

U.S. SOLAR MOUNTS

SLA-SD-BLDC Installation Instructions

Brushless Solar-Direct Lake Aerators

REV 3



Ultra-Rugged Solar Mounting Solutions

©2019 U.S. Solar Mounts Corp. All Rights Reserved

1. Installer Responsibility	3
2. Safety, Warnings & Cautions	3
3. SLA-SD-BLDC Basic System Overview	5
4. Site Planning and Preparations	6
5. Receiving Your Shipment	7
6. Installing the Pole Mounts	7
7. Connecting the Solar to the Aerator	9
8. Deploying the Diffusers	10
9. Commissioning the SLA	11
10. Making A Healthy Transition to An Aerated Lake or Pond	12
11. Troubleshooting	13

CUSTOMER SUPPORT

U.S. Solar Mounts products are designed to be simple and easy to install. If, for whatever reason, you need help during installation, please give U.S. Solar Mounts' customer support a call. We are happy to help ensure each installation goes as smooth as possible. Have a comment or suggestion on how we can improve your experience? Let us know. We do appreciate your feedback.

U.S. Solar Mounts

3498 Acorn Ave.
Sparta, WI 54656

(608)272-3999

info@ussolarmounts.us

1. Installer Responsibility

The installer is solely responsible for:

- Complying with all applicable local or national building codes, including any that may supersede this manual.
- Ensure that U.S. Solar Mounts and other products are appropriate for the particular installation and the installation environment.
- Ensure that the selected mount can support the array under live load conditions.
- Use only U.S. Solar Mounts parts and installer-supplied parts as specified by U.S. Solar Mounts. Substitution parts may void the warranty.
- **Ensure proper array/structure grounding**, including each module frame, the mounting pole and each rail. Failure to provide proper grounding may result in damage to your equipment or injury to personnel.
- **Do not rely on the mounting pipe to act as a ground rod!** It is not a reliable substitute for a properly installed grounding electrode system.
- **If you are unfamiliar** with NEC **compliant** solar electric installations, consult **with the dealer** that supplied your mount. They should have the skill and expertise to supply you with the necessary wiring diagrams and the appropriate connection wire, grounding equipment, junction boxes and fusing.

2. Safety, Warnings & Cautions



Safety warnings are not in this manual for our benefit; **they are for you.** Please follow them carefully.

You must read, understand, and comply with all of these safety instructions in order to protect your life and safety, and to prevent equipment problems or damage. Failure to follow the instructions in this chapter may void equipment warranties.



We make every effort to remove sharp edges from our products. However, we highly recommend wearing gloves when handling metal parts in order to avoid sharp edges.

Before you begin any digging for the post, you **MUST** make absolutely sure that there are no buried lines in the area that you'll be working. Buried utility lines can be **LETHAL** if struck and / or damaged.

Use your head and PLEASE do not become a statistic!



Note:

Locating services are normally provided for **FREE** by the utility company or one of their contractors. The Utility Company will not normally locate privately-owned lines, such as propane lines or wiring buried between buildings on your property.



CAUTION!

Check for any Overhead Power Lines that may be in or near your work area. Contact with power lines will ruin your day and very likely kill you.

You won't be able to tell everyone how cool your new Solar Lake Aerator is if you've been reduced to a smoldering heap on the ground.

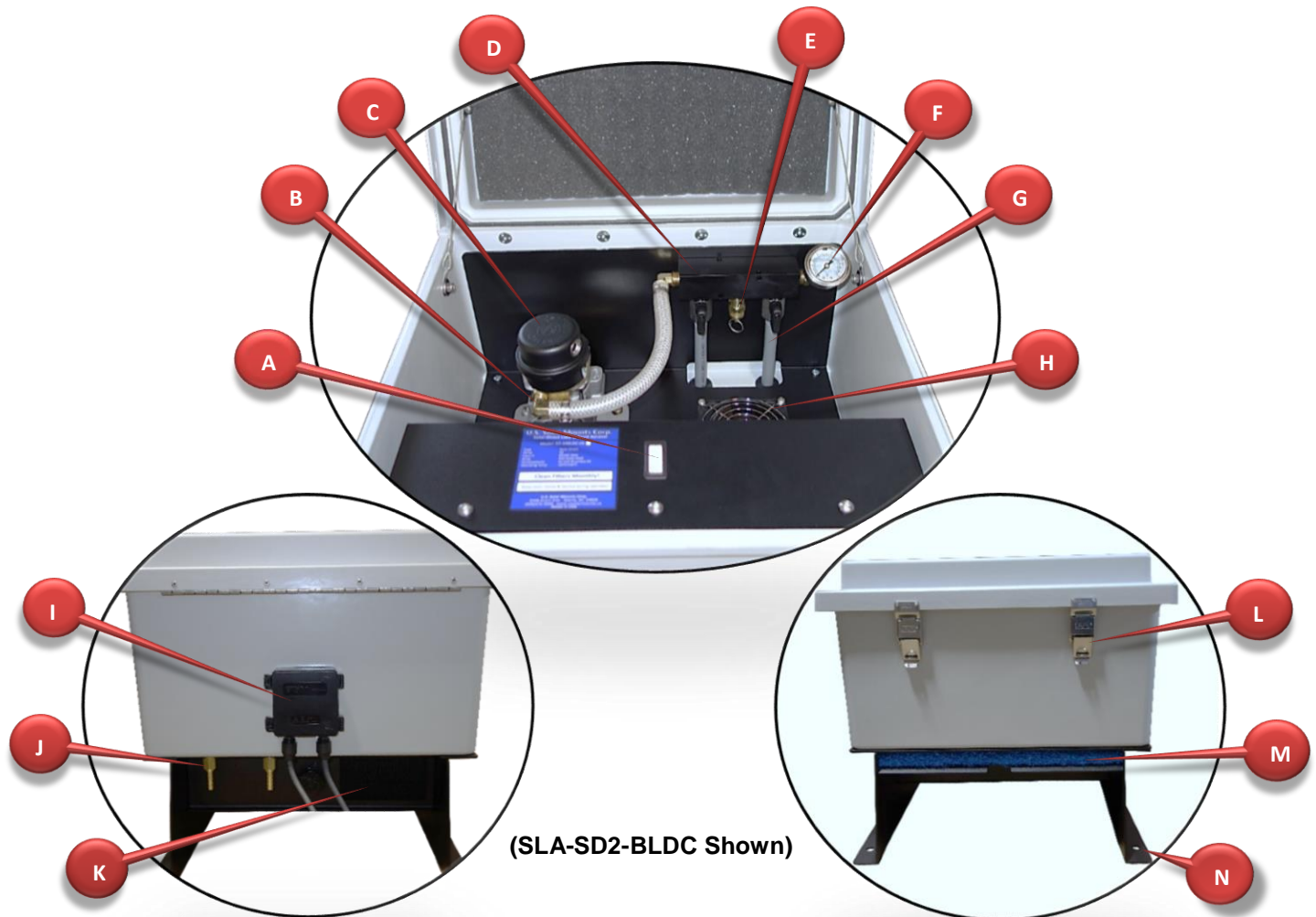
DANGER

THIN ICE

Be Aware of Thin Ice Hazards!

Ponds and lakes with aeration systems in use throughout the winter months can be very dangerous. Many States or localities may require that these lakes be clearly marked with signs declaring them hazardous due to thin ice or open water during the winter. **DO NOT** attempt to walk on aerated lakes, and ensure all proper precautions are taken to prevent severe harm or death to yourself or others!

3. SLA-SD-BLDC Basic System Overview

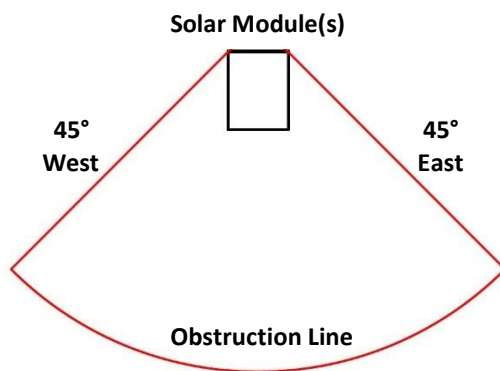
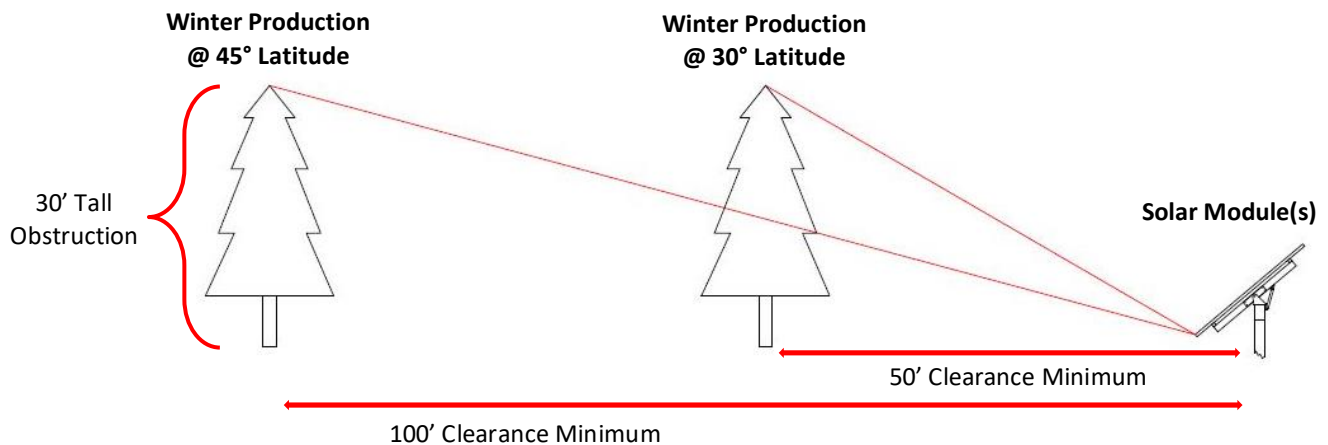


Basic System Components	
A	Circuit Breaker
B	Compressor Assembly
C	Compressor Intake Filter (Must Be Kept Clean)
D	Manifold Assembly
E	Pressure Relief Valve
F	Air Pressure Gauge
G	Diffuser Tube Entries and Flow-Balancing Valves (Shown Open)
H	Enclosure Cooling Fan
I	Solar Input Junction Box
J	External Tube Connections
K	Enclosure Cooling Air Exhaust
L	Enclosure Locking Hasps
M	Enclosure Cooling Air Intake and Filter (Must Be Kept Clean)
N	Enclosure Mounting Holes (4 x 7/16")

4. Site Planning and Preparations

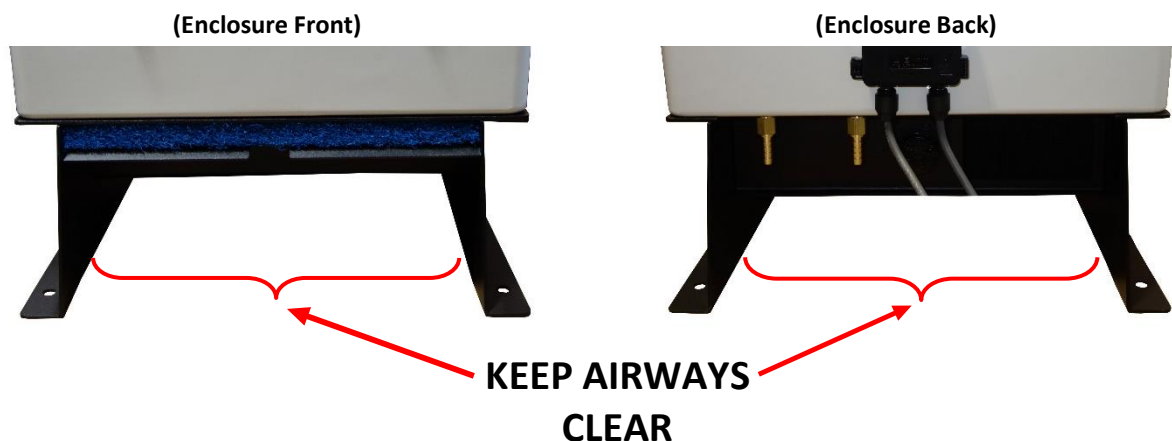
Note: This section can be completed before or after receiving your SLA system(s).

The first step in preparing your site for a Solar Lake Aerator is picking the installation location. The modules must have good solar access throughout the entire day, while also being close to the body of water you wish to aerate. Use the following diagram to assist in finding a good spot for your solar array.



NOTE: Any shading on the panels during the day can dramatically affect the air output of the SLA. Ensure you have picked a good location for the panels. To aid in finding a suitable location, the SLA comes with 15' power leads to reach the solar array. These leads can be extended up to 50' as an optional upgrade, if desired.

The SD2 and SD4 enclosures need to be set on fairly level ground that is free of any dust, weeds, or any other contaminant that may clog up the filter intake. The enclosure needs **at least a 24" x 24" cleared area** and includes (4) 7/16" holes in the base for mounting to a pad or slab, if desired.



Once a suitable location has been chosen, the pole for the solar mount needs to be installed in the ground. Each individual SLA unit will require an installer-supplied steel mounting pole.

Please refer to the supplied Solar Mount Installation Instructions for foundation details.

5. Receiving Your Shipment

The site chosen for the installation and/or delivery of the SLA System must have adequate access for delivery trucks, semi-tractors, or any other equipment necessary to offload the skid(s) upon arrival. U.S. Solar Mounts may request assistance with shipping and logistics.

Upon delivery of the SLA system, the customer is responsible for inspecting the shipment for any damages incurred during shipping. If any damage is apparent, a claim must be made with the driver upon drop-off.

The SLA normally arrives packaged on a single skid with all components present. You may wish to use some form of equipment such as an all-terrain forklift or track loader for unloading the shipment and relocating the materials on the jobsite. The skid will be fairly heavy, but each individual piece can be handled by no more than two people.

Please note: Multiple-unit orders will likely come packaged on multiple skids, optimized to make the best use of materials and to keep freight costs to a minimum.

6. Installing the Pole Mounts

Refer again to the supplied Solar Mount Installation Instructions for assembly of the Solar Mount and installation of the Solar Module(s).

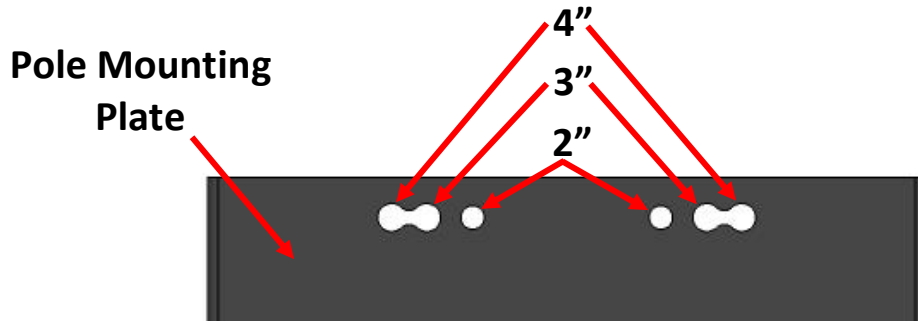
Once the mount has been assembled, use the following table to assist in setting a proper tilt angle for optimal year-round production.

Recommended SLA Array Tilt (Optimal Year-Round*)	
<u>Latitude</u>	<u>Tilt Angle</u>
0° to 25°	20°
25° to 35°	30°
35° to 45°	40°
45°+	50°

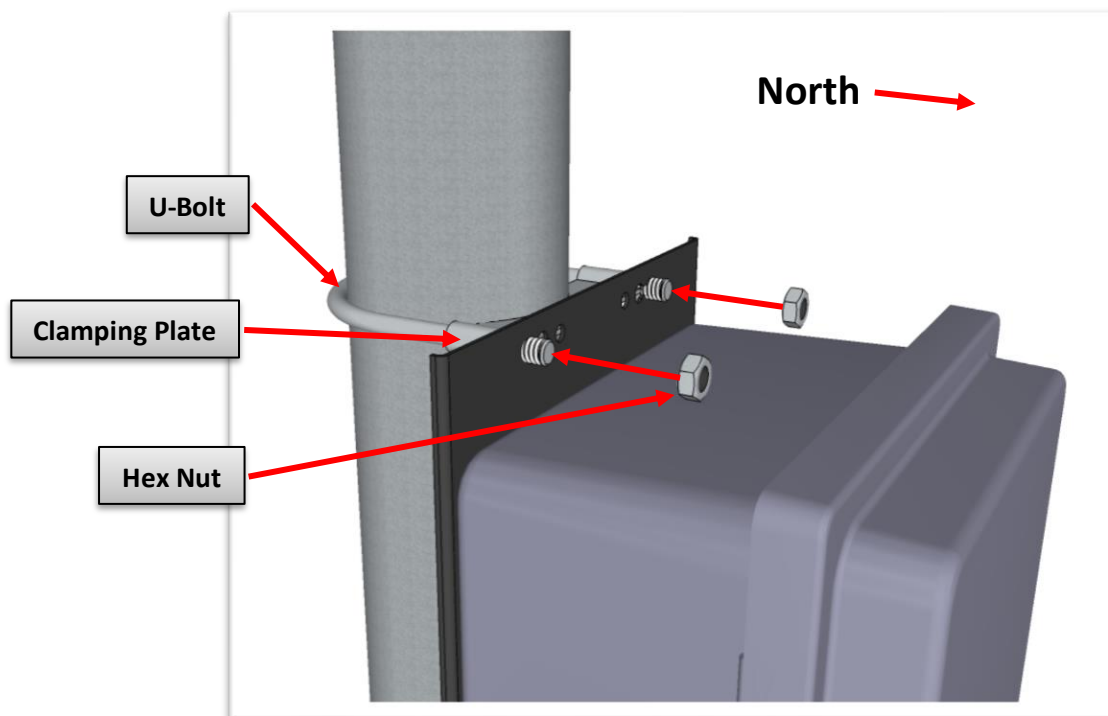
*Angles shown are based on optimal year-round tilt angles for a fixed array and may not be accurate for all locations. Arrays can also be adjusted seasonally for better production. Consult with your dealer or a local solar professional for more information on what angle will work best for your area.

If you are installing an SD1 system, now is the time to attach the aerator to the mounting pole.

The SD1 Pole Mounting Plate has holes included for clamping to a 2", 3", or 4" pole, as indicated below. Included in the packaging will be 2 Clamping U-Bolts of the appropriate size for your system, determined by the Solar Mount required for operation.



Attach the Aerator to the pole as shown below, with the box on the North side of the pole to allow clearance for the solar modules and mount. Leave the hex nuts loose while positioning the Aerator. Ensure there is enough clearance at the bottom of the box to keep the Air Intake out of any potential grass/weed growth in the future. Tighten the hex nuts evenly once you are happy with the positioning of the Aerator.

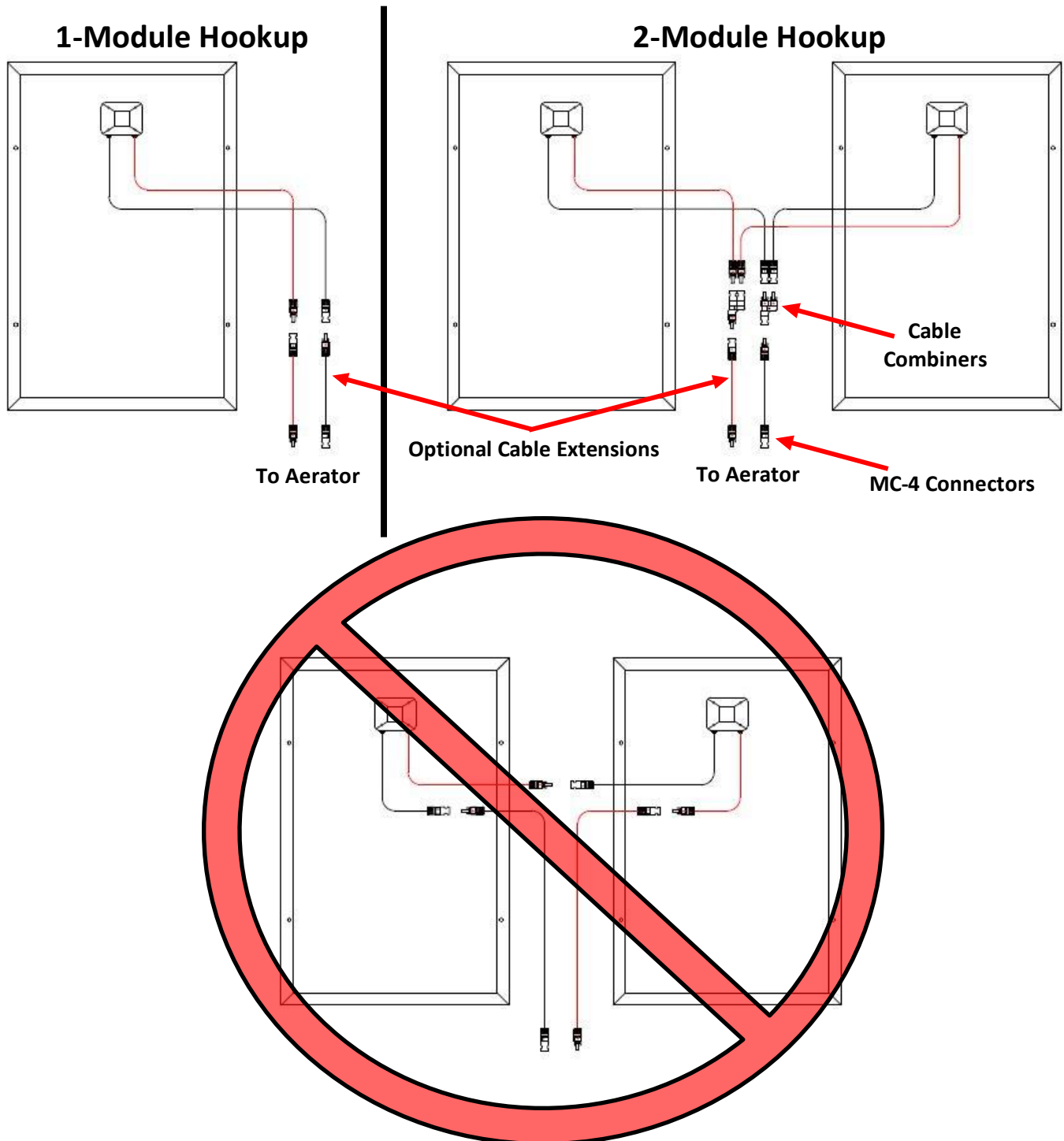


7. Connecting the Solar to the Aerator

Use the following diagram for connecting the module(s) to the SLA.

DO NOT connect the positive and negative leads of the same module together!

DO NOT connect multiple modules in Series, as shown in the bottom diagram!



Once the proper connections have been made at the array, route the remaining positive and negative leads to the SLA enclosure. Take care to route the cables so that they are neat and protected from physical damage.

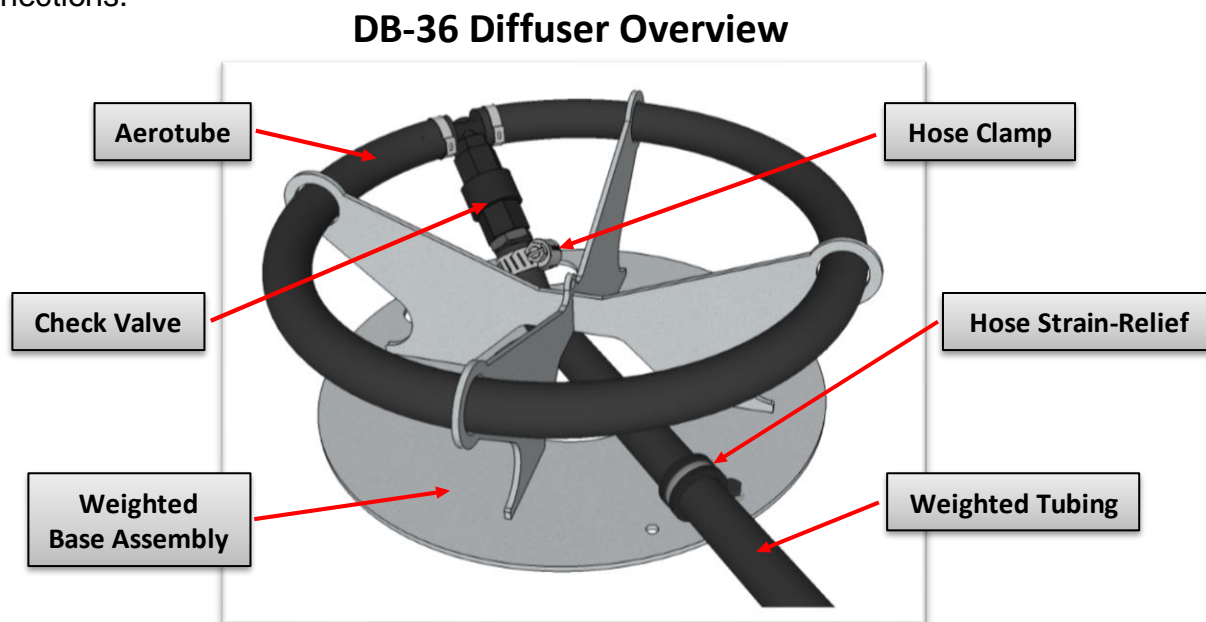
While the PV output leads supplied with the unit may be direct-buried, the MC-4 Solar connectors should **NEVER BE BURIED**. These leads may also be installed in a suitably-sized PVC conduit. In areas where damage by animals or livestock is of concern, the installer is responsible for restricting access to the enclosure, wiring, and array.

If you have any questions about wiring methods and/or procedures, please call U.S. Solar Mounts at (608)272-3999. We'll be glad to offer advice & guidance.

8. Deploying the Diffusers

Deploying the aeration diffusers will most likely be easiest with the assistance of a boat appropriate for the body of water you will be aerating. A second person may also be helpful for this step to ensure the weighted hose deploys properly.

The weighted hose may need to be trimmed or extended, depending on the positioning of the diffusers relative to the enclosure. If the diffusers and hose were not sourced from US Solar Mounts, the installer is responsible for supplying the necessary hose, diffusers, and fittings. The SLA comes with 3/8" brass barb fittings for the external hose connections.



Once assembly is complete as shown, uncoil the remaining weighted hose on shore and begin pulling the diffuser to the desired location. The diffuser can either be dropped to the lake bottom or be tied to a line so it can be lowered into position.

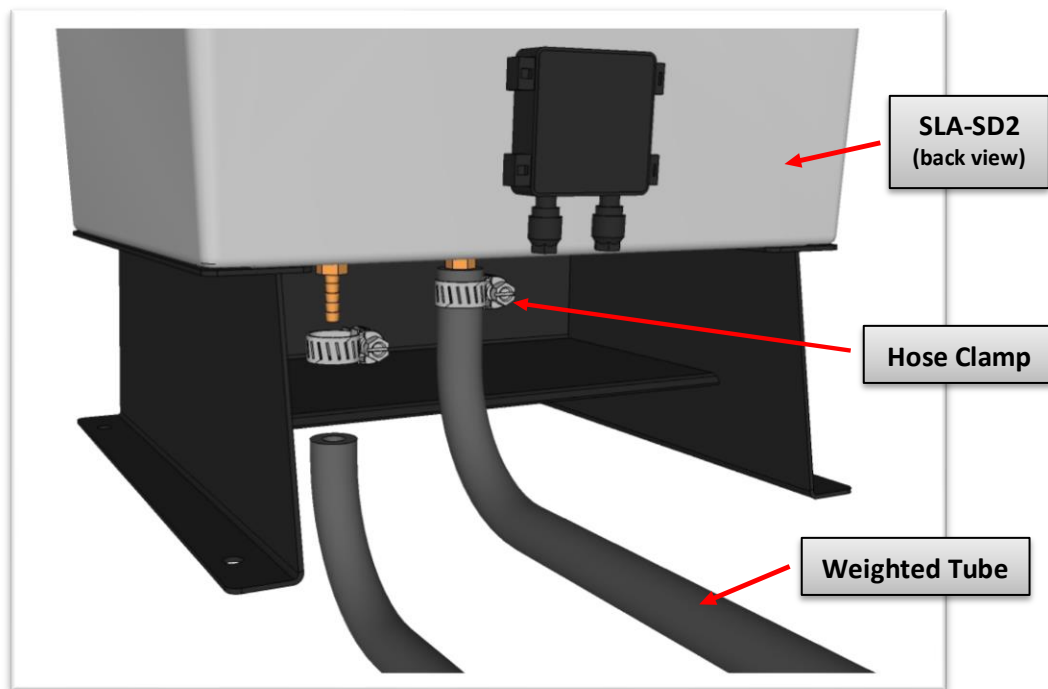
Note: Do not forget to tie a float to the diffuser if you plan on removing them for any reason! A float will also assist in regularly checking and cleaning the diffuser to ensure proper function.

WARNING!!

Use proper boating and water safety precautions while deploying the aerator diffusers!

Note: The positioning of the diffusers can have a large impact on the overall effectiveness of the aeration process and also in maintaining the general health of your pond or lake. Consult your DEALER or Professional Aquatic Engineer to help determine the most effective way to operate your SLA and to optimize diffuser locations.

After the diffusers have been lowered into place, trim the weighted hose to the finished length and then attach them to the SLA as shown.



9. Commissioning the SLA

Note: The performance of the SLA during commissioning is solely dependent on the solar conditions at that time. US Solar Mounts recommends waiting for good solar conditions before completing the initial start-up of the aerator to ensure proper system performance.

With the SLA connected to the solar modules and the diffusers deployed, the system can now be turned on. Ensure the ball valves are open fully on the manifold(s) by turning the knobs so they are in line with the valves.

DO NOT start or operate the system with all balancing valves closed!
This may damage the system and void the Warranty.

Turn the system on by toggling all of the breakers to the on position. Ensure the cooling fan and compressor(s) appear to be running properly. Then, adjust the balancing valves as necessary to even out the flow to each diffuser. This is best done by watching the bubbles rise from each head and adjusting the valves until both streams are approximately equal.

Once all adjustments have been completed and the system appears to be running properly, close the lid and secure both of the latches. The SLA installation is now complete!



SD2 Package Shown

10. Making A Healthy Transition to An Aerated Lake or Pond

When installing an aeration system in an older, existing pond, a few extra steps are recommended for ensuring a healthy transition to a fully aerated body of water.

An old pond will most likely have a thick layer of unhealthy muck built up at its bottom that may contain damaging amounts of harmful gasses. Disturbing this layer could cause foul odors to rise to the surface upon activation of an aeration system. In sufficient concentration, this could also harm or kill fish or other aquatic life if allowed to mix into the pond too rapidly.

To avoid any such issues, it is recommended that the aerator(s) be operated intermittently at first. Operate the system for only 30 minutes to an hour for the first couple days. Increase the run time by at most one hour each day, until reaching the final desired operational period. This should allow enough time for the harmful gasses to escape. It will also give your pond and fish some time to get used to the changes in the water ecosystem, preventing any harm.

11. Troubleshooting

In the unlikely event that your SLA experiences an issue, use the troubleshooting chart below to assist with determining the problem and a solution.

Troubleshooting Guide		
Issue	Possible Cause	Solution
Compressor won't run at all	Poor solar conditions/very dark clouds	Wait for better conditions
	Shading on modules	Correct or remove cause of shading.
	Snow on Modules	Remove snow from the array.
	Damaged or Failed electrical connection	Check all connections & repair or replace
	Tripped circuit breaker	Reset breaker. If problem persists, the compressor likely needs replacement.
	Compressor has failed	Replace compressor
	Controller has failed (extremely rare)	Replace controller
Compressor runs intermittently	Poor solar conditions/clouds	Wait for better conditions. Unit will Auto Re-start
	Enclosure over-temperature	See "Enclosure Over-Heating" below.
	Compressor Over-Current	The controller will shut down the compressor if an over-current condition occurs. This could be a sign that the compressor needs replacement.
Pressure Relief Valve is "popping off"	Hose is kinked, crushed or damaged	Repair or replace damaged hose
	Diffuser(s) are clogged	Clean diffusers
	Diffuser(s) too deep in lake	Relocate diffusers
	Possible ice in hose(s)	<u>DO NOT</u> operate the system in this condition. Shut down the system and Remove ice from the lines.
	Balancing valves are too restricted	Adjust valves
Compressor runs - low air output	Poor solar conditions/clouds	Wait for better conditions
	Balancing valves set incorrectly	Adjust valves
	Compressor Intake Filter is dirty	Replace the filter
	Hose(s) kinked, crushed or damaged	Repair or replace the hose
Enclosure Over-Heating	Dirty Enclosure Intake Filter(s)	Clean or replace filters
	Obstructed intake and/or exhaust ports	Remove obstruction(s)
	Cooling fan(s) stopped	Check the circuit breaker for the fan(s). If the breaker is not tripped, this indicates that the cooling fan(s) has failed and needs replacement.
<p>If you have any questions about your SLA System or need replacement parts, please contact U.S. Solar Mounts. We'll be glad to assist you in getting your system up and running as quickly as possible.</p>		