

AQUA FX

The leaders in reverse osmosis.



5 Stage Mako RO/DI Instruction & Owner's Manual

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MAKO INSTALLATION INSTRUCTIONS

Congratulations on your new AquaFX Mako water treatment system. There are a few basic steps about the installation and maintenance of your water treatment system. If you should have any difficulties or questions, please do not hesitate to contact us and we will be happy to help you any way we can.

ALWAYS hook your RO unit to a softened water supply.

Your system was custom built to order, and it is ready to hook up to a water supply with the appropriate adapters included. Aqua FX pressure tests all systems prior to shipping, so your RO membrane will not be installed, you simply remove the membrane

from the plastic bag and place it in the white housing of the unit. Insert the end with the double O-rings in first.



it is located across the top



Double O-Rings

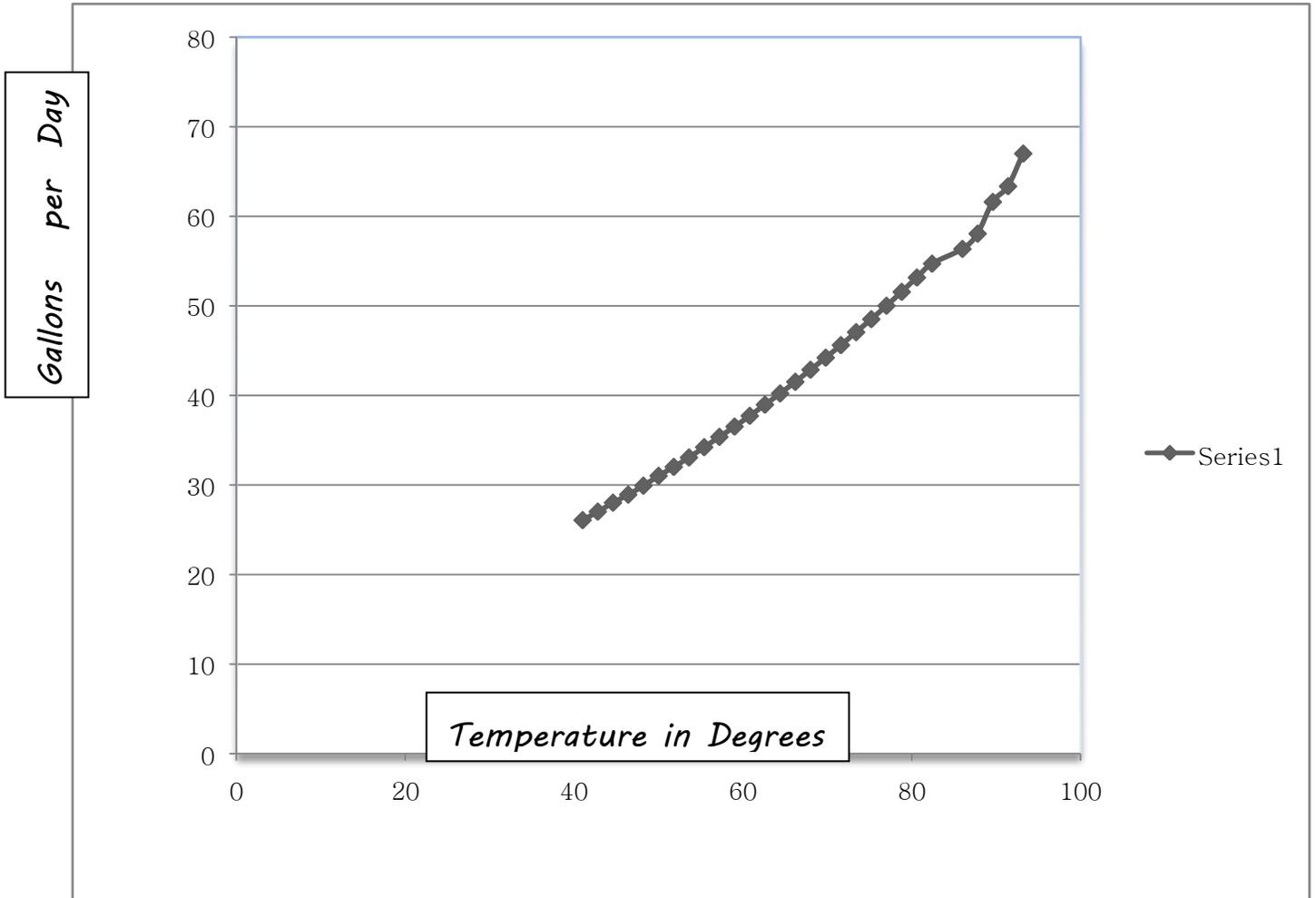
Before you can hook the unit up to a supply.

- 1) *Unpack your unit completely.*
- 2) *Inspect for any damage or broken parts as a result of shipping.*
- 3) *Locate and connect the supply side of the equipment. This will be the right side as you face the system. The supply side will consist of **Black** 1/4" tubing and has the connection for the type of water supply you specified.*
- 4) *Locate the **Yellow** drain line, and place in an appropriate area for drainage.*
- 5) *Locate the **blue** product water line that will provide treated water for use and slip the tubing into the left side of the system.*
- 6) *Once installed, allow the system to run for approximately 15 minutes to flush membrane completely. Please check systems for leaks, parts can come lose during shipping!*
- 7) *You will know when to replace the reusable color changing DI when the resin color has completely changed (the cartridge will change colors from the bottom up). The sediment and carbon block filters (stage 1 and 2) should be changed According to accompanying chart or sooner if, you notice your pressure gauge drop 5 PSI or more you should then replace the stage 1 and 2 filters. You need at least 35 PSI supply pressure to permeate the membrane.*
- 8) *The only way to check your membrane for proper rejection is with a TDS Meter (Total dissolved solids)*
- 9) *You are now ready to make clean, fresh, ultrapure water.*

These instructions cover the most common set up configurations. If you ordered different colored tubing or filter cartridge housings, you may not be able to follow these instructions completely. All AquaFX systems come with a **3 year limited warranty**. All Clear Canisters **MUST** be re-placed after 3 years. Please contact us if you have problems with your unit. Customer is responsible for filter and membrane changes and associated costs. AquaFX carries a complete line of parts and accessories for all of our systems at www.aquariumwaterfilters.com. Thank you for your business!

Temperature Compensation Table

The Series 1 curve demonstrates the effect temperature has on the permeate flow of a 50 Gallon per Day (GPD) membrane.



The above curve was generated by varying the water temperature. 50 GPD is produced at approximately using 72 degrees F (at a constant pressure of 50 PSIG, and constant TDS of 125PPM)

The three major variables that control permeate are temperature, pressure and incoming water quality. We can control these to some extent; please do not hesitate to call us for assistance

Aqua Engineering & Equipment, Inc.

Returned Goods Policy

Damaged Merchandise:

Aqua Engineering & Equipment, Inc. cannot be held liable for damage to or loss of a shipment by any carrier. Claims for damaged products, suspected damages, container shortages, or pilferage within the container on delivery must be noted on the delivery receipt. The carrier's claims representative should then be notified immediately.

Returned Goods:

Aqua Engineering & Equipment, Inc. cannot assume responsibility for the error of others. Merchandise ordered incorrectly cannot be returned without written authorization. Please contact the Shipping/Receiving department for a Return Materials Authorization (RMA) number. Special /Custom orders or items cannot be returned. Material must be new and in marketable condition. We reserve the right to levy a restocking fee on all goods. We will assume all responsibility for our own errors at no charge to the customer.

Shipping & Receiving
Phone: 407.599.2123
Fax: 407.599.2124

Cancellation or Order Changes:

Orders are processed as they are received. Internet and phone orders must cancel within 24 hours of order time. Any orders which require custom materials or components (i.e. custom tanks, brackets, electrical components) cannot be cancelled once special material has been ordered and/or production has begun.

Accessories

Drinking water kit: Turn your RO/DI system into a drinking and cooking water purifier for your home. Better than bottled water because you control the process.

Handheld TDS Meters: The only true way to check the performance of your system. Check the TDS to detect early membrane exhaustion. Checking the water after the DI cartridge will give you added peace of mind that your reef/salt water system is receiving the quality of water you need.

RO/DI Water Storage Tanks: These tanks are used by many of our customers to store water or to save up sufficient water to begin a new tank. They can be equipped with automatic shutoff valves to reduce waste water.

Membrane Flush Kits: Flush kits are used to extend the life of the membrane by rinsing debris that accumulate over time.

Piggy Bank Membrane system: Add a membrane to your existing system to approximately double your output! Conditions Permitting, call us for an assessment

Storage Tank(s): Many times storage of water is needed or just desired. 40 gallon or larger food grade tanks are available to automatically top off. We can design tanks to your needs!

Limited 3 Year Warranty

Aquarium & Home Water Treatment Systems

This unit is of exceptional quality, hereby warrants equipment to its first purchaser at retail as follows;

This warranty covers filter cartridge housings, fittings and tubing and all components. Filter replacements including sediment cartridges, carbon block cartridges, DI cartridges and Reverse Osmosis membranes are the responsibility of the consumer. Exceptional water conditions are NOT covered. Potable water supplies ONLY.

Warranty begins at the time of product registration, and must be registered within 10 days of the date of purchase.

This warranty does not require replacement of the entire unit. The defective part (s) (or the entire unit) will either be repaired or replaced with new Parts

This warranty is void if the equipment is not installed and operated according to instructions. It does not apply to damage caused by abuse, accident, neglect, freezing or other abnormal conditions beyond the company's control. Clear Canisters are covered for a 3 year period and should be changed no later than 3 years from installation and each 3 year period following. SOFT WATER Only.

Filter Change Sheet and Normal Operation

Note: Filters are referenced in the order in which they appear in the system

1. **Sediment Filter:** *This filter is first in line; removes particles that can be physically filtered out. An example of a particle that would be removed is sand. This filter's life depends on the amount of particles in your water. The best gauge of this filter's life is pressure drop. When you see a 5PSIG drop, you should change your filter. Discoloration is also a sign that the filter is loaded and therefore time to replace with a new filter.*

2. **Carbon Block, GAC or Chloramine Blaster Filter:** *These filters effectively reduce VOC's (Volatile Organic Compounds) ONLY for water that is safe by the federal Safe Water Drinking Standards. If you have water with a known containment, you need to treat it accordingly. The only cost effective way to predict filter life is by estimating the gallons. (unless carbon is being used for a known containment, then testing is essential) The carbon block will filter 3,750 gal @ 1.0 GPM of 2ppm Chlorine (Cl₂). A GAC will yield 5000 gallons of treated water @ 1.0 GPM of 2ppm Chlorine (Cl₂). The Chloramine Blasters are run 2 in series and will yield approximately 8000 gallons of treated water. **Do not exclude drain water from this capacity, as it is treated water.***

3. **Reverse Osmosis Membrane:** *This is the first component in the system that reduces Total Dissolved Solids (TDS); a common example of dissolved solids can be salts or calcium. A TDS meter is the best way to determine if your membrane is operating properly. A properly operating membrane will give you a TDS reduction of at least 90%. EXAMPLE: Raw water TDS is 100ppm, after the membrane it should be 10ppm or less. Membranes can fail by Clogging or Scaling, in which case very little or no water will be produced. Membranes will also fail from contact with chlorine. If this happens the water quality will be very poor. So changing the carbon filter on time is essential. Hot water will also ruin a membrane (>80 Deg. F). If your membrane produces significantly more than it is rated for, that is an indication that something is wrong.*

4. **Deionization Filter (DI): IF USED** *The DI filter is the last filter inline. This filter consists of 2 resins. One is charged with Hydrogen (H⁺) and the other a Hydroxide ion (OH⁻). As water passes over these resins, the remaining "salts" (or ions) exchange out and only H⁺ and OH⁻ are released into the stream. Due to the quality of resin we use, the water you get will be, literally as pure as possible. The resin is a color indicating resin; it will slowly change from a dark purple/blue/black to a rust red/orange color. As this filter nears the end of its useful life you may experience "break through". Keep this in mind, depending on the water quality needed. For applications demanding 18 Mega-Ohm water, 2 DI's are **STRONGLY** recommended.*

Trouble shooting guide

Problem	Solution
<ul style="list-style-type: none"> ● High TDS after membrane 	<p>Clogged Pre-filters. Causing Pressure Drop. Insufficient pressure will yield poor TDS rejection from RO membranes. Change Pre-Filters.</p> <p>Average Membrane life is 2 to 3 years. Most common cause for membrane failure is insufficient pre-filter maintenance. AquaFX Carbons are rated for 3,750 gal @ 1.0 GPM of 2ppm Chlorine. Do not exclude drain water from this capacity, as it is treated water. Very high TDS (>550ppm) may also yield premature failure.</p>
<ul style="list-style-type: none"> ● Low incoming water pressure. 	<p>Incoming water pressure must be above 40 PSI, Add a booster pump if below 40psig. Make sure Pre-Filters are not clogged causing low pressure.</p>
<ul style="list-style-type: none"> ● No water to drain. 	<p>Flow Restrictor is clogged, Replace Drain Flow Restrictor. (rare) Check to see if water is turned on.</p>
<ul style="list-style-type: none"> ● All water is going out of the drain 	<p>With no back pressure, most of the water will exit out of the drain. Make sure a Flow restrictor is present.</p>
<ul style="list-style-type: none"> ● Very little/slow water production 	<p>Reference units flow rate vs. actual production. Slow flow from RO is normal. Cold water, low pressure and high contaminant levels will contribute to decreasing the rate of water production. Heating water (NO WARMER THEN 80 Degrees F), increasing pressure or additional pre-filtration will help to counteract these adverse affects.</p>
<ul style="list-style-type: none"> ● Drain Water Continues After Product line is full 	<p>The most common cause of a 'continuing drain' is a pressure leak on the product side of the RO. If the pressure cannot build, the automatic shut-off (ASO) will not close. Check ASO with a ball valve right after RO. Close Ball valve then wait 1-3 minutes. If drain continues, replace ASO Valve. If it stops, have the customer, find then stop pressure leak. If a float valve is being used, it is more than likely the culprit.</p>
<ul style="list-style-type: none"> ● The incoming feed water TDS has increased. 	<p>An increase in feed water TDS will also give an increase in Product Water TDS. R.O. (Dolphin) Users will see this rise in TDS, due to the membrane removes a percentage of TDS. RO/DI (Mako, Mako, Great White) Users will not see this rise, but the DI will exhaust faster than normal.</p>
<ul style="list-style-type: none"> ● DI is exhausting very fast 	<p>R.O. Membranes are manufactured with a preservative on them, if your initial startup allows the membrane to 'rinse' into the DI; there will be some immediate exhaustion, followed by normal exhaustion.</p> <p>Chloramines Vs Chlorine – If the customer's water is disinfected with Chloramines (NH₂CL) the ammonia portion will still be present post RO.</p> <p>For R.O. (Dolphin) users, they may wish to purchase DI to remove the ammonia..</p> <p>RO/DI (Mako, Mako, and Great White) users will have the ammonia removed by the DI. This will tax the DI, Chloramines appears in several forms, so the decreased life would depend on the state of Chloramines. (mono, di or tri)</p>

