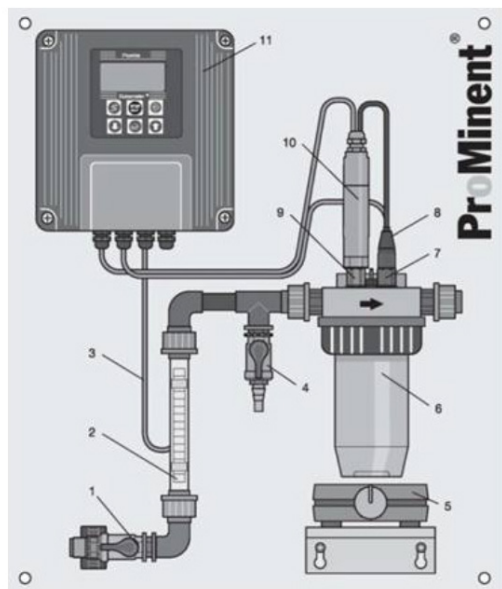
- Reliable monitoring and efficient process management in real time
- No interference from cross sensitivity
- pH of up to 9.5
- Electro-chemical measurement with no dirt-sensitive optics or expensive reagents
- No sample transfer system needed and no mechanical parts
- Simple Fluoride-selective electrode makes for rapid commissioning
- Long service life thanks to inner electrolytes with patent pending
- Simple calibration without standard solution using the optional complete photometer kit (type DT2)

ProMinent® DULCOTEST® Sensors

DULCOTROL® Fluoride measuring system

Key applications

- Online monitoring of fluoridation of potable water in water works
- Online monitoring of waste water, especially in facilities producing semiconductors and solar cells



- 1 Shut-off valve
- 2 Flow Meter
- 3 Limit contact
- 4 Sampling tap
- 5 Magnetic stirrer (for calibration with standard solutions only)
- 6 In-line probe housing DLG IV
- 7 Reference electrode REFP SE
- 8 Temperature sensor Pt 100
- 9 Measuring transistor 4-20 mA FP V1
- 10 Fluoride probe FLEP
- 11 Measuring unit DULCO

Measured variable
Reference method
Measuring ranges

pH range
Temperature
Pressure
Flow

Conductivity
Response time
Degree of protection
Storage period

Concentration of Fluoride ions
Photometric, photometer DT2B
With measuring transducer FPV1: 0.05 - 10 mg/l
With measuring transducer FP100V1: 0.05 - 100 mg/l
5.5 - 9.5
1 - 35° C
Max 100 psi (no surges)
10 - 200 l/h
Recommended 20 l/h
Min 100 uS/cm
T95 max. 30 s (for conc. > 0.5ppm)
IP 65
Approx. 6 months

ProMinent® DULCOTEST® Sensors

Overview: Amperometric Sensors

For optimum functioning of chlorine, bromine, chlorine dioxide and ozone sensors please note the following guidelines:

- Use DULCOMETER® measurement and control systems.
- Install only in ProMinent® DGM or DLG III in-line probe fittings.
- Defined flow between 7.9-15.8 gph (30-60 L/h).
- Chlorine measurement must only take place when pH is stable.
- Regular calibration with a Photometer (e.g. Type DT 1).

Important:

Amperometric sensors are not electrically isolated. When installing in external appliances (e.g. PLC), you should electrically isolate the supply voltage and the analog input signal.

Summary of features:

- High zero point stability
- Compact design
- Integrated temperature correction
- Simple to install
- Simple to maintain
- Short running-in period
- Measurement signal virtually unaffected by flow

Measured variable	Applications	Graduated measuring range	DULCOMETER®	Sensor type
Free chlorine	Drinking water, swimming pool	0.01–100 ppm	DAC, D1C, D2C	CLE 3-mA-xppm, CLE 3.1-mA-xppm
Free chlorine	Drinking water, swimming pool water, in situ electrolysis (without diaphragm)	0.02-10 ppm	DAC, D1C, D2C	CLO 1-mA-xppm
Free chlorine	Hot water up to 70 °C (legionella), in situ electrolysis (without diaphragm)	0.02-2 ppm	DAC, D1C, D2C	CLO 2-mA-2ppm
Free chlorine	Drinking water, swimming pool	0.01–50 ppm	DMT	CLE 3-DMT-xppm
Free chlorine	Drinking water, swimming pool	0.01–10 ppm	DULCOMARIN® II	CLE 3-CAN-xppm, CLE 3.1-CAN-xppm
Free chlorine	Drinking water, swimming pool	0.05-5 ppm	COMPACT	CLB 2-µA-xppm
Free chlorine	Cooling water, process water, waste water, water with higher pH values (stable)	0.01-10 ppm	DAC, D1C, D2C	CBR 1-mA-xppm
Total available chlorine	Swimming pool water with chlorine-organic disinfectants	0.02–10 ppm	DAC, D1C, D2C	CGE 2-mA-xppm
Total available chlorine	Swimming pool water with chlorine-organic disinfectants	0.01–10 ppm	DULCOMARIN® II	CGE 2- CAN-xppm
Total chlorine	Drinking, service, process and cooling water	0.01–10 ppm	DAC, D1C, D2C	CTE 1-mA-xppm
Total chlorine	Drinking, service, process and cooling water	0.01–10 ppm	DMT	CTE 1-DMT-xppm
Total chlorine	Drinking, service, process and cooling water	0.01–10 ppm	DULCOMARIN® II	CTE 1-CAN-xppm
Combined chlorine	Swimming pool water	0.02–2 ppm	DAC, D2C	CTE 1-mA-2 ppm + CLE 3.1-mA-2 ppm
Combined chlorine	Swimming pool water	0.01–10 ppm	DULCOMARIN® II	CTE 1-CAN-xppm + CLE 3.1-CAN-xppm
Total available bromine	Cooling water, swimming pool water, whirl-pool water, bromine with bromorganic disinfectants (e.g. BCDMH)	0.2–10 ppm	DAC, D1C	BRE 1-mA-xppm
Total available bromine	Cooling water, swimming pool water, whirl-pool water, bromine with inorganic bromine compounds (e.g. NaBr/HOCl)	0.2–10 ppm	DAC, D1C	BRE 2-mA-xppm
Total available bromine	Cooling water, swimming pool water, whirl-pool water with bromorganic or inorganic bromine compounds	0.02-10 ppm	DULCOMARIN® II	BRE 3-CAN-10 ppm
Free and bound bromine	Cooling water, process water, waste water, water with higher pH values (stable)	0.02-20 ppm	DAC, D1C	CBR 1-mA-xppm

ProMinent® DULCOTEST® Sensors

Overview: Amperometric Sensors

Measured variable	Applications	Measuring range	Connection to DULCOMETER®	Sensor type
Chlorine dioxide	Drinking water	0.01–10 ppm	DAC, D1C, D2C DULCOMARIN® II	CDE 2-mA-xppm
Chlorine dioxide	Bottle washer system	0.02–2 ppm	DAC, D1C, D2C DULCOMARIN® II	CDP 1-mA
Chlorine dioxide	Hot water up to 60 °C, cooling water, waste water, irrigation water	0.01–10 ppm	DAC, D1C, D2C DULCOMARIN® II	CDR 1-mA-xppm
Chlorite	Drinking, wash water	0.02–2 ppm	DAC, D1C DULCOMARIN® II	CLT 1-mA-xppm
Ozone	Drinking, service, process, swimming pool water	0.02–2 ppm	DAC, D1C	OZE 3-mA-xppm
Dissolved oxygen	Drinking, surface water	2–20 ppm	DAC, D1C	DO 1-mA-xppm
Dissolved oxygen	Activated sludge tank, sewage treatment plant	0.1–10 ppm	DAC, D1C	DO 2-mA-xppm
Peracetic acid	CIP, antiseptic food filling process	1–2,000 ppm	DAC, D1C	PAA 1-mA-xppm
Hydrogen peroxide	Clear water, fast control	1–2,000 ppm	PEROX controller	Perox sensor PEROX-H2.10-P
Hydrogen peroxide	Process, swimming pool water	0.5–2,000 ppm	DAC, D1CA	PER1-mA-xppm

Overview: Amperometric Sensors Selection Guide

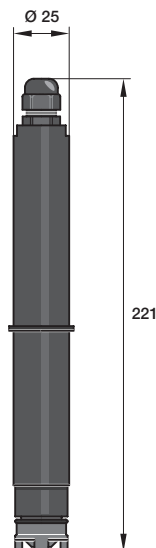
		Selection Guide						
		CLE 3	CLE 3.1	CLO 1	CLO 2	CBR 1	CGE 2	CTE 1
Measured variable	Free chlorine	x	x	x	x	x		
	Total available chlorine (cyanuric acid derivatives)						x	x
	Total chlorine						x	x
Selectivity of free chlorine	raised		x					
	yes	x		x	x	x		
	no						x	x
Application	Public swimming pools	x	x				(x)	
	Private swimming pools	x	x	x			x	
	Drinking water	x	x		x			x
Disinfectant	Cooling water					x		x
	Waste water					x		x
	chlorine gas, hypochlorite, electrolysis with diaphragm	x	x	x	x	x		x
Specifications	electrolysis without diaphragm			x	x			
	chlorine-containing cyanuric acid derivatives						x	
	Measuring range [ppm]	0.01–100	0.01–10	0.02–2	0.02–2	0.01–10	0.02–10	0.01–10
Installation	pH range	5.5–8	5.5–8	5–9	5–9	5–9.5	5.5–9.5	5.5–9.5
	Temperaturer (°F)	41–113	41–113	41–113	41–158	41–113	41–113	41–113
	(°C)	5–45	5–45	5–45	5–70	5–45	5–45	5–45
Installation	Max. pressure [bar]	1	1	8	8	1	3	3
	open outlet	x	x	x	x	x	x	x
	direct installation in the circuit			x	x			

Note: Interference, such as film-forming substances, chemical residue, flow, conductivity

ProMinent® DULCOTEST® Sensors

Chlorine Sensors

pk_6_039



Measurement of free chlorine

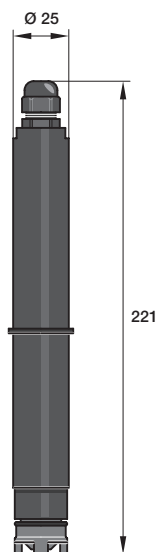
CLE 3-mA

Measured variable:	Free chlorine (hypochlorous acid HOCl)
Analysis:	DPD 1
pH range:	5.5-8.0 (up to pH 8.5 with pH correction)
Temperature range:	5-45 °C temperature compensated
Max. pressure:	14.5 psi
Flow:	30-60 L/h in DGM or DLG III
Power supply:	16-24 V DC (two-wire technology)
Output signal:	4-20 mA = measurement range (un-calibrated) Warning: no electrical isolation!
Typical applications:	CLE 3-mA-0.5 ppm, potable water CLE 3-mA-2/5/10 ppm, swimming pool, potable, industrial, process water (surfactant free)
Measurement and control devices:	DAC, D1C, D2C
In-line probe housing:	DGM, DLG III

Part No.

CLE 3-mA-0.5 ppm set, with 100 ml electrolyte	792927
CLE 3-mA-2 ppm set, with 100 ml electrolyte	792920
CLE 3-mA-5 ppm set, with 100 ml electrolyte	1033392
CLE 3-mA-10 ppm set, with 100 ml electrolyte	792919
CLE 3-mA-20 ppm set, with 100 ml electrolyte	1002964
CLE 3-mA-50 ppm set, with 100 ml electrolyte	1020531
CLE 3-mA-100 ppm set with 100 ml electrolyte	1022786

pk_6_039



CLE 3.1-mA

Measured variable:	free chlorine (hypochlorous acid HOCl) where there is a high rate of combined chlorine and/or in the case of pH values up to 8.5 (with pH correction)
Reference method:	DPD1
Measurement range:	0.01-0.50 mg/l (CLE 3.1-mA-0.5 ppm) 0.02-2.00 mg/l (CLE 3.1-mA-2 ppm) 0.01-5.00 mg/l (CLE 3.1-mA-5 ppm) 0.1-10.0 mg/l (CLE 3.1-mA-10 ppm)
pH range:	5.5-8.0 (up to pH 8.5 with pH correction)
Temp. range:	5-45 °C temperature compensated
Max. pressure:	14.5 psi
Inflow:	30-60 L/h in the DGM or DLG III
Supply voltage:	16-24 V DC (two wire technology)
Output signal:	4-20 mA = measurement range (uncalibrated) Important: not electrically isolated!
Typical applications:	swimming pool, industrial and process water with higher proportions of combined chlorine and/or higher pH values to pH 8.5
Measurement and control equipment:	DAC, D1C, D2C
In-line probe housing:	DGM, DLG III

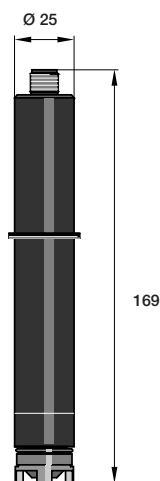
Part No.

CLE 3.1-mA-0.5 ppm set, with 100 ml electrolyte	1020530
CLE 3.1-mA-2 ppm set, with 100 ml electrolyte	1018369
CLE 3.1-mA-5 ppm set, with 100 ml electrolyte	1019398
CLE 3.1-mA-10 ppm set, with 100 ml electrolyte	1018368

ProMinent® DULCOTEST® Sensors

Chlorine Sensors

pk_6_038

**CLE 3-DMT**

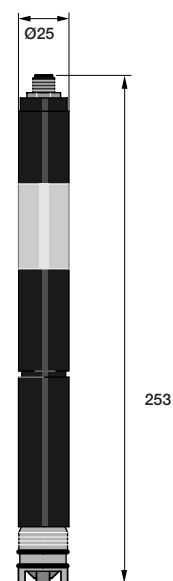
Measuring cell for use with the DMT “chlorine” measurement transducer.

Measured variable:	Free chlorine (hypochlorous acid HOCl)
Reference method:	DPD1
Measurement range:	0.01-5.0 mg/l 0.05-50 mg/l
Supply:	From the DMT measurement transducer
Output signal:	Un-calibrated, not temperature compensated
Temp. measurement:	Via integrated Pt 1000: compensation carried out in DMT
Measuring cell output:	5-pin plug
Other data as for CLE-3 mA.	

Part No.

CLE 3-DMT-5 ppm set with 100 ml electrolyte	1005511
CLE 3-DMT-50 ppm set with 100 ml electrolyte	1005512

pk_6_096

**CLE 3-CAN-P**

Sensors for connection to a CAN interface (e.g. DULCOMARIN® II swimming pool controller)

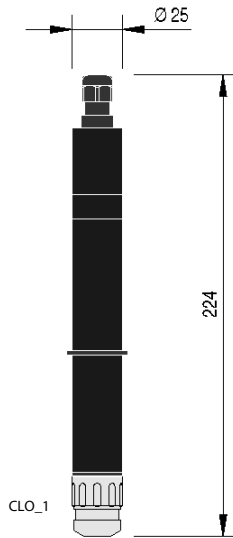
Measured variable:	free chlorine (hypochlorous acid)
Reference method:	DPD 1
Measurement range:	0.01 -10 mg/l
Power supply:	via CAN interface (11-30 V)
Temperature measurement:	via installed digital semiconductor element
Output signal:	uncalibrated, temperature compensated, electrically isolated
Compatibility:	CAN-Open bus systems
Additional data see CLE 3-mA	

Part No.

CLE 3-CAN-P 0.01 ... 10.0 ppm set with 100 ml electrolyte	1083209
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ProMinent® DULCOTEST® Sensors

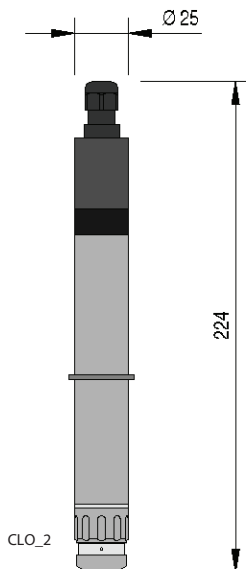
Chlorine Sensors



CLO 1-mA

Measured variable:	Free chlorine (hypochlorous acid HOCl)
Reference method:	DPD1
pH range:	5-9 ppm
Temperature:	5-45 °C
Max. pressure:	116 psi
Sample flow:	30-60 L/h (in DGM or DLG III), constant flow as flow-dependent signal
Power supply:	16-24 V DC (2-wire)
Output signal:	4-20 mA = Measuring range, temperature-compensated, uncalibrated, not electrically isolated
Typical applications:	Swimming pool, uncontaminated drinking water and industrial service water, and can also be used together with diaphragm-free electrolysis processes
Measurement and control equipment:	DAC
In-line probe fitting:	DGM, DLG III
Measuring principle:	amperometric, 3 electrodes, no diaphragm

	Measuring range	Part No.
CLO 1-mA-2 ppm	0.02-2.0 ppm	1033871
CLO 1-mA-2 ppm	0.10-10.0 ppm	1033870



CLO 2-mA

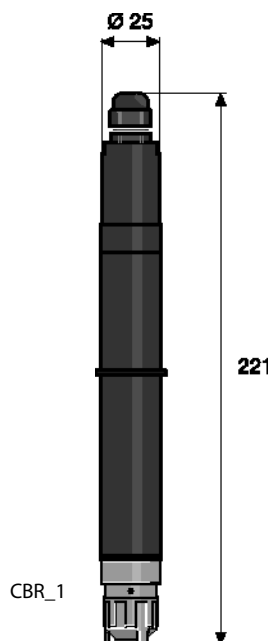
Measured variable:	Free chlorine (hypochlorous acid HOCl)
Reference method:	DPD1
pH range:	5-9 ppm
Temperature:	5-70 °C
Max. pressure:	116 psi at 25 °C max
Sample flow:	30-60 L/h (in DGM or DLG III), constant flow as flow-dependent signal
Typical applications:	Hot water up to 70 °C, combatting legionella, uncontaminated drinking water and industrial service water, can, also be used together with diaphragm-free electrolysis processes
Measurement and control equipment:	DAC
In-line probe fitting:	DGM, DLG III to 60 °C, special fitting for 60-70 °C on request
Measuring principle:	amperometric, 3 electrodes, no diaphragm

	Measuring range	Part No.
CLO 2-mA-2 ppm	0.02-2.0 ppm	1033878

Accessories for hydrodynamic cleaning	Part No.
Cleaning set CLO/DGMA with flow nozzle CLO for DGMA and cleaning balls (approx. 100)	1104286
Flow nozzle CLO	1104264
Cleaning balls (approx. 100)	1104267

ProMinent® DULCOTEST® Sensors

Chlorine Sensors

**CBR 1-mA**

Measured variable:	Free chlorine (hypochlorous acid HOCl), free bromine, bound-bromine
Reference method:	DPD1
pH range:	5-9.5 ppm
Temperature:	5-45 °C
Max. pressure:	14.5 psi
Sample flow:	30-60 L/h (in DGM or DLG III)
Power supply:	16-24 V DC (2-wire)
Output signal:	4-20 mA = Measuring range, temperature-compensated, uncalibrated, not electrically isolated
Typical applications:	Cooling water, Process water, Waste water, Water with high higher pH values (stable pH)
Measurement and control equipment:	DAC, D1C
In-line probe fitting:	DGM, DLG III
Measuring principle:	amperometric, 2 electrodes, diaphragm-covered

	Measuring range	Part No.
CBR 1-mA-0.5 ppm	0.01-0.5 ppm	1038016
CBR 1-mA-2 ppm	0.02-2 ppm	1038015
CBR 1-mA-5.00 ppm	0.05-5.00 ppm	1052138
CBR 1-mA-10 ppm	0.10-10 ppm	1038014

ProMinent® DULCOTEST® Sensors

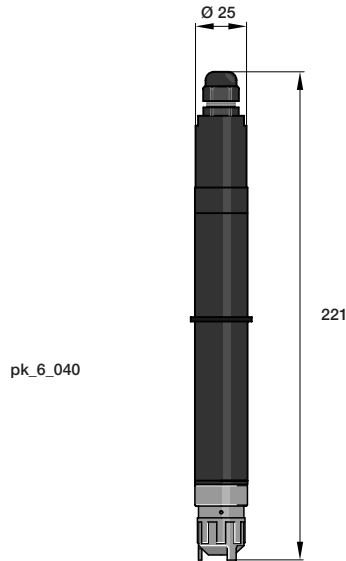
Chlorine Sensors

Sensor for Free Chlorine CLR 1-mA

Sensor for free chlorine measurement above 10 ppm in rinsing water applications.

Your benefits

- Measured variable free chlorine for high concentration of up to 1,000 ppm * Standard range is 10 ... 200 ppm
- Diaphragm-covered sensor prevents faults caused by changing flow or ingredients in the water
- Resistance to films of dirt by pore-free diaphragm



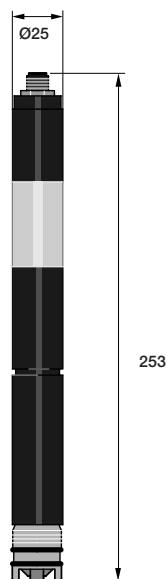
Measured variable:	Free chlorine (hypochlorous acid HOCl)
Reference method:	DPD1
pH range:	5.5 ... 8.0
Temperature:	5 ... 45 °C
Max. pressure:	14.5 psi
Sample flow:	30 ... 60 L/h in DGMa or DLG III
Supply voltage:	16 ... 24 V DC (2-wire)
Output signal:	4 ... 20 mA = Measuring range, temperature-compensated, uncalibrated, not electrically isolated
Disinfection process:	Chlorine gas, hypochlorite, electrolysis with diaphragm
Installation:	Bypass: open water outlet
Measuring and control equipment:	DACb
Typical applications:	Salad, vegetable and poultry washing water, contaminated process and waste water
Measuring principle, technology	Amperometric, 2 electrodes, membrane-covered

	Measuring range	Part No.
CLR 1-mA-200 ppm	10.0 ... 200 ppm	1047978

*Important note: Measuring range from 10.0 ... 1,000 ppm on request

ProMinent® DULCOTEST® Sensors

Chlorine Sensors



pk_6_096

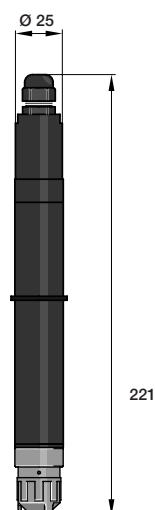
CLE 3.1-CAN-P

Sensor for connection to a CAN interface (e.g. DULCOMARIN® II swimming pool controller)

Measured variable:	free chlorine (hypochlorous acid) with high proportion of bound chlorine and/or pH value up to 8.0
Reference method:	DPD 1
Measurement range:	0.01 -10 mg/l
Power supply:	via CAN-interface (11-30 V)
Temperature measurement:	via installed digital semiconductor element
Output signal:	uncalibrated, temperature compensated, electrically isolated
Compatibility:	CAN-Open bus systems
Additional data see CLE 3.1-mA	

Part No.

CLE 3.1-CAN-P	10 ppm	0.01 ... 10.00 ppm	1083584
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pk_6_040

Measured variable of organic combined chlorine and free chlorine (total available chlorine)**CGE 3-mA**

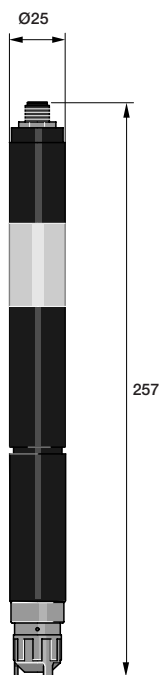
Measured variable:	Total available chlorine: sum of organically combined chlorine (e.g. combined in cyanuric acid) and free chlorine
Reference method:	DPD1
Measurement range:	0.02-2.00 mg/l (CGE 3-mA-2 ppm) 0.1-10.0 mg/l (CGE 3-mA-10 ppm)
pH range:	5.5-9.5
Temperature range:	5-45 °C temperature compensated
Max. pressure:	43.5 psi
Flow:	30-60 L/h in DGM or DLG III
Power supply:	16-24 V DC (two-wire technology)
Output signal:	4-20 mA = measurement range (un-calibrated) Warning: no electrical isolation!
Typical applications:	Swimming pools and in water with high pH-value
Measurement and control devices:	DAC
In-line probe housing:	DGM, DLG III

Part No.

CGE 3-mA	2 ppm	0.02 ... 2.0 ppm	1047959
CGE 3-mA	10 ppm	0.10 ... 10.00 ppm	1047975

ProMinent® DULCOTEST® Sensors

Chlorine Sensors



pk_6_084

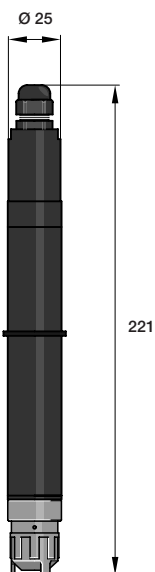
CGE 3-CAN-P

Probe for connection to a CANopen interface (e.g. DULCOMARIN® 3 and DULCOMARIN® II)

Measured variable:	total available chlorine: sum of organically combined chlorine (e.g. combined in cyanuric acid) and free chlorine
Reference method:	DPD
Range:	0.01-10.00 ppm
pH range:	5.5-9.5
Temp. range:	5-45 °C (temperature compensated)
Max. pressure:	43 psi
Incident flow:	30-60 L/h (with DGMa or DLG III)
Supply:	via CAN interface (11-30 V)
Temperature measurement:	via built-in digital semiconductor device
Output signal:	calibrated, temperature-compensated, electrically-isolated
Compatibility:	DULCOMARIN® 3, for DULCOMARIN® II only with hardware after 06.02.2014 from software version 3027 or later, with hardware after 06.02.2014 from software version 3033 or later

See CGE 3-mA for other information

	Part No.
CGE 3-CAN-P-10 ppm	1083211



pk_6_040

Measured variable of total chlorine

CTE 1-mA

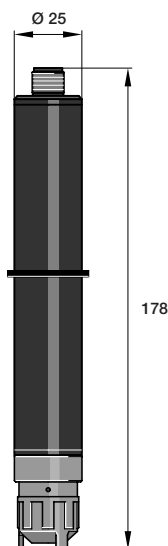
Measured variable:	total chlorine
Reference method:	DPD4
Measurement range:	0.01...0.50 mg/l (CTE 1-mA-0.5 ppm) 0.02... 2.00 mg/l (CTE 1-mA-2 ppm) 0.05... 5.00 mg/l (CTE 1-mA-5 ppm) 0.1...10.0 mg/l (CTE 1-mA-10 ppm)
pH range:	5.5...9.5
Temperature range:	5...45 °C (temperature compensated)
Max. pressure:	32 psi
Flow:	30...60 L/h (in DGM or DLG III)
Power supply:	16...24 V DC (two-wire technology)
Output signal:	4...20 mA = measurement range (un-calibrated) Warning: no electrical isolation!
Typical applications:	CTE 1-mA-0.5 ppm, potable water CTE 1-mA-2/5/10 ppm: Potable, process, industrial and cooling water. In swimming pools in combination with CLE 3.1 for determining combined chlorine.

Measurement and control devices:	DAC, D1C
In-line probe housing:	DGM, DLG III

	Part No.
CTE 1-mA-0.5 ppm set, with 50 ml electrolyte	740686
CTE 1-mA-2 ppm set, with 50 ml electrolyte	740685
CTE 1-mA-5 ppm set, with 50 ml electrolyte	1003203
CTE 1-mA-10 ppm set, with 50 ml electrolyte	740684

ProMinent® DULCOTEST® Sensors

Chlorine Sensors



pk_6_015

CTE 1-DMT

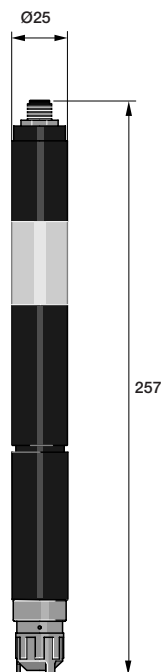
Measuring cell for use with the DMT “chlorine” measurement transducer.

Measured variable:	Total chlorine
Reference method:	DPD4
Measurement range:	0.01-10.0 mg/l
Power supply:	From the DMT measurement transducer (3.3 VDC)
Output signal:	Un-calibrated, not temperature compensated
Temperature measurement:	Via integrated Pt 1000: compensation carried out in DMT
Sensor output:	5-pin plug
Other data as for CTE 1 mA	

Part No.

CTE 1-DMT-10 ppm set with 50 ml electrolyte

1007540



pk_6_084

CTE 1 -CAN-P

Sensor for connection to a CAN interface (e.g. DULCOMARIN® 3 and DULCOMARIN® II)

Measured variable:	total chlorine
Reference method:	DPD 4
Measurement range:	0.01 -10 mg/l
Power supply:	via CAN interface (11-30 V)
Temperature measurement:	via installed digital semiconductor element
Output signal:	uncalibrated, temperature compensated, electrically isolated
Compatibility:	DULCOMARIN® 3, DULCOMARIN® II only with hardware after 06.02.2014 from software version 3035 or later

Additional data see CTE 1 mA

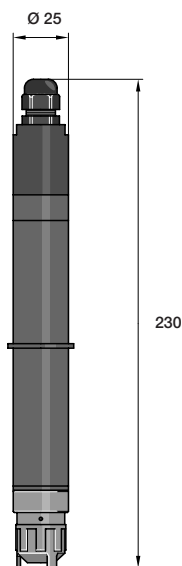
Part No.

CTE 1-CAN-P-10 ppm 0.01 ... 10.0 ppm

1083210

ProMinent® DULCOTEST® Sensors

Bromine Sensors



pk_6_074

The following bromating agents are used as disinfectants:

organic brominating agent

a) DBDMH (1,3-dibrom-5,5-dimethyl-hydantoin) e. g. sold as Albrom 100®

b) BCDMH (1-bromine-3-chlorine-5,5-dimethyl-hydantoin) e.g. sold as Brom-Sticks®

These bromating agents are solid and are metered as saturated solutions via brominators.

Inorganic free bromine

Free bromine is produced via the so-called Acti-Brom process® (Nalco) chlorine bleach + acid + sodium bromide.

For measuring DBDMH or free bromine as a bromating agent in the measurement range: 0.2 -10 ppm bromine the BRE 2-mA-10 ppm sensor is recommended along with DPD1-method calibration.

Alternatively, to measure BCDMH in the same measurement range, the BRE 1-mA-10 ppm sensor is recommended along with DPD4-method calibration.

Typical applications are in swimming pools, jacuzzis and cooling systems. Particularly in cooling systems the quality of the sample water must be tested and, where applicable, compatibility with other chemicals employed (e.g. corrosion inhibitors). Dissolved copper (>0.1 mg/l) will interfere with the measurement.

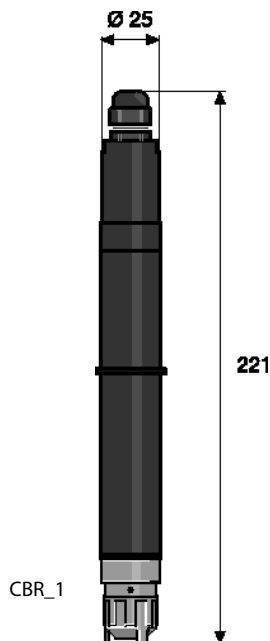
Photometric DPD measurement is the recommended method for calibrating the bromine sensor (e.g. with DT 1), calculated and displayed as bromine. If bromine is determined as "chlorine" with DPD, note when selecting the measurement range that you need to lower the result by a factor of 2.25.

Bromine measured variable

Measured variable:	Total available bromine (free and organic bound bromine)
Bromine chemicals:	DBDMH (1,3-dibromine 5,5-dimethyl hydantoin) BCDMH (1-bromine-3-chlorine-5,5-dimethyl hydantoin), free bromine
Reference method:	DBDMH, free bromine: DPD1 BCDMH: DPD4
Measurement range:	DBDMH free bromine: 0.2-10.0 mg/l with type BRE 2-mA-10 ppm BCDMH: 0.2-10.0 mg/l with type BRE 1-mA-10 ppm
pH dependence:	if pH 7 changes to pH 8 the sensor sensitivity is reduced accordingly a) in the case of DBDMH and free bromine by approx. 10 % b) in the case of BCDMH by approx. 25 %
Temperature range:	5-45 °C
Max. pressure:	43.5 psi
Sample flow:	30-60 L/h in DGM or DLG III
Voltage:	16-24 V DC (two-wire technology)
Output signal:	4-20 mA = measurement range (not calibrated) Warning: not electrically isolated!
Typical applications:	Swimming pools / whirlpools and cooling water; can also be used in seawater
Measurement and control device:	DAC
In-line probe housing:	DGM, DLG III

ProMinent® DULCOTEST® Sensors

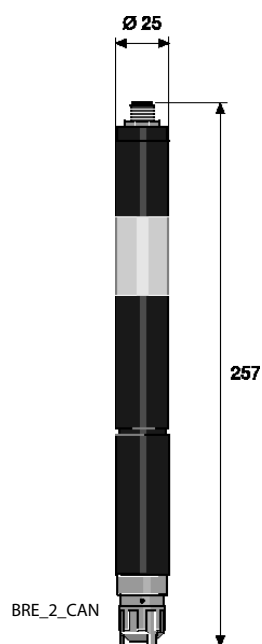
Bromine Sensors

**BCR 1-mA (replaces BRE 1 sensor)**

Measured variable:	Total available Bromine from BCDMH bromo-3-chloro-5,5-dimethylhydantoin) and N-Bromamide Sulfonate
Reference method:	DPD4
pH range:	5-9.5 ppm
Temperature:	5-45 °C
Max. pressure:	14.5 psi
Sample flow:	30-60 L/h (in DGM or DLG III)
Power supply:	16-24 V DC (2-wire)
Output signal:	4-20 mA = Measuring range, temperature-compensated, uncalibrated, not electrically isolated
Typical applications:	Cooling water, Process water, Waste water, Water with higher pH values (stable pH)

Measurement and control equipment:	DACb
In-line probe fitting:	DGM, DLG III
Measuring principle:	Amperometric, 2 electrodes, diaphragm-covered

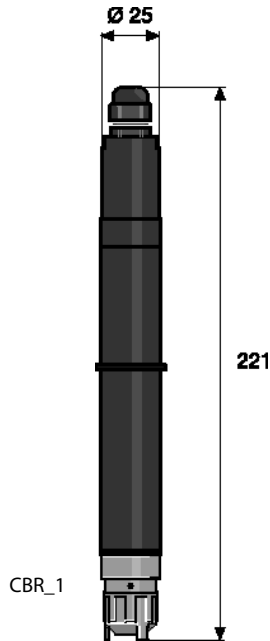
	Measuring range	Part No.
BCR 1-mA-0.5 ppm	0.01-0.5 ppm	1041697
BCR 1-mA-2 ppm	0.02-2.0 ppm	1040115
BCR 1-mA-10 ppm	0.10-10.0 ppm	1041698

**BRE 3-CAN-P**

Sensor for connection to CAN interface
(e.g. swimming pool controller DULCOMARIN® II)

Measured variable:	Total available bromine
Reference method:	DBDMH, free bromine: DPD1 BCDMH: DPD4
pH dependence:	if pH changes from pH 7 to pH 8, the sensor sensitivity is reduced a) in the case of DBDMH and free bromine by approx. 10 % b) in the case of BCDMH by approx. 25 %
Temperature:	5-45 °C
Max. pressure:	43.5 psi
Sample flow:	30-60 L/h (in DGM or DLG III)
Supply Voltage:	Via CAN interface (11-30 V)
Output signal:	Uncalibrated, temperature-compensated, electrically isolated
Typical applications:	Swimming pools/whirlpools and cooling water; can also be used in seawater
Measurement and control equipment:	DULCOMARIN®II
In-line probe fitting:	DGM, DLG III
Measuring principle:	amperometric, 2 electrodes, diaphragm covered

	Measuring range	Part No.
BRE 3-CAN-P	0.02 ... 10.0 ppm	1083573



CBR 1-mA (replaces BRE 2 sensor)

Measured variable:	Free chlorine (hypochlorous acid HOCl), free bromine, bound-bromine
Reference method:	DPD1
pH range:	5-9.5 ppm
Temperature:	5-45 °C
Max. pressure:	14.5 psi
Sample flow:	30-60 L/h (in DGM or DLG II)
Power supply:	16-24 V DC (2-wire)
Output signal:	4-20 mA = Measuring range, temperature-compensated, uncalibrated, not electrically isolated
Typical applications:	Cooling water, Process water, Waste water, Water with high higher pH values (stable pH)
Measurement and control equipment:	DAC
In-line probe fitting:	DGM, DLG III
Measuring principle:	Amperometric, 2 electrodes, diaphragm-covered

	Measuring range	Part No.
CBR 1-mA-0.5 ppm	0.01-.5 ppm*	1038016
CBR 1-mA-2 ppm	0.02-2 ppm*	1038015
CBR 1-mA-5 ppm	0.05-5.0 ppm*	1052138
CBR 1-mA-10 ppm	0.10-10 ppm*	1038014

* Measuring range based on chlorine. The upper and lower limits of the measuring range are increased by a factor of 2.25 when measuring bromine, e.g. CBR 1-mA-0.5 ppm: 0.0225-1.125 ppm.

ProMinent® DULCOTEST® Sensors

Chlorine Dioxide Sensor Overview

Sensor type	CDE 2-mA	CDE 3-mA	CDP 1-mA	CDR 1-mA
Application	Drinking water	Hot water circuits	Bottle Washer system	Cooling water, waste water, Agriculture
Measurement range	0.01-10	0.01-0.50	0.02-2	0.01-10
Temperature	5-45 °C	5-60 °C	10-45 °C	1-55 °C
Max. pressure	14.5 psi	14.5 psi	43.5 psi	43.5 psi
pH range	4-11	4-11	5.5-10.5	1.0-10.0
Response time	120 sec	120 sec	60 sec	180 sec
Run-in time	2-6 hrs	2-6 hrs	4-12 hrs	2-6 hrs
Surfactant-resistance	no	no	yes	yes
Contamination resistance	no	no	under certain conditions	yes
Cross sensitivity	CDE <2% to Chlorine and Ozone interference			

Chlorine Dioxide Sensors

CDE 2-mA

Measured variable:	Chlorine dioxide (ClO ₂)
Reference method:	DPD1
Measurement range:	0.01 - 0.50 mg/l (CDE 2-mA-0.5 ppm) 0.02-2.00 mg/l (CDE 2-mA-2 ppm) 0.1-10.0 mg/l (CDE 2-mA-10 ppm)
Cross sensitivity:	to chlorine <2 %
pH range:	ClO ₂ stability range
Temperature range:	45 °C temperature compensated, no significant temperature fluctuations
Max. pressure:	14.5 psi
Flow:	30-60 L/h in DGM or DLG III
Power supply:	16-24 V DC (two-wire technology)
Output signal:	4-20 mA = measurement range (un-calibrated) Warning: no electrical isolation!
Typical applications:	Potable, industrial, process water (surfactant free)
Measurement and control device:	DAC, D1C
In-line probe housing:	DGM, DLG III

Part No.

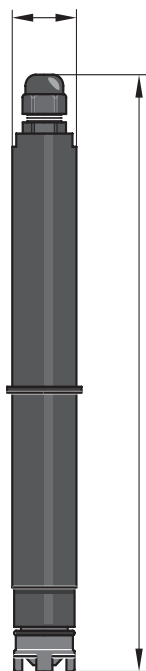
CDE 2-mA-0.5 ppm set, with 100 ml electrolyte	792930
CDE 2-mA-2 ppm set, with 100 ml electrolyte	792929
CDE 2-mA-10 ppm set, with 100 ml electrolyte	792928

CDE 2.1-mA

Technical data: as Type CDE 2-mA, but maximum temperature 60 °C
 Typical application: chlorine dioxide treatment to combat legionella

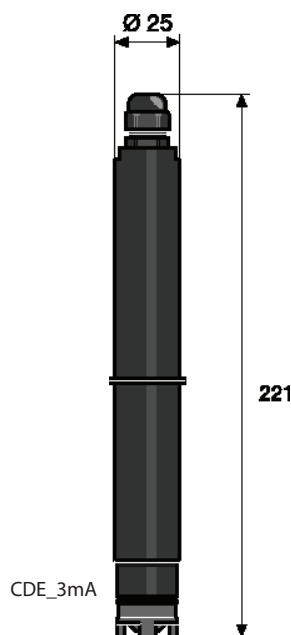
CDE 2.1-mA

0.5 ppm comes complete with 100 ml of electrolyte
 Order on request



ProMinent® DULCOTEST® Sensors

Chlorine Dioxide Sensors

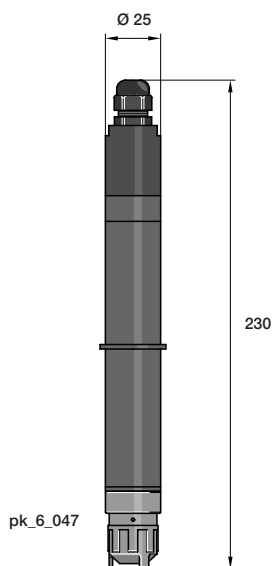
**CDE 3-mA**

Measured variable:	Chlorine dioxide (ClO_2)
Reference method:	DPD1
pH range:	4-11 ClO_2 stability range
Cross sensibility:	Ozone, compared with chlorine <2%
Temperature:	5-60 °C
Max. pressure:	14.5 psi no pressure surges
Sample flow:	30-60 L/h in DGM
Supply voltage:	16-24 V DC (two-wire technology)
Output signal:	4-20 mA \approx measuring range, temperature-compensated, uncalibrated, not electrically isolated
Type application:	chlorine dioxide treatment of uncontaminated warm water to combat legionellae
Measuring and control device:	DAC, D1C
In line probe fitting:	DGM, DLG III
Measuring principle:	amperometric, 2 electrodes, diaphragm-covered

	Measuring range	Part No.
CDE 3-mA-0.5 ppm	0.01-0.5 ppm	1026154

Chlorine dioxide sensors complete with electrolyte, 100 ml

Chlorine Dioxide Sensors

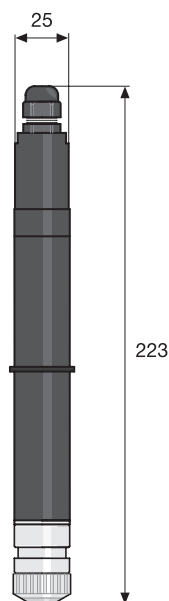
**CDP 1-mA-2 ppm (ClO_2 -process probe)**

Applications:	Bottle washing machines and water containing surfactants
Measured variable:	Chlorine dioxide (ClO_2)
Reference method:	DPD1
Measurement range:	0.02-2.00 mg/l
pH range:	5.5-10.5
Temperature range:	10-45 °C short term periods 55 °C with external temperature correction via Pt 100 (no internal temperature correction!)
Temperature variation speed:	Up to 10°C/min
Max. pressure:	43.5 psi no pressure surges
Flow:	30-60 L/h in DGM
Supply voltage:	16-24 V DC (two-wire technology)
Output signal:	4-20 mA = measurement range (un-calibrated) Warning: no electrical isolation!
Type application:	Process water containing surfactants (bottle washing machines)
Measuring and control device:	DAC with automatic temperature compensation only
In line probe housing:	Probe housing quote on request.

	Part No.
CDP 1-mA-2 ppm set with 100 ml electrolyte	1002149

ProMinent® DULCOTEST® Sensors

Chlorine Dioxide Sensors



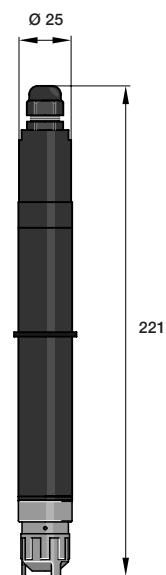
pk_6_083

CDR 1-mA-2 ppm

Measured variable:	Chlorine dioxide (ClO_2)
Reference method:	DPD1
pH range:	1-10
Temperature range:	1 - 55 °C short term periods 60 °C
Max. pressure:	44 psi no pressure surges
Response time T_{90} :	2-3 min
Sample flow:	30-60 L/h
Supply Voltage:	16-24 VDC
Output signal:	4-20 mA (temperature compensated, not calibrated)
Measuring and control device:	DAC, D1C
In line probe housing:	DGMa / DLGIII

	Measuring ranges	Part No.
CDR 1-mA-0.5 ppm	0.01-0.50 ppm	1033762
CDR 1-mA-2 ppm	0.02-2.00 ppm	1033393
CDR 1-mA-10 ppm	0.01-10 ppm	1033404

Chlorite Sensors



pk_6_040

Measured variable chlorite CLT 1-mA

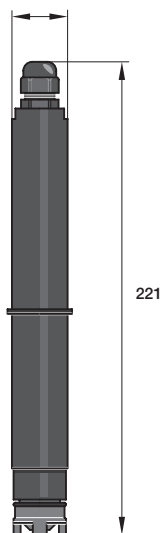
Measured variable:	chlorite anion (ClO_2^-)
Reference method:	DPD method Chlorite in presence of chlorine dioxide
Measurement range:	0.020-0.500 mg/l (CLT 1-mA-0.5 ppm) 0.10-2.00 mg/l (CLT 1-mA-2 ppm)
pH range:	6.5-9.5
Temp. Range:	1-40 °C temperature compensated
max. pressure:	14 psi
Sample flow:	30-60 L/h in DGM or DLG III
Power supply:	16-24 V DC (two-wire)
Output signal:	4-20 mA = measurement range (uncalibrated) Important not electrically isolated!
Model Use:	Monitoring potable water treated with chlorine dioxide or similar. Selective measurement of chlorite in presence of chlorine dioxide, chlorine and chlorate is also possible.
Measurement and control equipment:	DAC, D1C
In-line probe housing:	DGM, DLG III

	Part No.
CLT 1-mA-0.5 ppm set with 50 ml electrolyte	1021596
CLT 1-mA-2 ppm set with 50 ml electrolyte	1021595

We recommend the DT4 photometer for calibration of the chlorite sensor.

ProMinent® DULCOTEST® Sensors

Ozone Sensors



pk_6_039

OZE 3-mA

Measured variable:	Ozone (O ₃)
Reference method:	DPD4
Measurement range:	0.02-2.00 mg/l
pH range:	Ozone stability range
Temperature range:	5-40 °C temperature compensated, no significant Temperature fluctuations
Max. pressure:	14 psi
Flow:	30-60 L/h in DGM or DLG III
Power supply:	16-24 VDC (two-wire technology)
Output signal:	4-20 mA = measurement range (un-calibrated) Warning: no electrical isolation!
Typical applications:	Swimming pools, potable, industrial, process water, surfactant free
Measurement and control devices:	DAC, D1C
In-line probe housing:	DGM , DLG III

Part No.

OZE 3-mA-2 ppm set, with 100 ml electrolyte

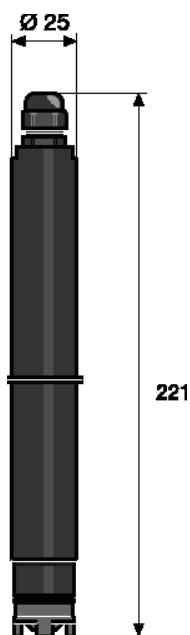
792957

Ozone sensor OZR 1-mA

Sensor for measuring and monitoring the absence of ozone, also suitable for use in contaminated water. For operation on controllers with 4-20 mA input

Your benefits

- Measured variable: Ozone, without cross sensitivity to chlorine, hydrogen peroxide
- Diaphragm-covered sensor (encapsulated) minimises faults caused by changing flow or ingredients in the water
- Suitable also for monitoring the absence of ozone (rupture monitoring on filters) and for discontinuous
- ozone treatment processes
- Resistance to films of dirt by pore-free diaphragm



Measured variable	Ozone (O ₃)
Reference method	DPD4
pH range	4.0 ... 11.0 Stability range of ozone
Cross sensitivity	chlorine dioxide, peracetic acid, bromine, bromamine
Temperature	5 ... 40 °C
Max. pressure	14.5 psi
Intake flow	30...60 l/h (in the DGM or DLG III)
Supply voltage	16...24 V DC (two-wire system)
Output signal	4...20 mA Measuring range, temperature-compensated, uncalibrated, not electrically isolated
Response time t ₉₀ after 1 month with 0.00 ppm ozone	<210s
Selectivity	Non-selective
Installation	Bypass: open sample water outlet
Sensor fitting	DGM, DLG III
Measuring and control equipment	DAC
Typical applications	Potable water, swimming pool water, process, service or cooling water, monitoring the ozone breakdown of filters.
Resistance to	Salts, acids, alkalis, surfactants, dirt films
Measuring principle, technology	Amperometric, 2 electrodes, membrane-covered

Measuring Range

Part No.

OZE 3-mA-2 ppm set, with 100 ml electrolyte

0.02 ... 2.0 mg/l

1051647

Important note: A mounting kit (order no. 815079) is required for initial fitting of the ozone sensors in the in-line probe housing DLG III.

ProMinent® DULCOTEST® Sensors

Dissolved Oxygen Sensors

The measured variable "dissolved oxygen" gives the quantity of the gaseous physical dissolved oxygen in its aqueous phase in mg/l (ppm).

The "dissolved oxygen" is an important parameter for controlling the quality of surface water and water which needs to be oxygenated for use in aqua culture and aqua zoos. The dissolved oxygen is also used to control processes in sewage plants and waterworks.

The following sensors are assigned to the different applications and can be supplied separately as 4-20 mA-transmitters to central controllers or together with the DAC measured variable: "Dissolved oxygen", or as a stand alone solution.

DO 3-mA

Measured variable: **Dissolved oxygen**

Calibration: oxygen in air or reference measurement in process water

Measurement range: 0-20 mg/l

Accuracy : $\pm 0.1 \%$ ppm

Temp. range: 0 ... 50 °C

Max. pressure: 29 psi

Enclosure rating: IP 68

Power supply: 18-30 V DC

Output signal: 4-20 mA. Measurement range calibrated, temperature corrected and electrically isolated

Process integration: Immersion by an immersion assembly. The connection is possible using the immersion pipe adapter (reducing nipple, order no. 356924) and the 45° angle (order no. 356335). Both parts are included in the scope of delivery: and can be ordered as an accessory (also see Accessories).

Installation into ProMinent DGMa with mounting kit 791818

Installation into ProMinent DLG III with mounting kit 815079

Measuring and control equipment: DACb as of firmware 02.01.01.02 with complete calibration functionality and all correction variables (temperature, salinity, air pressure, height above sea level).
Displayed units: [ppm] and [% oxygen saturation]
DACa, AEGIS II, calibration only possible by the input of a reference concentration determined from the process water.
Only temperature correction variable. Displayed unit: [ppm]

Typical applications: This sensor is widely used for DO measurement in water above 0.1 ppm to oxygen saturation.
Aeration tanks / clarifiers / waterworks
Fish and shrimp farming
Large zoo aquariums
Assesment of the biological status of surface water

Interference by: Oxidant (e.g. chlorine, chlorine dioxide, ozone) and many organic solvents (e.g. chloroform, toluene, acetone)

Measurement Principle: Optical: Measurement of the relaxation time of a pulsed fluorescence beam

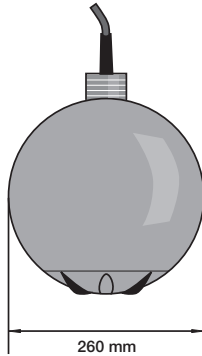
	Measuring range	Part No.
DO 3-mA-20 ppm	0.10...20.0 mg/l	1094609

product

solenoid-driven
metering pumpsmotor-driven
metering pumpspump spare parts &
accessoriesDULCOMETER®
instrumentationDULCOTEST®
sensorsstandard & custom
systems

ProMinent® DULCOTEST® Sensors

Dissolved Oxygen Sensors



pk_6_051

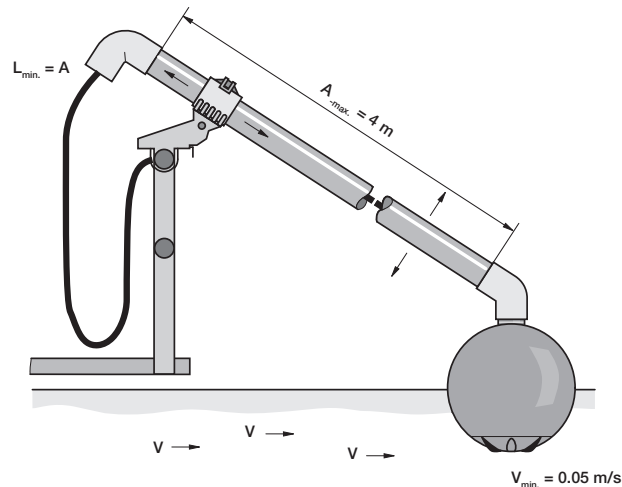
DO 2-mA

Measured variable:	dissolved oxygen
Calibration:	of oxygen in air
Measurement range:	0-10 mg/l
Reproducibility of measurement:	± 0.5 % of measurement limit value
Temp. Range:	0 -50 °C
Max. pressure:	14.5 psi
Velocity of sample water:	minimum: 0.05 m/s
Enclosure rating:	IP 68
Supply voltage:	12-30 V DC
Output signal:	4-20 mA. Measurement range calibrated, temperature corrected and electrically isolated
Process integration:	as float with venturi grooves to increase the flow of sample water for the self-cleaning of the sensor part. Supplied with adapter for connection to PVC-pipes with outside diameter: 1.97" (50 mm) and railing bracket, also for PVC pipes with outside diameter: 1.97" (50 mm). The customer must provide the straight PVC tube and a 45 ° standard elbow for gluing to PVC pipes (outside diameter 50 mm).
Typical application	Control of the oxygen input in activated sludge pools (sewage plant) for the purpose of energy conservation

DO 2-mA-10 ppm

Part No.
1020533

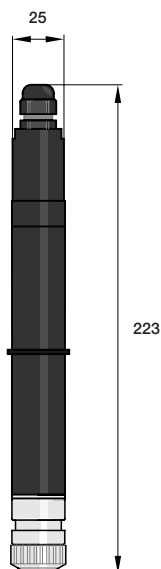
* Special Order from ProMinent Germany



pk_6_012

ProMinent® DULCOTEST® Sensors

Peracetic Acid Sensors



pk_6_083

The DULCOTEST® PAA 1 sensor models are membrane-covered amperometric 2-electrode sensors for the selective measurement of peracetic acid. Peracetic acid is used as a disinfectant particularly in the food and beverage industries as well as in the cosmetic, pharmaceutical and medical industries. The continuous measurement and control of the peracetic acid is essential to comply with demanding disinfection requirements and for quality control. Unlike with the sensors in the earlier Perox PES system the PAA 1-mA can be used with the DACb controller. Commissioning and maintenance is greatly simplified. The sensors can even be used in the presence of surfactants (tensides).

PAA 1-mA

Measured variable:	peracetic acid
Reference method:	titration
Measurement range	10-200 mg/l (PAA 1-mA-200 ppm) 100-2000 mg/l (PAA 1-mA- 2000 ppm)
pH range:	1-9 (peracetic acid stability range)
Temp. range:	1-45 °C temperature compensated
Admissible temperature fluctuation:	0.3 °/min
Response time T_{90}	3 min.
Max. Pressure.:	14.5 psi at 30 °C, in DGM
Sample flow:	30- 60 L/h with DGM or DLG III in-line probe housing
Power supply	16-24 V DC (two wire)
Output signal:	4-20 mA measurement range (uncalibrated) Important not electrically isolated
Typical application:	Cleaning in Place (CIP) and rinsing systems, also designed for use in the presence of cationic and anionic tensides. Selective measurement of peracetic acid as well as hydrogen peroxide is possible.
Measurement and control equipment:	DACb
In-line probe housing:	DGM, DLG

Part No.

PAA 1-mA-200ppm	1022506
PAA 1-mA-2000ppm	1022507

ProMinent® DULCOTEST® Sensors

Hydrogen Peroxide Sensors

The DULCOTEST® PEROX and PER1 probes are membrane-covered amperometric sensors for online determination of hydrogen peroxide concentration. Because it is totally biologically degradable, hydrogen peroxide is frequently used as a disinfectant and oxidant in water treatment and production:

- Chemical bleaching in the timber, paper, textile and mineral salt industries
- Organic synthesis in the chemical, pharmaceutical and cosmetics industries
- Oxidation of drinking water, landfill seepage water, contaminated ground water
- Disinfection of cooling water, service water and production water in the pharmaceutical and food and beverages industries, and in swimming pools
- Deodorization (gas scrubber) in municipal and industrial wastewater purification plants
- Dechlorination in chemical processes

Sensors are selected using the following decision table:

Requirement	Type	Type
	PER1	PEROX
Probe matrix contaminated by dirt or chemicals	suitable due to impermeable diaphragm	more susceptible due to permeable diaphragm
Electrical interference due to interference potentials in the measured medium	immune as counter electrode is separated from process	more susceptible as counter electrode is in the medium
Temperature range	up to 50 °C	up to 40 °C
Ease of handling during installation and maintenance	suitable due to temperature compensation and transducer integrated in sensor	separate temperature sensor and transducer
Response time for H ₂ O ₂ for fast control	sluggish T ₉₀ = 6-8 min	fast T ₉₀ = 20 s
Rapid temperature changes	sluggish due to integrated temperature sensor	fast due to separate temperature sensor
Long process cycles with no H ₂ O ₂ present	unsuitable	suitable due to pulsed polarisation technology
Range can vary in phases by several orders of magnitude, or is not clear at time of ordering	selection of suitable sensor necessary	suitable as range can be manually selected at the sensor transducer
Cost per channel	lower	higher

ProMinent® DULCOTEST® Sensors

Hydrogen Peroxide Sensors

Operating conditions

Requirement	Type PER1	Type PEROX
Measured variable	hydrogen peroxide	hydrogen peroxide
Calibration	photometric with DT4 hand-held photometer, see page 233	photometric with DT4 hand-held photometer, see page 233
Ranges	2.0-200.0 mg/l 20-2.000 mg/l different sensors	1-20, 10-200, 100-2000 selectable
pH range	2.5-11	2.5-10
Temperature	0-50 °C	0-40 °C (0-30 °C at > 1.000 ppm)
Permissible temperature changes	< 0.3 °C/min	< 1 °C/min (with external temp. measurement) see O.I.
Sensor response time	T ₉₀ approx. 480 sec	T ₉₀ approx. 20 sec
Reproducible accuracy	≥1 ppm or better than ± 5% of measured value	better than 5 % referred to range full scale value
Min. conductivity	0.05-5.00 mS/cm	with 20 mg/l range: 5 µS/cm 200 mg/l range: 200 µS/cm up to 1.000 mg/l: 500 µS/cm up to 2.000 mg/l: 1 mS/cm
Sampled water flow	20-100 L/h with DGMA	60 L/h recommended
Max. operating pressure	0-14.5 psi	29 psi
Supply	16-24 VDC (2-wire system)	16-24 VDC (3-wire system)
Output signal	4-20 mA, temperature compensated, uncalibrated, not electrically isolated	4-20 mA, temperature compensated, uncalibrated, not electrically isolated
Typical applications	swimming pool, treatment of contaminated wastewater, treatment of process media from production	treatment of clear and chemically uncontaminated water, control systems with necessarily short response times
Measurement and control device	DACb, D1Ca...H 7	DACb, D1Ca ...H 1
In-line probe housing	DGM, DLG	DGM, DLG

Part No.

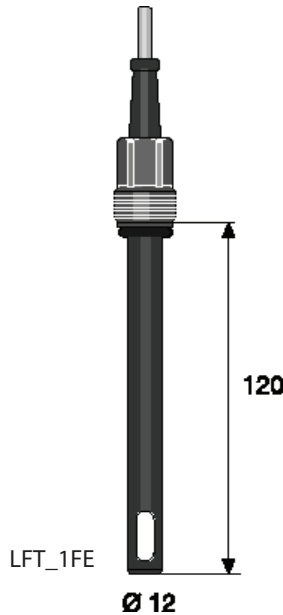
PER 1- mA - 50 ppm	1030511
PER 1- mA - 200 ppm	1022509
PER - mA - 2000 ppm	1022510
Peroxide Sensor PEROX-H2.10P	792976
Peroxide Transducer V1 for D1Ca	1034100
Peroxide Transducer V2 for DACb	1047979
PT100 Temperature Sensor	305063
PT1000 Temperature Sensor	1002856

Accessories

Photometer for calibration DT3B	1039317
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ProMinent® DULCOTEST® Sensors

Conductivity Sensors

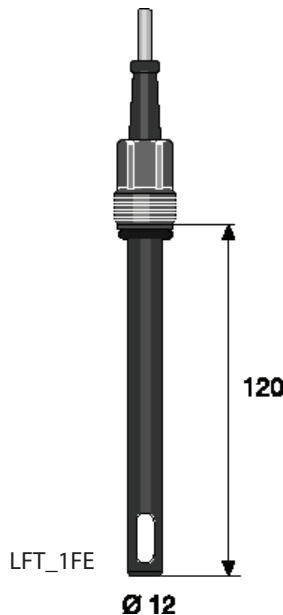


LFT 1FE

Measurement range:	0.01-20 mS/cm
Cell constant k:	1 cm ⁻¹ ± 5%
Temperature compensation:	Pt 100
Fluid temperature:	0-80 °C
Max. pressure:	232 psi
Electrode material:	Special graphite
Shaft material:	Epoxy
Thread:	PG 13.5
Installation length:	120 ± 3 mm
Electrical connection:	5 m fixed cable (2 x 0.5 mm ²)
Typical applications:	Drinking, cooling, industrial water. The sensors in the LF series are not wholly suitable for the measurement of cleaning solutions containing surfactants or liquids containing solvents.

LFT 1FE

Part No.
1001374



LFTK 1FE-5m-shd

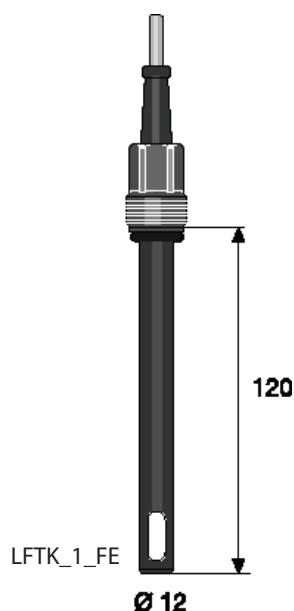
Measurement range:	0.01-20 mS/cm
Cell constant k:	1 cm ⁻¹ ± 5%
Temperature compensation:	Pt 1000
Fluid temperature:	0-80 °C
Max. pressure:	232 psi
Electrode material:	Special graphite
Shaft material:	Epoxy
Thread:	PG 13.5
Installation length:	120 ± 3 mm
Electrical connection:	5 m fixed cable (4 x 0.25 mm ²), screened
Typical applications:	Portable, cooling, industrial water. Sensors of the LF series have only limited applicability for taking measurements in cleaning solutions containing surfactants and media containing solvents.

LFTK 1FE-5m-shd

Part No.
1046132

ProMinent® DULCOTEST® Sensors

Conductivity Sensors

**LFTK 1 FE**

Measurement range:	0.01-20 mS/cm
Cell constant k:	1 cm ⁻¹ ± 5%
Temperature compensation:	Pt 1000
Fluid temperature:	0-80 °C
Max. pressure:	232 psi
Electrode material:	Special graphite
Shaft material:	Epoxy
Thread:	PG 13.5
Installation length:	120 ± 3 mm
Electrical connection:	5 m fixed cable (2 x 0.5 mm ²)
Typical applications:	Drinking, cooling, industrial water. The sensors in the LF... series are not wholly suitable for taking measurements in cleaning solutions containing surfactants or liquids containing solvents

LFTK 1 FE**Part No.****1002821**

Sensor Accessories

Measurement Transmitter 4 - 20 mA (Two Wire)

Advantages:

- Safer signal transfer, even across large distances
- Interference free 4-20 mA signal
- Simple installation directly onto sensor

Typical applications: Measurement signal transfer over large distances, or to transfer signals subject to disturbance (e.g. pH, redox) in conjunction with D1C, D2C and DULCOMARIN® measurement and control systems, or for direct connection to PC/PLC.

pH measurement transmitter 4-20 mA, type pH V1

Measurement range: pH 0...14
 Accuracy: better than pH 0.1 (typical \pm pH 0.07)
 Socket: SN6
 Input resistance: $10^{12} \Omega$
 Signal output: 4...20 mA \approx -500...+500 mV \approx pH 15.45 - -1.45
 not calibrated, not electrically isolated
 Power supply: 18...24 V DC
 Ambient temperature: -5...50 °C, non-condensing
 Enclosure rating: IP 65
 Dimensions: 141 mm length, 25 mm \varnothing

Part No.
809126

Redox measurement transmitter 4-20 mA, type RH V1

Technical data as for pH transmitter, but:

Measurement range: 0...1000 mV
 Accuracy: better than ± 0.5 mV (typical ± 3 mV)
 Input resistance: $> 5 \times 10^{11} \Omega$
 Signal output: 4...20 mA \approx 0...+1000 mV
 not electrically isolated

Part No.
809127

Temperature measurement transmitter 4-20 mA, type Pt 100 V1

Technical data as for pH transmitter, but:

Measurement range: 0...100 °C
 Accuracy: better than ± 0.5 °C (typical ± 0.3 °C)
 Input resistance: $\sim 0 \Omega$
 Signal output: 4...20 mA \approx 0...+100 °C
 not electrically isolated

Part No.
809128

Impedence converter

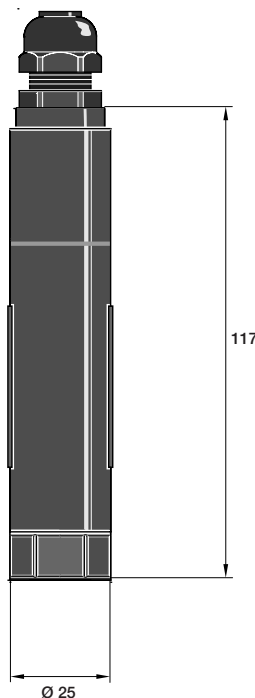
Owing to their high impedance, pH and redox sensor systems are prone to be disturbed by electrical noise, particularly if the sensor cables are longer than usual. The impedance converter changes the impedance of the sensor signal to about 1 kOhm and makes it less susceptible to electrical noise. The unit can be screwed down directly onto the pH or redox sensor with SN6 connections. The converter has a SN6 connection for the sensor cable.

Powered by a built-in battery, sufficient for 5 years of operation. Enclosure rating NEMA 4.

Part No.

Type 2 MAZ 20

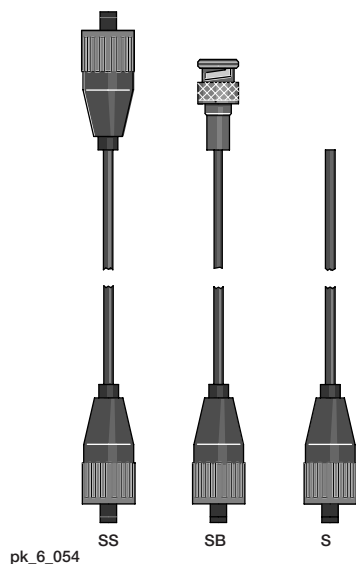
305350



pk_5_064

Sensor Accessories

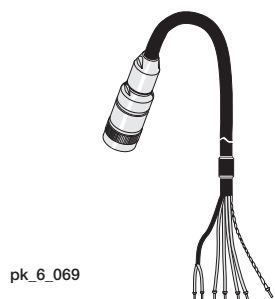
Signal Cables



General guidelines:

- Ensure that signal leads are as short as possible.
- Ensure signal leads are separated from power cables running parallel to them.
- Use pre-assembled combined signal leads wherever possible.
-
- **Signal leads for pH/ORP measurement**
- Pre-assembled to facilitate installation
- Factory tested to ensure function reliability
- IP 65

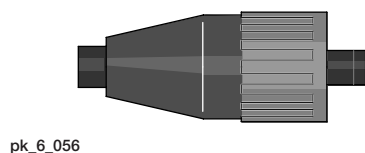
Design		Description	Part No.
2 x SN6	coax Ø 3 mm	6 ft. (2.0 m) - SS	304955
	coax Ø 3 mm	15 ft. (5.0 m) - SS	304956
	coax Ø 3 mm	30 ft. (10.0 m) - SS	304957
SN6 - open end	coax Ø 3 mm	6 ft. (2.0 m) - S	305030
	coax Ø 3 mm	15 ft. (5.0 m) - S	305039
	coax Ø 3 mm	30 ft. (10.0 m) - S	305040
SN6 - BNC	coax Ø 3 mm	30 ft. (10.0 m) - SB	305099



Signal leads for electrodes with Vario Pin plug

Pre-assembled 6-core signal lead with Vario Pin plug for connection to electrode type PHEPT 112 VE.

	Part No.
Vario Pin signal lead VP 6-ST/ 2 m	1004694
Vario Pin signal lead VP 6-ST/ 5 m	1004695
Vario Pin signal lead VP 6-ST/10 m	1004696



SN6 coax connector

K 74 crimping pliers and a soldering iron are required for connecting coax connectors to cables.

	Part No.
SN6 coaxial plug for 5 mm Ø coaxial signal lead	304974
SN6 coaxial plug for 3 mm Ø coaxial signal lead	7304975



LK coax signal cable

For pH and ORP measurements.

	Part No.
Coax low noise 5 mm Ø, black	723717
Coax low noise 3 mm Ø, black	1080373
Please specify length with order.	

Sensor Accessories

Signal Cables



pk_1_085

Signal leads for DMT type chlorine measuring cells

The signal lead is required for connection of DMT type measuring cells to the DMT transducer.

		Part No.	
Universal cable, 5-pin round plug;	5-core	6 ft. (2 m)	1001300
Universal cable, 5-pin round plug;	5-core	15 ft. (5 m)	1001301
Universal cable, 5-pin round plug;	5-core	30 ft. (10 m)	1001302

Cable accessories for CAN-type chlorine sensors

	Part No.
T-distributors M12 5 pole CAN	1022155
Moving load M12-joint	1022154
Moving load M12-plug	1022592
Connecting cable - CAN M12 5 pole 0.5 m	1022137
Connecting cable - CAN M12 5 pole 1 m	1022139
Connecting cable - CAN M12 5 pole 2 m	1022140
Connecting cable - CAN M12 5 pole 5 m	1022141
Connecting cable - CAN, sold in meters	1022160
Plug-CAN M12 5 pole Screw terminal	1022156
Coupling-CAN M12 5 pole Screw terminal	1022157



pk_6_054

Signal leads for Pt 100/Pt 1000 (2 x 0.5 mm²)

			Part No.
Length	15 ft. (5 m)	SN6 - open ended	1003208
Length	30 ft. (10 m)	SN6 - open ended	1003209
Length	60 ft. (20 m)	SN6 - open ended	1003210

Sensor adapters

	Part No.
SN6 male to BNC male	7305024
SN6 female to BNC female	7305065
SN6 male to SN6 male	7305025

LKT signal lead for conductivity measuring cells

4-core, shielded, Ø 6.2 mm



pk_6_055

	Part No.
Please specify length with order.	723712

Two-wire signal lead (16 Gauge)

For -mA type chlorine/bromine/chlorine dioxide/ozone measuring cells and pH, ORP; Pt 100, conductivity transducers.

	Part No.
Please specify length with order.	7902797

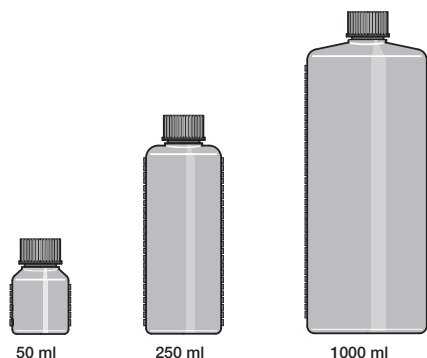
Sensor Accessories

Buffer Solutions

pH quality buffer solutions

Accuracy \pm pH 0.02 (\pm 0.05 at pH 10). The shelf life depends upon frequency of use and the amount of chemical drag-in.

Alkaline buffer solutions can react with CO₂ if left open. This will affect their values, therefore close after use. Buffer solutions should be replaced after a maximum of three months after opening. The solution contains a biocide to prevent bacteria forming.



pk_6_058

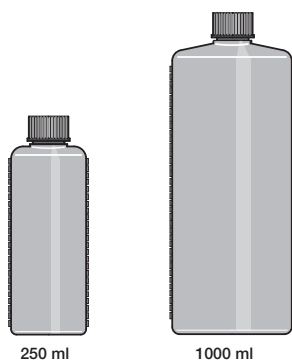
		Part No.
pH 4.0 - red	500 ml	7903994
pH 7.0 - green	500 ml	7903995
pH 10.0 - blue	500 ml	7903996

ORP quality buffer solutions

Accuracy to \pm 5 mV. Shelf life depends upon frequency of use and the strength of the chemicals in sample solutions.

Buffer solutions should be replaced after a maximum of three months after opening.

Warning: The 470 mV ORP buffer solution is an irritant!

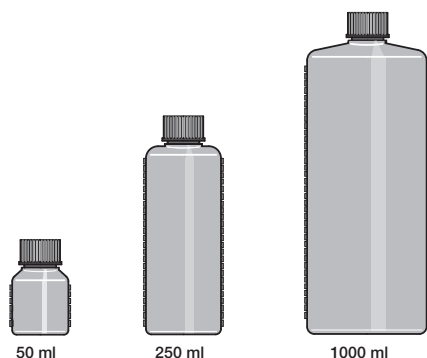


pk_6_058

		Part No.
ORP buffer 470 mV	50 ml	506240
	1000 ml	506241

3 molar KCl solutions

3 molar KCl solution is ideally suited to the protection of pH and ORP electrodes (e.g. in electrode case) and as an electrolyte for refillable electrodes (e.g. PHEN, RHEN). However, for earlier version refillable electrodes with reference electrodes without the larger AgCl reservoir we recommend the AgCl saturated KCl solution.

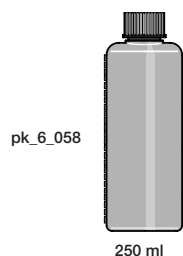


pk_6_058

		Part No.
KCl solution, 3 molar	50 ml	505533
KCl solution, 3 molar	250 ml	791440
KCl solution, 3 molar, AgCl saturated	1000 ml	505534

Sensor Accessories

Electrolyte Solutions



Cleaning solutions

Pepsin/hydrochloric acid cleaning solutions: For cleaning pH electrode diaphragms contaminated with protein.

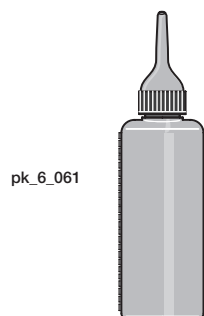
Cleaning Solution	250 ml	Part No.
		791443

Conductivity calibration solution

For the accurate calibration of conductivity sensors we recommend using calibration solutions with known conductivity levels.

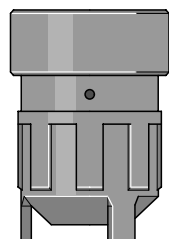
Buffer sol. LF 1000 µS/cm	1000 ml	Part No.
		7901492

Electrolyte for Amperometric sensors



Sensor type	Volume (ml)	Part No.
Electrolyte for chlorine sensors type CLE, CLR 1	100	506270
Electrolyte for CDM 1 and CDE 3 type chlorine dioxide sensors	100	506271
Electrolyte for CDE 2 and CDR 1 type chlorine dioxide sensors	100	506272
Electrolyte for OZE type ozone sensors	100	506273
Electrolyte for CGE/CTE/BRE type sensors	50	792892
Electrolyte for CDP type chlorine dioxide sensors	100	1002712
Electrolyte for peracetic acid, ozone sensors type PAA 1, OZR 1	100	1023896
Electrolyte for CLT 1 type chlorite sensors	50	1022015
Electrolyte for PER 1 type hydrogen peroxide sensors	50	1025774
Electrolyte for CLO 1 type chlorine sensor	100	1035191
Electrolyte for CLO 2 type chlorine sensor	100	1035480
Electrolyte for CBR 1 type chlorine/bromine sensor	100	1038017
Electrolyte for BCR 1 type bromine sensor	50	1044843

Membrane Caps



Spare membrane caps, accessory sets for Amperometric sensors

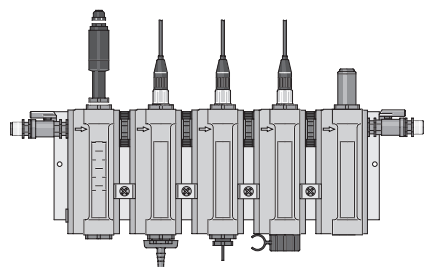
Used with sensors	Capacity (ml)	Part Number
Membrane cap for types CLE II T, CDM 1 and OZE 1	-	790486
Membrane cap for types: CLE 2.2, CLE 3, CDE 1.2, CDE 2, OZE 2 and OZE 3	-	790488
Sensor cap for CLO 1	-	1035197
Sensor cap for CLO 2	-	1035198
Diaphragm cap for CGE 3, CGE 2, CTE 1 (2/5/10 ppm) and BRE 1 (10 ppm), BRE 2	-	792862
Membrane cap for CTE 1 (0.5 ppm), CBR 1, BCR 1	-	741274
Membrane cap for CDP 1, BRE 1 (0.5 / 2 ppm), CLT	-	1002710
Membrane cap for CDE 3	-	1026578
Diaphragm cap for PAA 1, CDR 1, CLR 1, OZR 1	-	1023895
Membrane cap for PER 1	-	1025776
Membrane cap for H2.10 P	-	792978
Accessory set for CGE 3, CGE 2, CTE 1 (2/5/10 ppm) and BRE 1 (10 ppm), BRE 2 (2 diaphragm caps + electrolyte)	50	740048
Accessory set for CTE 1 (0.5 ppm) (2 membrane caps + electrolyte)	50	741277
Accessory set for CLE (2 membrane caps + electrolyte)	100	1024611
Accessory set for CDP 1 (2 membrane caps + electrolyte), BRE 1 (0.5 / 2 ppm), CLT	100	1002744
Accessory set for PAA 1 and OZR 1 (2 diaphragm caps + electrolyte)	100	1024022
Accessory kit for PER 1 (2 membrane cap + electrolyte)	50	1025881
Accessory set for CDE 3 (2 membrane caps + electrolyte)	100	1026361
Accessory set for CLO 1 (electrolyte, grinding disc, plug)	100	1035482
Accessory set for CLO 2 (electrolyte, grinding disc, plug)	100	1035483
Accessory set for CBR 1 (2 membrane caps + electrolyte)	100	1038984
Accessory set BCR 1 (2 membrane caps + electrolyte)	50	1044844

Sensor Accessories

Spare parts for dissolved Oxygen Sensors

Description	Measuring Range	Part Number
Sensor insert for type DO 1-mA-20 ppm: Diaphragm thickness 125 µm	2.00 20.0 ppm	1020534
Sensor insert for type DO 2-mA-10 ppm: Diaphragm thickness 50 µm	0.10 ... 10.0 ppm	1020535
Bracket of sensor insert for type DO 1-mA-20 ppm (with diaphragm protection for fish farming)		1020540
Bracket of sensor insert for type DO 2-mA-10 ppm		1020541
Sensor cap for type DO 3-mA-20 ppm		1096350
Protective cap for type DO 3-mA-20 ppm		1096352

DGMa Sensor Housings



pk_6_066

DGM modular in-line probe housing

To accept conductivity, Pt 100, pH or ORP probes with PG 13.5 screw-in thread, or amperometric sensors with R 1" screw-in thread.

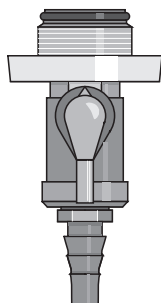
Advantages:

- Simple to assemble (already mounted on panel up to max. 7 units)
 - Simple retrofit expansion possibility (see expansion modules)
 - Module for monitoring flow of sampled water
 - Simple to calibrate measured variables due to low sample water volume
 - Ball valve on either end for adjusting and impeding flow
- Each fully-assembled DGM is equipped with a single sampling cock.

Material:	Transparent PVC (all modules) FPM (seals) PP (calibration cup) PVC white (mounting panel)
Max. temperature:	60 °C
Max. pressure:	87 psi / 30 °C 14.5 psi / 60 °C 29 psi, (with flow monitor, 30 °C)
Flow volume:	Up to 80 L/h (40 L/h recommended)
Flow sensor:	Reed contact max. switch power 3 W max. switch voltage 175 V max. switch current 0.25 A max. operating current 1.2 A max. contact resistance 150 mΩ
Switch hysteresis:	approx. 20 %
Enclosure rating:	IP 65
Applications:	Potable, swimming pool water or water of similar quality with no suspended solids
Assembly:	Max. 5 modules pre-assembled onto baseboard: more than 5 modules, pre-assembled onto baseboard as custom version, priced accordingly. FPM = Fluorine Rubber

Sensor Accessories

DGMa Sensor Housings



pk_6_071

Sampling tap for DGM

for PG 13.5 and 25 mm modules designed as a convenient ball valve.

	Part No.
PG 13.5 sampling tap	1004737
25 mm sampling tap	1004739

Expansion modules for DGM

For simple retrofit to an existing DGM.

	Part No.
Flow expansion module with scale in L/h	1023923
Flow expansion module with scale in gph	1023973
Flow sensor for flow expansion module (optional)	791635

DGMa Identcode

DGM Series Version:							
DGM	A	Series					
		Flow monitor module:					
		0	None				
		1	With l/h scale				
		2	With gph scale				
		3	With flow monitor, l/h scale (Required for Pause Contact Option on Controller)				
		4	With flow monitor, gph scale (Required for Pause Contact Option on Controller)				
		Number of PG 13.5 modules:					
		0	None				
		1	One PG 13.5 module NOTE: For all pH, ORP & Temperature Glass Sensors				
		2	Two PG 13.5 modules				
		3	Three PG 13.5 modules				
		4	Four PG 13.5 modules				
		Number of 25 mm modules:					
		0	None				
		1	One 25 mm module* * Chlorine, Chlorine Dioxide & Ozone Sensors				
		2	Two 25 mm modules*				
		Material:					
		T	Transparent PVC				
		Seal material:					
0	Viton®						
Connections:							
0	1/2" x 3/8" tubing adapters						
1	PVC half-union connections with 1/4" MNPT adapter						
DGM	A	0	0	0	T	0	0

Recommended accessories:	Part No.
reference potential plug with SS pin	791663
flow sensor (spare)	791635
calibration cup (spare)	791229

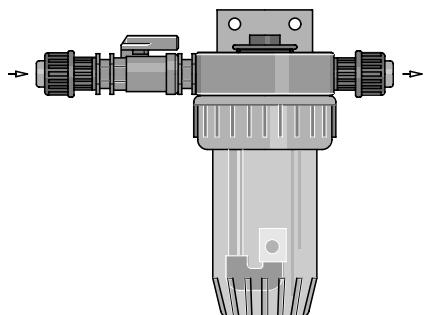
Sampling Tap for PG 13.5 module	1004737
Sampling Tap for 25 mm module	1004739

Recommended accessories:	Part No.
Mounting set for 15 mm (PHEP/RHEP)	791219
Mounting set for 25 mm module (CLE, CTE, CGE, CDE, CDP, OZE, CBQ, BRE)	791818

Bubble disperser for CI sensor	740207
Bubble disperser for pH/ORP sensors	791703

Sensor Accessories

DLG Sensor Housings



pk_6_063

DLG III type in-line probe housing

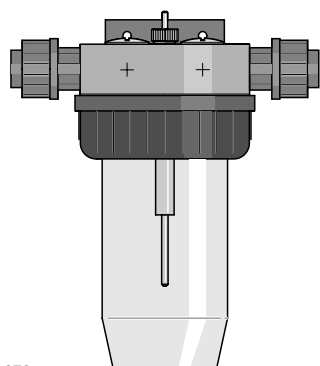
To accept 2 electrodes (conductivity, Pt 100, pH or ORP electrodes) with PG 13.5 screw-in thread, as well as a sensor with R 1 thread (amperometric sensors) with integrated stainless steel pin as liquid reference potential.

The DLG III is fitted with a plastic ball valve on the input side for stopping and adjusting the sample water flow.

Material:	Rigid PVC
Transparent housing cup:	Polyamide
Ball valve material:	Rigid PVC
Max. pressure:	1 bar
Max. temperature:	55 °C

Part No.

DLG III B	914956
Assembly kit for fitting amperometric sensors	815079



pk_6_070

DLG IV type in-line probe housing

To take 4 electrodes (pH, ORP, Pt 100, conductivity) with PG 13.5 threaded connector, with integrated stainless steel pin as liquid reference potential. Bracket for wall mounting.

Material:	Hard PVC or PP
Transparent housing:	Polyamide
Max. pressure:	1 bar
Max. temperature:	55 °C for PVC version 80 °C for PP version

Sample water connector: 1/2" MNPT

Part No.

DLG IV PVC	1005332
DLG IV PP	1005331
NEW DLG V - PVC Probe Holder Complete	7903967

Sensor Holders



CPVC holder (for pH/ORP)

CPVC universal in-line sensor holder with 3/4" MNPT, 5" (127 mm) long body.	7500192
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PVDF holder (for pH/ORP)

PVDF universal in-line sensor holder with 3/4" MNPT, 5" (127 mm) long body.	7305021
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Stainless steel holder (for pH/ORP)

Stainless steel universal in-line sensor holder with 3/4" MNPT, 5" (127 mm) long body.	7305022
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PG 13.5 Submersible holder (for pH/ORP)

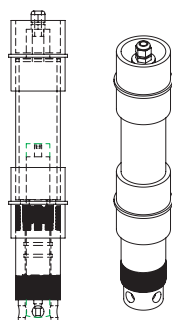
CPVC Waterproof sensor holder with 1-1/2" NPT, 5" (127 mm) long body.	7744693
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CPVC holder (for 25 mm sensors)

CPVC universal in-line sensor holder with 2" MNPT, 5" (127 mm) long body (needs pn. 791818).	7740719
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25 mm Submersible holder (consult factory for details)

CPVC Waterproof sensor holder 1-1/2" FNPT, 5" (127 mm) long body.	7744008
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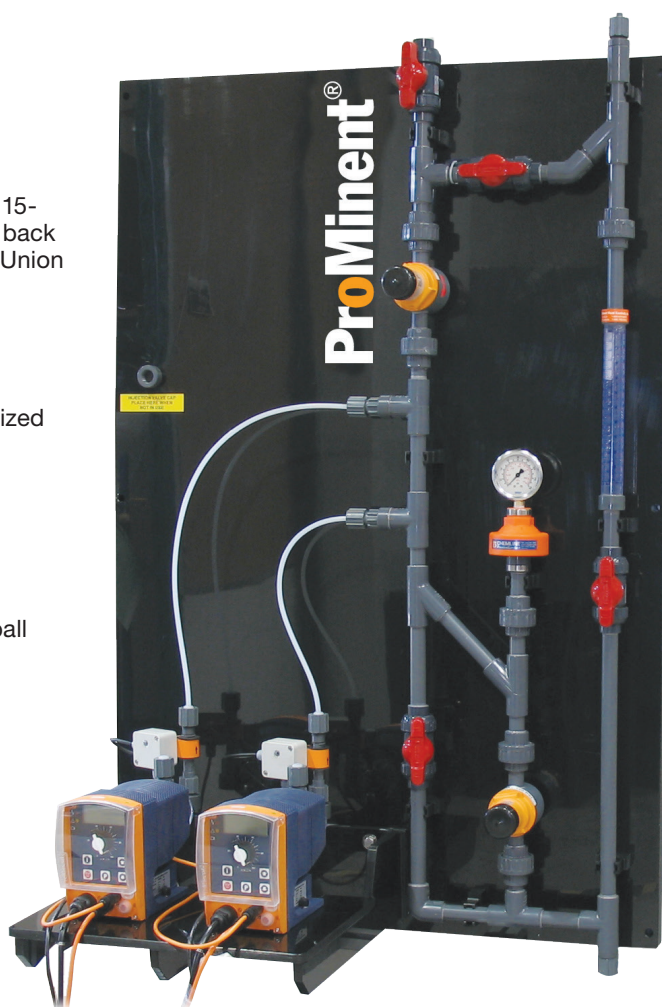


ProMinent® ProSIP

Overview: ProMinent Standard Injection Systems

The ProMinent Standard Injection Package provides the best in practice safe chemical feed design for a duty or duty backup application. The pre-configured and tested system is designed to include the following components arranged and assembled on a chemically resistant floor-stand or wall-mount backboard:

- Chemically resistant 15-150 PSIG adjustable back pressure valve (True Union Connection)
- Calibration column sized appropriately
- True Union 3-piece ball valves

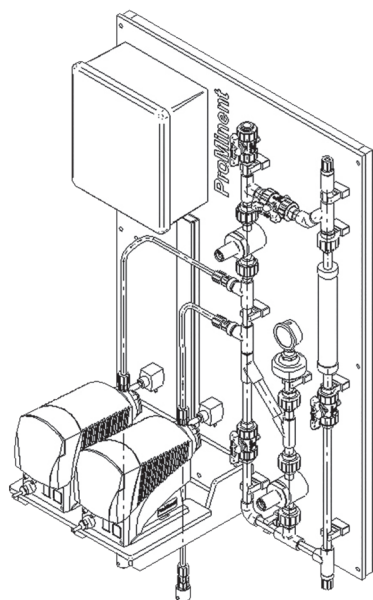


- Pressure Indicator with diaphragm isolation
- Chemically resistant 15-150 PSIG adjustable pressure relief valve (True Union Connection)
- Discharge connection with adapter to site piping / tubing

Chemical Pump Installation...safe and easy!

ProMinent® Standard Systems-ProSIP-S

Overview: ProSip-S



ProSip Range:

ProMinent ProSip System come with a 3 Year Leak Free Guarantee, when supplied with a completed configuration sheet [\(see page 297\)](#)

ProSip-S for Solenoid Pumps:

The ProMinent Standard Metering Package provides the best in practice safe chemical feed design for a duty or duty backup application. The preconfigured and tested system is designed to include the following components arranged and assembled on a chemically resistant wall mountable backboard:

Feature & Benefits

- Self Fill Calibration column sized to suit 60 second pump design flow
- Chemically resistant 15-150 PSIG adjustable back pressure valve (True Union Connection)
- Chemically resistant 15-150 PSIG adjustable pressure relief valve (True Union Connection)
- Pressure Gauge with diaphragm isolation
- True Union 3-piece ball valves
- Common pump shelf to accommodate up to two pumps
- Low Point Drain with chemically compatible drain tubing
- Discharge connection with adapter to site piping / tubing

Standard Package Dimensions

Dimensions 32" x 48" x 17 ½" (WxHxD)

Weight – Operational Approx. 65 kg

ProMinent® ProSIP-S

Configuration Data ProSip-S

Pump Identcode: _____ Qty.: 1 or 2

Model	Pump Application	Volume	Part Number	System Spare Parts Kit
Viton*	Best Suited for: Sodium Hypochlorite, Hydrochloric Acid, Phosphoric Acid, Citric Acid, Alum, Sodium Bromide	100 ml	7904314	7904349
		250 ml	7904316	
		500 ml	7904318	
EPDM	Best Suited for: Sodium Hydroxide, Soda Ash, Sodium Hypochlorite	100 ml	7904313	7904350
		250 ml	7904315	
		500 ml	7904317	

Calibration Column Volume Selection Assistant

ProMinent Recommends that the calibration column be suitable to handle a one minute draw down at maximum system design flow.

Volume	Flow Rates	Pump Types
100 ml	Pump Flow Rates to 6 lph	Gala / Beta – 1000, 1601, 1602, 1005, 1605 Delta – 1608 (Low Flow Only)
250 ml	Pump Flow Rates to 15 lph	Gala / Beta – 0708, 0413, 1008, 0713 Delta – 2508, 1608, 1612
500 ml	Pump Flow Rates to 30 lph	Gala / Beta – 0220, 0420, 0232 Delta – 1020, 0730

Important Note: ProSip-S is not for use with Delta 0450 & 0280 series Pumps

Flow Monitor Selection Assistant

ProMinent recommends that pump be provided with relay contact option to best use this feature.

Monitor Type	Pump Application	Model	Part Number
Flow Monitor Type 1	Suitable for Pump Types	Viton*	792073
	Gala 1601, 1602, 1005, 1605	EPDM	7792073
Flow Monitor Type 2	Suitable for Pump Types	Viton*	792074
	Gala 0708, 0413, 1008, 0713	EPDM	7792074
Flow Monitor Type 2	Suitable for Pump Types	Viton*	792075
	Gala 0220, 0420, 0232	EPDM	7792075

Junction Box Option

For safe and effective hook up of electrical and control signals ProMinent offers an optional junction box that provides hard wired power and pump signal local to the skid. The box is a CSA NEMA 4X FRP enclosure with labelled power and control terminal strip making electrical installation quick and simple.

Please note that the Junction Box item for low flow Self Degassing Delta pumps is already included and does not need to be added.

Pump Type	Pump Application	Part Number
Single Pump	Hinged 6"x6"x4" NEMA4X, CSA FRP Enclosure	7901636
Dual Pump	Hinged 10"x8"x6" NEMA4X, CSA FRP Enclosure	7901649

* Viton is a registered trademark of Dupont

product
overviewsolenoid-driven
metering pumpsmotor-driven
metering pumpspump spare parts &
accessoriesDULCOMETER®
instrumentationDULCOTEST®
sensorsstandard & custom
systems

ProMinent® Standard Systems-ProSIP-FMB

Features & Benefits

SAFE

- 3 Year Leak Free Guarantee (see warranty registration sheet for details)
- Best in class components for one source supply
- Over Pressure Protection: Safety relief valve protects package from overpressure
- Local Pressure Indication: Provides operator safety and local indication of pump operation

EASY

- No fabrication needed on site, complete turnkey package
- All critical components have union fittings for easy maintenance and replacement
- Designed for easy draining of chemical for safe and simple servicing and maintenance
- Easy calibration, with column being able to be gravity filled from tank or by the pump
- Optional accessories can be added to the package at time of order or easily retrofitted on site

DESIGN

- Designed, Engineered and Fabricated in Canada!
- Pumps are positioned for easy access/maintenance of the liquid-end (no need to remove pump)
- Suction inlet can be piped from either the left or right side to suit site location
- Back pressure and pressure relief valve provided as standard



ProMinent® ProSIP-FMB

Package Process Specifications

Fluid Compatibility:	Various chemicals have different reactions with various materials and seals. Published chemical compatibility charts list common chemicals and their compatibility ratings with these materials and seals. For brand chemicals not appearing within these published charts, ProMinent are not able to make any recommendations; please contact your chemical provider to confirm compatibility			
Package Line Size:	1/2" - 1-1/2" (Selected based on the pump connections, as shown in the pump capacity table)			
Piping Material:	PVC, Sch. 80			
Flow Range:	As per the selected pump (see pump capacity table in the ProMinent catalogue for details)			
Available Seal Materials:	Viton Typical Applications: Sodium Hypochlorite, Citric Acid, Alum, Ferric Phosphate, etc. EPDM Typical Applications: Sodium Hydroxide, Sodium Hypochlorite, Soda Ash, etc.			
Maximum Design Pressure:	150 psi / 10 bar / 1000 kPa			
Maximum Operating Pressure:	123 psi / 8.5 bar / 850 kPa			
Test Pressure:	150 psi / 10 bar / 1000 kPa			
Maximum Suction Pressure:	14.5 psi / 1 bar / 100 kPa			
Minimum Differential Pressure:	21 psi / 1.5 bar / 145 kPa			
Chemical Pumping Temperature:	Minimum: 5°C / 41°F Maximum: 25°C / 77°F			
Ambient Temperature:	Minimum: 5°C / 41°F Maximum: 45°C / 113°F			
Chemical Viscosity (at Lowest Temperature):	Between 1 -500 (cPs)	Sigma Pump with a Standard PVT Liquid-End (without valve springs)		
	501 - 3,000 (cPs)	Sigma Pump with a Standard PVT Liquid-End (with valve springs) Solenoid Pump with High Viscosity (PVT4) Liquid-End		
Equipment Location:	Indoors			
Area Classification:	Solenoid Pumps:	Unclassified Only		
	Sigma Control / Sigma 1 Basic Pumps:	Unclassified Only (motors are integral to the pump)		
	Sigma 2 & 3 Basic Pumps:	As per the motor nameplate (motors purchased separate to the pump)		
Available Voltage:	Solenoid Pumps:	As per the selected pump model		
	Sigma Control Pumps:	As per the selected pump model		
	Sigma 1 Basic Pumps:	As per the selected pump model		
	Sigma 2 & 3 Basic Pumps:	As per the installed motor (purchased separate to the pump)		
Package Dimensions:	1/2" to 1" Packages			
	1 Pump:	30" (762 mm) Width	x 48.5" (1232 mm) Height	x 22" (559 mm) Depth
	2 Pump Traditional:	30" (762 mm) Width	x 60" (1520 mm) Height	x 30" (760 mm) Depth
	2 Pump Shared:	49" (1245 mm) Width	x 57" (1448 mm) Height	x 25" (635 mm) Depth
	1-1/2" Packages			
	1 Pump:	66" (1680 mm) Width	x 72" (1830 mm) Height	x 36" (910 mm) Depth
	2 Pump Traditional:	66" (1680 mm) Width	x 72" (1830 mm) Height	x 36" (910 mm) Depth
	2 Pump Shared:	55" (1397 mm) Width	x 65" (1651 mm) Height	x 33" (838 mm) Depth

product overview

solenoid-driven metering pumps

motor-driven metering pumps

pump spare parts & accessories

DULCOMETER® instrumentation

DULCOTEST® sensors

standard & custom systems

ProMinent® Standard Systems-ProSIP-FMB

Package Installed Components

The items listed below come preinstalled and tested as a single packaged unit.

- PE (Black) Floor Mounted Frame for Flooded Inlet
- Calibration Column
Provides an easy way to verify flow output from a chemical metering pump, ensuring there is no over/under dosing.
- 2-Port Pressure Relief Valve (PRV), adjustable setting from 7-150 psi
Used to protect devices and piping downstream of the metering pump. The set pressure of this valve should be approximately 15% higher than the operating pressure, but below the design pressure of the package.
- 2-Port Back Pressure Valve (BPV), adjustable setting from 7-150 psi
Used to maintain a set pressure at the injection to ensure accurate metering, and are also used to prevent siphoning. The Back Pressure Valve ensures proper metering pump check valve operation.
- 0-160psi SS Pressure Gauge with PVC isolator
All components on a systems are susceptible to damage by pressure. A pressure gauge shows the system is operating within pressure limits, ensures the line is depressurized before any maintenance/repair and allows the Back Pressure Valve and Pressure Relief Valve to be re-set afterwards.

Also Included on the Traditional Two Pump Packages (Only):

- Pulsation Dampener (installed on each pump)
- On the 2 pump Traditional packages, a pulsation dampener will be installed on each pump discharge. Dampeners are not provided on the 1 Pump and 2 Pump Shared discharge packages, but are available as optional accessories (see following page)

ProMinent® ProSIP-FMB

Package Selection Guide - 1/2" Process Piping

	Pump Model	Pump Series	Pump Liquid-End Type	Maximum Rated Flow		Maximum Rated Pressure		ProSIP-FMB Package Options					
				L/hr	GPH	BAR	PSI	1 Pump		2 Pump Traditional		2 Pump Shared	
								Viton	EPDM	Viton	EPDM	Viton	EPDM
1/2" process piping	Beta, Gala & Gamma X	1604	PVT41	3.24	0.86	16	232	1061515	1061521	7904399	7904385	1061527	1061533
		1605		3.69	0.99	16	232						
		1005		3.96	0.99	10	145						
		1008		6.12	1.62	10	145						
		0708		6.39	1.71	7	100						
		1009		7.65	2.02	10	145						
		0713		9.9	2.61	7	100						
		0413		11.1	2.88	4	58						
		0715		12.33	3.26	7	101						
		0420		15.4	4.05	4	58						
		0220		17.1	4.5	2	29						
		0424		20.4	5.39	4	58						
	Delta	0450	PVT2 or PVT3	49	12.9	4	58	1061516	1061522	7904646	7904640	1061528	1061534
		0280		75	19.8	2	29						
	Sigma Basic	16017	PVT	20	5.3	10	145						
		16035		42	11.1	10	145						
		10050		60	15.8	10	145						
		10022		26	6.8	10	145						
		10044		53	14	10	145						
		07065		78	20.6	7	101						
		16050		60	15.9	10	145						
	Sigma Control	16017		21	5.55	10	145	1061515	1061521	7904399	7904385	1061527	1061533
		16035		42	11.1	10	145						
		10050		49	12.9	10	145						
		10022		27	7.12	10	145						
		10044		53	14	10	145						
		07065		63	16.6	7	101						
		16050		61	15.9	10	145						

Please note that flow rates for PVT4 pumps are based on high viscosity fluids. Variations in viscosities will affect pump capacities

ProMinent® Standard Systems-ProSIP-FMB

Package Selection Guide - 3/4", 1" and 1.5" Process Piping

	Sigma Version	Pump Series	Pump Liquid-End Type	Maximum Rated Flow		Maximum Rated Pressure		ProSIP-FMB Package Options					
				L/hr	GPH	BAR	PSI	1 Pump		2 Pump Traditional		2 Pump Shared	
								Viton	EPDM	Viton	EPDM	Viton	EPDM
3/4" process piping	Basic	07042	PVT	50	13.2	7	102	1061517	1061523	7904400	7904386	1061529	1061535
		04084		101	26.7	4	58						
		04120		144	38	4	58						
		16090		106	28	10	145						
		16130		156	41.2	10	145						
		07120		150	39.6	7	102						
		07220		164	69.7	7	102	1061518	1061524	7904648	7904642	1061530	1061536
	Control	07042		52	13.7	7	102	1061517	1061523	7904400	7904386	1061529	1061535
		04084		101	26.7	4	58						
		04120		117	31	4	58						
		16090		109	28.8	10	145						
		16130		131	34.6	10	145						
		07120		150	39.6	7	102						
		07220		271	71.6	7	102	1061518	1061524	7904648	7904642	1061530	1061536
1" process piping	Basic	04350	PVT	420	111	4	58	1061519	1061525	7904551	7904387	1061531	1061537
		120145		174	46	10	145						
		120190		251	46	10	145						
		120270		351	92.7	10	145						
	Control	04350		353	93.3	4	58						
		120145		182	48	10	145						
		120190		243	64.2	10	145						
		120270		365	96.4	10	145						
	Basic	070410		492	130	7	102	1061520	1061526	7904650	7904644	1061532	1061538
		070580		696	184	7	102						
		040830		1000	264	4	58						
	Control	070410		500	132	7	102						
		070580		670	177	7	102						
		040830		1040	274.8	4	58						

Please note that flow rates for PVT4 pumps are based on high viscosity fluids. Variations in viscosities will affect pump capacities

ProMinent® ProSIP-FMB

Optional, Package Mounted Accessories

Ordered separately, these items will be installed on your ProSIP-FMB package when they are purchased together

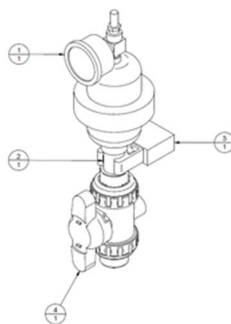
■ Pulsation Dampener Assembly

Recommended accessory for all motor driven pumps. Dampeners help prevent piping damage and wear of line devices caused by pulsating flow. The ProSIP-FMB packages come with capped pipe where the dampener assembly can be installed. The dampener assembly includes an isolation valve. ProMinent will include all dampener assemblies which are ordered with a package.

Sizing:

Dampener assemblies are sized to cover all packages within that line size. To select; simply match your ProSIP-FMB line size and materials (Example: ProSip package 1061517 has 1" piping and PVC/Viton materials, so the dampener assembly would be 1061544.)

Part Number	Description
1061539	PD ASSEMBLY: 0.5"-164ML-PVC/EPDM
1061540	PD ASSEMBLY: 0.5"-164ML-PVC/VITON
1061541	PD ASSEMBLY: 0.75" - 1393ML - PVC/EPDM
1061542	PD ASSEMBLY: 0.75" - 1393ML - PVC/VITON
1061543	PD ASSEMBLY: 1" - 1393ML - PVC/EPDM
1061544	PD ASSEMBLY: 1" - 1393ML - PVC/VITON
1061545	PD ASSEMBLY: 1.5" - 2867ML - PVC/EPDM
1061546	PD ASSEMBLY: 1.5" - 2867ML - PVC/VITON



Item #	Description
1	Pulsation Dampener
2	PVC Pipe
3	Pipe Support
4	Isolation Type Ball Valve

■ Flow Monitor (cannot be used in conjunction with a Deaeration Valve):

Provides visual flow verification via green/red flashing LED light and an alarm output via pumps contact relay (Maximum viscosity is 50 cPs) Only suitable for pumps operating above 50 strokes per minute or on Contact mode.

* Not for use with Solenoid High Viscosity (PVT4) pumps or Sigma Basic pumps

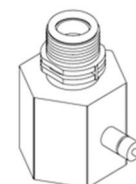
Pump Type	Material	Seal	Pump Series	Part #
Sigma 1 Control	PVDF	EPDM	12017, 10022, 12035, 10044, 10050, 07065	1021168
	PVDF	Viton® B	12017, 10022, 12035, 10044, 10050, 07065	1021169
Sigma 1 & 2 Control	PVDF	EPDM	07042, 04084, 04120, 12050,12090, 12130	1021170
	PVDF	Viton® B	07042, 04084, 04120, 12050,12090, 12130	1021171
Sigma 2 & 3 Control	PVDF	EPDM	07120, 04350, 120145, 120190, 120270, 07220	1021164
	PVDF	Viton® B	07120, 04350, 120145, 120190, 120270, 07220	1021165
Sigma 3 Control	PVDF	EPDM	07410,07580, 04830	1021166
	PVDF	Viton® B	07410,07580, 04830	1021167



■ Deaeration Valve (cannot be used in conjunction with a Flow Monitor): For use with suction lift applications only

Some chemicals, such as Sodium Hypochlorite, are prone to off-gas and can cause problems with air becoming trapped in the pump dosing head, resulting in inaccurate metering. The deaeration valves solve this issue by bleeding off gasses (must be vented back to tank)

Size	Part #
DN 10	7744259
DN 15	7744260
DN 20	7744249
DN 25	7744987
DN 32	7745134



ProMinent® Standard Systems-ProSIP-FMB

Optional, Package Mounted Accessories

■ Electrical Panels

When ordered with a packages, the below panels and junction boxes would be installed on package and wired as applicable (all items are CSA approved).

Please Note: Panels are NOT suitable for Sigma Basic pumps

■ Junction Box

For safe and effective hook up of electrical and control signals ProMinent offers an optional junction box that provides hard wired power and pump signal local to the skid. The box is a CSA NEMA 4X FRP enclosure with labelled power and control terminal strip making electrical installation quick and simple.

Part #	For ProSIP-FMB Packages
7901636	1 Pump Packages
7901649	2 Pump Traditional or Shared Packages



■ Standard Automatic Switch-Over Panel

Only for use with ProMinent 2 pump ProSIP-FMB Traditional packages!

Panels are intended to be used with two ProMinent metering pumps (control versions) orientated in a duty/standby configuration. The injection flow rate of the metering pumps can be adjusted through the speed control signal (from customer) or adjusted through the pump keypad. The duty pump will run continuously, while the stand-by pump will be stopped.

The Control Panel is designed to operate in local/automatic mode and is equipped with a 3 position selector switch for HAND-OFF-AUTO pump selection.

In **Off** mode the pump is disabled (pump will be stopped regardless of any other condition).

In **Hand** mode the pump runs at a pre-set speed adjustable through the pump interface.

In **Auto** mode the pump will be controlled through the 4..20mA signal from the customers control system. In the event that a fault occurs a fault signal will be sent to the customers control system.

Part #	Description	Selector Switch 1	Selector Switch 2
7905111	"Standard Automatic Switch-Over Control Panel"	"Select the Duty pump (A or B mode)"	"Select Hand, Off, or Auto Mode"

Optional, Loose Shipped Package Accessories

Off skid accessories that can be used in conjunction with the above package (installed on site by others)

■ Y-Strainer:

Protects pump and downstream devices from damage caused by small solids which may have fallen into, or formed in the tank. Installed between the package inlet and the tank (by others).

All Y-Strainers have true union connections and come with both FNPT and socket inserts.

Part #	Description
7900293	1/2" Y-Strainer: PVC with EPDM Seals
7900294	1/2" Y-Strainer: PVC with Viton Seals
7900295	3/4" Y-Strainer: PVC with EPDM Seals
7900296	3/4" Y-Strainer: PVC with Viton Seals
7900291	1" Y-Strainer: PVC with EPDM Seals
7900292	1" Y-Strainer: PVC with Viton Seals
7904871	1-1/2" Y-Strainer: PVC with EPDM Seals
1049960	1-1/2" Y-Strainer: PVC with Viton Seals



ProMinent® ProSIP-FMB

Optional, Loose Shipped Package Accessories

■ PVC Braided Hose:

PVC braided tubing can be used in conjunction with the hose barbs (provided with the package) for the package suction.

Part #	Description
7037017	Hose for 1/2" Piping Packages
7037041	Hose for 3/4" Piping Packages
7741322	Hose for 1" Piping Packages
7904105	Hose for 1-1/2" Piping Packages






■ Pulsation Dampener Bladder Kits:

Bladder kits include a replacement bladder and the hardware for the dampener shell (holds the two half's of the dampener shell together).

Part #	Description
1061785	PD Bladder Kit: FMB-0.5-PVC-EPDM
1061786	PD Bladder Kit: FMB-0.5-PVC-Viton
1061787	PD Bladder Kit: FMB-0.75-PVC-EPDM
1061788	PD Bladder Kit: FMB-0.75-PVC-Viton
1061789	PD Bladder Kit: FMB-1.0-PVC-EPDM
1061790	PD Bladder Kit: FMB-1.0-PVC-Viton
1061791	PD Bladder Kit: FMB-1.5-PVC-EPDM
7740206	PD Bladder Kit: FMB-1.5-PVC-Viton

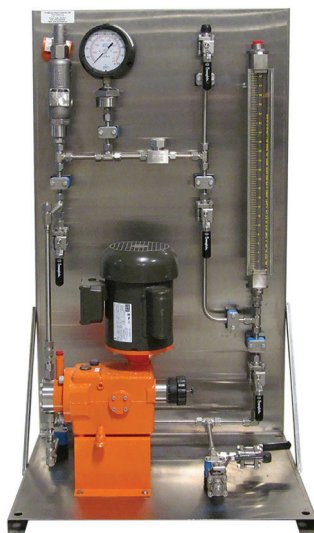


■ Spare Parts Kits:

	Part Number	Description	Used for Package Part Number	What's Included in the Spare Parts Kit
1 Pump Package	1061728	Spare Parts Kit: FMB-1P-0.5-PVC-EPDM	1061521 & 1061522	- Replacement for each isolation valve installed on selected package 
	1061729	Spare Parts Kit: FMB-1P-0.75-PVC-EPDM	1061523 & 1061524	
	1061730	Spare Parts Kit: FMB-1P-1.0-PVC-EPDM	1061525	
	1061731	Spare Parts Kit: FMB-1P-1.5-PVC-EPDM	1061526	
	1061732	Spare Parts Kit: FMB-1P-0.5-PVC-Viton	1061515 & 1061516	
	1061733	Spare Parts Kit: FMB-1P-0.75-PVC-Viton	1061517 & 1061518	
	1061734	Spare Parts Kit: FMB-1P-1.0-PVC-Viton	1061519	
	1061735	Spare Parts Kit: FMB-1P-1.5-PVC-Viton	1061520	
2 Pump: Traditional	7904391	Spare Parts Kit: FMB-2P-T-0.5-PVC-EPDM	7904385 & 7904640	- Replacement for each union fittings installed on selected package 
	7904392	Spare Parts Kit: FMB-2P-T-0.75-PVC-EPDM	7904386 & 7904642	
	7904393	Spare Parts Kit: FMB-2P-T-1.0-PVC-EPDM	7904387	
	7904652	Spare Parts Kit: FMB-2P-T-1.5-PVC-EPDM	7904644	
	7904556	Spare Parts Kit: FMB-2P-T-0.5-PVC-Viton	7904399 & 7904646	
	7904555	Spare Parts Kit: FMB-2P-T-0.75-PVC-Viton	7904400 & 7904648	
	7904557	Spare Parts Kit: FMB-2P-T-1.0-PVC-Viton	7904551	
	7904654	Spare Parts Kit: FMB-2P-T-1.5-PVC-Viton	7904550	
2 Pump: Shared	1061690	Spare Parts Kit: FMB-2P-S-0.5-PVC-EPDM	1061533 & 1061534	- Spare parts kit for each back pressure and pressure relief valve installed on each package Kit Includes: 1 Compression Spring 1 Spring Plate 1 Diaphragm 1 Pressure Adjustment Disk 
	1061691	Spare Parts Kit: FMB-2P-S-0.75-PVC-EPDM	1061535 & 1061536	
	1061692	Spare Parts Kit: FMB-2P-S-1.0-PVC-EPDM	1061537	
	1061693	Spare Parts Kit: FMB-2P-S-1.5-PVC-EPDM	1061538	
	1061724	Spare Parts Kit: FMB-2P-S-0.5-PVC-Viton	1061527 & 1061528	
	1061725	Spare Parts Kit: FMB-2P-S-0.75-PVC-Viton	1061529 & 1061530	
	1061726	Spare Parts Kit: FMB-2P-S-1.0-PVC-Viton	1061531	
	1061727	Spare Parts Kit: FMB-2P-S-1.5-PVC-Viton	1061532	

ProMinent® Standard Systems-ProSIP-I

Floor Mounted Pump Package... Safe and Simple!



Features & Benefits

SAFE

- Preassembled and tested: 3 Year Leak Free Guarantee (see warranty sheet for details)
- Correctly Sourced System Components: Best in class components for one source supply
- Over Pressure Protection: Safety relief valve protects pumps and piping from overpressure
- Local Pressure Indication: Provides operator safety and local indication of pump operation

EASY

- No fabrication needed on site, complete turnkey package
- All critical components have union fittings for easy maintenance and replacement
- Designed for easy draining of chemical for safe and simple servicing and maintenance
- Easy calibration, with column being able to be gravity filled from tank or by the pump
- Optional accessories can be added to the package at time of order or easily retrofitted on site

DESIGN

- Designed, Engineered and Fabricated in Canada!
- Pumps are positioned for easy access/maintenance of the liquid-end
- Suction inlet can be piped from either the left or right side to suit site location
- Pressure relief valve provided as standard

Package Specifications:

Ordered separately, these items will be installed on your ProSIP-FMB package when they are purchased together

Description:

Typical Applications:	Corrosion Inhibitors, Antiscalants, Demulsifiers, Polymers, Acids and Bases, Filming Amine, Additives
Seal Materials:	Teflon / PFA
Wetted Materials:	316SS, Teflon
Chemical Compatibility:	wetted materials are generally compatible with most chemicals, please contact ProMinent for confirmation
Design Pressures:	Up to 1500PSI
Flow Rates:	Up to 200lph
Chemical Viscosity:	Up to 3,000 cPs
Piping Materials:	316SS
Ambient Temperatures:	0degC to 40degC
Fluid Temperatures:	10degC to 80degC (note 1)
Equipment Location:	Indoors, heated

Note 1: lower temperatures available for non-process option

ProMinent® ProSIP-I

Optional, Package Mounted Accessories

Package is designed for a single (duty) pump. All components are located on the package and are functional for the designated pump. These packages are designed for all ProMinent pumps up to 3/4" discharge connection.

All packages include, as standard:

- **Floor Mounted Frame for Flooded Suction**

304 SS metal sheet, L-shape

- **Calibration Column**

Provides an easy way to verify flow output from a chemical metering pump, ensuring there is no over/under dosing.

Calibration Column to be selected from the tables below based on the pump flow rate;

- **Pressure Relief Valve (PRV), 316SS construction**

Used to protect devices and piping downstream of the metering pump. The set pressure of this valve should be approximately 15% higher than the operating pressure, but below the design pressure of the individual components.

PRV to be selected from the tables below based on maximum operating pressure required by process and line sizes;

- **SS Pressure Gauge with 316SS isolator**

All components on a systems are susceptible to damage by pressure. A pressure gauge shows the system is operating within pressure limits, ensures the line is depressurized before any maintenance/repair;

The operating range for the Pressure Gauge to be selected from the tables below based on maximum operating pressure required by the process;

Two package options are offered:

Option 1: Process – ASME design, CRN Certificates available; selection from the table below is based on line sizes;

Option 2: Non-Process – standard ProMinent design and documentation, no registration available

Selection:

Packages are selected based on process parameters required.

Once a pump has been selected for the desired flow rate and pressure (please see ProMinent catalogue for pump

ProMinent® Standard Systems-ProSIP-I

Optional, Package Mounted Accessories

selection) a package can be selected from the tables below;

Process Packages:

Pump Discharge Diameter Size	Package P/N	Pressure Relief Valve P/N	Operating Range	Pressure Gauge P/N	MAX Flow Rate	Calibration Column P/N	
3/8"	1061598	1061741*	0-200PSI	1061742	19lph	1061754	
			0-300PSI	1061743	38lph	1061984	
1/2"	1061600		0-200PSI	1061742	76lph	1061755	
			0-300PSI	1061743	152lph	1061985	
Pressure setting to be provided at the time of order;			0-200PSI	1061742	152lph	1061985	
Non-Process Packages:			0-300PSI	1061743	226lph	1061756	
3/4"	1061602		0-300PSI	1061743	226lph	1061756	
Pump Discharge Diameter Size	Package P/N	Pressure Relief Valve P/N	Operating Range	Pressure Gauge P/N	MAX Flow Rate	Calibration Column P/N	
3/8"	1061599	1061763	0-100PSI	1061765	250ml	1061768	
			0-200PSI	1061766			
1/2"	1061601	1061763	0-100PSI	1061765	500ml	1061769	
			0-200PSI	1061766	2000ml	1061771	
3/4"	1061603	1061764	0-100PSI	1061765	2000ml	1061771	
			0-200PSI	1061766	4000ml	1061772	

Optional Equipment:

■ **Pulsation Dampener Assembly, 316SS / Teflon**

Recommended accessory; helps prevent piping damage and wear of line devices caused by pulsating flow (can be easily retrofitted in the field).

Pulsation dampeners can be selected from the table below based on 26x stroke volume or greater.

All dampeners are 316SS construction with Teflon bladder, mounted on system when ordered with package.

Non-process Packages:

PD size	assembly p/n
4 cu.in.	1062209
36 cu.in.	1062208
85 cu.in.	1062207

Pressure rating 300PSI

Process Packages:

PD size	assembly p/n
4 cu.in.	1061759
36 cu.in.	1061760
85 cu.in.	1061758

Pressure rating 300PSI

ProMinent® ProSIP

Warranty Registration Form

How to Register Your ProMinent ProSip Package:

- Complete items 1-8 below (all sections must be completed for the warranty to be activated)
- Return the completed form to ProMinent, within four (4) weeks of the package ship date prosipwarranty@prominent.ca
- Package is not covered under warranty if this form is not completed (in full) and returned to the above email address

One form is required per package!

1. Name of Company Purchasing Equipment: _____
2. Name of Person Completing This Form: _____
3. Part Number of Package to be Registered: _____
4. Purchase Order Number: _____
5. Chemical Service: _____
6. Pump Identcode and Serial #
 *Pump Identcode and Serial # _____
7. We have ensured that chemical used with this equipment is compatible with PVC and the seal materials ordered:
 Yes ☐ No† ☐
8. The process conditions this package will be installed into, falls within the specifications listed within the manual:
 Yes ☐ No† ☐

Warranty Conditions:

†Package not covered under warranty

- The 3 year leak free warranty only applies to socked welded connections.
- Warranty is for replacement of the spool piece(s) only!
- The warranty replacement of the spool pieces does not include any time or labour by ProMinent to replace. ProMinent only offers the defective replacement spool piece.
- Proprietary chemicals without specific compatibility data are not included in this warranty as they do not appear in any published chemical charts.
- Warranty doesn't cover any wearable parts such as check valves, seals and diaphragms which are included with the package. All wearable parts should be changed regularly as part of a routine scheduled maintenance plan.
- Detailed photos of the leaky spool piece are acceptable for a claim, with accompanying serial # etc. ProMinent will issue a RGA for the faulty spool to be returned for evaluation.
- For successful warranty claims, the spool piece will be sent prepaid by ProMinent by our standard carrier (advised at time of claim).

Warranty Claims:

Please contact ProMinent : Phone: 1-888-709-9933 ext. 2625
 Email: technical@prominent.ca

*If ProSip ordered with 2 pumps



ProMinent® Smart Disinfection

Process Control & Monitoring Panel [PCM] Package

The PCM is a complete package pre-installed on a PE back panel with the ProMinent DACb controller, the DGMA modular sensor housing and the appropriate sensors with wiring, for either Total Chlorine or Free Chlorine measurement with pH (and temperature) compensation. The complete PCM package for the select parameters can be ordered with just one part number as shown. It eliminates the need for on-site installation of components and saves time and effort.

The Process Control and Monitoring [PCM] package completes the intelligent control circuit between the parameters measured by the ProMinent sensors and ProMinent metering pumps on the dosing system.

The PCM package is expertly designed to provide ease of use and long term trouble free service in applications for Free Chlorine with pH compensation for 2.0 and 5.0 ppm, or Total Chlorine for 5.0 ppm. It adds process safety and consistency, critical in a wide range of industries, from Municipal to Food & Beverage. The PCM package includes:

- ProMinent DGMA Sensor Housing with sample water flow switch and housing up to 3 sensors.
- ProMinent DulcoTest series Sensors - a combination of 2 (Free Cl and pH) or Total Chlorine.
- ProMinent Controller: diaLog DACb for 2-channel measurement and control features.



Features & Benefits

- Plug & Play design, Pre-configured & Tested
- Highly accurate Amperometric Chlorine Sensors: type CBR and CTE
- pH compensated Free Chlorine measurement, with Option of Temperature compensation of pH
- 2-channel measurement: Ch.1: pH; Ch.2: Free or Total Chlorine
- 2-way P / PID controller with 4x frequency outputs for dosing pump control
- 4x Digital inputs: sample water flow, pause, chemical level warning
- 2x Limit relays (configurable) + Alarm relay (configurable)
- 2x Analog outputs: Measured Value and Control variables
- Option to add Disturbance variable input (feed forward) for flow input
- Control variable monitoring by time to avoid incorrect metering
- Data Logger: measured value, control variable, calibration data and error logs
- Storage on SD card and depiction on Controller display
- Large Display, User Friendly and Intuitive Operation of the DACb controller

Technical Data: ProMinent Smart Disinfection Process Control & Monitoring Panel:

Sensors	Free Chlorine: CBR-1mA – 2 ppm, Amperometric, DPD1, clear to dirty media
	Free Chlorine: CBR 1-mA-5 ppm, Amperometric, DPD1, clear to dirty media
	F-Cl With pH: PHED-112-SE, Potentiometric, clear to dirty media
	PT-1000 Temperature sensor – for Temperature compensation of pH
	Total Chlorine: CTE 1-mA-5 ppm, Amperometric, DPD4, clear to dirty media
Sensor Housing & Sample Water	DGMA, modular, with integrated Sample Water Flow switch
	Sample Water Flow: 30 – 60 L/h;
	Max Sample Water Pressure: 14.5 psig, atmospheric discharge
	Sample Water discharge: through Air-gap, to tank or drain

ProMinent® Smart Disinfection

Process Control & Monitoring Panel [PCM]

Dulcometer diaLog DACb Monitoring Controller: 2-channel, selected for PCM package:	
Parameters	Free Chlorine [2.0 or 5.0 ppm] with pH compensation and Total Chlorine: 5.0 ppm
Accuracy	0.3 % based on full scale reading
pH compensation	5.0 – 9.5 pH, automatic pH compensation range for Free Chlorine
Inputs	Two Channel inputs for Chlorine / pH 4x Digital inputs: Sample water fault, Pause, Parameter switching, Level monitoring, Pause & Sample water alarm Ch.2 1x Disturbance variable (Flow signal) via frequency/Hz (is always available), 1x of : - Disturbance variable (Flow meter) via analog (mA), OR - pH compensation (mV) for Free Chlorine, With pH control, OR - External remote set point via an analog (mA) signal for Ch. 1
Control characteristics	P / PID Control; 2x bi-directional control
Analog Outputs	2x analog (mA): Measured, Correction (pH), Control variables
Frequency Outputs	2x 2Ch. (4) Pulse Frequency outputs for Metering Pump Controls (4 pumps)
Limit Relays	2x Limit relays (configurable): cycle/real time timer, interm. prg. ctrl. output
Alarm Relay	1x Alarm relay (configurable), 250 V ~ 3A, 700 VA contact type change over
Data Logging	SD card, Calibration and Events, saving & transfer of data
Display / Interface	Display window: 2" x 4"; Key pads: 9x in 2" x 3" (glove friendly)
Electrical	1 ph/110 VAC /60 Hz,

Overview: Selectable (PCM) Packages

Simply select the control package required from the list below,

ProMinent will install and test the selected equipment for an easy installation on site.

Part Number	Included in the package
1061562	PCM-Free Chlorine, CBR 1 mA 2 ppm sensor with pH compensation
1061563	PCM-Free Chlorine, CBR 1 mA 5 ppm sensor with pH compensation
1061564	PCM-Total Chlorine, CTE 1 mA 5 ppm sensor
1061565	PCM-Free Chlorine, CBR 1 mA 2 ppm with pH & Temperature compensation
1061566	PCM-Free Chlorine, CBR 1 mA 5 ppm with pH & Temperature compensation
1097333	PCM-Free Chlorine, CBR 1 mA 2 ppm sensor
1097374	PCM-Free Chlorine, CBR 1 mA 5 ppm sensor
1097375	PCM-Total Chlorine, CTE 1 mA 5 ppm sensor with pH compensation
1097376	PCM-Total Chlorine, CTE 1 mA 5 ppm sensor with pH & Temperature compensation
1097377	PCM-Total Chlorine, CTE 1 mA 2 ppm sensor
1097378	PCM-Total Chlorine, CTE 1 mA 2 ppm sensor with pH & Temperature compensation
1097130	PCM-Free Chlorine, CLE 3.1 mA 2ppm sensor with pH & Temperature compensation

Package Backboard Only - Controller, Sensors and holder separate	Part #	Drawing #
Package for application requiring 1 or 2 process sensors	7901506	7901506-200
Package for application requiring 3 or 4 process sensors	7905124	7905124-200

ProMinent® Standard Systems

Overview: Standard Automatic Switch-Over Panels

Panels listed below are for control signals and power. If ordered alone, the panels will ship loose for installation and external wiring by others. If ordered with an appropriate pump package; all the electrical components located on the package will be wired to the Control Panel. The Panels are built to operate in unclassified area environment located indoors (ambient temperature range 10°C to 45°C).

Operation:

Panels are intended to be used with two ProMinent metering pumps (control versions) orientated in a duty/standby configuration. The injection flow rate of the metering pumps can be adjusted through the speed control signal (from customer) or adjusted through the pump keypad. The duty pump will run continuously.

The Control Panel is design to operate in local/automatic mode and is equipped with a 3 position selector switch for **HAND-OFF-AUTO** pump selection.

In **Off** mode the pump is disabled (pump will be stopped regardless of any other condition).

In **Hand** mode the pump runs at a preset speed adjustable through the pump interface.

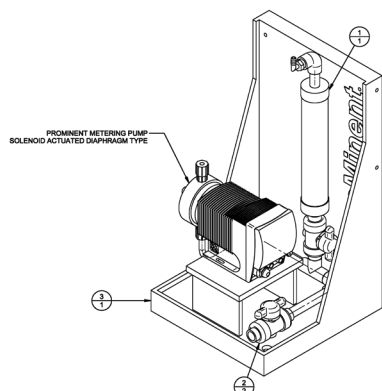
In **Auto** mode the pump will be controlled through the signal from the customers control system. In the event that a fault occurs a fault signal will be sent to the customers control system.

	For use with	Selector Switch 1	Selector Switch 2	Part #
Standard Automatic Switch-Over Control Panel	ProMinent GMXa, Delta*, and Sigma control pumps	Select the Duty pump (A or B mode)	Select Hand, Off, or Auto Mode	7905111
Delta Degassing Automatic Switch-Over Control Panel	ProMinent Delta Degassing Pump (G option)	Select the Duty pump (A or B mode)	Select Hand, Off, or Auto Mode	7905112

ProMinent® Standard Systems

Simple Single Pump System

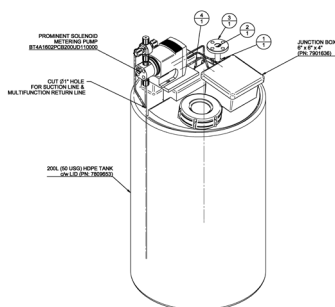
For Concept, Beta or Gala pump only (pumps purchased separately):



7902753	PE Frame, PVC/EPDM piping. Comes with 500ml Calibration Column
7902754	PE Frame, PVC/Viton piping. Comes with 500ml Calibration Column

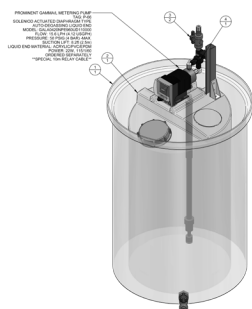
Pump Mounted on a Tank

Single Tank Arrangements (Includes JB and Multi-Function valve):



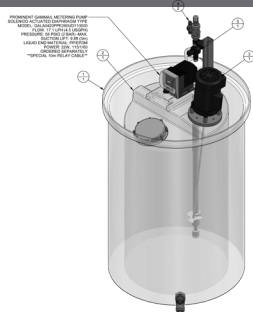
7901671	CNPb, Beta or GMXa pump mounted on a 100L tank
7901672	CNPb, Beta or GMXa pump mounted on a 200L tank
7901674	CNPb, Beta or GMXa pump mounted on a 680L tank
7901675	CNPb, Beta or GMXa pump mounted on a 1,150L tank
7901681	CNPb, Beta or GMXa pump mounted on a 2,250L tank

Tank with Containment (Includes Suction Assembly & Multi-Function valve):



7902780	CNPb, Beta or GMXa pump mounted on a 250L tank
7902784	CNPb, Beta or GMXa pump mounted on a 400L tank

Tank with Containment & Mixer (Includes Suction Assembly & Multi-Function valve):

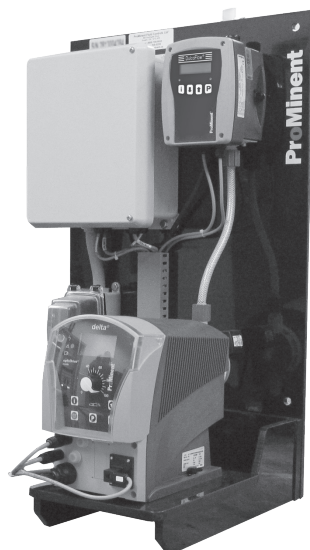


7902783	Soleniod Pump mounted on 250L tank with containment and mixer
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product
overviewsolenoid-driven
metering pumpsmotor-driven
metering pumpspump spare parts &
accessoriesDULCOMETER®
instrumentationDULCOTEST®
sensorsstandard & custom
systems

ProMinent® Measurement System - ProFlo

Overview: Measurement System – ProFlo



The ProFlo package is designed to accurately measure, display, record and transmit the flow rate from a ProMinent Metering pump. The ProFlo is a complete package that is assembled and pre-wired at the factory. The design ensures proper operation of the DulcoFlow® Flow Meter, DulcoFlow® is specifically designed for measuring pulsing volume flows in the range from 0.1 to 50 L/h with an accuracy of +/- 2%. The DulcoFlow® unit is capable of sensing a no or low flow condition, can shut the pump down and notify the plant of flow loss. Wetted materials are PVDF, PTFE and PFA for a wide range of chemical compatibility and temperature ranges.

Viscosity Ratings:

Standard Pump: 1-200 cPs

Pump with Degassing Head: 1-50 cPs

Standard Pump with Springs: 201 - 500 cPs

High Viscosity Pump: 501 - 2000 cPs

Note: Pump and flow meter must be ordered separately based on process requirements.

Features & Benefits

- Control panel allows for complete wired solution direct from the factory with the option for plugs and receptacles to easily remove the pump and flow meter for maintenance without the need for an electrician.
- Service friendly design – open access design for easy maintenance and quick removal and cleaning of the system in the field.
- Dulcoflow meter ensures accurate flow measurement under pulsating flow conditions.

ProFlow Selection Chart

Unit	Part Number
Gala & Delta non-degassing	7905108
Delta with Autodegas	7905109

Delta 0450 & 0280 not suitable for ProFlo application. Please consult with ProMinent representative.

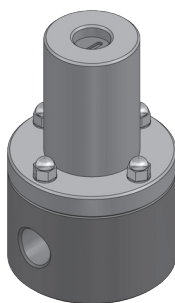
Package Dimensions

Dimensions - 76 cm x 46 cm (29 3/4" x 18")

Operational Weight – Approximately 11kg (25 lbs)

ProMinent® Measurement System - ProFlo Optional Accessories

Back Pressure Valve (optional)

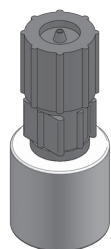


Recommended that a minimum of 40 psig backpressure be applied to optimize performance of flow measurement.

Recommended for this system would be 1/2" connections.

Please see the [Backpressure Valves](#) section of this catalogue for more information.

Foot Valve (optional)

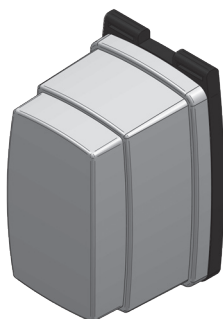


Foot valve ensures that ProFlo system maintains full prime during suction lift applications.

Foot valves are provided as standard with Gala pumps (with exception of PVT4, TTT & SST liquid ends). For Delta pumps; accessories can be ordered with Delta pumps through the ident-code.

Please contact ProMinent for more information or see [Foot Valves](#) section of this catalogue.

Optional Receptacle Selection Chart



Receptacles allow the pump and DulcoFlow unit to be easily plugged and unplugged when needed for maintenance, without being having to be hardwired to an electrical panel.

Optional Receptacle	# of Plugs	Part No.
Nema 3R	2	7905121
Nema 4X*	1	7902123

* If ordering the NEMA 4X unit, a quantity of two is required.

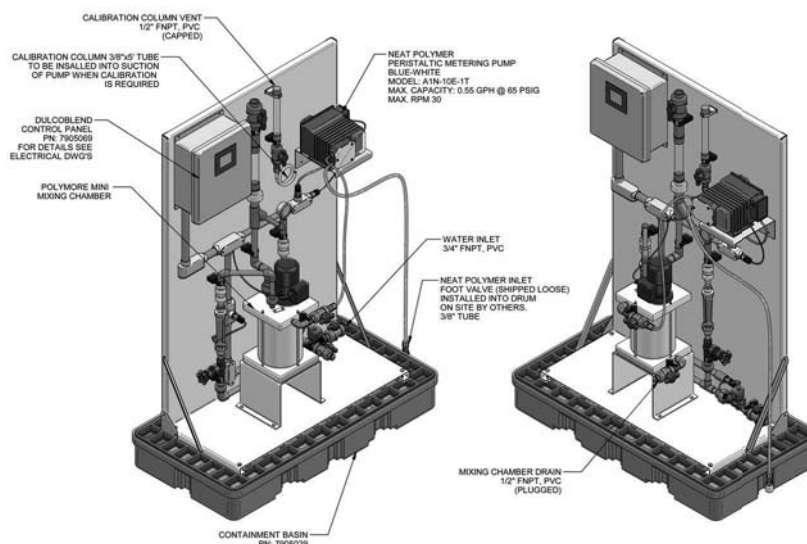
ProMinent® Polymer Systems - DulcoBlend S

DISCONTINUED, FOR INFO ONLY
Replaced by the ProMix Series - pages 307 - 314

Overview: Polymer Systems - DulcoBlend S

The ProMinent DulcoBlend Liquid Polymer preparation system is a unique 3 chamber design that provides the mixing energy required to activate neat emulsion and liquid polymer solutions into a dilute ready to use solution for water and waste water treatment processes.

The operator friendly design provides features and benefits that come from the years of experience ProMinent has in the field with handling polymer applications.



Feature & Benefits

- Easy access mixing chamber injection valve, one single check valve in the system that is easily removed for cleaning and maintenance.
- Valveless chemical injection pump design, no plugging check valves or areas for agglomeration of polymer to occur.
- Easy Fill calibration assembly – simple quick connect attachment on calibration column allows calibration of the system and cleaning of the calibration column as well.
- User friendly HMI affords all operation of the unit and control in either auto or manual mode.
- Incoming flow monitoring - incoming water flow monitored with interlock on low flow to prevent polymer clogging issues in mixing chamber
- 4 Stage mixing design – the DulcoBlend Tri-Force mixing chamber and 4th stage in-line static mixer provides a smooth transition of high energy mixing at the initial water interface to smooth activation energy at the outlet of the unit.
- Unique injection process, the velocity injection system maintains a consistent injection velocity at the highest point of mixing energy preventing polymer clotting at the injection point and providing better activation.
- Service friendly design - open access design for easy maintenance and quick removal and cleaning of the system in the field, complete with drains and easily activated flush sequence to remove all polymer prior to shut down.
- Auto-Flush, simple operator programmed pre-flush and post rinse of polymer unit eliminates clogging of the unit on shutdown and ensures proper water flow prior to polymer preparation on start up.

DulcoBlend Selection Chart

Unit	Part Number	Primary Dilution (gph)	Primary Rotameter (gpm)	Secondary Dilution (gph)	Secondary Rotameter (gpm)	Peristaltic Pump (gph)	Max Pump Pressure (psig)
60x2-0.55T	7905070	60	1	60	1	0.55	65
180x2-1.19T	7905071	180	3	120	2	1.19	65
300x2-2.74T	7905072	300	5	300	5	2.74	50

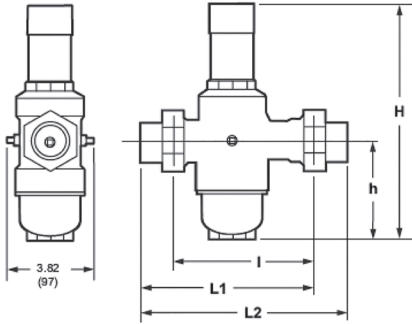
Package Dimensions

Dimensions - Operational Weight – Approximately 75 kg

ProMinent® Polymer Systems - DulcoBlend S Accessories

Pressure Regulating Valve

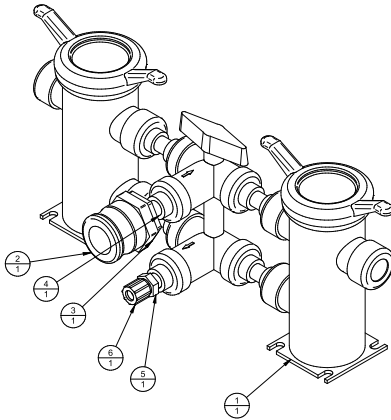
Allows for consistent incoming water flow through the elimination of pressure variations on incoming water line. Water: 3/4" NPT, double union, 15-150 psig; preset at 50 psig; cast bronze valve body, brass stem, plastic cap, EPDM elastomer.



ProMinent Part No. – 7746302

Dimension in IN. (mm)				Threaded		Sweat	
Size	H	h	I	L1	L2	L1	L2
1 1/2	11 13/16 (299)	5 (126)	6 3/8 (163)	7 13/16 (196)	9 3/8 (234)	7 7/8 (201)	9 3/8 (239)

DulcoBlend Basket Strainer

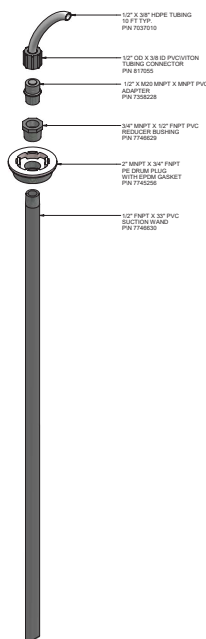


PVC Duplex Basket Strainer to eliminate intrusion of polymer clots in the system, providing added protection to plugging the check valve to the mixing chamber. Polymer to drain by gravity to the strainer from tote or tank, pump suction hooks directly to outlet.

Approx. Dimensions – 20.5"x10.5"x 8.5" (LxWXH)

ProMinent Part No. – 7905068

Suction wand for Neat Polymer:



Easy insertion into chemical drum, seals bunge connection, provides rigid suction line and easy drum exchange. 1/2" size, Length 33", PVC/Viton and HDPE construction

ProMinent Part No. – 7746627

ProMinent® Polymer Systems - DulcoBlend S Accessories

Drum Dryer Vent



Desiccant dryer vent to fit on std. 55 USG drums, ¾"-14 NP SM, prevents humidity in the air from entering the drum and prematurely activating the polymer solution and causing clots, refillable cartridge.

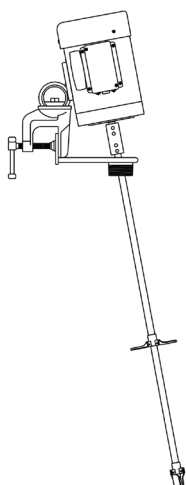
ProMinent Part No. - 7746622

Drum Dryer Desiccant Refill Pk.

Refill pack For Drum Dryer Vent

ProMinent Part No. - 7746623

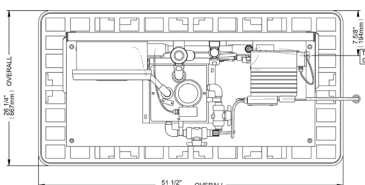
Drum Mixer:



Collapsible C-Clamp Style drum agitator provides a means of preventing settling of polymer solution in the drum with brief periodic mixing controlled from the DulcoBlend Control System. ½ hp, 1ph/115-230V/60Hz, 1725 rpm, TEFC motor, with 2" Drum Adapter, and adjustable C-clamp, Shaft Length 34", collapsible propeller.

ProMinent Part No. - 7746626

DulcoBlend Containment Stand



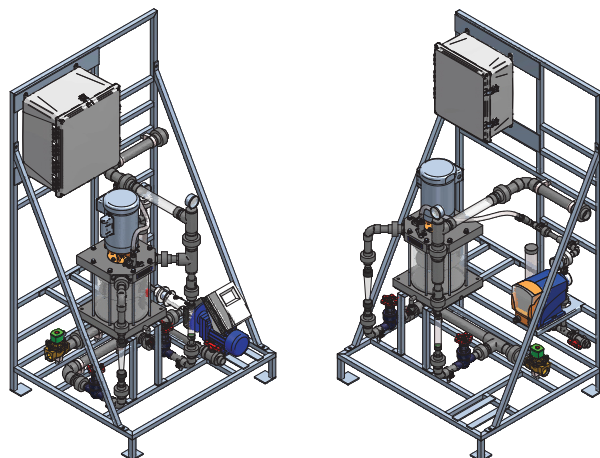
HDPE Drip Pan for DulcoBlend System with grated plastic top provides drip and minor leakage containment for the system and eliminates potential slip hazards with the polymer.

Dimensions – 51.5" x 26.25" x 6" (LxWxD)

ProMinent Part No. – 7905029

ProMinent® ProMix™ - M (In-line Controls)

Overview: ProMix™ - M (In-line Controls)



The ProMinent® ProMix™ is a pre-engineered polymer mixing system with intuitive controls. Designed as an in-line or makedown unit, the ProMix™ is engineered to meet liquid polymer applications utilizing diaphragm or progressive cavity pump technologies. The unique mixing regime delivers a highly activated polymer solution to every application with optimum performance.

Features & Benefits

- LCD display with touchpad control
- 4-20 mA input to pace pump
- Remote start/stop
- General alarm contacts
- Adjustable flush settings
- True multi-zone mixing chamber that delivers a tapered energy profile for proper polymer activation
- Unique injection check valve with easy access for cleaning
- Diaphragm and progressive cavity pump options
- System protection against loss of water flow
- Precise activated polymer solution delivery
- Open design for easy maintenance
- Suction lift or flooded suction
- Twist lock fittings
- Selectable emulsion or mannich polymer

Specifications

- Water Inlet: 1-1/2" FNPT
- Polymer Inlet: 1/2" or 1" FNPT
- Product Outlet: 1-1/2" FNPT
- Drain Connection: 1/4"
- Max. Chamber Pressure Rating: 150 PSIG
- Max. Operating Pressure: 100 PSIG
- Power Supply:
 - DA Models 120 VAC, 1 ph, 60 Hz, 20 Amp
 - PA Models 220 VAC, 1 ph, 60 Hz, 20 Amp
- Motor: 1.5 hp, 115/230 VAC, 1 PH, TEFC, 1725 rpm
- Dimensions: 40" x 34" x 72" (L x W x H)

ProMinent® ProMix™-M (In-line Controls)

Capacity data

Diaphragm Metering Pump Systems

ProMix™-M / Diaphragm Metering Pump Systems

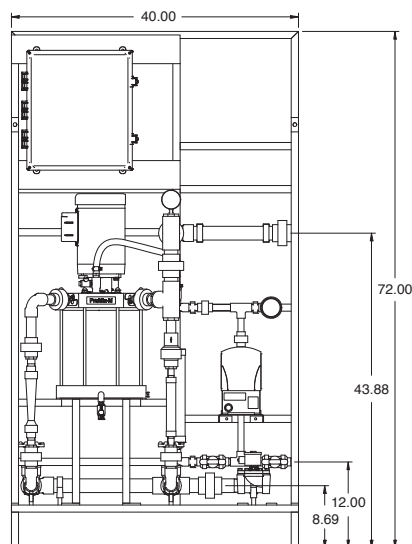
Part Number	Model Number	Primary Dilution gph	Post Dilution gph	Neat Polymer Pump gph	Max. Pump Pressure psig
1048367	300x2-2.3DA	300	300	2.3	100
1048368	600x2-3.8DA	600	600	3.8	100
1048369	600x2-6.2DA	600	600	6.2	100
1048370	600x2-10.3DA	600	600	10.3	58
1048371	1200x2-6.2DA	1200	1200	6.2	100
1048372	1200x2-10.3DA	1200	1200	10.3	58
1048373	1500x2-6.2DA	1500	1500	6.2	100
1048374	1200x2-10.3DA	1500	1500	10.3	58

Progressive Cavity Pump Systems

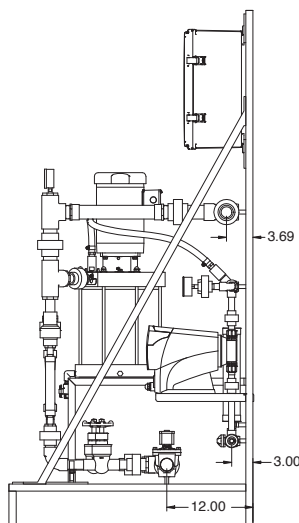
ProMix™-M / Progressive Cavity Pump Systems

Part Number	Model Number	Primary Dilution gph	Post Dilution gph	Neat Polymer Pump gph	Max. Pump Pressure psig
1048375	300x2-5.0PA	300	300	5.0	100
1048376	600x2-5.0PA	600	600	5.0	100
1048377	600x2-10.0PA	600	600	10.0	100
1048378	1200x2-10.0PA	1200	1200	10.0	100
1048379	1200x2-24.0PA	1200	1200	24.0	100
1048380	1500x2-10.0PA	1500	1500	10.0	100
1048381	1500x2-24.0PA	1500	1500	24.0	100

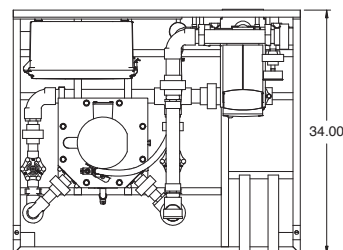
Dimensional Drawings



FRONT VIEW



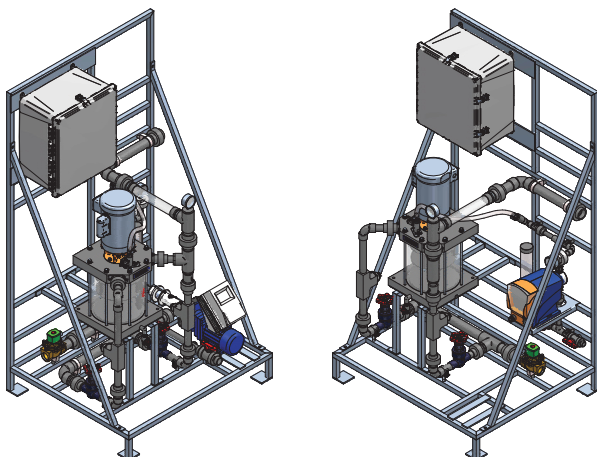
SIDE VIEW



PLAN VIEW

ProMinent® ProMix™-M (Batch & In-line Controls)

Overview: ProMix™-M (Batch & In-line Controls)



The ProMinent® ProMix™ is a pre-engineered polymer mixing system with intuitive controls. Designed as an in-line or makedown unit, the ProMix™ is engineered to meet liquid polymer applications utilizing diaphragm or progressive cavity pump technologies. The unique mixing regime delivers a highly activated polymer solution to every application with optimum performance

Features & Benefits

- LCD display with touchpad control
- 4-20 mA input to pace pump
- Remote start/stop
- General alarm contacts
- Adjustable flush settings
- True multi-zone mixing chamber that delivers a tapered energy profile for proper polymer activation
- Unique injection check valve with easy access for cleaning
- Diaphragm and progressive cavity pump options
- System protection against loss of water flow
- Precise activated polymer solution delivery
- Open design for easy maintenance
- Suction lift or flooded suction
- Twist lock fittings
- Selectable emulsion or mannich polymer
- Select batch or in-line controls

Specifications

- Water Inlet: 1-1/2" FNPT
- Polymer Inlet: 1/2" or 1" FNPT
- Product Outlet: 1-1/2" FNPT
- Drain Connection: 1/4"
- Max. Chamber Pressure Rating: 150 PSIG
- Max. Operating Pressure: 100 PSIG
- Power Supply:
 - DB Models 120 VAC, 1 ph, 60 Hz, 20 Amp
 - PB Models 220 VAC, 1 ph, 60 Hz, 20 Amp
- Motor: 1.5 hp, 115/230 VAC, 1 PH, TEFC, 1725 rpm
- Dimensions: 40" x 34" x 72" (L x W x H)

ProMinent® ProMix™-M (Batch & In-line Controls)

Capacity data

Diaphragm Metering Pump Systems

ProMix™-M / Diaphragm Metering Pump Systems

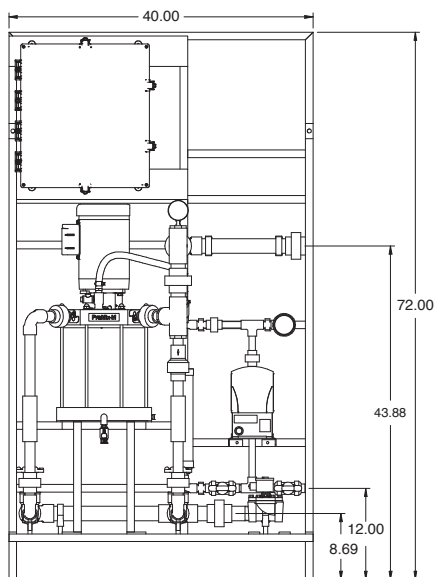
Part Number	Model Number	Primary Dilution gph	Post Dilution gph	Neat Polymer Pump gph	Max. Pump Pressure psig
1048382	300x2-2.3DB	300	300	2.3	100
1048383	600x2-3.8DB	600	600	3.8	100
1048384	1500x2-6.2DB	1500	1500	6.2	100
1048385	1500x2-10.3DB	1500	1500	10.3	58

Progressive Cavity Pump Systems

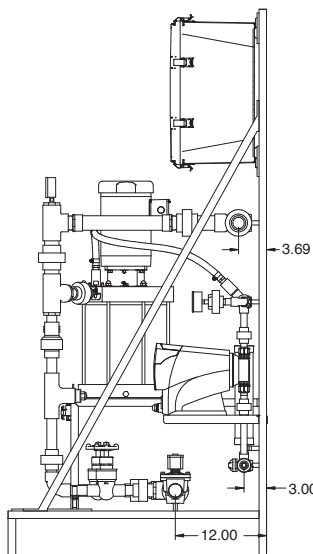
ProMix™-C / Progressive Cavity Pump Systems

Part Number	Model Number	Primary Dilution gph	Post Dilution gph	Neat Polymer Pump gph	Max. Pump Pressure psig
1048386	1500x2-5.0PB	1500	1500	5.0	100
1048387	1500x2-10.0PB	1500	1500	10.0	100
1048388	1500x2-24.0PB	1500	1500	24.0	100

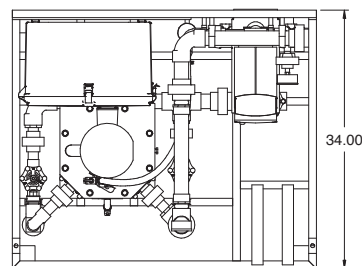
Dimensional Drawings



FRONT VIEW



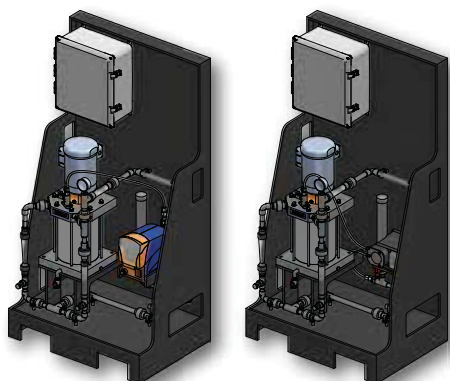
SIDE VIEW



PLAN VIEW

ProMinent® ProMix™-S

Overview: ProMix™-S



The ProMinent® ProMix™ is a pre-engineered polymer mixing system made for the water and wastewater markets. Designed as an in-line unit, the ProMix™ can be customized to meet most liquid polymer applications utilizing tubing or diaphragm pump technologies depending on the application requirement or customer preference. The unique mixing chamber allows for complete makedown of the neat or diluted polymer to guarantee a problem-free injection.

Features & Benefits

- Open design for easy maintenance
- True multi-zone mixing regime for proper polymer activation
- Unique injection check valve with easy access for cleaning
- Adjustable auto flush settings
- System protection against loss of water flow
- Precise activated polymer solution delivery
- Remote start/stop
- LCD display with touchpad control
- 4-20 mA input to pace pump
- General alarm contacts
- Twist lock fittings for easy maintenance of polymer and water connections
- Selectable start/stop and 4-20 mA control from the control panel
- Adjustable neat polymer pump for flooded suction or suction lift applications

Specifications

- Water Inlet: 3/4" FNPT
- Polymer Inlet: 1/2" FNPT
- Product Outlet: 3/4" FNPT
- Drain Connection: 1/4"
- Max. Chamber Pressure rating: 150 PSIG
- Max. Operating Pressure: 100 PSIG
- Power Supply: 120 VAC, 1 Phase, 60Hz
- Current Load: 15 Amp
- Motor: 1/2 hp, 115/230 VAC, 1 Phase, TEFC, 1725 rpm
- Dimensions: 24" x 34" x 66" (L x W x H)
- Neat Polymer Pump: Peristaltic or Diaphragm design

ProMinent® ProMix™-S

Capacity data

Peristaltic Tube Pump Systems

ProMix™-S / Peristaltic Tube Pump Systems

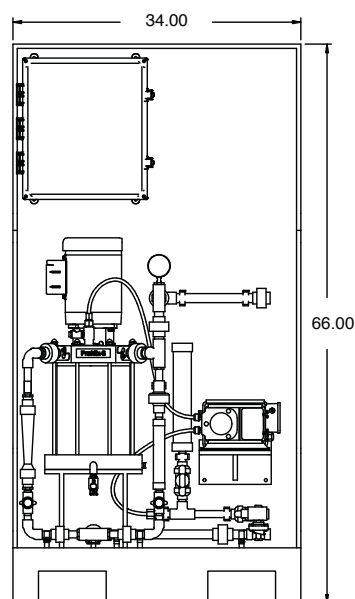
Part Number	Model Number	Primary Dilution	Post Dilution	Neat Polymer Pump	Max. Pump Pressure
		gph	gph	gph	psig
1048346	60x1-0.22TA	60	-	0.22	65
1048347	60x2-0.95TA	60	60	0.95	65
1048348	120x2-0.95TA	120	120	0.95	65
1048349	120x2-2.00TA	120	120	2.00	65
1048351	300x2-2.00TA	300	300	2.00	65
1048352	300x2-3.73TA	300	300	3.73	50

Diaphragm Metering Pump Systems

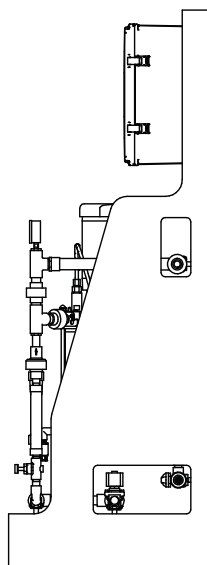
ProMix™-S / Diaphragm Metering Pump Systems

Part Number	Model Number	Primary Dilution	Post Dilution	Neat Polymer Pump	Max. Pump Pressure
		gph	gph	gph	psig
1048353	60x1-1.01DA	60	-	1.01	100
1048354	60x2-1.01DA	60	60	1.01	100
1048355	120x2-1.01DA	120	120	1.01	100
1048356	120x2-2.30DA	120	120	2.3	100
1048357	300x2-2.30DA	300	300	2.3	100
1048358	300x2-3.70DA	300	300	3.7	100

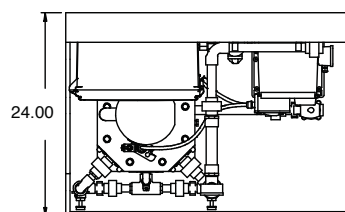
Dimensional Drawings



FRONT VIEW



SIDE VIEW

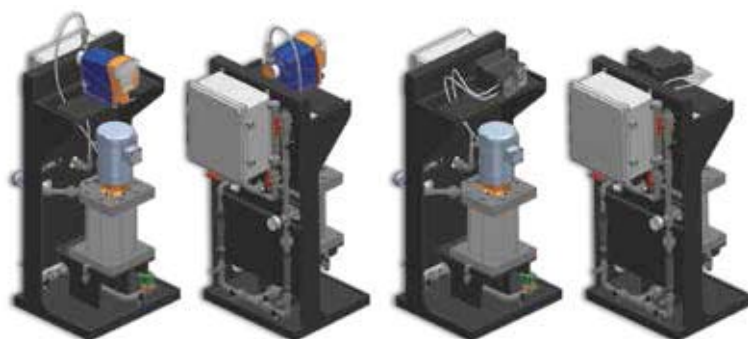


PLAN VIEW

ProMinent® ProMix™ - C

Overview: ProMix™ - C

The ProMinent® ProMix™ is a pre-engineered polymer mixing system made for the water and wastewater markets. Designed as an in-line unit, the ProMix™ can be customized to meet most liquid polymer applications utilizing tubing or diaphragm pump technologies depending on the application requirement or customer preference. The unique mixing chamber allows for complete makedown of the neat or diluted polymer to guarantee a problem-free injection.



Features & Benefits

- Open design for easy maintenance
- True multi-zone mixing regime for proper polymer activation
- Unique injection check valve with easy access for cleaning
- Adjustable auto flush settings
- System protection against loss of water flow
- Precise activated polymer solution delivery
- Remote start/stop
- LCD display with touchpad control
- 4-20 mA input to pace pump
- General alarm contacts
- Twist lock fittings for easy maintenance of polymer and water connections
- Selectable start/stop and 4-20 mA control from the control panel

Specifications

- Water Inlet: 3/4" FNPT
- Polymer Inlet: 1/2" FNPT
- Product Outlet: 3/4" FNPT
- Drain Connection: 1/4"
- Max. Chamber Pressure rating: 150 PSIG
- Max. Operating Pressure: 100 PSIG
- Power Supply: 120 VAC, 1 Phase, 60Hz
- Current Load: 15 Amp
- Motor: 1/2 hp, 115/230 VAC, 1 Phase, TEFC, 1725 rpm
- Dimensions: 24" x 26" x 50" (L x W x H)
- Neat Polymer Pump: Peristaltic or Diaphragm design

ProMinent® ProMix™-C

Capacity data

Diaphragm Metering Pump Systems

ProMix™-C / Peristaltic Tube Pump Systems

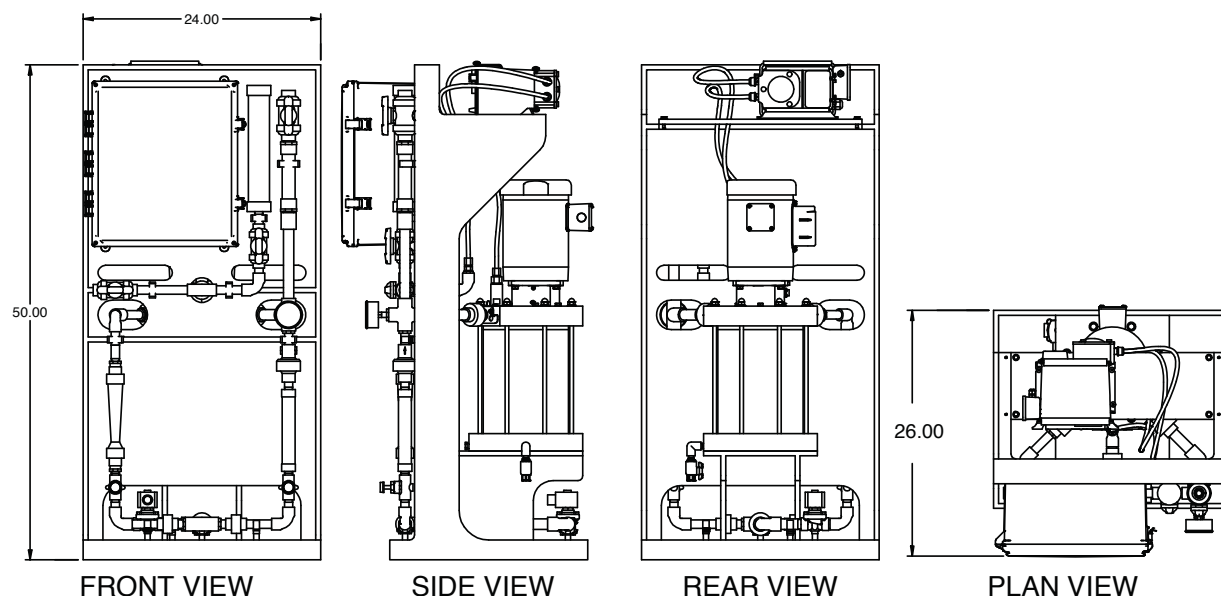
Part Number	Model Number	Primary Dilution gph	Post Dilution gph	Neat Polymer Pump gph	Max. Pump Pressure psig
1048360	60x1-0.22TA	60	-	0.22	65
1048361	60x2-0.95TA	60	60	0.95	65
1048362	120x2-0.95TA	120	120	0.95	65
1048363	120x2-2.00TA	120	120	2.00	65
1048364	300x2-2.00TA	300	300	2.00	65
1048365	300x2-3.73TA	300	300	3.73	50

Diaphragm Metering Pump Systems

ProMix™-C / Diaphragm Metering Pump Systems

Part Number	Model Number	Primary Dilution gph	Post Dilution gph	Neat Polymer Pump gph	Max. Pump Pressure psig
1048460	60x1-1.01DA	60	-	1.01	100
1048461	60x2-1.01DA	60	60	1.01	100
1048462	120x2-1.01DA	120	120	1.01	100
1048463	120x2-2.30DA	120	120	2.30	100
1048474	300x2-2.30DA	300	300	2.30	100
1048475	300x2-3.70DA	300	300	3.70	100

Dimensional Drawings



ProMinent® ProMdry™

Overview: ProMdry™

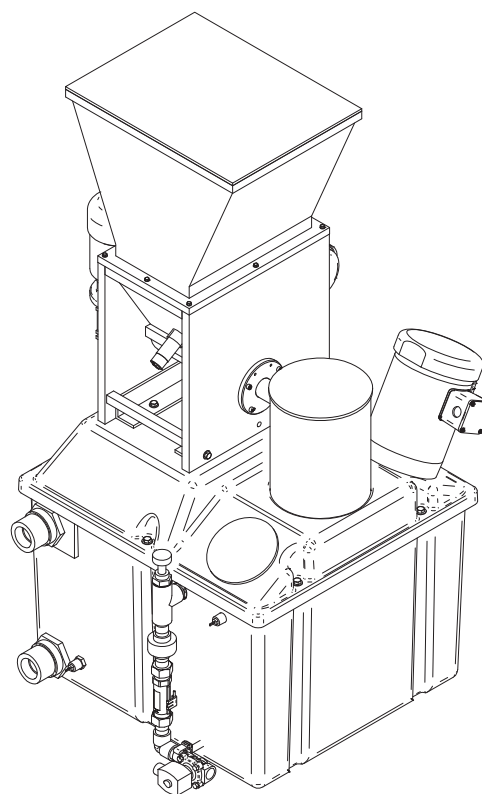
The ProMdry™ system is designed to mix dry chemicals into solution prior to adding to the water treatment process. The volumetric feeder dispenses dry chemical into the mix tank while the flow switch is monitoring water entering the mix tank. The dry chemical and the water are introduced directly into the prop style tank mixer, where they are mixed into solution. The solution is then drawn from the opposite side of the tank to the process.

Features & Benefits

- Rugged PE volumetric feeder with internal arch breaker
- Can be configured as a batching system or as an inline feed system
- Corrosion resistant, 35 gallon, fiberglass tank
- Fully automated control
- Integral level switches, water on/off solenoid, mixer and variable speed volumetric feeder.
- NEMA 4X
- Remote start input, alarm status output relay
- Corrosion resistant 316 SS mixer shaft and mixing prop

Applications

- Municipal water treatment
- Hydrated lime
- Soda ash
- Sodium bicarbonate
- Activated carbon
- Compatible with most dry chemicals (consult factory)



Technical Data

Specifications

- Water Flow: up to 15USGPM at 30psi
- Dry Feed Rate: up to 2.4 cubic ft / hour (depends on desired/maximum concentration)
- Solution Output Flow: up to 15USGPM
- Power input: 120VAC, 1 phase, 60Hz, 20 Amp

Materials of Construction

- Mix Tank and Cover: (Chemical resistant fiberglass reinforced vinylester) 35 US Gallons
- Volumetric Feeder: Polyethylene housing, 304SS feed screw and discharge spout
- Control Panel: NEMA 4X Polycarbonate
- Tank Mixer: 316 SS propeller and shaft
- Various tank sizes and hoppers available in PE and SS

ProMinent® ProMdry™

Identcode Ordering System

DRYA		Version:										
0035F	35 Gal / Fiberglass											
Electrical connection:												
0	US Standard 115 V											
Control system:												
0	Inline											
1	Batching											
Volumetric feeder:												
1	TDG18 - 0.95 cubic ft/hr											
2	TDG55 - 1.45 cubic ft/hr											
3	TDG110 - 2.87 cubic ft/hr											
Hopper:												
0	none											
1	1 cubic ft PP											
2	1 cubic ft SS											
Vibrator for feeder:												
0	None											
V	With vibrator											
Piping material:												
P	PVC											
Accessories:												
0	None											
Execution:												
0	Standard w/ProMinent logo											
Approval:												
0	Standard											
Certificates:												
0	None											
Language:												
EN	English											
DRYA	0035F	0	0	1	0	0	P	0	0	0	0	EN

ProMinent® Custom Systems

Custom Systems: Overview

ProMinent is the world's largest metering pump manufacturer with over 40 subsidiaries worldwide. As a metering pump manufacturer we pride ourselves on being in the best position to design and engineer packages which are required for metering pumps.

We are centrally located in Ontario, with offices in Alberta and Quebec. ProMinent offers complete and comprehensive turnkey packages from project conception, design, Project Management, fabrication, shipment and start-up assistance and training available.

Experience with:

- Industrial Applications
- Oil & Gas, Petrochemical and Chemical Industries
- Custom Packaged Systems
- International Projects
- Mining Industries
- Pulp & Paper and Forest Products Industries
- Wet & Dry Feed Systems

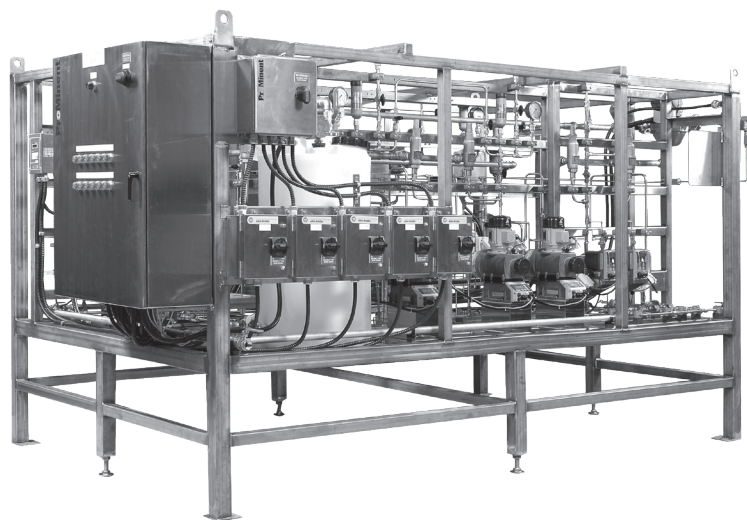
Key Features:

- Strict QA/QC as per ISO 9001
- Experienced in working to Oil & Gas specifications
- Packages can be designed to meet the latest local ASME and CSA codes.
- Provincial registrations available: ABSA & TSSA
- Can meet design codes such as ASME B31.3
- Complete documentation packages available
- Complete turnkey metering pump packages available

Materials:

- PVC
- CPVC
- PP
- PVDF (Fusionwelded)
- 316 Stainless Steel (threaded, tubing or welded)
- Lined piping
- Are able to provide packages with Hastalloy & Titanium piping

Please contact your ProMinent Representative to discuss your application



Canada and worldwide service and support



Experts in chemical feed and water treatment

ProMinent is at home in more than 100 countries. This secures global availability of our products and ensures that we are never far away from our customers. Wherever in the world you are located, our products and services meet the same high quality standard locally for you. Our experience and expertise in water treatment and metering technology are available across the globe.

You can find contact details of our local branches and representative offices at www.prominent.com/en/locations

You can download the ProMinent app for iPad and iPhone on the iTunes App Store or at www.prominent.com/app

Available on the
App Store



METERING | MEASUREMENT & CONTROL | TREATMENT | DISINFECTION | IMPLEMENTATION

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