

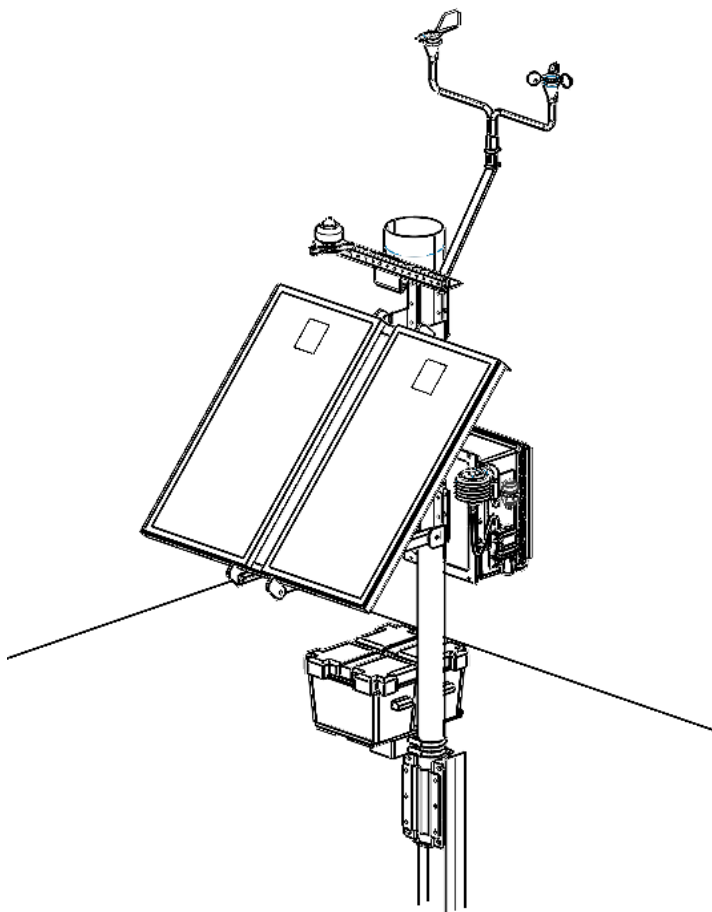


INTRODUCTION

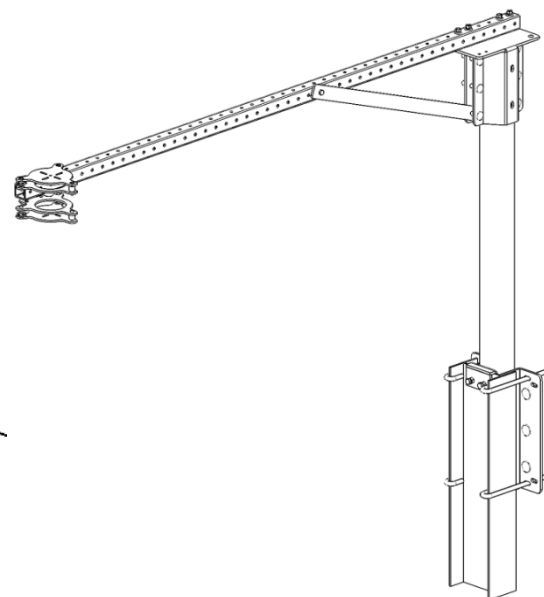
The NRG Systems Flare SRM System is a turnkey measurement station for performance monitoring of utility-scale PV projects. This document provides an instructional overview of the **updated** SRM Flare Solar tower which has been designed to be modular, quick, and easy to assemble.

Discussed within this document are several representative cases for installing the tubular tower, attached booms, sensor mounts, and power supplies. Details on optional accessories and sensors can be found in their respective instruction sheets, denoted by the NRG part number.

Also included in this document are installation instructions for the [NRG Systems Pile Mounted Albedometer](#), which support two identical pyranometers, mounted 180 degrees opposite each other. These sensors are used to measure the global horizontal irradiance (GHI) from the upward facing sensor and reflected horizontal irradiance (RHI) from the downward facing sensor. In turn, this data can be used to calculate the solar albedo ratio, or solar reflectance, at a given location. This albedometer, used in conjunction with the Flare SRM System, has been designed to be modular, quick, and easy to assemble.



Solar Flare SRM System



Pile Albedometer Mount



NRG SRM Flare Tower and Optional Associated Parts

NRG Part Number	Part Description	Part Specification Notes	QTY
20691	Solar Tower	Pile Mount SRM Tubular Tower Assembly	1
13414	PV Panel RPS	Single (100W) PV Frame Assembly	1
OR			
13415	PV Panel RPS	Double (200W) PV Frame Assembly	1
20696	Sensor Boom	2 ft Square Sensor Top Boom Assembly	1
OR			
20694	Sensor Boom	4 ft Square Sensor Top Boom Assembly	1
15736	Battery Bracket	100/200Ah Tower Mounted Battery Platform Assembly	1/2
20550	Pyranometer Mount	Regular NRG EZ-Level Pyranometer Bracket Assembly	1+
20605	Pyranometer Mount	Large NRG EZ-Level Pyranometer Bracket Assembly	1+
20575	Wind Sensor Mounting Boom	Dual Anemometer and Vane Mounting Boom Discrete/Multi Met Wind Boom Mount	1
OR			
20697	Multi-Met Sensor Mount	Digital Multi-Met Angular Mounting Bracket	1
20736	Rain Gauge Bracket	Universal Boom-Mounted Rain Bucket Platform	1
20701	Met Sensor Mounting Panel	BP/RH/Temp Discrete Sensor Mounting Panel	1
OPTIONAL ADDITION			
20706	Pile Mount Albedo	Pile Mount SRM Tubular Tower Assembly	1
20550	Pyranometer Mount	Regular NRG EZ-Level Pyranometer Bracket Assembly	2

Tools Required

- 3/8", 1/2", 9/16", 3/4" Sockets
- 1/2", 3/4" Wrench
- 3/16" Allen Key/ Hex wrench
- P2 Screwdriver
- Impact Driver
- Torque Wrench
- Level

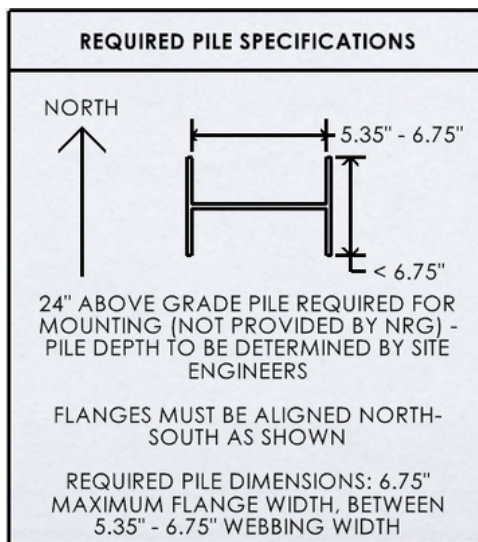


INSTALLATION PROCEDURES

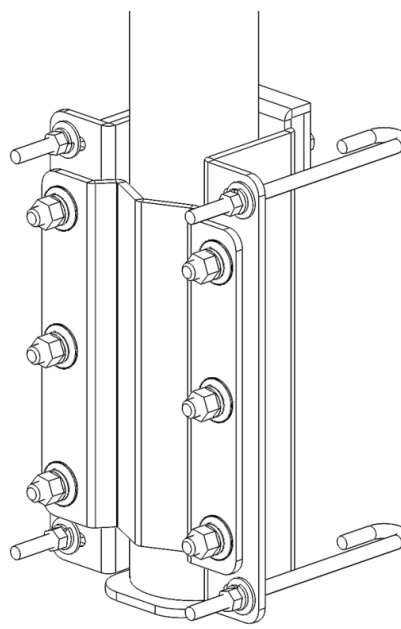
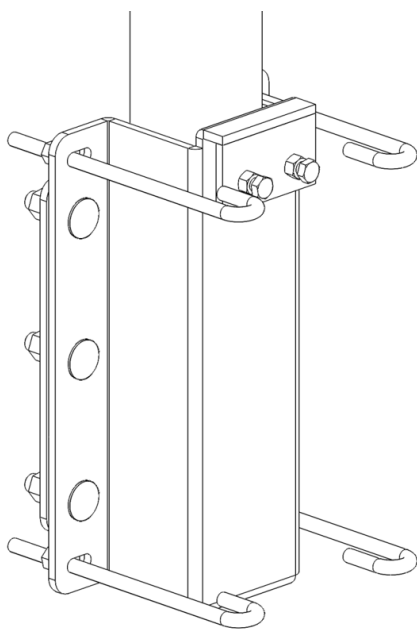
Pile-Mounted Tower Installation

Tools Required:

- 9/16" Socket
1. Prepare the mounting pile prior to tower set-up. **NOTE** the required pile orientation and specifications below.



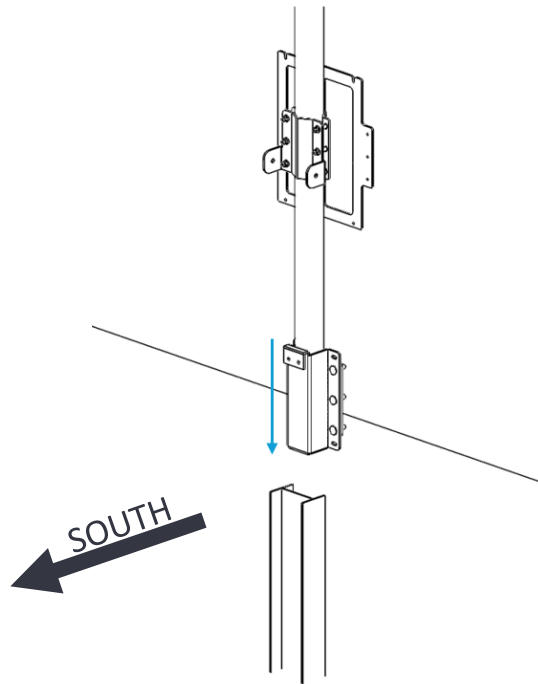
Tower brackets ship pre-installed to the tubular tower for ease of assembly. See detailed view of tower assembly below.



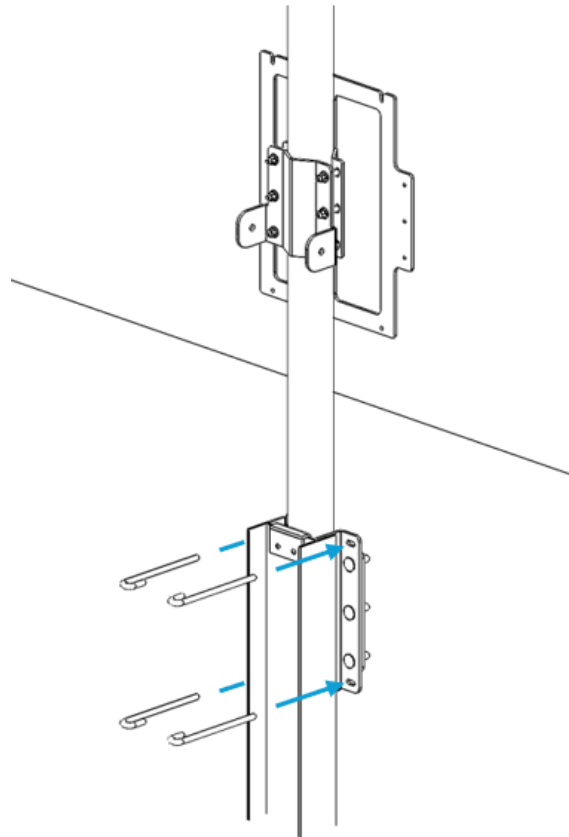


SRM Flare System | Tower Installation

2. Place tower assembly on pile webbing. **NOTE** required directional orientation.



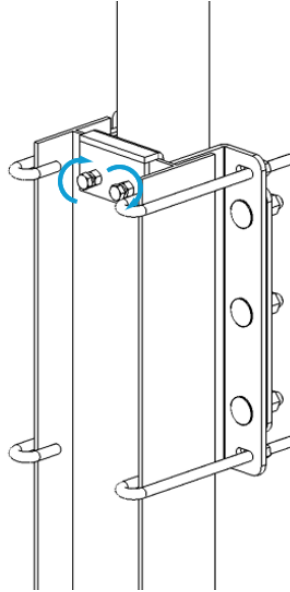
3. Install J-bolts (quantity 4) through the tower bracket. Torque to 30 ft/lbs with 9/16" socket.



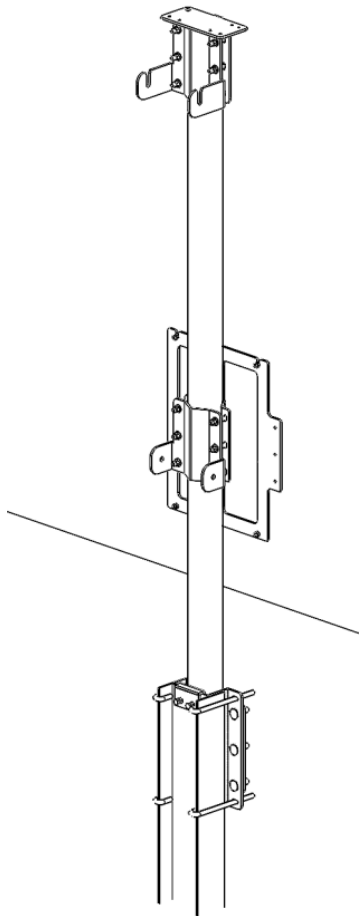


SRM Flare System | Tower Installation

4. Install and tighten the two fasteners on the bracket back-tab. Torque to 7 ft/lbs.



Installed View:

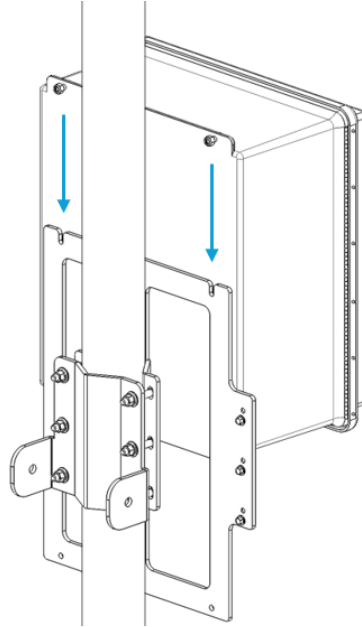




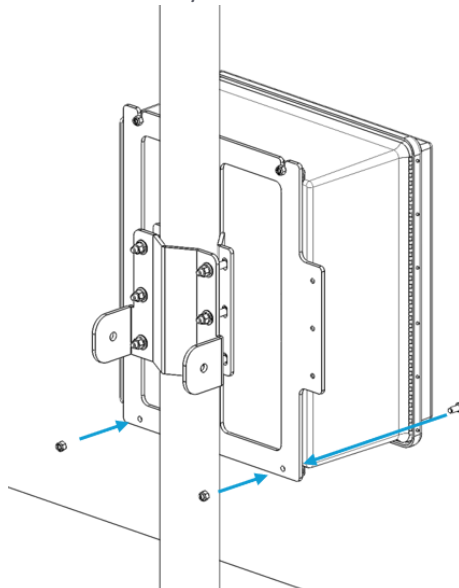
Power Supply Installation

Tools Required:

- ½" Socket and Wrench
1. Loosely install the two top ½" fasteners through the shelter box. Drop the shelter box down into the slots at the top of the shelter box mounting bracket (pre-installed to the tower).

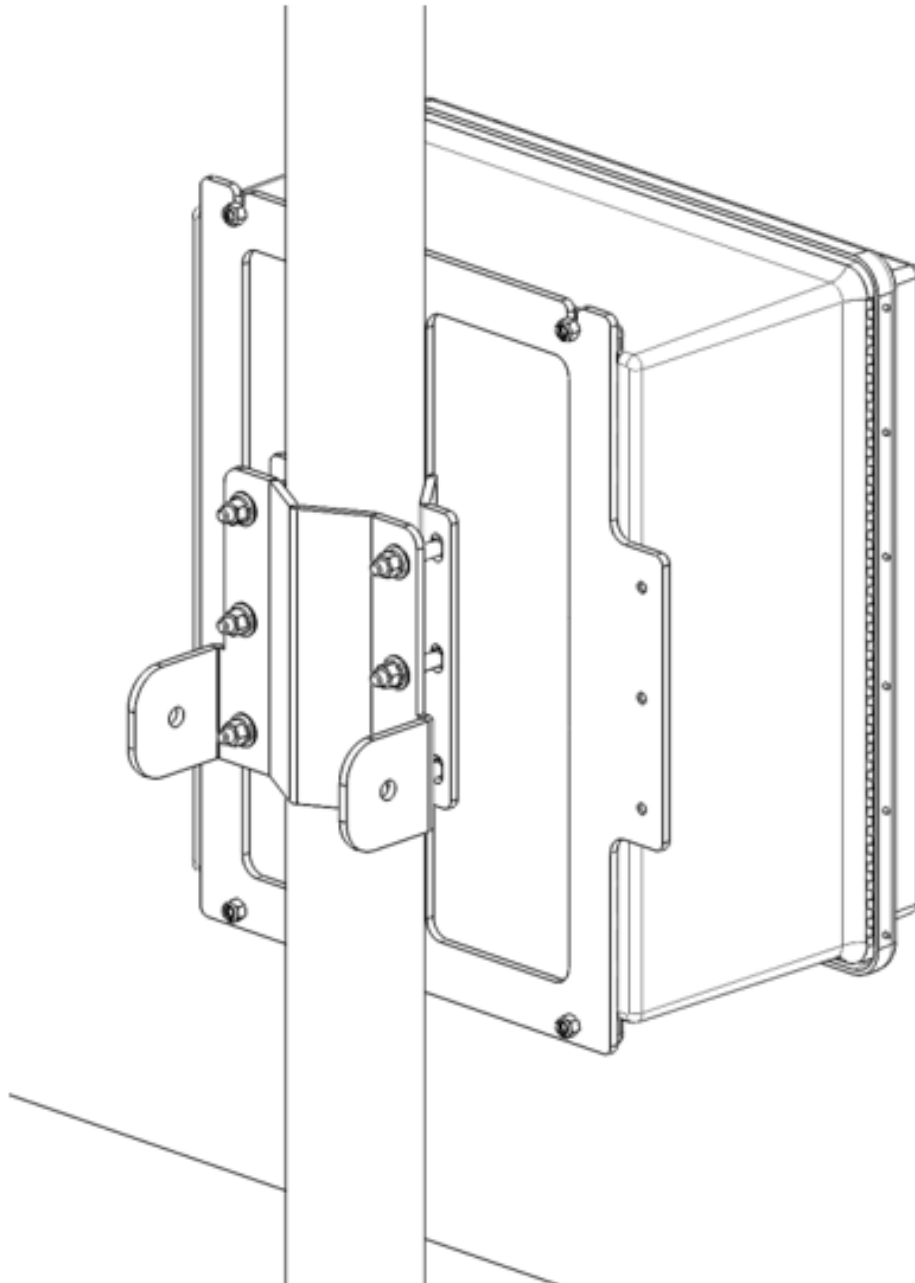


2. Install the remaining two ½" fasteners through the bottom corners of the shelter box and tower bracket. Torque all four fasteners to 3 ft/lbs.





Installed View:

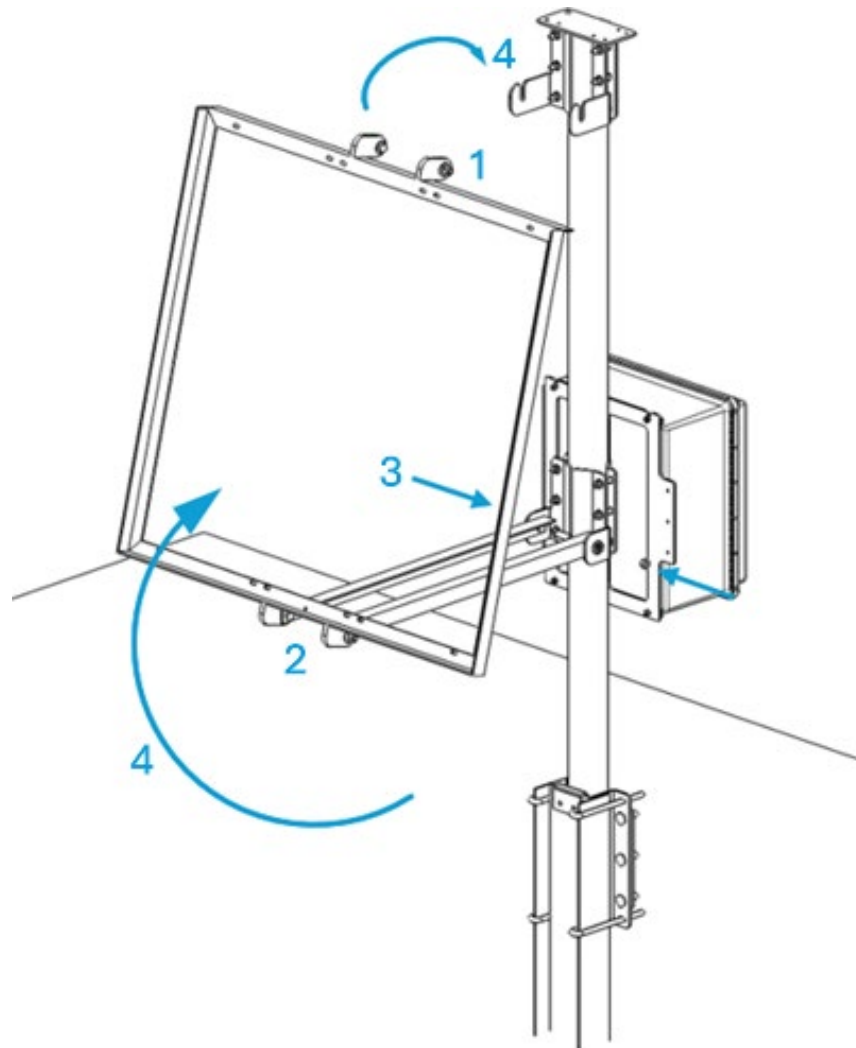




Remote Power PV Panel Installation

Tools Required:

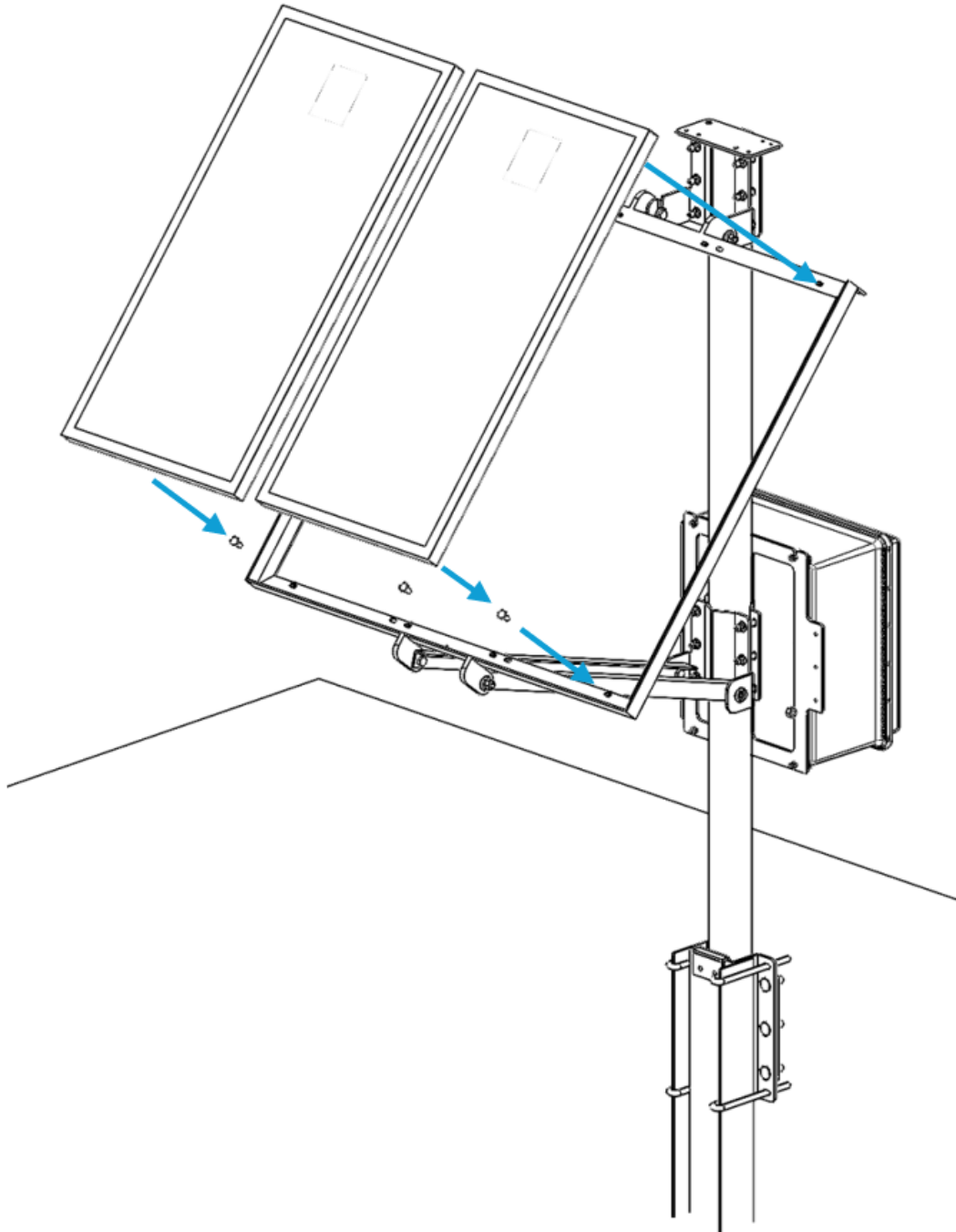
- $\frac{3}{4}$ " Socket and Wrench
 - $\frac{1}{2}$ " Socket
1. Loosely install two $\frac{3}{4}$ " fasteners on the PV frame top tabs.
 2. Loosely secure the PV panel frame arms to the bottom of the PV frame using two $\frac{3}{4}$ " fasteners.
 3. Loosely secure the ends of the PV panel frame support arms to the bracketry at the back of the shelter box mount using two $\frac{3}{4}$ " fasteners.
 4. Pivot the bracket frame up and install the PV frame top tabs into the hardware slots on the top of the tower.
 5. Tighten all $\frac{3}{4}$ " fasteners securing the panel frame to the tower (quantity: 6). Torque fasteners to 30 ft/lbs.





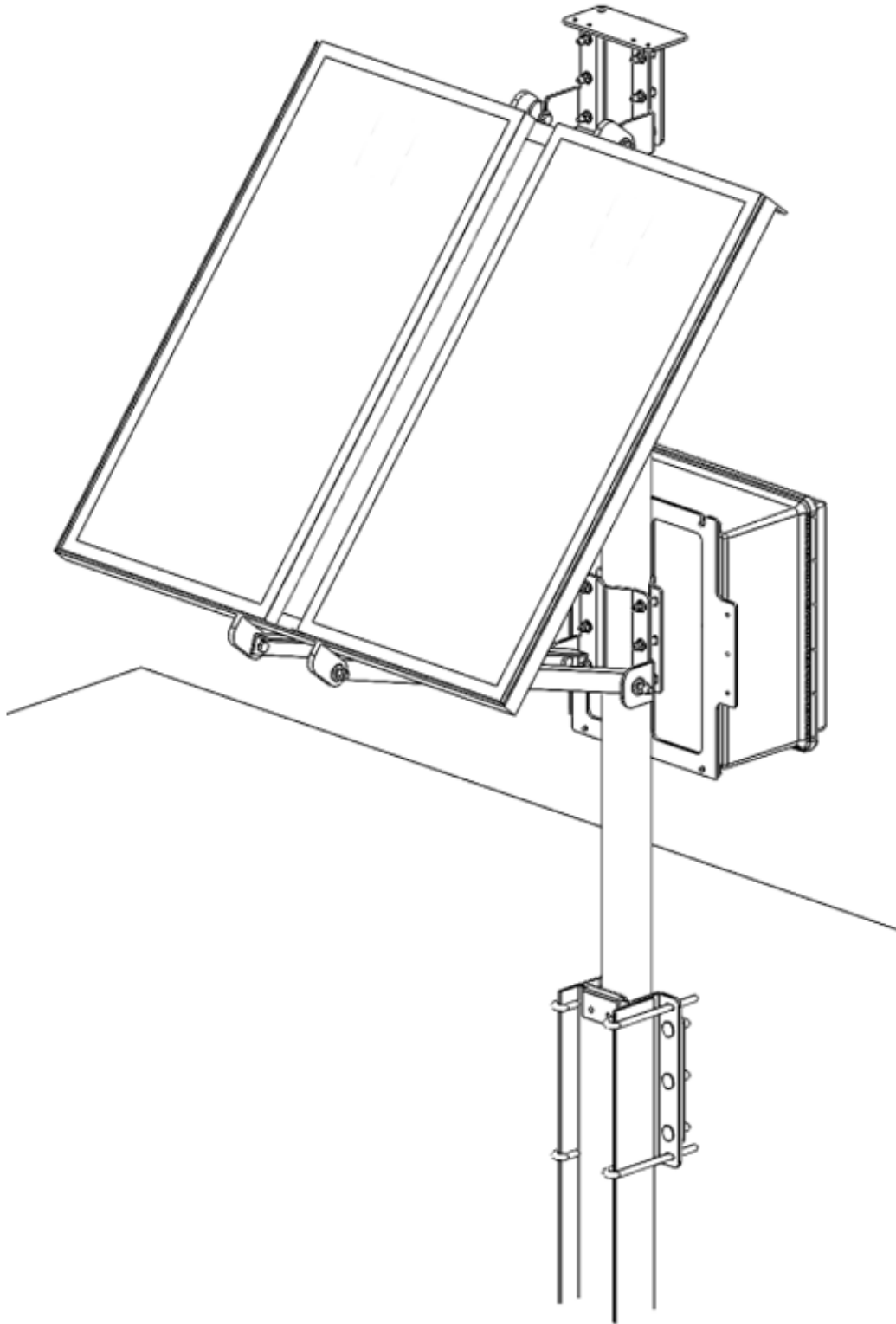
SRM Flare System | Tower Installation

6. Install one or two 100W PV panels (depending on RSP system) to the PV frame using the provided $\frac{1}{2}$ " carriage bolts. Four carriage bolts per PV panel; one for each corner. Torque $\frac{1}{2}$ " panel frame fasteners to 7 ft/lbs.





Installed View:

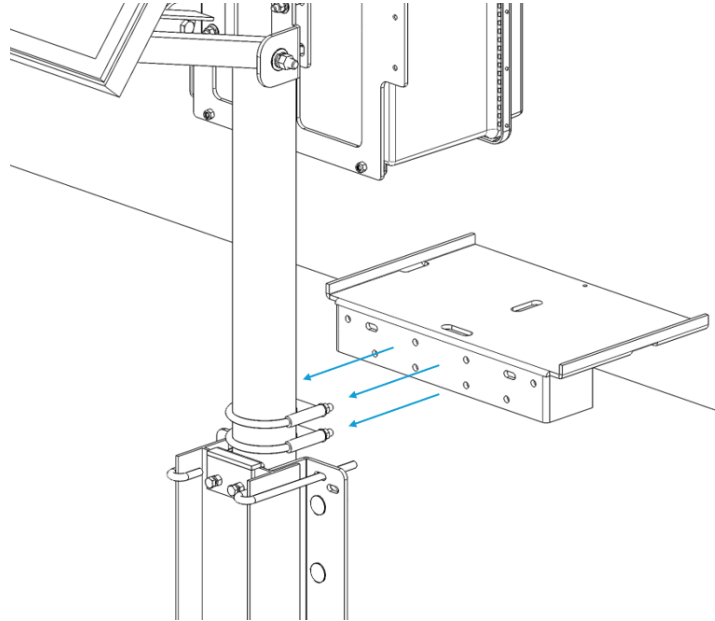




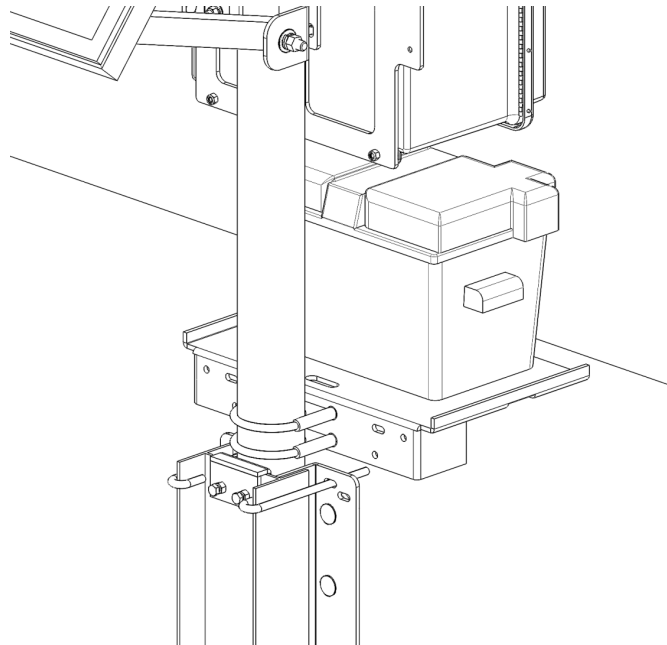
Battery Mounting Bracket Installation

Tools Required:

- ½" Socket or Wrench
1. Using the provided U-bolts (quantity 2), fasten the battery mounting bracket platform to the tubular tower. Placement and quantity of battery brackets may vary depending on system configuration and conduit clearance. Torque fasteners with ½" socket or wrench to 25 ft/lbs.



Installed View:





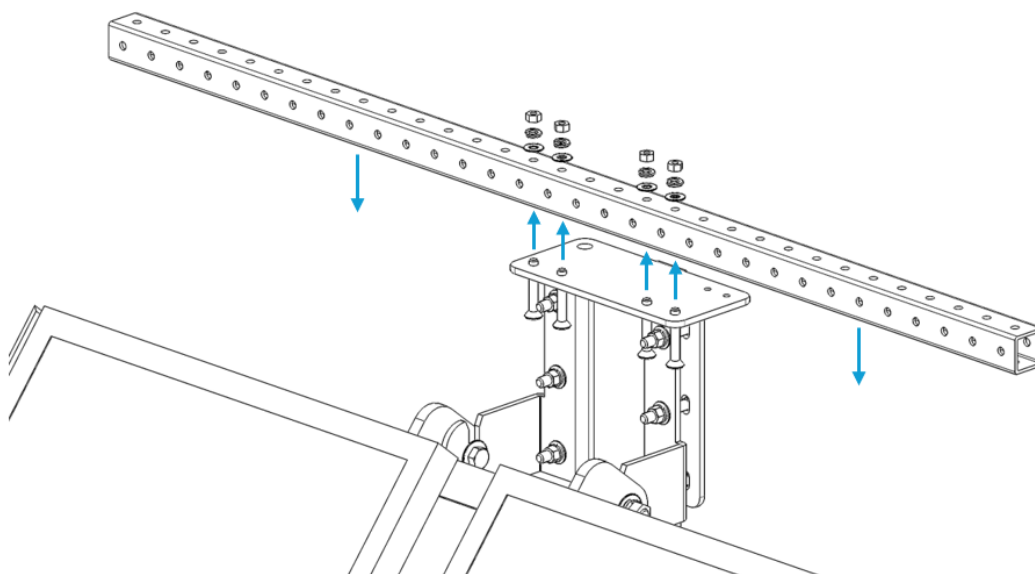
Sensor Boom Installation (2 or 4 ft. length)

Tools Required:

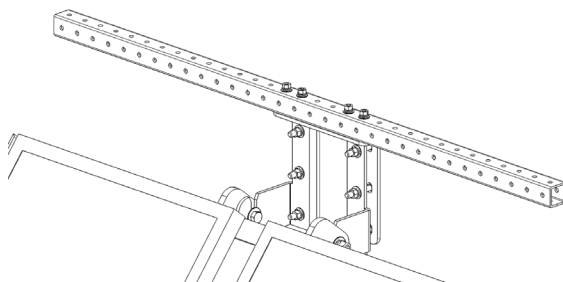
- 3/16" Allen Wrench/Hex Key
- ½" Socket

Note: To reduce overhead work, sensor mounting brackets for pyranometers and rain gauges (detailed below) may be attached to the square sensor boom prior to boom installation to the top of the tower.

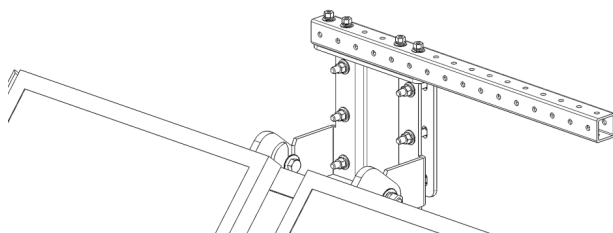
1. Install square sensor boom to the top of the tower using ½" bolts (quantity 4). Torque fasteners to 7 ft/lbs. The 4' square boom (item # 20694) or 2' square boom (item # 20696) install with the same method.



Installed Views:



4' Square Boom (item # 20694)



2' Square Boom (item # 20696)

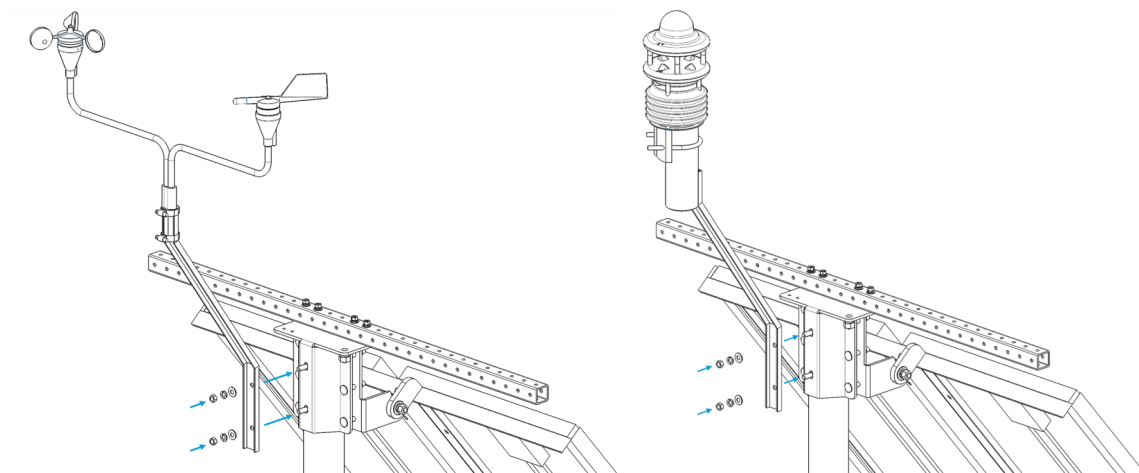
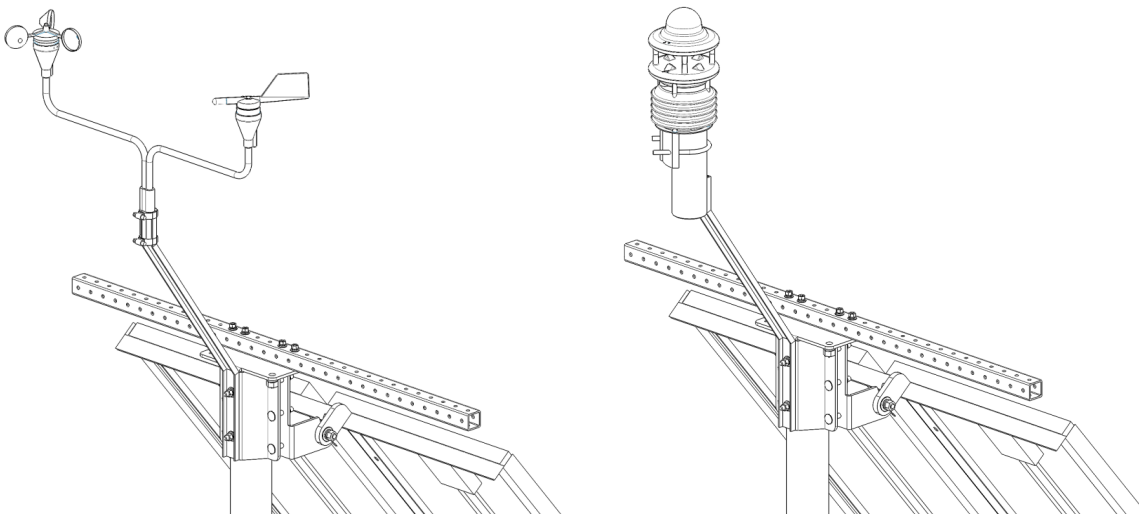
**Installing Wind Sensor Boom (NRG Dual Discrete Sensors or Multi-Met Sensor)****Tools Required:**

- ½" Socket

Note: Only one of the two wind sensor booms can be installed per tower.

Note: To reduce overhead work, wind sensor(s) may be mounted to the boom and sensor cables connected prior to installation. Dual discrete wind sensor boom (item # 20575) or multi-met boom (item # 20697) (both shown) install with the same methods.

1. Install the wind sensor boom using the ½" fasteners (quantity 2). Torque fasteners to 7 ft/lbs.

**Installed Views:**

Dual Discreet Wind Sensor Boom (item # 20575)

Multi-Met Sensor Boom (item # 20697)

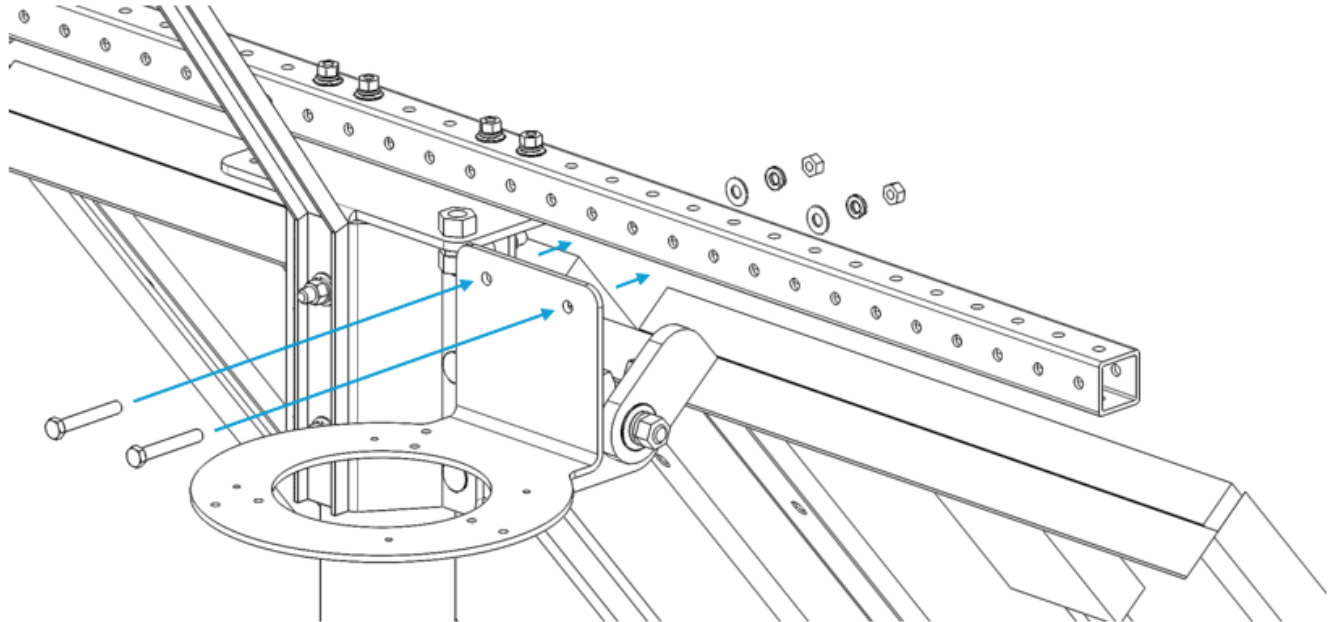


Installing Rain Gauge Mounting Hardware

Tools Required:

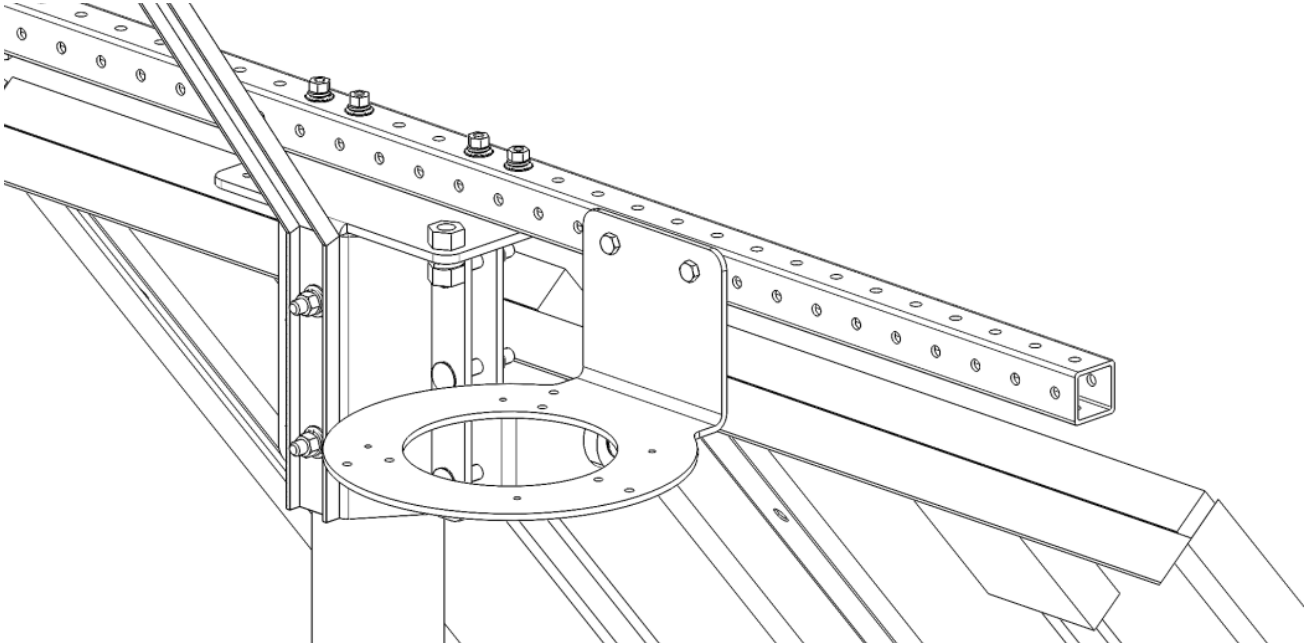
- ½" Socket and Wrench

1. Using ½" bolts install the bracket to the square sensor mounting boom. Torque fasteners to 7 ft/lbs.



2. Install compatible rain gauge tipping bucket. See specific sensor documentation for detailed installation instructions.

Installed View:





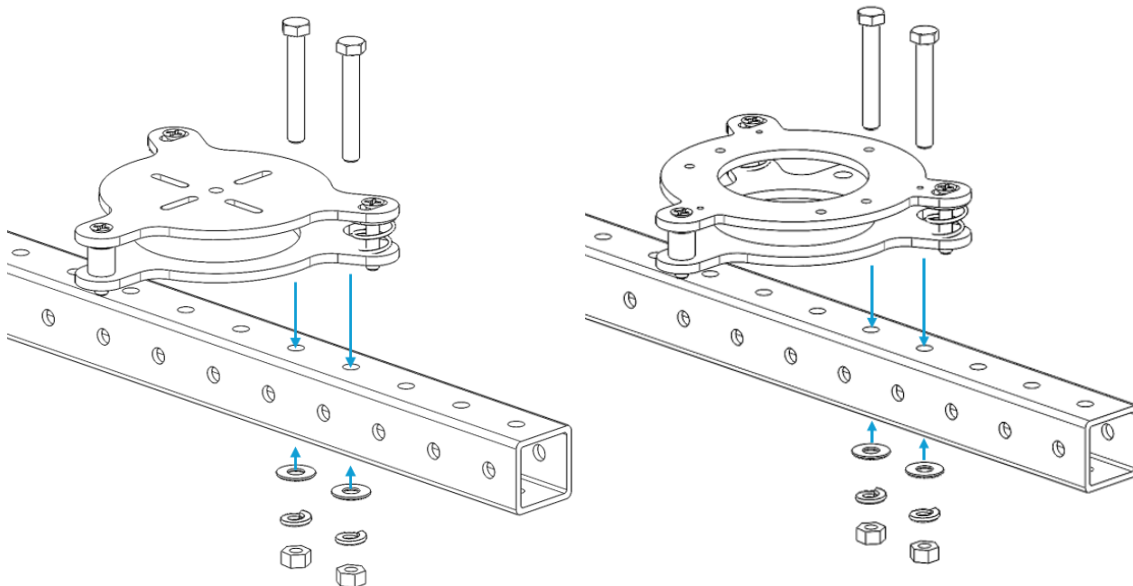
Installing Pyranometer Mounting Hardware

Tools Required:

- ½" Socket and Wrench
- P2 Screwdriver

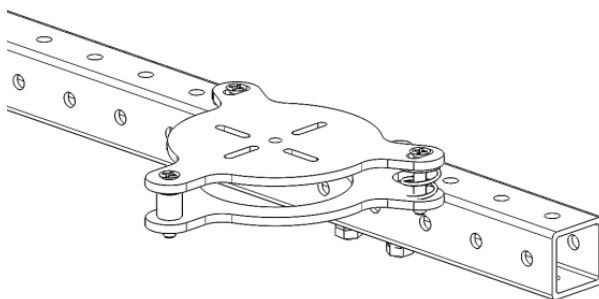
Note: Both the Regular-sized EZ-Mount Pyranometer Bracket (item # 20550, below, left) and Large-sized EZ-Mount Pyranometer Bracket (item # 20605, below, right) install with the same methods. Quantity and type of pyranometer mount will vary depending on system configuration.

1. Install pyranometer mounting brackets to the square boom using ½" bolts. Torque fasteners to 7 ft/lbs.

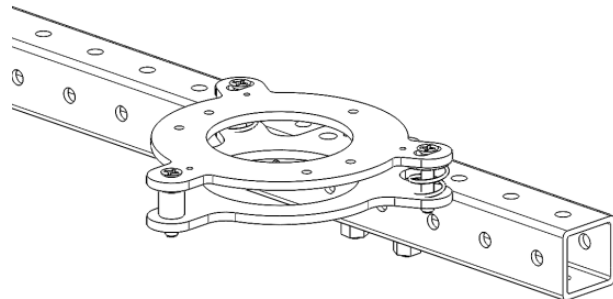


2. Install compatible pyranometer(s). See specific sensor documentation for detailed installation instructions. Level the sensor by adjusting the spring-loaded screws with a P2 screwdriver.

Installed Views:



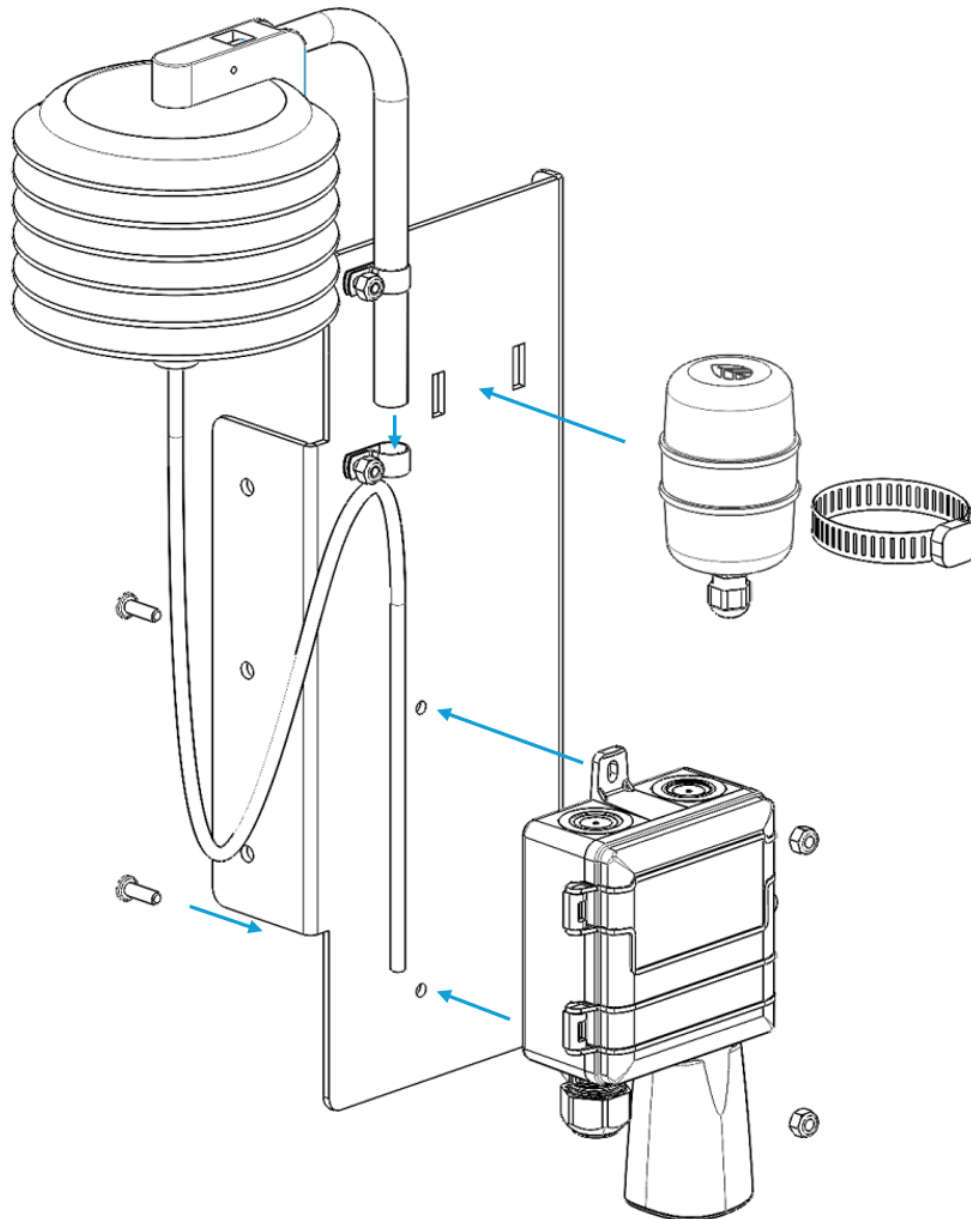
Regular EZ-Mount Bracket (item # 20550)



Large EZ-Mount Bracket (item # 20605)

**Installing Met Sensor Mounting Panel*****Tools Required:***

- 3/8" Socket
 - 5/16" Socket
 - P2 screwdriver
1. Install temperature, pressure, and humidity meteorological sensors to panel using the 3/8" hardware and socket for Relative Humidity and Temperature sensors. For the Barometric Pressure sensor, use the 5/16" socket to secure it with the provided hose clamp shown below.

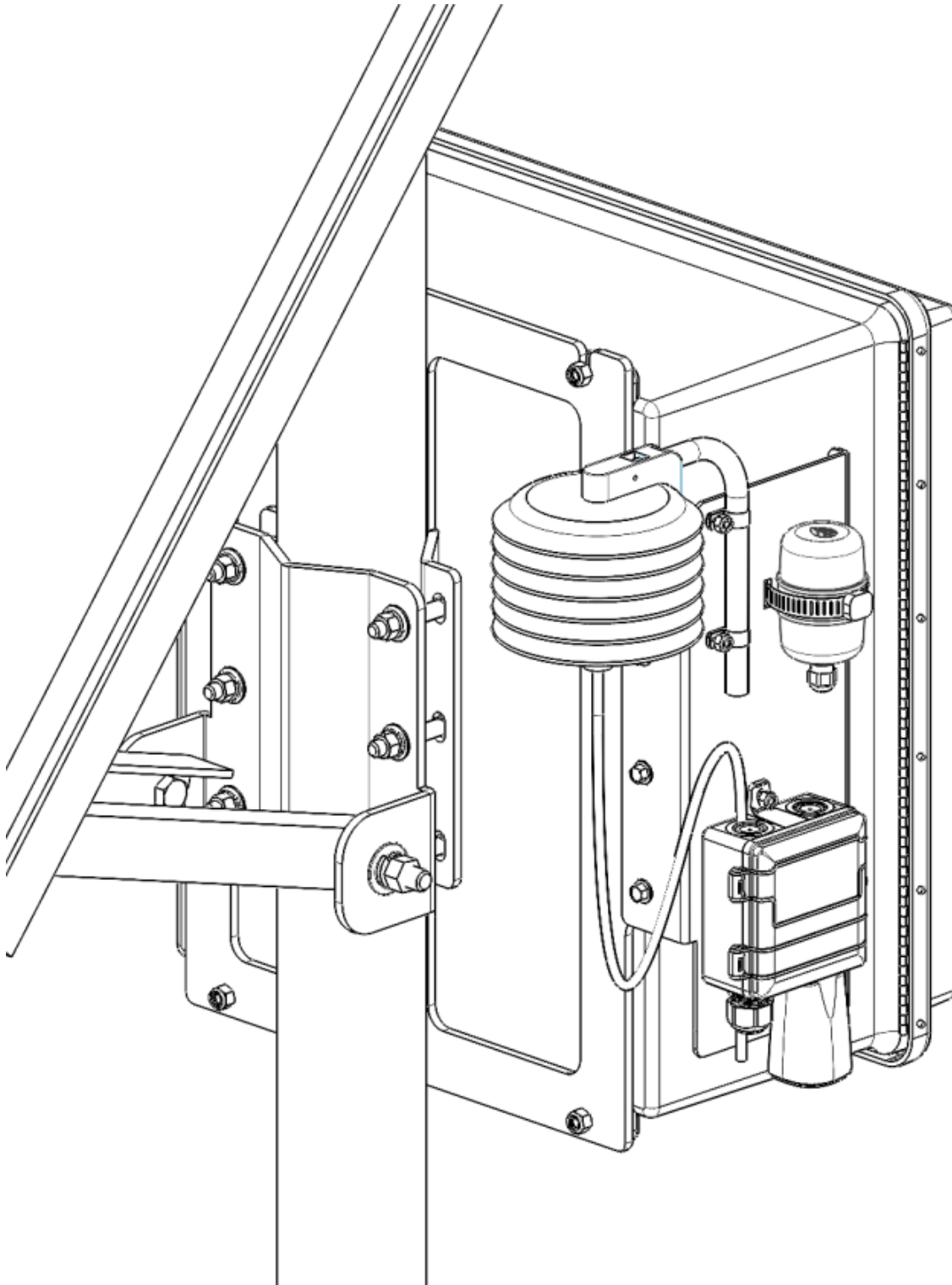




SRM Flare System | Tower Installation

2. Secure the sensor mounting plate to the shelter box mounting bracket using the provided 3/8" fasteners (quantity 3). Torque fasteners to 5 ft/lbs.

Installed View:

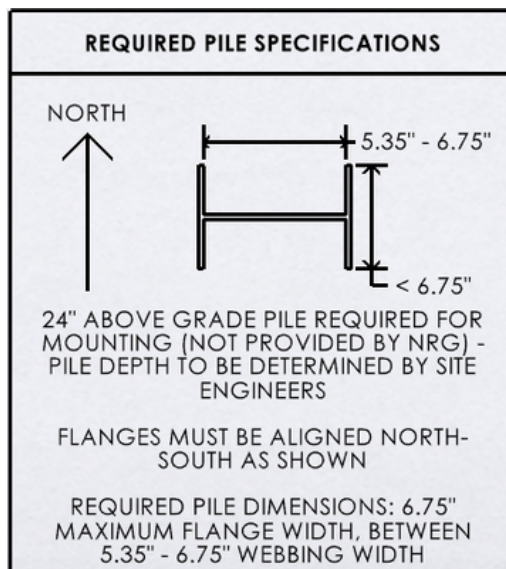




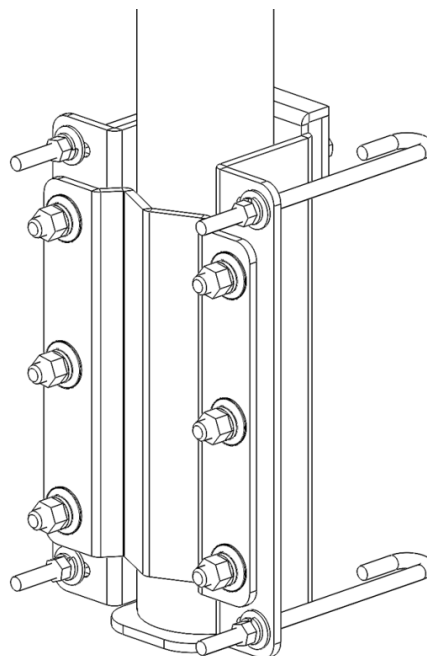
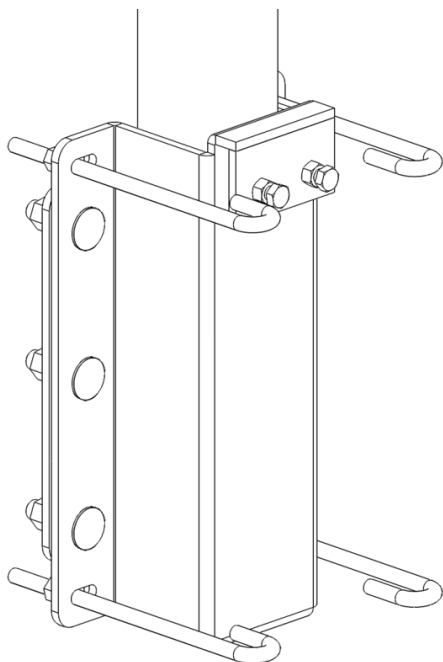
Pile Mounted Albedometer Installation

Tools Required:

- ½" Socket or Wrench
1. Prepare the mounting pile prior to tower set-up. **NOTE** the required pile orientation and specifications below.



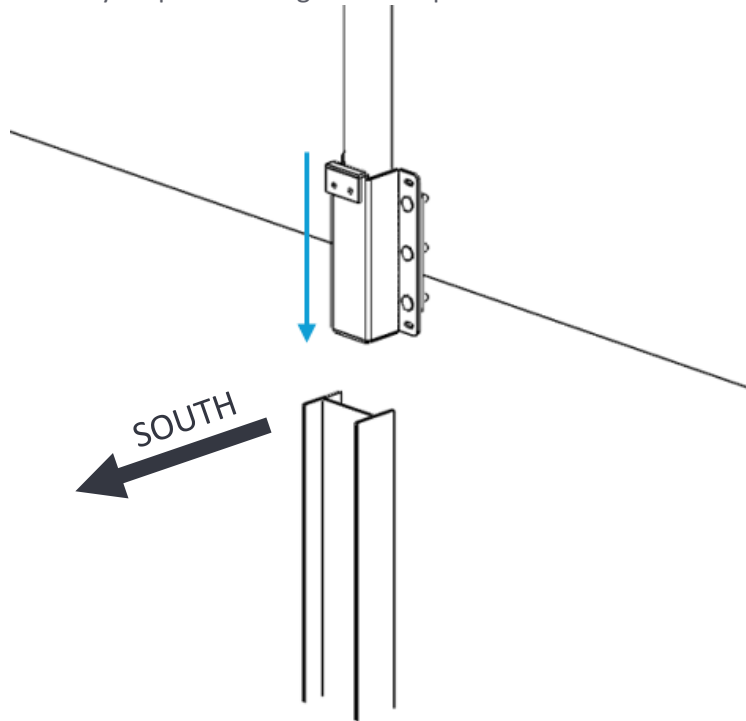
Tower brackets ship pre-installed to the tubular tower for ease of assembly. See detailed view of tower assembly below.



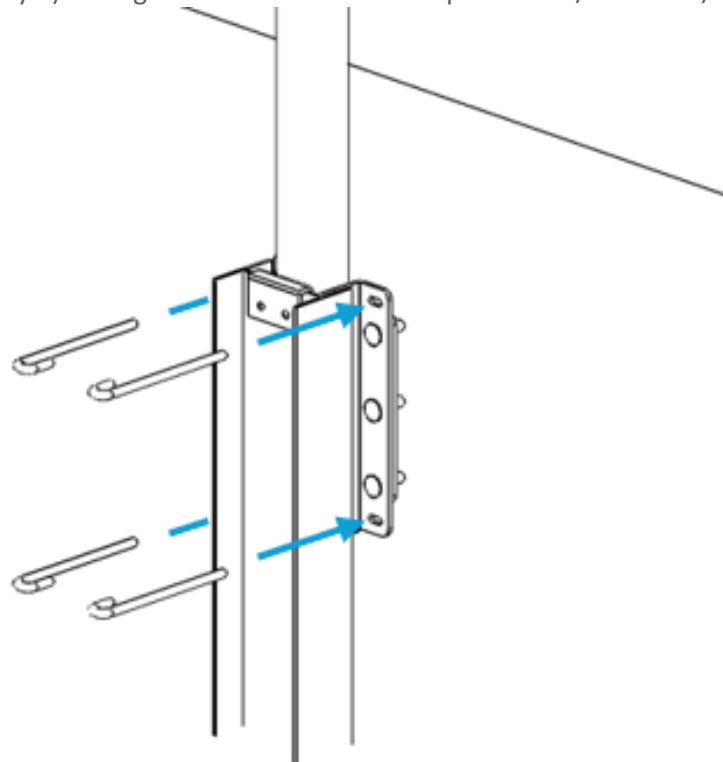


SRM Flare System | Tower Installation

2. Place tower assembly on pile webbing. **NOTE** required directional orientation.



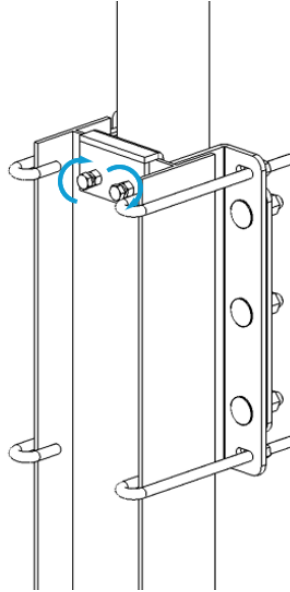
3. Install J-bolts (quantity 4) through the tower bracket. Torque to 30 ft/lbs with 9/16" socket.



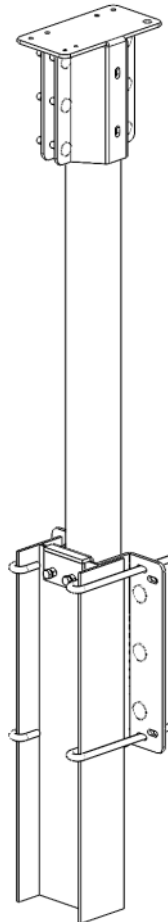


SRM Flare System | Tower Installation

4. Install and tighten the two fasteners on the bracket back-tab. Torque to 7 ft/lbs.



Installed View:



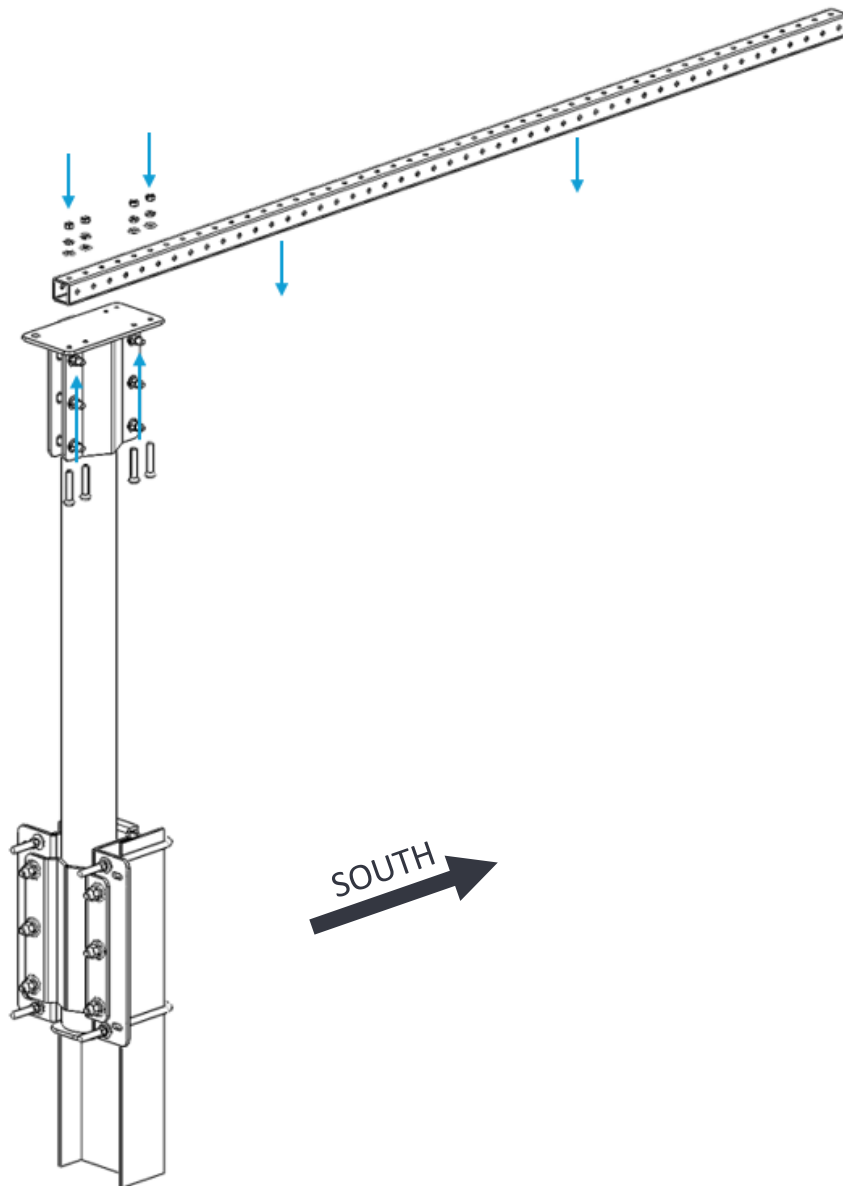


Sensor Boom Installation

Tools Required:

- 3/16" Allen Wrench/Hex Key
- 1/2" Socket
- 9/16" Socket

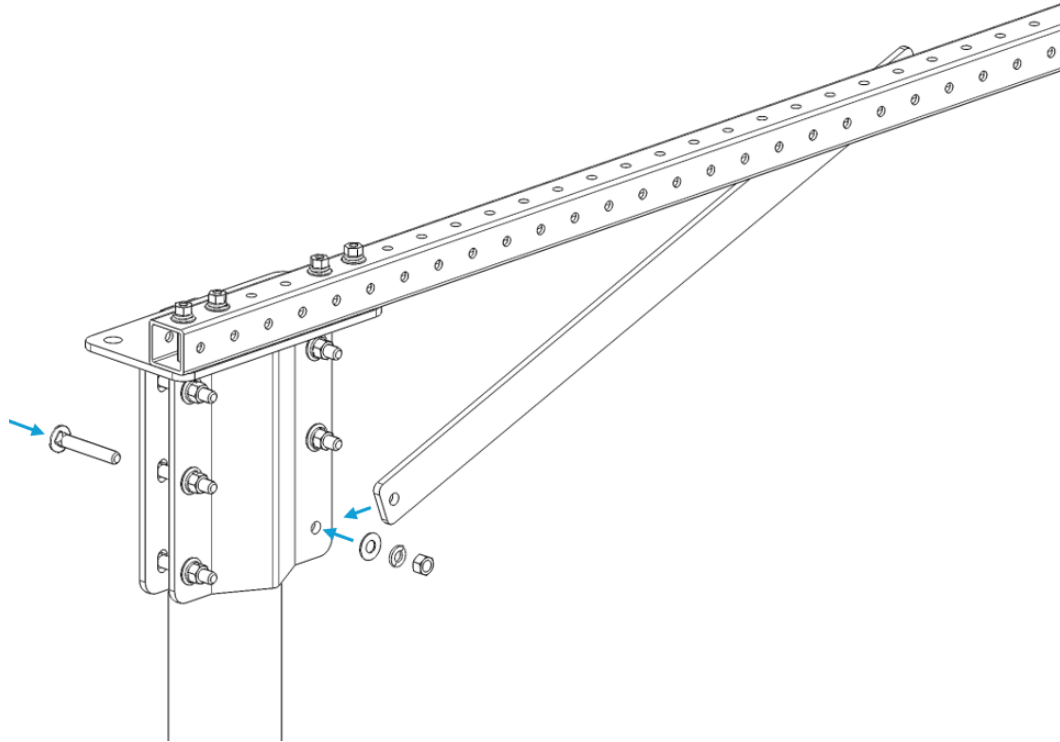
1. Install square sensor boom to the top of the albedo tower assembly, **facing South**. Torque fasteners to 7 ft/lbs. using a 1/2" socket.



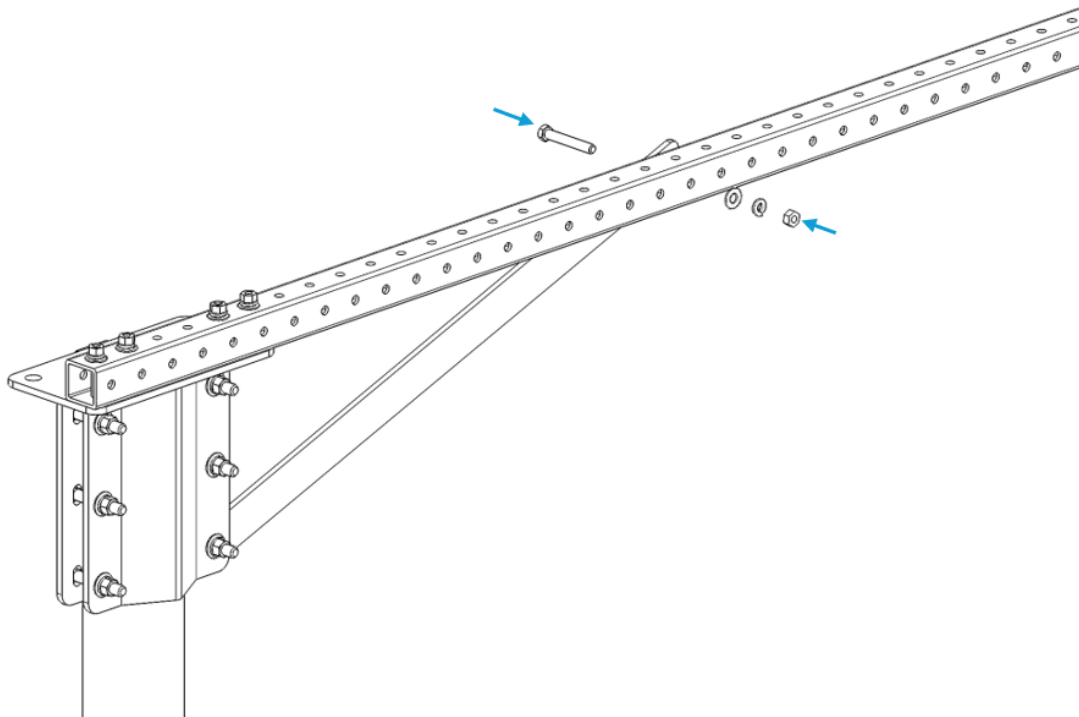


SRM Flare System | Tower Installation

2. Remove **one** carriage bolt from the top of albedo tower assembly, as shown. Install boom brace, and replace bolt, using 9/16" socket, torquing bolt to 30 ft/lbs.

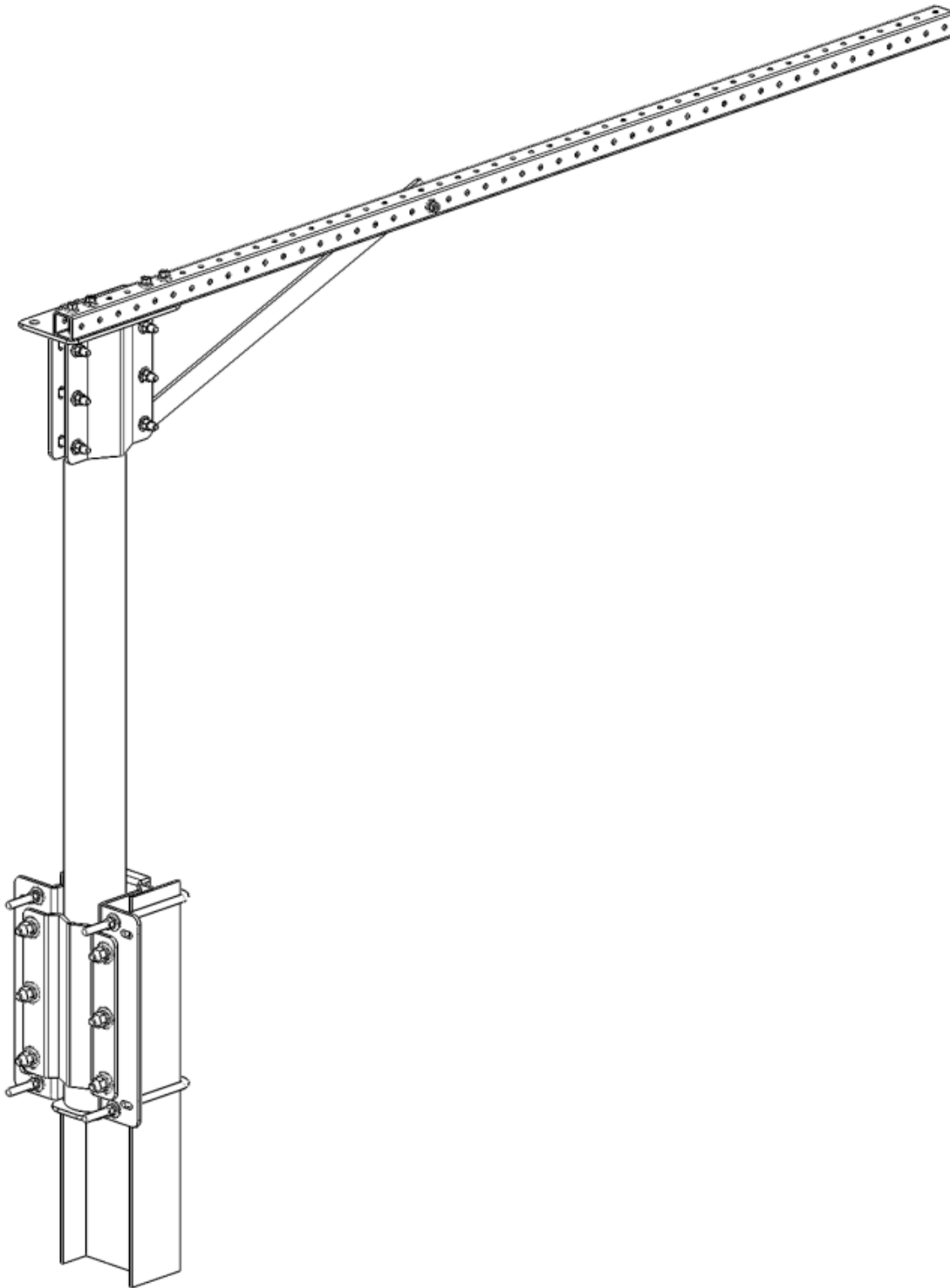


3. Line up boom brace and install an additional bolt through the brace and boom using a 1/2" socket; torque fastener to 7 ft/lbs.





Installed View:

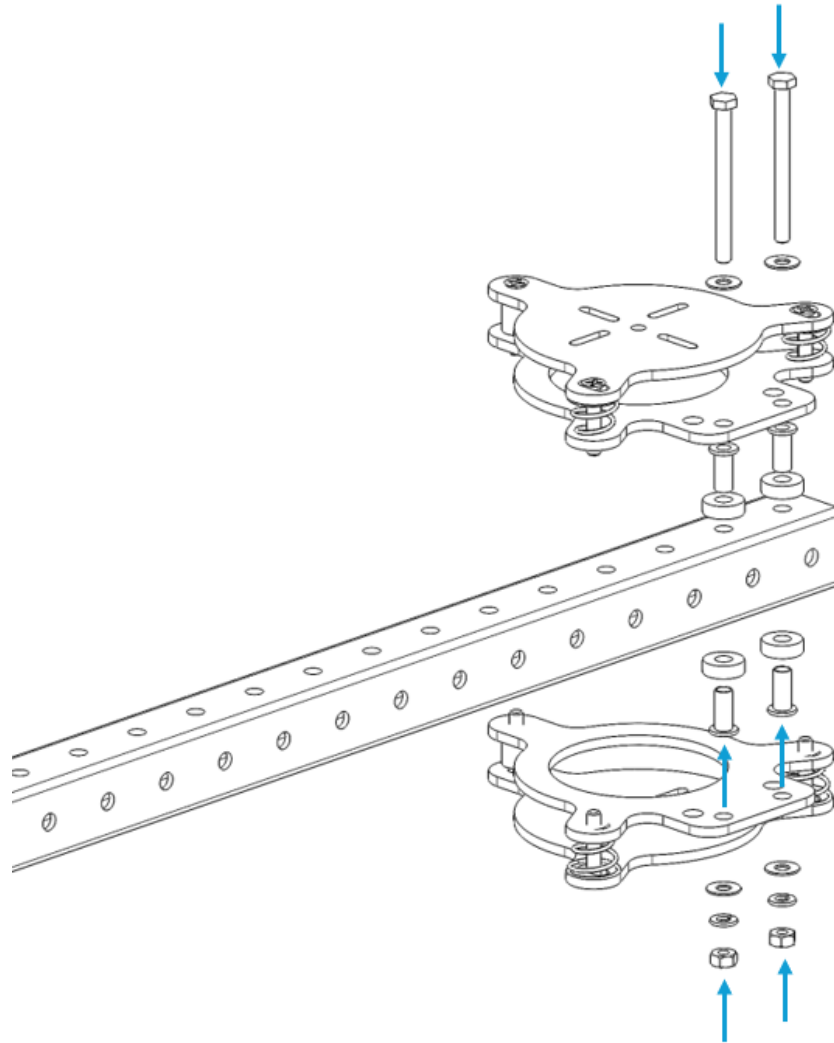




Installing Pyranometer Mounting Hardware

Tools Required:

- ½" Socket and Wrench
 - P2 Screwdriver
1. Install pyranometer mounting brackets on south end of square boom. **Stack-up of nylon washers must be in place to ensure proper electrical isolation of sensors.** Torque fasteners to 7 ft/lbs., using 1/2" socket.





SRM Flare System | Tower Installation

2. Install compatible GHI (upward-facing) and RHI (downward-facing) pyranometers. Note that the two sensors must be of the same make and model for accurate data acquisition. See specific sensor documentation for detailed installation instructions. If sensors utilize leveling feel, they should be removed before installation. Level the sensors to the ground by adjusting the mounting bracket spring-loaded screws with a P2 screwdriver.

Installed View: