Protegra CS™ RO Series
Meeting All Your Pure Water Demands
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 deionization 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:**
- Feed for ultrapure water systems
- General chemistry
- Laboratory washing machines
- Water for autoclaves and environmental chambers
- Buffer preparation

<table>
<thead>
<tr>
<th>Protegra CS™ RO Series</th>
<th>130</th>
<th>200</th>
<th>350</th>
<th>500</th>
<th>750</th>
<th>1000</th>
<th>1250</th>
</tr>
</thead>
<tbody>
<tr>
<td>Permeate output at 15°C l/h</td>
<td>130</td>
<td>200</td>
<td>350</td>
<td>500</td>
<td>750</td>
<td>1000</td>
<td>1250</td>
</tr>
<tr>
<td>Salt rejection rate %</td>
<td>98</td>
<td>98</td>
<td>98</td>
<td>98</td>
<td>98</td>
<td>98</td>
<td>98</td>
</tr>
<tr>
<td>Recovery rate max. %</td>
<td>75</td>
<td>75</td>
<td>75</td>
<td>75</td>
<td>75</td>
<td>75</td>
<td>75</td>
</tr>
<tr>
<td>Operating pressure max. bar</td>
<td>14</td>
<td>14</td>
<td>14</td>
<td>14</td>
<td>14</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td>Power consumption kWh</td>
<td>0.55</td>
<td>0.55</td>
<td>0.55</td>
<td>0.55</td>
<td>1.6</td>
<td>1.6</td>
<td>1.6</td>
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<tr>
<td>Dimensions H x W x D mm</td>
<td>1650 x 600 x 600</td>
<td>1650 x 600 x 750</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Catalog Number</td>
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<td>3013</td>
<td>3014</td>
<td>3015</td>
<td>3016</td>
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</tbody>
</table>
The Protegra CS™ DI Series incorporates RO membranes and mixed-bed cartridges to produce pure water with conductivity values under 0.1μS/cm.

The reverse osmosis membrane is the initial deionization component, leaving the mixed-bed ion exchanger to deal with post-deionization. This reduces the cartridge exchange frequency and, in turn, the operating costs. We have integrated a completely dischargeable storage tank and a pressure booster pump. This system can also be operated as a central water treatment facility in, for instance, a laboratory wing with a closed circuit pipeline.

Additional integration options include UV oxidization and disinfection, CO₂ traps for the tank, sterile filtration and ultrafiltration. All units are supplied ready for immediate use, with all equipment installed into a cabinet and fitted with an RS 232 interface.

**Protegra CS™ DI Series**

<table>
<thead>
<tr>
<th>Permeate output at 15°C l/h</th>
<th>130</th>
<th>200</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pure water quality μS/cm</td>
<td>&lt;0.1</td>
<td>&lt;0.1</td>
</tr>
<tr>
<td>Recovery rate max. %</td>
<td>75</td>
<td>75</td>
</tr>
<tr>
<td>Operating pressure max. bar</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td>Purewater pressure bar</td>
<td>1.5 to 3</td>
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<tr>
<td>Power consumption kWh</td>
<td>0.55</td>
<td>0.55</td>
</tr>
<tr>
<td>Dimensions H x W x D mm</td>
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</table>

**Typical applications:**

- Feed for ultrapurewater systems
- General chemistry
- Laboratory washing machines including final rinse
- Water for autoclaves and environmental chambers
- Buffer preparation
- Photometry
- Spectrophotometry
- Media preparation
The Principle Behind The El-Ion® Electro-Deionization Module

The El-Ion® electro-deionization module uses resin chambers in a single bed configuration has shown to deionize the water. Microbiological analysis has proven a remarkable reduction in the number of bacteria with high CFU counts in the feed water. The electrodes that contact the resin create an electric potential 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 SiO₂ and CO₂ 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 – using no chemicals and low power consumption.

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 El-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.

Typical applications:
- 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
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® electrodeionization 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.

**Comparison Ix-Resin / El-Ion® electro-deionization module**

The most convincing advantage of the Protegra CS™ RO/EDI Series is the integrated deionization El-Ion® module.
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 El-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.

**Fields of use:**
- Microbiology
- Electronics
- Optics
- Semiconductor
- Pharmaceuticals
- Chemistry
- Clinical
- Power Plant
- Glass Industry
- Galvanic Industry

The side panels are easy to remove from all Protegra CS™ RO/EDI Series cabinets. This makes it very easy to access the equipment inside (equipment photographed without front and side panels).
Many applications need specialized equipment— for example the pharmaceuticals industry. We have developed and built systems in which all parts that come into contact with water are made of stainless steel. These systems meet all FDA requirements. The up-and-coming fuel cell technologies can benefit from our equipment too. We can also produce equipment that meets other industrial standards.

All units are equipped with an RS 232 interface. Siemens can plan and build systems in all sizes and configurations and customize it to meet your needs.