OUTDOOR WATER SOLUTIONS

AERMASTER DD SOLAR AERATORS

Installation Instructions

Congratulations! You have purchased an environmentally safe aeration system designed to run on clean, solar power energy.

John Redd

Important Safety Instructions:

- Reduce risk of bodily injury when handling bulky and/or heavy components by using a 2-person installation team. A second person should help to lift and handle these components.
- DANGER: RISK OF ELECTRIC SHOCK! DO NOT TOUCH ANY UNINSULATED PARTS OF THE SOLAR PANEL, OUTPUT WIRING CONNECTED TO THE SOLAR PANEL OR INSIDE BLACK ELECTRICAL BOX LOCATED IN THE CABINET.
- The solar panel can develop voltages greater than 42V DC, which poses a shock and/or electrocution hazard. Outdoor Water Solutions recommends wearing electrically non-conductive gloves when handling the Solar Panel's output leads.
- To avoid shorting, the Solar Panel's output does not cross a conductive object such as a screw driver shaft.
- Install panel and wiring during DRY weather conditions. Never install system while the weather is raining or in any way, precipitating.

Warnings:

- When preforming ANY maintenance or cleaning on solar panels or cabinet, the system must be turned off by the toggle switch located inside the cabinet.
- HIGH WIND AREA: Mount solar panels closer to ground to eliminate flexing of panels and pole.
- Clear area from any trees/shrubs obstructing solar panels.
- Monitor the panels. You don't need to do anything, but keep an eye on them. Make sure your diffusers are producing water movement on the pond surface at clear sun peak.
- Keep the panels out of the shade. While you're at it, make sure that there are no new shade issues that weren't there when the system was installed. We here at Outdoor Water Solutions would never suggest you cut down a tree, but you may need to trim them back. Shade on solar panels actually works exponentially, not proportionally, to reduce panel output. So if 1/4 of the panel is shaded, you're not losing 1/4 of the output for that panel, you're likely losing more than half.
- Diffuser Max Depth is 15FT. DO NOT exceed 15FT of water depth.

Warranty:

- Five years on solar panels
- Two years on all parts and components

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How much sun is required?

One common source of confusion with regards to solar powered aerators is the question of how much sun is required to successfully power the aerator? Does it have to be perfectly sunny? What if a cloud blocks the sun? The answer is... it depends. The sun's energy varies throughout the day and at some point in the day (usually around 12pm), the sun will reach its peak intensity. If it's a clear day (i.e. no clouds), this is the point at which a solar powered aerator will reach its peak output. As the day progresses and the sun gets lower in the sky, the power output of a solar panel will naturally decrease until dark at which point power output will halt altogether. In the same way, anything that obstructs the sun during the day, such as clouds, trees and buildings, will also have an effect on the output of the panel. For example, if the sun is obstructed by some light cloud cover, it is still possible, depending on the time of day, to achieve greater than 50% of the solar devices direct-solar output. In terms of an aeration system, that means you could still achieve a reasonable flow rate as long as the clouds don't get too thick, or the sun isn't too low in the sky

Tools/materials needed:

1-QUIKRETE 80 lb. Concrete Mix

1-shovel or post-hole digger

1-Level

1-Measuring tape

Power drill

Work Table

(1)-1/2” socket with ratchet

Included parts:

1- Solar Panel mounting galvanized pole

2- Solar panels prewired with MC4 connectors

1-Large “L” bracket adjustable solar panel mount

2- (#1)- 53” x 1 1/2”angle solar panel braces with pole

2-MC4 prewired disconnects from cabinet

2-#2 kit adjustable support angles 2 ½” in length

2- Y-connectors

1-Bag of hardware

1-Angle Finder

Step 1: ***Preparing install area***

Choose a proposed Direct Drive “DD” solar system location. Clear any debris in area where proposed install site will be located. Check for trees that may be obstructing solar panels (trim if needed).

Step 2: ***Installing 5ft- 1 ½” round galvanized solar panel pole***

Using a shovel or post hole digger, dig hole 2 - 2 1/2ft in depth and 1-2ft in diameter. The galvanized mounting pole must be at the least 1 ½ - 2ft deep in hole. Insert piece of rebar into predrilled hole located in the bottom of the mounting pole then put the pole into the center of the hole. (See figure #1) Using level, make sure galvanized pole is level; then, add concrete. After concrete has been poured, double check pole to make sure pole is level. (See Figure #2) Brace pole until concrete has hardened.

Figure #1

Figure #2

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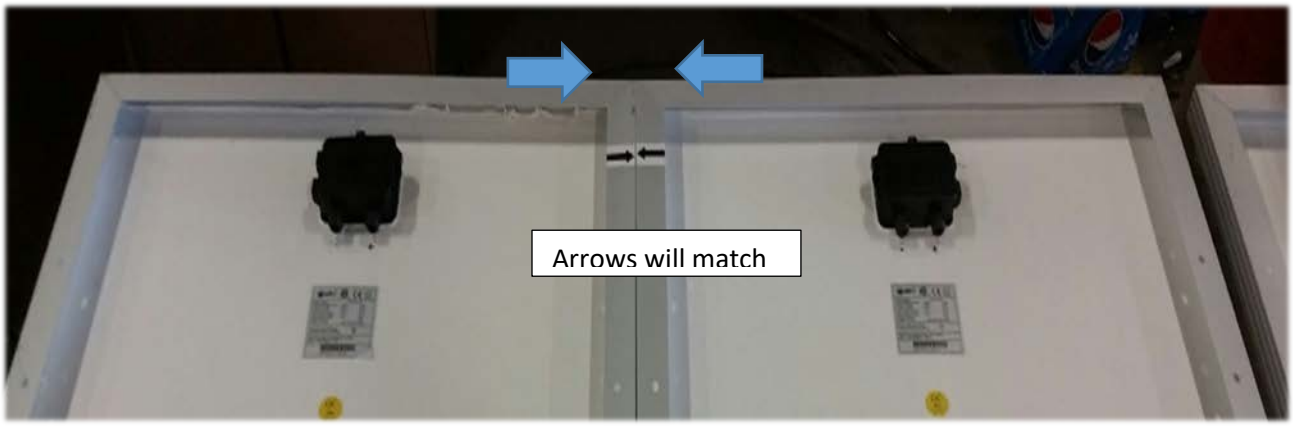
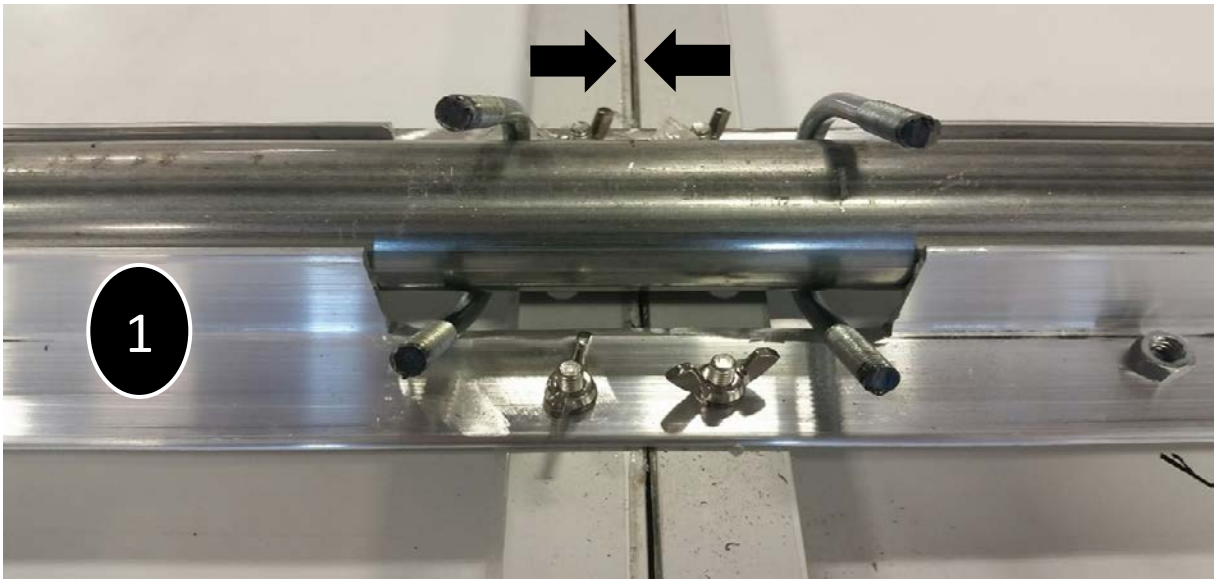
Step 3: ***Installing adjustable solar panel mounting kit with braces to solar panels.***

The two solar panels are predrilled. On a table, face the solar panels glass (blue) side down and the junction box wiring up. The panels should be side by side. Make sure arrows point to each other.



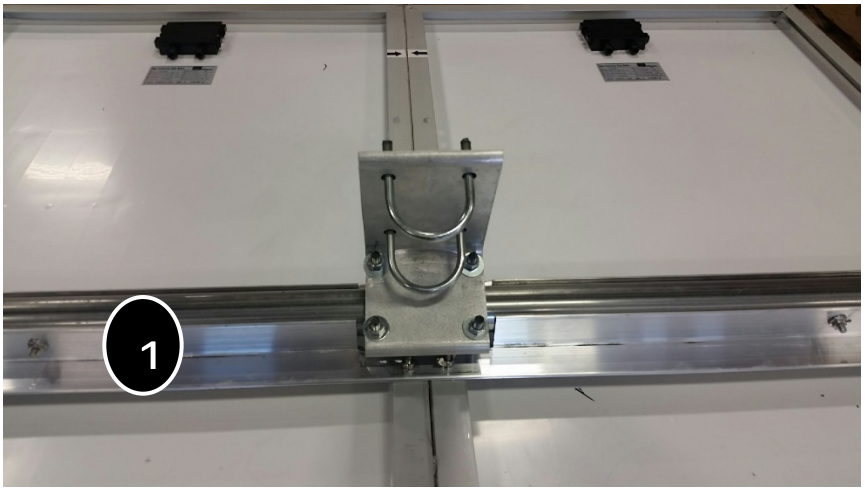
Step #4 ***Installing main support to preassembled galvanized pole and "L" angle***

Attach the aluminum frame (#1) to the two solar panels. There are 4 predrilled holes in the center of the aluminum frame and 4 predrilled holes on the outside of the aluminum frame. Using the provided hardware, attach and finger tighten the 4 outer edge solar panel frames with 1/4- 20 bolts, lock washers and nuts, two on each outer edge of solar panels. Do not tighten fasteners. Attach and finger tighten the 4 center edge solar panel frames with 1/4- 20 bolts and nuts. Do not tighten fasteners until all fasteners have been installed.



Step #5: Installing “L” Bracket and U-Bolts

You will need a 3/8” wrench for this step. Attach your aluminum frame (#1) to the large “L” bracket. Use 3/8” bolts, nuts and washers to attach the L bracket to the aluminum frame. Tighten tight. The U-bolt washers and nuts must be kept loose so it can be attached to the mounting pole.



Step #6 Installing panels to pole

A two man lift is recommended to install panels to pole in cement. The pole must be installed to be flush to the top of the Large “L” bracket as shown in the picture below. Tighten all U-bolts.

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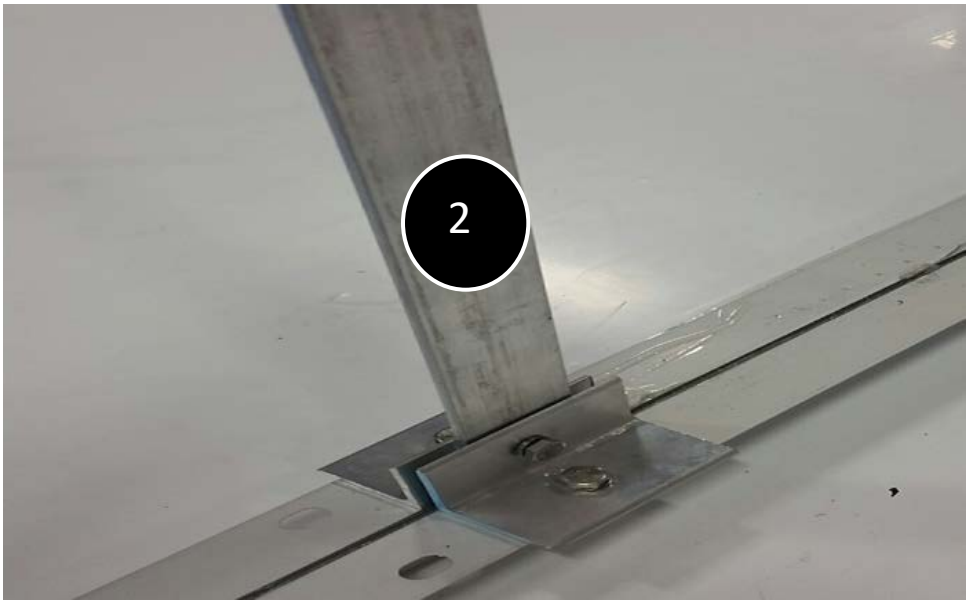
Step #7 Installing Support bracket to panels

Install the two “L” brackets to the panels approximately 15” up from the bottom. You’ll see two pre-drilled mounting holes on the inside of the panels. Use ¼” bolts, nuts and washers to attach. Insert the flat aluminum angle adjuster into the two “L” brackets as shown in the picture below and attach with ¼” bolts, washer and nut. Tighten all bolts.



Step #8 Connecting marked #2 flat aluminum angle adjuster to solar pole

Attach the other end of the #2 aluminum angle adjuster to the black U bolt on the mounting pole using the provided hardware. Then set the panel angle as shown below.

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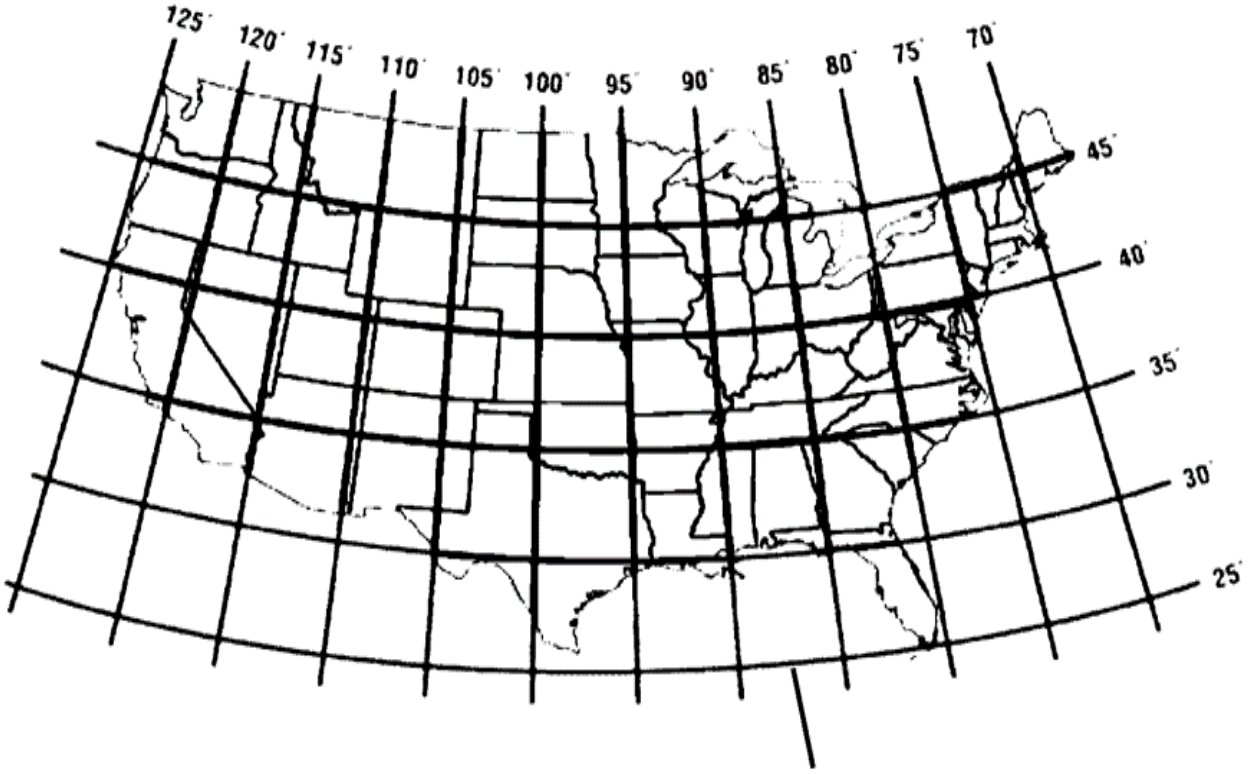
<u>Step #9</u>- Setting the tilt for your solar panels:

To get the most power from your solar panel the adjustable mounting bracket must be set correctly.

The tilt should be equal to your latitude, minus 15 degrees in winter or plus 15 degrees in summer.

Example: If the Solar Panel is located near Denver, CO which has a latitude of 40 degrees, then:

- 40 minus 15 equals 25 degrees for the winter.
- 40 plus 15 degrees equals 55 degrees for the summer.
- Set the adjustable mounting bracket to correct degrees (See figure #9)



Latitude Lines

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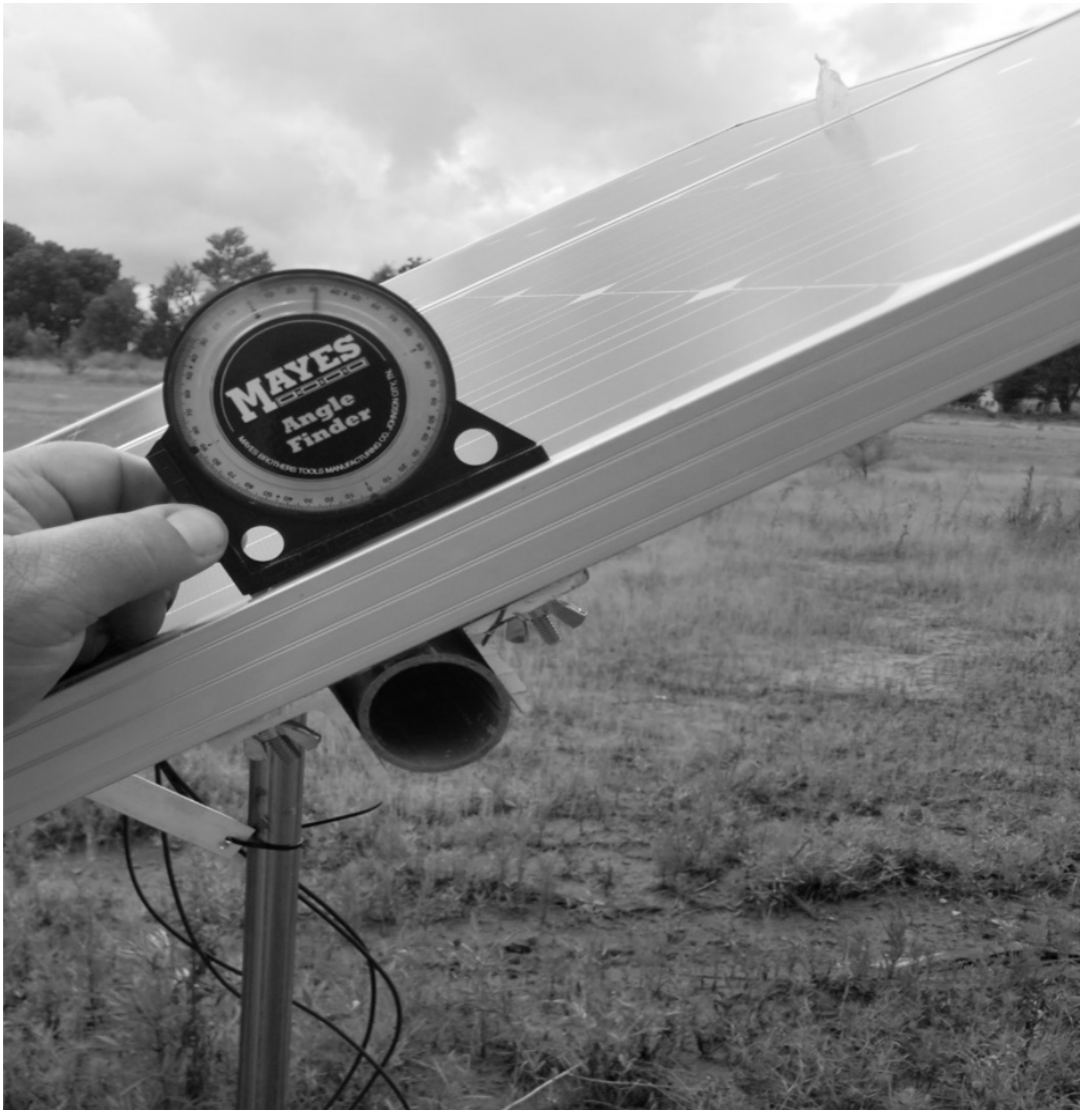
Use provided Angle Finder to correctly set the right degree for your panel location.



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Step #11 ***Connecting compressor to solar panels***

Solar wiring is in parallel. Start by connecting the two female on the Y-connector from the cabinet to the two male from solar panels. (See figure #10) Connect the male connector to female Y-connector from solar panel. (See figure #11) Use zip ties to secure all loose cables to pole and secure cable under panel.

Figure #10

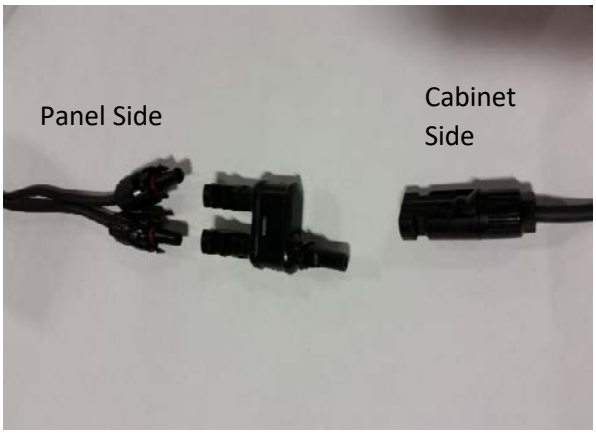


Figure #11

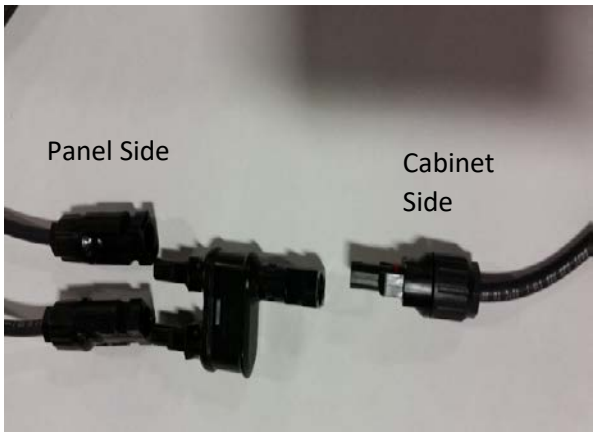
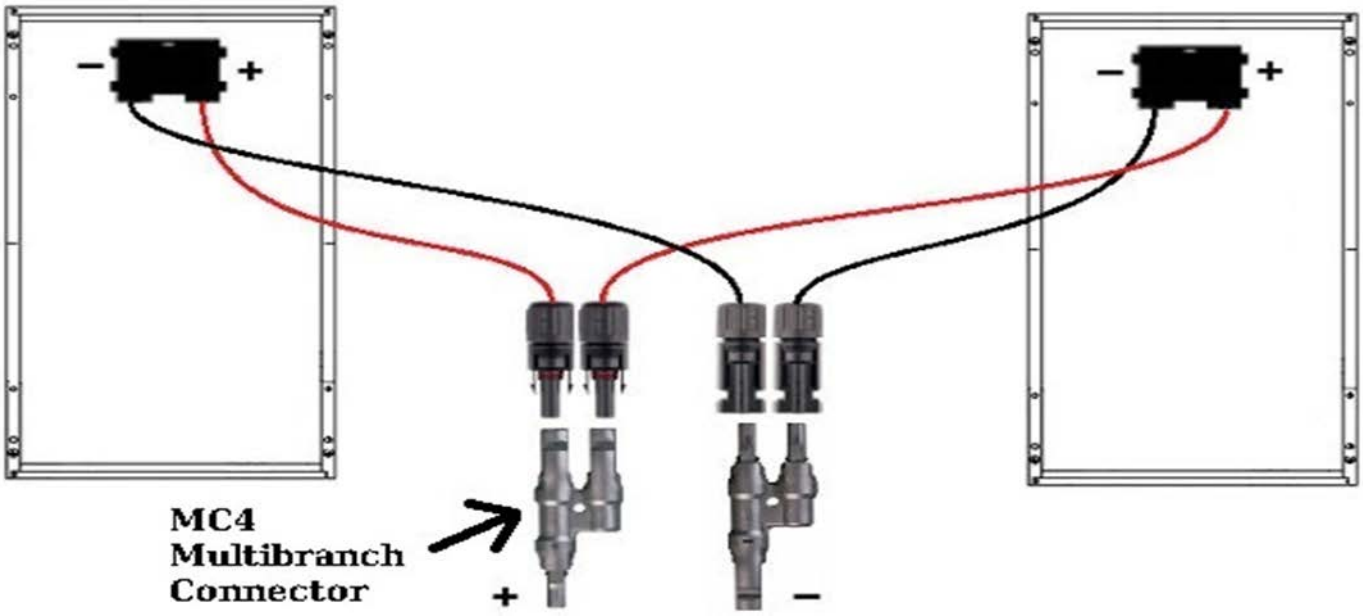


Figure #12



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Step #12 ***Solar Aerator installation***

Attach the four mounting feet to the compressor cabinet and set the solar aerator on a level surface consisting of a concrete pad, injection molded or fiberglass equipment pad or a bed of rock or crushed limestone. You can also set the unit on a prefabricated pad with mounting bolts (both available as an option from Outdoor Water Solutions). Connect each airline to the airline going out to the pond. Make sure you do not remove the black and white backflow valves that are located between the tubing coming out of the compressor and the weighted airline going out to your pond. Each of these has a set screw that allows back pressure to bleed off of the compressor so it restarts easier and prolongs the life of your compressor. Do not adjust as these have been tested and preset at the factory. Do not bury.

Step #13 ***Diffuser installation***

Run each airline from the cabinet base out to the place in the pond where you want your diffuser and attach your diffuser. For diffusers with a base, lower the diffuser down to the bottom of the pond. Using a thin rope can help to keep the diffuser and base upright. You don't have to tie the rope on, just fold the rope in half, lower the diffuser, then pull the rope up by pulling on one half.

We also suggest installing your diffuser into the deep part of the pond to ensure complete circulation of your water. The exception to this would be if you're wanting to keep the water open for watering livestock in the winter, then you can put the diffuser closer to the shoreline (or move it there in the fall). You can also place the diffuser in a more shallow area if you are in a northern climate and have trout, walleye, Northern pike or Muskie in the pond and want the deep parts of the pond to remain colder in the summer months. Bury each airline 4-6" or deeper to prevent damage from equipment or animals. You can place this tubing into conduit or pvc if desired for extra protection.

Note: Air will travel to the point of least resistance or to the shallow diffusers first. Adjusting the airflow so that it goes to the deepest diffusers is usually required. Lower pressure high volume is the goal when adjusting diffusers.

Step #14 ***Turning on solar system***

MAKE SURE CABINET MC4 CONNECTIONS ARE CONNECTED TO SOLAR PANELS PRIOR TO SYSTEM START UP.

DO NOT place diffuser in more than 15ft water depth. After positioning all diffusers in pond unlock cabinet and turn the toggle switch to the on position. We recommend turning your electric aerator on for an hour the first day, then increasing the time by a couple of hours each day until it is running continuously. On rare occasions, you can have a pond "turnover" if you turn aeration on continuously in a pond not previously aerated. This means the oxygen

deprived water in the bottom of the pond rises to the top and your fish cannot survive due to the low oxygen conditions. Doing this over the course of 3-4 days can prevent any potential issues.

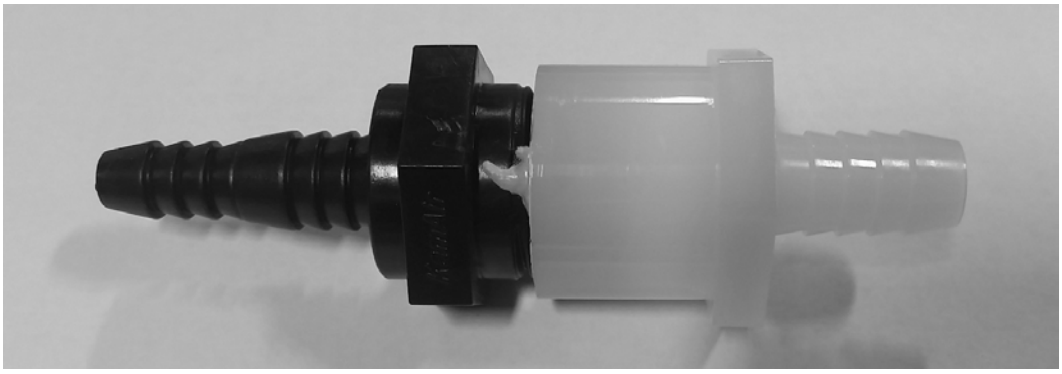
Enjoy your new Outdoor Water Solutions DD Solar Aeration system.

Compressor Replacement Instructions:

To replace a DC solar compressor you will need a Philips screwdriver and a 7/16" wrench. Remove 4-philips screws on top of compressor. Once head plate is loose, carefully separate top from bottom motor. Repeat on new compressor. Remove mounting feet from old compressor and hand tighten to new compressor. Set new compressor top aside (will not use) Remove old compressor bottom out of cabinet. Install new bottom motor. Using old top plate tighten the four Philips head screws. Complete and ready to turn system on.

If your unit doesn't have a backflow valve coming out of the cabinet, we recommend adding one as follows:

1. Turn off system
2. Connect the black end of the backflow valve to the piece of high heat tubing coming out of the compressor cabinet.
3. Connect the white end to your weighted airline going out to your pond. Do not adjust or change the settings on the bleed off screw that is included with this fitting. It allows the compressor to restart without back pressure extending the life of your compressor.
4. NOTE: The bleeder screw will need to be out of the ground and able to bleed air pressure



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Maintenance:

Safety first – follow the system on/off procedure in your manual for shutting down the system before commencing cleaning.

Cabinet care- Twice a year check the interior cabinet for outside debris and remove if any.

For safety reasons, it's also wise to clean your panels from the ground if possible. A good quality soft brush and a squeegee with a plastic blade on one side and a cloth covered sponge on the other coupled with a long extension can make for the perfect tool allowing you to stay on the ground. Use a hose with a suitable nozzle to allow the stream of water to reach the panels.

What to look for when cleaning: Dust, bird droppings, pollution, pollen, tree sap, plant matter residue, etc., all reduce the overall effectiveness of solar panel generation capacity. Panels must be cleaned regularly to maximize system performance and longevity.

When to clean solar panels: Clean your panels on an overcast day, early in the morning or in the evening. If the sun is beating down on the panels, any water used can quickly evaporate and dirt will become smeared. Early morning can be a particularly good time for cleaning as dew that has settled on the panels overnight will likely have softened grime; meaning you'll need to use less water and less energy to clean your solar panels. If the panels are dry, before tackling the modules with water, brush off any loose materials first – this will make cleaning easier and faster.

Solar panel cleaning warning: DO NOT use common car-wash soaps and window cleaners which contain alkalines that promote oxidation and require a deionized water rinse. Never use an abrasive soap or a cleaning sponge - the goal is to get the glass as clean and clear as possible and you don't want to scratch it. Outdoor Water Solutions recommends to use warm water and dishwashing soap.

Drying solar panels after washing: Dry solar panels with a towel making sure the towel does not scratch the panels. A chamois that you would use for your car is a good choice.