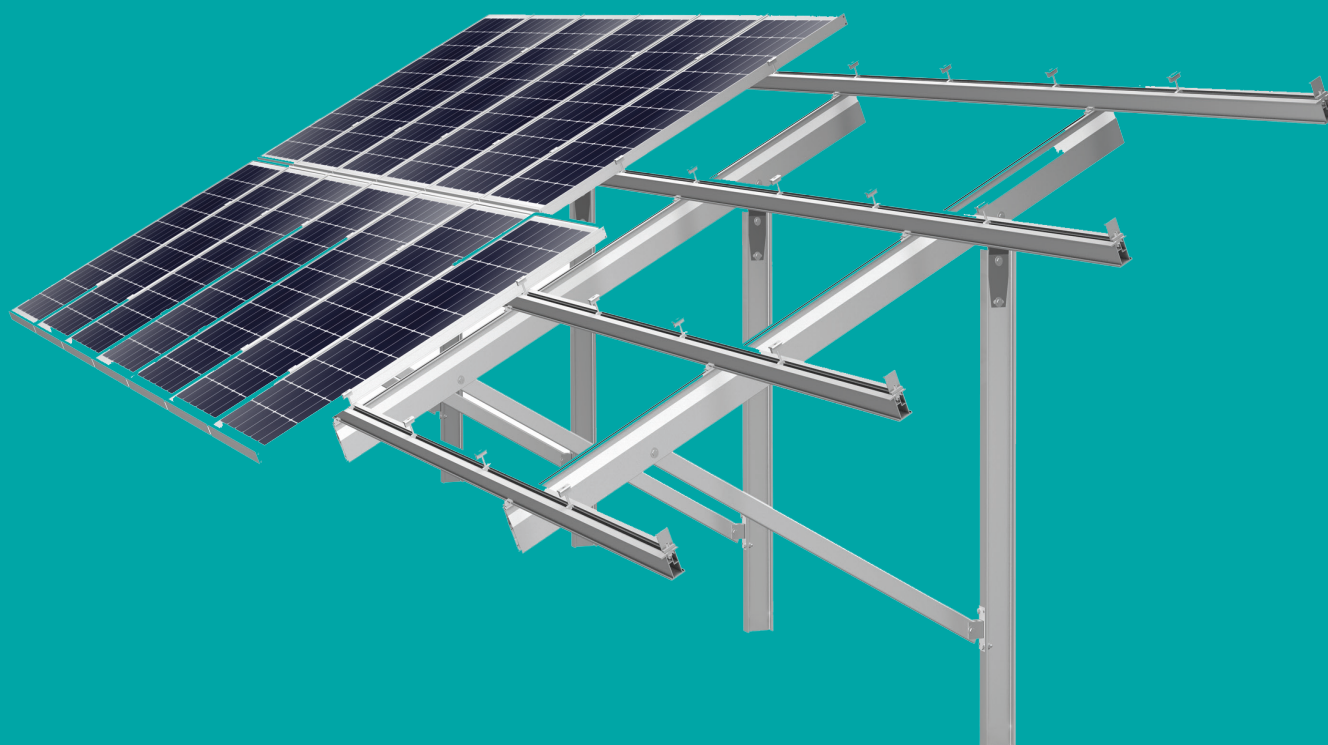


1-Post ProLine

Installation manual



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1. Introduction

1.1 Short description

1-Post ProLine is an open field, single post PV ground mount system. The 1-Post ProLine can be anchored with driven piles or cast in concrete. It consists of a hot-dipped galvanized steel substructure with stainless steel fasteners and aluminum clamps.

1.2 About these instructions

Content

These instructions describe the installation of the 1-Post ProLine mounting system and provide necessary information regarding components, system planning and important safety warnings. Sections 1, 2 and 3 provide an overview as well as detailed information about the 1-Post ProLine system and components. Section 4 provides basic module layout and planning information. The remaining sections provide detailed system assembly and installation instructions.

Validity of the installation manual

This installation manual is only valid in conjunction with:

- The document "Installation manual for PV mounting systems – general part". This document states the general information on Mounting Systems' products with regard to standards, safety, transport, maintenance, disassembly and disposal.
- The product-specific overview drawing (POD). **Therefore, the POD takes precedence over the installation manual in case of discrepancies between the two documents.**
- The supplied material for 1-Post ProLine according to the bill of materials (BOM).

These documents are an integral part of the product 1-Post ProLine and must be observed at every installation.

Please read both this installation manual and the above mentioned documents carefully prior to any installation, maintenance and disassembly work. You will be provided with all information for safe and complete installation, maintenance and disassembly. However, if you have any questions after having read these documents, please contact Mounting Systems GmbH.

User group

These installation instructions are intended for the following persons (user group):

- Skilled personnel
- Instructed personnel

Skilled personnel

Skilled personnel are persons who, on the basis of their professional training, are able to execute installation, maintenance and disassembly work properly.

Instructed personnel

Instructed personnel are persons who have been instructed and taught appropriately regarding the assigned tasks and the possible risks in the event of improper conduct. An instructed person must have received instructions regarding the required safety devices, precautions, relevant regulations, accident prevention regulations as well as operating conditions and must have demonstrated his/her competence. The implemented work must be inspected and accepted by skilled personnel.

Guidance notes

The following guidance notes enhance the orientation when handling this installation manual:

Pictograms:



This symbol indicates important information and useful tips.



This symbol indicates ways and means to make the installation process easier.

1.3 Warnings

The following warnings are used in these Installation Instructions to indicate safety-related information. They include:

- Warning symbols (pictograms)
- Signal words which identify the hazard level
- Information about the type and source of the hazard
- Information about the potential consequences if the hazard is disregarded
- Measures for the prevention of hazards and the prevention of injuries or damage to property.

The signal words of the warnings respectively indicate one of the following hazard levels:

 DANGER	Indicates a potentially mortal danger, disregard for which may result in death or serious injury.
 WARNING	Indicates a potentially dangerous situation which may result in serious injury or damage to property.
 CAUTION	Indicates a potentially dangerous situation which may result in injuries or damage to the property if ignored.
 ATTENTION	Indicates potential danger which can result in damage to the property.

1.4 Safety

All universally valid safety instructions for products of Mounting Systems GmbH are listed in the document "Installation manual for PV mounting systems – general part". Please read this document carefully and observe the instructions given therein: Do not use the product in a manner other than intended, comply with the obligations of the owner and observe all general and specific safety instructions.

In addition, please observe the specific safety instructions given in this installation manual for all installation work. The specific safety instructions are positioned in each case directly with the respective installation step.

2. Technical description

Upon delivery of the 1-Post ProLine system, check to ensure that all parts and components as described in the Bill of Materials and the Product Drawing are present. If an item is missing or damaged, please document the discrepancy and notify Mounting Systems immediately.

2.1 System overview

The major system components of 1-Post ProLine are listed below. Some components can vary depending on:

- Desired type of foundation
- Type of module
- Number and configurations of modules
- Local conditions

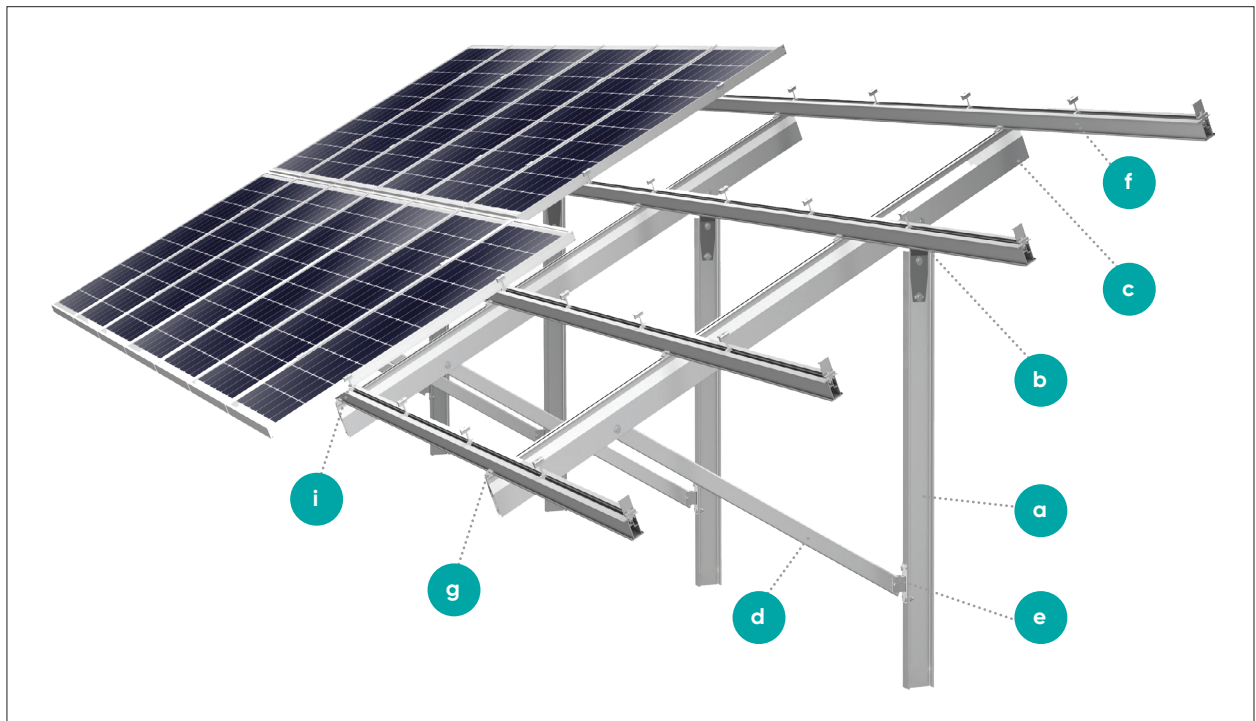


Image 2.1 - 1 Portrait Configuration

1-Post ProLine components:

- a Foundation (driven piles)
- b Adapter rafter
- c Rafter
- d Diagonals
- e Adapter Diagonals
- f Module support rail
- g Module support clamps
- h Connector*
- i Module mid clamp/end clamp
- j Small parts*

* not shown in the overview

2.2 Components

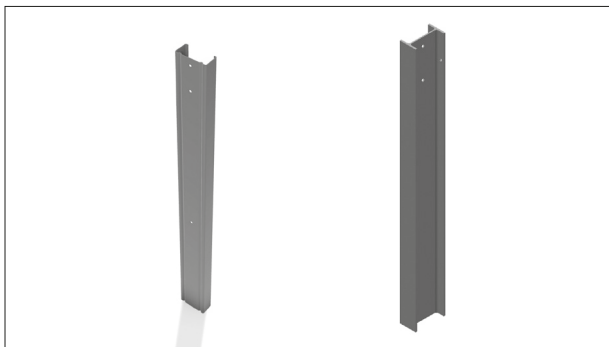


Image 2.2 - 1 Foundation

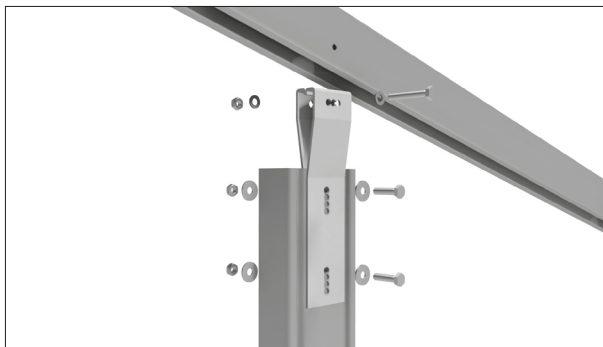


Image 2.2 - 2 Rafter adapter

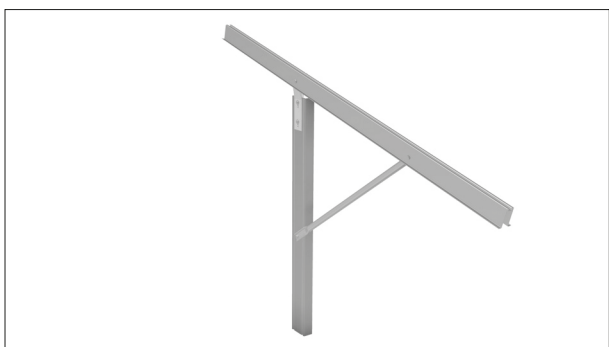


Image 2.2 - 3 Rafter assembly with diagonal

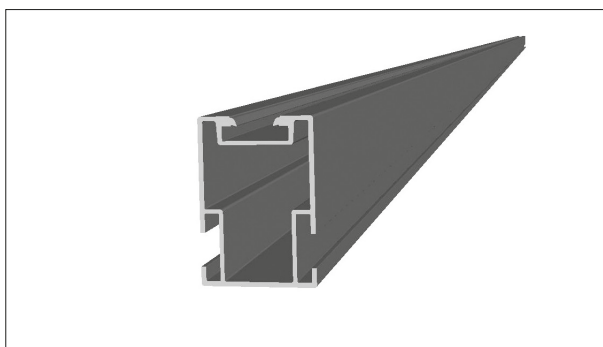


Image 2.2 - 4 Module support rail

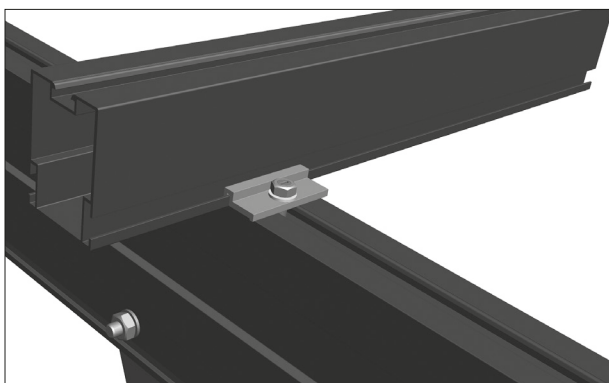


Image 2.2 - 5 Module support clamp

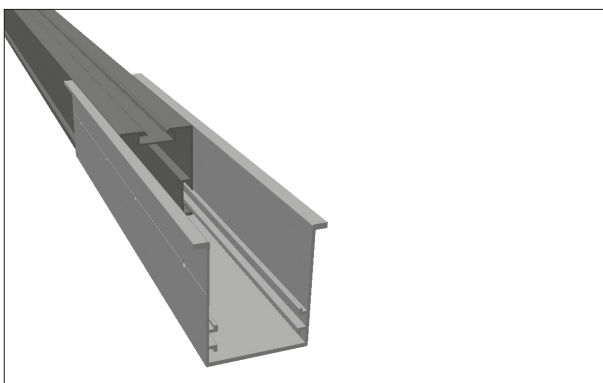


Image 2.2 - 6 Connector

Module clamps

Module clamps are used to secure the PV modules to the 1-Post ProLine module rails. All module clamps are equipped with a Mounting Systems' Clickstone, a special clip to click into the module rail.

Module mid clamps are used to hold PV modules in the center of the module rails.

Module end clamps

Module end clamps are installed at the ends of the module rails. Module end clamps exist in two variants:

1. For a fix module height shown in image 2.2-7.
2. For variable module height the universal end clamp is used, shown in image 2.2-8.

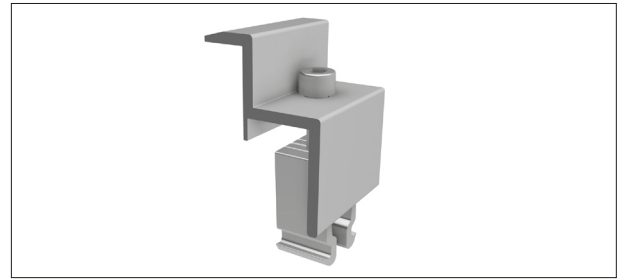


Image 2.2 – 7 Module fix end clamp

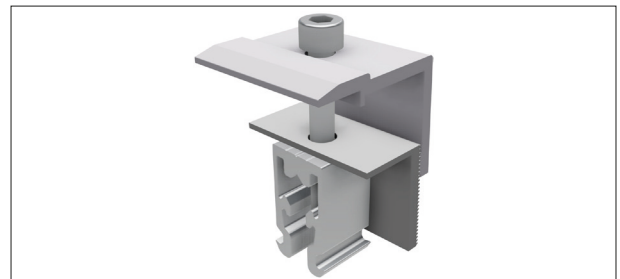


Image 2.2 – 8 Module universal end clamp

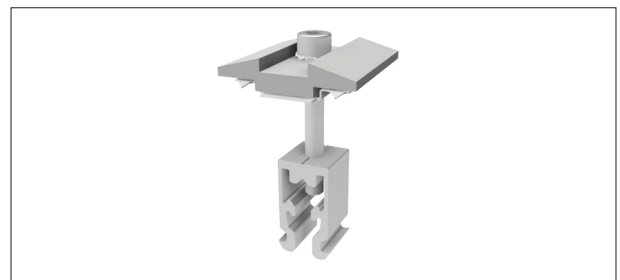


Image 2.2 – 9 Module mid clamp with bonding

3. Product Drawings and Bill of Materials

Product-specific documentation is supplied as part of the 1-Post ProLine system. It contains all the information necessary to install the system.

The documentation includes:

- Bill of Material (BOM)
- System overview drawing(s) which show:
 - the exact module configuration for the project
 - Component variations specific to the project
 - the parts supplied for bolted connections specific to the product
 - Dimension and tolerances

4. Basic Installation Requirements

4.1 System units

1-Post ProLine is designed in separate system units which can be up to 20 m long. The Bill of Materials and dimensions of the specific system unit are listed in the POD.

4.2 Required tools

In order to mount the 1-Post ProLine, the following tools are required:

- Power drill/ electric screwdriver
- Folding rule/ measuring tape
- Angle
- Spirit level or laser level tool
- Allen key 5 mm
- Open end wrenches: 2 x size 17 mm and size 13mm for module support clamp

4.3 Tightening torques

A good quality torque wrench should be used to tighten bolted connections to the torque requirements. These values will be specified in your POD.

5. Foundation

5.1 Installation of ramming posts

Ramming posts should be oriented as shown in Image 5.1 - 1. Make sure that the posts are positioned and installed within the tolerances. The corresponding tolerances will be specified in your POD. The absence of specific information in the POD shall apply the following guidelines:

Tolerances

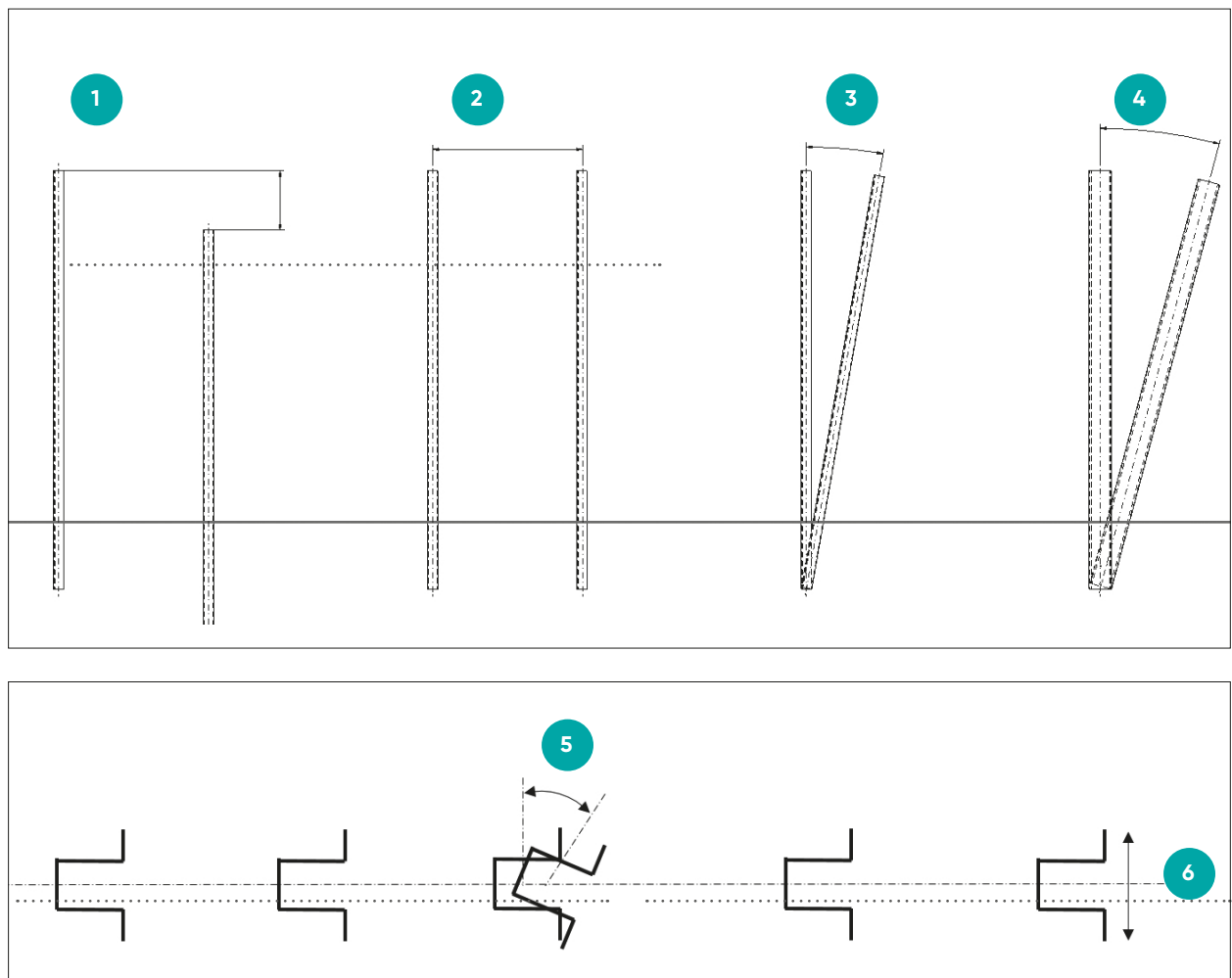


Image 5.1 - 1 Orientation of ramming posts

1. Post height max. ± 2 cm based on planned height
2. Position E-W max. ± 5 cm
3. Inclination tolerance E-W max. 1° ($1^\circ \approx 2\text{cm/m}$)
4. Inclination tolerance N-S max. 1°
5. Torsion max. 2°
6. Axis tolerance E-W max. $\pm 2\text{cm}$ based on the post top



HINT!

After the ramming posts have been set, the pile head (about 3 cm) should be treated with zinc dust primer. This prevents premature corrosion and thus support the longevity of the system.

6. Superstructure Assembly

6.1. Rafter – Diagonal

The rafter adapter should be installed once the foundation is completed. The rafter adapter is adjustable in both the vertical direction and the North-South direction to compensate for any unevenness from the piles.

Installation steps

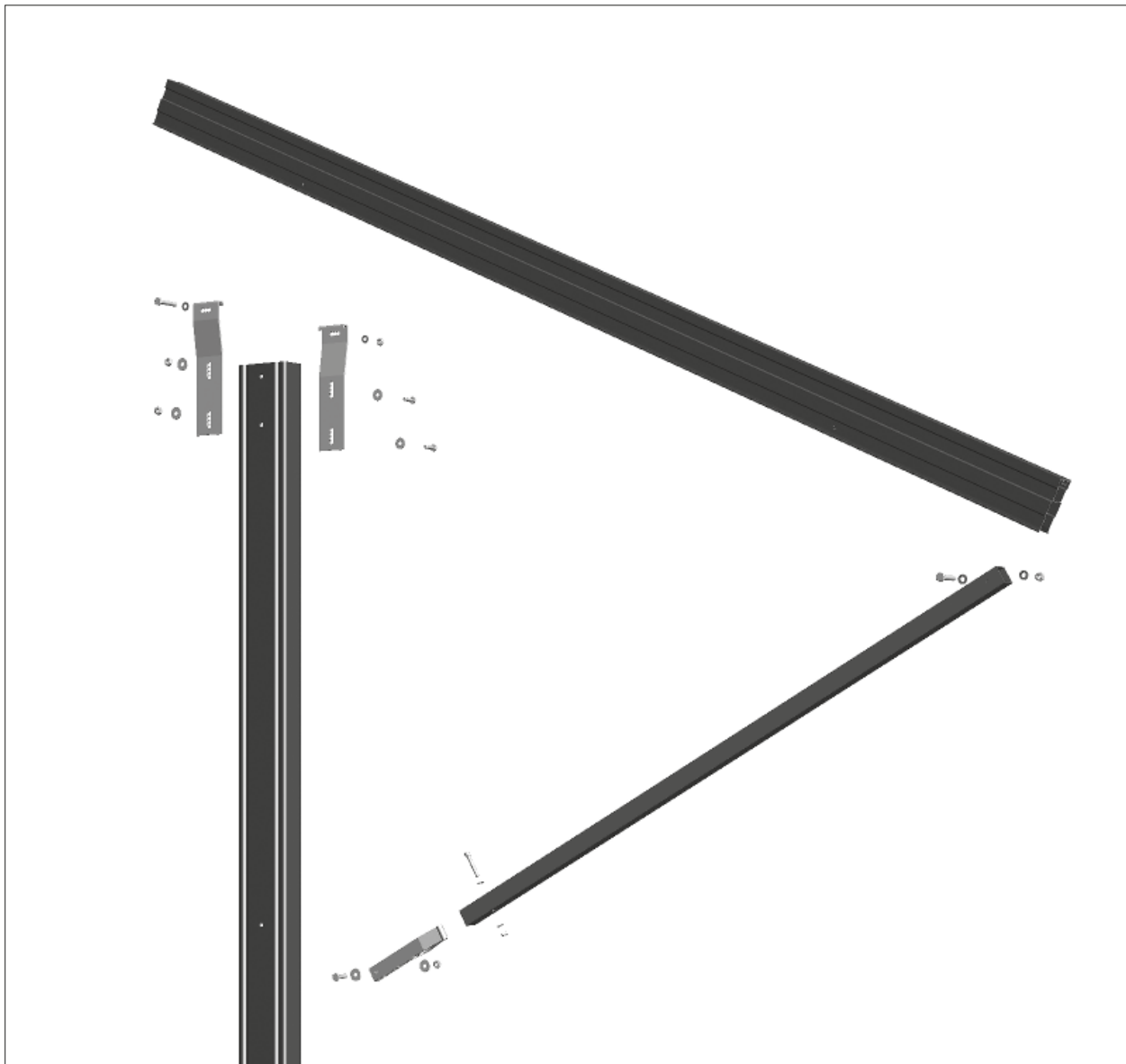


Image 6.1 – 1 Installation steps



HINT!

The uncranked (plain) side of the diagonal is attached to the flat side of the foundation. The corresponding screw is also set from this page.

6.2 Modulträger

1-Post ProLine system uses module rails (Image 6.2 - 1) mounted on the rafter to hold the modules in place. Module rail clamps (Image 6.2 - 2) are used to mount the module rails to the rafters.

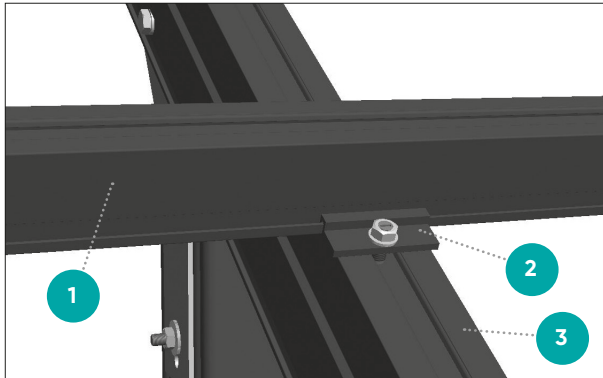


Image 6.2 - 1 general structure

- 1 Module support rail
- 2 Module support clamp
- 3 Rafter

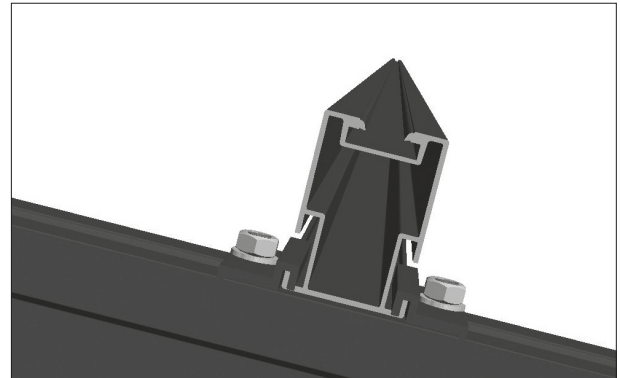
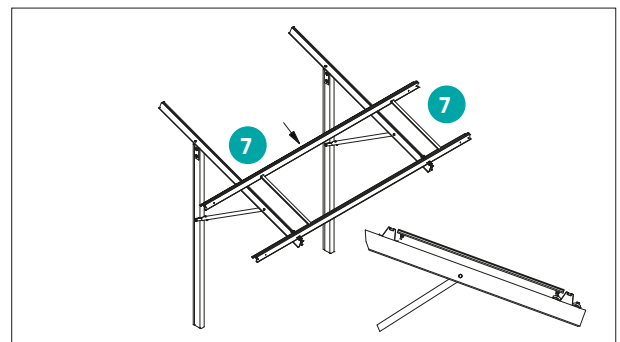
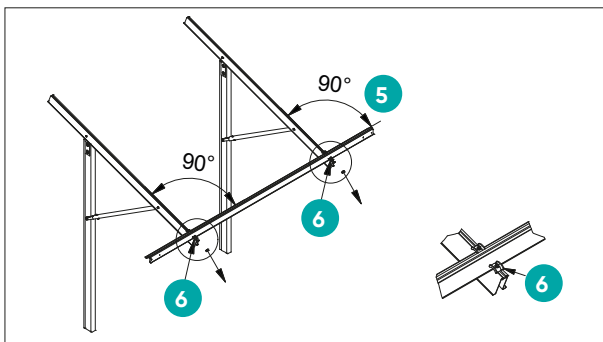
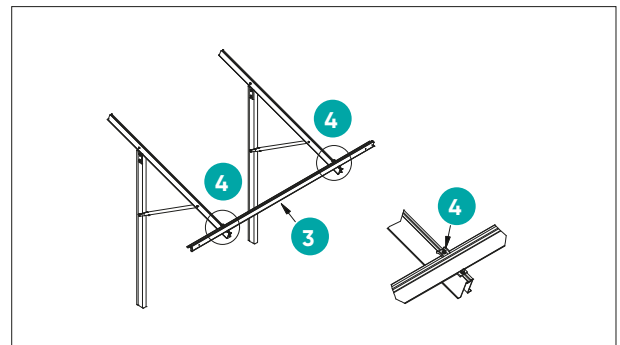
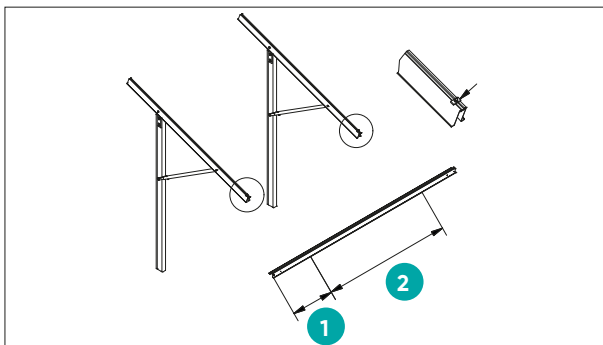


Image 6.2 - 2 Module support profile pre-assembled

General installation steps

1. Mark cantilever arm length of module support rail
2. Mark field length of module support rail
3. Lay module support rail
4. Mount top module support clamp
5. Control right angle between rafter and module support rail
6. Mount bottom module support clamp
7. Mount second module support rail with help of a gauge. The gauge can be cut out of a piece of wood.



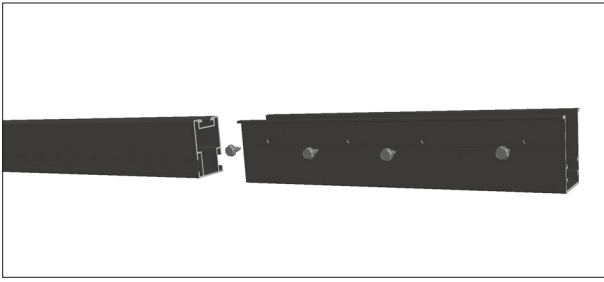


Image 6.3 - 1 Connector and small parts

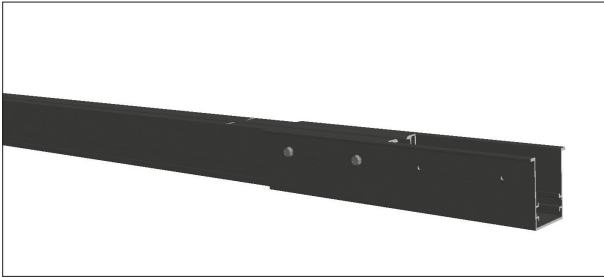


Image 6.3 - 2 Installed connector

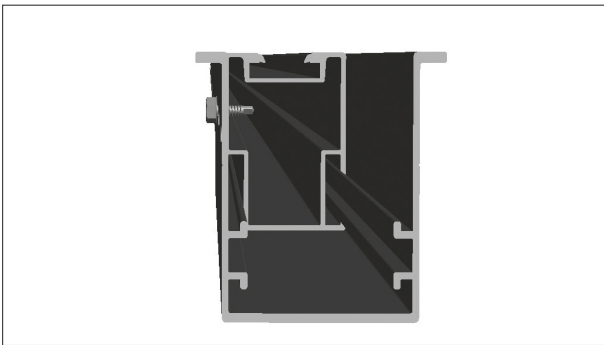


Image 6.3 - 3 Installed Connector with module support

6.3 Connector

The module rails are spliced together with a module rail splice as shown in Images 6.3 - 1 through 6.3 - 3.

Installation steps:

- Connect the single module support rails of one unit with rail connectors. Please refer to your POD for the correct type, positioning and small parts for the connection. Do not leave a space between the two rails and adhere to the specified tightening torques.

7. Module installation

7.1 Installing Clickstones

Mounting Systems' Clickstone is a special clip with which the module clamps are fastened in the module rail. You only need a 5mm Allen key for the installation. The Clickstone is inserted from above into the top channel of the module rail.

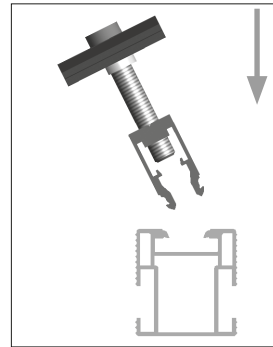
Installation steps:

- Insert the Clickstone at a slight angle into the rail channel.
- While holding it firmly in place, rock the Clickstone upright until it clicks into place.

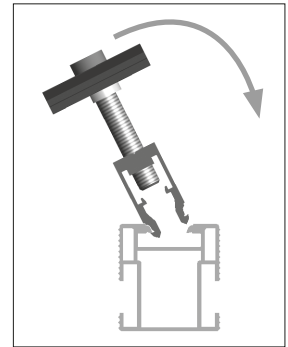


HINT!

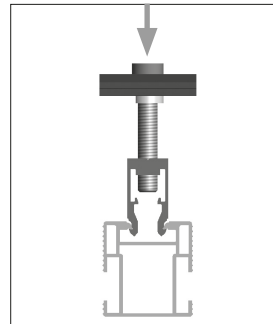
The Clickstone is made undersized, so it is easily to lock it. In Clickstone-channel, it can be pushed into place so easily. By screwing the screw Clickstone is forced apart, thus ensuring the right support. To remove the Clickstone again, loosen the screw so far that it no longer touches the noses in the Clickstone. Then you can easily press the legs of the Clickstone together and remove it from the channel.



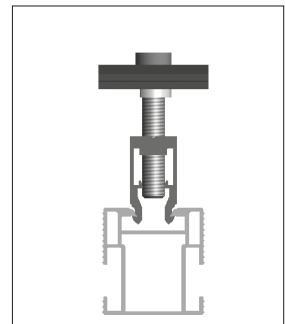
1



2



3



4

Image 7.1 – 1 Installation steps Clickstone

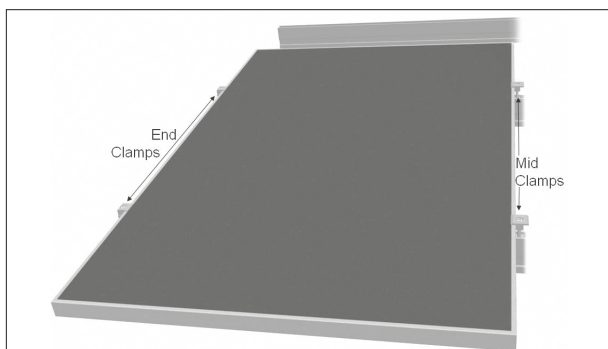


Image 7.2 - 1 Installing locations clamps

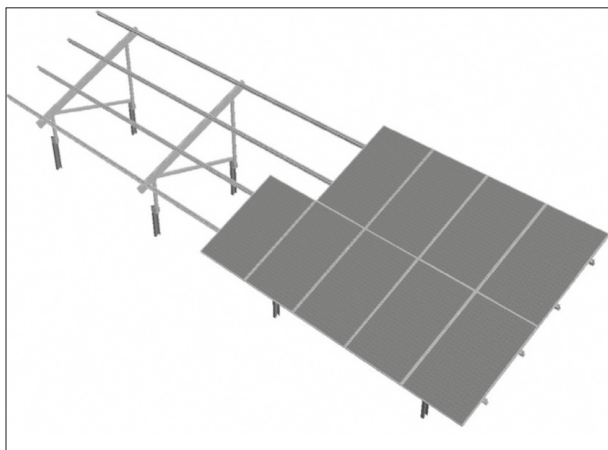


Image 7.2 - 2 Portrait installation



HINT!

Use of a spare module clamp Clickstone or other item as a spacing gauge between the top of one row of modules and the bottom of another can help provide a neat, aesthetically pleasing array.

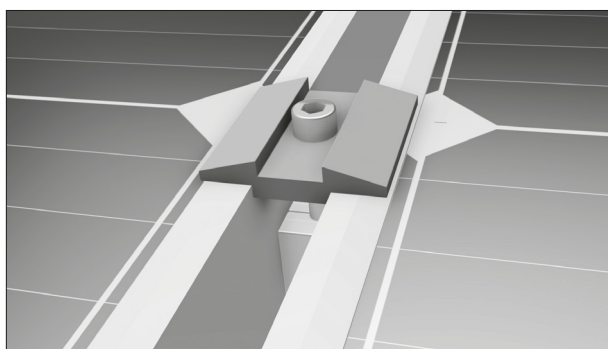


Image 7.2 - 3 Module mid clamp

7.2 Portrait installation

The procedure below describes the installation of modules on a single row. This procedure begins on the west end of the array and moves east. Modules can also be installed from east to west if desired.

- Insert the Clickstone of an end clamp into each module support rail.
- Place the first PV module on the rails and slide the module frame against the end clamp. With the module's clamping points correctly positioned under the end clamps, tighten the end clamps onto the module frame.
- Insert a mid clamp into each module support rail. Push it flush against the module, ensuring the clamp body rests on top of the previously installed module frame.
- Place the next module on the module support rail and slide it against the mid clamps.
- Repeat the above steps for the rest of the row of modules. At the end of a row, install an end clamp on the outside of the last module to complete the row.



CAUTION

Material damage due to incorrect mounting

Incorrectly fastened modules can fall and become damaged.

- Ensure the Clickstones click in securely.
- Ensure the modules are flush against both sides of the clamp.
- Observe and adhere to the recommended torque specifications.

8. Maintenance

When properly assembled, the 1-Post ProLine is a reliable and trouble-free system and should require little in the way of ongoing repair. Nevertheless, Mounting Systems recommends maintaining a regular inspection and maintenance schedule. Such a program can detect and address potential problems before they become serious and help ensure the system's excellent long-term durability and reliability.

The following procedure pertains only to the 1-Post ProLine mounting system structure. Maintenance and repair of other PV system components should be carried out in accordance with the respective manufacturers' recommendations.

8.1 Inspection

At least annually the system should be visually inspected for obvious loose connections, missing components, modules which appear to have shifted, vegetation overgrowth, wind-blown debris and other indications of abnormality. Any problems detected at this time should be addressed and repaired as necessary.

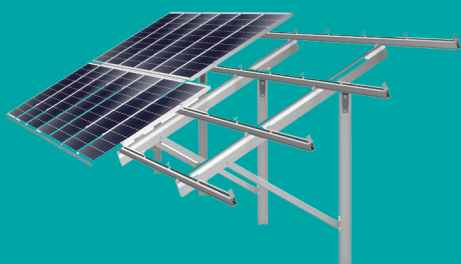
8.2 Testing

After one year in service, it is a good practice to check the torque settings of a representative sample of system connections including module clamps and rail clamps. Do not exceed the recommended torque settings. If a disproportionate number of loose connections (more than 10% of connections) are found, it may be an indication of improper assembly and it may be necessary to take comprehensive corrective action.

A smaller sampling of connections can be tested annually thereafter. Mounting Systems recommends keeping records of the connections sampled each year and testing and, if necessary, adjusting previously untested connections in succeeding years. After all connections have been tested, sample sizes and test frequency can be reduced.



**mounting
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