

# UO-S7 3,000 - 15,000 KR/FU

## Concentrate-staged reverse osmosis units

The concentrate-staged reverse osmosis with high recovery up to 90 % is used for desalination of softened water with a salinity of up to 1,000 mg/l. It is equipped with a high-quality centrifugal pump with variable-speed drive (VSD = FU). Frequency-controlled operation reduces electricity cost by 30 - 50 %, extends the lifespan of the unit and keeps permeate production constant irrespective of operation pressure. The PLC Siemens S7-1200 allows visualization of the plant as well as optimal control and evaluation of the plant operation, optional data transfer via interfaces, remote access

### BENEFITS

- Convenient and user-friendly PLC S7-1200
- High yield of up to 90 % saves water and minimises operating cost
- Equipment with VSD (FU) saves 30 - 50 % electricity cost, maintains permeate production constant and enables a longer lifespan as well as particularly quiet operation
- Concentrate flushing device KSE and connection kit ARA for manual cleaning unit MRA already included

### APPLICATIONS

- Desalination of softened water
- Suitable for all industrial applications
- Ideal for minimising water and energy costs



UO-S7 10000 KR

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## Concentrate-staged reverse osmosis units

### DESCRIPTION

#### Concentrate-staged reverse osmosis

- Base frame made of stainless steel and high-pressure piping made of stainless steel with orbital welding
- Pre-filter (5 µm) with two glycerine-filled manometers
- High-pressure pump as low-noise, multi-stage centrifugal pump with variable-speed drive (VSD = FU)
- Special low pressure elements with energy-saving PA/PS composite membranes in GRP pressure vessels
- Control cabinet with lockable main switch and power section for controlling the pump
- Including KSE concentrate flushing unit and ARA connection kit
- Unit incl. piping and wiring, electrical construction acc. to VDE 0100 Part 600, VDE 0113 Part 1
- Unit tested, parameterised and conserved in own test field

#### Fittings and instrumentation

- Inlet solenoid valve and sampling valves for feed water and permeate (each vessel and total)
- Stainless steel valves for adjusting the flow rates of permeate, permeate recirculation, concentrate and concentrate recirculation, permeate check valve per pressure vessel
- Pressure sensors for pressure after pre-filter, pump inlet, operating and concentrate pressure
- Flow sensors for permeate, concentrate and permeate / concentrate recirculation of KR stage
- Conductivity measurement permeate and permeate recirculation KR stage with temperature compensation

#### Programmable logic controller (PLC) Siemens S7-1200

- Fully automatic monitoring and control of the plant with appealing visualization
- Intuitive operation via 7" touchscreen or 4" touchscreen and buttons (only sizes 3000/3500)
- Languages of plain text display: German / English / others on request at extra charge
- Circular storage of operating data and warning / fault messages on SD card (32 GB)
- Optimum operational safety due to adjustable limit values with warning and fault messages
- Password-protected programming of the operating parameters
- Siemens components and protocols in industry standard for high quality requirements

#### Available inputs

- DIGITAL: External stop, hard water protection (hardness monitoring unit limitron), 2x level permeate tank (tank min / max), 2x level dosing (pre-empty / empty) and universal input (configurable)
- ANALOGUE: Level permeate tank (4 - 20 mA)

#### Available outputs

- DIGITAL: Collective fault signal, universal output (configurable)
- ANALOGUE: Conductivity permeate (4 - 20 mA)

#### Optionally available

- Hardness control unit limitron and DOSIN AS-K dosing station with SAW drip tray
- Either PR permeate recirculation or KVP concentrate displacement with permeate
- MRA manual cleaning unit (as alternative to KVP)
- Interfaces Profinet, Profibus, Modbus RTU/TCP, BACnet and back-up / alternating / parallel RO operation

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## Concentrate-staged reverse osmosis units

### CONDITIONS OF USE

The unit may only be used for the desalination of softened feed water with drinking water quality or appropriately pre-treated well or surface water. The unit is designed for a salinity (TDS) of 1,000 mg/l and a temperature of 15 °C. Under these conditions, the projected permeate output is achieved even after three years of operation. The permeate yield depends on the raw water quality and the pre-treatment. The following parameters must be maintained in the feed water:

Free chlorine	not detectable
Iron (Fe)	< 0.2 mg/l
Manganese (Mn)	< 0.05 mg/l
Silica (SiO <sub>2</sub> )	< 25 mg/l
Silt density index (SDI)	< 3
Feed water temperature	5 – 25 °C
Feed water pressure	2 – 4 bar
Pressure fluctuation	± 0.5 bar

### TECHNICAL DATA OF SERIES

Controller	PLC Siemens S7-1200
Desalination rate min.	98.5 %
Permeate recovery	85 – 90 %
Permeate back pressure max.	0.3 bar
pH value operation	6.5 – 9.5
pH value cleaning	2 – 12
Ambient temperature	5 – 40 °C

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## Concentrate-staged reverse osmosis units

Product name	Mains connection	Hydraulic connection	Dimensions in mm	Item number
Permeate l/h	kW / V / Hz	feed/permeate/conc.	W x D x H	
UO-S7 3000 KR/FU	5.5 / 3 x 380 - 500 / 50 - 60	DN 32 / DN 25 / DN 20	3,500 x 700 x 1,740	381 822
UO-S7 3500 KR/FU	5.5 / 3 x 380 - 500 / 50 - 60	DN 32 / DN 25 / DN 20	3,500 x 700 x 1,740	381 832
UO-S7 4000 KR/FU	7.5 / 3 x 380 - 500 / 50 - 60	DN 32 / DN 32 / DN 25	2,950 x 840 x 1,810	381 842
UO-S7 5000 KR/FU	7.5 / 3 x 380 - 500 / 50 - 60	DN 32 / DN 32 / DN 25	2,900 x 840 x 1,810	381 852
UO-S7 6000 KR/FU	7.5 / 3 x 380 - 500 / 50 - 60	DN 40 / DN 40 / DN 25	3,440 x 840 x 1,830	381 862
UO-S7 7000 KR/FU	7.5 / 3 x 380 - 500 / 50 - 60	DN 40 / DN 40 / DN 25	3,920 x 840 x 1,830	381 872
UO-S7 8500 KR/FU	11.0 / 3 x 380 - 500 / 50 - 60	DN 50 / DN 40 / DN 25	4,880 x 790 x 1,830	381 882
UO-S7 10000 KR/FU	11.0 / 3 x 380 - 500 / 50 - 60	DN 50 / DN 50 / DN 32	4,060 x 870 x 1,860	381 962
UO-S7 12000 KR/FU	11.0 / 3 x 380 - 500 / 50 - 60	DN 50 / DN 50 / DN 32	4,930 x 870 x 1,860	381 972
UO-S7 15000 KR/FU	15.0 / 3 x 380 - 480 / 50 - 60	DN 50 / DN 50 / DN 32	5,100 x 940 x 1,860	381 982