

## ELECTRODIALYSIS PILOT UNIT P2 EDR-X

### USAGE AND FUNCTIONS

Pilot unit P2 EDR-X is used for pilot tests of electrodialysis (ED) process. Pilot tests are necessary prior industrial scale application design for validation of proposed technology and scale-up data gathering. Unit can be also used for pilot test of electrodialysis with bipolar membrane (EDBM) on two circuit EDBM stack.

Unit P2 EDR-X can work in batch, feed-and-bleed or continuous mode, diluate and concentrate circuits can work in different modes. Unit can be equipped with up to two electrodialysis modules with electrodes polarity reversal ability. pH of diluate or concentrate is controlled automatically by two chemical dosage pumps. Concentrate conductivity is controlled automatically by water dosage. Safety filters avoids stack clogging by suspended solids. All process parameters (pH, conductivity, temperature, electric current, voltage) are visualized and logged.



### UNIT PARTS

- ED module(s): EDR-X/50-0.8 or EDR-X/100-0.8 - with polarity reversal electrodes
- Pumps of diluate (D), concentrate (C) and electrode solution (E)
- Safety filters for diluate and concentrate
- Connection for diluate and concentrate tanks – tanks of D and C circuits are not part of the unit
- Store tank for electrode solution with cover
- Flowmeter of diluate, concentrate and electrolyte stream
- Manual reversal system of diluate and concentrate hydraulics
- Switch board and DC power source with manual polarity reversal
- Data logging (pH, conductivity, temperature, electric current, voltage)

### APPLICATION SAMPLES

Desalination of various solutions and salt concentrates production by electrodialysis process:

- desalination of organics in water solutions: whey demineralization, wine stabilization, coolant recycling
- water production: demineralization of irrigation or utility water
- concentration of brines: brine concentration prior evaporation, recycling of inorganic fertilizers and another chemical compounds

**P2 EDR-X UNIT SPECIFICATIONS**

Parameter	Value
Max. number of ED modules	2 pcs
Tanks volume C	300 l
DC power supply	200/60 V/A
Unit dimension (l x w x h)	1575 x 1200 x 2408 mm
Unit weight without ED module	approx. 440 kg

**MODULE SPECIFICATIONS**

Parameter	EDR-X/50-0.8	EDR-X/100-0.8
Effective area of ED module	9.53 m <sup>2</sup>	18.97 m <sup>2</sup>
Effective area of one membrane	944 cm <sup>2</sup>	944 cm <sup>2</sup>
Number of membrane pairs in ED module	50 pcs	100 pcs
Anion-exchange membrane AM(H)-PES	50 pcs	100 pcs
Cation-exchange membrane CM(H)-PES	51 pcs	101 pcs
Spacer thickness	0.8 mm	0.8 mm
Electrodes (anode, cathode) Ti+Pt	2 pcs	2 pcs
Hydraulic connection	∅ 32 mm	∅ 32 mm
ED module dimension (l x w x h)	298 x 250 x 1060 mm	446 x 250 x 1060 mm
ED module weight (empty)	approx. 75 kg	approx. 130 kg

**OPERATING AND LIMITING MODULE WORKING PARAMETERS**

Parameter	EDR-X/50-0.8	EDR-X/100-0.8
Operating voltage (on membrane pair)	0.7 – 2 V	0.7 – 2 V
Max. voltage	100 V	200 V
Max. electrical current	30 A	30 A
Operating flow rate D, C	1.2 m <sup>3</sup> /h	2.5 m <sup>3</sup> /h
Min. flow rate D, C	0.5 m <sup>3</sup> /h	1.0 m <sup>3</sup> /h
Operating flow rate E	0.7 m <sup>3</sup> /h	0.7 m <sup>3</sup> /h
Min. flow rate E	0.3 m <sup>3</sup> /h	0.3 m <sup>3</sup> /h
Max. pressure drop in ED module	15-30 kPa	15-30 kPa
Operating temperature	20-30 °C	20-30 °C
Min./max. temperature	10/35 °C	10/35 °C

**Capacity (batch process):** 95 % desalination of 200 liters of 20g/l Na<sub>2</sub>SO<sub>4</sub> takes about 2 hours for 50 membrane pairs and about 1 hour for 100 membrane pairs at the temperature of 25°C.