

EDI Technology within the PURELAB Pulse

Electrodeionization Technology

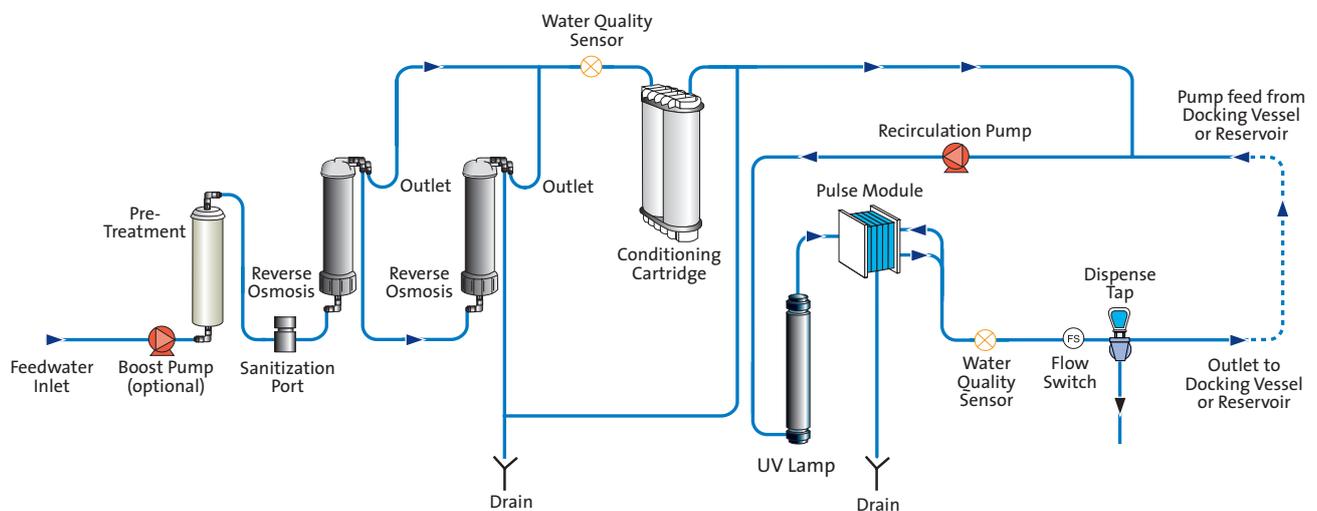
Electrodeionization (EDI) is an electrically-driven water purification process that involves the use of Ion Exchange (IX) resins and Ion Permeable Membranes. Water enters the EDI module, where an applied voltage forces ions to move through the resins and across the membranes. These ions are collected into concentrate streams which can then be put to drain or be recycled. The de-ionized product water from an EDI module can then be used directly or undergo further treatment.



PURELAB Pulse

The PURELAB Pulse unit is equipped with state of the art patented PULSE (EDI) technology. The unit provides Type II purified water directly from a potable source. Feed water to the unit is pre-treated through an activated carbon bed to remove Cl_2 , then flows through reverse osmosis cartridges. The water flows through the conditioning cartridge to remove the hardness before passing through the bactericidal UV lamp and the Pulse module. Water is then ready to be dispensed through a tap on the unit or is recirculated via a docking vessel or reservoir. Water from the reservoir is recirculated through the UV lamp and through the Pulse module to ensure high purity is maintained.

Process flow PURELAB Pulse



TECHNOLOGY NOTE 23

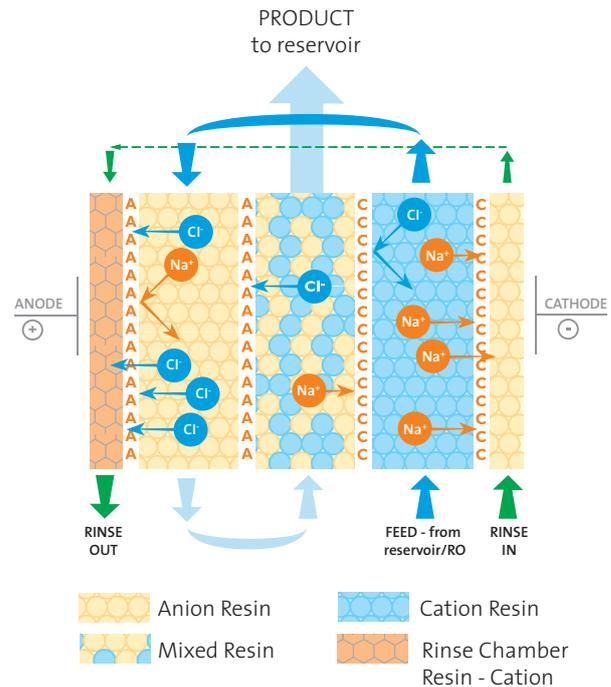
The features of ELGA's Pulse module combined with those of the process in the unit give the best results for purifying and maintaining water quality.

Benefits of the Pulse Module

- The unique internal design and process features a series of anion, cation, and mixed bed resin compartments that (well known in the industrial water purification industry) is an optimum arrangement to produce ultra pure water.
- Because of the intrinsic nature of an EDI device, resins are continuously regenerated by the current and are never exhausted. The benefit is the absence of the adverse effects given by exhaustion of a resin bed, such as silicon, boron, or organic breakthrough. Water quality is always maintained.
- The adverse effects of resin bed exhaustion are overcome. There is no sudden release of boron, silicon and organic contaminants as the deionization cartridge exhausts and no release of organics when a new cartridge is fitted.
- The Pulse Module within the PURELAB Pulse works on low voltage, about 12 Volts, which guarantees low power consumption.
- Our tests and experience in the field have shown that the Pulse module also makes a significant contribution in keeping bacteria levels to the minimum due to the rapid changes in local pH as water moves through the stack. (See Technology Note 22).

Benefits of the PURELAB Pulse process

- During normal operation mode, the water from the reservoir is re-circulated through a 254 nm UV lamp, then through the stack, to guarantee the quality. The unique position of the Pulse Module in the recirculation loop avoids the need to use a final deionization cartridge. The unit specification is $>10\text{M}\Omega\text{-cm}$, but the product water from the unit can easily reach $18\text{M}\Omega\text{-cm}$.
- The dilution of feed-water (RO permeate) with water from the reservoir as it re-circulates through the purification technologies ensures that the Pulse Module always operates under optimum conditions and enables it to effectively deionize short-term blips of poorer quality feed-water without significantly reducing product quality.



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