ProMinent® Product Catalog

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"Product Overview" T.O.C. II

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polymer blending & dry feed solutions

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- ProMix™ -M (Batch & In-line Controls)
- ProMix™ -S
- ProMix™ -C
- ProMdry™

Introduction

Pump Installation Guide

Selection, installation, operation & accessories guidelines

When selecting, installing and operating a pump wit 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 90% 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).

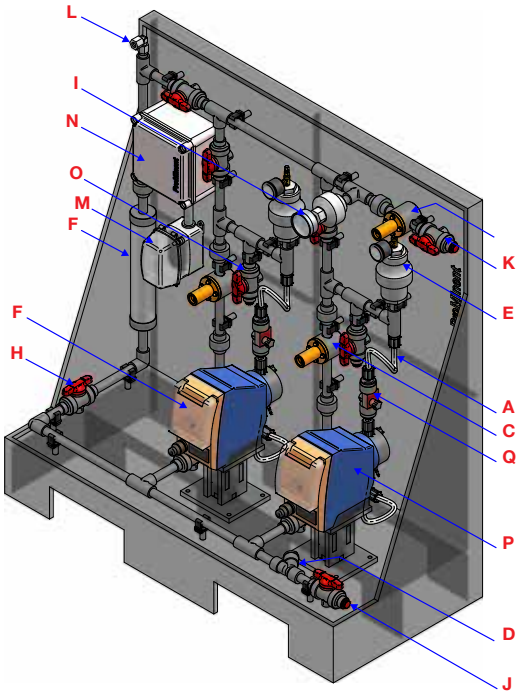
Installation Tip:

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

Standard System Configuration

A: Reinforced PVC tubing
B: Backpressure/anti-siphon valve
C: Pressure relief valve
D: Location of "Y" strainer
E: Pulsation Dampener
F: Calibration Column
G: Metering Pump
H: Ball Valve
I: Pressure Gauge
J: Product Inlet
K: Product Outlet
L: Vent to Tank
M: Duplex Receptacle*
N: Termination Box*
O: Flush Valve
P: Backup Pump
Q: Flow Monitor

*(M) & (N) are **not** standard: Items shown for layout purposes only.



Introduction

Pump Selection by Capacity

Pump Model	Capacity			Max.	Std. MNPT	Manual	Pulse		Analog
	GPD	gph	cc/Min	PSIG	Fittings (in.)	Freq Adj	1:1	M/D	4-20mA
Concept b 1000	5	0.19	12	145	1/4" x 3/16"	0-180	STD	N/A	N/A
beta/4b 1000	5	0.19	12	145	1/4" x 3/16"	0-180	STD	STD	OPT
Concept b 1601	7	0.29	12	232	1/4" x 3/16"	0-180	STD	N/A	N/A
beta/4b 1601	7	0.29	18	232	1/4" x 3/16"	0-180	STD	STD	OPT
beta/4b 2001	7	0.29	18	290	1/4" x 3/16"	0-180	STD	STD	OPT
beta/4b 1602	14	0.58	36	232	1/4" x 3/16"	0-180	STD	STD	OPT
beta/b 2002	14	0.58	48	290	1/4" x 3/16"	0-180	STD	STD	OPT
gamma/ X 1602	15	0.61	38	232	1/4" x 3/16"	0-200	STD	OPT	OPT
Concept b 1002	15.12	0.63	40	145	1/4" x 3/16"	0-180	STD	N/A	N/A
beta/5 b 2504	18	0.77	49	363	8 x 4 mm	0-180	STD	STD	OPT
Concept b 1003	19	0.79	50	145	1/4" x 3/16"	0-180	STD	N/A	N/A
gamma/ X 1604	23	0.95	60	232	1/4" x 3/16"	0-200	STD	OPT	OPT
gamma/ X 2504	24	1	60	363	8 x 4 mm	0-200	STD	OPT	OPT
beta/4 b 1604	24	1	63	232	1/2" x 3/8"	0-180	STD	STD	OPT
ProMus (17) 3/8" Plunger	24	1	63	3500	1/4" FNPT	29-58	N/A	N/A	OPT
Concept b 0704	25	1.03	65	102	1/4" x 3/16"	0-180	STD	N/A	N/A
beta/5b 1605	26	1.1	69	232	1/2" x 3/8"	0-180	STD	STD	OPT
beta/4b 1005	26	1.1	69	145	1/2" x 3/8"	0-180	STD	STD	OPT
Concept b 0705	32.88	1.37	86	102	1/4" x 3/16"	0-180	STD	N/A	N/A
ProMus (17) 7/16" Plunger	33	1.38	87	3500	1/4" FNPT	29-58	N/A	N/A	OPT
beta/5b 1008	43	1.8	114	145	1/2" x 3/8"	0-180	STD	STD	OPT
beta/4b 0708	46	1.9	120	101	1/2" x 3/8"	0-180	STD	STD	OPT
gamma/ X 0708	48	2	126	102	1/2" x 3/8"	0-200	STD	OPT	OPT
gamma/ XL 2508	50.4	2.1	133	363	3/8" x 1/2" (1/2" MNPT dis. Only)	0-200	STD	N/A	N/A
gamma/ XL 1608	50.4	2.1	133	232	3/8" x 1/4"	0-200	STD	N/A	N/A
Concept b 0705	57	2.38	150	44	3/8" x 1/4"	0-180	STD	N/A	N/A
gamma/ X 1009	57	2.38	150	145	1/2" x 3/8"	0-200	STD	OPT	OPT
ProMus (17) 3/8" Plunger	59	2.4	151	3500	1/4" FNPT	29-138	N/A	N/A	OPT
beta/5b 0713	70	2.9	183	101	1/2" x 3/8"	0-180	STD	STD	OPT
ProMus (30) 5/8" Plunger	72	3	189	2080	1/4" FNPT	29-58	N/A	N/A	OPT
beta/4 b 0413	77	3.2	202	58	1/2" x 3/8"	0-180	STD	STD	OPT
gamma/ XL 1612	77	3.2	202	232	3/8" x 1/4"	0-200	STD	N/A	N/A
ProMus (17) 7/16" Plunger	80	3.3	208	3500	1/4" FNPT	29-138	N/A	N/A	OPT
gamma/ X 0414	85	3.56	225	58	1/2" x 3/8"	0-200	N/A	N/A	OPT
ProMus (30) 13/16" Plunger	91	3.8	240	1230	3/8" FNPT	29-43	N/A	N/A	OPT
gamma/ X 0715	92	3.83	242	102	1/2" x 3/8"	0-200	N/A	N/A	OPT
Concept b 0215	104	4.33	273	22	3/8" x 1/4"	0-180	STD	N/A	N/A
beta/5b 0420	108	4.5	284	58	1/2" x 3/8"	0-180	STD	STD	OPT
beta/4 b 0220	120	5	315	29	1/2" x 3/8"	0-180	STD	STD	OPT
gamma/ X 0220	125	5.2	328	29	1/2" x 3/8"	0-200	STD	STD	OPT
Sigma/1 HM 12017	124	5.2	334	145	1/2"	0-88	STD	OPT	OPT
gamma/ XL 1020	127.2	5.3	334	145	1/2" x 3/8"	0-200	STD	N/A	N/A
gamma/ X 0424	152	6.34	400	58	1/2" x 3/8"	0-200	STD	N/A	N/A
Sigma/1 HM 10022	164	6.8	434	145	1/2"	0-88	STD	OPT	OPT
ProMus (30) 5/8" Plunger	173	7.2	454	2080	1/4" FNPT	29-138	N/A	N/A	OPT
gamma/ XL 0703	192	8.0	505	102	1/2" x 3/8"	0-200	STD	N/A	N/A
beta/5b 0232	202	8.4	530	29	1/2" x 3/8"	0-180	STD	STD	OPT
Sigma/1 HM 12035	266	11.1	700	145	1/2"	0-172	STD	OPT	OPT
gamma/ X 0424	285.6	11.9	751	29	1/2" x 3/8"	0-200	STD	N/A	N/A
gamma/ XL 0450	316.8	13.2	833	58	5/8" MNPT Standard	0-200	STD	N/A	N/A
Sigma/1 HM 10044	336	14	884	145	1/2"	0-172	STD	OPT	OPT
Sigma/2 HM 12050	382	15.9	1003	145	1/2"	0-87	STD	OPT	OPT
gamma/ XL 0280	506	21.1	1331	29	5/8" MNPT Standard	0-200	STD	N/A	N/A
ProMus (30) 1-1/8" Plunger	506	21.1	1331	640	3/8" FNPT	29-115	N/A	N/A	OPT
ProMus (40) 1-3/4" Plunger	614	25.6	1615	265	3/4" FNPT	29-58	N/A	N/A	OPT
Sigma/2 HM 12090	686	28.6	1804	145	3/4"	0-156	STD	OPT	OPT
Sigma/2 HM 07120	912	38	2397	100	3/4"	0-87	STD	OPT	OPT
Sigma/3 HM 120190	1445	60.2	3798	145	1"	0-124	STD	OPT	OPT
ProMus (40) 2" Plunger	1603	66.8	4214	200	3/4" FNPT	29-115	N/A	N/A	OPT
Sigma/2 HM 07220	1673	69.7	4397	100	3/4"	0-156	STD	OPT	OPT
ProMus (40) 2-1/4" Plunger	2030	84.6	5337	160	3/4" FNPT	29-115	N/A	N/A	OPT
Sigma/3 HM 120270	2054	85.6	5400	145	1"	0-173	STD	OPT	OPT
Sigma/2 HM 04350	2200	92.5	5833	58	1"	0-232	STD	OPT	OPT
ProMus (40) 2-1/4" Plunger	2436	101.5	6404	160	3/4" FNPT	29-138	N/A	N/A	OPT
Sigma/3 HM 070410	3120	130	8200	100	1-1/2"	0-86	STD	OPT	OPT
Sigma/3 HM 070580	4416	184	11600	100	1-1/2"	0-124	STD	OPT	OPT
Sigma/3 HM 040830	6336	264	16670	58	1-1/2"	0-173	STD	OPT	OPT

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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_3CHO	100%	–	–	+	+	0	–	+/0	+	+
Acetamide	CH_3CONH_2	S	+	+	+	+	+	0	+	+	+
Acetic Acid	CH_3COOH	100%	–	+(50%)	+	+(70%)	+	–	0	+	+
Acetic Anhydride	$(CH_3CO)_2O$	100%	–	–	+	0	0	–	+/0	–	+
Acetone	CH_3COCH_3	100%	–	–	+	+	+	–	–	0	+
Acetophenone	$C_6H_5COCH_3$	100%	–	n	+	+	+	–	+	+	+
Acetyl Chloride	CH_3COCl	100%	–	+	0	–	–	+	–	–	+
Acetylacetone	$C_5H_8O_2$	100%	–	–	+	+	+	–	+	–	+
Acetylene Dichloride=>	Dichloroethylene										
Acetylene Tetrachloride=>	Tetrachloroethane										
Acrylonitrile	CH_2=CH-CN	100%	–	–	+	+	+	–	–	+	+
Adipic Acid	$C_6H_{10}O_4$	S	+	+	+	+	+	+	+	+	+
Allyl Alcohol	CH_2CHCH_2OH	96%	–	0	+	+	+	–	+	+	+
Aluminum Acetate	$Al(CH_3COO)_3$	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_3COONH_4	S	+	+/0	+	+	+	+	+	+	+
Ammonium Aluminum Sulfate	$NH_4Al(SO_4)_2$	S	+	+	+	+	+	+	+	+	+
Ammonium Bicarbonate	NH_4HCO_3	S	+	+	+	+	+	+	+	+	+
Ammonium Carbonate	$(NH_4)_2CO_3$	40%	+	+	+	+	+	+	+	+	+
Ammonium Chloride	NH_4Cl	S	+	+	–	+	+	+	+	+	+
Ammonium Fluoride	NH_4F	S	+	0	0	+	+	+	+	+	+
Ammonium Hydrogen Carbonate	NH_4HCO_3	A.C.	+	+	+	+	+	+	+	+	+
Ammonium Hydroxide	NH_4OH	S	+	+	+	+	+	–	+	+	+
Ammonium Nitrate	NH_4NO_3	S	+	+	+	+	+	+	+	+	+
Ammonium Oxalate	$(NH_4)_2C_2O_4$	S	+	+	+	+	+	+	+	+	+
Ammonium Perchlorate	NH_4ClO_4	10%	+	+	+	+	+	+	+	+	+
Ammonium Peroxodisulfate	$(NH_4)_2S_2O_8$	S	+	+	+(5%)	+	+	+	+	+	+
Ammonium Persulfate	$(NH_4)_2S_2O_8$	A.C.	+	+	+	+	+	+	+	+	+
Ammonium Phosphate	$(NH_4)_3PO_4$	A.C.	+	+	+(10%)	+	+	+	+	+	+
Ammonium Sulfate	$(NH_4)_2SO_4$	A.C.	+	+	+(10%)	+	+	+	+	+	+
Ammonium Sulfide	$(NH_4)_2S$	S	+	+	n	+	+	+	+	+	+
Amyl Alcohol	$C_5H_{11}OH$	100%	+	+	+	+	+	–	+	+	+
Aniline	$C_6H_5NH_2$	100%	–	–	+	+	+	–	+/0	+	+
Aniline Hydrochloride	$C_6H_5NH_2HCl$	S	n	+	–	+	+	+/0	+/0	+	+
Antimony Trichloride	$SbCl_3$	S	+	+	–	+	+	+	+	+	+
Aqua Regia	$3HCl+HNO_3$	100%	–	+	–	–	–	–	0	+	+
Arsenic Acid	H_3AsO_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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PVDF is resistant against most chemicals (excluding ketones, esters).

Chemical	Formula	CONC.	Acrylic	PVC	316 SS	PE	PP	Viton®	EPDM	PVDF	Teflon
Benzaldehyde	C_6H_5CHO	100%	–	–	+	0	+	+	+	+	+
Benzene	C_6H_6	100%	–	–	+	0	0	0	–	+	+
Benzene Sulfonic Acid	$C_6H_5SO_3H$	10%	n	n	+	n	+	+	–	+	+
Benzoic Acid	C_6H_5COOH	S	+	+	+	+	+	+	+	+	+
Benzoyl Chloride	C_6H_5COCl	100%	–	n	0	0	0	+	+	n	+
Benzyl Alcohol	$C_6H_5CH_2OH$	100%	–	–	+	+	+	+	–	+	+
Benzyl Benzoate	$C_6H_5COOC_7H_7$	100%	–	–	+	0	+	+	–	0	+
Benzyl Chloride	$C_6H_5CH_2Cl$	90%	–	n	+	0	0	+	–	+	+
Bleach=>	Sodium Hypochlorite										
Bleaching Powder	$Ca(OCl)_2$	S	+	+	–	+	+	+	+	+	+
Borax	$Na_2B_4O_7$	A.C.	+	+	+	+	+	+	+	+	+
Boric Acid	H_3BO_3	S	+	+	+	+	+	+	+	+	+
Brine		S	+	+/0	+/0	+	+	+	+	+	+
Bromine	Br_2	100%	–	–	–	–	–	–	–	+	+
Bromine Liquid	Br_2	100%	–	–	–	–	–	–	–	+	+
Bromine Water	–	S	–	+	–	–	–	–	–	+	+
Bromo Benzene	C_6H_5Br	100%	n	n	+	0	0	0	–	+	+
Bromochloro Methane	CH_2BrCl	100%	–	–	+	0	–	n	+/0	+	+
Bromochlorotrifluoroethane	$HCClBrCF_3$	100%	–	–	+	0	0	+	–	+	+
Butanediol	HOC_4H_8OH	10%	n	+	+	+	+	0	+	+	+
Butanetroil	$C_4H_{10}O_3$	S	+	+	+	+	+	0	+	+	+
Butanol	C_4H_9OH	100%	–	+	+	+	+	0	+/0	+	+
Butyl Acetate	$CH_3COOC_4H_9$	100%	–	–	+	–	0	–	+/0	+	+
Butyl Acrylate	$C_7H_{13}O_2$	100%	–	–	+	+	+	–	–	+	+
Butyl Amine	$C_4H_9NH_2$	100%	n	n	+	+	n	–	–	0	+
Butyl Benzoate	$C_6H_5COOC_4H_9$	100%	–	–	+	0	0	+	+	n	+
Butyl Ether	$(C_4H_9)_2O$	100%	–	–	+	+	+	–	0	+	+
Butyl Mercaptan	C_4H_9SH	100%	n	n	n	n	n	+	–	+	+
Butyl Oleate	$C_{22}H_{42}O_2$	100%	n	n	+	n	n	+	+/0	+	+
Butyl Stearate	$C_{22}H_{44}O_2$	100%	0	n	+	n	n	+	–	+	+
Butylaldehyde	C_3H_7CHO	100%	–	n	+	+	+	–	+/0	n	+
Butyric Acid	C_3H_7COOH	100%	+(5%)	+(20%)	+	+	+	+	+	+	+
Calcium Acetate	$(CH_3COO)_2Ca$	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_2O_3	S	+	+	–	+	+	+	+	+	+
Camphor	$C_{10}H_{16}O$	100%	–	–	+	–	+	0	–	+	+
Carbolic Acid (see Phenol)	C_6H_5OH	100%	–	0	+	0	+	+	–	+	+
Carbon Disulfide	CS_2	100%	–	–	+	0	0	+	–	+	+
Carbon Tetrachloride	CCl_4	100%	0	–	+	0	–	+	–	+	+
Carbonic Acid	H_2CO_3	S	+	+	+	+	+	+	+	+	+

*** Requires flushing.**

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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_2O	0.5%	0	+	–	0	0	0	–	+	+
Chloroacetic Acid	$CH_2ClCOOH$	A.C.	–	–	–	–	+	+	+	+	+
Chlorine Water	Cl_2+H_2O	S	+	+	–	0	0	+	+	+	+
Chlorobenzene	C_6H_5Cl	100%	–	–	+	0	+	+	–	+	+
Chloroethanol	$ClCH_2CH_2OH$	100%	–	–	+	+	+	–	0	0	+
Chloroethylbenzene	$C_6H_4ClC_2H_5$	100%	–	–	+	0	0	0	–	n	+
Chlorophenol	C_6H_4OHCl	100%	n	n	+	+	+	n	–	+	+
Chlorotoluene	C_7H_8Cl	100%	–	–	+	n	n	+	–	+	+
Chloroacetone	$ClCH_2COCH_3$	100%	–	–	+	n	n	–	+	n	+
Chlorobutadiene	C_4H_5Cl	100%	–	–	+	n	n	+	–	n	+
Chloroform	$CHCl_3$	100%	–	–	+	–	0	+	–	+	+
Chlorohydrin	$C_3H_7O_2Cl$	100%	n	n	+	+	+	+	0	–	+
Chloroprene=>	Chlorobutadiene										
Chlorosulfonic Acid	$SO_2(OH)Cl$	100%	–	–	–	–	–	–	–	–	+
Chrome Sulfate	$Cr_2(SO_4)_3$	S	+	+	+	+	+	+	+	+	+
Chromic Acid	H_2CrO_4	50%	–	+	+(10%)	+	0	+	–	+	+
Chromic Sulfuric Acid	$K_2CrO_4+H_2SO_4$	S	–	+	n	–	–	n	n	+	+
Citric Acid	$C_6H_8O_7$	S	+	+	+	+	+	+	+	+	+
Cobalt Chloride	$CoCl_2$	S	+	+	–	+	+	+	+	+	+
Copper II Acetate	$Cu(CH_3COO)_2$	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	$C_6H_4CH_3OH$	100%	0	0	+	+	+	+	–	+	+
Crotonaldehyde	$CH_3C_2H_2CHO$	100%	n	–	+	+	+	–	+	+	+
Cyclohexane	C_6H_{12}	100%	+	–	+	+	+	+	–	+	+
Cyclohexanol	$C_6H_{11}OH$	100%	0	+/0	+	+	+	+	–	+	+
Cyclohexanone	$C_6H_{10}O$	100%	–	–	+	+	+	–	+/0	+	+
Cyclohexyl Alcohol=>	Cyclohexanol										
Cyclohexylamine	$C_6H_{13}N$	100%	0	0	+	n	n	–	n	n	+
Decahydronaphthaline	$C_{10}H_{18}$	100%	–	+/0	n	0	0	0	–	+	+
Decalin=>	Decahydronaphthaline										
Diisononyl Phthalate	$C_{26}H_{42}O_4$	100%	–	–	+	+	+	n	n	+	+
Diacetone Alcohol	$C_6H_{12}O_2$	100%	–	–	+	+	+	–	+	+	+
Diamine Ethylene	$(CH_2NH_2)_2$	100%	n	0	0	+	+	–	+	+	+
Dibromoethane	$C_2H_4Br_2$	100%	–	–	+	–	n	+	–	+	+
Dibutyl Ether	$C_4H_9OC_4H_9$	100%	0	–	+	0	0	–	0	+	+
Dibutyl Phthalate	$C_{16}H_{22}O_4$	100%	–	–	+	0	+	+	+/0	+	+
Dibutylamine	$(C_4H_9)_2NH$	100%	n	n	+	+	+	–	–	+	+
Dichloro Acetic Acid	$Cl_2CHCOOH$	100%	–	+	+	+	+	–	+	+	+
Dichloro Benzene	$C_6H_4Cl_2$	100%	–	–	+	0	0	+	–	+	+
Dichloro Butane	$C_4H_8Cl_2$	100%	–	–	+	0	0	+	–	+	+
Dichloro Butene	$C_4H_6Cl_2$	100%	–	–	+	0	0	0	–	+	+
Dextrose	$C_6H_{12}O_6$	A.C.	+	+	+	+	+	+	+	+	+
Dichloroethane	$C_2H_4Cl_2$	100%	–	–	+	–	0	+	–	+	+
Dichloroethylene	$C_2H_2Cl_2$	100%	–	–	+	–	0	0	–	+	+
Dichloroisopropyl Ether	$(C_3H_6Cl)_2O$	100%	–	–	+	0	0	0	0	n	+
Dicyclohexylamine	$C_{12}H_{23}N$	100%	0	0	+	+	+	–	+	n	+

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Diethylamine	$(C_2H_5)_2NH$	100%	–	–	+	0	+	–	+	+	+
Diethylene Glycol	$C_4H_{10}O_3$	100%	+	+	+	+	+	+	+	+	+
Diethyleneglydolethyl Ether	$C_8H_{18}O_3$	100%	n	n	+	+	+	n	+/0	+	+
Diethyl Ether	$(C_2H_5)_2O$	100%	–	–	+	0	0	–	–	+	+
Diglycolic Acid	$C_4H_6O_5$	30%	+	+	+	+	+	+	n	+	+
Dihexyl Phthalate	$C_{20}H_{26}O_4$	100%	–	–	+	+	+	–	n	+	+
Diisobutylketone	$C_9H_{18}O$	100%	–	–	+	+	+	–	+	+	+
Diisopropylketone	$C_7H_{14}O$	100%	–	–	+	+	+	–	+	+	+
Dimethyl Carbonate	$(CH_3O)_2CO$	100%	n	n	+	–	+	+	–	+	+
Dimethyl Phthalate	$C_{10}H_{10}O_4$	100%	–	–	+	+	+	–	+/0	+	+
Dimethylformamide	$HCON(CH_3)_2$	100%	–	–	+	+	+	–	+	–	+
Dimethylhydrazine	$H_2NN(CH_3)_2$	100%	n	n	+	+	+	–	+	+	+
Dioctyl Phthalate	$C_6H_4(COOC_8H_{17})_2$	100%	–	–	+	+	+	–	+/0	+	+
Dioxane	$C_4H_8O_2$	100%	–	–	+	+	0	–	+/0	0	+
Dimethyl Formic Amide	$HCON(CH_3)_2$	100%	–	–	–	0	+	0	0	–	+
Disodium Hydrogen Phosphate	Na_2HPO_4	S	+	+	+	+	+	+	+	+	+
Disulfur Dichloride	S_2Cl_2	100%	+	+	+	+	+	+	–	+	+
DMF=>	Dimethylformamide										
Engine Oils		100%	n	+/0	+	+	+	+	–	+	+
Ethanol	C_2H_5OH	100%	–	+	+	+	+	–	+	+	+
Ethanol Amine	$HOC_2H_4NH_2$	100%	0	n	+	+	+	–	+/0	+	+
Ethyl Acetate	$CH_3COOC_2H_5$	100%	–	–	+	+	+35%	–	+/0	–	+
Ethyl Acrylate	$C_2H_3COOC_2H_5$	100%	–	–	+	+	+	–	+/0	0	+
Ethyl Benzene	$C_6H_5C_2H_5$	100%	–	–	+	0	0	0	–	+	+
Ethyl Benzoate	$C_6H_5COOC_2H_5$	100%	n	–	+	+	+	+	–	0	+
Ethyl Bromide	C_2H_5Br	100%	n	n	n	+	+	+	–	+	+
Ethyl Chloride	C_5H_5Cl	100%	–	–	+	–	–	+	–	+	+
Ethyl Chloroacetate	$ClCH_2COOC_2H_5$	100%	–	0	+	+	+	+	–	+	+
Ethyl Chlorocarbonate	$ClCO_2C_2H_5$	100%	n	n	n	n	n	+	–	n	+
Ethylacetylacetate	$C_6H_{10}O_3$	100%	n	–	+	+	+	+	–	+	+
Ethylacrylic Acid	C_4H_7COOH	100%	n	n	+	+	+	n	+/0	+	+
Ethylene Dibromide	$C_2H_4Br_2$	100%	–	–	+	–	0	+	–	+	+
Ethylene Dichloride	$C_2H_4Cl_2$	100%	–	–	+	–	0	+	–	+	+
Ethylene Glycol	$C_2H_4(OH)_2$	100%	+	+	+	+	+	+	+	+	+
Ethylenglycol Ethylether	$HOC_2H_4OC_2H_5$	100%	n	n	+	+	+	n	+/0	+	+
Ethylhexanol	$C_8H_{16}O$	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_6H_5F	100%	–	–	+	0	+	0	–	+	+
Fluoroboric Acid	HBF_4	35%	+	+	0	+	+	+	+	+	+
Formaldehyde	CH_2O	40%	+	+	+	+	+	–	+/0	+	+
Formamide	$HCONH_2$	100%	+	–	+	+	+	+	+	+	+
Formic Acid	HCOOH	S	–	+/0	+	+	+	–	–	+	+
Freon 12,13,22,114,115	–	100%	–	+	–	–	–	–	–	0	+
Furan	C_4H_4O	100%	–	–	+	+	+	–	n	–	+
Furane Aldehyde	$C_5H_5O_2$	100%	n	n	n	n	n	–	+/0	0	+
Furfuryl Alcohol	$OC_4H_3CH_2OH$	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%	+	+	+	+	+	+	+/0	+	+
Gasoline	–	100%	–	–	+	+	+	+	–	+	+
Glucose	$C_6H_{12}O_6$	S	+	+	+	+	+	+	+	+	+
Glycerol Triacetate	$C_3H_5(CH_3COO)_3$	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	$C_5H_{11}CHO$	100%	n	n	+	+	+	–	+/0	+	+
Hexane	C_6H_{14}	100%	+	+	+	+	+	+	–	+	+
Hexanol	$C_6H_{11}OH$	100%	–	–	+	+	+	n	+	+	+
Hexene	C_6H_{12}	100%	n	+	+	+	+	+	–	+	+
Hydrazine Hydrate	$N_2H_4{*}H_2O$	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	$(NH_2OH)_2{*}H_2SO_4$	10%	+	+	+	+	+	+	+	+	+
Hypochlorous Acid	HOCl	S	+	+	–	0	0	+	+/0	+	+
Iodine	I_2	S	0	–	–	0	+	+	+/0	+	+
Isobutyl Alcohol	$C_2H_5CH(OH)CH_3$	100%	–	+	+	+	+	+	+	+	+
Isopropyl Chloride	$CH_3CHClCH_3$	80%	–	–	+	0	0	+	–	+	+
Isopropyl Acetate	$CH_3COOCH(CH_3)_2$	100%	–	–	+	+	+	–	+/0	+	+
Isopropyl Alcohol	$(CH_3)_2CHOH$	100%	0	+/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	$C_3H_6O_3$	100%	–	+	+/0	+	+	+	+(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	$C_4H_4O_4$	S	+	+	+	+	+	+	+	+	+
Malic Acid	$C_4H_6O_5$	S	+	+	+	+	+	+	+	+	+
Manganese II Chloride	$MnCl_2$	S	+	+	+	+	+	+	+	+	+

***Requires flushing.**

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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	$C_6H_{10}O$	100%	–	–	+	n	n	–	+/0	n	+
Methacrylic Acid	C_3H_5COOH	100%	n	n	+	+	+	0	+/0	+	+
Methanol	CH_3OH	100%	–	+	+	+	+	+	+	+	+
Methoxybutanol	$CH_3O(CH_2)_4OH$	100%	–	–	+	+	+	+	0	+	+
Methyl Acetate	CH_3COOCH_3	60%	–	–	+	+	+	–	+/0	+	+
Methyl Acrylate	$C_2H_3COOCH_3$	100%	–	–	+	+	+	–	+/0	+	+
Methyl Benzoate	$C_6H_5COOCH_3$	100%	–	–	+	+	+	+	–	0	+
Methyl Catechol	$C_6H_3(OH)_2CH_3$	S	+	+	+	+	+	+	–	+	+
Methyl Cellulose		S	+	+	+	+	+	+	+	+	+
Methyl Chloroacetate	$ClCH_2COOCH_3$	100%	–	0	+	+	+	0	–	+	+
Methyl Cyclopentane	$C_5H_9CH_3$	100%	+	+	+	+	+	+	–	+	+
Methyl Dichloroacetate	$Cl_2CHCOOCH_3$	100%	–	–	+	+	+	–	n	n	+
Methyl Ethyl Ketone (MEK)	$CH_3COC_2H_5$	100%	–	–	+	+	+	–	+	–	+
Methyl Glycol	$C_3H_8O_2$	100%	+	+	+	+	+	–	+/0	+	+
Methyl Isobutyl Ketone	$CH_3COC_4H_9$	100%	–	–	+	+	+	–	0	–	+
Methyl Isopropyl Ketone	$CH_3COC_3H_7$	100%	–	–	+	+	+	–	+/0	–	+
Methyl Methacrylate	$C_3H_5COOCH_3$	100%	–	–	+	+	+	–	–	+	+
Methyl Oleate	$C_{17}H_{33}COOCH_3$	100%	n	n	+	+	+	+	+/0	+	+
Methyl Salicylate	$HOC_6H_4COOCH_3$	100%	–	–	+	+	+	n	+/0	+	+
Methylacetyl Acetate	$C_5H_8O_3$	100%	–	–	+	+	+	–	+/0	+	+
Methylamine	CH_3NH_2	32%	+	0	+	+	+	–	+	0	+
Methylene Chloride	CH_2Cl_2	100%	–	–	0	–	0	+	–	0	+
Milk	–	–	+	+	+	+	+	+	+	+	+
Morpholine	C_4H_9NO	100%	–	–	+	+	+	n	n	+	+
Naphthalene	$C_{10}H_8$	S	–	–	+	–	+	+	–	+	+
Nickel II Acetate	$(CH_3COO)_2Ni$	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	$C_6H_5NO_2$	100%	–	–	+	–	+	–	–	+	+
Nitro Methane	CH_3NO_2	100%	–	–	+	+	+	–	+/0	0	+
Nitro Propane	$(CH_3)_2CHNO_2$	100%	–	–	+	+	+	–	+/0	n	+
Nitro Toluene	$C_6H_4NO_2CH_3$	100%	–	–	+	+	+	0	–	+	+
Oxalic Acid	$(COOH)_2$	S	+	+	+(10%)	+	+	+	+	+	+
Octane	C_8H_{18}	100%	+	+	+	+	+	+	–	+	+
Octanol	$C_8H_{17}OH$	100%	–	–	+	+	+	+	+	+	+
Octyl Cresole	$C_{15}H_{24}O$	100%	–	–	+	+	+	0	n	+	+
Oleum	$H_2SO_4+SO_3$	10%	n	–	+	–	–	+	–	–	+
Perchloric Acid	$HClO_4$	70%	–	+(10%)	–	+	+(10%)	+	+/0	+	+
Pentane	C_5H_{12}	100%	+	+	+	+	+	+	–	+	+
Pentanol=>	Amyl Alcohol										
Peracetic Acid	$C_2H_4O_3$	50%	–	0	+	0	0	+	0	+	+
Petroleum Ether	C_nH_{2n+2}	100%	+	+/0	+	+	+	+	–	+	+
Phenol	C_6H_5OH	100%	–	–	+	+	+	+	–	+	+
Phenyl Ethyl Ether	$C_6H_5OC_2H_5$	100%	–	–	+	+	+	–	–	n	+
Phenyl Hydrazine	$C_6H_5NHNH_2$	100%	–	–	+	0	0	0	–	+	+
Phosphoric Acid	H_3PO_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	$C_6H_4(COOH)_2$	S	+	+	+	+	+	+	+	+	+
Picric Acid	$C_6H_2(NO_3)_3OH$	S	+	+	+	+	+	+	+	+	+
Piperidine	$C_5H_{11}N$	100%	–	–	+	n	n	–	–	n	+
Polyphosphate =>	Sodium Tripolyphosphate										
Potassium Acetate	CH_3COOK	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	$KC_4H_5O_6$	S	+	+	+	+	+	+	+	+	+
Potassium Borate	KBO_2	S	+	+	+	+	+	+	+	+	+
Potassium Bromate	$KBrO_3$	S	+	+	+	+	+	+	+	+	+
Potassium Bromide	KBr	S	+	+	+(10%)	+	+	+	+	+	+
Potassium Carbonate	K_2CO_3	S	+	+	+	+	+	+	+	+	+
Potassium Chlorate	$KClO_3$	S	+	+	+	+	+	+	+	+	+
Potassium Chloride	KCl	S	+	+	–	+	+	+	+	+	+
Potassium Chromate	K_2CrO_4	10%	+	+	+	+	+	+	+	+	+
Potassium Chrome Sulfate	$KCr(SO_4)_2$	S	+	+	+	+	+	+	+	+	+
Potassium Cyanate	KOCN	S	+	+	+	+	+	+	+	+	+
Potassium Cyanide	KCN	S	+	+	+(5%)	+	+	+	+	+	+
Potassium Cyanoferrate II	$K_4Fe(CN)_6$	S	+	+	+	+	+	+	+	+	+
Potassium Cyanoferrate III	$K_3Fe(CN)_6$	S	+	+	+	+	+	+	+	+	+
Potassium Dichromate	$K_2Cr_2O_7$	S	+	+	+25%	+	+	+	+	+	+
Potassium Ferricyanide	$K_3Fe(CN)_6$	S	+	+	+	+	+	+	+	+	+
Potassium Ferrocyanide	$K_4Fe(CN)_6$	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_2SO_4	S	+	+	+	+	+	+	+	+	+
Potassium Phosphate	KH_2PO_4	S	+	+	+	+	+	+	+	+	+
Potassium Sulfate	K_2SO_4	S	+	+	+	+	+	+	+	+	+
Potassium Sulfite	K_2SO_3	S	+	+	+	+	+	+	+	+	+
Propanol	C_2H_7OH	100%	–	+	+	+	+	+	+	+	+
Propionic Acid	C_2H_5COOH	100%	0	+	+	+	+	+	+	+	+
Propionitrile	CH_3CH_2CN	100%	n	n	+	+	+	+	–	+	+
Propyl Acetate	$CH_3COOC_3H_7$	100%	–	–	+	+	+	–	+/0	+	+
Propylene Glycol	$CH_3CHOHCH_2OH$	100%	+	+	+	+	+	+	+	+	+
Pyridine	C_6H_5N	100%	–	–	+	+	0	–	–	–	+
Pyrrole	C_4H_4N	100%	n	n	+	+	+	–	–	n	+
Salicylic Acid	HOC_6H_4COOH	S	+	+	+	+	+	+	+	+	+
Sea Water	–		+	+	0	+	+	+	+	+	+
Silic Acid	SiO_2+H_20	S	+	+	+	+	+	+	+	+	+
Silver Bromide	AgBr	S	+	+	+/0	+	+	+	+	+	+
Silver Chloride	AgCl	S	+	+	–	+	+	+	+	+	+
Silver Nitrate	$AgNO_3$	S	+	+	+	+	+	+	–	+	+
Soda Ash=>	Sodium Carbonate										
Sodium Acetate	CH_3COONa	S	+	+	+	+	+	+	+	+	+
Sodium Benzoate	C_6H_5COONa	S	+	+	+	+	+	+	+	+	+
Sodium Bicarbonate	$NaHCO_3$	S	+	+	+	+	+	+	+	+	+
Sodium Bisulfate	$NaHSO_4$	S	+	+	+	+	+	+	+	+	+
Sodium Bisulfite	$NaHSO_3$	S	+	+	+	+	+	+	+	+	+

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Sodium Borate	$NaBO_2$	S	+	+	+	+	+	+	+	+	+
Sodium Bromate	$NaBrO_3$	S	+	+	+	+	+	+	+	+	+
Sodium Bromide	NaBr	S	+	+	+	+	+	+	+	+	+
Sodium Carbonate	Na_2CO_3	S	+	+	+/0	+	+	+	+	+	+
Sodium Chlorate	$NaClO_3$	S	+	+	+	+	+	+	+	+	+
Sodium Chloride	NaCl	S	+	+	–	+	+	+	+	+	+
Sodium Chlorite	$NaClO_2$	24%	+	+	+(10%)	+	+	+	+	+	+
Sodium Chromate	Na_2CrO_4	S	+	+	+	+	+	+	+	+	+
Sodium Cyanide	NaCN	S	+	+	+	+	+	+	+	+	+
Sodium Dichromate	$NaCr_2O_7$	S	+	+	+	+	+	+	+	+	+
Sodium Dithionite	$Na_2S_2O_4$	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	0	+	+	+
Sodium Iodide	NaI	S	+	+	+	+	+	+	+	+	+
Sodium Metaphosphate	$(NaPO_3)n$	S	+	+	+	+	+	+	+	+	+
Sodium Nitrate	$NaNO_3$	S	+	+	+	+	+	+	+	+	+
Sodium Nitrite	$NaNO_2$	S	+	+	+	+	+	+	+	+	+
Sodium Oxalate	$Na_2C_2O_4$	S	+	+	+	+	+	+	+	+	+
Sodium Perborate	$NaBO_2$+*H_2O_2	S	+	+/0	+	+	+	+	+	+	+
Sodium Perchlorate	$NaClO_4$	S	+	+	+(10%)	+	+	+	+	+	+
Sodium Peroxide	Na_2O_2	S	+	+	+	–	+	+	+	+	+
Sodium Persulfate	$Na_2S_2O_8$	S	n	+	+	+	+	+	+	+	+
Sodium Pyrosulfite	$Na_2S_2O_5$	S	+	+	+	+	+	n	n	+	+
Sodium Salicylate	$C_6H_4(OH)COONa$	S	+	+/0	+	+	+	+	+	+	+
Sodium Silicate	Na_2SiO_3.	S	+	+	+	+	+	+	+	+	+
Sodium Sulfate	Na_2SO_4	S	+	+	+	+	+	+	+	+	+
Sodium Sulfide	Na_2S	S	+	+	+	+	+	+	+	+	+
Sodium Sulfite	Na_2SO_3	S	+	+	+(50%)	+	+	+	+	+	+
Sodium Tetraborate	$Na_2B_4O_7$*$10H_2O$	S	+	+	+	+	+	+	+	+	+
Sodium Thiosulfate	$Na_2S_2O_3$	S	+	+	+(25%)	+	+	+	+	+	+
Sodium Tripolyphosphate	$Na_5P_3O_{10}$	S	+	+	+	+	+	+/0	+	+	+
Stannic Chloride	$SnCl_4$	100%	+	+	–	+	+	+	+	+	+
Stannous Chloride	$SnCl_2$	S	+	+	–	+	+	+	+	+	+
Starch	$(C_6H_{10}O_5)n$	S	+	+	+	+	+	+	+	+	+
Stearic Acid	$C_{17}H_{35}COOH$	100%	+	+	+	+	+	+	–	+	+
Styrene	$C_6H_5CHCH_2$	100%	–	–	+	0	0	0	–	+	+
Succinic Acid	$C_4H_6O_4$	S	+	+	+	+	+	+	+	+	+
Sugar Syrup		S	+	+	+	+	+	+	+	+	+
Sulfuric Acid	H_2SO_4	98%	+30%	+50%	+20%	+80%	+85%	+	+	+	+
Sulfurous Acid	H_2SO_3	A.C.	+	+	+(10%)	+	+	+	+	+	+
Sulfuryl Chloride	SO_2Cl_2	100%	–	–	n	–	–	+	0	n	+
Tannic Acid	$C_{76}H_{52}O_{46}$	50%	+	+	+	+	+	+	+	+	+
Tartaric Acid	$C_4H_6O_6$	S	+(50%)	+	+	+	+	+	+/0	+	+
Tetrachloroethane	$C_2H_2Cl_4$	100%	–	–	+	0	0	0	–	+	+
Tetrachloroethene	C_2Cl_4	100%	–	–	+	0	0	0	–	+	+
Tetrahydrofuran	C_4H_8O	100%	–	–	+	0	0	–	–	–	+
Tetrahydro Naphthalene	$C_6H_4C_4H_8$	100%	–	–	+	0	–	+	–	+	+
Thionyl Chloride	$SOCl_2$	100%	–	–	n	–	–	+	+	–	+
Thiophene	C_4H_4S	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	$C_6H_5CH_3$	100%	–	–	+	0	0	0	–	+	+
Toluene Diisocyanate	$C_7H_6(NCO)_2$	100%	n	n	+	+	+	–	+/0	n	+
Tributyl Phosphate	$(C_4H_9)_3PO_4$	100%	n	–	+	+	+	–	+	+	+
Trichloroacetaldehyde Hydr.	$CCl_3CH(OH)_2$	S	–	–	+	+	0	0	0	–	+
Trichloroethane	CCl_3CH_3	100%	–	–	+	0	0	+	–	+	+
Trichloroethene	C_2HCl_3	100%	–	–	+/0	0	0	0	–	+	+
Trichloroethylene	C_2HCl_3	100%	–	–	+	0	0	0	–	+	+
Trichloroacetic Acid	CCl_3COOH	50%	–	+	–	+	+	–	0	+	+
Tricresyl Phosphate	$(C_7H_7O)_3PO$	90%	n	–	+	+	+	0	+	n	+
Triethanolamine	$N(C_2H_4OH)_3$	100%	–	0	+	+	+	–	+/0	+	+
Trioctyl Phosphate	$(C_8H_{17})_3PO_4$	100%	n	–	+	+	+	0	+	+	+
Trisodium Phosphate	Na_3PO_4	S	+	+	+	+	+	+	+	+	+
Urea	$CO(NH_2)_2$	S	+	+/0	+	+	+	+	+	+	+
Vinyl Acetate	$CH_2CHOOCCH_3$	100%	–	–	+	0	–	0	–	+	+
Xylene	$C_6H_4(CH_3)_2$	100%	–	–	+	0	–	0	–	0	+
Zinc Acetate	$(CH_3COO)_2Zn$	S	+	+	+	+	+	–	+	+	+
Zinc Chloride	$ZnCl_2$	S	+	+	–	+	+	+	+	+	+
Zinc Sulfate	$ZnSO_4$	S	+	+	+	+	+	+	+	+	+

ProMinent® Warranty

Warranty. Subject to the warranty limitation set forth below, Seller warrants that the Products sold hereunder will substantially conform to Seller's published specifications and will be free from defects in material and workmanship under normal and proper use and service. For pump drive units and controller electronics, the applicable "Warranty Period" for the above stated express warranty shall be two (2) years after delivery EXW. For sensors, the applicable "Warranty Period" for the above stated express warranty shall be six (6) months after delivery EXW. For all other products and for systems, the applicable "Warranty Period" for products and system components covered by Seller's above stated express warranty shall be one (1) year after delivery EXW. Extended warranty periods ("Extended Warranty Plans") may be purchased separately from Seller to extend the Warranty Periods set forth above. Subject to availability, upon payment in full for such Extended Warranty Plans, the Warranty Periods hereunder shall be extended in accordance with Seller's applicable Extended Warranty Plans, subject to all applicable terms and conditions. Drawings, functional specifications, formal submittals and any other requirements documents prepared by Seller and approved by Purchaser shall be deemed the correct interpretations of the work to be performed even if inconsistent with other, conflicting plans and specifications, whether prepared by Seller, Purchaser or otherwise. Upon resale, Purchaser agrees to extend to its customers no greater warranties, and limit its liability and remedies to the same extent, as those set forth herein.

Warranty Limitation. The warranty and remedies for breach of warranty provided for in these General Conditions extend only to the original end-user's production use of Products and do not cover, and Seller shall not be liable for, (i) Third-party products provided/specified by Purchaser, and any other third-party products expressly identified as such, are specifically excluded from Seller's warranty set forth herein. Seller's sole and exclusive warranty liability, responsibility and obligation with respect to such third-party product is to use all commercially reasonable efforts to pass through to Purchaser any applicable warranties provided by the sellers of such third-party products, if any, (ii) Products returned contaminated by chemicals or other substance, (iii) abnormal wear and tear or damage caused by installation, maintenance, or use which is improper or contrary to the instructions published by Seller, (iv) storage of Products in a wet or damp area or unprotected from weather and other job conditions, (v) any cause beyond the control of Seller, including without limitation conditions caused by movement, settlement or structural defects of the environment in which

ProMinent® Warranty Continued

the Products are installed, fire, wind, hail, flood, lightning or other acts of God, any conditions related to, or caused by, failure to process or inaccurate processing of time-sensitive information and/or mechanisms, intentional acts, accidents, negligence or exposure to harmful chemicals, pollutants or other foreign matter or energy, (vi) repair or damage caused by anyone except personnel authorized by Seller, or (vii) any damage to the finish of the Products after they leave Seller's facility. Items repaired or replaced and designs corrected under warranty are warranted until: (a) the expiration of the original warranty period; or (b) ninety (90) days from the date Purchaser receives the repaired or replaced item, whichever is later in time. All Product literature is for illustrative purposes only and does not contain a warranty of any kind. Seller's advice relating to the technical usage of the Products or the intellectual property rights of others, whether provided orally or in writing or through the provision of test results, is given in accordance with Seller's best knowledge at that time, but shall at all times be deemed to be non-binding. Such advice does not relieve Purchaser from the obligation, and Purchaser accepts full responsibility, to confirm for himself the suitability of the Products for the intended purpose(s). **THE WARRANTY SET FORTH IN STRICTLY LIMITED TO ITS TERMS AND IS IN LIEU OF ALL OTHER WARRANTIES, GUARANTEES, EXPRESS OR IMPLIED, ARISING BY OPERATION OF LAW, COURSE OF DEALING, USAGE OF TRADE OR OTHERWISE, SPECIFICALLY EXCLUDING ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.**

Remedy. Purchaser's sole and exclusive remedy, and Seller's only obligation for breach of warranty hereunder, shall be, at Seller's option in its sole discretion, to (i) repair or replace the defective Product (other than Product sold as systems (or skids)) which fails within the applicable Warranty Period, free of charge, provided that Purchaser promptly notifies Seller of such failure and, after receipt of prior written authorization from Seller, returns such Product to the place requested by Seller, freight prepaid, and thereupon Seller finds such to be defective; or (ii) with respect to Products that were sold as systems (or skids), repair or replacement of defective Product which falls within the applicable Warranty Period, free of charge, provided that Purchaser (A) promptly notifies Seller of such failure; (B) properly prepares the Product for service (including without limitation ensuring that the Products to be inspected/serviced are not pressurized, flushing such Products of all substances, and such other preparation as Seller may reasonably specify); and (C) make such Products available for inspection and/or service by Seller's designated service provider in a safe work environment that is appropriate for the work to be performed. Seller reserves the right to charge Purchaser for travel and service time for on-site service technicians in the event Purchaser fails to meet its commitments above. Without limiting the above, Seller may, at its own cost and expense, decide to uninstall and remove the system/skid in question to Seller's designated facility for inspection and/or repair. In such cases, Seller shall also, at its own expense, return the repaired or replaced system/skid to Purchaser's site and install such system/skid. Seller's obligations with respect to breach of warranty are strictly limited to repair, or replacement as stated above. Except as may be otherwise specifically agreed in writing in Seller's quotation or similar written document issued by Seller, Purchaser must pay all other costs related to repair or replacement of Product under warranty, including removal, installation or reinstallation costs. Seller's personnel must be granted access to inspect the Products claimed to be defective at the site of their installation or use.

Return Goods Authorization. All returns, whether under warranty or otherwise, are subject to Seller's required return goods authorization ("RGA") process. No Products will be accepted for return unless Purchaser has fulfilled/met all applicable RGA requirements as set forth below: (i) Purchaser must certify that all Product to be returned to Seller (whether under warranty or otherwise) is certified "Contaminate-Free". Prior to returning any Product, Purchase must contact Seller to obtain Seller's "Contaminate-Free Certification" form and complete, sign and return such certification form assuring Seller that Products to be returned are not contaminated with chemical agents. Such Contaminate-Free Certification must accompany returned Product; (ii) Any Product returned, or to be returned, for repair under warranty is subject to Seller's verification that such return under warranty is (a) within the applicable Warranty Period; and (b) eligible for warranty repair subject to the warranty limitations set forth in above; (iii) Any Product returned for credit in accordance with ProMinent's Terms and Conditions (excluding Product for which credit is issued by Seller as remedy for breach of warranty) must be returned unused, in good condition, and, in Seller's sole discretion, in restockable and resaleable condition; (iv) In the event any Product that is returned to Seller without meeting all of the applicable requirements set forth in Section 9 of ProMinent's Terms and Conditions entitled "Returns Goods Authorization", Seller shall contact Purchaser and attempt to resolve any issues in good faith using commercially reasonable measures; provided, however Seller reserves the right, at any time and in Seller's sole discretion, to send any such non-compliant return Product back to Purchaser, at Purchaser's sole cost, expense and risk; (v) Purchaser agrees that Seller's decisions on the RGA matters set forth in Section 9 of ProMinent's Terms and Conditions entitled "Returns Goods Authorization", are final and binding.

ProMinent Fluid Controls' complete Terms and Conditions can be found at the following link:
http://prominent.us/promx/pdf/ProMinent_GENERAL_TERMS_&_CONDITIONS_of_SALES_Draft1_D1_July_2021_A02.pdf

Solenoid-Driven Metering Pump Overview

Concept b

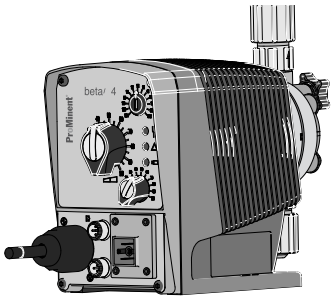


Ideal for basic chemical feed applications

(see page 29 for complete details)

- Solenoid driven diaphragm pump
- Capacities: 0.18 gph (0.7 l/h) to 4.33 gph (16.4 l/h)
- Maximum pressure: 232 psi
- Turndown: 40:1
- Manual, external contact pulse 1:1 operation
- 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, PP and PVT
- Adjustable bleed valve with fine adjustment for continuous degassing
- NSF/ANSI 61 approved

Beta b



Ideal for basic chemical feed applications

(see page 33 for complete details)

- Solenoid driven diaphragm pump
- Capacities: 0.19 gph (0.74 lph) to 8.4 gph (32 lph)
- Maximum pressure: 363 psi
- Turndown: 100:1
- External control via adjustable pulse contact signal 1:32-32:1
- (Optional) External control via standard 4-20 mA signal
- Stroke length: 0-100% (30% minimum recommend for most repeatable accuracy)
- Stroke Frequency: 10 distinct settings @ 10% increments
- Liquid ends: NP, PP, PVT, TT and SST
- Auto degassing and high viscosity (HV) available
- NSF/ANSI 61 approved liquid ends

gamma/ X



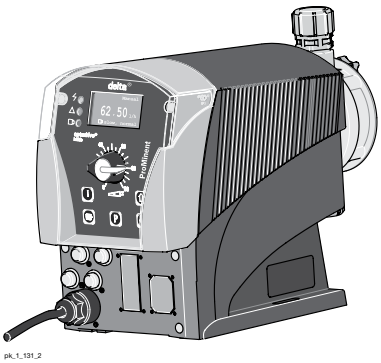
Ideal for basic chemical feed applications

(see page 40 for complete details)

- Capacity range from 0.24 GPH to 11.9 GPH
- Maximum pressure: 363 psi
- Simple adjustment of the capacity directly in GPH
- 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 lines and air or gas bubbles trapped in the dosing head
- High viscosity liquid ends (PVT4) for viscosities of up to 3000 cP
- Large backlit graphic display and status LED's
- NSF/ANSI 61 Approved Liquid ends
- Bluetooth, PROFIBUS, CANbus interface as an optional feature

Solenoid-Driven Metering Pump Overview

delta (No Longer Available, for Reference ONLY)



pk_1_131_2

Ideal for applications requiring metering pump accuracy with minimal pulsation *(see page 52 for complete details)*

- Solenoid driven diaphragm pump driven by optoDrive and protected by OptoGuard
- Capacities: 2.99 gph (11.3 lph) to 19.8 gph (75 lph)
- Maximum pressure: 363 psi
- Turndown: 36,000:1
- Manual, external contact pulse with multiplier/divider and analog operation
- Displays gph (lph) and totalized flow (gallons or liters)
- Stroke length: 0-100% (30% minimum recommend for most repeatable accuracy)
- Stroke Frequency: digital from 1 to 200 spm
- Adjustable suction and discharge stroke duration to minimize pulsation
- Liquid ends: PVT and SST
- Flow verification
- 14-day programmable timer
- Profibus and CAN-bus interface
- Integrated hydraulic monitoring identifies air lock and pressure changes
- NSF/ANSI 61 approved liquid ends

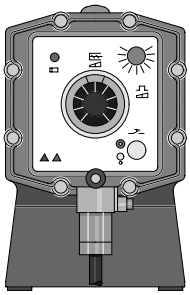
gamma/ XL



Ideal for applications requiring metering pump accuracy with minimal pulsation *(see page 46 for complete details)*

- Integrated pressure measurement and display for greater safety during commissioning and in the process
- Capacities: 1.0 gph (3.8 l/h) to 21.1 gph (80 l/h)
- Maximum pressure: 363 psi
- Capacity adjustment range 40,000:1
- Bluetooth and Wi-Fi connection for the simple configuration and call-up of process data (optional)
- Direct input of the required final concentration with volume-proportional metering tasks in concentration mode
- External control via potential-free contacts with pulse step-up and step-down
- Scalable external control via 0/4-20 mA standard signal
- Guaranteed metering by means of automatic bleedin
- Simple adjustment of capacity in gph or in l/h
- The last 300 events are saved in the integral log book
- Connection to process control systems via a BUS interface, such as PROFIBUS®, PROFINET®, CAN bus or Wi-Fi

EXtronic

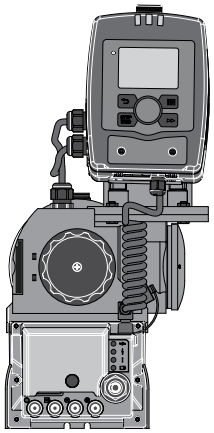


Ideal for explosion proof applications
(see page 58 for complete details)

- Solenoid driven diaphragm pump designed for ex-proof applications
- Capacities: 0.05 gph (0.19 lph) to 15.9 gph (60 lph)
- 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

Motor-Driven Metering Pump Overview

Sigma X: Sigma/ 1 (S1Cb/S1Ba)



Economical mid-range applications

(see page 68 for complete details)

- Mechanical diaphragm pump
- Includes 115/230 V motor
- Maximum pressure: 174 psi
- Stroke length: 0-100% (30% minimum recommend for most repeatable accuracy)
- Liquid ends: PVT and SST

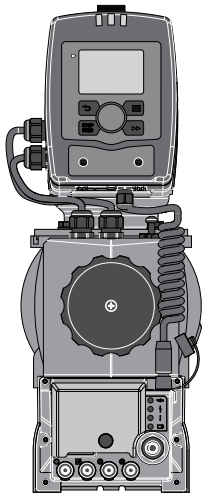
Basic Version

- Capacities: 5.3 gph (20 l/h) to 38 gph (144 l/h)
- Maximum pressure: 174 psi
- Turndown: 10:1

Control Version

- Microprocessor driven
- Capacities: 5.3 gph (20 l/h) to 30.9 gph (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 gph (lph) and totalized flow (gallons or liters)
- Flow verification
- NEW Removable HMI unit with illuminated LCD, click-wheel and 4 operation buttons
- Connection to PROFIBUS®-DP and interface
- Integrated multilayer safety diaphragm (standard) with visual or electrical rupture indicator

Sigma X: Sigma/ 2 (S2Cb/S2Ba)



Economical mid-range applications

(see page 78 for complete details)

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

Basic Version

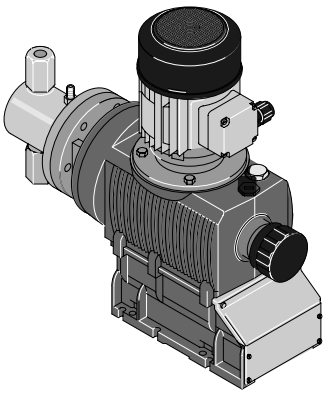
- Capacities: 15.1 gph (57 l/h) to 111 gph (420 l/h)
- Standard 56-C flange. (Motor not included)
- Turndown: 100:1 with variable speed motor
- Stroke Frequency: Only with SCR or VFD

Control Version

- Capacities: 14.8 gph (56 lph) to 93 gph (352 lph)
- 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 gph (lph) and totalized flow (gallons or liters)
- Flow verification
- NEW Removable HMI unit with illuminated LCD, click-wheel and 4 operation buttons
- Connection to PROFIBUS®-DP interface
- Integrated multilayer safety diaphragm (standard) with visual or electrical rupture indicator

Motor-Driven Metering Pump Overview

Sigma/2 HK



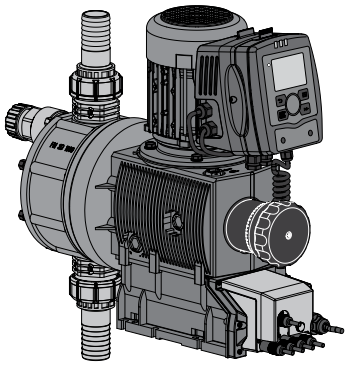
Ideal for high pressure applications requiring significant turndown
(see page 88 for complete details)

- 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: 0.6 gph (2.3 l/h) to 20.1 gph (76 l/h)
- Standard 56-C flange. (Motor not included).
- Turndown: 100:1 with variable speed motor
- Stroke Frequency: Only with SCR or VFD

Sigma X: Sigma/ 3 (S3Cb/S3Ba)



Ideal for applications requiring automation, large turndown and/or Flow verification
(see page 92 for complete details)

- Capacities: 46 gph (174 l/h) to 274.7 gph (1040 l/h)
- 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

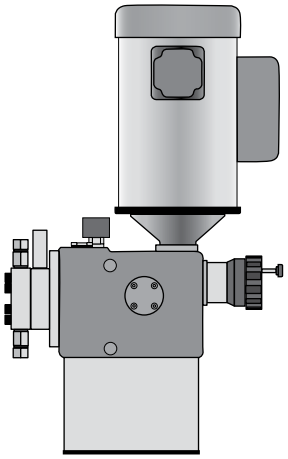
- Standard 56-C flange. (Motor not included)
- Capacities: 46 gph (174 l/h) to 264.2 gph (1000 l/h)
- Turndown: 100:1 with variable speed motor
- Stroke Frequency: Only with SCR or VFD

Control Version

- Includes 115/230 V motor
- Capacities: 48.1 gph (182 l/h) to 274.7 gph (1040 lph)
- 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 gph (lph) and totalized flow (gallons or liters)
- Flow verification
- NEW Removable HMI unit with illuminated LCD, click-wheel and 4 operation buttons
- Connection to PROFIBUS®-DP interface
- Integrated multilayer safety diaphragm (standard) with visual or electrical rupture indicator

Motor-Driven Metering Pump Overview

ProMus



High pressure chemical process metering

(see page 102 for complete details)

- Hydraulic diaphragm pump
- Capacities: 0.20 gph (0.87 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

Hydro API 675

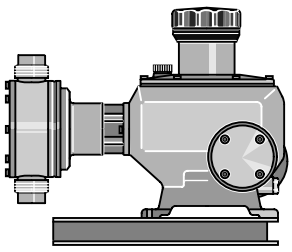


Hydraulic diaphragm metering pump

(see page 108 for complete details)

- Hydraulic diaphragm meteringpump
- Hydro 2 Capacities: 24 gph max
- Hydro 3 Capacities: 53.1 gph max

Makro TZb



Ideal for high volume and high pressure applications

(see page 115 for complete details)

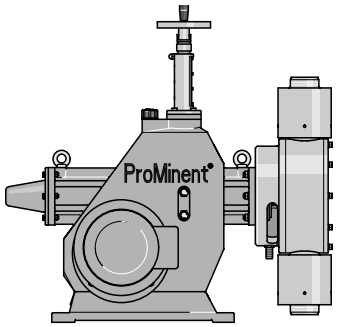
- Available with add-on and multi-head designs
- Capacities: 2.6 gph (10 l/h) to 529 gph (2004 l/h)
- Turndown: 100:1 with variable speed motor
- Motor not included
- Stroke length: 0-100% (30% minimum recommend for most repeatable accuracy)
- Stroke Frequency: Only with SCR or VFD
- Liquid ends: PP,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

TZMb

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

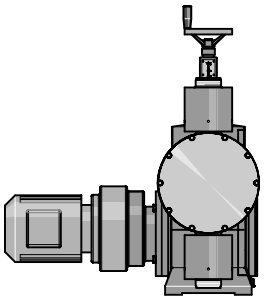
Motor-Driven Metering Pump Overview

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

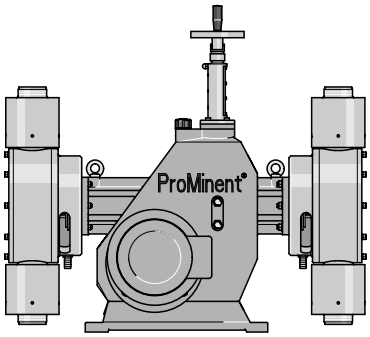


M5Ma

- 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

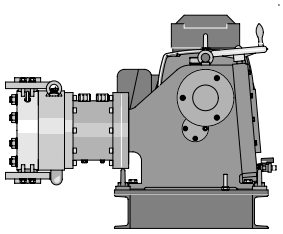


M5Ka

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

Motor-Driven Metering Pump Overview

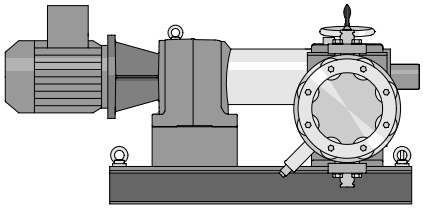
ORLITA



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

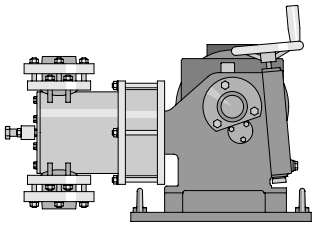
MfS

- 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



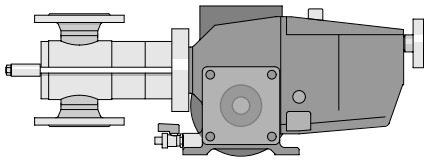
MhS

- 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

Motor-Driven Metering Pump Overview

DULCO flex Control & DulcoFlex

Ideal for high volume applications
(see page 119 for complete details)



DULCO flex Control (DFXa)

- Intelligent Peristaltic pump
- Maximum flow: 7.92 gph
- Maximum pressure: 101.5 psi
- Patented easy tube replacement
- Roller design



DULCO flex Control (DFYa)

- Intelligent Peristaltic pump
- Maximum flow: 7.92 gph
- Maximum pressure: 101.5 psi
- Patented easy tube replacement
- Roller design



DulcoFlex (DFBU)

- Peristaltic pump
- Maximum flow: 337 gph
- Maximum pressure: 116 psi
- Incorporates both hose and tubing technology
- Roller design



DulcoFlex RAD (DFBR)

- Peristaltic pump
- Maximum flow: 337 gph
- Maximum pressure: 116 psi
- Incorporates both hose and tubing technology
- Roller design



DulcoFlex (DFCU)

- Peristaltic pump
- Maximum flow: 130 gpm
- Maximum pressure: 116 psi
- Incorporates hose technology
- Roller design

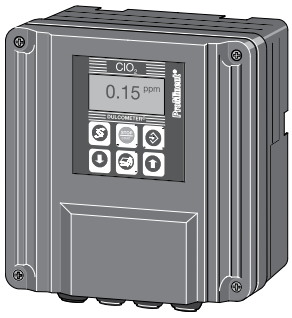


DulcoFlex (DFDU)

- Peristaltic pump
- Maximum flow: 225 gpm
- Maximum pressure: 232 psi
- Suction lifts up to 29 feet
- Shoe design

Analytical Instrumentation Overview

D1Cb/c



Microprocessor based single process variable analyzer

(see page 198 for complete details)

- Controls or measures one of 14 different variables
- Menu driven calibration with limit and control settings
- Sensor diagnostics alarms upon sensor failure
- Programmable access code
- Non-volatile memory
- Two current analog signal outputs
- Feed forward for compound loop control
- pH and temperature correcting variables
- Proportional or PID control
- Wall or panel mount available

diaLog DACb



Microprocessor based dual process variable analyzer

(see page 210 for complete details)

- 3 measuring channels with 14 freely selectable measured variables
- PID controller with frequency-based metering pump control for 2 metering pumps.
- 3 analog outputs for measured value, correction variable or control variable (dependent on the optional equipment).
- 7 digital inputs for sample water fault detection, pause and parameter switching.
- 2 relays with limit value functions, timer and non-continuous control, 3-point step control (dependent on the optional equipment).
- Measured variables and language selection during commissioning.
- Temperature compensation for the pH and fluoride measured variables.
- Saving and transfer of device parameterization using the SD card.
- Subsequent upgrade of the software functions by means of an activation key or firmware update.

Dulcometer Compact



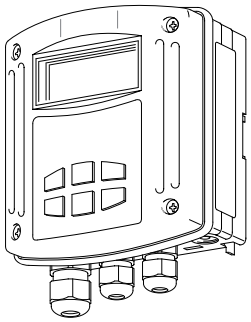
Microprocessor based single process variable analyzer

(see page 215 for complete details)

- Measured variables pH and ORP (can be changed on the controller)
- 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

Analytical Instrumentation Overview

DMT



Single process variable transmitter

(see page 216 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
- NEMA 4X wall mounted unit

PROFI PROCESS FIELD BUS BUS

Cooling Tower and Boiler Controllers



Wide range of controllers for water treatment applications

(see page 219 for complete details)

- Controls pH, ORP and Conductivity
- NEMA 4X enclosure
- Web Browser accessible
- Enhanced responsive browser views for Smart Phones and Tablets
- Analog inputs and outputs
- Relay output and digital input options
- MODBUS
- Ethernet
- Control multiple Towers and Boilers
- CSA, CE, and UL rated

"Solenoid-Driven Metering Pumps" T.O.C. III

CATALOG SECTION TABS

product overview
- Introduction
- Pump selection by capacity
- Chemical resistance list
- Solenoid & Motor Pump Overview
- Analytical Instrumentation Overview

solenoid-driven metering pumps
- **Concept b**
- **Beta b**
- **gamma/ X**
- **Delta**
- **gamma/ XL**
- **Extronic**

motor-driven metering pumps
- Sigma/ X: Sigma/ 1
- Sigma/ X: Sigma/ 2
- Sigma/ X: Sigma/ 3
- ProMus
- Hydro 2 API 675
- Hydro 3 API 675
- Makro
- Orlita
- DULCO flex Control
- DulcoFlex

pump spare parts & accessories
- Solenoid pump spare parts
- Motor pump spare parts
- Pump accessories

DULCOMETER instrumentation
- D1Cb/c
- DACb
- Dulcometer Compact
- DMT
- MicroFlex
- MultiFLEX
- AEGIS II
- SlimFlex 5

DULCOTEST sensors
- Amperometric sensors
- Potentiometric sensors
- Potentiostatic sensors
- Conductometric sensors
- Accessories

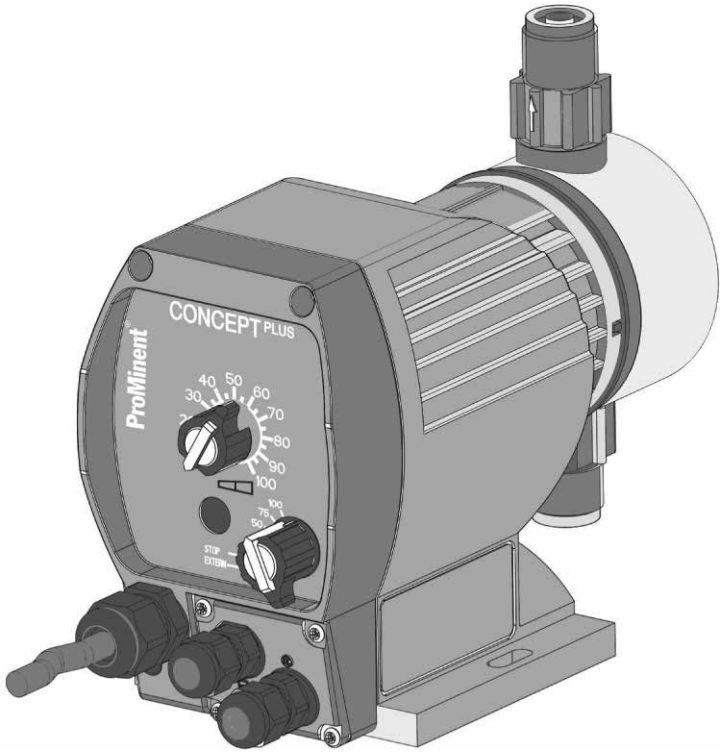
polymer blending & dry feed solutions
- ProMix™ -M (In-line Controls)
- ProMix™ -M (Batch & In-line Controls)
- ProMix™ -S
- ProMix™ -C
- ProMdry™

ProMinent® Concept b
Solenoid Diaphragm Metering Pumps

Overview: Concept b

Ideal for basic chemical feed applications
(see page 138 for spare parts and page 151 for control cables)

- Capacity range of 0.19 to 4.33 GPH (0.7 to 16.4 L/h) at pressures up to 232 psi (16 bar).
- Continuous stroke length adjustment from 0-100 % (recommended 30-100 %)
- Fixed frequency settings @ 0, 25, 50, 75 and 100%.
- Low cost opens up opportunities in the most basic applications
- NP, PP and PVT liquid ends
- Integral bleed valve simplifies priming and prevents “loss of prime”
- Common applications: Cooling towers, chlorination and metal finishing
- NSF 61/50 approved liquid ends



ProMinent® Concept b Solenoid Diaphragm Metering Pumps

Capacity Data

Pump Version	Capacity at Maximum Back Pressure psig	(bar)	U.S. GPH	(L/h)	mL/ stroke	Max. Stroking Rate spm	Pre-Primed Suction Lift ft.	(m)	Tubing Connectors O.D. x I.D. (in.)	Shipping Weight (approx.) lbs.	(kg)
1000	145	(10)	0.19	(0.7)	0.07	180	20	(6)	1/4" x 3/16"	3.97	(1.8)
1601	232	(16)	0.29	(1.1)	0.10	180	20	(6)	1/4" x 3/16"	3.97	(1.8)
1002	145	(10)	0.63	(2.4)	0.18	180	16	(5)	1/4" x 3/16"	3.97	(1.8)
1003	145	(10)	0.79	(3.0)	0.19	240	16	(5)	1/4" x 3/16"	3.97	(1.8)
0704	102	(7)	1.03	(4.0)	0.36	180	13	(4)	1/4" x 3/16"	3.97	(1.8)
0705	102	(7)	1.37	(5.2)	0.38	240	13	(4)	1/4" x 3/16"	3.97	(1.8)
0309	44	(3)	2.38	(9.0)	0.83	180	20	(6)	3/8" x 1/4"	3.97	(1.8)
0215	22	(1.5)	4.33	(16.4)	1.40	180	5	(1.5)	3/8" x 1/4"	3.97	(1.8)

(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)

External pulse contact retrofit available as an option (P/N 1046731)

NSF 50 certification only applies to NPB0 & NPB2 liquid ends

Materials In Contact With Chemicals

	Pump head	Valves	O-rings	Balls
PPE	Polypropylene	Polypropylene	EPDM	ceramic
PPB	Polypropylene	Polypropylene	Viton®	ceramic
NPE	Acrylic	PVC	EPDM	ceramic
NPB	Acrylic	PVC	Viton®	ceramic
PVT	PVDF	PVDF	PTFE	ceramic

Pump diaphram with PTFE-coating.
Note: Viton® is a registered trademark of DuPont Dow Elastomers.

ProMinent® Concept b
Solenoid Diaphragm Metering Pumps

Identcode Ordering System

CNPb — Concept PLUS

Version	Capacity	Version	Capacity
1000	0.19 gph (0.7 l/h), 145 psi (10 bar)	0704	1.03 gph (4.0 l/h), 102 psi (7 bar)
1601	0.29 gph (1.1 l/h), 232 psi (16 bar)	0705	1.37 gph (5.2 l/h), 102 psi (7 bar)
1002	0.63 gph (2.4 l/h), 145 psi (10 bar)	0309	2.38 gph (9.0 l/h), 44 psi (3 bar)
1003	0.79 gph (3.0 l/h), 145 psi (10 bar)	0215	4.33 gph (16.4 l/h), 22 psi (1.5 bar)

Liquid end material:

PP	Polypropylene
NP	Acryllic/PVC
PV	PVDF

O-rings:

B	Viton® seals
E	EPDM seals
T	PTFE seals

Liquid end version:

0	Non-bleed version, no valve spring
1	Non-bleed version, with valve spring
2	With bleed valve, no valve spring (except 0704 models)
3	With bleed valve, with valve spring
7	Auto-degassing

Connection:

M	1/4" x 3/16"
N	3/8" x 1/4"

Logo:

0	With ProMinent logo

Power Supply:

A	1 ph 230 V 50/60 Hz (Euro plug)
D	1 ph 115 V 50/60 Hz (US plug)
4	1 ph 230 V 50/60 Hz (US plug) (consult factory for pricing)

Control Option:

0	Standard (w/o external control)
B	With external and level input retrofit kit, fitted, without level switch

Accessories:

1	With accessories (foot valve, injection valve, tubing)

Control Variant:

0	Standard

Approval:

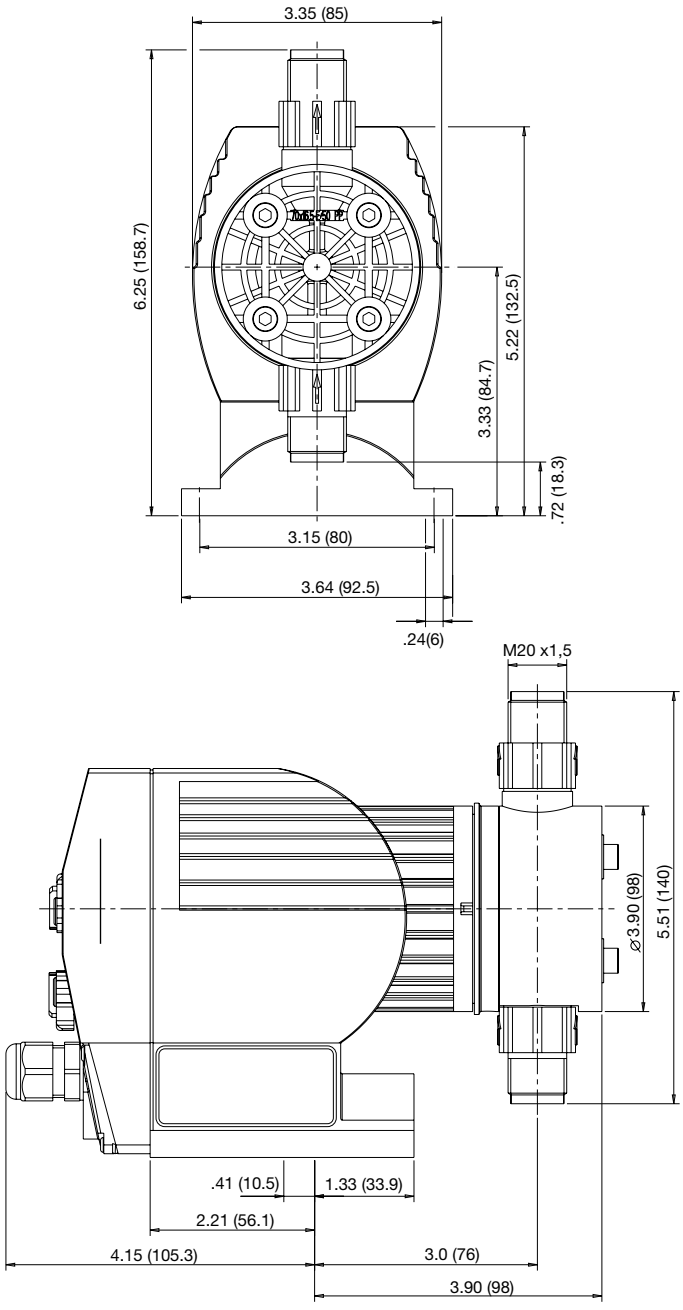
01	CE
07	MET
11	MET + NSF 61

CNPb	1000	PP	B	0	M	0	A	0	1	0	01

ProMinent® Concept b
Solenoid Diaphragm Metering Pumps

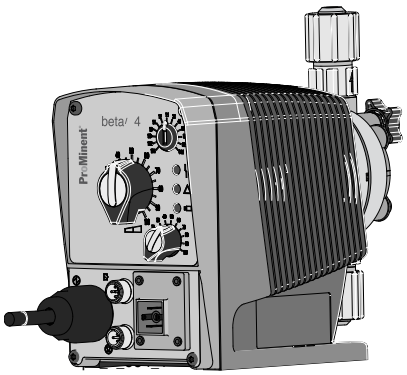
Dimensional Drawings

Dimensions in inches (mm).
Ranges given, actual dimension dependent on liquid end material.



ProMinent® Beta b
Solenoid Diaphragm Metering Pumps

Overview: Beta b



Ideal for basic chemical feed applications
(see page 141 for spare parts and page 151 for control cables)

- Capacity range 8.4 gph (32 l/h) max, 363 psi (25 bar) max
- Standard external control via potential-free contacts with pulse step-up and step-down to adapt to existing signal transducers of 64:1 to 1:64
- (Optional) external control via standard 4-20 mA and potential-free contacts with pulse step-up and step-down of 32:1 to 1:32
- Continuous stroke length adjustment from 0-100% (recommended 30-100%)
- Supplied in PP, Acrylic/PVC, PTFE, PVDF, SS
- Patented coarse/fine deaeration for PP, and Acrylic/PVC
- Auto-degassing liquid end in Acrylic/PVC
- HV liquid end for highly viscous media (suitable for viscosities to 3000 cPs)
- 10-setting stroke frequency adjustment from 10-100%
- External control via voltage-free contacts
- Connector for two-stage level switch
- 12-24 V DC, 24 V AC low voltage version
- 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 b 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 (17.5 bar). Capacity range for the Beta/4 is 0.19 to 5 gph (0.74 to 19 l/h); Beta/5 is 0.80 to 8.4 gph (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 an adjustment ratio of 10:1. 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).

Specifications

Drive Unit

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

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 b 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 b metering pump liquid ends are available in five material versions: Polypropylene (PP), Kynar (PVDF), Acrylic/PVC (NP), PTFE (TT), and 316 Stainless steel (SS).

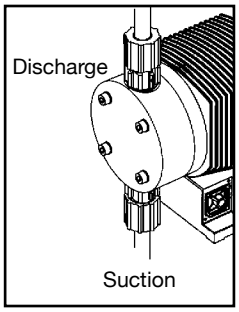
Some liquid ends are interchangeable between the BT4b and BT5b.

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 PP, PVT, and NP liquid ends).

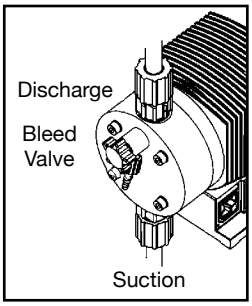
Automatic degassing liquid ends are available for PP and NP versions (except 1000 and 0232). This style liquid end discharges from the center and degasses from the top to prevent air build-up in the chamber.

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.

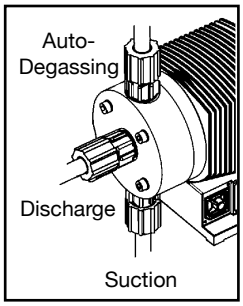
Suction and discharge ports are equipped with double-ball check valves for superior repeatability.



Liquid end without bleed valve



Liquid end with bleed valve



Auto-degassing liquid end

Power Supply

The Beta b 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

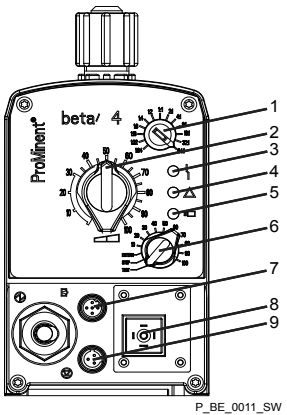
Three LED lights indicate operational status. A green light flashes during normal operation; a yellow light warns of low chemical; and a red light indicates lack of chemical or an operational error.

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 150 ms). This allows a second ProMinent metering pump to be paced synchronously, or to totalize flow with an external stroke counter.

1 Pulse Control Switch
2 Stroke Length Adjustment Knob
3 Fault Indicator (red)
4 Warning Indicator (yellow)
5 Operating Indicator (green)
6 Multifunctional Switch
7 "External Control" Terminal
8 Relay Connection (optional)
9 "Level Switch" Terminal



c UL us Recognized

CE Available

ProMinent® Beta b
Solenoid Diaphragm Metering Pumps

Specifications (Cont.)

Maximum stroke length:	0.05” (1.25 mm)
Materials of construction	
Housing:	Fiberglass reinforced PPE
Diaphragm:	PTFE-faced EPDM with plastic core
Liquid end options:	Polypropylene, PVDF, Acrylic/PVC, PTFE, 316 SS
Enclosure rating:	IP 65
Motor insulation class:	F
Power supply:	100-230 VAC, 1 phase, 50/60 Hz, +/- 10%; 12-24 VDC or 24VDC (+/- 10%)
Check valves:	Double ball
Metering repeatability:	When used according to operating instructions, ±2% under constant conditions and at minimum 30% stroke length
Power cord:	6 ft (2 m)
Relay cable (optional):	6 ft (2 m)
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: 250 VAC/DC, 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: <1µA Maximum current: < 100 mA Maximum voltage: 24 VDC Switch functions: $15x10^9$ Contact closure: 100 µs (for pacing relay)
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)
PVDF	149°F (65°C)	212°F (100°C)

Average power drain at maximum stroking rate (Watts) / current drain at pump stroke (Amps)	
BT4b:	17W / 0.7 A or 15 A (peak current for approx. 1 µs)
BT5b:	22W / 1.0 A or 15 A (peak current for approx. 1 µs)
Service factor:	1.15
Warranty:	2 years on drive, 1 year on liquid end (extended warranties available)
Industry standards:	UL recognized, CE available for U.S.A. and Canada, NSF/ANSI 61
Valve threads:	Metric thread for PP, NP, PVT, and TT versions. 1/2” MNPT connections are available in all materials.
Standard Production Test:	**All pumps are tested for capacity at maximum pressure prior to shipment.**
Max. solids size in fluid:	Pumps with 1/4” valves: 15µ - Pumps with 1/2” valves: 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 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.
Necessary contact duration:	20 µs
Recommended Viscocity:	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. Stroking Rate	Tubing Connectors[2] O.D. x I.D.	Shipping Weight (higher weights are for SS)	
	PSIG	(bar)	U.S. GPH	(L/h)	mL/ stroke	PSIG	(bar)	U.S. GPH	(L/h)	mL/ stroke	ft	(m)	spm	in	lbs	(kg)
BT4b: with standard liquid ends																
1000	145	(10)	0.20	(0.74)	0.07	72.5	(5)	0.22	(0.82)	0.08	19.6	(6.0)	180	1/4 x 3/16	6.4-7.9	(2.9-3.6)
2001[3]	290	(20)	0.25	(0.96)	0.10	145	(10)	0.40	(1.5)	0.13	19.6	(6.0)	180	1/4 x 3/16	6.4-7.9	(2.9-3.6)
1601	232	(16)	0.29	(1.1)	0.10	116	(8)	0.37	(1.4)	0.13	19.6	(6.0)	180	1/4 x 3/16	6.4-7.9	(2.9-3.6
2002[3]	290	(20)	0.45	(1.70)	0.20	145	(10)	0.74	(2.8)	0.24	19.6	(6.0)	180	1/4 x 3/16	6.4-7.9	(2.9-3.6)
1602	232	(16)	0.58	(2.2)	0.20	116	(8)	0.66	(2.5)	0.24	19.6	(6.0)	180	1/4 x 3/16	6.4-7.9	(2.9-3.6)
1604	232	(16)	0.95	(3.6)	0.33	116	(8)	1.14	(4.3)	0.40	19.6	(6.0)	180	1/4 x 3/16	6.8-8.6	(3.1-3.9)
0708	101	(7)	1.88	(7.1)	0.66	50.8	(3.5)	2.22	(8.4)	0.78	19.6	(6.0)	180	1/2 x 3/8	6.8-8.6	(3.1-3.9)
0413	58	(4)	3.2	(12.3)	1.14	29	(2)	3.75	(14.2)	1.31	9.8	(3.0)	180	1/2 x 3/8	6.8-8.6	(3.1-3.9)
0220	29	(2)	5.02	(19.0)	1.76	14.5	(1)	5.52	(20.9)	1.94	6.5	(2.0)	180	1/2 x 3/8	7.3-9.7	(3.3-4.4)
BT5b: with standard liquid ends																
2504[3]	363	(25)	0.77	(2.9)	0.27	145	(10)	1.3	(5.0)	0.46	19.6	(6.0)	180	(8 x 4mm)	9.9-11.7	(4.5-5.3)
1008	145	(10)	1.8	(6.8)	0.63	72.5	(5)	2.19	(8.3)	0.76	19.6	(6.0)	180	1/2 x 3/8	9.9-11.7	(4.5-5.3)
0713	101	(7)	2.91	(11.0)	1.02	50.8	(3.5)	3.46	(13.1)	1.21	13.1	(4.0)	180	1/2 x 3/8	9.9-11.7	(4.5-5.3)
0420	58	(4)	4.52	(17.1)	1.58	29	(2)	5.05	(19.1)	1.77	9.8	(3.0)	180	1/2 x 3/8	10.4-12.8	(4.7-5.8)
0232[1]	29	(2)	8.45	(32.0)	2.96	14.5	(1)	9.56	(36.2)	3.35	6.5	(2.0)	180	1/2 x 3/8	11.2-14.6	(5.1-6.6)
BT4b: with auto-degassing liquid ends, 3-port (NPB9/NPE9)																
1601	232	(16)	0.16	(0.6)	0.06	116	(8)	0.21	(0.8)	0.07	5.9	(1.8)	180	1/4 x 3/16	6.4	(2.9)
1602	232	(16)	0.37	(1.4)	0.13	116	(8)	0.46	(1.7)	0.174	6.9	(2.1)	180	1/4 x 3/16	6.4	(2.9)
1604	232	(16)	0.71	(2.7)	0.25	116	(8)	0.95	(3.6)	0.33	8.8	(2.7)	180	1/4 x 3/16	6.8	(3.1)
0708	101	(7)	1.74	(6.6)	0.61	58	(4)	1.98	(7.5)	0.69	6.5	(2.0)	180	1/2 x 3/8	6.8	(3.1)
0413	58	(4)	2.85	(10.8)	1	29	(2)	3.33	(12.6)	1.17	6.5	(2.0)	180	1/2 x 3/8	6.8	(3.1)
0220	29	(2)	4.28	(16.2)	1.5	14.5	(1)	4.76	(18.0)	1.67	6.5	(2.0)	180	1/2 x 3/8	7.3	(3.3)
BT5b: with auto-degassing liquid ends, 3-port (NPB9/NPE9)																
1008	145	(10)	1.66	(6.3)	0.58	72.5	(5)	1.98	(7.5)	0.69	9.8	(3.0)	180	1/2 x 3/8	9.9	(4.5)
0713	101	(7)	2.6	(10.5)	0.911	58	(4)	3.25	(12.3)	1.14	8.2	(2.5)	180	1/2 x 3/8	9.9	(4.5)
0420	58	(4)	4.12	(15.6)	1.44	29	(2)	4.6	(17.4)	1.61	8.2	(2.5)	180	1/2 x 3/8	10.4	(4.7)
BT4b: with self-bleeding liquid ends, 2-port without bypass (PVT7)																
1602	145	(10)	0.37	(1.4)	0.13	16	(8)	0.45	(1.7)	0.16	5.9	(1.8)	180	1/4 x 3/16	6.3	(2.9)
1604	145	(10)	0.71	(2.7)	0.25	16	(8)	0.95	(3.6)	0.33	5.9	(1.8)	180	1/4 x 3/16	6.8	(3.1)
0708	101	(7)	1.8	(6.6)	0.61	50.8	(3.5)	2	(7.5)	0.69	5.9	(1.8)	180	1/2 x 3/8	6.8	(3.1)
0413	58	(4)	2.8	(10.8)	1	29	(2)	3.3	(12.6)	1.17	5.9	(1.8)	180	1/2 x 3/8	6.8	(3.1)
0220	29	(2)	4.4	(16.2)	1.5	14.5	(1)	4.7	(18.0)	1.67	5.9	(1.8)	180	1/2 x 3/8	7.2	(3.3)
BT5b: with self-bleeding liquid ends, 2-port without bypass (PVT7)																
1008	145	(10)	1.7	(6.3)	0.58	72.5	(5)	2	(7.5)	0.69	5.9	(1.8)	180	1/2 x 3/8	9.9	(4.5)
0713	101	(7)	2.8	(10.5)	0.97	58	(3.5)	3.2	(12.3)	1.14	5.9	(1.8)	180	1/2 x 3/8	9.9	(4.5)
0420	58	(4)	4.1	(15.6)	1.44	29	(2)	4.6	(17.4)	1.61	5.9	(1.8)	180	1/2 x 3/8	10.4	(4.7)

Above capacities and suction lift refer to pumps tested on water at 115 VAC, 60 Hz, and an ambient temperature of 70°F (21°C).
Higher specific gravity fluids will reduce suction lift. Higher viscosity fluids will reduce capacity.
Liquid ends for highly viscous media have 10-20% less metering capacity and are not self-priming. Standard connectors are 1/2" MNPT or 5/8" hose barb. Positive suction recommended.

[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

Universal control cable necessary for external Beta control. (see page 151)

Materials In Contact With Chemicals

Liquid end materials in contact with media

Version	Liquid End	Suction/Discharge valves	Seals	Valve balls	Diaphragm*
*PVT	*PVDF	*PVDF	PTFE	Ceramic	PTFE
PPT	Polypropylene	*PVDF	PTFE	Ceramic	PTFE
NPT	Acrylic	*PVDF	PTFE	Ceramic	PTFE
TTT	PTFE with Carbon	PTFE with Carbon	PTFE	Ceramic	PTFE
SST	316 Stainless Steel	316 Stainless Steel	PTFE	Ceramic	PTFE

*Highly compatible material suitable for most fluids.

ProMinent® Beta b
Solenoid Diaphragm Metering Pumps

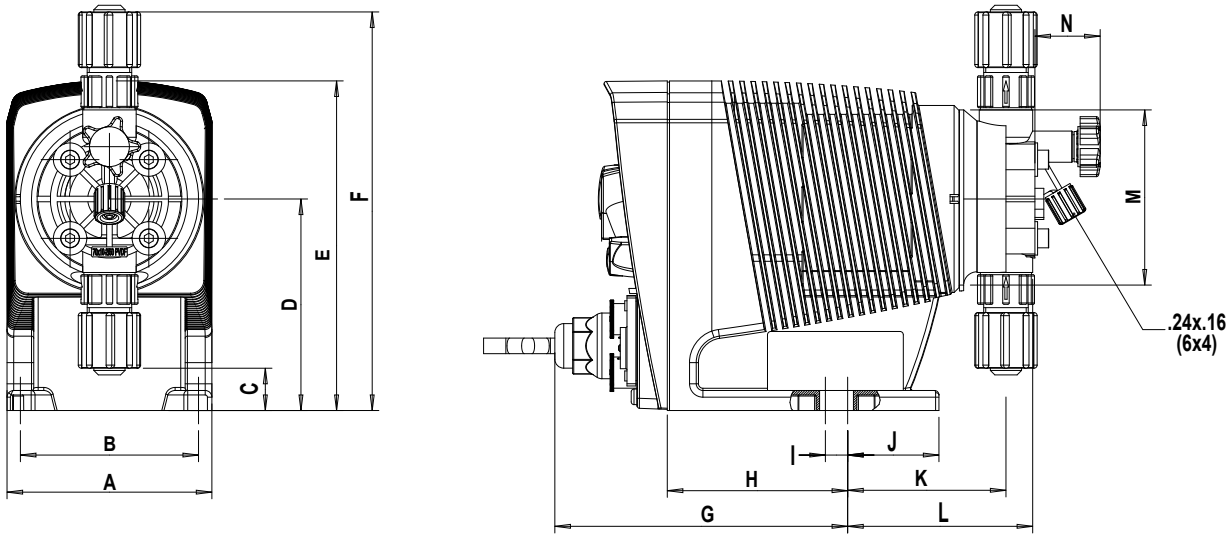
Identcode Ordering System

BT4b	Beta 4b																Beta 5b	
	Version	Capacity															Version	Capacity
	1000	0.20 gph (0.74 l/h), 145 psi (10 bar)															2504	0.77 gph (2.9 l/h), 363 psi (25 bar)
	2001	0.25 gph (0.96 l/h), 290 psi, (20 bar)															1008	1.8 gph (6.8 l/h), 145 psi (10 bar)
	1601	0.29 gph (1.10 l/h), 232 psi (16 bar)															0713	2.91 gph (11.0 l/h), 102 psi (7 bar)
	2002	0.45 gph (1.70 l/h), 290 psi (20 bar)															0420	4.52 gph (17.1 l/h), 58 psi (4 bar)
	1602	0.58 gph (2.2 l/h), 232 psi (16 bar)															0232	8.45 gph (32.0 l/h), 29 psi (2 bar)
		Liquid end material:																
		PP	Polypropylene/PVDF, for self-degassing version Polypropylene/Polypropylene															
		NP	Acrylic glass/PVDF, for self-degassing version Acrylic glass/PVC															
		PV	PVDF/PVDF															
		TT	PTFE/PTFE															
		SS	Stainless steel															
			O-rings:															
			E	EPDM/PTFE coated, only for PP and NP self-degassing														
			B	FPM-B/PTFE coated, only on PP and NP self-degassing														
			T	PTFE/PTFE coated														
			P	Diaphragm and seal EPDM														
				Liquid end version:														
				0	Non-bleed version, no valve spring, for TT, SS and type 0232 only													
				1	Non-bleed version, with valve spring, for TT, SS and type 0232 only													
				2	With deaerator, no valve spring, PP, PV, NP only, not type 0232													
				3	With deaerator, with valve spring, PP, PV, NP only, not type 0232													
				4	Version for highly viscous media, only PVT, types 1005, 1605, 0708, 1008, 0413, 0713, 0220, 0420													
				7	Self-bleeding without bypass, only with PV, not for versions 2504 and 0245													
				9	Auto-degassing for PP, NP only, not for types 1000 and 0232													
					Hydraulic connections:													
					0	Standard according to technical data												
					B	special-connection 3/8" x 1/4"												
						Labeling:												
						0	Standard Housing											
							Logo:											
							0	With ProMinent® logo										
								Power supply:										
								U	Universal 100-240 V									
								M	12-24 VDC									
									Cable and plug:									
									1	6 ft Open end								
									A	6 ft European								
									D	6 ft USA 115 V								
									U	6 ft USA 230 V								
										Relay:								
										0	No relay							
										1	Fault annunciating relay, drops out							
										4	Option 1 + pacing relay							
										5	Option 3 + pacing relay							
											Accessories:							
											0	No accessories						
											1	With foot and injection valve, 5 ft PVC suction tubing, 10 ft PE discharge tubing						
												Control type:						
												0	No lock					
												1	With lock: manual operation locked when external cable plugged in					
													Control variants:					
													0	External contact 1:1				
													A	External analog 0-20mA/4-20mA				
														Remote stop:				
														0	External controllable frequency			
															Auxilliar frequency:			
															0	External controllable frequency =180max		
																Approval:		
																01	CE	
BT4b	**1000**	**PP**	**E**	**0**	**0**	**0**	**0**	**U**	**D**	**0**	**0**	**0**	**0**	**0**	**0**	**01**		

ProMinent® Beta b
Solenoid Diaphragm Metering Pumps

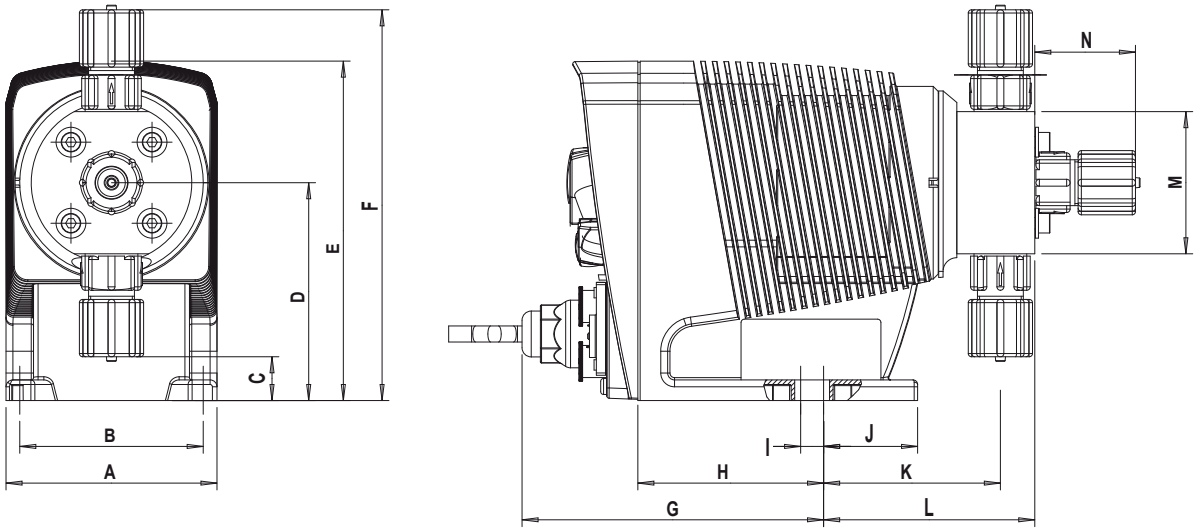
Dimensional Drawings

Dimensions in inches (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	3.6 (92)	3.1 (80)	.13-.75 (3.2-19)	3.7 (95)	5.8 (148)	7.0-7.8 (179-199)	5.2 (131.5)	3.2 (81)	.39 (10)	1.4 (36)	2.8-3.0 (71-76)	3.2-3.7 (83-93)	2.8-4.3 (Ø 90-Ø 110)	1.1 29.3
BT5	4.0 (102)	3.1 (80)	.13-.75 (3.2-19)	4.0 (101)	6.0 (153)	7.0-7.8 (179-199)	5.3 (135.5)	3.3 (85)	.59 (15)	1.6 (41)	2.8-3.0 (71-76)	3.2-3.7 (83-93)	2.8-4.3 (Ø 90-Ø 110)	1.1 29.3

With Auto-Degassing Liquid Ends



Pump	A	B	C	D	E	F	G	H	I	J	K	L	M	N
BT4	3.6 (92)	3.1 (80)	.30-.75 (7.5-19)	3.7 (95)	5.8 (148)	6.7-7.42 (170.5-188.5)	5.2 (131.5)	3.2 (81)	.39 (10)	1.4 (36)	2.9-3.0 (74-77)	3.5-4.2 (89-105.5)	2.8-3.5 (Ø 90-Ø 70)	1.73 43.9
BT5	4.0 (102)	3.1 (80)	.30-.75 (7.5-19)	4.0 (101)	6.0 (153)	6.7-7.42 (170.5-188.5)	5.3 (135.5)	3.3 (85)	.59 (15)	1.6 (41)	2.9-3.0 (74-77)	3.5-4.2 (89-105.5)	2.8-3.5 (Ø 90-Ø 70)	1.73 43.9

ProMinent® gamma/ X Solenoid Diaphragm Metering Pumps

Overview: gamma/ X

The **gamma/ X** solenoid diaphragm metering pump 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 143** for spare parts)

- Capacity range from 0.24 GPH to 11.9 GPH, maximum discharge pressure up to 363 psi
- Simple adjustment of the capacity directly in GPH
- 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 lines 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
- 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, PROFIBUS, CANbus interface as an optional feature (see page 151 for PROFIBUS)



PROFI PROCESS FIELD BUS BUS

Bluetooth

ProMinent® gamma/ X Solenoid Diaphragm Metering Pumps

Capacity Data

Capacity data: gamma/ X

Pump Version	Capacity at Maximum Backpressure					Max. Stroking Rate	Tubing Connectors O.D. x I.D	Pre-Primed Suction Lift **		SS Liquid end connections FNPT	Shipping Weight lbs	
	psig	(bar)	GPH*	(l/h)	ml/stroke	Strokes/min	in	ft	(m)	in	NP/PV	SS
gamma/ X: with standard liquid ends												
1602	232	(16)	0.61	(2.3)	0.19	200	1/4 x 3/16	19.6	(6)	1/4	7.9	9
1604	232	(16)	0.95	(3.6)	0.30	200	1/4 x 3/16	16.4	(5)	1/4	7.9	9
0708	102	(7)	2.0	(7.6)	0.63	200	1/2 x 3/8	13.1	(4)	1/4	8.1	11
0414	58	(4)	3.56	(13.5)	1.13	200	1/2 x 3/8	9.8	(3)	1/4	8.1	11
0220	29	(2)	5.2	(19.7)	1.64	200	1/2 x 3/8	6.5	(2)	3/8	8.1	11
2504	363	(25)	1.0	(3.8)	0.32	200	(8 x 4mm)	13.1	(4)	1/4	10.8	12.1
1009	145	(10)	2.38	(9.0)	0.75	200	1/2 x 3/8	9.8	(3)	1/4	11.2	14.3
0715	102	(7)	3.83	(14.5)	1.21	200	1/2 x 3/8	9.8	(3)	1/4	11.2	14.3
0424	58	(4)	6.34	(24)	2.00	200	1/2 x 3/8	9.8	(3)	3/8	11.2	14.3
0245	29	(2)	11.9	(45)	3.70	200	1/2 x 3/8	6.5	(2)	3/8	11.5	15.4
gamma/ X: with auto-degassing liquid ends NPB9/ NPE9												
1602	232	(16)	0.34	(1.30)	0.11	200	1/4 x 3/16	6.9	(2.1)	~	7.9	~
1604	232	(16)	0.63	(2.40)	0.21	200	1/2 x 3/8	8.8	(2.7)	~	7.9	~
0708	101	(7)	1.8	(6.80)	0.57	200	1/2 x 3/8	6.5	(2)	~	8.1	~
0414	58	(4)	3.17	(12)	1.00	200	1/2 x 3/8	6.5	(2)	~	8.1	~
0220	29	(2)	4.75	(18)	1.5	200	1/2 x 3/8	6.5	(2)	~	8.1	~
1009	145	(10)	2.11	(8)	0.67	200	1/2 x 3/8	9.8	(3)	~	11.2	~
0715	101	(7)	3.56	(13.5)	1.00	200	1/2 x 3/8	8.2	(2.5)	~	11.2	~
0424	58	(4)	5.28	(20)	1.67	200	1/2 x 3/8	8.2	(2.5)	~	11.2	~
gamma/ X: with self-bleeding liquid ends, 2-port without bypass (PVT7)												
1602	232	(10)	0.24	(0.9)	0.08	200	1/4 x 3/16	6	(1.8)	~	7.9	~
1604	232	(10)	0.42	(1.6)	0.13	200	1/4 x 3/16	6	(1.8)	~	7.9	~
0708	101	(7)	1.50	(5.7)	0.48	200	1/2 x 3/8	6	(1.8)	~	8.1	~
0414	58	(4)	3.17	(12.0)	1.00	200	1/2 x 3/8	6	(1.8)	~	8.1	~
0220	29	(2)	4.60	(17.4)	1.45	200	1/2 x 3/8	6	(1.8)	~	8.1	~
1009	145	(10)	1.58	(6.0)	0.50	200	1/2 x 3/8	6	(1.8)	~	11.2	~
0715	101	(7)	3.40	(12.9)	1.08	200	1/2 x 3/8	6	(1.8)	~	11.2	~
0424	58	(4)	5.07	(19.2)	1.60	200	1/2 x 3/8	6	(1.8)	~	11.2	~

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 ½" MNPT connections.

Permissible ambient temperature: 14 °F to 113 °F | Average power consumption: 78 W | Degree of protection: IP 66

** Capacity data represents minimum values, tested using water at 68 ºF (room temperature)*

*** Suction lift with pre-primed suction line and liquid end*

Materials In Contact With Chemicals

Liquid end materials in contact with media

	Pump head	Suction/discharge valve	Ball seat	Seals	Balls
NPE	Clear Acrylic	PVC	EPDM	EPDM	Ceramic
NPB	Clear Acrylic	PVC	FKM	FKM	Ceramic
PPT	Polypropylene	PVDF	PTFE	PTFE	Ceramic
PVT	PVDF	PVDF	PVDF	PTFE	Ceramic
SST	Stainless Steel	Stainless Steel	Ceramic	PTFE	Ceramic

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

Permissible ambient temperature: 14 °F - 113 °F / Average power consumption: 25/30 W / Degree of protection: IP 66/NEMA 4X

FKM = fluorine rubber

ProMinent® gamma/ X Solenoid Diaphragm Metering Pumps

Specifications

Maximum stroke length: For 70mm solenoid approx. .05”
For 85mm solenoid approx. .06”

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 65
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
Check valves: Double ball suction / discharge (PVT4 with spring loaded single ball)
Power cord: 6ft
Relay cable (optional): 6ft
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 300 Ω maximum impedance
Relay contact rated 24 V 100 mA

Ambient temperature range

In operation: 14 °F to 113 °F
Storage & Transport: -4 °F to 140 °F
Max. fluid operating temp:

Material	Constant	Short Term*
Acrylic/PVC	113 °F	140 °F
PVDF	113 °F	248 °F
SS	113 °F	248 °F

*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
Maxiumum pulse input: 25 pulses / second
Analog Input Impedance: 120 Ohms
Recommended Viscocity: 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

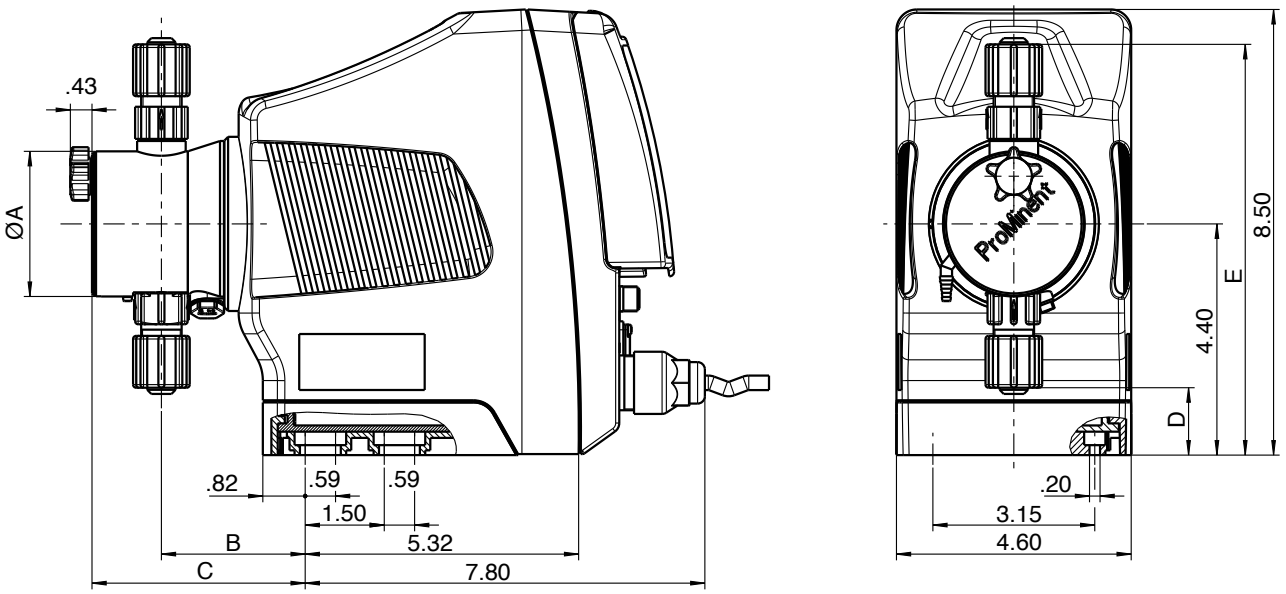
ProMinent® gamma/ X
Solenoid Diaphragm Metering Pumps

Identcode Ordering System

GMXa	Gamma/ X																
	Version	Capacity				Version	Capacity				Version	Capacity					
	1602	0.61 gph (2.3 l/h), 232 psi (16 bar)				0220	5.2 gph (19.7 l/h), 29 psi (2 bar)				0424	6.34 gph (24 l/h), 58 psi (4 bar)					
	1604	0.95 gph (3.6 l/h), 232 psi (16 bar)				2504	1.0 gph (3.8 l/h), 363 psi (25 bar)				0245	11.9 gph (45 l/h), 29 psi (2 bar)					
	0708	2.0 gph (7.6 l/h), 102 psi (7 bar)				1009	2.38 gph (9.0 l/h), 145 psi (10 bar)										
	0414	3.56 gph (13.5 l/h), 58 psi (4 bar)				0715	3.83 gph (14.5 l/h), 102 psi (7 bar)										
		Liquid end material:															
		NP	Clear acrylic /PVDF, for auto-degassing version Clear acrylic / PVC														
		PP	Polypropylene														
		PV	PVDF/PVDF														
		SS	Stainless Steel														
		TT	PTFE Carbon-loaded														
			O-rings:														
			B	FKM-B/PFTE coated													
			E	EPDM/PTFE coated													
			T	PTFE/PFTE coated													
				Liquid end version:													
				0	Non-bleed version, no valve spring only with NP, TT and SS and type 0245												
				1	Non-bleed version, with valve spring only with NP, TT and SS and type 0245												
				2	Bleed function, no valve springs only with PV, NP not for type 0245												
				3	Bleed function, with valve springs only with PV, NP not for type 0245												
				4	Version for highly viscous media only with PV, types 1604, 0708, 0414, 2504, 1009, 0715, 0424												
				7	Self-bleeding without bypass, only with PV, not for versions 2504 and 0245												
				9	Auto-degassing with bypass (SEK), only with NP, not for types 2504 and 0245												
					Hydraulic connections:												
					6	Standard (SS/TT)											
					M	1/4" x 3/16"											
					N	3/8" x 1/4"											
					O	1/2" x 1/4" for 2504 only											
					Q	1/2" x 3/8"											
						Diaphragm rupture indicator:											
						0	Without diaphragm rupture indicator										
						1	With diaphragm rupture indicator, optical sensor										
							Version:										
							0	Standard									
								Logo:									
								0	Standard, with logo								
									Electrical Connection:								
									U	100-230 V, ±10 %, 50/60 Hz							
										Cable and plug with 6ft (2m) power cord, single phase:							
										A	European plug						
										D	N. American plug, 115 V						
											Relay, pre-set to:						
											0	Without relay					
											1	1 x changeover contact 230 V – 2 A, fault indicating relay N/C					
											4	2 x N/O 24 V – 100 mA, such as 1 + pacing relay					
											C	1 x N/O 24 V – 100 mA, such as 1 + 4 – 20 mA output					
											F	Auto degassing module (not available for version 2504)					
											G	Auto degassing module + fault relay (not available for version 2504), comes with panel					
												Accessories:					
												0	Not included (for PVDF, TT, SS)				
												1	With foot and injection valve, 5 ft PVC suction tubing, 10 ft PE discharge tubing				
													Control Variants:				
													0	Manual + external 1:1 with pulse control			
													3	Manual + external with pulse control + analogue 0/4 - 20 mA			
													5	Options 3 + 4 week process timer			
													C	Options 3 + CANopen			
													R	Options 3 + PROFIBUS® DP interface, M12 Note: no relay with PROFIBUS® version "R"			
														Metering Monitor:			
														0	Pulse signal input		
															Bluetooth connection:		
															0	Not included	
															B	Included	
																Language:	
																EN	Standard
GMXa	1601	PP	E	1	M	0	0	0	U	D	1	0	0	0	0	EN	

ProMinent® gamma/ X
Solenoid Diaphragm Metering Pumps

Dimensional Drawings



Material design **PPT**

Type	Ø A	B	C	D	E
0245	4.30	3.00	–	.55	8.22
0424, 0220	3.50	3.00	4.33	.95	7.95
0715, 0414	3.50	2.91	4.21	.95	7.95
1009, 0708	3.50	2.91	4.25	.95	7.95
1604	2.75	2.80	4.17	1.25	7.80
1602	2.75	2.80	4.17	1.25	7.80

Material design **NPT**

Type	Ø A	B	C	D	E
0245	4.30	3.00	4.13	.55	8.27
0424, 0220	3.50	3.00	4.09	.90	7.87
0715, 0414	3.50	3.00	4.09	.90	7.87
1009, 0708	3.50	2.91	4.01	.90	7.87
1604	2.75	3.03	4.13	1.30	7.52
1602	2.75	3.03	4.13	1.30	7.52

Material design **PVT**

Type	Ø A	B	C	D	E
0245	4.30	3.00	–	.55	8.22
0424, 0220	3.50	3.11	3.50	.98	8.00
0715, 0414	3.50	2.87	3.50	.98	8.00
1009, 0708	3.50	2.95	3.62	.98	8.00
1604	2.75	2.80	3.31	1.42	7.72
1602	2.75	2.80	3.31	1.42	7.72

ProMinent® gamma/ XL Solenoid Diaphragm Metering Pumps

Overview: gamma/ X

The new ***gamma/ XL*** is a solenoid metering pump with predictive intelligence. Thanks to its controlled solenoid drive with sensor-free pressure measurement, it detects hydraulic faults even in the case of minimal deviations – immediately and optimally matching its output to the pressure conditions and properties of the medium while protecting the pump and piping systems from overload situations. The ***gamma/ XL*** covers a capacity range of **.006 GPD** at **363 PSIG** to **21.1 GPH** at **29 PSIG** (depending on pump version).
(see **page 147** for spare parts)

- Electronic stroke length adjustment via click wheel
- Volume adjustment in GPH or LPH
- Manual, Analog, Contact and Batch modes optional
- Integrated system pressure measurement
- BUS interfaces such as Profibus, CANbus, PROFINET and Modbus
- High visibility of LED-indicator lights
- Large illuminated display
- Analog output for stroke length and stroke rate transmission
- Auto compensates programmed feed rates during back pressure fluctuations
- As low as 1 mL/hr continuous feed rate with regulated solenoid drive
- Turn down ratio up to 40,000:1
- Integrated pressure measurement and display
- Available diaphragm rupture indicator
- Integrated 7-day timer
- Detects Overpressure/ No Pressure (broken discharge line) and gas in the liquid end
- Automatically sets optimal speed and stroke based on GPH settings (when set to automatic)
- New configurable input/output
- gamma/ XL and delta footprints are identical



ProMinent® gamma/ XL
Solenoid Diaphragm Metering Pumps

Capacity Data

Capacity data: gamma/ XL

Pump Version	Capacity at Maximum Backpressure					Max. Stroking Rate	Tubing Connectors O.D. x I.D	Pre-Primed SuctionLift **		Shipping Weight lbs	
	PSIG	**(bar)**	**GPH***	**(L/H)**	**ml/stroke**	**Strokes/min**	**in**	**ft**	**(m)**	**NPE/NPB/PVT**	**SS**
gamma/ XL: with standard liquid ends											
2508	363	(25)	2.0	(8.0)	0.67	200	3/8" x 1/4" (1/2" MNPT dis. Only)	16.4	(5)	22.0	24.25
1608	232	(16)	2.0	(8.0)	0.67	200	3/8" x 1/4"	16.4	(5)	22.0	24.25
1612	232	(16)	3.17	(12)	1.00	200	3/8" x 1/4"	19.6	(6)	22.0	24.25
1020	145	(10)	5.3	(20)	1.70	200	1/2 x 3/8	16.4	(5)	22.0	24.25
0730	102	(7)	7.9	(30)	2.50	200	1/2 x 3/8	16.4	(5)	22.0	24.25
0450	58	(4)	13.2	(50)	4.20	200	5/8" ID hose barb standard***	9.8	(3)	22.0	24.25
0280	29	(2)	21.1	(80)	6.70	200	5/8" ID hose barb standard***	6.5	(2)	22.0	24.25
gamma/ X: with self-bleeding liquid ends, 2-port without bypass (PVT7)											
1608	145	(10)	1.85	(7)	0.60	200	1/2" x 3/8"	5.9	(1.8)	22.0	~
1612	145	(10)	2.64	(10)	0.80	200	1/2" x 3/8"	5.9	(1.8)	22.0	~
1020	145	(10)	3.96	(15)	1.25	200	1/2" x 3/8"	5.9	(1.8)	22.0	~
0730	102	(7)	7.26	(27.5)	2.30	200	1/2" x 3/8"	5.9	(1.8)	22.0	~

Positive suction is recommended on pumps with 1/2" MNPT connections.

gamma/ XL metering pumps with high viscosity liquid ends (PVT 4) have a 10 – 20 % lower capacity rating and are not self-priming.

Permissible ambient temperature: 14 °F to 113 °F | Average power consumption: 78 W | Degree of protection: IP 66

Repeatability ± 2% when utilized and installed per operating instructions

** Capacity data represents minimum values, tested using water at 68 ºF (room temperature)*

*** Suction lift with pre-primed suction line and liquid end*

**** (1/2" MNPT optional)*

Materials In Contact With Chemicals

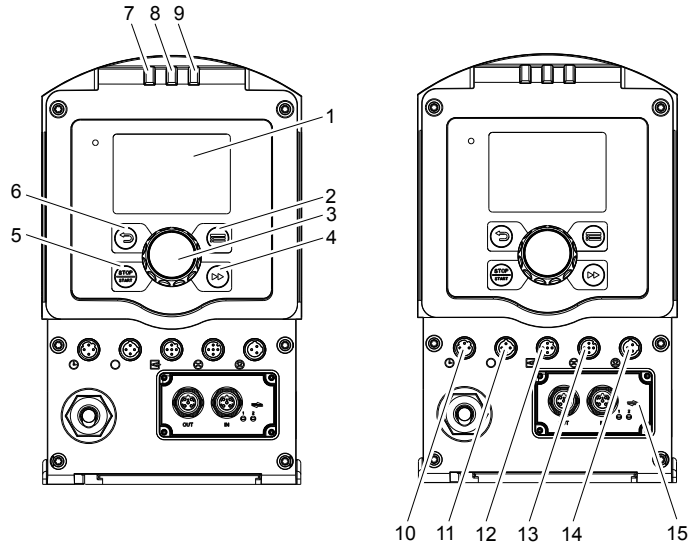
Liquid end materials in contact with media

Version	Liquid End	Suction/discharge valve	Ball seat	Seals	Balls
NPT	Acrylic	PVC	PVDF	PTFE	Ceramic
PVT	PVDF	PVDF	PVDF	PTFE	Ceramic
NPE	Acrylic	PVC	PVDF	EPDM	Ceramic
NPB	Acrylic	PVC	PVDF	FKM	Ceramic
SST	316 SST	316 SST	Ceramic	PTFE	Ceramic
SST (DN10)	316SST	316 SST	PTFE with carbon	PTFE	Ceramic

Note: PVT7 versions have PVDF / PTFE wetted parts. Diaphragm with a PTFE face

FKM = fluorine rubber

Control Elements



1 LCD screen
2 *[Menu]* key
3 Clickwheel
4 *[Priming]* key
5 *[STOP/START]* key
6 *[Back]* key
7 Fault indicator (red)
8 Warning indicator (yellow)
9 Operating indicator (green)
10 "Config I/O" terminal
11 "Diaphragm rupture indicator" terminal
12 "External control" terminal
13 "Metering monitor" terminal
14 "Level switch" terminal
15 Slot for relays and optional modules

ProMinent® gamma/ XL Solenoid Diaphragm Metering Pumps

Specifications

Maximum stroke length: 110 mm solenoid approx. 2mm

Materials of construction:

Housing	Fiberglass reinforced PPE (Polyphenylene Ether)
Diaphragm	PTFE faced EPDM with plastic core
Liquid end options	Acrylic/PVC, PVDF, Stainless Steel
Enclosure rating	IP 66
Power supply	100 – 230 VAC 1 Phase 50 / 60 Hz ± 10%
Power consumption	2508/ 1608/ 1612/ 1020/ 0730/ 0450/ 0280 78 W
Check valves	Double ball suction / discharge (PVT4 with spring loaded single ball)
Power cord	6ft
Relay cable (optional)	6ft
Relay Options:	
Identcode Option 1	Fault indicating relay, N/C 230 V - 6 A Max.
Identcode Option 4	Fault indicating relay, N/C 24 V - 1 A Max. Pacing relay, normally open 24 V - 100 mA Max.
Identcode Option C	4 – 20 mA current output Fault indicating relay 24 V - 100 mA Max.

Ambient temperature range:

In operation	14 °F to 113 °F
Storage & Transport	14 °F to 122 °F

Max. fluid operating temp

Material	Constant	Short Term*
Acrylic/PVC	104 °F	140 °F
PVDF	122 °F	248 °F
SS	122 °F	248 °F

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

Contact input:

Minimum pulse duration	10 ms
Maximum pulse input	50 pulses / second
Analog Input Impedance	120 Ohms
Recommended Viscosity	Max. 0-50 cPs for standard liquid end Max. 50-200 cPs for valve with springs Max. 20-500 cPs for auto-degassing liquid ends Max. 500-1000 cPs for high-viscosity liquid ends

ProMinent® gamma/ XL
Solenoid Diaphragm Metering Pumps

Identcode Ordering System

GXLa — **Product Range**

Regional Version

US — North America

Version	Capacity	Version	Capacity
2508	2.0 gph (8 l/h), 363 psi (25 bar)	0730	7.9 gph (30 l/h), 102 psi (7 bar)
1608	2.0 gph (8 l/h), 232 psi (16 bar)	0450	13.2 gph (50 l/h), 58 psi (4 bar)
1612	3.17 gph (12 l/h), 232 psi (16 bar)	0280	21.1 gph (80 l/h), 29 psi (2 bar)
1020	5.3 gph (20 l/h), 145 psi (10 bar)		

Liquid end material:

PV	PVDF/PVDF, not for pump type 2508
NP	Clear acrylic /PVC, only for pump types 2508, 1608, 1612, 1020 and 0730
SS	Stainless Steel

O-rings:

B	Standard Diaphragm/ Viton-B seal
E	Standard Diaphragm/ EPDM seal
F	FDA-Compliant
T	Standard Diaphragm/ PTFE seal

Liquid end version:

0	Without bleed valve, without valve spring, only with material TT and SS
1	Without bleed valve, with valve spring, only with material TT and 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
7	Self-bleeding without bypass, only for types 1608, 1612, 1020 and 0730, only for material NP and PV

Hydraulic connections:

6	Standard connection for SST and PVT4 ONLY
7	without connection
M	Connection 1/4" x 3/16" USA
N	Connection 3/8" x 1/4" USA
Q	Connection 1/2" x 3/8" USA

Diaphragm rupture indicator:

0	Without diaphragm rupture indicator
1	With diaphragm rupture indicator, optical sensor

Version:

0	Standard

Logo:

0	Standard, with logo

Electrical Connection:

U	100-240 V, ±10 %, 50/60 Hz

Cable and plug:

A	European plug, 6 ft
D	N. American plug, 115 V, 6 ft
V	N. American plug, 115 V, 16 ft
W	N. American plug, 115 V, 32 ft

Relay, pre-set to:

0	Without relay
1	1 x changeover contact 230 V – 2 A, fault indicating relay N/C
4	2 x N/O 24 V – 100 mA, such as 1 + pacing relay
C	1 x N/O 24 V – 100 mA, such as 1 + 4 – 20 mA output

Accessories:

0	Without accessories
1	With foot and injection valve

Control Variants:

0	Manual + external 1:1 with pulse control
3	Manual + external with pulse control + analogue 0/4 - 20 mA
C	CANopen
D	CANopen Dulcomarin
E	PROFINET®
M	Modbus RTU
P	PROFINET® without certificate
R	PROFIBUS® M12 plug

Communication:

0	Without

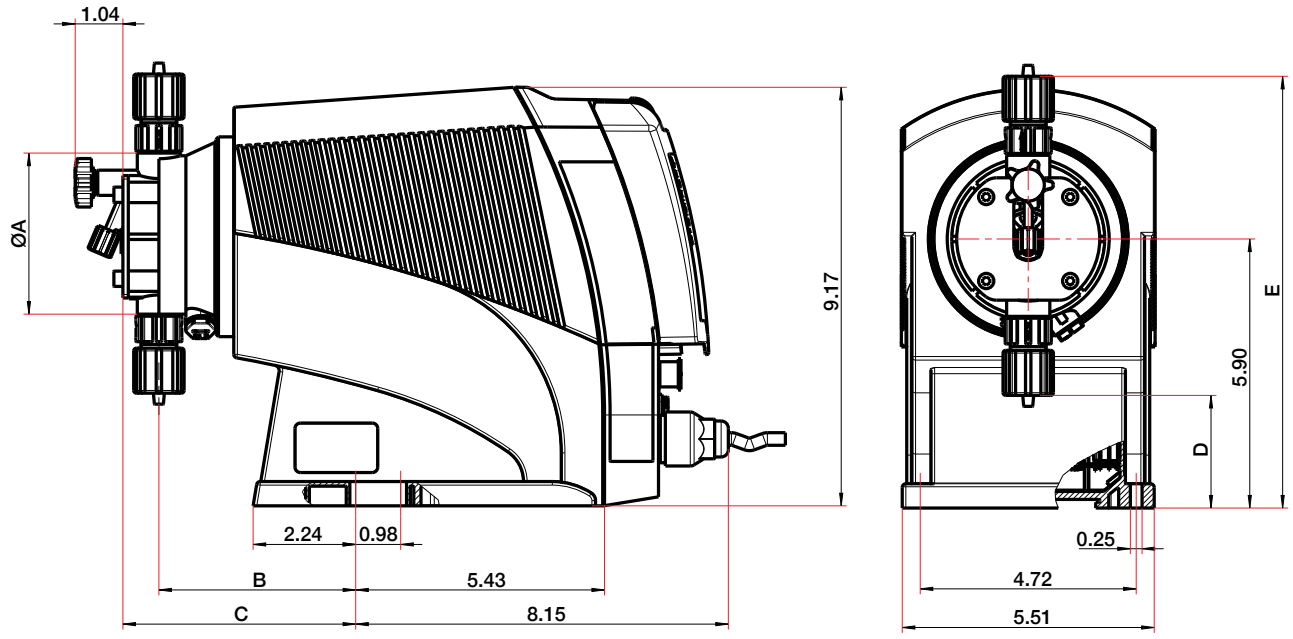
Language:

EN	Standard

GXLa	US	1608	PV	T	2	6	0	0	0	U	A	0	0	0	0	EN	

ProMinent® gamma/ XL Solenoid Diaphragm Metering Pumps

Dimensional Drawings



	1608	1612	1020	0703
⌀A	3.54	3.54	3.54	3.54
B	4.25	4.33	4.33	4.40
C (with bleed valve)	~	5.12	5.12	5.20
C (SER)	5.03	5.12	5.12	5.20
D	2.50	2.50	2.50	2.50
E	9.45	9.45	9.45	9.45

Note: The above drawing represents the **PV** liquid end version (see O&M for all other) All measurements are in inches

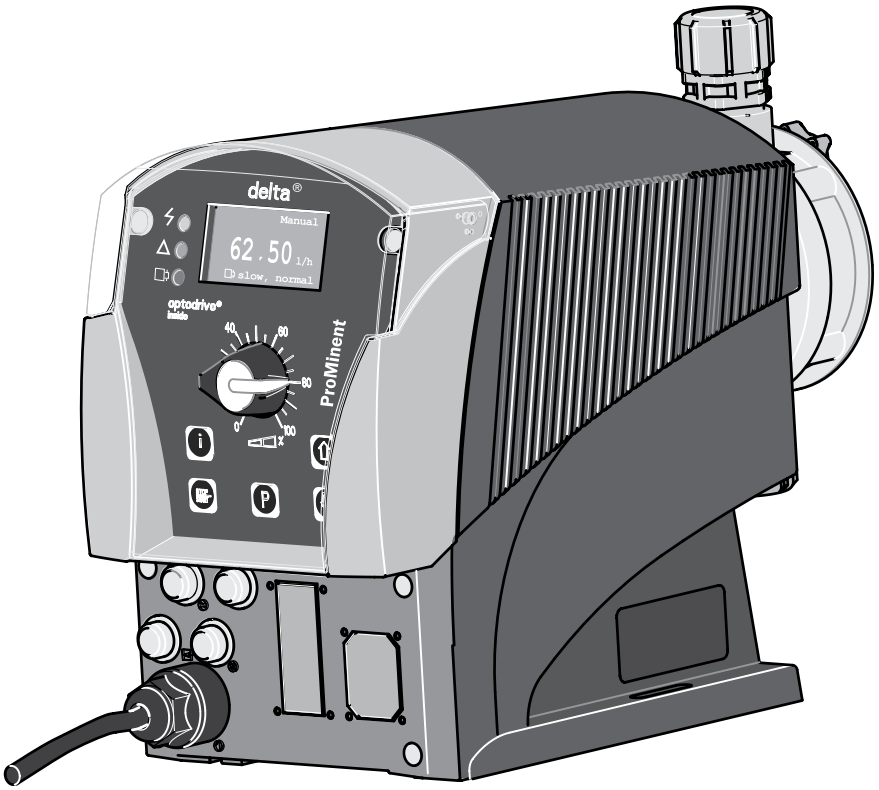
ProMinent® delta
Solenoid Diaphragm Metering Pumps

Overview: delta (No Longer Available, for Reference ONLY)

Ideal for applications requiring metering pump accuracy with minimal pulsation

(see page 147 for spare parts and page 151 for control cables)

- Continuous or pulsating dosing
- Configurable suction and delivery stroke duration
- Pump can be adapted to the dosing media
- Integrated optoGuard monitoring detects blocked dosing points, broken dosing lines and air or gas bubbles trapped in the dosing head
- Capacities: 2.0 gph (7.5 lph) to 19.8 gph (75.0 l/h)
- Stroke length continuously adjustable from 0 - 100% (recommended range 30 - 100%)
- Acrylic, PVDF and stainless steel material versions
- Patented bleed
- Optional detection and indication of diaphragm failure
- Adjustment and display of pump delivery from the keypad with choice of display in l/h or strokes/min
- Optional external auto-degassing solenoid kit available for outgassing media
- Large backlit graphic display
- External control options via voltage-free contacts with optional increase/reduce speed pulse
- Optional external control via standard 0/4-20 mA signal
- Interfaces for PROFIBUS® DP *(see page 151)* or CAN bus system
- 14-day process timer option for time and event-dependent dosing duties
- Connections for 2 stage-level switch and flow monitor
- 3 LED displays for operation and warning and error message in plain text
- Optional concentration input for volume-proportional dosing
- NSF/ANSI 61 approved



pk_1_131_2

ProMinent® delta
Solenoid Diaphragm Metering Pumps

Capacity Data

Capacity data: delta

Pump Version	Capacity at Maximum Backpressure				Max. strokes/ min.	Pre-primed suct. lift		Suction/Discharge connectors	Shipping weights (higher weights are for SST)	
	GPH	**(L/h)**	**psig**	**(bar)**	**spm**	**ft**	**(m)**	**in**	**lbs**	**(kg)**
2508	2	(7.5)	363	(25)	200	19.6	(5)	3/8" x 1/2" (1/2" MNPT dis. only)	22-24	(10-11)
1608	2.1	(7.8)	232	(16)	200	16.4	(5)	3/8" x 1/4"	22-24	(10-11)
1612	3	(11.3)	232	(16)	200	19.6	(6)	3/8" x 1/4"	22-24	(10-11)
1020	4.8	(18.0)	145	(10)	200	16.4	(5)	1/2" x 3/8"	22-24	(10-11)
0730	7.7	(29.2)	102	(7)	200	16.4	(5)	1/2" x 3/8"	22-24	(10-11)
0450	12.9	(49.0)	58	(4)	200	9.8	(3)	5/8" ID hose barb standard[1]	22-24	(10-11)
0280	19.8	(75.0)	29	(2)	200	6.7	(2)	5/8" ID hose barb standard[1]	22-24	(10-11)
delta: with self-bleeding liquid end without bypass										
1608	1	(3.8)	232	(16)	200	5.9	(1.8)	1/2" x 3/8"	22.0	(10.0)
1612	1.7	(6.5)	232	(16)	200	5.9	(1.8)	1/2" x 3/8"	22.0	(10.0)
1020	3.7	(14.0)	145	(10)	200	5.9	(1.8)	1/2" x 3/8"	22.0	(10.0)
0730	7.4	(28.0)	101	(7)	200	5.9	(1.8)	1/2" x 3/8"	22.0	(10.0)

Above capacities and suction lift refer to pumps tested on water at 115 VAC, 60 Hz, and an ambient temperature of 70°F (21°C).
Higher specific gravity fluids will reduce suction lift. Higher viscosity fluids will reduce capacity.
[1] (1/2" MNPT optional)

Materials In Contact With Chemicals

Liquid end materials in contact with media

Version	Liquid End	valves	Seals	Valve balls	Diaphragm*
*PVT	*PVDF	*PVDF	PTFE	Ceramic	PTFE
SST	316 SS	316 SS	PTFE	Ceramic	PTFE
NPE	Acrylic	PVC	EPDM	Ceramic	PTFE
NPB	Acrylic	PVC	Viton®	Ceramic	PTFE

*Highly compatible material suitable for most fluids.
Viton® is a registered trademark of DuPont Dow Elastomers.

ProMinent® delta
Solenoid Diaphragm Metering Pumps

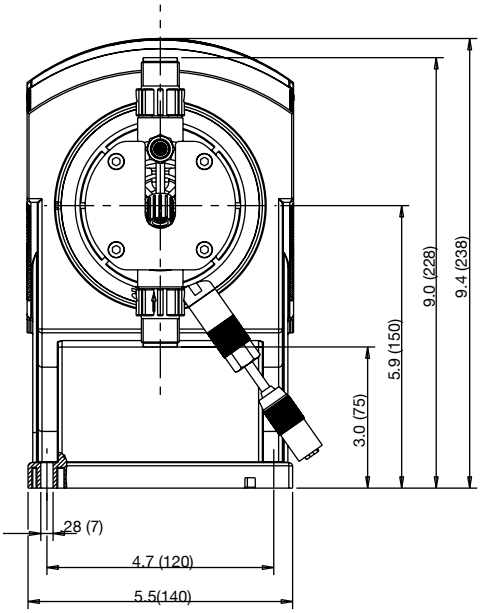
Identcode Ordering System

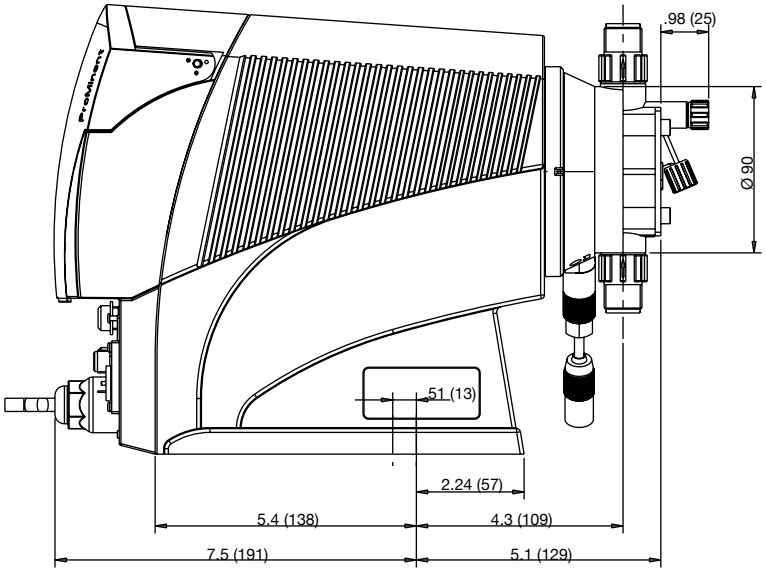
DLTA	**delta**															
	Version	**Capacity**														
	2508	2.1 gph (7.5 l/h), 362 psi (25 bar)														
	1608	2.1 gph (7.8 l/h), 232 psi (16 bar)														
	1612	3.0 gph (11.30 l/h), 232 psi (16 bar)														
	1020	5.05 gph (19.1 l/h), 145 psi (25 bar)														
	Version	**Capacity**														
	0730	7.7 gph (29.20 l/h), 101.5 psi (7 bar)														
	0450	13 gph (49 l/h), 58 psi (4 bar)														
	0280	19.8 gph (75 l/h), 29 psi (2 bar)														
		Liquid end materials:														
		PV	PVDF (for models 1608, 1612, 1020, and 0730)													
		SS	SS													
		NP	Acrylic glass/PVC (for pump type 2508, 1608, 1612, 1020 & 0730)													
			O-rings:													
			T	PTFE seals												
			E	EPDM o-ring (NP only)												
			B	Viton® o-rings (NP only)												
				Liquid end version:												
				0	W/o bleed valve, w/o spings (for SS liquid ends)											
				1	W/o bleed valve, with springs (for SS liquid ends)											
				2	With bleed valve, w/o springs											
				3	With bleed valve, with springs											
				4	W/o bleed valve, with springs (for high viscosity only)											
				X	W/o liquid end											
					Connection:											
					0	1/2" x 3/8" tubing (for models 1020 & 0730); 5/8" hose barb (for models 0450 & 0280); 3/8" x 1/4" tubing (for models 1608 & 1612)										
					6	1/2" MNPT Connections (for models 0450, 0280 & 2508)										
						Diaphragm failure indicator:										
						0	Without diaphragm failure indicator									
						1	With diaphragm failure indicator									
							Logo:									
							0	Standard, with ProMinent® logo								
								Electrical connection (± 10%):								
								U	115-230 V, 50/60 Hz							
									Cable and plug with 6 ft (2 m) power cord, single phase:							
									A	European plug						
									D	N. American plug, 115 V						
									U	N. American plug, 230V						
										Relay:						
										0	Without relay (Required with PROFIBUS)					
										1	Fault annunciating relay, drops out					
										3	Fault annunciating relay, pulls in					
										4	Option 1 + pacing relay					
										5	Option 3 + pacing relay					
										A	Alarm indication + pump shut off					
										C	Option 1 + 4-20 mA analog output + fault output (24V 100 mA max.)					
										G	Auto-degassing valve + fault relay (not available for version 2508)					
											Accessories:					
											0	Not included				
											1	Foot Valve, Inj Valve, 15' Tubing (3/8" x 1/4") PVC (for model 1608)				
											1	Foot Valve, Inj Valve, 15' Tubing (3/8" x 1/4") PVDF (for model 1612)				
											1	Foot Valve, Inj Valve, 15' Tubing (1/2" x 3/8") PVC (for model 1020)				
											1	Foot Valve, Inj Valve, 15' Tubing (1/2" x 3/8") PVDF (for model 0730)				
											1	Foot Valve, Inj Valve, 5' Suction Tubing (1/2" x 3/8") PVC (1/2" MNPT on Discharge) (for model 2508)				
											1	FV, IV, 15' House (5/8" ID) PVDF (for models 0450 & 0280)				
												Control Variants:				
												0	Manual + External contact (multiplier/divider)			
												3	Manual + External with pulse control & analog control			
												4	Option 0 + 14 day timer			
												5	Option 3 + 14 day timer			
												M	with pH,ORP and chlorine control module			
												R	Option 3 + Profibus M12 (Relay must be 0)			
													Access Code:			
													0	No Access Code		
													1	Access Code		
														Language:		
														EN	English	
															Pause/Float:	
															0	Standard
DLTA	**2508**	**PV**	**0**	**0**	**0**	**0**	**0**	**U**	**A**	**0**	**0**	**0**	**0**	**EN**	**0**	

Dimensional Drawings

Dimensions in inches (mm).
Ranges given, actual dimension dependent on liquid end material.

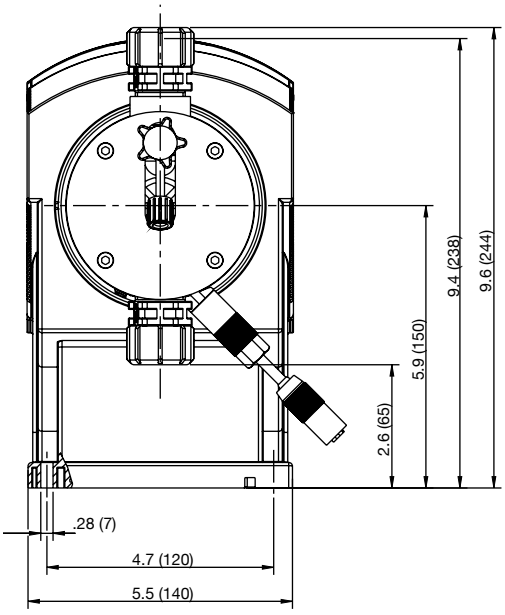
Dimensions of delta® type 1612 - 0730 PVT

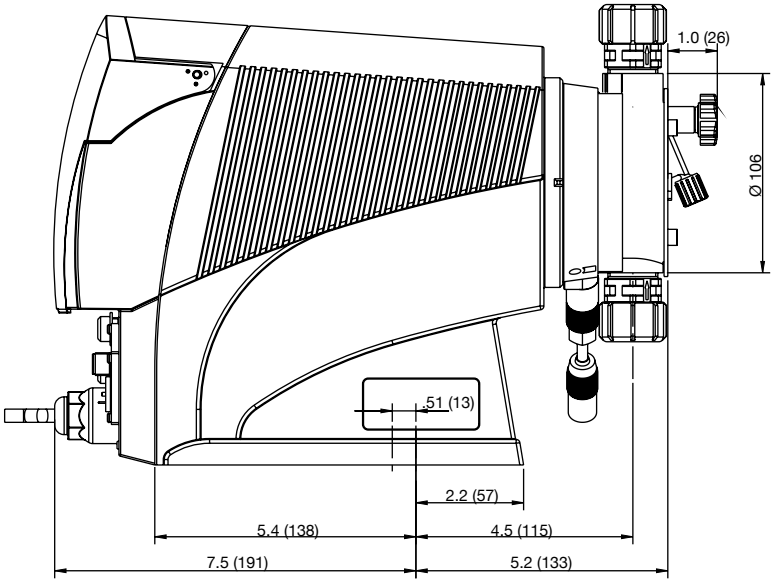




dimensions in inches (mm)

Dimensions of delta® type 0450 - 0280 PVT



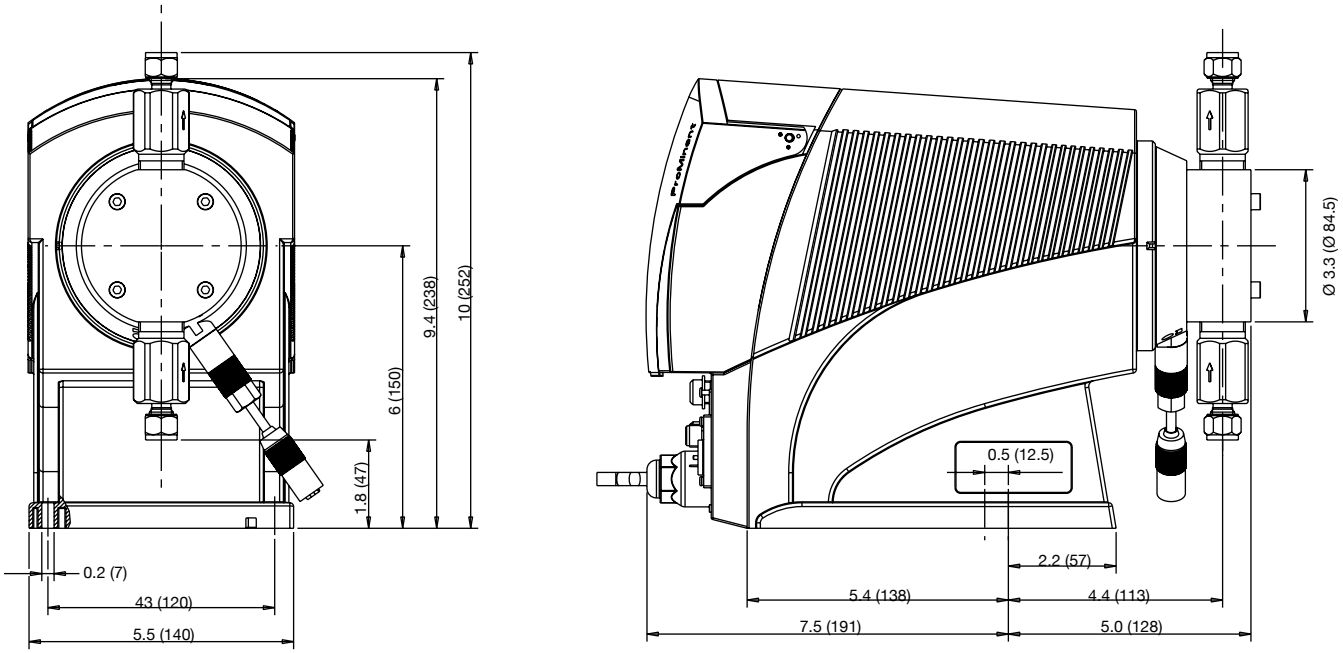


dimensions in inches (mm)

ProMinent® delta
Solenoid Diaphragm Metering Pumps

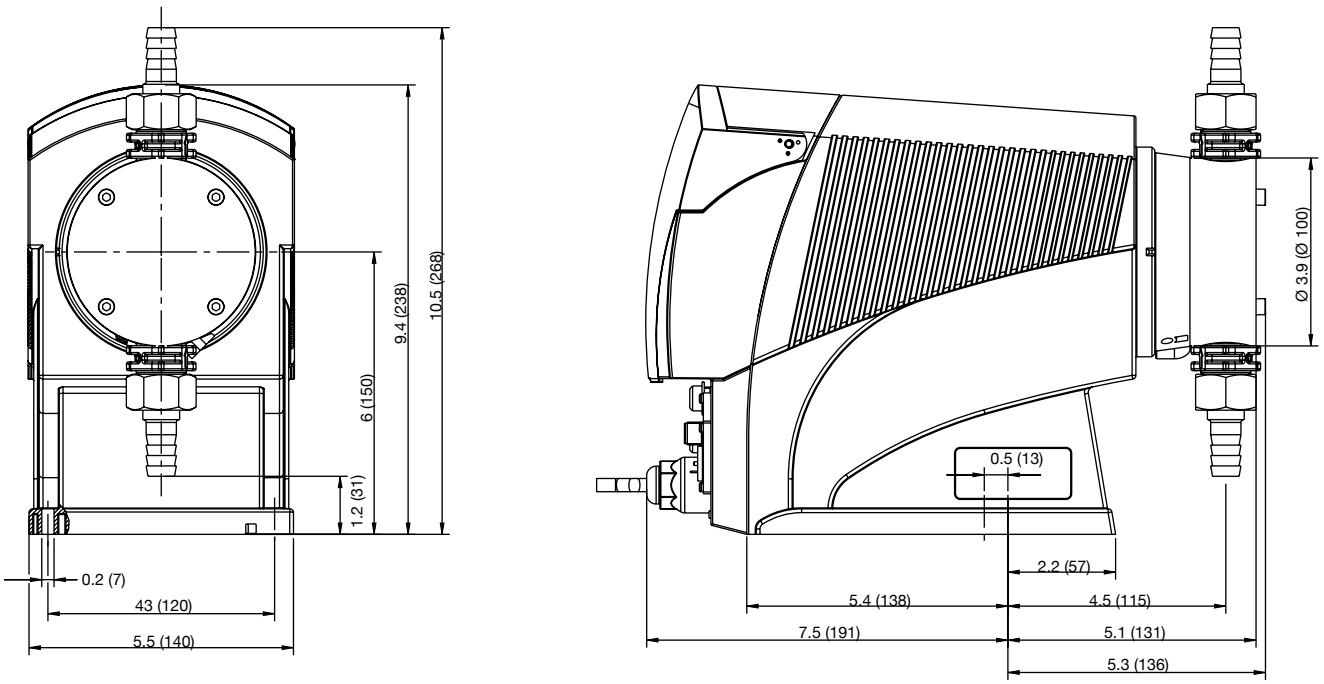
Dimensional Drawings

Dimensions of delta® type 1612 - 0730 SST



dimensions in inches (mm)

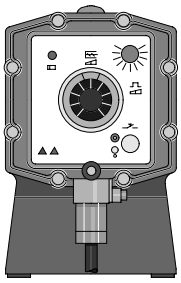
Dimensions of delta® type 0450 - 0280 SST



dimensions in inches (mm)

ProMinent® EXtronic Solenoid Diaphragm Metering Pumps

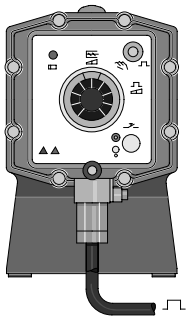
Overview: EXtronic



pk_1_020

Control type "Internal"

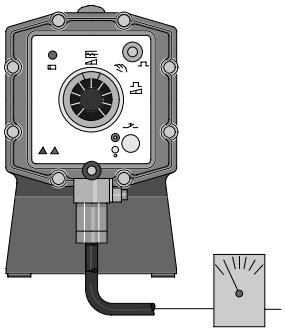
Stroke length adjustment 1:10, stroking rate adjustment 1:25, total adjustment range 1:250.



pk_1_019

Control type: "External Contact"

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



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 146 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 conjection 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 enclsoure 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
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

Capacity data: Extronic

Pump Version	Capacity at Max. Backpressure					Capacity at 1/2 Max. Backpressure					Pre-Primed Suction Lift		Max. Stroking Rate	Tubing Connectors O.D. x I.D.	Shipping Weight (higher weights are for SS)	
EXBb	psig	(bar)	GPH	(L/h)	mL/ stroke	psig	(bar)	GPH	(L/h)	mL/ stroke	ft	(m)	spm	in	lbs	(kg)
1000	145	(10)	0.05	(0.19)	0.03	73	(5)	0.07	(0.27)	0.04	4.9	(1.5)	120	1/4 x 3/16	26.5-35.3	(12-16)
1601	232	(16)	0.26	(1.0)	0.14	116	(8)	0.34	(1.3)	0.18	16.4	(5)	120	1/4 x 3/16	26.5-35.3	(12-16)
2501	363	(25)	0.30	(1.14)	0.15	290	(20)	0.29	(1.1)	0.17	16.4	(5)	120	1/4 x 3/16	39.7	(18)
1201	174	(12)	0.45	(1.7)	0.23	87	(6)	0.53	(2.0)	0.28	16.4	(5)	120	1/4 x 3/16	26.5-35.3	(12-16)
2502	363	(25)	0.53	(2.0)	0.28	290	(20)	0.58	(2.2)	0.31	16.4	(5)	120	1/4 FNPT	28.7-37.5	(13-17)
1002*	145	(10)	0.61	(2.3)	0.31	73	(5)	0.71	(2.7)	0.38	16.4	(5)	120	1/2 x 3/8	26.5-35.3	(12-16)
0803	116	(8)	0.98	(3.7)	0.51	58	(4)	1.03	(3.9)	0.54	9.8	(3)	120	1/4 x 3/16	26.5-35.3	(12-16)
2505	363	(25)	1.11	(4.2)	0.64	290	(20)	1.27	(4.8)	0.73	6.5	(2)	110	1/4 FNPT	35.3-44.1	(16-20)
1006*	145	(10)	1.59	(6.0)	0.83	73	(5)	1.9	(7.2)	1	16.4	(5)	120	1/2 x 3/8	28.7-37.5	(13-17)
0308	44	(3)	2.27	(8.6)	1.2	22	(1)	2.72	(10.3)	1.43	16.4	(5)	120	1/2 x 3/8	26.5-35.3	(12-16)
1310*	188	(13)	2.77	(10.5)	1.59	87	(6)	3.14	(11.9)	1.8	16.4	(5)	110	1/2 x 3/8	35.3-44.1	(16-20)
0613	87	(6)	3.46	(13.1)	1.82	44	(3)	3.94	(14.9)	2.07	18.0	(5.5)	120	1/2 x 3/8	28.7-37.5	(13-17)
0814*	116	(8)	3.70	(14.0)	2.12	58	(4)	4.07	(15.4)	2.33	16.4	(5)	110	1/2 x 3/8	35.3-44.1	(16-20)
0417	51	(3.5)	4.6	(17.4)	2.42	29	(2)	4.73	(17.9)	2.49	14.7	(4.5)	120	1/2 x 3/8	28.7-37.5	(13-17)
0430	51	(3.5)	7.13	(27.0)	4.09	29	(2)	7.79	(29.5)	4.47	16.4	(5)	110	DN 10	35.3-44.1	(16-20)
0260	22	(1.5)	15.85	(60.0)	9.09	-	(-)	-	(-)	-	4.9	(1.5)	110	DN 15	35.3-44.1	(16-20)
EXtronic with Auto-degassing Liquid Ends																
1601	232	(16)	0.17	(0.66)	0.09	-	(-)	-	(-)	-	5.9	(1.8)	120	1/4 x 3/16	27	(12)
1201	174	(12)	0.26	(1.0)	0.14	-	(-)	-	(-)	-	6.6	(2.0)	120	1/4 x 3/16	27	(12)
0803	116	(8)	0.63	(2.4)	0.33	-	(-)	-	(-)	-	9.2	(2.8)	120	1/4 x 3/16	27	(12)
1002	145	(10)	0.48	(1.8)	0.25	-	(-)	-	(-)	-	6.6	(2.0)	120	1/4 x 3/16	27	(12)

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. Higher viscosity fluids will reduce capacity.
Liquid ends for highly viscous media have 10-20% less metering capacity and are not self-priming. Standard connectors are 1/2" MNPT or 5/8" hose barb. Positive suction is recommended.
*High Viscosity models are available in the 1002, 1006, 1310 and 0814 models. Liquid end designation is PP4 (Polypropylene/EPDM) Suitable for viscosities to 3500 cps

ProMinent® EXtronic Solenoid Diaphragm Metering Pumps

Materials in Contact With Chemicals

Version	Liquid End	Suction/Discharge	Seals	Valve balls	Diaphragm
PP1	Polypropylene	Polypropylene	EPDM	Ceramic	PTFE
PP4[1]	Polypropylene	Polypropylene	EPDM	Ceramic	PTFE
NP1	Acrylic	PVC	Viton®	Ceramic	PTFE
NP3	Acrylic	PVC	Viton®	Ceramic	PTFE
NS3[2]	Acrylic	PVC	Viton®	Ceramic	PTFE
PS3[2]	PVC	PVC	Viton®	Ceramic	PTFE
TT1	PTFE with carbon	PTFE with carbon	PTFE	Ceramic	PTFE
TTT	PTFE with carbon	PTFE with Carbon	PTFE	Ceramic	PTFE
SS	316 Stainless steel	316 Stainless Steel	PTFE	Ceramic[3]	PTFE

[1] PP4 with Hastelloy C valve springs.
[2] NS3 and PS3 with Hastelloy C valve springs, PVDF valve core. NOTE: Viton® is a registered trademark of DuPont Dow Elastomers.
[3] DN 10 and DN 15 valve balls are 316 stainless steel

Factory Mutual System approved

Approved
(standard in Canada)

Approved

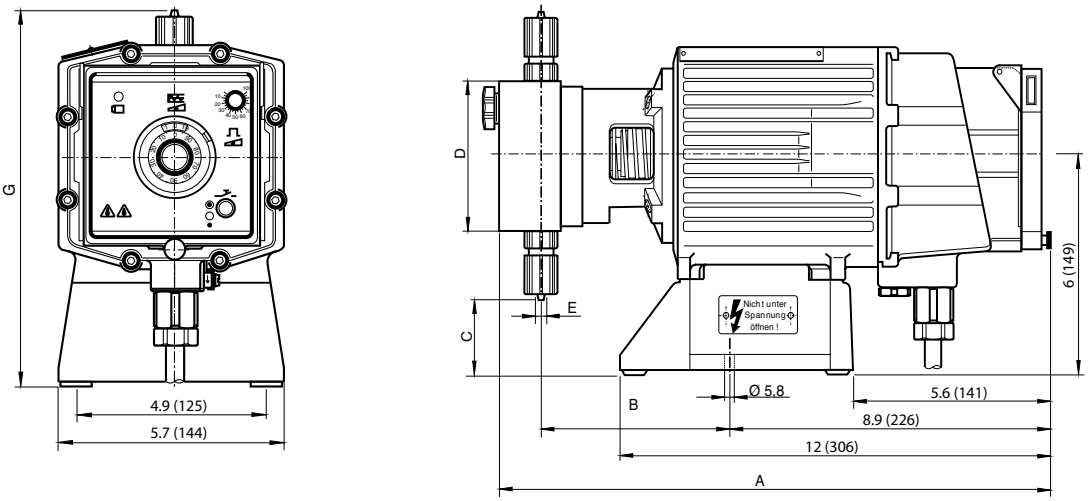
The EXtronic metering pumps are registered according to DIN-VDE 0170/0171-5.78.

ProMinent® EXtronic Solenoid Diaphragm Metering Pumps

Identcode Ordering System

EXBb	Enclosure Type:								
	G	Explosion protection							
	M	Fire and explosion protection: permissible liquid end material - PTFE & Stainless Steel							
	Version:	Capacity:			Version:	Capacity:			
	1000	0.05 gph, 145 psi			0613	3.46 gph, 87 psi		*Type 2502 & 2505 only available in SS and SB	
	1601	0.26 gph, 232 psi			0417	4.6 gph, 50.8 psi		**Type 1310 only avaiable in NP, PP4, SS and SB	
	1201	0.45 gph, 174 psi			2501***	0.26 gph, 363 psi		***Type 2501 available in SSM and SBM only	
	0803	0.98 gph, 116 psi			2505*	1.11 gph, 363 psi		❖Type 0430 & 0260 not available in SS2	
	1002	0.61 gph, 145 psi			1310**	2.77 gph, 189 psi			
	0308	2.27 gph, 43.5 psi			0814	3.7 gph, 116 psi			
	2502*	0.53 gph, 363 psi			0430❖	7.13 gph, 50.8			
	1006	1.59 gph, 145 psi			0260❖	15.8 gph, 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						
		SS1	316 SS with PTFE O-rings (Only for types 0430 & 0260)						
		SS2	316 SS with PTFE O-rings, 1/4" FNPT thread						
		SB1	316 SS with PTFE O-rings, R 1/4" internal thread, R 1/2" for type 0260 (Recommended for combustible media)						
		SSM	as SS1, with diaphragm failure indicator, type 2501 only						
		SBM	as SB1, with diaphragm failure indicator, type 2501 only						
			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			
					4*	External contact, intrinsically safe [i,a]		*Intrinsically safe only with E=Ex protection	
					5*	Analog 0-20 mA, intrinsically safe [i,a]			
					6*	Analog 4-20 mA, intrinsically safe [i,a]			
					7	Manual with zero volts ON/OFF			
					8	Manual with zero volts ON/OFF, intrinsically safe [i,a]			
						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**	

Dimensional Drawings

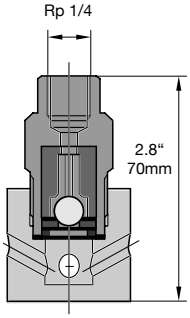


Dimensions in inches (mm)

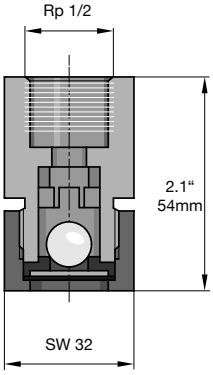
Pump		A	B	C	D	E	F	G
1000, 1601, 1201, 0803	NP1	15.4 (391)	5.4 (136)	2.7 (69)	ø70	6 x 4	ø38	9.0 (229)
1002, 0308, 2502/05, 1006	NP1	15.4 (391)	5.4 (136)	2.4 (61)	ø85	8 x 5	ø50	9.3 (237)
1310, 0613	NP1	15.4 (391)	5.4 (136)	2.0 (52)	ø100	8 x 5	ø66	9.6 (244)
0814, 0417	NP1	15.4 (391)	5.4 (136)	2.0 (52)	ø100	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® EXtronic Solenoid Diaphragm Metering Pumps

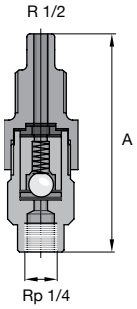
Special Valves for EXtronic®



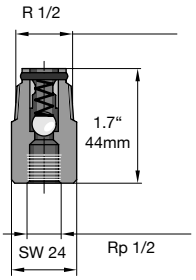
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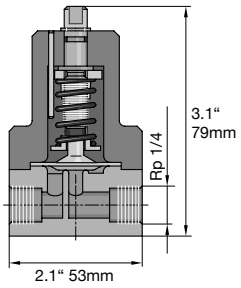
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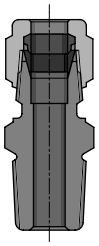
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Stainless steel 1.4404 “SB” foot valve

With filter and ball check valve, designed for use with flammable materials.

Materials: 1.4404/1.4401/PTFE/ceramic

	Order No.
Connector ISO 7 Rp 1/4 SB version for ProMinent EXtronic®	809301
Connector ISO 7 Rp 1/2 SB version for ProMinent EXtronic®	924561

Stainless steel 1.4404 “SB” injection valve

Spring loaded ball check valve designed for use with flammable materials.

Materials: 1.4404/1.4401/Hastelloy C/PTFE/ceramic

	Order No.
Connector ISO 7 Rp 1/4 - R 1/2, pre-pressure approx. 7.3 psi	809302
Connector ISO 7 Rp 1/2 - R 1/2, pre-pressure approx. 7.3 psi	924560

Adjustable “SB” back pressure valve

Materials: 1.4404; PTFE coated diaphragm. Connector both sides ISO 7 Rp 1/4

	Order No.
Operating range approx. 14.5 - 145 psi (1-10 bar), closed version designed for use with flammable materials.	924555

To generate a constant back pressure for accurate metering with a free outlet. Can also be used as an overflow valve.

PTFE dosing pipe

Carbon-filled, surface resistance <10^7 Ω

Material	Length m	Ext. diam. x int. diam.	Permissible operating press. psi (bar)*	Order No.
PTFE	Sold by the foot	6.0 x 4.0	174 (12)	1024831
PTFE	Sold by the foot	8.0 x 5.0	232 (16)	1024830
PTFE	Sold by the foot	12.0 x 9.0	130.5 (9)	1024832

* permissible operating pressure at 68°F (20 °C) in accordance with EN ISO 7751, $^1/_4$ of the bursting pressure, assuming chemical resistance and correct connection.

Additional ancillary equipment, i.e. foot valves, injection valves and back pressure valves in the usual material combinations, identical to gamma ancillary equipment and/or for connector DN 15 Vario ancillary equipment, see section 2.14.

Stainless steel straight threaded connectors

Swagelok system in stainless steel SS 316 (1.4401) for connection of pipework to liquid ends and valves with internal thread and for SB version.

Normal thread o-rings compounds required.	Order No.
6 mm - ISO 7 R 1/4	359526
8 mm - ISO 7 R 1/4	359527

"Motor-Driven Metering Pumps" T.O.C. IV

CATALOG SECTION TABS

product overview

- Introduction
- Pump selection by capacity
- Chemical resistance list
- Solenoid & Motor Pump Overview
- Analytical Instrumentation Overview

solenoid-driven metering pumps

- Concept b
- Beta b
- gamma/ X
- delta
- gamma/ XL
- Extronic

motor-driven metering pumps

- **Sigma X: Sigma/ 1**
- **Sigma X: Sigma/ 2**
- **Sigma X: Sigma/ 3**
- **ProMus**
- **Makro**
- **Hydro 2 API 675**
- **Hydro 2 API 675**
- **Orlita**
- **DULCO flex Control**
- **DulcoFlex**

pump spare parts & accessories

- Solenoid pump spare parts
- Motor pump spare parts
- Pump accessories

DULCOMETER instrumentation

- D1Cb/c
- DACb
- Dulcometer Compact
- DMT
- MicroFlex
- MultiFLEX
- AEGIS II
- SlimFlex 5

DULCOTEST sensors

- Amperometric sensors
- Potentiometric sensors
- Potentiostatic sensors
- Conductometric sensors
- Accessories

polymer blending & dry feed solutions

- ProMix™ -M (In-line Controls)
- ProMix™ -M (Batch & In-line Controls)
- ProMix™ -S
- ProMix™ -C
- ProMdry™

ProMinent® Sigma X: Sigma/1 Motor Diaphragm Metering Pumps

Overview: Sigma/ 1 control type (S1Cb)

The Sigma/1 motor diaphragm metering pumps are produced with a high-strength inner housing for parts subject to load as well as an additional plastic housing to protect against corrosion. The capacity range extends from 5.3 to 38 gph (20 - 144 l/h) and pressures up to 174 psig (12 bar). Stroke length is 0.16 in

Under defined conditions and when installed correctly, the reproducibility of the metering is better than ±2 % at a stroke length of between 30 % and 100 % (instructions in the operating instructions manual must be followed).

In all motor-driven metering pumps without integrated overload protection, for safety reasons, suitable overload protection must be provided during installation. (see page 148 for spare parts)

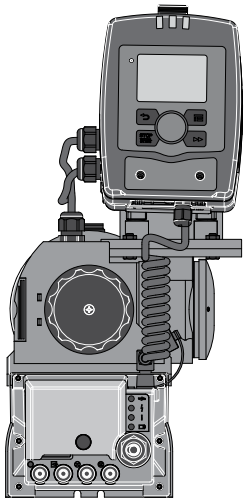


Sigma/ 1 Basic Type (S1Ba)

The Sigma/ 1 basic type is a motor-driven metering pump without internal electronics. Various NEMA 56C frame motors can be used depending upon the application requirements. The Sigma 1 Basic pump is also suitable for use with inverter duty and DC motors for varying flow requirements.

ProMinent® Sigma X: Sigma/1 Motor Diaphragm Metering Pumps

Sigma/ 1 control type (S1Cb)



For optional control via contact or analog signals (e.g. 0/4 - 20 mA) the Sigma control type results in good adaptability, even in fluctuating metering requirements.

The microprocessor control is an optimum combination of speed control and stop & go operation, i.e. it works in a wide control field with customized fine adjustment. Moreover it enables an optimum metering result thanks to the metering behavior of the metering pump being matched to the chemicals or application.

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

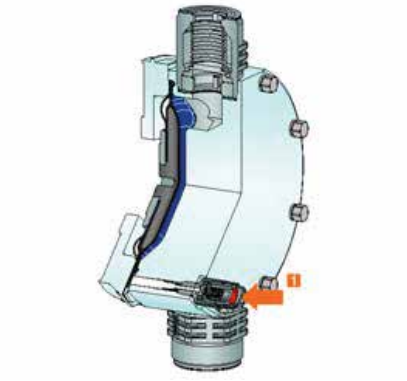
Detachable operating unit (HMI)



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 unauthorized operation of the metering pump or against changing of the pump settings.

The Sigma X features a NEW removable HMI control unit with innovative click-wheel and 4 operating buttons. An illuminated LCD display provides information about the relevant operating status. LEDs on the operating unit and the control unit indicate the active pump functions or the pump status.

Diaphragm rupture warning system



The liquid end has a patented multilayer safety diaphragm as standard and a visual diaphragm rupture indicator.

The diaphragm is coated on both sides with PTFE film. This coating ensures that no leakage to the outside occurs even if the diaphragm ruptures. If the diaphragm ruptures, feed chemical enters between the diaphragm layers and thus triggers a mechanical indication or an alarm via the sensor area. This concept ensures reliable metering - even under critical operating conditions.

ProMinent® Sigma X: Sigma/1 Motor Diaphragm Metering Pumps

Sigma/ 1 control type (S1Cb)

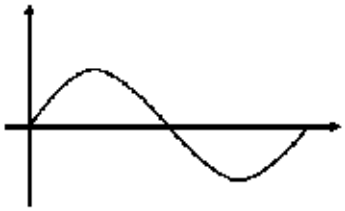


Diagram 1: Discharge stroke, suction stroke equal

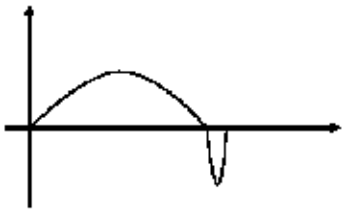


Diagram 2: long discharge stroke, short suction stroke

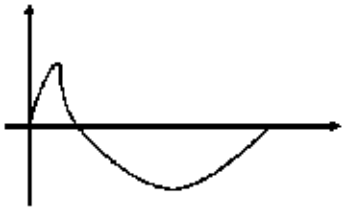


Diagram 3: short discharge stroke, long suction stroke

Metering profiles

Metering profiles ensure optimum metering results, thanks to the metering behavior 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 optimized discharge stroke **(Diagram 2)** or with optimized suction stroke **(Diagram 3)**. Three typical metering profiles are shown schematically with the behavior over time.

In normal operating mode the time behavior for the suction stroke and the discharge stroke is similar **(Diagram 1)**. In the mode with optimized discharge stroke **(Diagram 2)** the discharge stroke is lengthened while the suction stroke is executed as quickly as possible. This setting is, for example, useful for applications that require optimum mixing behavior and optimized chemical mixing.

In the mode with the optimized suction stroke **(Diagram 3)**, 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 minimize the NPSH value.

ProMinent® Sigma X: Sigma/1 Motor Diaphragm Metering Pumps

Specifications (S1Ba and S1Cb)

General:

Maximum stroke length:	0.16” (4.0 mm)		
Power cord:	6 feet (2 m) 2 wire + ground (supplied on control versions)		
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	
	Pressure Relief Valves:	PVDF/Viton® O-rings	SS/Viton® O-rings
Viscosity ranges:	**Liquid end version**	**Max. strokes/min**	**Viscosity (mPas)**
	Standard	180 0-200	
	With valve springs	130	200-500
	With valve springs and suction-side feed	90	500-1000*
	* Only when properly installed & adjusted		
Sound pressure level:	Sound pressure level LpA < 70 dB in accordance with EN ISO 20361:2010-10 at max. stroke length, max. stroke rate, max. back pressure (water)		
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, CSA available (standard in Canada), 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 temp:	Material	Constant (Max. Backpressure)	Short Term (15 min. @ max.30 psi)
	PVDF	149˚F (65˚C)	212˚F (100˚C)
	316 SS	194˚F (90˚C)	248˚F (120˚C)
Diaphragm failure indication:	Visual indicator is mandatory. The delivery unit 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.		
Sigma/1 Basic Version			
Motor:	See available motors in Identcode		

Certified to NSF/ANSI 61

ProMinent® Sigma X: Sigma/1 Motor Diaphragm Metering Pumps

Specifications (S1Ba and S1Cb) Cont.

Sigma/1 Control Version

Control Function:	At stroke frequencies equal to or greater than 33%, the integral AC variable frequency drive continuously varies the motor speed in a linear response to the incoming signal. At stroke frequencies less than 33%, the motor starts and stops according to a control algorithm to provide the desired stroke frequency. In the start-stop mode the motor speed is constant at approximately 580 RPM.
Enclosure rating:	(IP 65)
Pump power requirements:	ph, 115V-230V, 50/60 Hz (internally converted to drive below motor)
Motor data:	Totally enclosed, fan cooled (IP55); class F insulation; IEC frame; 1/8 HP
(0.09 kW) 230 V, 3 phase (0.7 A)	
Relay load	
Fault relay only (option 1):	Contact load: 230 VAC, 8 A, 50/60 Hz
Operating life: > 200,000 switch functions	
Fault and pacing relay Contact load:	max. 24 V, AC/DC, max. 100 mA
(Option 3):	maximum 200,000 switch cycles
Contact closure:	100 ms (for pacing relay)
Analog output signal:	maximum impedance 300 W
Isolated 4-20 mA output signal	
BUS interface options available:	CANopen, PROFIBUS DP
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 + 10%, 50/60 Hz

ProMinent® Sigma X: Sigma/1 S1Cb Motor Diaphragm Metering Pumps

Capacity Data (S1Ba)

Capacity data: Sigma/ 1 Basic Version

Pump version	Capacity at Max. Backpressure				Max. Stroke Rate	Output per Stroke	Max. Suction Lift		Max. Suction Pressure		Suction/ Discharge Connector		Shipping Weight w/Motor (approx.)	
S1Ba H	psig	(bar)	GPH	(L/h)	spm	mL/ stroke	ft	(m)	psig	(bar)	in	(DN)	lbs	(kg)
12017 PVT	145	(10)	5.3	(20.4)	88	3.8	23	(7)	14.5	(1)	1/2 MNPT	(10)	19.8	(9)
12017 SST	174	(12)	5.3	(20.4)	88	3.8	23	(7)	14.5	(1)	3/8 FNPT	(10)	26.5	(12)
12035 PVT	145	(10)	11	(42)	172	4	23	(7)	14.5	(1)	1/2 MNPT	(10)	19.8	(9)
12035 SST	174	(12)	11	(42)	172	4	23	(7)	14.5	(1)	3/8 FNPT	(10)	26.5	(12)
10050 PVT	145	(10)	15.8	(60)	246	4	23	(7)	14.5	(1)	1/2 MNPT	(10)	19.8	(9)
10050 SST	145	(10)	15.8	(60)	246	4	23	(7)	14.5	(1)	3/8 FNPT	(10)	26.5	(12)
10022 PVT	145	(10)	6.9	(26.4)	88	5	19.6	(6)	14.5	(1)	1/2 MNPT	(10)	19.8	(9)
10022 SST	145	(10)	6.9	(26.4)	88	5	19.6	(6)	14.5	(1)	3/8 FNPT	(10)	26.5	(12)
10044 PVT	145	(10)	13.9	(52.8)	172	5.1	19.6	(6)	14.5	(1)	1/2 MNPT	(10)	19.8	(9)
10044 SST	145	(10)	13.9	(52.8)	172	5.1	19.6	(6)	14.5	(1)	3/8 FNPT	(10)	26.5	(12)
07065 PVT	102	(7)	20.6	(78)	246	5.2	19.6	(6)	14.5	(1)	1/2 MNPT	(10)	19.8	(9)
07065 SST	102	(7)	20.6	(78)	246	5.2	19.6	(6)	14.5	(1)	3/8 FNPT	(10)	26.5	(12)
07042 PVT	102	(7)	13.3	(50)	88	9.5	9.8	(3)	14.5	(1)	3/4 MNPT	(15)	21	(9.5)
07042 SST	102	(7)	13.3	(50)	88	9.5	9.8	(3)	14.5	(1)	1/2 FNPT	(15)	29.8	(13.5)
04084 PVT	58	(4)	26.6	(100)	172	9.7	9.8	(3)	14.5	(1)	3/4 MNPT	(15)	21	(9.5)
04084 SST	58	(4)	26.6	(100)	172	9.7	9.8	(3)	14.5	(1)	1/2 FNPT	(15)	29.8	(13.5)
04120 PVT	58	(4)	38	(144)	246	9.7	9.8	(3)	14.5	(1)	3/4 MNPT	(15)	21	(9.5)
04120 SST	58	(4)	38	(144)	246	9.7	9.8	(3)	14.5	(1)	1/2 FNPT	(15)	29.8	(13.5)

Capacity Data (S1Cb)

Capacity data: Sigma/ 1 Control Version

Pump version	Capacity at Max. Backpressure				Max. Stroke Rate	Output per Stroke	Max. Suction Lift		Max. Suction Pressure		Suction/ Discharge Connector		Shipping Weight w/Motor (approx.)	
S1Cb H	psig	(bar)	GPH	(L/h)	spm	mL/ stroke	ft	(m)	psig	(bar)	in	(DN)	lbs	(kg)
12017 PVT	145	(10)	5.5	(21)	90	3.8	23	(7)	14.5	(1)	1/2 MNPT	(10)	19.8	(9)
12017 SST	174	(12)	5.5	(21)	90	3.8	23	(7)	14.5	(1)	3/8 FNPT	(10)	26.5	(12)
12035 PVT	145	(10)	11.1	(42)	170	4	23	(7)	14.5	(1)	1/2 MNPT	(10)	19.8	(9)
12035 SST	174	(12)	11.1	(42)	170	4	23	(7)	14.5	(1)	3/8 FNPT	(10)	26.5	(12)
10050 PVT	145	(10)	12.9	(49)	200	4	23	(7)	14.5	(1)	1/2 MNPT	(10)	19.8	(9)
10050 SST	145	(10)	12.9	(49)	200	4	23	(7)	14.5	(1)	3/8 FNPT	(10)	26.5	(12)
10022 PVT	145	(10)	7.1	(27)	90	5	19.6	(6)	14.5	(1)	1/2 MNPT	(10)	19.8	(9)
10022 SST	145	(10)	7.1	(27)	90	5	19.6	(6)	14.5	(1)	3/8 FNPT	(10)	26.5	(12)
10044 PVT	145	(10)	14	(53)	170	5.1	19.6	(6)	14.5	(1)	1/2 MNPT	(10)	19.8	(9)
10044 SST	145	(10)	14	(53)	170	5.1	19.6	(6)	14.5	(1)	3/8 FNPT	(10)	26.5	(12)
07065 PVT	102	(7)	16.6	(63)	200	5.2	19.6	(6)	14.5	(1)	1/2 MNPT	(10)	19.8	(9)
07065 SST	102	(7)	16.6	(63)	200	5.2	19.6	(6)	14.5	(1)	3/8 FNPT	(10)	26.5	(12)
07042 PVT	102	(7)	13.7	(52)	90	9.5	9.8	(3)	14.5	(1)	3/4 MNPT	(15)	21	(9.5)
07042 SST	102	(7)	13.7	(52)	90	9.5	9.8	(3)	14.5	(1)	1/2 FNPT	(15)	29.8	(13.5)
04084 PVT	58	(4)	26.7	(101)	170	9.7	9.8	(3)	14.5	(1)	3/4 MNPT	(15)	21	(9.5)
04084 SST	58	(4)	26.7	(101)	170	9.7	9.8	(3)	14.5	(1)	1/2 FNPT	(15)	29.8	(13.5)
04120 PVT	58	(4)	30.9	(117)	200	9.7	9.8	(3)	14.5	(1)	3/4 MNPT	(15)	21	(9.5)
04120 SST	58	(4)	30.9	(117)	200	9.7	9.8	(3)	14.5	(1)	1/2 FNPT	(15)	29.8	(13.5)

Materials In Contact With Chemicals

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

ProMinent® Sigma X: Sigma/1 S1Ba Motor Diaphragm Metering Pumps

Identcode Ordering System (S1Ba)

S1Ba	Drive Type:												
	H	Main Drive, Diaphragm											
		Verison Capacity:											
		12017	5.3 gph (20.4 l/h), 145 psi (10 bar)		07065	20.6 gph (78 l/h), 102 psi (7 bar)							
		12035	11 gph (42 l/h), 145 psi (10 bar)		07042	13.3 gph (50 l/h), 102 psi (7 bar)							
		10050	15.8 gph (60 l/h), 145 psi (10 bar)		04084	26.6 gph (100 l/h), 58 psi (4 bar)	**Note: For SS versions see capacity data**						
		10022	6.9 gph (26.4 l/h), 145 psi (10 bar)		04120	38 gph (144 l/h), 58 psi (4 bar)							
		10044	13.9 gph (52.8 l/h), 145 psi (10 bar)										
			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							
						Liquid end version:							
						0	Without valve springs						
						1	With 2 valve springs (Hastelloy C4, 1 psig)						
							Hydraulic connections:						
							7	PVDF clamping nut & insert					
							8	SS clamping nut & insert					
								Logo:					
								0	Standard with logo				
									Electrical Connection (± 10%):				
									S	3 ph, 230 V/400 V, 50/60 Hz			
									M	1 ph, AC, 230 V, 50/60 Hz			
									N	1 ph, AC, 115 V 60 Hz			
									K	90 VDC Permanent magnet			
									3	Without motor, B5			
										Enclosure rating:			
										0	Standard		
											Stroke sensor:		
											0	Without stroke sensor (Standard)	
											2	With Pacing relay (Consult Factory)	
												Stroke length adjustment:	
												0	Manual (Standard)
												4	W/ stroke positioning moto 4-20 mA, 230 V 50/60 Hz
												6	W/ stroke positioning motor 4-20 mA, 115 V 50/60 Hz
S1Ba	**H**	**12017**	**PV**	**T**	**A**	**0**	**7**	**0**	**S**	**0**	**0**	**0**	

ProMinent® Sigma X: Sigma/1 S1Cb Motor Diaphragm Metering Pumps

Identcode Ordering System (S1Cb)

S1Cb — **Drive Type:**

H — Main Drive, Diaphragm

Version: Capacity:

12017	5.5 gph (21 l/h), 145 psi (10 bar)	07065	16.6 gph (63 l/h), 102 psi (7 bar)
12035	11.1 gph (42 l/h), 145 psi (10 bar)	07042	13.2 gph (50 l/h), 102 psi (7 bar)
10050	12.9 gph (49 l/h), 145 psi (10 bar)	04084	26.7 gph (101 l/h), 58 psi (4 bar)
10022	7.1 gph (27 l/h), 145 psi (10 bar)	04120	30.9 gph (117 l/h), 58 psi (4 bar)
10044	14 gph (53 l/h), 145 psi (10 bar)		

Note: For SS versions see capacity data

Liquid end material:

- PV — PVDF
- SS — Stainless Steel

Seal:

- T — PTFE seal

Diaphragm type:

- S — Multi-layer safety diaphragm w/ visual indicator
- A — Multi-layer safety diaphragm w/ pump stop function

Liquid end version:

- 0 — Without valve spring
- 1 — With 2 valve springs

Hydraulic connections:

- 7 — PVDF clamping nut & insert
- 8 — Stainless steel clamping nut & insert

Logo:

- 0 — Standard with logo

Electrical Connection (± 10%):

- U — 100 - 240 V

Cable and plug:

- 8 — Open end 3m UL/CSA 115/230V
- D — North American plug, 115 V
- X — Without cable

Relay:

- 0 — No relay
- 1 — Fault indicating relay
- 3 — Option 1 + pacing relay
- 8 — 4-20 mA output + fault/pacing relay

Control variant:

- 0 — Manual + External with pulse control (mult/div)
- 1 — Manual + External with pulse control & analog
- 6 — *Option 1 + PROFIBUS® (M12 plug)

Over Pressure Shut-off:

- 0 — Without over pressure shut-off

Operating unit (HMI):

- 0 — HMI + 1.64' (0.5m) cable
- 4 — HMI + 6.5' (2.0 m) cable
- 5 — HMI + 16.4' (5.0 m) cable
- 6 — HMI + 32.8' (10.0 m) cable
- X — Without HMI

Access Code:

- 0 — No access code
- 1 — Access code

Language:

- EN — English

Approval:

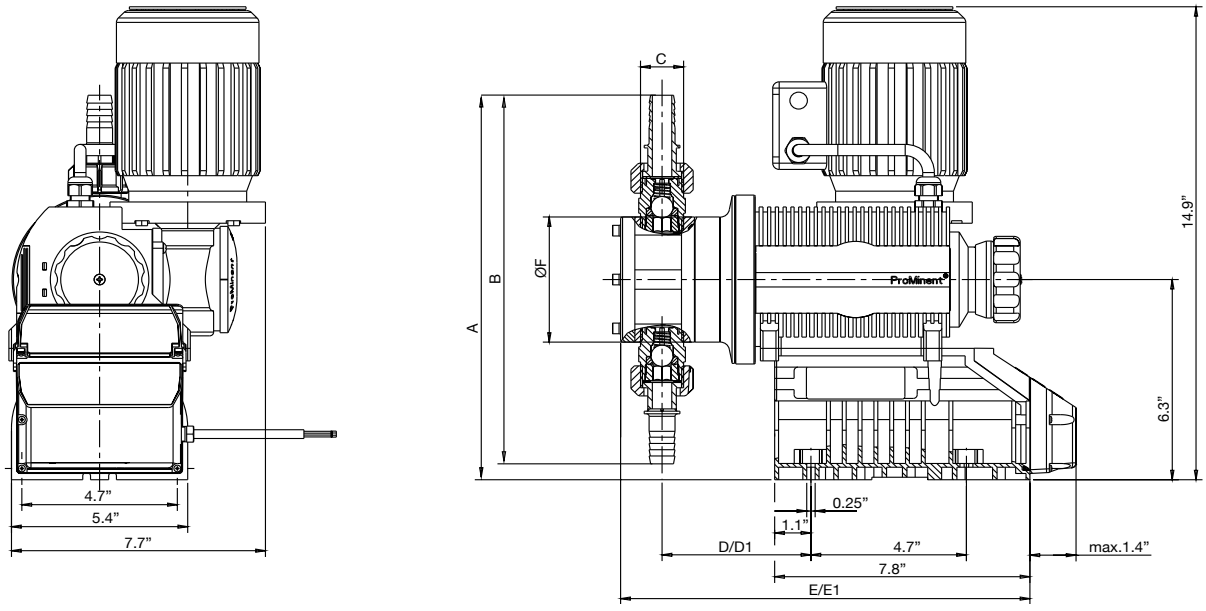
- 01 — CE

S1Cb	H	12017	PV	T	S	0	0	0	U	D	0	0	0	0	S	EN	01	

*With the option PROFIBUS®-DP no relay can be selected

ProMinent® Sigma X: Sigma/1 Motor Diaphragm Metering Pumps

Dimensional Drawing: (S1Ba)



Dimensions in inches (mm)

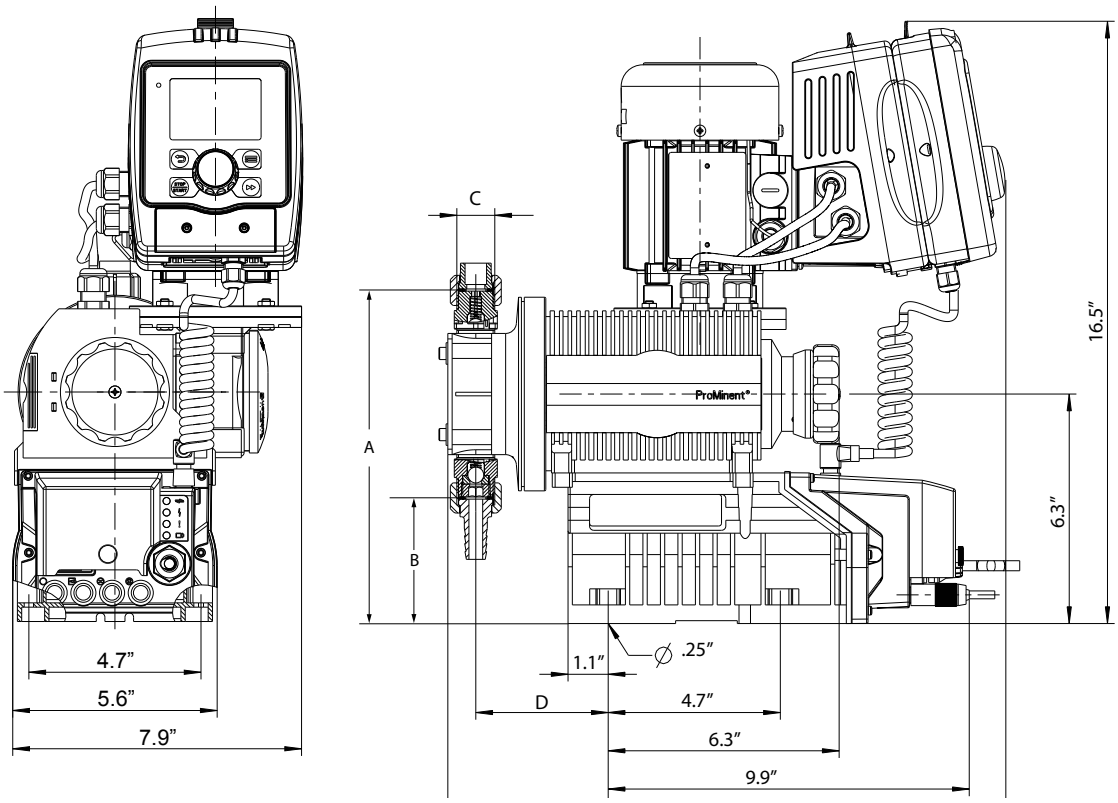
Type Sigma/ 1	A	B	Suction/ Discharge Valve Thread C*	D	D1**	E	E1**	ØF
12017, 12035, 10050, 10022, 10044, 07065								
PVT	11 (279)	9.38 (238)	1/2” MNPT	3.54 (90)	4.33 (110)	10.8 (275)	11.6 (295)	3.8 (96)
SST	9.75 (248)	7.13 (181)	1/2” FNPT	3.5 (89)	4.29 (109)	10.8 (275)	11.6 (295)	3.8 (96)
07042, 04084, 04120								
PVT	11.38 (289)	10 (254)	3/4” MNPT	3.74 (95)	4.52 (115)	11.2 (285)	12 (305)	4.8 (122)
SST	13.3 (337)	13.1 (332)	DN 25	4.5 (115)	5.3 (135)	13.4 (340)	14.2 (360)	5.8 (148)

* Piping adapters provided according to technical data.

** Dimensions with diaphragm failure detector.

ProMinent® Sigma X: Sigma/1 Motor Diaphragm Metering Pumps

Dimensional Drawing: (S1Cb)



Dimensions in inches (mm)

Type Sigma 1	A	B	C*	D	E
12017, 12035, 10050					
PVT	9.2 (234)	3.4 (87)	1/2" (MNPT)	3.7 (93)	4.3 (109)
SS	9.1 (231)	3.5 (89)	3/8" (MNPT)	3.6 (92)	4.3 (109)
10022, 10044, 07065					
PVT	9.2 (234)	3.4 (87)	1/2" (MNPT)	4.6 (117)	4.3 (109)
SS	9.1 (231)	3.5 (89)	3/8" (MNPT)	4.6 (117)	4.3 (109)
07042, 04084, 04120					
PVT	9.6 (243)	3.1 (78)	3/4" MNPT	3.9 (98)	4.7 (119)
SS	9.6 (243)	3.1 (78)	1/2" (MNPT)	3.8 (97)	4.6 (118)

** Suction/ Discharge valve thread*

Piping adapters provided according to technical data

ProMinent® Sigma X: Sigma/2 Motor Diaphragm Metering Pumps

Overview: Sigma/ 2 control type (S2Cb)

The Sigma/2 motor diaphragm metering pumps are produced with a high-strength inner housing for parts subject to load as well as an additional plastic housing to protect against corrosion. The capacity range extends from 14.7 to 111 gph (56 - 420 l/h) and pressures up to 232 psig (16 bar). Stroke length is 0.20 in

Under defined conditions and when installed correctly, the reproducibility of the metering is better than ±2 % at a stroke length of between 30 % and 100 % (instructions in the operating instructions manual must be followed).

In all motor-driven metering pumps without integrated overload protection, for safety reasons, suitable overload protection must be provided during installation. (see page 148 for spare parts)

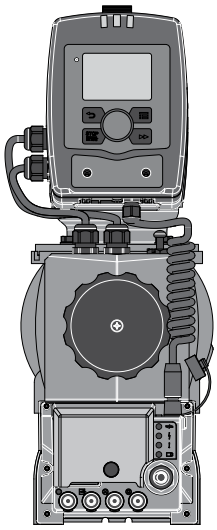


Sigma/ 2 Basic Type (S2Ba)

The Sigma/ 2 basic type is a motor-driven metering pump without internal electronics. Various NEMA 56C frame motors can be used depending upon the application requirements. The Sigma 2 Basic pump is also suitable for use with inverter duty and DC motors for
varying flow requirements.

ProMinent® Sigma X: Sigma/2 Motor Diaphragm Metering Pumps

Sigma/ 2 control type (S2Cb)



For optional control via contact or analog signals (e.g. 0/4 - 20 mA) the Sigma control type results in good adaptability, even in fluctuating metering requirements.

The microprocessor control is an optimum combination of speed control and stop & go operation, i.e. it works in a wide control field with customized fine adjustment. Moreover it enables an optimum metering result thanks to the metering behavior of the metering pump being matched to the chemicals or application.

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

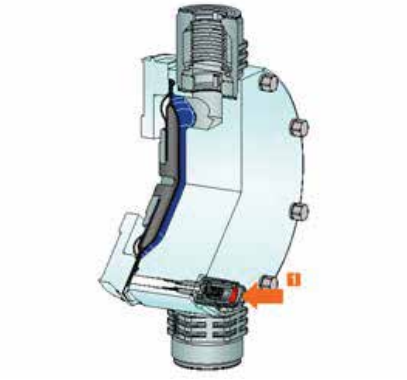
Detachable operating unit (HMI)



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 unauthorized operation of the metering pump or against changing of the pump settings.

The Sigma X features a NEW removable HMI control unit with innovative click-wheel and 4 operating buttons. An illuminated LCD display provides information about the relevant operating status. LEDs on the operating unit and the control unit indicate the active pump functions or the pump status.

Diaphragm rupture warning system



The liquid end has a patented multilayer safety diaphragm as standard and a visual diaphragm rupture indicator.

The diaphragm is coated on both sides with PTFE film. This coating ensures that no leakage to the outside occurs even if the diaphragm ruptures. If the diaphragm ruptures, feed chemical enters between the diaphragm layers and thus triggers a mechanical indication or an alarm via the sensor area. This concept ensures reliable metering - even under critical operating conditions.

ProMinent® Sigma X: Sigma/2 Motor Diaphragm Metering Pumps

Sigma/ 2 control type (S2Cb)

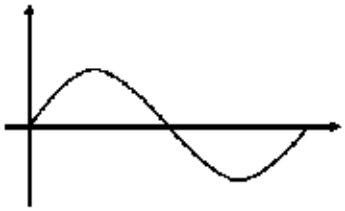


Diagram 1: Discharge stroke, suction stroke equal

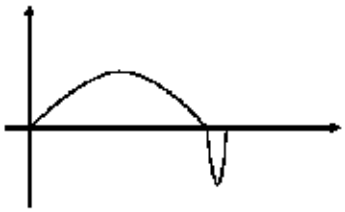


Diagram 2: long discharge stroke, short suction stroke

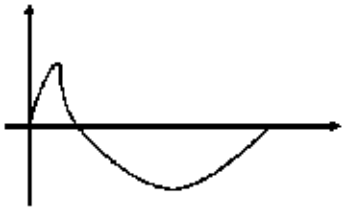


Diagram 3: short discharge stroke, long suction stroke

Metering profiles

Metering profiles ensure optimum metering results, thanks to the metering behavior 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 optimized discharge stroke **(Diagram 2)** or with optimized suction stroke **(Diagram 3)**. Three typical metering profiles are shown schematically with the behavior over time.

In normal operating mode the time behavior for the suction stroke and the discharge stroke is similar **(Diagram 1)**. In the mode with optimized discharge stroke **(Diagram 2)** the discharge stroke is lengthened while the suction stroke is executed as quickly as possible. This setting is, for example, useful for applications that require optimum mixing behavior and optimized chemical mixing.

In the mode with the optimized suction stroke **(Diagram 3)**, 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 minimize the NPSH value.

ProMinent® Sigma X: Sigma/2 Motor Diaphragm Metering Pumps

Specifications (S2Ba and S2Cb)

General:

Maximum stroke length: 0.196” (5.0 mm) HM; 0.6” (15 mm) HK

Power cord: 6 feet (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

Viscosity ranges:

Liquid end version	Max. strokes/min	Viscosity (mPas)
Standard	180	0-200
With valve springs	130	200-500
With valve springs and suction-side feed	90	500-1000*

* Only when properly installed & adjusted

Sound pressure level: Sound pressure level LpA < 70 dB in accordance with EN ISO 20361:2010-10 at max. stroke length, max. stroke rate, max. back pressure (water)

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), NSF/ANSI 61

Certified to NSF/ANSI 61

Sigma 2 Diaphragm:

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 ±2%

Max. fluid operating temperatures:

Material	Constant (Max. Backpressure)	Short Term (15 min. @ max.30 psi)
PVDF	149˚F (65˚C)	212˚F (100˚C)
316 SS	194˚F (90˚C)	248˚F (120˚C)

Diaphragm failure indication: Visual indicator is mandatory. The delivery unit 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 diaphragm failure indication).

Max. solids size in fluid: 0.3 mm

Stroke length adjustment: Manual, in increments of 0.5%. Motorized stroke length adjustment is available.

Sigma 2 Packed Plunger:

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, stainless steel; optional springs (Hastelloy C4).

Repeatability: When used according to the operating instructions, better than ±0.5%

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 X: Sigma/2 Motor Diaphragm Metering Pumps

Specifications (S2Ba and S2Cb) Cont.

Sigma 2 Basic Version

Motor mounting flange:	Fits all NEMA 56C frame motors (motor not included with pump)
Gear ratios and stroke frequencies (with 1725 RPM motor):	20:1 = 87 SPM, 11:1 = 158 SPM, 7.25:1 = 238 SPM
Motor coupling:	Flexible coupling included with pump
Required Motor HP:	1/3 HP (0.25 kW)
Full load RPM:	1750 RPM (60 Hz)
Stroke sensor (optional):	Hall effect - requires 5 VDC

Sigma 2 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 fre quency. In the start-stop mode the motor speed is constant at approximately 580 RPM.
Enclosure rating:	IP 65
Pump power requirements:	1ph, 115V-230V, 50/60 Hz (internally converted to drive below motor)
Motor data:	Totally enclosed, fan cooled (IP55); class F insulation; Manufacturer ATB; 0.25 kW (0.33 HP) 230 3 phase (1.2 A, 1690 rpm)
Relay load *Fault relay only (Option 1):*	Contact load: 250 VAC, 8 A, 50/60 Hz Operating life: > 200,000 switch functions
Fault relay with pacing relay (Option 3):	**Fault Relay** Contact load: 24 V, 8 A, 50/60 Hz Operating life: > 200,000 switch functions **Pacing relay** Residual impedance in ON-position (R_{DSOn}): < 8 Ω Residual current in OFF-position: <1µA Maximum voltage: 24 VDC Maximum current: < 100 mA (for pacing relay) Switch functions: $750x10^6$ Contact closure: 100 ms (for pacing relay)
Air Humidity	Max. air humidity*: 95% rel. humidity * non-condensing
Fuse:	Internal, 6.3 AT - (1.5 kA)
Analog output signal:	Max. impedance 300 Ω Isolated 4-20 mA output signal
Bus interface options available:	CANopen, PROFIBUS DP
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.)
Contact input max. pulse frequency:	25 pulses/sec
Contact input 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
Input power requirements:	single phase, 115-230 VAC

ProMinent® Sigma X: Sigma/2 Motor Diaphragm Metering Pumps

Capacity Data (S2Ba)

Capacity data: Sigma/ 2 Basic Version

Pump Version	Capacity at Max. Backpressure				Max. Stroke Rate	Output per Stroke	Max. Suction Lift		Max. Suction Pressure		Suction/ Discharge Connector		Shipping Weight w/Motor (approx.)	
S2Ba H	psig	(bar)	GPH	(L/h)	spm	mL/stroke	ft	(m)	psig	(bar)	in	(DN)	lbs	(kg)
16050 PVT	145	(10)	15.8	(60)	87	11.4	23	(7)	44	(3)	1/2 MNPT	(15)	33	(15)
16050 SST	232	(16)	14.7	(56)	87	11.4	23	(7)	44	(3)	1/2 FNPT	(15)	44	(20)
16090 PVT	145	(10)	28.0	(106)	158	11.4	23	(7)	44	(3)	3/4 MNPT	(15)	33	(15)
16090 SST	232	(16)	25.9	(98.4)	158	11.4	23	(7)	44	(3)	1/2 FNPT	(15)	44	(20)
16130 PVT	145	(10)	41.2	(156)	238	10.9	23	(7)	44	(3)	3/4 MNPT	(15)	33	(15)
16130 SST	232	(16)	39.0	(148)	238	10.9	23	(7)	44	(3)	1/2 FNPT	(15)	44	(20)
07120 PVT	102	(7)	39.6	(150)	87	27.4	16	(5)	15	(1)	3/4 MNPT	(25)	35	(16)
07120 SST	102	(7)	39.6	(150)	87	27.4	16	(5)	15	(1)	3/4 MNPT	(25)	53	(24)
07220 PVT	102	(7)	69.7	(264)	158	27.4	16	(5)	15	(1)	3/4 MNPT	(25)	35	(16)
07220 SST	102	(7)	69.7	(264)	158	27.4	16	(5)	15	(1)	3/4 MNPT	(25)	53	(24)
04350 PVT	58	(4)	111.0	(420)	238	29.4	16	(5)	15	(1)	1 MNPT	(25)	35	(16)
04350 SST	58	(4)	111.0	(420)	238	29.4	16	(5)	15	(1)	1 MNPT	(25)	53	(24)

Capacity Data (S2Cb)

Capacity data: Sigma/ 2 Control Version

Pump Version	Capacity at Max. Backpressure				Max. Stroke Rate	Output per Stroke	Max. Suction Lift		Max. Suction Pressure		Suction/ Discharge Connector		Shipping Weight w/Motor (approx.)	
S2Cb H	psig	(bar)	GPH	(L/h)	spm	mL/stroke	ft	(m)	psig	(bar)	in	(DN)	lbs	(kg)
16050 PVT	145	(10)	16.1	(61)	90	11.4	23	(7)	29	(2)	1/2 MNPT	(15)	33	(15)
16050 SST	232	(16)	14.7	(56)	90	10.4	23	(7)	29	(2)	1/2 FNPT	(15)	44	(20)
16090 PVT	145	(10)	28.8	(109)	160	11.4	23	(7)	29	(2)	3/4 MNPT	(15)	33	(15)
16090 SST	232	(16)	26.2	(99)	160	10.3	23	(7)	29	(2)	1/2 FNPT	(15)	44	(20)
16130 PVT	145	(10)	34.6	(131)	200	10.9	23	(7)	29	(2)	3/4 MNPT	(15)	33	(15)
16130 SST	232	(16)	34.1	(129)	200	10.9	23	(7)	29	(2)	1/2 FNPT	(15)	44	(20)
07120 PVT	102	(7)	39.6	(150)	90	27.4	16	(5)	15	(1)	3/4 MNPT	(25)	35	(16)
07120 SST	102	(7)	39.6	(150)	90	27.4	16	(5)	15	(1)	3/4 MNPT	(25)	53	(24)
07220 PVT	102	(7)	71.6	(271)	160	27.7	16	(5)	15	(1)	3/4 MNPT	(25)	35	(16)
07220 SST	102	(7)	71.6	(271)	160	27.7	16	(5)	15	(1)	3/4 MNPT	(25)	53	(24)
04350 PVT	58	(4)	93.3	(353)	200	29.4	16	(5)	15	(1)	1 MNPT	(25)	35	(16)
04350 SST	58	(4)	93.3	(353)	200	29.4	16	(5)	15	(1)	1 MNPT	(25)	53	(24)

Materials In Contact With Chemicals

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

ProMinent® Sigma X: Sigma/2 Motor Diaphragm Metering Pumps

Identcode Ordering System (S2Ba)

S2Ba	Drive Type												
	H	Main Drive, Diaphragm											
		Version	Capacity:										
		16050	15.8 gph (60 l/h), 145 psi (10 bar)				07120	39.6 gph (150 l/h), 102 psi (7 bar)					
		16090	28.0 gph (106 l/h), 145 psi (10 bar)				07220	69.7 gph (264 l/h), 102 psi (7 bar)	**Note: For SS versions see capacity data**				
		16130	41.2 gph (156 l/h), 145 psi (10 bar)				04350	111 gph (420 l/h), 58 psi (4 bar)					
			Liquid end material:										
			PV	PVDF									
			SS	316 Stainless Steel									
				Seal:									
				T	PTFE seal								
					Diaphragm type:								
					S	Safety diaphragm w/ visual indicator							
					A	Safety diaphragm w/ pump stop function							
						Liquid end version:							
						0	Without valve springs						
						1	With 2 valve springs (Hastelloy C4, 1 psig)						
							Hydraulic connections:						
							0	No nuts, No inserts					
							7	PVDF clamping nut & insert					
							8	SS clamping nut & insert					
								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)
												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
S2Ba	**H**	**16050**	**PV**	**T**	**S**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	

ProMinent® Sigma X: Sigma/2 Motor Diaphragm Metering Pumps

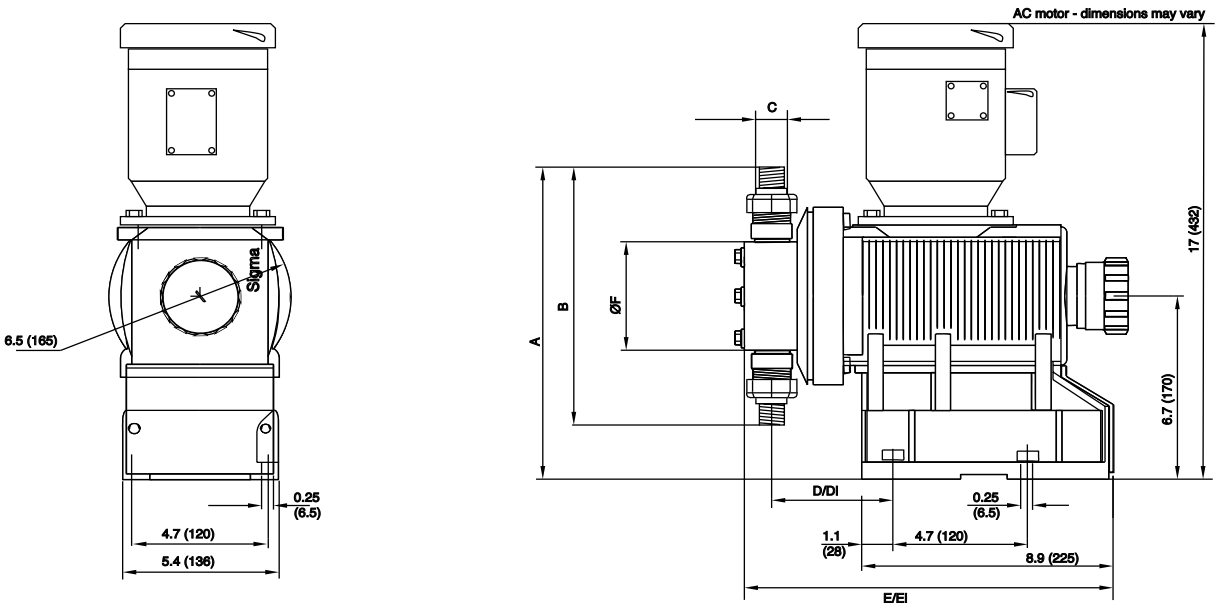
Identcode Ordering System (S2Cb)

S2Cb	Drive Type																	
	H	Main Drive, Diaphragm																
		Version: ' Capacity:																
		16050	16.1 gph (61 l/h), 145 psi (10 bar)				07120	39.6 gph (150 l/h), 102 psi (7 bar)										
		16090	28.8 gph (109 l/h), 145 psi (10 bar)				07220	71.6 gph (271 l/h), 102 psi (7 bar)	**Note: For SS versions see capacity data**									
		16130	34.6 gph (131 l/h), 145 psi (10 bar)				04350	93.3 gph (353 l/h), 58 psi (4 bar)										
			Liquid end material:															
			PV	PVDF														
			SS	Stainless Steel														
				Seal:														
				T	PTFE seals													
					Diaphragm type:													
					S	Multi-layer safety diaphragm w/ visual indicator												
					A	Multi-layer safety diaphragm w/ pump stop function												
						Liquid end version:												
						0	Without valve springs											
						1	With 2 valve springs (hastelloy C4, 1 psig)											
							Hydraulic connections:											
							0	No Nuts, no inserts										
							7	PVDF clamping nut & insert										
							8	Stainless steel clamping nut & insert										
								Logo:										
								0	Standard with ProMinent logo									
									Electrical Connection (± 10%):									
									U	1ph, 115 V - 230 V 50/60Hz								
										Cable and plug:								
										8	Open end 3m UL/CSA 115/230V							
										D	North American plug, 115 V							
										X	Without cable							
											Relay:							
											0	No relay						
											1	Fault indicating relay						
											3	Option 1 + pacing relay						
											8	4-20 mA output + fault/pacing relay						
												Control variant:						
												0	Manual + External with pulse control (mult/div)					
												1	Manual + External with pulse control & analog					
												6	*Option 1 + PROFIBUS® (M12 plug)					
													Over Pressure Shut-off:					
													0	Without over pressure shut-off				
														Operating unit (HMI):				
														0	HMI + 1.64' (0.5) cable			
														4	HMI + 6.5' (2.0 m) cable			
														5	HMI + 16.4' (5.0 m) cable			
														6	HMI + 32.8' (10.0 m) cable			
														X	Without HMI			
															Access Code:			
															0	Without access code		
															1	Access code		
																Language:		
																EN	English	
																	Approval:	
																	01	CE
S2Cb	**H**	**16050**	**PV**	**T**	**S**	**0**	**0**	**0**	**U**	**D**	**0**	**0**	**0**	**0**	**0**	**EN**	**01**	

*With the option PROFIBUS®-DP no relay can be selected

ProMinent® Sigma X: Sigma/2 Motor Diaphragm Metering Pumps

Dimensional Drawing: (S2Ba)



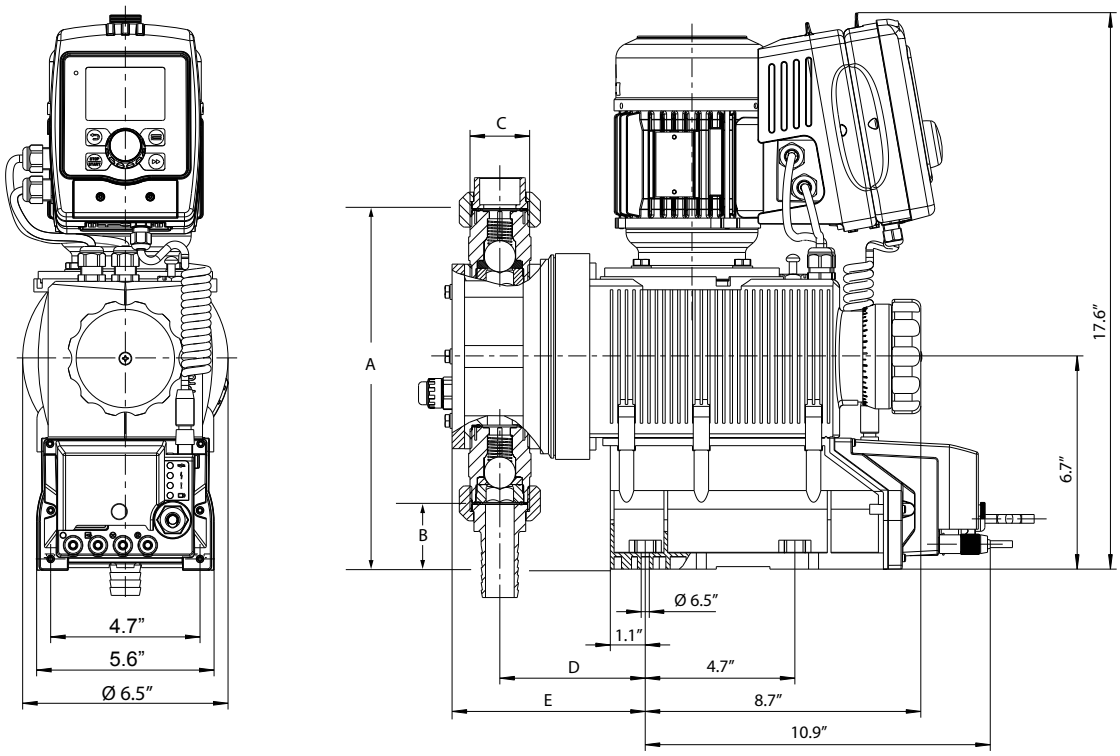
Dimensions in inches (mm)

Type Sigma/ 2	A	B	Suction/ Discharge Valve Thread C*	D	D1**	E	E1**	ØF
16050, 16090, 16130								
PVT	10.1 (257)	6.95 (177)	DN 15	4.1 (104)	4.9 (124)	13.0 (329)	13.7 (349)	4.0 (101)
SST	10.9 (276)	8.2 (208)	DN 15	4.1 (104)	4.9 (124)	13.0 (329)	13.7 (349)	4.0 (101)
07120, 07220								
PVT	13.3 (337)	13.1 (332)	DN 25	4.5 (115)	5.3 (135)	13.4 (340)	14.2 (360)	5.8 (148)
SST	13.3 (337)	13.1 (332)	DN 25	4.5 (115)	5.3 (135)	13.4 (340)	14.2 (360)	5.8 (148)
04350								
PVT	14.3 (362)	14.1 (358)	DN 25	4.5 (115)	5.3 (135)	13.4 (340)	14.2 (360)	5.8 (148)
SST	14.3 (362)	14.1 (358)	DN 25	4.5 (115)	5.3 (135)	13.4 (340)	14.2 (360)	5.8 (148)

* Piping adapters provided according to technical data.

** Dimensions with diaphragm failure detector.

Dimensional Drawing: (S2Cb)



Dimensions in inches (mm)

Type Sigma 2	A	B	C*	D	E
16050, 16090, 16130					
PVT	10.1 (257)	6.95 (177)	DN 15	4.4 (111)	5.7 (144)
SS	10.9 (276)	8.2 (208)	DN 15	4.3 (110)	5.2 (133)
07120, 07220					
PVT	13.3 (337)	2.04 (52)	DN 25	4.6 (117)	6.1 (155)
SS	13.3 (337)	2.08 (53)	DN 25	4.6 (117)	5.8 (147)
04350					
PVT	14.3 (362)	2.04 (52)	DN25	4.6 (117)	6.1 (155)
SS	14.3 (362)	2.08 (53)	DN25	4.6 (117)	5.8 (147)

** Suction/ Discharge valve thread*

Piping adapters provided according to technical data

ProMinent® Sigma/ 2 HK Plunger Metering Pumps

Overview: Sigma/2 HK

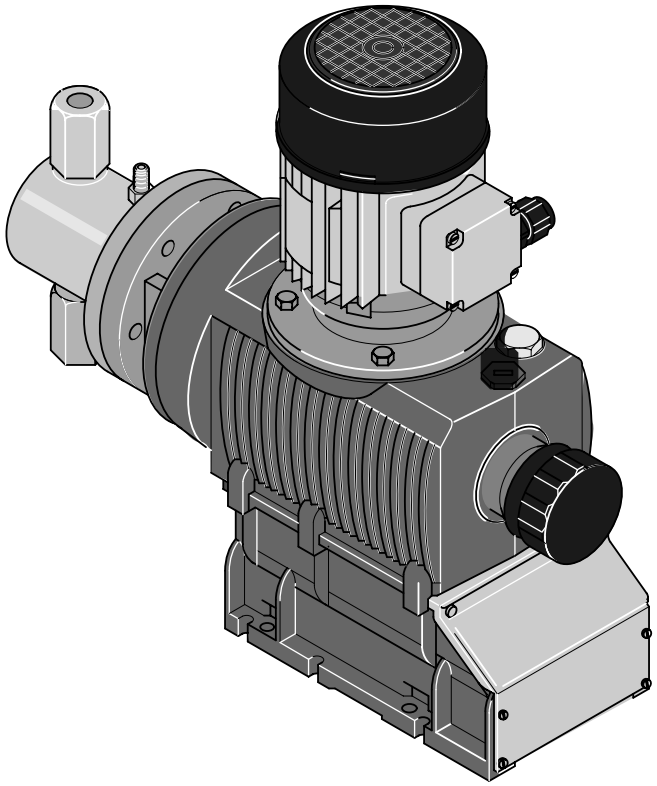
Ideal for high pressure applications requiring significant turndown

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 15.9-111.0 gph (60-420 l/h) at a maximum back pressure of 174-4,640 psi (12-320 bar). The pump capacity is adjusted by varying the stroke length 0.2 in (5 mm) in .2% increments via a self-locking adjusting knob.
The reproducible metering accuracy is better than ±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, three liquid end sizes, two liquid end materials. For safety reasons, all motor-driven metering pumps must be equipped with adequate protection against electrical overload.

Sigma/ 2 HK Basic Type (S2Ba)

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.

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



ProMinent® Sigma/ 2 HK Plunger Metering Pumps

Specifications

General:

Maximum stroke length:	0.6” (15 mm) HK
Stroke frequency control:	S2Ba: Constant speed or optional DC/SCR drive or AC inverter
Materials of construction	
Inner casing:	Cast aluminum
Housing:	Glass-filled Luranyl™ (PPE)
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)
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, stainless steel; optional springs.
Repeatability:	When used according to the operating instructions, better than ±0.5%

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.
Motor mounting flange:	Fits all NEMA 56C frame motors (motor not included with pump)
	Gear ratios and stroke frequencies
(with 1725 RPM motor):	20:1 = 87 SPM, 11:1 = 156 SPM, 7.25:1 = 232 SPM
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

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)		Max. Suction Pressure		Suction/ Discharge Connector	Shipping Weight w/Motor	
Pump Version S2Ba HK	psig	(bar)	U.S. gph	(l/h)	Stroke/ min	ml/ stroke	ft	(m)	psig	(bar)	in MNPT	lbs	(kg)
32002 SST	4640	(320)	0.6	(2.3)	84	0.46	16	(5)	2175	(150)	1/4	53	(24)
23004 SST	3335	(230)	1.2	(4.8)	153	0.52	16	(5)	2175	(150)	1/4	53	(24)
10006 SST	1450	(100)	2.0	(7.6)	233	0.55	16	(5)	2175	(150)	1/4	53	(24)
14006 SST	2030	(140)	1.8	(7.1)	84	1.42	13	(4)	870	(60)	1/4	53	(24)
10011 SST	1450	(100)	3.4	(13.1)	153	1.43	13	(4)	870	(60)	1/4	53	(24)
05016 SST	725	(50)	5.2	(20)	233	1.43	13	(4)	870	(60)	1/4	53	(24)
07012 SST	1015	(70)	3.9	(14.8)	84	2.90	13	(4)	435	(30)	1/4	53	(24)
04522 SST	652	(45)	7.0	(27.6)	153	2.91	13	(4)	435	(30)	1/4	53	(24)
02534 SST	363	(25)	10.7	(40.8)	233	2.92	13	(4)	435	(30)	1/4	53	(24)
04022 SST	580	(40)	7.0	(26.5)	84	5.26	13	(4)	218	(15)	3/8	55	(25)
02541 SST	363	(25)	13.0	(49.2)	153	5.37	13	(4)	218	(15)	3/8	55	(25)
01264 SST	174	(12)	20.1	(76)	233	5.45	13	(4)	218	(15)	3/8	55	(25)

Identcode Ordering System (S2Ba HK)

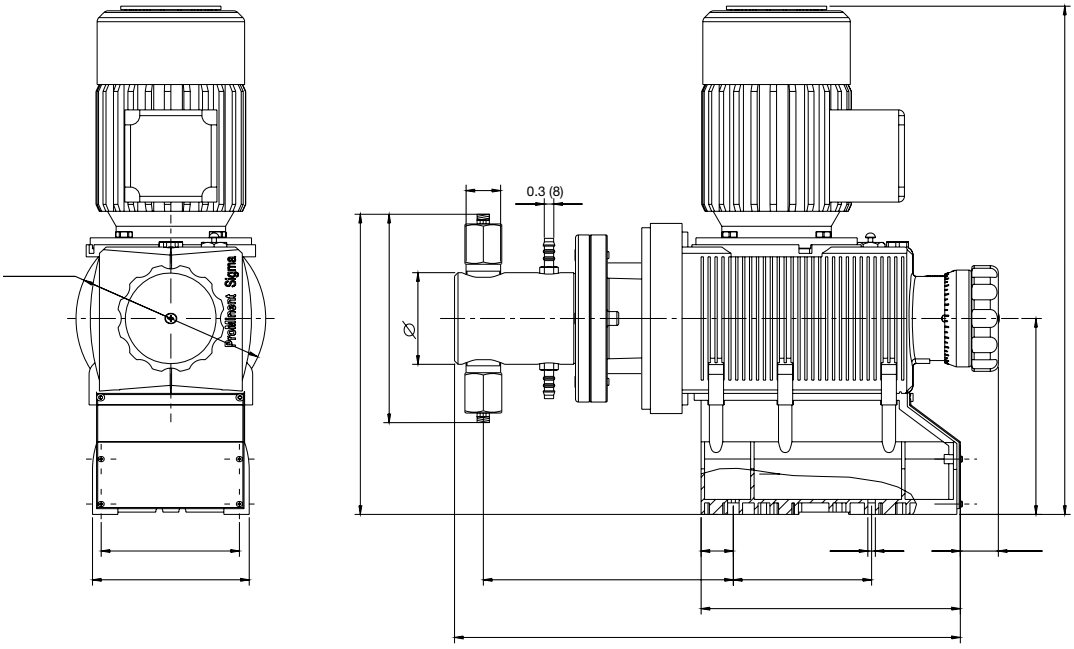
S2Ba	Drive Type												
	HK	Main Drive/Plunger											
		Version: Capacity:											
		32002	0.6 gph (2.3 l/h), 4640 psi (320 bar)				04522	7.0 gph (27.6 l/h), 652 psi (45 bar)					
		14006	1.8 gph (7.1 l/h), 2030 psi (140 bar)				02541	13.0 gph (49.2 l/h), 363 psi (25 bar)					
		07012	3.9 gph (14.8 l/h), 1015 psi (70 bar)				10006	2.0 gph (7.6 l/h), 1450 psi (100 bar)					
		04022	7.0 gph (26.5 l/h), 580 psi (40 bar)				05016	5.2 gph (20 l/h), 725 psi (50 bar)					
		23004	1.2 gph (4.8 l/h), 3335 psi (230 bar)				02534	10.7 gph (40.8 l/h), 363 psi (25 bar)					
		10011	3.4 gph (13.1 l/h), 1450 psi (100 bar)				01264	20.1 gph (76 l/h), 174 psi (12 bar)					
			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)	
											1	With Pacing relay (Consult Factory)	
												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
S2Ba	**HK**	**32002**	**SS**	**T**	**4**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	

ProMinent® Sigma/ 2 HK Plunger Metering Pumps

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

Dimensional Drawing: (S2Ba HK)



The S2Ba HK models offer other motors, and height dimensions may vary.

Dimensions in inches (mm)

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

ProMinent® Sigma X: Sigma/3 Motor Diaphragm Metering Pumps

Overview: Sigma/ 3 (S3Cb)

The Sigma/3 motor diaphragm metering pumps are produced with a high-strength metal inner housing for parts subject to load as well as an additional plastic housing to protect against corrosion. The capacity range extends from 46 to 274.7 gph (174 - 1040 l/h) and pressures up to 174 psig (12 bar). Stroke length is 0.24 in.

Under defined conditions and when installed correctly, the reproducibility of the metering is better than ±2 % at a stroke length of between 30 % and 100 % (instructions in the operating instructions manual must be followed).

In all motor-driven metering pumps without integrated overload protection, for safety reasons, suitable overload protection must be provided during installation. (see page 148 for spare parts)

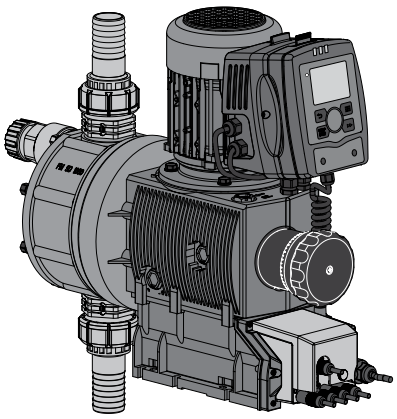


Sigma/ 3 Basic Type (S3Ba)

The Sigma/ 3 basic type is a motor-driven metering pump without internal electronics. Various NEMA 56C frame motors can be used depending upon the application requirements. The Sigma 3 Basic pump is also suitable for use with inverter duty and DC motors for varying flow requirements.

ProMinent® Sigma X: Sigma/3 Motor Diaphragm Metering Pumps

Sigma/ 3 control type (S3Cb)



For optional control via contact or analog signals (e.g. 0/4 - 20 mA) the Sigma control type pump results in good adaptability, even in fluctuating metering requirements.

The microprocessor control is an optimum combination of speed control and stop & go operation, i.e. it works in a wide control field with customized fine adjustment. Moreover it enables an optimum metering result thanks to the metering behavior of the metering pump being matched to the chemicals or application.

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

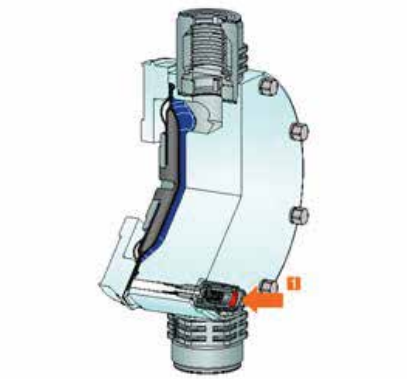
Detachable operating unit (HMI)



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 unauthorized operation of the metering pump or against changing of the pump settings.

The Sigma X features a NEW removable HMI control unit with innovative click-wheel and 4 operating buttons. An illuminated LCD display provides information about the relevant operating status. LEDs on the operating unit and the control unit indicate the active pump functions or the pump status.

Diaphragm rupture warning system



The liquid end has a patented multilayer safety diaphragm as standard and a visual diaphragm rupture indicator.

The diaphragm is coated on both sides with PTFE film. This coating ensures that no leakage to the outside occurs even if the diaphragm ruptures. If the diaphragm ruptures, feed chemical enters between the diaphragm layers and thus triggers a mechanical indication or an alarm via the sensor area. This concept ensures reliable metering - even under critical operating conditions.

ProMinent® Sigma X: Sigma/3 Motor Diaphragm Metering Pumps

Sigma/ 3 control type (S3Cb)

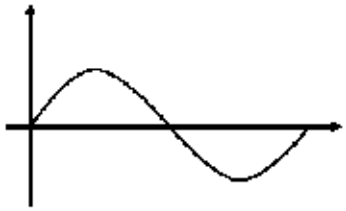


Diagram 1: Discharge stroke, suction stroke equal

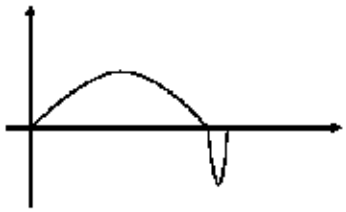


Diagram 2: long discharge stroke, short suction stroke

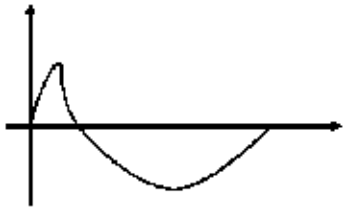


Diagram 3: short discharge stroke, long suction stroke

Metering profiles

Metering profiles ensure optimum metering results, thanks to the metering behavior 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 optimized discharge stroke **(Diagram 2)** or with optimized suction stroke **(Diagram 3)**. Three typical metering profiles are shown schematically with the behavior over time.

In normal operating mode the time behavior for the suction stroke and the discharge stroke is similar **(Diagram 1)**. In the mode with optimized discharge stroke **(Diagram 2)** the discharge stroke is lengthened while the suction stroke is executed as quickly as possible. This setting is, for example, useful for applications that require optimum mixing behavior and optimized chemical mixing.

In the mode with the optimized suction stroke **(Diagram 3)**, 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 minimize the NPSH value.

ProMinent® Sigma X: Sigma/3 Motor Diaphragm Metering Pumps

Specifications (S3Ba and S3Cb)

General:

Maximum stroke length:	0.236" (6.0 mm)
Power cord:	6 foot (2 m) 2 wire + ground (supplied on control version)
Stroke frequency control:	S3Ba: Constant speed or optional DC/SCR drive or AC inverter 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	Hastelloy C	Hastelloy C

Viscosity ranges:

Liquid end version	Max. strokes/min	Viscosity (mPas)
Standard	180	0-200
With valve springs	130	200-500
With valve springs and suction-side feed	90	500-1000*

* Only when properly installed & adjusted

Sound pressure level:	Sound pressure level LpA < 70 dB in accordance with EN ISO 20361:2010-10 at max. stroke length, max. stroke rate, max. back pressure (water)
Drive:	Cam and spring-follower (lost motion)
Lubrication:	Oil lubricated
Recommended oil:	ISO VG 460, such as Mobil Gear Oil 634s
Oil quantity:	Approximately 0.95 quart (900 mL)
Recommended oil change interval:	5,000 hours
Warranty:	Two years on drive, one year on liquid end.
Factory testing:	**Each pump is tested for rated flow at maximum pressure.**
Industry Standard:	CE approved, CSA available (standard in Canada), 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%

Certified to NSF/ANSI 61

Max. fluid operating temperatures:

Material	Constant (Max. Backpressure)	Short Term (15 min. @ max.30 psi)	Minimum temperature
PVDF	149˚F (65˚C)	212˚F (100˚C)	14˚F (-10°C)
316 SS	194˚F (90˚C)	248˚F (120˚C)	14˚F (-10°C)

Diaphragm failure indication:	Visual indicator is mandatory. The delivery unit 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 0.5%. Motorized stroke length adjustment available.

ProMinent® Sigma X: Sigma/3 Motor Diaphragm Metering Pumps

Specifications (S3Ba and S3Cb) Cont.

Basic Version

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

Control Version

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 fre quency. In the start-stop mode the motor speed is constant at approximately 580 RPM.
Enclosure rating:	IP 65
Pump power requirements:	1ph, 115V-230V, 50/60 Hz (internally converted to drive below motor)
Motor data:	Totally enclosed, fan cooled (IP55); class F insulation; Manufacturer ATB; 0.55 kW (0.75 HP) 230 3 phase (2.5 A, 1710 rpm)
Relay load *Fault relay only (Option 1):*	Contact load: 250 VAC, 8 A, 50/60 Hz Operating life: > 200,000 switch functions
Fault relay with pacing relay (Option 3):	**Fault Relay** Contact load: 24 V, 100 mA, 50/60 Hz Operating life: > 200,000 switch functions **Pacing relay** Residual impedance in ON-position (R_{DSOn}): < 8 Ω Residual current in OFF-position: <1µA Maximum voltage: 24 VDC Maximum current: < 100 mA (for pacing relay) Switch functions: $750x10^6$ Contact closure: 100 ms (for pacing relay)
Air Humidity	Max. air humidity*: 95% rel. humidity * non-condensing
Fuse:	Internal, 6.3 AT - (1.5 kA)
Analog output signal:	Max. impedance 300 Ω Isolated 4-20 mA output signal
Bus interface options available:	CANopen, PROFIBUS DP
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.)
Contact input max. pulse frequency:	25 pulses/sec
Contact input 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
Input power requirements:	single phase, 115-230 VAC

ProMinent® Sigma X: Sigma/3 Motor Diaphragm Metering Pumps

Capacity Data (S3Ba)

Capacity data: Sigma/ 3 Basic Version

Pump Version S3Ba H	Capacity at Max. Backpressure psig	(bar)	GPH	(L/h)	Max. Stroke Rate spm	Output per Stroke mL/stroke	Max. Suction Lift (water) ft	(m)	Max. Suction Pressure psig	(bar)	Suction/ Discharge Connector in	(DN)	Shipping Weight w/Motor (approx.) lbs	(kg)
120145 PVT	145	(10)	45.9	(174)	86	33.7	16	(5)	29	(2)	1 MNPT	(25)	49	(22)
120145 SST	174	(12)	45.9	(174)	86	33.7	16	(5)	29	(2)	1 MNPT	(25)	57	(26)
120190 PVT	145	(10)	66.3	(251)	124	33.7	16	(5)	29	(2)	1 MNPT	(25)	49	(22)
120190 SST	174	(12)	66.3	(251)	124	33.7	16	(5)	29	(2)	1 MNPT	(25)	57	(26)
120270 PVT	145	(10)	92.7	(351)	173	33.8	16	(5)	29	(2)	1 MNPT	(25)	49	(22)
120270 SST	174	(12)	92.7	(351)	173	33.8	16	(5)	29	(2)	1 MNPT	(25)	57	(26)
070410 PVT	102	(7)	129.9	(492)	86	95.1	13	(4)	14.5	(1)	1-1/2 MNPT	(32)	53	(24)
070410 SST	102	(7)	129.9	(492)	86	95.1	13	(4)	14.5	(1)	1-1/2 MNPT	(32)	64	(29)
070580 PVT	102	(7)	183.8	(696)	124	95.1	13	(4)	14.5	(1)	1-1/2 MNPT	(32)	53	(24)
070580 SST	102	(7)	183.8	(696)	124	95.1	13	(4)	14.5	(1)	1-1/2 MNPT	(32)	64	(29)
040830 PVT	58	(4)	264.1	(1000)	173	95.1	10	(3)	14.5	(1)	1-1/2 MNPT	(32)	53	(24)
040830 SST	58	(4)	264.1	(1000)	173	95.1	10	(3)	14.5	(1)	1-1/2 MNPT	(32)	64	(29)

Capacity Data (S3Cb)

Capacity data: Sigma/ 3 Control Version

Pump Version S3Cb H	Capacity at Max. Backpressure psig	(bar)	GPH	(L/h)	Max. Stroke Rate spm	Output per Stroke mL/stroke	Max. Suction Lift (water) ft	(m)	Max. Suction Pressure psig	(bar)	Suction/ Discharge Connector in	(DN)	Shipping Weight w/Motor (approx.) lbs	(kg)
120145 PVT	145	(10)	48.1	(182)	90	33.7	16	(5)	29	(2)	1 MNPT	(25)	49	(22)
120145 SST	174	(12)	48.1	(182)	90	33.7	16	(5)	29	(2)	1 MNPT	(25)	57	(26)
120190 PVT	145	(10)	64.2	(243)	120	33.7	16	(5)	29	(2)	1 MNPT	(25)	49	(22)
120190 SST	174	(12)	64.2	(243)	120	33.7	16	(5)	29	(2)	1 MNPT	(25)	57	(26)
120270 PVT	145	(10)	96.4	(365)	180	33.8	16	(5)	29	(2)	1 MNPT	(25)	49	(22)
120270 SST	174	(12)	96.4	(365)	180	33.8	16	(5)	29	(2)	1 MNPT	(25)	57	(26)
070410 PVT	100	(7)	132.1	(500)	90	95.1	13	(4)	14.5	(1)	1-1/2 MNPT	(32)	53	(24)
070410 SST	100	(7)	132.1	(500)	90	95.1	13	(4)	14.5	(1)	1-1/2 MNPT	(32)	64	(29)
070580 PVT	100	(7)	177	(670)	120	95.1	13	(4)	14.5	(1)	1-1/2 MNPT	(32)	53	(24)
070580 SST	100	(7)	177	(670)	120	95.1	13	(4)	14.5	(1)	1-1/2 MNPT	(32)	64	(29)
040830 PVT	58	(4)	274.7	(1040)	180	95.1	10	(3)	14.5	(1)	1-1/2 MNPT	(32)	53	(24)
040830 SST	58	(4)	274.7	(1040)	180	95.1	10	(3)	14.5	(1)	1-1/2 MNPT	(32)	64	(29)

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 (Polyvinylidenefluoride)	PTFE	Glass	PTFE	PTFE	Ceramic/ Hast. C + CTFE**	PTFE
SST	Stainless steel	PTFE	Stainless steel	PTFE	PTFE	Stainless steel	PTFE

ProMinent® Sigma X: Sigma/3 Motor Diaphragm Metering Pumps

Identcode Ordering System (S3Ba)

S3Ba	Drive Type											
	H	Main Drive, Diaphragm										
		Version: Capacity:										
		120145	45.9 gph (174 l/h), 145 psi (10 bar)									
		120190	66.3 gph (251 l/h), 145 psi (10 bar)									
		120270	92.7 gph (351 l/h), 145 psi (10 bar)									
		070410	129.9 gph (492 l/h), 100 psi (7 bar)									
		070580	183.8 gph (696 l/h), 100 psi (7 bar)									
		040830	264.1 gph (1000 l/h), 58 psi (4 bar)									
		Note: For SS versions see capacity data										
			Liquid end material:									
			PV	PVDF								
			SS	316 Stainless Steel								
				Seal:								
				T	PTFE							
					Diaphragm type:							
					S	Safety diaphragm w/ visual indicator						
					A	Safety diaphragm w/ pump stop fuction						
						Liquid end version:						
						0	Without valve springs					
						1	With 2 valve springs (Hastelloy C4, 1 psig)					
							Hydraulic connections:					
							7	PVDF clamping nut & insert				
							8	SS clamping nut & insert				
								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)
											2	With Pacing relay (Consult Factory)
												Stroke length adjustment:
												0 Manual (Standard)
												4 W/ stroke positioning motor 4-20 mA, 230 V 50/60 Hz
												6 W/ stroke positioning motor 4-20 mA, 115 V 50/60 Hz
S3Ba	**H**	**120145**	**PV**	**T**	**S**	**0**	**7**	**0**	**2**	**0**	**0**	**0**

ProMinent® Sigma X: Sigma/3 Motor Diaphragm Metering Pumps

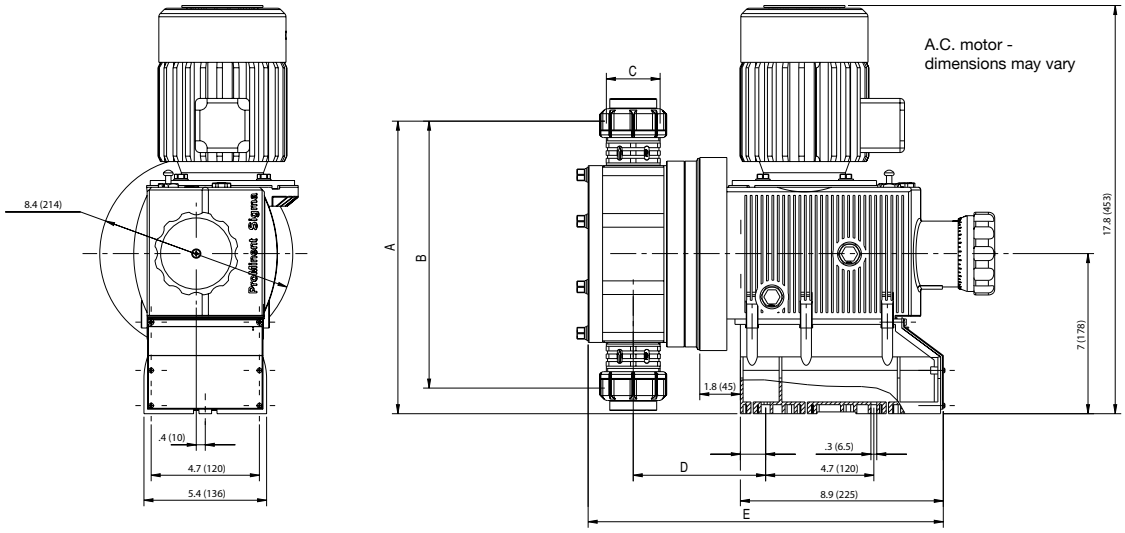
Identcode Ordering System (S3Cb)

S3Cb	Drive Type																
	H	Main Drive, Diaphragm															
		Version:	**Capacity:**														
		120145	48.1 gph (182 l/h), 145 psi (10 bar)					070410	132.1 gph (500 l/h), 100 psi (7 bar)								
		120190	64.2 gph (243 l/h), 145 psi (10 bar)					070580	177 gph (670 l/h), 100 psi (7 bar)	**Note: For SS versions see capacity data**							
		120270	96.4 gph (365 l/h), 145 psi (10 bar)					040830	274.7 gph (1040 l/h), 58 psi (4 bar)								
			Liquid end material:														
			PV	PVDF max. 145 psi (10 bar)													
			SS	Stainless Steel													
				Seal:													
				T	PVDF with PTFE/Viton® seal												
					Diaphragm type:												
					S	Multi-layer safety diaphragm w/ visual indicator											
					A	Multi-layer safety diaphragm w/ pump stop function											
						Liquid end version:											
						0	Without valve springs										
						1	With 2 valve springs (Hastelloy C4, 1 psig)										
							Hydraulic connections:										
							0	Standard connection									
							7	PVDF clamping nut & insert									
							8	Stainless steel clamping nut & insert									
								Logo:									
								0	Standard with ProMinent logo								
									Electrical Connection (± 10%):								
									U	1ph, 115 V - 230 V 50/60Hz							
										Cable and plug:							
										8	Open end 3m UL/CSA 115/230V						
										D	North American plug, 115 V						
										X	Without cable						
											Relay:						
											0	Without relay					
											1	Fault annunciating relay					
											3	Option 1 + Pacing Relay					
											8	Option 3 + 4-20 mA output					
												Control variant:					
												0	Manual + External with pulse control (mult/div)				
												1	Manual + External with pulse control & analog				
												6	*Option 1 + PROFIBUS® (M12 Plug)				
												7	Option 1 + CANopen				
													Over Pressure Shut-off:				
													0	Without over pressure shut-off			
														Operating unit (HMI):			
														0	HMI + 1.64' (0.5m) cable		
														4	HMI + 6.5' (2.0 m) cable		
														5	HMI + 16.4' (5.0 m) cable		
														6	HMI + 32.8' (10.0 m) cable		
														X	Without HMI		
															Access Code:		
															0	Without access code	
															1	Access code	
																Language:	
																EN	English
																	Approval:
																	01 CE
S3Cb	**H**	**120145**	**PV**	**T**	**S**	**0**	**0**	**0**	**U**	**D**	**0**	**0**	**0**	**0**	**0**	**EN**	**01**

*With the option PROFIBUS®-DP no relay can be selected

ProMinent® Sigma X: Sigma/3 Motor Diaphragm Metering Pumps

Dimensional Drawing: (S3Ba)



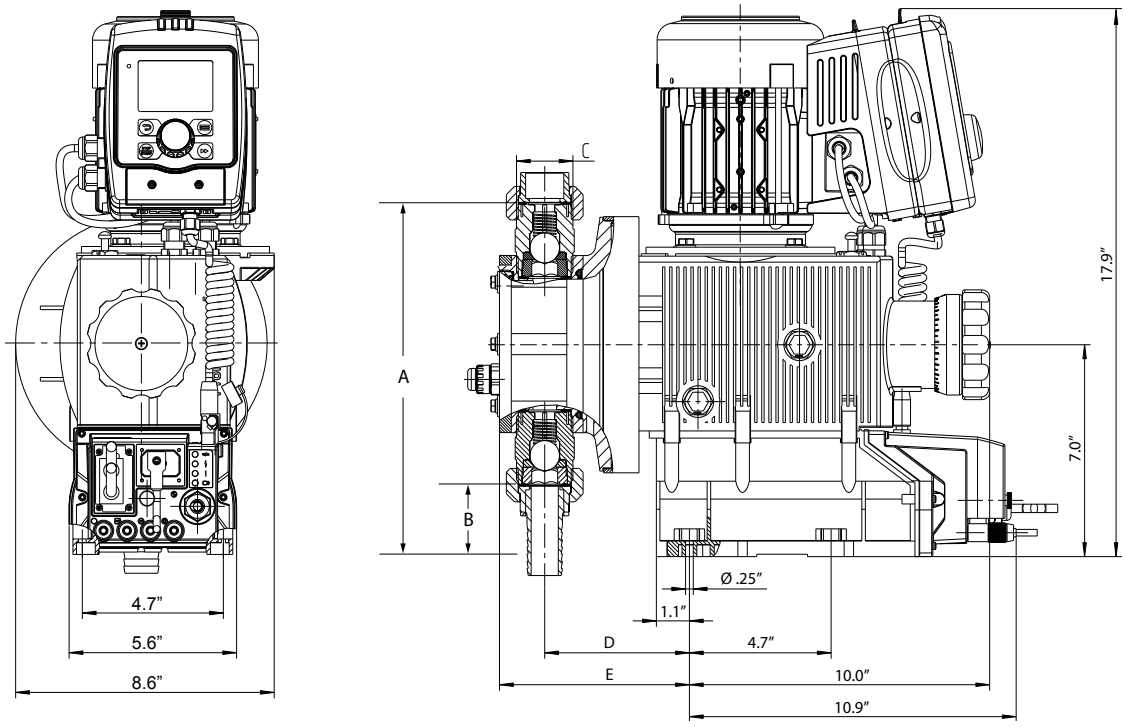
Dimensions in inches (mm)

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

* Piping adapters provided according to technical data.
** Dimensions with diaphragm failure detector.

ProMinent® Sigma X: Sigma/3 Motor Diaphragm Metering Pumps

Dimensional Drawing: (S3Cb)



Dimensions in inches (mm)

Type Sigma 3	A	B	C*	D	E
121045, 120190, 120270					
PVT	10.1 (257)	6.95 (177)	DN 15	4.4 (111)	5.7 (144)
SS	10.9 (276)	8.2 (208)	DN 15	4.3 (110)	5.2 (133)
070410, 070580, 040830					
PVT	13.3 (337)	13.1 (332)	DN 25	4.6 (117)	6.1 (155)
SS	13.3 (337)	13.1 (332)	DN 25	4.6 (117)	5.8 (147)

** Suction/ Discharge valve thread*

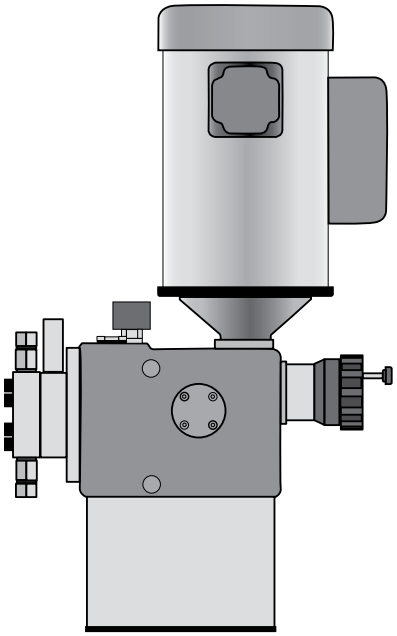
Piping adapters provided according to technical data

ProMinent® ProMus Hydraulic Diaphragm Metering Pumps

Overview: ProMus

High pressure chemical process metering

(see page 149 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 plun¬ger (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 18 spm
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 temp:	constant: 195 F (90 C) short term 250 F (120 C)
Max solids size : to suction inlet	0.3mm; if larger than this provisions must be made to remove them prior
Max viscosity:	200 mPas
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: used to protect system	Integrated pressure relief to protect pump. External pressure relief must be
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

ProMinent® ProMus Hydraulic Diaphragm Metering Pumps

Capacity Data

Capacity Data: ProMus

		Capacity at Max. Backpressure 60 Hz (1750 rpm)							Max. Stroke Rate	Capacity at Max. Backpressure 50 Hz (1458 rpm)				Typical suct./dis. Connection	
Plunger	(in.)	psig (PVDF)	Bar (PVDF)	psig (SS2)	Bar (SS2)	GPH	(L/h)	Gear Ratio	Stroke/ min.	GPH	(L/h)	Stroke/ min.	Bar (SS2)	FNPT/ BSP (SS2)	MNPT/ BSP (PVDF)
Size 17	3/8"	230	16	3500	241	0.2	(0.87)	100	18	~	~	~	~	~	~
	3/8"	230	16	3500	241	0.61	(2.3)	50	35	~	~	~	~	~	~
	3/8"	230	16	3500	241	0.76	(2.8)	40	43	0.63	2.45	36	241	1/4	1/4
	3/8"	230	16	3500	241	1.02	(3.8)	30	58	0.85	3.29	48	241	1/4	1/4
	3/8"	230	16	3500	241	2.03	(7.6)	15	115	1.69	6.56	96	241	1/4	1/4
	3/8"	230	16	3500	241	2.44	(9.2)	12.5	138	2.03	7.88	115	241	1/4	1/4
	7/16"	230	16	3500	241	0.83	(3.1)	50	35	~	~	~	~	~	~
	7/16"	230	16	3500	241	1.04	(3.9)	40	43	0.87	3.36	36	241	1/4	1/4
	7/16"	230	16	3500	241	1.38	(5.2)	30	58	1.15	4.46	48	241	1/4	1/4
	7/16"	230	16	3500	241	2.77	(10.4)	15	115	2.31	8.94	96	241	1/4	1/4
	7/16"	230	16	3500	241	3.32	(12.5)	12.5	138	2.77	10.72	115	241	1/4	1/4
Size 30	5/8"	230	16	2080	143	1.8	(6.8)	50	35	~	~	~	~	~	~
	5/8"	230	16	2080	143	2.2	(8.5)	40	43	1.87	7.26	36	143	1/4*	1/2
	5/8"	230	16	2080	143	3.0	(11.3)	30	58	2.50	9.68	48	143	1/4*	1/2
	5/8"	230	16	2080	143	6.0	(22.7)	15	115	5.00	19.37	96	143	1/4*	1/2
	5/8"	230	16	2080	143	7.2	(27.2)	12.5	138	6.00	23.24	115	143	1/4*	1/2
	13/16"	230	16	1230	85	3.0	(11.5)	50	35	~	~	~	~	~	~
	13/16"	230	16	1230	85	3.8	(14.3)	40	43	3.17	12.27	36	85	3/8	1/2
	13/16"	230	16	1230	85	5.1	(19.1)	30	58	4.22	16.37	48	85	3/8	1/2
	13/16"	230	16	1230	85	10.1	(38.2)	15	115	8.45	32.73	96	85	3/8	1/2
	13/16"	230	16	1230	85	12.2	(46.1)	12.5	138	10.14	39.28	115	85	3/8	1/2
	1-1/8"	230	16	640	44	6.3	(24.0)	50	35	~	~	~	~	~	~
	1-1/8"	230	16	640	44	7.9	(30.0)	40	43	6.61	25.61	36	44	3/8	1/2
	1-1/8"	230	16	640	44	10.6	(40.1)	30	58	8.81	34.14	48	44	3/8	1/2
	1-1/8"	230	16	640	44	21.1	(79.8)	15	115	17.62	68.29	96	44	3/8	1/2
	1-1/8"	230	16	640	44	25.4	(96.1)	12.5	138	21.15	81.95	115	44	3/8	1/2
Size 40	1-3/4"	230	16	265	18	15.4	(58.2)	50	35	~	~	~	~	~	~
	1-3/4"	230	16	265	18	19.2	(72.6)	40	43	15.99	61.97	36	18	3/4	3/4
	1-3/4"	230	16	265	18	25.6	(96.9)	30	58	21.32	82.62	48	18	3/4	3/4
	1-3/4"	230	16	265	18	51.2	(193.8)	15	115	42.64	165.24	96	18	3/4	3/4
	1-3/4"	230	16	265	18	61.4	(232.4)	12.5	138	51.17	198.29	115	18	3/4	3/4
	2"	200	14	200	14	20.1	(76.0)	50	35	~	~	~	~	~	~
	2"	200	14	200	14	25.1	(95.0)	40	43	20.89	80.94	36	14	3/4	3/4
	2"	200	14	200	14	33.4	(126.4)	30	58	27.85	107.91	48	14	3/4	3/4
	2"	200	14	200	14	66.8	(252.8)	15	115	55.70	215.83	96	14	3/4	3/4
	2"	200	14	200	14	80.2	(303.5)	12.5	138	66.84	258.99	115	14	3/4	3/4
	2-1/4"	160	11	160	11	25.4	(96.1)	50	35	~	~	~	~	~	~
	2-1/4"	160	11	160	11	31.7	(119.9)	40	43	26.43	102.43	36	11	3/4	3/4
	2-1/4"	160	11	160	11	42.3	(160.1)	30	58	35.25	136.58	48	11	3/4	3/4
	2-1/4"	160	11	160	11	84.6	(327.8)	15	115	70.49	273.16	96	11	3/4	3/4
	2-1/4"	160	11	160	11	101.5	(384.2)	12.5	138	84.59	327.79	115	11	3/4	3/4

~ Not available for 50 Hz operation

* ProMus30ASS2 Identity Code have a 1/4" FNPT outlet and a 3/8" FNPT Inlet

Materials In Contact With Chemicals

Liquid end materials in contact with media

Material	Pump head	Suction/Pressure 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

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 liquied 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)						
		SS3	316 St. steel Single inlet, Double outlet (Rcmd. for Flooded suction w/ discharge pressure above 500 psi)						
		PVT	PVDF/PTFE size 17 Double inlet & outlet; sizes 30/40 Single inlet & outlet						
			Connectors:						
			0	NPT					
			1	BSP taper					
			7	MNPT PVDF Standard (PVT LE only)					
				Gear ratio:					
				1	12.5:1 56C				
				2	15:1 56C				
				3	30:1 56C				
				4	40:1 56C				
				5	50:1 56C				
				6	12.5:1 IEC (IEC 71 with B5 flange)				
				7	15:1 IEC (IEC 71 with B5 flange)				
				8	30:1 IEC (IEC 71 with B5 flange)				
				9	40:1 IEC (IEC 71 with B5 flange)				
				10	50:1 56C IEC (IEC 71 with B5 flange)				
				11	100:1 (17A 3/8 plunger only) 56C				
					Motor:				
					X	No motor included			
					D	Standard motor (1/2 HP, 115V, single phase, TEFC, NEMA 56C			
						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**	**1**	**X**	**0**	**1**	**A**	**0**

ProMinent® ProMus Hydraulic Diaphragm Metering Pumps

Data Requirements To Size a ProMus Pump

Complete this data sheet and fax it to ProMinent Pittsburgh at (412) 787-0704 for a review of the system hydraulics and recommendations on pump and accessory specifications.

Desired capacity min./max.	GPH (l/h) _____
Available power supply	_____ V, _____ Hz, _____ phase
Working temperature min./max.	°F (°C _____
Description of process fluid	_____
Concentration %	_____
Solids content %	_____
Absolute viscosity, cP	_____
Vapor pressure at working temperature	psig (bar) _____
Remarks (e.g. abrasive, developing	_____
gases and fumes, flammable, corrosive)	_____
Suction conditions:	
Suction lift min./max., or	ft. (m) _____
Positive suction head min./max., or	ft. (m) _____
Pressure in chemical tank	psig (bar) _____
Length of suction line	ft. (m) _____
Size (I.D.) of suction line	in. (mm) _____
Number of valves and fittings in suction line	_____
Discharge conditions:	
Back-pressure min./max.	psig (bar) _____
Discharge head min./max.	ft. (m) _____
Negative discharge head min./max. ft. (m)	_____
Length of discharge line	ft. (m) _____
Size (I.D.) of discharge line	in. (mm) _____
Number of valves and fittings in discharge line	_____

ProMinent® Hydro/ 2 API 675 Hydraulic Diaphragm Metering Pumps

Overview: Hydro/ 2 API 675 (HA2a)

For flexible metering with excellent process reliability in the medium pressure range.
Capacity range of single pump: 1.85 - 24.0 gph; 145.0 - 1450.4 psi

As the new member of the Hydro product range, the hydraulic diaphragm metering pump Hydro/ 2 API 675 (HA2a) meets the requirements of API 675. The pumps stand out on account of their full-motion drive and automatic bleeding. There are a variety of drives, including some for use in areas at risk from explosion.

Your benefits:

Excellent process safety and reliability:

- PTFE multi-layer diaphragm with integral diaphragm rupture warning system
- Integral hydraulic relief valve
- Metering reproducibility is better than ± 1% within the 20-100% stroke volume range under defined conditions and with proper installation

Excellent flexibility:

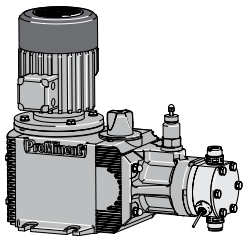
- The modular construction with single and double head versions permits a wide range of applications, with the double head designs being operated in push-pull mode
- It is possible to combine up to 5 metering units, even with different pump capacities, in multiple pump systems
- 5 different gear ratios are available

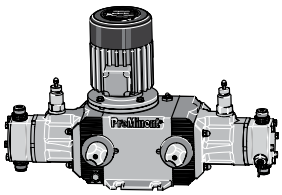
Technical Details:

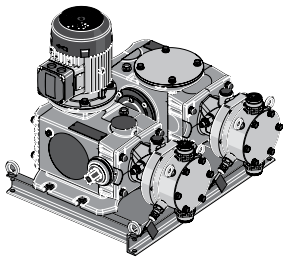
- Stroke length: 15 mm, Rod force: 2,000 N
- Stroke volume adjustment range: 0 – 100%
- Stroke volume adjustment: manually by scaled rotary dial (optionally with electric actuator or control drive)
- Metering reproducibility is better than ± 1% in the 20 to 100% stroke volume range under defined conditions and with correct installation
- PTFE multi-layer diaphragm with electric diaphragm rupture warning system via a contact
- Integrated hydraulic relief and bleed valve
- Wetted materials: PVDF, PTFE+25% carbon, stainless steel 1.4571, Hastelloy C.
- A wide range of power end versions is available: three-phase standard or 1-phase AC motor, motors for use in Exe and Exde areas, different flange designs for use in customer-specific motors
- Degree of protection: IP 55, ISO Class F
- Design in compliance with API 675 among others

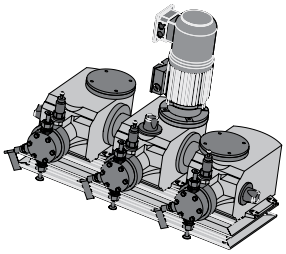
Field of application:

- Oil and gas industry
- Volume-proportional metering of chemicals/additives in the treatment of boiler feed water
- Metering of reactants and catalysts in the chemical industry
- Level-dependent metering of auxiliary agents in industrial production engineering, for instance hot wax metering in the production of adhesive strips


Hydro pump


Hydro double head pump


Hydro externally mounted pump


Hydro triplex pump

ProMinent® Hydro/ 2 API 675 Hydraulic Diaphragm Metering Pumps

Capacity Data: (HA2a)

Capacity data[1]: Hydro/ 2 API 675 (HA2a)											
Plunger Max.	Pressure	Max. Pump capacity in gph at strokes/Min (60 Hz)				Theor. Stroke volume	Suction Lift	Connection on suction/ discharge side		Shipping Weight w/Motor (approx.)	
		Stroke frequency									
⌀	psig	72	149	180	224	mL/ stroke	ft	PVDF*	SST	lbs	(kg)
16	1,450	–	–	2.6 - 2.6	3.2 - 3.4	3.0	9.8	1/2" MNPT	SS flange 1/2" / ANSI - DN 10	68.3	(31)
16	928	–	2.6 - 3.0	3.2 - 4.1	3.8 - 5.1	3.0	9.8	1/2" MNPT	SS flange 1/2" / ANSI - DN 10	68.3	(31)
16	580	–	3.2 - 4.1	3.8 - 4.9	4.3 - 6.1	3.0	9.8	1/2" MNPT	SS flange 1/2" / ANSI - DN 10	68.3	(31)
16	363	–	3.8 - 4.5	4.4 - 5.5	5.4 - 7.1	3.0	9.8	1/2" MNPT	SS flange 1/2" / ANSI - DN 10	68.3	(31)
16	145	2.2 - 2.4	4.1 - 5.1	4.7 - 6.1	5.7 - 7.7	3.0	9.8	1/2" MNPT	SS flange 1/2" / ANSI - DN 10	68.3	(31)
18	928	–	3.8 - 4.9	5.8 - 5.8	7.7 - 7.7	3.8	9.8	1/2" MNPT	SS flange 1/2" / ANSI - DN 10	68.3	(31)
18	580	2.2 - 2.5	4.1 - 5.8	6.7 - 6.7	8.2 - 9.0	3.8	9.8	1/2" MNPT	SS flange 1/2" / ANSI - DN 10	68.3	(31)
18	363	2.5 - 2.8	5.1 - 6.1	7.3 - 7.7	8.2 - 9.6	3.8	9.8	1/2" MNPT	SS flange 1/2" / ANSI - DN 10	68.3	(31)
18	145	2.4 - 3.2	5.1 - 6.7	7.3 - 8.3	9.1 - 10.6	3.8	9.8	1/2" MNPT	SS flange 1/2" / ANSI - DN 10	68.3	(31)
22	580	2.2 - 2.4	6.3 - 7.9	8.6 - 9.0	11.6 - 13.3	5.7	9.8	1/2" MNPT	SS flange 1/2" / ANSI - DN 10	68.3	(31)
22	362	2.2 - 2.6	6.3 - 7.9	7.9 - 10.6	11.1 - 13.7	5.7	9.8	1/2" MNPT	SS flange 1/2" / ANSI - DN 10	68.3	(31)
22	145	2.5 - 3.2	5.3 - 9.0	9.5 - 14.8	11.6 - 13.3	5.7	9.8	1/2" MNPT	SS flange 1/2" / ANSI - DN 10	68.3	(31)
26	363	6.3 - 6.9	11.1 - 15.3	12.7 - 18.6	20.6 - 22.7	7.9	9.8	1/2" MNPT	SS flange 1/2" / ANSI - DN 10	68.3	(31)
26	145	6.3 - 7.4	9.5 - 16.0	11.1 - 19.3	12.7 - 24.0	7.9	9.8	1/2" MNPT	SS flange 1/2" / ANSI - DN 10	68.3	(31)

1- SPECIFIC FLOW RATE AND PRESSURE MUST BE PROVIDED UPON ORDER

* Liquid end PVDF version Max. 363 psi (25 bar)

The permitted design of the rate flow is possible in the stated range with pump selection in accordance with API 675 (adjustment range 1:10).

Example: Considering plunger 16 mm, pressure 25 bar (363 psi) and stroke rate 180 stroke/min gives (4.4) – 5.5 gph; the adjustment range of 1:10 is met for a flow rate between 4.4 and 5.5 gph.

Materials In Contact With Chemicals

Material	Dosing Head	Suction/ pressure connection	Seals/ ball seat	Balls
SST	Stainless steel 1.457/1.4404	Stainless stell 1.4581	PTFE/ZrO_2 (DN 15 - stainless steal 1.4404	Ceramic
PVT*	PVDF (polyvinylidene fluoride)	PVDF (polyvinylidene fluoride)	PTFE/ PTFE	Ceramic
HCT	Hastelloy C	Hastelloy C	PTFE/ Hastelloy C	Ceramic
TTT	PTFE + 25% carbon	PVDF (polyvinylidene fluoride)	PTFE/ PTFE	Ceramic

Spare Parts: (HA2a)

Plunger ⌀	Pressure	Connection suction / discharge side		Allocated to Type HP2a	Spare Diaphragm S1, P1	Spare Diaphragm H1	Spare Part Set S1	Spare Part Set P1	Spare Part Set H1
							See below for content	See below for content	See below for content
mm	psi (bar)	PVDF	SST	Type / Liquid end					
16	1450.0 (100)	1/2" MNPT	SS flange 1/2" / ANSI - DN 10*	Type 100..../FMH 25	1005545	1006481	1029260	1005548	1009571
16	928.2 (64)	1/2" MNPT	SS flange 1/2" / ANSI - DN 10*	Type 100..../FMH 25	1005545	1006481	1029260	1005548	1009571
16	580.1 (40)	1/2" MNPT	SS flange 1/2" / ANSI - DN 10*	Type 100..../FMH 25	1005545	1006481	1029260	1005548	1009571
16	363.0 (25)	1/2" MNPT	SS flange 1/2" / ANSI - DN 10*	Type 100..../FMH 25	1005545	1006481	1029260	1005548	1009571
16	145.0 (10)	1/2" MNPT	SS flange 1/2" / ANSI - DN 10*	Type 100..../FMH 25	1005545	1006481	1029260	1005548	1009571
18	928.2 (64)	1/2" MNPT	SS flange 1/2" / ANSI - DN 10	Type 064.../FMH 25	1005545	1006481	1005549	1005548	1009571
18	580.1 (40)	1/2" MNPT	SS flange 1/2" / ANSI - DN 10	Type 064.../FMH 25	1005545	1006481	1005549	1005548	1009571
18	363.0 (25)	1/2" MNPT	SS flange 1/2" / ANSI - DN 10	Type 064.../FMH 25	1005545	1006481	1005549	1005548	1009571
18	145.0 (10)	1/2" MNPT	SS flange 1/2" / ANSI - DN 10	Type 064.../FMH 25	1005545	1006481	1005549	1005548	1009571
22	580.1 (40)	1/2" MNPT	SS flange 1/2" / ANSI - DN 10	/ FMH 60	1005546	1006482	1005553	1005552	1009573
22	363.0 (25)	1/2" MNPT	SS flange 1/2" / ANSI - DN 10	/ FMH 60	1005546	1006482	1005553	1005552	1009573
22	145.0 (10)	1/2" MNPT	SS flange 1/2" / ANSI - DN 10	/ FMH 60	1005546	1006482	1005553	1005552	1009573
26	363.0 (25)	1/2" MNPT	SS flange 1/2" / ANSI - DN 10	Type 025... /FMH 60	1005546	1006482	1005553	1005552	1009573
26	145.0 (10)	1/2" MNPT	SS flange 1/2" / ANSI - DN 10	Type 025... /FMH 60	1005546	1006482	1005553	1005552	1009573

**Version SST with double ball valve, valve connector on suction-pressure with female thread Rp 1/4 and external thread G 3/4 - DN 10*

Spare part set includes:

S1/H1 1 spare diaphragm cpl., 1 set of seals, 2 vavle balls, (4 valve balls for version with double ball valves)

P1 1 spare diaphragm cpl., 1 suction valve cpl, 1 discharge valve cpl., 2 valve balls, 1 set of seals

ProMinent® Hydro/ 2 API 675 Hydraulic Diaphragm Metering Pumps

Identcode: (HA2a)

HA2a

Drive:

V	Simplex (vertical)	T	Triplex
D	Simplex double head		
U	Duplex		

Plunger:

016	Plunger D 16	026	Plunger D 26
018	Plunger D 18		
022	Plunger D 22		

Stroke frequency 60 Hz - Operation:

072	72 Strokes/min; 60 Hz	180	180 Strokes/min 60 hz
149	140 Strokes/min; 60 Hz	214	214 Strokes/min 60 Hz

Pressure stage:

A	145 psi (10 bar)	H	928.2 psi (64 bar)
D	362.6 psi (25 bar)	J	1450.3 psi (100 bar)
E	580.2 psi (40 bar)		

Material:

S1	Standard stainless steel; PTFE	T1	PTFE + Carbon; PTFE
H1	Hastelloy C; PTFE		
P1	PVDF; PTFE		

Valve design:

0	Without valve springs/ for plunger D=16 SST and HCT double ball valves
1	With valve springs/ for plunger D=16 SST and HCT double ball valves

Diaphragm rupture signal:

0	Standard	2	Visual indicator
1	Without		

Hydraulic connection:

0	Standard
F	Flange ANSI

Electrical power supply:

4	no motor, w/motor flange NEMA 56 C
0	Add on drive

Stroke length adjustment:

0	Standard stroke length adjustment
C	Stroke control motor 0-20 mA; 115 V; 60 Hz
D	Stroke control motor 4-20 mA; 115 V; 60 Hz

Temperature:

0	-4 °F - 104 °F / -4 °F - 194 °F (SS;HC) 122 °F (PTFE) 140 °F (PVDF)
1	14 °F - 122 °F / -4 °F - 194 °F (SS;HC) 122 °F (PTFE) 140 °F (PVDF)
2	-13 °F - 104 °F / -13 °F - 194 °F (SS;HC) 122 °F (PTFE) 149 °F (PVDF)

Paint:

0P	C3 Standard textured paint - RAL 2003	3P	C5 Offshore - RAL 2003
1P	C3 Standard gloss paint - RAL 2003		
2P	C4 Outdoor - RAL 2003		

Testing:

S1	Standard performance test	A2	API cpl. Test + NPSH/NPIP
S2	Standard performance test + 3.1 Certificate		
A1	API cpl. Test		

Certification:

0	CE	3	CE + EAC + ATEX
1	CE + ATEX		
2	CE + EAC		

Documentation:

EN	English

Units:

0	bar, l/h
1	psi, gph
2	kPa, l/h

HA2a	V	016	072	A	S1	0	0	0	4	0	0	0P	S1	0	EN	1

ProMinent® Hydro/ 3 API 675 Hydraulic Diaphragm Metering Pumps

Overview: Hydro/ 3 API 675 (HA3a)

For flexible metering with excellent process reliability in the medium pressure range.
Capacity range of single pump: 3.96 – 53.0 gph, 145 – 1450.4 psi

The hydraulic diaphragm metering pump Hydro/ 3 API 675 (HA3e) meets the requirements of API 675, among other things due to its full-motion drive and automatic bleeding. Some of the many drive options are also approved for use in areas at risk from explosion.

Your benefits:

Excellent process safety and reliability:

- PTFE multi-layer diaphragm with integral diaphragm rupture warning system
- Integral hydraulic relief valve
- Metering reproducibility is better than ± 1% within the 20-100% stroke volume range under defined conditions and with proper installation

Excellent flexibility:

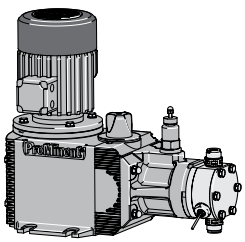
- The modular construction with single and double head versions permits a wide range of applications, with the double head designs being operated in push-pull mode
- It is possible to combine up to 5 metering units, even with different pump capacities, in multiple pump systems
- 5 different gear ratios are available
- Customized designs are available on request

Technical Details:

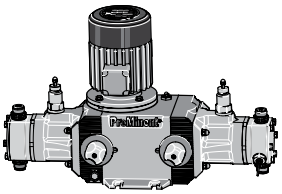
- Stroke length: 15 mm, Rod force: 4,200 N
- Stroke volume adjustment range: 0 – 100%
- Stroke volume adjustment: manually by scaled rotary dial (optionally with electric actuator or control drive)
- Metering reproducibility is better than ± 1% in the 20 – 100% stroke volume range under defined conditions and with correct installation
- PTFE multi-layer diaphragm with electrical diaphragm rupture warning system via a contact
- Integrated hydraulic relief and bleed valve
- Wetted materials: PVDF, PTFE+25% carbon, stainless steel 1.4571, Hastelloy C.
- A wide range of power end versions is available: three-phase standard or 1-phase AC motor, motors for use in Exe and Exde areas, different flange designs for use in customer-specific motors
- Degree of protection: IP 55 (standard) ISO Class F
- Design in compliance with API 675 among others

Field of application:

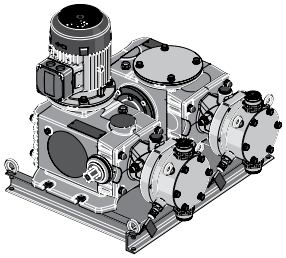
- Oil and gas industry.
- Volume-proportional metering of chemicals/additives in the treatment of boiler feed water
- Metering of reactants and catalysts in the chemical industry
- Level-dependent metering of auxiliary agents in industrial production engineering, for instance hot wax metering in the production of adhesive strips



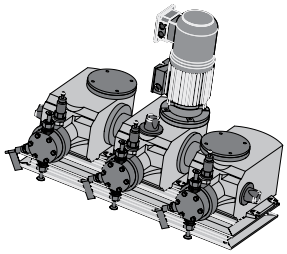
Hydro pump



Hydro double head pump



Hydro externally mounted pump



Hydro triplex pump

ProMinent® Hydro/ 3 API 675 Hydraulic Diaphragm Metering Pumps

Capacity Data: Hydro/ 3 API 675 (HA3a)

Capacity data[1]: Hydro/ 3 API 675 (HA3a)											
Plunger Max.	Pressure	Max. Pump capacity in gph at strokes/Min (60 Hz) Stroke frequency				Theor. Stroke volume	Suction Lift	Connection on suction/ discharge side		Shipping Weight (approx.)	
⌀	psig	72	149	180	224	mL/ stroke	ft	PVDF*	SST	lbs	(kg)
26	928	5.7 - 5.9	11.1 - 13.6	12.7 - 16.2	17.4 - 19.8	7.9	9.8	1/2" MNPT	SS flange 1/2" / ANSI - DN 15	90.4	(41)
26	580	5.7 - 6.6	11.6 - 14.3	12.7 - 17.4	15.8 - 22.4	7.9	9.8	1/2" MNPT	SS flange 1/2" / ANSI - DN 15	90.4	(41)
26	363	4.7 - 6.6	9.5 - 15.6	12.7 - 18.6	17.4 - 23.4	7.9	9.8	1/2" MNPT	SS flange 1/2" / ANSI - DN 15	90.4	(41)
26	145	4.7 - 6.9	9.5 - 15.6	11.1 - 19.3	15.8 - 24.3	7.9	9.8	1/2" MNPT	SS flange 1/2" / ANSI - DN 15	90.4	(41)
32	580	7.9 - 8.0	15.9 - 20.7	22.2 - 25.4	20.6 - 32.0	12.0	9.8	1/2" MNPT	SS flange 1/2" / ANSI - DN 15	90.4	(41)
32	363	7.9 - 8.3	15.9 - 21.7	20.6 - 26.3	20.6 - 33.3	12.0	9.8	1/2" MNPT	SS flange 1/2" / ANSI - DN 15	90.4	(41)
32	145	7.0 - 9.9	15.9 - 23.2	22.3 - 28.5	19.0 - 35.5	12.0	9.8	1/2" MNPT	SS flange 1/2" / ANSI - DN 15	90.4	(41)
38	174	7.9 - 16.0	22.2 - 34.6	25.4 - 39.9	47.5 - 52.3	17.0	9.8	1/2" MNPT	SS flange 1/2" / ANSI - DN 15	90.4	(41)
38	145	9.5 - 16.2	25.4 - 34.9	28.5 - 42.8	47.5 - 53.1	17.0	9.8	1/2" MNPT	SS flange 1/2" / ANSI - DN 15	90.4	(41)

1- SPECIFIC FLOW RATE AND PRESSURE MUST BE PROVIDED UPON ORDER

* Liquid end PVDF version Max. 363 psi (25 bar)

The permitted design of the rate flow is possible in the stated range with pump selection in accordance with API 675 (adjustment range 1:10).

Example: Considering plunger 16 mm, pressure 25 bar (363 psi) and stroke rate 180 stroke/min gives (4.4) – 5.5 gph; the adjustment range of 1:10 is met for a flow rate between 4.4 and 5.5 gph.

Materials In Contact With Chemicals

Material	Dosing Head	Suction/ pressure connection	Seals/ ball seat	Balls
SST	Stainless steel 1.457/1.4404	Stainless stell 1.4581	PTFE/stainless steal 1.4404	Ceramic
PVT*	PVDF (polyvinylidene fluoride)	PVDF (polyvinylidene fluoride)	PTFE/ PTFE	Ceramic
HCT	Hastelloy C	Hastelloy C	PTFE/ Hastelloy C	Ceramic
TTT	PTFE + 25% carbon	PVDF (polyvinylidene fluoride)	PTFE/ PTFE	Ceramic

Spare Parts: Hydro/ 3 (HA3a)

Plunger ⌀	Pressure	Connection suction / discharge side		Allocated to Type HP2a	Spare Diaphragm S1, P1	Spare Diaphragm H1	Spare Part Set S1 See below for content	Spare Part Set P1 See below for content	Spare Part Set H1 See below for content
mm	psi (bar)	PVDF	SST	Type / Liquid end					
26	928.2 (64)	1/2" MNPT	SS flange 1/2" / ANSI -DN 15	Type 064.../FMH 25	1005545	1006481	1005549	1005548	1009571
26	580.1 (40)	1/2" MNPT	SS flange 1/2" / ANSI -DN 15	Type 064.../FMH 25	1005545	1006481	1005549	1005548	1009571
26	363.0 (25)	1/2" MNPT	SS flange 1/2" / ANSI -DN 15	Type 064.../FMH 25	1005545	1006481	1005549	1005548	1009571
26	145.0 (10)	1/2" MNPT	SS flange 1/2" / ANSI -DN 15	Type 064.../FMH 25	1005545	1006481	1005549	1005548	1009571
32	580.1 (40)	3/4" MNPT	SS flange 1/2" / ANSI -DN 15	/ FMH 60	1005546	1006482	1005553	1005552	1009573
32	363.0 (25)	3/4" MNPT	SS flange 1/2" / ANSI -DN 15	/ FMH 60	1005546	1006482	1005553	1005552	1009573
32	145.0 (10)	3/4" MNPT	SS flange 1/2" / ANSI -DN 15	/ FMH 60	1005546	1006482	1005553	1005552	1009573
38	363.0 (25)	3/4" MNPT	SS flange 1/2" / ANSI -DN 15	Type 025... /FMH 60	1005546	1006482	1005553	1005552	1009573
38	145.0 (10)	3/4" MNPT	SS flange 1/2" / ANSI -DN 15	Type 025... /FMH 60	1005546	1006482	1005553	1005552	1009573

**Version SST with double ball valve, valve connector on suction-pressure with female thread Rp 1/4 and external thread G 3/4 - DN 10*

Spare part set includes:

S1/H1 1 spare diaphragm cpl., 1 set of seals, 2 vavle balls, (4 valve balls for version with double ball valves)

P1 1 spare diaphragm cpl., 1 suction valve cpl, 1 discharge valve cpl., 2 valve balls, 1 set of seals

ProMinent® Hydro/ 3 API 675 Hydraulic Diaphragm Metering Pumps

Identcode: Hydro/ 3 (HA3a)

HA3a **Drive Type**

V	Simplex (vertical)	T	Triplex
D	Simplex double head		
U	Duplex		

Plunger:

022	Plunger D 22	038	Plunger D 38
026	Plunger D 26		
032	Plunger D 32		

Stroke frequency 60 Hz - Operation:

072	72 Strokes/min; 60 Hz	180	180 Strokes/min 60 hz
149	140 Strokes/min; 60 Hz	214	214 Strokes/min 60 Hz

Pressure range:

A	145 psi (10 bar)	H	928.2 psi (64 bar)
D	362.6 psi (25 bar)	J	1450.3 psi (100 bar)
E	580.2 psi (40 bar)		

Material:

S1	Standard stainless steel; PTFE	T1	PTFE + Carbon; PTFE
H1	Hastelloy C; PTFE		
P1	PVDF; PTFE		

Valve design:

0	Without valve springs/ for plunger D=16 SST and HCT double ball va
1	With valve springs/ for plunger D=16 SST and HCT double ball valve

Diaphragm rupture signal:

0	Standard	2	Visual indicator
1	Without		

Hydraulic connection:

0	Standard
F	Flange ANSI

Electrical power supply:

4	no motor, w/motor flange NEMA 56 C
0	Add on drive

Stroke length adjustment:

0	Standard stroke length adjustment
C	Stroke control motor 0-20 mA; 115 V; 60 Hz
D	Stroke control motor 4-20 mA; 115 V; 60 Hz

Temperature:

0	-4 °F - 104 °F / -4 °F - 194 °F (SS;HC) 122 °F (PTFE) 140 °F (PVDF)
1	14 °F - 122 °F / -4 °F - 194 °F (SS;HC) 122 °F (PTFE) 140 °F (PVDF)
2	-13 °F - 104 °F / -13 °F - 194 °F (SS;HC) 122 °F (PTFE) 149 °F (PVDF)

Paint:

0P	C3 Standard textured paint - RAL 2003	3P	C5 Offshore - RAL 2003
1P	C3 Standard gloss paint - RAL 2003		
2P	C4 Outdoor - RAL 2003		

Testing:

S1	Standard performance test	A2	API cpl. Test + NPSH/NPIP
S2	Standard performance test + 3.1 Certificate		
A1	API cpl. Test + NPSH/NPIP		

Certification:

0	CE	3	CE + EAC + ATEX
1	CE + ATEX		
2	CE + EAC		

Documentation:

EN	English

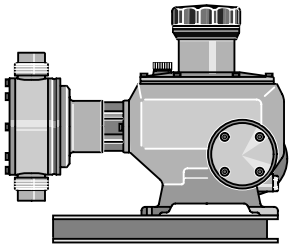
Units:

0	bar, l/h
1	psi, gph
2	kPa, l/h

HA3a	V	022	072	A	S1	0	0	0	4	0	0	0P	S1	0	EN	1

ProMinent® Makro TZ Diaphragm Metering Pumps

Overview: Makro TZ

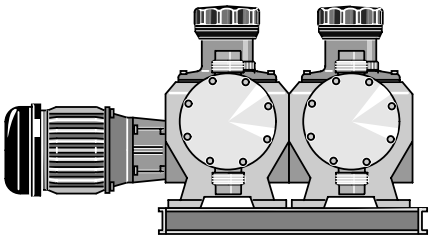


Ideal for high volume and high pressure applications

(see page 150 for spare parts)

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

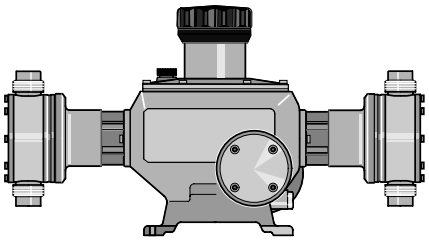
The stroke length can be adjusted by means of the shift ring mechanism from 0-10 mm (TZMb), with 0.5 % accuracy. The 5-speed gearbox is encased in a cast, seawater resistant, acrylic resin lacquered housing. Liquid ends are available in different material combinations to suit differing applications. 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. (You must follow the instructions 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 (TZMb)

TZMb	Drive Type:												
	H	Main Drive											
		Pump Type:											
		120260	82 gph, 174 psi			070720	228 gph, 100 psi						
		120340	108 gph, 174 psi			070860	272 gph, 100 psi						
		120430	136 gph, 174 psi			040840	266 gph, 58 psi						
		120510	162 gph, 174 psi			041100	348 gph, 58 psi						
		070430	136 gph, 100 psi			041400	443 gph, 58 psi						
		070570	180 gph, 100 psi			041670	529 gph, 58 psi						
			Liquid end material:										
			PC	PVC									
			PP	Polypropylene									
			SS	Stainless Steel									
			TT	PTFE + 25% carbon									
				Seal material:									
				T	PTFE								
					Positive displacement element:								
					1	Standard composit 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				
									Electrical power supply:				
									0	add-on drive unit without electrical connection			
									4	No motor, with 56 C flange			
										Enclosure rating:			
										0	IP 55 (Standard) ISO class F		
											Stroke sensor:		
											0	No stroke sensor	
											1	With stoke sensor (Namur)	
												Stroke length adjustment:	
												0	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**

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 TZMbH	**gph**	**l/h**	**psi**	**bar**	**ml/ stroke**	**strokes/ min.**	**ft (m)**	**in (DN)**	**lb (kg)**
120260	82	312	174	12	60	86	13.1 (4)	1 1/2 (25)	102/119 (46/54)
120340	108	408	174	12	60	115	13.1 (4)	1 1/2 (25)	102/119 (46/54)
120430	136	516	174	12	60	144	13.1 (4)	1 1/2 (25)	102/119 (46/54)
120510	162	612	174	12	60	173	13.1 (4)	1 1/2 (25)	102/119 (46/54)
120650	–	–	174	12	60	–	13.1 (4)	1 1/2 (25)	102/119 (46/54)
070430	136	516	100	7	99	86	11.5 (3.5)	2 (32)	110/141 (50/64)
070570	180	684	100	7	99	115	11.5 (3.5)	2 (32)	110/141 (50/64)
070720	228	864	100	7	99	144	11.5 (3.5)	2 (32)	110/141 (50/64)
070860	272	1032	100	7	99	173	11.5 (3.5)	2 (32)	110/141 (50/64)
071070	–	–	100	7	99	–	11.5 (3.5)	2 (32)	110/141 (50/64)
040840	266	1008	58	4	194	86	9.8 (3)	2 1/4 (40)	124/177 (56/80)
041100	348	1320	58	4	194	115	9.8 (3)	2 1/4 (40)	124/177 (56/80)
041400	443	1680	58	4	194	144	9.8 (3)	2 1/4 (40)	124/177 (56/80)
041670	529	2004	58	4	194	173	9.8 (3)	2 1/4 (40)	124/ 177 (56/80)
042100	-	-	58	4	194	-	9.8 (3)	2 1/4 (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/ Discharge 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® DULCO Flex Control Series Peristaltic Metering Pumps

Overview: DULCO flex Control - DFXa

The **DULCO flex Control - DFXa** is an intelligent peristaltic metering pump that is valve-free and has the accuracy of a diaphragm pump. Applications include gaseous, highly viscous, abrasive, shear-sensitive and chemically aggressive 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-preformance tubing consists of a **TPV (Santoprene)** or **PUR (Polyurethane)** material that provides excellent chemical resistance and a long service life.

The **DULCO flex Control - DFXa** is powered by a DC motor and will provide continuous metering from **0.038 GPD (6 ml/h) to 17.17 GPH (65 l/h)** and pressures up to **100 PSIG (7bar)**. Additional features such as communication protocol includes PROFIBUS, CANbus, Modbus and PROFINET are available.

Your benefits

- NSF61 Approvedl
- Volume adjustment in GPH or LPH
- Manual, Analog, Contact and Batch modes optional
- High visibility of LED-indicator lights
- Large illuminated display
- New configurable input/output port
- CIP (cleaning in place) enabled system
- Reverse flow is possible
- Dosing head can be aligned in four directions: Left, Right, Up and Down
- Integrated 7-day timer
- Viscosities to 10,000 cPs

NSF®

Certified to NSF/ANSI 61



PROFI® PROCESS FIELD BUS BUS

ProMinent® DULCO flex Control Series Peristaltic Metering Pumps

Capacity Data

Capacity data: DULCO flex Control - DFXa

Pump Version	Capacity at Maximum Backpressure				Max. speed	Connector size	Pre-primed suct. lift		Shipping weight	
	PSIG	**(bar)**	**GPH**	**(l/h)**	**rpm**	**in**	**ft**	**(m)**	**lbs**	**(kg)**
0518	73	(5)	4.75	(18)	100	1/2" x 3/8"	16.4	(5)	12.8	5.8
0530	73	(5)	8.00	(30)	100	1/2" x 3/8"	16.4	(5)	12.8	5.8
0730	100	(7)	8.00	(30)	100	1/2" x 3/8"	16.4	(5)	12.8	5.8
0565	73	(5)	17.17	(65)	100	1/2" x 3/8"	16.4	(5)	12.8	5.8

Tube material:

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

PUR (Polyurethane): available with pump version 0518, 0530 and 0565 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: 14 - 113 °F

Optional relay modules: 1 x switch over contact, 230 V - 8 A or 2 x On, 24 V - 100 mA

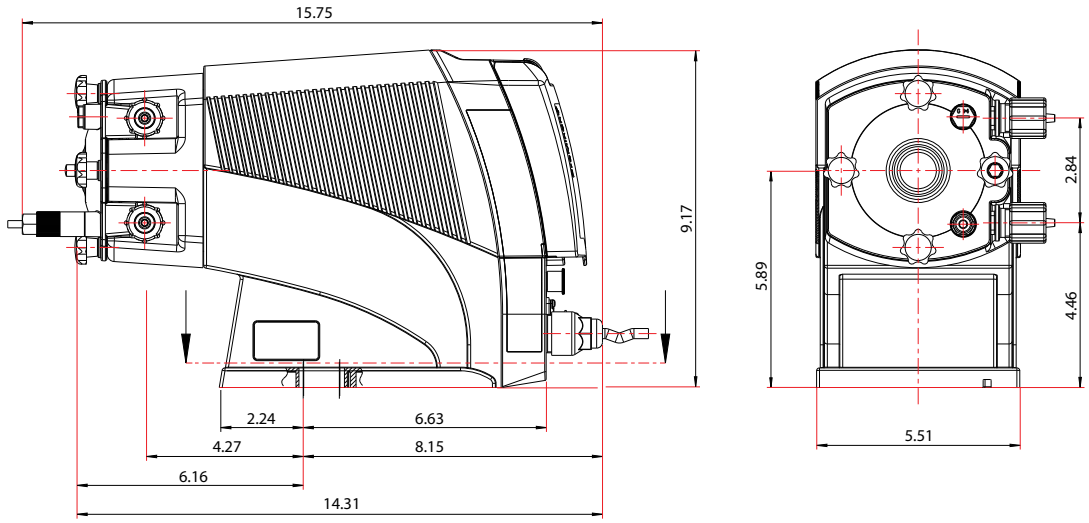
Spare Parts

Tube assembly:	**Part Number**
TPV (Santoprene) 101.5 PSIG (7 bar), Version 0730	1102991
TPV (Santoprene) 72.5 PSIG (5 bar), Version 0530	1102907
PUR (Polyurethane) 72.5 PSIG (5 bar), Versions 0518, 0530 and 0565	1104951

Tube assembly & 1/2" x 3/8" Connection set:	**Part Number**
0530 TPV (Santoprene) FDA	1108974
0530 TPV (Santoprene)	1108975
0530 PUR (Polyurethane) FDA	1110172
0530 PUR (Polyurethane)	1110171
0730 TPV (Santoprene) FDA	1108951
0730 SPT (Santoprene)	1108952

Dosing head parts:	**Part Number**
Dosing head	1094919
Dosing head cover	1104727
Spare star knob set	1104952
Rotor Complete	1103249

Dimensional Drawings



Note: All above measurements are in inches

ProMinent® DULCO flex Control Series Peristaltic Metering Pumps

Specifications

Materials of construction:	
Housing	Fiberglass reinforced PPE (Polyphenylene Ether)
Dosing head	Glass reinforced PA6 (Polyamide)
Rotor	Fiberglass reinforced PPS (Polyphenylennsulphide)
Pump hose	TPV (Santoprene) available with pump versions 0730 and 0530
	PUR (Polyurethane) available with pump version 0518,0530 and 0565 only
Connections:	
Hose Connection	PVDF
O-rings (wetted)	PTFE
Electrical:	
Enclosure rating	IP 66, NEMA 4X Indoor
Power supply	100 – 230 VAC 1 Phase 50 / 60 Hz ± 10%
Power cord	6ft
Relay Options:	
Relay cable (*optional*)	6ft
Identcode Option 1	1 x changeover contact 230 V AC - 6 A, Fault indicating relay (N/C)
Identcode Option 4	1 x N/O 24 V DC -1 A - 1 x N/O 24 V - 1 ma, As 1 + pacing relay
Identcode Option C	1 x N/O 24 V DC - 100 mA and 1 x 4-20 mA output, As 1 + 4-20 mA output
Ambient temperature range:	
In operation	14 °F to 113 °F (-10 °C to 45 °C)
Storage & Transport	14 °F to 122 °F (-10 °C to 50 °C)
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
Hose insert 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
Contact input:	
Minimum pulse duration	20 ms
Maxiumum pulse input	25 pulses / second
Analog Input Impedance	120 Ohms

ProMinent® DULCO flex Control Series Peristaltic Metering Pumps

Identcode Ordering System

DFXa	**DULCO flex Control**																	
	Regional design:																	
	US	USA																
		Version Capacity:																
		0518	4.75 gph (18 l/h), 73 psi (5 bar)															
		0530	7.92 gph (30 l/h), 73 psi (5 bar)															
		0730	7.92 gph (30 l/h), 100 psi (7 bar)															
		0565	17.17 gph (65 l/h), 73 psi (5 bar)															
			Tube material:															
			SP	Santoprene (TPV)	***Note:*** *Available with pump versions 0730 and 0530*													
			VP	Polyurethane (PUR)	**Note:** Available with pump versions 0518, 0430 and 0565 only													
				Seal material:														
				F	FDA-compliant (PTFE)													
				T	PTFE													
					Dosing head orientation:													
					R	Right (view from behind)												
					L	Left (view from behind)												
					O	Top												
					U	Bottom												
						Hydraulic connector:												
						Q	connection 1/2" x 3/8" (USA)											
							Tube rupture alarm:											
							1	With diaphragm rupture indicator, optical sensor										
								Design:										
								0	Housing RAL 5003 / cover RAL 2003									
									Logo:									
									0	with ProMinent logo								
										Power connection:								
										U	Universal 100 - 240 V							
											Cable and plug:							
											D	USA 115 V - 6 ft. (2m)						
												Relay:						
												0	No relay					
												1	1x changeover contact 230 V - 8A, fault indicating relay N/C					
												4	2x N/O 24 V - 100 mA, fault indicating relay N/C + pacing relay					
												C	1x N/O 24 V - 100 mA, fault indicating relay N/C + 4-20 mA output					
													Accessories:					
													0	None				
													1	Injection valve 1/2" and foot valve				
														Control Variants:				
														0	Manual + Contact with PulseControl			
														3	Manual + Contact with PulseControl + Analog			
														C	CANopen			
														P	ProfiNet			
														R	ProfiBus			
															Communication:			
															0	None		
																Language:		
																EN	English	
																	Certification:	
																	01	CE
																		Documentation:
																		EN English
DFXa	**US**	**0730**	**SP**	**F**	**R**	**Q**	**1**	**0**	**0**	**U**	**D**	**0**	**0**	**0**	**0**	**EN**	**01**	**EN**

ProMinent® DULCO Flex Control Series Peristaltic Metering Pumps

Overview: DULCO flex Control - DFYa

The **Dulco flex Control- DFYa** metering pump adds an intelligent peristaltic offering to our established line of ProMinent pumps

This new design of peristaltic pump is controlled electronically via an HMI controller thus allowing for greater turndown in our DulcoFlex pump series. All the benefits of a peristaltic pump are retained including off-gassing fluids, high viscosity and abrasive media, and shear-sensitive liquids.

Like the DFXa, the DFYa offers simple and easy hose replacement via the HMI controller. When the hose needs replaced, the pump displays instructions for the user to step-through the replacement process.

Your benefits

- Contact, batch, manual or analog modes
- Adjustment of the metering rate directly in gph or l/h
- Connection to process control systems via a BUS interface, such as PROFIBUS®, Profinet or CANbus
- Large illuminated display
- Pump is available as an FDA design
- No problems with very gaseous media or air locks
- Reverse flow is possible
- Viscosities to 40,000 cPs



ProMinent® DULCO flex Control Series Peristaltic Metering Pumps

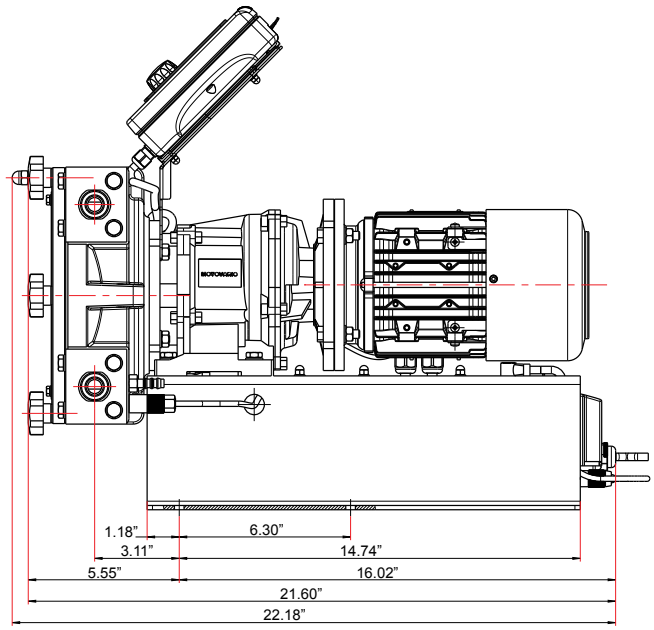
Capacity Data

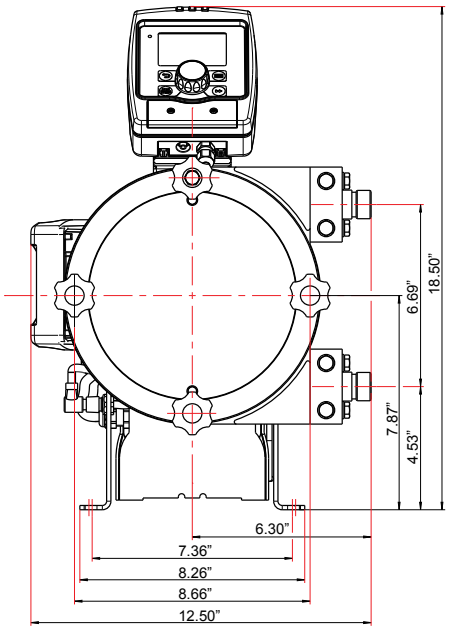
Capacity data: DULCO flex Control - DFYa

Pump Version	Capacity at Maximum Backpressure				Max. speed	Connector size	Pre-primed suct. lift		Shipping weight	
	GPH ±10%	**(L/h)** ±10%	**PSIG**	**(bar)**	**rpm**	**in**	**ft**	**(m)**	**lbs**	**(kg)**
04410	108.3	(410)	58	(4)	80	3/4”	26.25	(8)	66	(30)
06410	108.3	(410)	87	(6)	80	3/4”	26.25	(8)	66	(30)
08410	108.3	(410)	116	(8)	80	3/4”	26.25	(8)	66	(30)

Tube material:
NR (Natural rubber)
NBR (Nitrile rubber), NBR-A (Nitrile rubber FDA approved)
EPDM
HYPALON®
Pre-primed suction lift: 26.25 ft (8 m)
Rollers/ shoes: Rollers
Metering reproducibility: ± 2% with retracted tube (after approx. 500 revolutions)
Electrical connection: 100 - 230 V ± 10%, 50/60 Hz
Power consumption: Max. 400 W
Degree of protection: IP 55
Permissible ambient temperature: 32 - 113 °F (0 - 45 °C)
Optional relay modules:
Fault indicating relay - 230 V AC - 8 A
Fault indicating relay + Pacing relay - 24 V DC - 100 mA
0/4-20 mA output + fault indicating/ pacing relay - 24 V DC - 100 mA
Capacity data represents minimum values, tested using water at 68 °F (room temperature)
HYPALON® is a registered trade mark of DuPont Performance Elastomers

Dimensional Drawings





Note: All above measurements are in inches

ProMinent® DULCO flex Control Series Peristaltic Metering Pumps

Identcode Ordering System

DFYa	**DULCO flex Control**																		
	Regional design:																		
	US	USA																	
		Version Capacity:																	
		04410	108.3 gph ±10% (410 l/h), 58.0 psi (4 bar)																
		06410	108.3 gph ±10% (410 l/h), 87.0 psi (6 bar)																
		08410	108.3 gph ±10% (410 l/h), 116.0 psi (8 bar)																
			Tube material:																
			0	NR (Natural rubber)		A	NBR-A (Nitrile rubber FDA approved)												
			B	NBR (Nitrile rubber)		H	Hypalon												
			E	EPDM															
				Dosing head orientation:															
				R	Right (standard)														
				L	Left														
					Hydraulic connector:														
					A	VA, BSP 3/4"	E	PVDF, NPT 3/4"											
					B	VA, NPT 3/4"	F	PVC, NPT 3/4"											
					C	PP, BSP 3/4"	G	Tri-clamp, VA, 1"											
					D	PVDF, BSP 3/4"	H	DIN 11851, VA NW20											
						Tube rupture alarm:													
						0	Without hose rupture indicator												
						1	With diaphragm rupture indicator												
							Design:												
							P	ProMinent version											
							M	Modified											
								Special version:											
								0	Standard										
								H	Chemically high-resistance version (Halar-coated)										
									Logo:										
									0	With ProMinent logo									
									1	With out logo									
									M	Modified									
										Power connection:									
										U	Universal 100 - 240 V ± 10%, 50/60 Hz								
											Cable and plug:								
											D	USA 115 V - 6 ft. (2m)							
												Relay:							
												0	No relay						
												1	Fault indicating relay 230 V AC, 8 A						
												3	Fault indicating relay 24 V AC, 100 mA + Pacing relay 24 V AC, 100 mA						
												8	4-20 mA output + Fault indicating / Pacing relay 24 V AC, 100 mA						
													Accessories:						
													0	No accessories					
														Control Variants:					
														0	Manual + external contact wth pulse control				
														1	Manual + external contact wth pulse control + analog 4-20 mA				
														6	PROFIBUS® M12 plug				
														7	CANopen				
															Operating unit (HMI):				
															0	HMI + 1.64' (0.5m) cable			
															4	HMI + 6.5' (2.0 m) cable			
															5	HMI + 16.4' (5.0 m) cable			
															6	HMI + 32.8' (10.0 m) cable			
																Access code:			
																0	Access code		
																1	No access code		
																	Communication:		
																	0	None	
																		Documentation:	
																		EN	English
DFYa	**US**	**04410**	**0**	**R**	**A**	**0**	**P**	**0**	**0**	**U**	**D**	**0**	**0**	**0**	**0**	**0**	**0**	**EN**	

ProMinent® DulcoFlex Series

Overview: DulcoFlex DFBU



The DulcoFlex DFB is a versatile peristaltic pump, which incorporates both hose and tubing technology. The unique roller design offers a lubricant-free housing unlike typical shoe pumps. With pressures up to 116 psi and flow rates to 337 gph, the DFB ia a great choice for pumping difficult fluid such as slurries and abrasive chemicals.

Feature & Benefits

- 10, 13, 16, 19, 22 mm tubing pumps (30psi)
- 10, 13, 16, 22 mm reinforced hose pumps (116psi)
- Flows to 337 gph (5.6 gpm)
- Halar coating available for the toughest chemicals
- Disaster proof hose connections
- Roller Technology - Lower hose Stress
- Easy maintenance
- Reinforced hose
- Can run dry
- Self-priming
- Great for solids
- Reversible
- No seals
- No valves

DulcoFlex DFB Capacities

Capacity Data					
	DFB10	**DFB13**	**DFB16**	**DFB19***	**DFB22**
DFB Series					
Compression	Roller	Roller	Roller	Roller	Roller
Connection	3/8”	3/8”	3/4”	1”	1”
Capacity gal/rev	0.006	0.01	0.024	0.032	0.066
Max. Flow GPH	31	51	122	163	337
Max. Pressure Reinforced Hoses	116 psi	116 psi	116 psi	N/A	116 psi
Tubing	Norprene	Norprene	Norprene	Norprene	Norprene
Max. Presure Tubing	30 psi	30 psi	30 psi	30 psi	30 psi

Models are available with one of the following reinforced hoses: Natural Rubber, Buna, EPDM, Hypalon

**** DFB19 is not available with reinforced hoses***

ProMinent® DulcoFlex Series

Identcode Ordering System

DFBU	**DULCO®flex DFBU**										
	pump size										
	010 DFBu 010, 0.006 gal/revolution 3/8"				**019** DFBu 019, 0.032 gal/revolution 1"						
	013 DFBu 013, 0.010 gal/revolution 3/8"				**022** DFBu 022, 0.066 gal/revolution 1"						
	016 DFBu 016, 0.024 gal/revolution 3/4"										
		Speed									
		010 - 019 ONLY				**022 ONLY**					
		005 5 rpm	**029** 29 rpm			**209** 9 rpm		**236** 36 rpm			
		006 6 rpm	**039** 39 rpm			**212** 12 rpm		**239** 39 rpm			
		007 7 rpm	**043** 43 rpm			**216** 16 rpm		**245** 45 rpm			
		009 9 rpm	**049** 49 rpm			**218** 18 rpm		**249** 49 rpm			
		011 11 rpm	**054** 54 rpm			**220** 20 rpm		**257** 57 rpm			
		013 13 rpm	**061** 61 rpm			**225** 25 rpm		**264** 64 rpm			
		017 17 rpm	**068** 68 rpm			**227** 27 rpm		**272** 72 rpm			
		021 21 rpm	**077** 77 rpm			**230** 30 rpm		**287** 87 rpm			
		024 24 rpm	**086** 86 rpm								
			Motor type								
			0 Without motor								
			1 TEFC 115/1/60								
			2 TEFC 230-460/3/60 1000:1								
			3 WD/Chem Duty TENV 230-460/3/60 1000:1								
			4 X1 120/1/60								
			5 XV 230-460/3/60 1000:1								
			6 DC 90V								
				Hose material							
				0 Natural rubber							
				B NBR							
				E EPDM							
				H Hypalon							
				N Norprene (max 30 psi)							
					Connection						
					B SS NPT						
					F PVDF NPT						
					G PVC NPT						
					H Tri-clamp, SS						
						Base plate					
						4 base plate, HDPE					
							Leakage sensor				
							0 No leakage detector				
							L Leakage detector				
							R Leakage detector and relay kit				
								Orientation			
								D Down			
								L Left			
								R Right (standard)			
								U Up			
									VFD		
									0 Without VFD		
									1 Basic VFD 115/1/60		
									2 Basic VFD 460/3/60		
									3 Advanced VFD 115/1/60		
									4 Advanced VFD 460/3/60		
										Special version	
										0 Standard model	
										H Chemical version (Halar coated)	
											Discharge pressure
											1 30 psi (max tube)
											2 60 psi
											3 90 psi
											4 115 psi (max hose)
DFBU	**010**	**005**	**0**	**0**	**B**	**4**	**0**	**R**	**0**	**0**	**1**

ProMinent® DulcoFlex Series

Overview: DulcoFlex DFBR



The DulcoFlex RAD pump offers a choice of tubing or a reinforced hose in about ½ the space needed for conventional hose pumps! Proven roller technology means no expensive fill lubricants, no required torque stabilization, and up to 30% longer hose life than comparable “pressing shoe” hose pumps. Disaster proof hose/tube fittings, flows up to 337 gph, and pressure capability up to 116 psi makes the RAD pump a great choice for pumping difficult fluids!

Feature & Benefits

- 10, 13, 16, 19, 22 mm tubing pumps (30psi)
- 10, 13, 16, 22 mm reinforced hose pumps (116psi)
- Flows to 337 gph (5.6 gpm)
- Halar coating available for the toughest chemicals
- Disaster proof hose connections
- Roller Technology - Lower hose Stress
- Easy maintenance
- Reinforced hose
- Can run dry
- Self-priming
- Great for solids
- Reversible
- No seals
- No valves

DulcoFlex DFBR Capacities

Capacity Data					
	DFBR10	**DFBR13**	**DFBR16**	**DFBR19***	**DFBR22**
DFBR Series					
Compression	Roller	Roller	Roller	Roller	Roller
Connection	3/8”	3/8”	3/4”	1”	1”
Capacity gal/rev	0.006	0.01	0.024	0.032	0.066
Max. Flow GPH	31	51	122	163	337
Max. Pressure Reinforced Hoses	116 psi	116 psi	116 psi	N/A	116 psi
Tubing	Norprene	Norprene	Norprene	Norprene	Norprene
Max. Presure Tubing	30 psi	30 psi	30 psi	30 psi	30 psi

Models are available with one of the following reinforced hoses: Natural Rubber, Buna, EPDM, Hypalon

**** DFBR19 is not available with reinforced hoses***

ProMinent® DulcoFlex Series

Identcode Ordering System

DFBR	DULCO®flex DFBR											
	pump size											
	010 DFBr 010, 0.006 gal/revolution 3/8"					**019** DFBr 019, 0.032 gal/revolution 1"						
	013 DFBr 013, 0.010 gal/revolution 3/8"					**022** DFBr 022, 0.066 gal/revolution 1"						
	016 DFBr 016, 0.024 gal/revolution 3/4"											
		Speed										
		032 32 rpm										
		056 56 rpm										
		076 76 rpm										
			Motor type									
			0 Without motor									
			1 TEFC 115/1/60									
			2 TEFC 230-460/3/60 1000:1									
			3 WD/Chem Duty TENV 230-460/3/60 1000:1									
			4 X1 120/1/60									
			5 XV 230-460/3/60 1000:1									
			6 DC 90V									
				Hose material								
				0 Natural rubber								
				B NBR								
				E EPDM								
				H Hypalon								
				N Norprene (max 30 psi)								
					Connection							
					B SS NPT							
					F PVDF NPT							
					G PVC NPT							
					H Tri-clamp, SS							
						Base plate						
						4 base plate, HDPE						
							Leakage sensor					
							0 No leakage detector					
							L Leakage detector					
							R Leakage detector and relay kit					
								Orientation				
								D Down				
								L Left				
								R Right (standard)				
								U Up				
									VFD			
									0 Without VFD			
									1 Basic VFD 115/1/60			
									2 Basic VFD 460/3/60			
									3 Advanced VFD 115/1/60			
									4 Advanced VFD 460/3/60			
										Special version		
										0 Standard model		
										H Chemical version (Halar coated)		
											Discharge pressure	
											1 30 psi (max tube)	
											2 60 psi	
											3 90 psi	
											4 115 psi (max hose)	
DFBR	**010**	**005**	**0**	**0**	**B**	**4**	**0**	**R**	**0**	**0**	**1**	

ProMinent® DulcoFlex Series

Overview: DulcoFlex DFCU



The DulcoFlex DFC is a hose pump designed for difficult pumping applications. It incorporates a roller design which eliminates the need for cumbersome lubricants, unlike typical shoe pumps. The DFC can reach pressures up to 116 psi and flow rates up to 106 gpm and is ideal for difficult industrial and municipal applications.

Feature & Benefits

- Sizes: 30, 40, 50, 60, 70mm
- Flows to 106 gpm
- Disaster proof hose connections
- Roller Technology - Lower hose stress
- Easy maintenance
- Reinforced hose
- Can run dry
- Self-priming
- Great for solids handling
- Reversible
- No seals
- No valves

DulcoFlex DFCU Capacities

Capacity Data					
	DFCU30	**DFCU40**	**DFCU50**	**DFCU60**	**DFCU70**
DFCU Series					
Compression	Roller	Roller	Roller	Roller	Roller
Connection	1 1/4”	1 1/2”	1 1/2”	2”	2 1/2”
Capacity gal/rev	0.11	0.24	0.39	0.82	1.76
Max. Flow GPM	7.4	14.4	23.1	41.2	106.4
Max. Pressure Reinforced Hoses	116 psi	116 psi	116 psi	116 psi	116 psi
Tubing	N/A	Norprene	N/A	N/A	N/A
Max. Presure Tubing	N/A	30 psi	N/A	N/A	N/A

All models are available with one of the following reinforced hoses: Natural Rubber, Buna, EPDM, Hypalon

ProMinent® DulcoFlex Series

Identcode Ordering System

DFCU	DULCO®flex DFCU											
	pump size											
	030	DFCU 030, 0.11 gal/revolution		**060**	DFCU 060, 0.82 gal/revolution							
	040	DFCU 040, 0.24 gal/revolution		**070**	DFCU 070, 1.76 gal/revolution							
	050	DFCU 050, 0.39 gal/revolution										
		Speed										
		030 - 050 ONLY					**060 - 070 ONLY**					
		000	without gear reducer	**030**	30 rpm		**000**	without gear reducer		**034**	34 rpm	
		009	9 rpm	**035**	35 rpm		**012**	12 rpm		**042**	42 rpm	
		012	12 rpm	**039**	39 rpm		**016**	16 rpm		**053**	53 rpm	
		014	14 rpm	**045**	45 rpm		**023**	23 rpm		**057**	57 rpm	
		016	16 rpm	**049**	49 rpm		**028**	28 rpm		**071**	71 rpm	
		018	18 rpm	**057**	57 rpm							
		020	20 rpm	**064**	64 rpm							
		025	25 rpm	**072**	72 rpm							
		027	27 rpm	**082**	82 rpm							
			Motor type									
			0	No motor provided								
			1	TEFC Severe Duty 230-460/3/60 20:1 (variable speed)								
			2	TEFC Explosion Proof 230-460/3/60 Class 1 Div 1, Groups C&D								
				Hose material								
				0	Natural rubber							
				B	NBR							
				E	EPDM							
				H	Hypalon							
					Hydraulic connection							
					1	ANSI Flange SS						
					2	ANSI Flange PVC						
					3	ANSI Flange PVDF						
						Base plate						
						1	painted steel					
							Leakage sensor					
							0	Without leakage detector				
							A	5-48VDC, N.O. (USE WITH DRIVE)				
							B	5-48VDC, N.C.				
							C	24-240VAC, N.O.				
							D	24-240VAC, N.C.				
								Orientation				
								D	Down			
								L	Left			
								R	Right (standard)			
								U	Up			
									VFD			
									0	Without VFD		
									1	Basic VFD 115/1/60 **(030 & 040 ONLY)**		
									2	Basic VFD 460/3/60		
									3	Advanced VFD 115/1/60 **(030 ONLY)**		
									4	Advanced VFD 460/3/60		
										Special version		
										0	Standard version	
										H	Chemical version (Halar coated)	
											Discharge pressure	
											1	30 psi (max tube)
											2	60 psi
											3	90 psi
											4	115 psi (max hose)
DFCU	**030**	**000**	**0**	**0**	**1**	**1**	**0**	**R**	**0**	**0**	**1**	

ProMinent® DulcoFlex Series

Overview: DulcoFlex DFDU



The DulcoFlex DFD is a hose pump designed for pressures up to 232 psi and flow rates up to 160 gpm. The unique shoe design is made of steel for smoother and cooler compression. The DFD uses safe DulcoLube oil for the shoe lubrication. With suction lifts up to 29 feet, the DulcoFlex DFD is a great choice for difficult pumping applications.

Feature & Benefits

- Sizes: 25, 32, 40, 60, 70, 100mm
- Flows to 160 gpm
- Suction lifts up to 29 ft.
- Disaster proof hose connections
- DulcoLube food grade glycerin lubricant
- Designed heat sink fins for cooler operation
- Steel shoes for a smoother and cooler compression
- Run dry capabilities

DulcoFlex DFDU Capacities

Capacity Data						
	DFDU25	**DFDU32**	**DFDU40**	**DFDU60**	**DFCU70**	**DFDU100**
DFDU Series						
Compression	Shoe	Shoe	Shoe	Shoe	Shoe	Shoe
Connection	1”	1 1/2”	1 1/2”	2 1/2”	2 1/2”	4”
Capacity gal/rev	0.08	0.16	0.37	0.85	1.76	5.28
Max. Flow GPM	5.2	9.6	20.4	42.4	88	160
Max. Pressure Reinforced Hoses	232 psi	232 psi	232 psi	232 psi	232 psi	232 psi

All models are available with one of the following reinforced hoses: Natural Rubber, Buna, EPDM, Hypalon

"Pump Spare Parts & Accessories" T.O.C. VI

CATALOG SECTION TABS

product overview
- Introduction
- Pump selection by capacity
- Chemical resistance list
- Solenoid & Motor Pump Overview
- Analytical Instrumentation Overview

solenoid-driven metering pumps
- Concept b
- beta b
- gamma/ X
- delta
- gamma/ XL
- Extronic

motor-driven metering pumps
- Sigma/ X: Sigma/ 1
- Sigma/ X: Sigma/ 2
- Sigma/ X: Sigma/ 3
- ProMus
- Hydro 2 API 675
- Hydro 3 API 675
- Makro
- Orlita
- DULCO flex Control
- DulcoFlex

pump spare parts & accessories
- Solenoid pump spare parts
- Motor pump spare parts
- Pump accessories

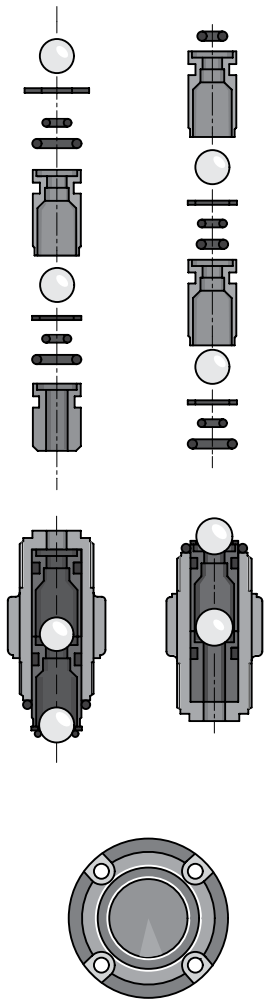
analytical instrumentation
DULCOMETER instrumentation
- D1Cb/c
- DACb
- Dulcometer Compact
- DMT
- MicroFlex
- MultiFLEX
- AEGIS II
- SlimFlex 5

analytical sensors
DULCOTEST sensors
- Amperometric sensors
- Potentiometric sensors
- Potentiostatic sensors
- Conductometric sensors
- Accessories

polymer blending & dry feed solutions
- ProMix™ -M (In-line Controls)
- ProMix™ -M (Batch & In-line Controls)
- ProMix™ -S
- ProMix™ -C
- ProMdry™

Solenoid Pump Spare Parts

beta/a, concept b and gamma/L



pk_1_008

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
2 Connector Sets
2 Valve Balls
1 Set O-rings

TT Liquid Ends

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

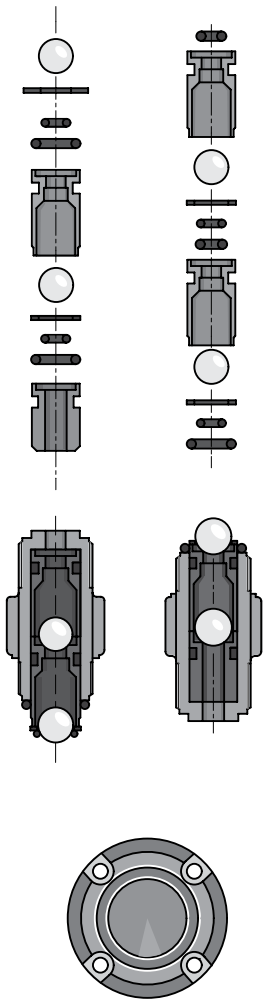
SS Liquid Ends

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	1023126	1023125	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

beta/a and gamma/L

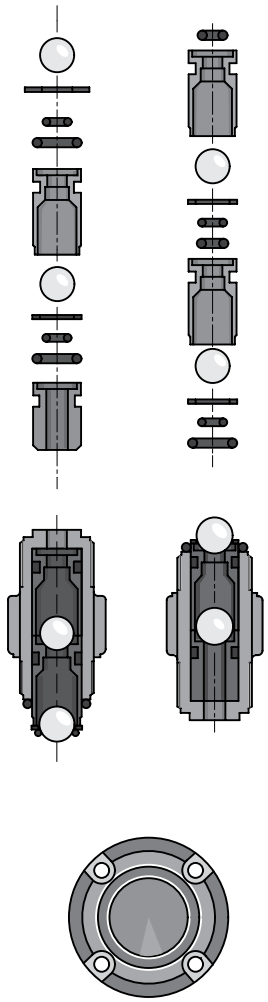


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Liquid End Version	Material Code	Complete Liquid End	Spare Parts Kit	Spare Valves Only (connector sets not included) Suction	Discharge	Diaphragm
0413 (cont.)	NPE	1002198	1001718	1001435	1001439	1000249
	PCB	1002363	1001726	1001434	1001438	1000249
	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	1023126	1023125	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



pk_1_008

For Auto-degassing pumps.

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

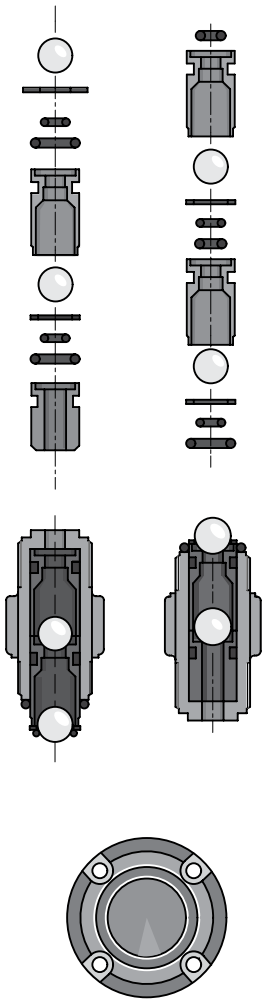
PP & NP
Liquid Ends

1 Diaphragm
1 Suction Valve
1 Discharge Valve
2 Connector Sets
2 Valve Balls
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) Suction	Discharge	Vent	Diaphragm
GALa							
1601	PPE	1002393	1001756	792644	1001067	1001063	1000245
	PPB	1002392	1001762	792646	1001066	1001062	1000245
	NPE	1002248	1001660	792119	1001065	1001061	1000245
	NPB	1002242	1001666	792026	1001064	1001060	1000245
1602	PPE	1002395	1001757	792644	1001067	1001063	1000246
	PPB	1002394	1001763	792646	1001066	1001062	1000246
	NPE	1002249	1001661	792119	1001065	1001061	1000246
	NPB	1002243	1001667	792026	1001064	1001060	1000246
1005	PPE	1002399	1001758	792644	1001067	1001063	1000247
	PPB	1002398	1001764	792646	1001066	1001062	1000247
	NPE	1002250	1001662	792119	1001065	1001061	1000247
	NPB	1002244	1001668	792026	1001064	1001060	1000247
0708	PPE	1002397	1001759	1001437	1001071	1001063	1000248
	PPB	1002396	1001765	1001436	1001070	1001062	1000248
	NPE	1002251	1001663	1001435	1001069	1001061	1000248
	NPB	1002245	1001669	1001434	1001068	1001060	1000248
0413	PPE	1002401	1001760	1001437	1001071	1001063	1000249
	PPB	1002400	1001766	1001436	1001070	1001062	1000249
	NPE	1002252	1001664	1001435	1001069	1001061	1000249
	NPB	1002246	1001670	1001434	1001068	1001060	1000249
0220	PPE	1002403	1001761	1001437	1001071	1001063	1000250
	PPB	1002402	1001767	1001436	1001070	1001062	1000250
	NPE	1002253	1001665	1001435	1001069	1001061	1000250
	NPB	1002247	1001671	1001434	1001068	1001060	1000250
1605	PPE	1002399	1001758	792644	1001067	1001063	1000247
	PPB	1002398	1001764	792646	1001066	1001062	1000247
	NPE	1002250	1001662	792119	1001065	1001061	1000247
	NPB	1002244	1001668	792026	1001064	1001060	1000247
1008	PPE	1002397	1001759	1001437	1001071	1001063	1000248
	PPB	1002396	1001765	1001436	1001070	1001062	1000248
	NPE	1002251	1001663	1001435	1001069	1001061	1000248
	NPB	1002245	1001669	1001434	1001068	1001060	1000248
0713	PPE	1002401	1001760	1001437	1001071	1001063	1000249
	PPB	1002400	1001766	1001436	1001070	1001062	1000249
	NPE	1002252	1001664	1001435	1001069	1001061	1000249
	NPB	1002246	1001670	1001434	1001068	1001060	1000249
0420	PPE	1002403	1001761	1001437	1001071	1001063	1000250
	PPB	1002402	1001767	1001436	1001070	1001062	1000250
	NPE	1002253	1001665	1001435	1001069	1001061	1000250
	NPB	1002247	1001671	1001434	1001068	1001060	1000250

Solenoid Pump Spare Parts

beta/b



pk_1_008

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
2 Connector Sets
2 Valve Balls
1 Set O-rings

TT Liquid Ends

1 Diaphragm
1 Suction Valve
1 Discharge Valve
2 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

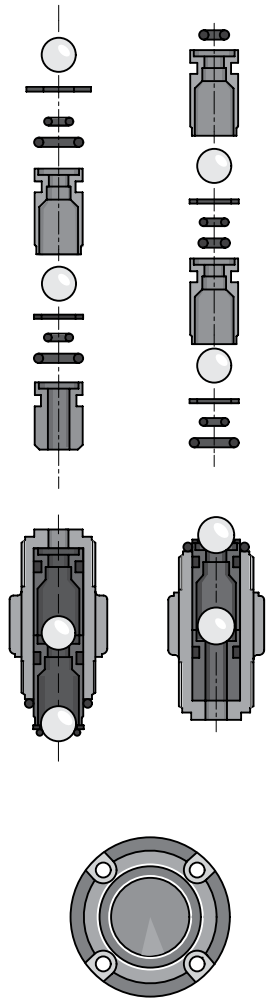
Liquid End Version	Material Code	Complete Liquid End	Spare Parts Kit	Spare Valves Only (connector sets not included) Suction	Discharge	Diaphragm
1000	PPT	1035317	1023107	1023128	1023127	1000244
	NPT	1034560	1023107	1023128	1023127	1000244
	PVT	1023134	1023107	1023128	1023127	1000244
	TTT	1002345	1001737	809407	809406	1000244
	SST	1002557	1002549	809424	809423	1000244
1601	PPT	1035318	1023108	1023128	1023127	1000245
	NPT	1034561	1023108	1023128	1023127	1000245
	PVT	1023135	1023108	1023128	1023127	1000245
	TTT	1002346	1001738	809407	809406	1000245
	SST	1002558	1002550	809424	809423	1000245
2001	NPT	1034561	1023108	1023128	1023127	1000245
	SST	1002558	1002550	809424	809423	1000245
1602	PPT	1035319	1023109	1023128	1023127	1000246
	NPT	1034562	1023109	1023128	1023127	1000246
	PVT	1023136	1023109	1023128	1023127	1000246
	TTT	1002347	1001739	809407	809406	1000246
	SST	1002559	1002551	809424	809423	1000246
2002	NPT	1034562	1023109	1023128	1023127	1000246
	SST	1002559	1002551	809424	809423	1000246
1604	PPT	1035320	1035332	1023128	1023127	1034612
	NPT	1034563	1035332	1023128	1023127	1034612
	PVT	1035298	1035332	1023128	1023127	1034612
	SST	1035325	1035331	809424	809423	1034612
	PVT HV	1035326	1035342	-	-	1034612
0708	PPT	1035321	1023111	1023126	1023125	1000248
	NPT	1034564	1023111	1023126	1023125	1000248
	PVT	1023138	1023111	1023126	1023125	1000248
	TTT	1002349	1001741	809445	809444	1000248
	SST	1002561	1002553	809497	809496	1000248
	PVT HV	1018073	1019067	1002267	1002267	1000248
0413	PPT	1035322	1023112	1023126	1023125	1000249
	NPT	1034565	1023112	1023126	1023125	1000249
	PVT	1023139	1023112	1023126	1023125	1000249
	TTT	1002350	1001742	809445	809444	1000249
	SST	1002562	1002554	809497	809496	1000249
	PVT HV	1018084	1019069	1002267	1002267	1000249
0220	PPT	1035323	1023113	1023126	1023125	1000250
	NPT	1034566	1023113	1023126	1023125	1000250
	PVT	1023140	1023113	1023126	1023125	1000250
	TTT	1002351	1001754	809445	809444	1000250
	SST	1002563	1002555	1002547	1002548	1000250
	PVT HV	1018085	1019070	1002267	1002267	1000250
2504	NPT	1034563	1035332	1023128	1023127	1034612
	SST	1035325	1035331	809424	809423	1034612
1008	PPT	1035321	1023111	1023126	1023125	1000248
	NPT	1034564	1023111	1023126	1023125	1000248
	PVT	1023138	1023111	1023126	1023125	1000248
	TTT	1002349	1001741	809445	809444	1000248
	SST	1002561	1002553	809497	809496	1000248
	PVT HV	1018073	1019067	1002267	1002267	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	PPT	1035322	1023112	1023126	1023125	1000249
	NPT	1034564	1023112	1023126	1023125	1000249
	PVT	1023139	1023112	1023126	1023125	1000249
	TTT	1002350	1001742	809445	809444	1000249
	SST	1002562	1002554	809497	809496	1000249
	PVT HV	1018084	1019069	1002267	1002267	1000249
0420	PPT	1035323	1023113	1023126	1023125	1000250
	NPT	1034566	1023113	1023126	1023125	1000250
	PVT	1023140	1023113	1023126	1023125	1000250
	TTT	1002351	1001754	809445	809444	1000250
	SST	1002563	1002555	1002547	1002548	1000250
	PVT HV	1018085	1019070	1002267	1002267	1000250

beta/b Auto-degass



pk_1_008

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 1 Suction Valve 1 Discharge Valve 2 Valve Balls
2 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) Suction	Discharge	Vent	Diaphragm
1601	NPE	1002248	1001660	792119	1001065	1001061	1000245
	NPB	1002242	1001666	792026	1001064	1001060	1000245
	PPE	1002393	1001756	792644	1001067	1001063	1000245
	PPB	1002392	1001762	792646	1001066	1001062	1000245
1602	NPE	1002249	1001661	792119	1001065	1001061	1000246
	NPB	1002243	1001667	792026	1001064	1001060	1000246
	PPE	1002395	1001757	792644	1001067	1001063	1000246
	PPB	1002394	1001763	792646	1001066	1001062	1000246
1604	NPE	1035299	1035333	792119	1001065	1001061	1034612
	NPB	1035300	1035334	792026	1001064	1001060	1034612
	PPE	1035301	1035335	792644	1001067	1001063	1034612
	PPB	1035302	1035336	792646	1001066	1001062	1034612
0708	NPE	1002251	1001663	1001435	1001069	1001061	1000248
	NPB	1002245	1001669	1001434	1001068	1001060	1000248
	PPE	1002397	1001759	1001437	1001071	1001063	1000248
	PPB	1002396	1001765	1001436	1001070	1001062	1000248
0413	NPE	1002252	1001664	1001435	1001069	1001061	1000249
	NPB	1002246	1001670	1001434	1001068	1001060	1000249
	PPE	1002401	1001760	1001437	1001071	1001063	1000249
	PPB	1002400	1001766	1001436	1001070	1001062	1000249
0220	NPE	1002253	1001665	1001435	1001069	1001061	1000250
	NPB	1002247	1001671	1001434	1001068	1001060	1000250
	PPE	1002403	1001761	1001437	1001071	1001063	1000250
	PPB	1002402	1001767	1001436	1001070	1001062	1000250
1008	NPE	1002251	1001663	1001435	1001069	1001061	1000248
	NPB	1002245	1001669	1001434	1001068	1001060	1000248
	PPE	1002397	1001759	1001437	1001071	1001063	1000248
	PPB	1002396	1001765	1001436	1001070	1001062	1000248
0713	NPE	1002252	1001664	1001435	1001069	1001061	1000249
	NPB	1002246	1001670	1001434	1001068	1001060	1000249
	PPE	1002401	1001760	1001437	1001071	1001063	1000249
	PPB	1002400	1001766	1001436	1001070	1001062	1000249
0420	NPE	1002253	1001665	1001435	1001069	1001061	1000250
	NPB	1002247	1001671	1001434	1001068	1001060	1000250
	PPE	1002403	1001761	1001437	1001071	1001063	1000250
	PPB	1002402	1001767	1001436	1001070	1001062	1000250

gamma/ X Spare Parts Kits

Spare parts kits for gamma/ X consists of:

1 Diaphragm
1 Suction Valve, complete
1 Discharge Valve, complete
1 Connector set
2 Valve Balls

				Spare Valves Only (connector sets not included)		
Liquid end version	**Material Code**	**Complete liquid end**	**Spare parts kit**	**Suction valve**	**Discharge valve**	**Diaphragm**
1602	NPB	1076836	1001723	792026	740348	1000246
	NPE	1076864	1001715	792119	740349	1000246
	NPT	1076878	1023109	1023128	1023127	1000246
	PPB	1076888	1001654	792646	740351	1000246
	PPE	1076910	1001646	792644	740350	1000246
	PPT	1076918	1023109	1023128	1023127	1000246
	PVT	1077298	1023109	1023128	1023127	1000246
	SST	1076128	1002551	809424	809423	1000246
	TTT	1076967	1001739	809407	809406	1000246
1604	NPB	1076837	1039986	792026	740348	1034612
	NPE	1076865	1039988	792119	740349	1034612
	NPT	1076879	1035332	1023128	1023127	1034612
	PPB	1076889	1039987	792646	740351	1034612
	PPE	1076911	1039989	792644	740350	1034612
	PPT	1076919	1035332	1023128	1023127	1034612
	PVT	1076803	1035332	1023128	1023127	1034612
	PVT4	1076241	1035342	1002267	1002267	1034612
	SST	1076239	1035341	809424	809423	1034612
	TTT	1076968	1035330	809407	809406	1034612
2002	NPB	1076981	1001723	792026	740348	1000246
	NPE	1076982	1001715	792119	740349	1000246
	NPT	1076983	1023109	1023128	1023127	1000246
	SST	1076980	1002551	809424	809423	1000246
2504	NPB	1076273	1039986	792026	740348	1034612
	NPE	1076324	1039988	792119	740349	1034612
	NPT	1076986	1023110	1023128	1023127	1034612
	SST	1076240	1035331	809424	809423	1034612
0708	NPB	1076838	1001725	1001434	1001438	1000248
	NPE	1076866	1001717	1001435	1001439	1000248
	NPT	1076880	1023111	1023126	1023125	1000248
	PPB	1076890	1001656	1001436	1001440	1000248
	PPE	1076912	1001648	1001437	1001441	1000248
	PPT	1076920	1023111	1023126	1023125	1000248
	PVT	1076804	1023111	1023126	1023125	1000248
	PVT4	1076242	1019067	1002267	1002267	1000248
	SST	1076237	1002553	809497	809496	1000248
	TTT	1076969	1001741	809445	809444	1000248
1009	NPB	1076839	1001725	1001434	1001438	1000248
	NPE	1076867	1001717	1001435	1001439	1000248
	NPT	1076881	1023111	1023126	1023125	1000248
	PPB	1076891	1001656	1001436	1001440	1000248
	PPE	1076913	1001648	1001437	1001441	1000248
	PPT	1076921	1023111	1023126	1023125	1000248
	PVT	1076805	1023111	1023126	1023125	1000248
	PVT4	1076923	1019067	1002267	1002267	1000248
	SST	1076802	1002553	809497	809496	1000248
	TTT	1076970	1001741	809445	809444	1000248

Solenoid Pump Spare Parts

gamma/ X continued

Spare parts kits for gamma/ X consists of:

1 Diaphragm
1 Suction Valve, complete
1 Discharge Valve, complete
1 Connector set
2 Valve Balls

				Spare Valves Only (connector sets not included)		
Liquid end version	**Material Code**	**Complete liquid end**	**Spare parts kit**	**Suction valve**	**Discharge valve**	**Diaphragm**
0414	NPB	1076840	1001726	1001434	1001438	1000249
	NPE	1076868	1001718	1001435	1001439	1000249
	NPT	1076883	1023112	1023126	1023125	1000249
	PPB	1076892	1001657	1001436	1001440	1000249
	PPE	1076914	1001649	1001437	1001441	1000249
	PPT	1076922	1023112	1023126	1023125	1000249
	PVT	1076831	1023112	1023126	1023125	1000249
	PVT4	1076243	1019069	1002267	1002267	1000249
	SST	1076236	1002554	809497	809496	1000249
	TTT	1076972	1001742	809445	809444	1000249
0715	NPB	1076841	1001726	1001434	1001438	1000249
	NPE	1076869	1001718	1001435	1001439	1000249
	NPT	1076884	1023112	1023126	1023125	1000249
	PPB	1076907	1001657	1001436	1001440	1000249
	PPE	1076915	1001649	1001437	1001441	1000249
	PPT	1076929	1023112	1023126	1023125	1000249
	PVT	1076833	1023112	1023126	1023125	1000249
	PVT4	1076933	1019069	1002267	1002267	1000249
	SST	1076937	1002554	809497	809496	1000249
	TTT	1076971	1001742	809445	809444	1000249
0220	NPB	1076842	1051107	1001434	1001438	1045456
	NPE	1076871	1051118	1001435	1001439	1045456
	NPT	1076885	1051129	1023126	1023125	1045456
	PPB	1076908	1001658	1001436	1001440	1045456
	PPE	1076916	1051096	1001437	1001441	1045456
	PPT	1076930	1051129	1023126	1023125	1045456
	PVT	1076834	1051129	1023126	1023125	1045456
	PVT4	1076934	1051134	1002267	1002267	1045456
	SST	1076235	1051145	809497	809496	1045456
	TTT	1076973	1051151	809445	809444	1045456
0424	NPB	1076843	1051107	1001434	1001438	1045456
	NPE	1076873	1051118	1001435	1001439	1045456
	NPT	1076886	1051129	1023126	1023125	1045456
	PPB	1076909	1001658	1001436	1001440	1045456
	PPE	1076917	1051096	1001437	1001441	1045456
	PPT	1076931	1051129	1023126	1023125	1045456
	PVT	1076835	1051129	1023126	1023125	1045456
	PVT4	1076935	1051134	1002267	1002267	1045456
	SST	1076936	1051145	809497	809496	1045456
	TTT	1076974	1051151	809445	809444	1045456
0245	NPB	1076844	1051108	1001434	1001438	1045443
	NPE	1076874	1051119	1001435	1001439	1045443
	NPT	1076887	1051130	1023126	1023125	1045443
	PPB	1076976	1051086	1001436	1001440	1045443
	PPE	1076977	1051097	1001437	1001441	1045443
	PPT	1076978	1051130	1023126	1023125	1045443
	PVT	1076979	1051130	1023126	1023125	1045443
	SST	1076271	1051146	809497	809496	1045443
	TTT	1076975	1051152	809445	809444	1045443

gamma/ X Spare Auto-degass Parts Kits

Spare parts kits for gamma/ X consists of:

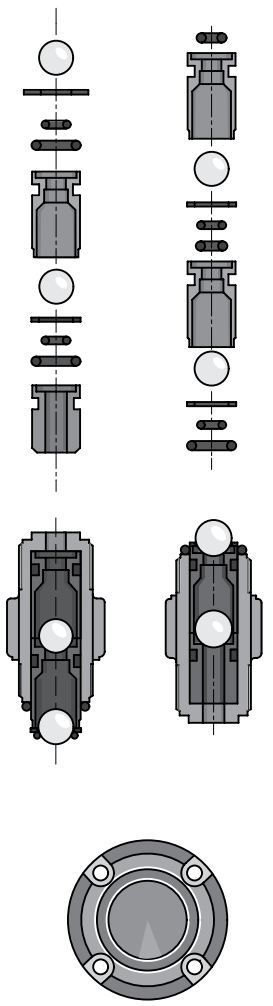
1 Diaphragm
1 Suction Valve, complete
1 Discharge Valve, complete
1 Connector set
2 Valve Balls

(Auto Degassing liquid ends with bypass)

Liquid end version	Material Code	Complete liquid end	Spare parts kit	Spare Valves Only (connector sets not included) Suction valve	Discharge valve	Diaphragm
1602	NPB9	1076988	1001667	792026	1001064	1000246
	NPE9	1076989	1001661	792119	1001065	1000246
1604	NPB9	1076991	1035334	792026	1001064	1034612
	NPE9	1076992	1035333	792119	1001065	1034612
0708	NPB9	1076993	1001669	1001434	1001068	1000248
	NPE9	1076994	1001663	1001435	1001069	1000248
1009	NPB9	1076995	1001669	1001434	1001068	1000248
	NPE9	1076996	1001663	1001435	1001069	1000248
0414	NPB9	1076997	1001725	1001434	1001068	1000249
	NPE9	1076998	1001717	1001435	1001069	1000249
0715	NPB9	1076999	1001670	1001434	1001068	1000249
	NPE9	1077000	1001664	1001435	1001069	1000249
0220	NPB9	1077001	1051113	1001434	1001068	1045456
	NPE9	1077002	1051124	1001435	1001069	1045456
0424	NPB9	1077003	1051113	1001434	1001068	1045456
	NPE9	1077004	1051124	1001435	1001069	1045456

(Auto Degassing liquid ends without bypass)

Liquid end version	Material Code	Complete liquid end	Spare parts kit	Spare Valves Only (connector sets not included) Suction valve	Discharge valve	Diaphragm
1602	PVT7	1076990	1047830	1113242	1047828	1000246
1604	PVT7	1077005	1047858	1113242	1047828	1034612
0708	PVT7	1077006	1047832	1113241	1047829	1000248
1009	PVT7	1077007	1047832	1113241	1047829	1000248
0414	PVT7	1077008	1047833	1113241	1047829	1000249
0715	PVT7	1077009	1047833	1113241	1047828	1000249
0220	PVT7	1077010	1051111	1113241	1047829	1045456
0424	PVT7	1077011	1051111	1113241	1047829	1045456



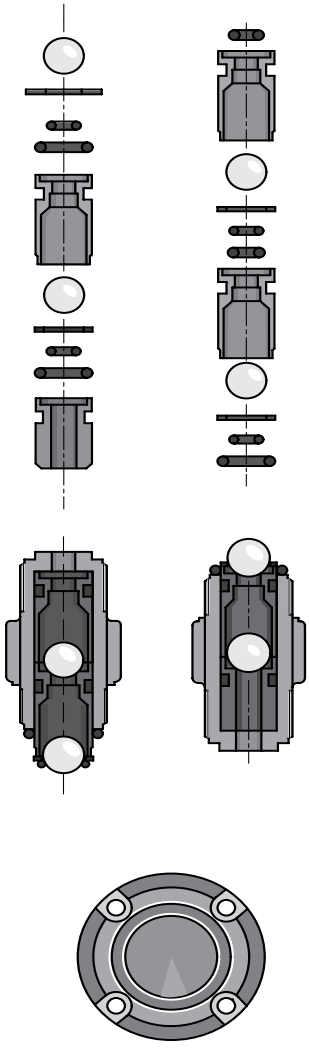
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EXtronic Spare Parts Kits

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
	SS2	912687	1002510
1002/2502	PP1	740388	811456
	NP3	740385	811456
	NS3/PS3	792036	811456
	TT	912690	811456
	HV/PP4 (Type 1002)	910174	811456
0308/1006/2505	PP1	740497	1002511
	NP1	740498	1002511
	SS2	912695	1002511
	HV/PP4 (Type 1006)	910940	1002511
0613/1310	NP1	740505	811458
	TT1	912698	811458
	SS2	912699	811458
	HV/PP4 (Type 1310)	910942	811458
0417/0814	NP1	740502	811459
	TT	910978	811459
0430/0230-DN 10	NP1	740508	811460
	TT	910994	811460
	SS1	910996	811460
0260	-	-	811461

Solenoid Pump Spare Parts

delta & gamma/ XL



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

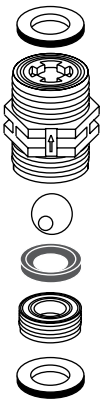
1 connector set

Liquid End Version	Material Code	Complete Liquid End	Spare Parts Kit	Diaphragm
1612	NPE	1030540	1030536	1000248
	NPB	1030542	1030525	1000248
	PVT	1025140	1027081	1000248
	PVT7	1110749	1111663	1000248
	SST	1027074	1027086	1000248
1020	NPE	1030541	1030537	1000249
	NPB	1030543	1030526	1000249
	PVT	1025141	1027082	1000249
	PVT7	1110638	1111665	1000249
	SST	1027075	1027087	1000249
0730	NPE	1030618	1030621	1000250
	NPB	1030609	1030612	1000250
	PVT	1025142	1027083	1000250
	PVT7	1110613	1110410	1000250
	SST	1027076	1027088	1000250
0450	PVT	1025143	1027084	1000251
	SST	1027077	1027089	1000251
0280	PVT	1025184	1027085	1025075
	SST	1027078	1027090	1025075
1608	NPE	1030619	1030620	1030353
	NPB	1030610	1030611	1030353
	PVT	1030227	1030225	1030353
	PVT7	1110654	1111657	1030353
	SST	1030228	1030226	1030353
2508	NPE	1030619	1030620	1030353
	NPB	1030610	1030611	1030353
	SST	1030228	1030226	1030353

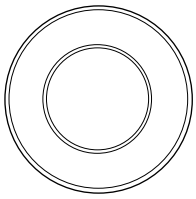
Note: Stainless steel version without suction and discharge valve sets.

Motor Pump Spare Parts

Sigma X 1,2 & 3



Valve Complete



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**

Motor Pump Spare Parts

ProMus

Description	Part No.
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 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 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 PVT single ball	855908

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:

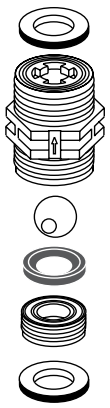
1 Pump diaphragm
1 Suction valve, complete
1 Discharge valve, complete
2 Valve balls
2 Ball-seat discs or valve assembly
1 Set of o-rings, complete

Standard kit for SS (stainless steel) version:

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

***SS with 2 valves, complete**

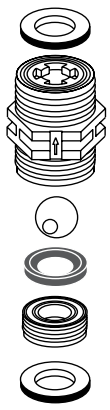
Note: Union nut and NPT inserts are not included in the spare parts kit.



HM/AM Valve complete

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	803707	811470
			910460*		
FM-260 DN 20	PPE	910407	910452	803701	811471
	PCB	910408	910455	803703	811471
	TTT	910409	910458	803705	811471
	SST	910410	910475	803708	811471
			910461*		
FM-530 DN 25	PPE	910413	910453	740615	811472
	PCB	910414	910456	740615	811472
	TTT	910415	910459	740615	811472
	SST	910416	910476	803708	811472
			910462*		
FM-1500 & 2100 DN 40	PPE	1001245	1001573	1023799	811473
	PCB	1001244	1001574	1023799	811473
	TTT	1001246	1001575	1023799	811473
	SST	1001247	1001577	1004178	811473
			1001576*		
FMH-70-20	PPE	-	911903	1023799	1007298
	PCB	-	911901	1023799	1007298
	TTT	-	911905	1023799	1007298
	SST	-	911907	1004178	1007298
			911908*		
FMH-90-20	PPE	-	911904	1023799	1007298
	PCB	-	911902	1023799	1007298
	TTT	-	911906	1023799	1007298
	SST	-	911909	1004178	1007298
			911910*		

Makro TZMb

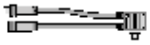


Material Code	Spare Parts Kit	Suction/Discharge Valves	Diaphragm
120260, 120340, 120430, 120510, 120650 (FM670 - DN25)			
PCT/PPT/TTT	1025164	740615	1022887
SST	1022896	803708	1022887
SST*	1022895	-	1022887
070430, 070570, 070720, 070860, 071070			
PCT/PPT/TTT	1025167	1020031	1022900
SST	1022917	1002811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

* Without Checkvalves

Pump & Systems Accessories

PROFIBUS® Adapters

	Description		Figure	Part No.
 fig. 1	**Y-adapter 2 x M12 x 1 male/female 9 pin, Sub-D plug**	9 pin, Sub-D plug	1	1005838
 fig. 2	**Adapter 1 x M12 x 1 male 9 pin, Sub-D plug**	9 pin, Sub-D plug	2	1005839
 fig. 3	**Y-adapter 2 x M12 x 1 male/female**	M12 x 1	3	1040956
fig. 4	**Adapter 1 x M12 x 1 male**	M12 x 1	4	1040955
 fig. 5	**PROFIBUS® Y-adapter**	M12 x 1	5	1036621
	PROFIBUS® (termination resistance, plug-in)	M12 x 1	5	1036622

Control cables



Required for external control of ProMinent metering pumps including:

- beta b
- gamma/ X
- gamma/ XL
- DULCO flex Control (DFXa) and (DFYa)
- Sigma X: Sigma/ 1 control
- Sigma X: Sigma/ 2 control
- Sigma X: Sigma/ 3 control

Description	Part No.
Universal control cable, 5 pin round plug; 5-wire, 6 ft. (2 m)	1001300
Universal control cable, 5 pin round plug; 5-wire, 16 ft. (5 m)	1001301
Universal control cable, 5 pin round plug; 5-wire, 32 ft. (10 m)	1001302
Universal control cable, 5 pin round plug; 5-wire, 164 ft. (50 m)	1032811

(DETAILED WIRING DIAGRAMS ON NEXT PAGE)

Control cables for configurable inputs and outputs

Control cable and round plug for configurable inputs and outputs for controlling the process timer or for additional alarm messages.

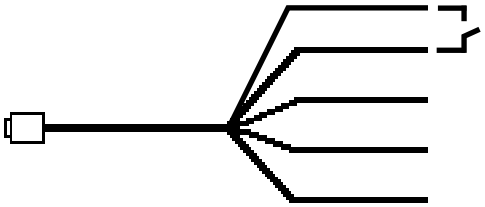
Suitable for use with the **gamma/ XL** and **DULCO flex Control (DFXa)** metering pumps.

Description	Part No.
Control cable for configurable i/o, 6 ft. (2 m)	1094091
Control cable for configurable i/o, 16 ft. (5 m)	1094093
Control cable for configurable i/o, 32 ft. (10 m)	1094092

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

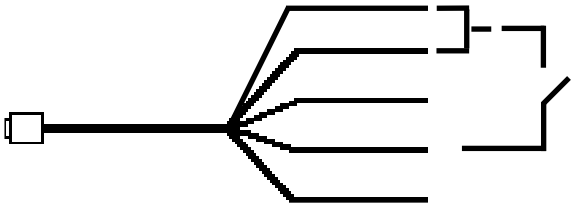
WHITE: Pulse

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

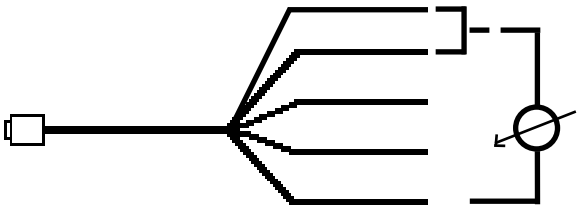
WHITE: Pulse (PC)

BLUE: Analog

Analog Control (not available with beta metering pumps)

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

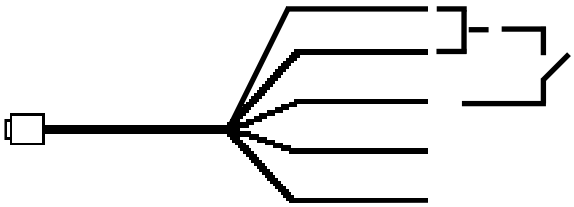
WHITE: Pulse

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)

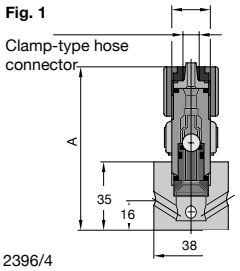
WHITE: Pulse

BLUE: Analog

Foot Valves

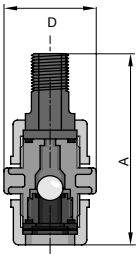
To be installed at the inlet of the suction line to improve priming and protect pump against coarse impurities. With ceramic* weight, strainer and ball check valve (must be mounted vertically for ball check function).

Fig. 1



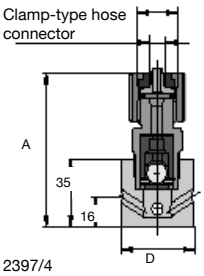
2396/4

Fig. 2



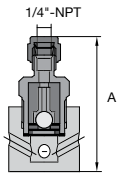
2165/4

Fig. 3



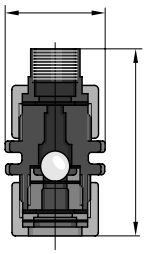
2397/4

Fig. 4



2398/4

Fig. 5



1521/4

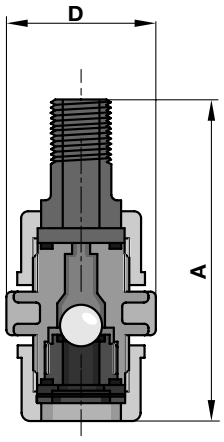
	Dimensions inches (mm)				
Polypropylene	**Dim "A"**		**Dim "D"**		**Part No.**
Valve body of PP, o-rings of EPDM (PP1, PPE)					
Connection 1/4" x 3/16" tubing (Fig 1)	3-1/4	(83)	1-3/8	(35)	924558
Connection 1/2" x 3/8" tubing (Fig 1)	3-1/4	(83)	1-3/8	(35)	924566
Connection 1/2" MNPT for 0423/0230 (Fig 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
PVT					
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
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)	924567
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

Fig. 1



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

Connection	Dimensions inches (mm) Dim "A"		Dim "D"		Part No.
1/2" MNPT (DN 10) (delta, Sigma 1 and Sigma 2)	3-7/8	(98)	1-1/2	(38)	7809465
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
1-1/2" MNPT (DN 40) (Sigma 3 and Makro)	6-1/2	(165)	3-1/2	(89)	1029475

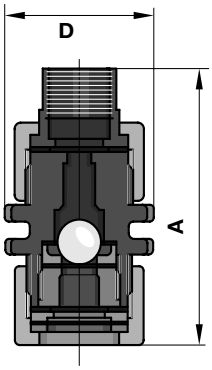
PTFE/PTFE (Fig. 1) Valve body and seals of PTFE (TT1)

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

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

1/2" MNPT (DN 10) (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

Fig. 2



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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

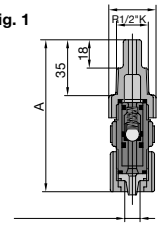
* See Figure 1, ** See Figure 2

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 include a 7 psig (0.5 bar) Hastelloy-C spring.

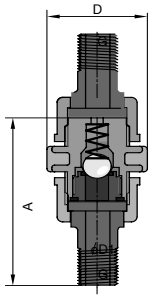
Caution: Injection valves and injection lances should not be used as isolating elements or for antisiphon protection!

Fig. 1



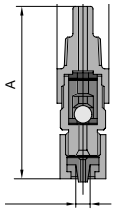
Clamp-type hose connector
2399/4

Fig. 2



1447/4

Fig. 3



Clamp-type hose connector
2400/4

Fig. 4

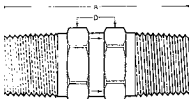
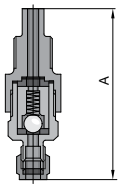


Fig. 5
1/4" NPT SS2



Clamp-type pipe connector
2401/4

	Dim "A" inches (mm)		Part No.
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
Connection 1/2" MNPT for 0423/0230 (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
Connection 1/2" x 3/8" tubing x 1/2" MNPT injection end (Fig 1)	3-7/8	(98)	7809478
Connection 1/2" MNPT for 0423/0230 (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)			
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			
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
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
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			
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			
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 (0.2-3.5 bar) (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 (0.5 bar) spring (Fig 5)	3-1/2	(89)	924597
Ball check valve, connection 3/8" FNPT inlet to 3/8" MNPT discharge, 7 psig (0.5 bar) spring (not illustrated) (SS1) (for 0423 & 0230 only)	3-1/2	(89)	809463
PVT			
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
Connection 1/2" x 3/8" tubing x 1/2" MNPT injection end (Fig 1)	3-7/8	(98)	1024714

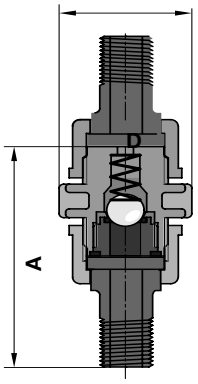
Pump & Systems Accessories

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.

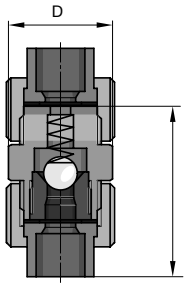
Caution: Injection valves and injection lances should not be used as isolating elements or for antisiphon protection!

Fig. 1



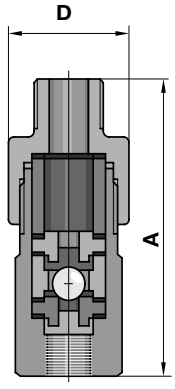
1447/4

Fig. 2



2405/4

Fig. 3



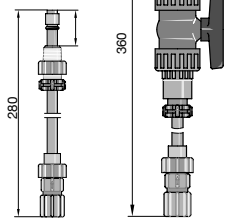
1239/4

Threaded Connection		Dimensions inches (mm) Dim "A"		Dim "D"		Part No.
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" FNPT by 1/2" MNPT (DN 8)		4	(83)	1-5/8	(42)	803732
3/8" FNPT by 1/2" MNPT (DN 10)		4	(83)	1-5/8	(42)	803733

Injection Lances

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.



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Polypropylene (EPDM o-rings)	Part No.
Connection 1/4" x 3/16" tubing to 1/2" MNPT	1021530
Connection 1/2" x 3/8" tubing to 1/2" MNPT	1021530
same, but with ball-type isolating valve	
Connection 1/4" x 3/16" tubing to 1/2" MNPT	1021531
Connection 1/2" x 3/8" tubing to 1/2" MNPT	1021531
PVC (Viton® o-rings)	
Connection 1/4" x 3/16" tubing to 1/2" MNPT	1021528
Connection 1/2" x 3/8" tubing to 1/2" MNPT	1021528
same, but with ball-type isolating valve	
Connection 1/4" x 3/16" tubing to 1/2" MNPT	1021529
Connection 1/2" x 3/8" tubing to 1/2" MNPT	1021529

Note: For brass 3/4" and 1" corporation stops, please call factory.

In-line check valve for tubing

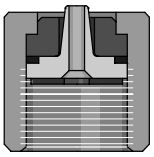


1856/4

Polypropylene	Part No.
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"	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

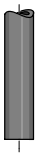


2181/4

Description	Part No.
PP/VITON® for hose type 1/4" x 3/16"	817166
PP/VITON® for hose type 1/2" x 3/8"	817171
PP/VITON® for hose type 3/8" x 1/4"	7817168
PP/EPDM for hose type 1/4" x 3/16"	817150
PP/EPDM for hose type 1/2" x 3/8"	817155
PP/EPDM for hose type 1/4" x 1/2"	817163
PP/EPDM for hose type 3/8" x 1/4"	7817151
PVC/Viton® for hose type 1/4" x 3/16"	817050
PVC/Viton® for hose type 1/2" x 3/8"	817055
PVC/Viton® for hose type 1/4" x 1/2"	817068
PVC/Viton® for hose type 3/8" x 1/4"	7817051
PVC/EPDM for hose type 1/4" x 3/16"	817060
PVC/EPDM for hose type 1/2" x 3/8"	740160
PVC/EPDM for hose type 3/8" x 1/4"	7817049
PTFE for hose type 1/4" x 3/16"	817201
PTFE for hose type 1/2" x 3/8"	791199
PVT for hose type 1/4" x 3/16"	1023246
PVT for hose type 1/2" x 3/8"	1024584
PVT for hose type 3/8" x 1/4"	7781457
PVT for hose type 8x4 mm (single only)	7500416

Tubing

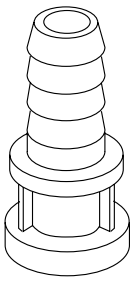
Suction and discharge tubing



1052/4

	Max. Operating . Pressure Rating (psig)	Part No.
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 1/4" x 1/2"	232	37032
PE 1/4" x 3/16"	100	7037005
PE 1/2" x 3/8"	100	7037010
PE 3/8" x 1/4"		7037011
Teflon (FEP) 1/4" x 3/16"	100	7037426
Teflon (FEP) 1/2" x 3/8"	100	7037428
Teflon (FEP) 8 x 4 mm	363	1033166

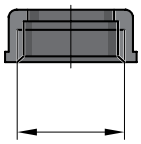
Hose Barbs



Material (all 1/2" DN 10)	Part No.
PP	800657
PVC	800554
PTFE	811572
316 SS	810536
Material (all 3/4" DN 15)	
PP	800655
PVC	811407
PTFE	811424
316 SS	810567

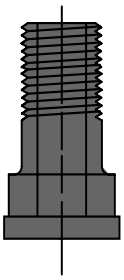
Pump & Systems Accessories

Union Nuts & Inserts



Union nut

1031/4



Threaded insert

1486/4

Pump	Union Nut Material	Threaded Insert Material	Union Nut Thread	Insert Thread	Union Nut Part No.	Threaded Insert Part No.
High Viscosity	PP	PP	DN 10	1/2" MNPT	358613	1017379
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
Sigma	PVDF	PVDF	DN 10	1/2" MNPT	358813	7358634
Sigma	PVDF	PVDF	DN 15	3/4" MNPT	358814	1017380
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

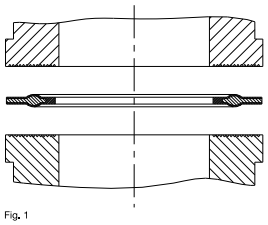


Fig. 1

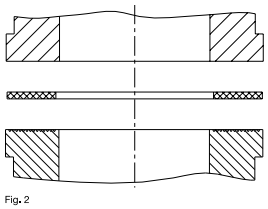


Fig. 2

Molded composite seal	PTFE, P/N
M20 x 1.5	1021686
DN10	1019364
DN15	1019365
DN20	1019366
DN25	1019367
DN32	1019353
DN40	1019368
DN50	1019369

Flat Seal	Viton®, P/N	EPDM, P/N
DN10	1019315	1019314
DN15	1019317	1019316
DN25	1019319	1019318
DN32	1019321	1019320
DN40	1019323	1019322
DN50	1019325	1019324

Pump & Systems Accessories

Gaskets

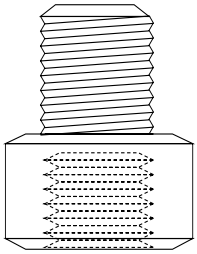
Gaskets

Virgin White Teflon gaskets for PTFE		Part No.
DN 10	Sigma X	483957
DN 15	Sigma X	483921
DN 20	Sigma X	483922

Note: The material make-up of the standard gaskets are teflon with a Viton® center. For applications using chemicals that react negatively with Viton®, the above gaskets are needed.

Tubing Adapters

Adapters

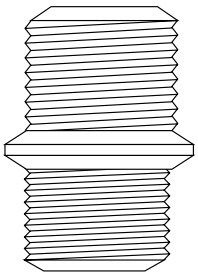


M20 x 1.5 Female by 1/2" MNPT

PVC	7744060
PVDF	7358652

M20 x 1.5 Female Socketweld

PVC	7740129
CPVC	7740881
PVDF	7745882



M20 x 1.5 Male by 1/2" MNPT

PVC/EPDM	7500856
PVC/Viton®	7500855
PVDF	7358660

M20 x 1.5 Male Socketweld

PVC	7740130
CPVC	7745158
PVDF	7745598



Right-angled PVC threaded connector

Connector for the beta b, gamma/X and gamma/XL 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 b, gamma/X and gamma/XL 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

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.

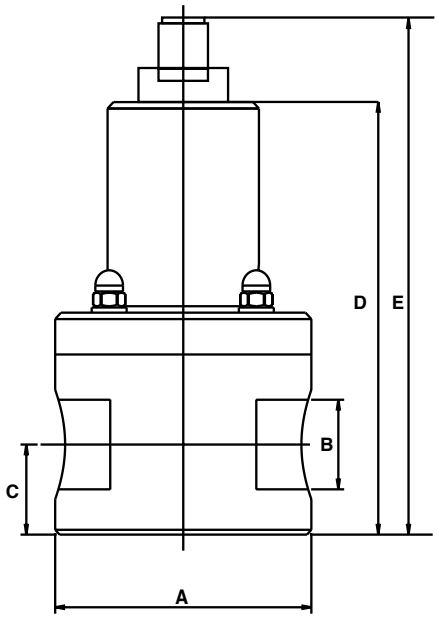
Pressure relief (3-port) valves are mounted in the discharge line, featuring a separate relief port which discharges back to the source tank or to the pump suction line to create a bypass.

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.



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

Pressure Relief Valves

1/4" FNPT valves

Material	Backpressure Valve (2-port)	Pressure Relief Valve (3-port)
PP	1009444	1009452
PVC	1009445	1009453
PVDF	1009446	1009454
316 SS	1009447	1009455

Tubing Adapters (1 required per valve port): 1/4" x 3/16" tubing x 1/4" MNPT	Part No.
PP/EPDM	7500060
PP/Viton®	7500058
PVC/EPDM	7500064
PVC/Viton®	7500062

1/2" FNPT valves

Material	Backpressure Valve (2-port)	Pressure Relief Valve (3-port)
PP	1006846	1006858
PVC	1006850	1006862
PVDF	1006854	1006866
316 SS	1008796	1008800

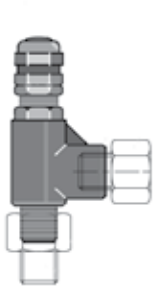
Tubing Adapters (1 required per valve port): 1/2" x 3/8" tubing x 1/2" MNPT	Part No.
PP/EPDM	7500061
PP/Viton®	7500059
PVC/EPDM	7500065
PVC/Viton®	7500063

	Material	Backpressure Valve (2-port)	Pressure Relief Valve (3-port)
3/4" FNPT valves	PP	1006847	1006859
	PVC	1006851	1006863
	PVDF	1006855	1006867
	316 SS	1008797	1008801
1" FNPT valves	PP	1006848	1006860
	PVC	1006852	1006864
	PVDF	1006856	1006868
	316 SS	1008798	1008802
1-1/2" FNPT valves	PP	1006849	1006861
	PVC	1006853	1006865
	PVDF	1006857	1006869
	316 SS	7302243	7302261
2" FNPT valves	PP	1009448	1009456
	PVC	1009449	1009457
	PVDF	1009450	1009458
	316 SS	7302247	7302265

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

Pressure relief valves

High pressure relief valve, adjustable, 1/4" and 1/2" NPT for Sigma X/ Makro HK and ProMus pumps



1112/4

Can also be used as a backpressure valve for < 30 gph (113 L/h).

These valves are without springs, which must be ordered separately.

		Part No.
Materials:	Stainless steel/Viton®	
Connection:	1/4" NPT male and female thread	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

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.

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.

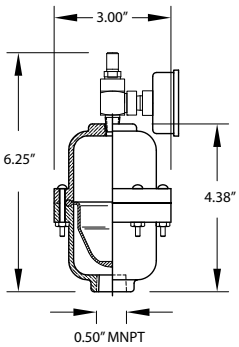
Multiply the pump's displacement per stroke (mL) times 26 to get minimum pulsation dampener volume (mL) to achieve 90% reduction in pulsation.

***** 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

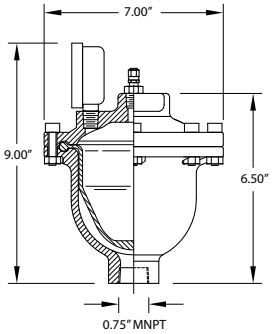


10 CU IN
(164 mL)

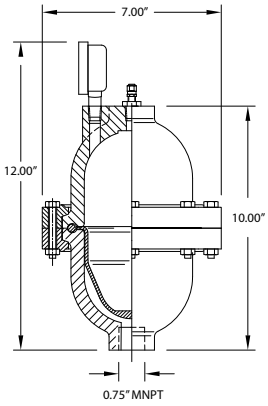
	Shipping Wt. lbs. (kg)	Model	Bladder size	Part No.
131 mL (8 cu. in.) Models				
SS housing: 3/8" FNPT, 1 port				
PTFE bellows	3 (1.4)	CTS1020 T	III	7253205
PVDF housing: 1/2" FNPT, 1 port				
PTFE bellows	1 (0.9)	FL12NK	III	1080264
164 mL (10 cu. in.) Models				
CPVC housing: 1/2" FNPT,1 port				
Nordel bladder (EPDM)	1 (0.9)	FL12NCP	III	1080253
Viton® bladder	1 (0.9)	FL12NCP	III	1080252
HYPALON® bladder	1 (0.9)	RC-10X-H50	III	7744098
Polypro housing: 1/2" FNPT, 1 port				
Nordel bladder (EPDM)	1 (0.9)	CTP1005 ND 5	III	1048663
PVDF housing: 1/2" FNPT, 1 port				
Nordel bladder (EPDM)	1 (0.9)	CTK1005 ND 5	III	7744100
Viton® bladder	1 (0.9)	FL12NK	III	1080265

Viton® and HYPALON® are registered trademarks of DuPont Dow Elastomers

Pulsation dampeners (cont.)



36 CU IN
(600 mL)

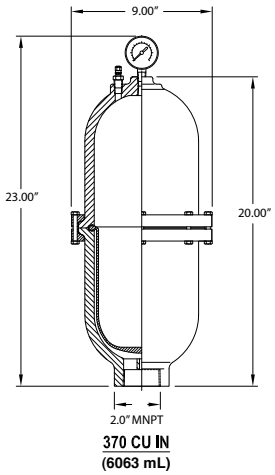


85 CU IN
(1393 mL)

	Shipping Wt. lbs (kg)	Model	Bladder Size	Part No.
262 mL (16 cu. in.) Models				
PVC housing: 3/4" FNPT, 1 port				
PTFE bellows	7 (3.2)	CT1311 T	II	7744211
PVDF housing: 3/4" FNPT, 1 port				
PTFE bellows	7 (3.2)	CT1401 T	II	7253234
SS housing: 3/4" FNPT, 1 port				
PTFE bellows	11 (5.0)	CT3120 T	II	7253237
600 mL (36 cu. in.) Models				
PVC housing: 3/4" FNPT, 1 port				
Nordel bladder	7 (3.2)	FL85NP	II	1080269
Viton® bladder	7 (3.2)	FL401NP	II	1080267
HYPALON® bladder	7 (3.2)	CT1311 H	II	7740946
Polypro housing: 3/4" FNPT, 1 port				
Nordel bladder	6 (2.7)	CT1301 ND	II	7253230
PVDF housing: 3/4" FNPT, 1 port				
Viton® bladder	7 (3.2)	FL40NK	II	1080268
SS housing: 3/4" FNPT, 1 port				
Viton® bladder	11 (5.0)	CT3120 V	II	7253238
1393 mL (85 cu. in.) Models				
PVC housing: 3/4" FNPT, 1 port				
PTFE bellows	10 (4.5)	CT311 T	II	7253229
SS housing: 3/4" FNPT, 1 port				
PTFE bellows	14 (6.4)	CT3020 T	II	7253206
PVDF housing: 3/4" FNPT, 1 port				
PTFE bellows	8 (3.6)	CT401 T	II	7253219
PVC housing: 3/4" FNPT, 1 port				
Nordel bladder	6 (2.7)	CT311 ND	II	7253221
Viton® bladder	6 (2.7)	FL85NP	II	1080266
HYPALON® bladder	6 (2.7)	CT311 H	II	7740947
PVDF housing: 3/4" FNPT, 1 port				
Nordel bladder (EPDM)	7 (3.2)	CT401 ND	II	7253209
Viton® bladder	8 (3.6)	CT401 V	II	7253210
1998 mL (122 cu. in.) Models				
PVC housing: 2" FNPT, 1 port				
PTFE bellows	16 (7.3)	CT911 T	I	7253228
2867 mL (175 cu. in.) Models				
PVC housing: 2" FNPT, 1 port				
HYPALON® bladder	13 (5.9)	CT911 H	I	7740948

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Pulsation dampeners (cont.)



	Shipping Wt. lbs (kg)	Model	Bladder Size	Part No.
5822 mL (355 cu. in.) Models				
PVC housing: 2" FNPT, 1 port PTFE bellows	18 (8.2)	CT111 T	I	7253215
PVDF housing: 2" FNPT, 1 port PTFE bellows	21 (9.5)	CT201 T	I	7253215
SS housing: 2" FNPT, 1 port (Fig. 4) PTFE bellows	40 (18.1)	CT2400 T	I	7253211
6063 mL (370 cu. in.) Models				
Polypro housing: 2" FNPT, 1 port (Fig. 4) Viton® bladder	15 (6.8)	CT101 V	I	7253213

Note: Other sizes and materials available upon request.

High pressure (1000psi) pulsation dampeners for ProMus pumps only.

	Model	Bladder Size	Part No.
66 mL (4 cu. in.) Models			
316 Stainless Steel housing: 3/8" FNPT, 1 port (not illustrated) Nordel bladder (EPDM)	H1120 ND	III	7744387
164 mL (10 cu. in.) Models			
316 Stainless Steel housing: 3/8" FNPT, 1 port (not illustrated) Nordel bladder (EPDM)	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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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 x (mL/stroke) = 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
Nordel bladder (EPDM)	J311ND	II	7744306
PVDF housing:			
Viton® bladder	J401V	II	7740860
6063 mL (370 cu. in.) Models (for 2" models)			
PVC housing:			
Viton® bladder	J111V	I	7744307
HYPALON® bladder	J111H	I	7744308
Nordel bladder (EPDM)	J111ND	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

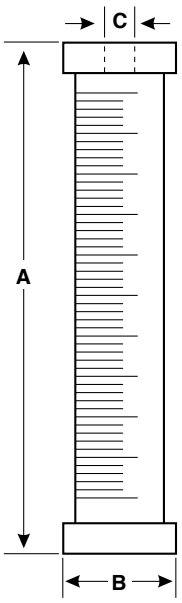
Calibration Columns are installed on the suction side of the metering pump and are isolated with two valves installed with the columns. The top of the column is vented back to the supply tank or drain. The calibration columns are filled to the top mark then the valve from the tank is closed. Turning on the metering pump will draw down the liquid providing a simple means to verify the accuracy of the pump flow rate. USGPH (gallons per hour) and mL (milliliters) are shown on the columns.

Glass Calibration Columns

- Borosilicate glass tube
- Protective outer shell
- GPH & mL scale
- Max. column pressure is 15 psi

Clear PVC Calibration Columns

- Clear tube for easy GPH reading
- Sealed top
- NSF-61 approved materials
- GPH & mL scale
- Max. column pressure is 15 psi

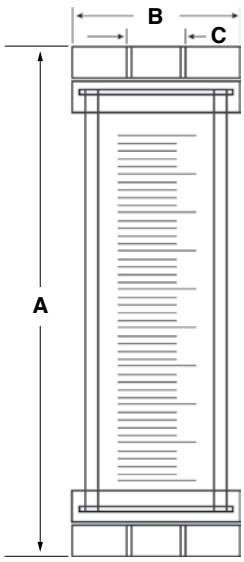


Clear PVC Calibration Column (Threaded)

Column Volume	Cap Material	Height A	Diameter B	Fitting Size C	Capacity (GPH)	Scale (mL)	Part No.
100 mL	PVC	11.00"	1.50"	1/2" NPT	3.2	2.0	7501331
250 mL	PVC	11.75"	2.10"	1/2" NPT	8.0	2.0	7501332
500 mL	PVC	13.00"	2.50"	1/2" NPT	16.0	5.0	1048428
500 mL	PVC	13.00"	2.50"	3/4" NPT	16.0	5.0	7501333
1,000 mL	PVC	22.00"	2.50"	3/4" NPT	32.0	5.0	7501334
2,000 mL	PVC	20.00"	3.95"	1" NPT	64.0	10.0	7501335
4,000 mL	PVC	37.00"	3.95"	1" NPT	128.0	10.0	7501336
10,000 mL	PVC	25.75"	7.25"	2" NPT	320.0	20.0	7501337
20,000 mL	PVC	47.75"	7.25"	2" NPT	640.0	20.0	7501338

Clear PVC Calibration Column (Socket)

Column Volume	Cap Material	Height A	Diameter B	Fitting Size C	Capacity (GPH)	Scale (mL)	Part No.
100 mL	PVC	11.00"	1.50"	1/2" SKT	3.2	2.0	7501339
250 mL	PVC	11.75"	2.10"	1/2" SKT	8.0	2.0	7501340
500 mL	PVC	13.00"	2.50"	3/4" SKT	16.0	5.0	7501341
1,000 mL	PVC	22.00"	2.50"	3/4" SKT	32.0	5.0	7501342
2,000 mL	PVC	20.00"	2.50"	1" SKT	64.0	10.0	7501343
4,000 mL	PVC	37.00"	3.95"	1" SKT	128.0	10.0	7501344
10,000 mL	PVC	25.75"	3.95"	2" SKT	320.0	20.0	7501345
20,000 mL	PVC	47.75"	7.25"	2" SKT	640.0	20.0	7501346



Glass Calibration Column

Column Volume	Cap Material	Height A	Diameter B	Fitting Size C	Capacity (GPH)	Scale (mL)	Part No.
100 mL	PVDF	14.93"	2.50"	1/2" NPT	3.2	2.0	7501347
100 mL	SS	14.93"	2.50"	1/2" NPT	3.2	2.0	7501355
200 mL	PVDF	20.93"	2.50"	1/2" NPT	6.4	2.0	7501348
200 mL	SS	20.93"	2.50"	1/2" NPT	6.4	2.0	7501356
500 mL	PVDF	14.99"	3.50"	3/4" NPT	16.0	5.0	7501349
500 mL	SS	14.99"	3.50"	3/4" NPT	16.0	5.0	7501357
1,000 mL	PVDF	26.99"	3.50"	3/4" NPT	32.0	5.0	7501350
1,000 mL	SS	26.99"	3.50"	3/4" NPT	32.0	5.0	7501358
2,000 mL	PVDF	27.33"	5.00"	1" NPT	63.0	10.0	7501351
2,000 mL	SS	27.33"	5.00"	1" NPT	63.0	10.0	7501359
4,000 mL	PVDF	39.28"	5.00"	1" NPT	127.0	10.0	7501352
4,000 mL	SS	39.28"	5.00"	1" NPT	127.0	10.0	7501360

O-Ring material is made of Viton®

Viton® and HYPALON® are registered trademarks of DuPont Dow Elastomers

Pump & Systems Accessories

Flow Monitor

Ultra-sound Flow Meter DulcoFlow®

Used for the measurement of pulsing flows ranging from 0.02-13 gph. All parts that come into contact with the feed chemical are made from PVDF, ensuring that even aggressive feed chemicals can be measured without a problem. The device is installed approximately 12" inches 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 fast with metering stroke versions.



Alongside the recording and measurement of flows, 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 lifting 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 or panel mounting.

- The cumulative volume can be calculated in gallons or liters
- 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)

Technical data

Measuring range:	0.03-13 gph
Accuracy:	± 2% after calibration using actual chemical
Analog output:	4-20 mA (recording or control)
Frequency output:	Configurable, max. 10 kHz
Protection class:	IP 65
Power supply:	100-230 V AC / 50/60 Hz
Max. viscosity of fluid:	2000 cP
Dimensions:	7.22” x 4.76” x 4.38” (HxWxD)
Smallest measurable Stroke volume:	0.03 ml/stroke (DFMa05) 0.05 ml/stroke (DFMa08)

Note: Max. distance from the pump discharge to the DulcoFlow unit is 12" inches.

Media to be measured

Connector:	Hose connection with nominal width 1/2” x 3/16”, 1/2" x 3/8", 3/8" x 1/4", 1/2" MNPT
Medium pressure:	44-232 psi * (minimum 44 psi needed for consistent measurement)
Medium temperature:	14-113 °F

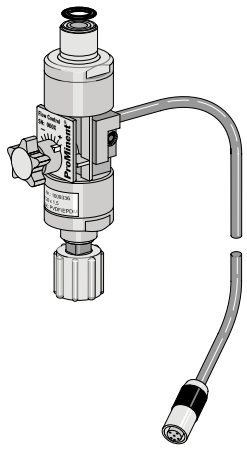
*A backpressure valve is recommened

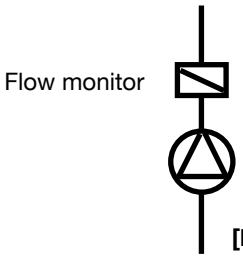
Identcode Ordering System

DFMA	Series Version:					
	05	beta® 1000 - 0413/0713, gamma/ X 1602 - 0414/0715, gamma/ XL 1608 - 1612				
	08	beta® 1604 - 0420, gamma/ X 1604 - 0424, gamma/ XL 1020 - 0450, Sigma X: Sigma/1				
		Seal Material:				
		T	PTFE			
			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:	
					1	4-20 mA output
					2	Contact Output
					3	with current and contact exit
					4	exit for controlled pump
						Design:

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.





[For use with low-viscosity (water-like) fluids only].

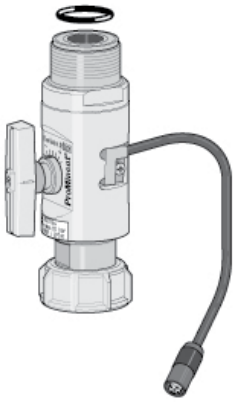
Materials:

Flow meter:	PVDF
Float:	PTFE-coated
O-rings:	Viton® B/EPDM

For gamma/L series in material versions PP, PVDF, NP and TT.

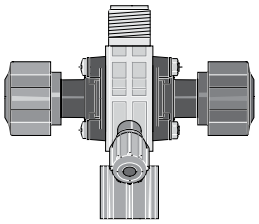
Flow Control	Material	Pump type	Part No.
Flow Control type I	PVDF, EPDM	1000, 1601, 1602	1009229
Flow Control type II	PVDF, EPDM	1005, 1605, 0708, 1008, 0413 0713, 0220, 0420, 0232	1009336
Flow Control type I	PVDF, Viton® B	1000, 1601, 1602	1009335
Flow Control type II	PVDF, Viton® B	1005, 1605, 0708, 1008, 0413 0713, 0220, 0420, 0232	1009338

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	1021164
	PVDF, Viton® B	07120, 04350, 120145, 120190 120270	1021165
Flow Control type V (Sigma/ 3)	PVDF, EPDM	07410,07580, 04830	1021166
	PVDF, Viton® B	07410,07580, 04830	1021167

Multifunction Valve



The ProMinent® multifunctional valve is simple to operate using smooth action rotary knobs, which return to their initial position on release. This ensures safe operation even under difficult access conditions. The ProMinent® multifunctional valve is made of PVDF and can be used with virtually all chemicals.

Back pressure valve, opening pressure approx. 22 psi (1.5 bar), with open discharge or positive pressure on the suction side ***(black rotary knob)***

Relief valve, opening pressure approx. 87, 145 or 232 psi (6, 10 or 16 bar) ***(red rotary knob***)

Priming aid with pending back pressure, no need to de-pressurize pipes

Pressure relief, e.g. prior to servicing

Warning: Back pressure valves are not intended as completely sealed units!

Caution: The bypass line must always be connected.

Materials in contact with chemicals:

Valve body	PVDF
Diaphragm	PTFE-coated
O-rings	FKM and EPDM (enclosed)

Technical data:

Type	Relief opening pressure*		Connection	Bypass connector	Part Number
	psig	(bar)			
Size I	232	(16)	6 - 12	6/4	792011
Size I	145	(10)	6 - 12	6/4	791715
Size I	87	(6)	6 - 12	6/4	1005745
Size II	145	(10)	6 - 12	12/9	792203
Size II	87	(6)	6 - 12	12/9	740427
Size III	145	(10)	DN 10	12/9	792215

** The relief opening pressure given above is the pressure at which the valve begins to open. The pressure can be up to 50 % higher until the valve is fully open depending on the type of pump.*

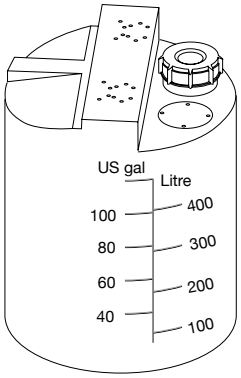
Application: multifunctional valves

Size I ALPc 1001, 1002, 1004, 1008, 0708
beta b, gamma/ L 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 ALPc 0419, 0230
Beta b, gamma/ L 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
For material design PP, PV, NP, TT

Chemical tanks



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 180°F (82°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".

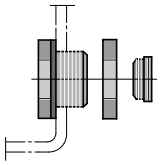
Capacity		O.D.		Height		Empty Weight		
gallon	(litre)	in.	(mm)	in.	(mm)	lb.	(kg)	Part No.
15	(60)	18	(445)	22	(559)	11	(5.0)	791994
26	(100)	20	(500)	30	(760)	17	(7.7)	1001490
70	(265)	26	(661)	42.5	(11079.5)	37	(17)	1023175
132	(500)	32	(820)	47	(1190)	54	(24.5)	791997
220	(830)	42	(1067)	41	(1041)	55	(25.0)	7809688
300	(1135)	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

PVC tank drain fitting with plug



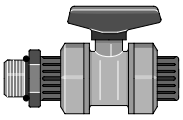
1077/4

1/2" FNPT as an additional con nection 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	7745801
PVC with EPDM seal	7740771

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.

PVC with Viton® seal	7745802
PVC with EPDM seal	7741477



2424/4

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	7000309
PVC with EPDM seal	7000311

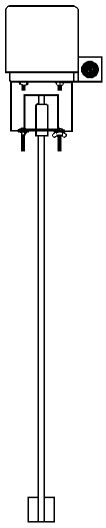
3/4" PVC ball valve with 3/4" FNPT connections for all chemical tanks with 3/4" PVC tank drain fittings.

PVC with Viton® seal	7741668
PVC with EPDM seal	7741485

Electric mixers

Note: with any tank-mounted mixer, the inertia of fluid rotating in a polyethylene tank may cause the tank to move when the fluid level is low. Provision should be made to anchor the tank or to automatically shut the mixer off when the fluid level is low.

Fig. 1

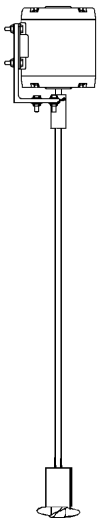


High speed mixer for water-like fluids in 15, 26 or 66 U.S. gallon tanks (Fig. 1):

Motor: 1/20 HP, 1550/1725 RPM, 115 VAC, 60 Hz, 1 ph., TEFC, with 8' Type SJ power cord, no on/off switch.
Shaft: 316 SS shaft/impeller (epoxy coated)
Mount: Four hole mounting flange with bolt holes, set at 5° angle for mounting directly on tank top.
Accessories: 1" diameter PVC metering pump suction pipe with bulkhead fitting for mounting to tank top.
Shipping weight: 9 lbs. (4 kg)

	Part No.
For 26 gallon tank (19" shaft)	7818588
For 66 gallon tank (34" shaft)	7818589
Shaft only (19" replacement)	7818590
Shaft only (34" replacement)	7818591

Fig. 2



High speed mixer for water-like fluids in 132 to 300 gallon tanks (Fig. 2):

Motor: 1/4 HP, 1725 RPM, 115/230 VAC, 60 Hz, TEFC. Power cord not included.
Shaft: 316 SS shaft/propeller. Shaft length: 36" (may be cut down for smaller tanks)
Mount: Bracket with bolt holes, for mounting directly on tank top.

Shipping weight: 27 lbs. (12 kg)	7818592
Shaft only (36" replacement)	7744506

Slow speed mixer for water-like fluids in 15, 26 or 66 gallon tanks:

Motor: 1/3 HP, 60 RPM, 115 VAC, 50/60 Hz, 1 ph., TEFC. Power cord not included.
Shaft: 316 SS shaft w/ 1 set of impellers. Shaft length is 44" (may be cut).
Mount: Bracket w/ 4 bolt holes for mounting directly on tank top.

Shipping weight: 32 lbs.	7818594

Note: Motor not thermally protected.

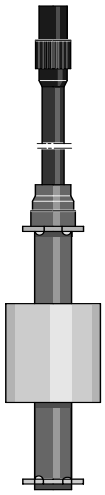
Mixer mounting kit for 26, 66, and 132 gallon tanks:

Polyethylene flange adapter for mounting mixers to metric flange. Includes all necessary hardware.	7744319

*(Other mixers available upon request)

Two-stage Float Switch

(includes ceramic weight - do not use ceramic weight for fluoride service)



2380/4

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 1.2" (30 mm).

With 3-pole round connector, suitable for direct connection to metering pump or with 3 leads
Switch mode when liquid level is low: 2 x N/C

Suitable for Beta b, gamma/ X, and gamma/ XL metering pumps

Technical data:

Max. Switching voltage: 24 V DC

Swiching current: 0.5 A

Switching power: 5 W/5 VA

Temperature range: 14 ºF - 149 ºF (-10 ºC - 65 ºC), degree of protection IP 67

Material	Connection cable	Lead lenght	Part Number
PP/PP	Round plug	6 Ft (2 m)	7142093
	Round plug	16 Ft (5 m)	7142095
PVC/PP	Round plug	6 Ft (2 m)	7142043
	Round plug	16 Ft (5 m)	7142038
PVDF/PVDF	Round plug	6 Ft (2 m)	7792639
	Round plug	16 Ft (5 m)	7792640

Float switch weights



1086/4

1.53" dia. x 1.26" (39 mm x 32 mm)	with oval opening .51" x 1.06" (13 mm x 27 mm)	Part Number
		404004

With two-stage float switches with round connector, the weight is slid into position from below after the float has been removed.

Note: Not for use in fluoride application (e.g. hydrofluosilicic acid).

Level switch, single-stage with flat plug

(includes ceramic weight – do not use ceramic weight for fluoride service)



2820/4

Single-stage level switch with flat plug for level monitoring in a storage tank.
Suitable for Concept b metering pumps

Technical data:

Max. Switching voltage: 100 V
Switching current: 0.5 A
Switching capacity: 5W/5A
Temperature range: 14 °F - 149 °F (-10 °C - 65 °C), degree of protection IP 67

Switching mode: at liquid level low 1 x N/O

Material	**PVDF/PE**	**PVDF/PVDF**
Level switch	PVDF	PVDF
Float	PE foamed	PVDF
Cable	PE	PE

Material	Connection cable	Lead length	Part Number
PVDF/PE	Flat plug	6 Ft (2 m)	1031588
PVDF/PE	Flat plug	16 Ft (5 m)	1031590
PVDF/PVDF	Flat plug	6 Ft (2 m)	1034695
PVDF/PVDF	Flat plug	16 Ft (5 m)	1034696

Float switch weights



1.53" dia. x 1.26"with oval opening .51" x 1.06" Part Number
(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.

PVC weight

1086/4

For bottom of foot valve in fluoride applications. 7404007

Two-stage Float switch

(includes ceramic weight - do not use ceramic weight for fluoride service)



2380/4

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 1.2" (30 mm).

With 3-pole round connector, suitable for direct connection to metering pump
Suitable for Sigma/ X 1, 2 & 3 metering pumps

Technical data:

Max. Switching voltage: 100 V

Switching current: 0.5 A

Switching capacity: 5 W/5 VA

Temperature range: 14 °F - 149 °F (-10 °C - 65 °C), degree of protection IP 67

Material	Connection cable	Lead length	Part Number
PP/PP	Round plug	6 ft (2m)	7142093
	Round plug	16 ft (5 m)	7142095
PVC/PP	Round plug	6 ft (2m)	7142043
	Round plug	16 ft (5 m)	7142038
PVDF/PVDF	Round plug	6 ft (2m)	7142006
	Round plug	16 ft (5 m)	7142007

Single-stage Float switch

(includes ceramic weight - do not use ceramic weight for fluoride service)



2820/4

Single-stage level switch with flat plug for level monitoring in a storage tank.
Suitable for Sigma/ 1, 2 & 3 basic metering pumps

Technical Data:

Max. Switching voltage: 100 V
Switching current: 0.5 A
Switching capacity: 5W/5A
Temperature range: 14 °F - 149 °F (-10 °C - 65 °C), degree of protection IP 67

Material	Connection cable	Lead length	Part Number
PP/PP	Flat plug	6 ft (2 m)	1031588
	Flat plug	16 ft (5 m)	1031590
PVC/PP	Flat plug	6 ft (2 m)	1031588
	Flat plug	16 ft (5 m)	1031590
PVDF/PVDF	Flat plug	6 ft (2 m)	1034695
	Flat plug	16 ft (5 m)	1034696

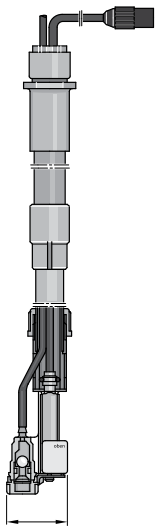
Float switch weights

PVC weight	Part Number
For fluoride, (hydrofluosilicic acid) or when plastic is required to replace standard ceramicweight.	7404007

Suction assemblies, two-stage: for beta b, gamma/ X and gamma/XL 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	Part No.
1/4" x 3/16"	790368
1/2" x 3/8"	790370

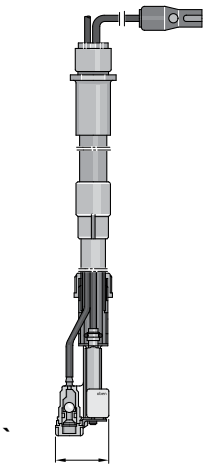
2798/R

Suction assemblies, single-stage: for Concept b

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



2798/F

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

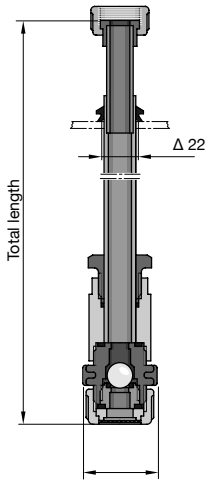
Requires 1.0" hole in top of tank for bulkhead fitting

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

Suction Assemblies

Suction assemblies: for Sigma X Basic and Makro pumps



Note: This fitting is a compression fitting, pipe can be cut to desired length.

2801/3

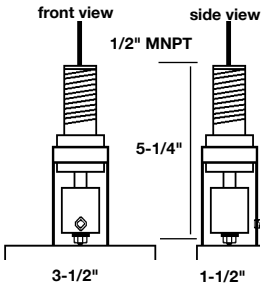
PP without float switch

Size of connection		Max. tank size gallons (liters)	Max. length inches (mm)	Part No.
PP-DN 10 - 1/2"	Sigma X	220 (830)	up to 52"(1320)	790389
PP-DN 15 - 3/4"	Sigma X	220 (830)	up to 52" (1320)	790394
PP-DN 25 - 1"	Sigma X/Makro	220 (830)	up to 52"(1320)	790396
PP-DN 32 - 1-1/2"	Sigma X	-	-	1005524

PVC without float switch

Size of connection		Max. tank size gallons (liters)	Max. length inches (mm)	
PVC-DN 10 - 1/2"	Sigma X	220 (830)	up to 52"(1320)	790387
PVC-DN 15 - 3/4"	Sigma X	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 X/Makro	220 (830)	up to 52"(1320)	790393
PVC-DN 32 - 1-1/2"	Sigma X	-	-	1005525

Diaphragm-failure Detector



Diaphragm-failure detector

To trip an alarm and/or switch the metering pump off in case of diaphram 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.	Part No.
N/O	7803640
N/C	7803650



Signal horn

115 V, 60 Hz, 95 dB, NEMA 4X (e.g. in conjunction with fault annunciating relay or relay combination) 7705004



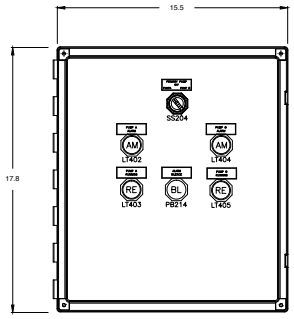
Amber signal strobe light

115 V, 60 Hz, NEMA 4X (e.g. for use in conjunction with fault annunciating relay or relay combination) 7914785

Pump & Systems Accessories

Universal Switchover Box

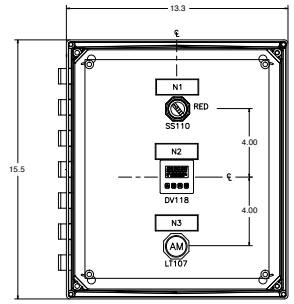
One, two ,three or four pump terminal boxes are TYPE 4X polycarbonate boxes with terminals for Power and control / alarm cable connections for all pumps respectively. Terminal box can be connected to PFC control panels for Local or Remote operation of the pumps, customer has access to all functions of PFC Solenoid and control version pumps via the terminal box including Dry contact start and 4-20mA speed reference as well as the Alarm contact status and Analog feedback for each pump.



Next Generation

Type 4X Polycarbonate PLC operated switchover control with ability to Single switch over or 3 attempt switchover prior to stopping the process. , Alternating primary pump or non alternating primary selection, Accepts Remote Start and 4-20mA or Pacing signals, external interlock contacts N.O and N.C. , Provides Alarm, Running and 4-20mA feedback for each pump, leak detection status available when appropriate pump option selected. Output available for customer supplied audible alarm. Optional duplex receptacle available. Functions are selectable via jumper installed by customer

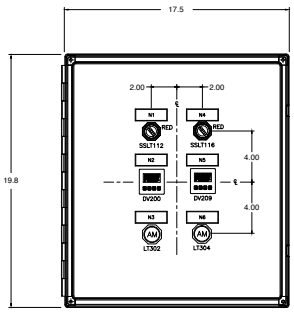
	Part No.
CP2_120VAC Auto S/O:	7746095
(17.8"x15.5")	*(replaces p/n 7951130*



One Pump SCADA Panel

TYPE 4X Single Pump Local control panel for customer SCADA interface. Dry contact Start & 4-20mA speed reference from SCADA in Remote mode, status to SCADA include Alarm, Pump Running, & analog feedback of pump output.
Enclosure dimensions (15.5"x13.3")

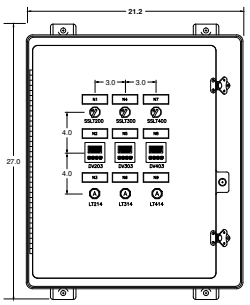
Part No.
7745681



Two Pump SCADA Panel

TYPE 4X Dual Pump Local control panel for customer SCADA interface. Each pump receives dry contact Start & 4-20mA speed reference from SCADA in Remote mode, status to SCADA include Alarm, Pump Running, & analog feedback of pump output for each pump. Enclosure dimensions (19.8"x17.5")

Part No.
7745682

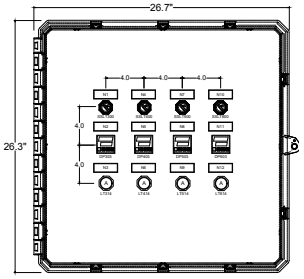


Three Pump SCADA Panel

TYPE 4X Three Pump Local control panel for customer SCADA interface. Each pump receives dry contact Start & 4-20mA speed reference from SCADA in Remote mode, status to SCADA include Alarm, Pump Running, & analog feedback of pump output for each pump. Enclosure dimensions (27"x 21.2")

Part No.
7746598

Four Pump SCADA Panel



TYPE 4X Three Pump Local control panel for customer SCADA interface. Each pump receives dry contact Start & 4-20mA speed reference from SCADA in Remote mode, status to SCADA include Alarm, Pump Running, & analog feedback of pump output for each pump. Enclosure dimensions (26.7"x 26.3")

Part No.
7747229

The above SCADA interface panels are designed to operate with ProMinent Gamma X, Gamma XL, and Sigma X (Sigma/1, 2 & 3 Model) pumps. Configure these pump models with the optional input 4-20mA control and 4-20mA feedback with fault indication for correct operation. These options are indicated in the pump Identification Codes as follows.

Gamma X Pumps – GMXaXXXXXXXXXX00UD**C**X**3**XXEN

Gamma XL Pumps – GXLaUSXXXXXXXXXX00UD**C**X**3**XEN

Sigma X – Sigma 1 Pumps – S1CbHXXXXXXXTXXX0UD**81**0XXEN

Sigma X – Sigma 2 Pumps – S2CbHXXXXXXXTXXX0UD**81**0XXEN

Sigma X – Sigma 3 Pumps – S3CbHXXXXXXXTXXX0UD**81**0XXEN

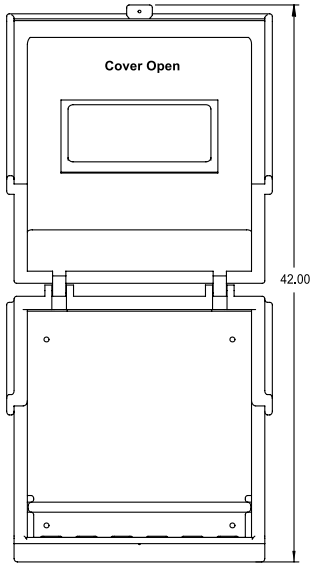
For interfacing with older generation ProMinent pumps, please contact Inside Sales for assistance.

	Part No
Terminal Box Kit, 1 Pump, Non-GFI Receptacle	
(Consists of P/N: 7745824* + Additional Components for Receptacle)	7745878
Terminal Box Kit, 1 Pump, GFI Receptacle	
(Consists of P/N: 7745824 + Additional Components for Receptacle)	
(NOT TO BE UTILIZED WITH SIGMA CONTROL SERIES PUMPS)	7745879
Terminal Box Kit, 2 Pump, Non-GFI Receptacle	
(Consists of P/N: 7745262* + Additional Components for Receptacle)	7745880
Terminal Box Kit, 2 Pump, GFI Receptacle	
(Consists of P/N: 7745262* + Additional Components for Receptacle)	
(NOT TO BE UTILIZED WITH SIGMA CONTROL SERIES PUMPS)	7745881
Terminal Box Kit, 3 Pump, Non-GFI Receptacle	
(Consists of P/N: 7745263* + Additional Components for Receptacle)	7746097
Terminal Box Kit, 3 Pump, GFI Receptacle	
(Consists of P/N: 7745263* + Additional Components for Receptacle)	
(NOT TO BE UTILIZED WITH SIGMA CONTROL SERIES PUMPS)	7746098
Terminal Box Kit, 4 Pump, Non-GFI Receptacle	
(Consists of P/N: 7746128* + Additional Components for Receptacle)	7746099
Terminal Box Kit, 4 Pump, GFI Receptacle	
(Consists of P/N: 7746128* + Additional Components for Receptacle)	
(NOT TO BE UTILIZED WITH SIGMA CONTROL SERIES PUMPS)	7746100

** Terminal Box Only*

Pump & Systems Accessories

Pump Shelves and Stands



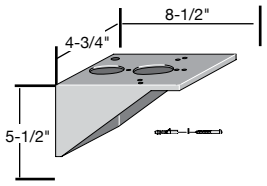
FRONT VIEW

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
Shipping weight (w/o pumps): 15 lbs.
Height: 19”
Width: 19”
Depth: 16.5”
Hinge: Plated Steel
Drain: 1/4” FNPT

Description	Part Numbers
Shelf w/cover	7500374

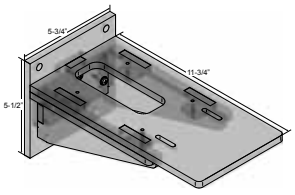


pk_1_092

Wall mounting bracket for solenoid pumps

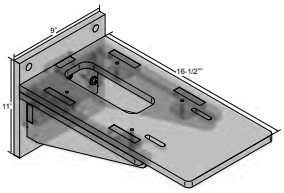
Made of fiberglass-reinforced PPE, with wall-plugs and screws, accepting a concept, beta b, and gamma/ X. Pumps can be mounted either parallel or perpendicular to the wall.

Part No. 810164



Wall mounting bracket for solenoid pump

Accepts concept, beta b, and gamma/ X
PP wall bracket mounts pumps so that diaphragm is parallel to the wall. 1088680

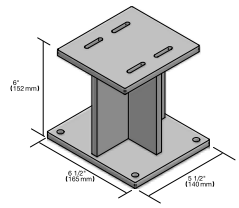


Wall mounting bracket for solenoid & motor pumps

Accepts gamma/ XL & Sigma/ X 1 and 2 series pumps
PP wall bracket mounts pumps so that diaphragm is parallel to the wall. 1088681

Pump & Systems Accessories

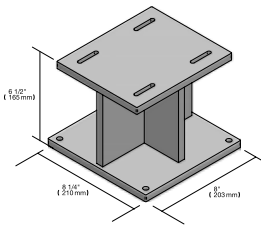
Pump Stands



Floor mounting stand for solenoid pumps

Polypropylene floor mounting stand accepts pumps parallel to the floor.

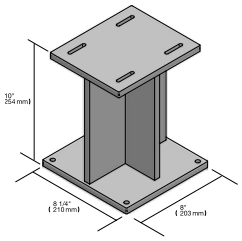
6" PP floor mounting stand 1079672



Floor mount stand for Motor pumps

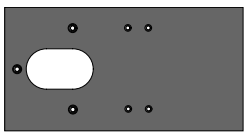
Polypropylene floor mounting stand accepts pumps parallel to the floor.

6-1/2" PP floor mounting stand 1028759



10" PP floor mounting stand 1088677

Adapter plate

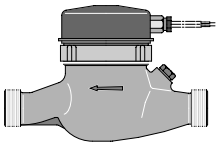


pk_1_121

With fixtures, for vertical wall-mounting of beta 4/5 SEK. Used with PPE wall console.

PP adapter plate 1003030

Pulse-type water meters for potable water



1137/4

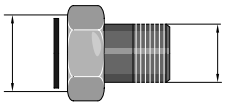
Contact water meter – US GPH Scale

max. operation temperature 104° F.

Pipe Coupl. Size	Min. Flow Rate in			Max. Flow Rate in			Press. Loss Max. Flow Rate		
in.	GPM	GPH	(L/h)	GPM	GPH	(L/h)	psig	(bar)	Part No.
3/4"	0.5	30	(113)	20	1200	(4542)	14.5	(1)	7500076
1"	0.6	36	(136)	50	3000	(11356)	14.5	(1)	7500077
1-1/2"	1.0	60	(227)	100	6000	(22712)	14.5	(1)	7500078
2"	2.0	120	(454)	130	7800	(29526)	14.5	(1)	7500079

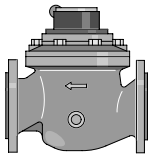
Note: Please specify GPC when ordering. (Price includes two screw fittings)

Screw fittings in brass with packing for water meters (price per unit)



1139/4

3/4"	7359021
1-1/2"	7359023
2"	7359024



1138/4

Contact water meter – US GPH, 3"...6" flanged

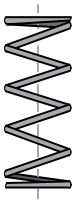
max. operation temperature 104°F.

Min. Flow Rate in			Max. Thru-Put		Pipe Flange Size	Install. Length	Standard Gallon/ Pulse	Weight lb. (kg)	Part No.
GPM	GPH	(L/h)	GPM	GPH	in.	in.			
2.6	156	(590)	650	39000	3" ASA	9" (225 mm)	10	42 (19)	7304512
11	660	(2498)	1875	112500	6" ASA	12" (298 mm)	25	89 (40)	7304514

Valve Springs

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).

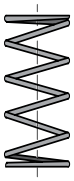
Discharge valve springs may be used instead of an external backpressure valve to improve repeatability when discharging to an open tank. Suction valve springs in excess of 1 psig (0.05 bar) make priming difficult; and in excess of 7 psig (0.5 bar) makes pumping impossible, except where suction pressure exceeds spring pressure.

Not recommended for antisiphon protection – use a diaphragm-type backpressure valve for antisiphon protection.There is no labor charge for installing the valve springs into the pump valves or injection valves.

	Pressure Rating Material of psig	(bar)	Construction	Part No.
Suction and Discharge Valves Model #'s:	1	(0.05)	316 SS	469406
beta b & gamma/ X 1000, 1601, 1602, 1005, 1605 (Fig. 1)	14	(1.0)	316 SS	469401
Suction and Discharge Valves, and Injection Valves Model #'s:	1	(0.05)	Hastelloy C	469403
beta b & gamma/ X 0708, 0413, 0220, 1008, 0713, 0420, 0232	7	(0.5)	Hastelloy C	469404
All standard **gamma/ XL** liquid ends	7	(0.5)	PVDF-coated Hastelloy C	818590
(Fig. 2)	14	(1.0)	Hastelloy C	469413
	14	(1.0)	PVDF-coated Hastelloy C	818536
	29	(2.0)	Hastelloy C	469410
Suction and Discharge Valves Model #'s:	1	(0.05)	Hastelloy C	469114
beta b & gamma/ X 1002 PP4/PP5, 0423, 0230,	1	(0.05)	302 SS	7469401
plus Injection Valves: Models 0423, 0230	7	(0.5)	Hastelloy C	469115
	7	(0.5)	PVDF-coated Hastelloy C	818515
	14	(1.0)	Hastelloy C	469119
Suction and Discharge Valves Model #'s:	1	(0.05)	Hastelloy C	469107
Model #'s: **beta b & gamma/ X** 1006, 1310, 0813 PP4/PP5	7	(0.5)	Hastelloy C	469108
only, plus Injection Valves: Models 1006,	7	(0.5)	PVDF-coated Hastelloy C	818516
1310 and 0813 PP4/PP5	14	(1.0)	Hastelloy C	469116
Discharge Valves Model #'s (w/ auto-degassing):	21	(1.5)	Hastelloy C	791052
beta b & gamma/ X 1601,1602, 1005, and 1605				

Valve springs

Fig. 1

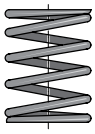


pk_1_103

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.

Fig. 2



pk_1_104

Not recommended for antisiphon protection – use a diaphragm-type backpressure valve for antisiphon protection.

There is no labor charge for installing the valve springs into the pump valves or injection valves.

Pump Model	Spring Pressure Rating psig	(bar)	Material of Construction	Part No.
DN 10 valves: Vario models 12017, 12026, 12042, 10025, 09039, 07063 **Sigma X: Sigma/1, Hydro**	1	(0.05)	Hastelloy C	469114
	7	(0.5)	Hastelloy C	469115
	7	(0.5)	PVDF-coated Hastelloy C	818515
	14	(1.0)	Hastelloy C	469119
	1	(0.05)	302 SS	7469401
DN 15 Valves: Vario models 06047, 05075, 04120 **Sigma X: Sigma/1** **Sigma X: Sigma/2** models 12050, 12090, 12130	1	(0.05)	Hastelloy C	469107
	7	(0.5)	Hastelloy C	469108
	7	(0.5)	PVDF-coated Hastelloy C	818516
	14	(1.0)	Hastelloy C	469116
DN 20 Valves: **Makro** models with 3/4" connectors	1	(0.05)	Hastelloy C	469451
	7	(0.5)	Hastelloy C	469409
	7	(0.5)	PVDF-coated Hastelloy C	818517
	14	(1.0)	Hastelloy C	469135
	1	(0.05)	302 SS	7469402
DN 25 Valves: **Makro** models with 1" connectors **Sigma X: Sigma/2** models 07120, 07220, 04350	1	(0.05)	Hastelloy C	469452
	7	(0.5)	Hastelloy C	469414
	7	(0.5)	PVDF-coated Hastelloy C	818518
	14	(1.0)	Hastelloy C	469136
DN 40 Valves: **Makro** models with 1-1/2" connectors	7	(0.5)	Hastelloy C	469104
	7	(0.5)	PVDF-coated Hastelloy C	818519
Makro HK pumps with 1/4" connectors	1	(0.05)	316 SS	469461
Makro HK pumps with 3/8" connectors	1	(0.05)	316 SS	469462

AC and DC Motors

AC motors

All AC motors are recognized by Underwriters Laboratories component approval program, and Canadian Standards Association.

All motors are 1725 RPM, C-faced, and 60 Hz. Manufacturer may vary.					**Part No.**
1/3 HP	TEFC	56-C	115/208-230V	1 phase	7951046
1/3 HP	TEFC	56-C	208-230/460V	3 phase	7951048
1/2 HP	TEFC	56-C	115/208-230V	1 phase	7951021
1/2 HP	TEFC	56-C	208-230/460V	3 phase	7951023
3/4 HP	TEFC	56-C	115/208-230V	1 phase	7951060
3/4 HP	TEFC	56-C	208-230/460V	3 phase	7951061
1 HP	TEFC	56-C	208-230/460V	3 phase	7951024
1-1/2 HP	TEFC	56-C w/base	115/208-230V	1 phase	7951025
1-1/2 HP	TEFC	56-C w/base	208-230/460V	3 phase	7951026
3 HP	TEFC	***182TC	208-230/460V	3 phase	7951142

*** Must use adapter (see below)

AC explosion-proof motors

Corrosion resistant epoxy finish. Positively locked drive end bearing.
UL and CSA approved for Class I, Group D or Class II, Group F and G.
UL approved cast conduit box-standard.

Manufacturer may vary.				**Part No.**
1/3 HP	56-C	115/208-230V	1 phase	7951014
1/3 HP	56-C	208-230/460V	3 phase	7951013
1/2 HP	56-C	115/208-230V	1 phase	7951006
1/2 HP	56-C	208-230/460V	3 phase	7951005
3/4 HP	56-C	115/208-230V	1 phase	7951004
3/4 HP	56-C	208-230/460V	3 phase	7951003
1-1/2 HP	56-C w/base	208-230/460V	3 phase	7951002
3 HP	*182TC	208-230/460V	3 phase	7951001

* Must use adapter (see below)

Adapter * ** (Required when using motors with 184TC or 182TC face)

Mounting flange and motor shaft coupling (Makro pumps w/3 HP, AC motors)	7951144

DC motors

Permanent magnet 1750 rpm.					**Part No.**
1/3 HP	TENV	90 V	56-C	Sigma	7951078
1/2 HP	TENV	90 V	56-C	Meta	7951079
3/4 HP	TEFC	90 V	56-C	Sigma/3, Meta, Makro, Hydro	7951080
1-1/2 HP	TEFC	180 V	145-TC	Makro, Hydro	7951081
3 HP	TEFC	180 V	184-C	Makro	7951140

AC Inverter

Provides variable motor speed with three-phase AC motors by adjusting the frequency (Hz) output to the motor. Motor not included with inverter. See motor section for three-phase motors. Features NEMA 4X enclosure with keypad and display of percent load or output voltage. Selectable for local or remote operation via 4-20 mA signal. Minimum speed 3-30 Hz.

Specifications

For 1/4 to 1/2 HP motors with line voltage 208-240 VAC, 3 phase, 60 hz 7746667
3 phase vac output: 2.3 amps max.
Weight: 5.07 lbs (2.3 kg)
Dimensions: (H x W x D) 9.137 x 6.34 x 6.89" (232 x 161 x 175 mm)

For up to 1 HP motors with line voltage 208-240 VAC, 3 phase, 60 hz 7746668
3 phase vac output: 4.3 amps max.
Weight: 5.07 lbs (2.3 kg)
Dimensions: (H x W x D) 13.3 x 11 x 6.25" (338 x 280 x 159 mm)

For up to 2 HP motors with line voltage 208-240 VAC, 3 phase, 60 hz 7746669
3 phase vac output: 7.0 amps max.
Weight: 5.07 lbs (2.3 kg)
Dimensions: (H x W x D) 9.137 x 6.34 x 6.89" (232 x 161 x 175 mm)

For up to 1 HP motors with line voltage 380-480 VAC, 3 phase, 60 hz 7746670
3 phase vac output: 2.2 amps max.
Weight: 5.07 lbs (2.3 kg)
Dimensions: (H x W x D) 9.137 x 6.34 x 6.89" (232 x 161 x 175 mm)

For up to 2 HP motors with line voltage 380-480 VAC, 3 phase 7746671
3 phase vac output: 4.1 amps max.
Weight: 5.07 lbs (2.3 kg)
Dimensions: (H x W x D) 9.137 x 6.34 x 6.89" (232 x 161 x 175 mm)

(For 3 HP and larger drives contact Customer Service)

Inverter Duty Rated Motors

1/3 HP	TEFC	230/460 VAC	56C	3 phase	7951146
1/2 HP	TEFC	230/460 VAC	56C	3 phase	7951145
3/4 HP	TEFC	230/460 VAC	56C	3 phase	7951147
1 HP	TENV	230/460 VAC	143TC	3 phase	7500429
1-1/2 HP	TENV	230/460 VAC	145TL	3 phase	7951149
3 HP	TENV	230/460 VAC	*184TC	3 phase	7951143

* Must use adapter (see below)

Adapter * (Required when using motors with 184TC or 182TC face)
Mounting flange and motor shaft coupling (Makro pumps w/3 HP, AC motors) 7951144

Stroke-positioning Motors

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
Sigma/ 1	7781491
Sigma/2	1018894
Sigma/3	1006504
Makro	1020798
ProMus	852752

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)	404233
	Ceramic	1/4"	(4.8)	7500289
For use with 9.5 mm valve only	PTFE	1/2"	(9.5)	7404206
	SS	1/2"	(9.5)	404240
For use with 9.2 mm (standard) valve	Ceramic	1/2"	(9.2)	7500290

Special valve balls

For metering pumps and accessories if standard materials are unsuitable.





pk_1_102

	Part No.
11.1 mm dia. for DN 10 (Sigma X)	
PTFE (1/2" MNPT connection)	7404207
Ceramic (1/2" MNPT connection)	7500291
SS (3/8" FNPT connection)	7404241
16 mm dia. for DN 15 (Sigma X)	
PTFE (3/4" MNPT connection)	7404208
Ceramic (3/4" MNPT connection)	404275
SS (1/2" FNPT connection)	404244
20 mm dia. for valve dia. 3/4" DN 20 (Makro)	
PTFE	404256
Ceramic	7500292
SS	404246
25 mm dia. for valve dia. 1" DN 25 (Sigma X, Makro)	
PTFE	7404257
Ceramic	404274
SS	404247
38.1 mm dia. for valve dia. 1-1/2" DN 40 (Makro)	
PTFE	404261
Ceramic	404278
SS	7404260

De-aeration 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 de-areation valve assembly can help evacuate gases accumulated in the liquid end of the pump automatically even against system backpressure.

The de-areation 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 de-areation valve the resistance to flow through the
bleed valve is relatively low. When the de-areation valve becomes full of liquid the resistance to flow through the de-areation valve increases dramatically, forcing the majority of the liquid to pass through the main discharge line.

Installation

A. General

Install the pump in accordance with the instructions contained in the pump operating manual. The de-areation 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

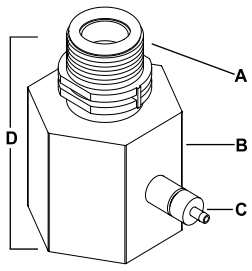
In calibrating the pump, use a graduated cylinder as the fluid source. You must collect any fluid returned through the bypass during the calibration and subtract it from the quantity drawn into the suction line.

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

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- Analytical Instrumentation Overview

solenoid-driven metering pumps
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- Beta b
- gamma/ X
- delta
- gamma/ XL
- Extronic

motor-driven metering pumps
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- Sigma/ X: Sigma/ 2
- Sigma/ X: Sigma/ 3
- ProMus
- Hydro 2 API 675
- Hydro 3 API 675
- Makro
- Orlita
- DULCO flex Control
- DulcoFlex

pump spare parts & accessories
- Solenoid pump spare parts
- Motor pump spare parts
- Pump accessories

DULCOMETER instrumentation
- **D1Cb/c**
- **DACb**
- **Dulcometer Compact**
- **DMT**
- **MicroFlex**
- **MultiFLEX**
- **AEGIS II**
- **SlimFlex 5**

DULCOTEST sensors
- Amperometric sensors
- Potentiometric sensors
- Potentiostatic sensors
- Conductometric sensors
- Accessories

polymer blending & dry feed solutions
- ProMix™ -M (In-line Controls)
- ProMix™ -M (Batch & In-line Controls)
- ProMix™ -S
- ProMix™ -C
- ProMdry™

ProMinent® DULCOMETER Analyzers

DULCOMETER Measuring and Control Units

DULCOMETER measuring and control units combine maximum process safety with a broad application spectrum. Different measured variables can be accurately determined. Depending on the application, the control behavior of DULCOMETER measuring and control unit is adapted to meet the relevant application. Different designs permit flexible use.

- Advantages at a glance:
- High measuring reliability, e.g. thanks to symmetrical input for pH/ORP
- High measuring accuracy, e.g. thanks high-impedance input for pH/ORP
- Minimum disturbance, e.g. thanks to alternating current disturbance suppression
- Two-wire technology for disturbance-resistant measurement
- Highly versatile thanks to many options and different designs

DULCOMETER measuring and control units, DULCOTEST sensors with ProMinent® metering pumps - the complete control cycle, measuring-controlling-metering and recording, everything from one single source, perfectly coordinated.

Function	Compact Controller	D1Cb	D1Cc	DACb
Control outputs				
Control of metering pump by pulse frequency	✔	✔, 2	✔, 2	✔, 2/4
Control of solenoid valve/motor-driven metering pump	✔	✔	✔	✔
Interference variable processing (flow) via mA				✔
Interference variable processing flow via frequency (e.g. of contact water meter)				✔
Metering time monitoring with deactivation of the control variable	✔	✔	✔	✔
Output relay configurable as limit value relay	✔, 1	✔, 2	✔, 2	✔, 2
Cycle timer		✔, 2	✔, 2	✔, 2
Real time timer	✔, 2			
Outputs				
Analog output 0/4-20 mA	✔, 1	✔, 1	✔, 1	✔, 2/3
Outputs				
Data logger with SD card				✔
Web server via LAN				✔
Parameter set switch-over via timer				✔
Parameter set switch-over via contact				✔
PROFIBUS® DP				✔
Modbus RTU				✔
Subsequent extension of functions via enabling code		✔	✔	✔
Operating hour counter		✔	✔	✔

ProMinent® DULCOMETER Analyzers

DULCOMETER Measuring and Control Units

Function	Compact Controller	D1Cb	D1Cc	DACb
Measured variable				
pH	✔	✔	✔	✔
ORP	✔	✔	✔	✔
Chlorine	✔	✔	✔	✔
Chlorine dioxide		✔	✔	✔
Chlorite		✔	✔	✔
Bromine		✔	✔	✔
Conductivity, conductive	✔			✔
Conductivity, inductive	✔			
Conductivity via mA		✔	✔	✔
Peracetic acid		✔	✔	✔
Hydrogen peroxide		✔	✔	✔
Ozone		✔	✔	✔
Dissolved oxygen		✔	✔	✔
Fluoride		✔	✔	
0/4-20 mA standard signal general measured variables		✔	✔	✔
Power Supply				
90-253V	✔	✔	✔	
~24 V DC				✔
Method of installation, degree of protection				
Wall mounted IP 65		✔		
Panel mounted, IP 54			✔	
Combination housing (wall-mounting, pillar assembly) IP 66 + IP 67. Installation on control	✔			✔
Measurement				
Number of measuring channels	1	1	1	2 or 3 optionally
Sensor monitoring of pH	✔	✔	✔	✔
Temperature compensation for pH	✔	✔	✔	✔
Temperature compensation for conductivity	✔			
pH compensation for chlorine				✔
Control				
PID controller	✔	✔	✔	✔
Monodirectional controller (ex. with pH acid or	✔			✔
Bidirectional controller (ex. with pH acid or alkali)		✔	✔	✔
Control Inputs				
Digital control inputs	✔, 1	✔, 1	✔, 1	✔, 4/7

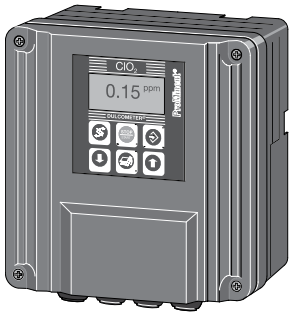
ProMinent® D1Cb and D1Cc Analyzers

D1Cb/D1Cc Single Channel Controller

- Flexibly upgradable thanks to subsequent activation option for functions by means of activation code
- Equipped for the essential basic requirements in water treatment
- Large, illuminated graphic display
- Operator guidance with clear text menu available in 14 languages in the controller
- Automatic buffer detection for pH
- **Standard configuration**
- The following functions are included in the D1Cb/D1Cc controller (the measured variables depend on the type of connection of the measured variable)
- Sensor monitoring for pH
- Switchable between all measured variables via mV or mA
- 2 power relays for limit value monitoring or timer functions
- Metering time monitoring with switch-off of the control variable
- Extended range voltage supply: 90-253 V, 50/60 Hz
- mA sensor input safely protected against short-circuit and polarization reversal
- Method of installation, wall mounting: D1Cb
- Method of installation, control panel: D1Cc
- **Applications**
- Waste water treatment
- Cooling water treatment
- Treatment of potable water
- Neutralization

ProMinent® D1Cb and D1Cc Analyzers

Technical Data



Wall Mount



Panel Mount

Measurement range:	**Type of connection mV:**
	pH 0.00 … 14.00
	ORP +1000 mV
	Type of connection mA:
	Chlorine: 0.00...0.500/2.00/5.00/10.0/20.0/50.0/100.0 ppm
	Chlorine dioxide: 0.00...0.500/2.00/10.0/20.0 ppm
	Chlorite: 0.02...0.50/0.1...2 ppm
	Bromine: 0.02...2.0/0.1...10.0 ppm
	Ozone: 0.00...2,00 ppm
	Hydrogen peroxide, sensor PER1: 2.0...200.0/20...2,000 ppm
	Hydrogen peroxide, sensor PEROX: 0...20/200/2,000 ppm, 1 vol.%
	Peracetic acid: 1...20/10...200/100...2,000 ppm
	Dissolved oxygen: 0.1...10/0.1...20 ppm
	pH: 0.00...14.00
	ORP: 0...+1000 mV
	Conductivity: 0...20/200/1,000 mS/cm
Resolution:	pH: 0.01 pH / ORP:1 mV
	Amperometric 0.001/0.01 ppm/l/0.1 %
Accuracy:	0.5 % from measurement range
Measurement input:	SN6 (input resistance > 0.5 x 1012 Ω)
Correction variable:	Temperature via Pt 100 (conductivity or PT1000)
Correction range temp.:	50 - 113 °F (10 - 45°C) (pH and conductivity only)
Control characteristic:	P/PID control
Control:	2-way control
Signal current output:	1 x electrically isolated 0/4-20 mA max. load 450 Ω Adjustable range and direction (measured, correction and control variable)
Control outputs:	2 reed contacts (pulse rate, for pump control) 2 relays (pulse length, 3P or limit value) 1 x 0/4-20 mA
Alarm relay:	250 V~3 A, 700 VA changeover contact
Power supply:	90 - 253 V, 50/60 Hz
Ambient temperature:	Wall mounted: 23 - 122°F (-5 - 50°C)

Mounting

- **Wall mount**: Nonmetallic enclosure with protective gland-style strain relief cable sockets
- Dimensions: 7.79”H x 7.87”W x 3.00”D (198 mm x 200 mm x 76 mm)
- Weight: Approx. 2.6 lbs. (1.2 kg) Shipping Weight: 4.4 lbs. (2.0 kg)
- Mounting: Detachable wall mount bracket
- Protection class: NEMA 4X (IP 65)
- **Panel mount:**
- Dimensions: 3.78”H x 3.78”W x 5.70”D (96 mm x 96mm x 145 mm)
- Protection class: NEMA 3 (IP 54) when mounted in panel

ProMinent® D1Cb and D1Cc Analyzers

Specifications

Temperature data (Panel Mount)

Permissible ambient temperature

Basic version: Control panel installation: 32° to 122°F (0° to 50°C)
Installation in wall-mounted housing: 23° to 113°F (-5° to 45°C)

Extended version (with status feedback or with correction value via mA or with disturbance variable via mA: Control panel installation: 32° to 113°F (0° to 45°C)
Installation in wall-mounted housing: 23° to 104°F (-5° to 40°C)

Permissible storage temperature: Control panel installation: 14° to 158°F (-10° to 70°C)

Material data/chemical resistance:

Part	Material
Housing and frame	PPO GF 10
Rear panel	PPE GF 20
Membrane keypad	Polyester film PET
Seal, outside	Cellular rubber CR
Seal, inside	Silicon-based sealing compound
Retaining clip and screws	Galvanized steel

Temperature data (Wall Mount)

Permissible ambient temperature

Basic version: 23° to 122°F (-5° to 50°C)
Installation in wall-mounted housing: 23° to 113°F (-5° to 45°C)

Extended version (with status feedback or with correction value via mA or with disturbance variable via mA: 23° to 104°F (-5° to 40°C)

Permissible storage temperature: 14° to 158°F (-10° to 70°C)

Material data/chemical resistance:

Part	Material
Housing	Luranyl PPE GF 10
Membrane keypad	Polyester film PET
Housing seal	Cellular rubber CR
Outer seal	Cellular rubber CR
Retaining bracket	Galvanized steel
M5 screws	A2

Standards: Supply voltage in accordance with DIN IEC 38
Electrical safety in accordance with EN 61010-1
Electromagnetic emitted interference in accordance with EN 55011 Gr.1/C1.A
CSA special inspection

Electrical data:	**Panel Mount**	**Wall Mount**
Rated voltage:	115/230 VAC, 50/60 Hz	115/230 VAC, 50/60 Hz
Max. power input:	140 mA at 115 V 70 mA at 230 V	120 mA at 115 V 60 mA at 230 V
Internal fuse protection:	Fine-wire fuse 5 x 20 mm 250 V slow-blow 100-115 V = 315 mA 200-230 V = 160 mA	Fine-wire fuse 5 x 20 mm 250 V slow-blow 100-115 V = 315 mA 200-230 V = 160 mA

Rated voltage: 100/200 VAC, 50/60 Hz
Max. power input: 150 mA at 100 V
75 mA at 200 V

Internal fuse protection: Fine-wire fuse 5 x 20 mm
250V slow-blow
100-115 V = 315 mA
200-230 V = 160 mA

Electrical data for both wall mount and panel mount D1C's

Rated voltage: 24 VDC or 24 VAC, 50/60 Hz (low voltage operation only)
Internal fuse protection: Fine-wire fuse 5 x 20 mm
250 V slow-blow, 100-115 V = 315 mA, 200-230 V = 160 mA

ProMinent® D1Cc and D1Cc Analyzers

Specifications (cont.)

Sensor input via SN6 socket:

Input impedance > 10^{12} W
Input impedance with reference electrode with respect to:
Device ground: <1 kW
Input range: ±1 V
Accuracy: ±0.5% of input range
Resolution: 0.0625% of input range
Connection facility for one potential equalization electrode (solution ground). As an alternative, two connection terminals can be connected with a wire jumper.

Sensor input via terminals:

Input impedance: >5 x 10^{11} W
Input impedance with reference electrode with respect to:
Device ground: <1 kW
Input range: ±1 V
Accuracy: ±0.5% of input range
Resolution: 0.0625% of input range
Connection facility for one potential equalization electrode (solution ground). As an alternative, two connection terminals can be connected with a wire jumper.

Standard signal input for measured variable:

Input range: 0/4...20 mA (programmable)
Input impedance: 50 W (Panel Mount) and (Wall Mount)
Accuracy: 0.5% of input range
Resolution: 0.014/0.012 mA
Supply voltage and current for external electronics: 20 V ±0.5 V, 20 mA

Standard signal input for correction measured value or disturbance variable mA:

Galvanically isolated from remaining inputs and outputs
Insulation voltage: 500 V
Input range: 0/4...20 mA (programmable)
Input resistance: 50 W
Accuracy: 0.5% of input range
Resolution: 0.014/0.012 mA
Supply voltage and current for external electronics: 23 V ±1 V, 20 mA **(Panel)**
19 V ±1.5 V, 20 mA **(Wall)**

Pt100 input:

Input range: 32° to 212°F (0° to 100°C)

Pt1000:

Accuracy: ±0.5°C
Resolution: 0.1°C

Digital inputs:

Common reference potential with respect to each other and with the RS 232 interface, but galvanically isolated from remaining inputs and outputs
Insulation voltage: 500 V (Wall Mount only)

Status signaling input:

Galvanically isolated from remaining inputs and outputs
Insulation voltage: 500 V
Potentiometer to be connected: 800 W ...10 kW
Accuracy (without potentiometer error): 1% of input range
Resolution: 0.5% of input range

Current output:

Galvanically isolated from remaining inputs and outputs
Insulation voltage: 500 V (Wall Mount only)
Output range: 0/4...20 mA (programmable)
Maximum load: 600 W
Accuracy: 0.5% of output range with respect to displayed value

Frequency outputs (Reed relay)

for pump control:

Type of contact: n/o contact, interference suppressed with varistors
Load capacity: 100 V peak, 0.5 A switching current (Panel Mount)
25 V peak, 0.5 A switching current (Wall Mount)
Contact service life: >50 x 10^6 switching operations at contact load 10 V, 10 mA
Max. frequency: 8.33 Hz (500 strokes/min)
Closing time: 100 ms

Power relay output for alarm signaling:

Type of contact: Changeover contact, interference supressed with varistors
Load capacity: 250 VAC, 3 A, 700 VA
Contact service life: >50 x 10^6 switching operations (Panel Mount)
>20 x 10^6 switching operations (Wall Mount)

ProMinent® D1Cb and D1Cc Analyzers

Specifications (cont.)

Power relay output	Type of contact:	n/o contact, interference supressed with varistors
for control variable output	Load capacity:	250 VAC, 3 A, 700 VA
or limit value signaling:	Contact service life:	>20 x 10^6 switching operations

Electrotechnical Safety/Radio Interference Protection:

EC low voltage directive (73/23/EEC) subsequently 93/44/EEC
EC EMC directive (89/336/EEC) subsequently 92/31/EEC
Supply voltage in accordance with DIN IEC 38
Electrical safety in accordance with EN 61010-1
Electromagnetic emitted interference in accordance with EN 55011 Gr. 1/Cl B
Noise immunity in accordance with IEC 801-2, -3, -4 or DIN VDE 0843, Part 2, Part 3, Part 4 or *EN 50082-2*

EN 60335-1:	Safety of electrical devices for domestic use
EN 50081-1:	EMC, emitted interference, residential
EN 50082-2:	EMC, noise immunity, industrial
EN 60555-2:	EMC, reactions in power supply networks, harmonics
EN 60555-3:	EMC, reactions in power supply networks, voltage fluctuations

ProMinent® D1Cb and D1Cc Analyzers

Identcode Ordering System D1C (Version b & c)

D1C	**Series**																	
	B	Wall mount version																
	C	Panel mount version																
		Type of Mounting:																
		W	Wall mounting (IP 65, D1Cb only)															
		D	Panel mounting (IP 54, D1Cc only)															
			Execution:															
			00	w/h LCD + keypad, w/h PM - Logo														
				Operating Voltage:														
				6	90 - 253 VAC 50/60 Hz													
					Approvals:													
					01	CE approval												
						Hardware add-on I:												
						0	None											
							Hardware add-on II:											
							0	None										
							1	RC protection for power relays (only D1Cb)										
								External connection:										
								0	None									
									Preset software functions:									
									V	Preset software functions								
										Measured Variables:								
										0	None			I	Chlorite			
										A	Peracetic acid			P	pH			
										B	Bromine			R	ORP (Redox)			
										C	Chlorine			S	0/4-20 mA norm signal			
										D	Chlorine dioxide			X	Dissolved oxygen			
										F	Fluoride			Z	Ozone			
										H	Hydrogen peroxide			T	Temperature via mA transducer			
										L	Conductivity via mA transducer				*Must include signal converter (pn. 809128)			
											Connection of measured variable:							
											1	Standard signal 0/4-20 mA, all measured variables						
											2	SN6 plug (mounting type "W" D1Cb only)						
											5	mV input for pH/redox via guard terminal						
												Correction variable:						
												0	None					
												2	Temperature Pt 100 / Pt 1000 (pH/conductivity)					
												4	Manual temperature input (pH/conductivity)					
													Control inputs:					
													0	None				
													1	Pause				
														Signal Output				
														0	None (Standard)			
														1	4-20 analog output			
															Relay Ouputs:			
															G	Alarm and 2 limit relays or 2 timer relays		
															M	Alarm and 2 limit relays or 2 relays		
																Pump pacing:		
																0	No pumps	
																2	Two pumps	
																	Control Action:	
																	0	None
																	1	Proportional control
																	2	PID control
																		Language:
																		00 Language neutral
D1C	**B**	**W**	**00**	**6**	**01**	**0**	**0**	**0**	**V**	**0**	**1**	**0**	**0**	**0**	**G**	**0**	**0**	**00**

ProMinent® D1Cb and D1Cc Analyzers

Fluoride Monitoring System

The D1C fluoride monitoring system incorporates the first buffer or reagent-free, ion specific sensor with a DULCOMETER D1C fluoride monitor. The monitor features upper and lower limit relays with alarm, and analog output for recording.

Note: The fluoride D1C is for monitoring only.

Measuring Principle & Application

The D1C fluoride monitoring system is based on the principles of potentiometric measuring using a reagent-free, ion specific sensor & reference electrode. The fluoride sensor features a continuous electrode activation function, ensuring long-term stability of the measurement without the need for frequent recalibration or conditioning chemicals. The fluoride sensor automatically compensates temperature, but a temperature sensor is also used to compensate for fluctuation during application.

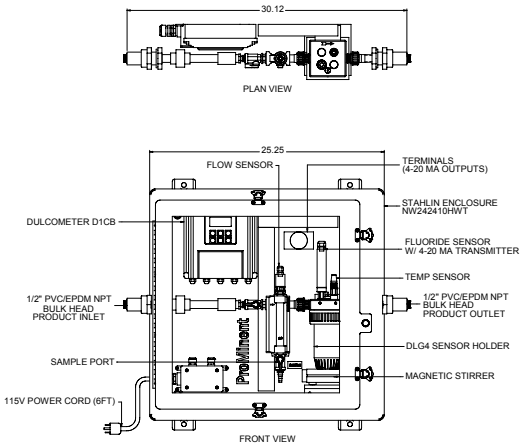
The fluoride sensor is recommended for use in water treatment only (patent pending). We recommend installation at atmospheric pressure.

Measuring Ranges & Operating Conditions of Fluoride Sensor

Measurement Range:	0.05 to 10 ppm fluoride
pH Operating Range:	5.5 to 8.5
Temperature Range:	34 to 95°F (1 to 35°C)
Max. Operating Pressure:	101.5 psi (7 bar) **Note:** the maximum admissible operating pressure for the monitoring system is 14.5 psi (1 bar) determined by the in-line sensor housing.
Sensor Response Rate T_{90}:	approx. 30 seconds
Reproducible Measuring Accuracy:	0.1 ppm
Measurement Water Flow Rate:	16 gph (60 L/h)

Fluoride Monitoring System

Part No. 7744836



- D1C Fluoride Monitor
- Fluoride sensor: FLE 010 SE with PG 13.5 male threaded connector & SN6 plug
- Reference electrode REFP-SE with PG 13.5 male connector & SN6 plug
- Temperature sensor: PT 100 SE with PG 13.5 connector & SN6 plug
- 4-20 mA Measurement transducer: FV1 for connection to fluoride monitor & reference electrode
- DLG IV In-line sensor housing: with PG 13.5 threaded connector
- Sample outlet
- Magnetic stirrer and magnet
- PVC piping with ball stop/adjusting valve, rotameter with limit contact, sampling tap
- Sample inlet
- 115V Power cord, connectors from monitor to sensors
- PP Backpanel

Options

Stand Base	7744837
NEMA 4X enclosed	7744711
Heater	7744722
Sun shield	7744723

ProMinent® D1Cb and D1Cc Analyzers

Fluoride Monitoring System Accessories

Replacement Sensors

FLEP 010 Fluoride Sensor with PG 13.5 male threaded connector and SN6 plug	1028279
REFP-SE Reference Electrode with PG 13.5 male connector and SN6 plug	1018458
PT 1000 SE Temperature Sensor with PG 13.5 male connector and SN6 plug	1002856
FPV1 4-20 mA Measurement Transducer for connection to fluoride monitor and reference electrode	1028280

Fluoride Photometer

The D2TA or D2TB Photometer (see page 229) can be used to calibrate the fluoride monitor.

Measurement Range:	**DT2A**	0.05 to 2 mg/L fluoride
	DT2B	0.05 to 2 mg/L fluoride
		0.05 to 6 mg/L free or total chlorine
		0.01 to 11 mg/L chlorine dioxide

D2TA kit with carry case	1010383
D2TB kit with carry case	1010394

ProMinent® D1Cb and D1Cc Analyzers

Overview: Hydrogen Peroxide and Peracetic Acid

Measuring principle

The Perox measuring systems are based on amperometric/potentiostatic measuring principles incorporating several special features compared to conventional measuring technologies. The platinum [hydrogen peroxide (H_2O_2) measurement] or gold (peracetic acid measurement) working electrode with a small surface area is covered by a microporous membrane cap to achieve a degree of selectivity and independence from flow influences. The entire stainless steel shaft of the Perox sensor serves as the counter-electrode. This represents the complete sensor section for H_2O_2 measurement; a reference pH electrode is also required for peracetic acid measurement.

A special, continuous electrode activation facility which represents the actual know-how, ensures long-term stability of the measurement without the need for frequent recalibration.

Since all amperometric measurement methods are relatively dependent of temperature, we recommend additional temperature compensation with the Pt 100 sensor if temperature fluctuations occur during applications. With the Pt 100, H_2O_2 measurement is a 2-electrode system while peracetic acid measurement is based on a 3-electrode system.

Applications

The environmentally-friendly substance hydrogen peroxide is used to an increasing extent in process control applications as an oxidizing or reduction agent. Examples of applications where continuous Perox H_2O_2 measure-ment control is used either alone or in advanced oxidation systems (with ozone, UV or Fenton's reagent) are:

- Odor control scrubbers
- Ground water purification
- Drinking water oxidation
- Utility water/cooling water disinfection
- Dechlorination, e.g. in chemical processes
- Landfill leachate treatment
- Biotechnology
- Vat dying/textile industry
- Swimming pool water disinfection

Peracetic acid as a disinfectant is used in the following industries:

- Food and beverage
- Cosmetics
- Pharmaceuticals
- Medicine

Continuous measurement and control is necessary wherever more demanding requirements are made with regard to disinfection and quality assurance.

Increasing the peracetic acid concentration in CIP processes as well as concentration control in bottle cleaning machines are typical applications of Perox peracetic acid measurement.

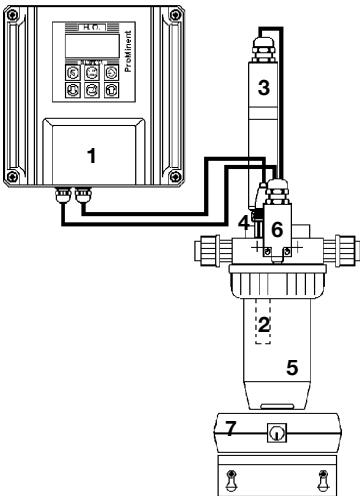
Operating conditions

Measuring ranges and applications	H^2O^2	Peracetic acid
Measuring range (selectable) mg/l	1 - 20 / 10 - 200 / 100 - 2000	10 - 200 / 100 - 2000
pH range	pH 2.5 - 10	pH 1 - 8
Temperature range	32 - 104°F (0 - 40°C)	41 - 95°F (5 - 35°C)
Permissible changes in temperature	less than 0.9°F (0.5°C) per minute	
Sensor response rate T_{90} approx.	20 seconds	2 minutes
Reproducible measuring accuracy	better than 2% referred to end value of measuring range	
Min. conductivity of measurement solution at:		
measuring range 20 mg/L	50 µS/cm	-
measuring range 200 mg/L	200 µS/cm	500 µS/cm
up to 1000 mg/L	500 µS/cm	2000 µS/cm
up to 2000 mg/L	1000 µS/cm	4000 µS/cm
Measurement water flow rate	recommended 16 gph (60 L/h)	
Max. operating pressure	29 psig (2 bar)	

Depending on the application, other parameters or water constituents may be of significance. For instance, higher concentrations of surface-active substances, such as fats or tensides, or suspended solids can have a detrimental effect on the measurement.

ProMinent® D1Cb and D1Cc Analyzers

Hydrogen Peroxide Analyzers



Recommended Hydrogen Peroxide System (descriptions follow)

			Part No.
1	D1C H_2O_2 Controller (1)		
1	Hydrogen Peroxide Sensor: H 2.10 P, complete with membrane cap (2)		792976
1	Perox signal converter: Perox-micro-H 1.20-mA (3)		741129
1	Connection between Perox signal converter and limit sensor Three-wire cable, priced per foot (specify length)		791948
1	Temperature Sensor: Pt 100 SE (4)		305063
1	Connection between the temperature sensor and the controller: (Based on distance between the controller and temperature sensor)		
	Up to 30 ft	SN6 open end cable 6 ft. (2 m) long	305030
		15 ft. (5 m) long	305039
		30 ft. (10 m) long	305040
	Over 30 ft.	Signal converter 4-20 mA Pt 100 V1	809128
		Two-wire cable - priced per foot (specify length)	7740215
1	DLG-PER In-line sensor housing (5) (includes limit sensor with 2 n/o contacts) (6)		1000165
1	Connection between the limit switch on the DLG-PER and the controller: Two-wire cable - priced per foot (specify length)		7740215
1	Magnetic stirrer 115 VAC (7)		7790915
1	Stirrer Magnet		7790916
1	Compact stand (PE, UV protected, black)		7740000
1	Power Cord, 6 ft.		741203

Accessories:

Replacement membrane cap: M 2.0 P for H_2O_2 sensor	792978
Polishing paste for sensor, 3 oz. (90 g) tube	559810

Note: We can also provide measuring and control instruments mounted and wired, e.g. on PVC board or in a control cabinet. See PCM Systems in Feed & Control Packages section.

Sensors: Hydrogen Peroxide Measurement

The H_2O_2 sensor shaft is made of stainless steel (counter and reference electrode) with a platinum working electrode. Installation length 4.7" (120 mm), 0.5" (12 mm) Ø, PG 13.5 internal thread and SN6 plug connection.

H 2.10 P, complete with membrane cap	792976

Temperature sensor Pt 100 for temperature compensation of H_2O_2 measurement; necessary when temperature fluctuations can occur in the measurement medium.

Pt 100 SE	305063

A coaxial measuring line with an SN6 connector is required for direct connection of a temperature sensor:

SN6 open end	6 ft. (2 m) long	305030
SN6 open end	15 ft. (5 m) long	305039
SN6 open end	30 ft. (10 m) long	305040

When distances between the measuring unit and sensor exceed 30 ft. (10 m), it is recommended to use a temperature signal converter which transmits the temperature signal via a 2-wire connection at 4-20 mA. Temperature compensation input should be taken into consideration when selecting the D1C-Perox controller from the identity code.

Signal converter 4-20 mA Pt 100 V1	809128
Two-wire cable for connection between point-of-use signal converter 4-20 mA and controller - priced per foot (specify length).	7740215

Perox Signal Converter

The signal converter controls and activates the hydrogen peroxide sensor and evaluates the sensor signal. It is screw-mounted directly on the head of the sensor.

The signal converter has a length of approx. 8.1" (205 mm) and a 1.25" (32 mm) Ø.

Signal converter for H_2O_2 measurement

A changeover switch for the three measuring ranges 1 - 20, 10 - 200 and 100 - 2000 mg/L H_2O_2 is located on the inside.

	Part No.
Perox-micro-H 1.20-mA	741129

In-line Sensor Housing

The DLG-PER in-line sensor housing must be used for hydrogen peroxide measurement where all (max. 3) individual sensors are installed in a measuring cup. A limit sensor must also be used which switches off the power supply for the signal converter when the measuring cup is removed. The DLG-PER in-line sensor housing features a body made of rigid PVC with a transparent polyamide cup and measurement water connection with 1/2" MNPT fittings.

DLG-PER In-line sensor housing (includes limit sensor with 2 n/o contacts)	1000165
Two-wire cable for connection between the limit switch on the DLG-PER and the controller - priced per foot (specify length)	7740215

For calibration of the DLG-PER in-line sensor housing, we recommend a magnetic stirrer to facilitate flow independent calibration.

Magnetic stirrer 115 VAC	7790915
Stirrer magnet	7790916
Mounting bracket for magnetic stirrer PVC (includes screws with wall anchor)	1000166

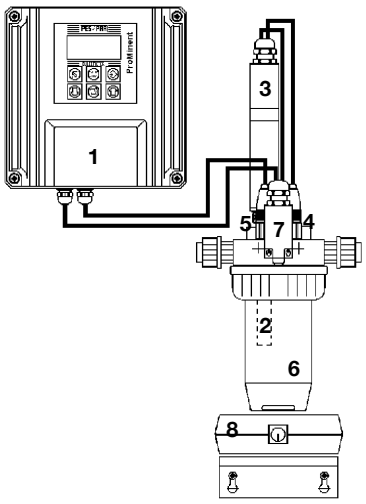
Accessories/Spare Parts

Replacement membrane cap:

M 2.0 P for H_2O_2	792978
Polishing paste for Perox sensor, 3 oz. (90 g) tube	559810

ProMinent® D1Cb and D1Cc Analyzers

Peracetic Acid Analyzers



Recommended Peracetic Acid System (descriptions follow)

			Part No.
1	D1C PAA Controller (1)		
1	Peracetic Acid Sensor: P2.10 B, complete with membrane cap (2)		809150
1	Perox signal converter: Perox-micro-P 1.30-mA (3)		741128
1	Connection between Perox signal converter and limit sensor Three-wire cable, priced per foot (specify length)		791948
1	pH Sensor: REFP - SE (4)		1000505
1	Temperature Sensor: Pt 100 SE (5)		305063
1	Connection between the temperature sensor and the controller: (Based on distance between the controller and temperature sensor)		
	Up to 30 ft	SN6 open end cable 6 ft. (2 m) long	305030
		15 ft. (5 m) long	305039
		30 ft. (10 m) long	305040
	Over 30 ft.	Signal converter 4-20 mA Pt 100 V1	809128
		Two-wire cable - priced per foot (specify length)	7740215
1	DLG-PER In-line sensor housing (6) (includes limit sensor with 2 n/o contacts) (7)		1000165
1	Connection between the limit switch on the DLG-PER and the controller: Two-wire cable - priced per foot (specify length)		7740215
1	Magnetic stirrer 115 VAC (8)		7790915
1	Stirrer Magnet		7790916
1	Compact stand (PE, UV protected, black)		7740000
1	Power Cord, 6 ft.		741203

Accessories:

Replacement membrane cap: M 2.0 B for peracetic acid sensor	809154
Polishing paste for sensor, 3 oz. (90 g) tube	559810

Note: We can also provide measuring and control instruments mounted and wired, e.g. on PVC board or in a control cabinet. See PCM Systems in Feed & Control Packages section.

Sensors: Peracetic Acid Measurement

The peracetic acid sensor shaft is made of stainless steel (counter electrode) with a gold working electrode. Installation length 4.7" (120 mm), 0.5" (12 mm) Ø.

P 2.10 B, complete with membrane cap 809150

A pH sensor is also required as a reference electrode for peracetic acid measurement

REFP - SE 1000505

Temperature sensor Pt 100 for temperature compensation of peracetic acid measurement; necessary when temperature fluctuations can occur in the measurement medium.

Pt 100 SE 305063

A coaxial measuring line with an SN6 connector is required for direct connection of a temperature sensor:

SN6 open end	6 ft. (2 m) long	305030
SN6 open end	15 ft. (5 m) long	305039
SN6 open end	30 ft. (10 m) long	305040

When distances between the measuring unit and sensor exceed 30 ft. (10 m), it is recommended to use a temperature signal converter which transmits the temperature signal via a 2-wire connection at 4-20 mA. Temperature compensation input should be taken into consideration when selecting the D1C-Perox controller from the identity code.

Signal converter 4-20 mA Pt 100 V1 809128

Two-wire cable for connection between point-of-use signal converter 4-20 mA and controller - priced per foot (specify length). 7740215

Perox Signal Converter

The signal converter controls and activates the peracetic acid sensor and evaluates the sensor signal. It is screw-mounted directly on the head of the sensor.

The signal converter has a length of approx. 8.1" (205 mm) and a 1.25" (32 mm) Ø.

Signal converter for peracetic acid measurement

A changeover switch for the two measuring ranges 10 - 200 and
100 - 2000 mg/L peracetic acid is located on the inside; the standard scope of delivery includes a measuring line with SN6 plug connector to facilitate connection to the reference electrode.

	Part No.
Perox-micro-P 1.30-mA	741128

In-line Sensor Housing

The DLG-PER in-line sensor housing must be used for peracetic acid measurement where all (max. 3) individual sensors are installed in a measuring cup. A limit sensor must also be used which switches off the power supply for the signal converter when the measuring cup is removed. The DLG-PER in-line sensor housing features a body made of rigid PVC with a transparent polyamide cup and measurement water connection with 1/2" MNPT fittings.

DLG-PER In-line sensor housing (includes limit sensor with 2 n/o contacts)	1000165
Two-wire cable for connection between the limit switch on the DLG-PER and the controller - priced per foot (specify length)	7740215
For calibration of the DLG-PER in-line sensor housing, we recommend a magnetic stirrer to facilitate flow independent calibration.	
Magnetic stirrer 115 VAC	7790915
Stirrer magnet	7790916
Mounting bracket for magnetic stirrer PVC (includes screws with wall anchor)	1000166

Accessories/Spare Parts

Replacement membrane cap:	
M 2.0 B for peracetic acid	809154
Polishing paste for Perox sensor, 3 oz. (90 g) tube	559810

ProMinent® diaLog DACb

DACb Multi-parameter Controller: Overview



Water parameter analysis made easy – with the DULCOMETER diaLog DACb.
With its specially designed functionalities, processing or interference variables and switchover of control parameters, it closes the control circuit between DULCOTEST sensors and ProMinent® metering pumps.
The two measuring and control channels of the DULCOMETER diaLog DACb can be individually configured to meet customer requirements. Everything that you need for the reliable treatment of industrial process water, potable water, and swimming pool water.

Your Benefits

- Simple operation thanks to a clearly arranged display
- More for your money: two measuring and control channels
- Versatile use: all common measured variables can be set per Channel and reconfigured as needed
- Control from everywhere: LAN-capable and convenient remote access via integrated web server
- Maximum flexibility: individually adjustable to different operating statuses, example: Day-Night mode
- Excellent process safety and reliability: precise metering by time-based monitoring of control variables
- Minimal time and effort: effortless duplication of device settings
- Precise monitoring and documentation: Event, calibration and measured data logger with easy-to-access SD memory card
- Optimum communication: Integration into customer networks through different fieldbus systems (PROFIBUS® DP and Modbus RTU, PROFINET)

Technical Details

- Measured variables: pH, ORP, chlorine, chlorine dioxide, chlorite, bromine, conductivity, peracetic acid, hydrogen peroxide, ozone, dissolved oxygen and fluoride
- Method of installation, degree of protection: Combination housing (wall mounting, control panel mounting, pillar assembly) IP 67 and IP 66
- Control: two measuring and control channels, each with independent monodirectional PID controller (optional: two bidirectional PID controllers)
- Temperature compensation for pH and for chlorine dioxide process sensor CDP, pH compensation for chlorine
- Digital inputs for the processing of control signals, of process water limit contacts, remote stop control and to monitor the liquid levels in chemical storage tanks
- Control outputs for electronically controlled metering pumps and solenoid valves
- Interference variable processing: simple control of water parameters in flowing water by processing the flow in the control algorithm
- Adaptation of the controller set point to changed process conditions is possible via remote control by means of the mA signal of a PLC Programmable Logic Controller or with higher requirements via the fieldbus option

ProMinent® DACb

DACb Multi-parameter Controller: Technical data

- Measuring range mV connection type:
- pH: 0.00 - 14.00
- ORP voltage: (-1500) - (+1500) mV
- Connection type mA (amperometric measured variables, measuring ranges corresponding to the sensors):
- Chlorine
- Chlorine dioxide
- Chlorite
- Bromine
- Ozone
- Hydrogen peroxide (PER sensor)
- Hydrogen peroxide (PEROX sensor with PEROX transducer V2 Order No. 1047979)
- Peracetic acid
- Dissolved oxygen
- Connection type mA (potentiometer measured variables, measuring ranges corresponding to the transmitter):
- pH
- ORP voltage
- Fluoride
- Conductivity (measuring ranges corresponding to the transmitters):
- via Transmitter 0/4 - 20 mA
- Temperature: via Pt 100/Pt 1000, measuring range 32°F - 302°F
- Resolution pH: 0.01
- ORP voltage: 1 mV
- Temperature: 32.18°F
- Amperometric analysis (chlorine etc.): 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)
- Temperature compensation Pt 100/Pt 1000 for pH, chlorine dioxide (CDP) sensor and fluoride
- Correction range 32°F - 302°F
- pH compensation range for chlorine Sensor CLE 3 and CLE 3.1: 6.5 - 8.5, sensor CBR: 6.5 - 9.5
- Disturbance signals Flow via 0/4 - 20 mA or contact water meter 1 - 500 Hz, the interference variable acts on both channels
- Control characteristic P/PID control
- Control 2 x bidirectional control
- Analogue outputs 2 (3) x 0/4 - 20 mA electrically isolated, max. load 450 Ω, range and assignment (measured, correction, control variable) can be set
- Control outputs 2 x 2 pulse frequency outputs for metering pump control 2 relays (limit value, 3-point step or pulse length control)
- Alarm relay 250 V ~3 A, 700 VA contact type changeover contact
- Digital control inputs 2 (5) as a remote-control input for the functions pause control / sample water fault, parameter set switch-over, level monitoring of chemical tanks
- Electrical connection 90 – 253 V, 50/60 Hz, 25 VA, 24 V DC
- Field bus connection PROFIBUS®-DP, Modbus RTU, PROFINET
- Ambient temperature 32°F - 122°F (for use indoors or with a protective enclosure)
- Enclosure rating Wall-mounted: IP 66 and IP 67 (NEMA 4X) Installation in the control cabinet: IP 54 for control cabinet door
- Tests and approvals CE, MET (corresponding to UL according to IEC 61010)
- Housing material PC with flame proofing equipment
- Dimensions 9.84 x 8.66 x 4.80 mm (WxHxD)
- Weight 2.86 lb

ProMinent® DACb

DACb Multi-parameter Controller: Technical data

Standard equipment

Basic measuring variable

- AA: 2 measuring channels with freely selectable measured variables for mA, including interference variable and pH compensation for chlorine
- VA: 2 measuring channels with freely selectable measured variables for mV (pH and ORP) and mA, including interference variable and pH compensation for chlorine
- VV: 2 measuring channels for pH and ORP
- L3: 2 measuring channels for the measured variable conductive conductivity
- PID controller with pulse frequency-based metering pump control for 2 metering pumps
- 2 analog outputs for measured value, correction value or control variable (dependent on the optional equipment)
- 4 digital inputs for sample water fault detection, pause and parameter switch-over
- 2 output relays selectable as limit value, cycle timer, real-time timer or intermittent programmable control output (depending on the optional equipment)
- Measured variables and language selection during commissioning
- Temperature compensation of the pH, chlorine dioxide (CDP) and fluoride measurement via Pt 100/Pt 1000
- Saving and transfer of device parameters by means of the SD card
- Calibration and event data logger (without SD card, data is saved in the controller)
- Interference variable processing (flow) via frequency (contact water meter)
- Subsequent upgrade of the software function by means of an activation key or firmware update

Optional equipment for 3rd pH measuring channel

Package 2

- 3rd mA output
- Two additional metering pumps control
- External remote set-point via an analog signal for Channel 1

Package 3

- Third complete measuring and control channel with PID controller
- 3rd analog output for measured value, correction value or control variable (depending on the optional equipment)
- 3 additional digital inputs: level monitoring, pause and sample water alarm for Channel 2
- Temperature compensation of the pH, chlorine dioxide (CDP) and fluoride measurement

Package 4

- Combination of packages 2 and 3 (only one Channel for amperometric sensors is available with the interference variable mA)
- **Communication options:**
- Measurement data logger with SD card
- Visualization of the measured data using a web server via LAN NS, PC/tablet and web browser
- PROFIBUS®-DP, Modbus RTU
- **Hardware extension:**
- Protective RC circuit for output relay: Protects the output relay if inductive loads are to be switched (example: solenoid valves or motors), not with 24 V DC electrical connector
- **A complete measuring point comprises:**
- Transmitter/controller DACb (see identity code)
- Fitting: DGMa, DLG III, immersion fitting
- pH sensor (identity code-dependent)
- ORP sensor (identity code-dependent)
- Chlorine, chlorine dioxide, chlorite, bromine, dissolved oxygen sensor
- Transducer for pH or ORP dependent on the cable length (> 10 m)
- Sensor cable

ProMinent® DACb

Identcode Ordering System DACb

DACb	Version:													
	Type of Mounting:													
	W	Wall mounted												
		Logo:												
		00	with ProMinent Logo											
			Operation Voltage:											
			6	100-230VAC, 50/60Hz										
				Channel 1 & 2										
				AA	mA/mA Measurement input									
				L3	2x Conductivity conductivity, Temperature									
				VA	mV/mA Measurement input									
				VV	mV/mV Measurement input									
					Channel 3:									
					4	M&C + 2DP + 3DI + FFWRD + pH								
						Software Presets:								
						0	No default settings							
							Channel Connections:							
							0	Channel 1, 2 & 3 hardwired						
							1	1x mV input on SN6 connection						
							2	2x mV input on SN6 connection						
							3	3x mV input on SN6 connection						
								Connection of Digital Sensors:						
								0	Without					
									Communication:					
									0	None				
									A	Mod RTU (RS485 or R232				
									B	PROFIBUS DPV1				
									E	Ethernet/LAN with Web Server				
										Data Logger:				
										1	with Data Logger			
											Hardware Upgrade:			
											0	None		
												Approvals:		
												01	CE	
													Certificates:	
													0	without
														Document Language:
														EN
DACb	**W**	**00**	**4**	**AA**	**4**	**0**	**0**	**0**	**0**	**1**	**0**	**01**	**0**	**EN**

ProMinent® DACb Reagentless Analyzers

DACb Complete Package Part Numbers



Free Chlorine Package



Fluoride/ Total Chlorine Package

Part Number	Package Type	Part Number	Package Type
	Chlorine		**Chlorine**
1055407	2 PPM Total Chlorine	1083297	5 PPM Total/Total Chlorine
1055408	2 PPM Free Chlorine/pH	1093232	5 PPM Free/Total Chlorine/pH
1080700	2 PPM Total Chlorine/pH	1049062	10 PPM Total Chlorine
1083296	2 PPM Total/Total Chlorine	1049063	10 PPM Free Chlorine/pH
1093231	2 PPM Free/Total Chlorine/pH	1080702	10 PPM Total Chlorine/ pH
1079048	5 PPM Total Chlorine	1083298	10 PPM Total/Total Chlorine
1079050	5 PPM Free Chlorine/pH	1093233	10 PPM Free/Total Chlorine/pH
1080701	5 PPM Total Chlorine/pH	1081716	20 PPM Total Chlorine/pH
	Fluoride		
1058259	10 PPM Fluoride/ 2 PPM Total Chlorine		
1093227	10 PPM Fluoride		
	Hydrogen Peroxide (H_2O_2)		
1082570	2,000 PPM Hydrogen Peroxide		
	Peracetic Acid (PAA)		
1093229	200 PPM Peracetic Acid		
1093230	2,000 PPM Peracetic Acid		

ProMinent® Compact Controller

Overview: Compact



DULCOMETER
Compact

The Measuring Transducer DULCOMETER Compact with control function for the measured variables pH and redox provides basic functions for applications in water treatment. It has a fixed configuration with the following features.

Summary of advantages:

- Measured variables pH and ORP (can be changed on the controller)
- 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

Applications

- Waste water treatment
- Treatment of drinking water
- Swimming pool water treatment

Technical Data

Measurement range:	pH: 0.00 - 14 ORP: -1000 - +1000 mV
Resolution:	pH: 0.01 pH ORP: 1 mV
Correction variable:	Temperature for pH via Pt 1000
Correction range:	32 - 248 °F, (0 - 120 °C)
Control characteristic:	P/PID
Control:	1-way controller with selectable control direction (raise/lower)
Signal current output:	1 x 4-20 mA galvanically isolated max. load 400 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:	14 - 140 ° F, (-10 - +60 °C)
Enclosure rating:	IP 67
Dimensions:	135 x 125 x 75 mm (H x W x D)
Weight:	1.10 lbs, (0.5 kg)

	Part no.
Compact controller for pH/ORP	1050627

ProMinent® DMT Transmitters

Overview: DMT

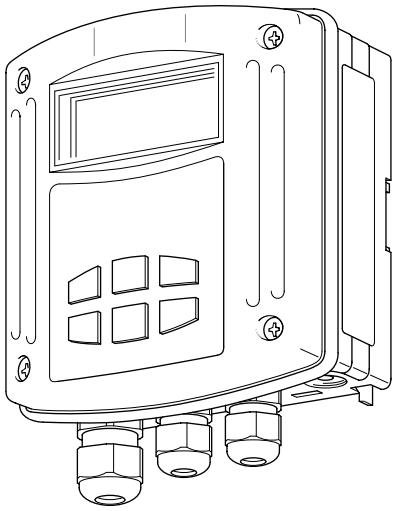
DULCOMETER DMT type transmitters are compact 2-wire transmitters for measured variables pH, redox, chlorine, conductive conductivity, temperature.
Easily combined with programmable memory controllers.

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



PROFIBUS® PROCESS FIELD BUS

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	Version:													
	A													
		Type of Mounting:												
		W	Wall mounted (also rail mounted)											
		S	Control panel installation[1]											
			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)									
					Communication interface:									
					0	None								
					4	PROFIBUS® DP (assembly type W only)								
						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)	
												1	Manual adjustable current value	
												2	Proportional or manual	
												3	Proportional or manual hold	
												4	4 mA constant current	
													Presetting C:	
													0	Standard
DMT	**A**	**W**	**0**	**9**	**0**	**P**	**1**	**0**	**E**	**0**	**0**	**0**	**0**	

ProMinent® Portable DT Photometer

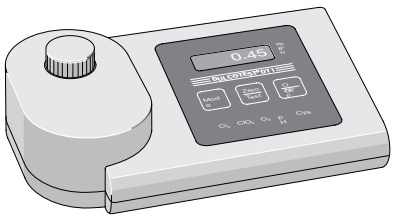
Overview: Photometer

Photometer DT1, DT2, DT3 and DT4

- Portable compact Photometer
- Simple to operate with support text
- Reliable, simple measurement of chlorine, chlorine dioxide, fluoride, chlorite, H_2O_2, bromine, ozone, pH and cyanuric acid
- Self-diagnostic

Applications:
swimming pool, drinking water, process water

Technical Data



pk_5_021

Measurement range of DT1:	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 DT2B:	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, DT3:	1 - 50 / 40 - 500 mg/l hydrogen peroxide
Measurement ranges, DT4:	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 **DT1 photometer**, complete with carrying case	1003473
Type **DT3 photometer**, complete with carrying case	1023143
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)	1007566
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	501317
Chlorine dioxide tablets Nr. 2 R 128	501318

Spare parts

Chlorite meter:

Foamer for expulsion of chlorine dioxide (DT4)	1022754
3 No. spare cuvettes for chlorite determination	1007566

H_2O_2 meter:

Reagent for H_2O_2 (DT3), 15 ml	1023636
Spare cuvettes, 5 No., for H_2O_2 (DT3)	1024072

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

M02	**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			
		BBIN	Boiler			
		CLAH	Closed loop reverse conductivty			
		CMAH	Condensate monitor			
			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
M02	**A**	**COIN**	**XX**	**0**	**01**	

ProMinent® Cooling Tower & Boiler Controllers

MultiFLEX Controllers



ProMinent's MultiFLEX water treatment controllers exemplify the latest in water management technology. Packed with features, the MultiFLEX line of products are designed to provide the highest degree of control and flexibility. With one MultiFLEX you can control and monitor multiple towers, multiple boilers, or tower/boiler combos.

Features

- Control up to 4 Towers at once
- Control up to 8 Boilers at once
- Web Browser Accessible
- LAN Accessible
- Up to 14 Analog Inputs
- Twelve Digital Inputs
- Ten Relay Outputs
- Works with Trackster 3 Software
- 5-Key Universal Keypad
- 4 Line, 20 Character Backlit Display
- Easily Upgraded with Plug-in Modules
- Fully Programmable
- Ethernet with user definable static IP address
- NEMA 4X Enclosure
- 120 or 240VAC 50/60Hz, Switch Selectable
- CE Approved
- Supports "Percentage Time Bleed & Feed"

ProMinent® Cooling Tower & Boiler Controllers

Identcode Ordering System (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):

XX	None	RR*	Dual ORP - Relay
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 - Relay	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 - Relay	II	Dual 4-20 mA Input (isolated) 1 relay
PM*	Single Cooling Tower pH - Monitor	I3	Dual 4-20 mA Input (isolated) 2 relays
PP*	Dual Cooling Tower pH - Relay	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 - Relay	RS	Rate to Stroke driver
OM*	Single ORP - Monitor	CS	Conduct continuous sample 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:

0	None	3	Three outlets
1	One outlet	4	Four outlets
2	Two outlets	5	Five outlets

Inhibitor powered relays (tower only):

0	None	3	Three
1	One	4	Four
2	Two		

Timed biocide powered relays:

0	None	3	Three
1	One	4	Four
2	Two		

Internal boiler treatment:

0	None	5	Five
1	One	6	Six
2	Two	7	Seven
3	Three	8	Eight
4	Four		

Remote communications:

0 — None

Feed verifications:

0	None	3	Feed verification (3)
1	Feed verification (1)	4	Feed verification (4)
2	Feed verification (2)		

Operating Voltage:

A	115 VAC 50/60 Hz
B	230 VAC 50/60 Hz

M05	A	B	XX	XX	XX	XX	0	0	0	0	0	0	A

ProMinent® Cooling Tower & Boiler Controllers

Identcode Ordering System (M10)

M10 Series Version:

A — **MultiFLEX 10 Controller Version A:** Includes 10 universally controlled powered (120/240VAC) relays, 12 status/water meter digital inputs, 14 analog input/output channels, 4 line 20 character backlit display, 5 key universal keypad and an Ethernet port with Browser communications. Can be programmed for cooling, boiler, process or a 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):

XX	None	RR*	Dual ORP - Relay
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 - Relay	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 - Relay	II	Dual 4-20 mA Input (isolated) 1 relay
PM*	Single Cooling Tower pH - Monitor	I3	Dual 4-20 mA Input (isolated) 2 relays
PP*	Dual Cooling Tower pH - Relay	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 - Relay	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' and 'H':

XX — Use same selection as expansion slot 'A' and 'B'

I/O Expansion Slot 'I' and 'J':

XX — Use same selection options as expansion slot 'A' and 'B'

I/O Expansion Slot 'K' and 'L':

XX — Use same selection options as expansion slot 'A' and 'B'

I/O Expansion Slot 'M' and 'N':

XX — Use same selection options as expansion slot 'A' and 'B'

Pre-wired power relay plug box:

0	None	6	Six outlets
1	One outlet	7	Seven outlets
2	Two outlets	8	Eight outlets
3	Three outlets	9	Nine outlets
4	Four outlets	A	Ten outlets
5	Five outlets		

Inhibitor powered relays (tower only):

0	None	3*	Three
1*	One	4*	Four
2*	Two		

Timed biocide powered relays:

0	None	3	Three
1	One	4	Four
2	Two		

Internal boiler treatment:

0	None	5	Five
1	One	6	Six
2	Two	7	Seven
3	Three	8	Eight
4	Four		

Remote communications:

0 — None

Feed verifications:

0	None
1	Feed verification (1)
2	Feed verification (2)
3	Feed verification (3)
4	Feed verification (4)

Operating Voltage:

A	115 VAC 50/60 Hz
B	230 VAC 50/60 Hz

M10	A	B	XX	XX	XX	XX	XX	XX	XX	0	0	0	0	0	0	A

ProMinent® Cooling Tower & Boiler Controllers

Overview AEGIS II

The most innovative and flexible water treatment controller available

The new AEGIS II provides reliable control and offers the most flexible communication options to optimize efficiency and profitability for all your cooling, boiler, and waste water or disinfection applications.



Features:

- Built In Wireless Access Point, Bluetooth and Ethernet
- New Keypad design for easy menu navigation
- Enhanced responsive browser views for Smart Phones and Tablets
- Flurometer connection via 4-20mA or (Future) direct Modbus
- 8 digital inputs for multiple flow meters for status indicators
- 10 Status LED's
- Integral Data Logger
- (Future) Optional Modbus/BACnet communications
- 9 Flexible control outputs include: ON/OFF setpoint or time based control & Frequency (Pulse) Proportional or volumetric control
- Conductivity, pH, ORP, Corrosion, Chlorine, Bromine, PAA, CLO2, Fluorescence and more

Technical Data AEGIS II

	Rating - Detail	Notes
Analog-Digital I/O		
Conductivity Serial Sensor	Tower & Integral Flowswitch sensors	Default tower sensor includes 1 GPM integral flowswitch & temperature
Conductivity Sensor	Boiler & Condensate sensors	Standard sensor
Fixed Temperature Sensor Input	Thermal compensation for both pH and Conductivity	Displayed as oF, oC or oK
Fixed 4-20 mA Current Loop Input	Assignable to control any relay or variable frequency control	Single point calibration if 4 mA = 0
4-20 mA Current	DC isolated, Manual & Auto modes, Interlocking, Alarm	Each optional current output uses a dual sensor card slot
Manual-Inventory-Inputs	Track drop counts, inventory, tank level, ppm	Alarmed delay prevents premature system ppm alarms
Communications User Interface		
Keypad - OLED	9 Key tactile feedback, 3 Function keys, 4 line Backlit	
10/100 Mbps, TCP/IP Ethernet, wifi, (Optional LAN, Future Modbus & Modbus RTU)	HTML micro web server with user definable IP address	Static IP Browser shows controller in real time
Controls for ON/OFF & Variable Frequency		
Sequential Volume Setpoints	Feed a fixed volume for every make-up volume	Meter only, fault tolerant feed controls
Blocking	Any of 9 controls may block any other control	Prevents incompatible concurrent controls
Interlocking	Up to 4 contact sets can be ‘AND’ed or ‘OR’ed	Relays & Frequency controls OFF when contact set opens
Biocide Event Controls	Each of 9 controls includes 28 timed events	Each control selectable for 1, 7 & 28 day cycles
System		
Electrical	100-240 VAC, 50/60 Hz, Single Phase	Universal power supply
Fusing for 2 AC powered loads	6.3 Amps @ 250VAC	Alarm on open AC load fuse
Surge Suppression	5 snubbed contacts	RC / Varistor on AC line input
Enclosure	Non-metallic, IP 65 / NEMA 4X	13.46” x 8.94” x 3.07” (342 x 227 x 78 mm) (WxHxD)

ProMinent® Cooling Tower & Boiler Controllers

AEGIS II Part Numbered Packages

AEGIS II - Cooling Tower (with Panel)

Part Number	Description
1079066	Conductivity, dual biocide
1079067	Conductivity, dual biocide, pH w/acid feed
1079068	Conductivity, dual biocide, ORP w/bleach feed
1079069	Conductivity, dual biocide, pH w/acid feed, ORP w/bleach feed
1079070	Conductivity, dual biocide, pH w/acid feed, ORP w/bleach feed, CS and CU corrosion

AEGIS II - Cooling Tower (with Pyxis)

Part Number	Description
1082241	Conductivity, dual biocide-includes Pyxis
1082242	Conductivity, dual biocide, pH w/acid feed-includes Pyxis
1082243	Conductivity, dual biocide, ORP w/bleach feed-includes Pyxis
1082244	Conductivity, single bio, pH w/acid feed, ORP w/bleach feed-includes Pyxis
1081939	Conductivity, single bio, pH w/acid feed, ORP w/bleach feed, CS and CU corrosion, includes Pyxis

AEGIS II - Cooling Tower with Little Dipper

Part Number	Description
1082245	Conductivity, dual biocide-includes Little Dipper
1082246	Conductivity, dual biocide, pH w/acid feed-includes Little Dipper
1082247	Conductivity, dual biocide, ORP w/bleach feed-includes Little Dipper
1082248	Conductivity, single bio, pH w/acid feed, ORP w/bleach feed-includes Little Dipper
1082249	Conductivity, single bio, pH w/acid feed, ORP w/bleach feed, CS and CU corrosion, includes Little Dipper

AEGIS II - Boiler (No Panel)

Part Number	Description
1079064	Single Boiler - 2
1079065	Dual Boiler / 2 chemical feed

Note: Other configurations available, please consult factory.

ProMinent® Cooling Tower & Boiler Controllers

Overview SlmFlex 5

The most innovative and flexible water treatment controller available

Say hello to flexible programming with ProMinent's SlimFlex 5 Built-in WiFi Hotspot.
Enhanced, responsive browser views for smart phones and tablets makes programming fast and easy! Built-in Ethernet and integral data logger creates the total communications package for all of your cooling tower and boiler applications.



Features:

- Cooling Tower or Boiler
- 5 Flexible control outputs include: ON/OFF setpoint or time based control
- Built In Wireless Access Points, Ethernet and USB
- New Keypad design for easy menu navigation
- Enhanced responsive browser views for Smart Phones and Tablets
- pH and/or ORP along with conductivity
- 6 digital inputs for multiple flow meters or status indicators
- 6 Status LED's
- 5 Powered relays
- Integral Data Logger
- Conductivity, pH, ORP and Fluorometer
- Email out data and alarms

ProMinent® Cooling Tower & Boiler Controllers

Technical Data SlimFlex 5

	Rating - Detail	Notes
Analog-Digital I/O		
Conductivity Serial Sensor	Tower & Integral Flowswitch sensors	Default tower sensor includes 1 GPM integral flowswitch & temperature
Conductivity Sensor	Boiler & Condensate sensors	Standard sensor
4-20 mA Current	DC isolated, Manual & Auto modes, Interlocking, Alarm	Each optional current output uses a dual sensor card slot
Manual-Inventory-Inputs	Track drop counts, inventory, tank level, ppm	Alarmed delay prevents premature system ppm alarms
Communications User Interface		
Keypad - OLED	9 Key tactile feedback, 3 Function keys, 4 line Backlit	
10/100 Mbps, TCP/IP Ethernet, WiFi	HTML micro web server with user definable IP address	Static IP Browser shows controller in real time
Controls for ON/OFF & Variable Frequency		
Sequential Volume Setpoints	Feed a fixed volume for every make-up volume	Meter only, fault tolerant feed controls
Blocking	Any of 5 controls may block any other control	Prevents incompatible concurrent controls
Interlocking	Up to 4 contact sets can be ‘AND’ed or ‘OR’ed	Relays control OFF when contact set opens
Biocide Event Controls	Each of 5 controls includes 28 timed events	Each control selectable for 1, 7 & 28 day cycles
System		
Electrical	100-240 VAC, 50/60 Hz, Single Phase	Universal power supply
Fusing for 2 AC powered loads	6.3 Amps @ 250VAC	Alarm on open AC load fuse
Surge Suppression	5 snubbed contacts	RC / Varistor on AC line input
Enclosure	Non-metallic, IP 65 / NEMA 4X	13.46” x 8.94” x 3.07” (342 x 227 x 78 mm) (WxHxD)

ProMinent® Cooling Tower & Boiler Controllers

SlimFlex 5 Part Numbered Packages

SlimFlex 5 - Cooling Tower Panel

Part Number	Description
1095560	Conductivity
1095561	Conductivity, with dual 4-20mA Output
1095598	Conductivity, pH
1095599	Conductivity, pH, with dual 4-20mA Output
1095600	Conductivity,ORP
1095601	Conductivity,ORP, with dual 4-20mA Output
1095562	Conductivity, pH, ORP
1095563	Conductivity, pH, ORP, dual 4-20mA Output

SlimFex 5 - Cooling Tower Panel with Pyxis

Part Number	Description
1095603	Conductivity - includes Pyxis
1095605	Conductivity, with dual 4-20 ma Output, includes Pyxis
1095607	Conductivity, pH, includes Pyxis
1095609	Conductivity, ORP, includes Pyxis
1095611	Conductivity, pH, ORP, includes Pyxis

SlimFlex 5 - Cooling

Part Number	Description
1095602	Conductivity, includes Little Dpper
1095604	Conductivity, with dual 4-20 mA Output, includes Little Dipper
1095606	Conductivity, pH, includes Little Dpper
1095608	Conductivity, ORP, includes Little Dpper
1095610	Conductivity, pH, ORP, includes Little Dpper

SlimFlex 5 - Cooling

Part Number	Description
1095564	Single Boiler Blowdown with chemical feed timers
1095565	Single Boiler Blowdown with chemical feed timers, dual 4-20 mA out
1095566	Dual Boiler Blowdown with chemical feed timers
1095567	Dual Boiler Blowdown with chemical feed timers, dual 4-20 mA out

Note: Other configurations available, please consult factory.

ProMinent® Cooling Tower & Boiler Controllers

Cooling Tower and Boiler 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 @175ºF - 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 @ 175ºf - cable required PN 1036595	B,C,D	7760998
Conductivity/Temperature Electrode 125 psi @125ºF with Tee - Cooling applications	B,C,D	7760200
Aquatrac Conductivity/Temperature/Thermal Flow Switch CTF (Cooling)	A,B,D	7760021
Corrosion Rate Electrode, Admirality	C,D	7760748
Corrosion Rate Electrode, Carbon Steel	C,D	7760746
Corrosion Rate Electrode, Copper	C,D	7760747
Corrosion Rate Electrode, Cupro-Nickle	C,D	7760750
Corrosion Rate Electrode, Stainless Steel	C,D	7760749
Corrosion Rate Electrode, Zinc	C,D	7760745
Aquatrac Thermal Flow Switch 100psi @125ºF	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, 230ºF 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, 1GPC, 3/4” FNPT	B,C,D	7760518
1” Contacting head water meter, 10GPC, 1” FNPT	B,C,D	7760515
1 1/2” Contacting head water meter, 100 GPC, 1” FNPT	B,C,D	7760516
2" Contacting head watermeter 100GPC, 2"FNPT	B,C,D	7760517
3/4in Paddlewheel Water Meter Sensor. Supplied in PVC pipe section.	B,C,D	7760514
1in Paddlewheel Water Meter Sensor. Supplied in PVC pipe section.	B,C,D	7760508
1.5" Paddlewheel Water Meter Sensor. Supplied in PVC pipe section.	B,C,D	7760509
2" Paddlewheel Water Meter Sensor. Supplied in PVC pipe section.	B,C,D	7760510
3" Paddlewheel Water Meter Sensor. Supplied in PVC pipe section.	B,C,D	7760511
4" Paddlewheel Water Meter Sensor. Supplied in PVC pipe section.	B,C,D	7760512
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,D	7760217
Motorized blowdown valve 3/4"NPT, 120VAC, 250psi steam	A,B,D	7760218
Motorized blowdown assembly, 1/2"NPT, 120VAC 250psi steam w/needle valve and T	A,B,D	7760013
A - microFLEX **B** - SlimFlex 5 **C** - multiFLEX **D** - AEGIS II		

"DULCOTEST Sensors" T.O.C. IX

CATALOG SECTION TABS

product overview

- Introduction
- Pump selection by capacity
- Chemical resistance list
- Solenoid & Motor Pump Overview
- Analytical Instrumentation Overview

solenoid-driven metering pumps

- Concept b
- Beta b
- gamma/ X
- delta
- gamma/ XL
- Extronic

motor-driven metering pumps

- Sigma/ X: Sigma/ 1
- Sigma/ X: Sigma/ 2
- Sigma/ X: Sigma/ 3
- ProMus
- Hydro 2 API 675
- Hydro 2 API 675
- Makro
- Orlita
- DULCO flex Control
- DulcoFlex

pump spare parts & accessories

- Solenoid pump spare parts
- Motor pump spare parts
- Pump accessories

DULCOMETER® instrumentation

- D1Cb/c
- DACb
- Dulcometer Compact
- DMT
- MicroFlex
- MultiFLEX
- AEGIS II
- SlimFlex 5

DULCOTEST® sensors

- **Amperometric sensors**
- **Potentiometric sensors**
- **Potentiostatic sensors**
- **Conductometric sensors**
- **Accessories**

polymer blending & dry feed solutions

- ProMix™-M (In-line Controls)
- ProMix™-M (Batch & In-line Controls)
- ProMix™-S
- ProMix™-C
- ProMdry™

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 Sensors 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 Sensors 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



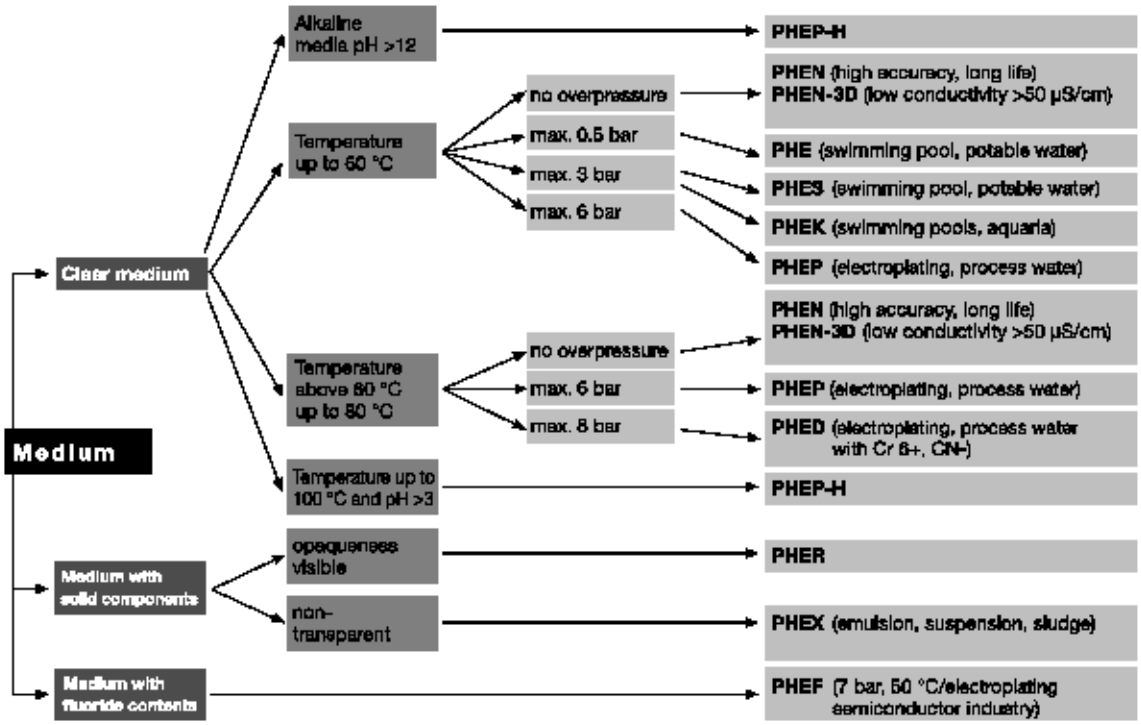
The comprehensive product line of DULCOTEST Sensors conductivity sensors ensures the right
sensor is selected with optimum price/performance ratio in applications ranging from simple water treatment through to intricate industrial process waste water processing. 27 different types of sensor tailored 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 Sensors pH Sensors



Selection Guide: Amperometric Sensors

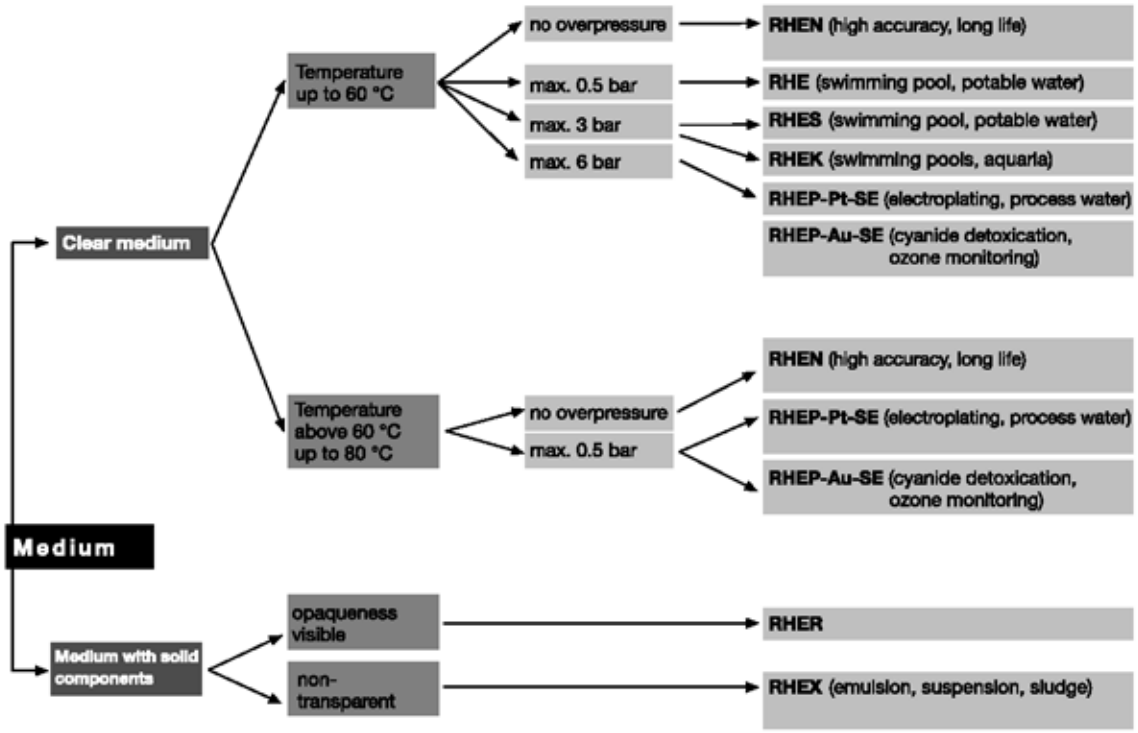
Measured variable	Applications	measuring range	Connection to DULCOMETER®	Sensor type
Free chlorine	Drinking water, swimming pool	0.01–100 ppm	D1C, DAC	CLE 3-mA-xppm, CLE 3.1-mA-xppm
Free chlorine	Drinking water, swimming pool water, in situ electrolysis (without diaphragm)	0.02-10 ppm	D1C, DAC	CLO 1-mA-xppm
Free chlorine	Hot water up to 70 °C (legionella), in situ electrolysis (without diaphragm)	0.02-2 ppm	D1C, DAC	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-
Free chlorine	Drinking water, swimming pool	0.05-5 ppm	COMPACT	CLB 2-µA-xppm

ProMinent® DULCOTEST Sensors

Overview: Sensors

Measured variable	Applications	Graduated measuring	Connection to DULCOMETER®	Sensor type
Total available bromine	Cooling water, swimming pool water, whirlpool water, bromine with bromorganic disinfectants (e.g. BCDMH)	0.2–10 ppm	D1C, DAC	BRE 1-mA-xppm
Total available bromine	Cooling water, swimming pool water, whirlpool water, bromine with inorganic bromine compounds (e.g. NaBr/HOCl)	0.2–10 ppm	D1C, DAC	BRE 2-mA-xppm
Total available bromine	Cooling water, swimming pool water, whirlpool 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	D1C, DAC	CBR 1-mA-xppm
Chlorine dioxide	Drinking water	0.01–10 ppm	D1C, DAC, DULCOMARIN® II	CDE 2-mA-xppm
Chlorine dioxide	Bottle washer system	0.02–2 ppm	D1C, DAC, DULCOMARIN® II	CDP 1-mA
Chlorine dioxide	Hot water up to 60 °C, cooling water, waste water, irrigation water	0.01-10 ppm	D1C, DAC, DULCOMARIN® II	CDR 1-mA-xppm
			D1C, DAC,	

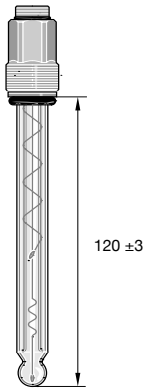
Selection Guide DULCOTEST Sensors ORP Sensors



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 insensitive plastics shaft					
	N	refillable KCl electrode					
	E	Puncture electrode					
	R	with PFTE circular diaphragm					
	P	pressure tight up to 87.0 psi (6 bar)					
	D	2 ceramics diaphragms (double junction)					
	S	swimmimg pool electrode					
	F	resistant to hydrofluoric acid					
		unspecified: standard gel-filled electrode					
		Special equipment:					
		T	temperature up to 212 ºF (100 °C), alkali-resistant				
		H	with built in temperature gauge				
		L	vertical to horizontal installation				
			pH measuring range:				
			112	pH measuring range: 1 - 12			
				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**	



pk_6_016

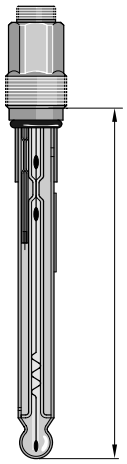
PHES 112 SE

pH range: 1-12
Temperature: 32-140 ºF (0-60 °C)
Max. pressure: 7.25 psi (0.5 bar)
Min. conductivity: >150 µS/cm
Diaphragm: Ceramic
Installation length: 4.72“ (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

ProMinent® DULCOTEST Sensors

pH Combination Sensors With SN6

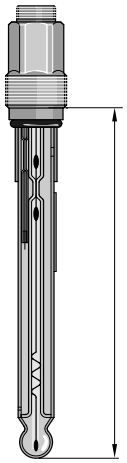


pk_6_019

PHEP 112 SE

pH range: 1-12
Temperature: 32-176 ºF (0-80 °C)
Max. pressure: 87 psi (6 bar)
Min. conductivity: >150 µS/cm
Diaphragm: Ceramic
Installation length: 4.72“ (120 ±3 mm), thread PG 13.5
Mounting hole: min Ø 0.6“ (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

	Part No.
PHEP 112 SE	150041

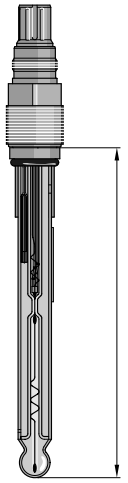


pk_6_019

PHEP-H 314 SE

pH range: 3-14 (Note: use below pH 3 shortens the service life)
Temperature: 32-212 ºF (0-100 °C)
Max. pressure: 87 psi (6 bar) at 77 ºF (25 °C)
43.5 psi (3 bar) at 212 ºF (100 °C)
Min. conductivity: 150 µS/cm
Diaphragm: ceramic
Insertion length: 4.72“ (120 ±3 mm), screw-in thread PG 13.5
Shank diameter: 0.47“ (12 mm) min. diam.
Typical applications: monitoring or control of chemical processes with neutral to highly-alkaline media and temperatures up to 100 °C

	Part No.
PHEP-H 314 SE	1024882



pk_6_068

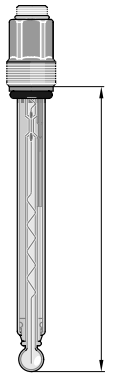
PHEPT 112 VE

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.

	Part No.
PHEPT 112 VE	1004571

ProMinent® DULCOTEST Sensors

pH Combination Sensors With SN6

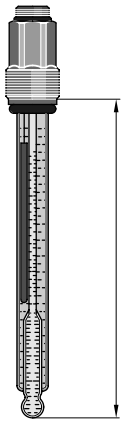


pk_6_018

PHER 112 SE

pH range: 1-12
Temperature: 32-176 °F (0-80 °C)
Max. pressure: 87 psi (6 bar)
Min. conductivity: >50 µS/cm
Electrolyte with solid KCl supply (salt rings in the reference electrolyte)
Diaphragm: PTFE ring diaphragm
Installation Length: 4.72“ (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



pk_6_017

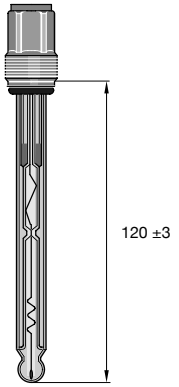
PHEX 112 SE

pH range: 1-12
Temperature: 32-212 °F (0-100 °C)
Max. pressure: 232 psi (16 bar) at 77 °F (25 °C); 87 psi (6 bar) at 212 °F (100 °C)
Min. conductivity: >500 µS/cm
Diaphragm: Circular gap diaphragm (solid electrolyte)
Installation length: 4.72“ (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). 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 8.9“ (225 ±3 mm)	150061

ProMinent® DULCOTEST Sensors

pH Combination Sensors With SN6

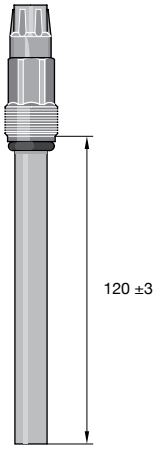


pk_6_022

PHED 112 SE

pH range: 1-12
Temperature: 32-176 °F (0-80 °C)
Max. pressure: 116 psi (8 bar)
Min. conductivity: >150 µS/cm
Diaphragm: Double junction
Installation length: 4.72“ (120 ±3 mm)
Typical applications: Potable, industrial water, lightly contaminated waste water, cooling tower water

	Part No.
PHED 112 SE	741036



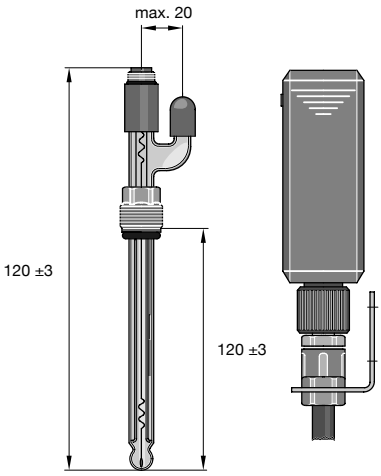
pk_6_007

PHEF 012 SE

HF

pH range: 1-12
Temperature: 32-122 °F (0-50 °C)
Max.pressure: 100 psi/7 bar
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



pk_6_021

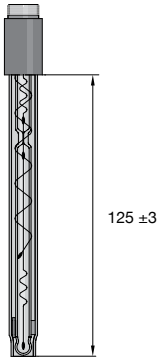
PHEN 112 SE

pH range: 1-12
Temperature: 32-176 °F (0-80 °C)
Max. pressure: Atmospheric pressure
Min. conductivity: >150 µS/cm
Diaphragm: Ceramic
KCl electrolyte, refillable
Installation Length: 4.72“ (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



pk_6_023

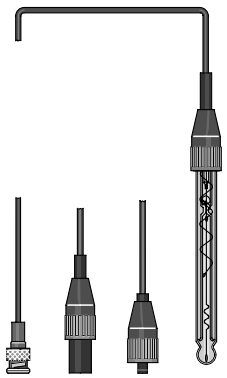
PHEK 112 SE

pH range 1-12
Temperature: 32-140 °F (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

pH Sensors with Fixed Cable

Series									
PHE	pH sensor								
	Properties								
	K	with insensitive plastics shaft							
	N	refillable KCl electrode							
	D	with double diaphragm (double injection)							
		Special equipment							
		T	with built in temperature gauge						
			pH measuring range						
			112	pH measurement range: 1...12					
				Electrical connection to electrode					
				F	fixed cable electrode				
					Internal thread				
					E	Internal thread			
					L	without, laboratory electrode refillable			
						Cable diameter			
						3	cable diameter 3 mm		
						5	cable diameter 5 mm		
							Cable length		
							01	cable length in meters	
								Electrical connection at device	
								S	SN6
								D	DIN
								B	BNC
								O	without connector
								M	SN6 male
PHE	**K**	**T**	**112**	**F**	**E**	**3**	**1**	**S**	



pk_6_024

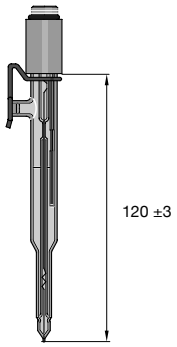
Type PHES 112 F

pH sensor, gel-filled, with coax cable and device plug, no internal thread.

Type	Cable length	Device plug	Part No.
PHES 112 F 301 S	3.3 ft. (1 m)	SN6	304976
PHES 112 F 303 B	9.8 ft. (3 m)	BNC	304981

ProMinent® DULCOTEST Sensors

pH Combination Sensors With SN6



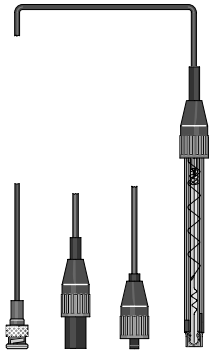
pk_6_025

PHEE 112 S

pH range: 1-12
Temperature: 32-140 °F (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

pH Combination Sensors With Fixed Cable

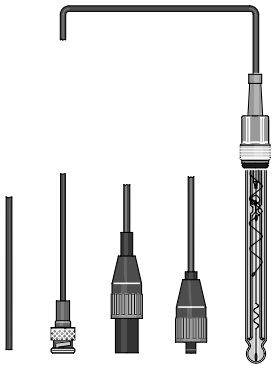


Type PHEK 112 F

pH combination probe with plastic shaft, glass stem, fixed coax cable and connector, no internal thread.

Type	Cable length	Device plug	Part No.
PHEK 112 F 301 B	3.3 ft. (1 m)	BNC	304996

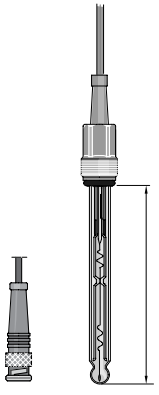
Further types on request.



Type PHE 112 FE

Type	Cable length	Device plug	Part No.
PHE 112 FE 303 S	9.8 ft. (3 m)	SN6	304984
PHE 112 FE 310 S	32.8 ft. (10 m)	SN6	304985
PHE 112 FE 303 B	9.8 ft. (3 m)	BNC	304988

Further types on request.



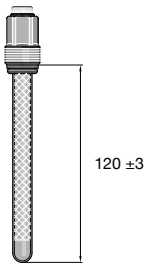
Type PHED 112 FE

Type	Cable length	Connector	Part No.
PHED 112 FE 303 B	9.8 ft. (3 m)	BNC	741038

Further types on request.

ProMinent® DULCOTEST Sensors

Temperature Sensors



pk_6_026

Temperature range: 0…100 °C
Max. pressure: 10 bar
Typical applications: Temperature measurement and pH temperature correction

	Part No.
Pt 100 SE	305063
Pt 1000 SE	1002856

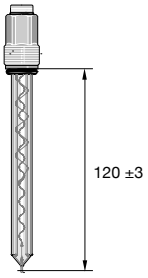
ORP Identcode Description

Identity Code Description (Type description)

RHEX Pt SE

- ORP-combination probe
  - **X**: with solid electrolyte and circular gap diaphragm
  - **K**: with strong plastic shaft
  - **P**: pressure tight to 87 psi (6 bar)
  - **R**: with PTFE ring diaphragm
  - **N**: refillable KCl electrode
  - **S**: swimming pool electrode
  - unspecified: standard gel-filled electrode
- **Pt:** Platinum electrode (pin)
- **Au:** Gold electrode (pin)
- **E**: internal mounting thread PG 13.5
- **S**: connector for SN6 coax plug

ORP Combination Sensors With SN6



pk_6_031

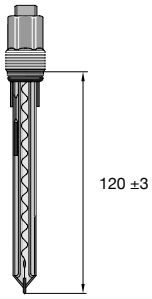
RHES-Pt-SE

Temperature: 32-140 °F (0-60 °C)
Max. pressure: 7.3 psi (0.5 bar)
Min. conductivity: >150 µS/cm
Diaphragm: Ceramic
Installation length: 4.72“ (120 ±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: 32-176 °F (0-80 °C)
Max. pressure: 87 psi (6 bar)
Min. conductivity: >150 µS/cm
Diaphragm: Ceramic
Installation length: 4.72“ (120 ±3 mm)
Mounting hole: min. Ø 0.57“ (14.5 mm)

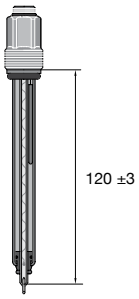
Typical applications: Swimming pools under pressure, potable and industrial water, lightly soiled wastewater, the electroplating and chemical industries, for higher temperatures and pressures.
Not suitable for media containing ozone

	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

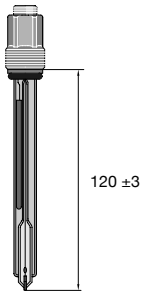


pk_6_034

RHER-Pt-SE

Temperature: 32-176 °F (0-80 °C)
Max. pressure: 87 psi (6 bar)
Min. conductivity: >50 µS/cm
Electrolyte with KCl supplement (salt rings in the reference electrolyte)
Diaphragm: PTFE ring diaphragm
Installation length: 4.72“ (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

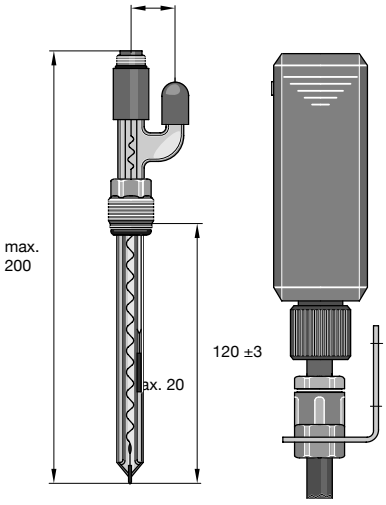
RHEX-Pt-SE

Temperature: 32-212 °F (0-100 °C)
Max. pressure: 232 psi (16 bar) at77 °F (25 °C); 87 psi (6 bar) at 212 °F (100 °C)
Min. conductivity: >500 µS/cm
Diaphragm: circular gap (solid electrolyte)
Installation length: 4.72“ (120 ±3 mm)
Typical applications: Waste water, industrial water, process chemistry, emulsions, suspensions, fluids containing protein and sulphite (not chlorine/fluoride or when subject to temperature fluctuations). 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



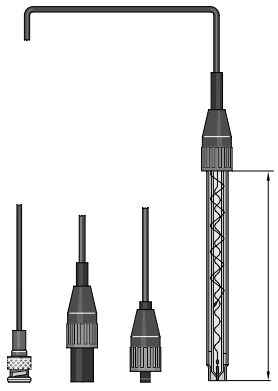
RHEN-Pt-SE

Temperature: 32-176 °F (0-80 °C)
Max. pressure: Atmospheric pressure operation
Min. conductivity: >150 µS/cm
Diaphragm: Ceramic
KCl electrolyte, refillable
Installation length: 4.72“ (120 ±3 mm)
Typical applications: Waste water
Supplied without PE storage container and tubing

		Part No.
RHEN-Pt-SE		305091
Accessories:		
PE storage container with connectors and tubing		305058
We recommend installation approx. 1.6 - 3.3 ft. (0.5-1 m) above sample fluid level.		
KCl solution 3 molar	250 ml	791440
KCl solution 3 molar	1000 ml	791441

ORP Sensors With Fixed Cable

Series								
RHE	ORP sensor							
	Properties							
	K	Plastics shaft						
		Electrode material						
		Pt	Platinum					
			Electrical connection to electrode					
			F	Fixed cable electrode				
				Internal thread				
				E	internal thread PG 13.5			
					Cable diameter			
					3	cable diameter 0.12" (3 mm)		
					5	cable diameter 0.20" (5 mm)		
						Cable length		
						01	cable length in meters	
							Electrical connection at device	
							S	SN6
							D	DIN
							B	BNC
RHE	**K**	**Pt**	**F**	**E**	**3**	**1**	**S**	



Type RHES-Pt-F

ORP combination probes with Pt electrode probe gel-filled, with glass shaft, without internal mounting thread.

Type	Cable length	Connector	Part No.
RHES-Pt-F 303 B	9.8 ft. (3 m)	BNC	304983

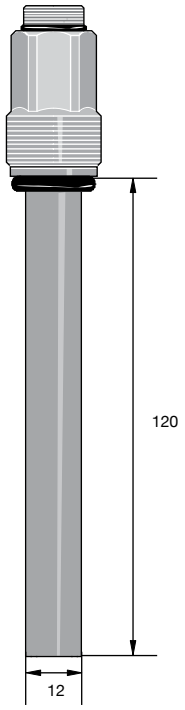
Type RHEK-Pt-F

ORP sensor with plastic shaft, Pt electrode with cover.
Fixed coax cable and device plug, no internal mounting thread.

Type	Cable length	Connector	Part No.
RHEK-Pt-F 301 S	3 ft. (1 m)	SN6	304997

ProMinent® DULCOTEST Sensors

Fluoride Sensors



pk_6_095

DULCOTEST Sensors fluoride electrodes are ion-selective electrodes based on the potentiometic 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.

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:	photometric, see section 5.4.5: DT2A and DT2B photometers
Measurement range with measurement transducer:	0.05-10.00 mg/l
pH range:	5.5-9.5
Temp. range:	34-95 ºF (1-35 °C)
Max. Pressure:	100 psi (no pressure surges)
Intake flow:	recommended 5.3 gph (20 l/h): 2.6-26.4 gph (10 - 200 l/h)
Conductivity range:	> 100 µS/cm
Response time T95 (open):	< 30 s (for conc. > 0.5 ppm)
Enclosure rating:	IP 65
Shelf life:	approx. 6 months
Length when fitted:	4.72“ (120 mm)
Shaft diameter:	0.472“ (12 mm)
Typical application:	monitoring the fluoridation of potable water
Measurement and control equipment:	D1C
in-line probe housing:	DLG IV

	Part No.
FLEP 010 (fluoride sensor)*	1028279

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 flouride sensor (part no. 1010311)

** replaces transducer (part no. 1009962)

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	D1C, DAC	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	D1C, DAC	CLO 1-mA-xppm
Free chlorine	Hot water up to 70 °C (legionella), in situ electrolysis (without diaphragm)	0.02-2 ppm	D1C, DAC	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	D1C, DAC	CBR 1-mA-xppm
Total available chlorine	Swimming pool water with chlorine-organic disinfectants	0.02–10 ppm	D1C, DAC	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	D1C, DAC	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	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, whirlpool water, bromine with bromorganic disinfectants (e.g. BCDMH)	0.2–10 ppm	D1C, DAC	BRE 1-mA-xppm
Total available bromine	Cooling water, swimming pool water, whirlpool water, bromine with inorganic bromine compounds (e.g. NaBr/HOCl)	0.2–10 ppm	D1C, DAC	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	D1C, DAC	CBR 1-mA-xppm

ProMinent® DULCOTEST Sensors

Overview: Amperometric Sensors

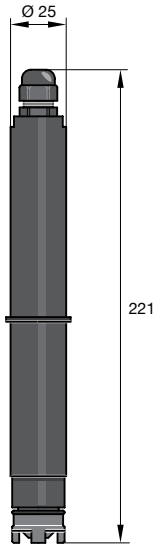
Measured variable	Applications	Graduated measuring range	Connection to DULCOMETER®	Sensor type
Chlorine dioxide	Drinking water	0.01–10 ppm	D1C, DAC, DULCOMARIN® II	CDE 2-mA-xppm
Chlorine dioxide	Bottle washer system	0.02–2 ppm	D1C, DAC, DULCOMARIN® II	CDP 1-mA
Chlorine dioxide	Hot water up to 60 °C, cooling water, waste water, irrigation water	0.01-10 ppm	D1C, DAC, DULCOMARIN® II	CDR 1-mA-xppm
Chlorite	Drinking, wash water	0.02–2 ppm	D1C, DAC DULCOMARIN® II	CLT 1-mA-xppm
Ozone	Drinking, service, process, swimming pool water	0.02–2 ppm	D1C, DAC	OZE 3-mA-xppm
Dissolved oxygen	Drinking, surface water	2–20 ppm	D1C, DAC	DO 1-mA-xppm
Dissolved oxygen	Activated sludge tank, sewage treatment plant	0.1–10 ppm	D1C, DAC	DO 2-mA-xppm
Peracetic acid	CIP, antiseptic food filling process	1–2,000 ppm	D1C, DAC	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	D1C, DAC	PER1-mA-xppm

Overview: Amperometric Sensors Selection Guide

		Selection Guide							
		CLE 3	**CLE 3.1**	**CLO 1**	**CLO 2**	**CLB 2**	**CBR 1**	**CGE 2**	**CTE 1**
Measured variable	Free chlorine	x	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	x		
	no							x	x
Application	Public swimming pools	x	x			x		(x)	
	Private swimming pools	x	x	x		x		x	
	Drinking water	x	x		x	x			x
	Cooling water						x		x
	Waste water						x		x
Disinfectant	chlorine gas, hypochlorite, electrolysis with diaphragm	x	x	x	x	x	x		x
	electrolysis without diaphragm			x	x	x			
	chlorine-containing cyanuric acid derivatives							x	
Specifications	Measuring range [ppm]	0.01-100	0.01-10	0.02-2	0.02-2	0.05-5	0.01-10	0.02-10	0.01-10
	pH range	5.5-8	5.5-8	5-9	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	41-113
	(°C)	5-45	5-45	5-45	5-70	5-45	5-45	5-45	5-45
	Max. pressure [bar]	1	1	8	8	8	1	3	3
Installation	open outlet	x	x	x	x	x	x	x	x
	direct installation in the circuit			x	x	x			

Note: Interference, such as film-forming substances, chemical residue, flow, conductivity

Chlorine Sensors



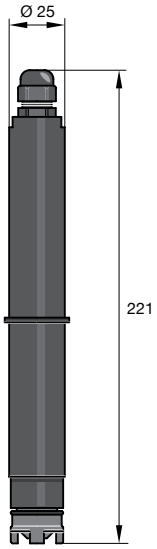
pk_6_039

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 D1C pH correction)
Temperature range:	41-113 °F (5-45 °C) temperature compensated
Max. pressure:	14.5 psi (1 bar)
Flow:	7.9-14.9 gph (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:	D1C, DAC, DULCOMARIN® (2/10 ppm only)
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

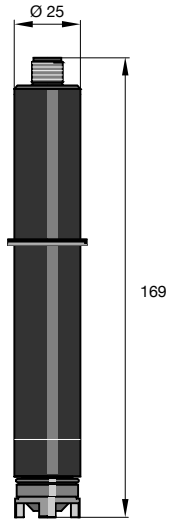
CLE 3.1-mA

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 D1C 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 D1C pH correction)
Temp. range:	41-113 °F (5-45 °C) temperature compensated
Max. pressure:	14.5 psi (1 bar)
Inflow:	7.9-14.9 gph (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:	D1C, DAC, DULCOMARIN®
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

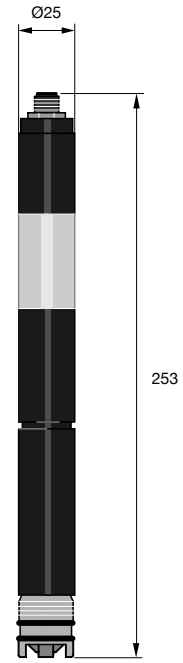
Measuring cell for use with the DMT “chlorine” measurement transducer.

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 (3.3 VDC)
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

Note: You require assembly kit (Part No. 815079) for the initial installation of the chlorine sensors into the DLM III in-line probe housing.



pk_6_096

CLE 3-CAN

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 semiconducter element
Output signal:	uncalibrated, temperature compensated, electrically isolated
Compatibility:	CAN-Open bus systems

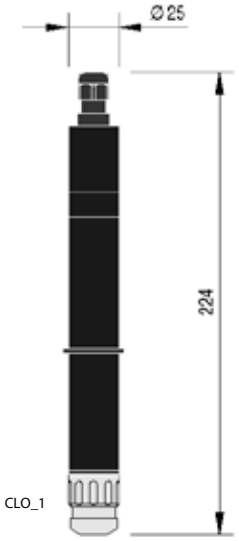
Additional data see CLE 3-mA

	Part No.
CLE 3-CAN-10 ppm set with 100 ml electrolyte	1023425

Note: You require assembly kit (Part No. 815079) for the initial installation of the chlorine sensors into the DLM III in-line probe housing.

ProMinent® DULCOTEST Sensors

Chlorine Sensors

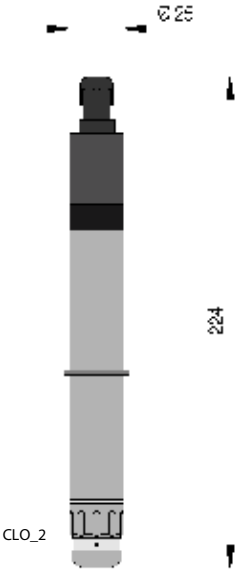


CLO_1

CLO 1-mA

Measured variable:	**Free chlorine (hypochlorous acid HOCl)**
Reference method:	DPD1
pH range:	5-9
Temperature:	41-113 °F (5-45 °C)
Max. pressure:	116 psi (8 bar)
Intake flow:	7.9-15.9 gph (30-60 l/h) (in DGM or DGL 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:	D1C, DAC
In-line probe fitting:	DGM, DLG III to 140 °F (60 °C), special fitting for 140-158 °F (60-70 °C) on request
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

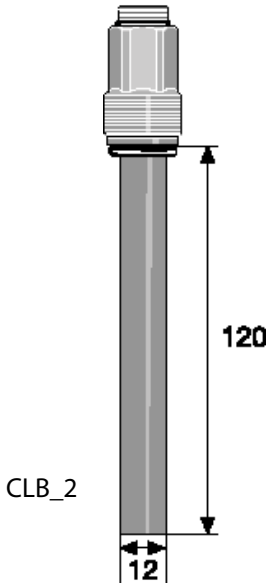
CLO 2-mA

Measured variable:	**Free chlorine (hypochlorous acid HOCl)**
Reference method:	DPD1
pH range:	5-9
Temperature:	41-158 °F (5-70 °C)
Max. pressure:	116 psi (8 bar)
Intake flow:	7.9-15.9 gph (30-60 l/h) (in DGM or DGL 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:	Hot water up to 158 °F (70 °C), combatting legionella, uncontaminated drinking water and industrial service water, can, also be used together with diapgragm-free electrolysis processes
Measurement and control equipment:	D1C, DAC
In-line probe fitting:	DGM, DLG III to 140 °F (60 °C), special fitting for 140-158 °F (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

ProMinent® DULCOTEST Sensors

Chlorine Sensors

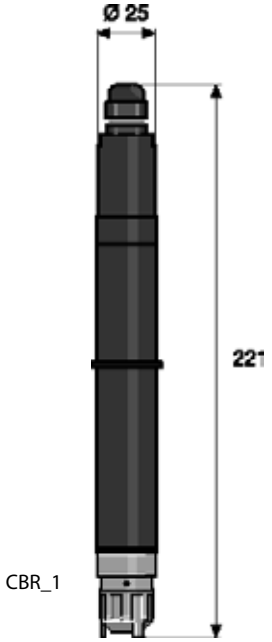


CLB_2

CLB 2-µA

Measured variable:	**Free chlorine (hypochlorous acid HOCl)**
Reference method:	DPD1
pH range:	5-9
Temperature:	41-113 °F (5-45 °C)
Max. pressure:	116 psi (8 bar)
Intake flow:	7.9-15.9 gph (30-60 l/h) (in DGM or DGL III), constant flow needed as flow-dependent signal
Power supply:	16-24 V DC (2-wire)
Output signal:	Non-amplified primary current signal, non-temperature-compensated, uncalibrated, not electrically isolated
Typical applications:	Private swimming pool, can also be used together with Diaphragm-free electrolysis processes for the generation of chlorine
Measurement and control equipment:	Compact controller
In-line probe fitting:	DGM, DLG III
Measuring principle:	amperometric, 3 electrodes, no diaphragm

	Measuring range	Part No.
CLB 2-µA-5 ppm	0.05-5.0 ppm	1038902



CBR_1

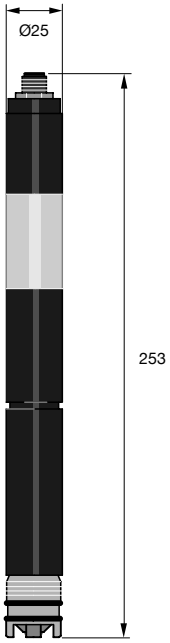
CBR 1-mA

Measured variable:	**Free chlorine (hypochlorous acid HOCl), free bromine, bound-bromine**
Reference method:	DPD1
pH range:	5-9.5
Temperature:	41-113 °F (5-45 °C)
Max. pressure:	14.5 psi (1 bar)
Intake flow:	7.9-15.9 gph (30-60 l/h) (in DGM or DGL 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:	D1C, 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-10 ppm	0.10-10 ppm	1038014

ProMinent® DULCOTEST Sensors

Chlorine Sensors



pk_6_096

CLE 3.1-CAN

Sensor for connection to a CAN interface (e.g. DULCOMARIN® II swimming pool controller)

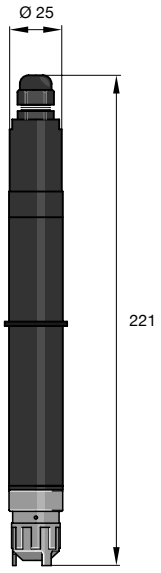
Measured variable:	**free chlorine (hypochlorous acid) with high proportion of bound chlorine and/or pH value up to 8.5 (with pH correction via D1C)**
Reference method:	DPD 1
Measurement range:	0.01 -10 mg/l
Power supply:	via CAN-interface (11-30 V)
Temperature measurement:	via installed digital semiconducter 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-10 ppm set with 100 ml electrolyte	1023426

Note: You require assembly kit Part No. 815079 for the initial installation of the chlorine sensors into the DLM III in-line probe housing.

Measured variable of organic combined chlorine and free chlorine (total available chlorine)



pk_6_040

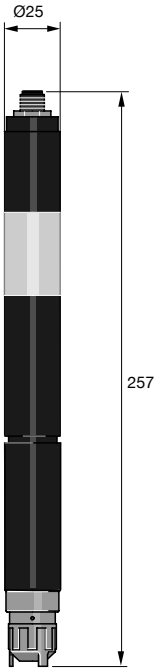
CGE 2-mA

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 2-mA-2 ppm) 0.1-10.0 mg/l (CGE 2-mA-10 ppm)
pH range:	5.5-9.5
Temperature range:	41-113 °F (5-45 °C) temperature compensated
Max. pressure:	43.5 psi (3 bar)
Flow:	7.9-15.9 gph (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:	D1C, DAC, DULCOMARIN®
In-line probe housing:	DGM, DLG III

	Part No.
CGE 2-mA-2 ppm set, with 50 ml electrolyte	792843
CGE 2-mA-10 ppm set, with 50 ml electrolyte	792842

ProMinent® DULCOTEST Sensors

Chlorine Sensors



pk_6_084

CGE 2-CAN

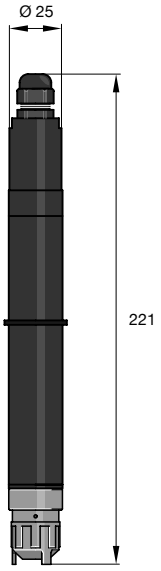
Probe for connection to a CANopen interface (e.g. DULCOMARIN® II swimming pool controller)

Measured variable:	**total available chlorine: sum of organically combined chlorine (e.g. combined in cyanuric acid) and free chlorine**
Reference method:	DPD1
Range:	0.01-10.00 ppm
pH range:	5.5-9.5
Temp. range:	5-45 °C (temperature compensated)
Max. pressure:	3 bar
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:	CANopen bus systems

See CGE 2-mA for other information

	Part No.
CGE 2-CAN-10 ppm c/w with 100 ml of electrolyte	1024420

Note: a mounting kit (Part No. 815079) is required for the initial installation of the chlorine probe in the DLG III in-line probe housing.



pk_6_040

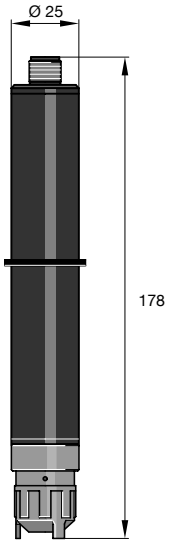
Measured variable of total chlorine

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:	3 bar
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:	D1C, DAC, DULCOMARIN® (2/10 ppm only)
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
CTE 1-mA-20 ppm set, with 50 ml electrolyte	7792910
Viton O-ring for CTE membrane cap	7781269

Chlorine Sensors



pk_6_015

CTE 1-DMT

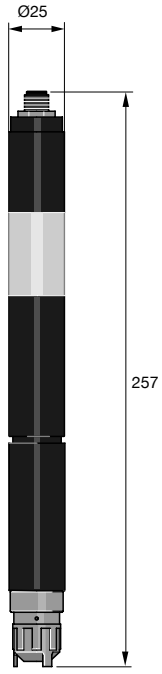
Measuring cell for use with the DMT “chlorine” measurement transducer.

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

Note: An assembly set 815079 is required for DLG III for initial installation of chlorine measuring cells.



pk_6_084

CTE 1 -CAN

Sensor for connection to a CAN interface

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 semiconducter element
Output signal:	uncalibrated, temperature compensated, electrically isolated
Compatibility:	CAN-Open bus systems

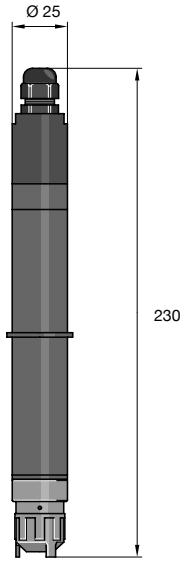
Additional data see CLE 3-mA

	Part No.
CTE 1-CAN-10 ppm set with 100 ml electrolyte	1023427

Note: You require assembly kit (Part No. 815079) for the initial installation of the chlorine sensors into the DLM III in-line probe housing

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

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:	41-113 °F (5-45 °C)
Max. pressure:	43.5 psi (3 bar)
Sample flow:	7.9-15.9 gph (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:	D1C, DAC
In-line probe housing:	DGM, DLG III

	Part No.
BRE 1-mA-2 ppm kit with 50 ml electrolyte	1006894
Measurement range relates to BCDMH	
BRE 1-mA-10 ppm kit with 50 ml electrolyte	1006895
Measurement range relates to BCDMH	
BRE 2-mA-10 ppm kit with 50 ml electrolyte	1020529
Measurement range relates to DBDMH, free bromine	
BRE 1-mA-0.5 ppm kit with 50 ml electrolyte	1041697
BRE 2-mA-2 ppm kit with 50 ml electrolyte	1033391

Note: Requires assembly kit (Part No. 815079) for the initial installation of the brominesensors into the DLM III in-line probe housing. Signal leads, see sensor technology accessories.

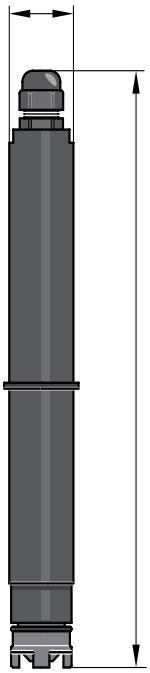
ProMinent® DULCOTEST Sensors

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	41-113 °F (5-45 °C)	41-140 °F (5-60 °C)	50-113 °F (10-45 °C)	33.8-131 °F (1-55 °C)
Max. pressure	14.5 psi (1.0 bar)	14.5 psi (1.0 bar)	43.5 psi (3.0 bar)	43.5 psi (3.0 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 (ClO2)
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:	ClO2 stability range
Temperature range:	5-41-113 °F (45 °C) temperature compensated, no significant temperature fluctuations
Max. pressure:	14.5 psi (1 bar)
Flow:	7.9-15.9 gph (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:	D1C, DAC
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

Note: You require assembly kit (Part No. 815079) for the initial installation of the chlorine sensors into the DLM III in-line probe housing.

CDE 2.1-mA

Technical data: as Type CDE 2-mA, but maximum temperature 140 °F (60 °C)

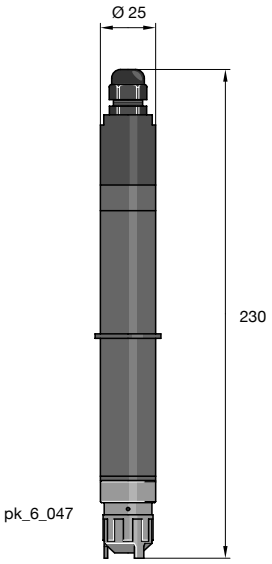
Typical application: chlorine dioxide treatment to combat legionella

CDE 2.1-mA

0.5 ppm comes complete with 100 ml of electrolyte

Order on request

Note: a mounting kit (Part No. 815079) is required for the initial installation of the Chlorine dioxide probe in the DLG III in-line probe housing.



CDP 1-mA-2 ppm (ClO_2-process probe)

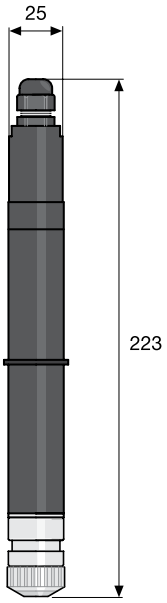
Applications:	Bottle washing machines and water containing surfactants
Measured variable:	**Chlorine dioxide (ClO_2)**
Reference method:	DPD1
Measurement range:	0.02-2.00 mg/l
pH range:	5.5-10.5
Temperature range:	50-113 ºF (10-45 °C) short term periods 131 ºF (55 °C) with **external temperature correction** via **Pt 100** (no internal temperature correction!)
Temperature variation speed:	Up to 10 K/min
Max. pressure:	43.5 psi (3 bar) no pressure surges
Flow:	7.9-15.9 gph (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:	**D1C, DAC with automatic temperature compensation only**
In line probe housing:	DGM, DLG III Probe housing quote on request.

	Part No.
CDP 1-mA-2 ppm set with 100 ml electrolyte	1002149

Note: You require assembly kit (Part No. 815079) for the initial installation of the chlorine dioxide sensors into the DLM III in-line probe housing.

ProMinent® DULCOTEST Sensors

Chlorine Dioxide Sensors



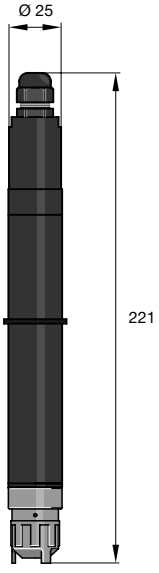
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CDR 1-mA-2 ppm

Measured variable:	**Chlorine dioxide (ClO_2)**
Reference method:	DPD1
pH range:	1-10
Temperature range:	1-131 °F (-17-7 °C) short term periods 140 °F (60 °C)
Max. pressure:	44 psi (3 bar) no pressure surges
Respones time T_{90}:	2-3 min
Intake flow:	8-16 gph (30-61 l/h)
Supply Voltage:	16-24 VDC
Output signal:	4-20 mA (temperature compensated, not calibrated)
Measuring and control device:	D1C, DAC
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

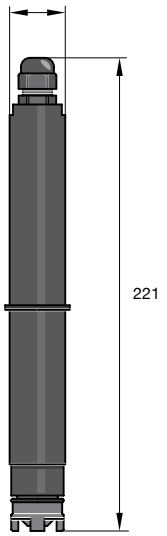
Measured variable:	**chlorite anion (ClO_2^-)**
Reference method:	DPD method Chlorite in presence of chlorine dioxide
Measurement range:	0.020-0.500 mg/l (CLT 1-mA-0.5 ppm) 0.10-2.00 mg/l (CLT 1-mA-2 ppm)
pH range:	6.5-9.5
Temp. Range:	33.8-104 °F (1-40 °C) temperature compensated
max. pressure:	1 bar
Intake flow:	7.9-15.9 gph (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:	D1C, DAC
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

Note: You require assembly kit (Part No. 815079) for the initial installation of the chlorite sensors into the DLM III in-line probe housing.
We recommend the DT4 photometer for calibration of the chlorite sensor.

ProMinent® DULCOTEST Sensors

Ozone Sensors



pk_6_039

OZE 3-mA

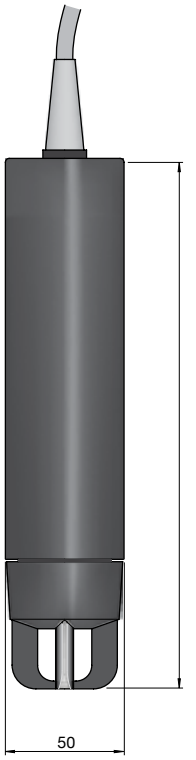
Measured variable:	**Ozone (O_3)**
Reference method:	DPD4
Measurement range:	0.02-2.00 mg/l
pH range:	Ozone stability range
Temperature range:	41-104 °F (5-40 °C) temperature compensated, no significant Temperature fluctuations
Max. pressure:	1 bar
Flow:	7.9-15.9 gph (30-60 l/h) in DGM or DLG III
Power 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:	D1C, DAC
In-line probe housing:	DGM , DLG III

	Part No.
OZE 3-mA-2 ppm set, with 100 ml electrolyte	792957

Note: You require assembly kit Part No. 815079 for the initial installation of the ozone sensors into the DLM III in-line probe housing.

ProMinent® DULCOTEST Sensors

Dissolved Oxygen Sensors



pk_6_050_1

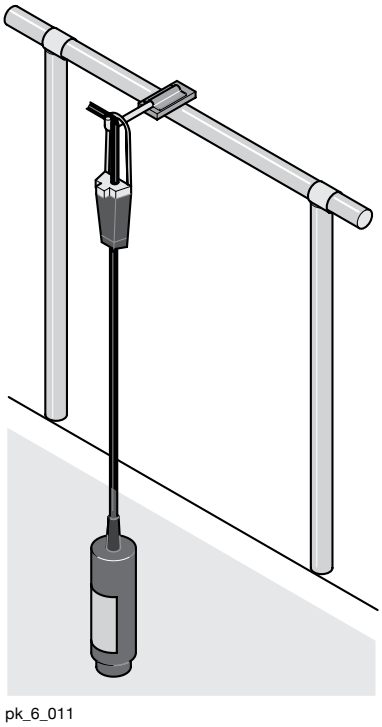
The measured variable “dissolved oxygen” gives the quantity of the gaseous physical dissolved oxygen in its aqueous phase in mg/l (ppm).

The “dissolved oxygen” is thereby 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 D1C as a stand alone solution.

DO 1-mA

Measured variable:	dissolved oxygen
Calibration:	of oxygen in air
Measurement range:	0-20 mg/l
Reproducibility of measurement:	± 0.5 % of measurement limit value
Temp. range:	32-122 °F (0 -50 °C)
Max. pressure:	14.5 psi (1 bar)
Velocity of sample water:	minimum: 0.16 ft./s (0.05 m/s)
Enclosure rating:	IP 68
Power supply:	12-30 V DC
Output signal:	4-20 mA. Measurement range calibrated, temperature corrected and electrically isolated
Process integration:	a) immersion, suspended on cable with or without mountain bracket for cable b) Immersion of immersion pipe 1. Immersion pipe with 1.97“ (50 mm) outside diameter and 1-1/4“ (31.75 mm) internal thread (provided by the customer). Connection via immersion pipe adapter 2. PVC immersion pipe with 1.97“ (50 mm) outside diameter (provided by the customer). Connection via standard PVC adhesive union (provided by the customer). c) In-flow operation to order
Typical applications	Fish and shrimp farming. Conditioning of water in large aquaria in zoological systems. Control of oxygen input in waterworks Appraisal of the biological status of surface waters

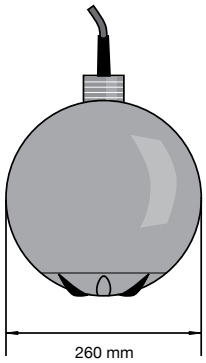


pk_6_011

	Part No.
DO 1-mA-20 ppm	1020532

ProMinent® DULCOTEST Sensors

Dissolved Oxygen Sensors

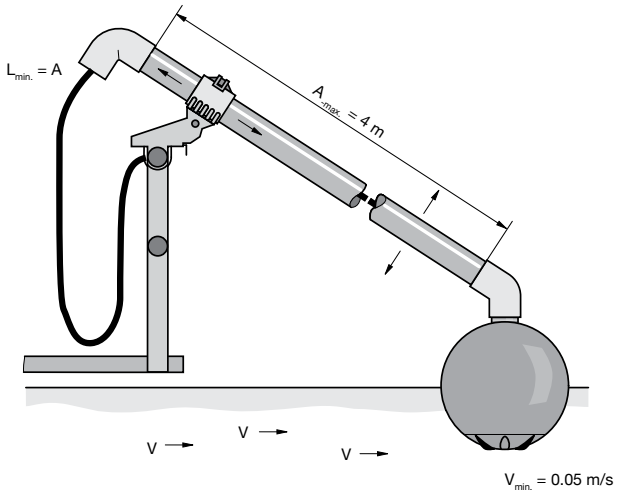


pk_6_051

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:	32-122 ºF (0 -50 °C)
Max. pressure:	14.5 psi (1 bar)
Velocity of sample water:	minimum: 0.16 ft./s (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

	Part No.
DO 2-mA-10 ppm	1020533



pk_6_012

Dissolved Oxygen Sensors

DO 3-mA

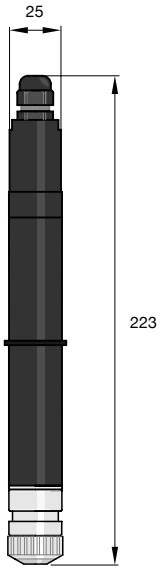
Measured variable:	dissolved oxygen
Calibration:	on atmospheric oxygen or by reference measurement in the process water
Measurement accuracy:	±0.1 ppm (mg/l)
Response time sensor t_{90}:	< 60 S at 77 °F (25 °C) from air to nitrogen
Temperature:	32-122 °F (0 -50 °C)
Temperature correction:	integrated Pt1000, fed to the outside
Max. pressure:	29 psi (2 bar)
Intake flow:	measurement even possible wothout flow
Supply voltage:	18-30 V DC
Electrical connection:	Fixed cable, 32.8 Ft (10 m)
Output signal:	4-20 mA. Measurement range calibrated, temperature corrected and galvanically isolated
Process integration:	**a)** Immersion by immersion pipe (PVC, d40/DN 32, provided by the customer). 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). **b)** Installation into ProMinent bypass fittings, type DGMa with mounting kit 791818 and type DLG III with mounting kit 815079
Measuring & 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, D1C: calibration only possible by the input of a reference concentration determined from the process water. Only temperature correction variable. Displayed unit: [ppm]
Typical applications:	Control of oxygen input into the aeration tank (clarification plant), control of oxygen input in water works, breeding of fish and shrimps, conditioning of the water of large aquaria in zoos, assessment of the biological condition of surface water.
Resistance to:	Contaminated water and the following chemical compounds: carbon dioxide, hydrogen sulfide, sulfur dioxide, ethylene oxide and against gamma sterilization.
Interference by:	Oxidant (e.g. chlorine, chlorine dioxide, ozone) and many organic solvents (e.g. chloroform, toluene, acetone)
Measuring priciple, technology:	Optical: Measurement of the relaxation time of a pulsed fluorescence beam

	Part No.
DO 2-mA-10 ppm	1020533



ProMinent® DULCOTEST Sensors

Peracetic Acid Sensors



pk_6_083

The DULCOTEST Sensors 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 D1Ca 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:	33.8113 °F (1-45 °C) temperature compensated
Admissible temperature fluctuation:	0.3 °/min
Response time T_{90}	3 min.
Max. Pressure.:	43.5 psi (3 bar) at 86 °F (30 °C), in DGM
Intake flow:	7.9-15.9 gph (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:	scouring in 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:	D1C, DAC
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 Sensors 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 122 °F (50 °C)	up to 104 °F (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_2O_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_2O_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

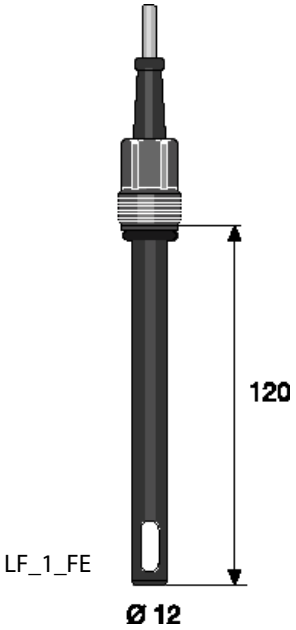
Operating conditions

Requirement	Type	Type
	PER1	**PEROX**
Measured variable	hydrogen peroxide	hydrogen peroxide
Calibration	photometric with DT4 hand-held photometer, see Chap. 5.4.4	photometric with DT4 hand-held photometer, see Chap. 5.4.4
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	5.3-26.4 gph (20-100 l/h) with DGMa	15.9 gph (60 l/h) recommended
Max. operating pressure	0-14.5 psi (0-1 bar)	29 psi (2 bar)
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	DAC...H 7	DAC...H 1
In-line probe housing	DGM, DLG	DGM, DLG

	Part No.
Perox sensor PEROX-H2.10-P	792976
Perox transducer PEROX-micro-H1.20-mA	1034100
PER 1- mA - 200 ppm	1022509
PER - mA - 2000 ppm	1022510
PER 1- mA - 50 ppm	1030511

ProMinent® DULCOTEST Sensors

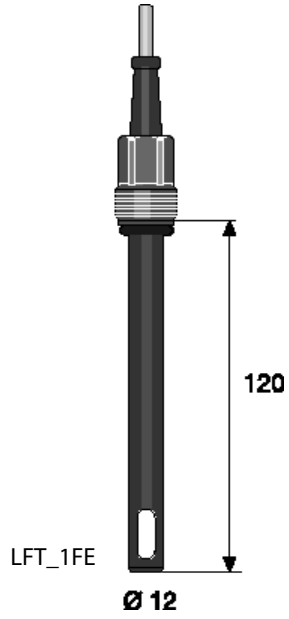
Conductivity Sensors



LF 1 FE

Measurement range:	0.01-20 mS/cm
Cell constant k:	1 cm^{-1} ± 5%
Temperature compensation:	-
Fluid temperature:	32-176 °F (0-80 °C)
Max. pressure:	232 psi (16 bar)
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.

	Part No.
LF 1 FE	741152



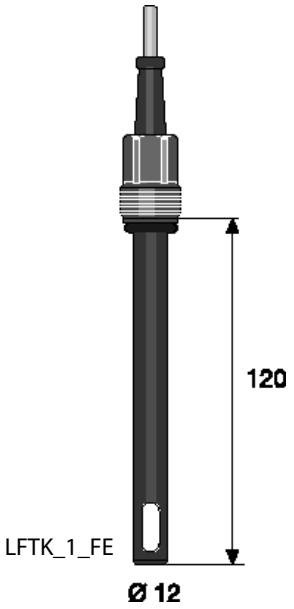
LFT 1FE

Measurement range:	0.01-20 mS/cm
Cell constant k:	1 cm^{-1} ± 5%
Temperature compensation:	Pt 100
Fluid temperature:	32-176 °F (0-80 °C)
Max. pressure:	232 psi (16 bar)
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.

	Part No.
LFT 1FE	1001374

ProMinent® DULCOTEST Sensors

Conductivity Sensors

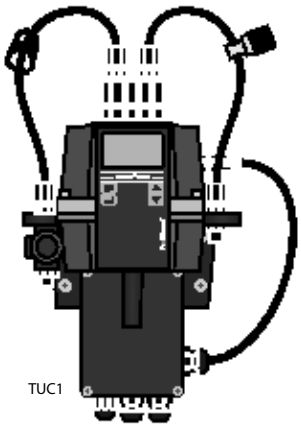


LFTK 1 FE

Measurement range:	0.01-20 mS/cm
Cell constant k:	1 cm^{-1} ± 5%
Temperature compensation:	Pt 1000
Fluid temperature:	32-176 °F (0-80 °C)
Max. pressure:	232 psi (16 bar)
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

	Part No.
LFTK 1 FE	1046132

Measuring Points for Turbidity



The new DULCOTEST Sensors measuring points for turbidity in the DULCO turb C range with versions TUC1, TUC2, TUC3 and TUC4, are compact online turbidity measuring points, consisting of a sensor, inline flow fitting and measuring device. The measuring device permits the measured value to be displayed, calibration, transmission of the measured value via a 4-20 mA signal and the indication of limit value transgressions and device faults. The measuring cuvette integrated in the measuring device enable the device to operate in the bypass of the process line. The visual measuring unit does not come into contact with the sample medium.

The intended application is the treatment of drinking water, whereby the DULCO turb C can be used in all treatment stages of raw water, from filter monitoring to measurement of fine turbidity in dispensed drinking water. It is also possible to monitor the turbidity of slightly contaminated process water and waste water, as well as treated water from the food and beverage industry up to a turbidity value of 1,000 NTU. Compared with the TUC 1 / TUC 2, the measuring stations TUC 3 / TUC 4 include an ultrasound-based self-cleaning function. This helps in particular to extend the service intervals particularly when used with the types of water that form films.

The measuring principle is identical to light scatter measurements. The light beam that is beamed into the measuring cuvette filled with sample water is dispersed on turbidity particles and the scattered light is measured at right angles (90°) to the beamed in light (Nephelometric measurement). The measuring unit for the turbidity measurement can be given as NTU (Nephelometric Turbidity Unit) or as FNU (Formazin Nephelometric Unit). The measuring process of types TUC1/TUC3 (infrared light) corresponds to the globally applicable standard ISO 7027 and the European Standard DIN EN 27027. The measuring process of types TUC3/TUC4 (achromatic light) corresponds to the US American standard USEPA 180.1.

ProMinent® DULCOTEST Sensors

Measuring Points for Turbidity

Measurement range:	0 … 1,000.0 NTU
Accuracy	± 2 % of the displayed value or ± 0.02 NTU below 40 NTU, depending on which value is the greater
	± 5 % of the displayed value above 40 NTU
Resolution:	0.0001 NTU below 10 NTU
Response time:	configurable
Display:	Multiple row LCD display with background lighting
Alarm relay:	Two programmable alarms, 120-240 VAC, 2 A Form C relay
Output signal:	4-20 mA, 600 Ω, not electrically isolated: dual-isolated, degree of interference, overvoltage category II
Communication interface:	Bi-directional RS-485, Modbus
Max. pressure:	Integrated pressure regulating valve regulates 1380 kPa (200 psi), based on the flow rate Flow 1.6-15.9 gph (6 – 60 l/h)
Temperature:	33.8-122 ºF (1-50 °C)
Material that contacts with the media:	Polyamide (PA), silicone, polypropylene (PP), stainless steel, borosilicate glass
Voltage supply:	100 - 240 VAC, 47-63 Hz, 80 VA
Ambient conditions:	Not suitable for outdoor use
	Maximum altitude 1.24 miles above sea level
	Maximal 95 % relative air humidity (non-condensing).
Enclosure rating:	IP 66
Standard:	USEPA 180.1 with the "Infrared" version, ISO 7027 or DIN EN 27027 with the "Achromatic light" version
Dimensions H x W x D:	34" x12" x 12" (35 x 30 x 30 cm)
Shipping weight:	5.5 lbs. (2.5 kg)

	Standard	Ultrasonic cleaning	Part no.
TUC 1	Infrared: ISO 7027, DIN EN 27027	No	1037696
TUC 2	Achromatic light: US EPA 180.1	No	1037695
TUC 3	Infrared: ISO 7027, DIN EN 27027	Yes	1037698
TUC 4	Achromatic light: US EPA 180.1	Yes	1037697

Spare parts

	Part no.
Drying agent	1037701
Cuvette TUC 1 / TUC 2	1037877
Cuvette TUC 3 / TUC 4	1037878
Infrared lamp TUC 1 / TUC 3	1037702
Achromatic light lamp TUC 2 / TUC 4	1037703
Hose kit	1037879
Pressure regulating valve	1037885

Accessories

	Part no.
Calibration set	1037699
Flow control	1037880

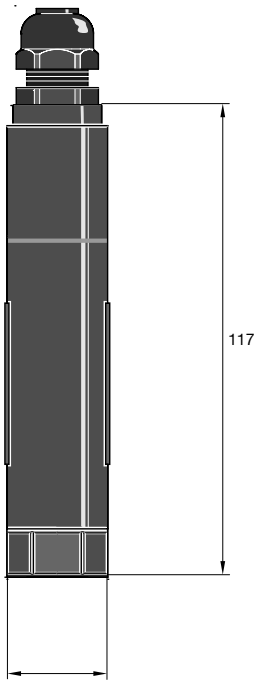
Sensor Accessories

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.



pk_5_064

pH measurement transmitter 4-20 mA, type pH V1

Measurement range:	pH 0…14
Accuracy:	better than pH 0.1 (typical ±pH 0.07)
Socket:	SN6
Input resistance:	10^{12} Ω
Signal output:	4…20 mA ≈ -500…+500 mV ≈ 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 Ø

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 x 10^{11} Ω
Signal output:	4…20 mA ≈ 0…+1000 mV not electrically isolated

Part No.
809127

Temperature measurement transmitter 4-20 mA, type Pt 100 V1

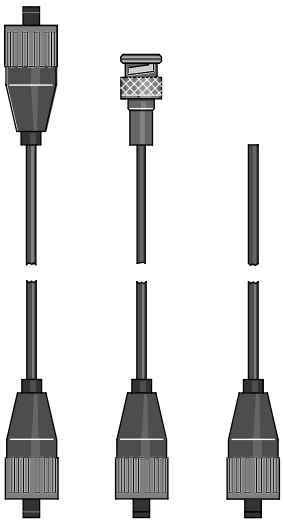
Technical data as for pH transmitter, but:

Measurement range:	0…100 °C
Accuracy:	better than ±0.5 °C (typical ±0.3 °C)
Input resistance:	~ 0 Ω
Signal output:	4…20 mA ≈ 0…+100 °C not electrically isolated

Part No.
809128

Sensor Accessories

Signal Cables



pk_6_054

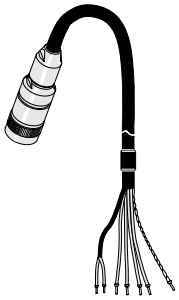
General guidelines:

- 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

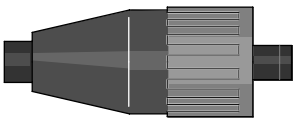
Design	Description		Part No.
2 x SN6	coax Ø 5 mm	3 ft. (0.8 m) - SS	305077
	coax Ø 5 mm	6 ft. (2.0 m) - SS	304955
	coax Ø 5 mm	15 ft. (5.0 m) - SS	304956
	coax Ø 5 mm	30 ft. (10.0 m) - SS	304957
SN6 - open end	coax Ø 5 mm	6 ft. (2.0 m) - S	305030
	coax Ø 5 mm	15 ft. (5.0 m) - S	305039
	coax Ø 5 mm	30 ft. (10.0 m) - S	305040
SN6 - BNC	coax Ø 3 mm	30 ft. (10.0 m) - SB	305099


pk_6_069

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


pk_6_056

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


pk_6_055

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	723718

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



pk_6_055

LKT signal lead for conductivity measuring cells

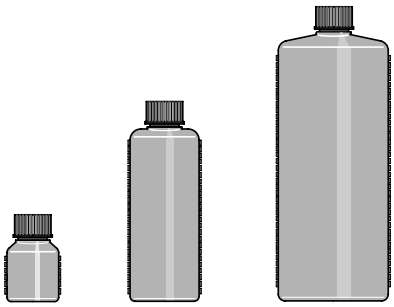
4-core, shielded, Ø 6.2 mm

	Part No.
Please specify length with order.	723712

Two-wire signal lead (2 x 0.25 mm²; Ø 4 mm)

For -mA type chlorine/bromine/chlorine dioxide/ozone measuring cells and pH, ORP; Pt 100, conductivity transducers.

	Part No.
Please specify length with order.	7740215

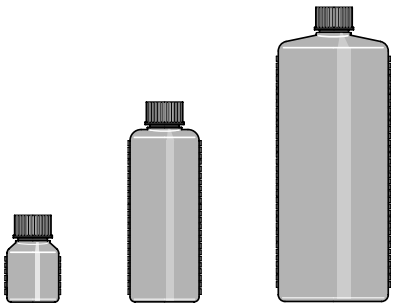


pH Quality Buffer Solutions

Accuracy ±pH 0.02 (±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 a maximum of three months after opening. The solution contains a biocide to prevent bacteria forming.

	Capacity	Part No.
pH 4.0 buffer - red color	50	506251
pH 4.0 buffer - red color	250	791436
pH 4.0 buffer - red color	1,000	506256
pH 5.0 buffer - red color	50	506252
pH 7.0 buffer - green color	50	506253
pH 7.0 buffer - green color	250	791437
pH 7.0 buffer - green color	1,000	506258
pH 9.0 buffer – colorless	50	506254
pH 9.0 buffer – colorless	1,000	506259
pH 10.0 buffer - blue color	50	506255
pH 10.0 buffer - blue color	250	791438
pH 10.0 buffer - blue color	1,000	506260



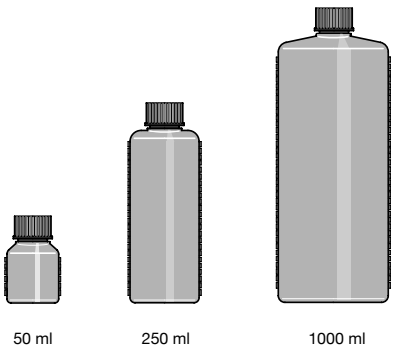
ORP Quality Buffer Solutions

Accuracy ± 5 mV. Their shelf life depends on how often they are used and how strong the carry-over of chemicals is.

Buffer solutions should be replaced a max. of 3 months after first opening.

Important: The ORP buffer solution 465 mV is an irritant!

	Capacity	Part No.
ORP buffer 465 mV	50	506240
ORP buffer 465 mV	250	791439
ORP buffer 465 mV	1,000	506241
ORP buffer 220 mV	50	506244
ORP buffer 220 mV	1,000	506245



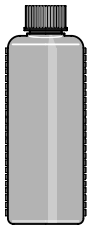
3 Molar KCl Solutions

3-molar KCl solution is most suited for the storage of pH and ORP sensors (e.g., in sensor quills) and as an electrolyte for refillable sensors (e.g., PHEN, RHEN). We only recommend using the KCl solution saturated with AgCl for the old design of the refillable sensors with reference electrodes without a large AgCl reservoir.

	Capacity	Part No.
KCl solution, 3 molar	50	505533
KCl solution, 3 molar	250	791440
KCl solution, 3 molar	1,000	791441

Sensor Accessories

Electrolyte Solutions



250 ml

pk_6_058

Cleaning solutions

Pepsin/hydrochloric acid cleaning solutions:

For cleaning pH electrode diaphragms contaminated with protein.

	Part No.
250 ml	791443

Conductivity calibration solution

For the accurate calibration of conductivity sensors we recommend using calibration solutions with known conductivity levels.

	Part No.
Buffer sol. LF 1413 myS/cm 250 ml	1027655
Buffer sol. LF 1413 myS/cm 1000 ml	1027656
Buffer sol. LF 12,88 mS/cm 250 ml	1027657
Buffer sol. LF 12,88 mS/cm 1000 ml	1027658

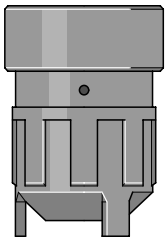


pk_6_061

Electrolyte for chlorine, bromine, chlorine dioxide and ozone measuring cells

	Part No.
CLE all chlorine measuring cells electrolyte, 100 ml	506270
CDM 1 type chlorine dioxide measuring cells electrolyte, 100 ml	506271
CDE chlorine dioxide measuring cells electrolyte, 100 ml	506272
OZE ozone measuring cells electrolyte, 100 ml	506273
Electrolyte for measuring cells types CGE/CTE/BRE, 50 ml	792892
Electrolyte for chlorine dioxide measuring cells type CDP, 100 ml	1002712
Electrolyte for peracetic acid sensors, type PAA 1, 100 ml	1023896
Electrolyte for chlorine probes, Type CLT 1, 50 ml	1022015

Membrane Caps

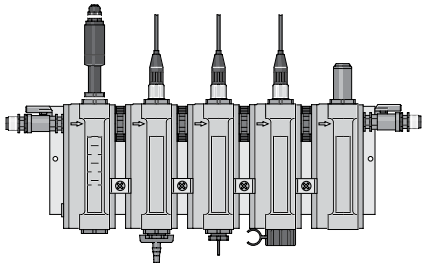


pk_6_075

Spare membrane caps, accessory sets for chlorine, bromine, chlorine dioxide and ozone sensors

	Part No.
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: this membrane cap is marked with a red dot	790488
Membrane cap for CGE/CTE 1 (2/5/10 ppm) and BRE 1 this membrane cap is orange	792862
Membrane cap for CTE 1 (0.5 ppm); this membrane cap is blue	741274
Membrane cap for CDP 1; this membrane cap is black	1002710
Membrane cap for PAA 1	1023895
Membrane cap for CLT 1	1002710
Accessory set for CGE 2/CTE 1 (2/5/10 ppm) and BRE 1 (2 membrane caps + 50 ml electrolyte)	740048
Accessory set CTE 1 (0.5 ppm) (2 membrane caps + 50 ml electrolyte)	741277
Accessory set for CDP 1 (2 membrane caps + 100 ml electrolyte)	1002744
Accessory kit CLT 1	1022100
Accessory kit PAA 1	1024022

DGMa Sensor Housings



pk_6_066

DGM modular in-line probe housing

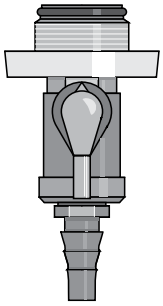
To accept conductivity, Pt 100, pH or ORP probes with PG 13.5 screw-in thread, or amperometric sensors with R 1" screw-in thread.

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:	140 °F, (60 °C)
Max. pressure:	87 psi, (6 bar) / 86 °F, (30 °C) 14.5 psi, (1 bar) / 140 °F, (60 °C) 29 psi, (2 bar),(with flow monitor, 86 °F, (30 °C))
Flow volume:	Up to 21 gph, (80 l/h),(10.5 gph, (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



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

Sensor Accessories

DGMa Identcode

DGM	Series Version:							
	A	Series						
		Flow monitor module:						
		0	None					
		1	With l/h scale					
		2	With gph scale					
		3	With flow monitor, l/h scale					
		4	With flow monitor, gph scale					
			Number of PG 13.5 modules:					
			0	None				
			1	One PG 13.5 module				
			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*			
				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**	

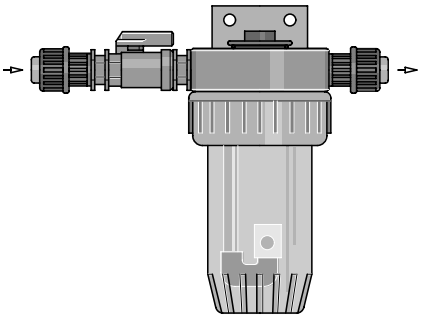
NOTE: Add 15 mm mounting set for PHEP/RHEP sensors

* 25 mm mounting set needed, P/N 791818

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
Mounting set for 15 mm (PHEP/RHEP)	791219
Mounting set for 25 mm module (CLE, CTE, CGE, CDE, CDP, 0ZE)	791818
Bubble disperser for Cl sensor	740207
Bubble disperser for pH/ORP sensors	791703

Sensor Accessories

DLG Sensor Housings



pk_6_063

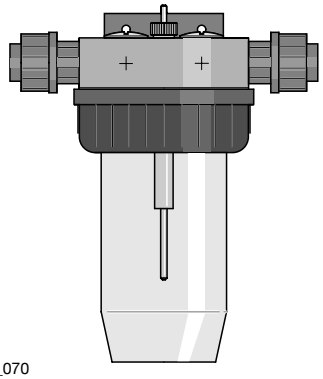
DLG III type in-line probe housing

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 A with PVC hose connectors for 8/5 mm Ø PE tubing	914955
DLG III B with PVC adhesive connectors for 16 mm Ø DN 10 pipe	914956
Assembly kit for fitting amperometric sensors	815079



pk_6_070

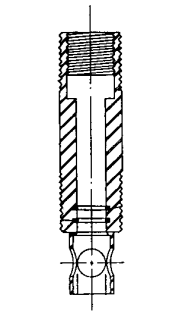
DLG IV type in-line probe housing

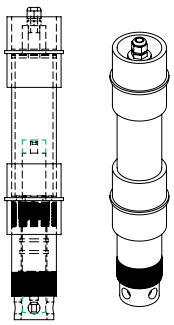
To take **4 electrodes** (pH, ORP, Pt 100, conductivity) with PG 13.5 threaded connector, with integrated stainless steel pin as liquid reference potential. Bracket for wall mounting.

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:	Union with d 16/DN 10 insert

	Part No.
DLG IV PVC for Ø 16/DN 10 pipe work connector	1005332
DLG IV PP for Ø 16/DN 10 pipe work connector	1005331

Sensor Holders





CPVC holder (for pH/ORP)

CPVC universal in-line sensor holder with 3/4" MNPT, 5" (127 mm) long body.	7500192

PVDF holder (for pH/ORP)

PVDF universal in-line sensor holder with 3/4" MNPT, 5" (127 mm) long body.	7500139

Stainless steel holder (for pH/ORP)

Stainless steel universal in-line sensor holder with 3/4" MNPT, 5" (127 mm)long body.	7500194

PG 13.5 Submersible holder (for pH/ORP)

CPVC Waterproof sensor holder with 1-1/2" NPT, 5" (127 mm) long body.	7744693

CPVC holder (for 25 mm sensors)

CPVC universal in-line sensor holder with 2" MNPT, 5" (127 mm) long body.	7500005

25 mm Submersible holder (consult factory for details)

CPVC Waterproof sensor holder 1-1/2" FNPT, 5" (127 mm) long body.	7744008

"Polymer Blending & Dry Feed Solutions" T.O.C. IX

CATALOG SECTION TABS

product overview
- Introduction
- Pump selection by capacity
- Chemical resistance list
- Solenoid & Motor Pump Overview
- Analytical Instrumentation Overview

solenoid-driven metering pumps
- Concept b
- Beta b
- gamma/L
- delta
- gamma/ XL
- Extronic

motor-driven metering pumps
- Sigma/ X: Sigma/ 1
- Sigma/ X: Sigma/ 2
- Sigma/ X: Sigma/ 3
- ProMus
- Hydro 2 API 675
- Hydro 2 API 675
- Makro
- Orlita
- DULCO flex Control
- DulcoFlex

pump spare parts & accessories
- Solenoid pump spare parts
- Motor pump spare parts
- Pump accessories

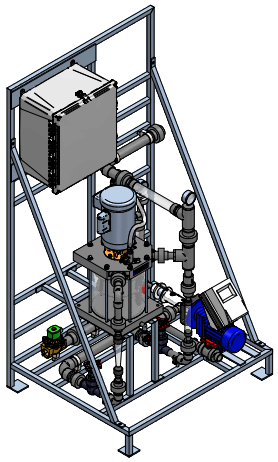
DULCOMETER instrumentation
- D1Cb/c
- DACb
- Dulcometer Compact
- DMT
- MicroFlex
- MultiFLEX
- AEGIS II
- SlimFlex 5

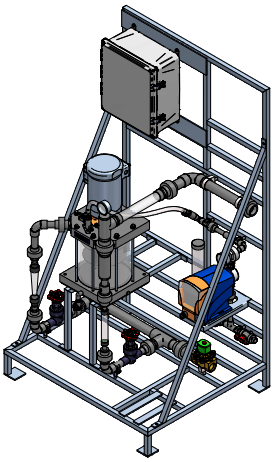
DULCOTEST sensors
- Amperometric sensors
- Potentiometric sensors
- Potentiostatic sensors
- Conductometric sensors
- Accessories

polymer blending & dry feed solutions
- **ProMix™ -M (In-line Controls)**
- **ProMix™ -M (Batch & In-line Controls)**
- **ProMix™ -S**
- **ProMix™ -C**
- **ProMdry™**

ProMinent® ProMix™-M (In-line Controls)

Overview: ProMix™-M (Inline 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.

Feature & 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. 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

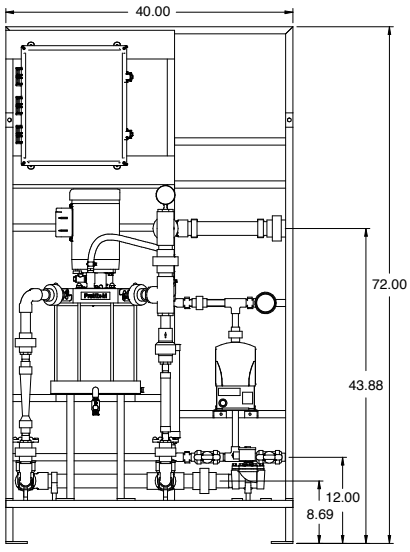
Part Number	Model Number	Primary Dilution gph	Post Dilution gph	Neat Polymer Pump gph	Max. Pump Pressure psig
1048367	300x2-2.3DA	300	300	2.3	100
1048368	600x2-3.8DA	600	600	3.8	100
1048369	600x2-6.2DA	600	600	6.2	100
1048370	600x2-10.3DA	600	600	10.3	58
1048371	1200x2-6.2DA	1200	1200	6.2	100
1048372	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

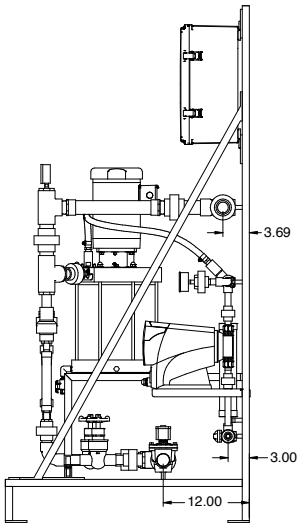
ProMix™-M / Progressive Cavity Pump Systems

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

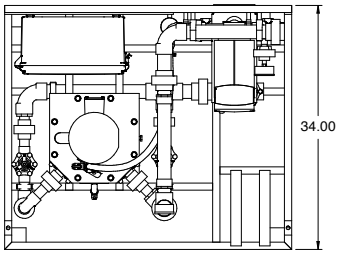
Dimensional Drawings



FRONT VIEW



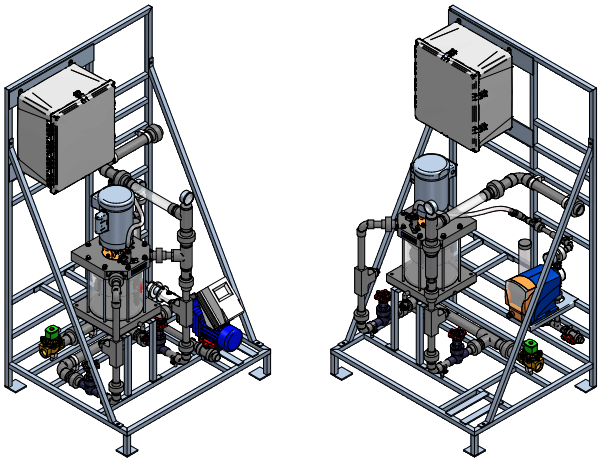
SIDE VIEW



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

Feature & 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. 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

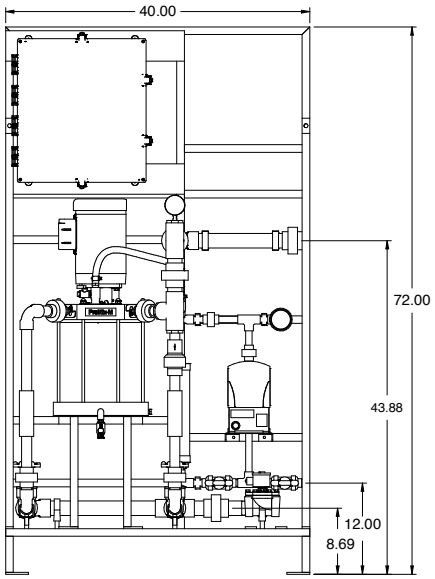
Part Number	Model Number	Primary Dilution gph	Post Dilution gph	Neat Polymer Pump gph	Max. Pump Pressure psig
1048382	300x2-2.3DB	300	300	2.3	100
1048383	600x2-3.8DB	600	600	3.8	100
1048384	1500x2-6.2DB	1500	1500	6.2	100
1048385	1500x2-10.3DB	1500	1500	10.3	58

Progressive Cavity Pump Systems

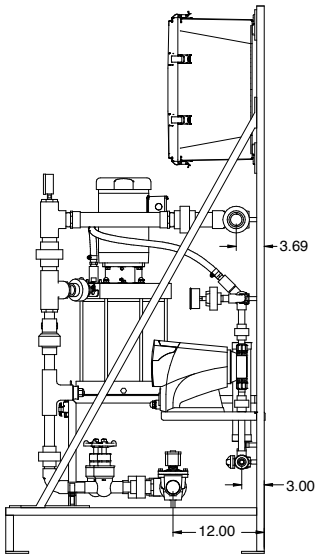
ProMix™-C / Progressive Cavity Pump Systems

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

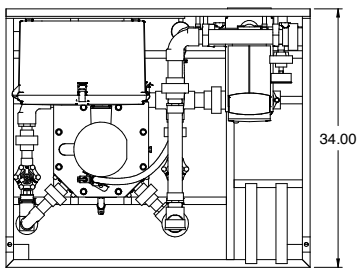
Dimensional Drawings



FRONT VIEW



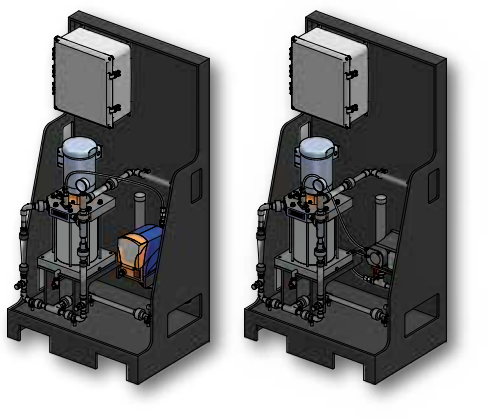
SIDE VIEW



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.

Feature & 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. 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

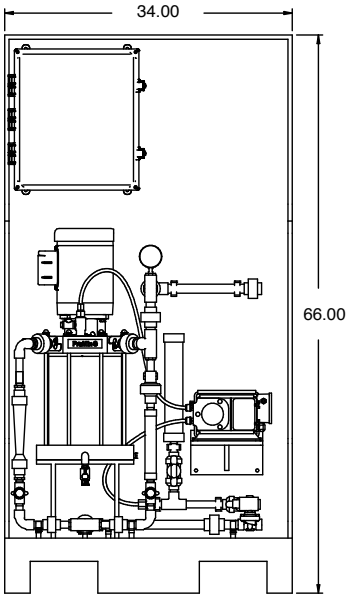
Part Number	Model Number	Primary Dilution	Post Dilution	Neat Polymer Pump	Max. Pump Pressure
		gph	gph	gph	psig
1048346	60x1-0.22TA	60	-	0.22	65
1048348	120x2-0.95TA	120	120	0.95	65
1048349	120x2-2.00TA	120	120	2.00	65
1048351	300x2-2.00TA	300	300	2.00	65
1048352	300x2-3.73TA	300	300	3.73	50

Diaphragm Metering Pump Systems

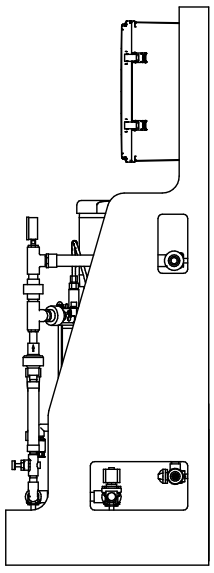
ProMix™-S /Diaphragm Metering Pump Systems

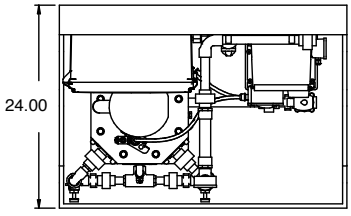
Part Number	Model Number	Primary Dilution	Post Dilution	Neat Polymer Pump	Max. Pump Pressure
		gph	gph	gph	psig
1048353	60x1-1.01DA	60	-	1.01	100
1048354	60x2-1.01DA	60	60	1.01	100
1048355	120x2-1.01DA	120	120	1.01	100
1048356	120x2-2.30DA	120	120	2.3	100
1048357	300x2-2.30DA	300	300	2.3	100
1048358	300x2-3.70DA	300	300	3.7	100

Dimensional Drawings



FRONT VIEW


SIDE VIEW

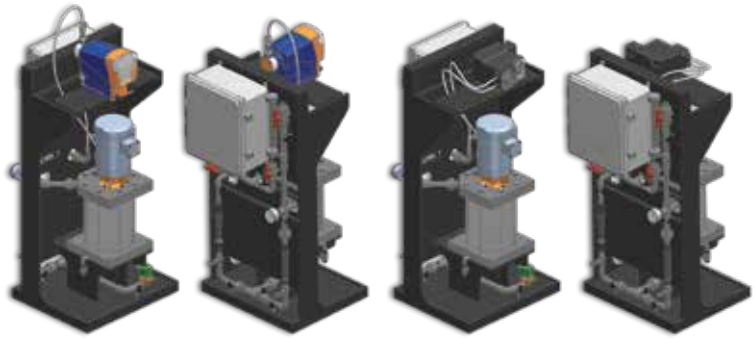


PLAN VIEW

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.



Feature & 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. 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

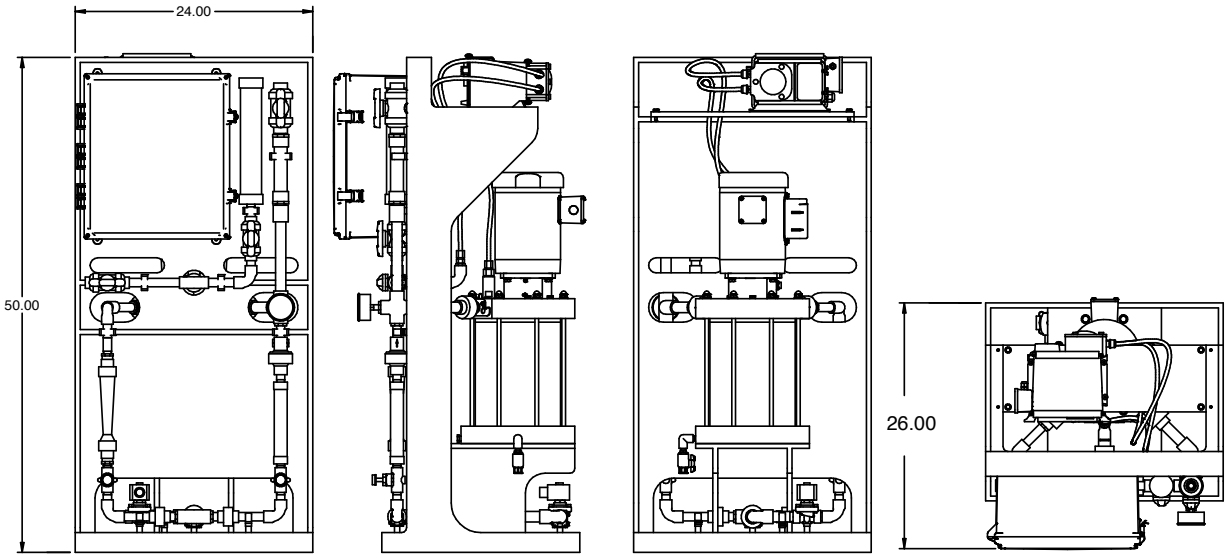
Part Number	Model Number	Primary Dilution	Post Dilution	Neat Polymer Pump	Max. Pump Pressure
		gph	gph	gph	psig
1048360	60x1-0.22TA	60	-	0.22	65
1048361	60x2-0.95TA	60	60	0.95	65
1048362	120x2-0.95TA	120	120	0.95	65
1048363	120x2-2.00TA	120	120	2.00	65
1048364	300x2-2.00TA	300	300	2.00	65
1048365	300x2-3.73TA	300	300	3.73	50

Diaphragm Metering Pump Systems

ProMix™-C / Diaphragm Metering Pump Systems

Part Number	Model Number	Primary Dilution	Post Dilution	Neat Polymer Pump	Max. Pump Pressure
		gph	gph	gph	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



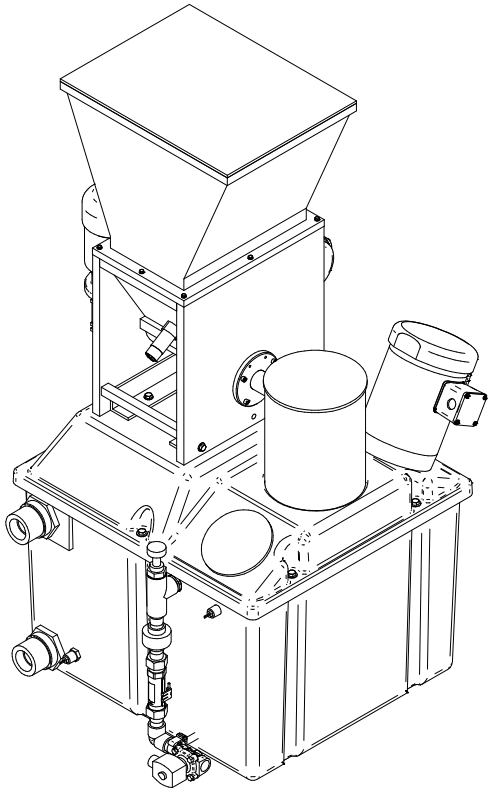
ProMinent® ProMdry™

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 30psid
- 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

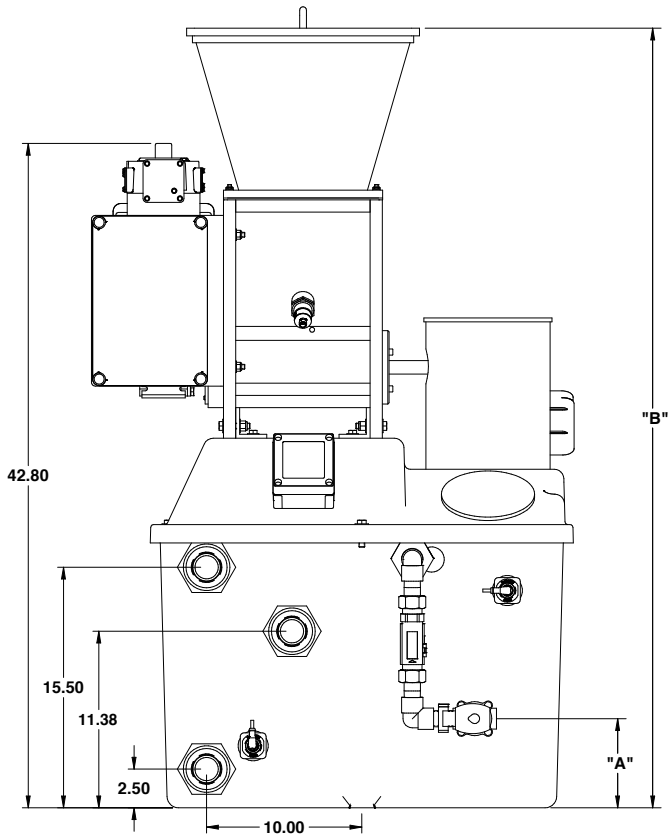
ProMinent® ProMdry™

Capacities

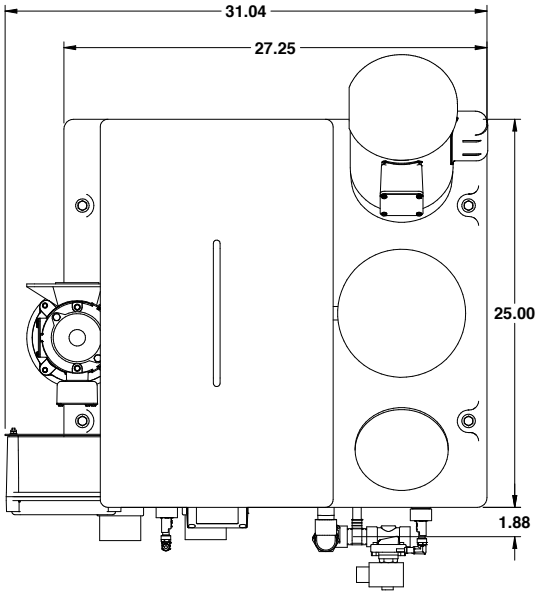
Tank size: 35 gallons **Fill rate:** 10 gpm

Dry Feeder	Capacity cubic ft/hr
TGD 18.13	0.95
TGD 30.13	1.45
TGD 38.13	2.87

Dimensional Drawings



FRONT VIEW



PLAN VIEW

Dimensions				
	Hopper Material			
		None	Stainless Steel	Polypropylene
System Type:	"A"	"B"		
Batch	5.25"	39.37"	48.37"	50.25"
Inline	5.75"	39.37"	48.37"	50.25"

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**