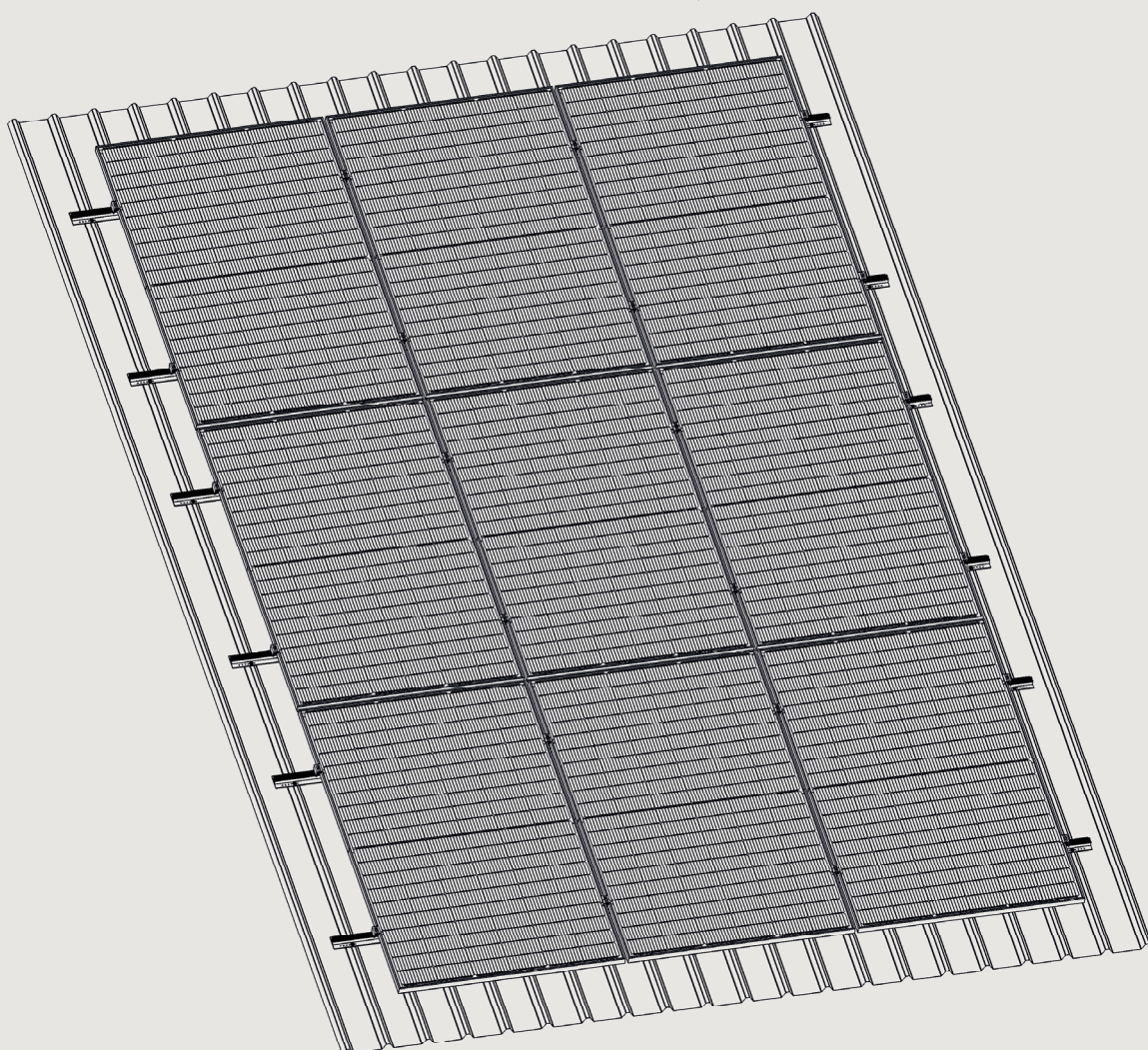


Apex Minirail

Portrait & landscape
orientation



This manual is an integral part of the unit. Please read the manual carefully before installation, operation or maintenance. Keep this manual for future reference.

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The main purpose of this installation manual is to provide instructions and detailed procedures for installing and maintaining Autarco' pitched trapezoidal roof mounting systems based on minirails, for buildings up to 20m in height.

1.1 Safety symbols



DANGER! A danger symbol indicates a hazardous situation, which if not avoided, will result in death or serious injury.



WARNING! Indicates a hazardous situation which, if not avoided, can result in serious injury.



ATTENTION! Attention statements are used to indicate where a part of the process or equipment has a special requirement. Attention statements should be followed at all times.

1.2 Target audience

This manual is intended for qualified personnel only, who install an Autarco solar PV solution with Minirail mounting systems. Before any further action, the installer must first read all safety regulations and be aware of the potential danger to operate high-voltage devices such as PV modules.



ATTENTION! Qualified personnel means a person with valid license from the local authority for:

- Installing electrical equipment and PV power systems (up to 1000 V)
- Applying all applicable installation codes and using personal protective equipment (PPE)
- Analyzing and reducing the hazards involved in performing electrical work

1.3 Mounting rail models covered

The Minirail is installed on corrugated (trapezoid) roofs using one of the following Autarco mounting plates:

- + M2.AR6TRL395 – For Portrait mounting
- + M2.R5CRXL150 – For Landscape mounting

Further information on the types of roof mounting hooks are available online at www.autarco.com/downloads/

2.1 Safety instructions



DANGER! Do not install during severe or sub-zero weather conditions.



WARNING! Never step or sit on the glass surface of a solar module.

The glass may break, resulting in shock or bodily injury. The module may also stop generating power.



WARNING! Always use the supplied parts to attach the solar modules and mounts.

Use of other parts is dangerous and may cause the solar modules or mounts to loosen or fall.



DANGER! Do not install this system on a roof with pitch > 60 degrees.



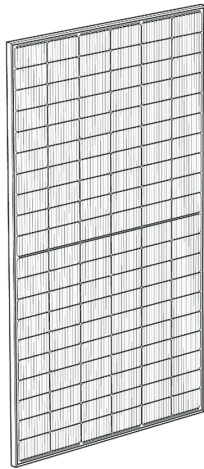
WARNING! The installation, maintenance, recycling, and disposal of the mounting components must be performed by qualified personnel in compliance with national and local standards and regulations.



WARNING! Always install modules onto a minimum of two rails which are parallel to the shorter side of the module. Otherwise, loosening of the modules may occur due to expansion or contraction of the rails under varying heat.

Any unauthorized actions including modification of product functionality of any form will affect the validation of warranty service; Autarco may deny the obligation of warranty service accordingly.

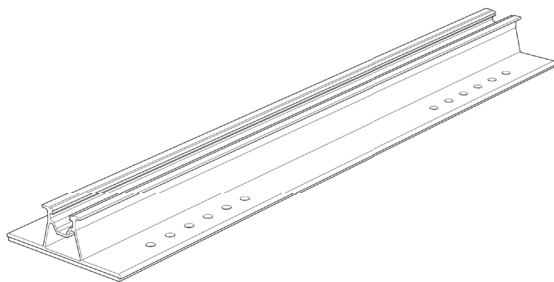
1. Solar modules
S1.MHJ/TBJ/MHL/MHN



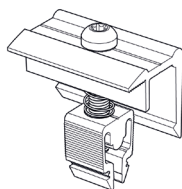
2.2.1

Portrait mounting

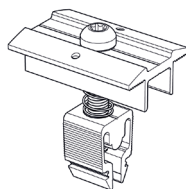
2. Minirail for portrait mounting
M2.AR6TRL395



2a. End clamp
M1.AR6(B)EC



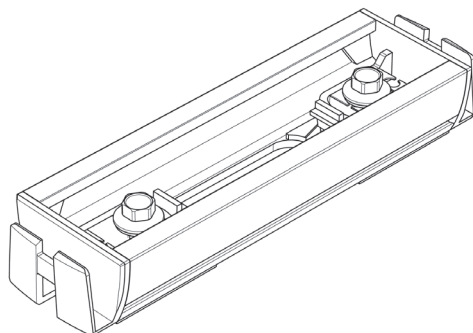
2b. Middle clamp
M1.AR6(B)MC



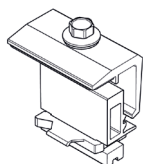
2c. Mounting screw
M6.SCREW6X25-
EPDMRING



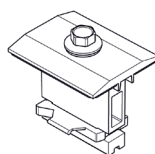
3. Minirail for landscape mounting
M2.R5CRXL150 + M6.SCREW6X25-EPDMRING



3a. End clamp
M1.R5CRX(B)EC



3b. Middle clamp
M1.R5CRX(B)MC

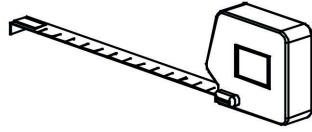


4. Measuring tool
M3.CRXMLST-1400

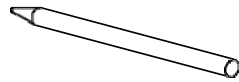


Please note the component numberings as they will be referenced in the installation section.

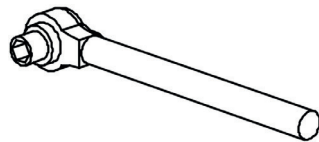
A. Tape Measure



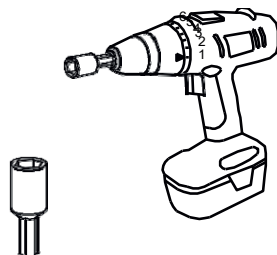
B.



C1.



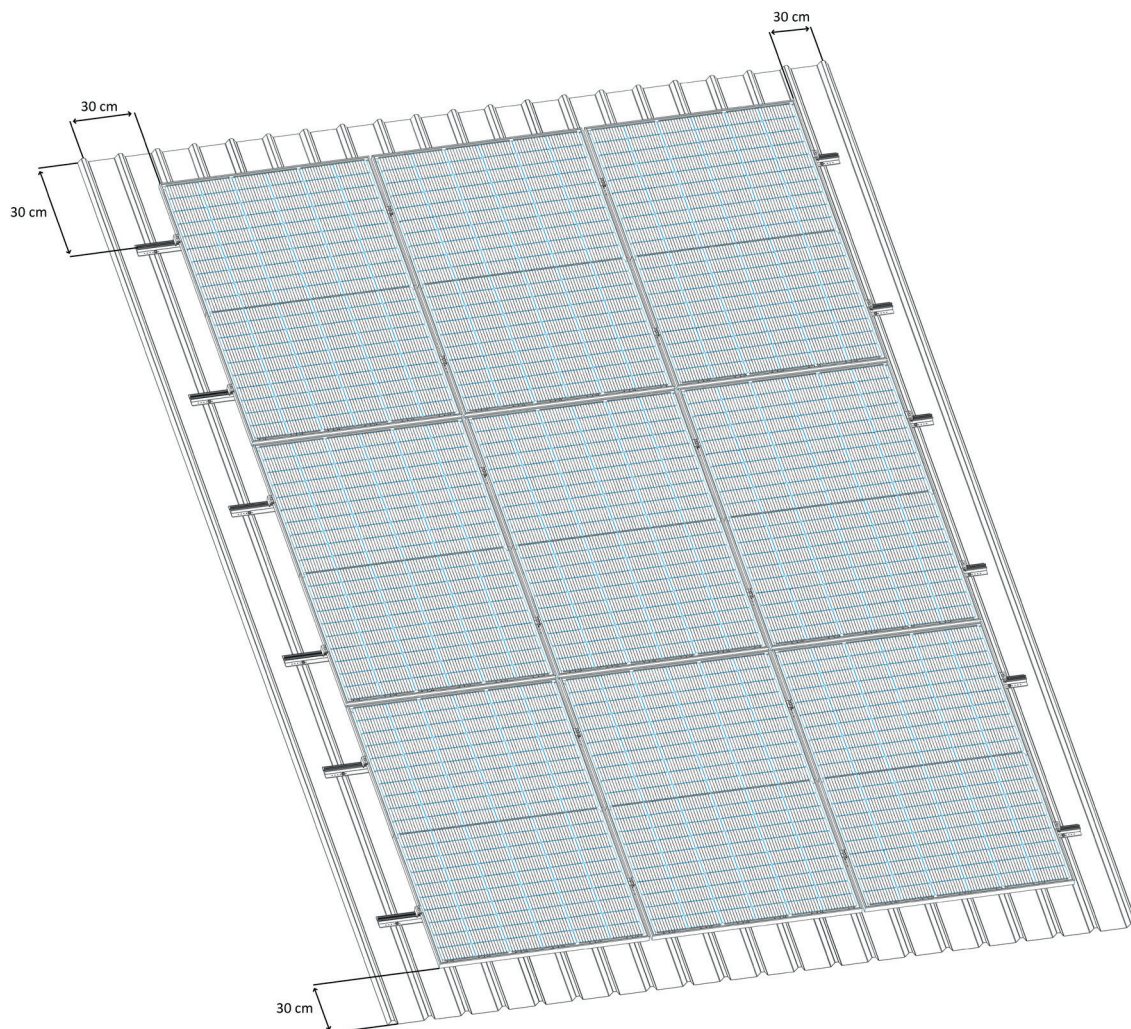
D2. Electric Impact wrench with M8 bolt





ATTENTION! DO NOT install this system on a roof with pitch > 60 degrees.

The minimum clearance of solar panels from the roof edges, gutters and ridges is typically 30cm (please check with your local building regulations before proceeding).



Before proceeding with the installation, make sure the rails are installed according to the dimensions given below:

Autarco Module	Module Dimension (mm)			Minimum Distance	Maximum Distance
MHJ / TBJ / TJ Series	1722	1134	R1	0.52 x L	0.63 x L
MHL / TBL / TL Series	1903	1134	R1	0.45 x L	0.66 x L

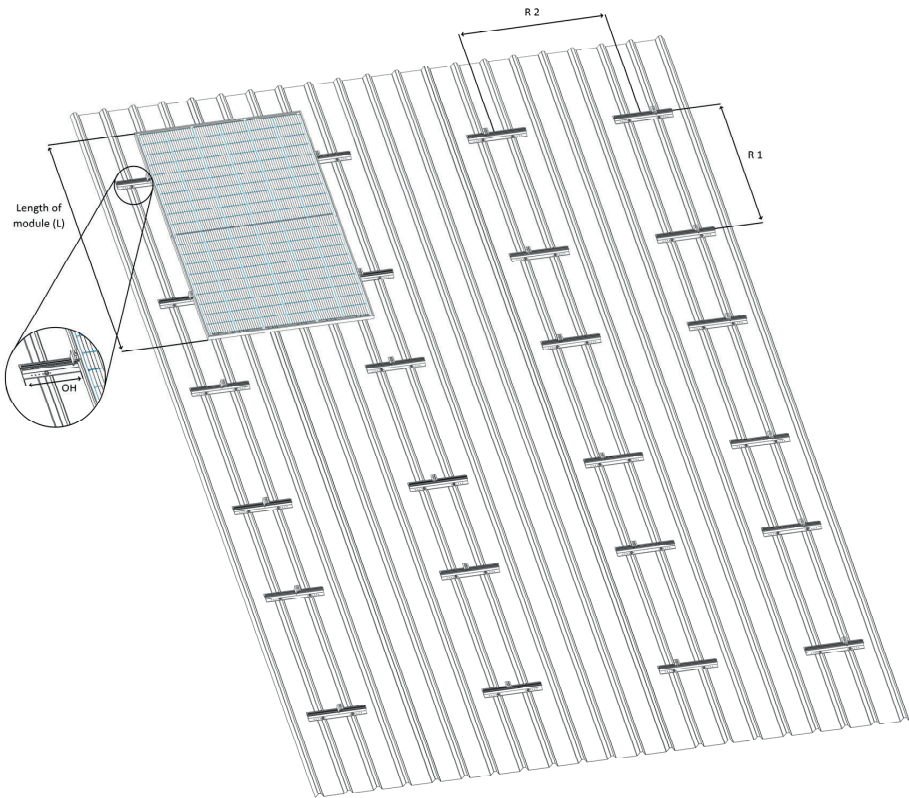
Table 1: Minimum and Maximum distance between rails for Autarco panels

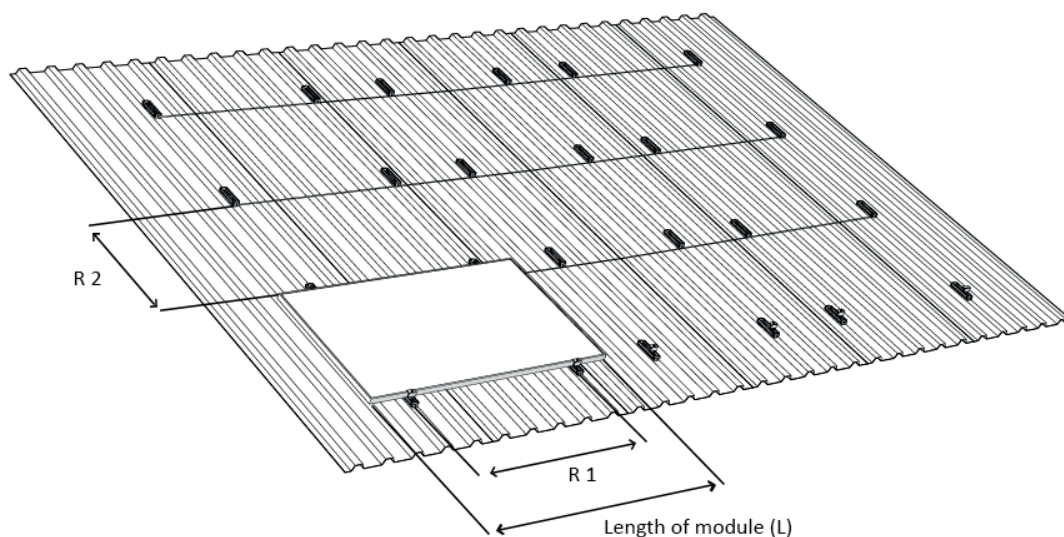
- The maximum distance between rails (**R1**) is depends on the length of the module (**L**) and is referenced in Table 1. *Refer to the ‘Mounting’ section of your module’s manual for module-specific values.*
- The maximum distance between two successive rails (**R2**) is 120 cm, but typically 60-80 cm.
- The maximum rail overhang distance (**OH**) is 30 cm.

The values for rail distance (**R1**) and overhang distance (**OH**) are determined by wind zone, height of the building and terrain code.

2.5.1

Portrait orientation

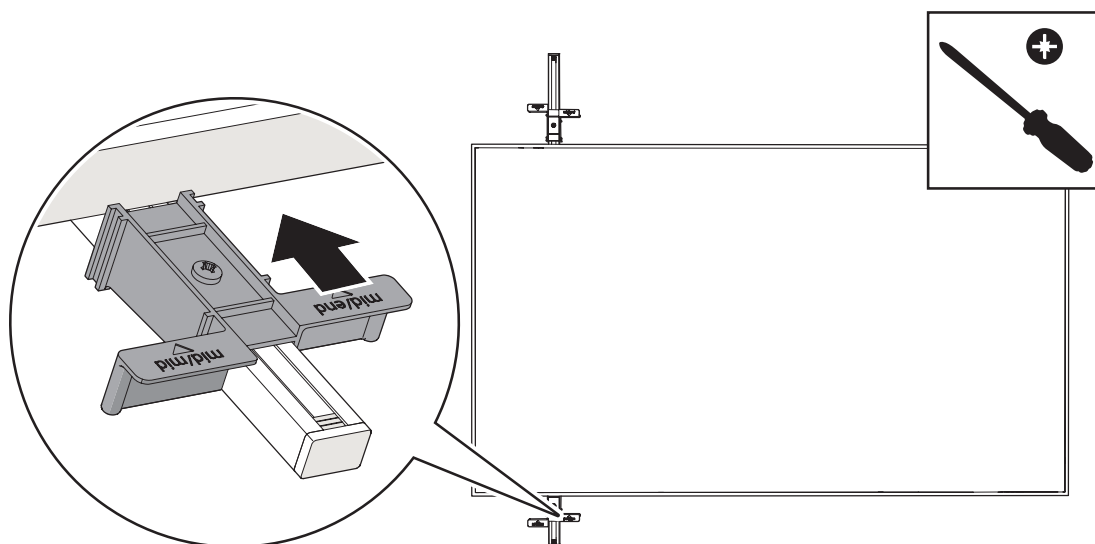




ATTENTION! For larger installations, it is recommended to use several sizing tools.

Use the provided measuring tool, 4 for positioning the rails accurately.

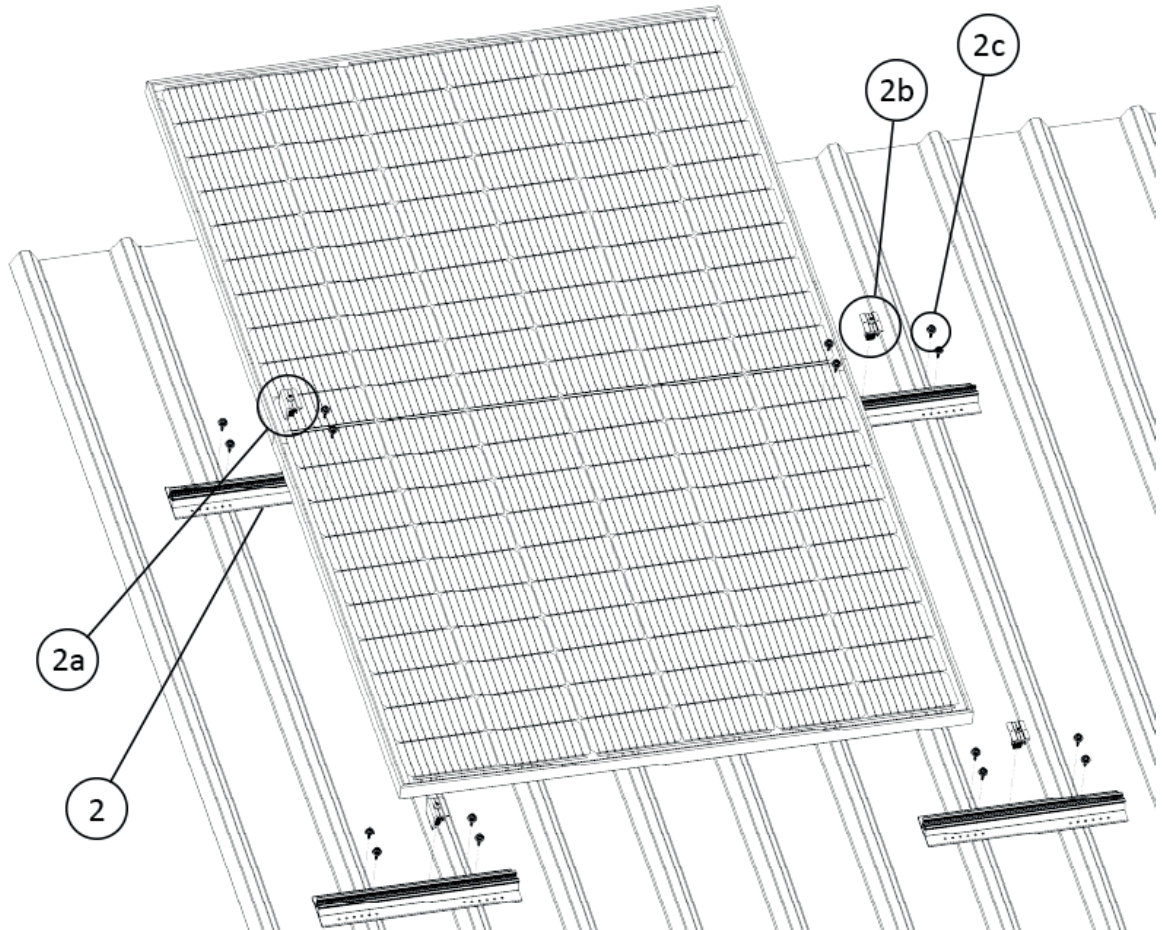
1. To adjust the sliding block, loosen the screw a few turns. Use a Philips screwdriver to do this.
2. Place the sizing tool on the short size of a panel.
3. Slide the sliding blocks against the side of the panel and screw them in place.





ATTENTION! Section 3 describes installation steps for Portrait Mounting only! Please skip to Section 4, if your system will be mounted in Landscape orientation.

Exploded view, refer to Section 2.2.1 for component numberings.

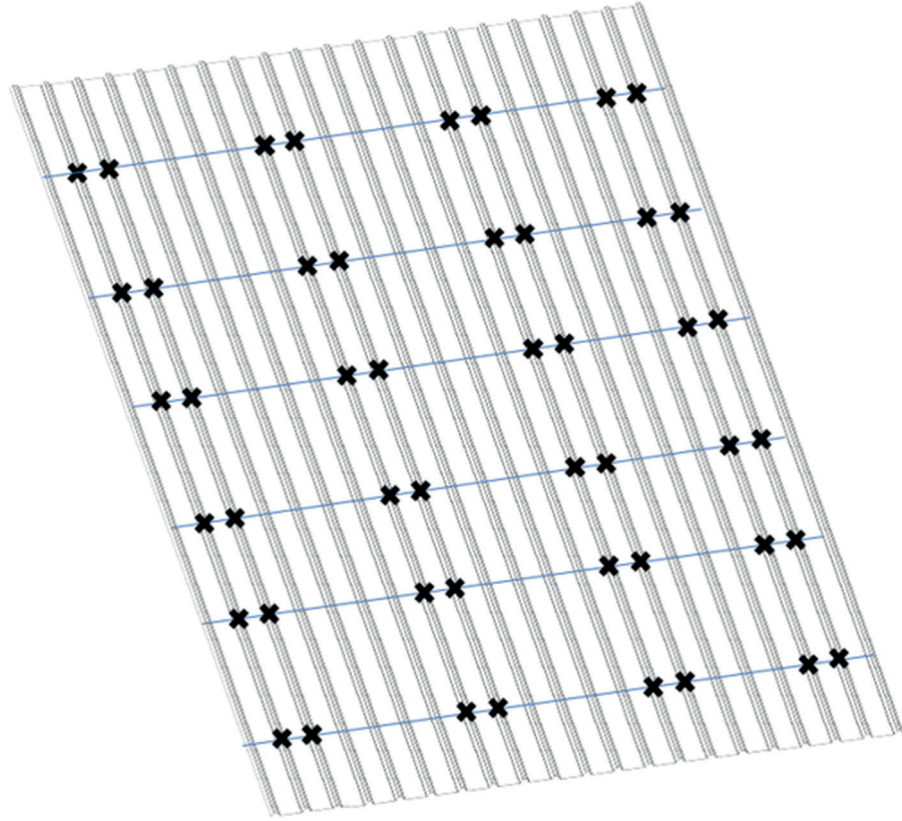


An overview of the installation steps for the Minirail Portrait Mounting System in exact order:

- 3.1. Marking the position of mounting rails
- 3.2. Mounting rails onto the roof
- 3.3. Attaching clamps onto the rails
- 3.4. Mounting modules onto the clamps

Marking the position of mounting rails

1. Refer to Section 2.5 for the recommended rail (R1 & R2) distances.
2. Using a chalk or marker pen, mark points on the roof where the rails will be installed.
Using a chalk line, you may also mark the outer contours of the field.

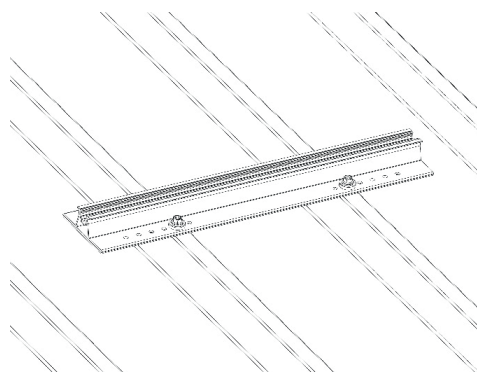
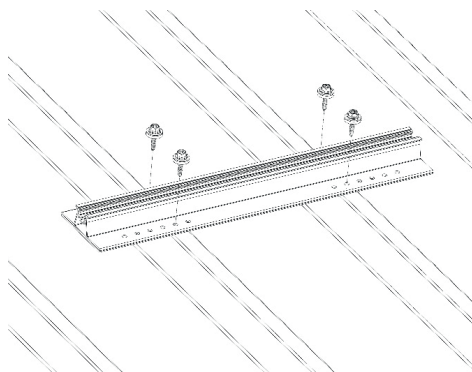


Mounting portrait rails onto the roof

1. Align mounting profile to the points marked in 3.1.
2. Adjust the minirail to line up holes with the ridges of the roof sheet.
3. Add the necessary roofing screws to secure the minirail to the roof sheet.
4. Repeat steps 1 to 3, to install all profiles on the roof.

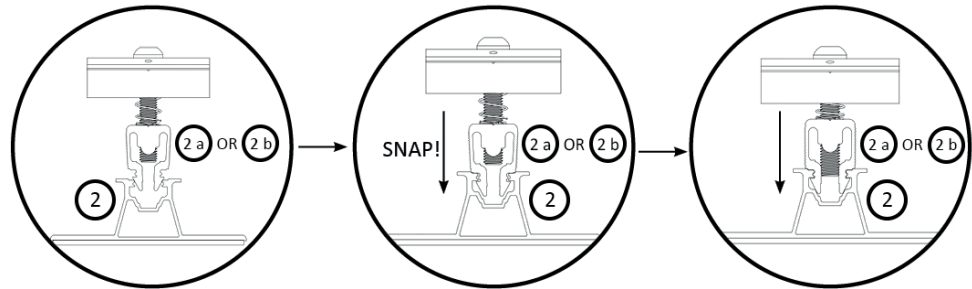


ATTENTION! DO not overtighten screws or bolts during installation (8 – 10 Nm).



End clamps and mid clamps for portrait mounted minirail systems can be easily screwed into the rails, using the steps given below. We use the middle clamps for this illustration, but the steps remain the same for end clamps.

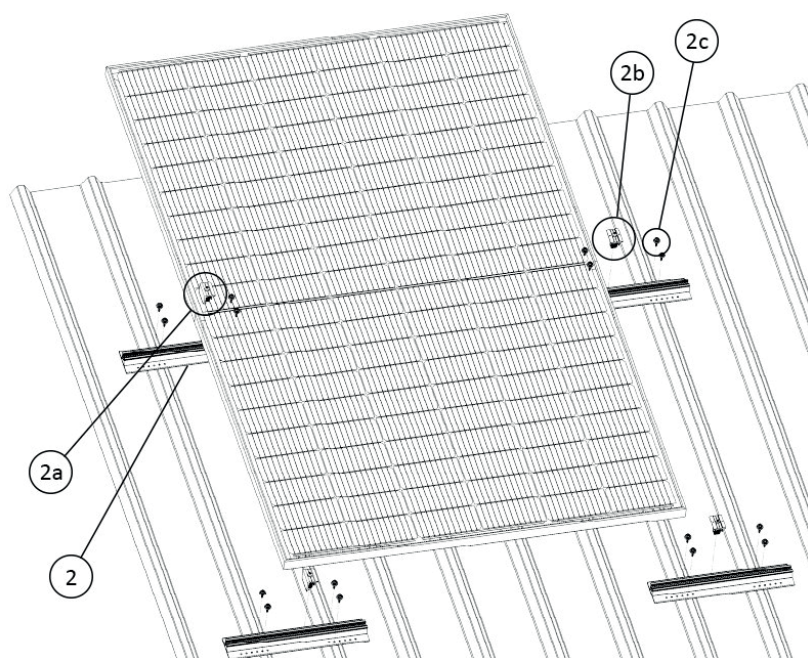
1. Hinge both legs of the clamp into the rail.
2. Press firmly down to snap the hinged legs in place.
3. Slide the clamp into the desired position on the rail and screw bolt to fix position.



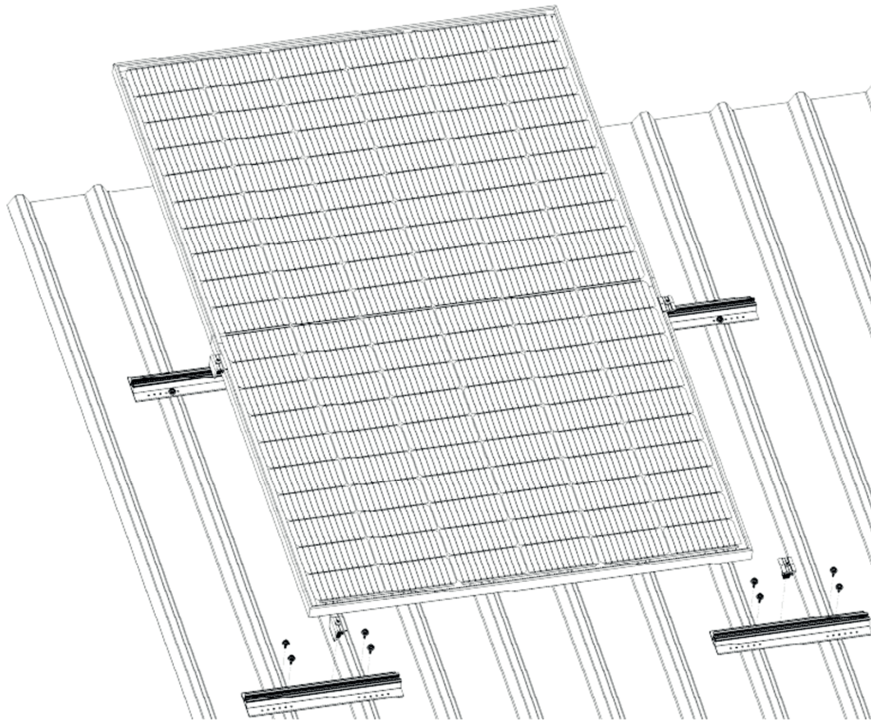
Mounting modules onto the rails Portrait orientation

First module with end clamps

1. At either end of the installation, assemble two end clamps (see 3.3.1).
Ensure less than 30cm rail is protruding outwards of the end clamp (OH).
2. Position the solar module in **portrait** orientation on the rails and align against the end clamps.
3. Tighten preassembled screws on the end clamps and fix the solar panel on to the rails.



4. Assemble middle clamps (see 3.3.1) onto the mounting profile and slide left to align with the adjacent module.
NOTE! Do not tighten the clamps yet.
5. Position the solar module in portrait orientation on the rails and align against the middle clamps.
6. Connect the panel cables to the previous panel.
7. Tighten preassembled screws on the middle clamps and fix the solar panel on to the rails.
8. Repeat steps 1 to 3 until the final solar module along the rails is installed.



9. Assemble two end clamps (see 3.3) onto the mounting profile and slide left to align with the final module.
10. Tighten preassembled screws on the end clamps and fix the solar panel on to the rails.

Installation complete!

Repeat installation section 3.4 to complete remaining section of rows!



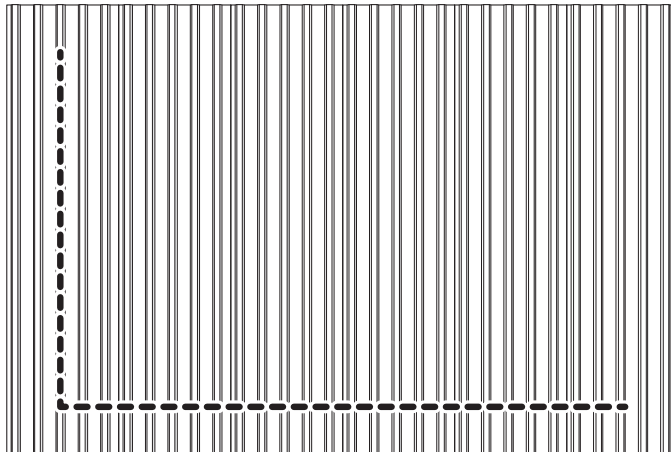
ATTENTION! Section 4 describes installation steps for Landscape Mounting only! Please go to Section 3, if your system will be mounted in Portrait orientation.

An overview of the installation steps for the Minirail landscape mounting system in exact order:

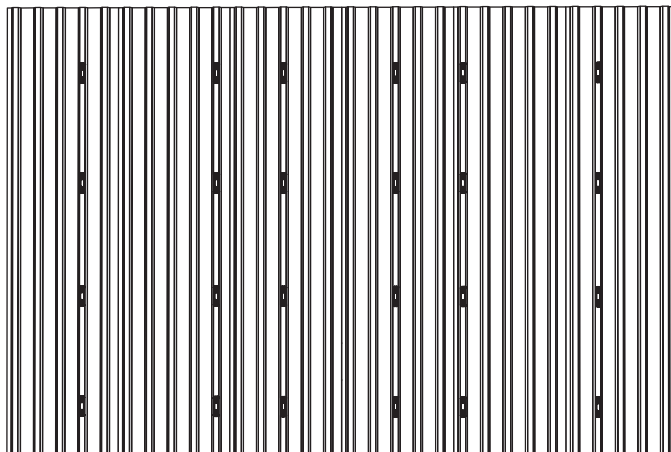
- 4.1 Marking the position of mounting rails
- 4.2 Mounting Landscape rails onto the roof
- 4.3 Attaching clamps onto the rails
- 4.4 Mounting modules onto the clamps – Landscape orientation

4.1 Marking the position of mounting rails

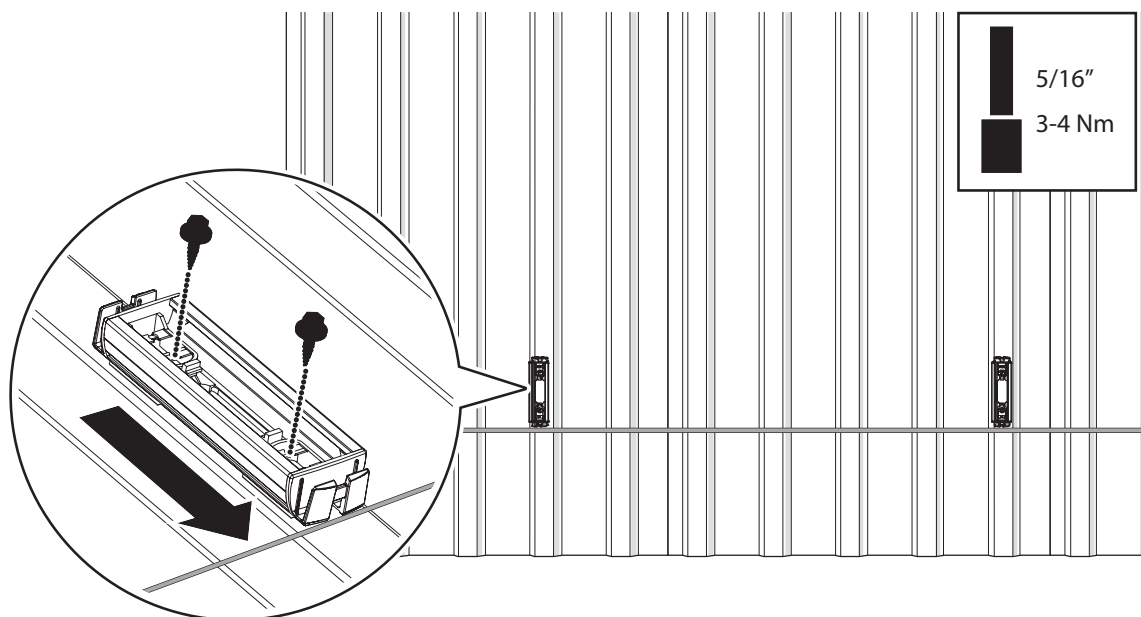
1. Refer to Section 2.5 for the recommended rail ($R1$ & $R2$) distances.
2. Use a chalk or marker pen to mark the contours of the field.



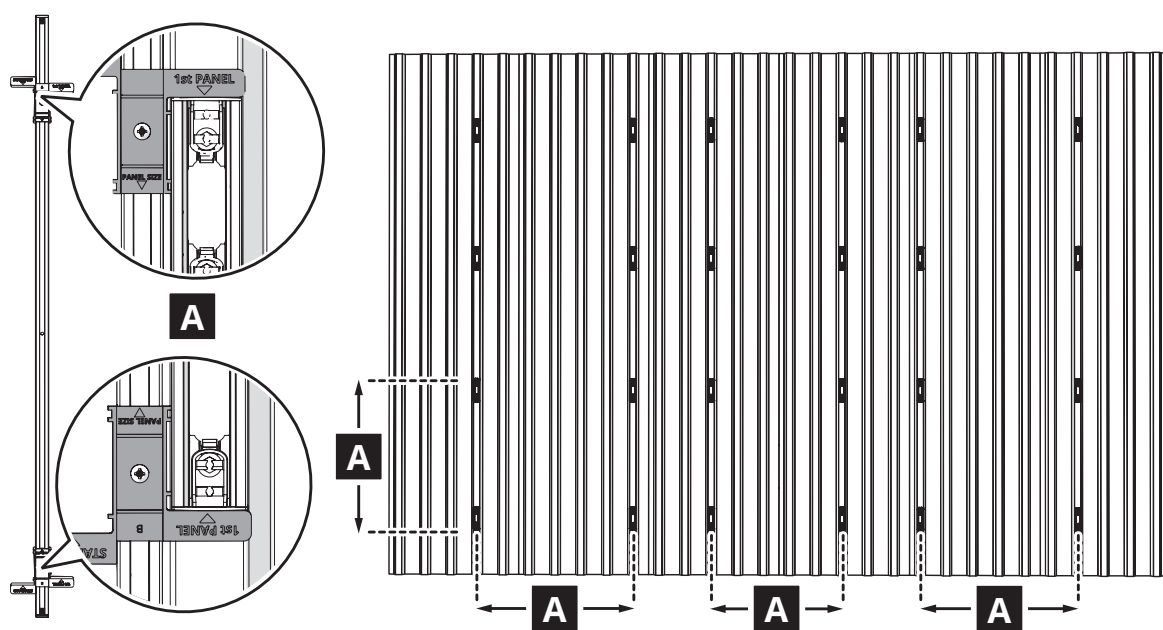
3. Measure and identify position of the mounting rails using the provided tool. Simultaneously, mark points on the roof where the rails will be installed.



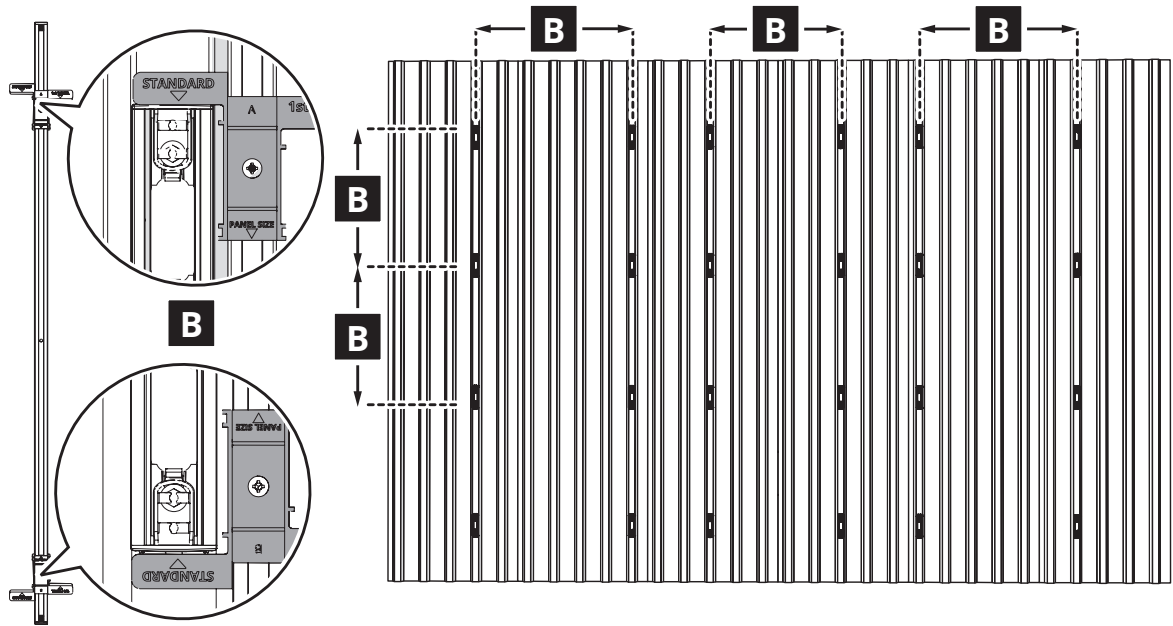
1. Align the mounting profile to the points marked in 4.1.
2. Tighten the two preassembled screws of the mounting profile onto the roof.



3. Repeat steps 1 and 2 to install the first horizontal row of mounting profiles.
4. Insert the sizing tool 4 into the cable clamp of the profile to be installed. Ensure the arrow on the sizing tool points towards the mounting profile.



5. Insert the sizing tool into the cable clamp of the installed mounting profile.
6. Screw on the next profile.



7. Repeat steps 4 to 6 to install the remaining rows of mounting profiles.



ATTENTION! For installing the remaining mounting profiles, use the sizing tool in position B with the STANDARD section.

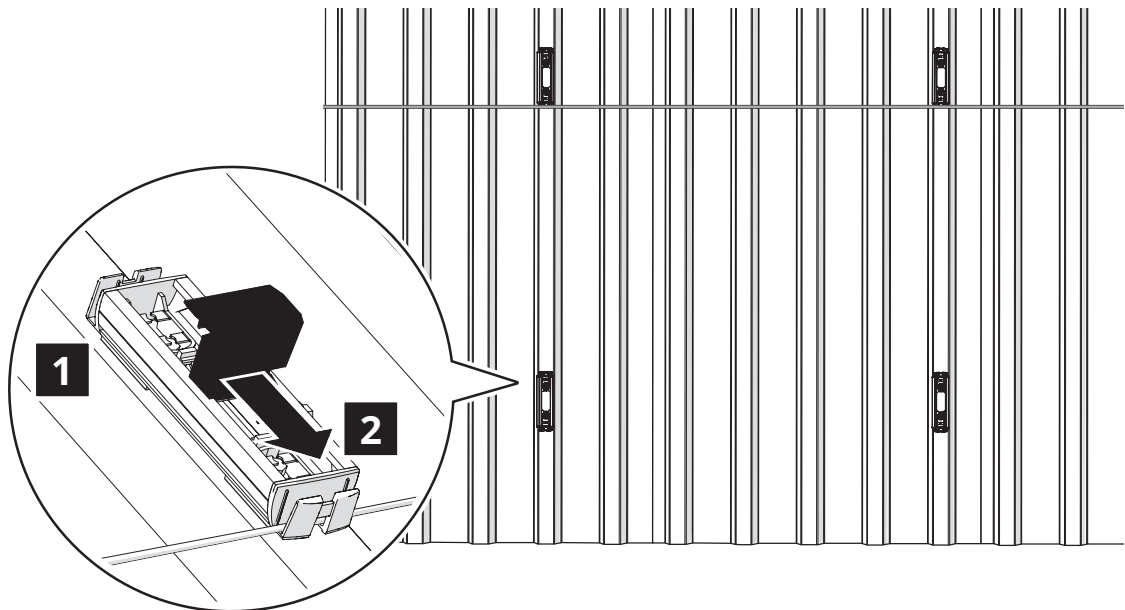
4.3

Attaching clamps onto the rails

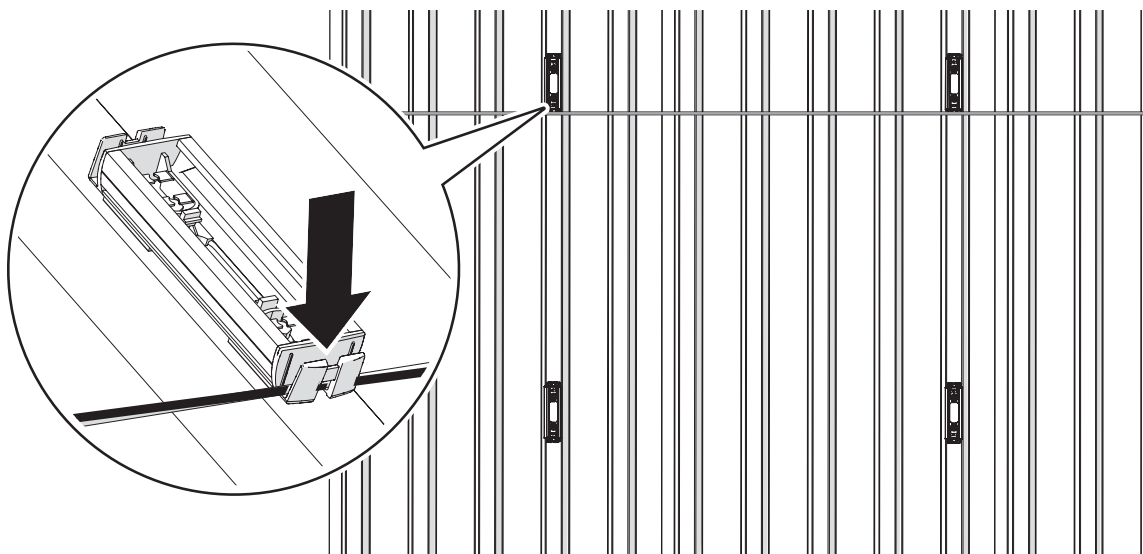


ATTENTION! All clamps for landscape system are inserted clockwise into the minirail and removed counterclockwise.

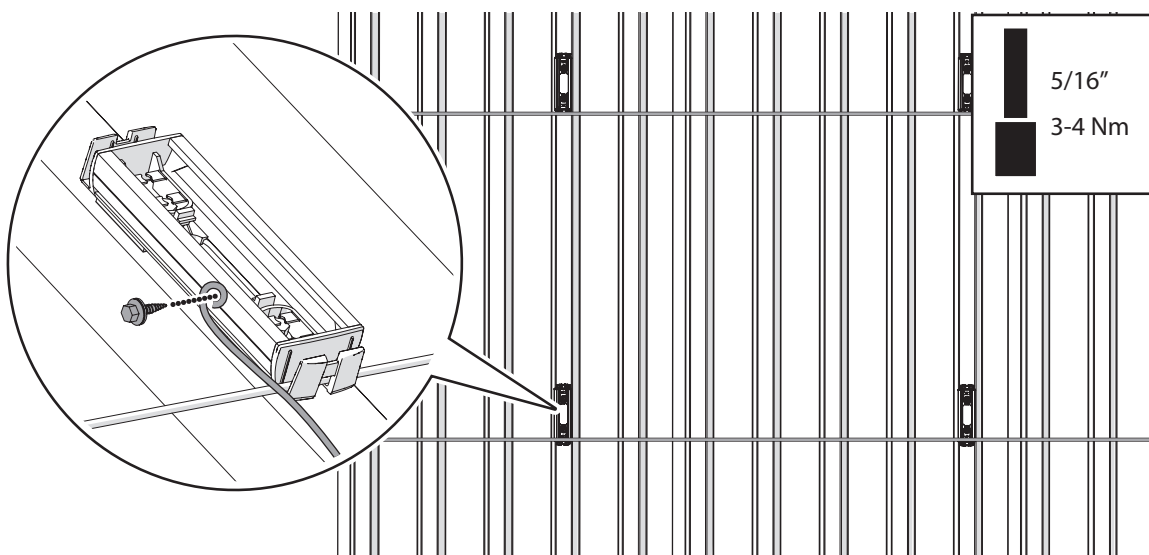
End clamps and mid clamps for landscape mounted minirail systems can be easily snapped into the rails, using the steps given below. We use the end clamps for this illustration, but the steps remain the same for end clamps.



- Place an end clamp in the first row of mounting profiles and slide it to the end of the mounting profile against the stopper.



- You can clamp the return cable of the solar panels into the lower cable clamps! This neatly conceals the return cable.

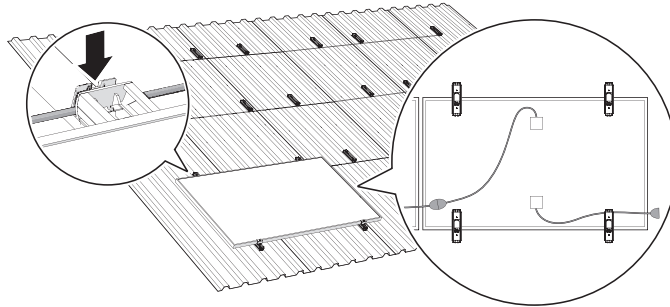


- **Optional!** Install the earthing cables to the lower mounting profiles with a self-driving screw.

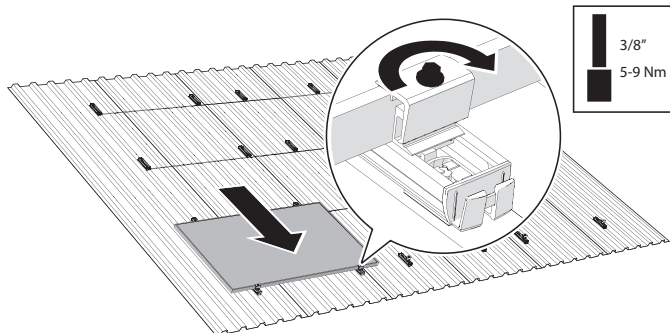
4.4.1

First module row with end clamps

1. Position first panel against two end clamps at the corner of the installation.
2. Clamp the panel cable into the top cable clamp.



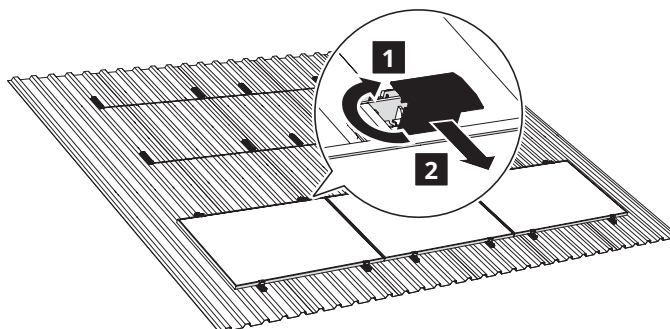
3. Lower the panel and align. Tighten screws of the preassembled end clamps 3a and fix the sol
4. Position the second panel against the next two end clamps.
5. Connect the panel cables to the previous panel.



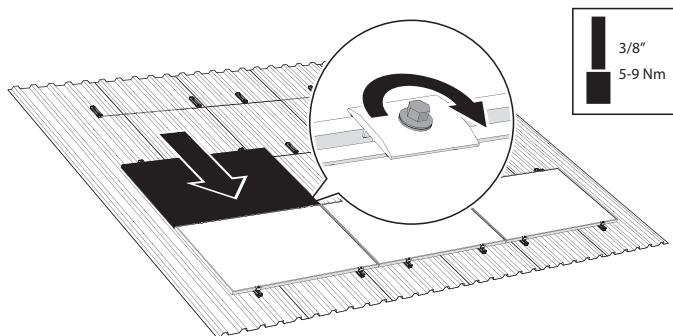
6. Clamp loose panel cable into the next clamp.
7. Tighten the screws of the next two end clamps.
8. Repeat steps 4 to 8 to place the first row of solar panels.

4.4.2

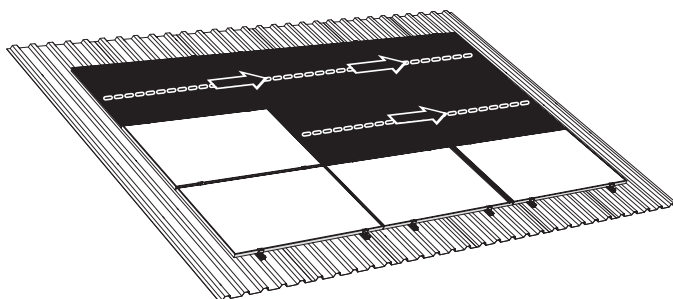
Module row with middle clamps



9. In the next row, place middle clamps (see 4.3) and slide against the first row of installed panels.



10. Position a panel against the middle clamps and align.
 11. Connect panel cable to the return or another row.
 12. Clamp the loose panel cable into the next cable clamp.
 13. Lower the panel and tighten screws of the two mid clamps.

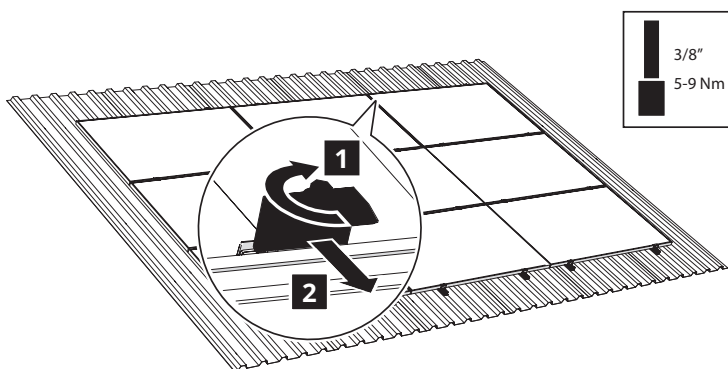


14. Align the next panel and repeat steps 10 to 14 to place the remaining rows of solar modules.

4.4.3

Final module with end clamps

15. Place an end clamp in the last two of mounting profiles and slide it against the last row of installed panels.
 16. Tighten preassembled screws on the end clamps and fix the solar panel on to the minirail.



Installation complete!

To comply with European Directive 2002/96/EC on waste Electrical and Electronic Equipment and its implementation as national law, electrical equipment that has reached the end of its life must be collected separately and returned to an approved recycling facility. Ignoring this EU Directive may have severe effects on the environment and your health.