

ProMaqua[®] Equipment Catalog

Products:

- **For Disinfection**
- **For Oxidation**
- **Membrane Technology**
- **Gravity Filters**

Issued by:
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ProMaqua® New Products 2011

Products for:

- **Storage**
- **Transfer**
- **Dosing**
- **Measurement and Control**

ProMaqua® Equipment Catalog

Products:

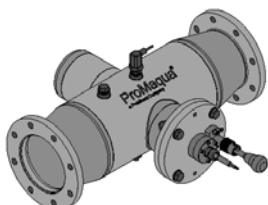
- **For Disinfection**
- **For Oxidation**
- **Membrane Technology**
- **Gravity Filters**

Annex

- **Service**
- **Sales**

ProMaqua® New Products 2011

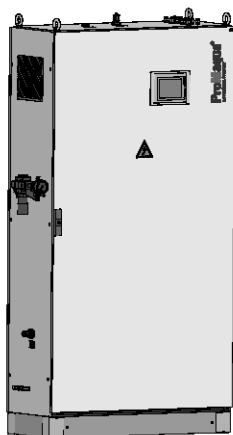
UV Systems – Dulcodes S (Chapter 1)



P PMA DS 0018 SW1

Three new UV systems Dulcodes S complete the existing range. The new multi-lamp systems available in three capacities, 4, 6 and 9 kW, can treat pool water with a maximum flow up to 2,201 gallons per minute photochemically decompose combined chlorine. These exceptionally compact systems are fitted with Powerline S medium-pressure lamps and can be installed in any location. All systems are sold standardly with automatic cleaning.

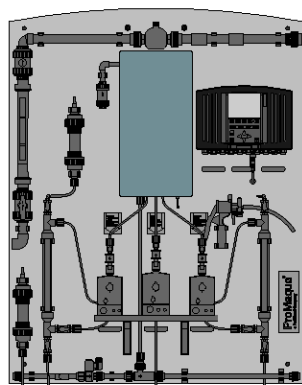
Ozone Generation Plants – OZONFILT® OZMa (Chapter 2)



P PMA OF 0010 SW

There are now three new additions to each of the ozone generation systems OZONFILT® series OZMa 4-6 A and 4-6 O that generate up to 735 g of ozone per hour from compressed air or oxygen. Its lower energy and cooling water consumption and compact design are key features of the new ozone generation plant OZONFILT® OZMa. The ozone volume can be set reproducibly and independently of voltage and pressure fluctuations. There is minimal compressed air consumption due to the use of self-optimizing pressure swing adsorption. Ozone can be directly fed into the water, even at backpressure of up to 2 bar, without the need for additional investment in booster pumps, injectors etc.

Chlorine Dioxide Plants – Bello Zon® (Chapter 3)

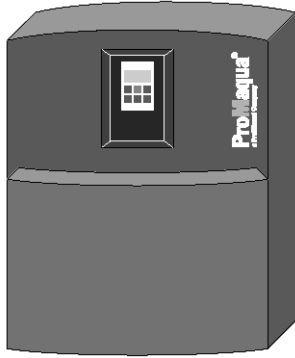


P_PMA_BEZ_0023_SW
CDKc 420 (figure shows optional configuration)

The chlorine dioxide systems Bello Zon® CDVc and CDKc are wired ready for connection and are used for the production, metering and monitoring of 20 to 7,500 g/h of chlorine dioxide. An innovative and completely newly developed reactor concept ensures the efficient production and metering of chlorine dioxide. Improved operating safety thanks to the use of PVDF and online monitoring of the metering pumps' stroke lengths. The extremely high level of safety guarantees the integral measurement, documentation and visualization of ClO₂, chlorite, pH, redox potential and the automatic monitoring of operating parameters and maintenance intervals. The systems operate on the basis of the chlorite acid process in accordance with DVGW (German Technical and Scientific Association for Gas and Water) guidelines (Specifications W 224 and W 624).

ProMaqua® New Products 2011

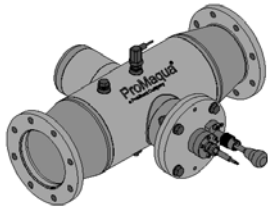
Electrolysis Plants – CHLORINSITU® compact (Chapter 4)



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Membrane electrolysis systems of the CHLORINSITU® IV compact type are new additions to the range of electrolysis systems CHLORINSITU®. They operate as safe negative pressure systems and are designed to be compact as well as space saving. The negative pressure in the system ensures that no process gases can escape into the environment at any time. A fully automatic softener unit is incorporated in the system and it is possible to set the time and water hardness level for regeneration. Defining the regeneration time reliably ensures that regeneration is only performed when disinfection is not needed. Only as much regeneration salt is used as is required, as regeneration takes place according to the hardness of the water, thus saving on regeneration salt. The CHLORINSITU® IV compact can optionally be used to adjust the pH level with the sodium hydroxide produced, as well as disinfecting the water with hypochlorous acid.

Capacity Data ProMaqua®



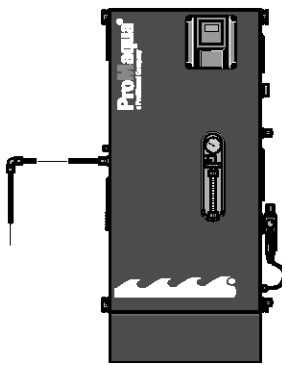
UV Systems Dulcodes

Dulcodes UV Disinfection Systems: 1-3522 gpm

UV radiation ensures a safe, chemical-free and reliable disinfection of water. Even stubborn parasites such as Cryptosporidia or Giardia are rendered harmless. Convincing arguments for Dulcodes systems are:

- Uniform radiation
- Optimized plant hydraulics
- Lamp with high UV-C output and long life time
- System controller with numerous monitoring and reporting functions

Special units beyond the stated capacity ranges are available on request.



PK_7_043_V2
OZONFILT® OZVa 3; capacity: 35 g/h

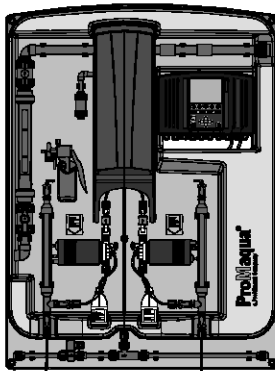
Ozone Generation Plants

Ozone generation systems OZONFILT® 5-735 g/h

Ozone generation systems Bono Zon® 40-720 g/h

Ozone is the strongest disinfectant and oxidant permitted for water treatment. With an environmentally friendly production process using air or oxygen, it decomposes to form oxygen after use and its concentration can be measured online at any time. It is the optimum solution for swimming pool water, drinking water, for the beverage industry or other industrial applications. ProMaqua offers systems complete with all accessories in almost every size.

Non-standard units beyond the stated capacity ranges are also available on request.



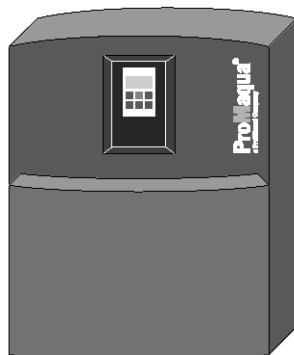
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CDVc 20-240 (figure shows optional configuration)

Bello Zon® Chlorine Dioxide Plants

Bello Zon® chloride dioxide generation systems: 5-10,000 g/h

Chlorine dioxide is establishing itself more and more as a universal disinfectant in applications, such as the disinfection of drinking water and industrial water, in the washing of food or in the treatment of cooling water and wastewater. Being independent of the pH of the water, its action keeps systems free of biofilm.

- Powerful disinfection performance with maximum ecological sustainability
- Safe and reliable system technology conforming to DVGW Work Sheets W224 and 624
- Worldwide availability of expertise and service



P PMA EL 007 SW

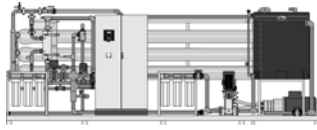
Electrolysis Plants

CHLORINSITU® electrolysis systems: 1.3 – 185 lbs. per day

The alternative to sodium hypochlorite and chlorine gas. Chlorine generated on site by electrolysis from harmless sodium chloride provides a highly cost-effective alternative to other chlorine products without the need to store hazardous chemicals on site.

Non-standard units beyond the stated capacity ranges are also available on request.

Capacity Data ProMaqua®



Pk_7_074

Membrane Filtration Plants

Dulcoclean® ultrafiltration systems 1-352 gpm

Dulcosmose® nanofiltration systems 1-220 gpm

Dulcosmose® reverse osmosis systems 0.1-220 gpm

In water treatment membrane filtration is the technique with the lowest operation costs used to remove particles and salts in the water. For this area, ProMinent® offers multiple and high quality systems.

Special units beyond the stated capacity ranges are available on request.

Dulcodes UV Systems

General Notes On UV Treatment

Disinfection is a fundamental step in modern water treatment. UV disinfection is being used to an ever-increasing extent here, as a safe, chemical-free and reliable disinfection process. Extensive research projects and numerous trouble-free operational systems prove the safety and reliability of UV disinfection.

With UV disinfection, the water to be disinfected is irradiated with ultraviolet light, which involves a purely physical, chemical-free process for water disinfection.

UV-C radiation in particular, with a wavelength in the 240 - 280 nm range, attacks the vital DNA of the bacteria directly. The radiation initiates a photochemical reaction and destroys the genetic information contained in the DNA. The bacteria lose their reproduction capability and are destroyed. Even parasites such as Cryptosporidia or Giardia, which are extremely resistant to chemical disinfectants, are efficiently reduced.

The initiation of photochemical reactions is utilized in other applications too. The undesirable combined chlorine in swimming pool water is reduced by UV radiation, as a result of which enormous fresh water savings are achieved. Oxidants such as ozone, chlorine or chlorine dioxide are reliably reduced in the production water used in the food and beverages industry, avoiding the need for costly activated charcoal filters.

Special version systems with special lamps and special composition of the radiation chamber can be used for reduction of TOC (Total Organic Carbon) in the treatment of ultrapure water.

UV disinfection has many advantages:

- Immediate and safe destruction of the bacteria without addition of chemicals
- Photochemical reduction of undesirable substances
- No THM or AOX formation, no formation of other undesirable substances
- No impairment of odor or taste of the water
- No storage and handling of chemicals required
- Effect is independent of pH
- No reaction vessel or reaction tank required
- Low space requirement
- Low investment and operating costs with high reliability and efficiency

Applications Of Dulcodes UV Systems

A large number of UV disinfection systems have been supplied worldwide, for the most diverse applications:

- **Own source water suppliers and municipal water works**
for disinfection of drinking water
- **Food and beverages industry**
to destroy the bacteria in the water needed for food and beverages production and for disinfection of service water
to reduce the chlorine dioxide in the production water
- **Pharmaceuticals and cosmetics industry**
to maintain the high microbiological requirements of the production water
to destroy residual ozone in the production water without use of activated charcoal filters
- **Reverse osmosis plants**
for permeate disinfection
- **Municipal sewage plants**
for reduction of the bacterial count in the sewage plant outflow
for reduction of the bacterial count in the industrial water extracted from the sewage plant outflow
- **Horticulture**
for disinfection of the irrigation water
- **Spa pools and swimming pools**
for disinfection of the pool water
for chloramine reduction in the pool water
- **Semiconductor industry**
for reduction of TOC and to maintain the high microbiological requirements of the production water

Description Of Dulcodes UV System

Basically, Dulcodes UV disinfection systems consist of:

- High-quality radiation chambers made from stainless steel (DIN 1.4404 or 1.4571) or UV-resistant plastic
- Lamp protection tubes made from high-quality quartz, easily removable for cleaning purposes
- Lamps with a particularly high UV output in the 254 nm range, ensuring an outstanding disinfection characteristic
- Highly selective UV sensors with good long-term and temperature stability
- UV system controllers and modern electronic ballasts fitted in a control cabinet

The special features of our Dulcodes UV disinfection systems are:

- Even irradiation of the entire water flow through optimized system hydraulics, so ensuring outstanding disinfection results
- Flow-optimized inlet zone
- Longitudinal flow against UV lamps with high turbulence
- Use of UV lamps with long lamp life time and high UV-C output
- Automatic cleaning system for the sleeve of medium-pressure lamps
- Manual cleaning system for the sleeve of system type Dulcodes R or Dulcodes S
- System controller with comprehensive monitoring and reporting functions
- Display of all important operating parameters and reporting of faults in plain text
- Trend display of the variation of the UV sensor signal with time
- Analogue output sensor signal and alarm relay
- Use of modern electronic ballasts with bus technology for lamp-friendly ignition and operation
- Individual lamp monitoring
- Direct control of automatic isolation and flushing valves

Dulcodes UV Lamps

Standard low pressure lamp

Robust low pressure mercury lamp with a life expectancy of approx. 14,000 operating hours. The operating temperature of the lamp is 86 – 122 °F. This is why its use is limited to water temperatures between 41 and 104 °F. The output is approx. 100 W per meter arc length.

Low pressure lamp High-Flux

Low pressure amalgam lamp with a life expectancy of approx. 10,000 operating hours. The operating temperature of the lamp is 212 - 226 °F. This is why its use is limited to water temperatures of up to 158 °F. The output is independent of the water temperature and is approx. 200 W per meter arc length.

Low pressure lamp Opti-Flux

Doped, high-performance low pressure amalgam lamp with a life expectancy of approx. 14,000 operating hours. The operating temperature of the lamp is 212 - 226 °F. This is why its use is limited to water temperatures of up to 158 °F. The output is independent of the water temperature and is approx. 300 W per meter arc length.

Medium pressure lamp Powerline

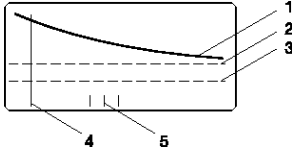
Medium pressure mercury lamp with a life expectancy of approx. 6,000 to 10,000 operating hours, depending on lamp size. The high output of these lamps (up 10,000 W per meter arc length) permits the treatment of very large flows. Thanks to their broad range spectrum, these lamps are specifically suitable for photo- chemical processes. The operating temperature of the lamp is 1202 - 1562 °F. Powerline medium pressure lamps are typically operated with a mechanical wiper system. This is why their use is limited to water temperatures of up to 104 °F.

Dulcodes UV Controllers

Compact controller

Compact unit for control of all basic functions of the UV system. The large graphical display shows the current UV-C output, the operating hours and the number of lamp switch-ons. With the fixed-setting warning and safety threshold levels, a warning signal is generated and a relay output (230 V / 0.2 A) for operation of a shut-off valve is actuated if the UV output is too low. Alternatively, this output can also be used as a common alarm relay (230 V / 2.5 A).

Comfort control



- 1 UV sensor signal
- 2 Warning threshold
- 3 Safety threshold
- 4 Calibration
- 5 On/Off contacts

The Dulcodes comfort control includes a large, graphical display for viewing the UVC sensor signal. Shown as a trend display, the lamp ageing, any possible deposit formation on the lamp protection tube or a change in water quality can be seen in a time window. The freely programmable safety and alarm thresholds are also shown as well as the number and times of the lamp activations. All operating and error messages are shown in full text. Setting the operating parameters is facilitated by the clear menu navigation. The control offers a selection of 9 different languages.

The control is connected to the ballasts via a bus system, which permits monitoring of each individual lamp. This also facilitates a spatial separation of the control over long distances from the radiation chamber including lamps and ballasts.

Various additional functions such as the automatic flushing of the system in a freely programmable flushing time, the control of a shut-off valve as well as of a circulating pump are integrated as standard. For this purpose, 2 voltage outputs 230 V / 0.2 A and a switching output 230 V / 2.5 A are integrated.

The UVC sensor signal can be monitored online via a standard signal output 0/4-20 mA. If the alarm and safety thresholds are undershot, two relay outputs (230 V / 2.5A) send a corresponding signal. All other faults are signaled via a combined alarm relay (230 V / 2.5 A).

3 potential-free control inputs facilitate linking of the control with external information: The error input can e.g. be used for an external temperature monitoring, the operation of the system can be normally interrupted using the pause input, the flow monitoring can be of help in connection with flushing processes.

Comfort control Powerline

This control type in addition includes the option for an external power control via a standard signal 0/4-20 mA (not for Dulcodes M 2 kW, 3 kW, and Dulcodes S). The systems can thus e.g. be controlled independent of the flow or the lamp output can be automatically adapted to a defined UVC sensor signal. This saves energy costs and extends the lamp lifetime of the lamps.

The control also is equipped with a display and monitoring of the temperature of the radiation chamber as well as with a freely programmable control of the mechanical wiper system for an automatic cleaning of the lamp protection tube.

Performance Overview Of Dulcodes UV Systems

ProMaqua® offers a wide range of UV systems for the most diverse applications. The following overview shows the output and main applications of our standard systems:

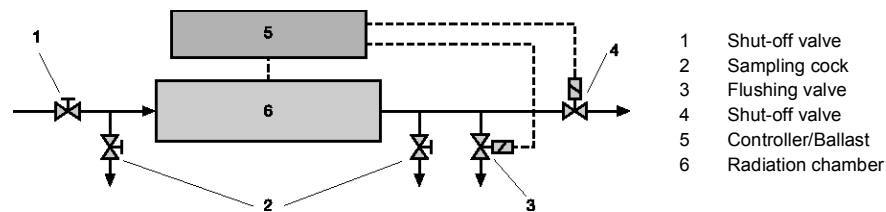
	Type P Compact	Type D Thin film	Type K Plastic chamber	Type S Pool water	Type Z Certified	Type R Manual wiper	Type W Standard	Type M Medium pressure
Output [m³/h]								
1.000								
500								
400 J/m², 98%/cm								
200								
Trans- mission (80 %/cm for type D)								
100								
50								
20								
10								
5								
2								
Application								
Drinking water	■				■	■	■	■
Industrial water	■	■	■	■	■	■	■	■
Swimming pool water			■	■		■	■	■
Waste water		■						
Salt water			■					

We offer a full advisory service covering everything required for safe use of a Dulcodes UV system:

- Assessment of the situation on site by trained, factory certified field technicians.
- All water parameters needed for an optimum system design can be measured in our water laboratory.
- Design and planning of the system.
- Commissioning and system maintenance by our trained service technicians.

Notes On Planning And Designing A UV System

- The system must always be designed for the greatest water flow.
- The system must always be designed for the worst anticipated UV transmission.
- Fireproof sampling cocks for microbiological tests must be provided before and after UV disinfection systems.
- A manual shut-off valve must be provided before the UV system to isolate the system for maintenance work. For this reason a by-pass line installation is recommended.
- With drinking water disinfection and similar applications, an electrically controlled shut-off valve must be provided after the UV disinfection system, which also closes automatically on mains failure (solenoid valve, automatic closing flap valve or similar).
- With service water disinfection, it is normally sufficient to provide a manual valve to isolate the system for maintenance work, instead of the electrically controlled valve.
- With drinking water disinfection and similar applications, a flushing valve must be provided after the UV disinfection.
- It must be ensured that there is sufficient space available for removing the lamp protection tube and lamp replacement.
- Modern electronic ballasts only allow a limited cable length between ballast and lamp, so that the control box with the ballasts must be positioned close to the lamp. On the other hand, the controller can be fitted in a control area, for example. However, the maximum cable lengths specified by us must not be exceeded in this case.



The following details are required for design of a UV system:

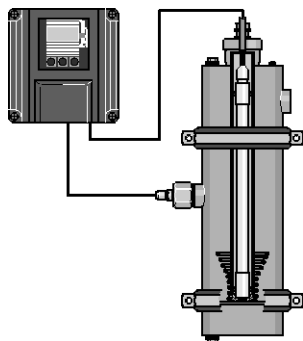
- Application of the system
- Maximum water flow
- Minimum UV transmission of the water

The UV transmission must be determined by means of a laboratory measurement of the absorption at 254 nm.

A full water analysis gives important conclusions on the operating conditions of the system. The following questionnaire provides our project engineers with the information needed to design an appropriate system.

Note: Dulcodes A UV System to be released in 2012.

Dulcodes P UV Systems



Dulcodes P UV systems are used for disinfection of drinking water and service water and – depending on transmission – can be used with flows up to 18 gpm. **Note:** Available on request.

Features

- Flow: up to 18 gpm (depending on transmission)
- Controller with switching output, to which an shut-off valve or fault indicating device can be connected
- High-quality, factory-calibrated UV sensor
- Graphical display to show UV intensity, total number of operating hours and number of lamp switching
- Standard low pressure lamp with a lamp life time of approx. 10,000 – 14,000 operating hours
- Radiation chamber made from high-grade stainless steel 1.4571 or 1.4404
- Controller and ballast in compact plastic housing

Main applications

pk_7_045_V2

Drinking water	Industrial water	Swimming pool water	Wastewater	Salt water
✓	✓			

Technical Data

Type	Max. flow (GPM)	Lamp Power (W)	Connected Load (W)	Radiation Chamber Length (in)	Minimum clearance for maintenance work (in)	Ø (in)	Empty weight / Operating weight (lb)	Connection nominal diameter
16P	6.6*	16	30	15.04	13.78	4.5	13.28/22.05	G 3/4"
45P	1*	45	60	37	35.43	4.5	22.05/44.1	G 1 1/4"

Lamp type Standard low pressure lamp (see Chap. 1.3.1)

Controller type Compact controller (see Chap. 1.3.2)

Permissible operating pressure 145 psi

Permissible ambient temperature 41 – 113 °F

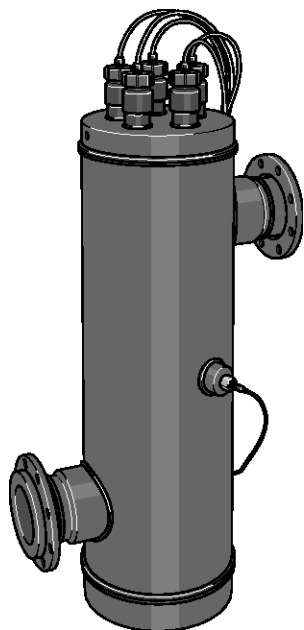
Permissible water temperature 41 – 104 °F

* 95 %/cm transmission; 400 J/m² UV dose

Spare Parts For Dulcodes P UV Systems

Name of the item	Part No.
UV lamp 16 W	on request
UV lamp 45 W	on request
O-ring for fixing the lamp in the lamp sleeve	on request
Lamp protection tube for 16 P	on request
Lamp protection tube for 45 P	on request
O-ring lamp protection tube/lamp cover	on request
UVC sensor P/D/W/R G 3/4 1.4539 for systems delivered from Sept. 2006	on request
O-ring UVC sensor	on request
Sensor cable 6.5 ft long	on request
Screw plug G 1/4	on request
O-ring for G 1/4" screwed plug	on request

Dulcodes K UV Systems With PE-HD Radiation Chamber



pk_7_047

The Dulcodes K range of UV systems with High-Flux lamps can be used for disinfection of saline water (thermal spring water, sea water). The radiation chambers are made from high-grade plastic and are optimized for compressive strength by special welding procedures (can be used up to an operating pressure of **4 bar**). Depending on transmission, the range can be used with flows up to 749 gpm.

These units are available upon request and do not carry NSF listing at this time.

Features

- Flow: up to 749 gpm (depending on transmission))
- High-efficiency low pressure High-Flux lamp with special amalgam technology, increased UV output, largely independent of temperature
- Lamp life time: approx. 10,000 h
- Ballasts with BUS interface for ignition and monitoring of each individual lamp
- Variable lamp current, hence lamp-friendly ignition process and precise adjustment of the optimum lamp operating current
- Long-term stable salt water-resistant UV-C sensor for monitoring the disinfection capability and transmission (UV transmission factor) of the water, factory-calibrated
- Large graphical display for display of the sensor signal
- Monitoring of lamp ageing, lamp sleeve fouling and changes in water quality
- Freely programmable controller, e.g. for different flushing, warning and shutdown procedures
- Radiation chambers made from UV-stabilized PE-HD
- Control cabinets made from coated steel

Main applications

Drinking water	Industrial water	Swimming pool water	Wastewater	Salt water
✓	✓	✓	–	✓

Technical Data

Type	Max. flow (GPM)	Lamp Power (W)	Connected Load (W)	Radiation Chamber Length (in)	Minimum clearance for maintenance work (in)	Ø (in)	Empty weight / Operating weight (lb)	Connection nominal diameter
1x130K	38.3*	1x130	150	54	55	5	27/40	DN 50
2x130K	163.0*	2x130	280	54	55	11	79/172	DN 100
3x130K	237.8*	3x130	420	54	55	11	88/172	DN 100
4x130K	435.9*	4x130	550	54	55	15.7	106/353	DN 150
5x130K	537.2*	5x130	680	54	55	15.7	110/353	DN 150
6x130K	651.6*	6x130	810	54	55	15.7	115/353	DN 150

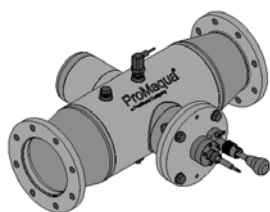
Lamp type	High-Flux low pressure lamp (see Chap. 1.3.1)
Controller type	Deluxe controller (see Chap. 1.3.1)
Permissible operating pressure	58 psi
Permissible ambient temperature	41 – 104 °F
Permissible water temperature	41 – 86 °F

* 95 %/cm transmission; 400 J/m² UV dose

Spare Parts For Dulcodes K UV Systems

Name of the item	Part No.
High-Flux UV lamp 130 W	on request
Lamp protection tube for Dulcodes K	on request
O-ring lamp protection tube/lamp cover	on request
UVC sensor K red brass	on request
O-ring UVC sensor	on request
Sensor cable, 16.5 ft (5m) long	on request
Replacement filter mat for control cabinet ventilation (2 pcs. Required per control cabinet)	on request

Dulcodes S UV Systems For Chloramine Control In Pool Water



P_PMA_DS_0018_SW1

Dulcodes S UV treatment systems are suitable for a photochemical degradation of combined chlorine (chloramine) in swimming pool water treatment. Special medium pressure UV lamps generate the intensive polychromatic UV radiation to reduce the odor-intensive and eye-irritating substances. The result is an improved water quality for healthy and pleasant bathing.

Features

- Flow: up to 3302 gpm (depending on transmission rate and radiation intensity).
- Extremely compact inline system with minimum space requirement.
- Simple installation thanks to minimal installation and fast retrofitting.
- Ultra-flexible installation thanks to free choice of installation location.
- Powerline S type medium-pressure lamp with a high-connected load of up to 3 kW per meter of arc length.
- High gas pressure and relatively high lamp operating temperature of 1112 to 1472 °F, hence broad emission spectrum.
- Lamp lifetime: approx. 8,000 h depending on lamp size.
- Long-time stable UVC sensor for monitoring the lamp output, the lamp protection tube contamination as well as changes in the water quality.
- Integral temperature sensor for monitoring the water temperature in the radiation chamber.
- Large graphical display to show the sensor signal with trend line of the variation of the UV sensor signal over time.
- Manual power control via manual step switch to perfectly adapt the system to the relevant capacity needed (not suitable for use with Dulcodes 1 x 0.65 and 1S).
- Automatic chloramine value-dependent on/off control, for instance when used in conjunction with the DCM 500 or DULCOMARIN® II Chemical Controller.
- Automatic wiper system for efficient removal of deposits on the lamp protection tube. All units, except 1x0.65S, sold standardly with automatic wiper system in USA.
- Radiation chambers made from high-grade stainless steel 1.4571 or 1.4404.
- Control cabinet made of coated steel.
- Optimum energy use thanks to large radiation chamber and even radiation of the entire water flow due to improved system hydraulics.

Main applications

Drinking water	Industrial water	Swimming pool water	Wastewater	Salt water
–	✓	✓	–	–

Technical Data

Type	Max. flow (GPM)	Lamp Power (kW)	Connected Load (kW)	Radiation Chamber Length (in)	Minimum clearance for maintenance work (in)	Min. distance from wall (in)	Empty weight / Operating weight (Lbs)	Connection nominal diameter (in)
1x0.65S	75.0*	0.65	0.75	19.7	13.2	6.3	47/69	2.5
1x1S	225.0*	1.00	1.10	27.6	15.8	17.7	69/104	4
1x2S	392.0*	2.00	2.10	27.6	19.7	21.6	84/144	6
1x3S	779.0*	3.00	3.20	31.5	23.6	25.6	115/261	8
2x2S	1507.0*	4.00	4.20	35.5	39.4	26.4	172/366	8
2x3S	1453.0*	6.00	6.20	35.5	39.4	26.4	172/366	10
3x3S	2202.0*	9.00	9.20	35.5	39.4	26.4	172/366	12

Lamp type

Powerline S medium pressure lamp (see Chap. 1.3.1)

Controller type

Powerline S comfort control

Permissible operating pressure

87 psi

Permissible ambient temperature

41 – 104 °F

Permissible water temperature

41 – 104 °F

* 95 %/cm transmission; 600 J/m² UV dose

Spare Parts For Dulcodes S UV Systems

Name of the item	Part No.
UV lamp Powerline 0.6/1 kW	1035179
UV lamp Powerline 2 kW	1035057
UV lamp Powerline 3 kW	1009385
Lamp protection tube for Dulcodes 0.6 S	1035218
Lamp protection tube for Dulcodes 1 S	1035166
Lamp protection tube for Dulcodes 2 S	1035041
Lamp protection tube for Dulcodes 3 S	1035193
Wiper element (2 required per UV lamp)	1027879
Spare part set UV S 1-3 kW motor wiper	1037735
Spare part set UV S 2x2 kW and 2x3 kW motor wiper	1037756
Spare part set UV S 3x3 kW motor wiper	1037757
O-ring lamp protection tube/lamp cover	790410
UVC-U sensor M 1.4539	1034147
O-ring UVC sensor	1002175
Sensor cable, 16.5 ft (5m) long	1009398

Accessories For Dulcodes UV Systems

Transmission Photometer TMX 02

A Photometer for measurement of the UV transmission at 254 nm in accordance with DIN 38404 is supplied in sturdy aluminum case complete with 40 mm quartz cuvette, 4 x NiMH rechargeable batteries and charger.

Technical Data

Dimensions L x W x H (mm)	370 x 330 x 150
Weight	3.0 kg
Voltage supply	4 x 1,500 mAh NiMH batteries
UV-C lamp	Mercury medium pressure lamp
Measurement resolution	Transmission in 0.1 %
Measurement accuracy	Transmission in ± 0.5 %

	Part No.
Transmission Photometer TMX 02	1027956

Protective gloves

Protective gloves made from white cotton to avoid fingerprints on UV lamps and lamp sleeves. 1 pair, universal size.

	Part No.
Protective gloves	1032815

Sampling cock

Fireproof sampling cock made from stainless steel.

	Part No.
Sampling cock	on request

Cleaning System

The cleaning system for flushing the radiation chamber with a cleaning solution to remove deposits on the lamp tubes and internal surfaces of the UV system consists of chemical tanks, booster and dosing pumps, valves and complete automatic or manual controller. Design and technical equipment are matched to the particular UV system and its application.

	Part No.
Cleaning system	on request

Clip-on thermostat

A thermostat is fitted to the outside of the radiation chamber. It monitors the temperature of the water and can be connected to the control. The flushing valve opens when the preset limit temperature is exceeded.

	Part No.
Clip-on thermostat	on request

OZONFILT[®] And Bono Zon[®] Ozone Plants

Ozone In Water Treatment

As the most powerful oxidant that can be used in water treatment, ozone enables a broad spectrum of possible applications:

Outstanding disinfection action against

- Bacteria and viruses
- Fungi and parasites

Oxidation of undesirable inorganic substances in the water

- Iron and manganese
- Arsenic
- Nitrite and sulfide

Oxidation of undesirable organic substances in the water

- Strong-smelling and strong-tasting compounds
- Humic substances and other compounds which, affect the color of the water
- Cyclic hydrocarbons
- Trihalomethanes, chloramines and other chlorine compounds

Microflocculating action

- After oxidation with ozone, substances and colloids dissolved in the water become insoluble and can be filtered

Significantly less environmentally harmful by-products occur in the production and use of ozone, than with other comparable oxidants and disinfectants. As a highly reactive gas, ozone is produced on site, and introduced to the water directly, without interim storage. Because of its high reactivity, ozone decomposes into oxygen again in the water, with a half-life of several minutes. All components of an ozone handling system must be perfectly matched with each other and with the planned application, to achieve an optimum relationship between ozone production and effect.

For every new project, our engineers can draw on the experience that we have continually accumulated since 1971, in the following applications:

Drinking water supply

- Oxidation of iron, manganese or arsenic
- Improvement in appearance and taste
- Disinfection

Food and beverage industry

- Disinfection of mineral water
- Disinfection at the rinser in the beverage industry
- Disinfection of production water

Swimming pools

- Reduction of chloramines and trihalomethanes, so avoiding typical swimming pool smell
- Crystal-clear water thanks to microflocculating action
- Reliable microbiological barriers in therapy pools
- Reduction of investment and operating costs through the possibility of reducing the circulating power and throttling the fresh water inlet

Industry

- Cooling water treatment
- Combating legionella in cooling water circuits
- Disinfection of process water
- Removal of odorous substances in air scrubbers

Performance Overview Of Ozone Plants

ProMaqua® ozone plants function according to the proven principle of dielectric barrier discharge. By applying a high voltage of several thousands of Volts, ozone is produced from oxygen between two electrodes separated by an insulating dielectric. Depending on the plant type, either dried ambient air or concentrated oxygen is used as oxygen source. ProMaqua® ozone plants are optimized to ensure maximum profitability and operating safety. They meet the German standard for ozone generation plants DIN 19627 and are characterized by low energy and cooling water consumption.

Medium frequency pressure systems

In case of the series OZONFILT® OZVa and OZMa, the operating gas air or oxygen is fed to the ozone generator under pressure. Ozone is generated using medium-frequency high voltages.

The use of an integrated variable pressure swing dryer and of a dielectric with optimum thermal conductivity results in an extraordinarily compact design of the plant.

Thanks to operation under pressure, the generated ozone can be directly fed to water systems with a backpressure of up to 29 psi. Additional pressure-increasing pumps and injectors thus become superfluous in many applications.

Vacuum systems

In case of the series Bono Zon® BONa, the operating gas air is suctioned through the air-drying and the ozone generator with the help of a pressure-increasing pump and an injector system. The ozone itself is generated under mains frequency and is controlled by changing the high voltage. The vacuum operation ensures a very safe operation.

ProMaqua® offers numerous ozone plants for diverse applications. The overview below shows the capacity ranges of our type series:

Output ozone/h]	[g	OZVa 1-4	OZVa 5-7	OZMa 1-6 A	OZMa 1-6 O	BONa
1000						
500						
200						
100						
50						
20						
10						
5						
2						
Operating gas		Air	Oxygen	Air	Oxygen	Air
Ozone concentration		20 g/Nm³	100 g/Nm³	20 g/Nm³	100 g/Nm³	20 g/Nm³

Larger systems available on request

ProMaqua® provides all the advice needed for the safe operation of an ozone plant:

- Evaluation of the situation on site by trained, expert field sales staff.
- In our water laboratory, we can measure all of the key water parameters required for an optimum plant design.
- Planning of the plant.
- Commissioning and plant service by our trained service technicians.

Ozone plants of the OZONFILT® OZVa range have been designed as pressurized plants, in which the operating gas – air or oxygen – is fed into the ozone generator under pressure. The ozone is generated using medium-frequency high voltage and is primary current controlled. The introduction of PCC (primary current controlled) technology, specially developed in-house by ProMaqua®, provides complete protection for the electrical components (high-voltage transformer and power stage) and also permits the correct digital display of the ozone feed rate in “grams/hour”. As a result, any required ozone volume between 3 and 100% of the nominal capacity can be set reproducibly, and largely independently of voltage and pressure fluctuations.

The use of an integrated pressure swing dryer and a dielectric with optimum thermal conductivity makes the plant extremely compact. The unique design of the generator ensures outstanding cooling performance with low cooling water consumption and removes the heat produced quickly before the ozone produced can decompose due to excessive heat.

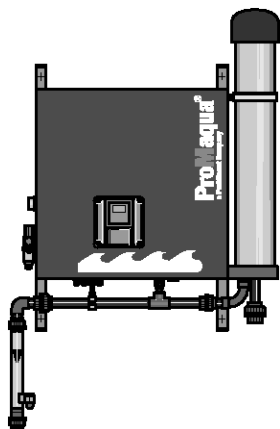
Operation under pressure means that the ozone generated can be introduced directly into water systems with backpressures of up to 29 psi. Additional booster pumps and injectors can therefore be dispensed with in many applications.

Combined with DULCOMETER® measuring and control technology and DULCOTEST®OZE ozone sensors, these systems are especially suitable for use where the operation is dependent on, and is controlled, by the measured data.

Features

- Simple operation
- Fully equipped
- High efficiency
- Low consumption of energy and cooling water
- High ozone concentration thanks to operation with oxygen
- PCC technology ensures complete protection of electrical components
- Correct digital display of ozone output in g/h
- Reproducible setting of the desired ozone quantity between 3 and 100% of nominal capacity

OZONFILT® Ozone Production Plants OZVa 1-4 (Operating Gas – Air)



pk_7_001_1_V2
OZONFILT® OZVa 1; capacity: 5 g/h

Under nominal conditions, the OZVa 1-4 range produces up to 40 g/h of ozone from oxygen in the surrounding air at a concentration of 20 g/Nm³. Using the designated mixing devices, ozone concentrations between 3 and 12 ppm can be achieved in the water to be treated, depending on the temperature (theoretical value at 30 or 0 °C).

Types OZVa 1 and 2 are installed in a control cabinet for wall mounting; types OZVa 3 and 4 are installed in a freestanding cabinet.

An adequate supply of compressed air and a mixing device designed for the operating conditions must be provided for the operation of the ozone plant.

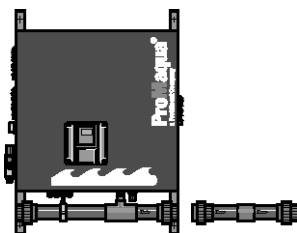
Compressed air requirements

- Oil- and dust-free, non-corrosive
- Constant upstream pressure of 6 - 10 bar
- Required air quantities:
 - OZVa 1: 7 l/min
 - OZVa 2: 20 l/min
 - OZVa 3: 40 l/min
 - OZVa 4: 45 l/min

Mixing device

OZVa 1 can be ordered in the following versions:

- Transparent mixing system with flow monitor mounted at the side of the plant (see fig. pk_7_001_1_V2)
- Static helical mixer mounted directly below the plant, made of PVC, with 4 helical blades (pressure drop approx. 0.4 bar at maximum throughput) (see fig. pk_7_042_V2)
- Without mixing system for connection of 12/10 mm stainless steel pipes or 12/9 mm PTFE pipes



pk_7_042_V2
OZONFILT® OZVa 2; capacity: 15 g/h

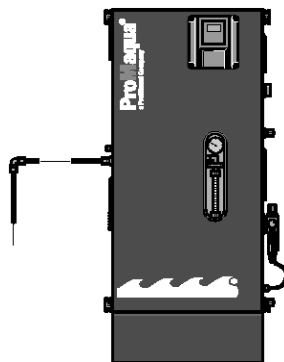
OZVa 2 can be ordered in the following versions:

- Static helical mixer mounted directly below the plant, made of PVC, with 4 helical blades (pressure drop approx. 0.4 bar at maximum throughput) (see fig. pk_7_042_V2)
- Without mixing system for connection of 12/10 mm stainless steel pipes or 12/9 mm PTFE pipes

OZVa 3 and 4 are in principle delivered as versions without mixing system; a suitable mixing system must be ordered separately (see Fig. pk_07_043_V2).

Notes

- The length of ozone gas transporting pipes and the number of joints should be kept to a minimum. All rooms with a removable joint are to be monitored with a gas detector according to the valid German accident prevention regulations. All OZONFILT® plants are equipped for fitting a gas detector such as e.g. type GMA 36 Ozon (see Accessories).
- For all installations the ozone generator must be interlocked with the water flow into the metering point.
- To prevent any return of ozonized water into the ozone-transporting pipe, a non-return valve is to be installed upstream of the OZVa.



pk_7_043_V2
OZONFILT® OZVa 3; capacity: 35 g/h

OZONFILT® OZVa 5-7 (Operating Gas – Oxygen)

The OZONFILT® OZVa 5-7 range is a new development based on proven PSG technology, which enables ozone concentrations of up to 150 g/Nm³ through the use of oxygen as operating gas. Using the designated mixing devices, ozone concentrations in the water to be treated of up to 90 ppm can be achieved (theoretical value at 0 °C).

Depending on the plant type, ozone is produced in 1-3 generators from oxygen provided from special oxygen generators or bottles. The rated output of the individual generators is 30 g/h at 100 g/Nm³.

Type 5 is installed in a wall cabinet corresponding to OZVa 2; the types 6 and 7 are installed in a freestanding cabinet corresponding to OZVa 4. In all three plants, the ozone is transported to the mixing device through a separate 12/10 mm stainless steel pipe or 12/9 mm PTFE pipe.

Operating gas specification

- Oxygen
- Concentration: > 90 vol%
- Dew point: < -50 °C
- Pressure: 3-6 bar

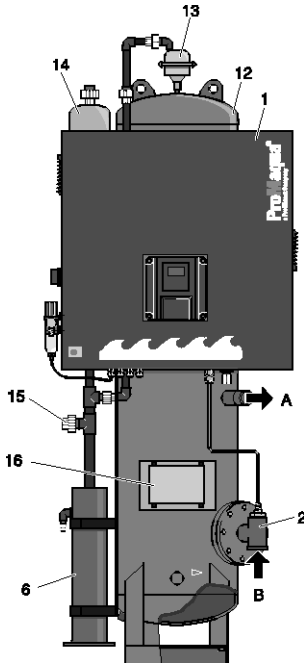
Mixing device

Because of the high ozone concentrations, we recommend mixing systems made of stainless steel. Mixing systems made of PVC may show a reduced service life, depending on the operating conditions.

Notes

- The length of ozone gas transporting pipes and the number of joints should be kept to a minimum. All rooms with a joint are to be monitored with a gas detector according to the valid German accident prevention regulations. All OZONFILT® plants are equipped for fitting a gas detector such as e.g. type GMA 36 Ozone (see Accessories).
- Depending on the operating and installation conditions, it might be necessary to also monitor the room air for excessive oxygen content. For this purpose, the gas detector GMA 36 Oxygen can be used.
- For all installations the ozone generator must be interlocked with the water flow into the metering point.
- To prevent any return of ozonized water into the ozone-transporting pipe, a non-return valve is to be installed upstream of the OVZa.
- All gas-transporting accessories must be resistant to ozone and oxygen (e.g. fat-free).
- Because of the high ozone concentrations, only catalytic residual ozone destructors can be used. Residual ozone destructors on the basis of active carbon ignite spontaneously if subjected to increased ozone concentrations.

OZONFILT® Compact OMVa



A to filtration
B Raw water

The OZONFILT® Compact OMVa is a complete, fully-assembled, ready for use ozone stage for treatment of drinking water, service water or swimming pool water in the capacity range from 5-40 g ozone/h, and consists of the following modules:

Ozone generation module (1), built in accordance with DIN 19627:

The ozone is produced with an OZONFILT® OZVa in a pressure-resistant ozone generator using an electronically produced and controlled medium-frequency voltage.

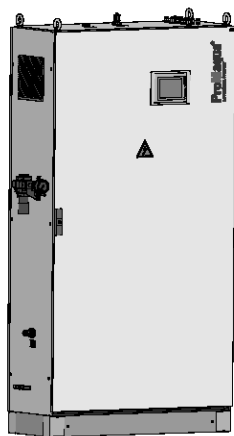
Ozone mixing module (2):

This module consists of an ozone dosing point and a downstream mixing section made from stainless steel, with a series of static mixing elements for intensive mixing of the ozone/air mix with the water to be treated. The pipelines carrying the ozone, and the pipeline from the raw water connection to the entry to the reaction tank are fabricated totally in stainless steel and have been factory pressure tested.

With back pressures up to max. 1.8 bar, no injector is required to suck out the ozone, as the ozone production takes place at positive pressure.

Reaction tank module (12):

The stainless steel reaction tank incorporates all necessary fittings for water distribution and an automatic vent valve (13). The ozone generation module (1), the residual ozone gas destructor (14) and room air monitoring (16) are mounted on this tank (12).



Ozone plants of the type series OZONFILT® OZMa are pressure systems which generate ozone using compressed air or oxygen under medium-frequency high voltage. The electronic power module offers complete protection for the electrical components (high-voltage transformer and power stage) and also permits a correct digital display of the ozone output in "gram/hour". It is thus possible to adjust any desired ozone quantity between 3 and 100 % of rated output reproducibly and largely independent of voltage and pressure fluctuations.

The use of an integrated, self-optimizing (dynamic) variable pressure swing dryer ensures a minimum compressed air consumption of the air systems. The use of a dielectric with optimum thermal conductivity results in an extraordinary compact design of the plant and minimum energy consumption. The novel design of the generator ensures excellent cooling with low cooling water consumption and quickly removes the generated heat before the ozone produced can degrade because of the high temperature.

A simple and safe operation is ensured by the programmable logic controller (PLC) in industry standard and the clear touch panel with data logger and screen recorder. Communication interfaces such as LAN or PROFIBUS® DP ensure an easy installation in industrial control systems; remote diagnosis and communication are facilitated via interfaces such as ISDN or GSM.

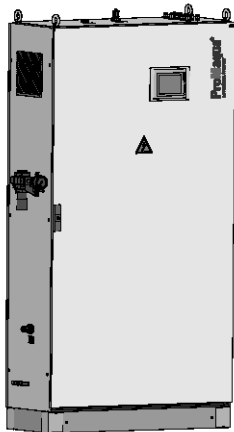
An ozone sensor can be directly connected to the ozone measuring and control device integrated in the PLC. Thus, the ozone fed to the water can be monitored and the ozone output can be directly controlled.

Thanks to operation under pressure, the generated ozone can be directly fed to water systems with a backpressure of up to 2 bar. Additional pressure increasing pumps and injectors thus become superfluous in many applications.

Features

- Simple installation thanks to compact design and single-phase voltage supply
- Low compressed air consumption thanks to dynamic variable pressure swing dryer with low priming pressure (air systems)
- Minimum energy and cooling water consumption thanks to new, maintenance-free generator concept
- Electronic power module with automatic ozone generation largely independent of voltage and pressure fluctuations. Thus maximum error tolerance with regard to influences from installation environment
- Infinitely variable adjustment of any desired ozone quantity between 3 and 100 % of rated output
- PLC with integrated ozone measurement and control
- 5.7" touch panel with data logger and screen recorder
- Multiple communications interfaces (e.g. LAN, Profibus DP, ISDN, GSM)
- Easy integration of customer-specific control requirements

OZONFILT Ozone Generation Plants OZMa 1-6 A (Operating Gas – Air)



Under nominal conditions, the OZMa 1-6 A range produces up to 420 g/h of ozone from compressed air at a concentration of 20 g/Nm³. Using the designated mixing devices, ozone concentrations between 3 and 12 ppm can be achieved in the water to be treated, depending on the temperature (theoretical value at 30 or 0 °C).

Different feature options can be compiled by combining different Identcode characteristics.

The plants are pre-mounted ready for connection in a painted steel cabinet (optional stainless steel control cabinet) and must only be connected to a single-phase voltage supply, compressed air, cooling water/ waste water and ozone metering point at the customer's site.

For the operation of the ozone plant, an adequate compressed air supply and a mixing device designed for the operating conditions are to be integrated.

Requirements on the compressed air supply

- Oil- and dust-free, non-corrosive, constant upstream pressure of 4.5 - 10 bar
- Required air quantity:
 - OZMa 1 A: 73 l/min
 - OZMa 2 A: 110 l/min
 - OZMa 3 A: 147 l/min
 - OZMa 4 A: 220 l/min
 - OZMa 5 A: 293 l/min
 - OZMa 6 A: 440 l/min

Mixing device

All OZMa plants are in principle delivered without mixing device, a suitable mixing system must be ordered separately. When selecting a suitable mixing device, please note that the mixing of ozone is the more efficient the higher the water flow in the mixing system is. The mixing system should thus be designed such that the flow of the water to be treated is at the upper range of the flow specification.

Notes on installation

The length of ozone gas transporting pipes and the number of joints should be kept to a minimum. All rooms with a removable joint are to be monitored with a gas detector according to the valid German accident prevention regulations. All OZONFILT® plants are equipped for fitting a gas detector such as e.g. type GMA

Ozonization contributes a large amount of gas to the water of which only a small percentage can dissolve. An adequate bleeding is thus to be integrated. Because the gases discharged this way have a considerable residual ozone concentration, suitable residual ozone destructors must be installed

For all installations the ozone generator must be interlocked with the water flow into the metering point. To prevent any return of ozonized water into the ozone-transporting pipe, a non-return valve is to be installed between OZMa and ozone metering point.

OZONFILT Ozone Generation Plants OZMa 1-6 O (Operating Gas – Oxygen)

Under nominal conditions, the OZMa 1-6 O range produces up to 735 g/h of ozone from oxygen at a concentration of up to 150 g/Nm³. Using the designated mixing devices, ozone concentrations in the water to be treated of up to 90 ppm can be achieved (theoretical value at 0 °C). Ozone concentration in g/Nm³ and system feed rate in g/h can be varied depending on the operating conditions and can thus be individually matched to the application conditions. Examples for various combinations are listed in the table of the technical data.

Different feature options can be compiled by combining different Identcode characteristics.

The plants are pre-mounted ready for connection in a painted steel cabinet (optional stainless steel control cabinet) and must only be connected to a single-phase voltage supply, oxygen, cooling water/waste water and ozone metering point at the customer's site.

Requirements on the oxygen supply

- See technical data
- Required gas quantities: see technical data

Mixing device

All OZMa plants are in principle delivered without mixing device, a suitable mixing system must be ordered separately. When selecting a suitable mixing device, please note that the mixing of ozone is the more efficient the higher the water flow in the mixing system is. The mixing system should thus be designed such that the flow of the water to be treated is at the upper range of the flow specification.

Because of the high ozone concentrations, we recommend mixing systems made of stainless steel. Mixing systems made of PVC may show a reduced service life, depending on the operating conditions.

Notes on installation

The length of ozone gas transporting pipes and the number of joints should be kept to a minimum. All rooms with a removable joint are to be monitored with a gas detector according to the valid German accident prevention regulations. All OZONFILT[®] plants are equipped for fitting a gas detector such as e.g. type GMA 36 Ozone.

Depending on the operating and installation conditions, it might be necessary to also monitor the room air for excessive oxygen content. For this purpose, the gas detector GMA 36 Oxygen can be used.

All gas-transporting accessories must be resistant to ozone and oxygen (e.g. fat-free).

Ozonization contributes a large amount of gas to the water of which only a small percentage can dissolve. An adequate bleeding is thus to be integrated. Because the gases discharged this way have a considerable residual ozone concentration, suitable residual ozone destructors must be installed. Because of the high ozone concentrations, only catalytic residual ozone destructors can be used. Residual ozone destructors on the basis of active carbon ignite spontaneously if subjected to increased ozone concentrations.

For all installations the ozone generator must be interlocked with the water flow into the metering point. To prevent any return of ozonized water into the ozone-transporting pipe, a non-return valve is to be installed between OZMa and ozone metering point.



BONa Range: Capacity Range 40-720 g/h

BONa plants are designed as vacuum plants and so comply with the highest safety measures. A clear, easy to read display panel provides information on air flow, voltage, power consumption and the status of the air treatment.

The ozone capacity can be steplessly adjusted over the full capacity range. The entire process control and monitoring of safety-related parameters takes place with the aid of the integrated PLC.

Minimal operating costs are achieved through the load-dependent regeneration of the air treatment and a significant reduction in the cooling water requirement.

Bono Zon® plants comply with the German standard for ozone production plants, DIN 19 627.

Bono Zon® plants are fitted with a reliable and economical adsorption drying system. The load-dependent control of the adsorption regeneration ends the heating phase when the breakdown temperature is reached. The required dew point is ensured at all times and the operating costs are minimized at the same time. This ensures optimum operational safety of the ozone plant.

The control for the booster pump and the protection device are integrated in the electrical cabinet of the BONa plant.

Features

- Choice of stainless steel or PVC ozone generation modules
- Automatic electronic overload detection linked to safety disconnection, even with part load operation.
- PLC Siemens® Simatic S7 controls all process sequences and issues fault messages if anomalies occur.
- Clear, easy to understand display and operating panel: the ozone generation sequence is displayed on the flow diagram. LED displays inform the operator of the current operating status and the set values, e.g. volume flow (takeoff gas), primary voltage and primary current are displayed.
- Ozone generator(s) optimized for minimum power consumption. Power requirement 18.7 Wh/g.
- Step less adjustment of ozone generation to demand by means of a regulating transformer, fitted with an electric actuator if required.
- Our DULCOTEST® OZE ozone sensor can be connected directly.
- The control for booster pump and the protection device are integrated in the electrical cabinet
- Clear, easy to read display area with operating and fault lamps and digital measuring instruments integrated in a display panel.
- Vacuum operation ensures highest possible protection against ozone escape.
- Air treatment using cost-effective adsorption drying plant. An optimum dew point is ensured by means of thermostatically-controlled regeneration.
- Bono Zon® plants comply with the German standard for ozone production plants, DIN 19627.

Nominal ozone concentration

20 g/m³ (based on standard conditions $p=1.013 \times 10^5$ Pa, $T=273$ K), measured with a cooling water temperature of 15 °C max., at an ambient air temperature of 20 °C max.

Design Conditions in Accordance with DIN 19627

Max. 30 °C; 60 % rel. humidity, dust-free installation, no aggressive gases, supply and extract air ventilation of the installation room.

An air conditioning system may be required with elevated ambient temperature and/or humidity at the installation position of the plant. Please specify separately at time of ordering! Suitable measures (e.g. air conditioning of the installation room) must be taken to prevent condensation forming, even when the plant is shut down.

Standard values for cooling water quality:

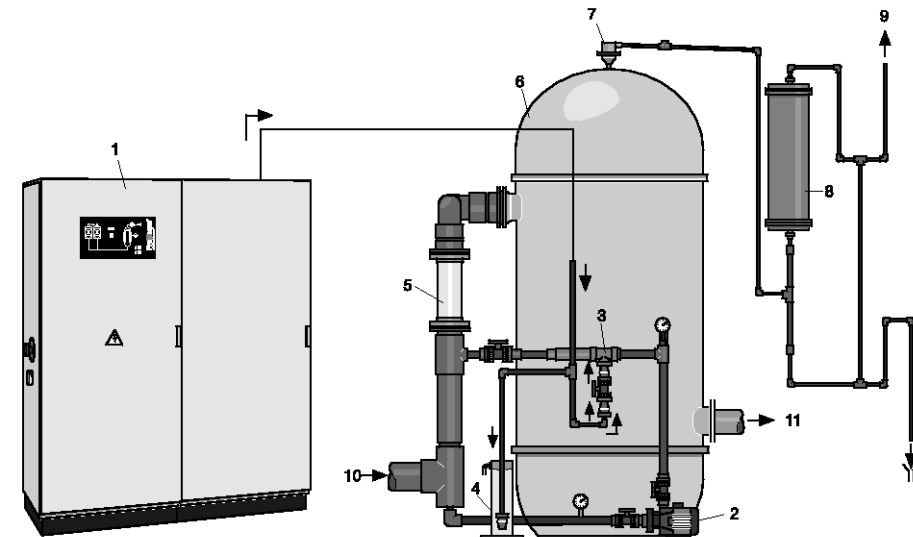
- Temperature < 25 °C
- Replaceable substances < 0.1 ml/l
- Iron < 0.2 mg/l
- Manganese < 0.05 mg/l
- Chloride < 250 mg/l (BONa D und E)
- No tendency to form lime deposits
- No corrosive components

Design

For optimum operation of a water treatment system using ozone, it is essential that all components are carefully matched with each other:

- **Ozone generation:**
Selection of a suitable ozone plant is not just determined by the required quantity of ozone/hour but also by other limiting conditions such as the nature and temperature of the cooling water and the environmental conditions, etc.
- **Mixing:**
First and foremost, the parameters of the water to be treated, such as flow rate, back pressure, etc. are required for the design the mixing system.
- **Reaction tank:**
Whether a reaction tank is required, and if so, what size and equipment is required, depends primarily on the requirements of the particular application.
- **Residual ozone destruction:**
Similarly, the choice of the suitable ozone destructor is determined by the ozonization application. As an example, no catalytic residual ozone destructors can be used in the swimming pool, because of their sensitivity to chlorine.

The diagram below shows a typical arrangement of an ozone treatment system. For each ozone project, our project engineers combine all the right components to meet specific customer requirements.



- 1 Ozone plant type BONA
- 2 Booster pump
- 3 Injector system
- 4 Water trap
- 5 Mixer
- 6 Reaction tank
- 7 Vent valve
- 8 Residual ozone destructor
- 9 Ozone-free exhaust air
- 10 Raw water
- 11 Ozonised water

BONA ozone production plant with mixing device, reaction tank and residual ozone destruction

Bono Zon Ozone Plant With Ozone Generator Made Of Stainless Steel

Depending on capacity, the ozone plants in this range are equipped with 1 – 9 ozone generators made from stainless steel. Indirect cooling of the dielectrics eliminates the possibility of cooling water ingress. Individual electrodes can be easily replaced without any need to empty the entire reactor. This ensures a high level of reliability and makes the plant very service-friendly.

The operating pressure of the ozone generator is -0.08 to 0 bar and must be produced with an injector system matched to the particular application.

Ozone generators made from PVC are optionally available for use in connection with corrosive cooling water.

Technical Data

Bono Zon Ozone Plant With Ozone Generator Made of Stainless Steel

Type		1D	2E	2D	3D	4D	5D	6D	7D	8D	9D
Number of generator modules		1	2	2	3	4	5	6	7	8	9
Ozone capacity, measured in accordance with DIN, with air 20°C, cooling water 15°C	g/h	80	120	160	240	320	400	480	560	640	720
Air flow for ozone production max.	m³/h	4	6	8	12	16	20	24	28	32	36
Ozone generation power consumption (without air treatment)	kW	1.5	2.2	3.0	4.5	6.0	7.5	9.0	10.5	12.0	13.5
Ozone connection		DN 15	DN 20	DN 20	DN 32	DN 32	DN 32	DN 40	DN 40	DN 40	DN 50

Cooling water

Type		1D	2E	2D	3D	4D	5D	6D	7D	8D	9D
Cooling water requirement cooling water temperature 15°C and air temperature < 25 °C	m³/h	0.1	0.2	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
Cooling water requirement cooling water temperature 25°C and air temperature < 30 °C	m³/h	0.3	0.6	0.6	0.9	1.2	1.5	1.8	2.1	2.4	2.7
Cooling water inlet pressure (before pressure reducer)	bar	1.5–6	1.5–6	1.5–6	1.5–6	1.5–6	1.5–6	1.5–6	1.5–6	1.5–6	1.5–6
Cooling water inlet	G..i	3/8"	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"
Cooling water outlet, open discharge		1/2	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4

Overall dimenaions

Type		1D	2E	2D	3D	4D	5D	6D	7D	8D	9D
Width	mm	800	1,600	1,600	2,000	2,400	2,400	2,800	3,200	3,400	3,400
Height	mm	1,950	1,950	1,950	1,950	2,200	2,200	2,200	2,200	2,200	2,200
Depth	mm	500	500	500	500	600	600	600	600	600	600

Weight

Type		1D	2E	2D	3D	4D	5D	6D	7D	8D	9D
Weight	kg	360	700	720	820	1,200	1,280	1,360	1,920	1,980	2,000

Accessories For Ozone Plants

Compressors For OZONFILT OZVa 1-4

Atlas Copco LFX compressors

The outstanding feature of this range of compressors is their especially favorable price/performance ratio. They are equipped with active start unloading and automatic condensate discharge by solenoid valve. The compressors are not suitable for continuous operation and should only be used in less harsh operating conditions.

Technical Data

Type		LFX 0.7	LFX 1.5
Free air delivery rate at 7 bar	l/min	61	124
Power consumption at 7 bar	W	530	970
Number of cylinders		1	1
Sound pressure level	dB (A)	62	64
Air receiver capacity	L	20	20
Weight		44	48
Suitable for OZVa Type	Kg	1 + 2	3 + 4
Type	Type	Part No.	
LFX 0.7	230 V / 50 Hz	1004458	
LFX 0.7	230 V / 60 Hz	1010719	
LFX 1.5	230 V / 50 Hz	1006343	
LFX 1.5	230 V / 60 Hz	1009638	

Air Filter Kit

	Part No.
Air Filter Kit For Atlas Copco LFX Compressors	1005789

Dürr ABK Compressors

The outstanding feature of this continuously rated range of compressors is their extremely robust construction, making them ideally suitable for industrial use. They are equipped with active start unloading, automatic condensate discharge by solenoid valve and an hours-run meter. PTFE coated special aluminum pistons lead to the long service life and reliability of these compressor units.

Technical Data

Type		TA-080	HA-234
Free air delivery rate at 7 bar	l/min	62	152
Supply max.	VAC	230	230
Supply frequency	Hz	50 / 60	50
Power consumption at 7 bar	W	800	1,900
Number of cylinders		1	3
Sound pressure level	dB (A)	68	78
Air receiver capacity	L	25	55
Weight		49	70
Suitable for OZVa Type	Kg	1 + 2	3 + 4
Type		Part No.	
TA-080		1025398	
HA-234		1025399	

Air Filter Kit

	Part No.
Air Filter Kit For Dürr ABK Compressors*	1025400

* 1 filter kit is required per cylinder.

Compressors with refrigeration drying for operation in conditions of high humidity, and high-capacity screw compressors for connection to several ozone plants are available on request.

Oxygen Generator for OZONFILT OZVa 5-7

OXYMAT 020

This compact oxygen generator works on the principle of pressure swing filtration of the surrounding air via a molecular sieve. When supplied with suitably dried compressed air, oxygen is generated with a purity of up to 95 % and a dew point of -70°C . The plant develops a pressure of 4 bar at the oxygen outlet and can be directly connected to the OZVa 5-7.

Technical Data

(at 90% oxygen yield)

Type		Version 1	Version 2
Capacity	Nm ³ /h	0.9	1.2
Air requirement (min. 6 bar)	Nm ³ /min	0.17	0.24
Power consumption incl. compressor	kW	1.5	2.5
Specific energy requirement	kWh/Nm ³	1.7	2.1

Required Components for Version 1

	Part No.
OXYMAT 020, 110-240 V / 50-60 Hz	1025383
Reciprocating compressor (oil-lubricated)	
Atlas Copco LE 2-10 E/100, with 100 l air receiver, 400 V / 50 Hz	
Refrigeration dryer FD 5, 230 V / 50 Hz	1025385
Filter set 006, for LE 2-10 and GX 2-10 FF	1025387
Hose set with quick-release couplings, LE 2-10 to OXYMAT 020 LE 2-10 to OXYMAT 020	
Connecting set with connections for 6x4 mm PTFE hose, between OXYMAT and OZVa	

Required Components for Version 2

	Part No.
OXYMAT 020, 110-240 V / 50-60 Hz	1025383
Atlas Copco Aircenter GX 2-10 FF/200, with screw compressor (oil injection), integrated refrigeration drying and 200 l air receiver, 400 V / 50 Hz	
Filter set 006, for LE 2-10 and GX 2-10 FF	1025387
Hose set with quick-release couplings, For connection of air treatment GX 2-10 FF with OXYMAT 020	1025389
Connecting set with connections for 6x4 mm PTFE hose, between OXYMAT and OZVa	1025395

Accessories

	Part No.
PTFE hose 6x4 mm, Admissible operating pressure 15 bar, sold in meters	037426
Service kit for Atlas Copco LE 2-10, (recommended after 8000 running hours)	1025390
Service kit for Atlas Copco GX 2-10 FF, (recommended after 8000 running hours)	1025391
Service kit 006, for Atlas Copco LE 2-10 and GX 2-10 FF	1025392

Static Helical Mixer Made From PVC Or Stainless Steel



Designed for intensive mixing of gas with liquid flows. 4 helical blades ensure optimum mixing of the ozone with minimal pressure drop (0.1 bar per blade at maximum flow). For optimum mixing results, the specified flow range of the static helical mixer must be complied with.

Version with loose flanges to DIN 2501 and integrated injection point made from stainless steel with couplings for 12 mm diam. stainless steel tube, or 12/9 mm PTFE hose, using stainless steel support inserts. In addition, the injection point is fitted with a non-return valve to protect the ozone plant from reverse flowing water. The mixers are manufactured as grease-free, so they are also suitable for Types OZVa 5-7. The stainless steel version has a G 1/4" pressure gauge tapping at the ozone mixing point.

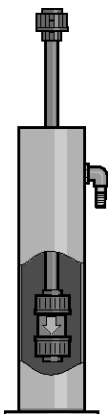
Flow m ³ /h	Material	Overall Length mm	Connector	Part No.
5 – 10	PVC-U	718	DN 40	1024324
10 – 15	PVC-U	718	DN 50	1024325
15 – 25	PVC-U	718	DN 65	1024326
25 – 35	PVC-U	1,100	DN 80	1024327
35 – 50	PVC-U	1,100	DN 100	1024328
50 – 90	PVC-U	1,300	DN 125	1034641
95 – 160	PVC-U	1,700	DN 150	1034640
5 – 10	1.4404	718	DN 40	1022503
10 – 15	1.4404	718	DN 50	1022514
15 – 25	1.4404	718	DN 65	1022515
25 – 35	1.4404	1,100	DN 80	1022516
35 – 50	1.4404	1,100	DN 100	1024154

Other sizes on request

Connecting Parts For The Gas Pipeline

	Part No.
Stainless steel pipe 12/10 mm, Sold by meter	015743
Stainless steel pipe 12/10 mm, grease-less, 1.4 m	1022463
PTFE hose 12/9 mm, grease-less, sold in meters	037428
Stainless steel support inserts, 2 pcs. for 12/9 mm PTFE hose, grease-less	1025397
Stainless steel coupling 12 mm – R 1/4, grease-less	1025755
Stainless steel fitting 12 mm – R 3/8, grease-less	1034642
Stainless steel 90° elbow D 12 – D 12, grease-less	1022462
Stainless steel pressure relief valve, Adjustable pressure	1029032
Range 0.07 – 2 bar, Connection size: 1/4" NPT, 2 additional inputs	
For connecting 2 pressure gauges.	

Accessories For Bono Zon Ozone Plants



Water trap

Water trap is a vacuum breaker that prevents backflow of water into the ozone generator.

Pre-assembled unit consisting of PVC loss vessel including overflow with DN 10 hose spigot, and a non- return valve with DN 20 PVC coupling.

Part No.

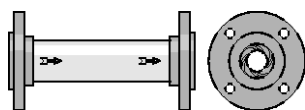
Water trap	1008781
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Ozone mixing

Static mixer designed for intensive mixing of gas with liquid flows. Made from PVC-U with two built-in helical mixers and a mixing section matched to the throughput.

The size depends only on the quantity of water to be ozonised. Pressure rating: PN 4, other pressure ratings available on request.

Connection DN 65-200: loose flanges PN 10.



Recommended flow m ³ /h	Flange connection DN mm		Part No.
15 – 25	65	350	1007841
25 – 35	80	450	1007842
35 – 50	100	550	1007843
50 – 90	125	650	1007864
90 – 160	150	800	1007865
160 – 250	200	1,000	1007866
250 – 350	200	1,000	1007867

Higher flows on request

Stainless steel version: on request

Ozone pumping devices

Complete ozone pumping devices consist of booster pump, injector and mixer and are assembled to suit specific project requirements. Design and technical details on request.

Vent valves

Vent valves made from stainless steel 1.4571 in ozone-resistant version for mounting on reaction tanks.

Suitable for BONA Types	Connector	Pressure (bar)	Part No.
1B	R 3/4" internal x R 1/2" external	0.5-6.0	302525
1A, 1D	R 1" internal x R 1/2" external	0.5-6.0	302526
to 3A, 3d	R 1" internal x R 3/4" external	0.5-2.0	303845

Residual Ozone Gas Destructor

Residual ozone gas destruction is used to remove traces of ozone gas from the exhaust air coming from the reaction tank. Because the exhaust air from the reaction tank still contains water, the pipework should be suitably routed so as to ensure that the water is drained off at the inlet side.

As the exhaust air after the residual ozone gas destructor is still up to 100 % saturated with water vapor, and because small temperature fluctuations, even on the outlet side, can lead to flow back of condensate, a suitable drainage connection must be provided here too.

The exhaust air from any downstream filter plant that may be fitted can also be routed via this ozone gas destruction unit.

PVC version

Residual ozone destructor based on active carbon granules in a PVC housing.

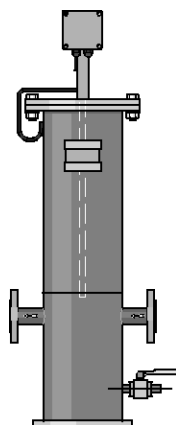
	Type	Ozone quality (g/h)	Part No.
Residual ozone destructor 3 L	10	10	879022
Residual ozone destructor 14 L	40	40	1004267
Residual ozone destructor 30 L	100	100	879019
Residual ozone destructor 60 L	200	200	879018

Note:

The stated ozone quantities refer to quantities added to the raw water. The residual ozone destructor is designed for the normal residual ozone concentration found in swimming pool applications. It may only be used in plants with air as operating gas and a maximum added quantity of 1.5 g of ozone/m³ treated water.

Stainless steel version

Residual ozone destructor based on a maintenance-free MnO catalytic converter with integrated heating, 230 V, 50-60 Hz. Connections Rp 1/2" or flanges to DIN 2642, PN10. Types 18 to 110 m³/h also fitted with Rp 1/2" ball valve as condensate drain.



Max. gas flow m ³ /h	Heating power (W)	Dimensions H x W x D (mm)	Connector	Part No.
1.5	100	700 x 110 x 180	Rp 1/2"	1018440
8.0	100	735 x 110 x 235	Rp 1/2"	1018406
18.0	140	1,154 x 275 x 240	DN 25	1019155
28.0	140	1,154 x 300 x 249	DN 25	1021037
40.0	500	1,156 x 330 x 264	DN 25	1026335
73.0	500	1,158 x 400 x 320	DN 32	1019971
110.0	500	1,160 x 450 x 375	DN 40	1027238

Note:

The catalytic residual ozone destructor must only be used in chlorine-free gas flows. The PVC version must therefore be used for swimming pool applications.

Room Air Monitoring

Gas detectors GMA 36 ozone and oxygen

Calibratable gas warning devices with digital display of the detected gas concentration. 2 relay outputs for issue of infringements of warning and alarm thresholds, to switch external alarm sounder and for interlocking with the ozone plant. The warning message relay is self-resetting; the alarm relay is a latching type and must be acknowledged at the device. 1 self-resetting relay for connection to an alarm horn is switched on fault conditions and when the alarm limit is exceeded.

The ozone sensor responds to all strongly oxidizing gases, hence it responds to chlorine gas or chlorine dioxide too.

The GMA 36 oxygen warning device is intended for installations where an unacceptably high oxygen enrichment of the ambient air is possible.

Technical Data

Type		Ozone	Oxygen
Warning at approx.	ppm/vol%	0.3	23.0
Alarm at approx.	ppm/vol%	0.5	25.0
Permissible ambient temperature	°C	-15 – 45	-15 – 45
Protection class housing		IP 54	IP 54
Dimensions (without PGs, without sensor) H x W x D	Mm	247 x 135 x 95	247 x 135 x 95
Supply	V/Hz	85 – 264/50	85 – 264/50 – 60
Power consumption	W	5	5
Warm-up phase max.	S	150	20
Relay contact "Warning", self-resetting	V/A	230/1	230/1
Relay contact "Alarm", latching	V/A	230/1	230/1
Relay contact "Horn", latching, can be acknowledged	V/A	230/1	230/1
Sensor measuring principle		electrochemical	electrochemical
Sensor service life (depending on environmental cond.)	Years	2 – 3	2 – 3

	Type	Part No.
Gas warning device Type GMA 36	Ozone	1023155
Gas warning device Type GMA 36	Oxygen	1023971

Spare parts

	Part No.
Replacement sensor for chlorine, chlorine dioxide, ozone	1023314
Replacement sensor for oxygen	1023851
Replacement sensor for gas warning devices in the Life CGM range	

Mounting kit

	Part No.
Mounting kit for direct mounting of the CGM 1060 and GMA 36 ozone warning devices on the housing of the OZVa plants	
Support bracket for mounting kit for all types of OZVa except OZVa 1/2 with transparent mixing system	

Warning light and horn

Combined horn and red warning lamp. IP 33 enclosure made from impact-resistant ABS. Dome made from clear polycarbonate. Connected load: 230 V AC, 50 mA. Supplied complete with B 15 d / 7 watt bulb.

	Part No.
Warning light and horn	1010508

Chlorine Dioxide Plants Bello Zon®

Chlorine Dioxide In Water Treatment

Chlorine dioxide is an extremely reactive gas, which – because of its instability – cannot be stored, and must only be produced, in the required quantities in special plants on the site where it is to be used.

Chlorine dioxide offers a number of advantages for water disinfection compared with chlorine, the disinfectant mainly used. The disinfecting power of chlorine dioxide actually increases slightly with increasing pH, whereas with chlorine the disinfecting power reduces. Chlorine dioxide remains stable in the pipeline system over a long period and ensures microbiological protection of the water for many hours, or even several days. Ammonia and ammonium, which cause significant chlorine depletion, are not attacked by chlorine dioxide, so that the dosed chlorine dioxide is fully available for bactericidal action. Chlorophenols, compounds with intense odors, which can be produced during water chlorination in some circumstances, are not formed when chlorine dioxide is used. Trihalomethanes (THMs), a group of substances, which, like their best known example, chloroform, are suspected of being carcinogenic, are produced when chlorine reacts with natural water components (humic acids, fulvic acids, etc.). Measured THM concentrations, if present at all, are drastically reduced when chlorine dioxide is used as an alternative disinfectant.

Advantages of chlorine dioxide:

- Disinfection power is independent of pH.
- High residual effect thanks to long-term stability in the pipeline system.
- Reduction of the biofilm in pipelines and tanks, hence reliable protection of entire water systems against legionella contamination.
- No reaction with ammonia or ammonium.
- No formation of chlorophenols and other intense odor compounds which can be produced in water chlorination.
- No formation of THMs and other chlorinated hydrocarbons, no increase in the AOX value.

Chlorine Dioxide Applications

For every new project, our engineers can draw on the experience that we have continually accumulated since 1976, in the following applications:

Municipal drinking water and waste water plants

- Disinfection of drinking water
- Disinfection of waste water

Hotels, hospitals, retirement homes, sports facilities, etc.

- Combating legionella in cold and hot water systems
- Water disinfection in air conditioning system cooling towers

Food and beverages industry

- Disinfection of product and industrial water
- Bottle cleaning, rinser and pasteurizer
- Cold sterile bottling
- Disinfectant in CIP systems
- Condensate water treatment in the milk industry
- Washing water treatment for fruit, vegetables, seafood, fish, and poultry

Horticulture

- Disinfection of irrigation water in plant growing

Industry

- Cooling water treatment
- Combating legionella in cooling circuits
- Disinfection of process water
- Removal of odorous substances in air scrubbers
- Combating slime in the paper industry

Bello Zon Plant Technology

Bello Zon® chlorine dioxide generating plants and metering systems work according to the chlorite/acid process. These plants generate a chlorine dioxide solution free of chlorine based on the reaction of sodium chlorite solution with hydrochloric acid.

Decades of experience with Bello Zon® chlorine dioxide plants have shown that an extraordinary yield of 90 to 95 % is achieved with the process parameters chosen (with reference to stoichiometric ratios).

In most applications, the metering is proportional to the flow, i.e. flow-dependent on the signal from an inductive or contact flow meter or parallel with a delivery pump.

In circulation systems, such as e.g. bottle washing machines, cooling circuits, where a chlorine dioxide loss has only to be supplemented, the addition can also be controlled via a chlorine dioxide measurement depending on the measured value.

Features

- Precise and reproducible chlorine dioxide production thanks to calibratable metering pumps for the initial chemicals.
- Ease of operation thanks to microprocessor control with display of all relevant operating parameters and error messages in full text.
- Display of the current production quantity as well as the flow rate of the connected flow meter for CDV and CDK.
- Integrated measurement of ClO_2 and chlorite as well as controlling of ClO_2 .
- Highest level of safety provided as standard thanks to design and operation in accordance with DVGW specifications W 224 and W 624.

Bello Zon® CDL Legio Zon®

Ideal for small water quantities and for both continuous and discontinuous treatment: The specialist in combating legionella and other pathogens supplies up to 10 g/h. The complete system with integrated metering pump is simple and safe to use thanks to its chlorine dioxide concentration of 2 g/l. An easy to understand user interface with self-explanatory menu navigation makes it simple to operate.

Bello Zon® CDV

The ideal system for medium to large water quantities for the production of 15 to 2,000 g/h of chlorine dioxide. The continuous treatment is safe and simple thanks to the use of diluted chemicals.

Bello Zon® CDK

This plant produces chlorine dioxide for large water quantities – 150 to 10,000 g/h. The continuous water treatment is particularly economic thanks to the use of concentrated chemicals.

ProMaqua provides all advice and support services needed for the safe use of a chlorine dioxide plant:

- Evaluation of the situation at site by trained, competent field sales staff.
- In our water laboratory, all important water parameters, which are required for an optimum plant design, can be analyzed.
- Planning of the plant.
- Commissioning and plant service by our trained service technicians.

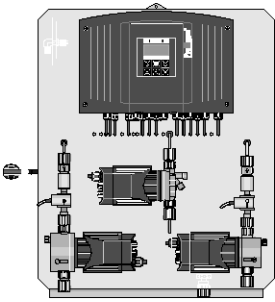
Performance Overview Of Chlorine Dioxide Systems

Type	CDL	CDV	CDK
Output [kg/h]			
200			
10			
2			
100			
10			
5			
1			
Application			
Food and beverages industry	■	■	
Legionella combating	■	■	
Municipal drinking and waste water treatment		■	■
Industry (cooling tower, waste / process water, etc.)		■	■

Chlorine dioxide is establishing itself more and more as a universal disinfectant in applications such as disinfecting drinking water and industrial water, washing food or in the treatment of cooling water and waste water. Its effect independent of the pH value of the water ensures systems remain free of biofilms.

- Efficient disinfection in connection with best eco-compatibility
- Safe and reliable plant technology
- World-wide availability of know-how and service

Bello Zon® Chlorine Dioxide Plants Type Legio Zon®



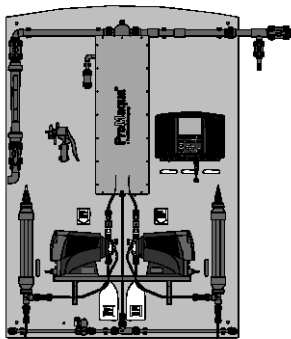
The Bello Zon® plants Legio Zon® are fully pre-mounted and are delivered ready for connection. A stylish cover protects against incorrect operation. Legio Zon® has an integrated metering pump whose capacity is matched to system requirements.

- Generation of 0-10 g/h of chlorine dioxide in batch mode, equally suitable for both continuous and discontinuous operation
- High level of safety in accordance with DVGW specifications W 224 as well as W 624 and no hazardous operating conditions thanks to the optimum chlorine dioxide concentration (2 g/l)
- High stability of the generated chlorine dioxide solution lasting over several days
- High operational safety thanks to automatic restart following a mains failure, automatic monitoring functions and maintenance messages
- Controller with menu-guided operation, flushing and service functions

The following optional accessories are available:

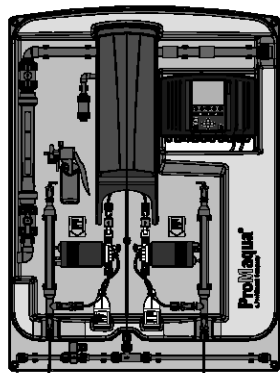
- Corrosion-resistant metering point with integrated mixing elements
- Pressure-retaining valve
- Drip pan for 1 chemicals container 25 l and 10 l each
- Photometer for determination of chlorine dioxide and chlorite
- Ready-to-use chemicals in 25 l or 10 l containers

Bello Zon® Chlorine Dioxide Plants Type CDVc



Complete chlorine dioxide systems Bello Zon® CDVc, wired ready for connection, are used for the production, metering and monitoring of 20 to 2,000 g/h of chlorine dioxide with diluted base chemicals. A completely newly developed reactor concept ensures the innovative production and metering of chlorine dioxide. Instead of the PVC hitherto used in the industry, PVDF is used for the first time. This results in higher operating safety and a better purity of the generated chlorine dioxide. The stroke lengths of the latest generation of ProMinent® metering pumps are monitored online. Hazardous operating statuses owing to incorrect operation of stroke length adjustment of the pumps can thus be avoided.

The precise production of chlorine dioxide is managed by the central plant control. Chlorine dioxide, chlorite, pH or redox potential sensors DULCOTEST® can be connected directly via the two mA inputs. The chlorine dioxide in the treated water, as well as its main by-product chlorite, can thus be monitored and documented online. Using the integrated PID controller, the chlorine dioxide concentrations in the water can be adjusted automatically depending on the measurement. All status messages and measured values are documented in the integrated data logger and visualized in the clear color display via the screen recorder. Using the embedded web server, the user interface can be called up remotely including all of the values and messages shown on the display. All that is needed to view this is a browser, with no need for further software.



The plants meet all of the requirements of the DVGW guidelines W 224 and W 624 with regard to design and operation and are intended for operation with pre-diluted chemicals Bello Zon® chlorite (7.5 % NaClO₂) and acid (9 % HCl).

In the bypass version for storage module, the plants are designed for filling of intermediate storage tanks for ClO₂ solution. For this purpose, the plants include a water supply line consisting of a shut-off valve, pre-filter, pressure reducer, solenoid valve (alternatively 230 V or 24 V), water meter and needle valve. The float flow meter integrated in the bypass line is designed for the low flow rate required to produce a stock solution of 500 - 2,000 ppm of ClO₂.

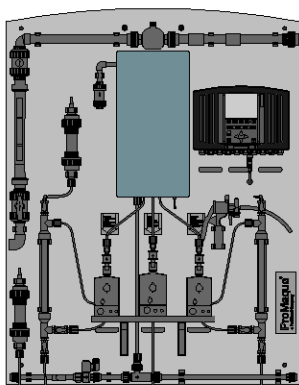
Advantages

- Efficient operation thanks to the production, metering, and monitoring of ClO₂ with only one system
- Maximum operating safety and purity of the ClO₂ generated with PVDF reactors
- Maximum operating safety thanks to stroke length-monitored pumps
- Perfect quality management thanks to integrated storage of all operating parameters and measured values
- Automatic monitoring of operating parameters and maintenance dates
- Easy and safe operation thanks to clear menu navigation in plain text

Features

- Capacity range: 20-2,000 g/h of ClO₂
- PVDF reactor
- Stroke length monitoring for metering pumps
- Control with large color display, integrated data logger and screen recorder
- Measurement, documentation, and visualization of ClO₂ and chlorite or redox potential

Bello Zon® Chlorine Dioxide Plants Type CDKc



Chlorine dioxide systems Bello Zon® CDKc, wired ready for connection, are used for the production, metering and monitoring of 170 to 7,500 g/h of chlorine dioxide with concentrated base chemicals. A completely newly developed reactor concept ensures the innovative production and metering of chlorine dioxide. Instead of the PVC hitherto used in the industry, PVDF is used for the first time. This results in higher operating safety and a better purity of the generated chlorine dioxide. The stroke lengths of the latest generation ProMinent® metering pumps are monitored online. Hazardous operating statuses owing to incorrect operation of stroke length adjustment of the pumps can thus be avoided.

The precise production of chlorine dioxide is managed by the central plant control. Chlorine dioxide, chlorite, pH or redox potential sensors DULCOTEST® can be connected directly via the two mA inputs. The chlorine dioxide in the treated water, as well as its main by-product chlorite, can thus be monitored and documented online. Using the integrated PID controller, the chlorine dioxide concentrations in the water can be adjusted automatically depending on the measurement. All status messages and measured values are documented in the integrated data logger and visualized in the clear color display via the screen recorder. Using the embedded web server, the user interface can be called up remotely including all of the values and messages shown on the display. All that is needed to view this is a browser, with no need for further software.

The plants meet all the requirements of the DVGW specifications W 224 and W 624 with regard to design and operation and are designed for operation with sodium chlorite 24.5 % in accordance with DIN EN 938 and hydrochloric acid 30-33 % in accordance with DIN EN 939.

In the bypass version for storage module, the plants are designed for filling of intermediate storage tanks for ClO₂ solution. For this purpose, the plants include a water supply line consisting of a shut-off valve, pre-filter, pressure reducer, solenoid valve (alternatively 230 V or 24 V), water meter and needle valve. The float flow meter integrated in the bypass line is designed for the low flow rate required to produce a stock solution of 500 - 2,000 ppm of ClO₂.

Advantages

- Efficient operation thanks to production, metering, and monitoring of ClO₂ with only one plant
- Highest operating safety and purity of the produced ClO₂ thanks to PVDF reactors
- Highest operating safety thanks to stroke length-monitored pumps
- Perfect quality management thanks to integrated storage of all operating parameters and measured values
- Automatic monitoring of operating parameters and maintenance dates
- Easy and safe operation thanks to clear menu navigation with full text

Features

- Capacity range: 170-7,500 g/h ClO₂
- PVDF reactor
- Stroke length monitoring for metering pumps
- Control with large color display, integrated data logger and screen recorder
- Measurement, documentation, and visualization of ClO₂, chlorite or redox potential

Safety Accessories And Analysis

Gas warning device GMA 36 – chlorine dioxide

The gas warning device Type GMA 36 for chlorine dioxide is designed as a compact measurement and switching unit for monitoring the surrounding air for dangerous concentrations of chlorine dioxide.

Technical Data

Type	Chlorine Dioxide
Warning at approx.	0.1 ppm/vol%
Alarm at approx.	0.3 ppm/vol%
Permissible ambient temperature	-15 – 45 °C
Protection class housing	IP 54
Dimensions (without PGs, without sensor) H x W x D	247 x 135 x 95 mm
Supply	85 – 264/50 – 60 V/Hz
Power Consumption	5 W
Warm-up phase max.	150 s Relay
Contact “Warning”, self-resetting	230 / 1 V/A
Relay contact “Alarm”, latching	230 / 1 V/A
Relay contact “Horn”, latching, can be acknowledged	230 / 1 V/A
Sensor measuring principle	electrochemical
Sensor service life (depending on environmental cond.)	2 – 3 years

Note: The sensor responds to all oxidizing gases

	Part No.
Gas warning device GMA 36 – chlorine dioxide	1023156

Spare Parts

	Part No.
Replacement sensor	
Replacement sensor	

Warning label in accordance with Safety Rules for Chlorine Dioxide

Chlorination of water”, Appendix 3 Sheet 3, soft PVC film, yellow/black, 300 x 200 mm, self-adhesive.

	Part No.
Warning label	607320

Acid fume separator

Acid fume separator SDA-90 filled with 0.7 l of acid-absorbing granules for absorption of hydrochloric acid fumes. Connection: DN 25 PP coupling with G 1/2“ union nut.

	Part No.
Acid fume separator	1009987
Replacement pack of absorbent material 0.7 L	1010500

Reactor chamber vent valve

Vent valve for reactor space, adjustable, instead of vent line, which is led to open air (already included in standard delivery package on CDVb).

	Part No.
Reactor chamber vent valve	791801

Safety collecting pans for the chemicals containers: see Chap. 3.6

Photometers DT1, DT2 and DT4

- Portable and compact photometer
- Simple operation with text support
- Safe, simple measurement of chlorine, chlorine dioxide, fluoride, chlorite, H₂O₂, bromine, ozone, pH and cyanuric acid
- Calibratable

Technical Data

Ranges DT1	0.5-6.0 mg/l free chlorine (DPD1) + total chlorine (DPD1+3) 0.1-13.0 mg/l bromine (DPD1) 0.05-11 mg/l chlorine dioxide (DPD1) 0.03-4 mg/l ozone (DPD4) 6.5-8.4 pH (phenol red) 1-80 mg/l cyanuric acid
Ranges 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
Ranges DT4	0.03-2.5 mg/l chlorite 0.05-11.0 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)
Permissible ambient temperature	5 – 40 °C
Relative humidity	30 – 90% (non-condensing)
Material	Housing material: ABS Keypad: Polycarbonate
Dimensions L x W x H (mm)	190 x 110 x 55
Weight	0.4 kg



		Part No.
Photometer DT1	Complete with carrying case	1003473
Photometer DT2B	Complete with carrying case	1010394
Photometer DT4	Complete with carry case	1022736

The standard delivery package for the photometers includes accessories, cuvettes and reagents.

Consumables for analysis

	Part No.
DPD 1 buffer, 15 ml	1002857
DPD 1 reagents, 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 off spare cells: round cells with covers for DPD phenol red and cyanuric acid detection (DT1 and DT2B)	1007566
3 off 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, 5 x DPD 3 solution	1007567
Chlorine dioxide tablets Nr. 1 R 127	501317
Chlorine dioxide tablets Nr. 2 R 128	501318

DPD reagents for measurement of excess chlorine, ozone or chlorine dioxide in the water, in conjunction with a Lovibond comparator.

	Amount	Part No.
DPD tablets No. 1	100	501319
DPD tablets No. 2	100	501320
DPD tablets No. 3	100	501321
DPD tablets No. 4	100	501322

Electrolysis Plants CHLORINSITU®

Electrolysis Plants CHLORINSITU®

In electrolysis, chlorine and sodium hydroxide are produced on site by passing an electric current through salt water.

With tubular cell electrolysis (types CHLORINSITU® II), the electrochemical reaction takes place in one chamber, so that the chlorine gas produced immediately reacts with sodium hydroxide to form sodium hypochlorite. A saturated brine is used as saline solution which is produced in a separate salt dissolving tank from salt of a predefined quality. The advantage of tubular cell electrolysis lies in the simple design of the equipment. The disadvantage is the relatively poor yield which, leads to a high entrainment of chloride in the water to be treated and the relatively low chlorine concentrations in the reaction mixture.

In membrane electrolysis, the electrochemical reaction takes place in two electrode chambers separated by a membrane, so that the formation of the chlorine and sodium hydroxide is physically separated. CHLORINSITU® III systems bring the reaction mixtures of both electrode chambers together again after the electrochemical reaction to produce a stock solution of sodium hypochlorite, which can be stored intermediately and metered as needed. With the CHLORINSITU® IV compact and CHLORINSITU® IV systems, the chlorine is transferred directly into the water to be treated where it dissolves as hypochloric acid. In CHLORINSITU® IV plus systems, excess chlorine gas produced is bound to the sodium hydroxide solution and stored temporarily as sodium hypochlorite, similarly as with the CHLORINSITU® III system. This means that the systems need only be designed for medium chlorine demand because capacity peaks can be compensated from the intermediate storage. With all CHLORINSITU® IV systems, the sodium hydroxide solution is temporarily stored and metered, as required, to correct the pH.

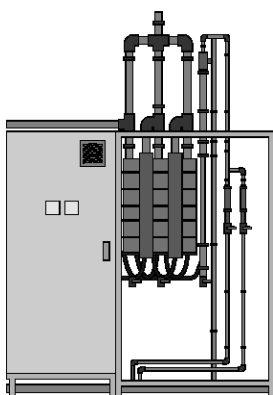
The advantage of membrane systems is their excellent efficiency and the prevention of entrainment of chloride from the electrolytic cell to the water to be treated. In plants for the production of sodium hypochlorite, the high yield results in solutions that have significantly higher chlorine content than when produced by tubular cell electrolysis.

- Disinfection using natural sodium chloride
- No handling of hazardous chemicals
- Economical method thanks to minimal consumption of salt and power
- Ultra-pure chlorine thanks to production on site and short temporary storage periods
- Chlorine generation and pH correction with one system (CHLORINSITU® IV)
- Maximum operating safety thanks to design as vacuum systems
- Improved working conditions for operating personnel
- No risk of confusing hazardous chemical containers

Performance Overview

	CHLORINSITU® IV compact	CHLORINSITU® II	CHLORINSITU® III	CHLORINSITU® IV	CHLORINSITU® IV plus
Output [g Cls ₂ /h]					
5000					
2000					
1000					
500					
200					
100					
50					
20					
Production of HOCl	■			■	■
Production of NaOCl		■	■		■
Application					
Drinking water	■	■	■	■	■
Process water		■	■	■	■
Swimming pool water	■	■	■		■

Tubular Cell Electrolysis Plants CHLORINSITU® II



Electrolysis systems of the CHLORINSITU® II series generate sodium-calcium hypochlorite with a concentration of 5 g/l. For this purpose, a saturated solution of sodium chloride is produced in a salt dissolving tank included with the delivery that is then electrolyzed in an open cell after corresponding dilution. The resulting solution is collected in a storage tank and, from there, metered with separate metering pumps as needed. Because of the moderate pH value of approx. 8.5 to 9, the pH value of the treated water is significantly less affected than when using commercially available sodium-calcium hypochlorite (pH 12-13.5). The hydrogen produced is then diluted with fresh air using an ATEX-approved ventilator and is dissipated harmlessly. Both the salt-dissolving and the diluent water come from a softener integrated in the system. Thus, lime deposits can be prevented and the long service life of the electrolytic cell can be ensured.

The systems are controlled with a modern PLC with a large, illuminated display and integrated modem for remote diagnosis and troubleshooting.

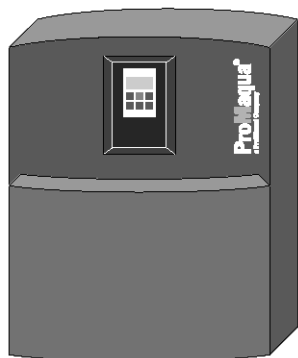
Electrolysis systems of the CHLORINSITU® II series are specifically suitable for applications where a robust and clearly laid-out technology is required, and where the entrainment of sodium chloride into the water to be treated is not problematic. Systems are available from 2.4 ppd up to 116 ppd.

- Robust, simple technology
- Compact, space-saving design
- Safe system control with remote diagnosis by modem
- Cost-effective operation thanks to the use of sodium chloride as an inexpensive raw material and lower chemical consumption for pH correction
- Improved working conditions for operating personnel
- No risk of confusing hazardous chemical containers

Scope of delivery:

Electrolysis system, mounted ready for operation on a powder coated stainless steel frame with programmable logic controller (PLC) in a control cabinet, integrated softener, electrolytic cell, ATEX-certified bleeding system and separate salt-dissolving tank with level monitor. Level sensors to monitor the storage tanks for the sodium-calcium hypochlorite to be provided by the customer. Automatic monitoring of water hardness downstream of the softener system and chlorine gas detector for systems from 600 g/h.

Membrane Electrolysis Plants CHLORINSITU® III - IV compact



Electrolysis systems of the CHLORINSITU® IV compact type generate ultra-pure chlorine gas in a vacuum process. For this purpose, a saturated solution of sodium chloride is produced in a salt dissolving tank included with the delivery that is then electrolyzed in a membrane cell. Sodium hydroxide and hydrogen are produced in the cathode chamber and ultra-pure chlorine gas and scaled down residual brine are produced in the anode chamber separated by the membrane. The resulting chlorine gas is suctioned off through an injector integrated in the system and dissolved in the water to be treated as hypochloric acid. The generated hydrogen is discharged through a bleed line and the scaled down residual brine is disposed of. The sodium hydroxide is disposed of or optionally used with a metering pump integrated in the system to correct the pH of the water to be treated. The salt dissolving water comes from a softener integrated in the plant, thereby preventing the formation of lime deposits and ensuring the long service life of the electrolytic cell.

The microprocessor controller integrated in the system digitally indicates the actual feed rate and monitors all key functions. All operating and error messages are shown in plain text on the clearly arranged display. The feed rate can be controlled manually or externally.

Electrolysis systems of the CHLORINSITU® IV compact series are especially suitable for use with smaller swimming pools in residential properties and hotels.

- Robust, simple technology
- Compact, space-saving design
- Water disinfection and pH correction with one system
- Safe vacuum plant technology
- Production and metering of ultra-pure hypochloric acid
- Cost-effective operation thanks to the use of sodium chloride as an inexpensive raw material and lower chemical consumption for pH correction
- Optional integral chlorine and pH control

Technical Data

Type / Output (ppd)	Voltage Supply	Power Uptake (kW)	Salt consumption (lb/h)	Process water consumption (gpm)	Dimensions L x W x H (in)	Brine Tank (gal)
1.7	230 V/50 Hz	0.11	.17	.4	24 x 14 x 26	32
3.5	230 V/50 Hz	0.22	.5	.8	24 x 14 x 26	32

Scope of delivery:

As CHLORINSITU® IV compact, but with a 15.85 gallon (60 liter) storage tank for storage of the sodium-calcium hypochlorite in place of the injector. A metering pump should be considered.

	Part No.
CHLORINSITU® III compact 1.7	on request
CHLORINSITU® III compact 3.5	on request

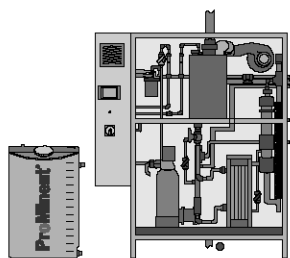
Type / Output (ppd)	Voltage Supply	Power Uptake (kW)	Salt consumption (lb/h)	Process water consumption (gpm)	Dimensions L x W x H (in)	Brine Tank (gal)
1.7	230 V/50 Hz	0.11	.17	.4	24 x 14 x 26	32
3.5	230 V/50 Hz	0.22	.5	.8	24 x 14 x 26	32

Scope of delivery:

Chlorine electrolysis plant mounted on a wall plate, wired ready for connection, with integrated microprocessor control and softener system. Electrolytic cell with vacuum monitor, separate salt dissolving tank with level monitor. Fitted injector and metering equipment for sodium hydroxide (optional).

	Part No.
CHLORINSITU IV compact 1.7	1036461
CHLORINSITU IV compact 1.7 with pH correction	1036462
CHLORINSITU IV compact 3.5	1036463
CHLORINSITU IV compact 3.5 with pH correction	1036464

Membrane Electrolysis Plants CHLORINSITU® III



Electrolysis systems of the CHLORINSITU® III type generate sodium hypochlorite with a concentration of approx. 2.5 percent without major entrainment of sodium chloride from the electrolytic cell into the finished product. For this purpose, a saturated solution of sodium chloride is produced in a salt-dissolving tank included with the delivery that is then electrolyzed in a membrane cell. Sodium hydroxide and hydrogen are produced in the chloride-free cathode chamber and scaled down residual brine are produced in the anode chamber separated by the membrane. The resulting chlorine gas is bound with sodium hydroxide, collected in a storage tank as sodium-calcium hypochlorite and from there metered with separate metering pumps as needed. Because of the moderate pH value of approx. 9 to 9.5, the pH value of the treated water is significantly less affected than when using commercially available sodium-calcium hypochlorite (pH 12-13.5). The hydrogen produced is then a diluted with fresh air using an ATEX-approved ventilator and is dissipated harmlessly. The salt dissolving water comes from a softener integrated in the plant, thereby preventing the formation of lime deposits and ensuring the long service life of the electrolytic cell. The efficiency of the electrolysis is monitored by an integrated pH measurement of the sodium hydroxide production.

The systems are controlled with a modern PLC with a large, illuminated display and integrated modem for remote diagnosis and troubleshooting.

Electrolysis systems of the CHLORINSITU® III series are specifically suitable for applications where an ultra-pure and low-chloride sodium-calcium hypochlorite is required.

- Robust, simple technology
- Minimum acid consumption for pH correction
- Excellent service life of electrolysis cells
- Compact, space-saving design
- Safe system control with remote diagnosis by modem
- Low-chloride sodium-calcium hypochlorite with a high chlorine concentration
- Cost-effective operation thanks to the use of sodium chloride as an inexpensive raw material and lower chemical consumption for pH correction

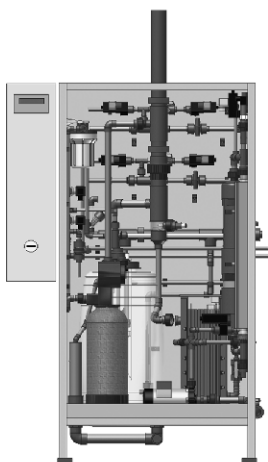
Technical Data

Type / Output (ppd)	Voltage Supply	Power Uptake (kW)	Salt consumption (lb/h)	Process water consumption (gpm)	Cooling water consumption (gpm/h)	Dimensions L x W x H (in)	Brine Tank (gal)	Recommended capacity storage tank (gal)
2.4	3 x 400 V	0.90	.2	.01	-	49 x 24 x 61	21	27
3.6	3 x 400 V	1.00	.5	.01	-	49 x 24 x 61	21	27
4.9	3 x 400 V	1.10	.5	.02	-	49 x 24 x 61	21	55
9.7	3 x 400 V	1.50	.9	.04	-	49 x 24 x 61	21	80
14.6	3 x 400 V	1.9	1.3	.07	.44	49 x 24 x 61	55	106
19.4	3 x 400 V	2.30	1.8	.08	.44	49 x 24 x 61	55	133
24.3	3 x 400 V	2.70	2.4	.11	.44	49 x 24 x 61	55	159
29.1	3 x 400 V	3.10	2.9	.13	.44	49 x 24 x 61	55	185
48.5	3 x 400 V	4.70	4.6	.21	.44	70 x 24 x 79	55	320
72.8	3 x 400 V	6.70	7.0	.32	.44	70 x 24 x 79	100	415
97.0	3 x 400 V	8.70	9.2	.43	.88	71 x 48 x 79	140	660
121.3	3 x 400 V	10.70	11.7	.53	.88	71 x 48 x 79	140	793
145.5	3 x 400 V	12.70	13.9	.64	.88	91 x 24 x 79	140	1000
169.8	3 x 400 V	14.70	16.2	.74	.88	91 x 24 x 79	140	1057

Scope of delivery:

Electrolysis plant mounted ready for operation on a powder-coated stainless steel frame with programmable logic controller (PLC) in control cabinet, integrated softener, electrolytic cell, pH value monitoring, ATEX-certified bleeding system and side salt dissolving tank with level monitor. Level sensors to monitor the storage tanks for sodium hypochlorite to be provided by the customer. Automatic monitoring of the water hardness downstream of the softener and chlorine gas detector for plants from 600 g/h.

Membrane Electrolysis Plants CHLORINSITU® IV



Electrolysis plants of the types CHLORINSITU® IV generate ultrapure chlorine gas in a vacuum process. For this purpose, a saturated solution of sodium chloride is produced in a salt dissolving tank included in the scope of delivery which is then electrolyzed in a membrane cell. Chloride-free sodium hydroxide and hydrogen are produced in the cathode chamber and ultrapure chlorine gas and scaled down residual brine in the anode chamber separated by the membrane. The resulting chlorine gas is suctioned off through an injector included in the scope of delivery and dissolved in the water to be treated as hypochloric acid. The chloride-free sodium hydroxide is stored intermediately and can be transferred into the water through the same injector to adjust the pH value. To achieve this, an external pH value controller is directly connected to the plant's control. The generated hydrogen is diluted with fresh air through an ATEX-compliant ventilator and discharged safely, the scaled down residual brine is disposed of. The salt dissolving water comes from a softener integrated in the plant. Thus, lime deposits can be prevented and a long service life of the electrolytic cell can be ensured.

The plants are controlled with a modern PLC with large, illuminated display and integrated modem for remote diagnosis and troubleshooting. The chlorine metering and the pH value correction are controlled as standard through contact inputs; analogue inputs are optionally available.

Electrolysis plants of the types CHLORINSITU® IV are suitable for all applications which require metering of hypochloric acid with simultaneous pH value correction.

- Robust technology
- Compact, space-saving design
- Safe vacuum plant technology
- Production and metering of ultrapure hypochloric acid without intermediate storage
- Chlorination and pH value adjustment with one single plant
- Economic operation thanks to the inexpensive raw material sodium chloride and less chemical consumption for pH value adjustment

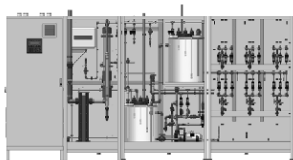
Technical Data

Type / Output (ppd)	Voltage Supply	Power Uptake (kW)	Salt consumption (lb/h)	Process water consumption (gal/h)	Cooling water consumption (gal/h)	Dimensions L x W x H (in)	Salt Tank (gal)	Recommended capacity storage tank (gal)
4.9	230 V	1.1	0.44	0.208	-	42 x 24 x 62	20.8	
7.3	3 x 400 V	1.3	0.66	0.338	-	43 x 24 x 62	20.8	
9.7	3 x 400 V	1.5	0.88	0.442	-	44 x 24 x 62	52	
14.6	3 x 400 V	1.9	1.32	0.62	-	45 x 24 x 62	52	
19.4	3 x 400 V	2.3	1.76	0.884	-	46 x 24 x 62	52	
24.3	3 x 400 V	2.7	2.42	1.092	-	47 x 24 x 62	52	
29.1	3 x 400 V	3.1	2.86	1.3	-	48 x 24 x 62	52	
36.4	3 x 400 V	3.7	3.52	1.638	-	49 x 24 x 62	98.8	
48.5	3 x 400 V	4.7	4.62	2.184	-	50 x 24 x 62	98.8	
60.6	3 x 400 V	5.7	5.72	2.86	-	51 x 24 x 62	98.8	
72.8	3 x 400 V	6.7	7.04	3.38	-	52 x 24 x 62	98.8	
84.9	3 x 400 V	7.7	8.14	3.9	-	53 x 24 x 62	98.8	
97.0	3 x 400 V	8.7	9.24	4.42	52	91 x 24 x 79	135.2	
121.3	3 x 400 V	10.7	11.66	5.46	52	92 x 24 x 79	135.2	
145.5	3 x 400 V	12.7	13.86	6.5	52	93 x 24 x 79	135.2	
169.8	3 x 400 V	14.7	16.28	7.54	52	94 x 24 x 79	135.2	

Scope of delivery:

Electrolysis plant mounted ready for operation on a powder-coated stainless steel frame with programmable logic controller (PLC) in control cabinet, integrated softener, electrolytic cell, pH value monitoring of electrolysis, ATEX-certified bleeding system and side salt dissolving tank with level monitor. The scope of delivery also includes a central injector system matched to the plant to meter chlorine gas and sodium hydroxide, inclusive of a booster pump. **Automatic monitoring of the water hardness downstream of the softener and chlorine gas detector for plants from 600 g/h.**

Membrane Electrolysis Plants CHLORINSITU® IV plus



Electrolysis plants of the types CHLORINSITU® IV plus generate ultrapure chlorine gas in a vacuum process. For this purpose, a saturated solution of sodium chloride is produced in a salt dissolving tank included in the scope of delivery which is then electrolysed in a membrane cell. Chloride-free sodium hydroxide and hydrogen are produced in the cathode chamber and ultrapure chlorine gas and scaled down residual brine in the anode chamber separated by the membrane. The resulting chlorine gas is processed further in two ways. As with the plants CHLORINSITU® IV, it is suctioned off through an injector included in the scope of delivery and dissolved in the water to be treated as hypochloric acid. If the complete production output is not needed, excess chlorine gas can also be bound with the produced sodium hydroxide as is the case with the plants of the types CHLORINSITU® III and stored intermediately as sodium hypochlorite. The plant thus does not have to be adjusted to the maximum demand of chlorine gas but can be adjusted to the average daily demand. Peaks of demand are covered by the additional metering of sodium hypochlorite from the intermediate storage. As with chlorine gas, metering will be carried out through a central injector system.

The chloride-free sodium hydroxide is also stored intermediately and can be transferred into the water to be treated through the central injector system to adjust the pH value. To achieve this, an external pH value controller is directly connected to the plant's control. The generated hydrogen is diluted with fresh air through an ATEX-compliant ventilator and discharged safely, the scaled down residual brine is disposed of. The salt dissolving water comes from a softener integrated in the plant. Thus, lime deposits can be prevented and a long service life of the electrolytic cell can be ensured. The efficiency of the electrolysis is monitored by an integrated pH measurement of the sodium hydroxide production.

The plants are controlled with a modern PLC with large, illuminated display and integrated modem for remote diagnosis and troubleshooting. The chlorine metering and the pH value correction are controlled as standard through contact inputs; analogue inputs are optionally available.

Electrolysis plants of the types CHLORINSITU® IV plus are a specifically economic alternative for all applications which require metering of hypochloric acid with simultaneous pH value correction.

- Robust technology
- Compact, space-saving design
- Safe vacuum plant technology
- Simultaneous production and metering of ultrapure hypochloric acid and sodium hypochlorite
- Chlorination and pH value adjustment with one single plant
- Economic operation thanks to the inexpensive raw material sodium chloride and less chemical consumption for pH value adjustment

Technical Data

Type / Output (ppd)	Voltage Supply	Power Uptake (kW)	Salt consumption (lb/h)	* Process water consumption (gpm)	Cooling water consumption (gpm)	Dimensions L x W x H (in)	Brine Tank (gal)	Recommended capacity storage tank (gal)
5	230 V	1.1	0.4	0.05	-	41.6 x 24 x 61 32 x 24 x 61	21	39.6
8	3 x 400 V	1.3	0.7	0.07	-	41.6 x 24 x 61 32 x 24 x 61	21	52.8
10	3 x 400 V	1.5	0.9	0.10	-	41.6 x 24 x 61 32 x 24 x 61	53	66
16	3 x 400 V	1.9	1.3	0.15	-	41.6 x 24 x 61 32 x 24 x 61	53	105.6
21	3 x 400 V	2.3	1.8	0.19	-	41.6 x 24 x 61 32 x 24 x 61	53	132
26	3 x 400 V	2.7	2.4	0.24	-	41.6 x 24 x 61 32 x 24 x 61	53	158.4
31	3 x 400 V	3.1	2.9	0.29	-	41.6 x 24 x 61 32 x 24 x 61	53	184.8
39	3 x 400 V	2.7	3.5	0.36	-	56 x 24 x 79 47.6 x 24 x 79	100	224.4
53	3 x 400 V	4.7	4.6	0.48	-	56 x 24 x 79 47.6 x 24 x 79	100	290.4
66	3 x 400 V	5.7	5.7	0.60	-	56 x 24 x 79 47.6 x 24 x 79	100	369.6
79	3 x 400 V	6.7	7.0	0.72	-	56 x 24 x 79 47.6 x 24 x 79	100	448.8
92	3 x 400 V	7.7	8.1	0.84	-	56 x 24 x 79 47.6 x 24 x 79	100	528
105	3 x 400 V	8.7	9.2	0.95	0.88	90.6 x 24 x 79 47.6 x 24 x 79	137	580.8
132	3 x 400 V	10.7	11.7	1.19	0.88	90.6 x 24 x 79 47.6 x 24 x 79	137	739.2
158	3 x 400 V	12.7	13.9	1.43	0.88	90.6 x 24 x 79 47.6 x 24 x 79	137	871.2
184	3 x 400 V	14.7	16.3	1.67	0.88	90.6 x 24 x 79 47.6 x 24 x 79	137	1029.6

* The process water consumption depends on the ratio between chlorine gas and stock production. Here, the value for a ratio 50% : 50% is given.

Scope of delivery:

Electrolysis plant mounted ready for operation on a powder-coated stainless steel frame with programmable logic controller (PLC) in control cabinet, integrated softener, electrolytic cell, pH value monitoring of electrolysis, ATEX-certified bleeding system and side salt dissolving tank with level monitor. Level sensors to monitor the storage tanks for sodium hypochlorite to be provided by the customer. The scope of delivery also includes a central injector system matched to the plant to meter chlorine gas, sodium hypochlorite and sodium hydroxide, inclusive of a booster pump. Automatic monitoring of the water hardness downstream of the softener and chlorine gas detector for plants from 600 g/h.

Gas Warning Device For Monitoring For Chlorine Gas

The Type GMA 36 chlorine gas-warning device is a compact measurement and switching unit designed for monitoring the surrounding air for dangerous concentrations of chlorine gas.

Gas warning device type GMA 36

For chlorine monitoring

Type	Chlorine
Warning at approx.	2.0 ppm/vol%
Alarm at approx.	4.0 ppm/vol%
Permissible ambient temperature	-15 – 45 °C
Protection class housing	IP 54
Dimensions (without PGs, without sensor) H x W x D	247 x 135 x 95 mm
Supply	85 – 264 / 50 – 60 V/Hz
Power consumption	5 W
Warm-up phase max.	150 s Relay
Contact “Warning”, self-resetting	230 / 1 V/A
Relay contact “Alarm”, latching	230 / 1 V/A
Relay contact “Horn”, latching, can be acknowledged	230 / 1 V/A
Sensor measuring principle	electrochemical
Sensor service life (depending on environmental cond.)	2 – 3 years

Note: The sensor reacts to all oxidizing gases.

	Part No.
GMA 36 chlorine gas detector	1023157

Spare parts

		Part No.
Replacement sensor	for chlorine, chlorine dioxide, ozone	1023314
Replacement sensor	for gas warning devices in the Life CGM range	1003009

Membrane Technology

Overview Membrane Technology

Systems for membrane filtration

In water treatment, membrane filtration is the process for removing particles and salts in the water ensuring the lowest operating costs. ProMaqua offers versatile and high-quality system technology in this field. This is complemented by the extensive ProMaqua® product range to produce customer-specific complete solutions.

Membrane filtration is a physical process to separate substances with the help of semi-permeable membranes. There are four types of processes, depending on the size of the particles/molecules to be removed:

- Microfiltration
- Ultrafiltration
- Nanofiltration
- Reverse osmosis

The following table shows the separation limits of the individual processes:

	Microfiltration	Ultrafiltration	Nanofiltration	Reverse Osmosis
Particle size	> 0.1 mm	0.1 – 0.01 mm	0.01 – 0.001 mm	< 0.001 mm
Particle type	Suspended particles, colloidal turbidity, oil emulsions	Macromolecules, bacteria, cells, viruses, proteins	Low-molecular organic compounds, ions	Ions

The ProMaqua experts, with their detailed industry knowledge, are not only able to put together the optimum system for the relevant application but also deliver complete water treatment solutions from one source, supported by the extensive ProMinent product range.

Performance Overview Ultrafiltration

Ultrafiltration is a membrane process which is increasingly used in water treatment to separate undesired water components. Parasites, bacteria, viruses and high-molecular organic substances as well as other particles are retained.

The applications of ultrafiltration are wide spread and may include different types of water.

Typical applications include drinking water, river water, process water, swimming pool water, seawater and wastewater.

The tasks range from drinking water purification to meet physical and microbiological limit values in accordance with the German Drinking Water Ordinance up to the pre-treatment of seawater for desalination by reverse osmosis.

The systems are matched to a specific task by individually selecting the membrane type and the operating mode. ProMaqua® uses extremely robust and resistant UF membranes and the dead-end principle to facilitate an optimization with regard to investment costs, required space and operating costs. With this selection, all raw waters with the exception of wastewater can be filtered largely without using chemicals.

The dead-end operation represents the standard operating mode. The raw water flows into the capillaries. The pure water (filtrate) passes through the membrane while the other constituents are retained on the surface of the membrane.

The constituents form a layer on the membrane. The membrane is backwashed fully automatically in regular intervals to remove the filter cake.

Ultrafiltration systems basically consist of:

- Stainless steel or high-grade coated steel rack
- Pre-filter to protect the membranes, if required. This filter can be designed as a backwashing filter optionally.
- UF membrane modules
- Pneumatically controlled valves made of high-quality materials
- Electronic pressure measurement
- Filtration pump and backwash pump with frequency converter made of suitable high-quality materials
- Magnetically inductive flow metering to control the flow rates for filtration and backwashing.
- Integrated filling system for the backwash water tank. The backwash water tank is also integral to small systems. With larger systems, tanks from our product range can be integrated or an application-specific solution found depending on the customer's requirements.
- PLC control with touch screen panel or microprocessor control unit. The PLC control simultaneously monitors all important parameters, such as pressure, pressure difference and flow rates. This ensures that the membranes are optimally protected. The control of pre- and post-treatment processes can be integrated, if required.

Advantages of ultrafiltration systems

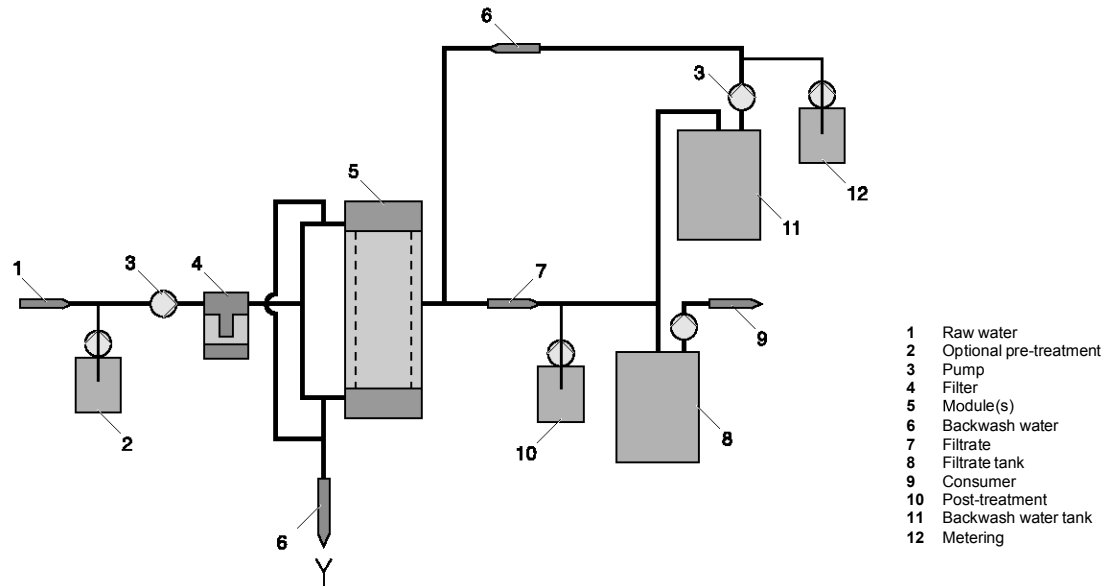
- Filtrate values smaller than 0.1 NTU independent of the raw water turbidity.
- Molecular weight cut off of the membranes (MWCO, Molecular Weight Cut Off) approx. 100 kDa (kilodalton).
- Excellent retention rates for bacteria (99.9999 %) and viruses (99.99 % based on MS2 phages).
- Very easy to use and simple to combine with other systems thanks to PLC control with touch screen.
- Optimum operating processes thanks to modern measuring and control technology.
- Complete solutions with perfectly coordinated pre- and post-treatment are available on request.

Ultrafiltration systems are available with a filtration capacity ranging from 1 to 80 m³/h at a water yield of > 96 %.

Areas of application of ultrafiltration systems

Typical areas of application include the removal of particles, turbidity and pathogens in public or private drinking water supplies. Ultrafiltration is predominantly used for the treatment of freshwater, in particular surface water, spring water or well water. In principle, brackish water and seawater can also be treated, e.g. as pre-treatment for a following desalination by nanofiltration or reverse osmosis. Further areas of application include the treatment of swimming pool water, process water from the food and beverage industry.

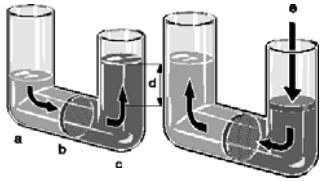
A typical general system layout is shown below:



Our engineers are using their wide experience in the water treatment to determine the ultrafiltration system, which is adopted to the specific raw water requirements. If desired and/or required, the best-suited pre- and post-treatment is also determined. For this purpose, numerous further ProMinent® and ProMaqua® products are available. Thus, the customer is offered a complete package of solutions from one single source.

The filtration capacity of the ultrafiltration systems ranges from 1 to 80 m³/h. Other capacities are available on request. Please contact us; we will be glad to assist you.

Performance Overview Of Nanofiltration



- a diluted solution (permeate)
 - b semi-permeable membrane
 - c concentrated solution (concentrate)
 - hydrostatic head corresponding to
 - d the osmotic product
 - e pressure
- Osmosis Reverse Osmosis

Nanofiltration is based on the same principle as reverse osmosis. The difference: The cutoff limit is slightly lower. Although ions are still held back by this type of membrane filtration, this takes place at a distinctly reduced extent compared to reverse osmosis. Ultimately, operating costs are reduced.

Typical salt retention rates are at 80 – 90 %. Polyvalent ions (e.g. Ca, Mg) are retained more effectively than monovalent ions (e.g. Na, K) so that nanofiltration systems are often used as an alternative to classic water softening.

If a lower salt retention rate is acceptable, nanofiltration systems offer an inexpensively priced alternative to reverse osmosis facilities, as nanofiltration systems can be operated at lower operating pressures. This means a smaller booster pump can be used. Advantage: Lower investment costs and, above all, lower energy costs! The operating costs are drastically reduced compared to conventional water softening as intricate and expensive routine regeneration with large quantities of salt is rendered completely unnecessary.

ProMaqua offers virtually all nanofiltration systems.

In principle, the untreated water to be desalinated by way of nanofiltration is pumped into a chamber, which is closed off by a semi-permeable membrane. The membrane is permeable to pure water and smaller ions. All other water constituents are held back. Partially desalinated water (permeate) and a concentrated solution (concentrate) are produced. For this process, ProMaqua uses high-quality nanofiltration membranes.

Dulcosmose® nanofiltration systems basically consist of:

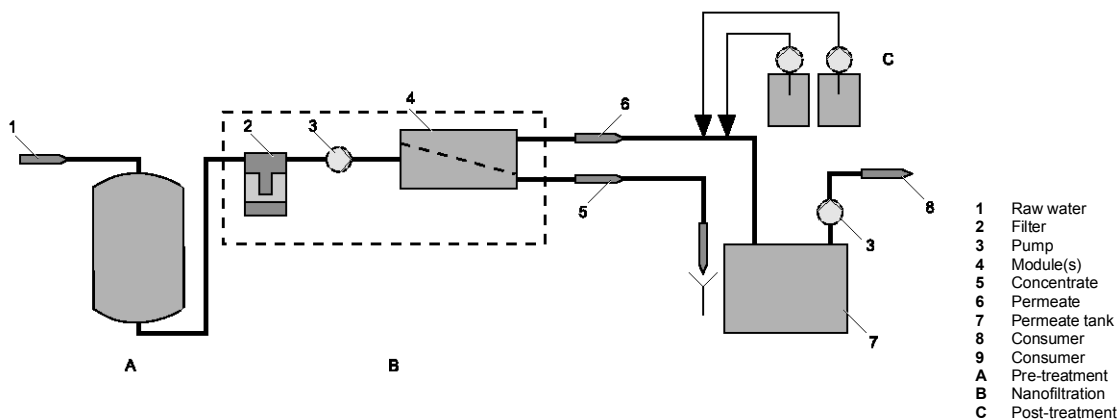
- Frame made from stainless steel, high grade double layer coated steel or PP
- 5 µm pre-filter
- Inlet valves are made from suitable, high-grade materials depending on the salt content of the raw water
- Pressure switch to protect the high-pressure pump
- High-pressure pump made from suitable, high-grade materials depending on the salt content of the raw water
- Low-pressure membranes designed as spiral-wound modules and fitted in GRP pressure vessels
- Variable-area flow meter or electronic and pressure gauge
- Stainless steel control and regulating valves for pressure and concentrate control
- ProMaqua in-house conductivity measurement cell and control system with versatile programming options also for the control of external pre- and post-treatment components
- A semi-automatic chemical cleaning system can be integrated as required

Advantages of Dulcosmose® nanofiltration systems

- Easy and safe operation ensured by ultramodern microprocessor control with integrated conductivity measurement and plain text display of operating status
- Efficient operation with a permeate yield of up to 80 % and up to 90 % separation of dissolved ions
- Low energy requirements through the use of low energy nanofiltration membranes
- Long service life of membranes thanks to integrated cleaning concept
- Well-designed, service-friendly system structure on stainless steel, high grade double coated steel or PP racks
- Low investment and operating costs as optimized components specifically matching the individual application are used
- On request, complete solutions with precisely matching pre-treatment and post-treatment facilities such as ProMinent® metering, measurement and control technology, i.e. simple networking, perfect function and overall monitoring of various system components

Advantages of Dulcosmose® nanofiltration systems

Typical applications include desalination installations in public or private drinking water supply systems, in the chemical and pharmaceuticals industry, food and beverage industry, metal-processing industry electroplating as well as in boiler feed water treatment. A typical system layout is shown in the following:



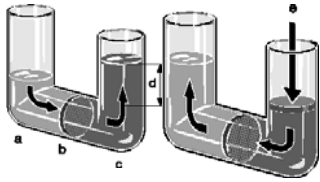
Nanofiltration is predominantly used for the treatment of fresh water.

However, the system can also be used to treat brackish water and seawater, e.g. as a pre-treatment stage for further desalination in a reverse osmosis system.

Our engineers are using their wide experience in the water treatment to determine the nanofiltration system, which is adapted to the specific raw water requirements. If required and/or necessary, the most suitable pre-treatment and post-treatment facilities are also selected from a comprehensive range of suitable ProMinent® and ProMaqua® products. In this way, a complete package is assembled for the customer with all components from under one roof. ProMaqua's extensive experience gained in the construction of specialized systems and complete solutions ranges from rack-mounted systems through to systems installed in standard transport containers.

The permeate capacity of the Dulcosmose® standard nanofiltration systems ranges from 1 to 50 m³/h. Other capacity ratings are available on request.

Performance Overview Reverse Osmosis



a diluted solution (permeate)
b semi-permeable membrane
c concentrated solution (concentrate)
d the osmotic product
e pressure

Osmosis Reverse Osmosis

Reverse osmosis is the part of membrane filtration with the highest separation performance. It is the reverse of the natural process of osmosis and hence is used as a method for desalination of aqueous solutions. Today, using suitable high-performance membranes, over 99 % of all salts can be removed from an aqueous solution.

The raw water to be desalinated is introduced into a chamber, which is sealed by a semi-permeable membrane. An artificial pressure is created in the chamber, opposing the osmotic pressure gradient. The membrane is only permeable to pure water, and not to the ions and other particles dissolved in it, so part of the raw water becomes pure desalinated water (permeate) and part becomes even higher concentrated solution (concentrate).

ProMaqua uses high-grade, low-pressure membranes for this process in its Dulcosmose® reverse osmosis plants.

Basically, Dulcosmose reverse osmosis plants consist of:

- Frame made from stainless steel, high grade double layer coated steel, or PP
- 5 µm pre-filter
- Pressure switch to protect the high-pressure pump
- High-pressure pump made from suitable, high-grade materials depending on the salt content of the raw water
- Low-pressure membranes designed as spiral-wound modules and fitted in GRP pressure pipes
- Variable-area flow meter or electronic and pressure gauge
- Stainless steel control and regulating valves for pressure and concentrate control
- ProMaqua in-house conductivity measurement cell and control system with versatile programming options also for the control of external pre- and post-treatment components
- Semi-automatic system for chemical cleaning

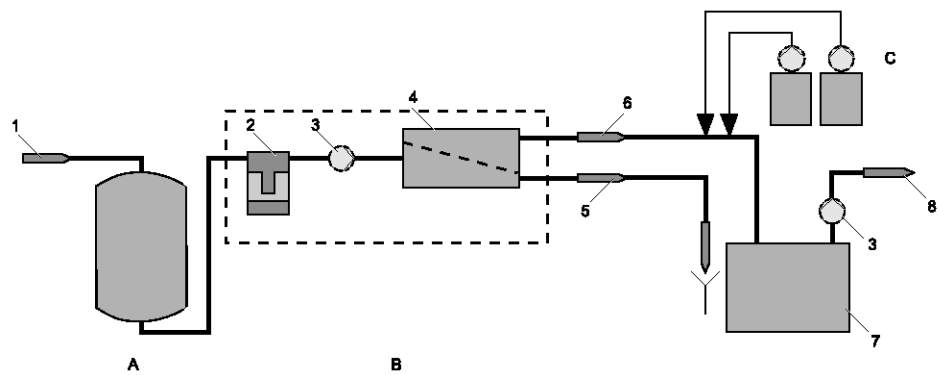
Advantages of Dulcosmose reverse osmosis plants:

- Simple, safe operation using modern microprocessor control with integrated conductivity measurement and real text display of operating status
- Efficient operation with pure water recovery of up to 80 % and rejection of over 99 % of dissolved ions
- Reduced energy consumption through use of "low-energy" reverse osmosis membranes and energy recovery from the concentrate stream by using state of the art pressure exchanger technology (with sea water desalination)
- Long service life of the membranes thanks to integrated cleaning concept and permeate and raw water flushing option
- Well-designed, service-friendly system structure on stainless steel, high grade double coated steel or PP racks
- Low investment and operating costs as optimized components specifically matching the individual application are used
- On request, complete solutions with precisely matching pre-treatment and post-treatment facilities such as ProMinent® metering, measurement and control technology, i.e. simple networking, perfect function and overall monitoring of various system components

Advantages of Dulcosmose reverse osmosis plants:

Typical applications are desalination duties in municipal or private drinking water supply, in the chemical and pharmaceuticals industries, food and beverage industry, metal processing industry, electroplating, in boiler feed water treatment and in power stations, for example.

A typical general plant schematic is shown below:



Basically, three types of raw water with different salt contents can be considered for desalination:

- Drinking water (typically up to 1,000 mg/l)
- Brackish water (typically up to 2,000 - 5,000 mg/l)
- Sea water (typically higher than 35,000 mg/l)

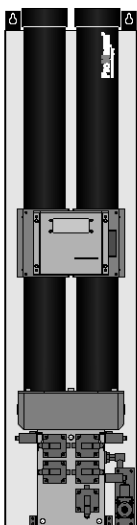
Our engineers use their years of experience in treatment of this raw water to determine - on the basis of the particular raw water analysis – the optimum variants for the suitable reverse osmosis plant for the customer. At the same time, the most suitable pretreatment and post-treatment stages are selected using other ProMinent® products. So a complete package is put together for the customer, from a single source. One of our specialties here is the supply of complete plants installed in a standard transport container.

ProMaqua also has wide experience in building other special plants, e.g. two-pass plants for higher permeate quality requirements. Please contact us – we'll be happy to advise you.

Type series	ecoPro	TW	BW	SW
Permeate output [m³/h]				
50				
25				
10				
5				
2.5				
1				
0.5				
0.25				
0.1				
Salt content mg/l	< 1000 mg/l	< 1000 mg/l	< 5000 mg/l	< 40000 mg/l
Particle removal	■	■	■	■
Particle removal and desalination	■	■	■	■

Dulcoclean® Ultrafiltration Systems

Ultrafiltration Systems Dulcoclean® UF eco Range



This series represents the compact ProMaqua® ultrafiltration system for residential water supply, apartment blocks, hotels, leisure centers, restaurants and industrial facilities and even smaller districts or villages can be supplied with clean drinking water with the use of a storage tank. Dulcoclean® UF eco systems are ideal for the removal of turbidity, particles and microbiological contaminations (bacteria, viruses, parasites) and the systems provide a consistently turbidity-free filtrate quality - free from pathogens - even with fluctuating raw water compositions. The retention rate for bacteria and viruses (based on MS2 phages) is at least 99.999 % or 99.99 % respectively.

Dulcoclean® UF eco 2 systems are cleaned fully-automatically with a forward flush depending on the degree of contamination of the membrane. Cleaning can be delayed to a pre-set time to avoid interrupting the water supply.

An intelligent PLC control ensures the fully automatic operation of the Dulcoclean® UF eco 4 system and guarantees minimum energy and water consumption. The intervals of back washings are automatically adapted to the degree of contamination of the membrane and the water quality. In addition, further peripheral components of your complete water treatment system can be controlled centrally. A regularly conducted integrity test offers maximum safety throughout the process.

Plant	Filtration capacity* at a max. of 15 °C (l/h)	Number of membranes	Connected load filtration / backwashing (W)	Dimensions H x W x D (mm)
Dulcoclean UF eco 2	2,100	1	5 / 8	1,268 x 149 x 149
Dulcoclean UF eco 4	3,900	2	5 / 35	1,368 x 267 x 358

Filtration performance depends on the water quality and the water pressure upstream of the system. The filtration performance reduces with increasing filtration duration. The maximum filtration performance is based on a new and uncontaminated module.

Typical continuous filtration performance and pre-treatment by the Dulcoclean® UF eco 4 systems with different types of raw water:

Type of raw water	Recommended pre-treatment	Continuous filtration performance
Well water	< 300 µm pre-filtration, ultrafiltration	1,900 l/h
Well water close to the surface, without DOC	< 300 µm pre-filtration, ultrafiltration	1,200 – 1,600 l/h
Well water close to the surface, without DOC	< 300 µm pre-filtration, flocculation, ultrafiltration with CIP	1,200 – 1,600 l/h
Surface water	< 300 µm pre-filtration, flocculation + sand filtration, ultrafiltration with CIP	950 – 1,200 l/h

Electrical connection	230/115 V, 50/60 Hz, 12/24 V DC
Operating pressure	2.5 – 5.0 bar
Trans-membrane pressure max.	2.5 – 3.5 bar
Operating temperature	4 – 40 °C
Membrane type	Robust single bore PES UF membrane
Nominal pore size	15 nm

Complete solutions with perfectly matched pre- and post- treatment are also available on request.

Ultrafiltration Systems Dulcoclean® UF Range

This range is the all-purpose, compact ProMaqua model for modern drinking water treatment. These systems are equipped with very robust ultrafiltration membranes and are operated in an economical dead-end process. Compared to the cross-flow mode, this process requires significantly less water and energy. Backwashing processes are performed at regular intervals to prevent blockage of the modules. Adjusted to the raw water quality, cleaning is supported by the addition of chemicals as required. The system is controlled by a PLC. The system offers a high level of flexibility and operating safety, thanks to the wide range of different control options. Variations and changes in the raw water quality can thus be easily compensated for. All relevant events are detected electronically.

The Dulcoclean® UF range is suitable for the following values in feed water:

pH range	3.0 - 12.0
Free chlorine	max. 200,00 ppmh
Turbidity	0.5 - 30 NTU
DOC	0.5 - 12 mg/l
Suspended solids	50 mg/l

Deviating values influence the performance data and require a separate design of the system. Please contact our experts.

Plant	Filtration capacity* at a max. of 15 °C (m³/h)	Number of 8" membranes	Dimensions H x W x D (mm)
Dulcoclean UF 1	2.7 – 4.5	1	1,864 x 588 x 1,137
Dulcoclean UF 2	5.4 – 9.0	2	1,864 x 588 x 1,638
Dulcoclean UF 4	10.8 – 18.0	4	1,864 x 588 x 2,638

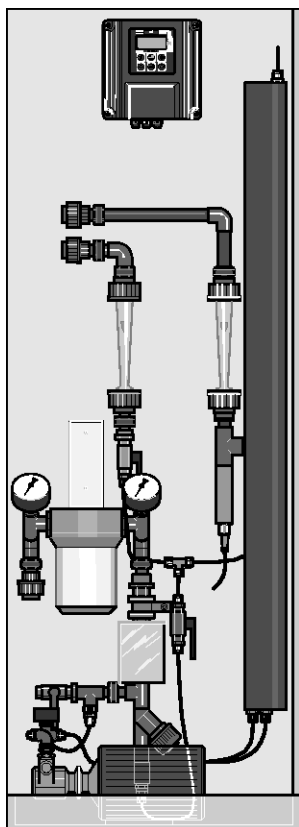
* Filtrate performance depends on the water quality

Systems with filtration capacity more than 18 m³/h are designed on a project basis. Offers are available on request. Please contact us.

Optionally available are a fully automatic neutralization system for the treatment of acid and alkaline back- wash water, an integrity test as well as customized data logging.

Dulcosmose® Reverse Osmosis Plants

Dulcosmose® Reverse Osmosis Plants, ecoPRO



Dulcosmose Reverse Osmosis systems ecoPRO range on PP rack:

Capacity range 100 – 1,500 l/h

This range is the cost-effective standard system for modern drinking water desalination. Equipped with the latest generation of "ultra low-pressure" membranes, these systems achieve maximum permeate capacity at low operating pressures, thereby ensuring reduced investment and running costs. The low operating pressures enable the systems to be fitted cost-effectively with PVC piping or piping with pressure hoses throughout.

The system sizes ecoPRO 600-1500 are additionally available with an integrated semi-automatic cleaning system and raw water flushing option. The semi-automatic cleaning system can also be simply retrofitted.

The ecoPRO 100-1500 range was designed for the following values in feed water:

pH range	3.0 ... 10.0
Silt density index max.	3
Free chlorine max.	0.1 mg/l
Total Fe, Mn max.	0.2 mg/l
Total hardness max.	0.1 °dH
Bacteria count max.	100 KBE/ml
Turbidity max.	0.5 NTU
COD max.	5 mg/l**

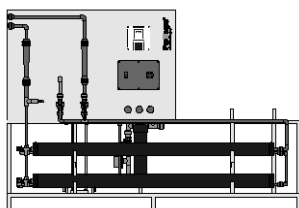
Plants with 2.5" and 4" membranes, salt rejection of the plants 90-95%

Plant	Permeate capacity at 15 °C temperature (l/h)	Number of 2.5" and 4" membranes	Connected load (kW)	Dimensions H x W x D (mm)	Max. salt content* (mg/l*)
ecoPRO 100	100	1	0.37	1,400 x 500 x 320	650
ecoPRO 200	200	2	0.55	1,400 x 500 x 320	650
ecoPRO 300	300	1	1.10	1,500 x 600 x 400	650
ecoPRO 550	550	2	1.10	1,500 x 600 x 400	650
ecoPRO 600	600	2	1.50	1,850 x 800 x 800	1,000
ecoPRO 900	900	3	1.50	1,850 x 800 x 800	1,000
ecoPRO 1200	1,200	4	1.50	1,850 x 800 x 800	1,000
ecoPRO 1500	1,500	5	2.20	1,850 x 800 x 800	1,000

* differing salinities affect the performance data accordingly

** as O₂

**Dulcosmose® Reverse Osmosis systems ecoPRO range on powder-coated steel rack;
capacity range 1,800 – 2,700 l/h**



This range is the standard model for modern drinking water desalination. Equipped with the latest generation of “ultra low-pressure” membranes, these systems guarantee maximum permeate output at low operating pressures and thus low investment and operating costs. The low operating pressures facilitate a cost-effective PVC piping. These systems are also available with an integrated semi-automatic cleaning system and with raw water flushing option.

The ecoPRO 1800-2700 range was designed for the following values in feed water:

Salt content max.	1,000 mg/l*
pH range	3.0 - 10.0
Silt density index max.	3
Free chlorine max.	0.1 mg/l
Total Fe, Mn max.	0.2 mg/l
Total hardness max.	0.1 °dH
Bacteria count max.	100 KBE/ml
Turbidity max.	0.5 NTU
COD max.	5 mg/l**

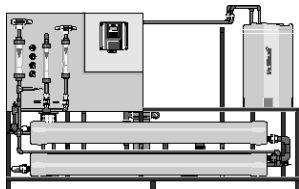
* differing salinities affect the performance data accordingly

** as O₂

Plants with 4” membranes, salt rejection of the plants 90-95%

Plant	Permeate capacity at 15 °C temperature (l/h)	Number of 4” membranes	Connected load (kW)	Dimensions H x W x D (mm)
ecoPRO 1800	1,800	6	2.2	1,750 x 2,500 x 750
ecoPRO 2400	2,400	8	2.2	1,750 x 2,600 x 750
ecoPRO 2700	2,700	9	2.2	1,800 x 3,500 x 750

Dulcosmose® Reverse Osmosis Plants, TW Range



This range represents the universal model for modern drinking water desalination. Equipped with the latest generation of "ultra low-pressure" membranes, these plants achieve maximum permeate capacity at low operating pressures, so ensuring reduced investment and running costs. The low operating pressures allow the use of cost-effective PVC pipework on these systems. In addition these plants are available with integrated semi-automated cleaning system and a permeate and raw water flushing option.

Special customized versions are possible with the TW range. Different pipework materials and different membrane types can be implemented, for increased salt rejection, for example. Measurement and control equipment, e.g. conductivity, redox potential or pH measurement, and dosing equipment (in pretreatment and post-treatment) can easily be integrated in these plants.

The TW range was designed for the following values in the feed water:

salt content max.	1,000 mg/l*
pH range	3.0 - 10.0
silt density index max.	3
free chlorine max.	0.1 mg/l
total Fe, Mn max.	0.2 mg/l
total hardness max.	0.1 °dH
bacteria count max.	100 KBE/ml
turbidity max.	0.5 NTU
COD max.	5 mg/l**

* differing salinities affect the performance data accordingly

** as O₂

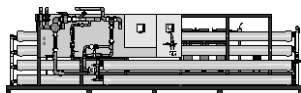
Plants with 8" membranes, salt rejection of the plants 90-95%

Plant	Permeate capacity at 15 °C temperature (l/h)	Number of 8" membranes	Connected load (kW)	Dimensions H x W x D (mm)
PRO 0300TW	3,000	3	3.0	1,800 x 4,000 x 1,000
PRO 0400TW	4,000	4	3.0	1,800 x 3,000 x 1,000
PRO 0500TW	5,000	5	4.0	1,800 x 4,000 x 1,000
PRO 0600TW	6,000	6	4.0	1,800 x 4,000 x 1,000
PRO 0700TW	7,000	6	7.5	1,800 x 4,000 x 1,000
PRO 0800TW	8,000	7	7.5	1,800 x 4,000 x 1,000
PRO 0900TW	9,000	7	7.5	1,800 x 4,000 x 1,000
PRO 1000TW	10,000	8	7.5	1,800 x 3,000 x 1,000
PRO 1100TW	11,000	9	11.0	1,800 x 4,000 x 1,000
PRO 1200TW	12,000	10	11.0	1,800 x 4,000 x 1,000
PRO 1300TW	13,000	11	11.0	1,800 x 4,000 x 1,000
PRO 1400TW	14,000	12	11.0	1,800 x 4,000 x 1,000
PRO 1500TW	15,000	12	11.0	1,800 x 4,000 x 1,000
PRO 2000TW	20,000	18	11.0	1,800 x 7,000 x 1,200
PRO 2500TW	25,000	24	15.0	1,800 x 7,000 x 1,200*
PRO 3000TW	30,000	28	18.5	1,800 x 7,000 x 1,200*
PRO 4000TW	40,000	34	22.0	1,800 x 7,000 x 1,200*
PRO 5000TW	50,000	48	22.0	1,800 x 7,000 x 1,200*

* separate cleaning tank

On request, these plants can also be supplied with different membrane types for other salt rejection, and with measurement and control equipment (conductivity, redox potential, pH measurement) and dosing equipment (in pretreatment and post-treatment).

Dulcosmose® Reverse Osmosis Plants, BW Range



This range represents the standard model for modern brackish water desalination. Equipped with the latest generation of "high rejection low-pressure" membranes, these plants achieve maximum permeate capacity at moderate operating pressures, so ensuring reduced investment and running costs. The ProMaqua® BW range of reverse osmosis plants are piped into PVC on the low-pressure side. The system pipework on the high-pressure side is fabricated in high-grade stainless steel, type DIN 1.4571. ProMaqua® stainless steel pipework systems are welded under shielding gas and root gas atmospheres (TIG) and then passivated in our own pickling bath.

In addition these plants are equipped with integrated semi-automated cleaning system and all permeate and raw water flushing options as standard.

The BW range was designed for the following values in the feed water:

salt content max.	5,000 mg/l*
pH range	3.0 - 10.0
silt density index max.	3
free chlorine max.	0.1 mg/l
total Fe, Mn max.	0.2 mg/l
total hardness max.	water must be chemically stabilized
bacteria count max.	100 KBE/ml
turbidity max.	0.5 NTU
COD max.	5 mg/l**

* Deviating salt contents have a corresponding influence on the performance data.

** as O₂

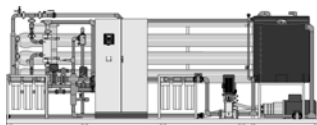
Plants with 8" membranes, salt rejection of the plants 95-98%

Plant	Permeate capacity at 15 °C temperature (l/h)	Number of 4" and 8" membranes	Connected load (kW)	Dimensions H x W x D (mm)
PRO 0200BW	2,000	9	4.0	1,800 x 3,500 x 750
PRO 0300BW	3,000	3	5.5	1,800 x 4,000 x 1,000
PRO 0400BW	4,000	4	5.5	1,800 x 3,000 x 1,000
PRO 0500BW	5,000	5	5.5	1,800 x 4,000 x 1,000
PRO 0600BW	6,000	6	7.5	1,800 x 4,000 x 1,000
PRO 0700BW	7,000	7	7.5	1,800 x 4,000 x 1,000
PRO 0800BW	8,000	8	11.0	1,800 x 4,000 x 1,000
PRO 0900BW	9,000	9	15.0	1,800 x 4,000 x 1,000
PRO 1000BW	10,000	10	15.0	1,800 x 4,000 x 1,000
PRO 1100BW	11,000	11	15.0	1,800 x 4,000 x 1,000
PRO 1200BW	12,000	12	15.0	1,800 x 5,000 x 1,000
PRO 1300BW	13,000	13	15.0	1,800 x 6,000 x 1,000
PRO 1400BW	14,000	14	15.0	1,800 x 5,000 x 1,000
PRO 1500BW	15,000	15	18.5	1,800 x 5,000 x 1,000
PRO 2000BW	20,000	21	18.5	1,800 x 6,000 x 1,200
PRO 2500BW	25,000	26	30.0	1,800 x 6,000 x 1,200*
PRO 3000BW	30,000	29	30.0	1,800 x 6,000 x 1,200*
PRO 4000BW	40,000	42	45.0	1,800 x 7,000 x 1,200*
PRO 5000BW	50,000	51	60.0	1,800 x 7,000 x 1,200*

* separate cleaning tank

On request, these plants can also be supplied with different membrane types for other salt rejection, and with measurement and control equipment (conductivity, redox potential, pH measurement) and dosing equipment (in pretreatment and post-treatment).

Dulcosmose® Reverse Osmosis Plants, SW Range



This range is the standard model for modern seawater desalination. Equipped with the latest generation of “high rejection low-pressure” membranes, these plants achieve maximum permeate capacity at moderate operating pressures, so ensuring reduced investment and running costs. The SW range of reverse osmosis plants is piped in PVC on the low-pressure side. Because of the high NaCl content, the system pipework on the high-pressure side is fabricated from extra high-grade, corrosion resistant stainless steel, type DIN 1.4539. Stainless steel pipework systems are welded under shielding gas and root gas atmospheres (TIG) and then passivated in our own pickling bath.

In addition these plants are equipped with integrated semi-automated cleaning system and all permeate and raw water flushing options as standard. As an option, the plants can be equipped with a system for energy recovery from the concentrate stream, where the latest generation of pressure exchangers are used.

The SW range was designed for the following values in the feed water:

Salt content max.	40,000 mg/l*
pH range	3.0 - 10.0
Silt density index max.	3
Free chlorine max.	0.1 mg/l
Total Fe, Mn max.	0.2 mg/l
Total hardness max.	water must be chemically stabilized
Bacteria count max.	100 KBE/ml
Turbidity max.	0.5 NTU
COD max.	5 mg/l**

* differing salinities affect the performance data accordingly

** as O₂

Plants with 4” and 8” membranes, salt rejection of the plants 99%

Plant	Permeate capacity at 15 °C temperature (l/h)	Number of 4” and 8” membranes	Connected load without energy recovery (kW)	Connected load with energy recovery (kW)	Dimensions H x W x D (mm)
PRO 0078SW	780	6	5.5		1,800 x 3,500 x 1,000
PRO 0185SW	1,850	3	15.0		1,800 x 4,000 x 1,000
PRO 0240SW	2,400	4	15.0		1,800 x 4,000 x 1,000
PRO 0300SW	3,000	5	18.5	11.2*	1,800 x 4,000 x 1,000
PRO 0360SW	3,600	6	18.5	14.7*	1,800 x 4,000 x 1,000
PRO 0490SW	4,900	8	30.0	18.7*	1,800 x 5,000 x 1,200
PRO 0610SW	6,100	10	37.0	18.7*	1,800 x 6,000 x 1,200
PRO 0730SW	7,300	12	41.0	22.2*	1,800 x 5,000 x 1,400
PRO 0920SW	9,200	15	75.0	26.2*	1,800 x 6,000 x 1,500
PRO 0980SW	9,800	16	75.0	27.7*	1,800 x 5,000 x 1,500
PRO 1230SW	12,300	20	75.0	41.2*	1,800 x 6,000 x 1,500**
PRO 1470SW	14,700	24	90.0	48.2*	1,800 x 7,000 x 1,500**
PRO 1840SW	18,400	30	110.0	66.2*	1,800 x 7,000 x 1,500**
PRO 2210SW	22,100	36	132.0	90.0*	1,800 x 7,000 x 1,500**
PRO 2580SW	25,800	42	150.0	105.0*	1,800 x 7,000 x 1,500**
PRO 2900SW	29,000	48	180.0	105.0*	1,800 x 7,000 x 1,500**

* Energy recovery by pressure exchanger technology

** Separate cleaning tank

On request, these plants can also be supplied with different membrane types for other salt rejection, and with measurement and control equipment (conductivity, redox potential, pH measurement) and dosing equipment (in pretreatment and post-treatment).

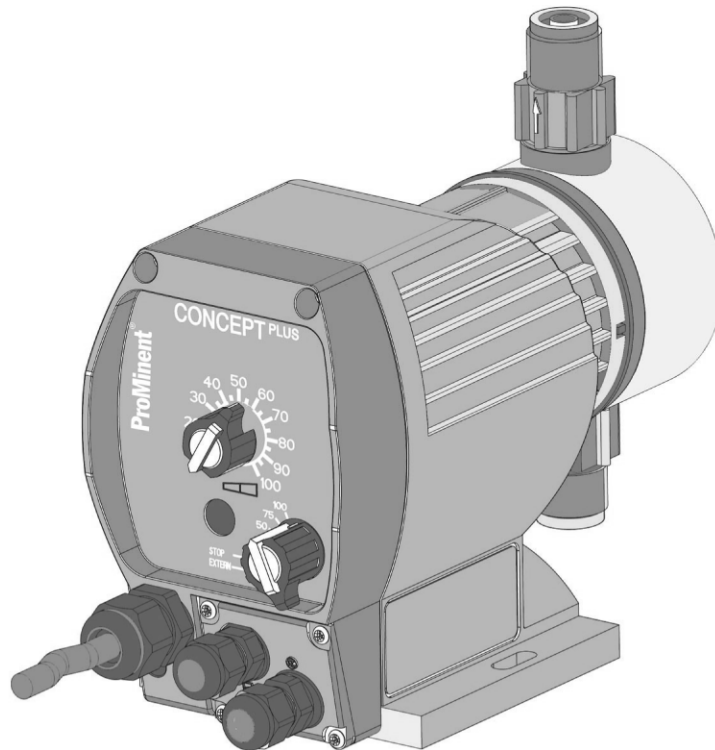
Pumps

ProMinent® Concept^{PLUS} Solenoid Diaphragm Metering Pumps

Overview: Concept^{PLUS}

Ideal for basic chemical feed applications

- Capacity range of 0.20 to 3.94 GPH (0.74 to 14.9 LPH) 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 (acrylic) and PVDF liquid ends
- Integral bleed valve simplifies priming and prevents "loss of prime"
- Common applications: Cooling towers, chlorination and metal finishing
- Optional chemical tank level indicator available
- Private labeling & colors available
- Certified to NSF/ANSI 61, NSF 50 pending



pk_1_005

Capacity Data

Pump Version	Capacity at Maximum Back Pressure					Max. Stroking Rate	Pre-Primed Suction Lift		Tubing Connectors O.D. x I.D. (in.)	Shipping Weight (approx.)	
	psig	(bar)	U.S. GPH	(L/h)	mL / stroke	spm	ft.	(m)		lbs.	(kg)
1000	145	(10)	0.20	(0.9)	0.07	180	20	(6)	1/4" x 3/16"	3.97	(1.8)
1602	232	(16)	0.40	(1.5)	0.10	240	20	(6)	1/4" x 3/16"	3.97	(1.8)
1003	145	(10)	0.70	(2.7)	0.19	240	16	(5)	1/4" x 3/16"	3.97	(1.8)
0704	101	(7)	1.00	(3.7)	0.36	180	13	(4)	1/4" x 3/16"	3.97	(1.8)
0705	101	(7)	1.40	(5.2)	0.38	240	13	(4)	1/4" x 3/16"	3.97	(1.8)
0308	43	(3)	2.25	(9.0)	0.79	180	20	(6)	3/8" x 1/4"	3.97	(1.8)
0215	21	(2)	3.94	(14.1)	1.40	180	5	(1.5)	3/8" x 1/4"	3.97	(1.8)

External pulse contact retrofit available as an option (P/N 1022000)

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 diaphragm with PTFE-coating.

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

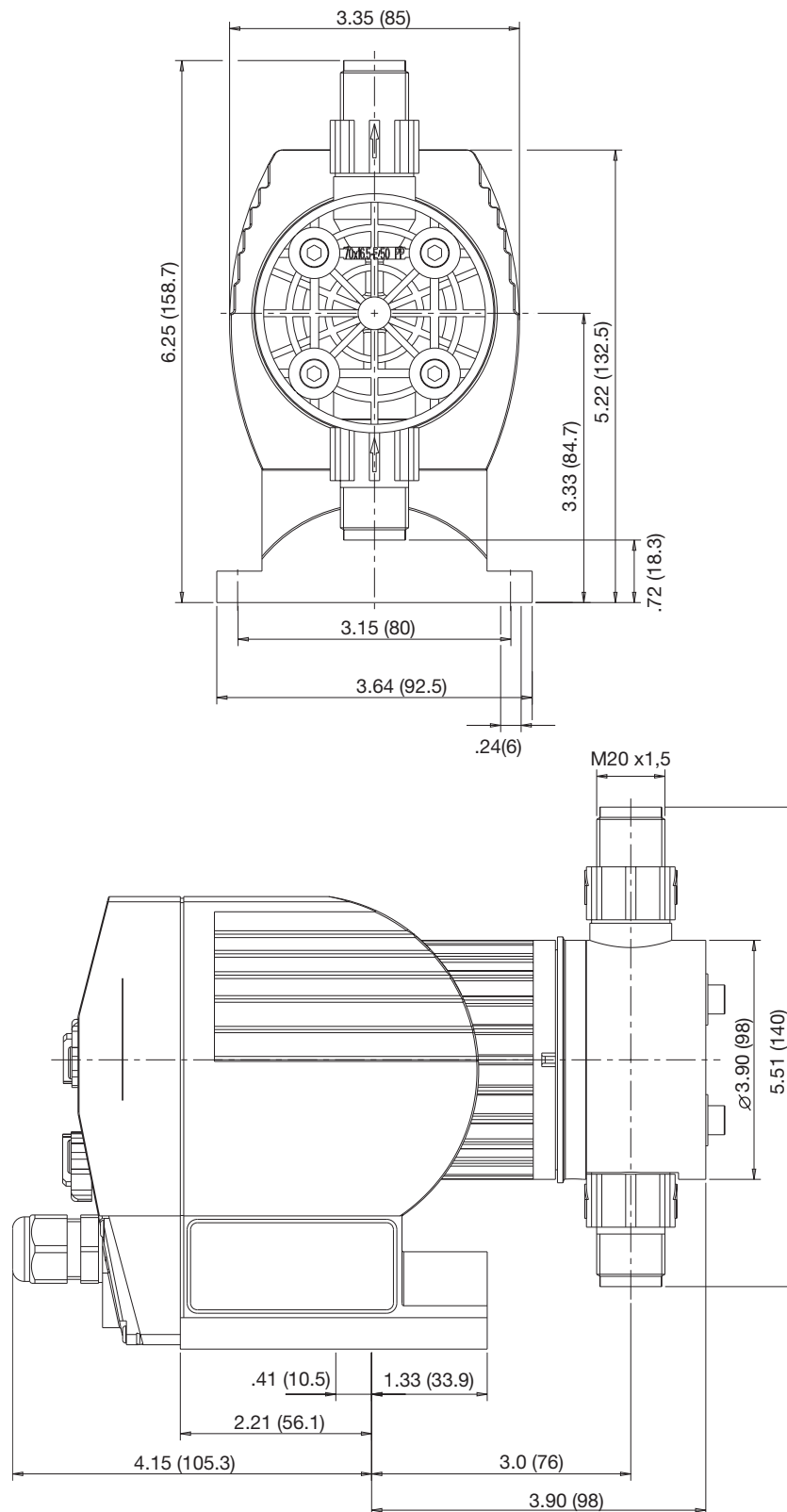
Identcode Ordering System

CNPa	Concept PLUS										
	Version:	Capacity:					Version:	Capacity:			
	1000	0.16 gph (0.6 l/h), 145 psi (10 bar)					0704	1.03 gph (3.9 l/h), 102 psi (7 bar)			
	1601	0.26 gph (1.0 l/h), 232 psi (16 bar)					0308	2.10 gph (8.0 l/h), 43.5 psi (3 bar)			
	1002	0.53 gph (2.0 l/h), 145 psi (10 bar)					0215	3.17 gph (13.5 l/h), 29 psi (1.5 bar)			
	Liquid end material:										
	PP	Polypropylene									
	NP	Acrylic/PVC									
	PV	PVDF									
	O-rings:										
	B	Viton/b									
	E	EPDM									
	T	PTFE									
	Liquid end version:										
	0	Without bleed valve, without valve springs									
	1	Without bleed valve, with valve springs									
	2	With bleed valve, w/o valve springs (except 0704 models)									
	3	With bleed valve, w/o valve springs									
	Connection:										
	0	Standard (in accordance with technical data)									
	B	Special connection 3/8" x 1/4"									
	Labeling:										
	0	Standard with logo									
	Electrical connection:										
	A	1 ph 230 V 50/60 Hz (Euro plug)									
	D	1 ph 115 V 50/60 Hz (US plug)									
	U	1 ph 230 V 50/60 Hz (US plug) (consult factory for pricing)									
	Control Option:										
	0	Standard (w/o external control)									
	B	Pulse control									
	Accessories:										
	1	With accessories (foot valve, injection valve, tubing)									
	Approval:										
	04	CSA									
CNPa	1000	PP	B	2	0	0	A	B	1	04	

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

- Capacity range 8.4 gph (32 l/h) max, 363 psi (25 bar) max
- External contact input for pulse control with a range of 1:64-64:1
- Continuous stroke length adjustment from 0-100% (recommended 30-100%)
- Supplied in Acrylic/PVC and PVDF
- 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 psi)
- 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, NSF 50 pending

ProMinent® solenoid-driven metering pumps consist of two main components: the pump drive unit and the liquid end. The beta series offers two drive (solenoid) sizes: beta/4 (BT4b) and the 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. It 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 the diaphragm is on. The diaphragm pushes into the dosing head cavity forcing 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 monitor can be used to stop the pump and indicate a problem.

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

Diaphragm

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

Specifications (Cont.)

Liquid End

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

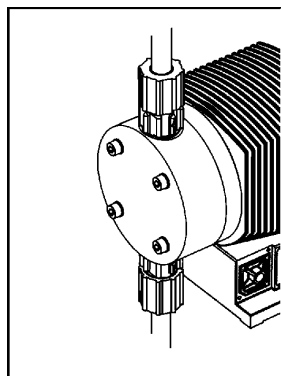
Some liquid ends are interchangeable between the BT4a and BT5a.

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

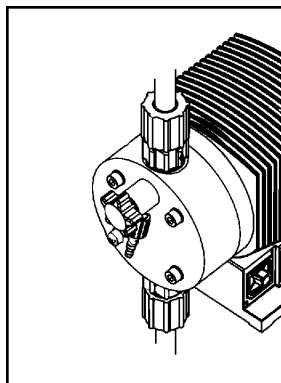
Automatic degassing liquid ends are available for PP and NP versions (except 1000 and 0232). This style liquid end discharges from the center and degasses from the top to prevent air build-up in the chamber.

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 so flooded suction is recommended.

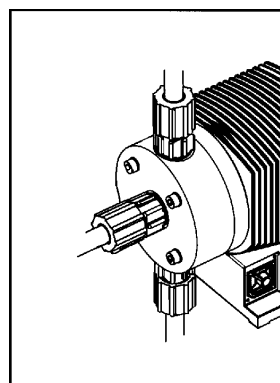
Suction and discharge parts are equipped with double ball check valves for superior repeatability.



Liquid end without bleed valve



Liquid end with bleed valve



Auto-degassing liquid end

Power Supply

The beta metering pumps accepts a universal 100-230 volt power supply $\pm 10\%$, 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.

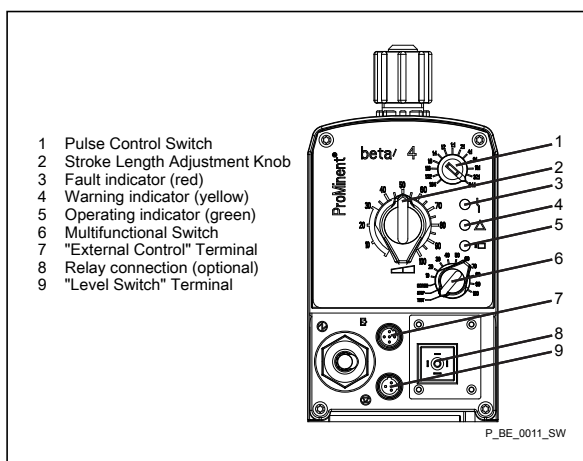
Fault Indicators

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



Specifications (Cont.)

<i>Maximum stroke length:</i>	0.05" (1.25 mm)		
<i>Materials of construction Housing:</i>	Fiberglass reinforced PPE		
<i>Diaphragm:</i>	PTFE-faced EPDM with plastic core		
<i>Liquid end options</i>	PVDF, Acrylic/PVC		
<i>Enclosure rating:</i>	(IP 65)		
<i>Motor insulation class:</i>	F		
<i>Power supply:</i>	100-230 VAC, 1 phase, 50/60 Hz, +/- 10%; 12-24 VDC or 24 VDC +/- 10%		
<i>Check valves:</i>	Double ball		
<i>Repeatability of the metering:</i>	When used according to operating instructions, ± 2% under constant conditions and at minimum 30% stroke length		
<i>Power cord:</i>	6 foot (2 m)		
<i>Relay Cable (optional):</i>	6 foot (2 m)		
<i>Relay load</i>			
<i>Fault relay only (options 1 & 3):</i>	Contact load: 250 VAC, 2 A, 50/60 Hz Operating life: > 200,000 switch functions		
<i>Fault and pacing relay (options 4 & 5):</i>	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: < 1 μ A Maximum current: < 100 mA Maximum voltage: 24 VDC Switch functions: 15x10 ⁹ Contact closure: 100 ms (for pacing relay)		
<i>Ambient temperature range:</i>	14 °F (-10 °C) to 113 °F (45 °C)		
<i>Max. fluid operating temperatures:</i>	Material Acrylic/PVC PVDF	Constant 113 °F (45 °C) 149 °F (65 °C)	Short Term 140 °F (60 °C) 212 °F (100 °C)
<i>Average power drain at maximum stroking rate (Watts) / current drain at pump stroke (Amps)</i> <i>BT4b:</i> <i>BT5b:</i>	17W / 0.7 A or 15 A (peak current for approx. 1 ms) 22 W / 1.0 A or A (peak current for approx. 1 ms)		
<i>Service factor:</i>	1.15		
<i>Warranty:</i>	2 years on drive, 1 year on liquid end		
<i>Industry standards:</i>	UL recognized, CE available for USA and Canada, NSF/ANSI 61		
<i>Valve threads:</i>	Metric thread for PP, NP, PVT and TT versions. 1/2" MNPT connections are available in all materials		
<i>Standard Production Test:</i>	All pumps are tested for capacity at maximum pressure prior to shipment		
<i>Max. solids size in fluid:</i>	Pumps with 1/4" valves: 15 μ – Pumps with 1/2" valves: 50 μ		
<i>Controlling contact (pulse):</i>	With voltage free contact, or with semiconductor sink login 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, and will not remember.		
<i>Necessary contact duration:</i>	20 ms		
<i>Recommended Viscosity:</i>	Max. 200 cPs for standard liquid end Max. 500 cPs for valve with springs Max. 50 cPs for auto-degassing metering pumps Max. 3000 cPs for high viscosity		

Capacity Data

Pump Version	Capacity at Max Backpressure				Capacity at 1/2 Max Backpressure				Pre-Primed Suction Lift (m)	Max. Stroking Rate spm	Tubing Connectors ² O.D. x I.D. inches	Shipping Weight (higher weights are for SS) lbs. (kg)	
	psig (bar)	U.S. GPH (L/h)	mL/stroke		psig (bar)	U.S. GPH (L/h)	mL/stroke						
BT4b													
1000	145	(10)	0.19 (0.74)	0.07	73	(5)	0.21 (0.82)	0.08	19.6	(6)	180	1/4 x 3/16	6.4-7.9 (2.9-3.6)
2001 ³	290	(20)	0.29 (1.1)	0.10	145	(10)	0.37 (1.40)	0.13	19.6	(6)	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 (1.40)	0.13	19.6	(6)	180	1/4 x 3/16	6.4-7.9 (2.9-3.6)
2002 ³	290	(20)	0.58 (2.2)	0.19	145	(10)	0.66 (2.5)	0.24	19.6	(6)	180	1/4 x 3/16	6.4-7.9 (2.9-3.6)
1602	232	(16)	0.58 (2.2)	0.19	116	(8)	0.66 (2.5)	0.24	19.6	(6)	180	1/4 x 3/16	6.4-7.9 (2.9-3.6)
1604	232	(16)	1.0 (3.8)	0.33	116	(8)	1.13 (4.3)	0.40	19.6	(6)	180	1/2 x 3/8	6.8-8.6 (3.1-3.9)
0708	101	(7)	1.9 (7.1)	0.66	50.5	(3.5)	2.22 (8.4)	0.78	19.6	(6)	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)	180	1/2 x 3/8	6.8-8.6 (3.1-3.9)
0220	29	(2)	5.0 (19.0)	1.76	14.5	(1)	5.52 (20.9)	1.94	6.5	(2)	180	1/2 x 3/8	7.3-9.7 (3.3-4.4)
BT5b													
2504 ³	363	(25)	0.77 (2.9)	0.27	181	(12.5)	0.97 (3.7)	0.34	19.6	(6)	180	8 x 4 mm	9.9-11.7 (4.5-5.3)
1008	145	(10)	1.8 (6.8)	0.63	73	(5)	2.19 (8.3)	0.76	19.6	(6)	180	1/2 x 3/8	9.9-11.7 (4.5-5.3)
0713	101	(7)	2.9 (11.0)	1.02	50.5	(3.5)	3.46 (13.1)	1.21	13.1	(4)	180	1/2 x 3/8	9.9-11.7 (4.5-5.3)
0420	58	(4)	4.5 (17.1)	1.58	29	(2)	5.04 (19.1)	1.77	9.8	(3)	180	1/2 x 3/8	10.4-12.8 (4.7-5.8)
0232 ¹	29	(2)	8.4 (32.0)	2.96	14.5	(1)	9.56 (36.2)	3.35	6.5	(2)	180	1/2 x 3/8	11.2-14.6 (5.1-6.6)
With auto-degassing liquid ends													
BT4b													
1601	232	(16)	0.16 (0.59)	0.06	116	(8)	0.21 (0.80)	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 (1.74)	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)	.95 (3.6)	0.33	8.8	(2.7)	180	1/2 x 3/8	6.8 (3.1)
0708	101	(7)	1.74 (6.6)	0.61	50.8	(3.5)	1.98 (7.5)	0.69	6.5	(2.0)	180	1/2 x 3/8	6.8 (3.1)
0413	58	(4)	2.8 (10.8)	1.00	29	(2)	3.3 (12.6)	1.17	6.5	(2.0)	180	1/2 x 3/8	6.8 (3.1)
0220	29	(2)	4.3 (16.2)	1.50	14.5	(1)	4.7 (18.0)	1.67	6.5	(2.0)	180	1/2 x 3/8	7.3 (3.3)
BT5b													
1008	145	(10)	1.66 (6.3)	0.58	73	(5)	1.98 (7.5)	0.69	9.8	(3)	180	1/2 x 3/8	9.9 (4.5)
0713	101	(7)	2.77 (10.5)	0.97	51	(3.5)	3.2 (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)

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

Note: Universal control cable necessary for external Beta control.

Materials In Contact With Chemicals

	Pump Head	Suction/Pressure Connector	O-rings	Balls
PPE ⁵	Polypropylene	Polypropylene	EPDM	ceramic
PPB ⁵	Polypropylene	Polypropylene	Viton [®]	ceramic
NPE ^{4,5}	Acrylic	PVC	EPDM	ceramic
NPB ^{4,5}	Acrylic	PVC	Viton [®]	ceramic
PVT ⁴	PVDF	PVDF	PTFE	ceramic
TTT	PTFE with carbon	PTFE with carbon	PTFE	ceramic
SST	316 stainless steel	316 stainless steel	PTFE	ceramic
NPT ⁴	Acrylic	PVDF	PTFE	ceramic
PPT	Polypropylene	Polypropylene	PTFE	ceramic

⁴ NSF/ANSI 61 approved

⁵ Only available in self de-gassing models

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

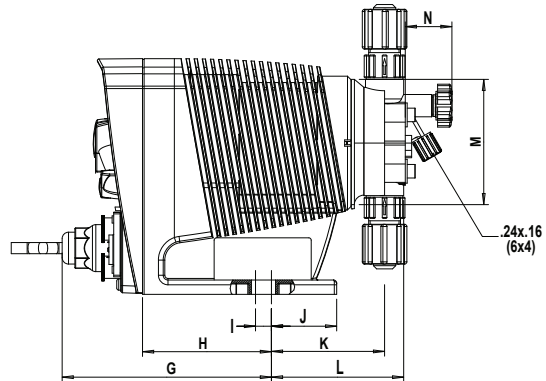
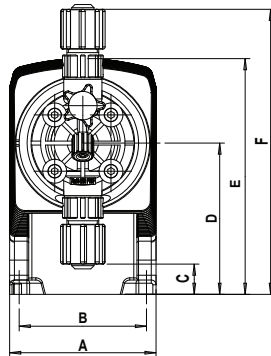
Identcode Ordering System

BT4b	Beta 4b										Beta 5b									
	Version:	Capacity:								Version:	Capacity:								Version:	Capacity:
	1000	0.20 gph (0.74 l/h), 145 psi (10 bar)								1604	0.95 gph (3.60 l/h), 232 psi (16 bar)								2504	0.77 gph (2.90 l/h), 362 psi (25 bar)
	2001	0.25 gph (0.96 l/h), 290 psi, (20 bar)								0708	1.88 gph (7.10 l/h), 101 psi (7 bar)								1008	1.80 gph (6.80 l/h), 145 psi (10 bar)
	1601	0.29 gph (1.10 l/h), 253 psi (17.5 bar)								0413	3.25 gph (12.30 l/h), 58 psi (4 bar)								0713	2.91 gph (11.00 l/h), 101 psi (7 bar)
	2002	0.45 gph (1.70 l/h), 290 psi (20 bar)																	0420	4.52 gph (17.10 l/h), 58 psi (4 bar)
	1602	0.58 gph (2.2 l/h), 253 psi (17.5 bar)																	0232	8.45 gph (32.00 l/h), 29 psi (2 bar)
Liquid end material:																				
		PP	Polypropylene/PVDF, for version self-degassing Polypropylene/Polypropylene																	
		NP	Acrylic glass/PVDF, for version self-degassing Acrylic glass/PVC																	
		PV	PVDF/PVDF																	
		TT	PTFE/PTFE																	
		SS	Stainless steel 1.4404/1.4404																	
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																	
		S	Diaphragm additionally with FPM coating for siliceous media																	
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																	
		9	Self-degassing for PP, NP only, not for types 1000 and 0232																	
Hydraulic connections:																				
		0	Standard according to technical data																	
		5	Connector for 12/6 hose, delivery side only																	
		9	Connector for 10/4 hose, delivery side only																	
Version:																				
		0	Standard																	
Logo:																				
		0	With ProMinent® logo																	
Power supply:																				
		U	100-230 V ± 10%, 50/60 Hz																	
Cable and plug:																				
		A	2 m European																	
		B	2 m Swiss																	
		C	2 m Australian																	
		D	2 m USA																	
		1	2 m, open-ended																	
Relay:																				
		0	No relay																	
		1	Fault indicating relay, normally energized, 1 x changeover contact 230 V - 2 A																	
		3	Fault indicating relay, normally de-energized, 1 x changeover contact 230 V - 2 A																	
		4	As 1 + pacing relay 2 x normally open contacts 24 V - 100 mA																	
		5	As 3 + pacing relay 2 x normally open contacts 24 V - 100 mA																	
Accessories:																				
		0	No accessories																	
		1	With foot and dosing valve, 2 m PVC suction tubing, 5 m PE discharge tubing																	
Control type:																				
		0	No lock																	
		1	With lock: manual operation locked when external cable plugged in																	
Control variants:																				
		0	Standard																	
Options on request:																				
		00	No options																	
BT4b	1000	PP	E	0	0	0	0	U	A	0	0	0	0	0	0					

Dimensional Drawings

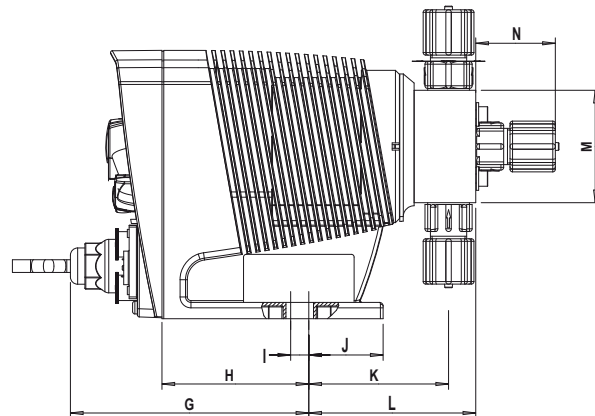
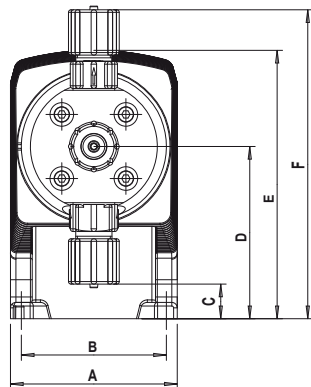
Dimensions in inches (mm).

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® Sigma/ 1 Motor Diaphragm Metering Pumps

Overview: Sigma/ 1

Ideal for Economical mid-range applications

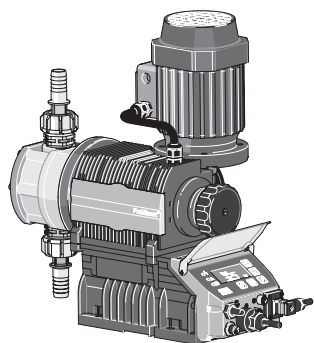
The ProMinent® Sigma/ 1 is a mechanically actuated diaphragm metering pump. It has a capacity range of 5.3-38 gph (20-144 l/h) at a max. back pressure of 174-58 psi (12-4 bar). The pump capacity is adjusted by varying the stroke length (4 mm) in 1% steps via a self locking adjusting knob.

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

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

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

All PVDF versions are NSF/ANSI 61 approve.



Sigma/ 1 Basic Type (S1Ba)

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

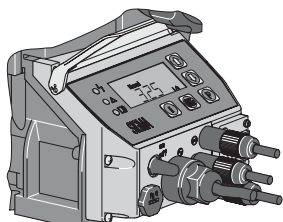
Different flanges are available so that customers can use their own motor to drive the pump.

Sigma/ 1 Control Type (S1Ca)

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

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

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



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

Standard Modes and Functions

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

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

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

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

Control Modes

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

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

Standard Functions

“Calibrate”

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

“Auxiliary Frequency”

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

“Flow”

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

“Float Switch”

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

“Pause”

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

“Stop”

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

“Prime”

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

Functions and Error Indicators

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

Optional Modes and Functions

Optional Control Modes

“Analog” Mode

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

“Contact” Mode with Pulse Control

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

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

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

For example:

Step-up Factor:

99.99 1 pulse = 99.99 pump strokes

10 1 pulse = 10 pump strokes

Step-down Factor:

0.25 4 pulses = 1 pump stroke

0.01 100 pulses = 1 pump stroke

“Batch” Mode

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

Access Code

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

Relay outputs

Fault annunciating relay

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

Fault annunciating and Pacing relay

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

4-20 mA Analog Output

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

Timer Relay

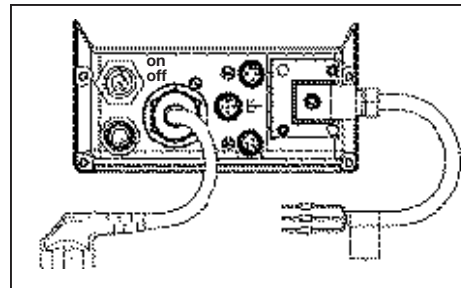
The optional integrated 2-week timer offers 81 programmable events. It can be set to hourly, daily work days, weekend, weekly or two-week periods with switch-on times from 1 second to two weeks. The timer can be programmed to change operation mode, frequency and the function of two relays. All the functions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

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

Fieldbus connection

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

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



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

Specifications

General

<i>Maximum stroke length:</i>	0.16" (4.0 mm)		
<i>Power cord:</i>	6 foot (2 m) 2 wire + ground (supplied on control versions)		
<i>Stroke frequency control:</i>	S1Ba: Constant speed or optional DC/SCR drive or AC inverter S1Ca: Microprocessor control version with innovative start/stop and variable speed control proportional to set frequency or external control signal.		
<i>Stroke counting:</i>	Standard on S1Ca		
<i>Materials of construction</i>			
<i>Housing:</i>	Glass-filled Luranyl™ (PPE)		
<i>Wetted materials of construction:</i>	Liquid End:	PVDF	316 SS
	Suct./Dis. Connectors:	PVDF	316 SS
	Seals:	PTFE/Viton®	PTFE/Viton®
	Check Balls:	Cermaic	SS
	Pressure Relief Valves:	PVDF/Viton® O-rings	SS/Viton® O-rings
<i>Drive:</i>	Cam and spring-follower (lost motion)		
<i>Lubrication:</i>	Sealed grease lubricated bearings and gearing		
<i>Warranty:</i>	Two years on drive, one year on liquid end		
<i>Factory testing:</i>	Each pump is tested for rated flow at maximum pressure		
<i>Industry Standard:</i>	CE approved, CSA available (standard in Canada), NSF/ANSI 61		
<i>Diaphragm materials:</i>	PTFE faced EPDM with Nylon reinforcement and steel core		
<i>Liquid end options:</i>	Polyvinylidene Fluoride (PVDF) or 316 SS, with PTFE faced Viton® seals		
<i>Check valves:</i>	Single ball check, PVDF and SS versions Optional springs available (Hastelloy C4)		
<i>Repeatability:</i>	When used according to the operating instructions, better than ± 2%		
<i>Max. fluid operating temperatures:</i>	Material	Constant (Max. Backpressure)	Short Term (15 min. @ max. 30 psi)
	PVDF	149 °F (65 °C)	212 °F (100 °C)
	316 SS	194 °F (90 °C)	248 °F (120 °C)
<i>Diaphragm failure indication:</i>	Optional, see accessories. Switch is N.C., opens to indicate failure. Switch rated 250 VAC, 0.3 A inductive or 0.5 A resistive; 30 VDC, 1.0 A resistive. Required minimum 21 psig (1.5 bar) backpressure on pump. N.O. switch available upon request. Includes double diaphragm leak prevention.		
<i>Max. solids size in fluid:</i>	0.3 mm		
<i>Stroke length adjustment:</i>	Manual, in increments of 1%. Motorized stroke length adjustment available.		
Sigma/ 1 Basic Version			
<i>Motor:</i>	See available motors in identity code		

Specifications (Cont.)

Sigma/ 1 Control Version

<i>Control Function:</i>	At stroke frequencies equal to or greater than 33%, the integral AC variable frequency drive continuously varies the motor speed in a linear response to the incoming signal. At stroke frequencies less than 33%, the motor starts and stops according to a control algorithm to provide the desired stroke frequency. In the start-stop mode the motor speed is constant at approximately 580 RPM
<i>Enclosure rating:</i>	NEMA 3 (IP 55)
<i>Motor data:</i>	Totally enclosed, fan cooled (IP 55); class F insulation; IEC frame; 1/8 HP (0.09 kW) 230 V, 3 phase (0.7 A)
<i>Relay load</i>	
<i>Fault relay only (options 1 & 3):</i>	Contact load: 250 VAC, 2A, 50/60 Hz Operating life: > 200,000 switch functions
<i>Fault and pacing relay (options 4 & 5):</i>	Contact load: max. 24 V, AC/DC, max. 100 mA Max. 50x10 ⁶ switch cycles @ 10 V, 10 mA
<i>Analog output signal:</i>	Max. impedance 300 W Isolated 4-20 mA output signal
<i>Profibus – DP field bus options:</i>	Transfer: RS – 485 Wiring: 2-wired, twisted, shielded Length: 3637 ft. (1200 m)/328 ft. (100 m) Baudrate: 9600 bits/s; 12 Mbits/s No. of participants: 32 with 127 repeaters Topology: Line Access procedure: Master/master with token ring
<i>Relay cable (optional):</i>	6 foot (2 m) 3 wire (SPDT) 250 VAC, 2A
<i>Pulse contact/remote pause contact:</i>	With voltage-free contact, or semiconductor sink logic control (not source logic) with a residual voltage of <700 mV. The contact load is approximately 0.5 mA at + 5 VDC. (Note: Semiconductor contacts that require >700 mV across a closed contact should not be used).
<i>Max. pulse frequency:</i>	25 pulses/sec
<i>Contact impedance:</i>	10 kOhm
<i>Max. pulse memory:</i>	65,535 pulses
<i>Necessary contact duration:</i>	20ms
<i>Analog – current input burden:</i>	Approximately 120 Ohm
<i>Max. allowable input current:</i>	50 mA
<i>Power requirements:</i>	Single phase, 115-230 VAC ± 10%, 50/60 Hz

Capacity Data

Sigma/1 Basic Version

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

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

Sigma/1 Control Version

Technical data:	60 Hz operation Capacity at Maximum Pressure				Max. Stroke Rate	Output per Stroke	Max. Suction Lift	Max. Suction Pressure	Suction/Discharge Connector		*Shipping Weight w/Motor
Pump Version	psig	(bar)	U.S. (L/h)	GPH	Stroke/min.	mL/stroke	(water) ft. (m)	psig (bar)	DN	in.	(approx.) lbs. (kg)
S1Ca HM											
12017 PVT	145	(10)	5.3	(20)	90	4	23 (7)	14.5 (1)	10	1/2 MNPT	19.8 (9)
12017 SST	174	(12)	5.3	(20)	90	4	23 (7)	14.5 (1)	10	3/8 FNPT	26.5 (12)
12035 PVT	145	(10)	11.1	(42)	170	4	23 (7)	14.5 (1)	10	1/2 MNPT	19.8 (9)
12035 SST	174	(12)	11.1	(42)	170	4	23 (7)	14.5 (1)	10	3/8 FNPT	26.5 (12)
10050 PVT	145	(10)	13.2	(50)	200	4	23 (7)	14.5 (1)	10	1/2 MNPT	19.8 (9)
10050 SST	145	(10)	13.2	(50)	200	4	23 (7)	14.5 (1)	10	3/8 FNPT	26.5 (12)
10022 PVT	145	(10)	6.8	(26)	90	5.1	19.6 (6)	14.5 (1)	10	1/2 MNPT	19.8 (9)
10022 SST	145	(10)	6.8	(26)	90	5.1	19.6 (6)	14.5 (1)	10	3/8 FNPT	26.5 (12)
10044 PVT	145	(10)	14	(53)	170	5.1	19.6 (6)	14.5 (1)	10	1/2 MNPT	19.8 (9)
10044 SST	145	(10)	14	(53)	170	5.1	19.6 (6)	14.5 (1)	10	3/8 FNPT	26.5 (12)
07065 PVT	102	(7)	17.2	(65)	200	5.1	19.6 (6)	14.5 (1)	10	1/2 MNPT	19.8 (9)
07065 SST	102	(7)	17.2	(65)	200	5.1	19.6 (6)	14.5 (1)	10	3/8 FNPT	26.5 (12)
07042 PVT	102	(7)	13.2	(50)	90	9.7	9.8 (3)	14.5 (1)	15	3/4 MNPT	21 (9.5)
07042 SST	102	(7)	13.2	(50)	90	9.7	9.8 (3)	14.5 (1)	15	1/2 FNPT	29.8(13.5)
04084 PVT	58	(4)	26.7	(101)	172	9.7	9.8 (3)	14.5 (1)	15	3/4 MNPT	21 (9.5)
04084 SST	58	(4)	26.7	(101)	172	9.7	9.8 (3)	14.5 (1)	15	1/2 FNPT	29.8(13.5)
04120 PVT	58	(4)	31.7	(120)	200	9.7	9.8 (3)	14.5 (1)	15	3/4 MNPT	21 (9.5)
04120 SST	58	(4)	31.7	(120)	200	9.7	9.8 (3)	14.5 (1)	15	1/2 FNPT	29.8 (13.5)

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

Note: Universal control cable necessary for external Sigma control. (see [page138](#))

Materials In Contact with Chemicals

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

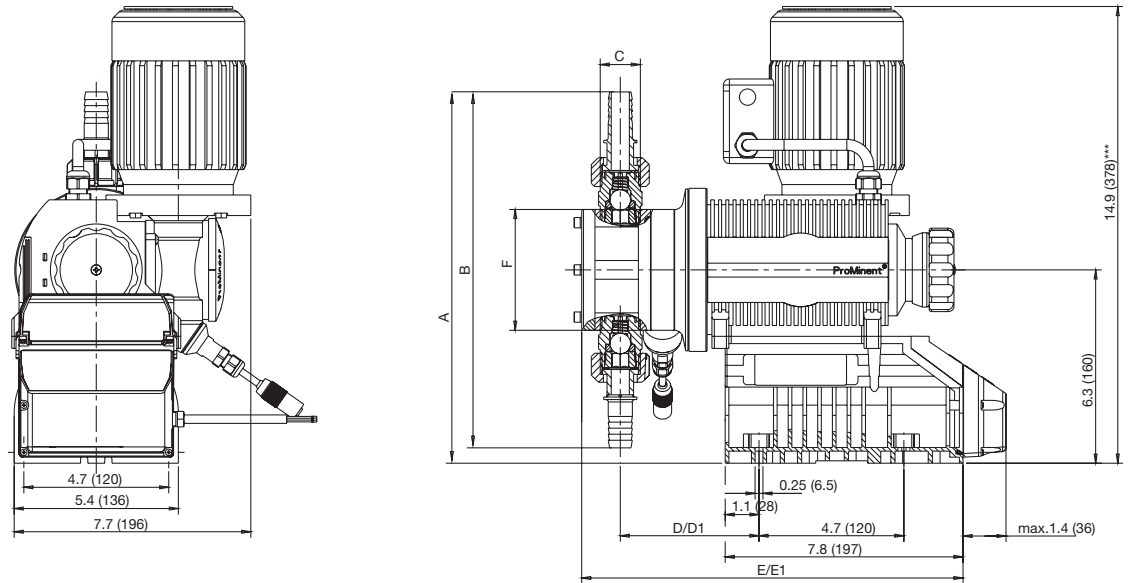
Ordering System (S1Ba)

S1Ba	Drive Type:												
	H	Main Drive, Diaphragm											
		Version: Capacity:											
		12017*	5.2 gph (20 l/h), 174 psi (10 bar)	07065	20.6 gph (78 l/h), 102 psi (7 bar)								
		12035*	11.1 gph (42 l/h), 174 psi (10 bar)	07042	13.2 gph (50 l/h), 102 psi (7 bar)								
		10050	15.8 gph (60 l/h), 145 psi (10 bar)	04084	26.7 gph (101 l/h), 58 psi (4 bar)								
		10022	6.8 gph (26 l/h), 145 psi (10 bar)	04120	38 gph (144 l/h), 58 psi (4 bar)								
		10044	14 gph (53 l/h), 145 psi (10 bar)										* For PVDF versions. Max. 145 psig NOTE: Refer to technical data for capacities and stroke rates
		Liquid end material:											
		PV	PVDF										
		SS	316 Stainless Steel										
		Seal material:											
		T	PTFE										
		Diaphragm type:											
			0	Standard diaphragm									
			1	With double diaphragm and failure monitor (NC contact opens on fault)									
		Liquid end version:											
			0	Without valve springs									
			1	With 2 valve springs (Hastelloy C4, 1 psig)									
		Connectors:											
			7	PVDF clamping nut & insert									
			8	SS clamping nut & insert									
		Labeling:											
			0	Standard with logo									
		Voltage supply:											
			S	3 ph, 230 V/400 V, 50/60 Hz									
			M	1 ph, AC, 230 V, 50/60 Hz									
			N	1 ph, AC, 115 V 60 Hz									
			K	90 VDC Permanent magnet									
			3	Explosion Proof**									
		Enclosure rating:											
			0	Standard									
		Stroke sensor:											
			0	Without stroke sensor (Standard)									
			2	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 moto 4-20 mA, 230 V 50/60 Hz									
			6	W/ stroke positioning motor 4-20 mA, 115 V 50/60 Hz									
		** EXPLOSION PROOF MOTOR (INCLUDING MOUNTING FLANGE):											
		1) pn. 7500344 1/3 HP, single ph, AC, 115 V, 60 Hz, EPFC (class 1 Group C & D or class 2 Group F & G T3B)											
		2) pn 7746261 1/2 HP, 3 ph, 1D, 208-230/460 VAC EPFC (class 1 Group C & D or class 2 Group F & G T3B)											
S1Ba	H	12017	PV	T	0	0	7	0	S	0	0	0	

Identcode Ordering System (S1Ca)

S1Ca	Drive Type																
S1Ca	H	Main Drive, Diaphragm	Version: Capacity:														
			12017*	5.2 gph (20 l/h), 145 psi (10 bar)	07065	17.2 gph (65 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	13.2 gph (50 l/h), 145 psi (10 bar)	04084	26.7 gph (101 l/h), 58 psi (4 bar)	* For PVDF versions. Max. 145 psig										
			10022	6.8 gph (26 l/h), 145 psi (10 bar)	04120	31.7 gph (120 l/h), 58 psi (4 bar)	NOTE: Refer to technical data for capacities and stroke rates										
			10044	14 gph (53 l/h), 145 psi (10 bar)													
			Liquid end material:														
			PVT	PVDF with PTFE gasket													
			SST	316 Stainless Steel with PTFE gasket													
			Diaphragm type:														
			A	Safety diaphragm w/ pump stop fuction													
			S	Safety diaphragm w/ visual indicator													
			Liquid end version:														
			0	Without valve springs													
			1	With 2 valve springs (Hastelloy C4, 1 psig)													
			Connectors:														
			7	PVDF clamping nut & insert													
			8	SS clamping nut & insert													
			Labeling:														
			0	Standard with logo													
			Voltage supply:														
			U	1 ph, 115-230 V ± 10%, 50/60 Hz													
			Cable and plug with 6 ft (2 m) power cord, single phase:														
			A	European plug, 230 V													
			D	N. American plug, 115 V													
			U	N. American plug, 230 V													
			Relay:														
			0	Without relay													
			1	Fault annunciating relay, drops out													
			3	Fault annunciating relay, pulls in													
			4	Option 1 + pacing relay													
			5	Option 3 + pacing relay													
			C	4-20 mA output, drops out													
			D	4-20 mA output, pulls in													
			E	4-20 mA output, pacing relay													
			Control variant:														
			0	Manual + External with pulse control (multiplier/divider)													
			1	Manual + External with pulse controls & analog control													
			4	Option 0 + Timer													
			5	Option 1 + Timer													
			P	Option 1 + Profibus (Relay must be 0)													
			Access Code:														
			0	No access code													
			1	Access code													
			Flow monitor:														
			0	Input for metering monitor signal (pulse)													
			1	Input for maintained flow switch signal													
			Stroke length adjustment:														
			C	Manual + Calibration													
			S1Ca	H	12017	PVT	A	0	7	0	U	A	0	0	0	0	C

Dimensional Drawing: (S1Ba)



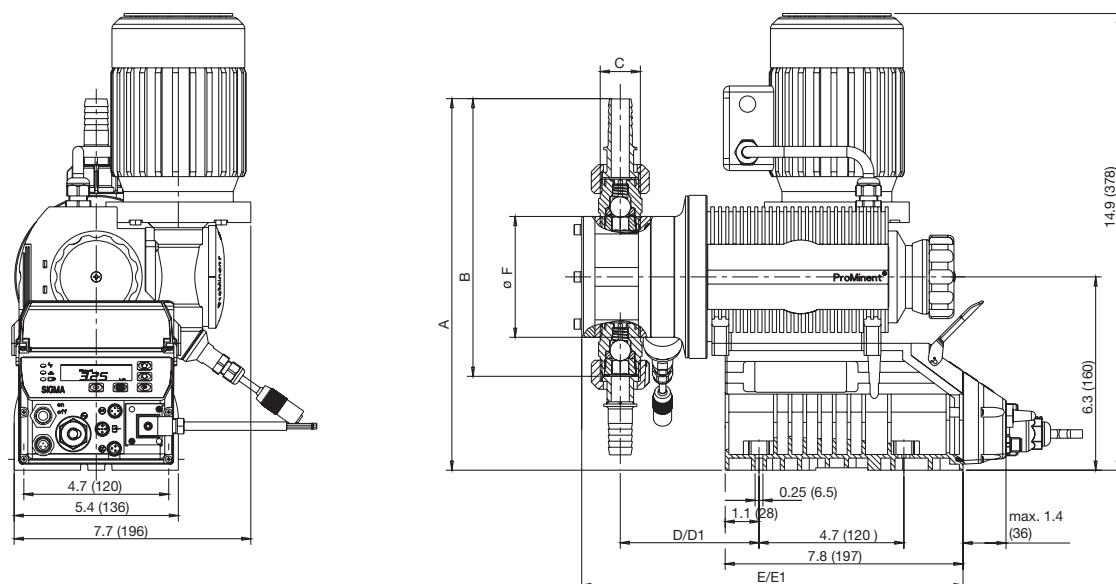
Type Sigma/ 1	A	B	Suction / Discharge Valve Thread C*	D	D1**	E	E1**	F
12017, 12035, 10050, 10022, 10044, 07065 PVT	11 (279)	9.38 (238)	1/2" MNPT	3.54 (90)	4.33 (110)	10.8 (275)	11.6 (295)	3.8 (96)
SST	9.75 (24*)	7.13 (181)	3/8" FNPT	3.5 (89)	4.29 (109)	10.8 (275)	11.6 (295)	3.8 (96)
07042, 04084, 04120 PVT	11.38 (289)	10 (254)	3/4" MNPT	3.74 (95)	4.52 (115)	11.2 (285)	12 (305)	4.8 (122)
SST	10.25 (260)	8.13 (206)	1/2" FNPT	3.7 (94)	4.48 (114)	11.2 (285)	12 (305)	4.8 (122)

* Piping adapters provided according to technical data

** Dimensions with diaphragm failure detector

*** Dimensions may vary depending on motor installed.

Dimensional Drawing: (S1Ca)



Dimensions in inches (mm)

Type Sigma/ 1	A	B	Suction / Discharge Valve Thread C*	D	D1**	E	E1**	F
12017, 12035, 10050, 10022, 10044, 07065 PVT	11 (279)	9.38 (238)	1/2" MNPT	3.54 (90)	4.33 (110)	10.8 (275)	11.6 (295)	3.8 (96)
SST	9.75 (24*)	7.13 (181)	3/8" FNPT	3.5 (89)	4.29 (109)	10.8 (275)	11.6 (295)	3.8 (96)
07042, 04084, 04120 PVT	11.38 (289)	10 (254)	3/4" MNPT	3.74 (95)	4.52 (115)	11.2 (285)	12 (305)	4.8 (122)
SST	10.25 (260)	8.13 (206)	1/2" FNPT	3.7 (94)	4.48 (114)	11.2 (285)	12 (305)	4.8 (122)

* Piping adapters provided according to technical data

** Dimensions with diaphragm failure detector

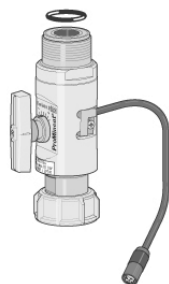
Pump & Systems Accessories

Metering Monitors

Adjustable metering monitor "Flow Control"

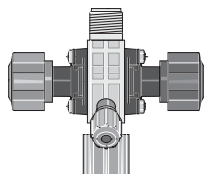
Supplied with connection cable for assembly directly to liquid end. Monitors individual strokes according to the float and orifice principles. The partial quantity of chemical flowing past the float is adjusted from the total stroke volume via the adjusting screw so that an alarm is actuated if the flow falls below 20%. The user can select the number of incomplete strokes permitted (between 1 and 125) in accordance with the actual process requirements

For Sigma HM with connection cable for assembly to liquid end.



Flow Control	Material	Pump type	Part No.
Flow Control type II (Sigma/ 1)	PVDF, EPDM	12017, 10022, 12035, 10044	1021168
		10050, 07065	
	PVDF, Viton® B	12017, 10022, 12035, 10044	1021169
Flow Control type III (Sigma/ 1)	PVDF, EPDM	07042, 04084, 04120, 12050	1021170
		12090, 12130	
	PVDF, Viton® B	07042, 04084, 04120, 12050	1021171
		12090, 12130	

Multifunction valve



ProMinent's multifunction valve is operated by means of smooth-action rotary knobs which automatically return to their initial position when released. Made of PVDF, it can be used in feed systems for virtually all chemicals. The multifunction valve is mounted directly on the liquid end of the pump for backpressure, antisiphon, pressure relief, priming and draining the discharge line. The inlet thread is female M20 x 1.5 and the discharge is male M20 x 1.5.

ProMinent's multifunction valve has the following functions:

- Backpressure valve, opening pressure approximately 22 psi (1.5 bar)
- Relief valve, opening pressure approximately 87, 145 or 232 psi (6, 10 or 16 bar)
- Admission aid in exiting backpressure, no need to de-pressurize pipes
- Pressure relief, e.g. prior to servicing

Warning: Backpressure valves are not intended as completely sealed units!

Materials in contact with chemicals:

Valve body	PVDF
Diaphragm	PTFE-coated
O-rings	Viton® or EPDM
DN 10 adapter	PVC

Technical data:

Type	Relief opening pressure	Application range by size	Part No.
Size I	145 psi (10 bar)	Beta b type 100, 1601,	791715
Size I	87 psi (6 bar)	1602, 1605, 1005, 1008, 0708, 0413, 0220	1005745
Size II (M20 x 1.5)	145 psi (10 bar)	Beta b type 1605, 1008,	792203
Size II	87 psi (6 bar)	0713, 0420, 0232	740427
Size III (DN 10)	145 psi (10 bar)		792215

Note: Multifunction valves mounted to stainless steel liquid ends require below adapters.

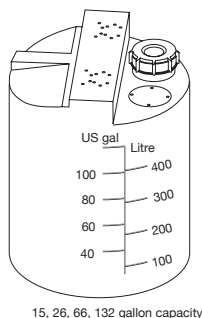
* Cannot adjust pressure; fixed factory setting.

Connector Set for SS version pumps

Adapter with o-rings, for use with SS2 liquid ends: 1/4" MNPT x Male M20 x 1.5 adapter, PVDF	7358651
Adapter with o-rings, for use with SS2 liquid ends: 3/8" MNPT x Male M20 x 1.5 adapter, PVDF	7358659

Tanks

Chemical Tanks



Made of translucent UV-stabilized polyethylene, with gallon/liter 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 gallon	(liter)	O.D. in.	(mm)	Height in.	(mm)	Empty Weight lb.	(kg)	Part No.
15	(60)	18	(445)	22	(559)	11	(5.0)	791994
26	(100)	20	(500)	30	(760)	17	(7.7)	1001490
78	(296)	26	(661)	43	(1100)	37	(17)	1023175
132	(500)	32	(820)	47	(1190)	54	(24.5)	791997
220	(830)	42	(1067)	41	(1041)	55	(25.0)	7809688
300	(1100)	43	(1092)	59	(1499)	70	(31.7)	7809687

Note: Pump mounting kit needed for all tanks (Part No. 7500124)

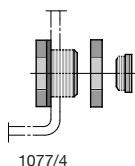
Accessories

Lock and key for screw on cap

200683

PVC tank drain fitting with plug

1/2" FNPT as an additional connection for chemical tanks. To be used as an open drain with plug or for addition of optional 1/2" ball valve fitting. Fits 1" opening.



PVC with Viton® seal
PVC with EPDM seal

Part No.
7809755
7744374

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
PVC with EPDM seal

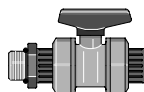
7000300
7744375

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
PVC with EPDM seal

7000309
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
PVC with EPDM seal

7741668
7741485

Acid fume separator

Acid fume separator SDA-90 filled with 0.7 l of acid-absorbing granules for absorption of hydrochloric acid fumes.

Connection: DN 25 PP coupling with G 1/2" union nut.

	Part No.
Acid fume separator	1009987
Replacement pack of absorbent material 0.7 L	1010500

Reactor chamber vent valve

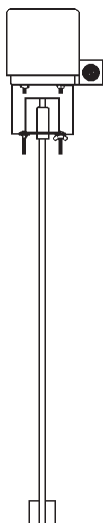
Vent valve for reactor space, adjustable, instead of vent line, which is led to open air (already included in standard delivery package on CDVb).

	Part No.
Reactor chamber vent valve	791801

Mixers

Electric mixers

Fig. 1



Note: with any tank-mounted mixer, the inertia of fluid rotating in 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.

For U.S. only.

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

Motor: 1/20 HP, 1550/1725 PFM, 115 VAC, 60 Hz, 1ph., 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

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.

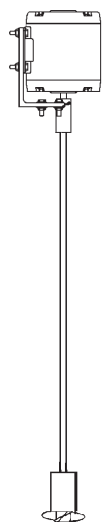
Shaft: 316 SS shaft/propeller. Shaft length: 36" (may be cut down for smaller tanks)

Mount: Bracket with bolt holes, for mounting directly on tank top.

Shipping weight: 27 lbs. (12 kg) 7818592

Shaft only (36" replacement) 7744506

Fig. 2



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

Motor: 1/3 HP, 60 PRM, 115 VAC, 50/60 Hz, 1ph., 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 15 gallon tanks:

Polyethylene flange adapter for mounting mixers to metric flange.

Includes all necessary hardware.

7744385

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

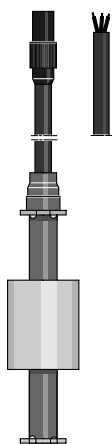
Polyethylene flange adapter for mounting mixer to metric flange.

Includes all necessary hardware.

7744319

*(Other mixers available upon request)

Float Switches



2380/4

Float switches, two stage Float switch, two-stage: for beta

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

To monitor the fluid level in the chemical tank. Two-stage function, first stage is early warning annunciation, second stage will shut down pump after an additional drop in the fluid level of approximately 1.2" (30mm).

Technical data:

Max. contact load 60 V, 0.3 A, 5 w/5 VA, temperature range -13 °F to 167 °F (-25 °C to 75 °C).

Materials:

PP body, foamed PP float 7/8" (21 mm) dia., PE cable

PP with 3-pole round connector	cable length	6 ft. (2 m)	7142093
		15 ft. (5 m)	7142095

PVC body, foamed PP float 7/8" (21 mm) dia., PE cable

PVC with 3-pole round connector	cable length	6 ft. (2 m)	7142043
		15 ft. (5 m)	7142038

PVDF body, foamed PVDF float 1" (25 mm) dia., PE cable

PVDF with 3-pole round connector	cable length	6 ft. (2 m)	7792639
		15 ft. (5 m)	7792640

Ceramic weight for float switch

1.53" dia. x 1.26" with oval opening .51" x 1.06"

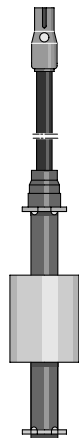
(39 mm x 32 mm) (13 mm x 27 mm) 404004

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 applications (e.g. hydrofluosilicic acid).



1086/4



2820/4

Float switches, single stage Float switch, single-stage: for Concept^{PLUS}

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

For minimum level indication with simultaneous shutdown of the metering pump.

Technical data:

Max. contact load 60 V, 0.3 A, 5 W/5 VA, temperature range -13 °F to 167 °F (-25 °C to 75 °C).

Materials:

PP body, foamed PP float 7/8" (21 mm) dia., PE cable

PP with flat connector	cable length	6 ft. (2 m)	790412
		15 ft. (5 m)	790470

PVC body, foamed PP float 7/8" (21 mm) dia., PE cable

PVC with flat connector	cable length	6 ft. (2 m)	790414
		15 ft. (5 m)	790468

PVDF body, foamed PVDF float 1" (25 mm) dia., PE cable

PVDF with flat connector	cable length	6 ft. (2 m)	790416
		15 ft. (5 m)	790472

Ceramic weight for float switch

1.53" dia. x 1.26" with oval opening .51" x 1.06"

(39 mm x 32 mm) (13 mm x 27 mm) 404003

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



1086/4

PVC weight

For bottom of foot valve for fluoride applications

7404007

For fluoride, (hydrofluosilicic acid) or when plastic is required to replace standard ceramic weight.

Float Switches (cont.)



Float switches, two stage for Sigma Control pumps

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

To monitor the fluid level in the chemical tank. Two-stage function, first stage is early warning annunciation, second stage will shut down pump after an additional drop in the fluid level of approximately 1.2" (30 mm).

Technical data:

Max. contact load 60 V, 0.3 A, 5 W/5 VA, temperature range -13 °F to 167 °F (-25 °C to 75 °C).

Materials:

Part No.

PP body, foamed PP float 7/8" (21 mm) dia., PE cable

PP with 3-pole round connector	cable length	6 ft. (2 m)	7142093
		15 ft. (5 m)	7142095

PVC body, foamed PP float 7/8" (21 mm) dia., PE cable

PVC with 3-pole round connector	cable length	6 ft. (2 m)	7142043
		15 ft. (5 m)	7142038

PVDF body, foamed PVDF float 1" (25 mm) dia., PE cable

PVDF with 3-pole round connector	cable length	6 ft. (2 m)	7142006
		15 ft. (5 m)	7142007



Float switches, two stage for Sigma basic pumps

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

For minimum level indication in source tank. May be used to stop pump at motor starter or variable speed drive, or trigger alarm. May be used with relay combination.

Technical data:

Max. contact load 60 V, 0.3 A, 5 W/5 VA, temperature range -13 °F to 167 °F (-25 °C to 75 °C).

Materials:

Part No.

PP body, foamed PP float 7/8" (21 mm) dia., PE cable

PP with 2 loose cable ends	cable length	15 ft. (5 m)	790412
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PVC body, foamed PP float 7/8" (21 mm) dia., PE cable

PVC with 2 loose cable ends	cable length	15 ft. (5 m)	790468
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PVDF body, foamed PVDF float 1" (25 mm) dia., PE cable

PVDF with 2 loose cable ends	cable length	15 ft. (5 m)	790472
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Float switch weights

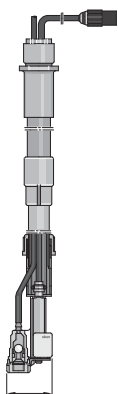
PVC weight

For bottom of foot valve for fluoride applications.

7404007

For fluoride, (hydrofluosilicic acid) or when plastic is required to replace standard ceramic weight.

Suction Assemblies



2798/R

Suction assemblies, two-stage: for Beta 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: EPDM o-rings, PE suction line

PVC version: Viton® o-rings, PVC suction line

Adjustable PP suction assembly, with bulkhead fitting for 1" opening and 2 stage float switch

For ProMinent pumps with PP foot valve, PE suction hose, PP supporting pipe and union. PP two-stage float switch with 3-pole round connector. **Adjustable length (foot valve to bulkhead)**

26" to 41" (660 mm to 1040 mm) for 26 – 220 gallon (140 – 830 L) tanks

Requires 1.0" hole in top of tank for bulkhead fitting PP version.

Suction line

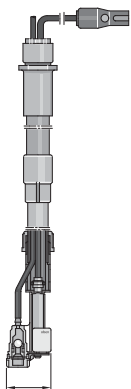
1/4" x 3/16"

1/2" x 3/8"

Part No.

790368

790370



2798/F

Suction assemblies, two-stage: for Concept^{PLUS}

Including foot valve, rigid supporting pipe, suction line and float switch with 6 ft. (2 m) cable. For use in drums or tanks with mixers, which could tangle flexible suction tubing or float switch cables.

PP version: EPDM o-rings, PE suction line

PVC version: Viton® o-rings, PVC suction line

Adjustable PP suction assembly, with bulkhead fitting for 1" opening and single-stage float switch for tank.

With PP foot valve, PE suction hose, PP supporting pipe and union. PP single-stage float switch with flat connector. **Adjustable length**

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

Suction line

1/4" x 3/16"

1/2" x 3/8"

Part No.

790368

790370

PVC Version

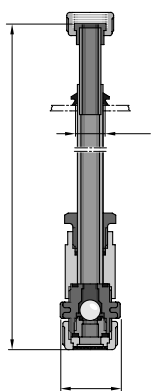
1/4" x 3/16"

1/2" x 3/8"

790350

790352

Suction Assemblies (cont.)



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

2801/3

Suction assemblies: for Sigma Basic

PP without float switch

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

PVC without float switch

Size of connection		Max. tank size gallons (liters)	Max. length inches (mm)	Part No.
PVC-DN 10 – 1/2"	Sigma	220 (830)	Up to 52" (1320)	790387
PVC-DN 15 – 3/4"	Sigma	220 (830)	Up to 52" (1320)	790391
PVC-DN 32 – 1-1/2"	Sigma	-	-	1005525

Float switch for rigid suction assemblies

PP, two-stage with round connector for S1Ca pumps

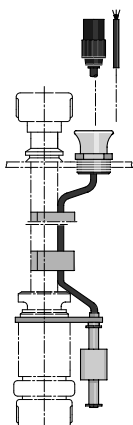
The float switch set can be ordered together with the suction assemblies 1/2" and 3/4".

3-pole round connector 10 ft. (3 m) cable 790321

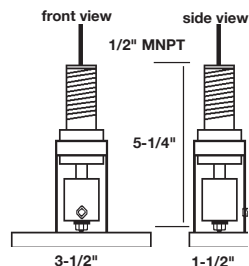
PVC, two-stage with round connector for S1Ca pumps

The float switch set can be ordered together with the suction assemblies 1/2" and 3/4".

3-pole round connector 10 ft. (3 m) cable 790318



Diaphragm-failure Detector



Diaphragm-failure detector

To trip an alarm and/or switch the metering pump off in case of a failure, fluid drains out a weep hole in the back plate, through a tube to the detector column. The float switch in the columns trips with 10 mL of fluid. Comprising of a float switch PVC/PE, clear PVC column, tube connectors and connecting tube. Switch closure, max. contact rating 60 VAC, 300 mA, 5 W. 1/2" MNPT conduit connection. Shipped with loose ends on cable.

N/O

7803640

N/C

7803650

For processing the alarm signal from the level switch we recommend the relay combination Part No. 914769.5 with wall-mounted plastic housing and 2 change-over relays.



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

Universal Switchover Box

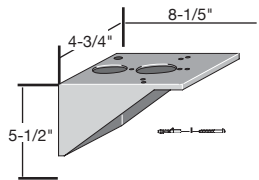
Two Pump Universal Switchover Box

Part No.

Automatically backup protection for ProMinent microprocessor based electronic metering pumps. Accepts Manual, 4-20 mA Analog, or External contact modes of operation, and can switch operation back and forth between two metering pumps based on an external dry contact opening and closure. Pumps must be equipped with an alarm relay output. The unit is equipped with a 120 VAC power cord and a weatherproof duplex receptacle for metering pumps power. Specify controls mode of metering pumps when ordering (e.g. Remote 4-20 mA analog pacing or water meter contact pacing).

7951130

Pumps and Stands



pk_1_092

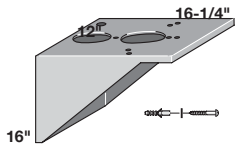
Wall mounting bracket for solenoid pumps

Part No.

Made of fiberglass-reinforced PPE, with wall-plugs and screws, accepting a beta metering pump. Pumps can be mounted either parallel or perpendicular to the wall.

PPE wall mounting bracket

810164

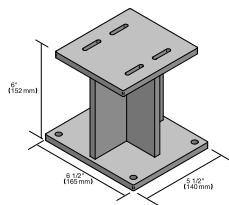


pk_1_092

Wall mounting bracket for Sigma

Polypro wall bracket mounts pumps so that diaphragm is parallel to the wall

7803799

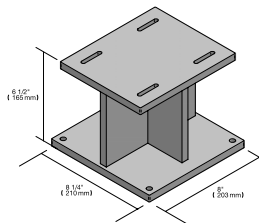


Floor mounting bracket for solenoid pumps

Polypropylene floor mounting bracket accepts pumps parallel to the floor.

6" PP floor mounting bracket

1028758



Floor mount bracket for Motor pumps

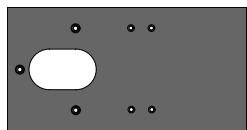
Polypropylene floor mounting bracket accepts pumps parallel to the floor.

6-1/2" PP floor mounting bracket

7028759

10" PP floor mounting bracket

1028760



pk_1_121

Adapter plate

With fixtures, for vertical wall-mounting of beta pumps with auto-degassing liquid ends. Used with PPE wall console.

PP adapter plate

1003030