ROTEK Australia

Reverse Osmosis Systems – RT Series

Features

- Electropolished stainless steel space frame
- FRP or s/s high pressure membrane housings
- High pressure schedule 80 rigid tubing
- Stainless steel control valves
- Dedicated micro-processor controller
- Low feedwater pressure sensor
- Permeate quality sensor & TDS display
- Storage tank level sensor input
- Permeate, reject and recirculation rotameters
- Adjustable pressure regulator valve
- Adjustable pump discharge pressure valve
- Programmed permeate flush
- Pressure monitoring gauges

The RT reverse osmosis systems are designed for treating low to moderate TDS feedwaters typical of municipal, dam and river sources. These basic systems are simple to install, operate and require little maintenance. A membrane permeate flush facility is standard and operates each time the system is started to assist with keeping the membranes clean. Continual monitoring of feedwater pressure, RO permeate quality and storage tank level is performed by the integrated microprocessor-based controller with a permeate TDS monitor.

Specifications/Models	*RT600/RT1500*	*RT3000*	*RT4500*	*RT6000*	*RT7500*	*RT8000*
Capacity (litres/day) @ 25°C	2,500/5,000	10,000	15,000	20,000	25,000	30-35,000
Operating pressure (kPa)	1050 - 1400 (1750 maximum)					
Pre-filtration (standard)	Dual 20" filter housing with 2.5"x20" sediment and carbon elements					
Pressure pump	RV or Vertical multi-stage 304 grade stainless steel					
Pump rating (KW)	0.5/0.75	2.2	2.2	2.5	3.0	3.0
Membrane type	TFC with FRP outer wrap suitable for fresh or brackish waters					
Membrane number & size	2.5” or 4"x40"	2 x 4"x40"	3 x 4"x40"	4 x 4"x40"	5 x 4"x40"	6 x 4"x40"
Membrane pressure vessel	FRP end port type, white finished (rated to 2050kPa) or stainless steel					
Flow rotameters	RO permeate, recirculation and reject streams					
Pressure gauges	Feedwater inlet, pump discharge, membrane discharge					
Quality monitor	TDS monitor with LCD (optional conductivity monitor available)					
Electrical controls	Custom microprocessor with LCD display & status indicators, overload breakers					
Power	220-240VAC 50hZ single phase or 415VAC 3 phase (optional)					
Frame	AISI 304 grade stainless steel, electro polished					
Dimensions	600 x 480 x 1550 mm (LWH), approx. 60kg					

Typical Operating Conditions		*Feedwater requirements*	
Max Operating pressure	1750kPa	pH	3.0 to 10.0
System recovery	50 - 75%	TDS (ppm)	<1000
Nominal rejection	98 - 99%	Turbidity/SDI	< 1.0 NTU/<5.0
Operating temperature	+5 to 45°C	Hardness/FAC	< 50.0 ppm/<0.1ppm

Systems may be ordered with optional front panel mount pre-filtration stages to ease access in restricted installation spaces, EVOLET TAC anti-scale systems for hard water supplies, automatic backwash pre-treatment systems and UV sanitation lamps.

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C-5TM Controller

The C-5TM controller for the RT series reverse osmosis systems is a dedicated micro-processor based unit specifically designed to control and monitor operation of a single pump reverse osmosis system. Unlike conventional controllers which close the feedwater inlet valve and turn off the high pressure pump simultaneously on shut-down, the C-5TM controller has a special delay function where the pump is stopped first and then the feedwater inlet valve is closed when the pump has stopped operating. This delay prevents pump damage through cavitation and zero feedwater flow at shutdown and extends pump life and system reliability.

The C-5TM controller is a compact, dedicated panel mount control units with input facilities for an external tank level sensor, high or low pressure sensor and TDS probe. The C-5TM is pre-programmed to switch external devices such as pumps and solenoid valves according to input signal condition. The integrated mini-mimic panel has a status indicator light for tank full/tank empty, membrane flush in operation, pump on or off, low feedwater pressure, inlet solenoid valve open or closed, and electrical fault (blown main fuse). A manual flush button is also included should the operator wish to initiate a manual flush cycle of the membrane using the existing feedwater supply.

Features

- Permeate TDS monitoring and display (0-99ppm range)
- Feedwater membrane flush at startup
- Low feedwater pressure shutdown
- Permeate tank full shut down with automatic system flush
- Multiple delay feedwater solenoid valve close time
- System status LED indicators and system flow schematic
- Manual feedwater flush control

Specifications

- Dimensions: 151 x 121 x 40mm (wdh)
- Panel cutout size: 141 x 111mm (wh)
- Power supply: 110V/220-240VAC, 50/60Hz
- Inputs: Dry contact closures, 5VDC
- Output relays: 220-240VAC 0.5A
- Operating conditions: Temperature -0-+50^{o}C, humidity ≦85%

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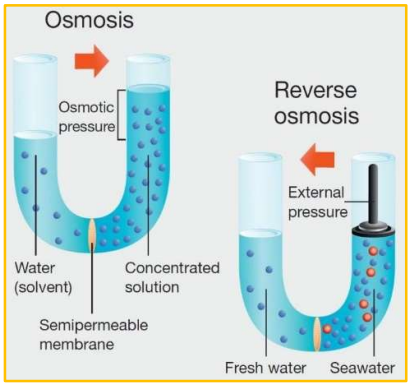
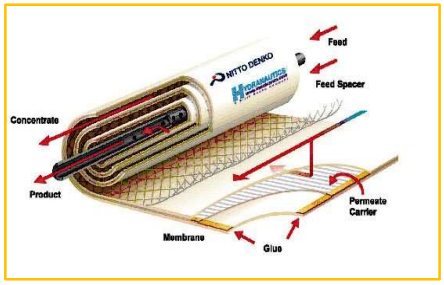
The Reverse Osmosis Process

Reverse osmosis is a very mature, well developed technology whose performance is easily measured. It is the method of choice for many industrial, municipal and commercial works when a reduction in feedwater TDS/conductivity or similar contaminants is required.



Osmosis is a term used to describe the diffusion of fluid through a semipermeable membrane from a solution with a low solute concentration to a solution with a higher concentration. Osmosis can be reversed if sufficient pressure is applied to the concentrated side of the membrane. This reversal process is used for water purification and desalination as the membrane allows only the water to pass through, but not larger molecules or ions (like salt).

For the reverse osmosis system to operate effectively, the feedwater must be filtered to remove suspended solids (to around 5 microns and then de-chlorinated. An anti-scalant injection system is generally required to remove hardness minerals (calcium, magnesium and iron) which would otherwise increase in concentration on the waste side of the membrane to the point where they form scale and foul the membranes. Water softeners may also be used to remove hardness minerals.



The pre-treated feedwater is pressurised and forced into a series of membrane and pressure vessel assemblies where the separation of pure water and contaminants occurs. Multiple membranes may be used for the higher flow rates and are housed in single or multi-place pressure vessels. RO membranes are available for a wide variety of feedwater types and all have a similar physical structure.

They differ in membrane polymer type, membrane thickness, surface area, spacer thickness, outer membrane covering and physical size. Surface modified membranes are used in more specialised areas to yield maximum stable performance and are preferred with difficult feedwater types.

The raw (untreated) feedwater source and quality of that source water are the key elements that directly affects the choice of pre-treatment equipment, pumps, piping, membranes and all system components. ROTEK has been designing Reverse Osmosis systems and their critical pre-treatment equipment for over twenty years to ensure our systems are suitable for each application. We can arrange thorough water testing through our NATA certified laboratory as well as on-site testing for limited parameters prior to making a recommendation to best suit your site.

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