

# GENESIS | RENEW™

## AUTOMATIC WATER CHANGE SYSTEM

### INSTALLATION AND USE



Congratulations on your purchase of the GENESIS | RENEW™ Automatic Water Change System! Please take a few moments to read and follow these installation instructions so you can fully enjoy your new system right out of the box. If you have any questions at all, please visit us at [www.GenesisReefSystems.com](http://www.GenesisReefSystems.com), or email us at [Support@GenesisReefSystems.com](mailto:Support@GenesisReefSystems.com). We are always happy to hear from our customers!

The following items have been shipped with your system:

- (1) RENEW™ Control Module
- (2) RENEW™ Metering Reservoirs (Pro Systems include 2 Level Sensors in each Reservoir)
- (2) RENEW™ Metering Reservoir Covers
- (2) Barbed Ball Valves
- (1) Communication Cable for use with the GENESIS STORM™ Automatic Top Off System
- (2) Level Sensor Vertical Members (Advanced and Pro Systems only)
- (4) Level Sensor Shrouds (Advanced and Pro Systems only)
- (2) Standalone Level Sensors (Advanced and Pro Systems only)
- (4) 5' Lengths of 1/2" Tubing (Pro System only)
- (2) 5' Lengths of 5/8" Tubing (Pro System only)
- (4) Suction Cups (Advanced and Pro Systems only)
- (6) Mounting Screws
- (2) Pumps (Optional)

## Installation

1. Find suitable mounting locations
  - The Metering Reservoirs must be located above the highest water level in the sump (or aquarium if you don't use a sump) and the replacement water bin, at a height where the selected pumps will be able to supply at least 1 gallon of water per minute. The Metering Reservoirs rarely need to be accessed after installation, so feel free to tuck them away somewhere that keeps your day-to-day aquarium workspace clear.
  - Remember – water is heavy! The Metering Reservoirs must be securely mounted on a vertical surface that can support a minimum of 20 pounds per bin. When mounting the Metering Reservoirs on a wall, ensure that the mounting screws will be driven into wall studs or use wall anchors that will support the weight of the bins.
  - The Control Module must be located in an easily accessible, dry location protected from accidental splashes.
  - The cords and control cables supplied are approximately 6 feet in length, and level sensor cables are approximately 8 feet in length. Ensure that they will reach from the Control Module to their respective locations before permanently mounting the components.
  
2. Mount the Metering Reservoirs
  - Ensure no electrical wires or plumbing reside behind or within the mounting area. Be very careful when drilling or driving screws into a blind mounting location!
  - Using the supplied template as a guide, mark and drill two pilot holes as indicated. Note that a line drawn between the centerpoints of the two holes must be perfectly vertical.
  - Insert wall anchors if necessary, following all directions provided with the anchors.
  - Drive the mounting screws into the holes or anchors, leaving about 1/8" inch between the screw head and the mounting surface.
  - Slip the Metering Reservoirs onto the screws and gently pull down about 1/2" until fully seated. There should be no "play" between the Reservoirs and the mounting surface when properly secured.
    - Tip: it is often convenient to install tubing, ball valves, and Reservoir Covers prior to mounting the Metering Reservoirs on the screws
  - Repeat these steps for the second Metering Reservoir
  
3. Mount the Control Module
  - Ensure no electrical wires or plumbing reside behind or within the mounting area. Be very careful when drilling or driving screws into a blind mounting location!
  - Using the supplied template as a guide, mark and drill two pilot holes as indicated.
  - Insert wall anchors if necessary, following all directions provided with the anchors.
  - Drive the mounting screws into the holes or anchors, leaving just less than 3/8" inch between the screw head and the mounting surface.
  - Slip the Control Module onto the screws and gently pull down about 1/2" until fully seated. There should be no "play" between the Control Module and the mounting surface when properly secured.
  
4. Mount the Level Sensors (Advanced and Pro models or purchased separately)
  - The Level Sensor Shrouds are designed such that they can be used in many different configurations.
    - Level Sensors can be installed inside, above, or below the shrouds
    - The Shroud Cover can be inserted onto the rear of the Shroud to create a hanger that is adjustable for tank lip widths as narrow as 1/2" or as wide as 2-1/4"
    - The shrouds can be left open or can be closed to prevent critters or water turbulence from affecting the sensors' performance
    - The shrouds will slide onto and secure themselves on any standard 1/2" PVC pipe, allowing them to be positioned at any height
    - The shrouds can be hung from one another using the T-shaped tabs and slots on the sides, allowing multiple sensors to be positioned on a single vertical member at slightly different heights.
    - Level Sensor wires can be dressed through the vertical member or PVC pipe to give a clean look to your installation
  - Using the Level Sensor to prevent a pump run-dry scenario:
    - Install one Shroud Cover onto the rear of one Shroud
    - Insert a vertical member or 1/2" PVC pipe through the assembled Shroud such that the Shroud Cover acts as a lip hanger
    - Install one Level Sensor inside a second Shroud by loosening the plastic nut on the sensor and sliding the sensor into the wide notch in the Shroud
    - Insert the other end of the vertical member or 1/2" PVC pipe into the Shroud with the sensor such that the Level Sensor's cord will come out of the TOP of the Shroud when hung on the tank.
    - Remove any packing foam or tape from the Level Sensor
    - Place the remaining Shroud Cover onto the lower Shroud to protect the Level Sensor if desired
    - Install Suction Cups onto the lower Shroud if desired
    - Hang the assembly over the lip of the tank and adjust the hanger width
    - Adjust the height of the Shroud / Sensor to the minimum desired water level

- Secure Suction Cups to the tank wall
- Using the Level Sensor to prevent an overflow scenario:
  - Install one Shroud Cover onto the rear of one Shroud
  - Insert a vertical member or 1/2" PVC pipe through the assembled Shroud such that the Shroud Cover acts as a lip hanger
  - Install one Level Sensor inside a second Shroud by loosening the plastic nut and sliding the switch into the wide notch in the Shroud
  - Insert the other end of the vertical member or 1/2" PVC pipe into the Shroud with the sensor such that the Level Sensor's cord will come out of the BOTTOM of the Shroud when hung on the tank.
  - Remove any packing foam or tape from the Level Sensor
  - Place the remaining Shroud Cover onto the lower Shroud to protect the Level Sensor if desired
  - Install Suction Cups onto the lower Shroud if desired
  - Hang the assembly over the lip of the tank and adjust the hanger width
  - Adjust the height of the Shroud / Switch to the maximum desired water level
  - Secure Suction Cups to the tank wall
- You can mix and match the above installation methods to suit your aquarium systems' specific needs

## 5. Connect the Components

NOTE: ALL WIRES SHOULD HAVE A DRIP LOOP TO PREVENT WATER FROM ENTERING THE CONTROL MODULE

- Plug into the Control Module the harness from the Metering Reservoir that will receive water from your aquarium system (the waste water). This harness plugs into the 6-pin receptacle on the lower right-hand side (as you are looking at the back of the Control Module).
  - Plug into the Control Module the harness from the Metering Reservoir that will receive water from your replacement water bin. This harness plugs into the 6-pin receptacle on the lower left-hand side (as you are looking at the back of the Control Module).
  - If used, plug the aquarium or sump's Level Sensor cable into the 2-pin receptacle on the lower right-hand side (as you are looking at the back of the Control Module).
  - If used, plug the replacement water bin's Level Sensor into the 2-pin receptacle on the lower left-hand side (as you are looking at the back of the Control Module).
  - If coupling your RENEW™ system with a STORM automatic top off system (see our website for why you want to do this!), plug the supplied communication harness into the center 6-pin receptacle on the back of the RENEW™ Control Module, and plug the other end into the center 6-pin receptacle on the back of the STORM Control Module.
6. Attach the 1/2" supply tubing on the replacement water's Metering Reservoir to a pump and place the pump in the replacement water bin. Cut the tubing to length if desired.
  7. Attach the 1/2" supply tubing on the waste water's Metering Reservoir to a pump and place the pump in the aquarium or sump. Cut the tubing to length if desired.
  8. Route the 5/8" tubing attached to the replacement water's Metering Reservoir back to the replacement water bin. The tubing should be secured such that the end of the tubing is just above the highest water level in the bin and so that the water will run down the side of the bin as the water level drops. Doing so will improve water flow and reduce noise when water flows back into the replacement water bin. Cut the tubing to length if necessary.
  9. Route the 5/8" tubing attached to the waste water's Metering Reservoir back to the aquarium or sump. The tubing should be secured such that the end of the tubing is just above the water level and so that the water will run down the side. Doing so will improve water flow and reduce noise when water flows back into the aquarium or sump. Cut the tubing to length if necessary.
  10. Route the 1/2" tubing attached to the valve on the replacement water's Metering Reservoir to the aquarium or sump. The end of the tubing should be secured such that the end of the tubing is just above the water level and so that the water will run down the side. Doing so will improve water flow and reduce noise when replacement water flows into the aquarium or sump. Cut the tubing to length if necessary.

11. Route the 1/2" tubing attached to the valve on the waste water's Metering Reservoir to a suitable receiving receptacle or drain.
  - **IMPORTANT:** ALWAYS FOLLOW LOCAL PLUMBING CODES WHEN CONNECTING TO OR USING EXISTING PLUMBING. UNLAWFUL OR IMPROPER CONNECTION OR USE CAN RESULT IN PROPERTY DAMAGE, HEALTH RISKS, AND ENVIRONMENTAL RISKS. IF YOU ARE UNCOMFORTABLE OR UNQUALIFIED WITH THIS TASK, SEEK THE ADVICE AND SERVICE OF A QUALIFIED, LICENSED PLUMBER. GENESIS REEF SYSTEMS, LLC CANNOT BE HELD LIABLE FOR ANY DAMAGES DIRECTLY OR INDIRECTLY RESULTING FROM CONNECTION TO OR USE OF EXISTING PLUMBING. WHEN CONNECTING TO OR USING EXISTING PLUMBING YOU ARE DOING SO AT YOUR OWN RISK.
12. Plug the replacement water pump's power cord into the AC receptacle on the bottom right of the Control Module (when viewing the front of the Control Module). Ensure that a drip loop is formed to prevent water from entering the Control Module!
13. Plug the waste water pump's power cord into the AC receptacle on the bottom left of the Control Module (when viewing the front of the Control Module). Ensure that a drip loop is formed to prevent water from entering the Control Module!
14. Plug the Control Module's power cord into a GFCI-protected 110VAC outlet. Ensure that a drip loop is formed to prevent water from entering the Control Module! You are now ready to use your RENEW™ Automatic Water Changing System!

## **Getting to know your RENEW™ Automatic Water Change System**

1. After installing your system, plugging it in, and preparing your replacement water, turn on the RENEW™ system by using the power switch on the front face of the Control Module. When power is “ON,” the switch will illuminate. Several LED indicators and the display will illuminate when the power is on as well.
2. There are four user input buttons on the Control Module. Starting on the left and moving toward the right, the buttons are MODE, START/PAUSE/CANCEL, and then INCREASE and DECREASE on the right. All are labeled accordingly.
3. Depressing the MODE button changes whether the system will perform a water change over the course of a day, a week, or one gallon after another until complete. For example, if you want perform a 24 gallon water change over the course of 24 hours, use the INCREASE and DECREASE buttons until the display reads “24” and then press the MODE button until the indicator next to “DAY” is illuminated. When the START button is depressed the system will start a sequence of 24 one-gallon water changes, with 1 one-gallon water change performed every hour (24 hrs/day divided by 24 gallons). Changing the mode to “WEEK” will stretch the 24 gallon water change over the timespan of one week by performing a one-gallon water change every 7 hours (168 hrs/week divided by 24 gallons). Finally, changing the mode to “CONTINUOUS” and pressing the START button would result in a one-gallon water change followed immediately by another one-gallon water change, for a total of 24 changes.
4. The START/PAUSE/CANCEL button is the primary control button for the RENEW™ system. Momentarily pressing and releasing the button will start a sequence of water changes. Momentarily pressing and releasing the button during an active sequence of water changes pauses the sequence until pressed again, at which time the sequence of water changes will resume. Pressing and holding the button for between three and five seconds will permanently cancel an active sequence of water changes. Pressing and holding the button for five seconds or longer will permanently cancel an active sequence of water changes and will order the system to empty the Metering Reservoirs.

The START/PAUSE/CANCEL button is the only button that is active during a sequence of water changes. Once a water change sequence has been started, the system will ignore input from the other three buttons until the water change is canceled or has completed.

5. The INCREASE and DECREASE buttons simply change the number of gallons to be changed.
6. Pressing and holding the MODE and START/PAUSE/CANCEL buttons simultaneously for five seconds accesses the Operation Settings for the RENEW™ system. These settings allow the user to set the type of system that they have (Basic, Advanced, or Pro), and are generally not needed after the system is initially installed unless the system is upgraded to include additional level sensors. Once in Operation Settings, the INCREASE and DECREASE buttons are used to select the operation mode. Basic (“b”) mode is the default and will need to be changed if you have an Advanced or Pro model. Basic mode does not monitor level sensor input. Advanced (“A”) mode monitors the two standalone level sensors that are placed in the sump (or aquarium) and replacement bin. Pro models can be run in two different operating modes: standard (“PS”) or abbreviated (“PA”). Pro Standard operating mode will monitor all six possible level sensors and will adjust the cycle times based on the reservoir level sensors’ inputs, and will include the Standby stage after each Dispense stage. Pro Abbreviated operation will function similarly, but will skip the Standby stage and immediately start another cycle when in Continuous mode. Skipping the Standby stage allows the system to exchange a volume of water more quickly, but does not allow the water just replaced to mix with the entire aquarium volume as thoroughly.
7. The power switch can be used at any time to quickly shut off your RENEW™ system and is equipped with a thermal circuit breaker that will automatically shut down the system if it draws more than 10 amps.

## **Example of Operation**

Let’s assume that you want your RENEW™ system to perform a 15 percent water change on your 90 gallon aquarium with a 10 gallon sump. Let’s also assume that you want it to perform the change in as short a time as possible.

Since your total water volume is 100 gallons, you’ll want to perform a 15 gallon water change:

1. Using the INCREASE and/or DECREASE buttons, adjust the value in the GALLONS window to “15”

Since you want your RENEW™ system to perform the water change as quickly as possible:

2. Using the MODE button, select “CONTINUOUS” mode

Now all you have to do is tell it to go!

3. Press the START/PAUSE/CANCEL button

It’s that simple!!! Your RENEW™ system will perform 15 one-gallon water changes one after the other. If you have an Advanced or Pro model, it will even monitor the water levels in your sump and replacement water bin, and alert you if either strays outside your

set levels. Plus, if you have the Pro model, the RENEW™ system will monitor its own operation and automatically interrupt a water change and alert you if it determines that something isn't quite right – offering the ultimate peace of mind!

Feel free to experiment with the settings on your RENEW™ system to find out what best suits your needs. If you ever “get lost,” and want to get back to the factory default settings, simply turn the unit off, press the INCREASE and DECREASE buttons simultaneously, and while still holding them turn the unit back on. Your RENEW™ system will reset itself to the factory defaults.

## **Interrupting and Canceling a Water Change Sequence**

If you ever need to pause your RENEW™ system while it is in an active water change sequence, simply press and release the START/PAUSE/CANCEL button. The current stage indicator will blink to indicate that the system is paused. To resume the sequence, simply press and release the button again, and your RENEW™ system will continue until completed.

If you ever need to permanently cancel a sequence, press and hold the START/PAUSE/CANCEL button for 3 seconds. The stage indicators will blink to indicate that you've canceled the sequence. You can also cancel a sequence and dispense the contents of the Metering Reservoirs by pressing and holding the START/PAUSE/CANCEL button for 5 seconds. The stage indicators will blink after holding the button for three seconds to indicate that the cycle has been canceled, and will open the Metering Reservoir valves after 5 seconds to drain any water contained within them.

## **Interaction with the Genesis STORM™ Specialized Top Off and Replenishment Module**

Your RENEW™ can be connected to a Genesis STORM™ Specialized Top Off and Replenishment Module to allow both units to be installed in an aquarium system and work together without manually disabling the STORM™. The STORM™ will not attempt to top off the sump or aquarium any time the RENEW™ unit is actively performing a water change cycle. This prevents the STORM™ from attempting to replace the waste saltwater removed by the RENEW™ system with fresh water. Doing so would adversely affect salinity in a saltwater aquarium and could eventually result in overflowing the sump in either a freshwater or saltwater aquarium. The RENEW™ will indicate that it detects the STORM™ via the indicators in the lower center portion of the Control Module, and will illuminate when it is disabling the STORM's™ top off functions as well.

## Troubleshooting

Your RENEW™ Automatic Water Change System is designed to provide years of reliable service. The following table describes some typical symptoms, reasons, and solutions to situations that you may encounter. If you still have difficulty or questions about your RENEW™ system, please call our customer service line or email our customer care representatives for further assistance at [Support@GenesisReefSystems.com](mailto:Support@GenesisReefSystems.com). Please have your system's serial number available when you call and provide it with any correspondence so we may better help you. The serial number can be found on the back of the Control Module.

Symptom	Possible Reason	Solution
No indicators are illuminated on Control Module and pushing any button produces no result	<ol style="list-style-type: none"> <li>1. No Power</li> <li>2. Unit is not turned ON</li> </ol>	<ol style="list-style-type: none"> <li>1. Ensure Control Module is firmly plugged into 110VAC receptacle. Check electrical supply's breaker or fuse</li> <li>2. Make sure Power Button is in the ON position</li> </ol>
The "Sump Level" and/or "Bin Level" LED indicators blink and system halts normal function, with a blinking stage indicator	<ol style="list-style-type: none"> <li>1. Water levels are too low</li> <li>2. Level Sensors are not plugged in</li> <li>3. RENEW™ Basic unit is configured to operate in "Advanced" or "Pro" modes</li> <li>4. Faulty Level Sensor</li> </ol>	<ol style="list-style-type: none"> <li>1. Top off sump and/or refill replacement water bin; afterward, press START/PAUSE/CANCEL button to resume operation</li> <li>2. Check Level Sensor connections on Control Module; afterward, press START/PAUSE/CANCEL button to resume operation</li> <li>3. Reconfigure system to operate in "Basic" mode (see "Getting to know your RENEW™ Automatic Water Change System")</li> <li>4. Manually slide float along sensor shaft; if no change, replace Level Sensor</li> </ol>
The "Reservoir High" LED indicator blinks and system halts normal function, with a blinking stage indicator	<ol style="list-style-type: none"> <li>1. The Metering Reservoir was not filled within 75 seconds during the Fill Stage</li> <li>2. Level Sensors are not plugged in</li> <li>3. Faulty Level Sensor</li> </ol>	<ol style="list-style-type: none"> <li>1. Ensure that pump is capable of filling the Metering Reservoir within 75 seconds at mounting height. Also make sure that there are no kinks in tubing delivering water to Reservoir, and that inlet valves (if used) are open.</li> <li>2. Check Reservoir connections on Control Module; afterward, press START/PAUSE/CANCEL button to resume operation</li> <li>3. Manually slide float along sensor shaft; if no change, replace Level Sensor</li> </ol>
The "Reservoir Low" LED indicator blinks and system halts normal function, with a blinking stage indicator	<ol style="list-style-type: none"> <li>1. The Metering Reservoir was not emptied within 90 seconds during the Dispense Stage</li> <li>2. Level Sensors are not plugged in</li> <li>3. RENEW™ Basic or Advanced unit is configured to operate in "Pro" mode</li> <li>4. Faulty Level Sensor</li> </ol>	<ol style="list-style-type: none"> <li>1. Examine drain tubing to ensure that there are no kinks blocking flow</li> <li>2. Check Reservoir connections on Control Module; afterward, press START/PAUSE/CANCEL button to resume operation</li> <li>3. Reconfigure system to operate in "Basic" or "Advanced" mode (see "Getting to know your RENEW™ Automatic Water Change System")</li> <li>4. Manually slide float along sensor shaft; if no change, replace Level Sensor</li> </ol>
The Metering Reservoir does not completely fill during the Fill Stage	<ol style="list-style-type: none"> <li>1. Pump is not capable of delivering one gallon within 75 seconds at mounted height</li> <li>2. Tubing is kinked, inlet valve is restricting flow, or pump inlet is blocked</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace pump with higher capacity or lower Metering Reservoir's mounting height</li> <li>2. Remove all kinks, open inlet valve, and ensure pump's inlet is not clogged or blocked</li> </ol>

The Metering Reservoir does not completely empty during the Dispense Stage	<ol style="list-style-type: none"> <li>1. Metering Reservoir is mounted too low</li> <li>2. Tubing is kinked or flow is otherwise impeded</li> <li>3. End of outlet tubing is submerged below water in sump or waste receptacle</li> <li>4. Waste line is pressurized</li> </ol>	<ol style="list-style-type: none"> <li>1. Relocate Metering Reservoir such that it is always above the maximum water level of the sump or waste receptacle</li> <li>2. Remove all kinks or obstructions and remove all valves from outlet tubing. Check outlet inside Metering Reservoir for blockage</li> <li>3. Cut and mount end of outlet tubing so that it is just above the maximum water level of the sump or waste receptacle</li> <li>4. Outlet on waste side is connected to a blocked or otherwise pressurized pipe. Immediately seek the advice of a licensed plumber if you are not qualified to perform plumbing repairs!</li> </ol>
The Metering Reservoir overflows during Fill Stage	<ol style="list-style-type: none"> <li>1. Pump capacity too high for Reservoir mounting height</li> <li>2. Metering Reservoir is mounted too low</li> <li>3. End of return tubing is submerged below water in source</li> <li>4. Return tubing is routed above top of Metering Reservoir</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace pump with lower capacity, decrease flow through inlet tubing using a flow valve, or increase Metering Reservoir's mounting height</li> <li>2. Increase Metering Reservoir's mounting height so that the entire Reservoir is above the maximum water level of the sump or replacement water bin</li> <li>3. Cut and mount end of return tubing so that it is just above the maximum water level of the source</li> <li>4. Route return tubing such that it never goes above the bottom of the Reservoir</li> </ol>
The Metering Reservoir continues to fill after Fill Stage is complete	<ol style="list-style-type: none"> <li>1. Metering Reservoir is mounted below water level in source (sump or replacement bin), and a siphon has been created</li> </ol>	<ol style="list-style-type: none"> <li>1. Raise Reservoir mounting height to ensure it is always completely above the maximum water level of the source</li> </ol>
Pump does not turn on during Fill Stage	<ol style="list-style-type: none"> <li>1. Pump needs maintenance or replacement</li> </ol>	<ol style="list-style-type: none"> <li>1. Unplug pump and clear obstructions from impeller (remove and clean if possible). If problem persists, replace pump</li> </ol>
Water flowing out of Metering Reservoirs creates too much noise	<ol style="list-style-type: none"> <li>1. Loud bubbling noise is heard. End of tubing is submerged below water level.</li> <li>2. Loud splashing noise is heard. End of tubing is too high or water is flowing directly into water volume.</li> </ol>	<ol style="list-style-type: none"> <li>1. Cut and mount end of tubing so that it is just above the maximum water level, such that the stream of water exiting the tube flows down the side of the receptacle</li> <li>2. Mount end of tubing so that it is just above the maximum water level, such that the stream of water exiting the tube flows down the side of the receptacle</li> </ol>

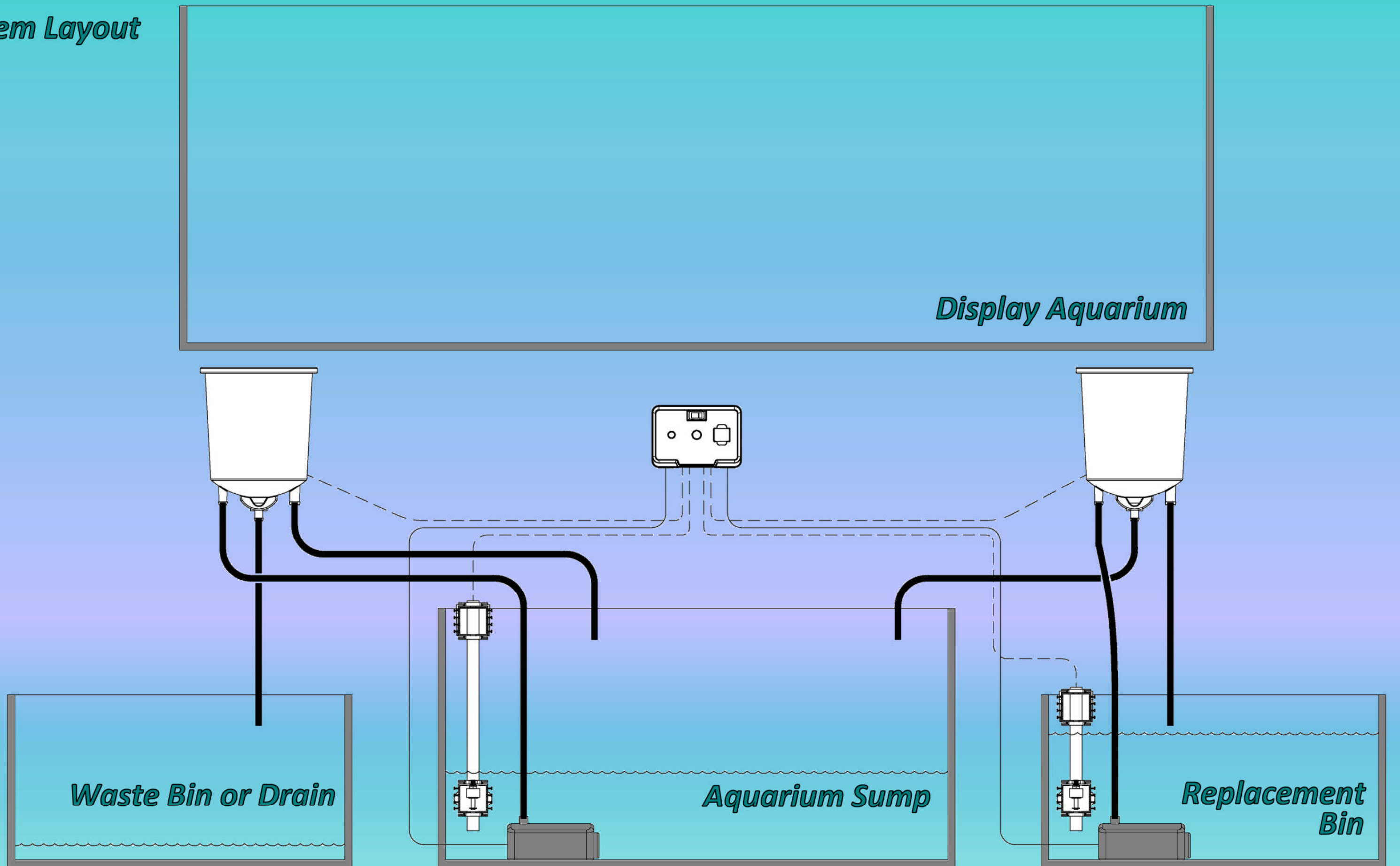
**Product Use** Many factors beyond Genesis Reef Systems' control and uniquely within the user's knowledge and control can affect the use and performance of a Genesis Reef Systems product in a particular application. Given the variety of factors that can affect the use and performance of a Genesis Reef Systems product, the user is solely responsible for evaluating the Genesis Reef Systems product and determining whether it is fit for a particular purpose and suitable for the user's method of application.

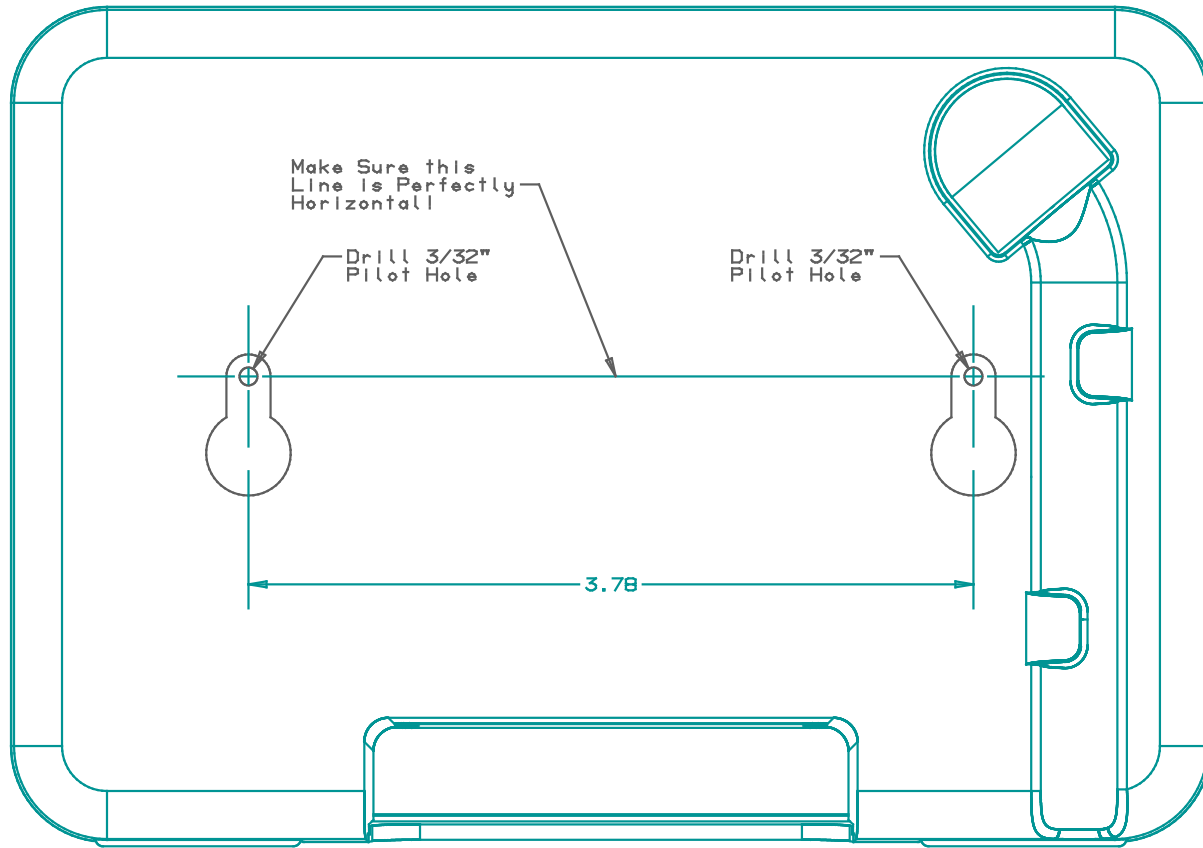
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**Limitation of Remedies and Liability** If the Genesis Reef Systems product is proved to be defective within the warranty period stated above the exclusive remedy, at Genesis Reef Systems' option, shall be to refund the purchase price of or to repair or replace the defective Genesis Reef Systems product. Genesis Reef Systems shall not otherwise be liable for loss or damages, whether direct, indirect, special, incidental, or consequential, regardless of legal theory asserted, including negligence, warranty, or strict liability.



*RENEW™ Pro  
System Layout*





Measure this Line Before Drilling. It Should Measure Exactly 6" in Length



Obstructions Must be No Closer than This Line to Allow for Cables

PRINT AT 100% SCALE

Top Line Must be No Closer Than .5" to Obstructions

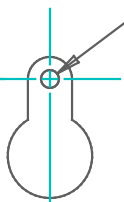
Measure this Line Before Drilling. It Should Measure Exactly 4" in Length



Measure this Line Before Drilling. It Should Measure Exactly 6" in Length

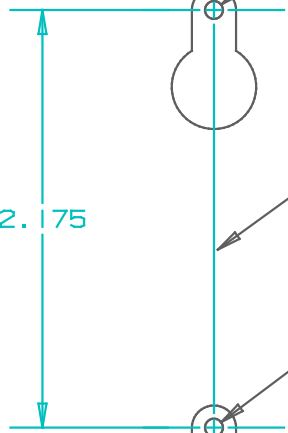


Drill 3/32" Pilot Hole

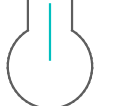


Make Sure this Line is Perfectly Vertical!

2.175



Drill 3/32" Pilot Hole



PRINT AT 100% SCALE

