

# Specification of Reverse Osmosis Units UO 10000 AS - UO 20000 AS

**Stand-type unit** for desalination of hardness stabilized drinking water according to German drinking water regulations (free chlorine not detectable), operating on the principle of reverse osmosis.

## Unit design

**Stainless steel main frame** housing the instruments and controls.

**Special inlet filter** with 5 µm-filter cartridge, **high pressure pump** low noise, multi-stage centrifugal type, **low energy spirally wound modules** with energy-efficient PA/PS composite membranes in GRP vessels with inliner.

**Valves** such as sampling valves for feed water and permeate (for each pressure vessel), inlet diaphragm valve, valves made of stainless steel to regulate the flow rate of permeate, concentrate and concentrate recirculation.

**Pressure gauges** for inlet and outlet pressure pre-filter, pump pressure, operating pressure and concentrate pressure, pressure switch for monitoring the feed water pressure.

**Flow meters** for permeate, concentrate and concentrate recirculation flow rate.

**Conductivity measurement** permeate, temperature compensated, measuring range 2-200 µS/cm.

**Connection set** for cleaning device, T-piece for injection point, concentrate flushing device.

**Control cabinet** with lockable main switch, electrical switchgear for control of the high-pressure pump and antiscalant dosing unit.

**RO 1000 microprocessor control system** for fully automated monitoring and control of the system with **two line text display** (16 characters per line) for display of operational status, permeate conductivity, temperature, operating hours, password-protected programming of the operating sequences and parameters as described below. Operators functions with password on different levels, low pressure shut down, conductivity limit fault and conductivity limit pre-alarm, **malfunction displays** for low pressure, hard water/motor overload, high conductivity pre-alarm, power supply malfunction.

**Programming options** for the following operating status with selectable duration:

- discard of permeate, subject to conductivity, with time limit
- discard of permeate, subject to time
- shut-down at high conductivity
- failure acknowledgement with or without password
- operators functions via password on different levels
- low pressure shut-down 0-99 sec.
- conductivity limit delay 0-99 min.
- conductivity limit fault 2-200 µS/cm
- conductivity limit prealarm 2-200 µS/cm
- interval for intermittent rinse when "tank full" 0-99 h
- duration of rinse when "tank full" 0-99 min.
- duration of concentrate displacement 0-99 min.
- duration of concentrate rinse 0-99 min.
- duration of permeate discard accord. to conductivity 1-99 min.
- range of permeate conductivity 2-200 µS/cm
- pump delay 0-9.9 sec.
- language German/English/French/Italian
- individual test of all inputs or outputs with LCD (diagnostics)

**Additional connections** possible: **Inputs** (low voltage) for level control with 1 or 2 float switches, hardness monitoring unit (the RO 1000 control system includes control functions for the limitron hardness monitoring unit), shut-down by external signal (forced stop, regeneration), **Outputs** for softener (230 V/50 Hz), 2 solenoid valves for concentrate rinse, permeate discard and -recycling, and DDC (collective malfunction signal on volt-free changeover contact).

Unit completely wired, pre-assembled and ready for installation. Electrical equipment in accordance with VDE 0100 part 600, VDE 113 part 1. Compressed air (oil-free) 4-6 bar required.

Technical Data		UO 10000 AS	UO 12000 AS	UO 15000 AS	UO 18000 AS	UO 20000 AS
Permeate flow rate	l/h	10,000	12,000	15,000	18,000	20,000
min. salt rejection	%	97	97	97	97	97
recovery	%	75	75	75	75	75
operating pressure	bar	12.0	11.5	12.0	12.0	11.5
membrane element / number		8040 / 9	8040 / 10	8040 / 12	8040 / 15	8040 / 17
voltage	V/Hz	3x400 / 50	3x400 / 50	3x400 / 50	3x400 / 50	3x400 / 50
motor power	kW	11	11	11	15	15
pre-fusing	A	25	25	25	32	32
feedwater connection	DN	50	50	65	65	65
permeate/concentrate conn.	DN	50 / 32	50 / 50	65 / 50	65 / 50	65 / 50
connection dosing point	R	1/2"	1/2"	1/2"	1/2"	1/2"
conductivity range	µS/cm	2 – 200	2 – 200	2 – 200	2 – 200	2 – 200
min./max. feedwater pressure	bar	2 / 6	2 / 6	2 / 6	2 / 6	2 / 6
min./max. feedwater temp.	°C	5 / 35	5 / 35	5 / 35	5 / 35	5 / 35
max. ambient temperature	°C	40	40	40	40	40
pH		3 – 11	3 – 11	3 – 11	3 – 11	3 – 11
height	mm	1,900	1,900	1,900	1,900	2,200
width	mm	3,900	4,900	4,900	5,900	4,900
depth	mm	800	800	800	800	800
weight approx.	kg	900	1,000	1,100	1,300	1,500
Code no.		381590	381600	381610	381620	381630

The units are designed for a maximum TDS of 1,000 mg/l, a water temperature of 15°C, a maximum colloidal index of 3 and free permeate outlet. Under these conditions, the units still reach design permeate flow after three years of operation. The permeate recovery depends on the raw water quality and the type of pre-treatment.

### **Optional Equipment**

#### **Surcharge for microprocessor control RO 5000**

Code no. 382140

#### **Permeate recirculation PR**

Code no. 382373 for RO units UO 10000

Code no. 382092 for RO units UO 12000-15000

Code no. 382093 for RO units UO 18000-20000