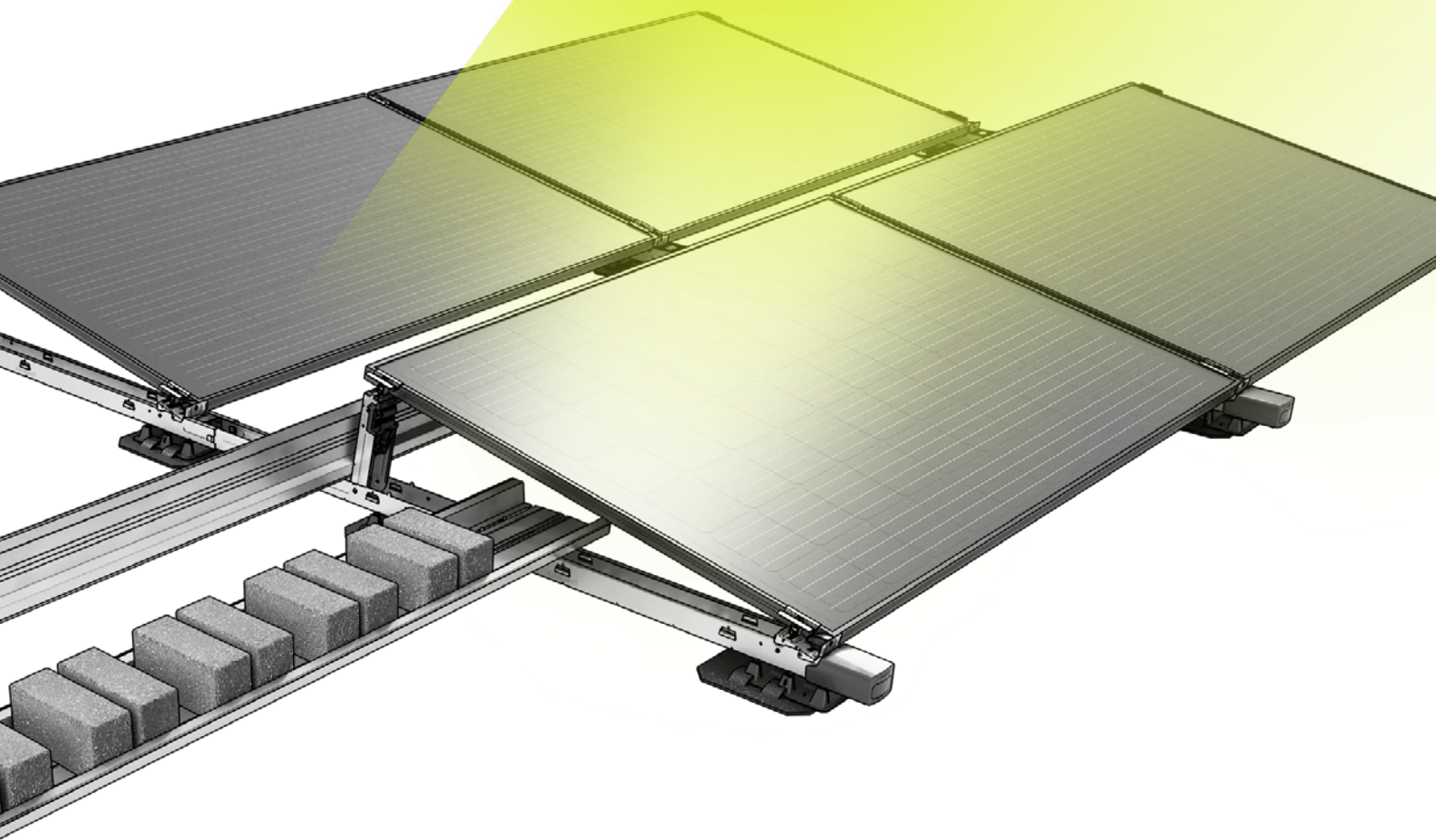


ENSTALL

blubase

Connect XL Single landscape Manual



Connect

TABLE OF CONTENTS

Introduction	3
Warranty and liability	3
Warranty	3
Liability	3
Product information	4
Intended use	4
Specifications	4
Requirements for the work environment	4
System and application	5
1. Components	5
Safety	6
1. Personal protective equipment	6
2. Safety warnings and regulations	6
Installation	7
1. Preparation	7
2. Place the base elements	9
3. Place ballast	14
4. Mounting the solar panels	16
5. Placing back plates	20
6. Installing side deflectors	22
7. Placing end caps	23
Annexes	24
A. Cable management	24
B. Cable tray	25
C. Spare parts list	27
D. Lightning protection	28

INTRODUCTION

ABOUT THIS DOCUMENT

This manual covers the installation instructions for the Enstall Connect XL mounting system for solar panels on flat roofs with roofing materials made of concrete, bitumen, EPDM, TPO, and PVC. For other roof materials, please contact your supplier.

The mounting system is suitable for mounting solar panels in single and dual landscape orientation. This document covers single landscape setup.

These instructions are addressed at qualified technical personnel.

You can download the latest version of this manual from eu.enstall.com.

OTHER RELEVANT DOCUMENTS




When installing the Enstall Connect XL mounting system, you will need the following documents in addition to this manual:

- The project plan, which you can create in the calculator at <https://calculator.enstall.com>.
- The installation manuals for the solar panels, inverters and any other components.

During the installation of the mounting system, it is important to adhere to the installation manual, the installation manual of the components, and the accompanying standards to prevent accidents. Pay special attention to (local) standards, regulations and legislation (among others):

- Local Building Regulations (latest version)
- Health and Safety at Work etc Act 1974
- Health and Safety in Roof work - HSE
- Eurocodes 0 (EN 1990 - Structural Design)
- Eurocodes 1 (EN 1991 - Influences on structures)
- HD-IEC 60364 series - Electrical installations for low voltage
- EN-IEC 62305-2 - Protection lightning - Risk Management
- MIS 3002 – The solar PV standard
- MCS012 - Product Certification Scheme Requirements: Pitched Roof Installation Kits

SYMBOLS USED IN THIS MANUAL

	Warning!	Failure to follow this instruction could result in serious injury or major damage to the product.
	Caution!	Failure to follow this instruction could result in personal injury or damage to the product.
	Note	Emphasises an instruction.

WARRANTY AND LIABILITY

WARRANTY

The warranty is subject to the warranty terms and general terms & conditions of Enstall. These can be found on the website eu.enstall.com.

LIABILITY

Enstall accepts no liability for damage or injury caused by the failure to comply (strictly) with the safety guidelines and instructions in this manual, or by negligence during installation of the product and the accessories listed in this document.




Enstall reserves the right to change this document without notice.

PRODUCT INFORMATION



INTENDED USE

The Enstall Connect XL Single mounting system is intended for mounting solar panels on flat roofs. With this mounting system you can install solar panels with the long side at the bottom (landscape). The mounting system is intended to be installed in a single arrangement.

SPECIFICATIONS

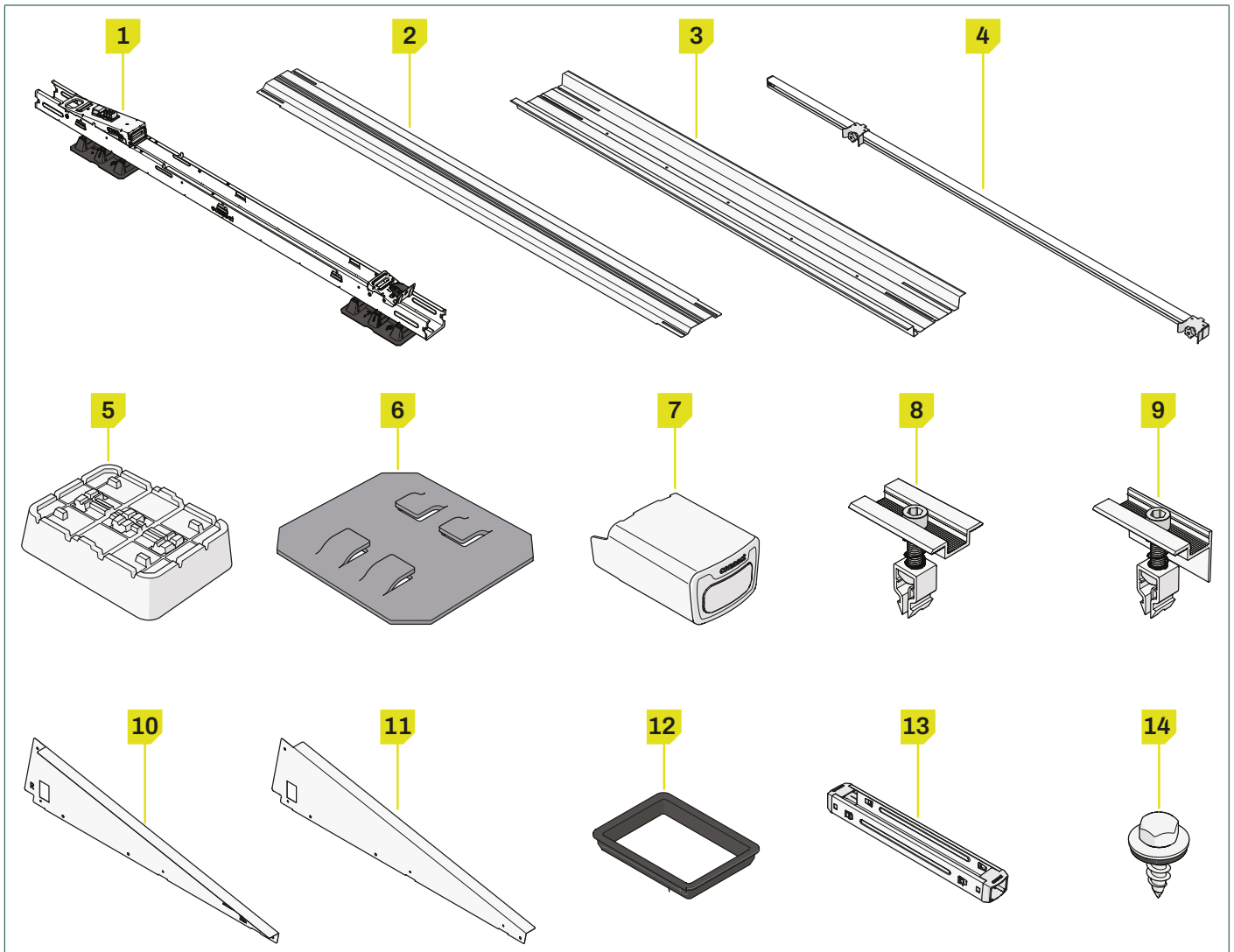
Orientation of solar panels	Landscape
Frame height of solar panel	30-35 mm
Maximum dimensions of solar panels	Length: 1663 mm - 2126 mm Width: 1130 mm - 1150 mm
Maximum field size	40 × 40 m per segment
Roof material	Concrete Bitumen EPDM PVC TPO
Roof pitch	0 - 5°  If your roof slope is > 5°, please contact your supplier.
Maximum roof height	 Subject to Eurocode guidelines and national additions. Use the calculator to calculate the possibilities of your project.
Edge zone	 Calculate the edge zone with the calculator.

REQUIREMENTS FOR THE WORK ENVIRONMENT

	The roof is in good condition. When in doubt, contact an expert for an inspection.
	The roof construction has sufficient bearing capacity to support the installation, taking into account wind and snow loads. When in doubt, contact a construction engineer.

SYSTEM AND APPLICATION

1. Components



Component

1	Connect XL base element	10	Connect XL side deflector left
2	Connect rear deflector	11	Connect XL side deflector right
3	Connect ballast tray	12	Connect cable grommet
4	Connect Solarsteller	13	Connect coupler
5	Connect leveling block	a.	Connect east-west coupler
6	Connect friction mat	b.	Connect 1700 coupler
7	Connect end cap	c.	Connect 1500 coupler
8	Easy mid clamp	d.	Connect 1320 coupler
9	Easy end clamp	14	Cladding screw Connect 6.5x19mm

i Check that the correct components are present in the required numbers according to the project plan generated by the calculator.

i Anchoring components are not included in this document. For anchoring instructions and articles, please refer to the dedicated Anchoring Manual.








SAFETY

1. Personal protective equipment



			
Hearing protection	Safety helmet	Safety glasses	Face masks
			
Safety gloves	Safety clothing	Safety shoes	

2. Safety warnings and regulations

Warning!





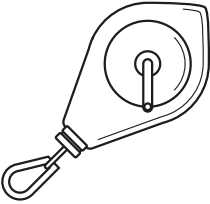
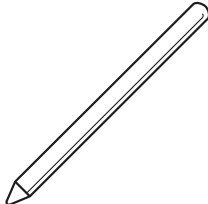
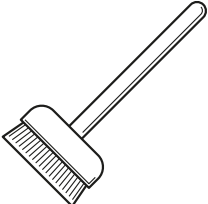
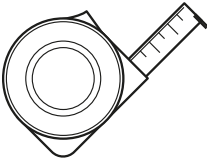
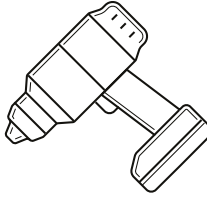
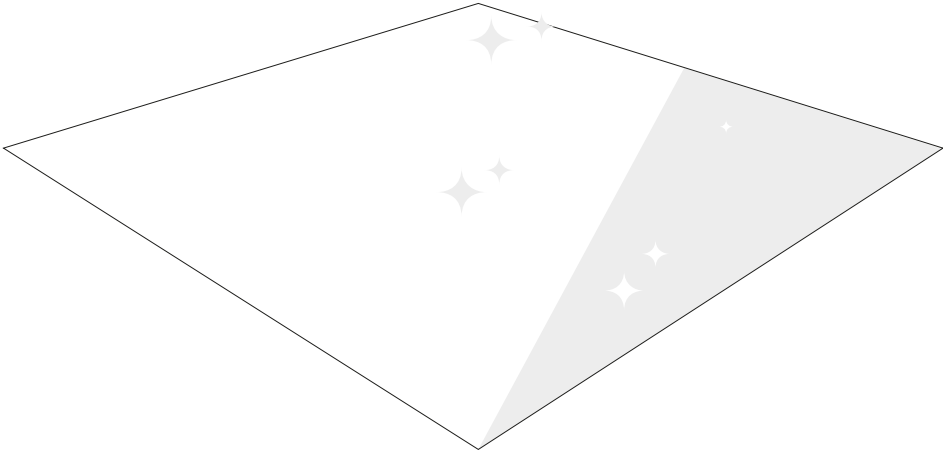
-  Installation work should always be carried out by at least two people.
-  Do not use components from other mounting systems.
-  Do not leave out parts.
-  Always work according to the current regulations for working on roofs.
-  Do not perform the installation in strong winds, or when the roof is slippery or wet.
-  Always work on the roof with fall protection and, if necessary, with safety nets and edge protection.
-  Always use a lifting aid or hoisting device when moving heavy equipment.

Caution!




-  Never walk on the system or on the solar panels.
-  Enstall is in no way responsible for the installation and/or connection of lightning protection on the roof. Get expert advice from your specialist and ensure that a safe installation can be guaranteed according to EN-IEC 62305 and HD-IEC 60364.

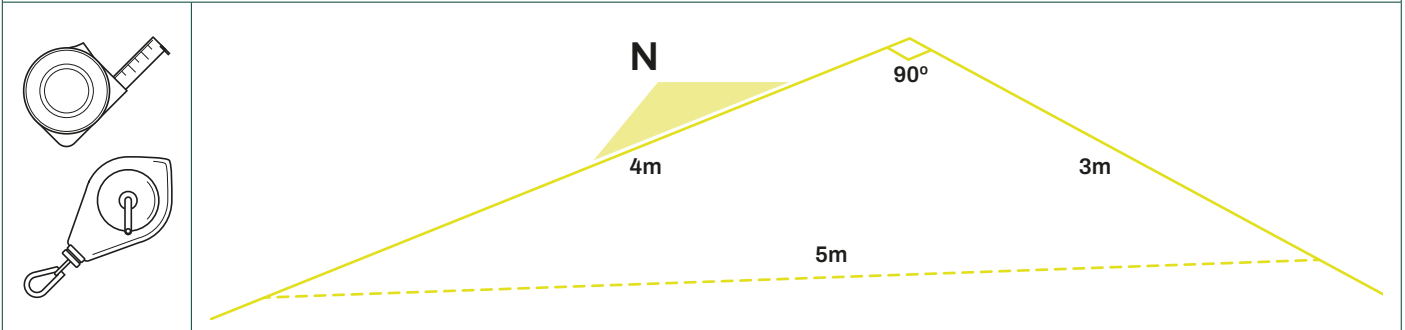
INSTALLATION

1. Preparation


1 Inspect the roof.				
	The roof is in good condition.			
	The roof construction has sufficient bearing capacity to support the installation, taking into account wind and snow loads.			
2 Check the project plan and components.				
	Check the project plan.			
	Check that all components are present (page 5).			
3 Make sure all the required tools are at hand.				
				
Chalkline tool	Marker or chalk	Broom	Tape measure	Cordless screwdriver
4 Clean and tidy the roof.				
				

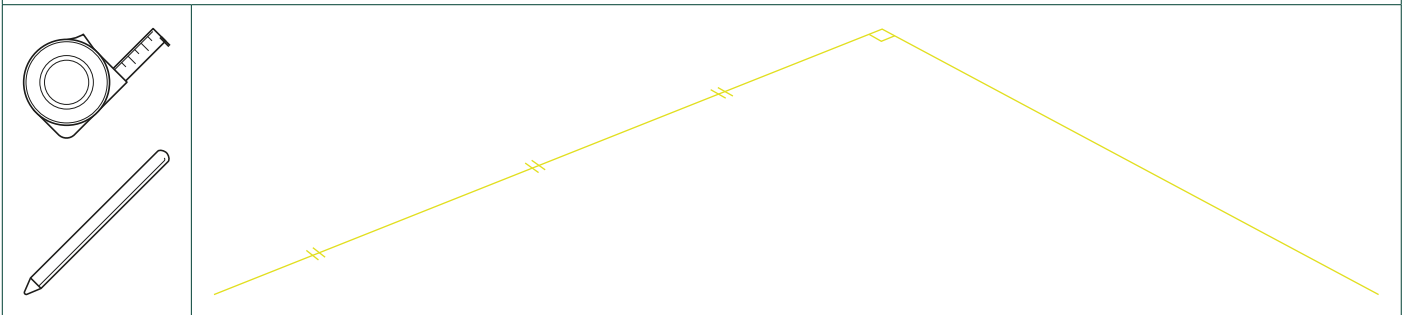
5 Draw the lines of the field and make note of the orientation of the north arrow.

-  Use the 3-4-5 rule to make sure the angle between your perpendicular lines is 90 degrees.
-  Consult the project plan to determine the position of the base elements for your project.
-  Take the starting point of the installation from the project plan.




6 Mark the position of the first Connect XL base element.

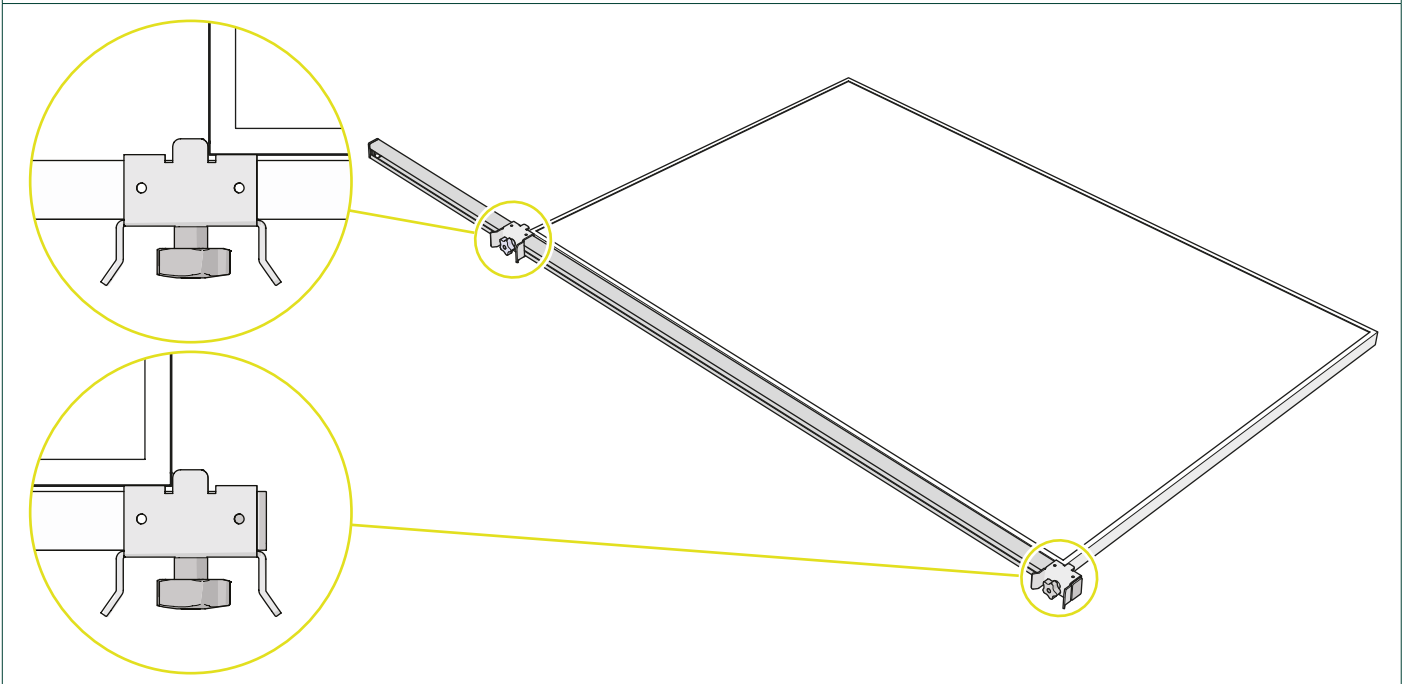
-  Be mindful of the edge zone. Consult the project plan to determine the position of the first base element.



7 Align the brackets of the Solarsteller to the corners of a solar panel.

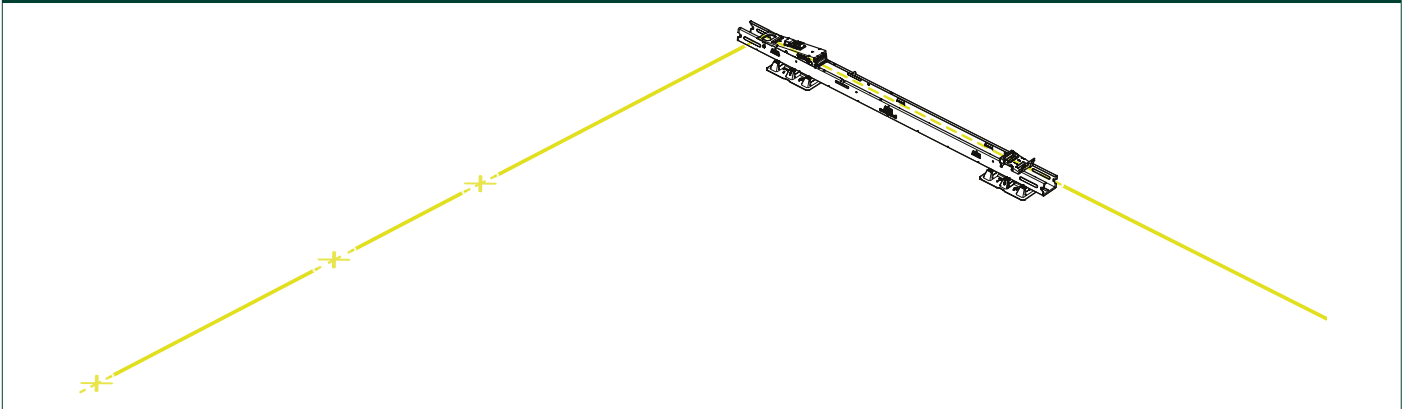
8 Duplicate the distance for all Solarstellers.

-  Tip: often, six Solarstellers are used to easily align and install the base elements.

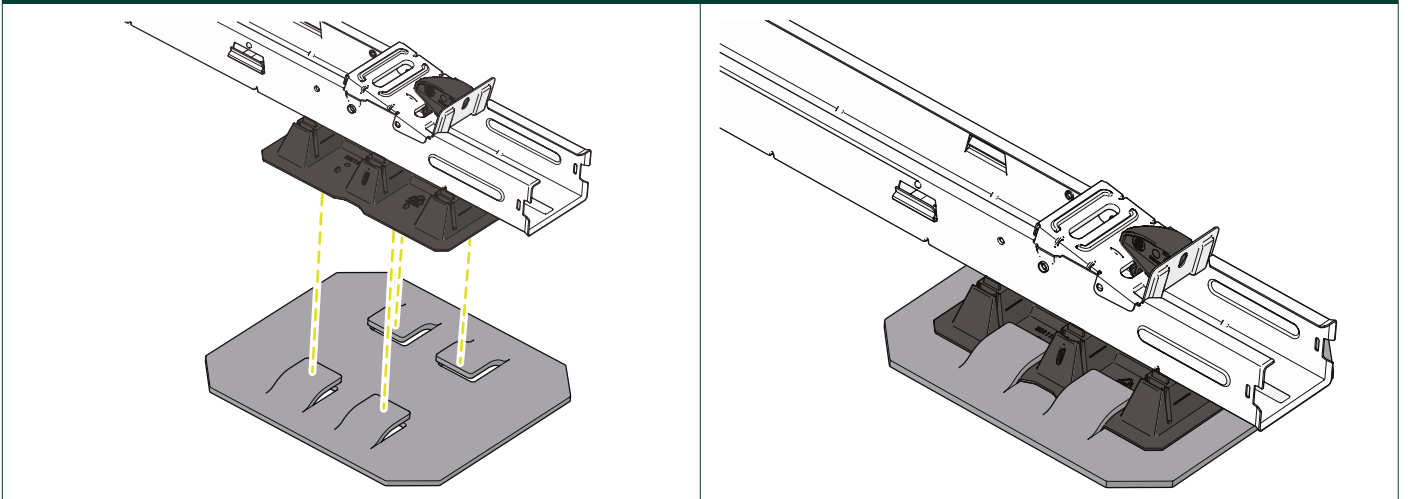


2. Place the base elements

- 1 Place the first base element on the roof and align the base element with the marked lines.



- 2 Optional: Add friction mats underneath the base plates of each base element.

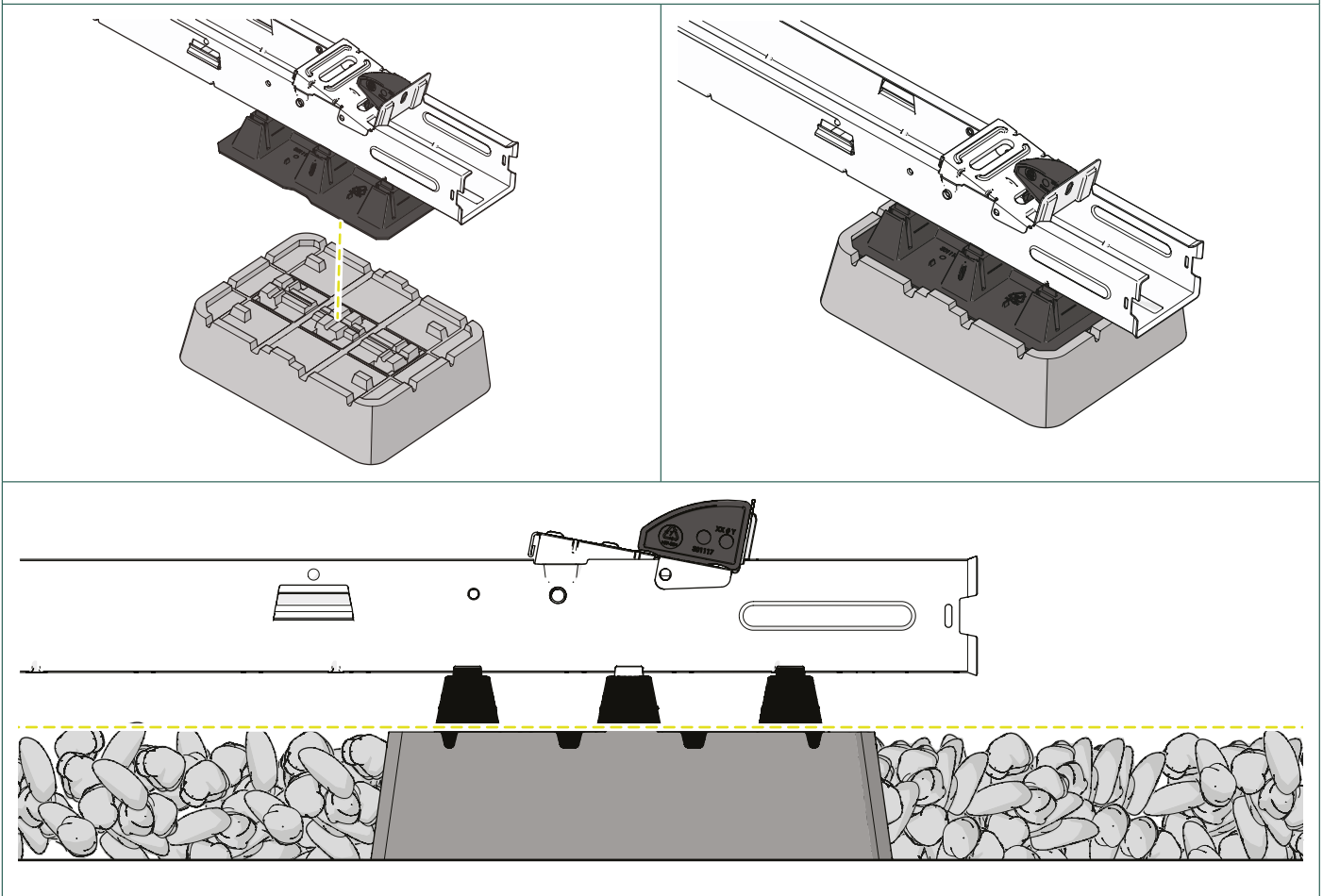


3 Situational: Place leveling blocks underneath the feet of each element when installing on roofs with pebbles.

4 Make sure the pebbles on the roof are level with the leveling blocks.

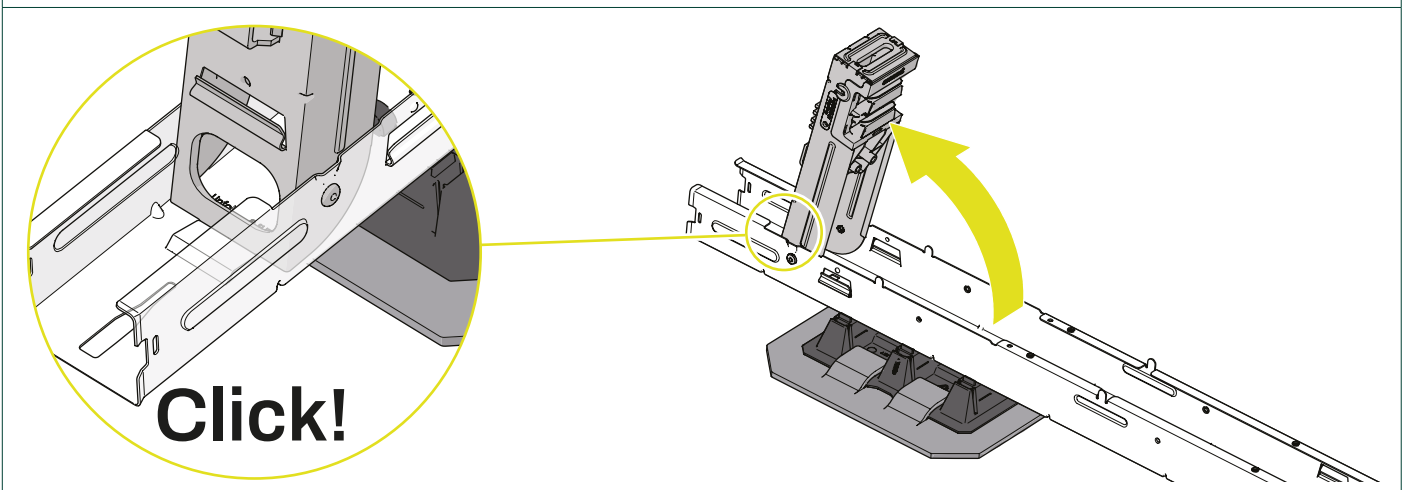
! Only use leveling blocks on roofs with pebbles. Do not use leveling blocks to raise the system from the roof, as this heavily increases the wind load on the solar panels.

i Remove all pebbles and debris from the positions of the leveling blocks.

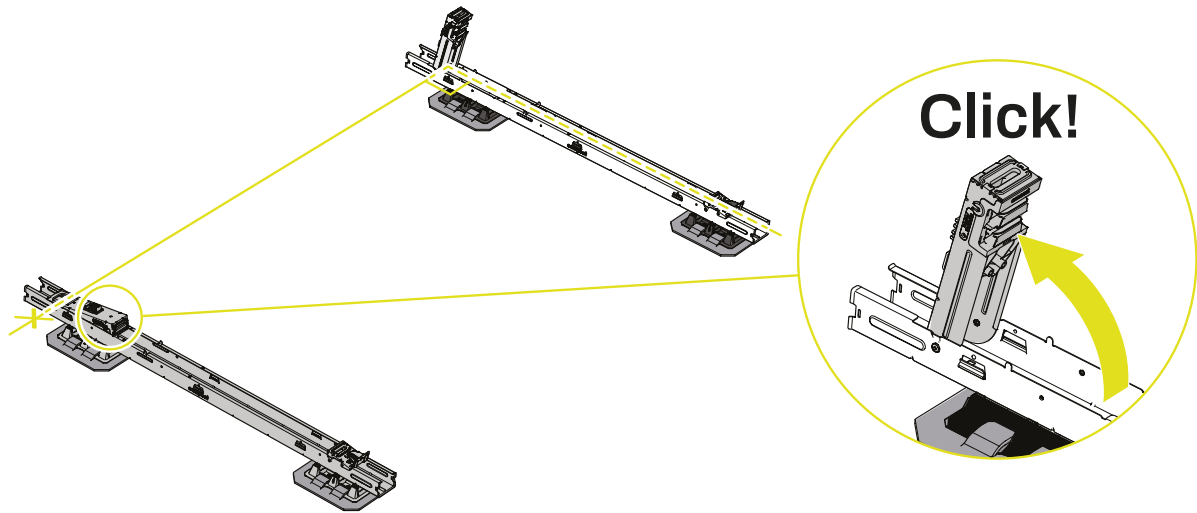


5 Tilt up the high base until it clicks into upright position.

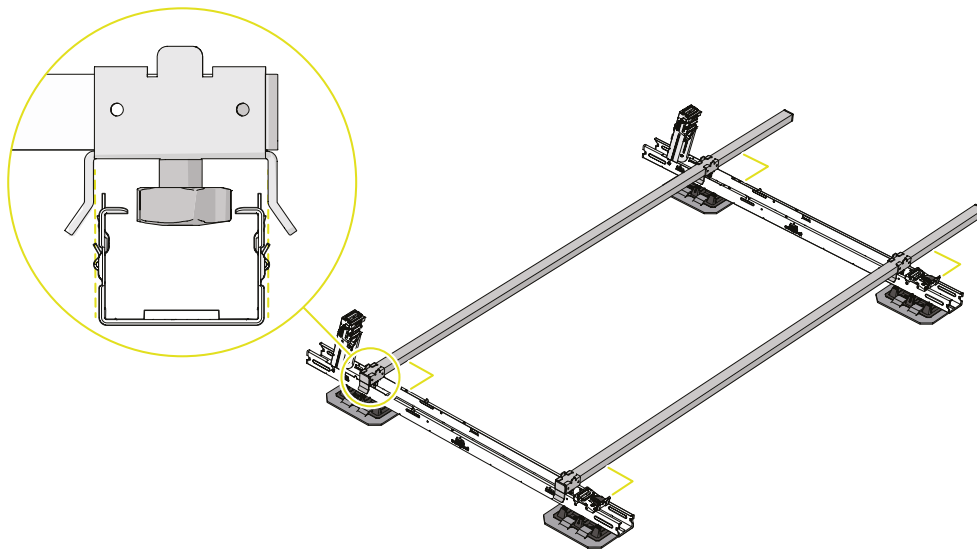
! Check that the base element is still aligned with the perpendicular lines.



- 6 Place the next base element on the roof.
- 7 Tilt up the high base until it clicks into upright position.

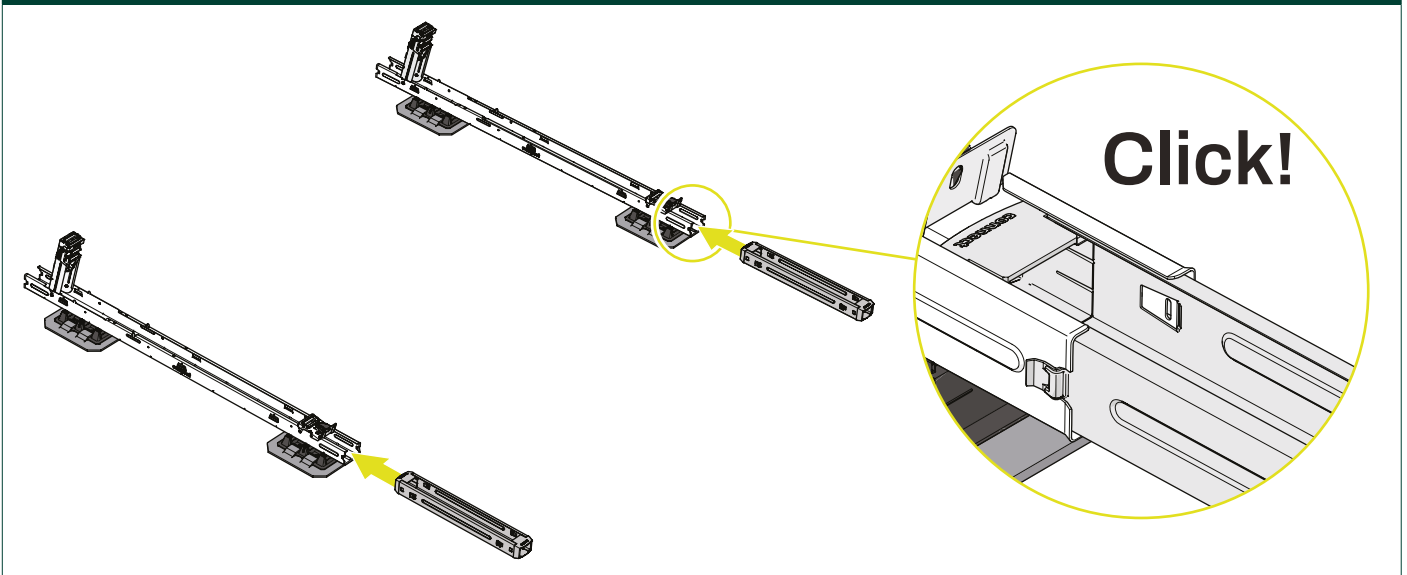


- 8 Use two Solarstellers to align the base elements perpendicular at the correct distance.




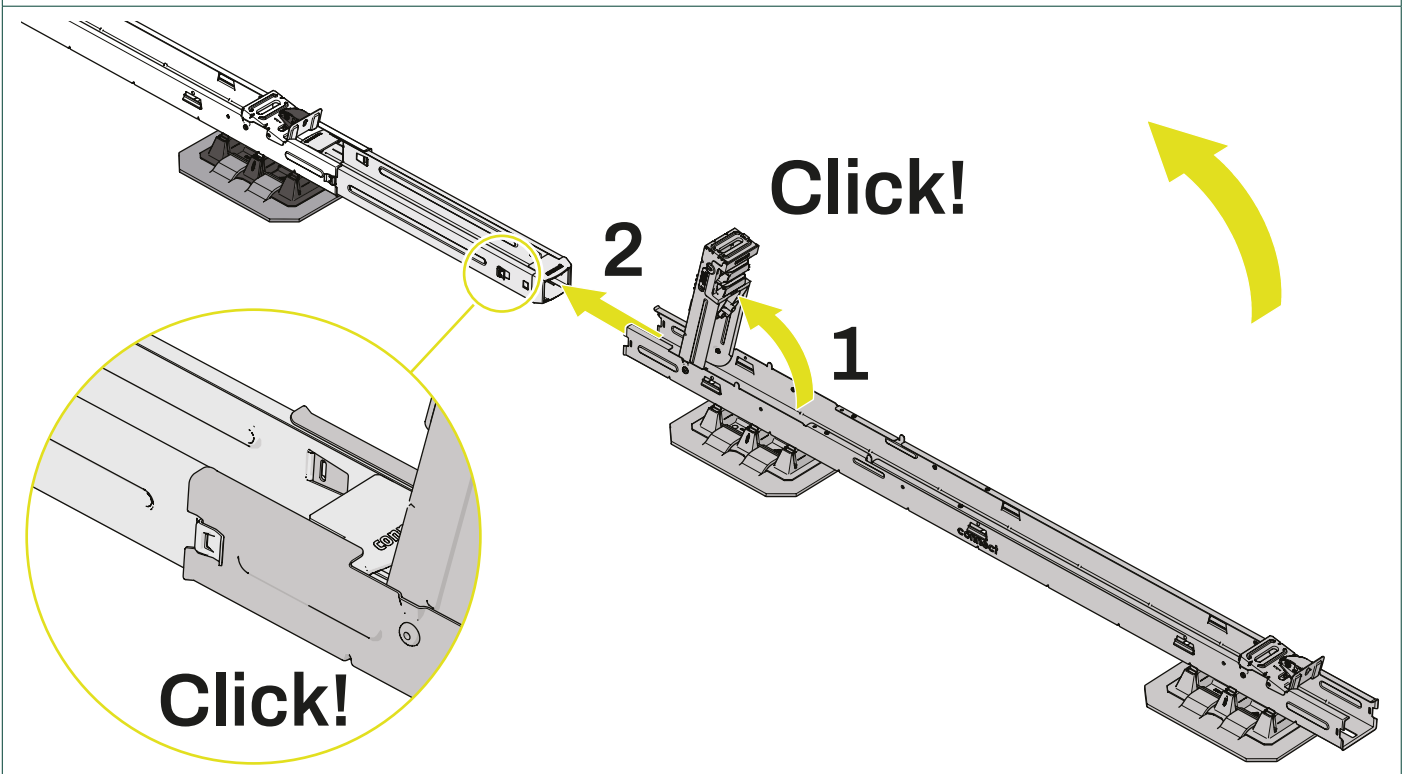
Repeat steps 2.1. - 2.8. for every module of the row.

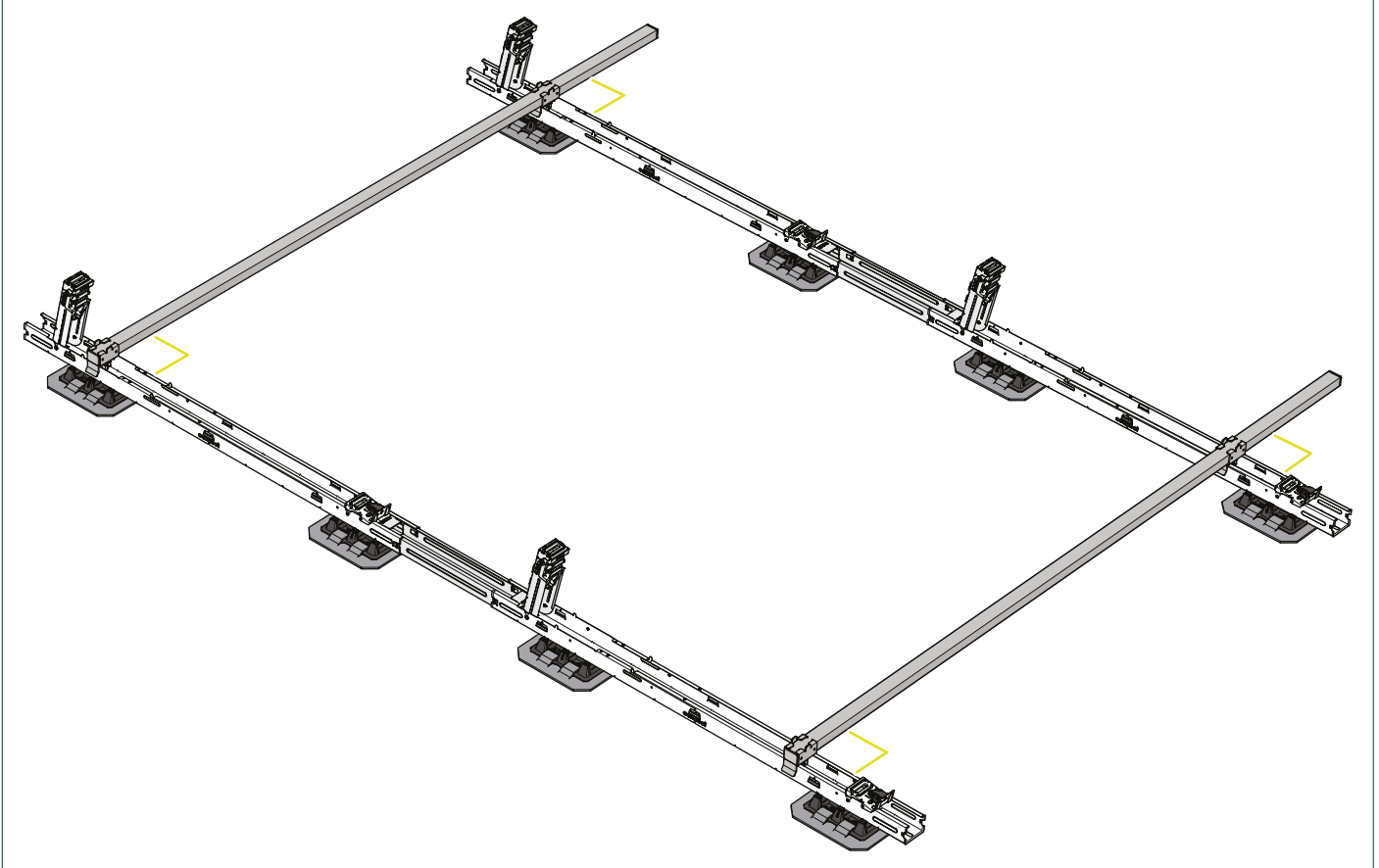
- 9 Extend the segment by inserting the coupler into the end of the base element until it clicks into place.



- 10 Tilt up the high base of the base element until it clicks into upright position.
11 Slide the base element over the coupler until it clicks into place.

 Tip: In this manual, the base elements are installed in south orientation. for east-west orientation, horizontally rotate every second base element 180 degrees.



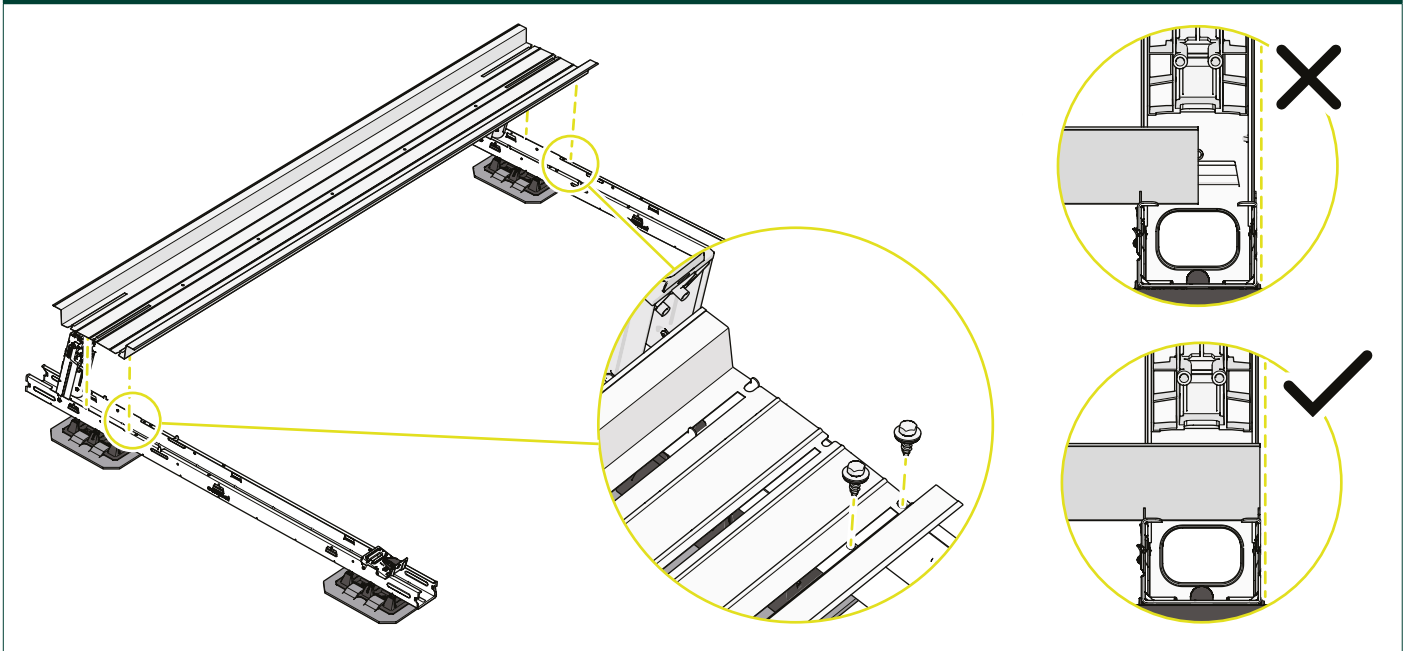
12 Realign the base elements using at least two Solarstellers.

3. Place ballast

- !** The calculator determines the ballast needed for your project. Follow the instructions from the project plan determined by the calculator. If anything changes in the layout of the solar panel field, the ballasting has to be recalculated.

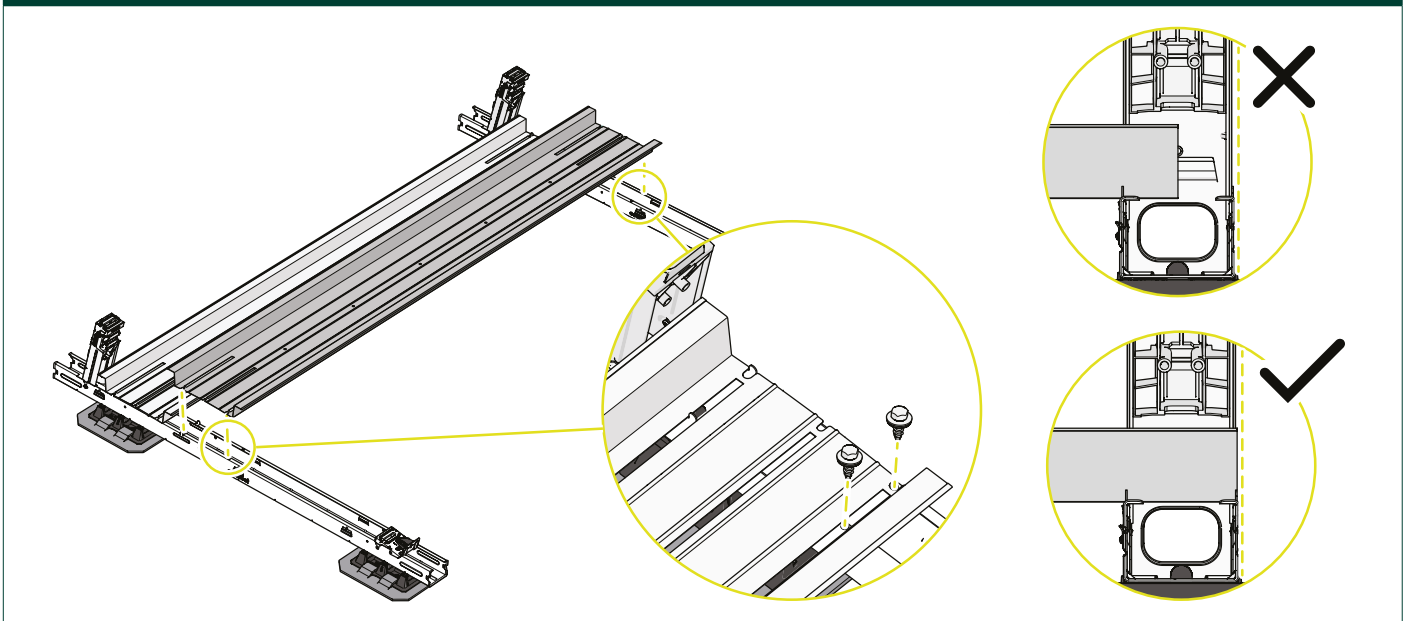
SINGLE BALLAST TRAY

- 1 Place the ballast tray over the base element in the position specified in the project plan.
- 2 Align the cut-outs in the ballast tray with the hole and flange of the base element.
- 3 Fix the ballast tray to each base element with two screws.



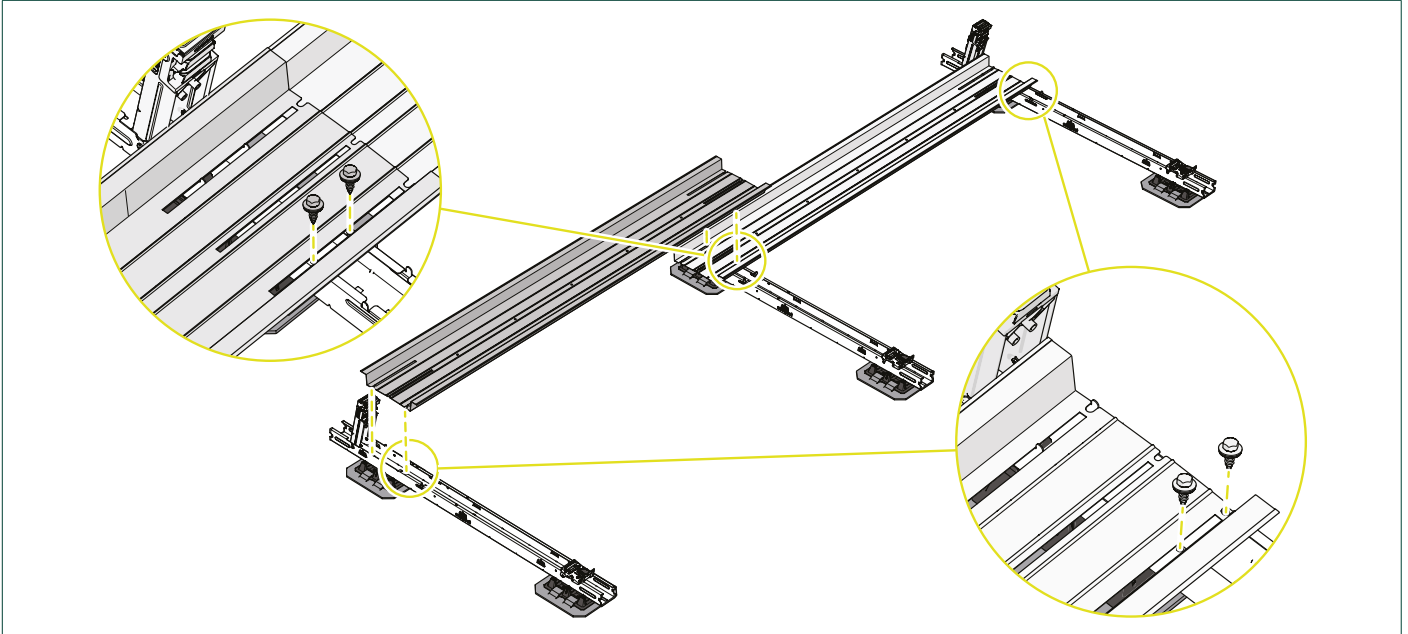
DOUBLE BALLAST TRAYS

- 1 Situational: Place a second ballast tray in front of the first ballast tray if the first ballast tray is full and more ballast is needed.
- 2 Align the cut-outs in the ballast tray with the hole and flange of the base element.
- 3 Fix the ballast tray to each base element with two screws.



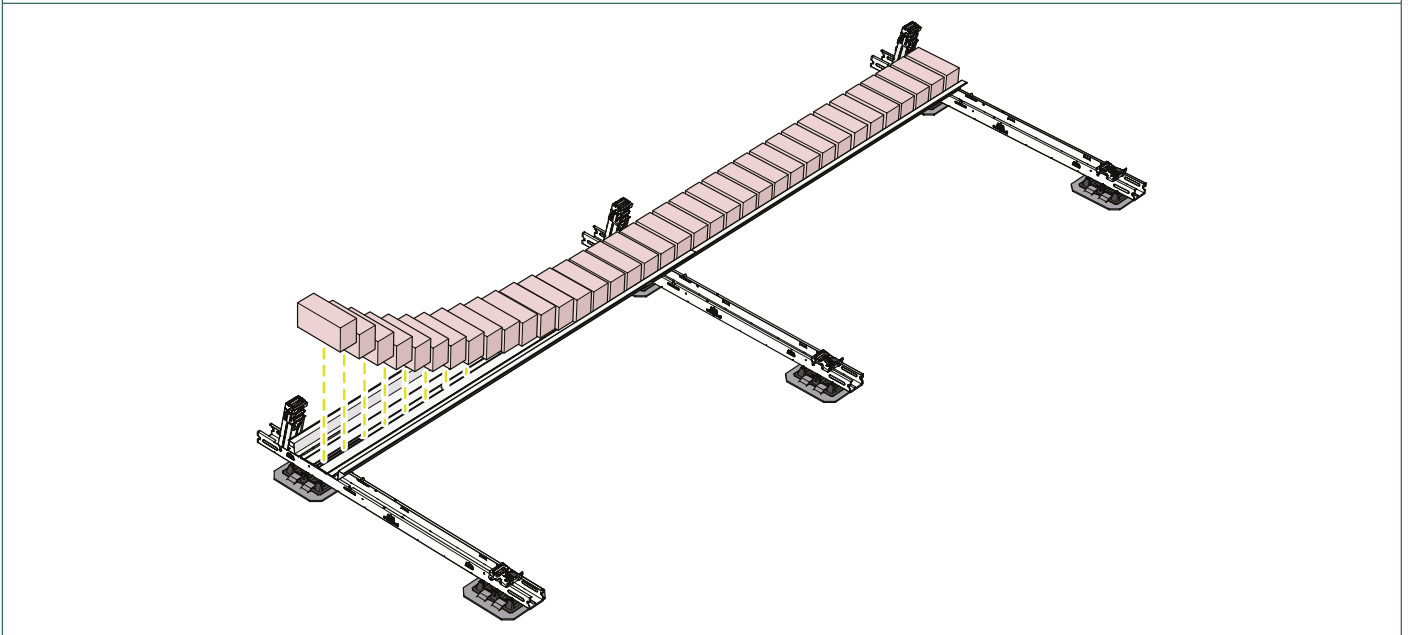
OVERLAPPING BALLAST TRAYS

- 1 Place the following ballast tray over the next base element, partially overlapping the first ballast tray.
- 2 Align the cut-outs in the ballast tray with the hole and flange of the base element.
- 3 Fix the ballast tray to each base element with two screws.



FILL THE BALLAST TRAYS

- 1 Evenly distribute the required positions and quantities of bricks over the ballast trays, following the project plan.
- i** When using alternative ballast forms, the calculated weight per tray must be met. Additionally, the ballast must be properly contained within the trays at all times.
 - i** For double ballast trays, place the bricks on their side in the second ballast tray to ensure they fit under the solar panel.

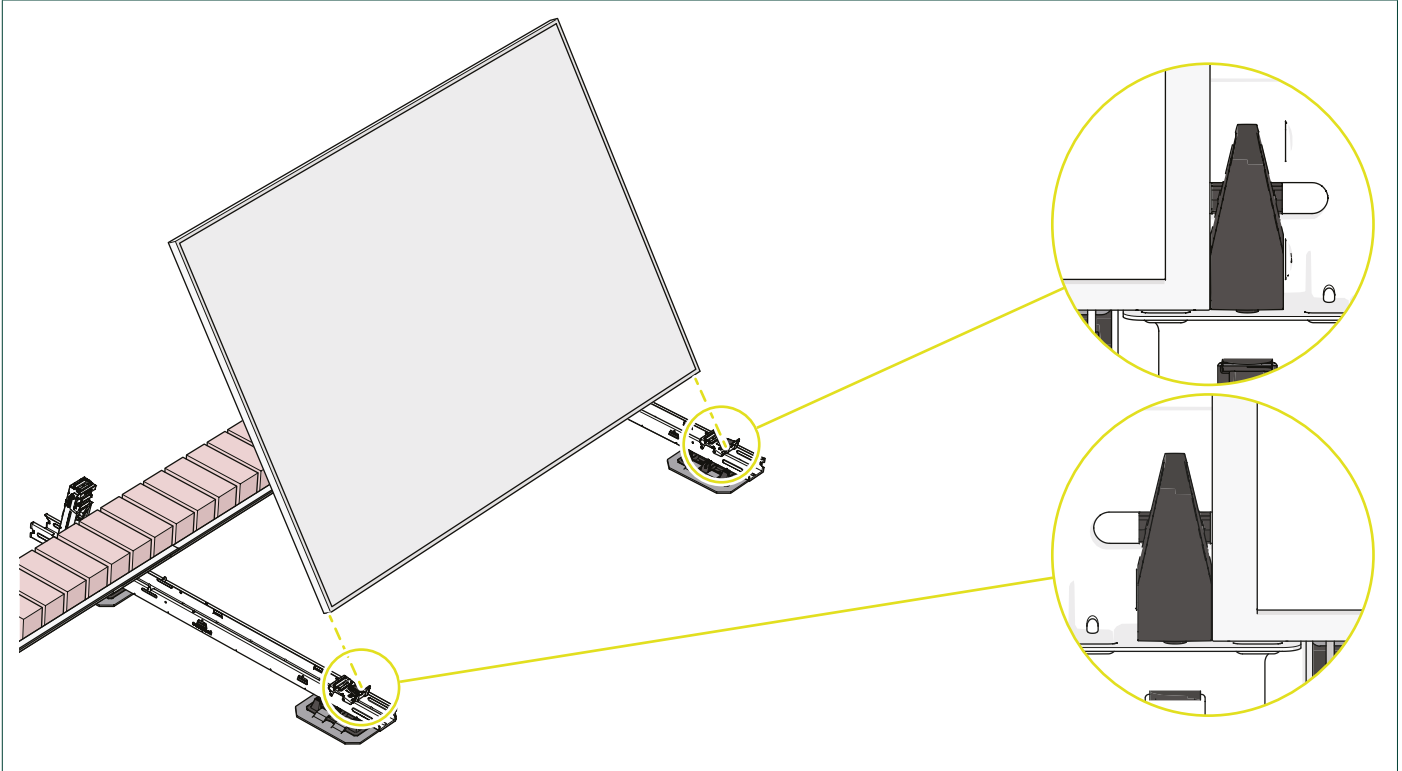


Repeat the steps in this chapter for all base elements.

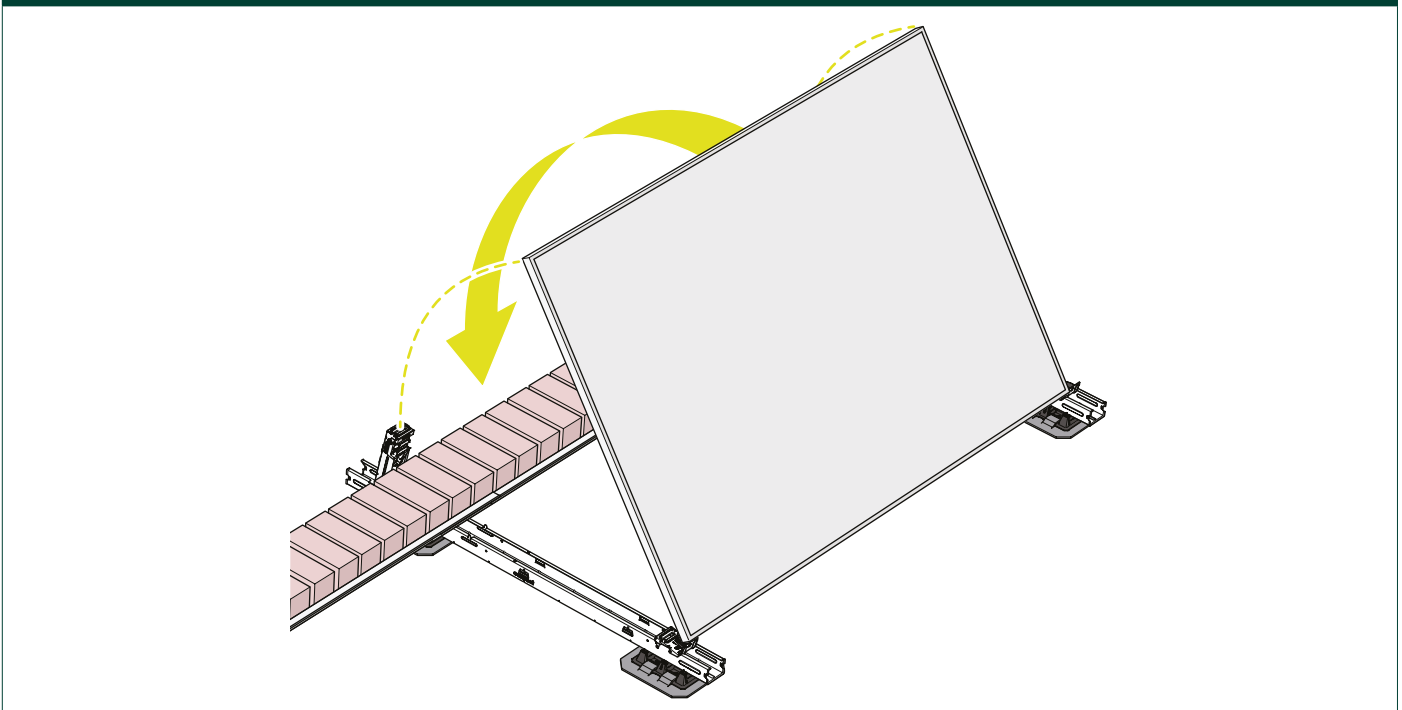
4. Mounting the solar panels

- !** Do not mount any solar panels if there may be strong winds in the time between mounting the solar panel and wind deflectors. Immediately mount the wind deflectors after mounting a field of solar panels.

- 1** Place the solar panel upright on two low bases between the guides.

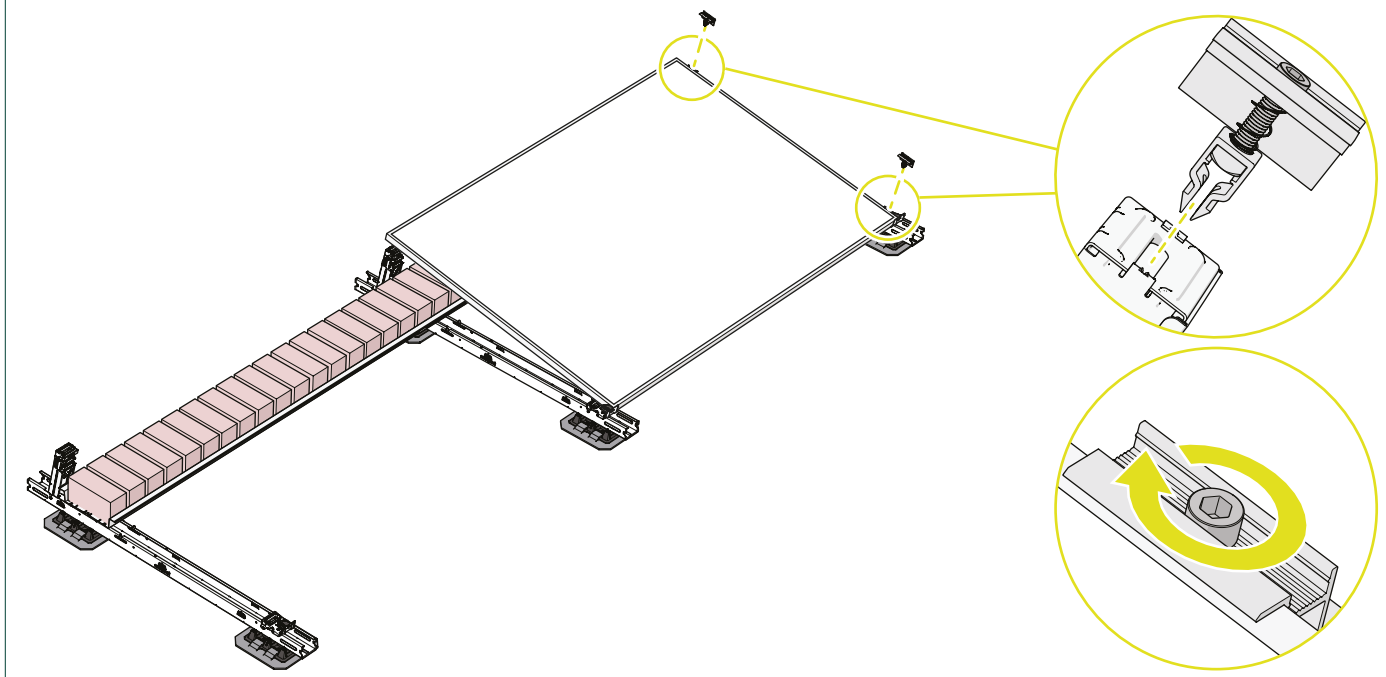


- 2** Carefully lower the solar panel on the high bases.



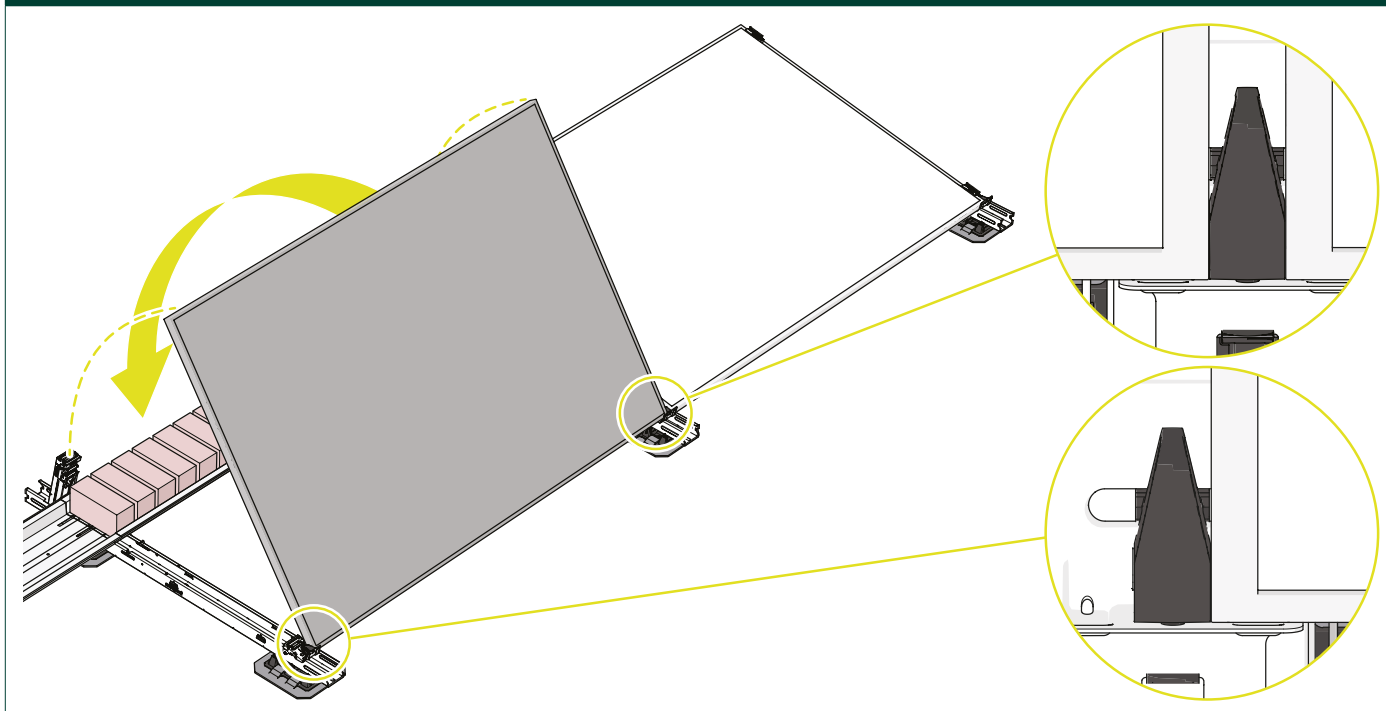
3 Mount the end clamps on the high and low base and tighten the screw using a 8mm hex tool. Apply a torque of 8 Nm.

i See appendix A for cable management instructions.

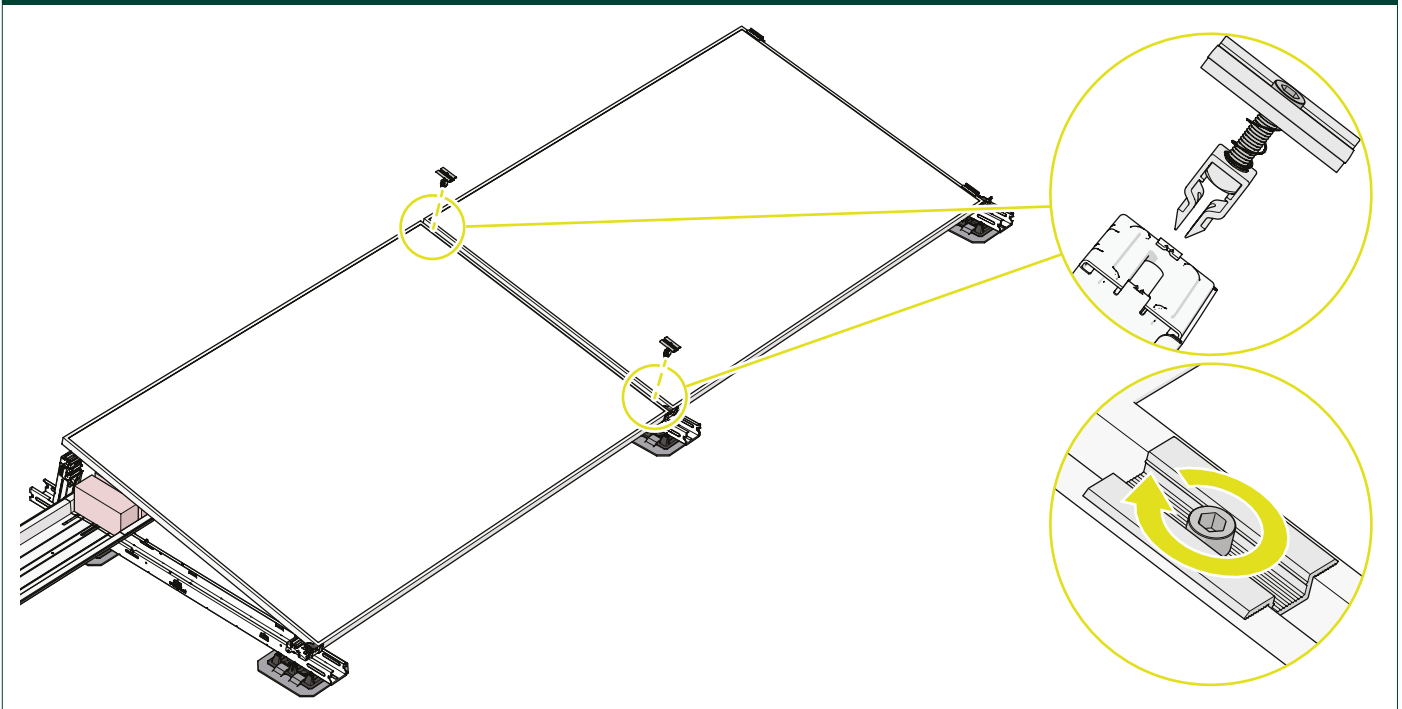


4 Place the solar panel upright on two low bases between the guides.

5 Carefully lower the solar panel on the high bases.

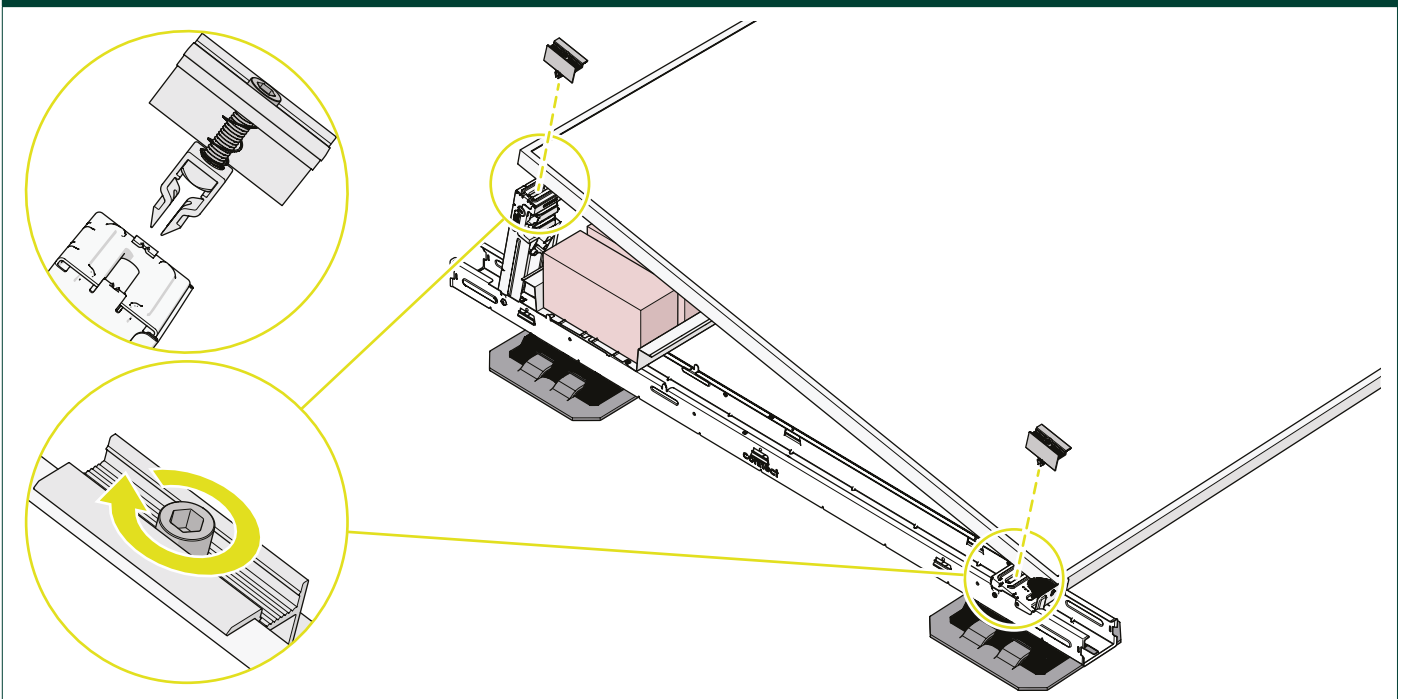


6 Mount the mid clamps on the high and low base and tighten the screw using a 8mm hex tool. Apply a torque of 8 Nm.

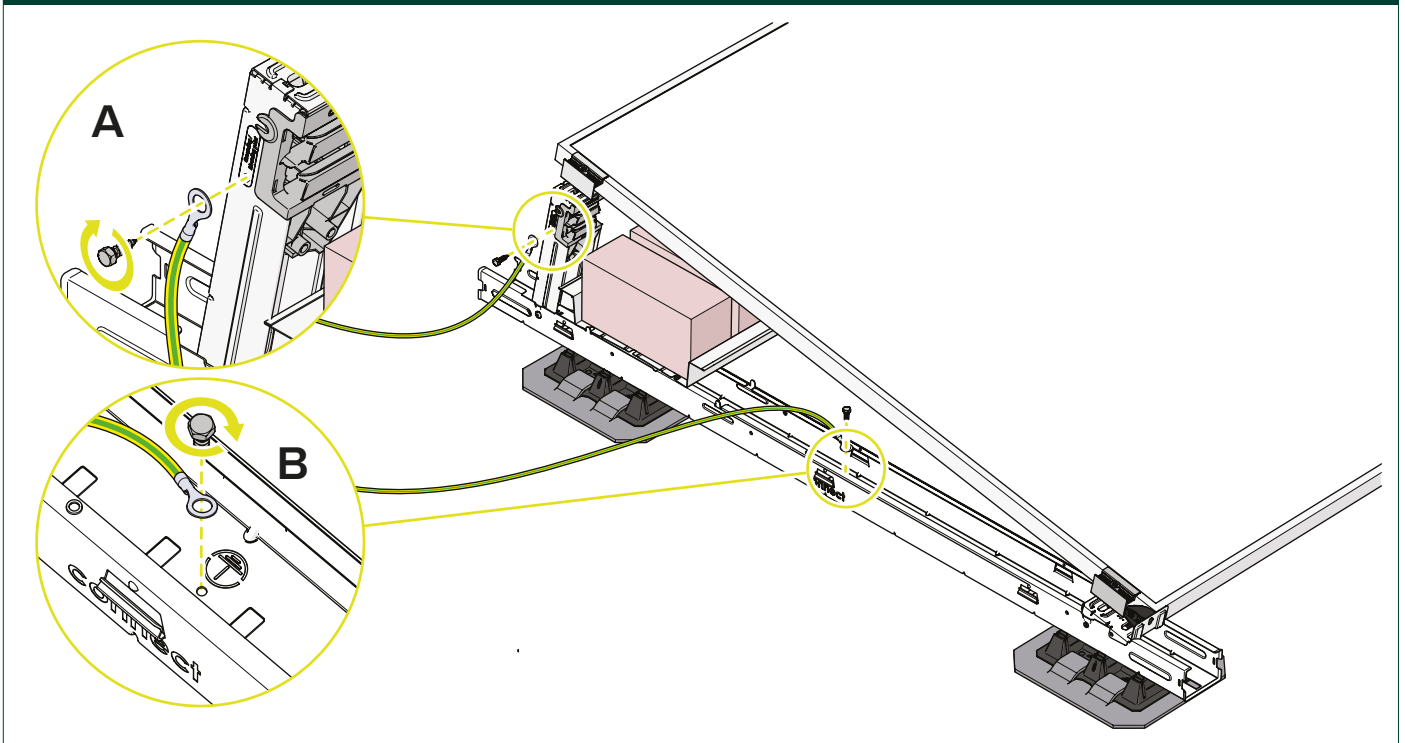


Repeat steps 4.4. - 4.6. for every panel of the row.

7 Mount the end clamps on the high and low base of the last panel of the row and tighten the screw using a 8mm hex tool. Apply a torque of 8 Nm.



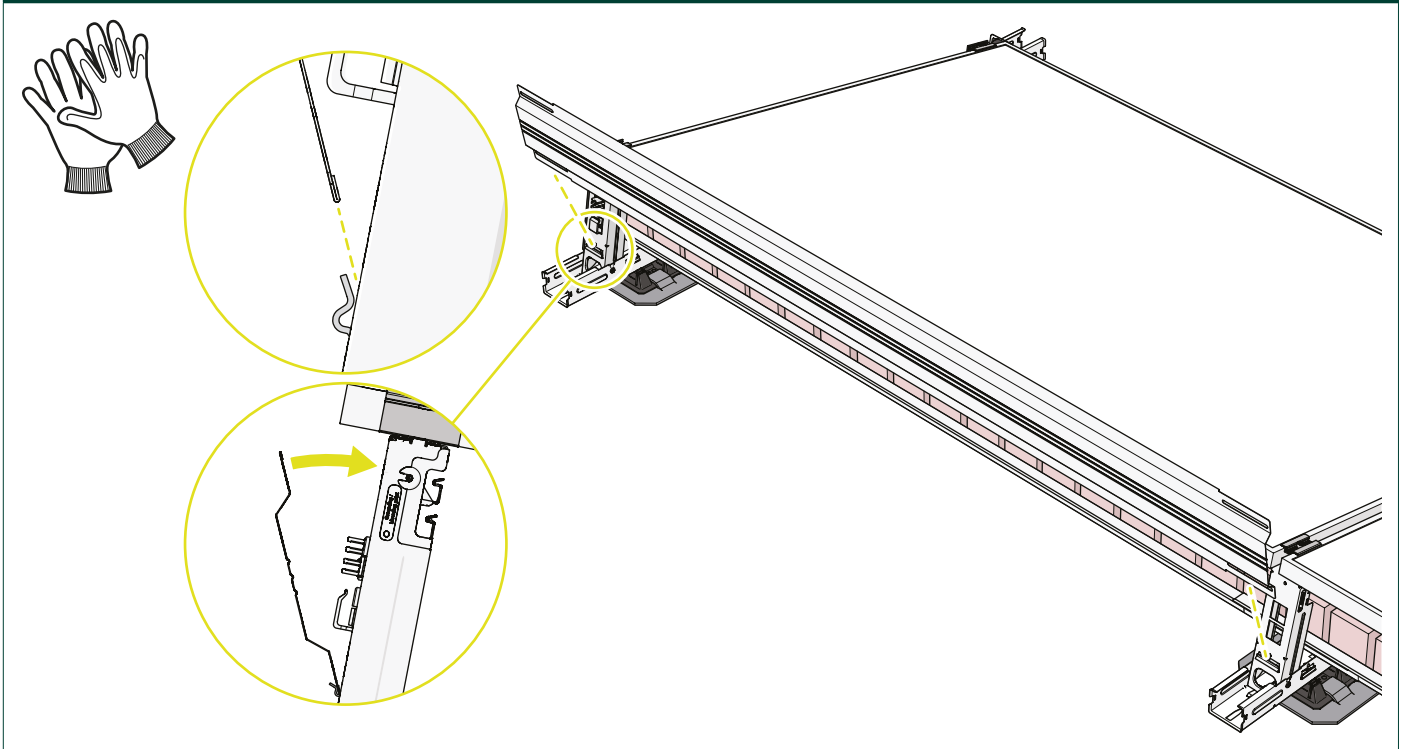
8 Attach a grounding cable to the high base (A) or base element (B) of each solar panel field.



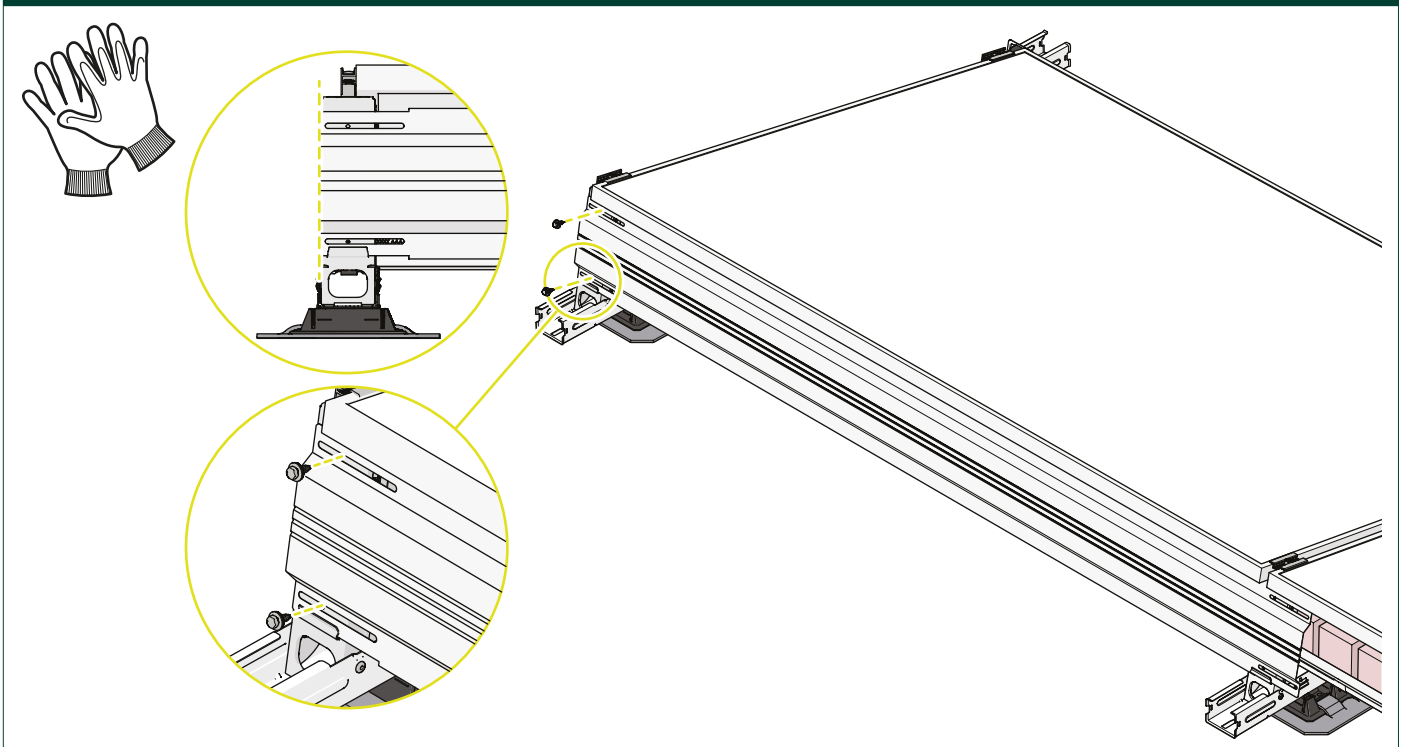
5. Placing back plates

i This chapter is only applicable if you have installed a single base element at the end of the segment. See step 2.

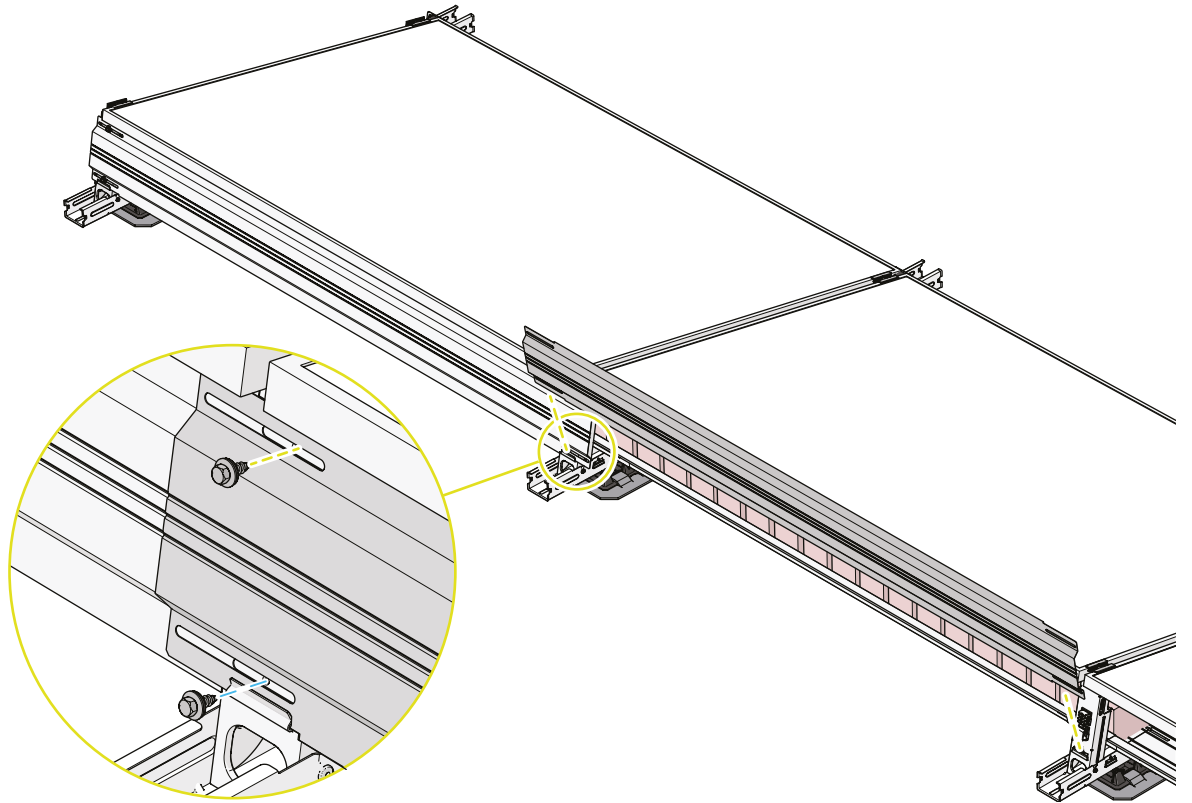
- 1 Place the back plate in the designated slots in the high bases and tilt the back plate up against the high base.



- 2 Align the back plate with the high base
- 3 Secure the back plate to the first high base with two cladding screws. Use a 3/8" socket.



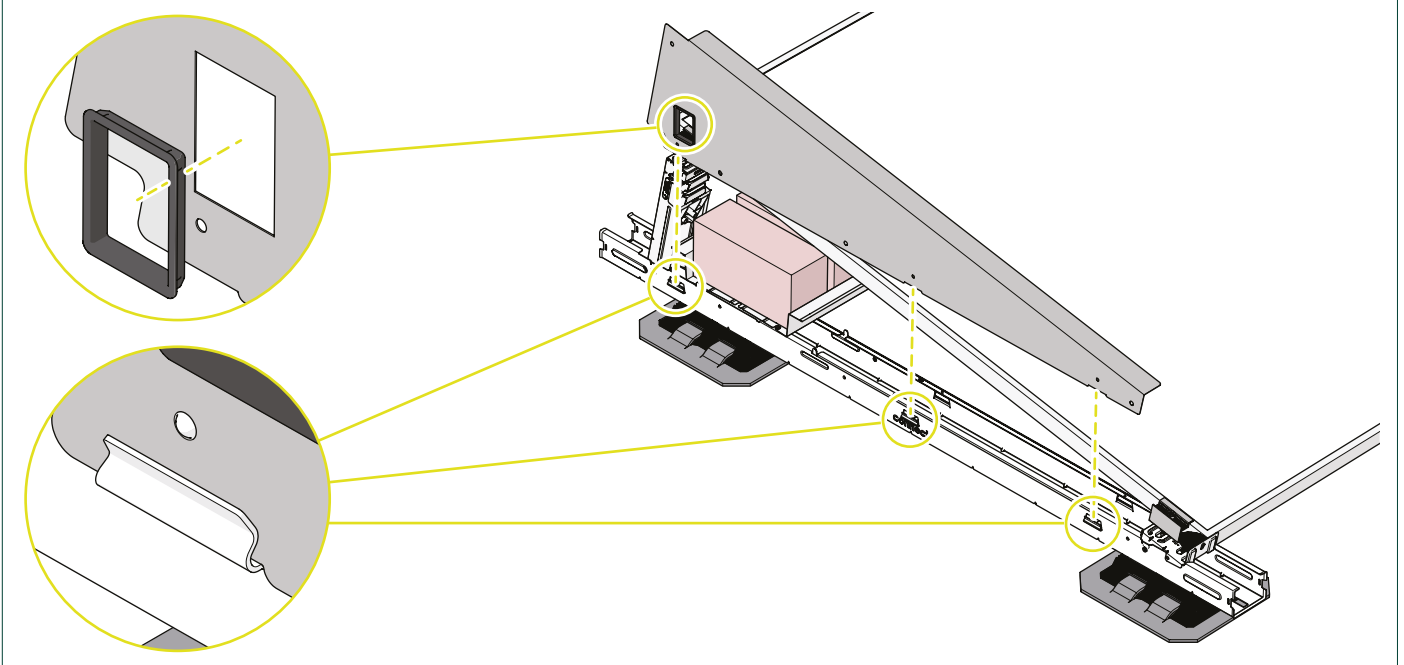
- 4 Place the next back plate in the designated slots in the high bases.
- 5 Tilt the back plate up and align the back plate with the solar panel, overlapping the first back plate.
- 6 Secure both back plates to the high base with two cladding screws. Use a 3/8" socket.



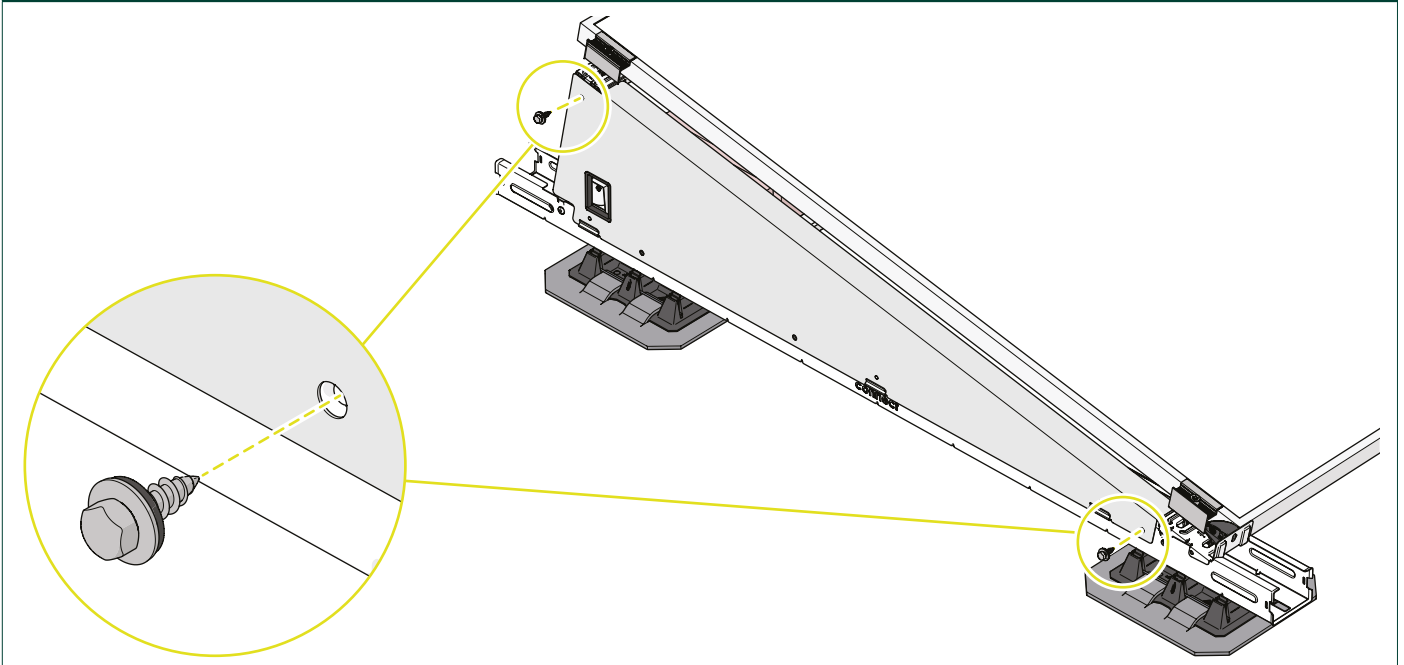
Repeat the steps in this chapter for all rear deflectors.

6. Installing side deflectors

- 1 Place the side deflector in the designated slots in the base element and align the holes in the deflector to the notches in the base element.
- 2 Optional: Insert the cable grommet into the side deflector.



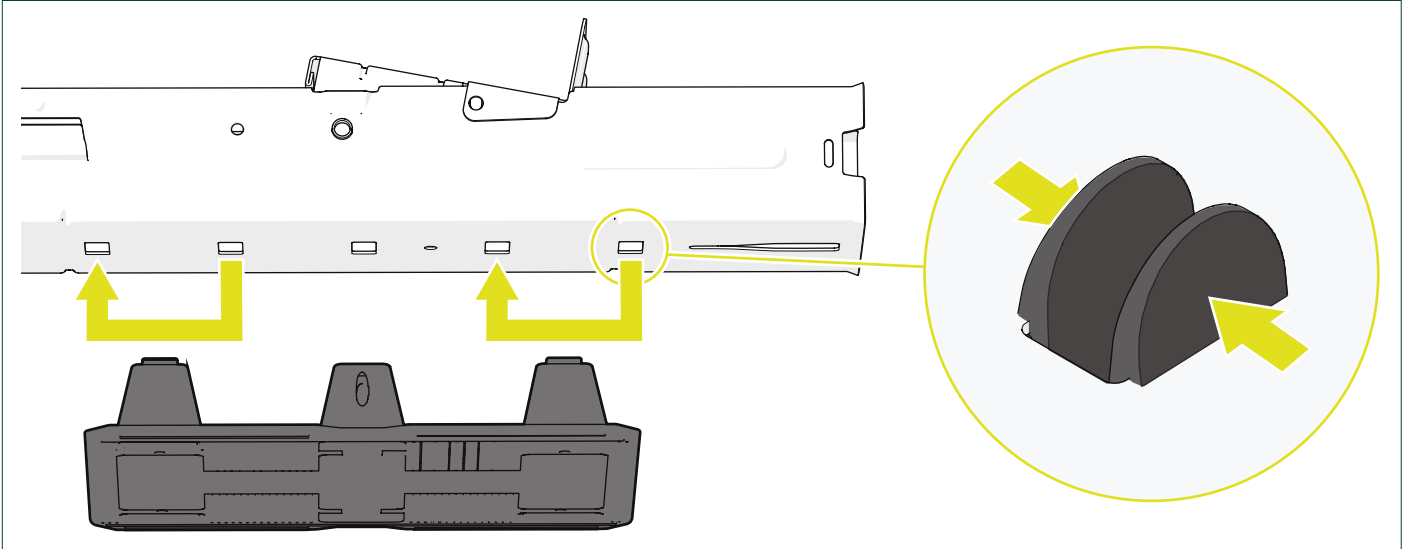
- 3 Secure the side deflector to the base element and high base with two cladding screws. Use a 3/8" socket.



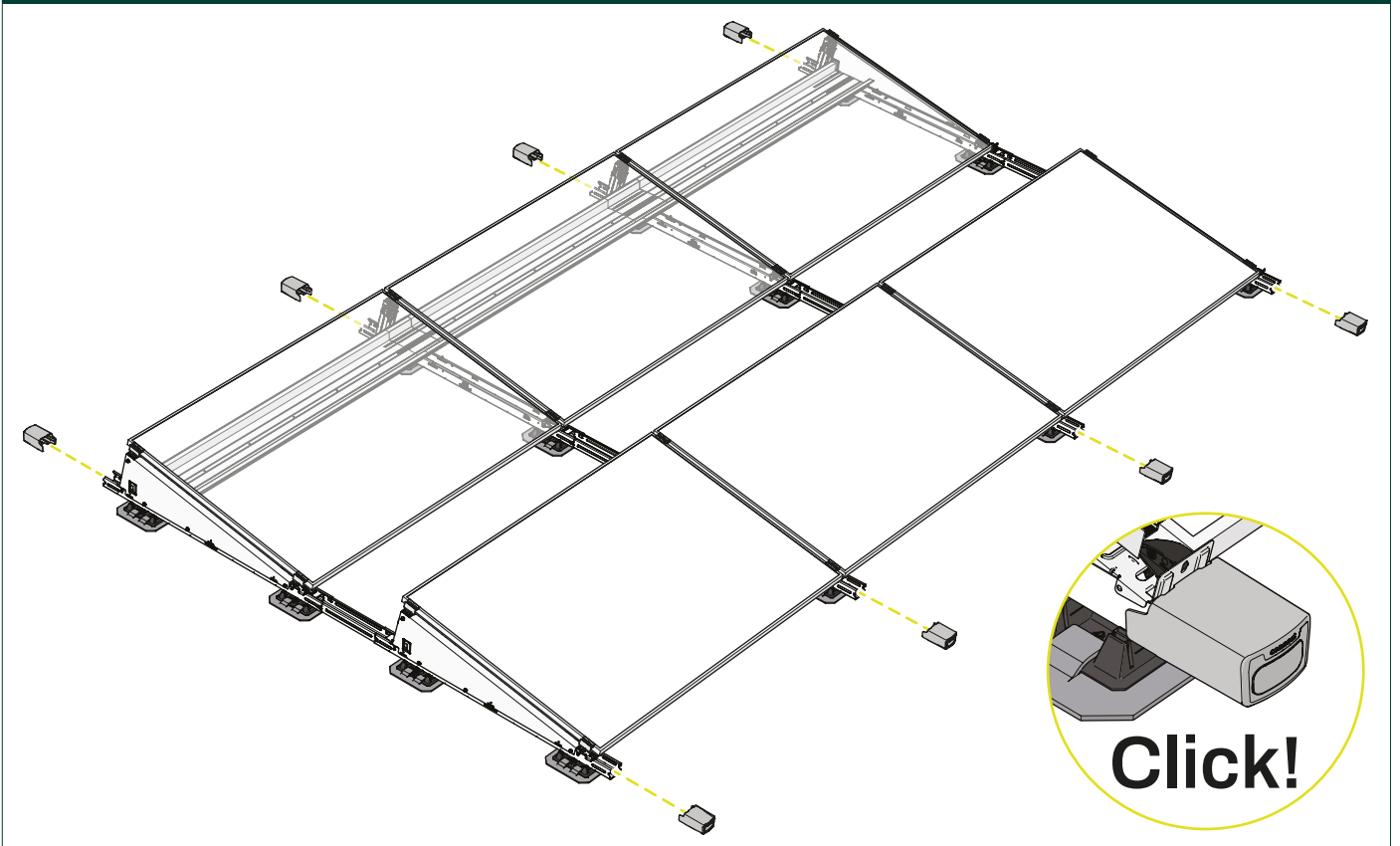
Repeat the steps in this chapter for all side deflectors.

7. Placing end caps

- 1 Optional: if you are going to install end caps on the outer base elements of the segment, move the foot at the low base of the first base element in the row one slot backwards.



- 2 Optional: Place end caps on the first and last base elements of every row.

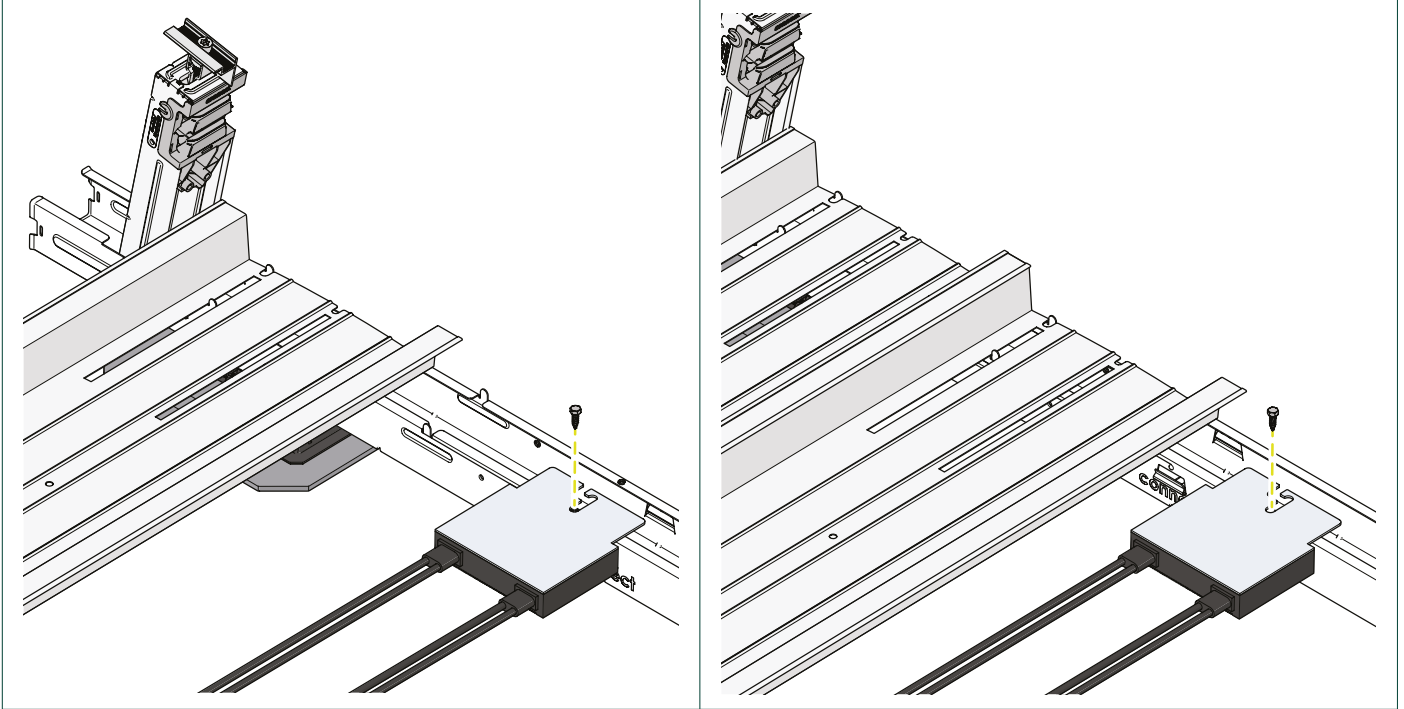


ANNEXES

A. Cable management

1 Mount the optimizer to the predrilled screw hole of a base element for every row.

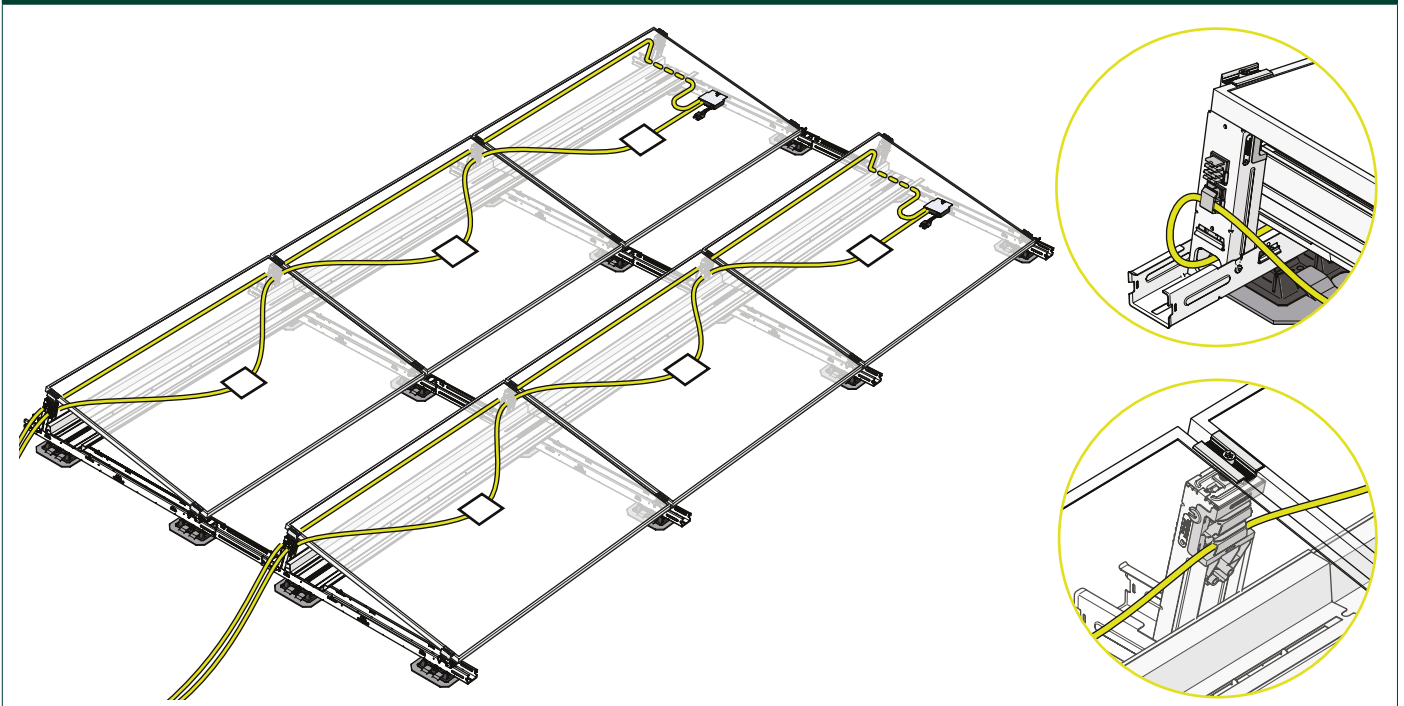
i If two ballast trays are installed on the base element, drill a hole next to the ballast trays in the base element and mount the optimizer to the base element.



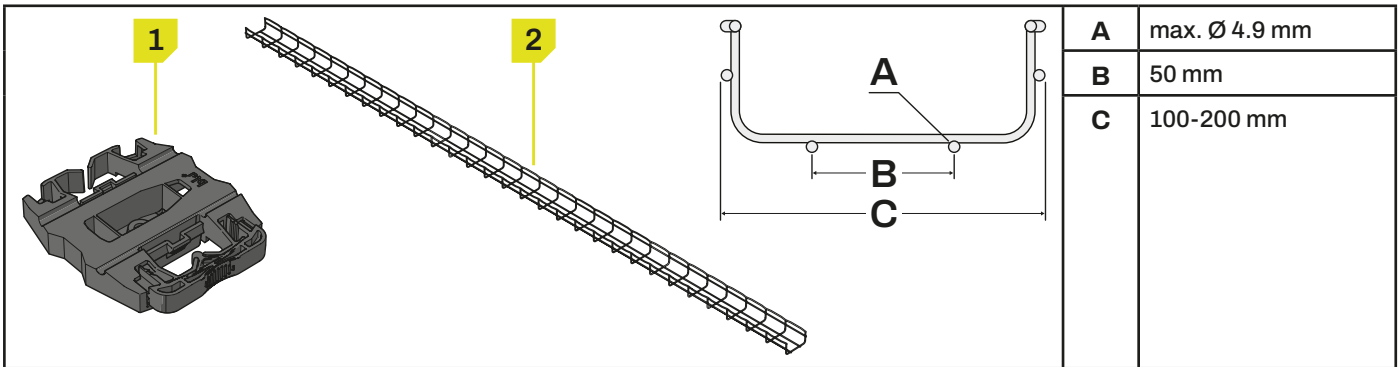
2 Guide the solar panel cables through cable guides at the front of the high bases.

3 Feed the return cable through the hole at the bottom of the high base.

4 Guide the return cable along the cable guides at the back of the high bases.



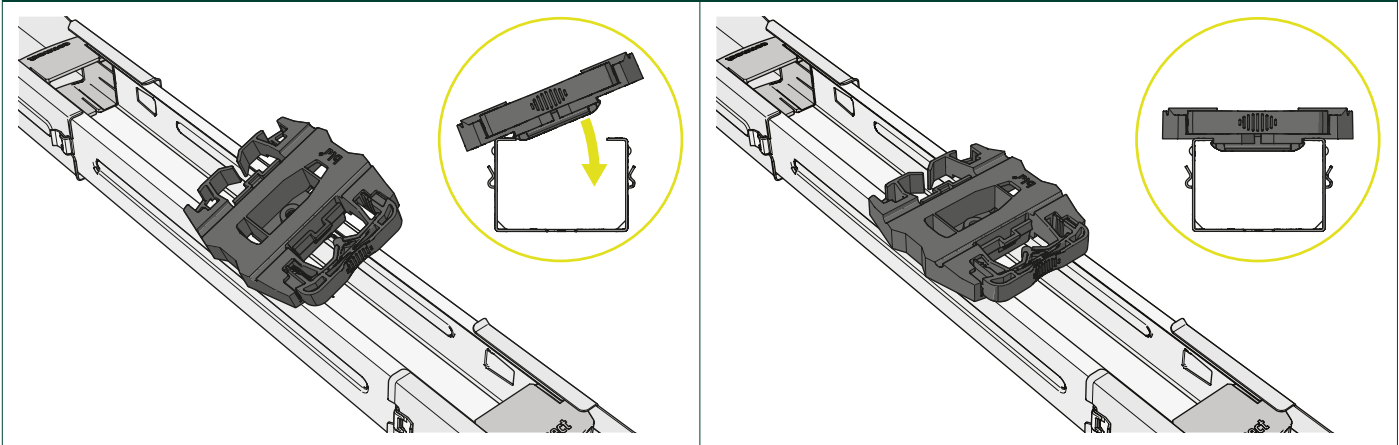
B. Cable tray



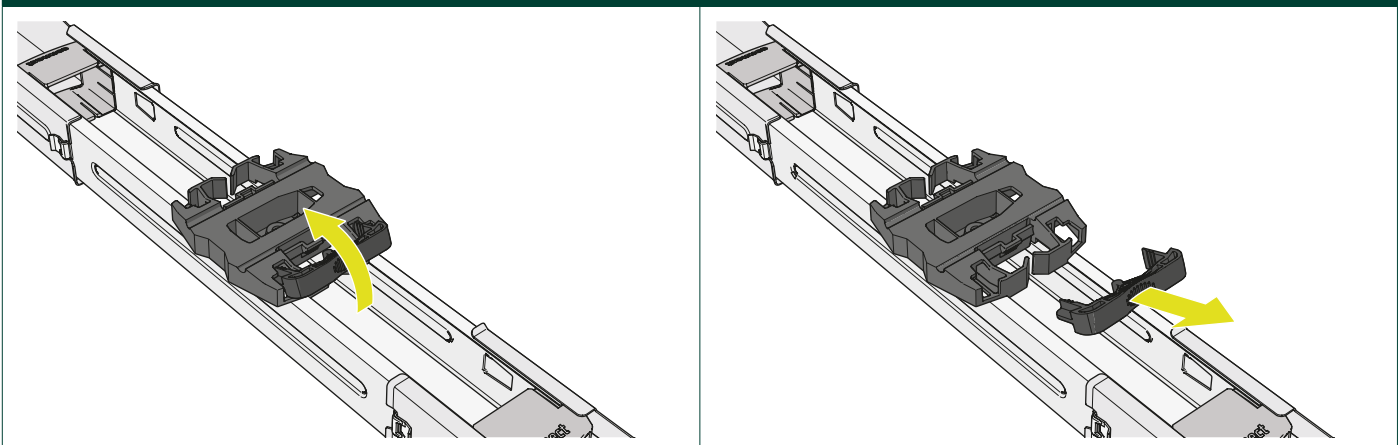
Component

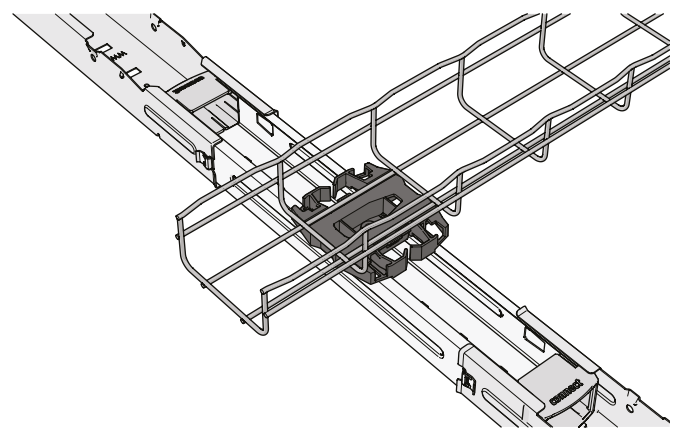
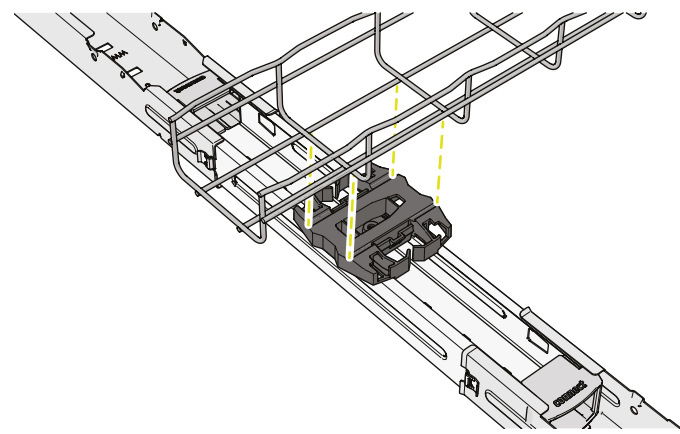
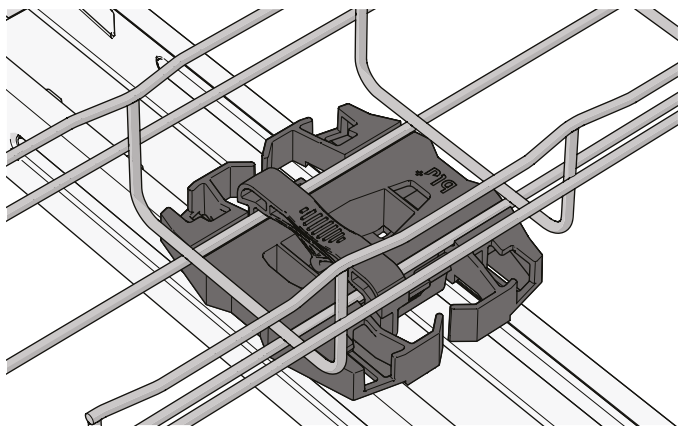
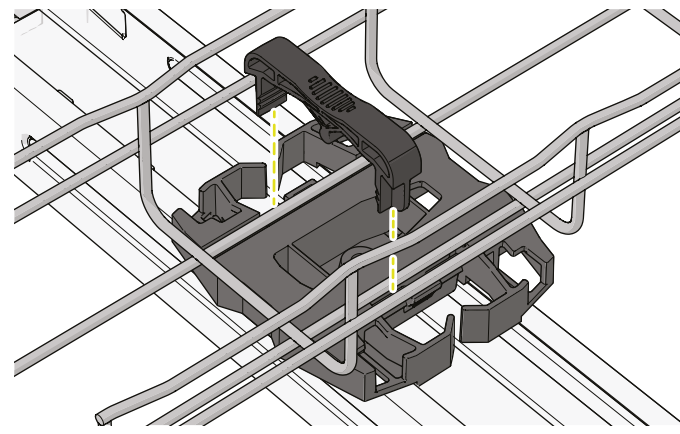
- 1 Connect cable tray adapter
- 2 Compatible cable tray (not included)

1 Click the cable tray adapter on the Connect coupler or base element.



2 Remove the cable tray clamp from the adapter.



3 Place the cable tray on the adapter.**4** Secure the cable tray to the adapter with the clamp.

C. Spare parts list

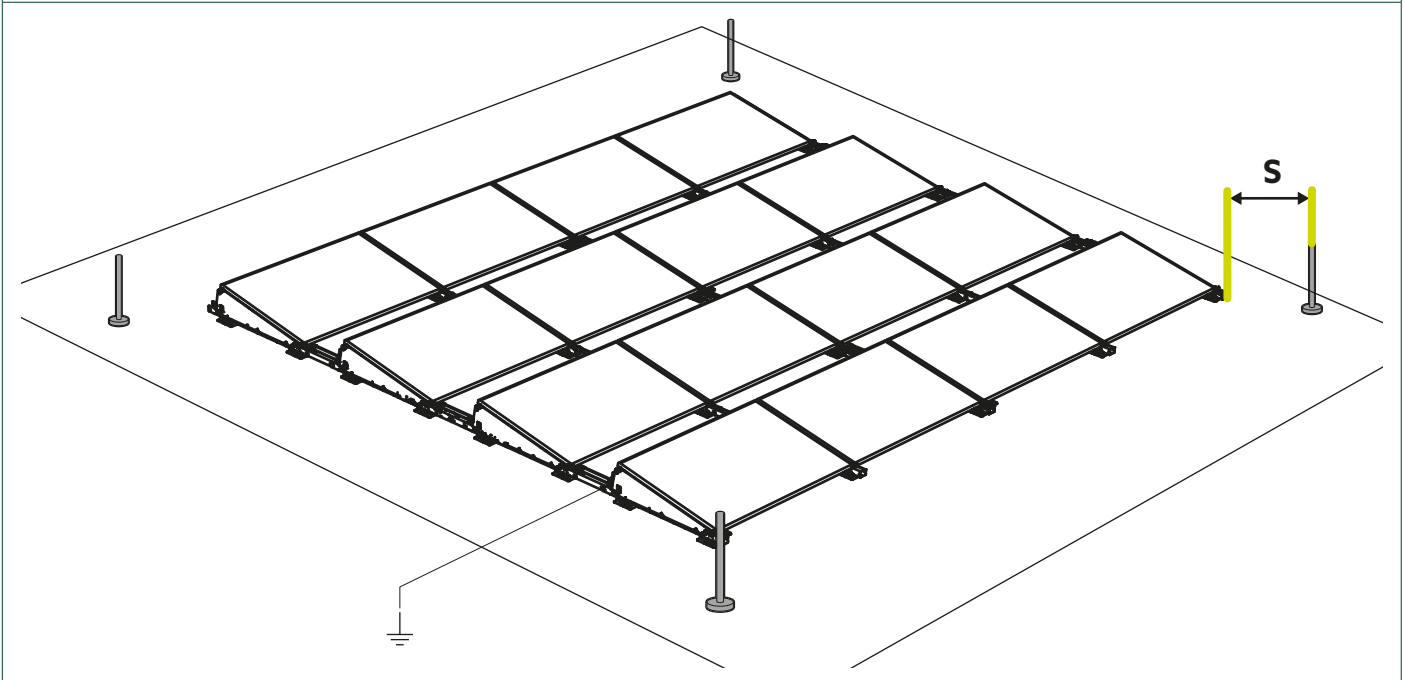
Generic name	Art. Code	Description
Base element	500175	Connect base element, landscape, pw=1130-1150, Magnelis
Ballast tray	500530	Connect ballast tray, landscape, pl=1663-1778, L=1901, Magnelis
	500531	Connect ballast tray, landscape, pl=1779-1894, L=2017, Magnelis
	500532	Connect ballast tray, landscape, pl=1895-2010, L=2133, Magnelis
	500533	Connect ballast tray, landscape, pl=2011-2126, L=2249, Magnelis
Rear deflector	500240	Connect rear deflector 72-cell panels
	500245	Connect rear deflector 72-cell panels large
	500236	Connect rear deflector landscape 66-cells
	500230	Connect rear deflector landscape small
	500630	Connect Backplate, Landscape, pl=1663-1778, Blank
	500631	Connect rear plate, landscape, pl=1779-1894, plain
	500632	Connect rear plate, landscape, pl=1895-2010, plain
500633	Connect rear plate, landscape, pl=2011-2126, plain	
Cable tray adapter	500100	Connect cable tray adapter
Mid clamp	852630	Easy mid clamp 26-30 mm
	853540	Easy mid clamp 35-40 mm
End clamp	860030	Easy end Clamp 30mm
	860035	Easy end clamp 35mm
Side deflector	500135	Connect side deflector, landscape, left, Magnelis
	500136	Connect side deflector, landscape, right, Magnelis
Connector	500050	Connect connector East West Setup
	500013	Connect connector 1320
	500015	Connect connector 1500
	500017	Connect connector 1700
Grommet	500005	Connect cable grommet
Leveling block	500810	Connect leveling block
End cap	220293	Connect end cap
Screw	500901	Cladding screw Connect 6.5×19mm
Friction mat	140920	Connect friction mat
	140930	Connect friction mat, PVC
SolarSteller	500011	Connect Solarsteller

D. Lightning protection

Preferred method: Installation of lightning protection system (LPS) with air-termination rods

Determine the safe separation distance (S in graphic below) according to NEN-EN-IEC 62305 (minimum 0.5 metres). Maintain this separation distance as a minimum between the solar panels field and lightning protection system (LPS).

- i** In this way you keep the solar panel field separate from the existing LPS and prevent lightning current from being conducted into the field.
- i** The correct distance for 'S' can be calculated using the formulas in the EN-IEC 62305-3 series.



Alternative method: connecting the PV system to the LPS

Is it impossible to maintain the required separation distance or is it specified that the PV system must be integrated into the lightning system? Then combine the PV system with the lightning protection system in accordance with EN-IEC 62305. Please refer to the table below.

Mesh size	LPL level	Connect the PV system every
15 x 15 metre	III	15 metre
20 x 20 metre	IV	20 metre

A few points to note:

- To ensure the integrity of your installation, the complexity of lightning conduction requires an expert assessment by a qualified lightning protection expert.
- Make sure that cable supports, ducts, etc. are grounded and connected to the lightning protection system.
- !** Metal cable brackets also form part of the PV system.
- Check whether an additional type 1 or type 2 surge protector is required for the cable lines (according to standard EN-IEC 62304).
- Preferably lay the cabling of the PV system in separate metal earthed conduits over the entire route, from roof entry, via inverter to the main distributor. The conduit should preferably be grounded to the roof safety net of the lightning protection system, to the grounding point at the inverter and to the earth rail at the main distribution system.
- An earth wire must run along the cabling of the PV system, coupled to the roof protection grid of the lightning protection installation, coupled to the ground point at the inverter and coupled to the main earth rail of the main distribution system.

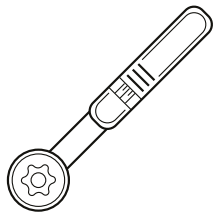
- Each individual PV installation must have an inlet and outlet to the lightning protection system at each corner of the field.
- To connect to the external lightning protection system, use a round aluminium or copper conductor (solid wire) with a minimum cross section of Ø8 mm (= 50 mm²).
- To reduce the contact resistance, each rail connector must be bridged. Use aluminum wire as described below (tested and approved solution).

! Enstall is in no way responsible for the installation and/or connection of lightning protection on the roof. Get expert advice from your specialist and ensure that a safe installation can be guaranteed according to EN-IEC 62305 and HD-IEC 60364.

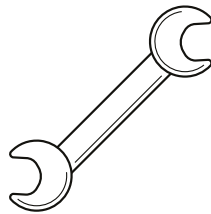
i Get expert advice from your lightning protection expert.

Preparation

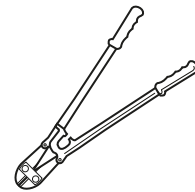
1 Make sure all the required tools are at hand.



Torque wrench up to 25 Nm with hexagon bit sizes 10 and 13

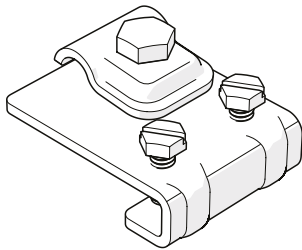


Open-end wrench sizes 10 and 13

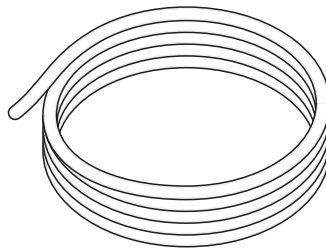


Bolt cutter

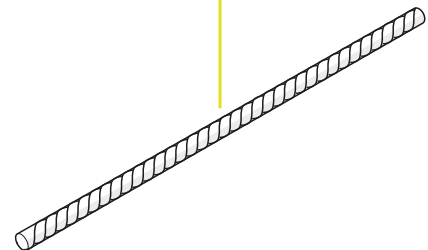
1



2



3



Component

Article number

1 Lightning protection Edge Connector Clamp

500795

2 Lightning protection Wire Long 21m*

1009135

3 Lightning protection Wire Short

125mm

500796

250mm

1009136

430mm

500798

642mm

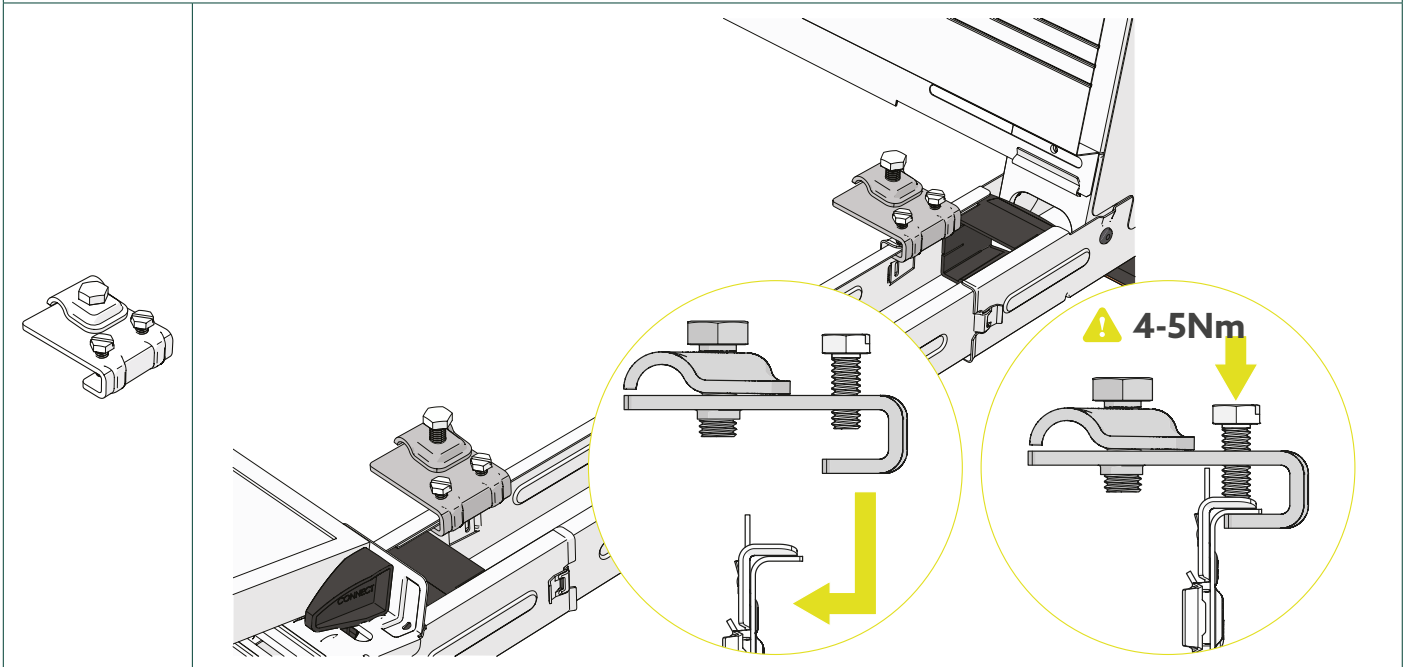
500799

* Supplied as untwisted roll. Twist the aluminum long wire around its axis 8-10x per meter length to stiffen the wire when installing.

Installation

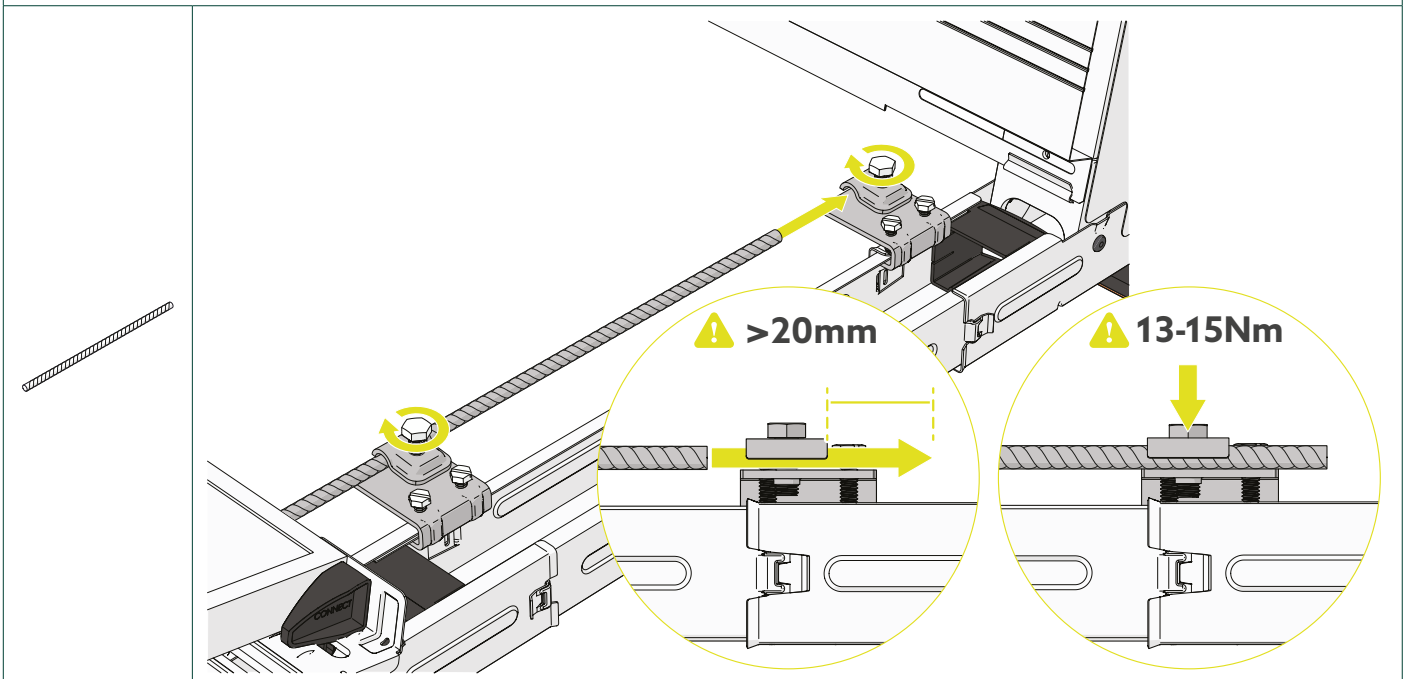
- 1 Mount two Connect lightning clamps in parallel at each end of the Connect coupler and secure them by tightening the pre-installed bolts at 4-5 Nm.

i Clamp the flanges of the Connect coupler and the Rail together with the screws of the Edge Connector Clamps.



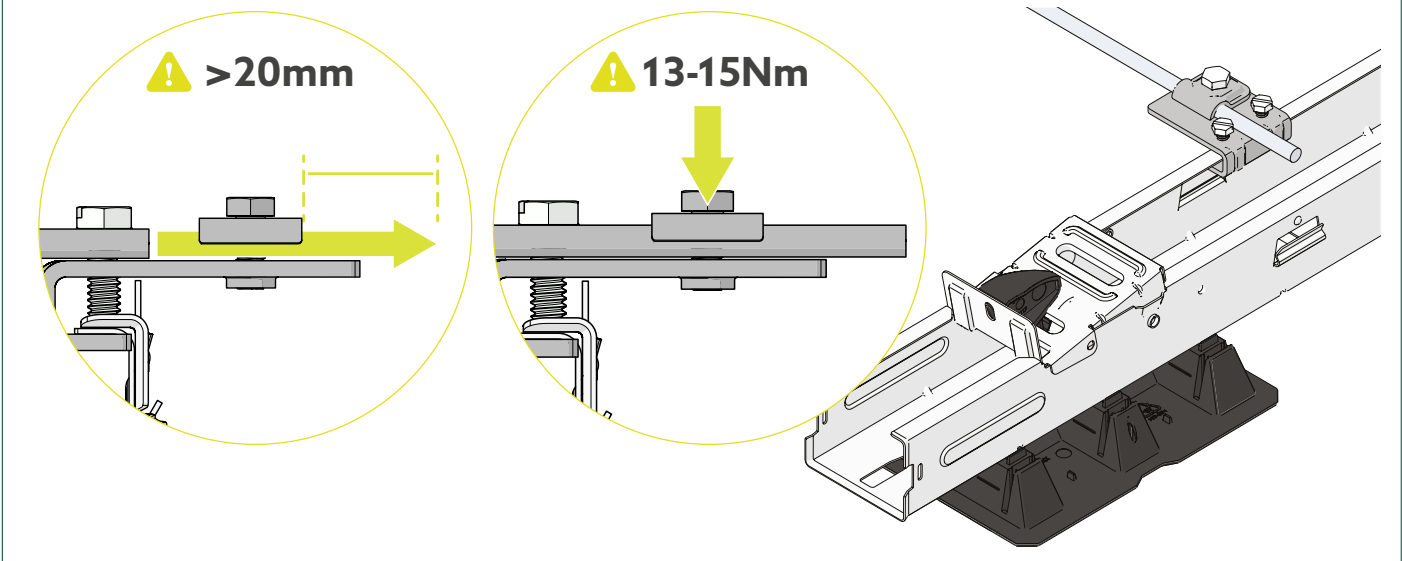
- 2 Feed a short aluminum wire through the top parts of the Edge Connector Clamps and secure the wire by tightening the pre-installed bolts at 13-15 Nm.

i Ensure that the short aluminum wire sticks out at least 20 mm at the end of each Edge Connector Clamp.



3 Attach a Edge Connector Clamp on the first base element and insert a long aluminum wire.

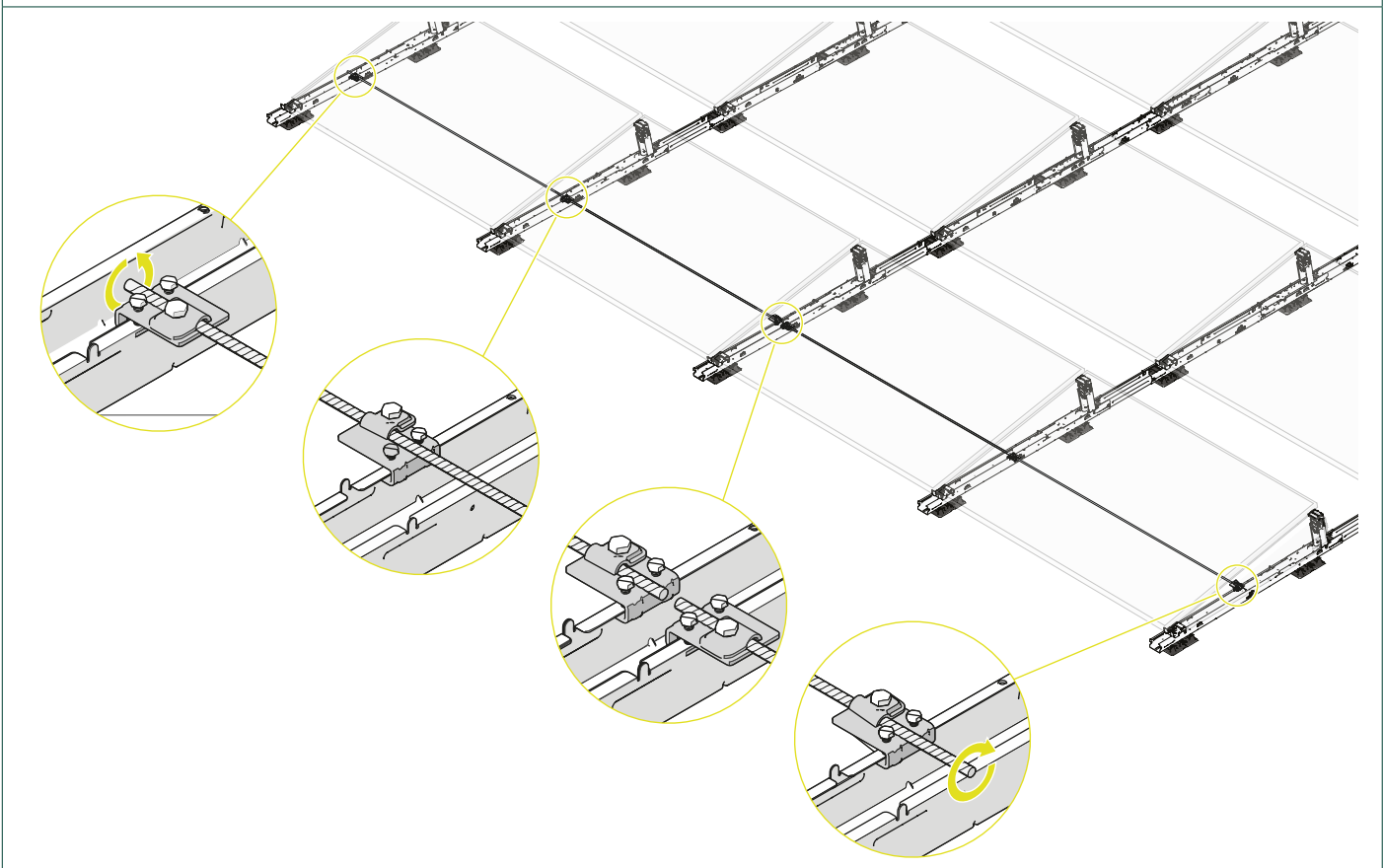
i Install the Edge Connector Clamps on a solid section of the module rail, without any gaps in the flange/edge.



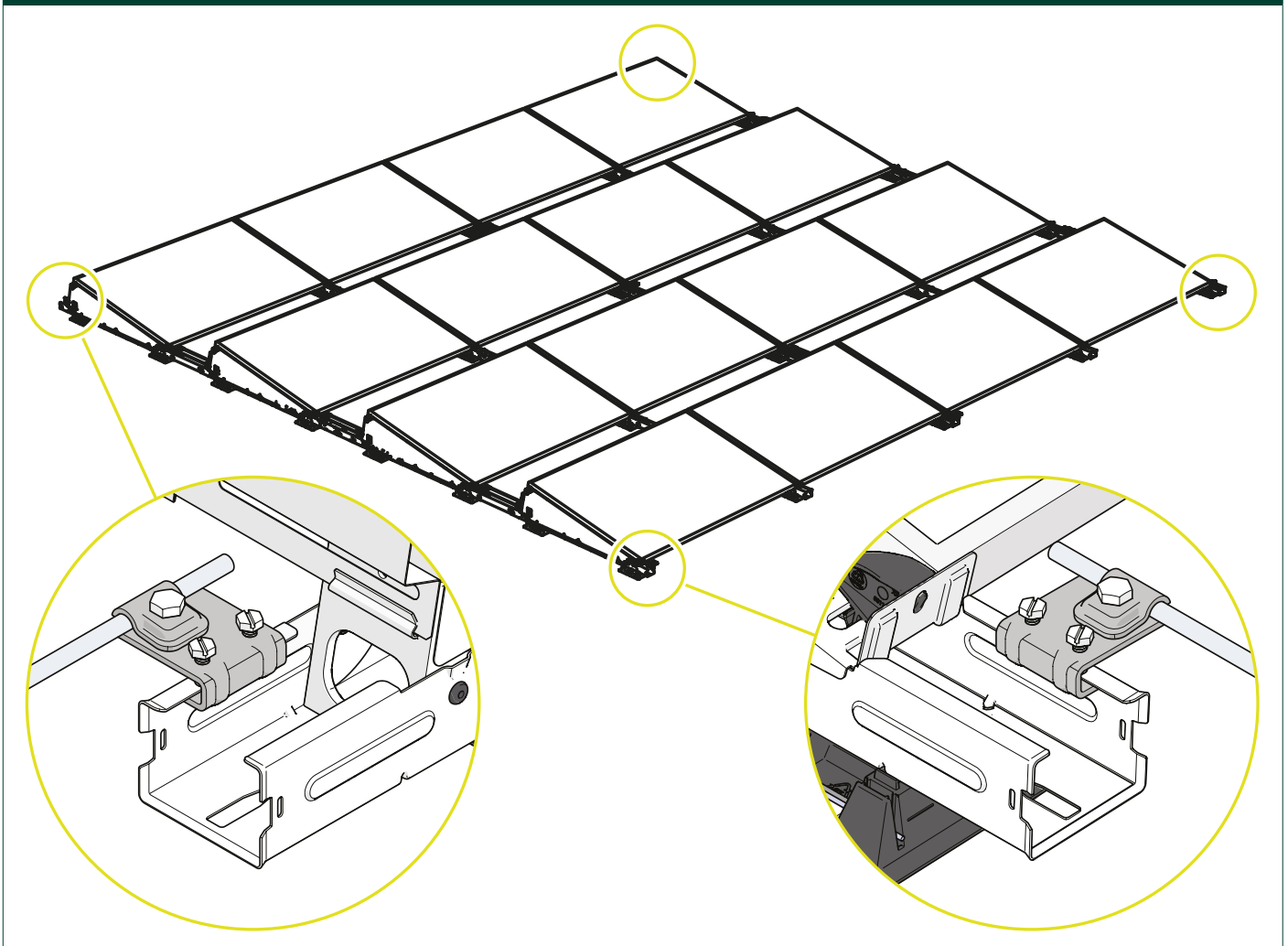
4 Twist the aluminum long wire around its axis 8-10× per meter length to stiffen the wire.

5 Connect all modules across the width of each individual field using a long aluminum wire and Edge Connector Clamps.

i If a single aluminum wire cannot connect all modules, attach a second Edge Connector Clamp to the last module reached by the first aluminum wire. Continue linking the remaining modules in the same manner.



- 6 Mount four Edge Connector Clamps at the end of each Connect base element, positioned at all corners of the field, to enable connection to the roof trap.



- i** The connection of the PV system to the external lightning protection system can now be established. To do this, attach a round aluminium or copper conductor (solid wire) with a minimum cross section of $\text{Ø}8\text{mm}$ (= 50mm^2) for the incoming and outgoing line on the one side to the four KSV 7.10 connectors and on the other side to the external lightning protection system.
- i** The Enstall Connect mounting system has been tested and approved for use in accordance with EN-IEC 62305. The lightning current carrying capacity has been tested according to EN 62561-1 and complies with test class N (50kA).
- i** After lightning impact it is recommended to arrange an inspection to control and ensure the integrity of the system.



ENSTALL

eu.enstall.com