INSTALLATION GUIDE

System

SunSentry™20

Solar Operational Meteorological Monitoring Station

08/2026

RELIABLE MONITORING SINCE 1974

Campbell SCIENTIFIC®

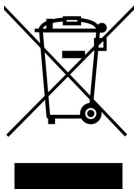
Please read first

About this manual

Please note that this manual was produced by Campbell Scientific Inc. primarily for the North American market. Some spellings, weights and measures may reflect this. In addition, while most of the information in the manual is correct for all countries, certain information is specific to the North American market and so may not be applicable to Europe, Middle East, and Africa (EMEA) or Asia Pacific (APAC) users. Differences include the U.S. standard external power supply details where some information (for example the AC transformer input voltage) will not be applicable for EMEA or APAC use. Please note, however, *that when a power supply adapter is ordered from Campbell Scientific it will be suitable for use in your country*.

Reference to some radio transmitters, digital cell phones and aerials (antennas) may also not be applicable according to your locality. Some brackets, shields and enclosure options, including wiring, are not sold as standard items in the EMEA or APAC market; in some cases alternatives are offered.

Recycling information for countries subject to WEEE regulations 2012/19/EU



At the end of this product's life it should not be put in commercial or domestic refuse but sent for recycling. Any batteries contained within the product or used during the product's life should be removed from the product and also be sent to an appropriate recycling facility, per The Waste Electrical and Electronic Equipment (WEEE) Regulations 2012/19/EU. Campbell Scientific can advise on the recycling of the equipment and in some cases arrange collection and the correct disposal of it, although charges may apply for some items or territories. For further support, please contact Campbell Scientific, or your local agent.

Table of contents

1. Introduction

This document outlines the basic steps required to install the SunSentry 20. More detailed installation information is provided in project-specific wiring diagrams, register maps, and standard sensor manuals and mount manuals.

The stations are typically installed in the following order:

1. Pile
2. CM400 tower
3. Main met enclosure
4. Solar panel
5. Crossarm

Tools list:

- Compass
- Ladder (recommended)
- Tape measure
- Open-ended and socket wrenches

> NOTE:
> A second set of wrenches is useful for components that have nuts and bolts combinations.

- Hex key set (US and Metric)
- Screwdrivers large and small, Phillips and straight
- Large hammer (if there is a separate ground rod)
- Zip ties

2. Siting

Locate the SunSentry 20 away from obstructions, such as trees and buildings. The horizontal distance from an obstruction should be at least ten times the height of the obstruction. No obstacles should be between the course of the sun and the pyranometers.

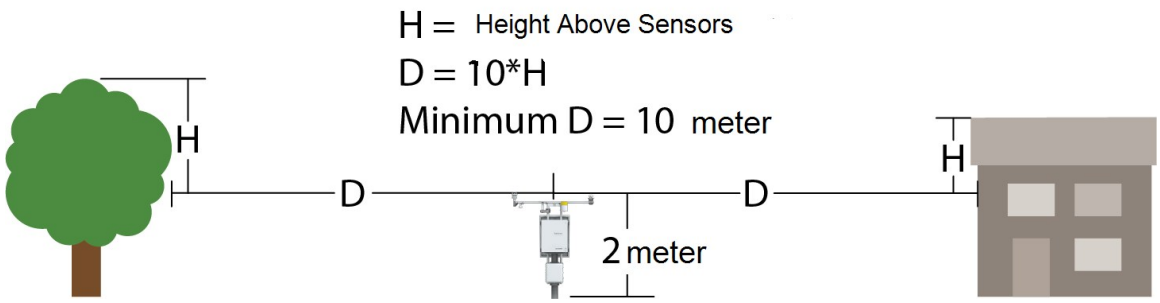


Figure 2-1. Distance between obstructions

Figure 2-2. Solar panel should face the equator

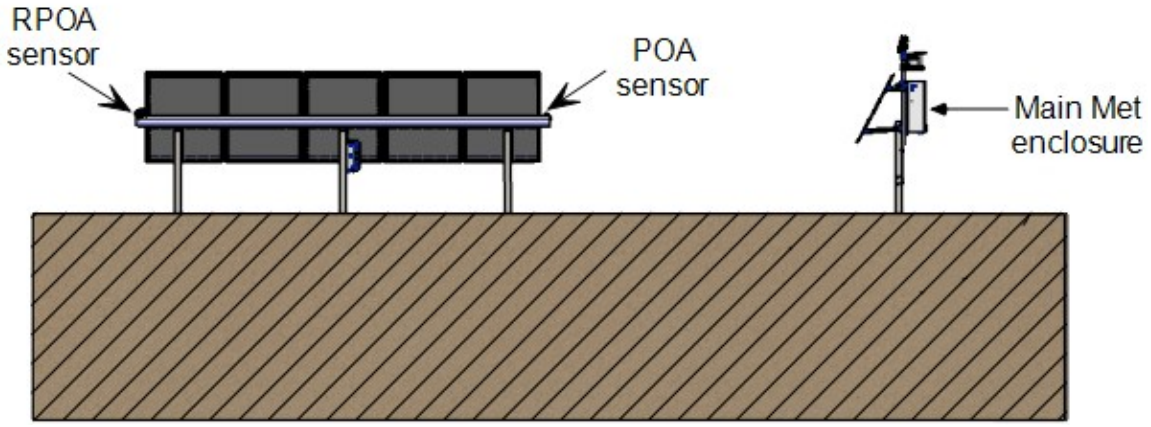
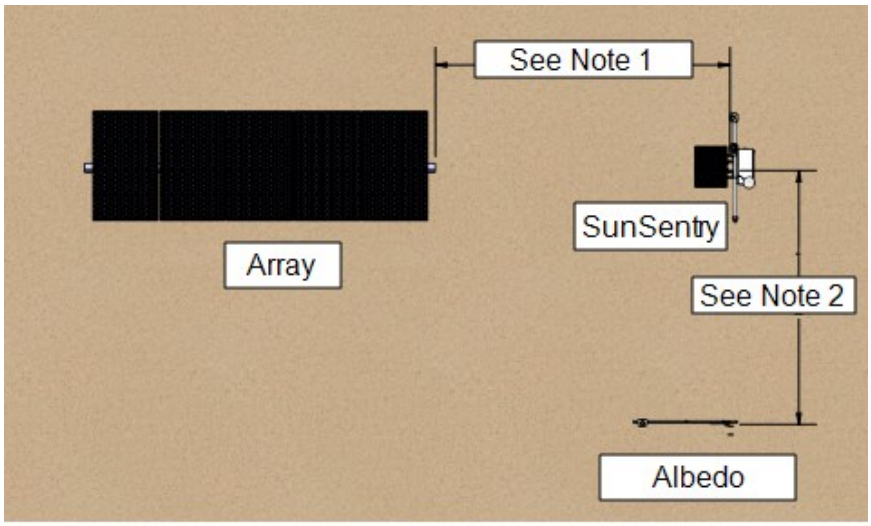


Figure 2-3. Main Met placement



1. The distance must be enough so that the array does not shade any part of the tower.
2. The distance must be enough so that the tower does not shade any part of the albedo setup or ground.

Figure 2-4. Layout of the three main parts of the SunSentry 20

3. Installation procedures

This section provides installation procedures for the instrumentation mounts, enclosures, solar panels, and sensors.

3.1 Driven piles

The SunSentry 20 uses available driven piles to mount the enclosures and sensors. Compatible pile sizes were selected to match those commonly used in solar power plant construction. The main sensor suite mounts to a driven pile using the CM400 Tower with Crossarm. A separate driven pile is used to mount the optional albedo sensor using the CM410 mount. Refer to Albedo (p. 22) for suggested height of the albedo pile. Campbell Scientific recommends the use of W6x12 piles. The following images show the layout of these driven piles.

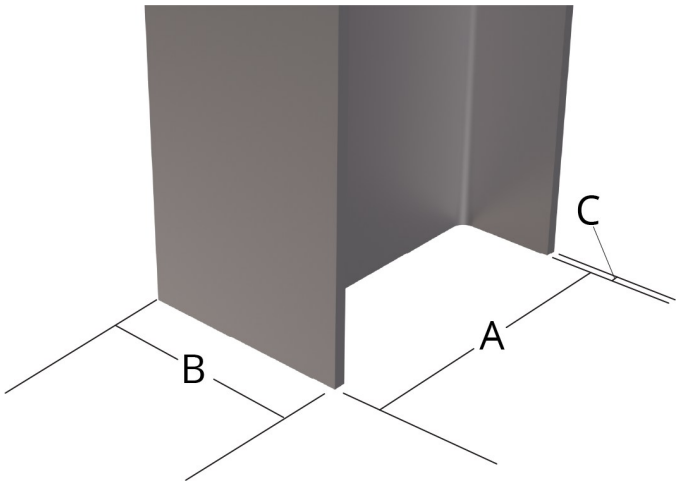


Figure 3-1. H-pile orientation

The CM400 tower mounts to all W6 H-piles or other H-piles with the following dimensions:

Section Depth A: 14 to 24 cm (5.5 to 9.5 in)

Flange Width B: 7.6 to 17.8 cm (3 to 7 in)

Flange Thickness C: < 1.8 cm (0.7 in)

For optimal installation that does not require drilling the pile, drive the pile as shown in orientation A (in Figure 3-2 [p. 5]).

Orientation B (in Figure 3-2 [p. 5]) also allows installation of the CM400 mounting structure. However, mounting in orientation B requires drilling holes and using ½-13 X 2 inch bolts, which must be supplied separately. The pile must have a flange width adequate to accommodate the drilled holes.

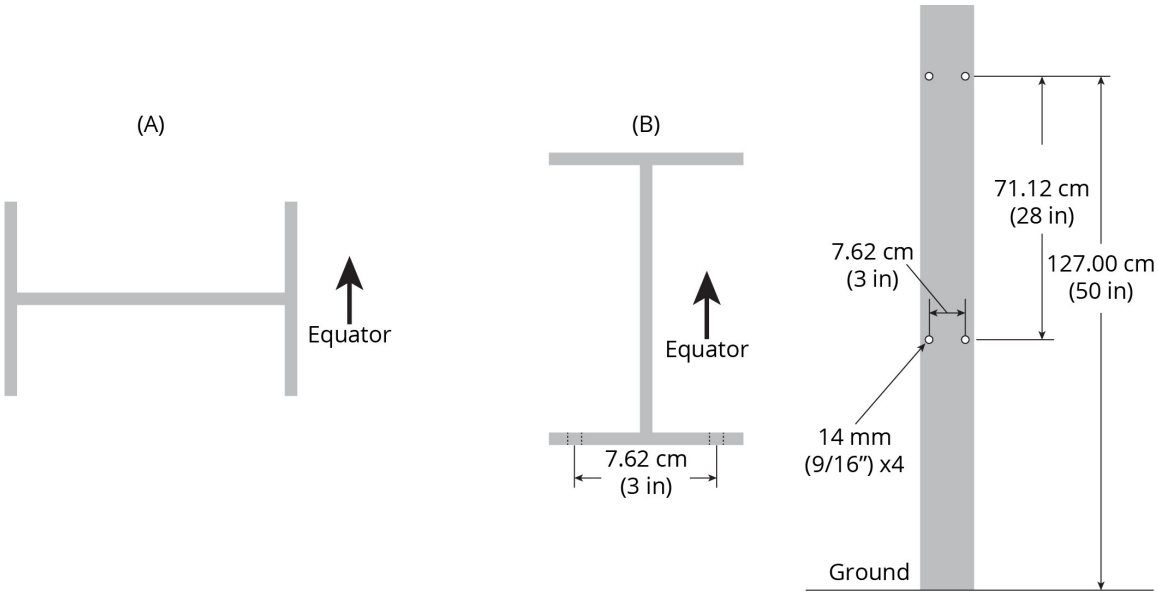


Figure 3-2. Pile dimensions

When using the default mounts provided by Campbell Scientific, the global horizontal irradiance (GHI) pyranometer and all-in-one weather sensors are positioned approximately 15 cm above the crossarm. As a general guideline, to achieve the sensor mounting heights recommended in Table 3-1 (p. 6), the pile exposure should be as follows:

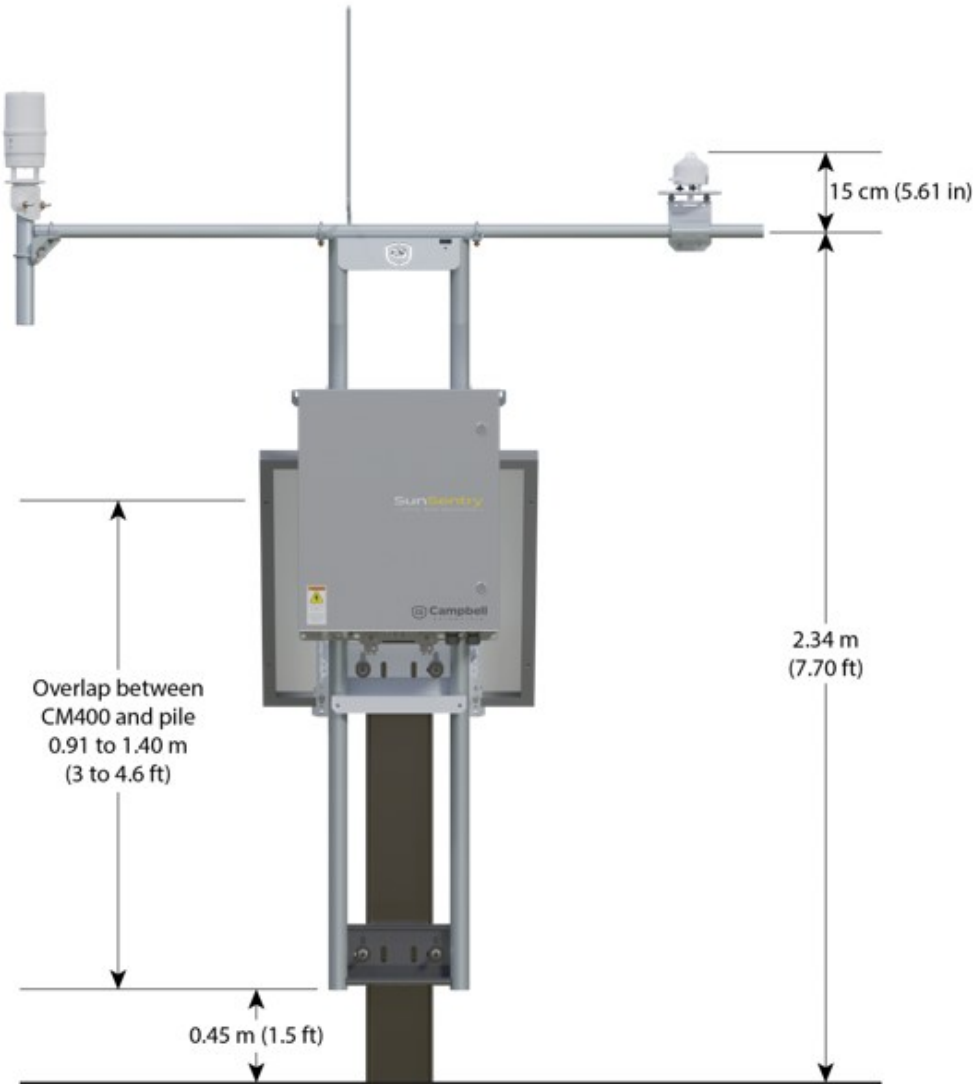
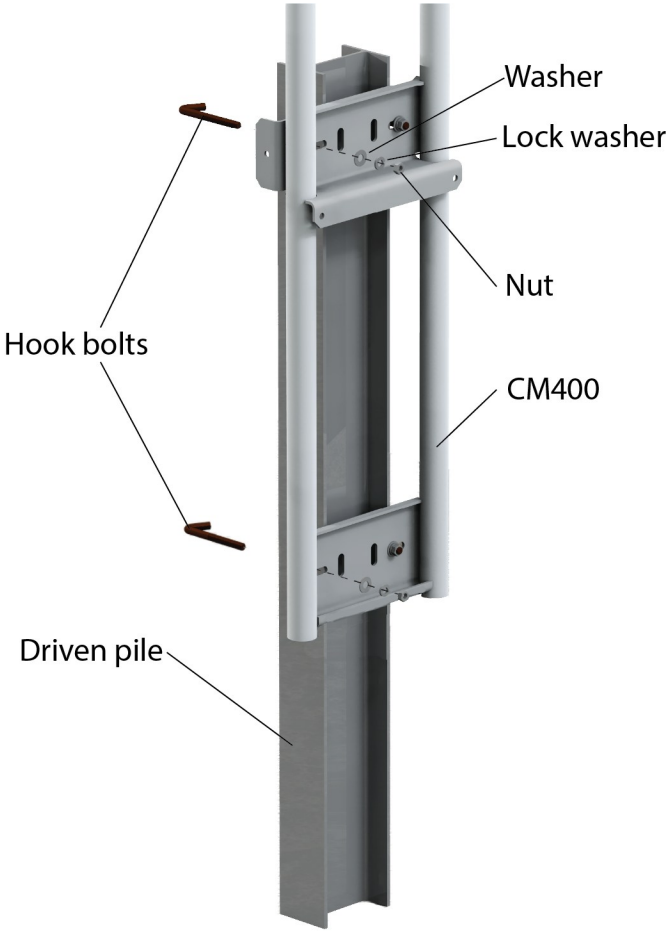


Table 3-1: Required pile exposure	
Sensor mounting height	Pile exposure
2.5 m (8.2 ft)	1.37 to 1.86 m (4.5 to 6.1 ft)

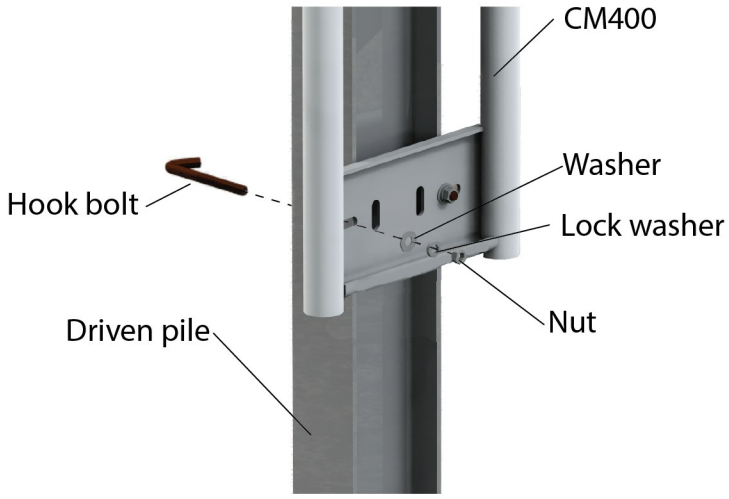
3.2 CM400 mounting structure

1. At the bottom of the CM400, use the hook bolts, washers, and nuts to mount the CM400 on the polar (north in Northern Hemisphere, south in Southern Hemisphere). The mounting height is determined by the formula:

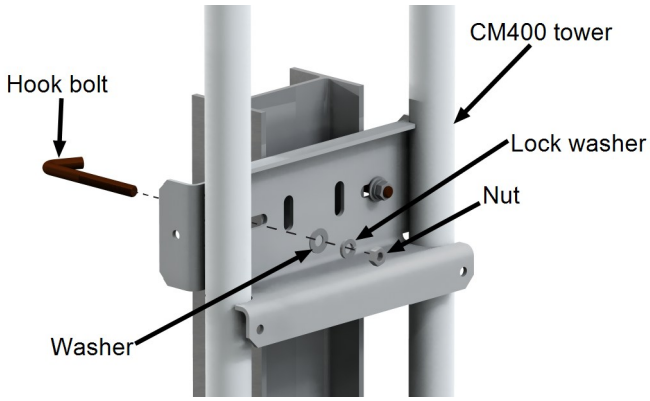
   Bottom of the CM400 = Desired sensor height – 2.15 m.



2. Loosely secure the CM400 using all the hook bolts, washers, lock washers, and nuts. Ensure the CM400 cross members for attachment to the driven pile are flush with the driven pile.

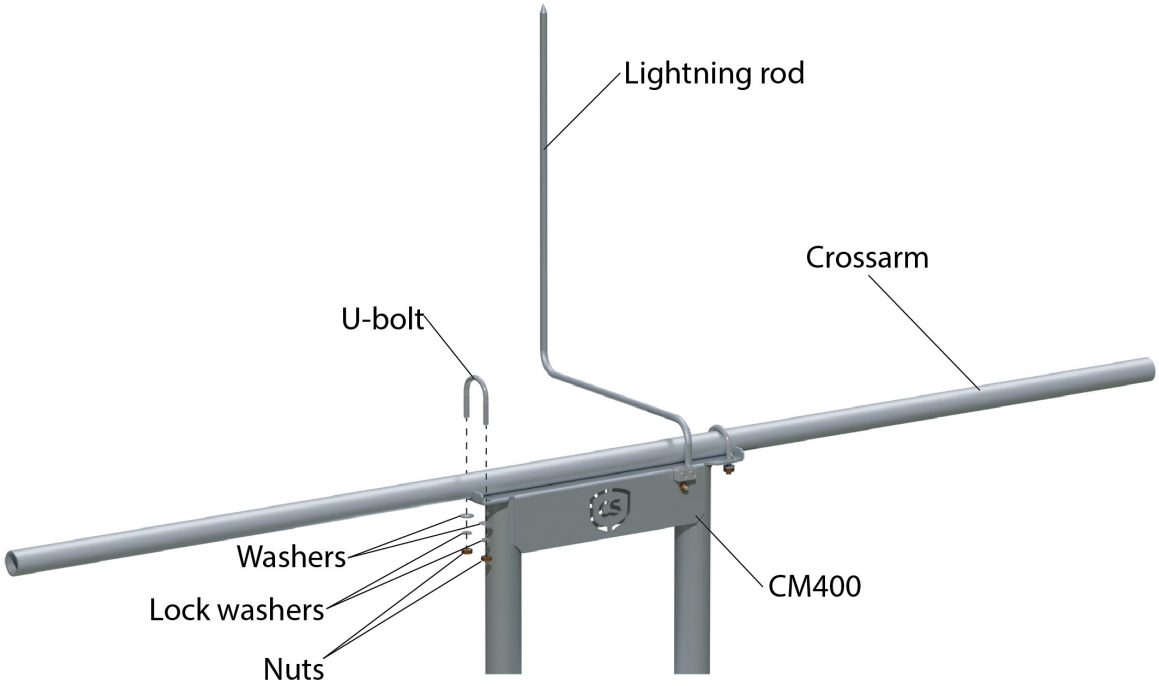


3. Use a spirit level to ensure the CM400 tower is installed vertically. Tighten all the nuts on the hook bolt to a torque of 47 to 54 N·m (~35-40 ft-lbf).



3.3 Crossarm

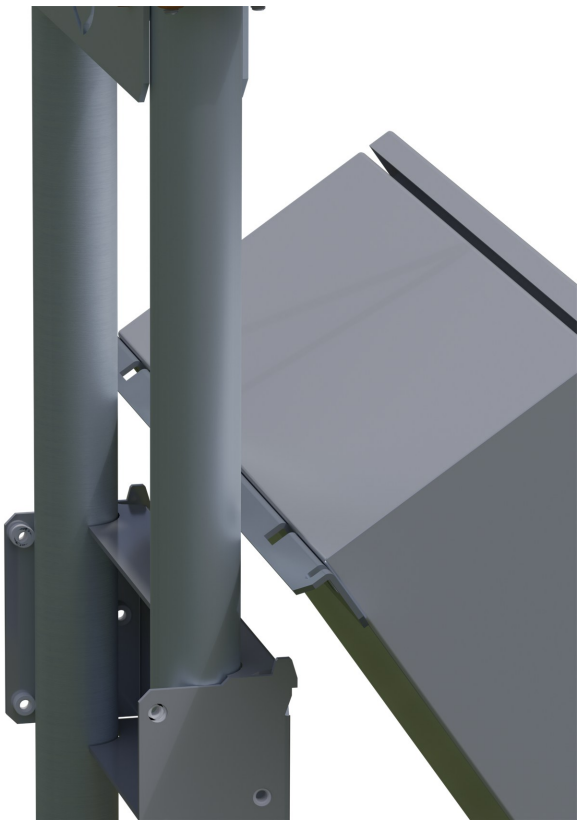
Install the crossarm (included with the CM400) using the supplied U-bolts, washers, and nuts. The crossarm should be centered on the top of the CM400 and extend equal distances in the east/west direction.



3.4 Main met enclosure

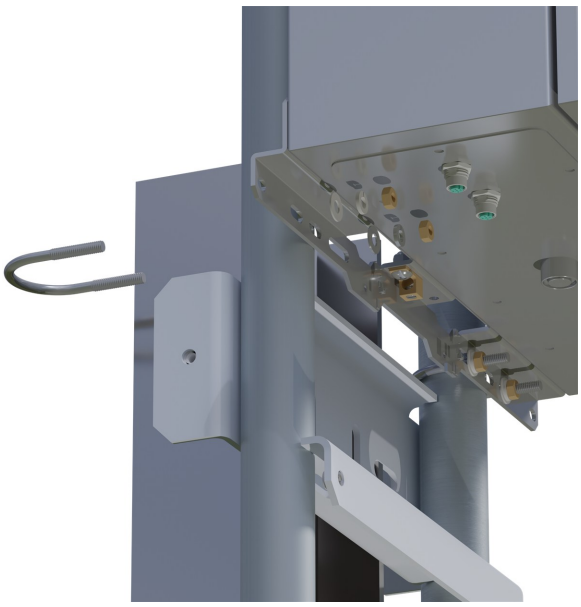
1. Lift the enclosure so it rests and hangs with the enclosure mounting hooks securely hooked through the slots in the enclosure mounting bracket.

   > NOTE:
   > This step is more easily done with two people.



2. Check the enclosure mounting hooks are securely embedded through their slots at both locations.

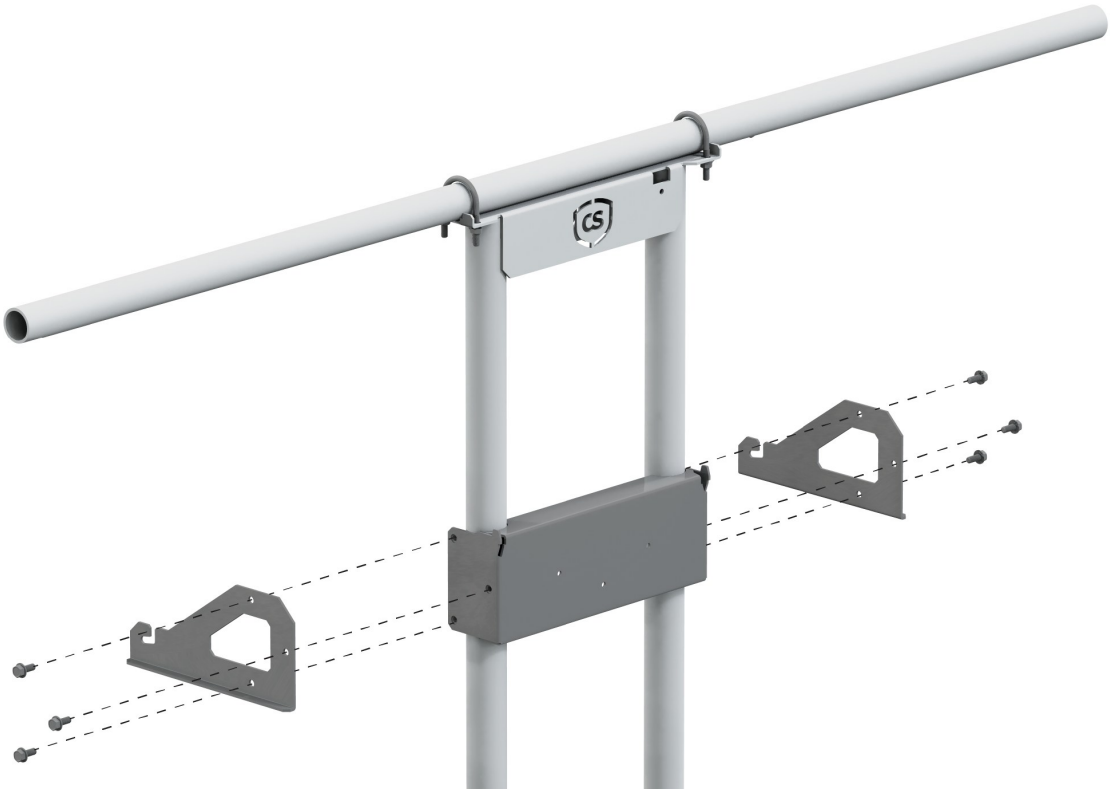
3. Secure the bottom of the enclosure mount to the CM400 by tightening the bolts to 12 to 14 N·m (~9 to 11 lbf·ft).



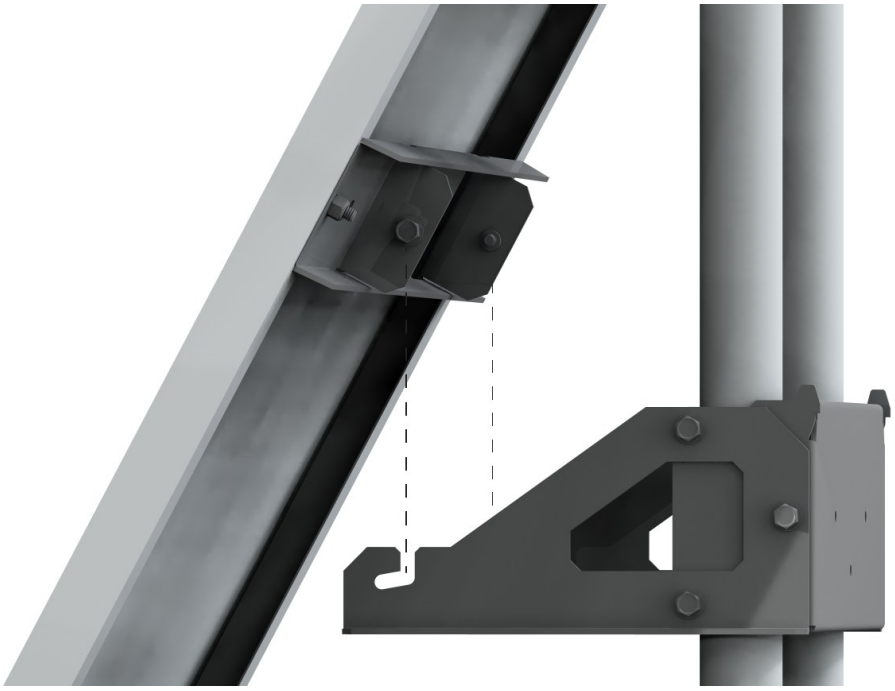
3.5 Solar panel (optional)

1. Attach the support arms to a solar panel bracket. The support arms can be assembled in several different lengths and at different mounting angles. See Solar panel angle (p. 16) for details.

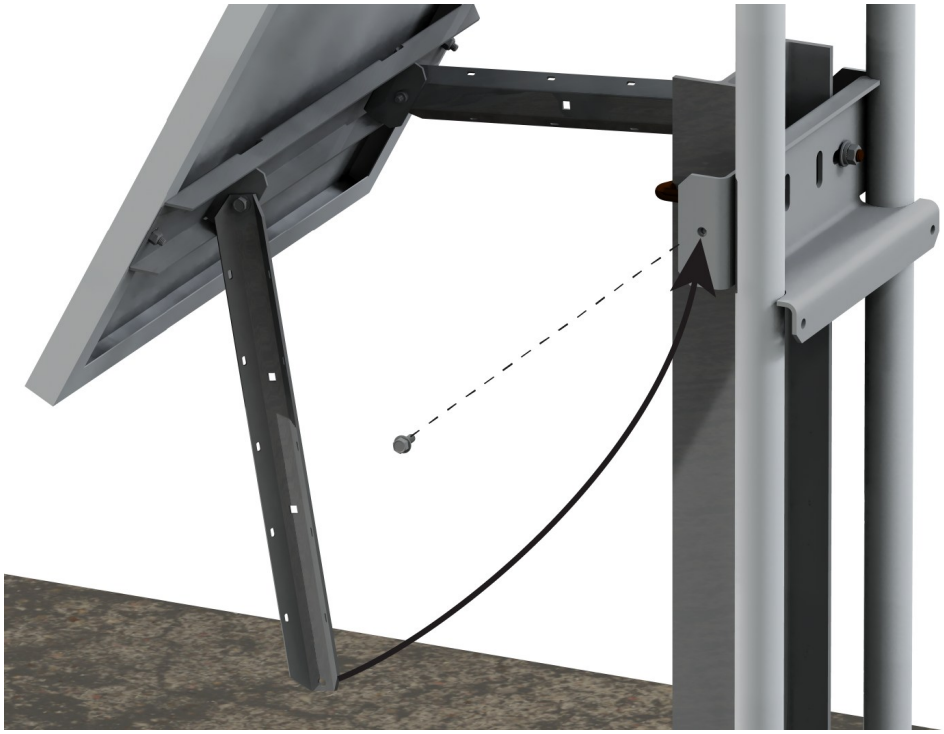
2. On the top bracket, screw in two screws into the threaded holes. Only engage several threads and leave enough of the screw shank exposed to hang the solar panel.
3. Use the serrated flange hex head screws to mount the hangers onto the CM400.



4. Hang the solar panel by the bolts on the solar panel bracket.



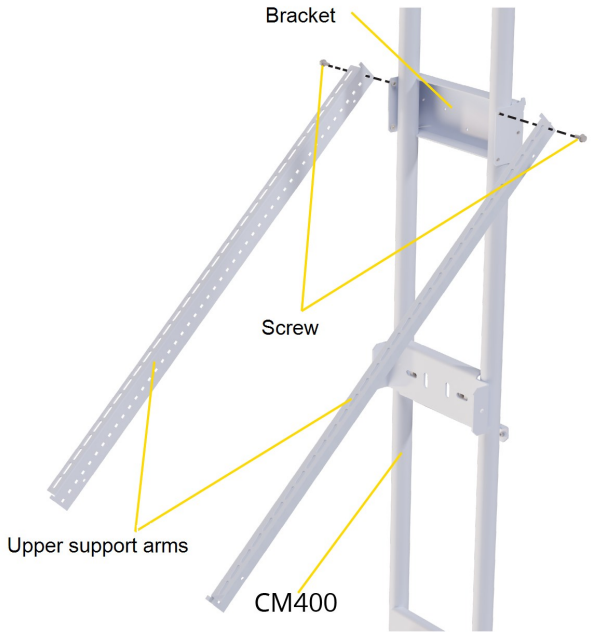
5. Secure the support arms to the CM400 bracket.



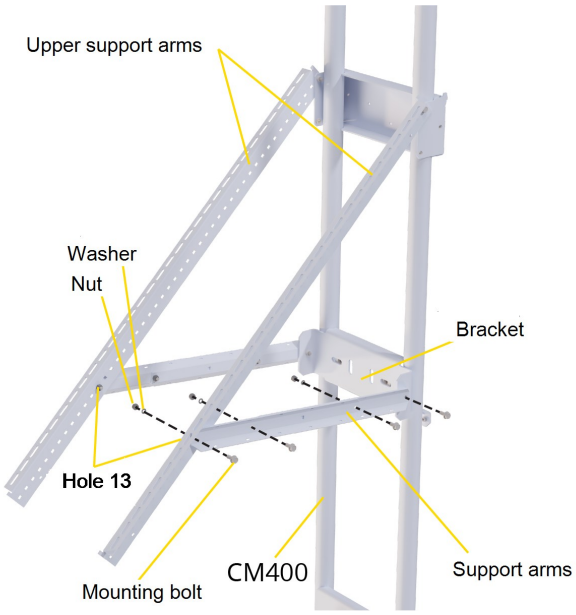
6. When the solar panel is securely held in place, tighten all screws to 14 to 17 N m (~11 to 12.5 lbf ft).

3.6 Generic solar panel installation

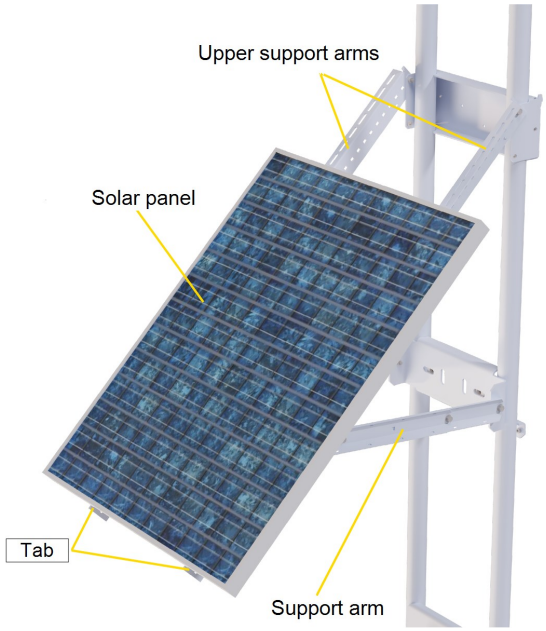
1. Use 2 screws to attach the upper support arms to the bracket shown on the CM400. Do not fully tighten the bolts.



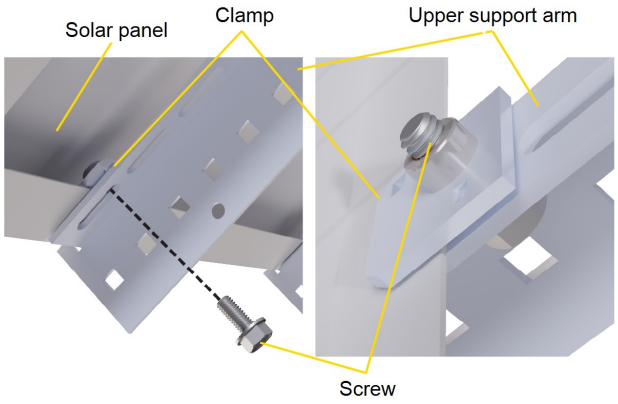
2. Refer to table Table 3-2 (p. 16) to determine the correct tilt angle for the solar panel. Assemble each pair of support arms according to the images accompanying Table 3-2 (p. 16), using the angle specified. Secure the arms with bolts, nuts, and washers, and fully tighten the bolts. Attach each assembled support arm to the CM400 using the screw in the bracket as shown.



3. After determining the correct orientation for the solar panel, rest it on the tabs at the bottom of the upper support arms.



4. At each point where the solar panel contacts the upper support arms, insert a clamp inside the solar panel frame. Align the clamp threads with an opening in the upper support arm and secure it with a screw. Repeat this process for the remaining three clamps, ensuring all four screws are fully tightened.



5. Fully tighten the 2 screws used in step 1 to attach the upper support arms to the bracket on the CM400.

3.6.1 Solar panel angle

The support arms can be assembled in several different lengths. The available mounting angles are 30°, 45°, and 60°. Table 3-2 (p. 16) provides recommended solar-panel angles for a range of latitudes.

Table 3-2: Solar panel tilt angle [1]

Site latitude (N or S)	Tilt angle
0° – 27°	30°
28° – 42°	45°
>43°	60°

[1] From *Design Aids for Small PV Power Systems*, Solorex Corp.

Figure 3-3. Solar panel at 60° angle

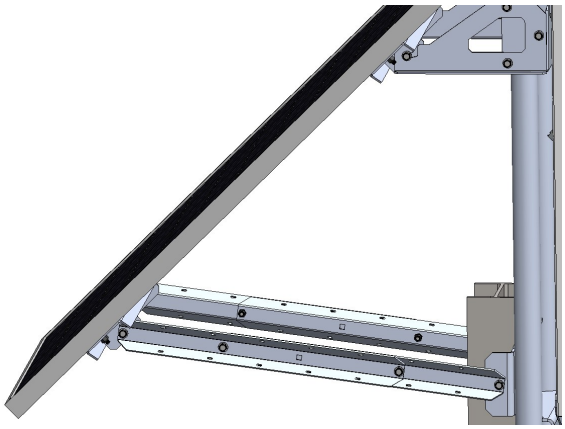


Figure 3-4. Solar panel at 45° angle

Figure 3-5. Solar panel at 30° angle

3.7 Sensors on main CM400 tower

Often an all-in-one weather sensor (ClimaVue 40), irradiance (SunVue 30, SRD100), rain gauge, hail sensor, and snow depth sensor are mounted to the main CM400 tower with the crossarm.

NOTE:
The sensor suite selected for each SunSentry 20 system is flexible to suit the needs of each project. A full list of sensors currently supported by the SunSentry 20 can be found at www.campbellsci.com/sunsentry. The following sections highlight recommended sensors for a SunSentry 20 deployment, along with high-level details that are important to consider. Refer to the sensor manuals for more information about the sensors.

NOTE:
The sensors should have been configured for this SunSentry 20 system prior to installation. The Modbus address and communications protocol settings must match the configuration settings in the user interface. Refer to the SunSentry 20 Operations and Maintenance manual available at www.campbellsci.com/sunsentry for more information.

3.7.1 All-in-one weather sensor

1. Attach the cable to the connector. Only hand tighten the connectors.

   CAUTION:
   Hand tighten only! Using tools to tighten the connectors can permanently weld the stainless steel connectors together.

2. Mount the sensor to the mounting tube using the CM221 bracket along with either the 3659 pipe or the 17387 mounting kit. Use the V-bolt, washers, and nuts (Figure 3-6 [p. 19]) to tighten the V-bolt nuts until hand-tight.

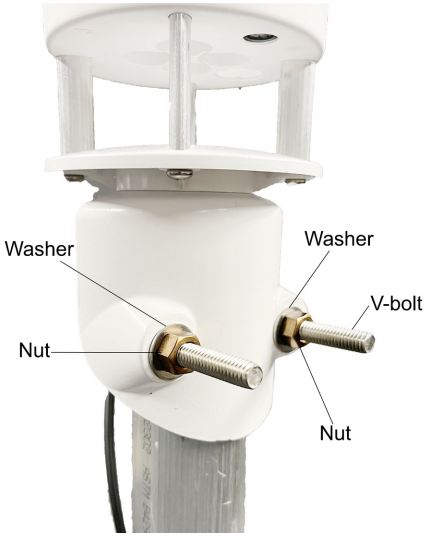


Figure 3-6. ClimaVue 40 mounted to a pole with V-bolt and nuts

> **CAUTION:**
> Do not over-tighten V-bolt as it will cause the plastic to break.

3. Attach the mounting tube to the crossarm.

Figure 3-7. Mounting tube installation

4. Orient the ClimaVue 40 so the **N** points to magnetic north (Figure 3-8 [p. 20]). Refer to www.ngdc.noaa.gov/geomag/declination.shtml.

Figure 3-8. N on the ClimaVue 40

> **NOTE:**
> Sensors are leveled after all the equipment is installed because the installation process can alter leveling. See Level sensors (p. 21) for more information.

3.7.2 Irradiance sensor

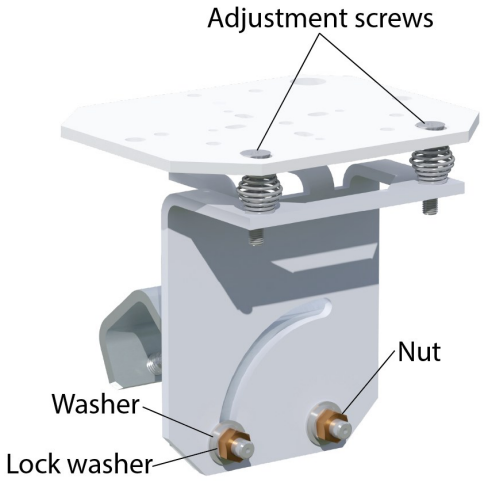
1. Connect the cable to the irradiance sensor.
2. Mount the CM256 mounting bracket to the crossarm.
3. Secure the irradiance sensor to a CM256 mounting bracket.

> **NOTE:**
> Sensors are leveled after all the equipment is installed because the installation process can alter leveling. See Level sensors (p. 21) for more information.

3.7.3 Level sensors

The sensors are leveled after mounting all the equipment because equipment installation can affect leveling.

1. Use the sensor bubble level to level each irradiance sensor using the adjustment screws of the CM256 mount.



2. Verify CM256 mounting hardware is firmly tightened and the mounting bracket is at the desired angle.
3. For the ClimaVue 40, use a torpedo level or the bubble level underneath the sensor to level it (Figure 3-9 [p. 22]). The angle of the instrument mount may need to be adjusted if the mast is not vertical. Shims can be added between the top of the mast and the bottom of the ClimaVue 40 to achieve level. The sensor must be within ±2° of dead level (0, 0) in both the X and Y directions to accurately measure rainfall and solar radiation. The ±2° can be confirmed by viewing the tilt values on the ***Web UI*** **Modbus Map** screen (**Register 42043 – Weather1_ClimaVue40_XOrientation** and **Register 42045 - Weather1_ClimaVue40_ YOrientation**).

Figure 3-9. Bubble level on the ClimaVue 40

4. Once level, tighten the V-bolt nuts by hand until hand-tight, then gently tighten with a wrench and recheck the level.

> **CAUTION:**
> Do not over-tighten V-bolt as it will cause the plastic to break.

3.8 Albedo

Albedo measurements are a supported feature of the SunSentry 20 system (sensors and accessories sold separately). This measurement is made using two pyranometers, typically a pair of class A or class C sensors. One pyranometer faces upward and the other faces downward. The CM275 Albedometer Mounting Stand (an accessory for the CM410 mount) co-locates both sensors on a single bracket that is mounted to the CM410 arm or another horizontal crossarm, such as the CM206.

Mount the albedo sensor away from obstructions that could block or otherwise interfere with incoming sunlight. Similar to the CM400 (SunSentry 20 met station mount), the CM410 (Pile Mount Arm for Albedo) is designed to mount a remote albedometer to a separate driven pile (e.g., W6x12). Refer to Driven piles (p. 3) for information about orientation and recommended site placement.

The following table and figures show the suggested pile and mounting plate heights. The top of the pile should be at least 1.09 m (43 in) and less than 1.58 m (62.5 in) above flat ground. Figure 3-11 (p. 24) shows the ideal mid-range of 1.34 to 1.42 m (53 to 56 in).

Table 3-3: Albedo mounting height

Albedo height m (ft)	Pile height m (ft)	Plate height m (ft)
1.50 (4.92)	1.09 (3.58)	0.67 (2.21)
1.75 (5.74)	1.42 (4.67)	0.92 (3.03)
2.0 (6.56)	1.58 (5.21)	1.17 (3.85)

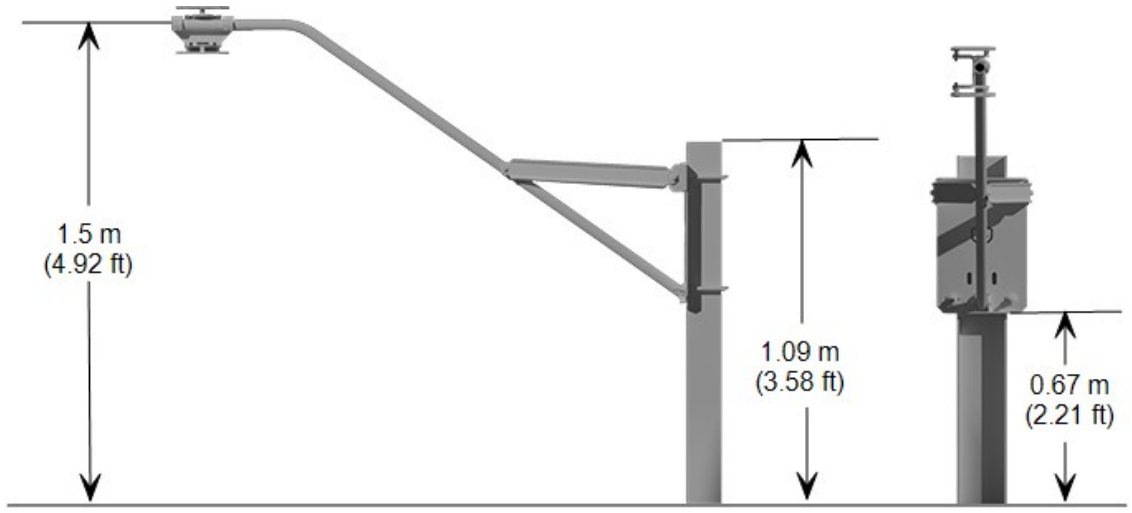


Figure 3-10. 1.5 meter albedo height

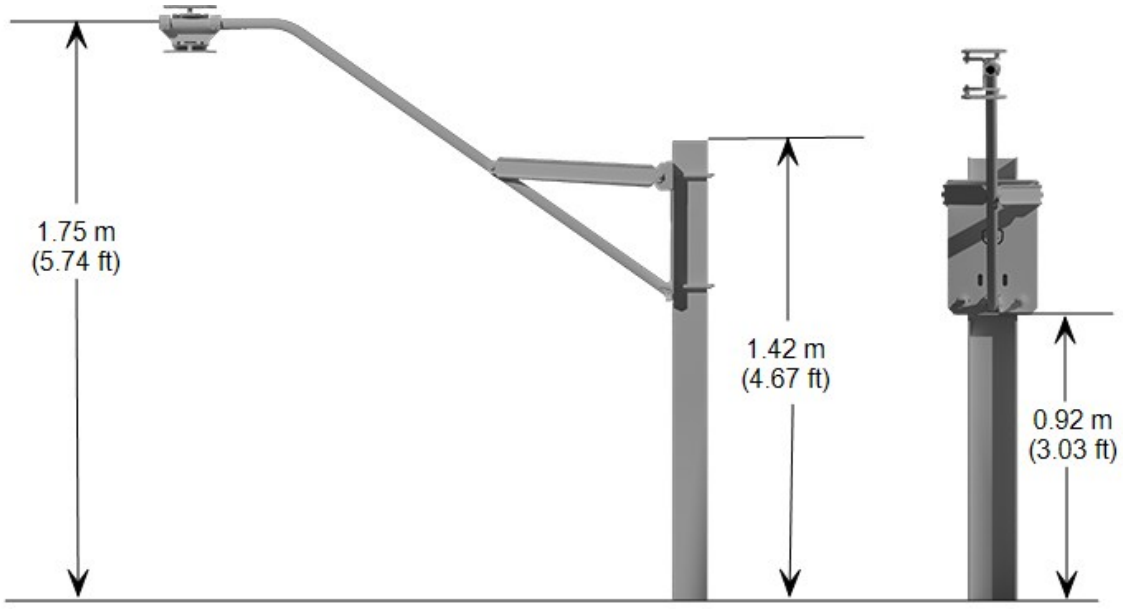


Figure 3-11. 1.75 meter albedo height

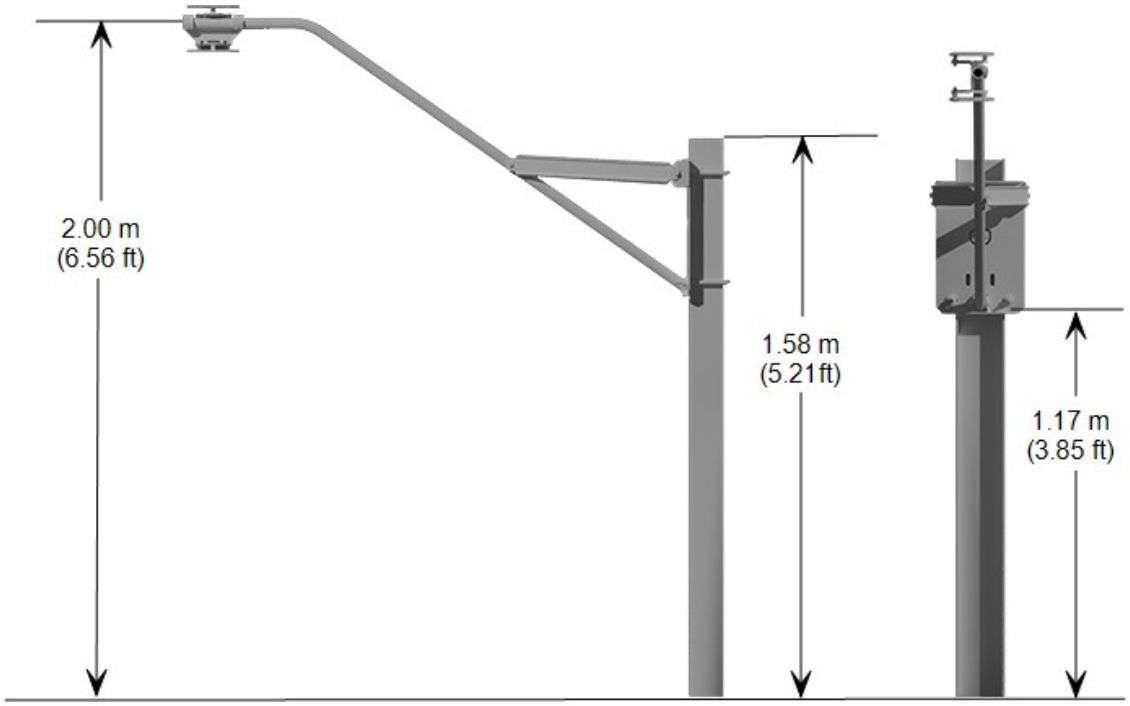
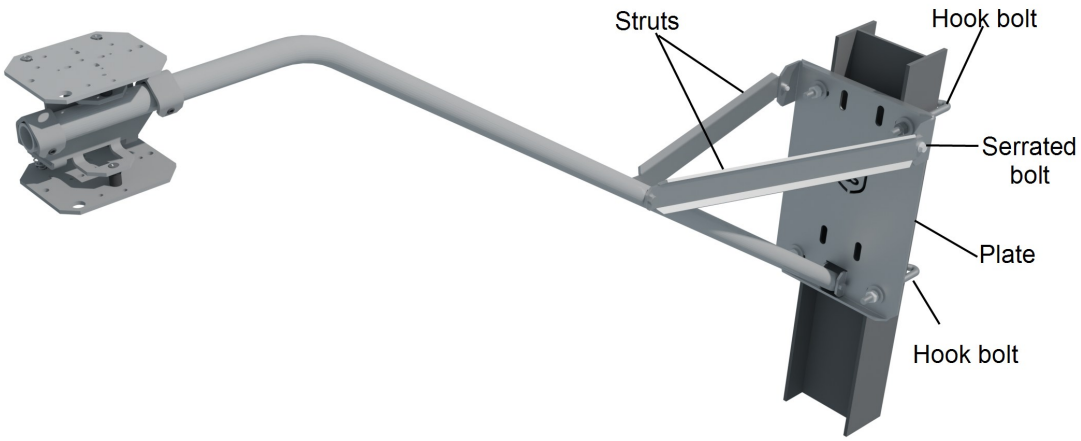


Figure 3-12. 2 meter albedo height

Mounting procedure:

1. Mount plate to pile using hook bolts. Ensure vertical edges of plate are plumb. Bottom of plate should be 28 to 44 inches above the ground for the installed albedo height to be within the industry recommended height of 1.5 to 2 meters (59 to 78.7 inches) above the ground. Tighten nuts to 15 to 20 ft-lb initially.

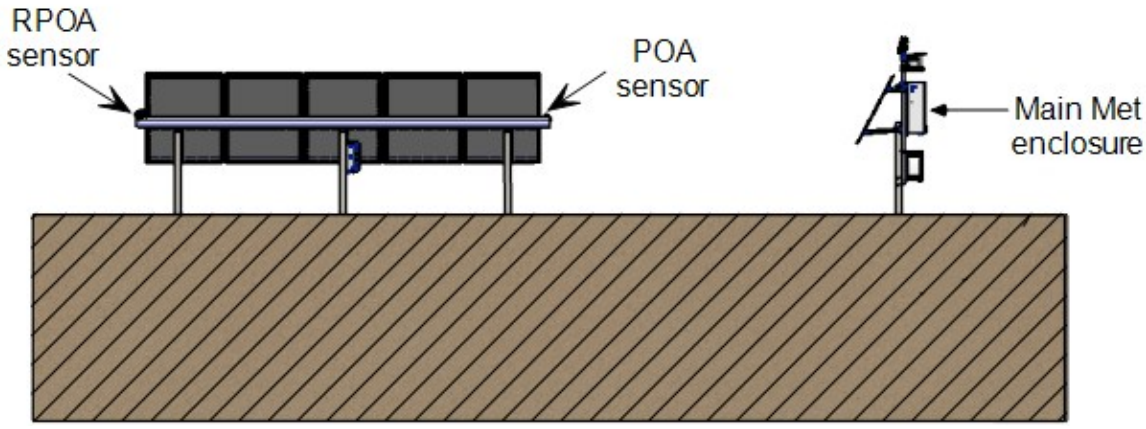


2. Loosely install struts using serrated bolts. The bolts should be threaded only partway to allow strut rotation.
3. Attach the arm to the plate flanges using a long bolt and nuts. Loosely tighten the nuts, ensuring the arm can rotate freely.
4. Connect the arm to the struts using a second long bolt and nuts. Loosely tighten the nuts to allow arm adjustment. The distal end of the albedo pipe should be approximately horizontal.
5. Tighten all bolts and nuts, ensuring proper alignment is maintained.
6. Mount the sensors on the CM275 bracket. Refer to the sensor manuals for more information.

7. Slide the albedo sensor onto the end of the arm and secure it to the arm using the provided mounting hardware.

8. Route the cables down the arm to the enclosure.
9. Connect sensors to the tower sensor daisy chain using an RS485CBL of the appropriate length.
10. Secure the cables to the arm using cable ties.

3.9 Solar array sensors



3.9.1 DustVue 10 soiling assembly

This section is for the newer DustVue 10. If your SunSentry 20 includes the older DustVue, refer to DustVue soiling assembly (p. 36). The DustVue 10 should be installed in an appropriate plane of

array (POA) or horizontal position. Care should be taken so it does not impact other measurements. The clean cell assembly should be oriented upwards if the sensor is mounted in a fixed tilt position.

If the site has single axis trackers, the DustVue 10 should be installed on the array torque tube close to the SunSentry 20. Campbell Scientific recommends the sensor be sited within the array to measure a soiling loss representing the average losses over that region of the PV plant.

The clean cell assembly will align itself with the torque tube using the mounting hardware. The sensor can be daisy chained with other pyranometers and back-of-module temperature sensors using our surge protection coupler and should be the first sensor in the chain. This configuration minimizes the voltage drop caused by longer cable lengths. The maximum recommended cable length is 50 m (150 feet) with 24 VDC input supply. The cable length in a daisy chain can easily surpass this limit.

Mounting to tracker torque tubes:

1. The following is the mounting bracket used to attach the DustVue 10 to a tracker torque tubes.

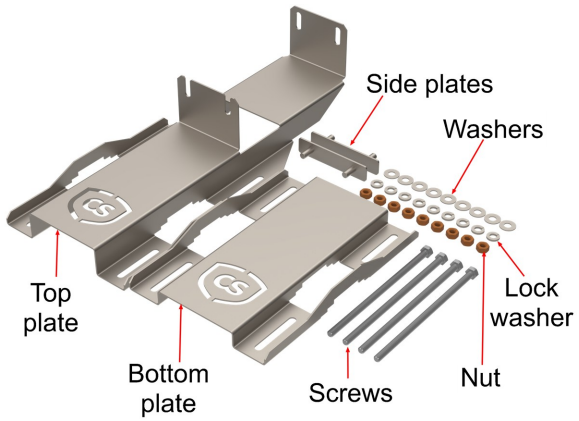


Figure 3-13. Tracker torque tube mounting bracket

2. Secure the bracket to the tracker torque tube by using the four screws, four nuts, eight washers, and eight lock washers (see Figure 3-13 [p. 27] and Figure 3-14 [p. 28]).

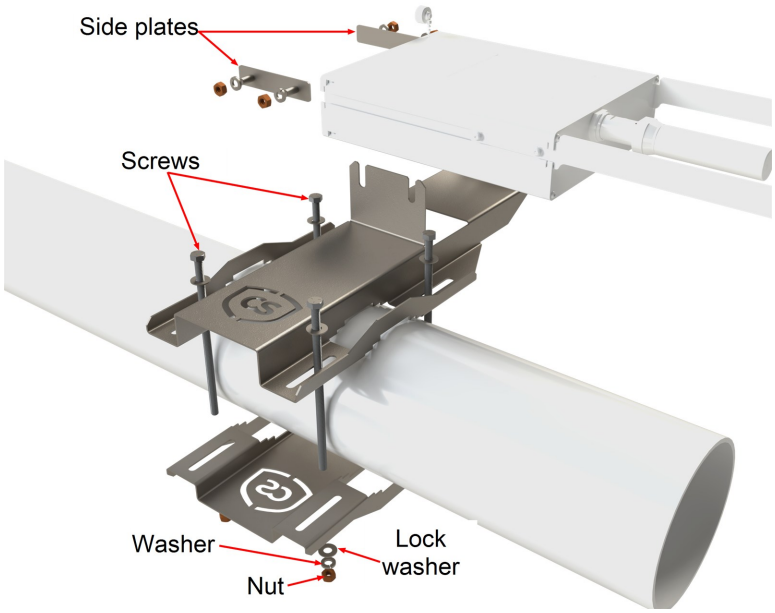


Figure 3-14. Exploded view of mounting bracket

3. Slide the side plates on the bracket (see Figure 3-14 [p. 28]).
4. Fasten the DustVue 10 to the bracket using the nuts and washers.

> **NOTE:**
> The sensor should be mounted so the cells on the bottom have a clear view of the ground below.

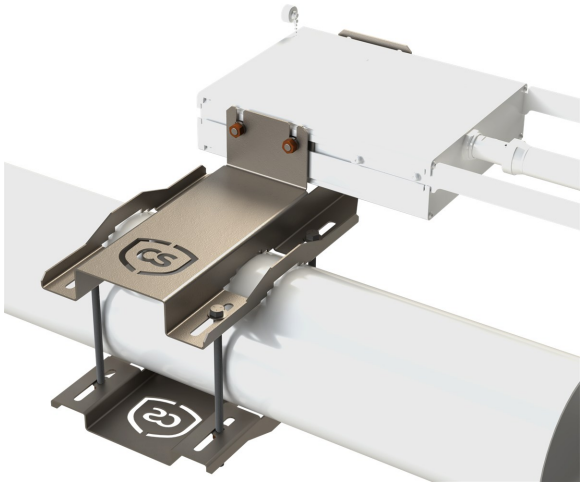


Figure 3-15. DustVue 10 mounted to crossarm

The DustVue 10 can also be mounted to a unistrut.

> **NOTE:**
> The sensor should be mounted so the cells on the bottom have a clear view of the ground below.

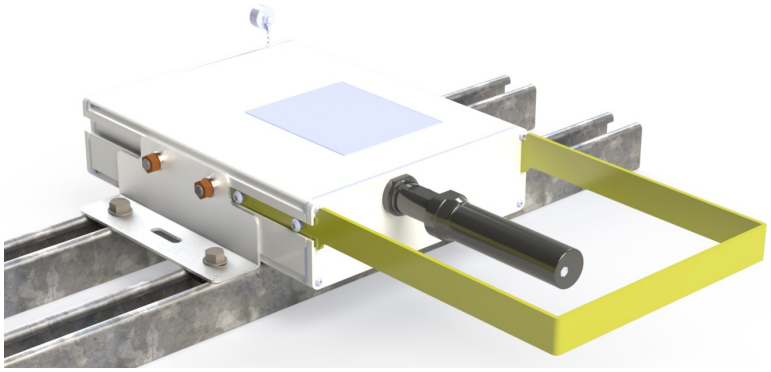
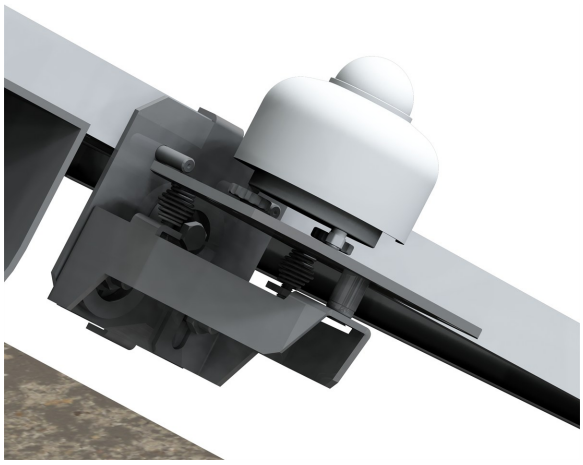


Figure 3-16. DustVue 10 mounted on a unistrut

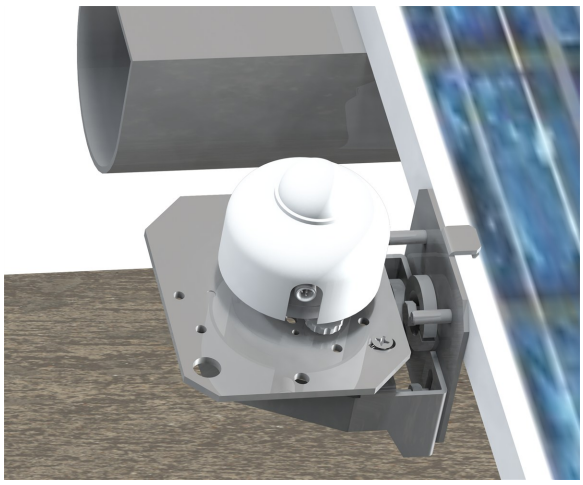
3.9.2 Plane of array (POA) and rear plane of array (RPOA) mounting

Irradiance sensors are used for the optional plane of array (POA) and rear plane of array (RPOA) measurements. Several irradiance sensors and mounts are available. As an example, this section shows the irradiance sensors being mounted directly to the solar panel using the CM268 mounting bracket. Campbell Scientific also offers the CM261 Single-Axis Tracker Mounting Stand and CM266 Unistrut Mount.

1. Mount sensor on CM268 plate.



2. Place CM268 solar panel lip.



3. Tighten nuts to secure the bracket to the solar panel.
4. Use the sensor bubble level to level each pyranometer using the adjustment screws of the CM268 mount.

4. Field connections

NOTE:
Use the ***Web UI*** to configure the system before making field connections. To access the ***Web UI***, the data logger must be connected to a USB port on the computer. The ***Web UI*** is available at www.linktodevice.com, and can also be accessed using the default RNDIS IP

address of 192.168.66.1, provided it has not been reconfigured to use a different IP address. After configuration, the ***Web UI*** will provide wiring information for connecting the sensors in your SunSentry 20 station.

Campbell Scientific recommends keeping the cable lengths as short as possible, preferably shorter than 10 m (32 ft). Cable lengths longer than 10 m (32 ft) should use surge protection devices (SPD) to prevent surges from harming the equipment. Refer to Surge protection (p. 33) for more information.

4.1 Power inputs

NOTE:
SunSentry 20 systems without the UPS option require AC power source when commissioning the system. When an AC source is not available at the site, an alternate power source must be provided such as an AC generator or battery pack. A 12 VDC battery can be used temporarily to power the main met station for commissioning. Some sensor functions, such as heaters, will not be activated when using 12 VDC power.

The AC power inputs connect to the **L/N/G** terminals. Connect battery ring lugs to battery terminals. See Battery only UPS (p. 33).

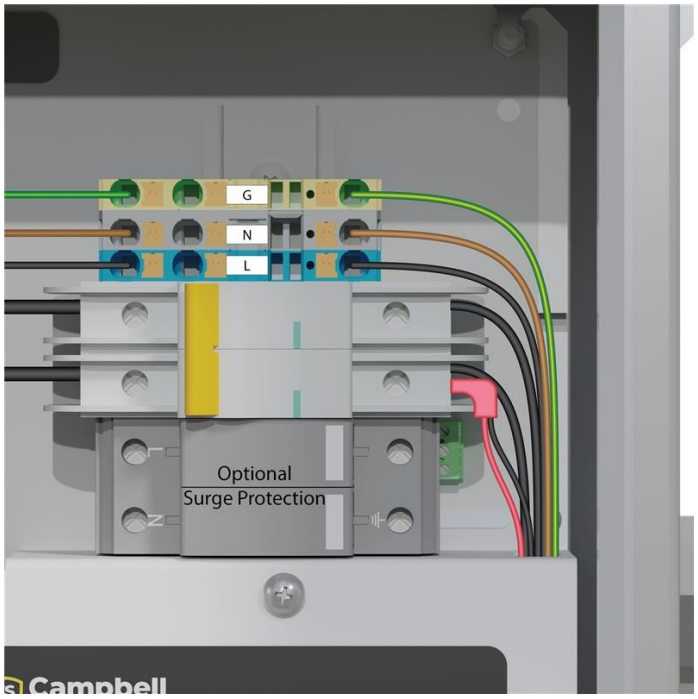


Figure 4-1. Main power connection

4.2 RS-485 connections

The RS-485 sensor cables connect to the bottom of the Main Met box at one of the two Com connectors (ComC5 or ComC7). The ISP11 connects to the Main Met box to provide additional surge protection.

Figure 4-2. ISP11 connections

4.3 Surge protection

The ISP10 surge protection device (SPD) connects to the sensor from the trunk line to protect the Modbus sensors. See SunSentry G2 Surge Protection for more information.

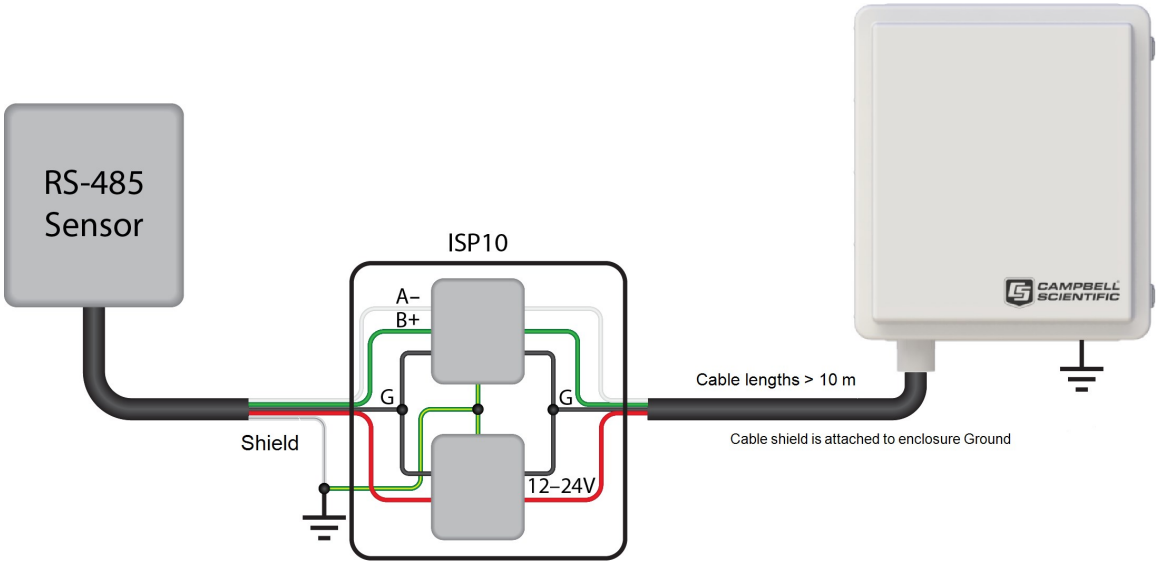


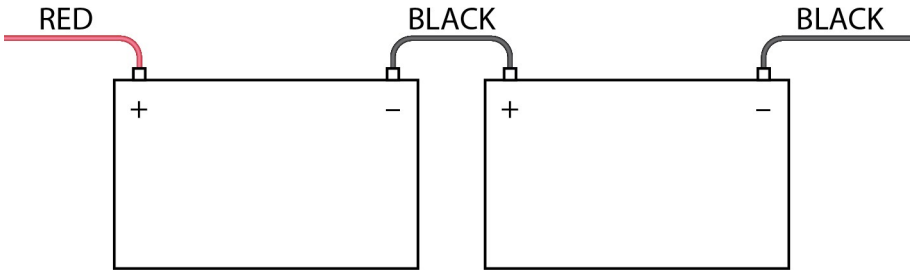
Figure 4-3. Recommended ISP10 surge protection for Modbus sensors connected to the trunk line

5. Accessories

The sections describes optional accessories for the SunSentry 20.

5.1 Battery only UPS

Connect the battery terminals to the batteries as shown in the following image. The batteries are connected in series to produce 24 VDC. The opening for batteries is a maximum of 8.75 inches tall, 18 inches wide, and 6.25 inches deep.



5.2 Battery and solar panel UPS

Attach the battery as shown above.

Attach the solar panel wires to the PV terminals paying attention to the polarity. The LOAD terminals are left disconnected.

5.3 Door switch

The door switch is an accessory that provides door open/closed feedback in the UI and in Modbus registers. The CS211 also provides cabinet temperature and humidity measurements. This is a factory-installed accessory.

5.4 AC SPD

The AC SPD is an accessory that provides additional surge protection to the AC input lines of the Main Met enclosure. This is a factory-installed accessory.

Appendix A. DustVue soiling assembly

This appendix is for customers who are using an older DustVue soiling assembly instead of the DustVue 10. The DustVue consists of a DustVue enclosure and two CS241DM back-of-panel temperature sensors. A clean and a dirty solar panel are required. The DustVue will work with any photovoltaic (PV) panel up to 700 W. Smaller wattage panels can be used.

1. Mount solar panels used for the soiling measurement in the same plane as production solar panels.
2. Secure the CS241DM sensors to the back of the solar panels.

3. Mount the DustVue enclosure.
4. Connect the solar panel and CS241DM cables to the proper connector on the DustVue (clean/soiled), and the power/communications cable to the junction box or SunSentry 20 main met enclosure as appropriate.

Your SunSentry System Warranty

We're committed to the quality and reliability of your SunSentry system. Here's what's covered:

What's Protected: Your SunSentry enclosure and all Campbell Scientific-built components within it are warrantied against defects in materials and workmanship for 5 years from the date of shipment (unless otherwise specified on your invoice). Third-party components and any sensors purchased with your SunSentry carry the original manufacturer warranties.

Our Promise to You: If you experience any issues during the warranty period, at our discretion we'll repair, replace, or refund defective equipment that meets these conditions:

1. The issue stems from a defect in materials or workmanship that affects how the device works
2. The equipment hasn't been misused or damaged through improper handling
3. The defect occurred within your warranty period
4. Our qualified technicians at a Campbell Scientific Service Center confirm the defect

Setting Clear Expectations: We want to be transparent about where this warranty doesn't apply — not to limit your protection, but to set shared expectations. The warranty does not cover:

- Consumables that naturally wear out (e.g., batteries, desiccants, filters, chemicals)
- Buyout components. These are supported under their original manufacturer warranty
- Field services or the results of service work
- Damage caused by misuse, neglect, improper installation, unauthorized modifications, or extreme environmental conditions
- Bugs or compatibility issues with software used outside of a Campbell-supported environment
- Lost or damaged software media
- Rental, training, or promotional units
- Items provided at no cost or sold as spare parts
- Custom stations that differ materially from our SunSentry standardized station

Getting Help is Easy: If you need warranty service, simply contact your regional Campbell Scientific office. Visit www.campbellsci.com/contact to find the office serving your area. We'll guide you through the return process and, in most cases, ship your repaired equipment back to you at no charge via standard ground shipping.

Please note: While we cover the equipment repair and return shipping, customers are responsible for removal, reinstallation, and initial shipping costs to our service center.

Additional Terms: This warranty represents our complete warranty obligation and supersedes any implied warranties, including merchantability or fitness for specific purposes, to the fullest extent permitted by law. Campbell Scientific is not liable for consequential damages.

This warranty incorporates Campbell Scientific's Terms and Conditions, which prevail in case of any conflicts. For U.S. customers, please see our Terms and Conditions. International customers should contact their regional office for applicable terms.

We stand behind our products and are here to support you throughout the life of your SunSentry.

Assistance

Products may not be returned without prior authorization. Please inform us before returning equipment and obtain a **return material authorization (RMA) number** whether the repair is under warranty/guarantee or not. See Your SunSentry System Warranty for information on covered equipment.

Campbell Scientific regional offices handle repairs for customers within their territories. Please see the back page of the manual for a list of regional offices or visit www.campbellsci.com/contact to determine which Campbell Scientific office serves your country.

When returning equipment, a RMA number must be clearly marked on the outside of the package. Please state the faults as clearly as possible. Quotations for repairs can be given on request.

It is the policy of Campbell Scientific to protect the health of its employees and provide a safe working environment. In support of this policy, when equipment is returned to Campbell Scientific, Logan, UT, USA, it is mandatory that a "Declaration of Hazardous Material and Decontamination" form be received before the return can be processed. If the form is not received within 5 working days of product receipt or is incomplete, the product will be returned to the customer at the customer's expense. For details on decontamination standards specific to your country, please reach out to your regional Campbell Scientific office.

> NOTE:
> All goods that cross trade boundaries may be subject to some form of fee (customs clearance, duties or import tax). Also, some regional offices require a purchase order upfront if a product is out of the warranty period. Please contact your regional Campbell Scientific office for details.

Safety

DANGER — MANY HAZARDS ARE ASSOCIATED WITH INSTALLING, USING, MAINTAINING, AND WORKING ON OR AROUND TRIPODS, TOWERS, AND ANY ATTACHMENTS TO TRIPODS AND TOWERS SUCH AS SENSORS, CROSSARMS, ENCLOSURES, ANTENNAS, ETC. FAILURE TO PROPERLY AND COMPLETELY ASSEMBLE, INSTALL, OPERATE, USE, AND MAINTAIN TRIPODS, TOWERS, AND ATTACHMENTS, AND FAILURE TO HEED WARNINGS, INCREASES THE RISK OF DEATH, ACCIDENT, SERIOUS INJURY, PROPERTY DAMAGE, AND PRODUCT FAILURE. TAKE ALL REASONABLE PRECAUTIONS TO AVOID THESE HAZARDS. CHECK WITH YOUR ORGANIZATION'S SAFETY COORDINATOR (OR POLICY) FOR PROCEDURES AND REQUIRED PROTECTIVE EQUIPMENT PRIOR TO PERFORMING ANY WORK.

Use tripods, towers, and attachments to tripods and towers only for purposes for which they are designed. Do not exceed design limits. Be familiar and comply with all instructions provided in product manuals. Manuals are available at www.campbellsci.com You are responsible for conformance with governing codes and regulations, including safety regulations, and the integrity and location of structures or land to which towers, tripods, and any attachments are attached. Installation sites should be evaluated and approved by a qualified engineer. If questions or concerns arise regarding installation, use, or maintenance of tripods, towers, attachments, or electrical connections, consult with a licensed and qualified engineer or electrician.

General

- Protect from over-voltage.
- Protect electrical equipment from water.
- Protect from electrostatic discharge (ESD).
- Protect from lightning.
- Prior to performing site or installation work, obtain required approvals and permits. Comply with all governing structure-height regulations, such as those of the FAA in the USA.
- Use only qualified personnel for installation, use, and maintenance of tripods and towers, and any attachments to tripods and towers. The use of licensed and qualified contractors is highly recommended.
- Read all applicable instructions carefully and understand procedures thoroughly before beginning work.
- Wear a hardhat and eye protection, and take other appropriate safety precautions while working on or around tripods and towers.
- Do not climb tripods or towers at any time, and prohibit climbing by other persons. Take reasonable precautions to secure tripod and tower sites from trespassers.
- Use only manufacturer recommended parts, materials, and tools.

Utility and Electrical

- You can be killed or sustain serious bodily injury if the tripod, tower, or attachments you are installing, constructing, using, or maintaining, or a tool, stake, or anchor, come in contact with overhead or underground utility lines.
- Maintain a distance of at least one-and-one-half times structure height, 6 meters (20 feet), or the distance required by applicable law, whichever is greater, between overhead utility lines and the structure (tripod, tower, attachments, or tools).
- Prior to performing site or installation work, inform all utility companies and have all underground utilities marked.
- Comply with all electrical codes. Electrical equipment and related grounding devices should be installed by a licensed and qualified electrician.
- Only use power sources approved for use in the country of installation to power Campbell Scientific devices.

Elevated Work and Weather

- Exercise extreme caution when performing elevated work.
- Use appropriate equipment and safety practices.
- During installation and maintenance, keep tower and tripod sites clear of un-trained or non-essential personnel. Take precautions to prevent elevated tools and objects from dropping.
- Do not perform any work in inclement weather, including wind, rain, snow, lightning, etc.

Internal Battery

- Be aware of fire, explosion, and severe-burn hazards.
- Misuse or improper installation of the internal lithium battery can cause severe injury.

- Do not recharge, disassemble, heat above 100 °C (212 °F), solder directly to the cell, incinerate, or expose contents to water. Dispose of spent batteries properly.

Use and disposal of batteries

- Where batteries need to be transported to the installation site, ensure they are packed to prevent the battery terminals shorting which could cause a fire or explosion. Especially in the case of lithium batteries, ensure they are packed and transported in a way that complies with local shipping regulations and the safety requirements of the carriers involved.
- When installing the batteries follow the installation instructions very carefully. This is to avoid risk of damage to the equipment caused by installing the wrong type of battery or reverse connections.
- When disposing of used batteries, it is still important to avoid the risk of shorting. Do not dispose of the batteries in a fire as there is risk of explosion and leakage of harmful chemicals into the environment. Batteries should be disposed of at registered recycling facilities.

Avoiding unnecessary exposure to radio transmitter radiation

- Where the equipment includes a radio transmitter, precautions should be taken to avoid unnecessary exposure to radiation from the antenna. The degree of caution required varies with the power of the transmitter, but as a rule it is best to avoid getting closer to the antenna than 20 cm (8 inches) when the antenna is active. In particular keep your head away from the antenna. For higher power radios (in excess of 1 W ERP) turn the radio off when servicing the system, unless the antenna is installed away from the station, e.g. it is mounted above the system on an arm or pole.

Maintenance

- Periodically (at least yearly) check for wear and damage, including corrosion, stress cracks, frayed cables, loose cable clamps, cable tightness, etc. and take necessary corrective actions.
- Periodically (at least yearly) check electrical ground connections.

WHILE EVERY ATTEMPT IS MADE TO EMBODY THE HIGHEST DEGREE OF SAFETY IN ALL CAMPBELL SCIENTIFIC PRODUCTS, THE CUSTOMER ASSUMES ALL RISK FROM ANY INJURY RESULTING FROM IMPROPER INSTALLATION, USE, OR MAINTENANCE OF TRIPODS, TOWERS, OR ATTACHMENTS TO TRIPODS AND TOWERS SUCH AS SENSORS, CROSSARMS, ENCLOSURES, ANTENNAS, ETC.

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