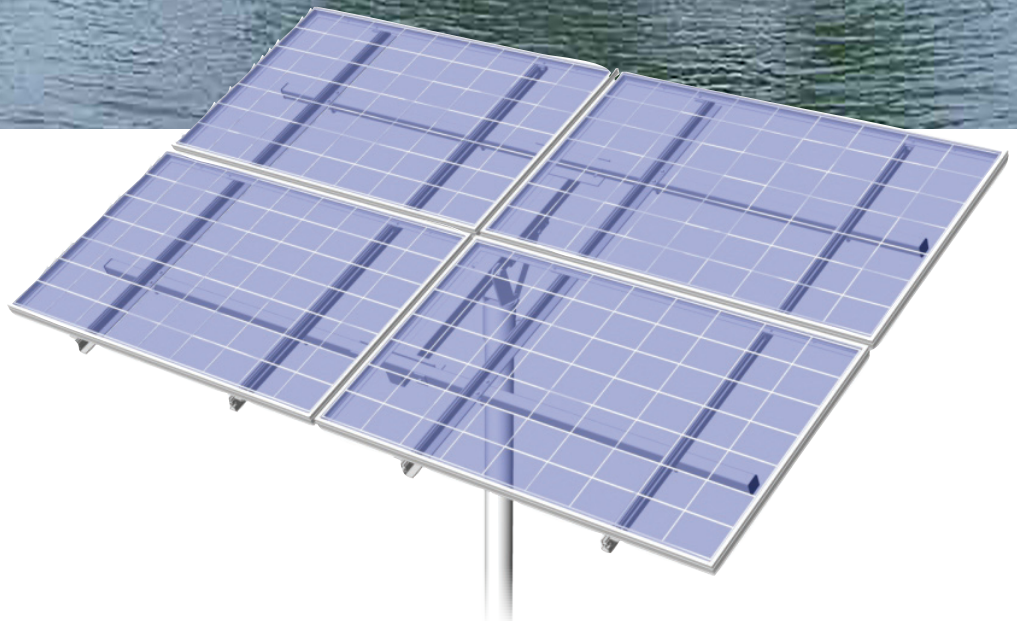




# Solar Powered System for 3/4 HP Boilermaker and 3/4 HP DA-20



## A few words about the product

Thank you for purchasing this Scott Aerator Solar Powered product. This completely sustainable system is a cost effective alternative to a direct wired power source. Now you can enjoy a clean pond or waterway without having to run expensive electrical lines to remote locations.

The Photon Drive is a variable speed motor drive designed to run Scott Aerator's 3/4 HP Fountain or Boilermaker specially equipped with a Franklin Electric three-phase submersible induction motor. The solar array is composed of a Universal Top of Pole Mount (UTPM) frame, four Type G PV modules and all necessary wiring components. The Universal Top-of-Pole support structure mounts on 4 inch SCH40/80 galvanized steel pipe and concrete footing which is not included (installer supplied).

### Location:

- Choose location that allows optimal access to sun facing South.
- Clear obstructions that will obscure direct sunlight (Be aware of smaller trees and bushes that may grow into path of desired sunlight)
- Plan accordingly for ensuring a stable foundation in sloped, soft or wet locations
- Choose location that offers the shortest path to your water feature (under 150 feet)

### Foundation:

Prior to assembly, it is important to set the foundation properly to maintain a solid and stable base for the solar array. Foundation requirements are dependent on several factors including wind speed, exposure category, soil type, steepest expected tilt angle, and above-ground clearance. For foundation recommendations on your specific installation, please contact the manufacturer at: Phone: 800-260-3792 Email: info@dpwsolar.com

- Set solid concrete foundation below and above grade to site specific requirements and/or codes
- Include rebar reinforcement
- Ensure foundation is plumb and pole collar is level
- Allow foundation to cure for 3 days

### Pole:

- Use 4" galvanized or stainless steel pole
- Plan for lowest installation possible while maintaining flood and or snow clearance from electrical components
- Allow for minimum 18" clearance between top disconnect and solar PV panels to protect against overheating electrical controls
- Make sure pole is plumb to ground

### Maintenance:

- Be sure to keep obstructions clear throughout the year.
- To maximize performance, periodically clean the PV panels with water only

## About these Assembly Instructions

### These instructions...

- Are intended to be used by individuals with sufficient technical skills for the task. Knowledge and use of hand tools, measuring devices and torque values is also required.
- Include various precautions in the forms of Notes, Cautions, and Warnings. These are to assist in the assembly process and/or to draw attention to the fact that certain assembly steps may be dangerous and could cause serious personal injury and/or damage to components.

Following the step-by-step procedures and these precautions should minimize the risk of any personal injury or damage to components while making the installation not only safe but an efficient process.

### WARNING:

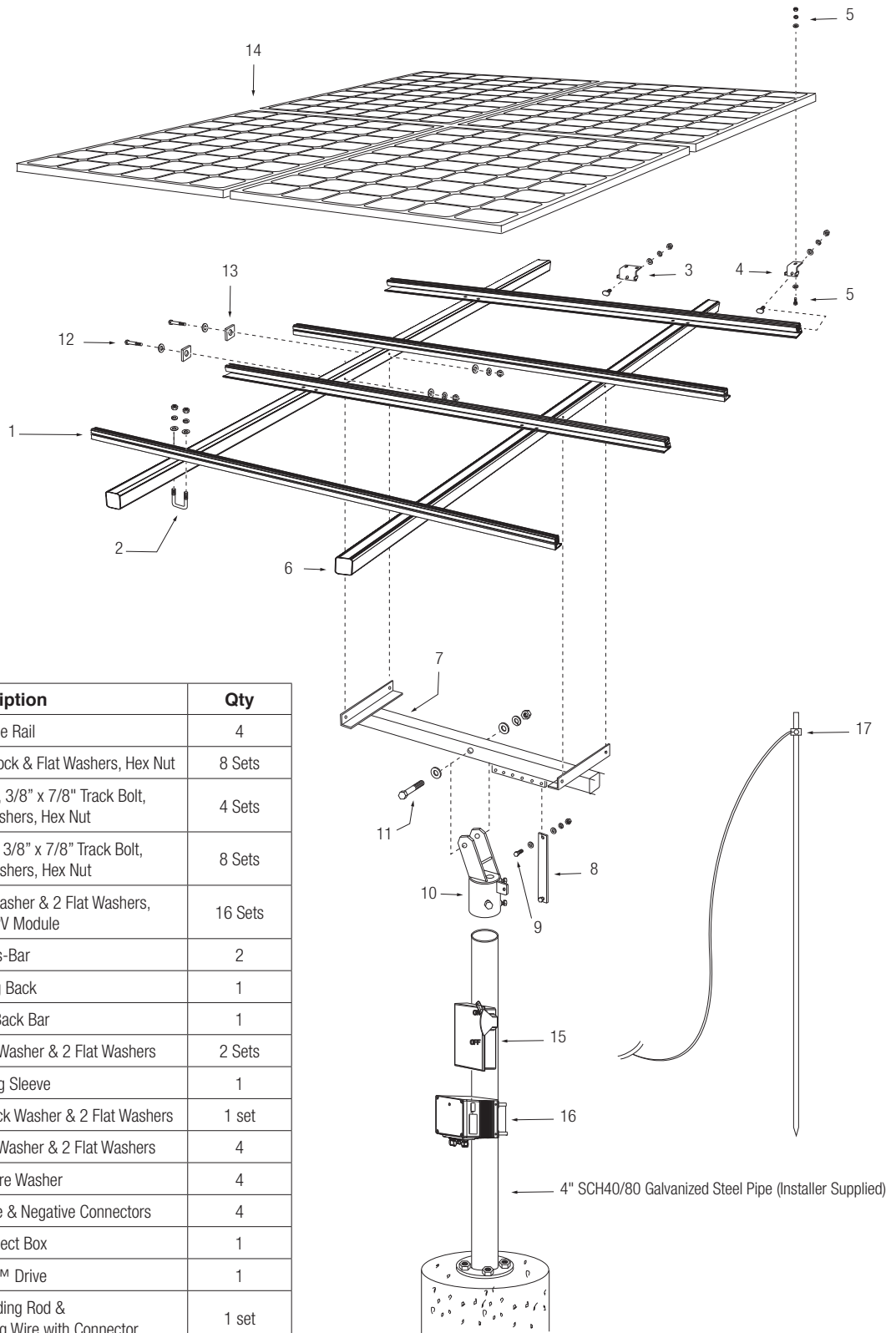
Follow the procedures and precautions in these instructions carefully.

**Follow all local and national codes when installing this product**

## Required Tools

- 7/16 inch wrench or socket for 1/4 inch module hardware
- 9/16 inch wrench or socket for 3/8 inch hardware
- 3/4 inch wrench or socket for 1/2 inch hardware
- 1-1/8 inch wrench or socket for 3/4 inch Pivot Bolt hardware
- Torque wrench
- Ratchet wrench
- Ratchet extension bar
- 3 to 6 foot level
- Tape Measure
- Square

**NOTE:**  
Please check to make sure your kit has all parts before proceeding with installation.



Item	Description	Qty
1	Module Rail	4
2	3/8" x 2" x 2-5/8" U-Bolt, Lock & Flat Washers, Hex Nut	8 Sets
3	Double Hole Slide Plate, 3/8" x 7/8" Track Bolt, Lock & Flat washers, Hex Nut	4 Sets
4	Single Hole Slide Plate, 3/8" x 7/8" Track Bolt, Lock & Flat Washers, Hex Nut	8 Sets
5	1/4" x 3/4" Bolt, Lock Washer & 2 Flat Washers, Secures PV Module	16 Sets
6	Cross-Bar	2
7	Strong Back	1
8	Strong Back Bar	1
9	3/8" x 1-3/4" Bolt, Lock Washer & 2 Flat Washers	2 Sets
10	Mounting Sleeve	1
11	3/4" x 5-1/2" Pivot Bolt, Lock Washer & 2 Flat Washers	1 set
12	3/8" x 3-1/4" Bolt, Lock Washer & 2 Flat Washers	4
13	3/8" Square Washer	4
14	PV Modules with Positive & Negative Connectors	4
15	Disconnect Box	1
16	Photon™ Drive	1
17	8 ft Grounding Rod & 4 Ga Copper Grounding Wire with Connector	1 set

## Step 1. Prepare the Cross-Bars and Module Rails.

Measurements have been calculated for this Scott Aerator system to assist in the installation process.

A. Mark the two Cross-Bars where indicated on Figure 1-1.

B. Mark the four Module Rails at the center line. Figure 1-2



### Marking for Proper Alignment

**NOTE:**

Be precise in marking the components, as this will prove beneficial as the assembly progresses.

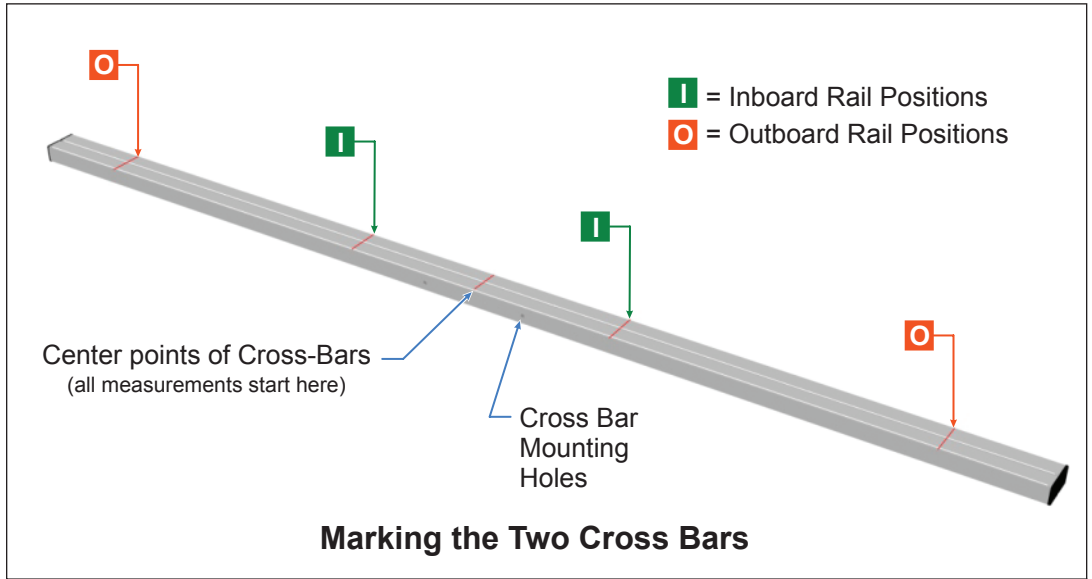


Figure 1-1

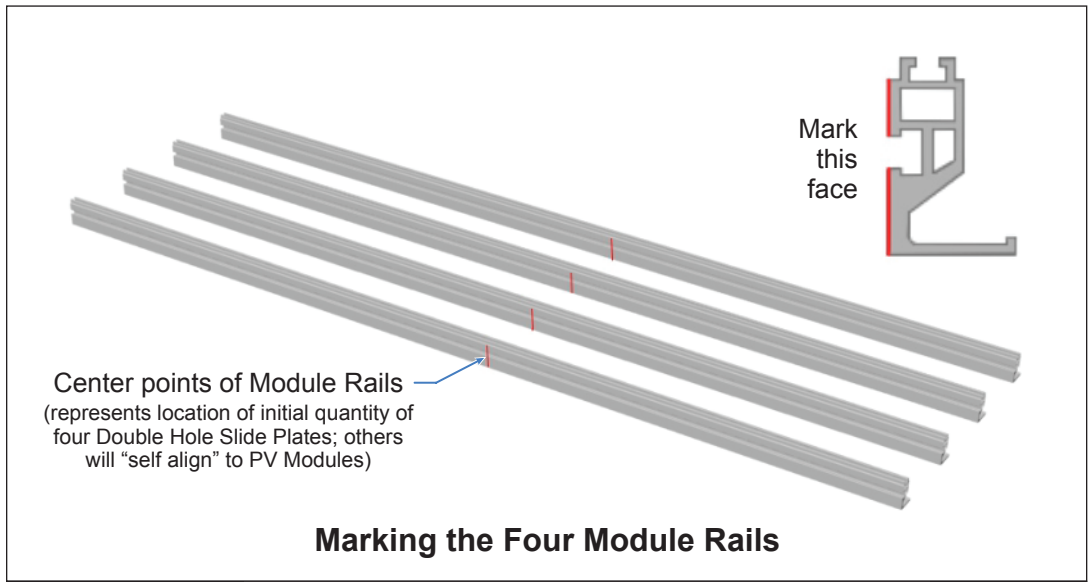


Figure 1-2

## Step 2. Attach Slide Plates to Module Rails.

Slide Plates are secured to the Module Rails using 3/8" x 7/8" Track Bolts and hardware. There are two types of Slide Plates: a Single Hole and a Double Hole.

Single Hole Slide Plates are used on the ends of the Module Rails and secure those PV Modules on the outer corners of the array. Double Hole Slide Plates are used along the Module Rails to secure two adjacent PV Modules.

In this step, all of the Slide Plates will be installed on the Rails, starting with the four Double Hole Slide Plates that align to the marks made previously. While these four will be aligned and secured to the Rails, the others will be roughly positioned and hand tightened with their final positions determined as the Modules are installed.

### Pre-assemble Slide Plates

Collect all the Slide Plates (Single and Double Hole) as well as the attaching hardware shown in Figure 4-1. Loosely assemble all of the Plates in preparation for attaching them to the Module Rails. Do not tighten the hardware at this time, as it should be left loose for ease of sliding the Plates into the Module Rails.

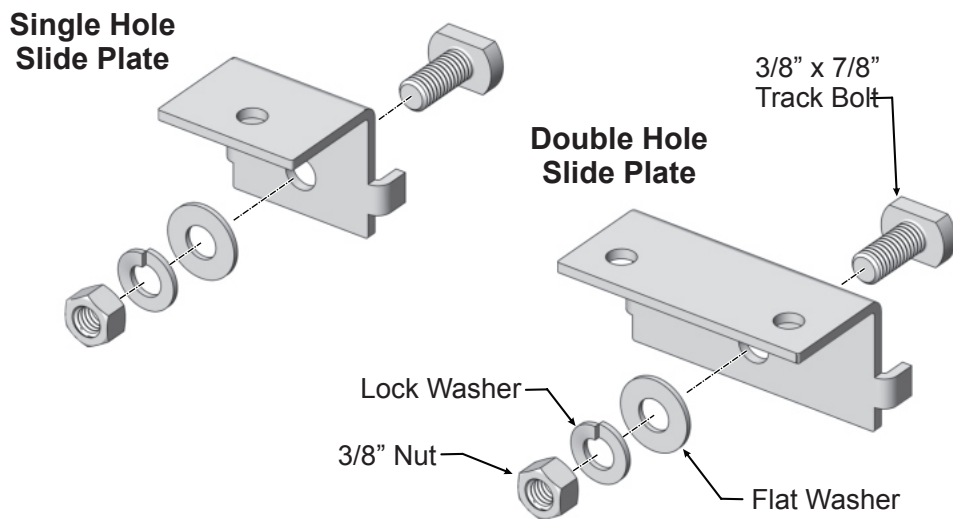


Figure 2-1: Pre-assembly of the Slide Plates

### Install the Four Double Hole Slide Plates

These are the initial four (one per Rail) Double Hole Slide Plates that align to the marks made previously.

- Align the tabs of the Double Hole Slide Plate and the head of the Track Bolt with the channel of the Rail, and slide toward alignment mark. (See Figure 2-2)
- Center Slide Plate over alignment mark and tighten securely. Torque at 32-34 ft.-lbs.
- Continue in this manner installing the remaining three Double Hole Slide Plates and ending with one Slide Plate per Rail.

**NOTE:**

Be precise in the alignment of components, as this will prove beneficial as the assembly progresses.

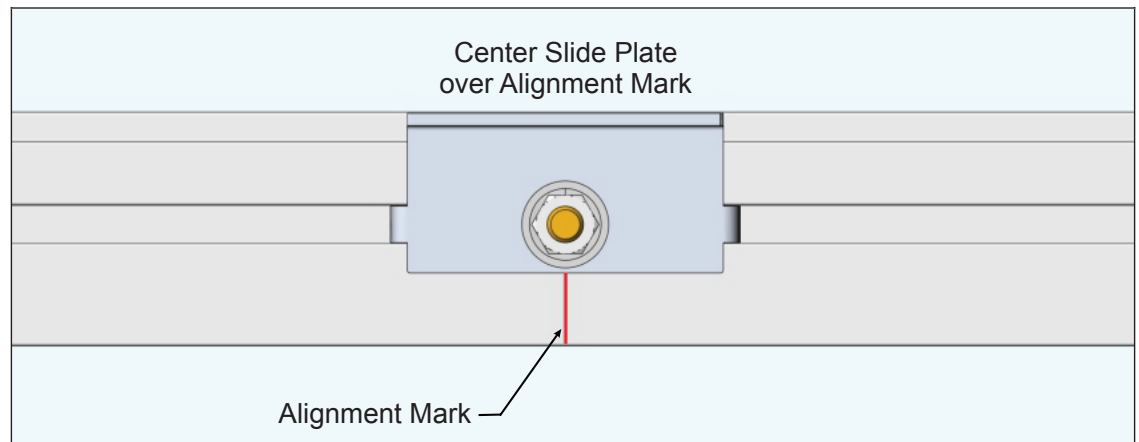
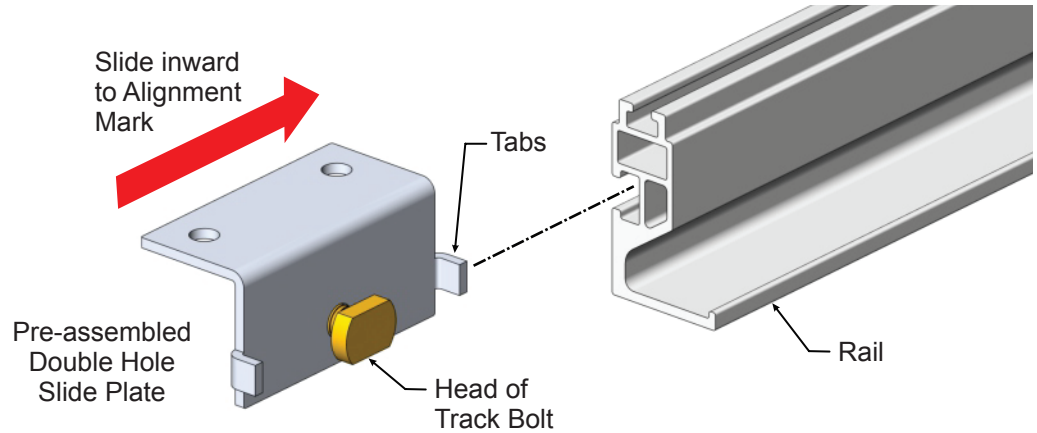


Figure 2-2: Installing and Aligning a Double Hole Slide Plate

**Install the Remaining Slide Plates (Single & Double Hole)**

Because the positions of these Slide Plates on the Rail are not important at this time, they may be positioned anywhere along the Rail.

- A. As done previously, align the Slide Plate tabs and the head of the Track Bolt with the channel of the Rail, and slide inward. Hand tighten to keep them from sliding off the Rail during handling. (See Figure 2-3)
- B. Continue in this manner while installing the remaining Slide Plates. Upon completion, the Rails should look like the one in Figure 5 below.

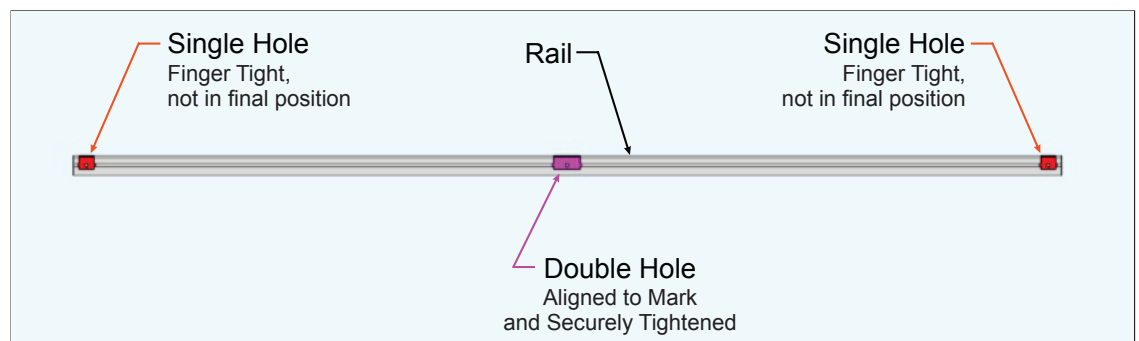


Figure 2-3: Slide Plate Positions

### Step 3. Install the Mounting Sleeve on Vertical Pipe

Before installing the Mounting Sleeve, Verify that the Mounting Pole is plumb to the ground and hasn't shifted or leaned while the concrete footing has cured.

The Mounting Sleeve slips on top of the Mounting Pole and has four 1/2" Set Bolts which are used to secure it to the Mounting Pole. (See Figure 3-1)

- A. Slip the Mounting Sleeve on top of Mounting Pole and slide it down until it rests/bottoms out on top of Mounting Pole.
- B. Rotate the Mounting Sleeve so the Support Bar Pivot Tab is pointing North and the Strongback Vertical Towers are leaning South.
- C. Secure the Mounting Sleeve by tightening the four 1/2" Set Bolts. Torque each Set Bolt to 55-60 ft./lbs.

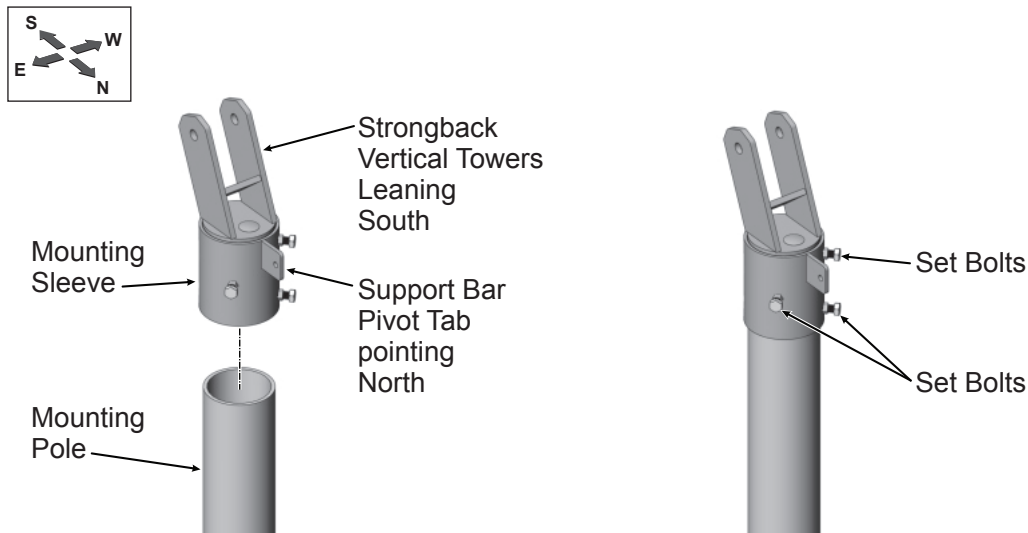


Figure 3-1: Installing the Mounting Sleeve

#### CAUTION:

Use care while working around the structure during the assembly. There could be components that create hazards or obstruct free movement causing serious bodily injury. Many are at head/eye level.



**NOTE:**

Although this system offers six elevation set points, for ease of assembly, set the angle to its lowest setting of 15-degrees. Optimum tilt setting of the rack will take place later in these instructions.

**Step 4. Install the Strongback to the Mounting Sleeve**

The Strongback is attached to the Mounting Sleeve using the Pivot Bolt that passes through its two Vertical Towers and the Support Bar. The Support Bar is attached to the Strongback on one end and the Support Bar Pivot Tab of the Mounting Sleeve on the other end using 3/8" hardware.

- A. Remove the Support Bar from the Strongback and re-install in the 15° elevation set point. Secure with the 3/8" hardware and finger tighten. (See Figure 4-1)

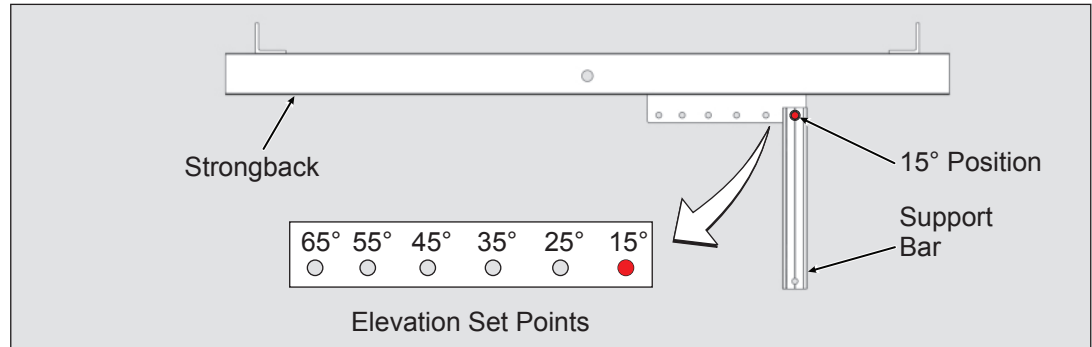


Figure 4-1: Positioning Support Bar

- B. Remove the Pivot Bolt from the Mounting Sleeve and also collect the 3/8" x 1-3/4" bolt, flat washers and lock washers and lock washer needed to secure the Support Bar to its Pivot Tab on the Mounting Sleeve. (See Figure 4-2)
- C. Orient the Strongback to the Mounting Sleeve with its Lower Support Bar positioned on the same side of the Mounting Sleeve as the Support Bar Pivot Tab.
- D. Slide the Strongback between the two vertical mounting tabs, aligning the thru-hole of the Strongback with the holes of the two Vertical Towers.
- E. Insert the Pivot Bolt along the one flat washer through the one Vertical Tower and the Strongback exiting the second Vertical Tower on the opposite side. Secure with the remaining flat washer, lock washer and hex nut. For now, finger tighten only to allow movement for the next step.

**CAUTION:**

This is a two person activity. The Strongback must be held in place by one person while the second person aligns it and secures it to the Mounting Sleeve using the Pivot Bolt and the 1/2" hardware. Failure to do so could lead to serious personal injury.

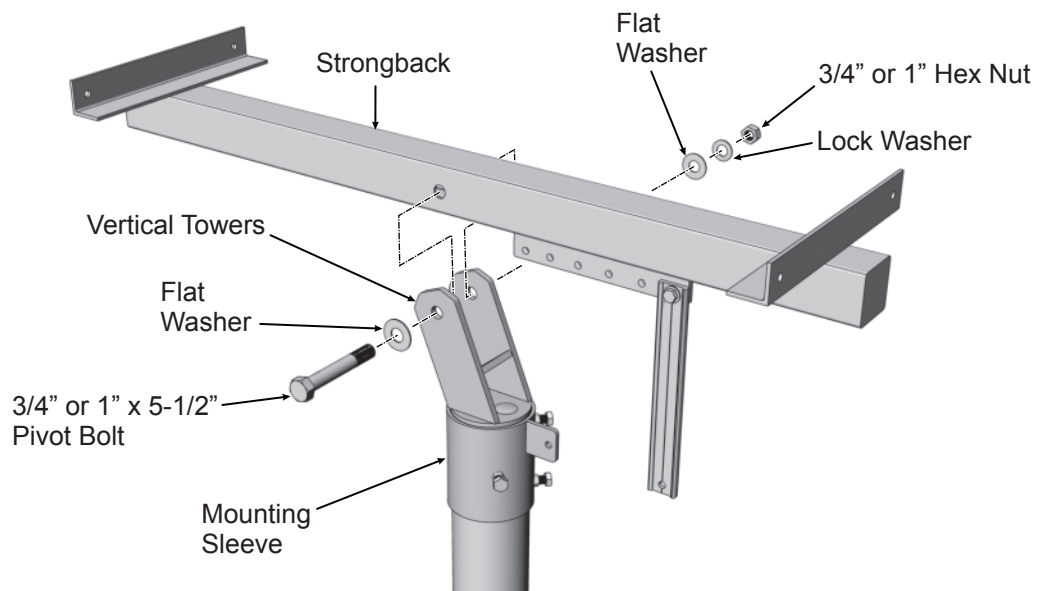


Figure 4-2: Installing the Strongback

- F. Pivot the Strongback and the Support Bar to align the mounting holes of the Support Bar with its Pivot Tab on the Mounting Sleeve. Slide the Support Bar over the Pivot Tab. Insert the 3/8" x 1-3/4" bolt and one flat washer through the Support Bar and Mounting Tab and secure it with the remaining flat washer, lock washer and hex nut. Torque hardware on both ends of Support Bar at 32-34 ft./lbs. (See Figure 4-3)
- G. Return and tighten the Pivot Bolt. The Pivot Bolt cannot be left loose - the Mounting Sleeve Vertical Towers must be firmly clamped to the sides of the Strongback eliminating any gaps between the Vertical Towers and the Strongback. Torque to 125-150 ft./lbs. (See Figure 4-4)

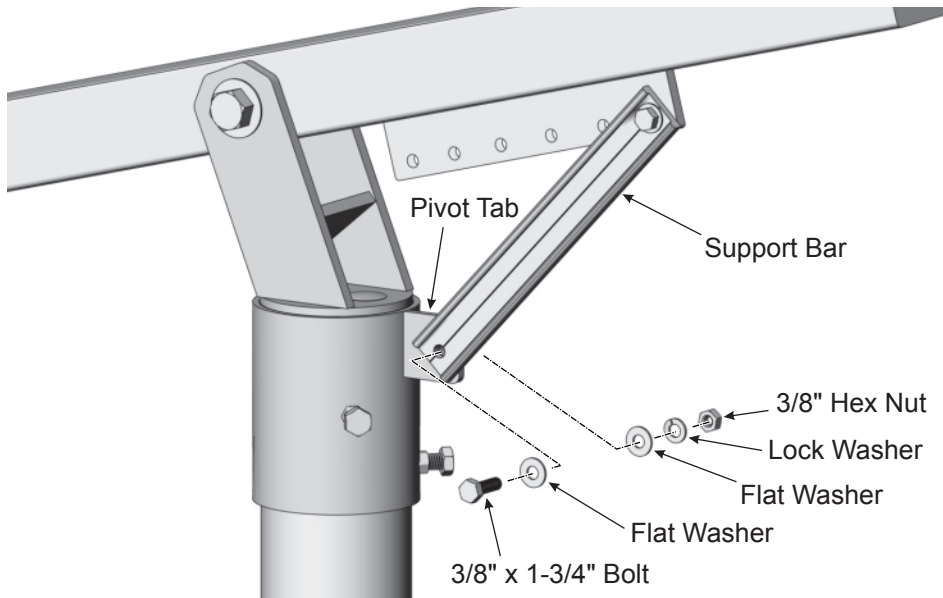


Figure 4-3: Positioning Support Bar

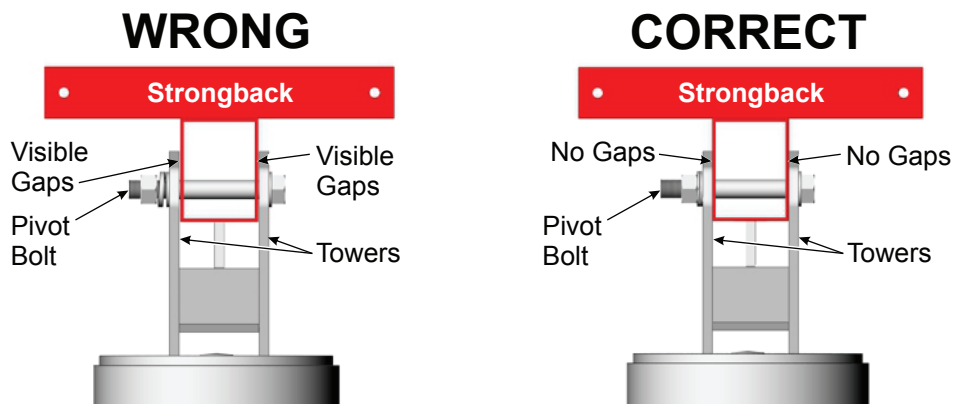


Figure 4-4: Tighten and Torque the Pivot Bolt

## Step 5. Install the Cross-Bars to the Strongback

Cross-Bars run in an E-W direction and are secured to the mounting angles (welded to the Strongback) using 3/8" square flat washers along with 3/8" x 3-1/4" bolts and hardware; they are not nested into the Mounting Angles (see Figure 5-1). There are two Cross-Bars to install, at opposite ends of the Strongback.

### Installing the Cross-Bars

- Position the Cross-Bar to the outside of the Strongback mounting angle (see Figure 7-1). Align the mounting holes and secure using 3/8" flat and square washers along with the 3/8" x 3-1/4" bolts and lock washer placing the square flat washer against the Cross-Bar. Tighten hardware and torque to 30-32 ft./lbs. (See Figure 5-2)
- Continue in this manner and install the opposite Cross-Bar to the Strongback. Refer to Figure 5-1 for proper positioning.

#### CAUTION:

This is a two person activity. Cross-Bars are long and unstable before they are fully secured to the Strongback. Cross-Bars must be held in place by one person while the second person aligns and secures them to the Strongback. Failure to do so could lead to serious personal injury.

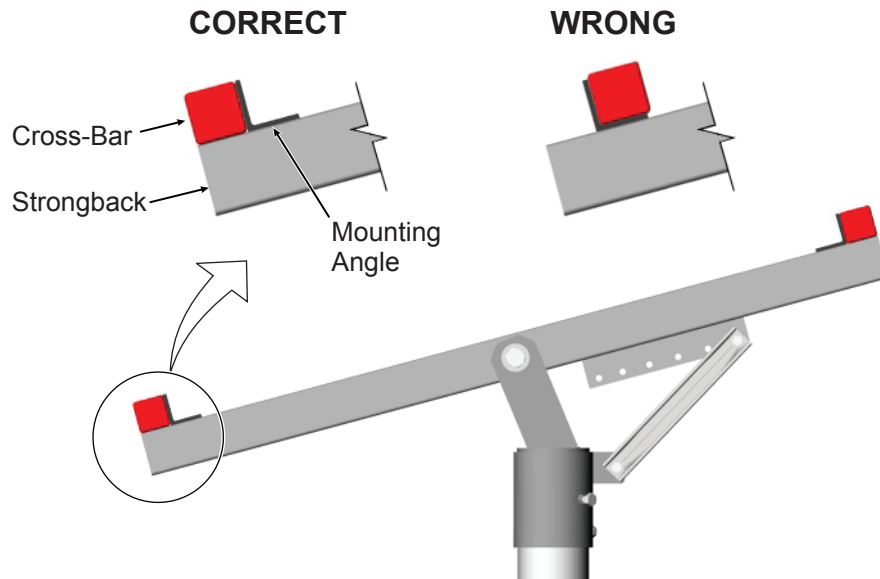


Figure 5-1: Cross-Bar Positioning Relative to Mounting Angles

#### WARNING:

Be sure to place the 3/8" square washers on the surface of the Cross-Bar and not on the Mounting Angles of the Strongback. Failure to do so will damage the surface of the Cross-Bar when the attaching hardware is tightened.

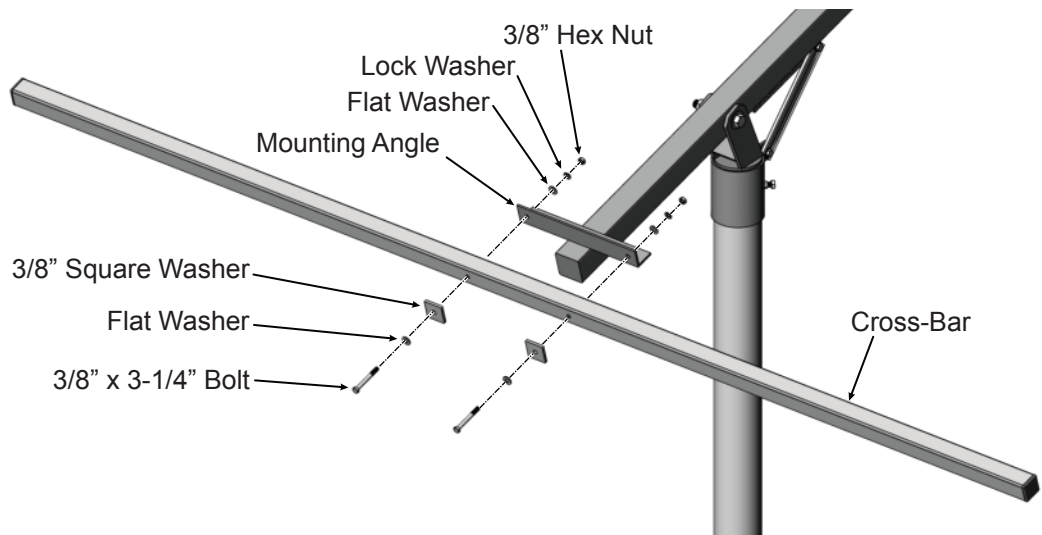
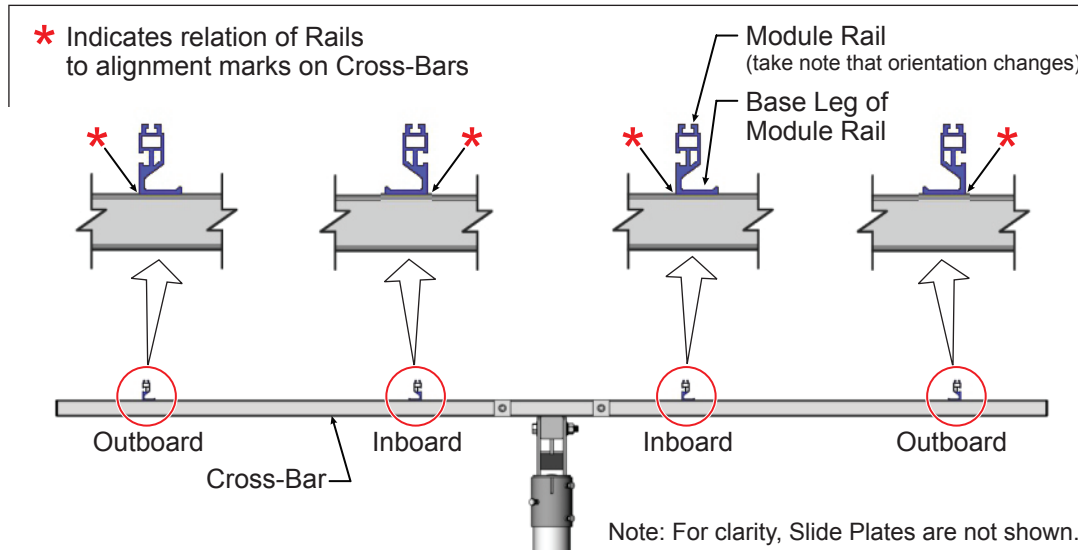


Figure 5-2: Installing the Cross-Bars on the Strongback

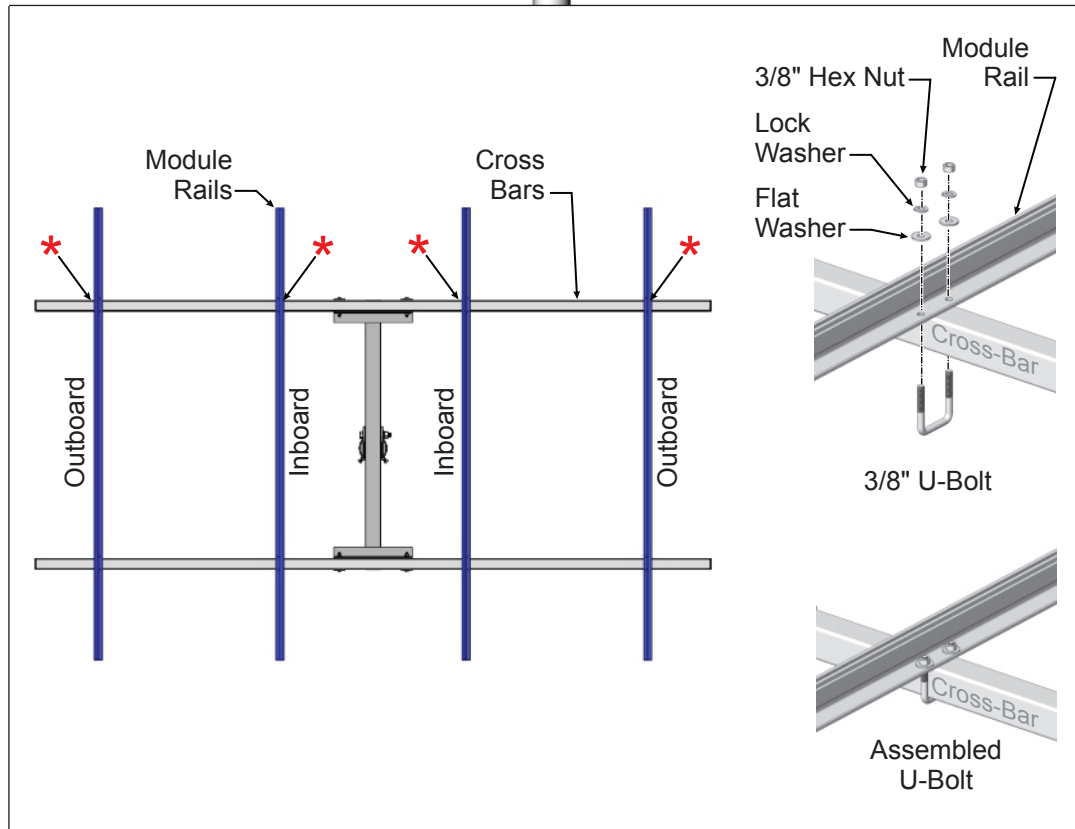
## Step 6. Attach the Module Rails to the Cross-Bars

Start by attaching the inboard Module Rails first and work outward. Referring to figure 6-1 for orientation of the Module Rails, position and align the Module Rails with the marks made in previous step. Straddle the two sets of mounting holes with the Cross-Bars and secure with 3/8" x 2" x 2-5/8" U-Bolts and hardware. Finger-tighten for now.



### CAUTION:

This is a two person activity. Module Rails are unstable before they are fully secured to the Cross-Bars. Module Rails must be held in place by one person while the second person aligns and secures them to the Cross-Bars. Failure to do so could lead to serious personal injury.



### NOTE:

Finger-tighten the Module Rails to the Cross-Bars while installing. When all Module Rails are installed, re-tighten to specified torque values.

Figure 6-1: Installing the Mounting Sleeve

**CAUTION:**

This is a two person activity. PV Modules are heavy and unstable before they are fully secured to the Module Rails. PV Modules must be held in place by one person while the second person aligns and secures them to the Module Rails. Failure to do so could lead to serious personal injury and damaged components.

**Step 7. Installing PV Modules to Sliding Plates**

In this step, the PV Modules are installed and secured first to the previously-installed Double Hole Slide Plates on PV Module at a time, after which the Single Hole Slide Plates are shifted and secured to the Modules. All PV Modules are secured to the Sliding Plates using 1/4" x 3/4" bolts and hardware.

Secure the PV Module to the Slide Plates

- A. Starting with the Northern row, align one of the PV Modules to a set of the secured Double Hole Slide Plates mounting holes. Secure with 1/4" x 3/4" bolts and hardware. Finger-tighten for now. (See Figure 7-1)

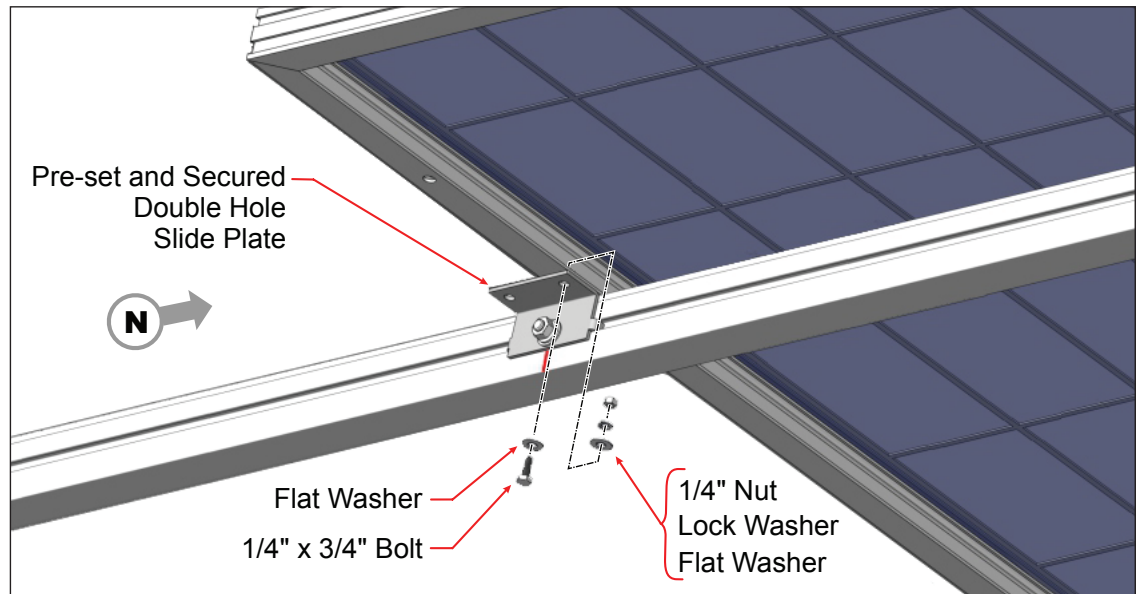


Figure 7-1: Installing first row of PV Modules to the Double Hole Slide Plates

- B. Locate the Single Hole Slide Plates (one on each Rail), loosen the hardware enough so that the Slide Plates will move, and slide their mounting holes into alignment with the just-installed-Module. Secure the Module with a 1/4" x 3/4" bolts and hardware. Finger-tighten for now. (See Figures 7-2 and 7-3 on page 13)
- C. Continue in this manner and install the adjacent E-W Module, and then the southern row that attaches to the same pre-set and secured Double Hole Slide Plates.

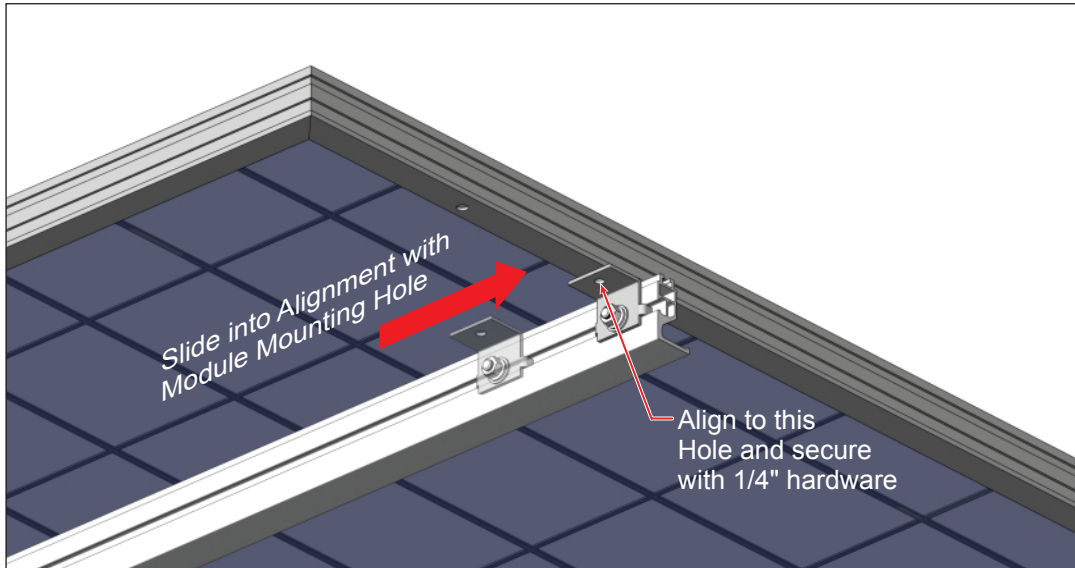


Figure 7-2: Aligning the Single Hole Slide Plate with PV Module Mounting Hole

**CAUTION:**

This is a two person activity. Module Rails are unstable before they are fully secured to the Cross-Bars. Module Rails must be held in place by one person while the second person aligns and secures them to the Cross-Bars. Failure to do so could lead to serious personal injury.

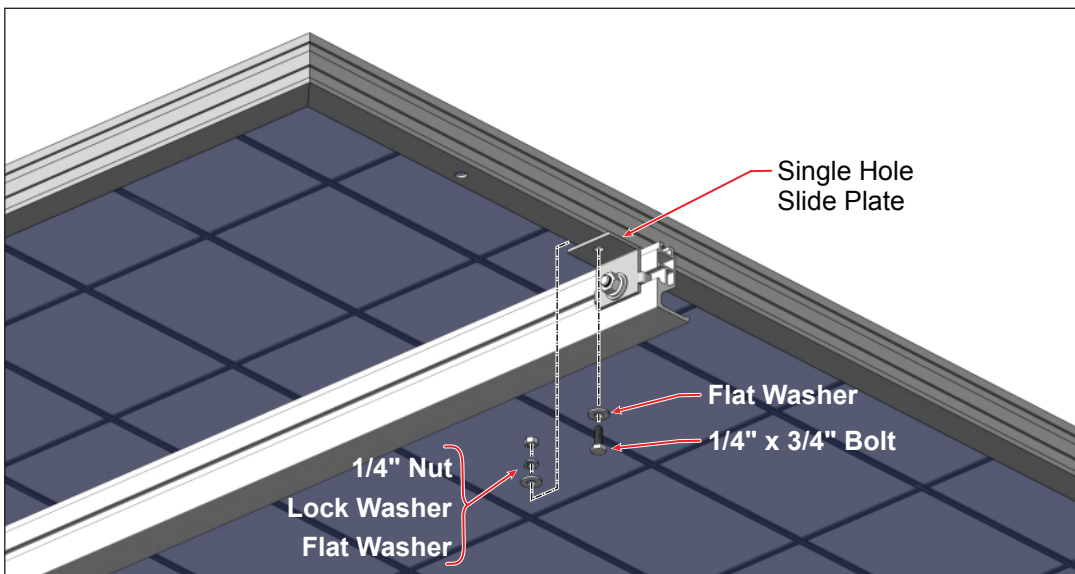


Figure 7-3: Securing PV Modules to the Single Hole Slide Plates

**Step 8. Square and Align the Array**

Using a square and visual references, ensure that the array is aligned to the mounting structure. Confirm that the PV Modules are square and have consistent even spaces all around. Adjust if necessary.

**Step 9: Now return and tighten mounting hardware**

- A. Return and tighten each set of the 3/8" U-bolts, securing the Module Rails to the Cross-Bars. Torque all at 32-34 ft./lbs.
- B. Return and tighten each of the 3/8" hardware securing all of the Slide Clamps (Single and Double Hole) to the Module Rails. Torque all at 32-34 ft./lbs.
- C. Return and tighten each set of 1/4" mounting hardware, securing the PV Modules to the Slide Clamps. Torque all at 6-8 ft./lbs.

### CAUTION:

Be certain to re-tighten all Module Rail and PV Module mounting hardware and torque to the specified values. Failure to do so could lead to structural failure, damaged components and/or serious personal injury.

### CAUTION:

Do not attempt to remove the Pivot Bolt during tilt adjustments! Removal could lead to serious personal injury or death. Adjustments are made with the Pivot Bolt hardware loosened but in place.

### CAUTION:

This is a two person activity. As the Pivot Bolt is loosened and the Support Bar hardware is removed, the rack is heavy and unstable. The rack must be held in place by one person while the second person loosens and removes the hardware and then re-installs/tightens the hardware back in place. Failure to do so could lead to serious personal injury and damaged components.

## Step 10: Adjust the Tilt Angle of the Rack

Use great care in this procedure as it can be dangerous if the procedure is not completed as described with a minimum of two people.

To adjust the tilt angle, loosen the Pivot Bolt hardware and remove the Support Arm upper hardware attaching the Support Arm to the Strongback.

- While one person holds the south edge of rack, the other loosens the Pivot Bolt and removes the upper 3/8" hardware attaching the Support Bar to the Strongback. (See Figure 10-1)
- Tilt the rack to the desired elevation angle (15°, 25°, 35°, 45°, 55° or 65°) and re-attach the Support Bar to the Strongback, placing the 3/8" hardware in the appropriate hole matching the desired elevation. Torque at 32-34 ft./lbs. (See Figure 10-2)
- After changing the tilt angle and tightening the Support Bar hardware, the Pivot Bolt must be re-tightened. The Mounting Sleeve Vertical Towers must be firmly clamped to the sides of the Strongback eliminating any gaps between the Vertical Towers and the Strongback. Torque to 125-150 ft./lbs. (See Figure 10-3)

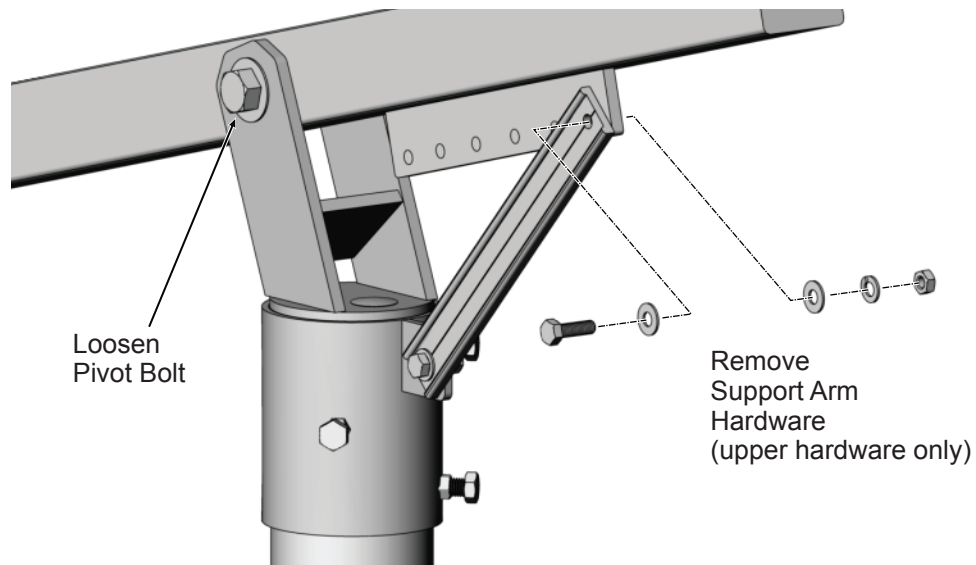


Figure 10-1: Preparing to Adjust the Tilt Angle

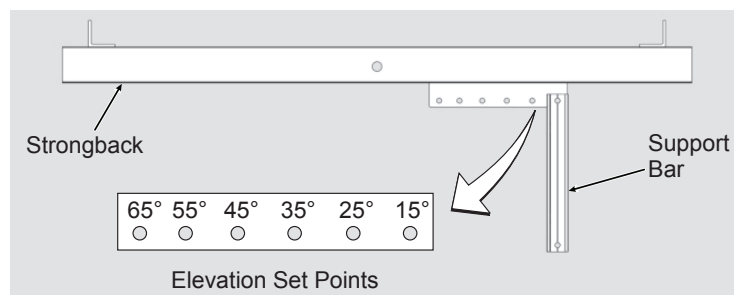


Figure 10-2:  
Setting the Tilt Angle

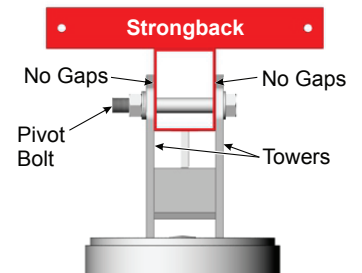


Figure 10-3:  
Tighten and Torque the Pivot Bolt

## Connecting the Photon™ Drive and Disconnect

The Photon Drive is a variable speed motor drive designed to run Scott Aerator's 3/4 HP Fountain or Boilermaker specially equipped with a Franklin Electric three-phase submersible induction motor.

The Photon Drive provides power by converting high voltage, direct current from a solar array into alternating current to run a standard AC submersible motor. The controller provides fault detection, motor soft start, and speed control. The Photon Drive is designed to provide these features with the plug and play ease of installation similar to a single-phase control box.

The controller drives the pump and reduces output as necessary to protect the system components from damage, and only shuts down in extreme cases. Full operation is restored automatically whenever abnormal conditions subside.

## Inspection

Before you begin, receive and inspect all components. Verify what was ordered and that no damage has occurred during transit.

## Descriptions and Features

The Photon Drive system controller controls a Franklin Electric 4-inch three-phase motor driving a 4-inch submersible centrifugal pump powered by a DC solar array.

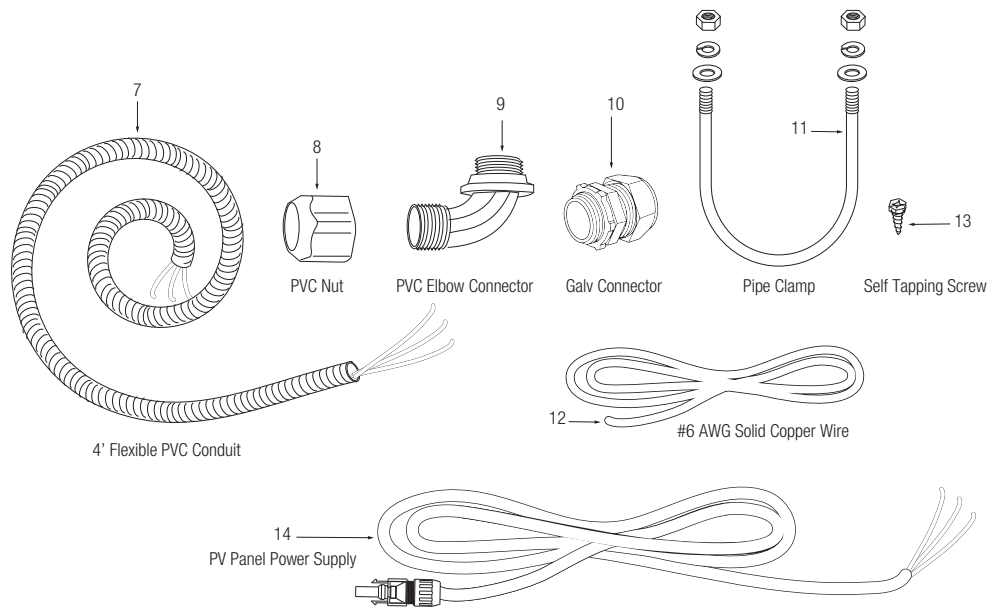
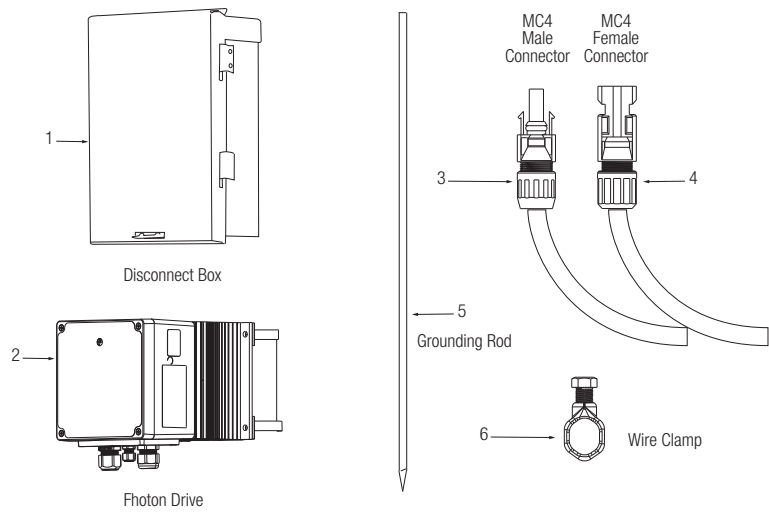
The Photon Drive continuously monitors system performance and incorporates a number of features for pump system protection. In the event of a fault, the Photon Drive will indicate the type of fault by a flashing red LED. (See Fault Codes and Troubleshooting on page 21 of the supplied manufacturer's manual).

The Photon Drive system is optimized for pumping under adverse input power conditions unique to solar arrays.

- Internal diagnostics will tolerate a lower input voltage.
- Whenever possible, the controller attempts to regulate the pump load in an optimized manner for maximum power transfer from the solar array. The controller construction is ruggedized for hostile environmental conditions.
- The case is constructed of heavy-gauge aluminum to resist rain and animal intrusion.
- The seals are designed for NEMA 4 (IEC rating IP66), (dust tight, withstands directed jets of water).
- For maximum protection against dust, there is no external cooling fan or other external moving parts.







**NOTE:**  
Please check to make sure your kit has all parts before proceeding with installation.

Item	Description	Qty
1	Disconnect Box	1
2	Photon™ Drive	1
3	MC4 Male Connector	4
4	MC4 Female Connector	4
5	8' Grounding Rod	1
6	Wire Grounding Clamp	1
7	4' Flexible PVC Conduit and Wiring	1
8	PVC Nut	2
9	PVC Elbow Connector	1
10	Galvanized Connector	1
11	4" Pipe Clamp, Lock Washer, Flat Washer, 5/16" Nut	2 set
12	#6 AWG Copper Grounding Wire	1
13	1/2" self Tapping Screws	2
14	PV Panel Power Supply	1

### **Anytime working on or near the Photon™ Drive, or system:**

- Turn OFF the external DC rated disconnect from the solar array to the Photon Drive.
- Securely cover the solar array with an opaque tarp.
- Wait a minimum of five minutes after removing power from the Photon Drive before servicing.
- Solar panels that have been exposed to full solar insolation for an extended period of time can achieve high temperatures and can be a potential source of burns to exposed skin if contacted. Use caution when working around solar arrays.

### **READ THESE INSTRUCTIONS COMPLETELY BEFORE INSTALLATION.**

**Note:** During installation, if a conflict arises between this manual and local or national electrical codes, the applicable local or national electrical codes shall prevail.

- The longevity and performance of the Photon Drive package may be adversely affected by improper installation.
- The solar PV array structure, modules, and wiring harness must be properly assembled according to the manufacturer's installation instructions before installing the Photon Drive.
- The supplied 75 °C rated wire is sized for a maximum voltage drop of 3% per local electric codes.

### **Installation Preparation and Requirements**

#### **When installing the Photon™ Drive, be aware that:**

- High voltage is present in the Photon™ Drive when powered on; use caution when live DC power is on.
- Do not allow any unauthorized persons near the solar array and connection sites while power is applied.
- A DC rated disconnect box is provided to disconnect the incoming DC power from the Photon™ Drive during installation and maintenance. Use a Volt Meter to confirm the absence of voltage in the line before proceeding with installation or maintenance.
- Appropriate consideration shall be given to sizing fuses to protect the wiring from the solar array's short circuit current (LSC). See local or national electrical codes for guidance.
- Keep all flammable materials away from the assembly site, including dry brush and vegetation.
- Keep the surrounding area clear of vegetation.
- Do not block airflow around the Photon Drive heat sink.
- Limit access of animals to the system.
- Protect wires from damage from wildlife and weathering by using conduit. For additional protection, bury the conduit in the ground.

# ATTENTION

## IMPORTANT INFORMATION FOR INSTALLERS OF THIS EQUIPMENT!

THIS EQUIPMENT IS INTENDED FOR INSTALLATION BY TECHNICALLY QUALIFIED PERSONNEL. FAILURE TO INSTALL IT IN COMPLIANCE WITH NATIONAL AND LOCAL ELECTRICAL CODES AND WITHIN FRANKLIN ELECTRIC RECOMMENDATIONS, MAY RESULT IN ELECTRICAL SHOCK OR FIRE HAZARD, UNSATISFACTORY PERFORMANCE, AND EQUIPMENT FAILURE. FRANKLIN INSTALLATION INFORMATION IS AVAILABLE FROM PUMP MANUFACTURERS AND DISTRIBUTORS AND DIRECTLY FROM FRANKLIN ELECTRIC.

## WARNING

SERIOUS OR FATAL ELECTRICAL SHOCK MAY RESULT FROM FAILURE TO CONNECT THE MOTOR, CONTROL ENCLOSURES, METAL PLUMBING, AND ALL OTHER METAL NEAR THE MOTOR OR CABLE TO A PROPER EARTH GROUND IN ACCORDANCE WITH LOCAL CODES, USING WIRE NO SMALLER THAN MOTOR CABLE WIRES. TO REDUCE RISK OF ELECTRICAL SHOCK, DISCONNECT POWER BEFORE WORKING ON OR AROUND THE WATER SYSTEM. DO NOT USE MOTOR IN SWIMMING AREAS.

## WARNING

High voltages (both AC and DC) capable of causing severe injury or death by electrical shock are present in this unit. The supplied disconnect switch is required to de-energize the equipment before servicing. This unit should only be installed or serviced by technically qualified professionals.

Anytime working on or near the Photon™ Drive, or system:

- Turn OFF the external DC rated disconnect from the solar array to the Photon™ drive controller.
- Securely cover the solar array with an opaque tarp.
- Wait a minimum of 5 minutes after removing power from the Photon™ Drive before servicing.

This equipment must not be used by children or persons with reduced physical, sensory or mental abilities, or lacking in experience and expertise, unless supervised or instructed. Children may not use the equipment, nor may they play with the unit or in the immediate vicinity.

## WARNING

Solar panels that have been exposed to full solar insolation for an extended period of time can achieve high temperatures and could be a potential source of burns to exposed skin if contacted. Use caution when working around solar arrays.

## Step 11. Franklin Electric Photon™ Drive and DC Disconnect

- Begin by attaching the Disconnect Box to the pole a minimum of 18 in. (45.7 cm) beneath the array with power knockout oriented downward. Pre-drill 1/8" holes and attach Disconnect Box to pole using 2 1/2" self tapping screws. See figure 11-1.
- Below the Disconnect Box, attach the Photon Drive with power connectors oriented downward using supplied u-bolts, washers, lock washers and 3/8" nuts. Leave approximately 7" between each to accommodate the power cable. Tighten nuts firmly.

### WARNING:

Do not connect PV Solar panels before all other connections are made and protective covers are in place

## Install Grounding Rod

- Drive grounding rod into ground near the base of the solar array and secure #6 AWG solid copper grounding wire using supplied grounding clamp.
- Properly secure the other end of the grounding wire to the dual grounding lug inside of the DC Disconnect. This will be the main equipment ground source. See figure 11-1.

### NOTE:

It is important that the Photon Drive be kept above potential snow and seasonal flood conditions.

## Connect Power Disconnect Box to Photon Controller

- Connect load wires from DC Disconnect to Solar Primary DC Terminal Block. See figure 11-2 and 11-3.

### WARNING:

Double check polarity to ensure positive and negative connections are in proper spots in DC Disconnect and Photon Controller

## Connect power supply from fountain or boilermaker

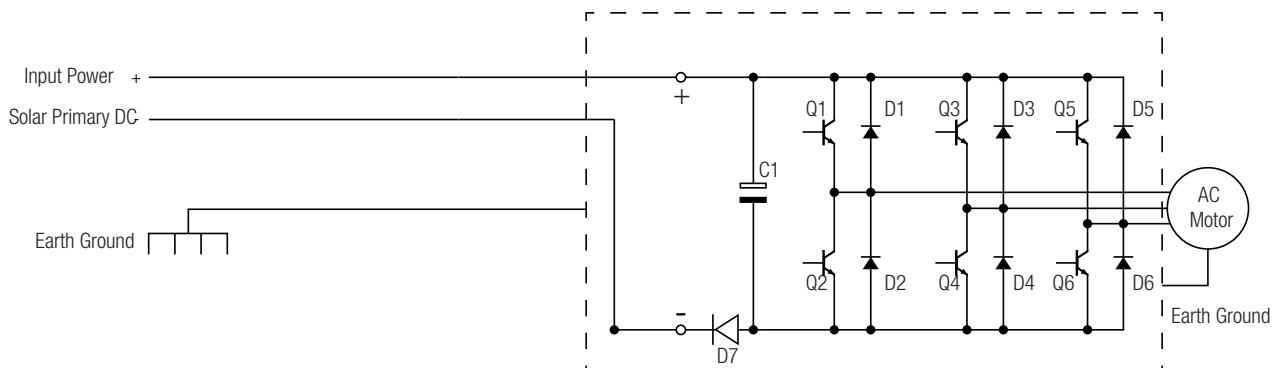
- Secure unit in water. **An improperly secured fountain will rotate and may cause severe damage to the power cable or equipment.** Installation instructions can be downloaded at [scottaerator.com](http://scottaerator.com).
- Route unit wiring back to Photon Controller.
- Feed wire through the squeeze-tight connector supplied with the Photon Drive. Insert power cable sheathing flush with top of connector for a water tight fit. Secure motor power supply connections as shown in figure 11-3.

### WARNING:

Do not use this system with any Fountain or Boilermaker that has not been equipped with a variable speed Franklin Electric three-phase induction motor

## Connect PV Solar Array Power Cable

- Feed the PV Solar power cable through supplied panel connector and attach positive and negative connections as shown in figure 11-2. Leave opposite end of cable unconnected until solar panels are covered and interconnected.



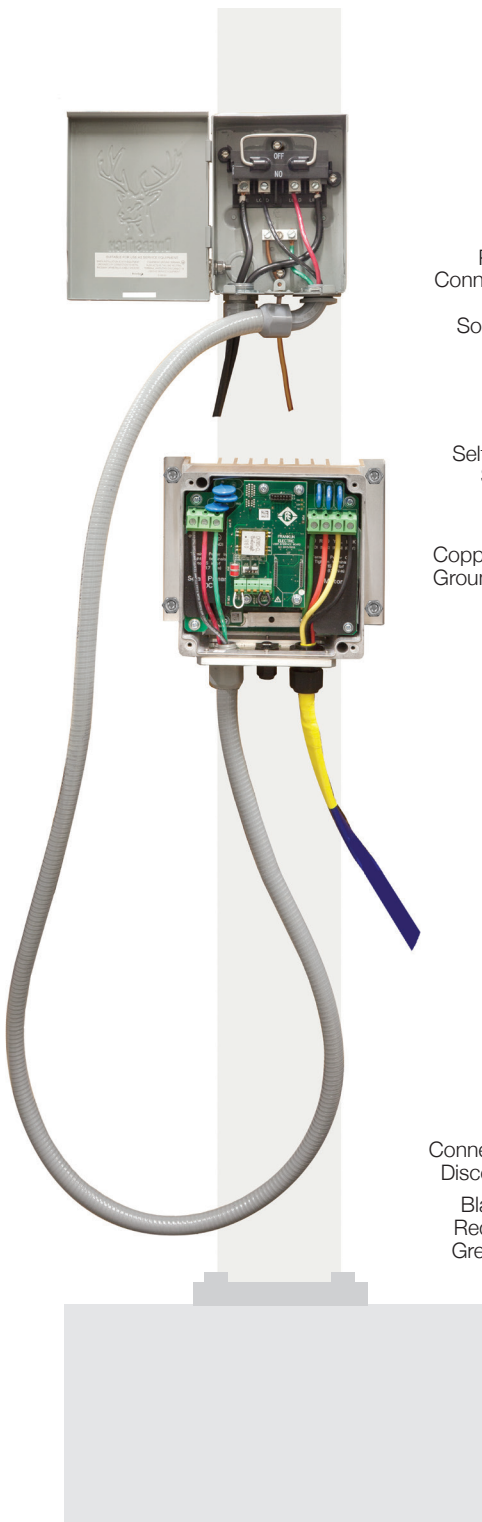


Figure 11-1: Photon Drive with Disconnect Box

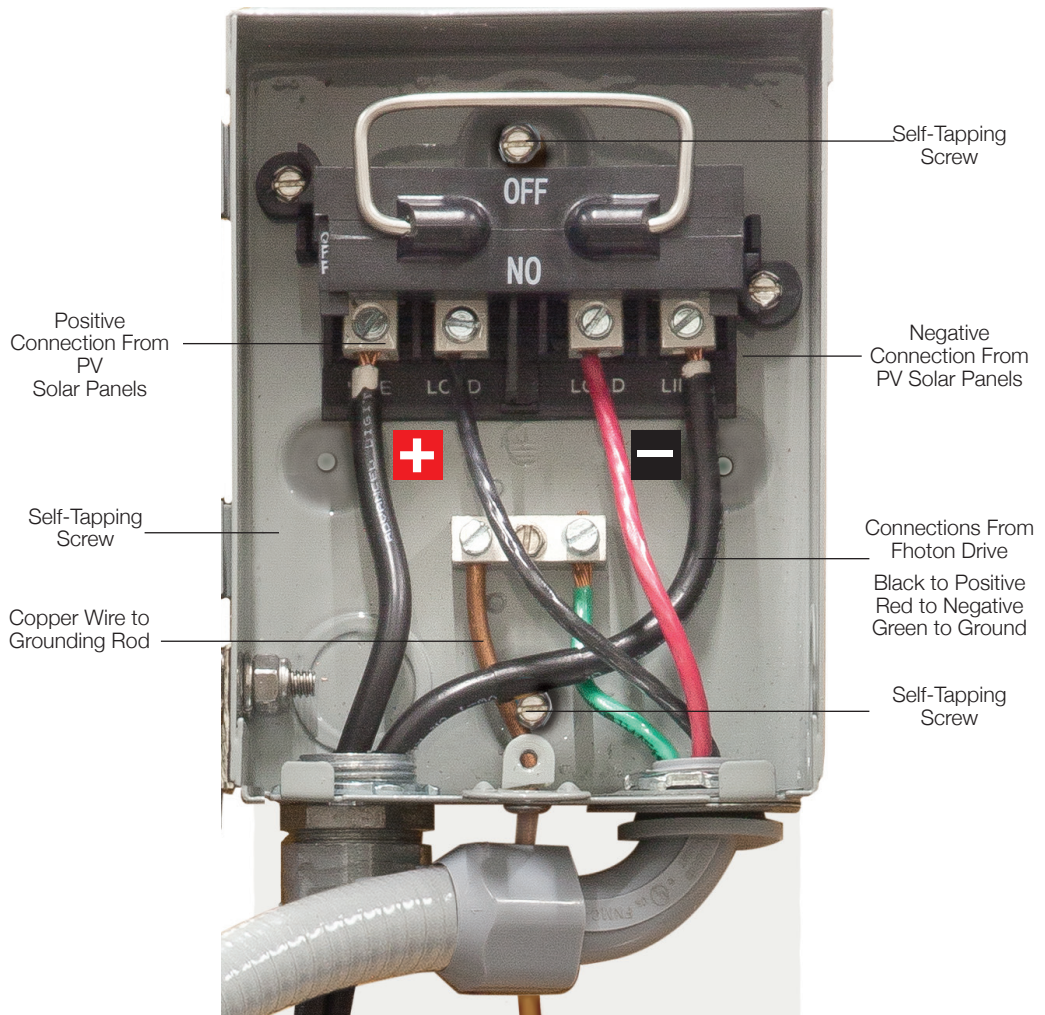


Figure 11-2: Disconnect Box Connections

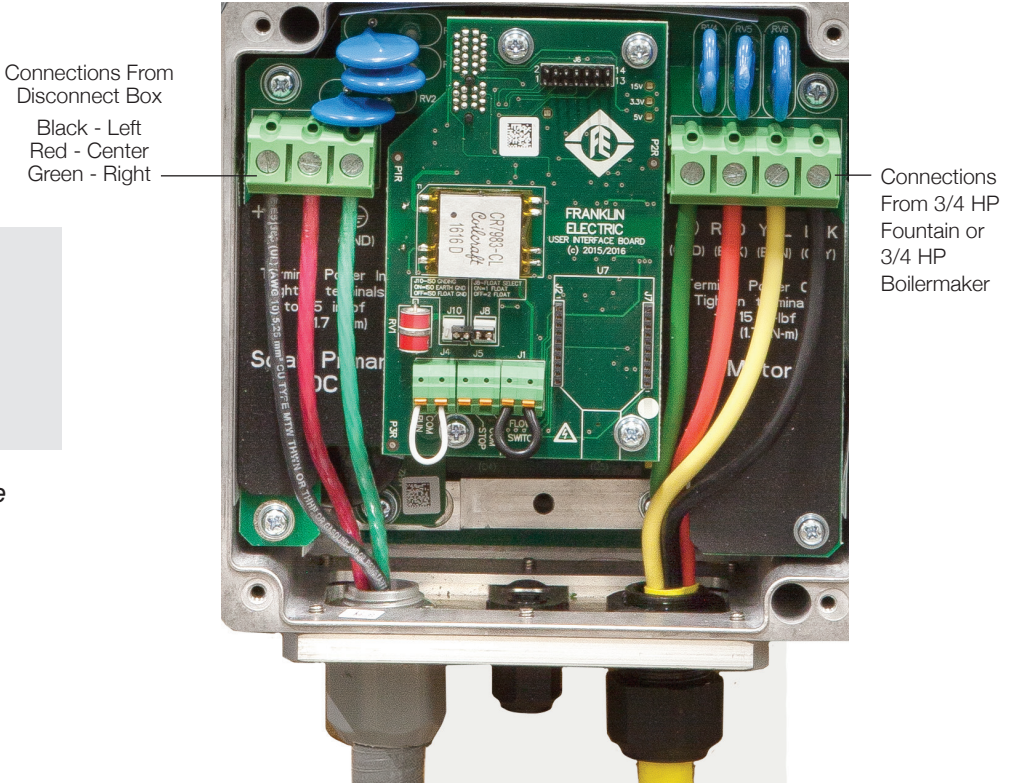


Figure 11-3 Photon Drive Connections

## Step 12. Connect cables of PV Modules in series

- A. Cover Solar Array with opaque tarp prior to interconnecting PV Module
- B. Connect cables of PV Modules in series
- C. Begin with upper left unit. Connect in series as shown in figure 12-1, making sure to seat each connector firmly. Connectors will click.
- Caution: Be sure positive and negative connections are made correctly.
- D. Connect Positive Cable from DC Disconnect to Positive (+) Cable coming from PV Module. Connect Negative (-) Cable to Negative Cable from PV Module.
- E. Secure all loose cables to framing using zip ties.

### WARNING:

Cover Solar Array with opaque tarp prior to interconnecting PV Module

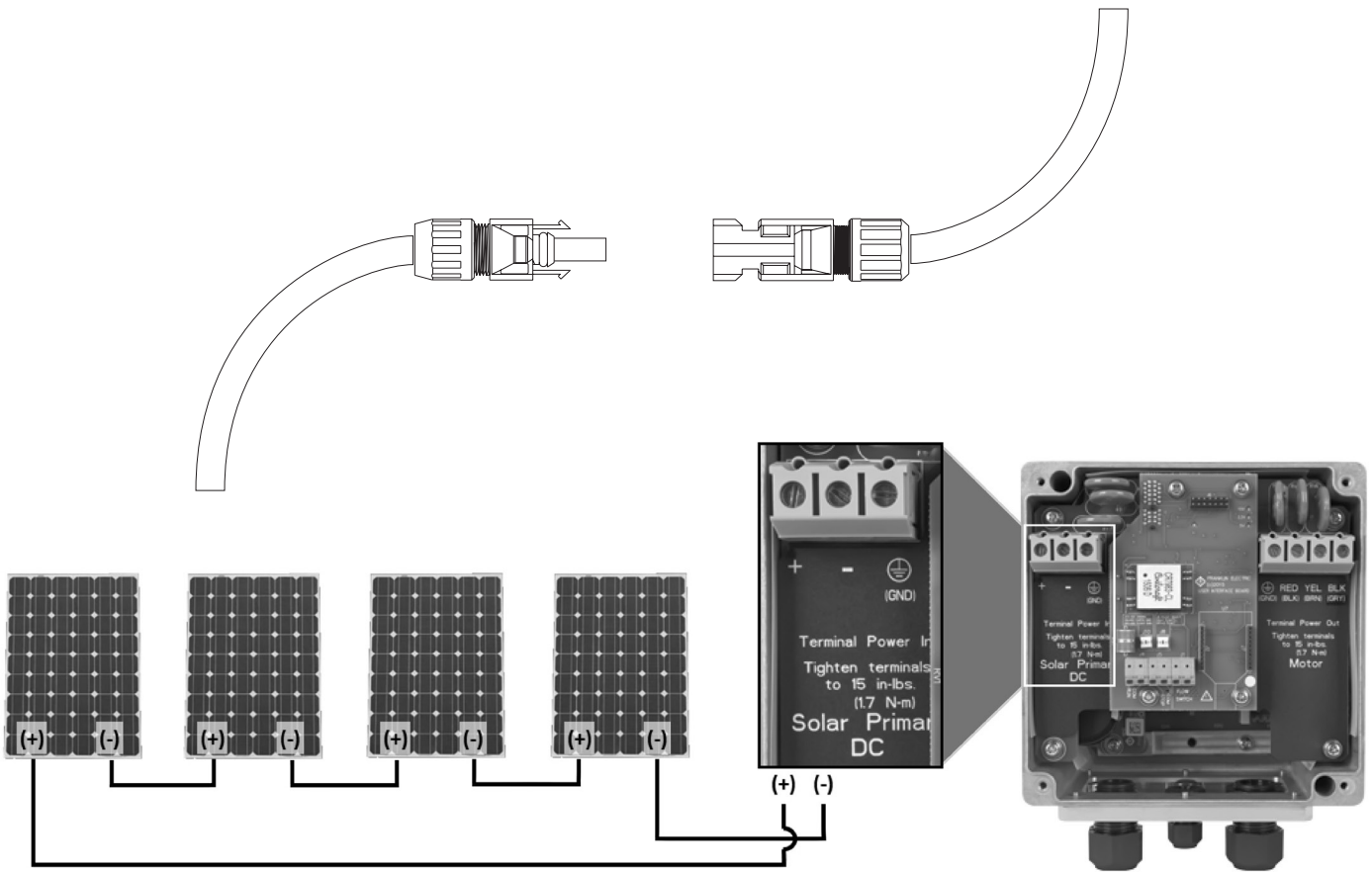


Figure 12-1: PV Solar Panel Connections

## System Diagnostics

The Photon™ Drive comes equipped with an LED indicator to convey operational status to the user. When operating normally, the LED will indicate solid green (IDLE condition) or flashing green (RUNNING condition). While in the RUNNING condition, the flash sequence count indicates rotor speed. A flash sequence is defined as follows: LED On for 0.5 seconds, LED Off of 0.5 seconds. Each sequence is separated by a 2 second Off time to give a clear visual indication between flash sequences. Flash sequences and cycles apply to both the red and green LED.

As an example, a 4 flash sequence of the green LED indicates an operating speed between 35 and 45 Hz. (See Table 1. Green LED Flash Sequence (RUNNING Condition))

Flash Sequence Count	Rotor Speed (Hz)
1	< 15
2	15-25
3	25-35
4	35-45
5	45-55
6	55-65

Table 1. Green LED Flash Sequence (RUNNING Condition)

The Photon Drive continuously monitors system performance and can detect a variety of abnormal conditions. In many cases, the controller will compensate as needed to maintain continuous system operation; however, if a high risk of equipment damage exists, the controller will protect the system and indicate the fault condition via a flashing red LED. If possible, the controller will try to restart itself when the fault condition subsides (see Troubleshooting section page 21 of the supplied manufacturers guide for a list of Fault Codes and correction actions). Refer to the photon manual for details on conditions in which a fault will occur.

### **The Scott Aerator Awesome Warranty**

All Scott Aerator motors are unconditionally warranted for five years against motor defects in materials or workmanship, under normal operating conditions. All other product components are warranted for one year from date of purchase. Scott Aerator will repair or replace failed parts under warranty when the defective unit is returned to the factory, shipping prepaid, and factory inspection establishes that the part was defective. The unit must be returned to the factory prior to shipment of replacement parts. All parts replaced under this warranty will be returned with shipping prepaid. Scott Aerator will not be liable for consequential damage nor for any costs associated with removal or attempts to repair components in the field.



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