



Mutiny 2.1 Setup and User Manual



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Introduction

The use of ozone in seawater filtration is a powerful way to achieve the crystal clear, “fish floating in air” effect seen in the world’s most beautiful marine aquaria. An extremely powerful oxidizing agent, ozone will essentially “bleach” your seawater clean when used in a controlled environment in a safe and effective manner.

Since the amount of ozone needed to clarify water is significantly less than that needed to kill most pathogens or other organisms, the usefulness of ozone extends even to systems that employ “probiotic” means of nutrient control. Coupled with an efficient protein skimmer, ozone can help improve water quality by breaking down large organic molecules into components more suited to skimming or usable by bacteria. Ozone users frequently report an increase in skimmer productivity and almost always in better water clarity and overall system health.

It is important to note that ozone can be a dangerous substance when used improperly. Failure to adequately destroy ozone and remove oxidation byproducts via suitable ozone reactor post-filtration can result in harm to both aquarium inhabitants as well as people. Be sure to follow all safety guidelines according to your ozone generator’s documentation.

Reactor Setup

Attach lower section tubing

Apply a light coat of the silicone grease, that is included in the skull container, to the 3 barbed fittings on the bottom of the reactor. Firmly push the 4' clear feed line and one of the black 1/2" effluent lines onto the 1/2" barbs. Then place the longer 3' section of 3/16" black tubing with the check valve on the venturi barb as shown.



Attach Sicce recirculating pump

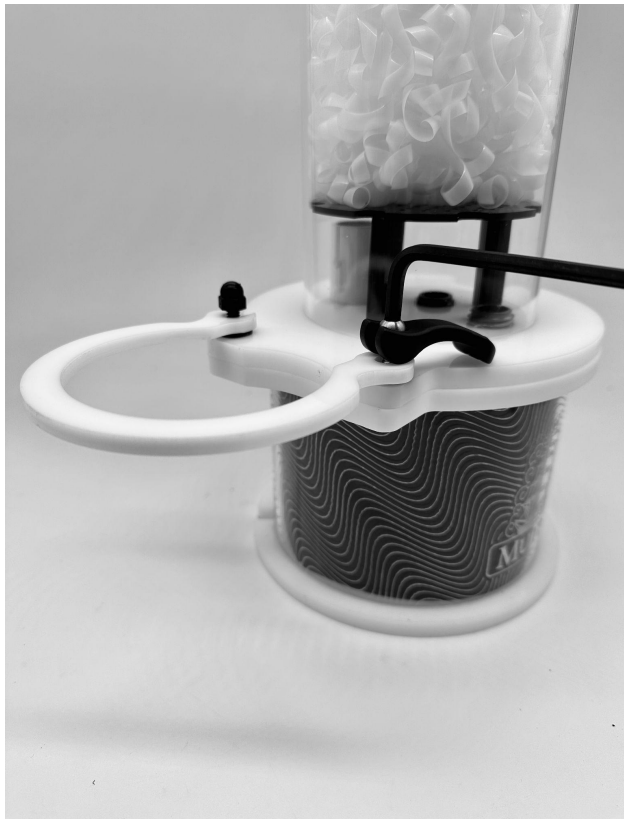
Flip the reactor upside down. Line up the tabs of the Sicce pump to the mating section on the volute stem assembly. While gently pressing on the pump twist the volute locking ring counter clockwise to lock the pump to the reactor. Inspect, to make sure the locking ring is fully seated and the pump and lock ring are sitting perfectly perpendicular to the reactor base. Once this is in place, grease the pump output barb and push the other section of 1/2" black tubing onto the pump as shown.



Attaching reactor to stand

Place the reactor on stand and route the power cord and air line through the bottom cutout. Install one of the 1.5" long pan head screws from under the stand through the left hole in the reactor. Then place one of the rubber washers over this stud and finally add the acorn nut. On the other side, screw the metal stud and other rubber washer in from the top using the included allen wrench. Place the second chamber clamp and the metal lever in place and tighten until you feel a bit of pressure on the lever when it is in the down position.

If you are installing the Mutiny in sump you will want to instead use the other plastic bolt installed from the bottom and wing nuts as shown.



External Configuration



In Sump Configuration

Install Second chamber clamp and attach remaining tubing

Slightly pull the clamp outward and push on to the carbon chamber.

Lightly grease the top barb connection, install the black tubing from the pump as shown.



Carbon preparation

Activated carbon needs to be washed before going into the postfilter to remove the dust. First empty the contents of the bag into a bucket and rinse with water. You can use tap water or reverse osmosis water if your water supply is chlorinated. Rinse and soak for a few minutes, then strain. We like to rinse and strain three times to get all the dust off.

You can now use the carbon as is or store it for future use. We like to thoroughly dry it out so it loads into the reactor easier, to do this we simply lay it out on a cardboard box overnight.



Load the cartridge

Make sure the included double layer of plastic filter mesh at the bottom of the cartridge and fill to about 2" below the top of the acrylic insert.

When inserting the carbon cartridge into the lid of the carbon reactor use a firm twist pushing up and counter clockwise. When removing the cartridge you want to twist the same counter clockwise direction.

Place the cartridge in the carbon filter and lock the carbon chamber in place. You are now ready for installation on your tank.

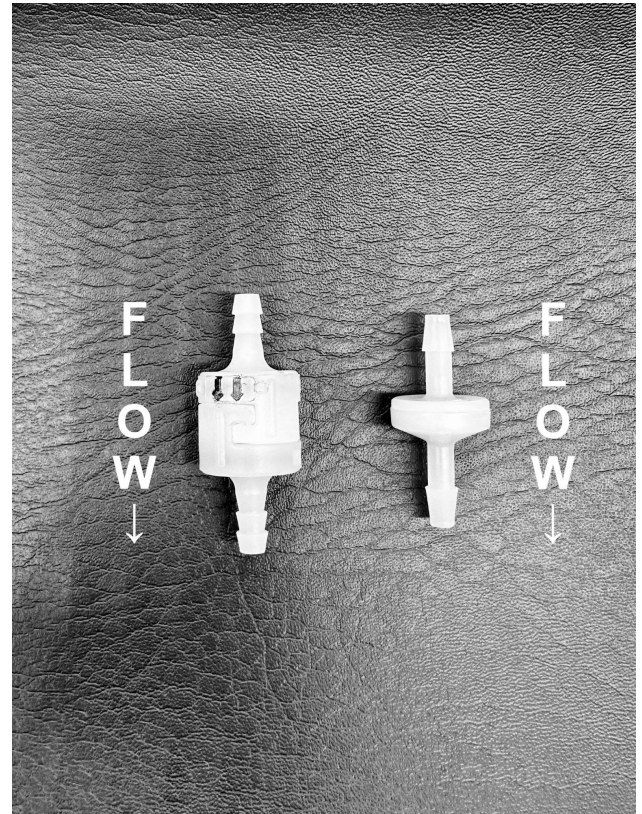
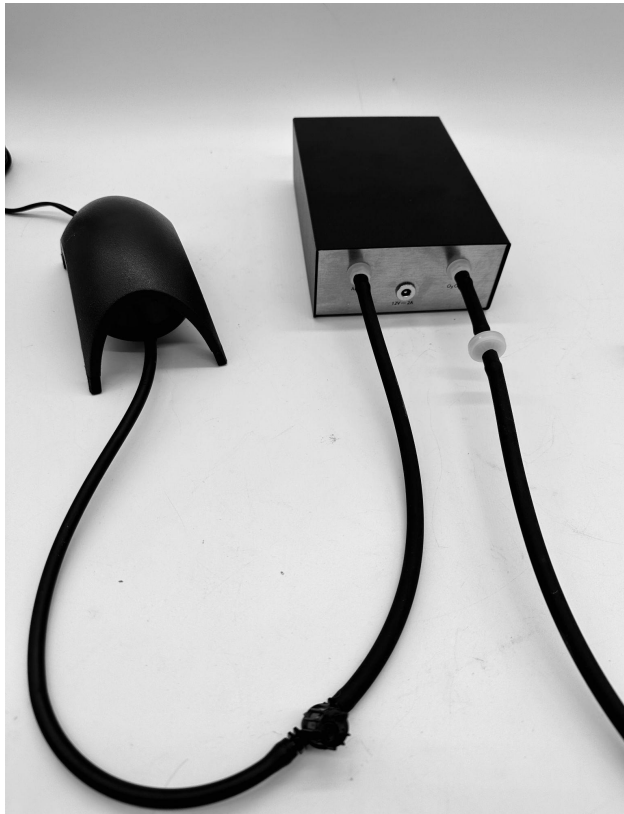




Tank Installation and Tuning the Reactor

Connect air pump to ozone generator

Connect the air line assembly with the air control valve to the air pump and the input side of the generator. Attach the check valve, short piece of black tubing and the 3/16" tubing from the Sicce pump to the output. Make sure that the check valve is oriented so the flow is going towards the reactor and away from the generator as shown.



Installation considerations

Select a secure and stable mounting location for your generator as high above the water line as possible. The Mutiny can be placed in sump or external. You can even put the main reactor in the sump and the post filter out of the sump and vice versa for some really flexible installation options. Here we are hard plumbing the feed line with a return pump manifold line but the procedure is the same if you are using a dedicated feed pump like the Sicce Sycra .5. Whichever feed pump method you choose, install the ½” water control valve in between your pump and the reactor.

Lightly grease the carbon filter output barb and install the 2’ section of clear tubing. The ideal spot for this output is at or slightly above the water level. There is a mix of air and water that comes out this line but it does not produce “microbubbles” like a skimmer output, still behind a baffle is recommended to reduce the chances of bubbles in your return line.

You can now turn on the water from your feed pump.



Setting flow rate through the reactor

The Mutiny is engineered to run at 25gph for maximum efficiency. All you will need is a 1 gallon container and a stopwatch to set this accurately.

Adjust your water flow control valve so that it takes approximately 140 seconds to fill your 1 gallon container. This does not have to be exact but try and get close.

The water level inside the carbon chamber will be higher than operational level at this stage but the flow is much easier to set with all the other system components off. If you need to adjust your flow rate in the future, make sure the rest of the system components are off for the most accurate results.



Turning on recirculating pump and setting air flow

Plug in the Sicce recirculating pump. Water will begin to move through the ozone chamber and the water level inside the carbon post filter will drop to the bottom. The water level inside the main chamber should be right at or slightly below the bottom media plate and the water level of the carbon should be below the carbon filter media plate. It may take up to 2 minutes for the system to equalize pressures and fall to these levels.

Once the system has pressurized with water you can now turn on the air. Start with the air control valve 100% CLOSED and SLOWLY begin to open the air valve. It takes a few seconds to build the air pressure to crack the check valve. You should see and hear when the valve has opened enough to crack. Water will begin foaming in the main reactor showerhead and you will notice the flow out the carbon surges a bit.

If you are installing ozone on your system for the first time, leave the airflow at the minimum amount for at least 30 days.

If you have been previously dosing ozone by another method you can set the air level to the maximum after 48 hours.

There is a break in period with the Mutiny similar to a protein skimmer. Once a biofilm has coated the internal tubing and pumps you can increase the air flow until the recirculating pump shuts down and then slightly back off until the recirculating pump starts again. This is the maximum air flow.



The picture below shows the water levels during normal operation.



Ozone dosing using the Poseidon 200

You do not need to wait for break in to complete before you start dosing ozone. As soon as the water levels have stabilized and you are happy with the installation you can turn on the generator and set the dose.

For tanks up to 75 gallons start at 2-3 on dial

For tanks 75-150 gallons start at 4-5 on dial

For tanks 150-250 start at 5-6 on dial

For tanks 250 and up start at 7 on dial

Monitoring and control with ORP

Any ORP monitoring/controlling equipment should be installed per manufacturer's instructions. Please keep in mind that ORP probes may take up to 2 weeks to fully stabilize in your aquarium before providing an accurate reading. GO SLOW. The maximum ORP level should remain below 450mv.

Note that a low ORP reading is not an indication that the ozone system is malfunctioning. ORP is a very poorly understood metric in marine aquaria, and many external factors influence a probe's measurement.

Set your ORP controller to ONLY shut off the ozone generator. The air pump and water pumps should always remain on. In the case of power failure the system will come back online by itself, everything "on" at the same time is the ideal start up order!

Monitoring with your eyes

We recommend judging effectiveness based on visual results, even if that measurement is subjective.

One simple qualitative measurement is referred to as the “bucket test”. It is a great idea to do this when you first set up the ozone reactor so you can get a baseline. Take a clean white bucket filled 10-12” deep with a sample of your tank water outside in the natural sunlight and take a picture from above.

After 48 hours use the same bucket with the same amount of water, but this time take the water from the output of the reactor, repeat the test with the same lighting as before and compare your sample pictures. You may be surprised at the results!

Other considerations

Air prep?

We have found that it is easier to maintain a system without drying the air and still achieve fantastic results. We realize this goes against some conventional ozone wisdom. Drying the air will improve the concentration of the ozone but so will turning up the dial. All of our setting recommendations take this into consideration. If you would like to dry the air, use a silica gel desiccant dryer installed in between the air pump and the generator. The Mutiny is not compatible with electric air dryers.

Acclimation

Ozone will dramatically change the clarity of your water, you should monitor and adjust your lighting schedule to acclimate your corals to the new intensity. This will vary from system to system depending on the starting clarity of the water. Raising your lights or adjusting the photoperiod for the first few weeks is recommended.

Fine Tuning and Final Thoughts

Observing water flow through the carbon can be a guide to flow rate. Once you have initially set your 25gph flow rate and the reactor has been running a bit you can visually observe the water in the carbon post filter to fine tune the reactor flow rate. It is important for the water to freely flow through the carbon with gravity. The water will “stack” up a little above the carbon during normal operation but it should not completely fill the clear acrylic between the top of the carbon and the showerhead of the lid. Depending on bioload, the water may foam up in this area as well. This is normal and is part of the degassing process from the destruction stage to the abatement stage. You can turn the flow rate down a little to prevent the stacking if excessive foaming occurs.

Systems with high bioloads, large amounts of accumulated detritus or nutrient fueled algae problems may notice carbon clogging a little faster than our suggested refill intervals. In this case we suggest using a little less carbon in the cartridge and changing it a little more frequently. This allows a slightly larger headspace above the carbon for it to drain through and prevents waste of carbon due to the top layers getting clogged.

Do not try to chase ORP numbers. We have found that the slow flow through the reactor over a long amount of time is really the best for system health and water clarity. Removing all organics from the system rapidly in order to achieve an arbitrary ORP number can do more harm than good. Note that the excess organics now being destroyed by ozone were previously used by *something* in the reef tank ecosystem; even if that something is a nuisance. Removing them is important (OR critical in order to obtain crystal clear water), but needs to be done in a controlled manner to prevent system shock.

If you previously used ozone in a skimmer, your ORP may drop when changing to the Mutiny reactor. Since the water was not properly treated before reentering the tank, this untreated ozone has a higher impact on the reading of the ORP probe. This higher ORP number does not mean the system is healthier, it just means the impact on the probe is greater. This is no different than placing a space heater next to your thermostat, it doesn't heat your house, only the measurement device.

Maintenance

Carbon

Activated Carbon should be replaced on the following schedule:

For systems under 150 gallons replace every 3 months

For systems over 150 gallons replace every 2 months

HDPE Media

Periodically this needs to be removed and cleaned. The media itself should last indefinitely but there are some undissolubles that will collect as well as some oxidation byproduct that will stain the media.

If the Mutiny is installed on a system with a bacteria/nutrient/algae problem there may be considerable build up at first. Ozone is a great choice to help with these issues but you will need to remove and wash the media monthly until the issues have been brought under control.

If the Mutiny is installed on a system in good general health cleaning this twice a year is recommended.

To clean the media, soak overnight in a strong chlorine bleach solution. Rinse with water and allow it to air dry.

Pumps and Tubing

The pumps and supplied tubing should last at least 5 years under normal operating conditions. Clean and inspect the Sicce recirculating pump impeller annually.

Check Valves

Replace check valves every 6 months.

Warranty and contact information

AVAST Marine Works products are warranted for a period of one year from the date of purchase against defects in materials and workmanship. AVAST will provide necessary parts and factory labor to repair or replace any failed component without cost to the Buyer.

Service

Warranty shall be void if any alteration or service is performed without written authorization from AVAST Marine Works or if the equipment has been connected to incorrect power. Buyer will be responsible for requesting warranty service through the AVAST Marine RMA process which requires buyers to return the defective unit for repair. The Buyer is liable for properly packaging the equipment and shipping cost for the initial return for repair. Return shipping cost is covered by AVAST if within the warranty period. Equipment damaged due to accident, neglect, abuse, misuse, natural or man-made disasters is not covered by this warranty, and the Buyer will be contacted with cost and approval for repair.

Liability

In no event will AVAST Marine Works be liable for any lost livestock, profits or any special, indirect or consequential damages due to loss of use.

The laws of the Commonwealth of Virginia will govern this warranty plan.

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