

RA Series Reverse Osmosis System

RA1500 RA3000 RA4500 RA6000

Installation Manual



RA series Reverse Osmosis System

Overall System Connections

Hello!

ROTEK RA Series RO systems are specifically designed for commercial and industrial-sized RO systems.

ROTEK Reverse Osmosis Systems feature an excellent pre-treatment design with high quality components to offer high performance. that can produce 1500~6000GPD (250~1000LPH) of permeate water flow, which means it can produce more pure water at less cost.

To understand more about how RA systems can help your business, welcome to Contact www.rotewater.com to speak with a qualified local representative



NOTE: This installation manual use RA6000 as demonstration.

Conditions

READ THIS FIRST

Please pay attention to the following installation and safety recommendations:

Read the installation manual before installing this system.

NOTE! Please make sure your installation location has enough room and access to a 220v power supply.

Incoming Water

Incoming water pressure must be between 10 PSI and 100 PSI. Test your water occasionally to make sure the system is performing. If your water is microbiologically unsafe or of unknown quality do not use this system without adequate disinfection before or after the system. Extremely hot or cold incoming water will damage the system and cannot be used. Your Untreated Water Inflow quality will determine your needs for pretreatment and filtration.

Leaks

Inspect all connections after the installation to make sure no leaks occur, wait until after the system is pressurized to inspect again. Check the system occasionally after installation or maintenance to make sure no leaks have developed. Install the system in a location with adequate drainage.

General

This RA system is for climate-controlled indoor use only. Exposure to overly high or low-temperature ranges will damage the unit. Follow all of your state and local laws and codes regarding plumbing even if they differ from what is stated in this manual. If your state law requires it or you prefer to we recommend using a professionally licensed installer or plumber who meets the requirements of this system. All O-Rings, fittings, filter canisters, and Teflon tape wear out after a certain period. The lifetime of your components is subject to change with the quality of the water supplied. Do not handle an unwrapped filter directly with your bare hands as this can cause early filter failure. Use appropriate eye protection when performing any drilling.

Maintenance

The owner/user is obligated to properly inspect and maintain the RA system when necessary, at least every 1 year. This includes the following:

The O-Ring on the filter housing, membrane vessel, booster pump, solenoid valve diaphragm, and fittings.

Replace any connectors and filter housings with proper replacement parts.

Sanitize your system as often as needed (this changes with the profile of your area's incoming water).

Always use proper replacement filter cartridges with the correct size and length replacements. Replace the Teflon Tape on all threaded connections and fittings.

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Introduction

System Specifications

Systems for raw water TDS value below 1,500 PPM				
Models	RA1500	RA3000	RA4500	RA6000
Permeate Flow[GPD/LPH]	1500 / 250	3000 / 500	4500/750	6000/1000
Dimensions (LWH) [cm]	69*63*130	69*63*147	69*63*147	69*63*147
Gross Weight [kg]	62	88	94	100
Recovery Rate*	18-75%	34-75%	45-75%	50-75%
Vessel Size & RO Elements [qty.]	FRP4040 x 1	FRP4040 x 2	FRP4040 x 3	FRP4040 x 4
Feed Water TDS	<1500ppm	<1500ppm	<1500ppm	<1500ppm
RO Membrane Vessel	SS304 vessel with PE end port type			
Pump & Motor HP	Rotary Vane 1HP	Multistage 2HP		
Power	220-240VAC 50/60Hz single phase			
Operating pressure [kPa]	760-1520 (adjustable)			
Pre-filtration (standard)	20" filter housings x 2pcs (5µm PP elements and CTO cartridge)			
Feed Connection	3/4" FNPT			
Permeate/Concentrate/Flush Connection	1/2"			
Flow Meters	RO permeate and Reject streams (optional for recirculation)			
Pressure Gauges	Feedwater, membrane discharge (optional for pump discharge)			
Electrical controls	Micro-processor based, overload breakers, LED indicators, TDS monitor			
System Protection	Low feedwater pressure sensor, Automatic membrane flush, Inlet feedwater solenoid valve			
Frame	AISI 304 grade stainless steel, electro polished			

*Minimum recovery rate is calculated based on no concentrate recirculation, it is possible to increase the overall recovery rate by increasing the concentrate circulation flow.

Please read the manual section regarding the proper care and maintenance of your RA system before proceeding with your installation. Also, please make sure to inspect the package for any missing components or shipping damages.

Simply read through the manual and complete the steps in order and you'll have your system up and running in no time. If you find any issues or have questions please contact your local distributor or visit www.rotewater.com for filter replacements.

Raw Water (Feed Water) Requirements

Raw water quality, pressures, and flow rates have a significant impact on the performance of any reverse osmosis system. To ensure reliable and consistent long-term performance, it is important to supply feed water having the minimum specifications detailed below. If your raw water supply is marginal, you should consider using a raw water break tank and booster pump to supply the system.

Raw Water Specifications (minimum)			
Hardness	<1 ppm	Hydrogen Sulfide	0 ppm
Free Chlorine	0 ppm	Manganese	< 0.05 ppm
Total Dissolved Solids	<1,500 ppm	Organics	< 1 ppm
Turbidity (SDI)	<5	Temperature	+5 to +40°C
pH	3-11	Silica	< 1.0 ppm
Iron	<0.01 ppm	Pressure	>300 kPa

These specifications should be met in order to have the reverse osmosis system perform optimally. All operation specifications are based on the test conditions listed below.

RO Operation Specifications			
Min. Working Pressure	35 psi (240kPa)	Max. Pressure	250 psi (1700 kPa)
Min. NaCl % Rejection	96%	Max. NaCl % Rejection	99%
Min. Feed (lpm)	5	Max. Feed (lpm)	50
Max. Hardness	1.0 ppm	pH Range	3 – 11
Max. TDS	1,500 ppm	Max. Temperature	40°C (105°F)

TEST CONDITIONS: Permeate flow and salt rejection based on 1500 ppm NaCl, 1034kPa (150psi), 77°F (25°C), pH 6.5-7.0, and recovery of 15%.

NOTE: Higher TDS and/or lower temperatures will reduce the system's production

Pretreatment Suggestion

Please make sure that the quality of your raw water meets the aforementioned RA raw water requirements, otherwise, it is recommended to install pre-treatment equipment. You can install it by yourself, or suggest using ROTEK's existing standard pretreatment module, of course, it can also be customized according to your raw water conditions.

Installation Notes

▲WARNING▲

All electrical work should be performed by a licensed electrician in compliance with all relevant electrical safety regulations.

All piping works shall be performed by licensed plumbers and comply with relevant water supply and drainage piping regulations.

Installation Notes

Before installation, ensure that the power supply matches the power requirements of the system. Most units are supplied as standard for 220-240VAC 50Hz or 60Hz single phase operation.

1. Ensure that all plumbing connections for the feed water inlet, permeate and membrane flush outlets are secure and conform to relevant plumbing regulations.
2. Ensure that power lead is rated to carry the current draw of the system. A minimum electrical wire diameter of 3.5mm is recommended.
3. The external storage tank level contact switch should be connected to the blue wires labelled for tank connection and located inside the electrical cabinet. Do not apply power to these wires as the connection is designed for a simple non-powered contact type closure switch only.
4. Use an external pressure booster pump if the feedwater pressure is below 35psi.
5. If your feedwater supply is marginal, use a feedwater storage tank and booster pump to supply the RO system.

Tools Required

Before you begin please make sure you have all of the following tools ready to use:

Box Cutter / Tube Cutter

Phillips-Head Screwdriver

Power Drill : 3/8" Drill Bit (for Drain Saddle)

Adjustable Wrench / No.13 Wrench

Teflon Tape

Components List

Your new RA system should include the following items. **If any item is missing, please contact your local distributor.**

Please take a few moments to check all the following components:

RA Main Unit*



**1/2" Flexible PE Tubing
(5 m)**



Installation Manual



Filter Housing Wrench



Solenoid Valve Diaphragm



2 extra pieces for backup

RO Membrane XLP4040**



*RA1500, RA3000, RA4500 and RA6000 have the same standard installation and operation procedures. This manual uses RA6000 for demonstration. The main unit in the package is subject to the model you purchased.

**ROTEK XLP-4040 not included in the RO system, needs to be ordered separately.

Note: This installation manual use RA6000 as demonstration.

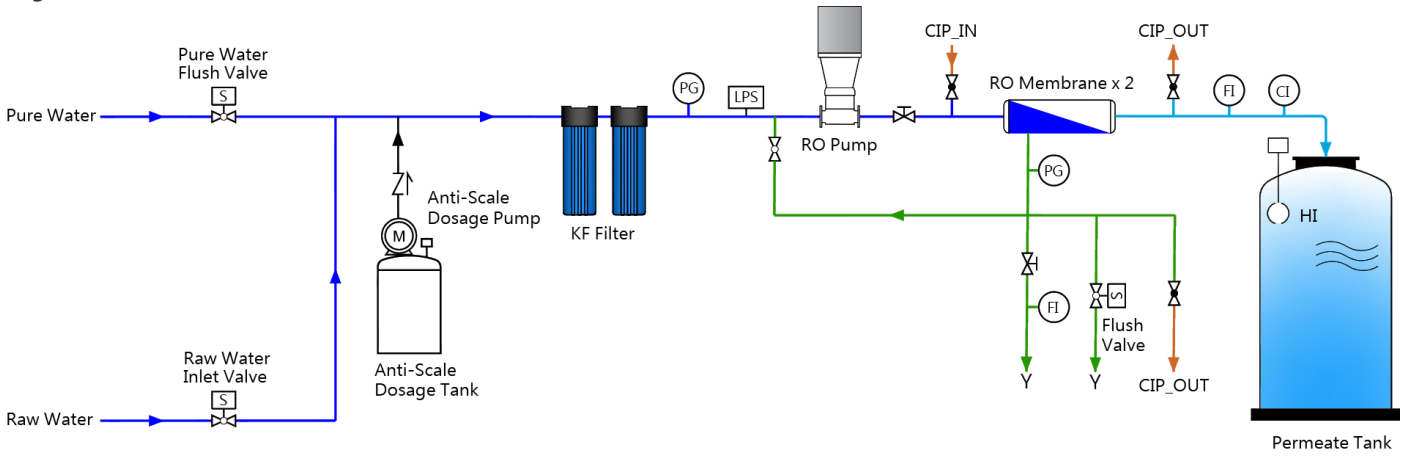
System Overview



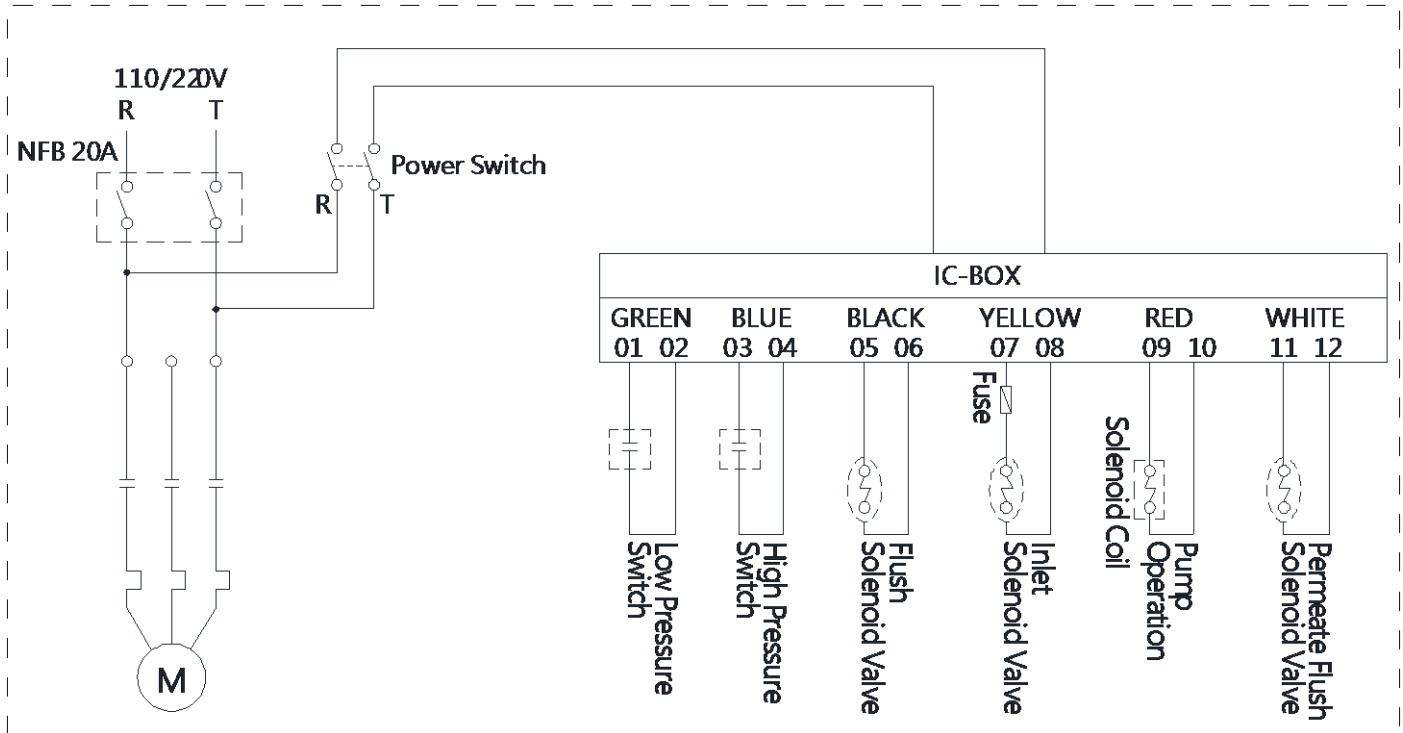
Item	Name	Specification	Qty
01	C5TM RO program controller	220V 50Hz	1
02	Raw Water Inlet Pressure Gauge	Snap-in 7 KGW-100psi-2.5" face width	1
03	RO Water Pressure Gauge	Snap-in 35KGW-500psi-2.5" face width	1
04	Power Switch	Luminous switch 4P	1
05	A Pressure Regulating Valve	SUS304 1/2"	1
06	Wastewater Flow Meter	5GPM	1
07	Pure Water Flow Meter	5GPM	1
08	Pre-Filters	KF-20" 5um PPx1 + CTOx1	1
09	Pure Water Flush Valve	ROTEK SLP 3/4"	1
10	Raw Water Inlet Valve	ROTEK SLP 3/4"	1
11	Low Voltage Switch	DANFOSS KP-35	1
12	Electromagnetic protection switch	TECO HUE-16K	1
13	RO Membrane Shell (RO Membrane XLP4040)	FRP-4040	4
14	RO High Pressure Pump	WALRUS TPRN 3-29 / 1Φ 220V 50Hz	1
15	Anti-Scaling Dosing Pump	INJECTA 2L/hr@7Bar	1
16	Anti-Scaling Dosing Barrel	PP-60L	1

Electronic Control System

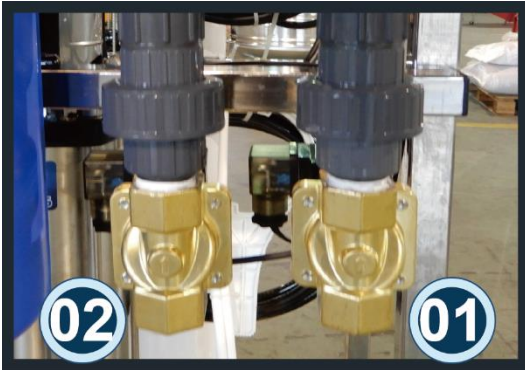
System flow chart



Circuit Schematic



Installation Procedure



System Operation Notes

- Make sure the ground is leveled and spacious for placing the RA machine.
- Fix ground wire underground.

Step 1

Connect pure water with a pipe diameter of 3/4" (male thread coupling) to the water inlet of the pure water flushing solenoid valve.

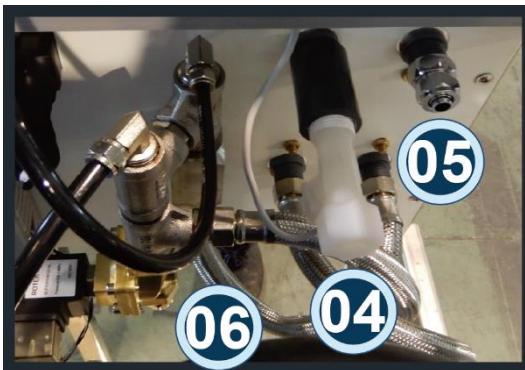
Step 2

Connect the raw water to the water inlet of the water inlet solenoid valve with a pipe diameter of 3/4" valve.



Step 3

Connect the outlet of the anti-scaling dosing pump of the anti-scaling equipment to the dosing water inlet on the main unit with a 1/4" diameter hose.



Step 4

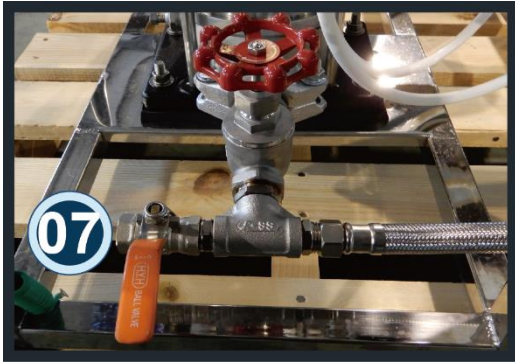
Connect the water outlet to the pure water bucket with a pipe diameter of 1/2"

Step 5

Connect the water outlet to the waste water with a pipe diameter of 1/2"

Step 6

Connect the outlet of the solenoid valve to the waste water with a pipe diameter of 1/2", indicating flushing



Step 7

Connect the water outlet of the filter of the CIP equipment to the water inlet (No. 07) of the stainless steel ball valve on the RO host with a pipe diameter of 1/2". The table is CIP_IN.



Step 8

Connect the water outlet (No. 08) of the stainless steel ball valve on the RO host to the water inlet of the CIP bucket of the CIP equipment with a pipe diameter of 1/2". The table is pure water CIP_OUT.



Step 9

Connect the water outlet of the stainless steel ball valve on the RO host to the water inlet of the CIP bucket of the CIP equipment with a pipe diameter of 1/2". The table is wastewater CIP_OUT.



Step 10

Connect the power supply to the contact breaker inside the electrical box. Ensure that the available power matches the power requirements of the system and that the power cables are rated to carry the current load of the system.

Install the Pre-filter Cartridge

Step 1

Prepare the 20" PP 5um or the CTO cartridge and a filter housing wrench.

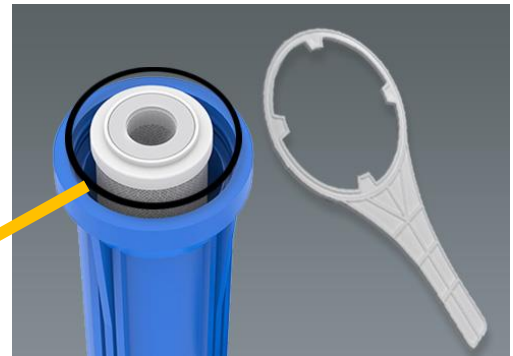
Unscrew the filter housing with the filter housing wrench.



Step 2

Unwrapping the new filter cartridge and placing the new cartridge inside the housing. Ensure the housing O-Ring in place at the Housing's lower groove (just below the threading).

O-Ring



Step 3

Place back the filter housing and tighten it with the filter housing wrench.

NOTE! Do not over-tighten.



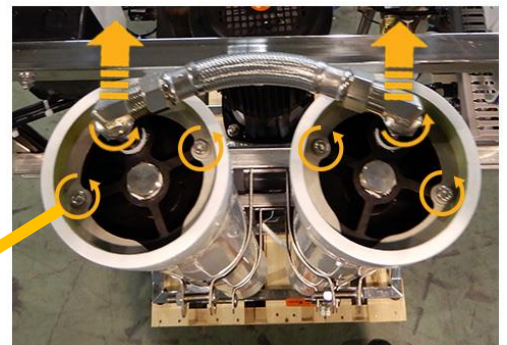
Install RO Membrane

Step 1

Disassemble the Permeate Pipe - The system permeate piping must be carefully removed from the permeate port of the vessel.

Release Locking Screws - Each of the two locking crescents is held in place with a single locking screw. The locking screws can be unthreaded using an M5 hex wrench.

Locking Screw



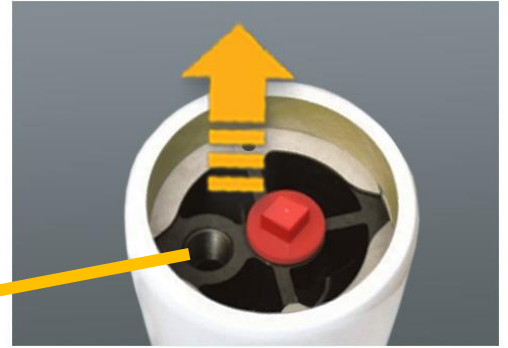
Step 2

Remove the Locking Crescent/Head Assemblies

Create a T-shaped handle by using a 1/2" NPT Male threaded PVC pipe and thread it tightly into the head permeate port. This facilitates an easier removal of the pressure vessel head. If challenging, gently rock or tap the head inward with a rubber mallet, then detach the head assembly part.

NOTE! Exercise caution with metal tools, avoiding leverage against the sidewall or scratching the inside surface of the bell area.

Permeate
Port



Step 3

Ensure to follow the direction of the arrow mark on the membrane, unwrapping the new RO membrane, and place into the pressure vessel,

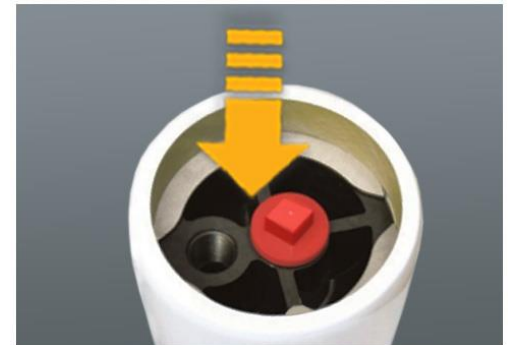
NOTE! Ensure the RO membrane arrow is installed in the same direction as shown outside the pressure vessel.



Step 4

Replace the Head - Hold the head assembly, square to the axis of the vessel.

Push firmly until the head is correctly positioned and the retaining groove is visible. It may be necessary to use a rubber mallet to tap the head into its engaged position.



Step 5

Install Locking Crescents - Clean and dry the retaining groove. Place the first locking crescent with the end section in the groove and the screw aligned with a threaded opening in the bearing plate. Tighten the screw using an M5 hex wrench until snug (max torque: 10Nm). Repeat for the second crescent. Perform a final tightness check after installing two crescents.

Step 6

Reconnect Permeate Piping - Reconnect the system permeate piping to the permeate port.

Conduct Pre-Pressurization Inspection - Perform a thorough pre-pressurization inspection, ensuring proper installation of heads, system piping connections, elements, adapters, and the thrust cone at the downstream end of the vessel.

Pressurize the System and inspect for Leaks - Do not operate vessels with leaks.

System Startup & Operation

System Operation Notes

1. Ensure that incoming water pressure is a minimum of 140kPa (20psi).
2. Check that your incoming water supply flow rate is sufficient for your particular model
3. Check that the available power supply matches your unit requirements.
4. Re-check all installation instructions and that all plumbing and electrical connections have been
5. made correctly and are secure.

Step 1

Switch the power in the front side to "I" (ON). This will open the inlet solenoid valve and allow pressurized feed water to enter the filter housing and the RO system.



Step 2

Release the breather valve to close it by pressing and holding the breather valve on top of the Pre-filter cap to release any air pressure that may have built up in the system, until water springs from the breather valve. This step usually only needs to be performed at the first start-up, or when you find there may have air entering the system.

Breather
Valve



Notice! If there is air in the RO system, the long-term accumulation may easily cause damage to the pump.

Step 3

Once the system is running, it automatically initiates a 30-second start-up flush. Then it continues to produce pure water until the pure water tank is full "FUL", and the water production will stop.

Also, if the water inlet pressure is lower than the default, the system will stop water production, too.

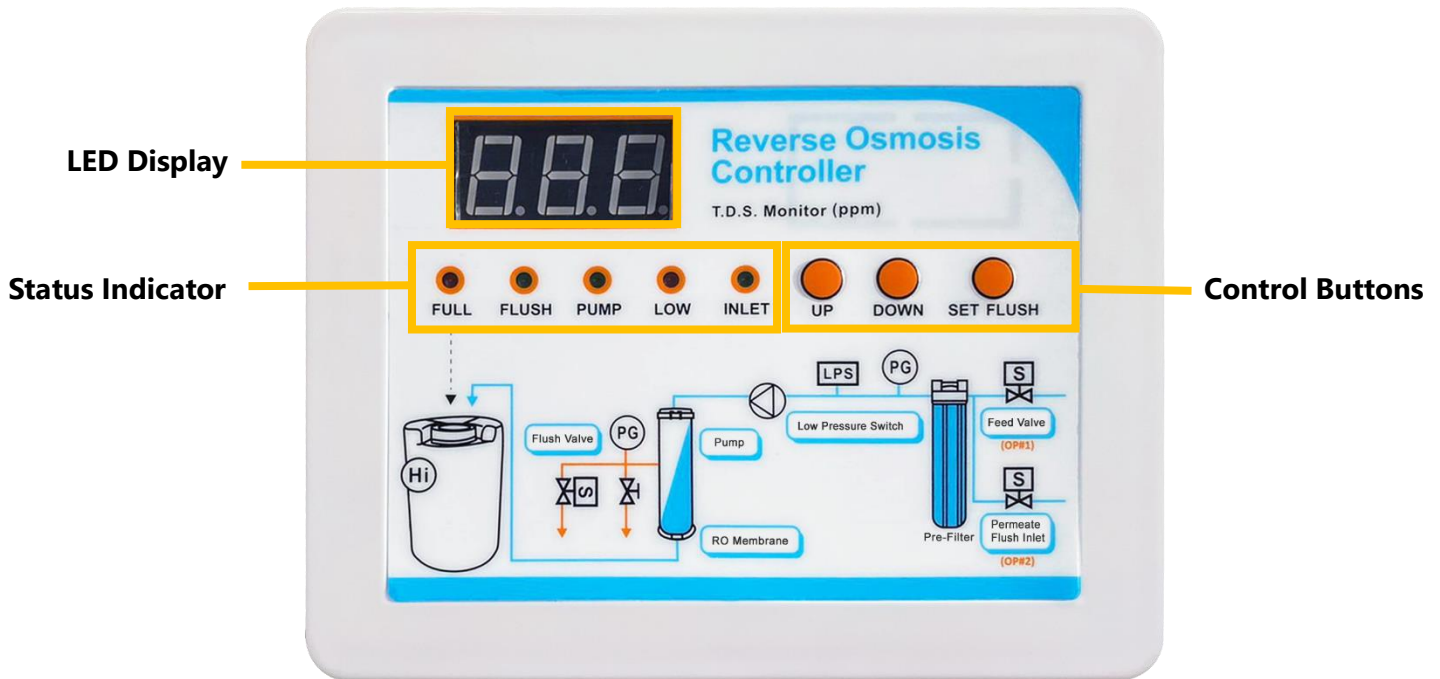
If the water inlet detects low pressure and displays "LO", the system will also enter system protection and stop water production.

Please refer to the chapter "C5TM RO Controller".



C5TM RO Controller

RO Controller Panel






Status Indicator Description

Status Indicator	Color	Description
Full	● Red	When the permeate storage tank is full, the RO system will stop making water and stand by.
Flush	● Green	The system is running an automatic flush cycle of the RO membrane.
Pump	● Green	The RO high-pressure pump is running and making water.
Low	● Red	The inlet water pressure below default pressure.
Inlet	● Green	The water inlet solenoid valve starts and feeds water.

Display Description

LED Display	Indicator Status	Description
	 FULL FLUSH PUMP LOW INLET	When the power is on, the screen will first display "888" and the default mode "OPA", then the raw water solenoid valve starts and feeds water.
	 FULL FLUSH PUMP LOW INLET	Startup Flush: the screen displays "030~000", and the countdown is 30 seconds.
	 FULL FLUSH PUMP LOW INLET	Start the pure water production, the number displayed on the screen is the TDS value of the pure water, and the indicator "PUMP" lights up.
	 FULL FLUSH PUMP LOW INLET	Start the Timed Flush: The default setting is every 120 minutes flushing 30 seconds, and the screen displays a countdown of "B30~B00".
	 FULL FLUSH PUMP LOW INLET	When the water tank is full, start to Tank-Full flush for 30 seconds, and the system will stand by.
	 FULL FLUSH PUMP LOW INLET	When the water tank is low (below the set pressure), the display shows "LO", the indicator LOW/INLET lights up, and the system will continue to feed water. The wastewater end will continue to drain until the inlet water pressure reaches the set value. When the indicator "LO" lights off, the system will flush for 30 seconds and resumes water production.
<p>NOTE If the pressure cannot reach the default value, please turn off the power and check your inlet water pressure. It is recommended to double confirm with the factory your raw water inlet pressure before installation.</p>		
	 FULL FLUSH PUMP LOW INLET	Start the Manual Flush: Press the SET/FLUSH button once, and the system will start a 30-second flush. Then the RO high-pressure pump resumes operation and starts to produce water.
	 FULL FLUSH PUMP LOW INLET	The default TDS range is 0 to 999 ppm, and the display flashes beyond the range of 999. (OPB mode is suitable for raw water TDS <10,000ppm)

Flow Meter and Pressure Gauges

RA6000 RO Permeate Flow Meter 10GPM		RO WATER INLET PRESSURE	Raw water Inlet Pressure Gauge
	<p>After startup flushing, the system begins to produce RO pure water. You can monitor it through the RO permeate flow meter.</p> <p>Typically RA permeate flow rate is 4.4 GPM / 16.7 LPM.</p>		<p>Displays the pressure of the raw water inlet.</p>
		RO INLET PRESSURE	RO Membrane Inlet Pressure Gauge
			<p>Displays the pressure of water entering the RO membrane.</p>

* Permeate Flow Rate is calculated based on Rotek XLP-4040 membranes

It is also possible to use other brands of membranes with RA units, but the flow rate may vary.

Troubleshooting

Why does my RO system keep on and off??

The pressure at the raw water inlet end is insufficient, or the inlet pipe is too small. If the water supply pressure is lower than 140kPa(20psi), please use an external booster pump, please use the water supply storage tank and booster pump to supply water to the RO system and prevent the system from circulating.

Why is the output of my RO pure water getting less?

1. If the output of RO pure water becomes smaller, which is about 65% lower than your usual flow rate, and the pressure of the RO water inlet pressure gauge becomes larger, it means that the RO membrane is clogged and needs to be replaced or cleaned.
2. If the RO system is in the state of producing water, and the permeate water flow rate drops a lot (about 70-75%), It means that the pre-filter element is clogged and needs to be replaced (If the flow rate does not increase after replacement, the first point applies) .

Important Reminder Please record the values of your RO permeate flow meter and pressure gauges, and test the water quality at the same time. Those data will be of great help to quickly eliminate obstacles. Please refer to the Operation Log attached at the end of this document.




Trouble Shooting

Malfunction	Reason	Solution
RO System Motor non-operation	1. Input power error	1.Check the type of power (voltage phase number) may decide to use a voltage types of computer box
	2. Electromagnetic switch is damaged	2.Check the solenoid switch coil and contacts (to check through the RX1 scale multimeter if is available)
	3. Overload switch for Electromagnetic switch tripped	3.Check at 1.25 times of the value of the clamp-on ammeter measured the operating electric current (by return trip lever)
	4. The control box is in the lack of water pressure	4.Check the pressure and the low pressure switch contacts and pre-filter the water is turned on (to check through the RX1 scale multimeter)
	5. High voltage breakdown or activated carbon, sand filtration protection Contact barrier	5.check through the RX1 scale multimeter if connected and AB connected well
	6. The control box fault	6.Check the computer box 9.10 point whether the power supply output to the solenoid switch and check the power supply is normal
	7. Axis motor was stuck by rust	7.Check the motor (started with different sound) If it cannot start, replace the motor
	8. Pump head stuck	8.Remove the pump head, manually rotate the pump head is rotatable, replace it if not available
RO membrane stuck	1. Water softener (high hardness) insufficient for RO	1.Check the water softener regeneration program, and calculate the amount of water is sufficient supply of soft water RO
	3. The proportion of pure water is not normal	3. Adjusting the ratio of pure water up to 1: 3 or more
	4. TDS for Raw water (or recovered) is too high	4. Check the water, and reduce the proportion of recycled, recycling concentration is not above TDS 800PPM
	5. Excessive colloidal suspensions	5. Please install the pre-filter 0.45U UF or less
	6. Poor quality of raw water	6. Please improve or increase the raw water pre-filtration system
	RO computer Motionless	1. Raw water pressure is insufficient (Need no less than 1.5 kg / cm ²)
2.Softener not even switch homing		2. Check and adjust the micro switch
3.RO power is not normal		3. Check the power supply, and the need to improve the voltage drop was within $\pm 5\%$ of normal
RO doesn't make water after flushing	1.The control box is in a high level state	1. Check the bucket and the high level of pure lines
	2. The control box is in a low level state	2. Check the raw water and pre-filter and pump pressure
RO Membrane The fresh water shortage	1. Flush valve fault	1. Flush valve replacement or cleaning
	2. Recovery valve open too much	2. Recovery valve adjustment

System Maintenance

These recommendations are intended for maximum efficiency of your RA system.

Replacements Table

Part	Model	Service Life
 Filter	20" PP Cartridge 20" CTO Cartridge	3 Months - 6 Months
 RO Membrane	ROTEK XLP-4040	6 Months - 1 Year
 Solenoid Valve Diaphragm	Custom Order Contact your local distributor for supply.	1 Year

Filter and RO Membrane Storage

1. Store unopened filters in an airtight container to prevent them from absorbing air. This prolongs the shelf life of the filters and avoids any possible odors or contamination from the air.
2. Store in a cool, dry, dark place (avoid heat and moisture contamination). Using this method it is okay to store filters for several years.

Extended System Non-Use

-If you will not be using the RO System for two weeks or more, please read the chapter "Vacation Mode".

How to Change the Pre-filter Cartridge

(Recommended about every 3 months, depending on water use)

1. You will need a clean cloth, dish soap, and the 20" PP 5um or the CTO cartridge,. (The system may release water when it is disassembled.)
2. Turn off the water supply connected to the RO System, the Feed Water Adapter Valve, and the Tank Valve [if you are using a tank]. Then open your pure water outflow to release pressure,
3. Unscrew the Filter Housing using the Filter Housing Wrench. Remove old filters and dispose of them.
4. Wash the Pre-filter Housings with dish soap then proceed to rinse until all soap is removed.
5. Ensure that your hands are washed clean before unwrapping the new filter. After unwrapping, place the new filter inside the housing. Make sure the Housing has an O-Ring firmly in place in the Housing's lower groove (just below the threading). Tighten the Pre-filter Housing using the Filter Housing Wrench. Do not overtighten.
6. Restarting the system.

How to Change the RO-4040 Membrane

(Recommended about 1 year. Lifespan varies based on quality of incoming water.)

NOTE! Make sure you have shut down the RA system, the Feed Water Adapter Valve, Water Supply, and the Tank Valve [if you are using a tank]

Head Removal

1. Shut Down the RO System and then Relieve the System Pressure.
The RO system should be totally shut down and all pressure relieved before conducting any maintenance or repair on the vessel.
2. Disconnect Permeate Piping
The system permeate piping must be carefully removed from the permeate port of the vessel.
3. Inspect the End Cap
The end cap should be inspected for any signs of corrosion or damage. Surface corrosion can be removed with a wire brush, while flushing with water.
4. Disconnect the Locking Screws
Each of the two locking crescent is held in place with a single locking screw. The locking screws can be unthreaded using an M5 hex wrench.
5. Remove the Locking crescent/Screw Assemblies
6. The locking crescent/screw assemblies should be easily removed from the retaining groove. Should the assemblies be difficult to remove, it may be necessary to rock the head slightly or tap the head inward with a rubber mallet.
7. Be careful when using metal tools, avoid leveraging against the sidewall of the vessel or scratching the inside surface of the bell area.
8. Remove the Head Assembly with One of the Following Techniques

Head Installation

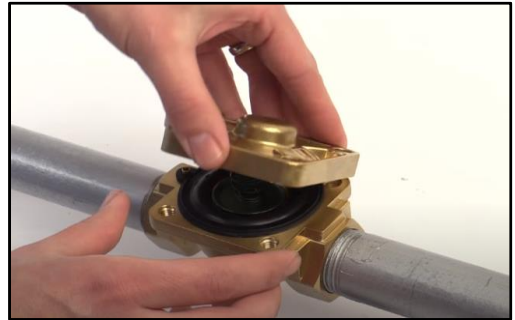
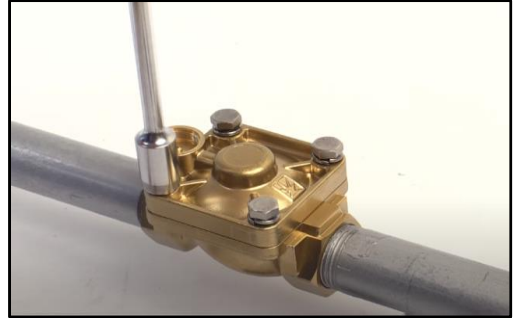
1. Install Head - Hold the head assembly, square to the axis of the vessel.
2. Push firmly until the head is correctly positioned and the retaining groove is visible. It may be necessary to use a rubber mallet to tap the head into its engaged position.
3. Install Locking Crescents - Clean and dry the retaining groove. Position the first locking crescent so that the end section sits in the retaining groove and the screw aligns with one of the threaded openings in the bearing plate. Use an M5 hex wrench to tighten the screw until snug. Do not over-tighten - maximum torque guideline: 10Nm. Install another crescent in the same manner.
4. Conduct a final tightness check of each screw after two crescents are installed.
5. Reconnect Permeate Piping - Reconnect the system permeate piping to the permeate port.
6. Conduct Pre-Pressurization Inspection - A thorough pre-pressurization inspection should be conducted, including verifying that the heads are properly installed, system piping connections are in place, elements are installed, adapters are installed, and thrust cone is installed at downstream end of the vessel.
7. Pressurize System.
8. Inspect for Leaks - All connections should be free from leaks. Do not operate leaking vessels.

How to Change the Solenoid Valve Diaphragm

(Recommended about 1 year. Lifespan varies based on quality of incoming water.)

NOTE! Make sure you have shut down the RA system, Make sure the Feed Water Adapter Valve is fully close.

1. Disassemble all the parts of the top.
2. Release the screws of Solenoid Valve, and open it.
3. Replacing a new Solenoid Valve Diaphragm.
4. Assemble all the parts of the top.



RO Membrane Cleaning

(Recommended about every 6 months to 1 year.)

Periodic cleaning of the membrane(s) can improve system performance. In normal operation, mineral scale, biological matter, colloidal particles, and organic substances can foul the membranes and reduce performance. The best prevention is to use a well-designed pre-treatment system incorporating efficient sediment removal, de-chlorination (if chlorine-based sanitisers are present), and softening or chemical dosing for the removal of scale forming minerals.

WARNING: Cleaning chemicals are dangerous and can cause injury and damage to the environment. It is the user's responsibility to comply with all applicable federal, state, and local regulations.

General Safety Precautions

When using any chemical indicated here in subsequent sections, follow accepted safety practices. Consult the chemical manufacturer for detailed information about safety, handling and disposal.

1. When preparing cleaning solutions, ensure that all chemicals are dissolved and well mixed before circulating the solutions through the membrane elements.
2. It is recommended the membrane elements be flushed with good-quality chlorine-free water after cleaning. Permeate water is recommended; but a de-chlorinated potable supply or pre-filtered incoming water may be used, provided that there are no corrosion problems in the piping system. Operate initially at reduced flow and pressure to flush the bulk of the cleaning solution from the elements before resuming normal operating pressures and flows. Despite this precaution, cleaning chemicals will be present on the permeate side following cleaning so divert the permeate stream to drain for at least 10 minutes or until the water is clear when starting up after cleaning.
3. During recirculation of cleaning solutions, the temperatures must not exceed 50°C at pH 2-10, 35°C at pH 1-11, and 30°C at pH 1-12.

Cleaning Procedures for organic fouling

1. Prepare the cleaning solution as listed below

- * Preferred 0.1% (wt) Soda Ash
pH 12, 30°C maximum
- * Alternative solution 0.1% (wt) NaOH 0.025% (wt)
pH 12, 30°C maximum

NOTE!

- (wt) Denotes weight percent of active ingredient.
- Cleaning chemical symbols in order used: NaOH is sodium hydroxide.

2. Low-flow rate pumping. Pump mixed, preheated cleaning solution into the housing at a low flow rate of 5-10 litres per minute at low pressure (<120kPa) to displace the process water. Use only enough pressure to compensate for the pressure drop from feed to concentrate. The pressure should be low enough so that little to no permeate is produced. A low pressure minimizes re-deposition of dirt on the membrane. Dump the concentrate, as necessary, to prevent dilution of the cleaning solution.

3. Re-circulate. After the process water is displaced, cleaning solution will be present in the

concentrate stream and this can be recycled to the cleaning solution tank. Recycle the cleaning solution for 15 minutes or until there is no visible colour change. If a colour change occurs, dispose of the cleaning solution and prepare a new solution as described in step 2.

4. Soak. Turn the recirculation pump off and allow the elements to soak for 1-15 hours (soaking overnight will give best results). To maintain temperature during an extended soak period, use a slow recirculation rate (2-5 litres per minute). Soak time will vary depending on the severity of the fouling. For lightly fouled systems, a soak time of 1-2 hours is sufficient.

5. High-flow pumping. Recirculate the cleaning solution through the membranes at 15-20 litres per minute for 45 minutes. This high flow rate flushes out the foulants removed from the membrane surface by the cleaning. If the elements are heavily fouled, using a higher flow rate is possible up to the maximum pressure drop across the membrane permissible (check with membrane manufacturer's data sheets). With higher flow rates, excessive pressure drop may be a problem. The maximum recommended pressure drops for most common membranes are 100kPa per element or 340 kPa per multi-element housing, whichever value is more limiting.

6. Flush out. Clean RO permeate water is preferred for this stage. If clean RO permeate water is not available, pre-filtered raw water can be used for flushing out the cleaning solution unless there will be corrosion problems (e.g., stagnant seawater will corrode stainless steel piping). To prevent precipitation of any remaining contaminants, the minimum flush out temperature is 20°C. The system should be flushed for 1 hour.

7. Re-start the system. The RO elements and the system need to stabilize before taking any performance data. The stabilization or normalisation period will vary depending on the severity of the fouling. To regain optimum performance, it may take several cleaning and soak cycles. RO Membrane

Cleaning Procedures for inorganic material fouling

1. Prepare the cleaning solution as listed below

- * Preferred 2.0% (wt) Citric Acid PH 2, 45°C maximum
- * Alternate Muriatic Acid
- * Alternative 1.0% Na₂S₂O₄

NOTE!

- (wt) Denotes weight percent of active ingredient.
- Cleaning chemical symbols in order used: HCl is hydrochloric acid (Muriatic Acid).

2. Low-flow rate pumping. Pump mixed, preheated cleaning solution into the vessel at a low flow rate of 5-10 litres per minute at low pressure (<120kPa) to displace the process water. Use only enough pressure to compensate for the pressure drop from feed to concentrate. The pressure should be low enough so that little to no permeate is produced. A low pressure minimizes re-deposition of dirt on the membrane. Dump the concentrate, as necessary, to prevent dilution of the cleaning solution.

3. Re-circulate. After the process water is displaced, cleaning solution will be present in the concentrate stream that can be recycled to the cleaning solution tank. Recycle the cleaning solution for 10 minutes or until there is no visible colour change. If at any time during the circulation process there is a change in pH or a colour change, dispose of the solution and prepare a new solution as described in step 2. A pH of 2 must be maintained for the cleaning to be effective.

4. Soak. Turn the pump off and allow the elements to soak. Soak the elements for 1-15 hours (soaking overnight will give best results). To maintain temperature during an extended soak period, use a slow recirculation rate (2-5 litres per minute). Soak time will vary depending on the severity of the scaling. For lightly scaled systems, a soak time of 1-2 hours is sufficient.

5. High-flow pumping. Feed the cleaning solution at 15-20 litres per minute for 45 minutes. The high flow rate flushes out the foulants removed from the membrane surface by the cleaning. If the elements are heavily fouled, using a higher flow rate is possible up to the maximum pressure drop across the membrane permissible (check with membrane manufacturer's data sheets). With higher flow rates, excessive pressure drop may be a problem. The maximum recommended pressure drops for most common membranes are 100kPa per element or 340 kPa per multi-element vessel, whichever value is more limiting.

6. Flush out. Clean RO permeate water is preferred for this stage. If clean RO permeate water is not available, pre-filtered raw water can be used for flushing out the cleaning solution unless there will be corrosion problems (e.g., stagnant seawater will corrode stainless steel piping). To prevent precipitation of any remaining contaminants, the minimum flush out temperature is 20°C. The system should be flushed for 1 hour

7. Re-start the system. The RO elements and the system need to stabilize before taking any performance data. The stabilization or normalisation period will vary depending on the severity of the fouling. To regain optimum performance, it may take several cleaning and soak cycles.

Additional Information

Never recirculate the cleaning solution for longer than 20 minutes. With longer recirculation, the carbonate scale can re-precipitate and end up back on the membrane surface, making it more difficult to clean. Carbonate scale reacts with HCl releasing carbon dioxide gas. Depending on the severity of the fouling, it may take repeated cleanings to remove all the scale. Cleaning severe scale may not be economical and element replacement may be the best choice.

NOTE! These recommendations are specific for the ROTEK membrane elements used in these reverse osmosis systems and may not be compatible with other brands of membrane elements. It is your responsibility to ensure the suitability of these recommendations and procedures if they are applied to membrane elements other than those which come with your system.

FAQ's

Do you need a tank?

No, you can directly use water as the RA system produces it, however, for immediacy you may wish to use a tank as this will increase your supply of instantly available water.

Does this system filter Fluoride, Lead, Pharmaceuticals, and Arsenic?

Yes, as well as Cyanide, Phosphate, Pesticides, Sodium, Cadmium, Sulfates, and many other contaminants up to certain levels. You may need other changes to media for high levels of these substances.

What PSI do I need? What is the operating pressure?

The minimum feed water PSI for the system is 20 and the maximum PSI is 60. If your PSI is too high you can purchase a Pressure Regulator to reduce your pressure to acceptable levels. Please get in touch with a qualified local representative or contact www.rotewater.com, who can give you more information based on your situation.

Does this unit soften water?

Your RA system will soften water. However, hard water does reduce the lifespan of your filters.

Can I install this system in the basement? If so, will it affect the efficiency of the RO System?

Yes, the RA system can be installed in a basement or other locations that are indoors with adequate water pressure, drainage, and power supply.

What is the discharge rate?

The typical discharge rate of RA is 0.35 gallons of wastewater for each gallon of pure water produced. Your water pressure, incoming water quality, and water temperature will affect your RO System discharge rate. **How often do I change Filters? Is there an indicator?**

The Sediment and Carbon Block Filters should be changed every 6 months. The RO Membrane and Post Activated Carbon Filter should be changed every one year at the same time as the second change of the 6 month filters. There is no direct indicator for filter changes. However, if you notice a drop in water quality before the 6 months or 1 year mark this may mean that due to your water quality your filter has degraded. If you reach 6 months or 1 year without noticing a change in taste you should still change your filter at this point as they are no longer viable.

Can I reuse discharge water?

Never consume discharge water. With proper installation, it is possible to utilize your discharge water. Please get in touch with a qualified local representative who can give you more information based on your situation.

What if I need to produce more water?

There are a lot of solutions to this problem, it's possible to upgrade your water system with some specialty equipment or we can help you with other solutions. Just contact us and we can help you find the solution that best fits your project.

Vacation Mode

When you plan to not use your RA system for 2 weeks to 1 month it should be Turned Off.

Turn Off System: Turn off the Power of RA.

Turn On System: Turn On the Power of RA.

For deactivation of 1 month or more:

1. Shut the incoming water supply and drain the entire system of water through your Pure Water Outflow.
2. Remove each filter and place vertically on a clean surface until dry.
3. Place each filter individually in a sealed air tight plastic wrap and place in the refrigerator for the duration (if filter is reusable and less than 3 months old).
4. You may leave the System and Filter Housings disassembled to ensure it stays dry to prevent bacteria growth.
5. You should wash the filter housings before replacing the filters, when you are ready to restart the system.

NOTE! Depending on your area's water you may not be able to reuse some or all of your filters. Please contact us if you need more information.

Year Limited Warranty



We Cover

This warranty covers any defects in the parts or manufacturing of your Rotek Water Reverse Osmosis Water Filtration System. We will give you new replacement parts in exchange for any defective parts.

What to Do

Please contact your qualified local representative who can give you information based on your situation. Be sure to have a copy of your purchase confirmation email or receipt. They will verify that the product and problem are under warranty and help you arrange to send your defective part back to Rotek Water with your receipt and contact information (name, address, phone number, and email address). They will help arrange to send the defective part, and the delivery of your replacement part, as well as guide you through the installation..

Time Covered

This warranty is effective for 1 full year from the date of the original purchase.

Not Covered

This warranty does not cover labor for removal or installation, accumulation of dirt or grime (you are responsible for your own cleaning), systems with the serial number removed or altered, damage from improper storage (high or low temperature, sun damage, etc), damage from a system not installed as instructions directed, anyone other than the original purchaser, damage from system abuse or unintended operation of the system, acts of God, improper water source, modification, negligence, use of the system beyond recommended specifications, Filters, RO Membrane, incidental damages from system failure, systems used with parts not provided by Rotek Water (including tanks, filters, faucets, pumps, diverter valves), or cosmetic damages..

Your State

Some states has further regulation on damages and warranty coverage. You may have other rights depending on your state.

Email us: sales@rotekwater.com

Operation Log

Operator							Start-up date
Site location							cleaning date
Model							Cleaning fluid Type 1
System Serial Number							Cleaning fluid Type 2
Observation	Range	Date	Date	Date	Date	Date	Date
operating hours							
Water inlet pressure (kPa) 140-650							
Membrane inlet pressure (kPa) 700-1400							
Pure water flow rate (lpm) 3-5lpm/Membrane							
Feed Water Conductivity or TDS							
Pure Water Conductivity or TDS							
Salt rejection rate (%) 95-99							
Dosing system							
Antiscalant Feed Settings							
acid feed setting							
flooded							
Last Influent Analysis Date							
Inlet water temperature							
Feed Water Conductivity or TDS							
Water hardness							