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# Raptor Lite Commercial Food Service Reverse Osmosis System

320-RPT-XXX-CS



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## Unpacking and Inspection

Be sure to check the entire unit for any shipping damage or lost parts. Also note damage to the shipping cartons. Contact US Water Systems at 1-800-608-8792 to report any shipping damage within **24 hours of delivery**. Claims made after 24 hours may not be honored. Small parts, needed to install the unit, will be in a parts bag. To avoid loss of the small parts, keep them in the parts bag until you are ready to use them.

## Safety Guide

- Check and comply with your provincial / state and local codes. You must follow these guidelines
- Use care when handling the RO system.
- The RO system works on 110 volt electrical power only. Be sure to use only the included transformer.
- Transformer must be plugged into an indoor 120 volt, grounded outlet only.
- **WARNING:** This system is not intended for treating water that is microbiologically unsafe or of unknown quality without adequate disinfection before or after the system. Contact US Water Systems for disinfection treatment equipment.

## Proper Installation

*This RO system must be properly installed and located in accordance with the Installation Instructions before it is used or the warranty will be void.*

- **DO NOT** install or store where the system will be exposed to temperatures below freezing or exposed to any type of weather. Water freezing in the system will break it. Do not attempt to treat water over 100°F.
- **DO NOT** install in direct sunlight. Excessive sun or heat may cause distortion or other damage to non-metallic parts.
- Properly ground to conform with all governing codes and ordinances.
- Use only *lead-free solder and flux* for all sweat-solder connections, as required by state and federal codes.
- Maximum allowable inlet water pressure is 125 psi. If daytime pressure is over 80 psi, night time pressure may exceed the maximum. Use a pressure reducing valve to reduce the pressure.
- **WARNING:** Discard all unused parts and packaging material after installation. Small parts remaining after the installation could be a choke hazard.



## Introduction

With our Raptor Lite Commercial Food Service Reverse Osmosis System, you can enjoy a wide range of beverages while dialing in the PRECISE level of TDS with the systems blending valve. This ensures that your beverages not only taste great but also provide essential nutrients and minerals for your body. Whether you're a coffee shop owner, restaurant owner, or a homeowner, our system is the perfect addition to any establishment that wants to provide its customers with the highest quality beverages.

## Features

- Single (500 GPD) or Dual (750 GPD) TFC high-flux reverse osmosis membrane
- 50% recovery rate
- Includes pressure gauges (pump pressure and output pressure)
- Bulkhead quick-connect fitting makes it truly "plug n' play"
- Made in USA
- Compact design is at home just about anywhere
- Cover removes easily for service.

## Seven Stage Treatment Process

1. 5 Micron Sediment Pre-Filter
2. Carbon Block Pre-Filter
3. Chloramine Carbon Block Pre-Filter
4. Reverse Osmosis Membrane
5. Storage Tank
6. Carbon Polishing Filter
7. Remineralization Cartridge

## How the System Works

A pressurized water source is fed to the first pre-filter which is a 5 micron sediment filter. The water then passes through a GAC and catalytic carbon filter to the solenoid shutoff valve. The water then goes from the solenoid switch to the booster pump. Water is pressurized at the booster pump and then is conveyed to the membrane. Product water (permeate) from the membrane filter is conveyed to the inline check valve and then to the high pressure switch then on to the pH remineralization system. As it is leaving the system to be stored, the TDS meter will check the water to determine the total dissolved solids in PPM. From there, the water can be pulled from the storage tank to any equipment that needs it. Waste water (concentrate) from the membrane is conveyed to the flow restrictors / membrane flush valve. The water leaving the flow restrictors / membrane flush valve is conveyed to an onsite drain.

## Specifications

Design	500 GPD	750 GPD
Configuration	Single Pass	
Feed Water Source	TDS < 1000 ppm	
Rejection and Flow Rates		
Rejection	97 - 98.5%	
Permeate Flow Rate	0.35 GPM	0.52 GPM
Connections		
Feed	3/8"	
Permeate	3/8"	
Concentrate	1/4"	
Tank Connection	3/8"	
Electrical Transformer	Input: 120VAC, 60Hz	
RO System L x W x H inch (cm)	17" x 12" x 17" (43.18x30.48x43.18)	

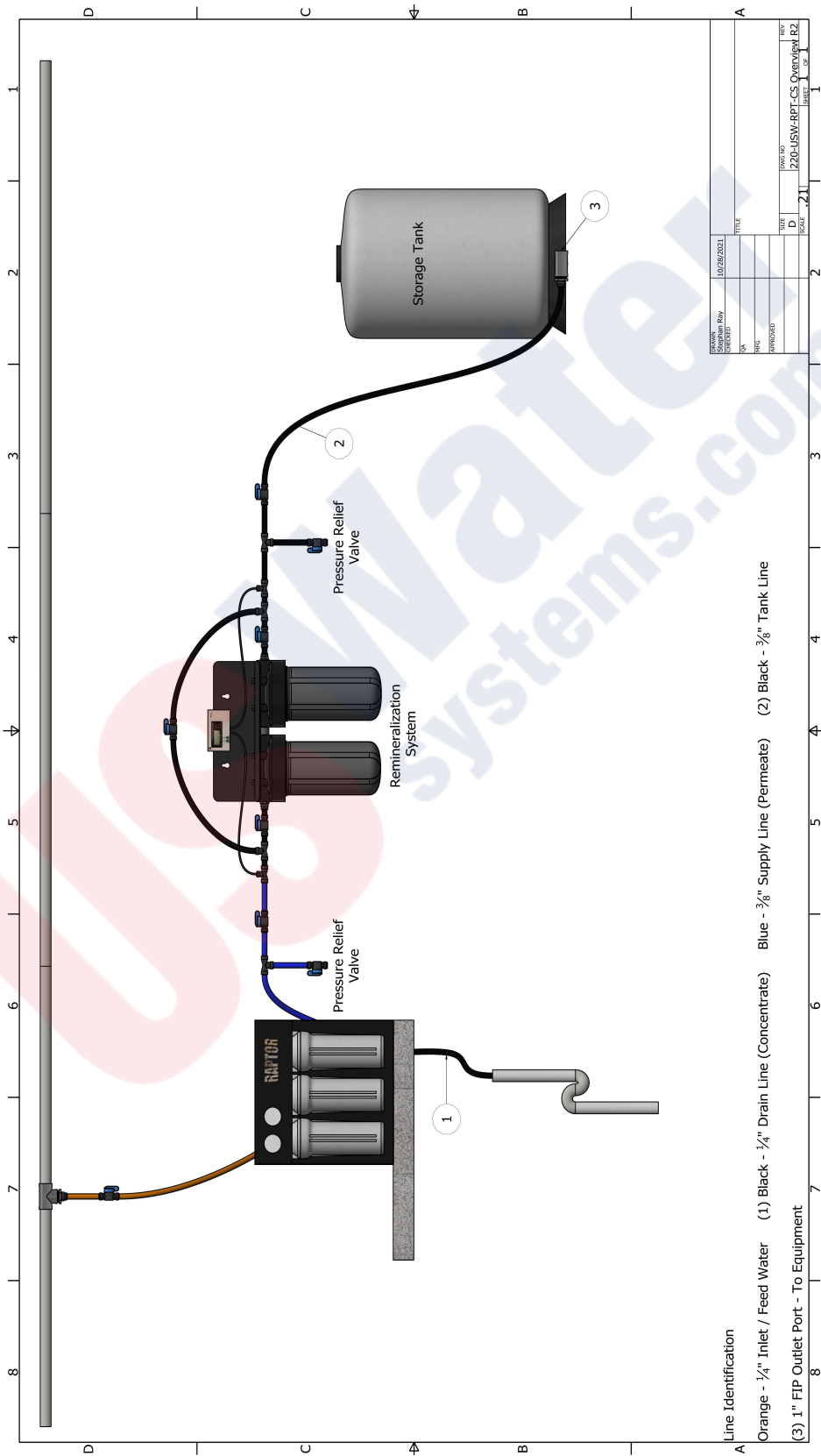
Operating Limits			
Design Temperature	77°F	Max Turbidity NTU	1
Max Feed Temperature	85°F	Max Free Chlorine ppm	0
Min Feed Temperature	40°F	Max TDS ppm	< 1000 ppm
Max Ambient Temperature	120°F	Max Hardness GPG	< 1
Min Ambient Temperature	40°F	Max pH (Continuous)	11
Max Feed Pressure psi	85	Min pH (Continuous)	3
Min Feed Pressure psi	30	Iron ppm	< 0.3
Max Operating Pressure psi	125	Manganese ppm	< 0.05
Max SDI Rating	< 3		

\* If any of the feed water parameters are not within the limits given, contact US Water Systems for assistance.

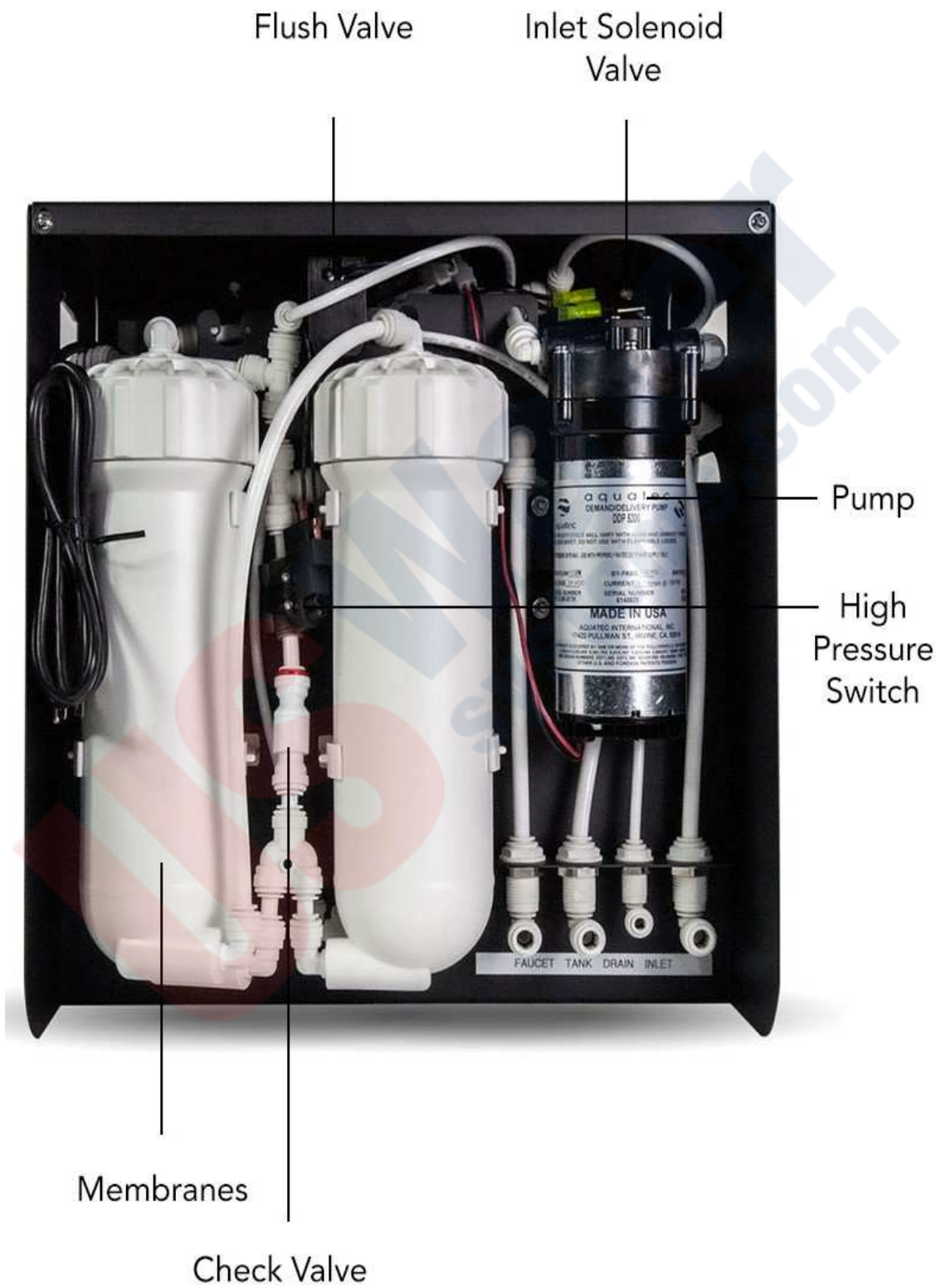
**NOTE: HIGHER TDS AND / OR LOWER TEMPERATURES WILL REDUCE THE SYSTEMS PRODUCTION. 2% OF THE SYSTEM OUTPUT CAN BE LOST FOR EVERY DEGREE "F" BELOW 77.**

- Do not use where the water is microbiologically unsafe or of unknown quality without adequate disinfection before or after the system.
- Pretreatment must be sufficient to eliminate chemicals, organics or inorganics that could attack the membrane material. Always turn off the unit, shut off the feed water, and disconnect the electrical power before working on the unit.
- Never allow the pump to run dry.
- Never allow the unit to freeze or operate with a feed water temperature above 100°F.

# System Flow Diagram



## Component Identification



Pump Pressure  
Gauge

Tank Pressure  
Gauge



Sediment  
Filter

Pre-Carbon  
Filter

Pre-Carbon  
Filter





## Rejection, Recovery & Flow Rates

The Raptor reverse osmosis system is designed to produce permeate water at the capacities indicated by the suffix in the systems name under the conditions listed above. For example, the RPT-500-CS produces 500 gallons per day of permeate water at the listed operating test conditions.

The amount of total dissolved solids (TDS) rejected by the membrane is expressed as a percentage. For example, a 98.5% rejection rate means that 98.5% of total dissolved solids do not pass through the membrane. To calculate the % rejection, use the following formula:

- **% Rejection = [(Feed TDS - Product TDS) / Feed TDS] x 100**
- Example: 98.5% = [(550 - 8.25) / 550] x 100

**NOTE: ALL TDS FIGURES MUST BE EXPRESSED IN THE SAME UNITS, TYPICALLY PARTS PER MILLION (PPM) OR MILLIGRAMS PER LITER (MG/L).**

The Raptor reverse osmosis system is designed to reject up to 98.5% NaCl, unless computer projections have been provided or stated otherwise.

The amount of permeate water recovered for use is expressed as a percentage. To calculate % recovery, use the following formula:

- **% Recovery = (Product Water Flow Rate / Feed Water Flow Rate) x 100**
- Example: 40% = (2.78 / 7.0) x 100

**NOTE: ALL FLOW RATES MUST BE EXPRESSED IN THE SAME UNITS, TYPICALLY GALLONS PER MINUTE (GPM).**



## RO Filter Installation Instructions

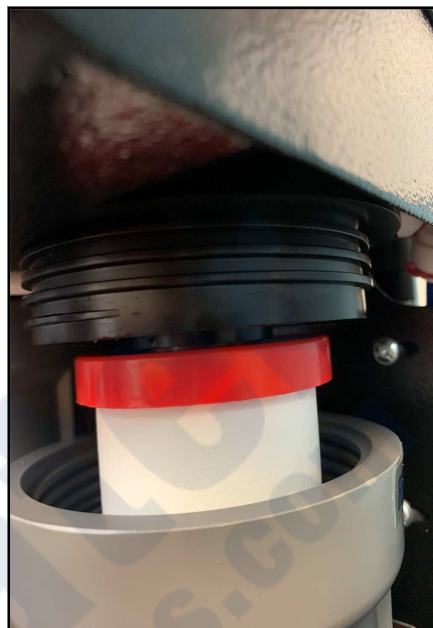
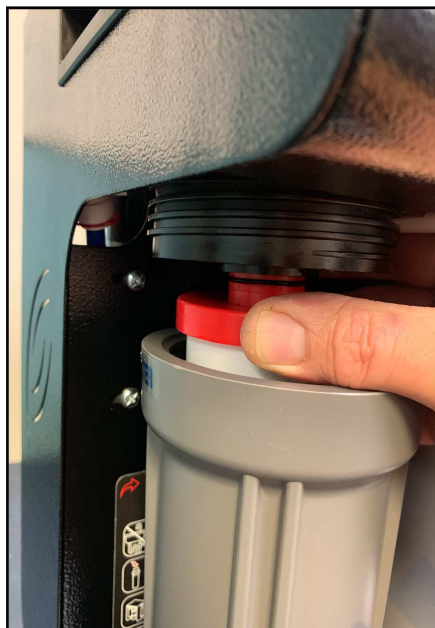
1. Remove the left filter sump. This is the Sediment filter housing. Grease the O-rings on the sump and the sediment filter.



2. Place the filter in the sump and place it under the filter top.



3. Push the filter up into the filter top and make sure it is seated fully. Install the filter sump and tighten hand tight.



4. Remove the center filter sump. This is the Granular Activated Carbon filter housing. Grease the O-rings on the sump and the carbon filter.





5. Place the filter in the sump and place it under the filter top.



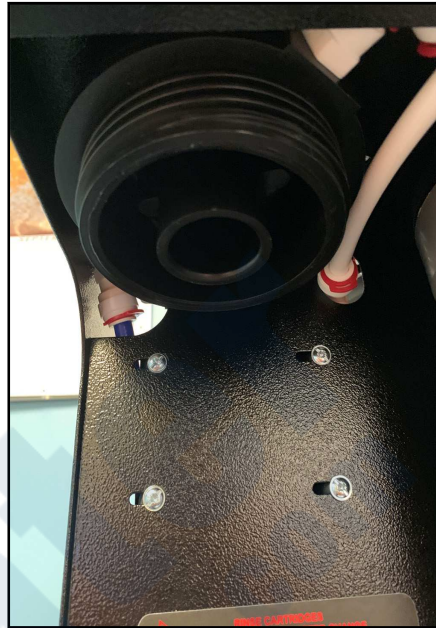
6. Push the filter up into the filter top and make sure it is seated fully. Install the filter sump and tighten hand tight.



7. Remove the right filter sump. This is the Chloramine carbon pre filter housing. Grease the O-rings on the sump and the carbon filter.



- Place the filter in the sump and place it under the filter top.



9. Push the filter up into the filter top and make sure it is seated fully. Install the filter sump and tighten hand tight.





## Membrane Installation, Removal & Replacement

Replacing and installing membranes in the pressure vessels is an easy process if you have the proper information and tools at hand. Please refer to the following instructions when removing and replacing membrane elements.

**WARNING: ALL PRESSURE GAUGES MUST READ ZERO BEFORE PROCEEDING. BEFORE ATTEMPTING, DISCONNECT THE POWER FROM THE SYSTEM AND BLEED ALL WATER PRESSURE FROM THE SYSTEM!**

1. Remove the end cap from the membrane housings. This is done by removing the 3/8" tubing and turning the cap counterclockwise. The tubing has a lock clip. Remove the clip and push in on the collet while pulling on the tubing. The tubing should easily slide out.



2. Open the membrane bag containing the membrane element from the shipping box. The membrane should be contained within a plastic oxygen barrier bag.

**WEAR GLOVES FOR THE FOLLOWING STEPS IN ORDER TO NOT CONTAMINATE THE MEMBRANE**

3. Make sure that all parts are clean and free from dirt. Examine the brine seal and permeate tube for nicks or cuts. Replace the cap O-rings or membrane brine seal if damaged. Lubricate the O-rings on the new membrane.



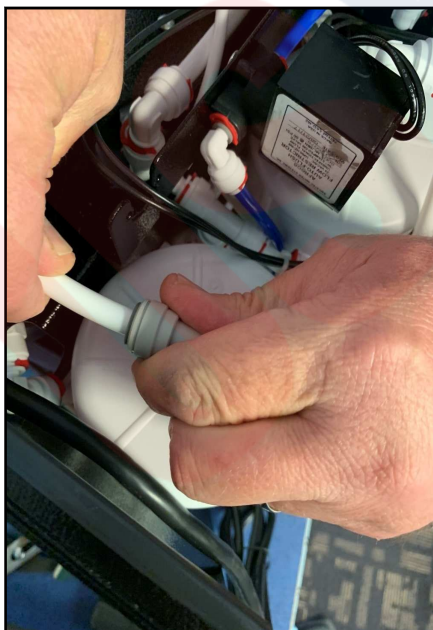
4. Flow directions should be observed for installation of the membrane element into the pressure vessel. The brine seal on the membrane should always be on the cap side of the membrane housing. This is the feed side of the housing and the brine seal should always be on the feed side.



5. Install the membrane in the housing and be sure that it is fully seated in the housing. When the membrane is fully seated, the permeate tube on the membrane should be inset from the housing.



6. Once the membrane is seated, the cap can be re-installed and the tube attached. Install the lock clip. The membrane is now installed.



## Replacing the Membrane Element

1. Remove the membrane cap from the membrane housing. Turn the cap counterclockwise while securing the membrane housing. Once the cap is removed, long nose pliers may be necessary to pull the old membrane element out of the membrane element housing. The membrane can be gripped at the permeate tube with the pliers if necessary.
2. Make sure that all parts are clean and free from dirt. Examine the brine seal and permeate tube for nicks or cuts. Replace the cap O-rings or membrane brine seal if damaged. Lubricate the O-rings on the new membrane.



3. Flow directions should be observed for installation of the membrane element into the pressure vessel. The brine seal on the membrane should always be on the cap side of the membrane housing. This is the feed side of the housing and the brine seal should always be on the feed side.
4. Install the membrane in the housing and be sure that it is fully seated in the housing. When the membrane is fully seated, the permeate tube on the membrane should be inset from the housing.
5. Once the membrane is seated, the cap can be re-installed and the tube attached. The membrane is now installed. See Startup Instructions to restart the system.

**CAUTION: WET MEMBRANES ARE SHIPPED IN A PRESERVATIVE SOLUTION. THE MEMBRANES MUST BE FLUSHED FOR AT LEAST 1 HOUR TO REMOVE THE PRESERVATIVE FROM THE MEMBRANE. DISCARD ALL OF THE PERMEATE AND CONCENTRATE WHICH IS PRODUCED DURING THE FLUSH PERIOD.**

## RO System Installation

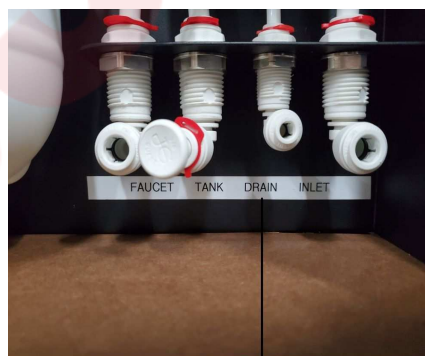
1. Inspect the system for any damage that could have occurred during shipment. Although all systems have been individually inspected, complete a quick inspection of the fittings, tubing and other components.
2. Please provide a reasonable amount of space for installation and leave 18 inches of space in front of the filter housings for easy removal during maintenance endeavors.  
**NOTE: THE REVERSE OSMOSIS SYSTEM SHOULD BE INSTALLED INDOORS AND IT IS SUGGESTED THAT IT NOT BE IN DIRECT SUNLIGHT OR EXTREME COLD.**
3. Connect the 3/8" tube fitting to an incoming water source. The minimum feed water pressure should be at least 30 psi. The systems minimum operating (membrane) pressure is 80 psi but the optimum operating pressure is 100 psi.



From Water Source

**NOTE: DO NOT OPERATE AT A PRESSURE EXCEEDING 125 PSI.**

4. Connect the concentrate 1/4" tubing (waste) line to drain.



Drain Line to Facility Drain



5. Connect a short piece of tubing to the faucet connection port on the Raptor system. Attach a supplied 3/8" QC union tee and ensure that the offset port is still available.



Faucet / Device / Atmospheric Tank Connection

6. Attach a short piece of tubing to the offset port in the previously installed tee. Proceed to connect a supplied 3/8" ball valve to this tubing. This will act as a pressure relief valve for RO filter changes.



7. Attach a short piece of tubing to the outlet port of the 3/8" QC union tee. Proceed to connect a supplied 3/8" ball valve to this tubing.



8. Attach a final piece of tubing to the previously installed ball valve. Ensure this tubing is long enough to reach where the RO storage tank is installed. It will be attached later in the installation.



## RO Tank Installation

1. Remove the RO tank from its packaging and place it in the desired location between the reverse osmosis system and the pH Remineralization system.
2. Thread tape the port at the bottom of the tank and install the reinforced coupling. Tighten it hand tight then, with a pair of channel locks, tighten it further. Use a second pair of channel locks to stabilize the pipe and ensure damage does not occur.  
**NOTE: If using a 20 Gallon tank, skip this step and proceed to Step 4.**
3. Thread tape the supplied 1" nipple and install it into the previously installed reducing coupling. Tighten it hand tight then, with a pair of channel locks, tighten it further. Use a second pair of channel locks to stabilize the coupling and ensure damage does not occur.
4. Thread tape the tank port or installed nipple at the bottom of the tank and install the steel reinforced union tee. Ensure the offset port of the tee is installed on the tank port or installed nipple. Tighten it hand tight then, with a pair of channel locks, tighten it further. Use a second pair of channel locks to stabilize the pipe and ensure damage does not occur.





5. Install the 1" x 1/2" reducing bushing in the inlet side of the tee. Ensure the threads are wrapped with thread tape and tighten it hand tight. Using a pair of channel locks, tighten it further.



6. Install the 3/8" QC x 1/2" MNPT fitting into the previously installed reducing bushing. Ensure the threads are thread taped and tighten it hand tight. Use an adjustable wrench to tighten it further.



7. Repeat Steps 5 and 6 for the outlet side of the tank tee.
8. Connect a piece of tubing to the outlet side of the tank tee. This will be connected later in the installation process.

## Remineralization Filter Installation

1. Install the remineralization system in the desired location in the water treatment system. The caps are marked "IN" and "OUT" on the top of the housings.
2. The system will be built when it arrives flowing left to right. This can be disassembled and changed to match a right to left flow application.



3. Use a level and pencil to mark a line on the wall. Mark the locations of the holes in the filter bracket on the wall. Make sure the correct fasteners are used to mount the system. This system needs to be mounted to a solid wall surface. A mounting board can be installed on a studded wall to ensure a good mounting surface.



4. Install the supplied threaded bushings in the inlet and outlet ports. Be sure to use Teflon tape on the fittings. Tighten them with channel locks, taking care not to crack the housings.
5. Install the 3/8" QC x 1/2" MIP connectors into the previously installed bushings. Be sure to use Teflon tape on the fittings. Tighten them hand tight then use a crescent wrench to tighten an additional turn.
6. Cut two (2) pieces of tubing approximately 4" each from the supplied tubing. Install a piece each into the inlet and outlet QC ports.

7. Install the 3/8" QC ball valve onto the now hanging tubing on the inlet side. Repeat this with a second ball valve and the outlet side.



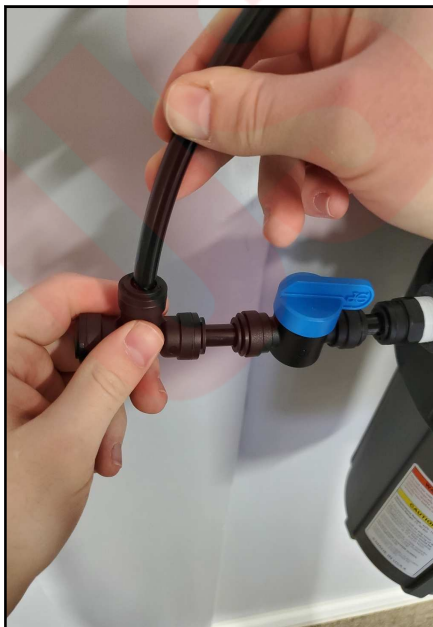
8. Cut an additional two (2) pieces of tubing approximately 4" long each from the supplied tubing. Install a piece each into the open ports on each ball valve.



9. Install the 3/8" QC union tee on the tubing hanging from the ball valve on the inlet side. Make sure it is oriented so that the offset port is still open. Repeat this process with the outlet side.



10. Install a tube from the offset QC port on the inlet tee to the offset port on the outlet tee. Cut the tubing in the center and install the last available ball valve. It is ok if this line is free hanging as long as kinks do not occur.





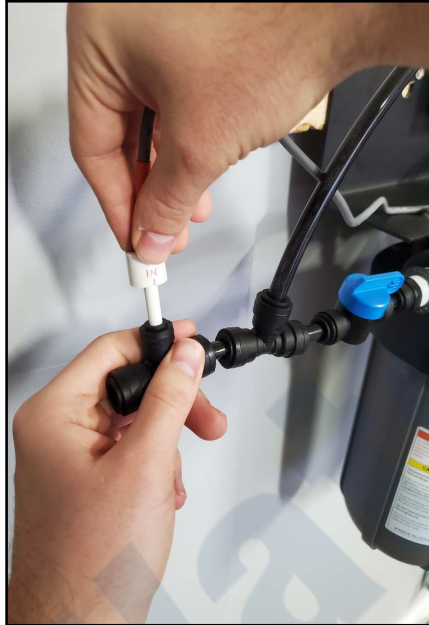
11. Cut an additional two (2) pieces of tubing approximately 4" from the supplied tubing. Install a piece each into the open ports on each 3/8" QC union tee.



12. Install the 3/8" x 3/8" x 1/4" QC tee onto the now hanging tubing on the inlet side. Make sure it is oriented so that the offset port is still open. Repeat this process with the outlet side.



13. Attach the "IN" probe from the EC-2 Monitor to the offset port of the inlet side tee. Ensure it is connected properly by lightly pulling on the probe once installed. If installed correctly, it should not pull out.



14. Repeat Step 14 with the "OUT" probe and the outlet side tee.



15. Connect the tubing previously installed in the outlet port of the RO tank into the inlet port of the remineralization system.
16. Install a piece of tubing into the outlet port of the remineralization system. This will be connected later in the installation process.

17. Remove the sumps from the filter housings and install the filters. Ensure that the carbon block is installed in the first sump and the pH filter is installed in the second. A very small amount of silicone grease or water can be used to lubricate the O-rings on the filter. The filter housing cap has a coupling that will accept the o-ringed nipple on top of the filter. Install the filter so the nipple on the top is fully seated in the filter housing cap.



18. Lubricate the O-ring on the filter housing sump and install it. Tighten the filter sump hand tight. That should be adequate. Do not use abrasive tools to tighten the housing or damage may occur.

**NOTE:** Adding a little bit of lubricant/silicone to the sump threads will make the sump easier to remove when replacing the filter.



**NOTE:** The filter will fit tightly in the housing cap. It will take force to push the filter in the cap. This ensures a positive seal. Be sure the the filter is pushed all the way in the cap.



## Start Up Procedure

1. Turn on the feed water and plug the booster pump transformer into a power supply of 110 volts 60 Hz.
2. Dispose of the initial product / permeate (clean) water until the TDS level / conductivity of the product water stabilizes at the lowest (cleanest) value. Use any TDS or conductivity meter to monitor the product water quality. A minimum quality of 96% NaCL rejection is recommended (See the rejection rate calculation).
3. Once the system has been flushed and the TDS level has stabilized, the permeate / product line can be attached to the storage tank. Additional flushing of the storage tank and distribution system may be required to reach the TDS level that is produced directly after the RO system at all points of use.
4. Proceed to flush the pH remineralization system by allowing water to run through the system. Take this time to also dial in the desired pH of the remineralization filter using the blending valves on the system. Once the water is running clear and the system has been adjusted, attach the outlet tubing from the pH remineralization system to the inlet of the distribution system or machine requiring the pH adjusted water.
5. This system has been factory wired and preset with a pressure switch at 40 - 60 psi, which is only to be used with a pressurized bladder tank. If using an atmospheric storage tank, a float switch will be required to turn the system on and off. An electric float switch can be used. The main power can be switched by using a "piggy back" connector type float switch or an outlet can be wired to switch power on and off utilizing a float switch.
6. The system will operate at around 100 - 125 psi when the pump is running. This pressure will vary depending on the feed water temperature and quality. The system is designed to operate at a pressure above 100 psi to ensure the membrane is compressed and is providing quality water.

## Filter Replacement Instructions

### RO Filter Replacement

1. Unplug the RO system and shut off the water supply. Ensure the ball valve on the storage tank supply line is shut.
2. Run tubing from the pressure relief ball valve to a drain and open the ball valve to relieve the RO pressure. Both gauges on the system should show 0 psi.
3. Remove each filter and sump and discard the old filter. Remove any excess water from the sump as well.
4. Refer to "RO Filter Installation Instructions and install all filters.
5. Turn the water supply to the RO on and plug the system back in. The system will take a few minutes to pressurize.
6. Dispose of the initial product / permeate (clean) water until the TDS level / conductivity of the product water stabilizes at the lowest (cleanest) value. Use any TDS or conductivity meter to monitor the product water quality. A minimum quality of 96% NaCL rejection is recommended (See the rejection rate calculation).
7. Once the system has been flushed and the TDS level has stabilized, close the pressure relief ball valve and remove the tubing from it. Slowly open the ball valve to the storage tank until it is fully open.

### Remineralization Filter Replacement

1. Close the supply ball valve on the inlet side of the remineralization system as well as ensuring the bypass ball valve on the top of the system is closed
2. Open the faucet closest to the remineralization system and allow all the water to empty from the plumbing systems.

**WARNING! If the pressure is not released, the filter sump will be very difficult to get loose. It is imperative that the water pressure is released prior to attempting to remove the filter sump.**

3. Remove the sump by spinning it clockwise until the sump is completely removed.



4. Remove the old filter and discard.
5. Lubricate the O-rings and install the new filter in the filter housing cap.



6. Lubricate the O-Ring for the sump and the sump threads with food grade silicone grease.



7. Install the filter sump in the filter cap by turning it counter-clockwise until it is hand tight.



8. Slowly open the inlet ball valve and open a faucet downstream of the filter to release the air.
9. Once the air has been released and the water is running clear, fully open the inlet ball valve and close the faucet.
10. Check the housing for leaks and repair as necessary.

## Operation and Maintenance

The reverse osmosis process causes a concentration of impurities. The impurities may precipitate (come out of solution) when their concentration reaches saturation levels.

**NOTE: PRECIPITATION CAN SCALE OR FOUL MEMBRANES AND MUST BE PREVENTED.**

1. Periodically observe the quality and quantity of product water from the system  
**NOTE: CHECK THE FEED WATER PRESSURE GOING INTO THE REVERSE OSMOSIS MEMBRANE. A SIGNIFICANT DROP IN PRESSURE COULD INDICATE A FOULED PRE-FILTER**
2. A 20% increase in TDS when checking the permeate water indicates possible membrane damage and the membrane may need to be replaced.
3. It is suggested that a hand held TDS digital meter is used once per week to monitor the water quality.  
**NOTE: IF THE TDS OF THE FEED WATER EXCEEDS 1000 PPM, A HIGHER FLOW RATE FLOW RESTRICTOR SHOULD BE USED TO EXTEND THE MEMBRANE LIFE.**
4. It is important to maintain and / or replace the carbon block regularly since the Thin Film Composite membranes are chlorine sensitive. Irreversible damage will occur with any chlorine present in the feed water.
5. The product line has a one way check valve installed. The check valve should be checked regularly and replaced if it is not properly sealing.
6. Keep the feed water temperature above 36°F (4°C)  
**NOTE: EXTREMELY COLD FEED WATER WILL LOWER THE PRODUCT WATER OUTPUT AND INCREASE PUMP PRESSURE.**

### Abnormal Permeate Flow

Permeate flow should be within 20% of the rated production, after correcting the feed water temperatures above or below 77°F.

Example:

- 5 gpm @ 59°F ( $5 / 1.42 = 3.52$  gpm)
- 5 gpm @ 77°F ( $5 / 1 = 5$  gpm)
- 5 gpm @ 84°F ( $5 / 0.89 = 5.62$  gpm)



## **Service Assistance**

If service assistance is required, please complete the following process:

Contact US Water Systems. Prior to making the call, have the following information available: system installation date, current operating parameters (e.g. flow, operating pressures, pH, etc.) and a detailed description of the problem.



## Temperature Correction Factors For Membranes

Find the temperature correct factor (TCF) from the table below. Divide the rated permeate flow at 77°F by the temperature correction factor. The result is the permeate flow at the desired temperature.

Temperature °F (°C)	Temperature Correction Factor	Temperature °F (°C)	Temperature Correction Factor	Temperature °F (°C)	Temperature Correction Factor	Temperature °F (°C)	Temperature Correction Factor
50.0 (10.0)	1.711	58.5 (14.7)	1.437	69.1 (20.6)	1.164	77.5 (25.3)	0.991
50.5 (10.3)	1.692	59.0 (15.0)	1.422	69.6 (20.9)	1.152	78.1 (25.6)	0.982
51.1 (10.6)	1.673	59.5 (15.3)	1.406	70.0 (21.1)	1.144	78.6 (25.9)	0.974
51.6 (10.9)	1.654	60.1 (15.6)	1.391	70.5 (21.4)	1.132	79.0 (26.1)	0.968
52.0 (11.1)	1.642	60.6 (15.9)	1.376	71.1 (21.7)	1.120	79.5 (26.4)	0.959
52.5 (11.4)	1.624	61.0 (16.1)	1.366	71.6 (22.0)	1.109	80.1 (26.7)	0.951
53.1 (11.7)	1.605	61.5 (16.4)	1.351	72.0 (22.2)	1.101	80.6 (27.0)	0.943
53.6 (12.0)	1.588	62.1 (16.7)	1.337	72.5 (22.5)	1.090	81.0 (27.2)	0.937
54.0 (12.2)	1.576	62.6 (17.0)	1.323	73.0 (22.8)	1.078	81.5 (27.5)	0.929
54.5 (12.5)	1.558	63.0 (17.2)	1.313	73.6 (23.1)	1.067	82.0 (27.8)	0.921
55.0 (12.8)	1.541	63.5 (17.5)	1.299	74.1 (23.4)	1.056	82.6 (28.1)	0.913
55.6 (13.1)	1.524	64.0 (17.8)	1.285	74.5 (23.6)	1.049	83.1 (28.4)	0.905
56.1 (13.4)	1.508	64.6 (18.1)	1.272	75.0 (23.9)	1.038	83.5 (28.6)	0.900
56.5 (13.6)	1.496	65.1 (18.4)	1.258	75.6 (24.2)	1.028	84.0 (28.9)	0.892
57.0 (13.9)	1.480	66.0 (18.9)	1.236	76.1 (24.5)	1.017	84.6 (29.2)	0.884
57.6 (14.2)	1.464	66.6 (19.2)	1.223	76.5 (24.7)	1.010	85.1 (29.5)	0.877
58.1 (14.5)	1.448	68.0 (20.0)	1.189	77.0 (25.0)	1.000	85.6 (29.8)	0.869

If a system is rated to produce 5 GPM of permeate water at 77°F, the same system will produce more water at a higher temperature. It will also produce less water at a lower temperature. Use the temperature correction table to obtain the correct flow.



## Troubleshooting

Symptoms	Possible Causes	Corrective Action
Low Inlet Pressure	Low supply pressure	Increase inlet pressure
	Pre-filters plugged	Change filters
	Solenoid valve malfunction	Replace sol. valve and / or coil
	Motor may not be drawing correct current	Use clamp-on amp meter to check the motor amp draw
	Leaks	Fix any visible leaks
Low Permeate Flow	Cold feed water	See temperature correction sheet
	Low operating pressure	See low inlet pressure
	Defective membrane brine seal	Inspect and / or replace brine seal
	Fouled or scaled membrane	Clean membrane
High Permeate Flow	Damaged product tube O-rings	Inspect and / or replace
	Damaged or oxidized membrane	Replace membrane
	Exceeding maximum feed water temperature	See temperature correction sheet
Poor Permeate Quality	Low operating pressure	See low inlet pressure
	Damaged product tube O-rings	Inspect and / or replace
	Damaged or oxidized membrane	Replace membrane
Membrane Fouling	Metal Oxide Fouling	Improve pretreatment to remove metals
	Colloidal Fouling	Optimize pretreatment for colloid removal
	Scaling (CaSO <sub>4</sub> , CaSO <sub>3</sub> , BaSO <sub>4</sub> , SiO <sub>2</sub> )	Increase anti-scalant dosage for CaVO <sub>3</sub> and CaCO <sub>4</sub> . Reduce recovery
	Biological Fouling	Replace cartridge filters
	Organic Fouling	Activated Carbon or other pretreatment
	Chlorine Oxidation	Check Chlorine feed equipment and de-chlorination system
	Abrasion of membrane by Crystalline Material	Improve pretreatment. Check all filters for media

## Warranty

**FIVE YEAR COVERAGE: Membrane and Filter Housings** - We warrant that for five (5) years from the date of purchase, we will replace the membrane and filter housings at no charge to you except for transportation and standard labor charges. Housings damaged due to environmental issues or improper installation are not covered. Consumables such as pre-filters and the membrane are not covered under this warranty.

**TWO YEAR COVERAGE: System Components** - We warrant that for two (2) years from the date of purchase, we will replace the system components at no charge to you except for transportation and standard labor charges. Components damaged due to environmental issues or improper installation are not covered. Consumables such as pre-filters and the membrane are not covered under this warranty.

**GENERAL PROVISIONS** - This warranty does not apply to any commercial or industrial installations which has been subjected to misuse, neglect, alteration or accident; or to any damage caused by fire, flood, freezing, Acts of God, or any other casualty, or if the original serial numbers have been removed. RO systems that are operated out of design parameters will not be warranted.

These warranties are in lieu of all other warranties expressed or implied and we do not authorize any person to assume for us

any other obligation on the sale of this RO system. No responsibility is assumed for delays or failure to meet these warranties caused by strike, government regulations or other circumstances beyond the control of US WATER SYSTEMS, INC. .

To obtain warranty service, call or write:  
US WATER SYSTEMS, INC. 1209 Country Club Road, Indianapolis, IN 46234 (800) 608-USWA.

ANY IMPLIED WARRANTIES OF FITNESS OR MECHANABILITY ARE LIMITED TO THE TERMS OF THIS EXPRESSED WARRANTY AND THERE ARE NO WARRANTIES WHICH EXTEND BEYOND THOSE HERIN. US WATER SHALL NOT BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES.

Some states do not allow the exclusion or limitations of incidental or consequential damages so the above limitation may not apply. This warranty gives specific legal rights to the customer and the customer may also have other rights which vary from state to state.

THIS WARRANTY MAY BE TRANSFERRED TO A SUBSEQUENT OWNER WITH WRITTEN APPROVAL OF US WATER AND PAYMENT OF STANDARD TRANSFER FEE.