

## Installation Instructions



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

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## Important Safety Instructions:

- Reduce risk of bodily injury when handling bulky and/or heavy components by using a two 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. It is recommended to wear electrically non-conductive gloves when handling the solar panel's output leads.
- To avoid shorting, the solar panel's output should 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 performing 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 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 maximum depth is 15 ft. DO NOT exceed 15 ft. of water depth.

## Warranty:

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

## 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 12 p.m.), 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 - Digging shovel or posthole shovel
- 1 - Level
- 2 -  $\frac{7}{16}$ " wrenches
- Power drill
- Work Table
- 1 -  $\frac{5}{16}$ " socket with ratchet

## Included parts:

- 1 - Solar Panel mounting galvanized pole
- 2 - Solar panels pre-wired with MC4 connectors
- 1 - Two way adjustable solar panel mount
- 2 - 52" x  $1\frac{1}{2}$ " angle solar panel braces
- 2 - MC4 pre-wired disconnects from cabinet
- 2 - Support angles  $2\frac{1}{2}$ " in length
- 2 - Y-connectors
- 1 - Bag of hardware

## Step 1: Preparing install area

Choose a proposed 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).

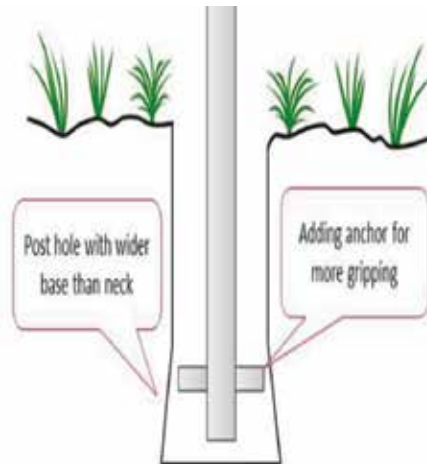
## Step 2: Installing 5' long, $1\frac{1}{2}$ " round galvanized solar panel pole

Using a digging shovel or post hole shovel, dig hole 2 to  $2\frac{1}{2}$  ft. in depth and 1 to 2 ft. in diameter. Insert pole into center of hole (see Figure #1). Galvanized solar panel pole must be at the least 2 ft. deep in hole. Insert rebar piece into pre-drilled hole (Figure #1A). This is for anchoring to pole into cement. 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.

Step 2 - Figure #1



Step 2 - Figure #1A



Step 2 - Figure #2



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### Step 3: Connecting two solar panel support brackets to (A) & (B) braces

Connect two support angles brackets to (A) and (B) braces using provided hardware (One 1/4-20 x 1/2" bolt, one 1/4" washer and one 1/4" nut) for each (A) and (B) support bracket. All support brackets are pre-drilled (see Figure #1 & 2).

Step 3 - Figure #1 (A) Bracket



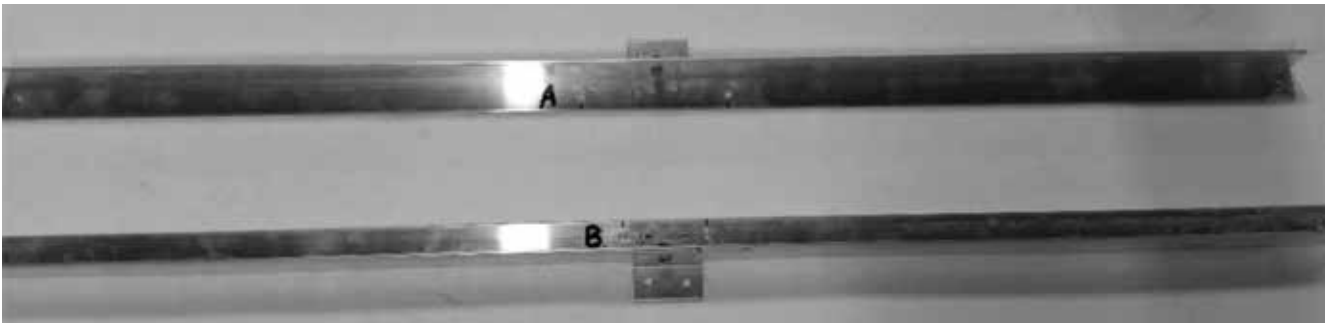
Step 3 - Figure #2 (B) Bracket



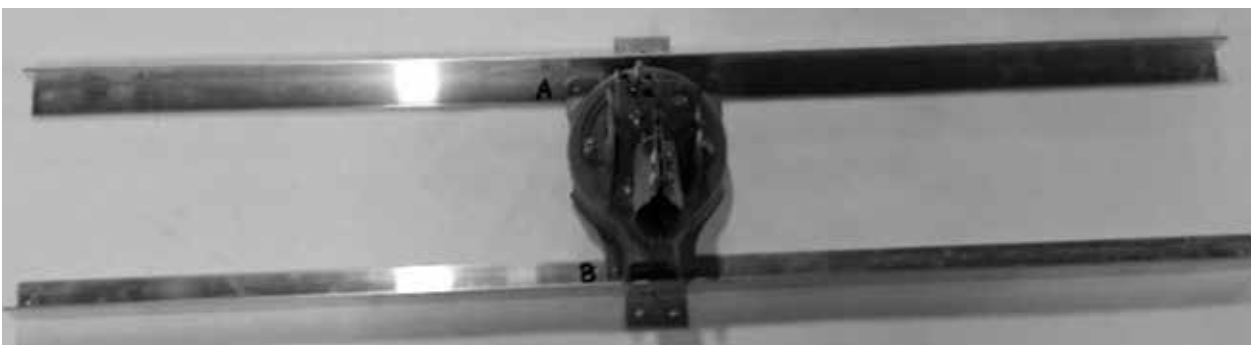
### Step 4: Attaching 2 x 54" x 1 1/2" angle to adjustable solar panel mount

Lay both (A) and (B) 1 1/2" angle braces on table (see Figure #3). The 1 1/2" angle brace (A) has two 6" apart center pre-drilled holes. The (B) 1 1/2" pre-drilled brace with two-3 1/2" spaced pre-drilled holes in center of bottom brace will be the closest brace to assembler. In the center of the braces (A) and (B), mount the adjustable solar panel mount loosely to braces by connecting all four 1/4- 20 bolts and nuts to braces (see Figure #4).

Step 4 - Figure #3



Step 4 - Figure #4



## Step 5: Installing two way adjustable solar panel mounting kit with braces to solar panels.

(See figure #5) The two solar panels are pre-drilled. 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. Mounting the two way adjustable solar panel mounting kit and braces by attaching to the center of the back of the solar panels. Now using the provided hardware, attach and finger tighten the four outer edge solar panel frames with 1/4"- 20 bolts and nuts, two on each outer edge of solar panels. Attach the two center support brackets to the pre-drilled solar panels (see Figure #6A & 6B). Do not tighten until all fasteners are connected. Tighten all fasteners once all fasteners have been matched to each pre-drilled hole. Do not drill into solar panel frames.

Step 5 - Figure #5



Step 5 - Figure #6A



Step 5 - Figure #6B



## Step #6 Installing both panels to galvanized pole

Once concrete has set and hardened, remove leveling supports from pole. Team lift panels in position facing true south. Insert adjustable solar mounting bracket into galvanized pole. Once South is determined and panels are set, tighten all five- 1/4"- 20 nuts on the solar panel mount clamping panels onto galvanized pole (see Figure #7). Screw in the two self-tapping screws to lock in adjustable panel mount onto galvanized pole (see Figure #8).

Step 6 - Figure #7



Step 6 - Figure #8





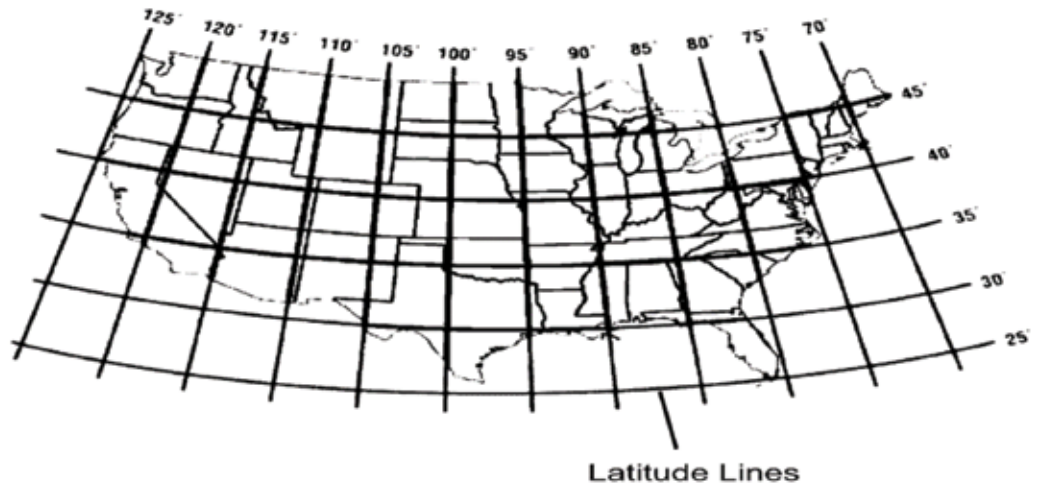
## Step #7- (See Figure #9) Setting the tilt for your solar panels:

To get the most power from your solar panel the adjustable mounting bracket must be set correctly. (see US chart, right)

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).



Step 7 - Figure #9



## Step #8 (Optional) Connecting Solar system to existing functional windmill

(See Figure #9B) Using barb connector tee and clamps, cut poly tubing from windmill to splice in tee connection and tighten clamps. On the remaining barb, connect solar cabinet outlet hose to barb and tighten clamp. The hose from the windmill and solar cabinet must have an inline check valve. Blue check valve on windmill see arrows on valve.

Step 8 -  
Figure #9B



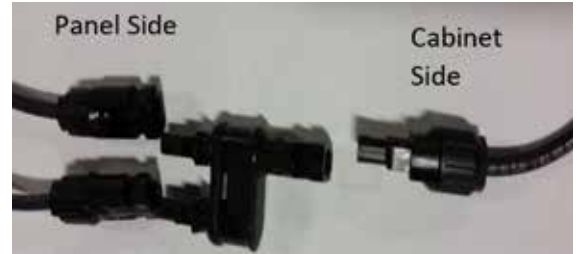
## Step #9 Connecting compressor to solar panels

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). Ty-wrap all loose cables to pole and secure cable under panel.

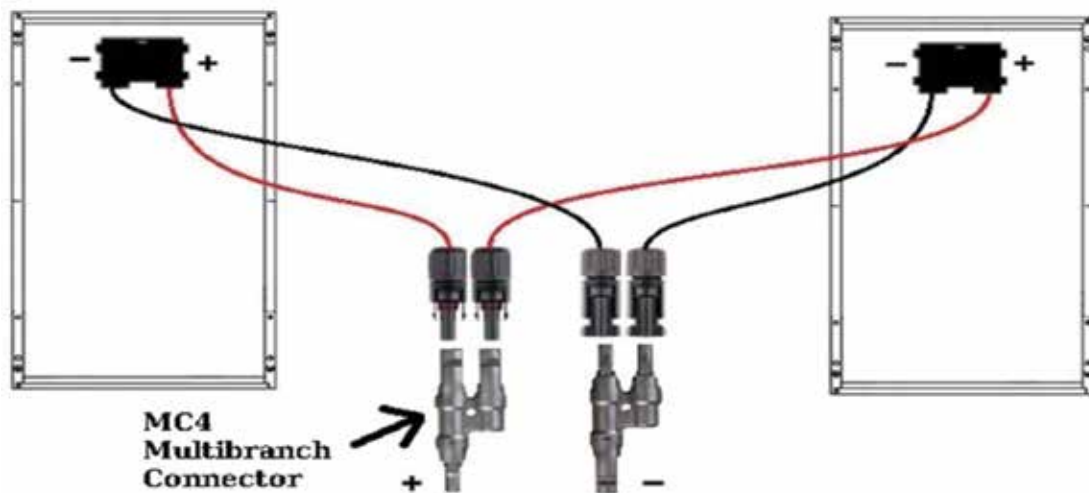
Step 9 - Figure #10



Step 9 - Figure #11



Step 9 -  
Figure #12



## Step #10 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. Connect each airline to the airline going out to the pond.

## Step #11 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.

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## Step #12 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 15 ft. water depth. After positioning all diffusers in pond, unlock cabinet and turn the toggle switch to the on position. We recommend turning your system 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 three to four days can prevent any potential issues. Enjoy your new solar aeration system.

## 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, they contain alkalines that promote oxidation and require a deionized water rinse. Never use an abrasive soap or cleaning sponge - the goal is to get the glass clean and clear as possible and you don't want to scratch it. It is recommended to use warm water and dish washing 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.



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