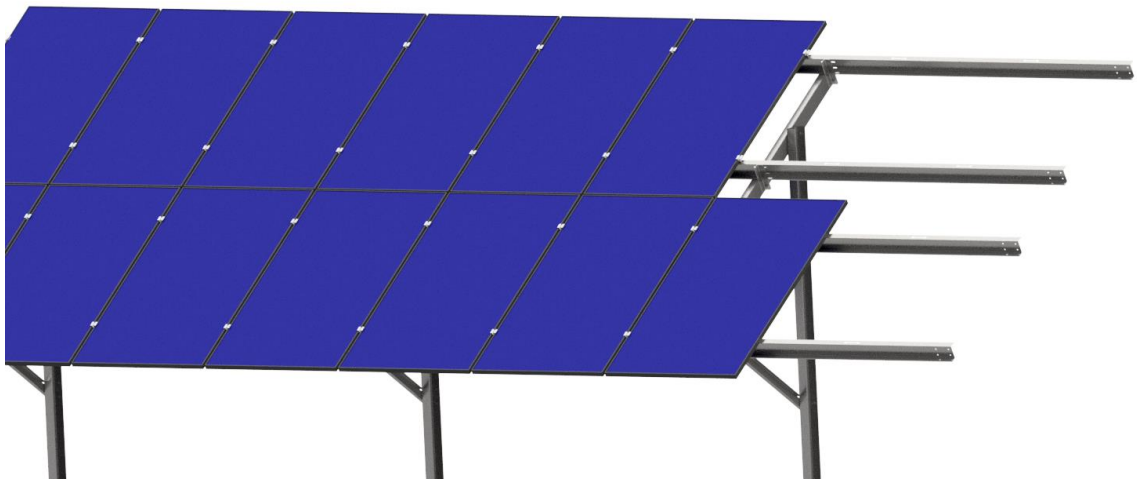
s-rack
SOLAR MOUNTING SYSTEMS

New Sigma S1
Steel
Installation Manual



Contents:

1. Introduction

1.1. Description

The new Sigma S1 Steel is a single post PV ground mount system that allows modules to be fixed in portrait orientation and can be installed using driven piles. The use of the steel purlin bracket allows for installation on uneven terrain with tolerances of up to 10° in east-west direction.

1.2. About the Manual

Content

These instructions provide important information regarding system, components, planning and safety warnings when handling the Sigma S1 Steel.

Sections 1, 2 and 3 show an overview as well as detailed information about the product and its components. Section 4 provides basic planning information. The remaining sections provide detailed system assembly and installation instructions.

Installation Manual Validity

This installation manual is only valid in conjunction with:

- S-Rack Australia Pty Ltd.'s Terms and Conditions. This document applies to all contracts and agreements for all products and services offered by S-Rack Australia Pty Ltd.
- Project Specific Drawings. These documents show all the project specific installation details, choice of components, dimensions, and any deviation from the standard material/assembly. Therefore, these drawings take precedence over the installation manual in case of discrepancies between the two documents.
- The supplied material for the Sigma S1 Steel according to the Bill of Materials (BOM).

The content of these documents must be followed during installation for the S-Rack Australia Pty Ltd warranty to apply.

Please read and check the Installation Manual, Project Drawings and Bill of Materials carefully prior to any installation, maintenance, and disassembly work.

All necessary information regarding installation, maintenance and disassembly will be provided. If you have any questions after having read these documents, please contact S-Rack Australia Pty Ltd.

Target Group

Skilled and trained personnel.

Skilled/Trained Personnel

An individual who has acquired professional training and as such, capable of executing installation, maintenance, and disassembly work properly.

Guidance Notes

Please see below installation guidance notes.

Symbols:

Important information and useful tips

Additional information and hints to make the installation process easier

1.3. Warnings

The following are used in the installation manual to indicate safety-related information. These include:

- Warning Symbols
- 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 to prevent injuries and damage to property

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

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

1.4. Safety

Safety instructions for S-Rack Australia Pty Ltd products are included in the documents. Do not use the products in a manner other than its intended function.

It is the responsibility of the customer to ensure that all general and specific safety instructions are followed.

In addition, please observe the specific safety instructions provided in this Installation Manual for all installation work. The specific safety instructions are positioned in each case directly with the respective installation steps.

2. Technical Description

This section provides a breakdown of the Sigma S1 Steel and its components. Upon delivery of the system, check to ensure that all parts and components adhere to the BOM and project specific drawings. Any items missing or damaged must be notified to S-Rack Australia Pty Ltd immediately.

2.1. System Overview

An overview of the Sigma Steel system can be seen below (Image 2.1-1). Please note that some components can vary depending on project-specific requirements.

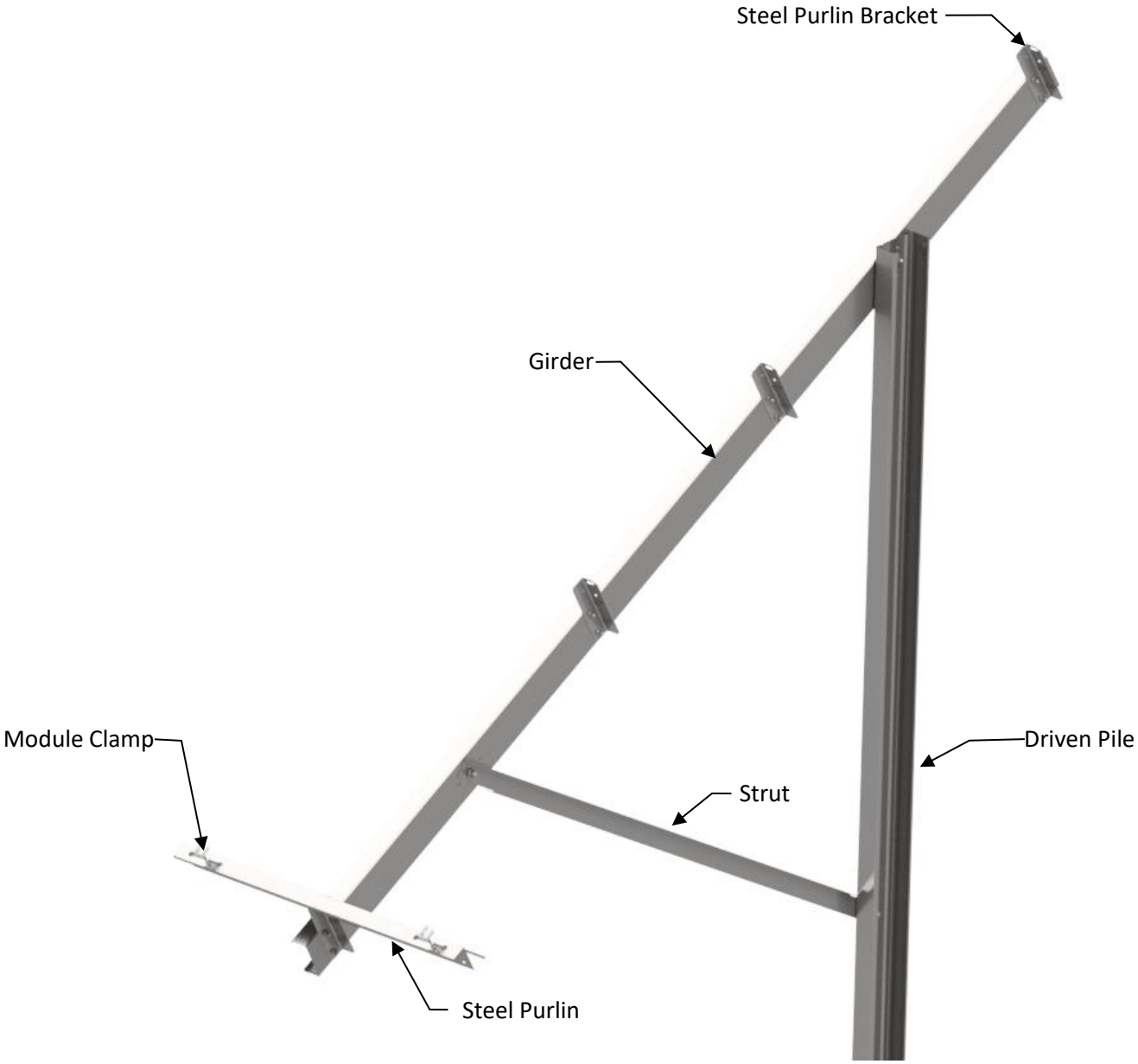
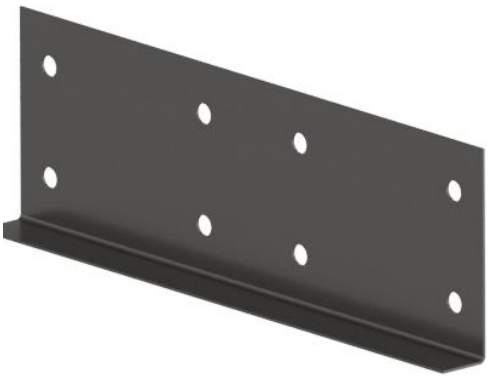


Image 2.1-1 - System Overview of the Sigma S1 Steel System

2.2. Component Details

Overview of System Components	
 Foundation	 Girder
 Strut	 Steel Purlin
 Steel Purlin Connector	 Steel Purlin Bracket

2.3. Module Clamps

Module Clamps come pre-assembled and are used to secure the PV modules to the steel purlins. All module clamps are equipped with aluminium part, M8 nut and bolt to secure the module clamps into the steel purlins.

Image 2.3 – 1 Module Clamps (Pre-assembled)

Module End Clamp

The clamps are installed at the start and end of a PV module row. The clamps are available in individual sizes allowing it to precisely match the required PV module thickness.

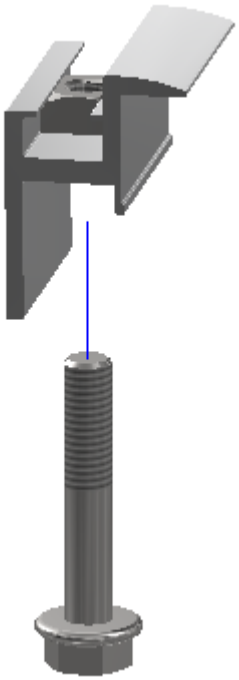


Image 2.3 – 2 Module End Clamp

Module Mid Clamp

The clamps are installed in-between PV modules along a PV module row and include integrated grounding pins.

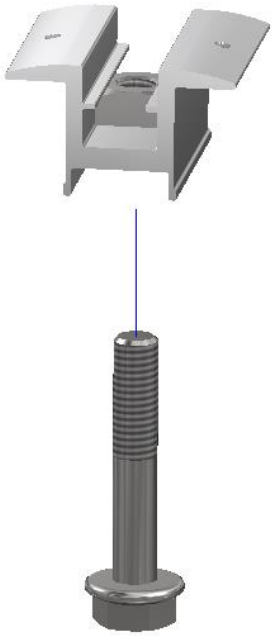


Image 2.3 – 3 Module Mid Clamp with Grounding Pins

3. Project Drawings and Bill of Materials

Project-specific documentation is supplied as part of the Sigma S1 Steel These documents contain all the information necessary to install the system.

The documentation includes:

- Bill of Materials
- Project Drawings (s) which show:
    - Exact module configuration for the project
    - Specific foundation information for the project
    - Dimensions and tolerances

4. Basic Installation Requirements

4.1. System Units

The Sigma S1 Steel is designed in separate system units which can be up to 30m long (without expansion gaps). Please refer to the BOM and Project Drawings for the dimensions of a specific system unit.

4.2. Required Tools

In order to install the Sigma S1 Steel, the following tools are required:

- Power drill/electric screwdriver
- Folding rule/measuring tape
- Angle measuring tool (protractor)
- Spirit level or laser level tool
- Wrenches for M8, M10 and M12 bolts

4.3. Tightening Torques

A good quality torque wrench should be used to tighten bolted connections to the torque requirements.

Connection	Size	Nm
Piles, girder, and struts	M12	40
Purlin bracket	M10	30
Purlin and module clamps	M8	15

5. Foundation

Driven piles should be oriented as shown in Image 5.1 -1. The posts need to be positioned and installed within the tolerances. The corresponding tolerances are specified in the project drawings.

Note:
As an alternative to ramming, piles can also be encased in concrete/stabilised sand.
Please refer to project documentations for specific dimensions and requirements.

Tolerances

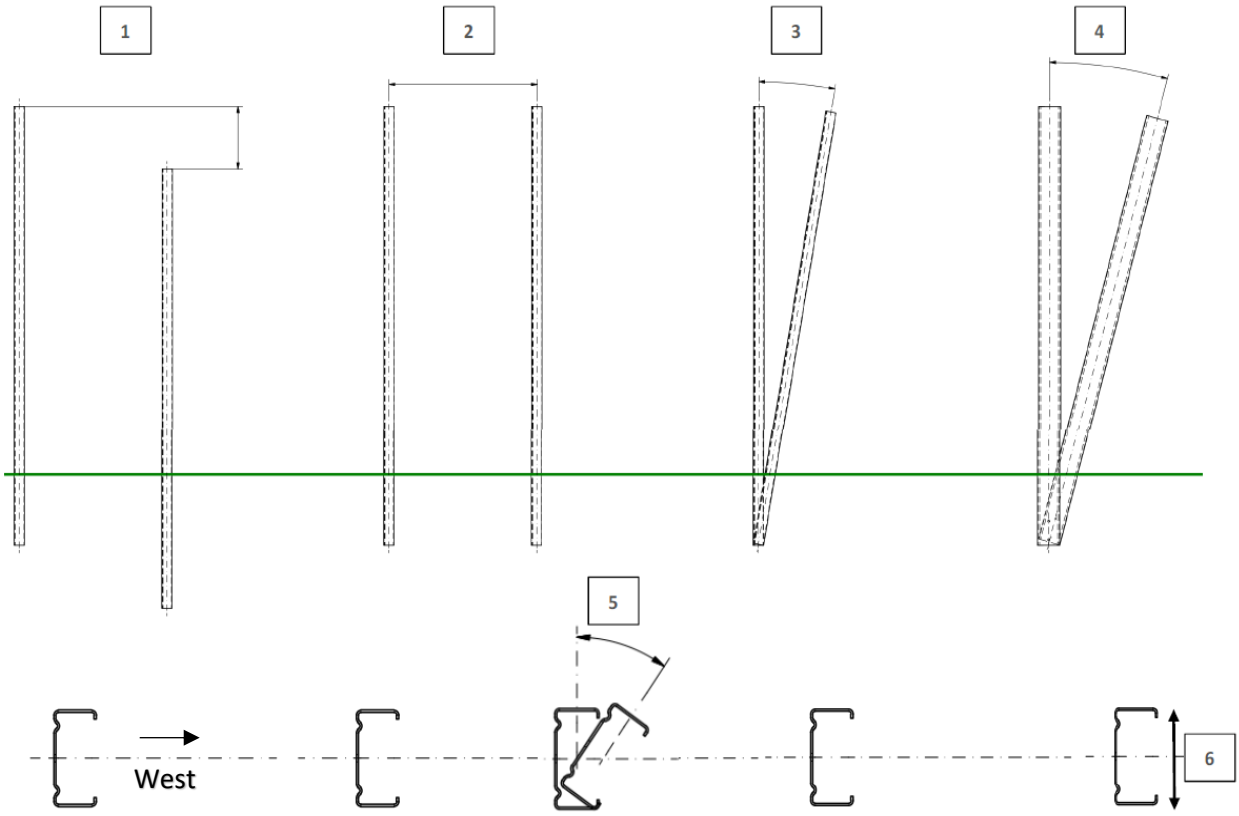


Image 5.1 – 1 Orientation of Driven Piles

In the absence of specific information in the drawings, the following guidelines apply:

1. Post height max. ± 2 cm based on planned height
2. Position E-W max. ± 5 cm, Position N-S max. ± 2 cm
3. Inclination tolerance E-W max. 2° (1° ≈ 2cm/m)
4. Inclination tolerance N-S max. 2°
5. Torsion max. 2°
6. Axis tolerance E-W max. ± 2cm based on the post top

Hint!
After the ramming posts have been set, top of pile (about 3cm) should be treated with a zinc rich primer.
This prevents premature corrosion and supports the longevity of the system.

6. Support Assembly

Installation Steps

Connect the girder (purlin brackets pre-assembled), strut and pile together as shown in (Image 6.1). Please refer to the Project Drawings and BOM for the correct type, positioning and small parts used for the connections. Make sure to observe the right tightening torques.

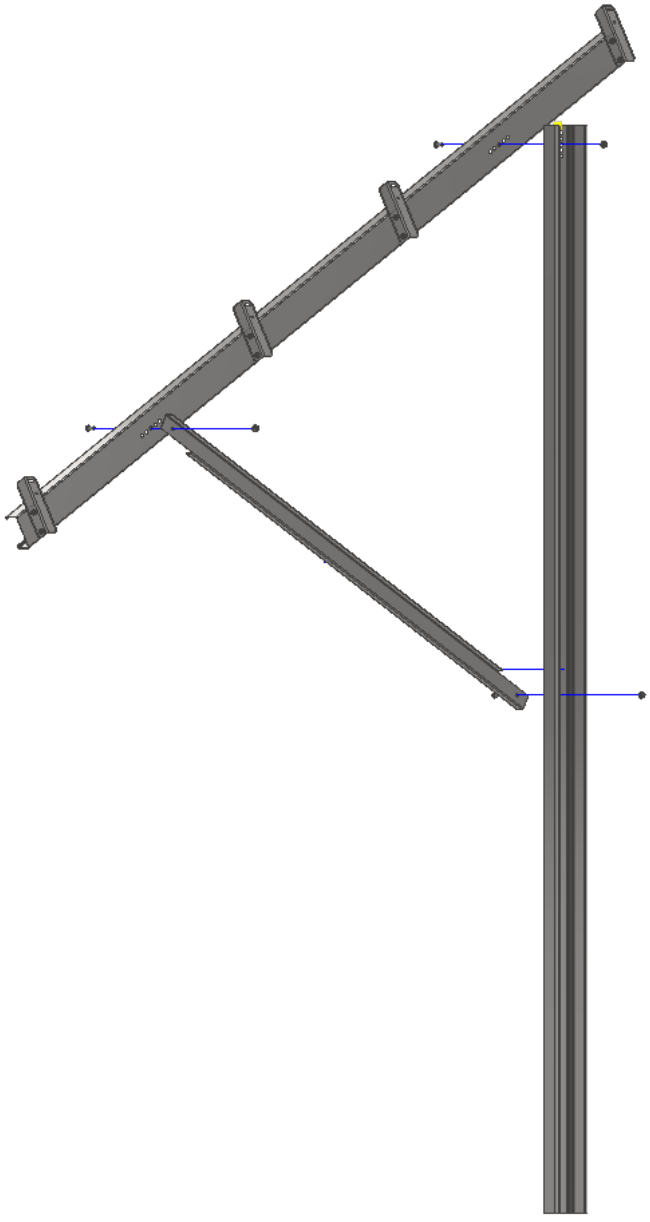


Image 6.1 General Structure of the Sigma S1 Steel Support

7. Steel Purlin Installation

The Sigma S1 Steel system uses steel purlins mounted on the rafter to hold the modules in place. Pre-assembled steel purlin brackets are used to secure the steel purlins to the rafter.

7.1. Purlin Placing and Alignment

Installation Steps

1. Identify steel purlin orientation by locating slots on the top flange (as shown on Image 7.1-1).
2. Position the steel purlins horizontally on top of the rafters and align them. Please refer to the project drawings for the exact position of the rails with regards to:
    - Spacing between purlins
    - Horizontal overhang (cantilever) over the outer ramming posts
3. Connect the steel purlins to the steel purlin brackets using the supplied bolts and nuts specified in the project documentation.
4. Adhere to the specified tightening torques.
5. Check that the spacing of the steel purlins does not get shifted with the final tightening of the bolts. Readjust if necessary.

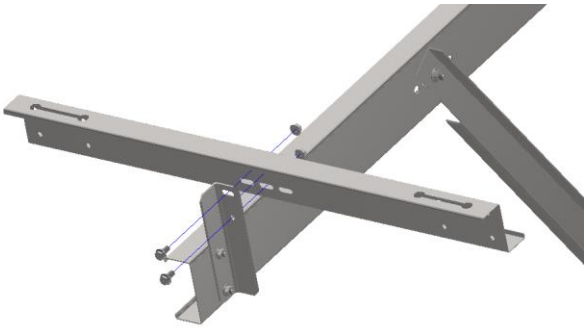


Image 7.1-1 Installing the Steel Purlins

Image 7.1-2 Aligning the Steel Purlins

7.2. Steel Purlin Connector

The steel purlins are spliced together using a steel purlin connector.

Mounting Steps

1. Align the 4 holes found at the end of the steel purlin to the 1st set of 4 holes in the connector.
2. Fix the connector to the steel purlin by securing it with the supplied bolt and nuts specified in the project documentation.
3. Fix the other set of 4 holes to the 4 holes on the next steel purlin.
4. Adhere to specified tightening torques.

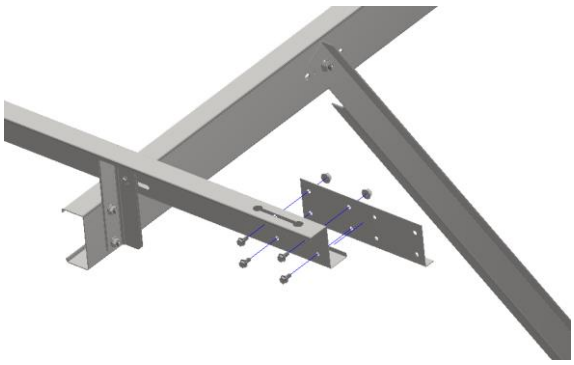


Image 7.2-1 Installing the Steel Purlin Connector

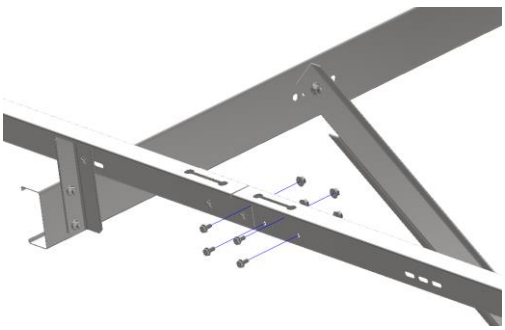


Image 7.2-2 Connecting 2 Steel Purlins

8. Module Clamp Installation

The module clamps for the Sigma S1 Keyhole Slot uses standard M8 bolt to attach the module clamps to the steel purlin.

Installation Steps

1. Align the module clamp with the keyhole slot, as shown in Image 8 – 1.

2. Push the module clamp towards the steel purlin and slide the bolt into purlin slot.

3. Tighten the bolt using the recommended torque settings.

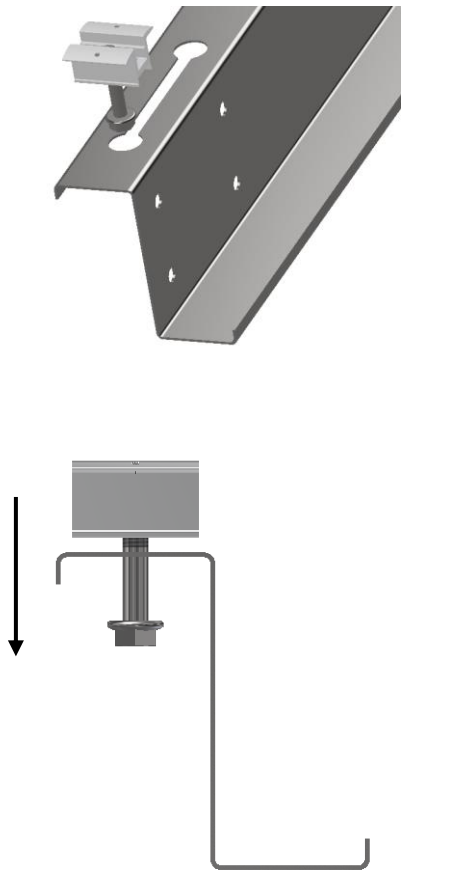


Image 8-1 Module Clamp Installation

Hint!

The steel module clamp is designed so that it is easy to attach to the steel purlin. By tightening the bolt, the steel clamp is pushed down, ensuring the right support.

To remove the module clamps, loosen the bolt until the steel clamp can be pulled away from the purlin.

CAUTION

Material damage due to incorrect installation

Incorrectly mounted module clamps can cause the PV modules to fall and be damaged.

Mount all module clamps in accordance with the instructions.

9. Module Installation

The procedure below describes the installation of modules on a single row. This procedure can begin on the west end of the array moving east or vice-versa.

9.1. Module Installation – Portrait

1. Insert a module end clamp into each module rail.

2. 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.

3. Insert a mid-clamp into each the module 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 rail and slide it against the mid clamps.

4. 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.

Hint!

Use of a spare module clamp or other item as a spacing gauge between the modules columns ensures that the spaces between columns are the same.

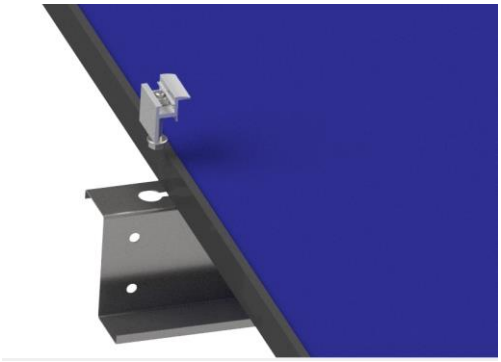


Image 9.1 – 1 Steel Module End Clamp

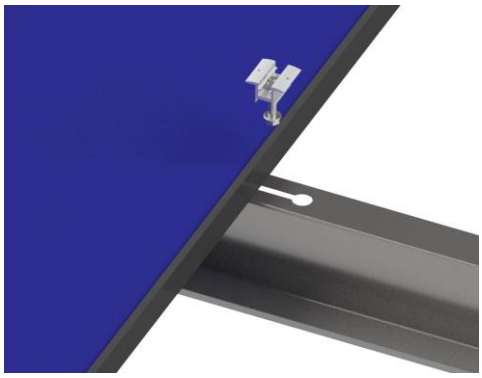


Image 9.1 – 2 Steel Module Mid Clamp

Image 9.1 – 3 Portrait Installation

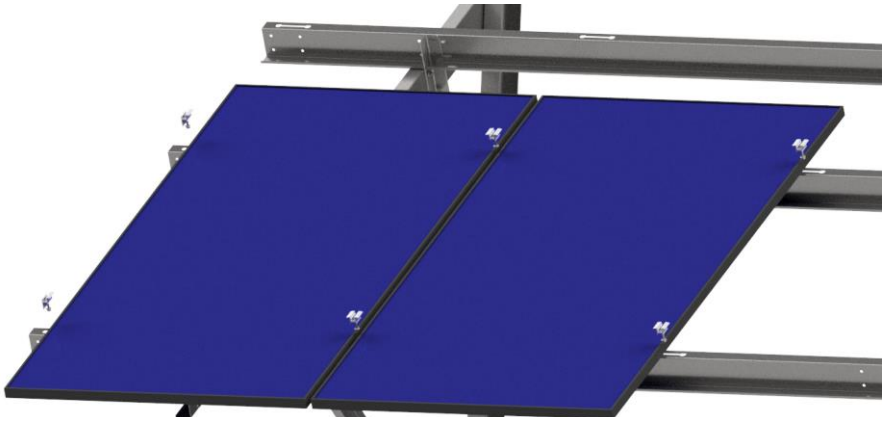


Image 9.1 – 4 Placing the next PV module

10. Maintenance

When correctly assembled, the Sigma S1 Steel is a reliable and trouble-free system that requires minimal maintenance. Nevertheless, S-Rack Australia Pty Ltd recommends performing regular inspections and creating a maintenance schedule. By doing so, potential problems can be detected and resolved before they can become serious, ensuring the system's excellent long-term durability and reliability.

The following procedure pertains only to the Sigma S1 Steel system structure. Maintenance and repair of other PV system components should be carried out in accordance with the respective manufacturers' recommendations.

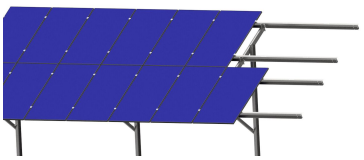
10.1. Inspection

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 annually. Any problems detected at this time should be addressed and repaired as necessary.

10.2. Testing

After one year in service, it is 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 an improper assembly and it may be necessary to take comprehensive corrective action.

S-Rack Australia Pty Ltd recommends keeping records of connections sampled each year and checking untested connections in the succeeding years. Once all connections have been tested, sample sizes and test frequency can be reduced.



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