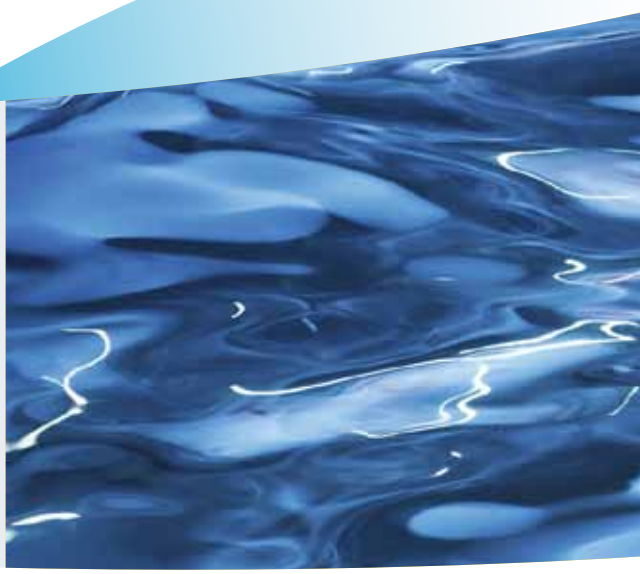
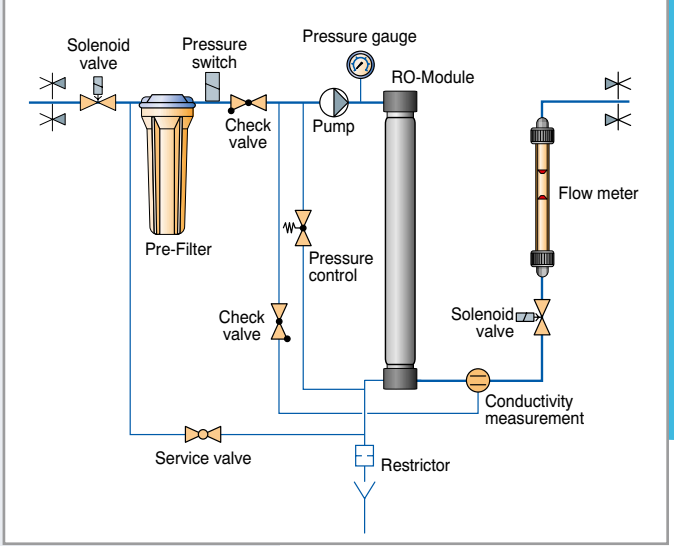
evoqua
WATER TECHNOLOGIES



PROTEGRA CS™ RO SERIES

MEETING ALL YOUR PURE WATER DEMANDS
RO AND RO EDI SYSTEMS



PROTEGRA CS™ RO SERIES FLOWSHEET

A CONVINCING PERFORMANCE

MULTI-PURPOSE PURITY – REVERSE OSMOSIS EQUIPMENT

Laboratory, medical and industrial applications all need pure water in various qualities and quantities.

The Protegra CS™ RO Series produces pure water for a wide variety of applications by reversing the natural osmosis process to deionize water in an environmentally friendly manner. Pure water produced via reverse osmosis can be put to a number of uses in laboratories – for rinsing laboratory glassware or as feed water to autoclaves, climatized cabinets and ultrapure water systems.

The Protegra CS™ RO Series focuses on economic efficiency, combining a compact design with high quality components and intelligent controls. The quality of the pure water produced depends on the quality of the inlet water entering the system.

Protegra CS™ RO Series

The Protegra CS™ RO Series series is designed to produce large amounts of purified water with conductivity values depending on the salt content of the feed water (for example 1000 µS/cm tap water quality: < 20 µS/cm product water). The deionizaton rate is at least 98 %. Additional equipment, such as different tank sizes and pressure pumps, can be added to the plant according to customers' individual needs. The system can, for instance, be set up as a central water treatment plant with in a building and supplemented with accessories to form a closed circuit pipeline.

All systems are equipped with an RS 232 interface.

We would be happy to recommend the right system for you!

TYPICAL APPLICATIONS

Protegra CS™ RO Series:

- Feed for laboratory ultrapure water systems
- general chemistry
- laboratory washing machines
- water for autoclaves and environmental chambers
- buffer preparation

PROTEGRA CS™ RO SERIES

		200	500	750	1000
Permeate output at 15°C	l/h	200	500	750	1000
Salt rejection rate	%	98	98	98	98
Recovery rate max.	%	75	75	75	75
Operating pressure max.	bar	14	14	14	14
Power consumption	kW/h	0.55	0.55	1.6	1.6
Dimension: H/W/D	mm	1650 x 600 x 600			1650 x 600 x 750
Catalog Number		**W3T199617**	**W3T197521**	**W3T199222**	**W3T199821**

Systems > 1000 l/h available upon request.

A HIGHLY PERFECTED TECHNOLOGY

REVERSE OSMOSIS INCLUDING EL-ION™ ELECTRO-DEIONIZATION MODULE

Consistently high water quality without the use of chemicals.

The combination of Protegra CS™ RO Series with the El-Ion™ electro-deionization module significantly improves the quality of the pure water. The Protegra CS™ RO/EDI Series are available with either a single stage or a two-stage El-Ion™ electro-deionization module. Our systems are distinguished by their ability to produce a consistent level of pure water quality, reaching conductivity values less than 0.1 µS/cm in a single stage plant and below 0.07 µS/cm in a two-stage plant.

PROTEGRA CS™ RO/EDI SERIES, EL-ION™ SINGLE-STAGE MODULE

		120	260	500	750
Pure water output at 15°C	l/h	120	260	500	750
Pure water quality	µS/cm	< 0.5	< 0.5	< 0.5	< 0.5
Typical pure water quality	µS/cm	< 0.1	< 0.1	< 0.1	< 0.1
Recovery rate max.	%	75	75	75	75
Operating pressure max.	bar	14	14	14	14
Power consumption	kW/h	0.6	0.75	1.5	1.7
Dimensions H x W x D	mm	1650 x 600 x 600		1650 x 600 x 750	
Catalog Number		**W3T200007**	**W3T199823**	**W3T200009**	**W3T198152**

PROTEGRA CS™ RO/EDI SERIES, EL-ION™ TWIN-STAGE MODULE

		120	260	500	750
Pure water output at 15°C	l/h	120	260	500	750
Pure water quality	µS/cm	< 0.1	< 0.1	< 0.1	< 0.1
Typical pure water quality	µS/cm	< 0.07	< 0.07	< 0.07	< 0.07
Recovery rate max.	%	75	75	75	75
Operating pressure max.	bar	14	14	14	14
Power consumption	kW/h	0.6	0.75	1.5	1.7
Dimensions H x W x D	mm	1650 x 600 x 600		1650 x 600 x 750	
Catalog Number		**W3T199822**	**W3T199619**	**W3T200008**	**W3T197525**

Protegra CS™ RO/EDI Series

The TOC content is less than 30 ppb. The special layout of the separate bed process and the associated shift in pH value towards the acidic reduces the bacterial count and prevents bacterial growth in the cell. No other system works more efficiently or more economically, as the EI-Ion™ module only has a 10 % loss rate. This is a particularly inexpensive system in terms of operating costs, and maintenance is minimal. And the compact cabinet design means that our system is at home in the smallest of spaces. All plants are equipped with an RS 232 interface.

Dosing systems are available to conditioning the feed water according to the inlet water specification. Please contact us fpr details with your water analysis.

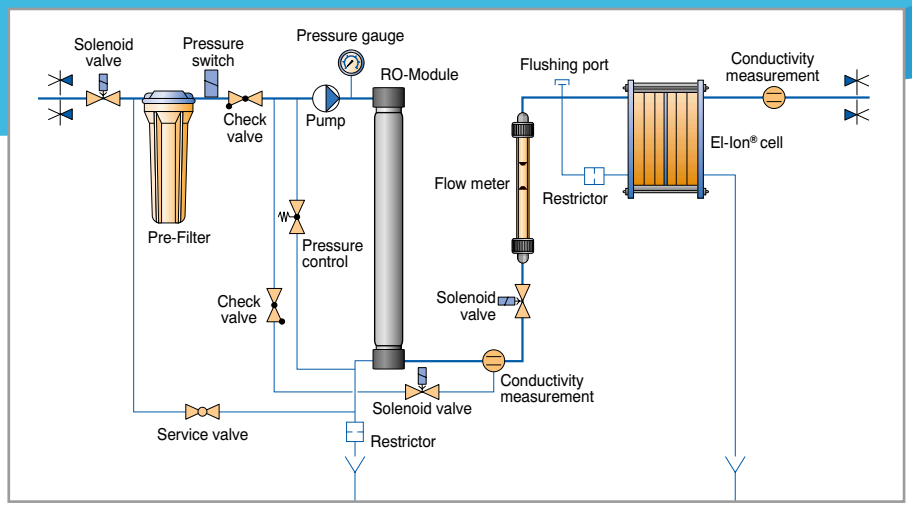
Please contact us if your feed water ist reaching the listed max. values in this feed water specification.

Degassing systems are available to reduce the CO_2 amount in your feed water which is protecting the EI-Ion™ cell

PROTEGRA CS™ RO/EDI SERIES

		120	260	500	750
Feed water specifications					
Pressure	bar	1 – 5	1 – 5	1 – 5	1 – 5
Conductivity	µS/cm	1400	1400	1400	1400
Colloid Index SDI		< 3	< 3	< 3	< 3
Free Choline	mg/l	0.5	0.5	0.5	0.5
Fe	mg/l	0.1	0.1	0.1	0.1
CO_2 max.	mg/l	15	15	15	15
SiO_2.	mg/l	15	15	15	15
Temerature	°C	5 -35	5 -35	5 -35	5 -35
Hardness	°dH	0	0	0	0

This specifications are for single and twin-stage systems



PROTEGRA CS™ RO/EDI SERIES FLOWSHEET

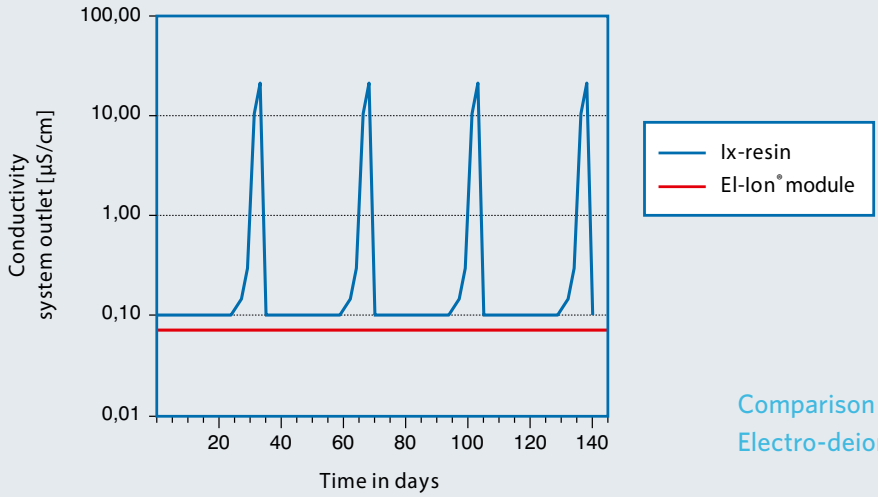
TYPICAL APPLICATIONS

Protegra CS™ RO/EDI Series:

- Feed for ultrapure water systems
- general chemistry
- laboratory washing machines including final rinse
- feed for autoclaves and environmental chambers
- buffer preparation
- photometry
- spectrophotometry
- general chemical analysis
- media preparation
- protein electrophoreses
- microbiological media preparation
- cytology and histology work
- electrophoreses

FIELDS OF USE :

- Microbiology
- Electronics
- Optics
- Semiconductor
- Pharmaceuticals
- Chemistry
- Clinical
- Power Plant
- Glass Industry
- Galvanic Industry



Comparison Ix-Resin / Electro-deionization

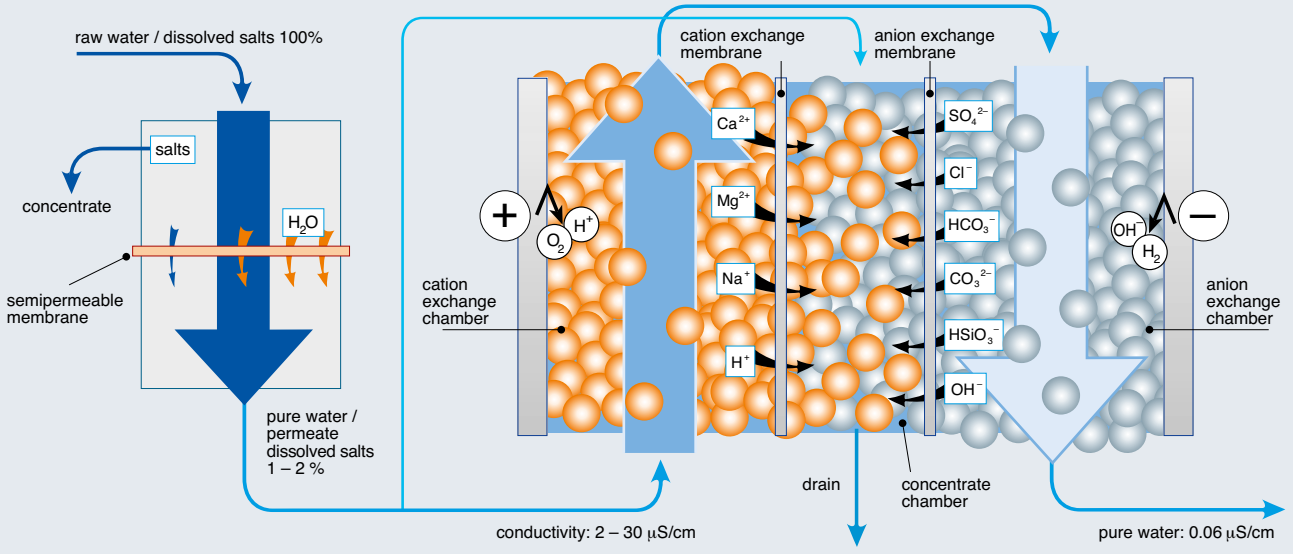
THE PRINCIPLE BEHIND

THE EL-ION™ ELECTRO-DEIONIZATION MODULE

The EI-Ion™ electro-deionization module uses resin chambers in a single bed configuration to deionize the water. Microbiological analysis has proven a remarkable reduction in the number of bacteria. The electrodes which are in direct contact with the resin create an electric field in the water that is unsuitable for bacteria to live in. The intermediate pH shift in the cells creates a positive effect for the removal of SiO_2 and CO_2 and helps as well to reduce bacterial growth.

Another advantage of electro-deionization is continuous operation. The resin is continually regenerated without the use of any chemicals. The energy consumption of this process is very low and serves as an advantage for the environment.

When a mixed bed polishing module is used, the conductivity of the product water increases during normal operation. The resin has to be changed or regenerated if the maximum acceptable conductivity is reached. When using the EI-Ion™ electro-deionization module, the water quality is constantly at the highest level. No regeneration, no quality variation. Simply high quality water at any time.



THE PRINCIPLE OF THE EL-ION™ MODULE

CUSTOMIZED RO/EL-ION™ SYSTEM COMBINATION SUPPLYING FUEL CELLS.

STAINLESS STEEL EQUIPMENT MEETS FDA STANDARDS – FOR USE IN THE PHARMA-CEUTICALS INDUSTRY WITH INTEGRATED EL-ION™ ELECTRO-DEIONIZATION MODULE.

VARIATION OF SYSTEMS

FOR DIFFERENT APPLICATIONS

We can plan and build systems in all configurations and customize them to meet your needs.

PROTEGRA CS™ RO/EDI SERIES AND ULTRAPURE WATER SYSTEM INCORPORATED INTO A SINGLE UNIT.

RO SYSTEMS ARE AVAILABLE FOR PRODUCTION RATES OF UP TO 3000 L/H.

INDUSTRIAL SCALE 2-STAGE REVERSE OSMOSIS EQUIPMENT.

REVERSE OSMOSIS

A NATURAL PHENOMENON IS USED FOR WATER PURIFICATION

The natural osmosis process can be reversed and used as an environmentally friendly and safe form of water purification.

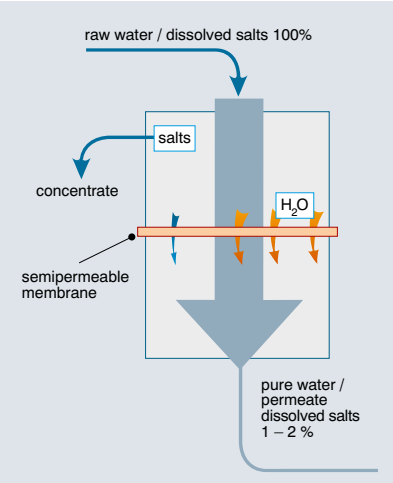
HOW DOES REVERSE OSMOSIS WORK?

A solution with a high salt concentration is separated by a semi permeable membrane from a solution with a low salt concentration. In normal osmosis, the water from the side with less salt will begin permeating the membrane into the more concentrated solution.

In reverse osmosis, pressure is supplied that exceeds the osmotic pressure of the higher concentrated solution to force water in the reverse direction.

Clean water starts to permeate through the membrane. This water contains approximately 98% less salt than the inlet water. This technology will also remove > 99 % of particles and bacteria.The production rate of an RO system depends on the water temperature.
Our specifications are given at a water temperature of 15°C. Each °C of temperature variation creates a water production shift of 3 %!

Most manufacturers use 25°C to rate their performance, however, with our systems, you can be assured that your water production is in the right range even if the temperature falls below 25°C.



THE PRINCIPLE OF REVERSE OSMOSIS

EVOQUA WATER TECHNOLOGIES

Fahrenberg 8, 22885 Barsbüttel, Germany

+49 (40) 670 868-6 globallab@evoqua.com **www.evoqua.com**

HyXo Oy
P.O. Box 16 (Palokorvenkatu 2)
FI-04261 Kerava, Finland
Tel. +358 10 417 4500
hyxo@hyxo.fi • www.hyxo.com