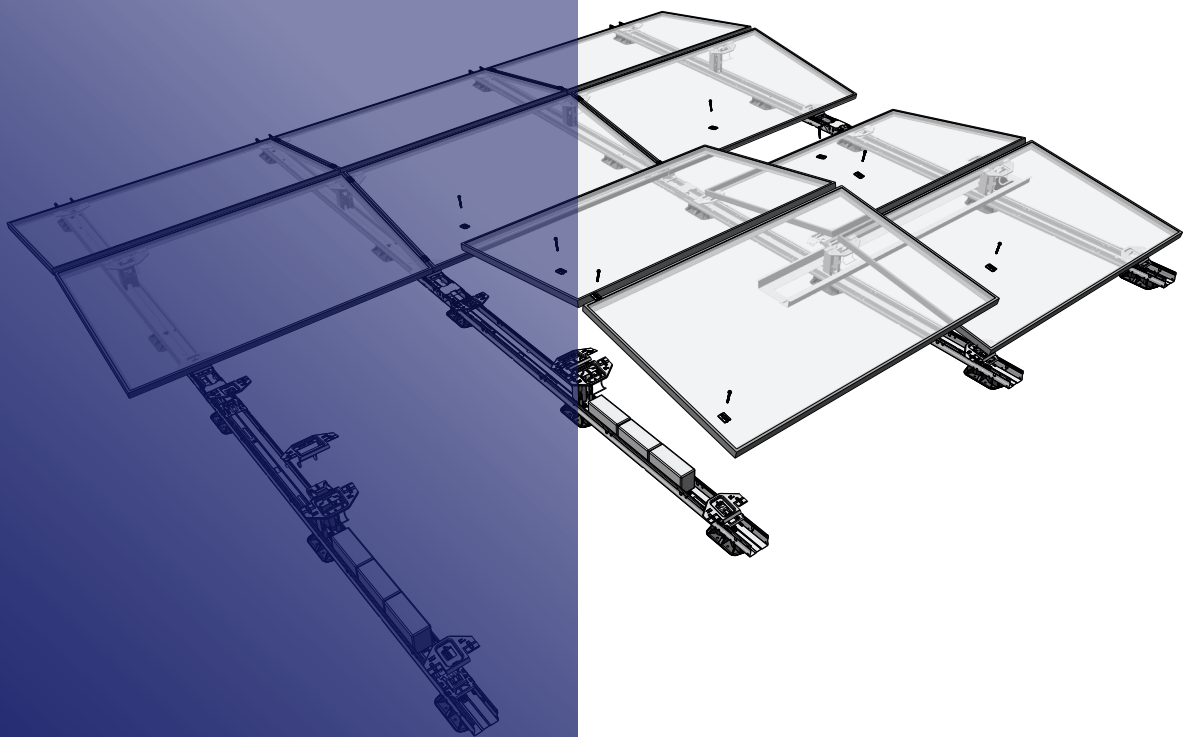


ESDEC

INNOVATIVE MOUNTING SYSTEMS



MANUAL FLATFIX WAVE ENTRY

FLATFIX

WAVE
ENTRY

REV03

www.esdec.com

DISCLAIMER

This installation manual must be kept in a safe place for future use!

We recommend that you contact your supplier for the duration and conditions of the warranty.

We refer to our General Terms and Conditions of Sale and Delivery, which are available on request.

The manufacturer rejects all liability for any damage or injury resulting from failure to follow this installation manual carefully and observe the usual precautions during transport, mounting and use of the FlatFix Wave mounting system.

Due to continuous improvement efforts, the product may differ in detail from what is described in this manual.

This means that the instructions given are only intended as a guide for the installation of the product mentioned in this manual.

This manual has been compiled with the greatest possible care, but the manufacturer cannot accept liability for any errors in this manual or their consequences.

In addition, all rights are reserved and no part of this manual may be reproduced in any form whatsoever.

GENERAL INSTALLATION CONDITIONS

General

Failure to comply with the instructions in this document may result in the lapse of all warranty and product liability claims.

The data, comments and opinions contained in this document are binding and should be checked for completeness and whether they are up to date.

Esdec BV reserves the right to change this document without notice.

Stability and condition of the roof

The roof must be in good condition and strong enough to support the weight of the solar panels, including additional materials, wind and snow loads.

Check the stability of the roof and adjust the roof/structure if necessary. If in doubt, call in a structural engineer.

Ensure that the load threshold of the roof is not exceeded, either locally or overall.

Safety warnings

- The FlatFix Wave Entry mounting system must be installed as standard by qualified technical personnel (at least 2 skilled persons).
- The addition or omission of parts may adversely affect operation and is strongly discouraged!
- Before installing the solar panels, the roof must be clean, dry, flat and free of algae, etc.
- Avoid assembling in strong winds and on a wet and slippery roof surface.
- Always work on the roof with fall protection and, if necessary, with safety nets and edge protection.
- Wear shoes with a reinforced tip and firm, non-slip soles.
- Always wear suitable protective clothing when performing work.
- When moving the material (solar panels, etc.), always use a hoisting aid/hoisting installation.
- Always place ladders on a strong, stable surface.
- Always place the ladder at an angle of about 75° and allow it to protrude about 1 metre above the roof edge.
- If possible, secure the ladder at the top with a rope or tension strap.
- Preferably work according to the manual "Safe Working on Roofs".
- **Note:** When mounting the standard unit and the start unit, make sure that hands and/or fingers are not trapped in the area of the hinged parts!

Range of application of FlatFix Wave

- Suitable for up to 1000 N/m² wind pressure.
- For roof heights above 20 m, please contact your supplier.
- Roof material: Concrete, Bitumen, EPDM, PVC, TPO.
For other roof coverings, please contact your supplier.
- Roof slope: A flat roof is a roof of up to 5°. If your roof slope is > 5°, please contact your supplier.
- Maximum field size: 20 m parallel to the row, 40 m perpendicular to the row.
- Suitable for all panels with a width in the range 990 mm to 1070 mm with a maximum panel length of 1.80 m and a maximum surface area of 1.93 m². The panel frame must meet the specification as shown on the next page.

Edge area

Edge area varying in size per building geometry in which higher wind pressures may apply.

The calculator will suggest the correct bill of materials and any measures to be taken if a field is fully or partially located in the edge area. Placing in the edge area is therefore not a problem.

It is recommended, however, that a minimum safety zone of 1 metre be observed to allow for good accessibility along the roof edge for maintenance purposes, so as not to obstruct drainage and to protect any folds in the roofing materials from undesirable stresses.

The system requires a minimum clearance of 30 cm beyond the field for proper installation and/or maintenance. Take into account the possibility of retrofitting fall protection or consider installing permanent fall protection.

Ballast

If your roof is higher than 20 metres, we recommend that you consult with your supplier to help determine the correct ballast.

Standards, regulations and rules

When installing the mounting system, it is important to follow the installation manual and related standards to prevent accidents.

In particular, observe the following standards, regulations and rules:

- Buildings Decree 2012 (regulations for the construction, use and demolition of buildings)
- NEN 7250:2014 - Structural aspects of solar power systems
- NEN-EN 1990 - Basis of structural design
- NEN-EN 1991-1-3 - General loads - snow load
- NEN-EN 1991-1-4 - General loads - wind pressure
- NEN 1010:2015 - Electrical installations for low voltage (HD-IEC 60364)
- NEN-EN-IEC 62305 - Lightning protection
- Workplace safety laws and regulations - safe working and working conditions
- NEN 3140 - safe operation of low-voltage installations
- VCA checklist - Safe working on the work floor
- Scaffolding directive & workplace safety A-sheet ladders/scaffolding

Removal and disassembly

Dispose of the product in accordance with local laws and regulations. At the end of the service life, all materials are recyclable.

The plastic roof supports are attached to the units and the wind deflectors by means of a click system.

Warranty

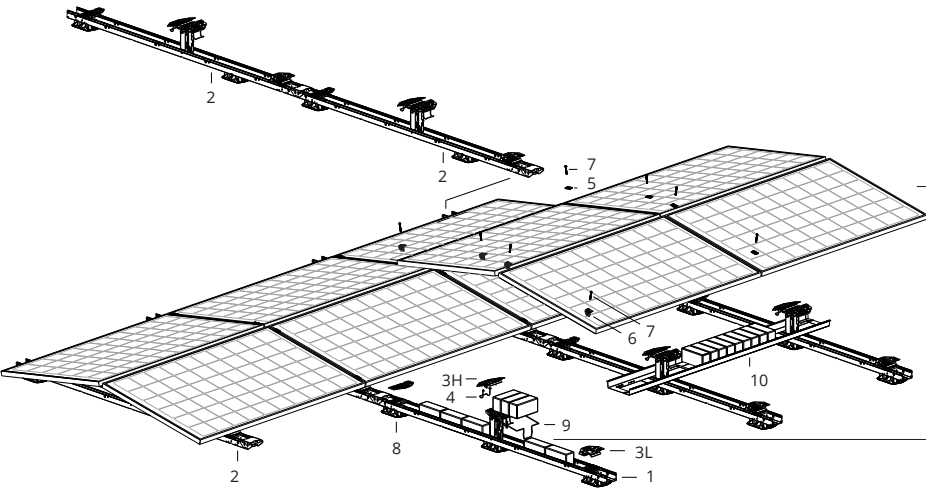
Warranty according to the Esdec BV warranty terms. These can be found on the website www.esdec.com

Liability

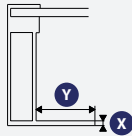
The manufacturer accepts no liability for damage or injury caused by failure to comply (strictly) with the safety guidelines and instructions in this manual, or by negligence during installation of the product and the accessories listed in this document.

- Typing errors reserved

1 BILL OF MATERIALS

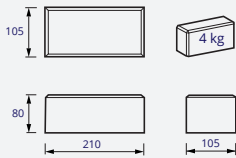


PANEL FRAME

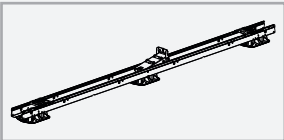


	min	max
X	1,2 mm	2 mm
Y	14 mm	35 mm

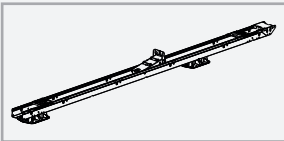
BALLAST



UNITS



1. FlatFix Wave Dual Start unit 2P DR1 1009106



2. FlatFix Wave Dual Unit 2P DR1 1009107



3. FlatFix Wave Adapter set 1009104

BALLAST ACCESSORIES



9. FlatFix Wave Ballast bracket 1009123

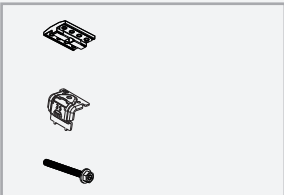


10. FlatFix Wave Ballast holder 1009128
2 pieces needed per ballast holder

ACCESSORIES



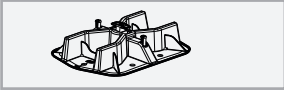
4. FlatFix Wave Cable bracket high base 1009125



5. Universal module clamp with bonding 1003022

6. FlatFix End clamp XX mm 10043XX (See page 10)

7. Mounting screw M6 x 70 mm 1000670



8. FlatFix Wave Base plate 1009120

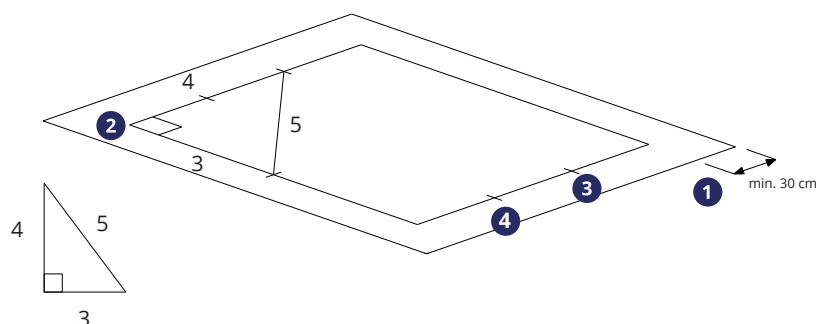
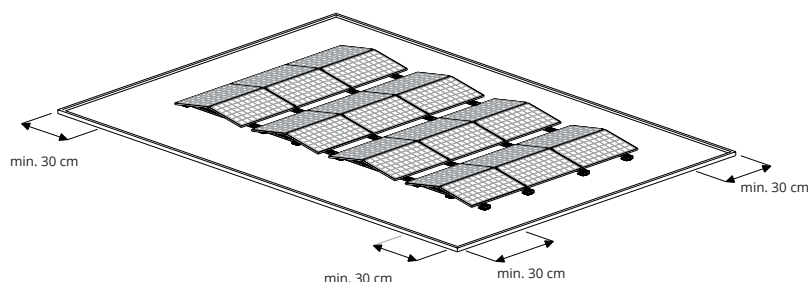
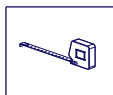
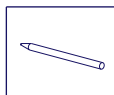


11. FlatFix Wave Measuring bar 2500mm 1009143

TOOLS & EQUIPMENT



2 PREPARATIONS FOR INSTALLATION



1 PREPARING THE ROOF AND ALIGNING (THE FIELDS)



Note: Make sure your roof is in good condition! If in doubt, consult with your roof specialist.

Note: Follow the construction plan and make sure the fields are well aligned.

2 MEASURING AND MARKING (OF FIELD)

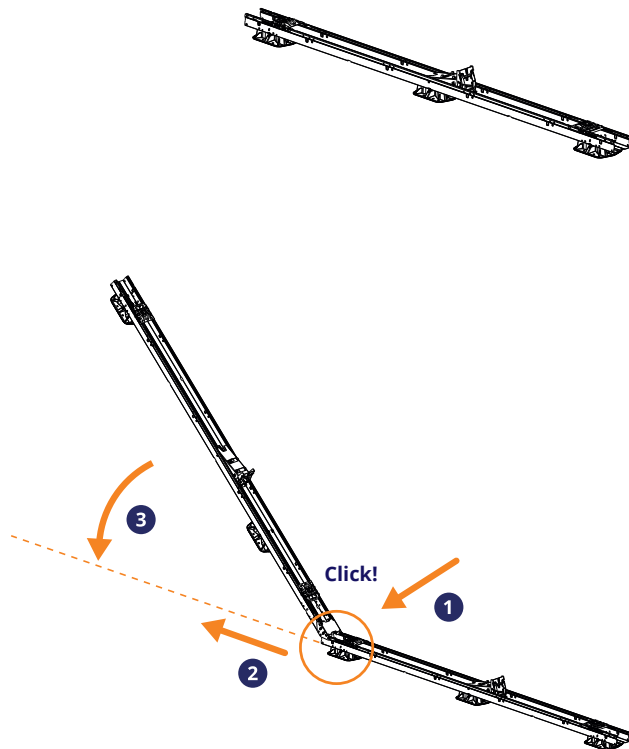
Calculate how much space you need based on the dimensions of your panel.

1. Keep at least 30 cm around the panel field free.
2. Draw field contours at right angles with a 3-4-5 rule. Use a chalk or blemish cord for this. Also mark each panel with a short stripe.
3. Mark the panel edges.
4. Use chalk to mark the place on the roof where the start units are to be placed.

Note: The distance from the solar panels to the edge of the roof should be approximately 1/5 of the height of the building. See the construction plan calculated with the ESDEC calculator for the correct distance.

Tip: Check the measurement using the 3-4-5 rule.

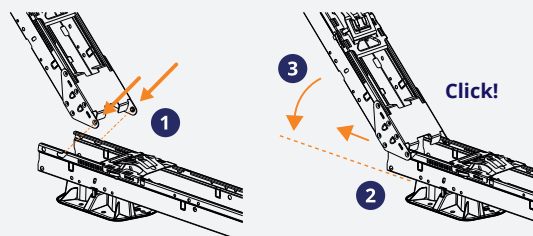
3 CONNECT THE DUAL UNIT TO THE DUAL START UNIT



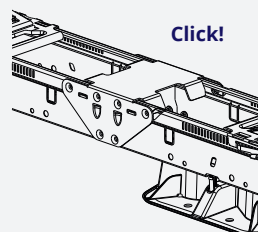
1 POSITION THE DUAL START UNIT ON THE ROOF

Note: Position the dual start unit exactly at the right location on the roof!

2 COUPLE DUAL UNITS TO THE DUAL START UNITS



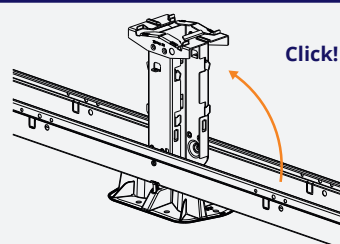
1. Slide the lugs of the dual unit coupling into the slots of the dual start unit at an angle of 45 degrees.
2. Pull back the lugs so that the coupling is firmly engaged.
3. Carefully turn the dual unit downwards until it is completely flat and clicks into place.



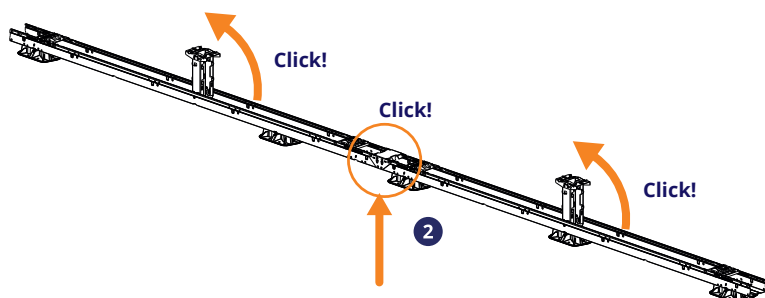
Tip: Lift the dual unit slightly at the coupling, by its own weight the unit will click firmly into place.

Note: Make sure that your hands/fingers are not trapped in the area of the hinged parts!

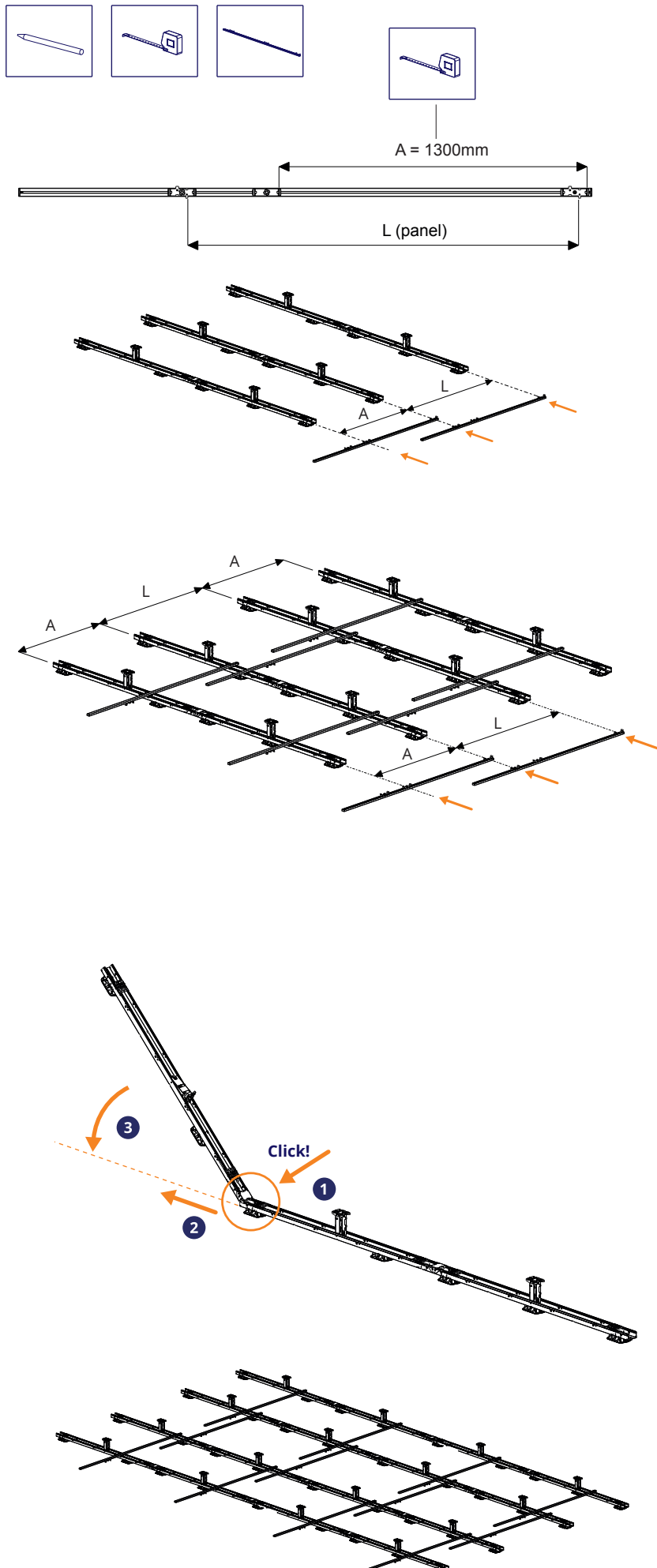
3 PLACE THE HIGH BASE (2x) IN A STANDING POSITION SO THAT IT CLICKS



See Annex A for an explanation of how to attach additional roof supports to the unit.

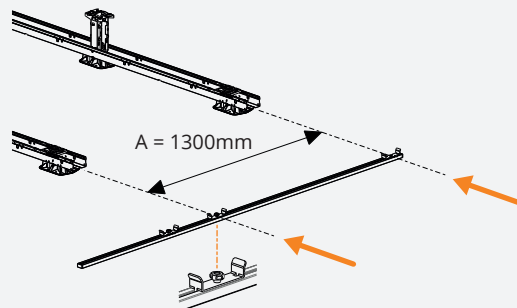


4 POSITIONING THE DUAL UNITS



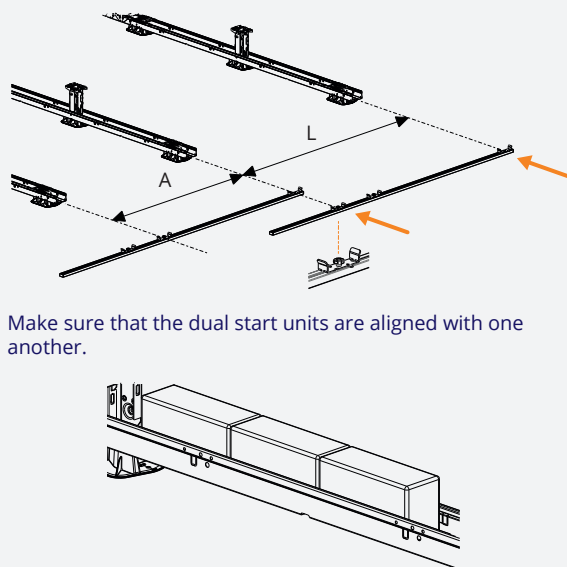
1 POSITION THE 2nd DUAL START UNIT

See Annex B for an explanation of how to use the measuring bar.



Place the first dual start unit at the edge of the panel field, with a centre-to-centre distance ($A = 1300\text{ mm}$). To do this, use the measuring bar at various points on the dual start unit.

2 POSITIONING OF THE OTHER DUAL START UNITS



Make sure that the dual start units are aligned with one another.

Tip: Ballast the aligned units to prevent them from shifting.

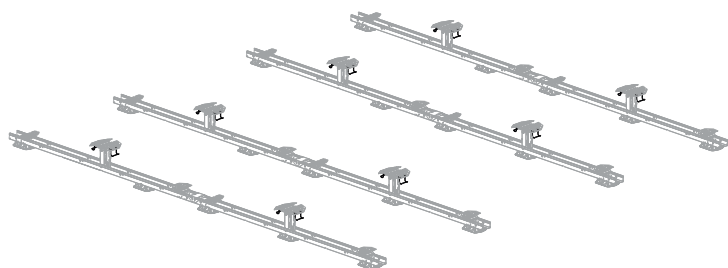
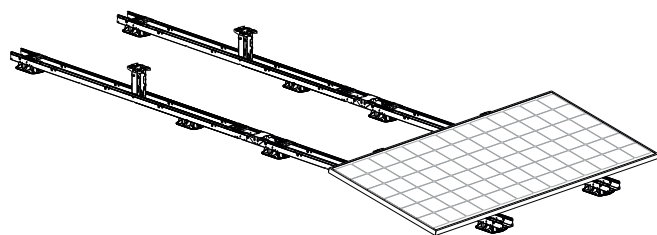
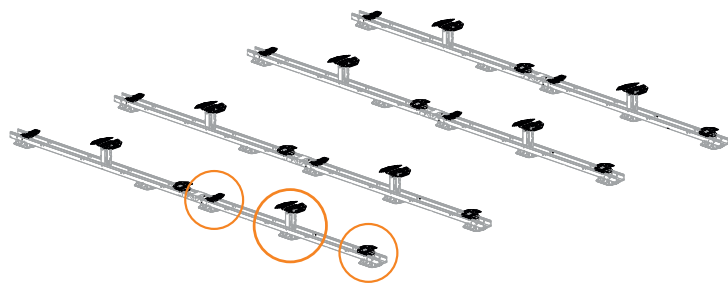
3 CONNECT AND POSITION THE OTHER DUAL UNITS

Repeat the steps described in chapter 3 to connect the other dual units and expand the field further. Make sure that the dual units are aligned with one another. To do this, use the measuring bar at various points on the dual unit.

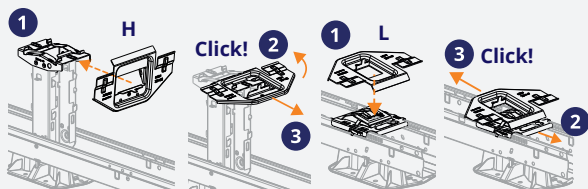
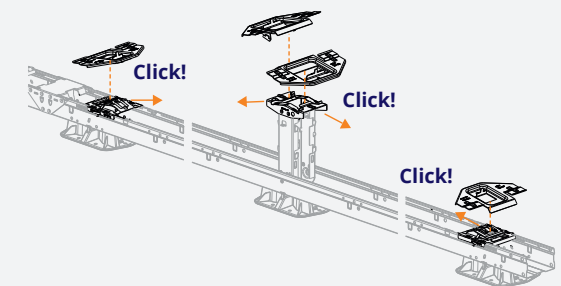


Note: Make sure that your hands/fingers are not trapped in the area of the hinged parts!

5 INSTALLING OF THE ADAPTER SETS AND CABLE BRACKET



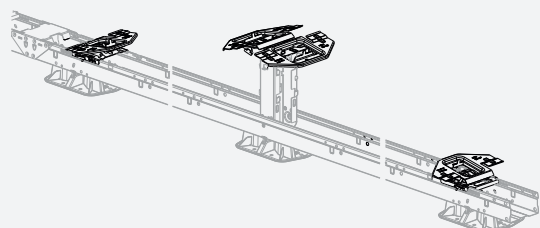
1 MOUNT THE ADAPTER SETS



1. Tilt the adapter (H), and place it on the high base.
2. Tilt the adapter so it is level with the high base.
3. Pull the adapter into the clamp.

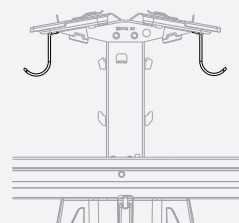
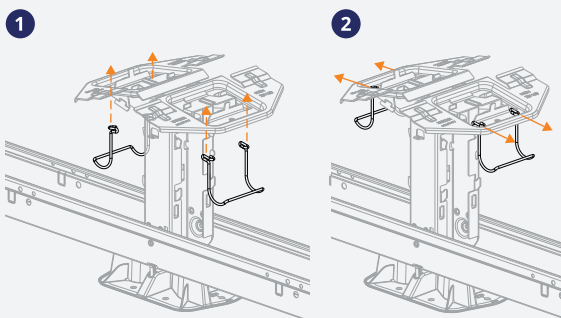
1. Place the adapter (L) on the panel clamp.
2. Hold the panel clamp.
3. Pull the adapter upwards.

Note: Perform this operation on both sides of the high base.



Note: The adapter set is not required for fields where the maximum row length is only 1 panel. See the construction plan from the calculator.

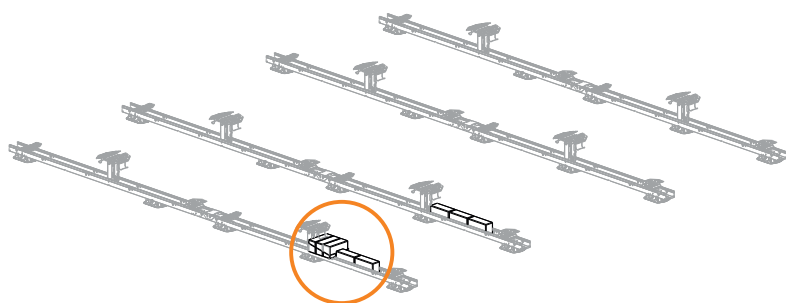
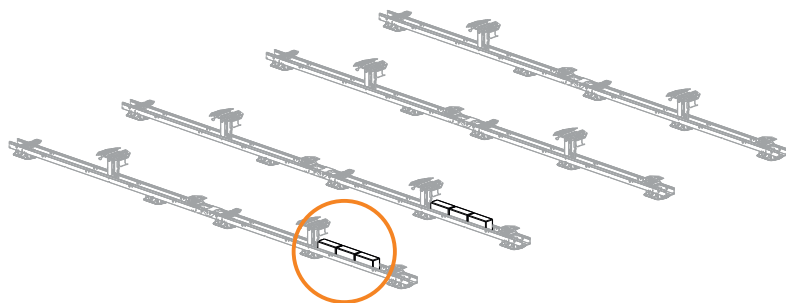
2 ASSEMBLE CABLE BRACKETS TO ADAPTERS



1. Insert the cable brackets from the bottom to the top through the adapter plate.
2. Push the cable bracket forward, on to the adapter plate.

Note: Perform this operation for all high base elements in the field. For cable management, see the specifications in Annex C.

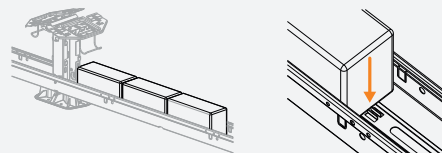
6 PLACING THE BALLAST



1 PLACING THE BALLAST (GENERAL)

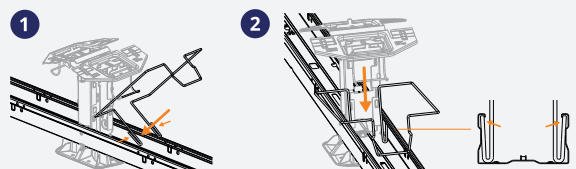
⚠ Note: The construction plan provides the guideline for the ballast positions. The ballast positions are determined using the calculator. Place the ballast at the points indicated by the calculator.

2 PLACE STANDARD BALLAST (3x4 kg.)



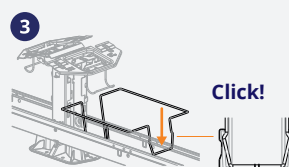
Place the standard ballast (3x4 kg.) in the units on the high base. Place the 1st ballast stone against the lug.

1 PLACE THE BALLAST (5x4 kg.) - INCIDENTAL

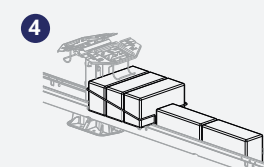


1 Tilt the ballast bracket at an angle in the unit on the high base.

2 Tilt the ballast bracket into the unit.

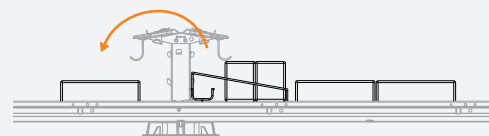


3 Slide the bracket against the high base and then click the bracket into the long edge!



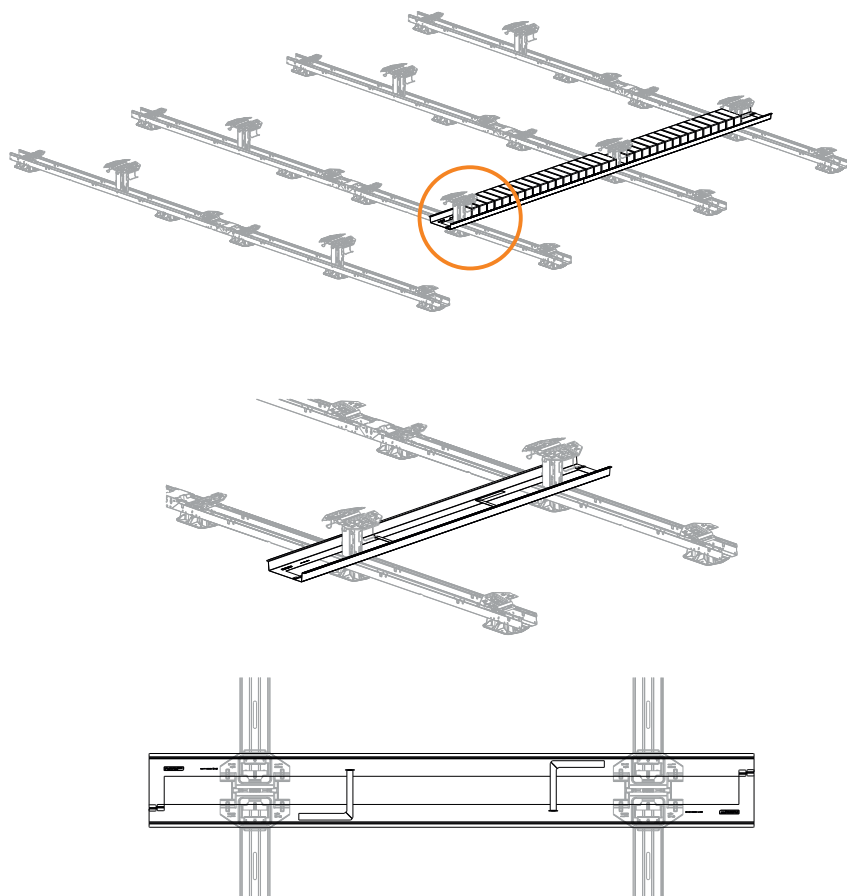
4 Place the ballast (3x4 kg.) in the ballast bracket and the other ballast (2x4 kg.) in the unit.

2 INSTALLING BALLAST IN POSITION AT A WIRE TRAY

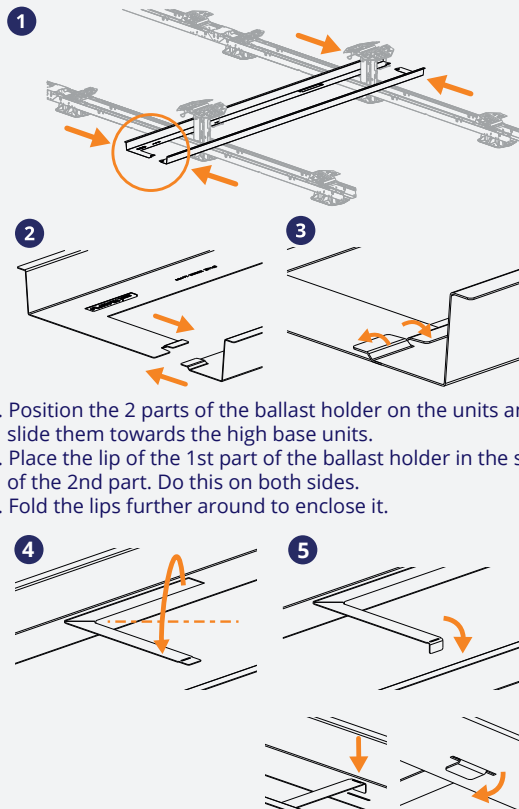


⚠ Note: If there is a wire tray, there is only room for 2 stones, instead of 3 stones, in the ballast bracket. Then place this 3rd stone in the unit on the other side of the high base.

6 PLACING THE BALLAST (INCIDENTAL)



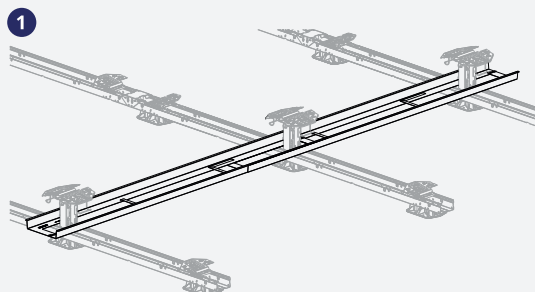
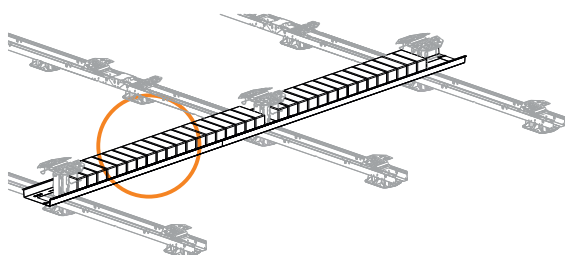
1 INSTALL THE BALLAST HOLDER (INCIDENTAL)



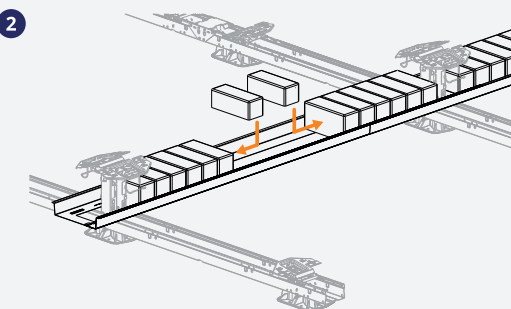
1. Position the 2 parts of the ballast holder on the units and slide them towards the high base units.
2. Place the lip of the 1st part of the ballast holder in the slot of the 2nd part. Do this on both sides.
3. Fold the lips further around to enclose it.

4. Press out the punched hooks and bend them.
5. Slide the end of the hook into the recess and fold over the lip.

2 INSTALL THE REMAINING BALLAST HOLDER (INCIDENTAL)



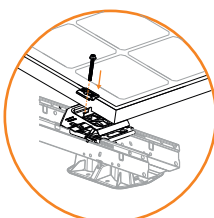
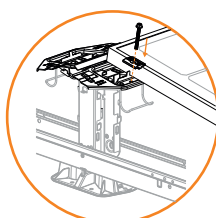
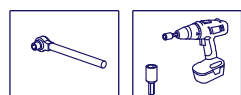
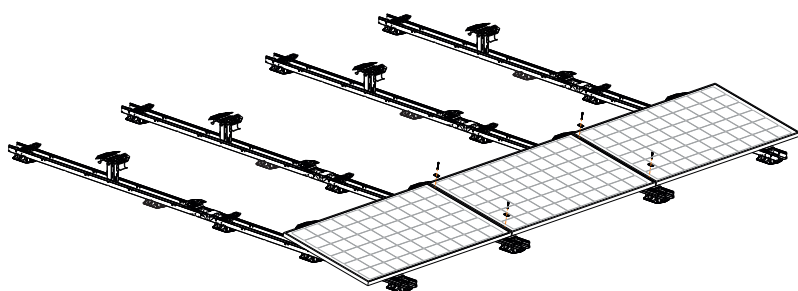
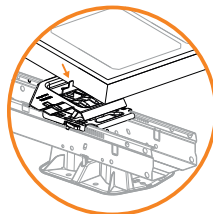
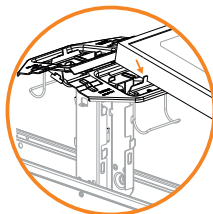
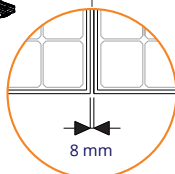
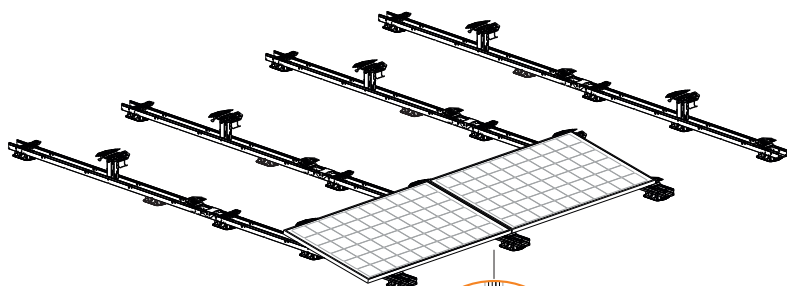
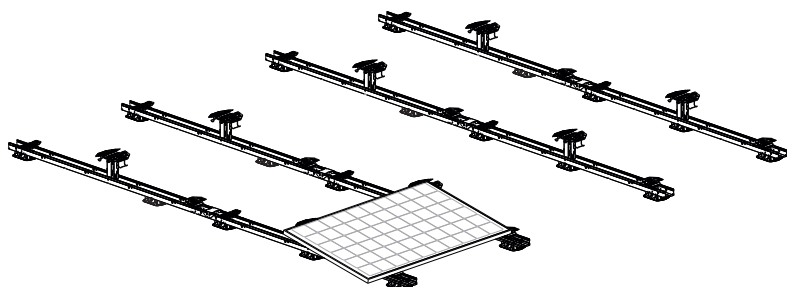
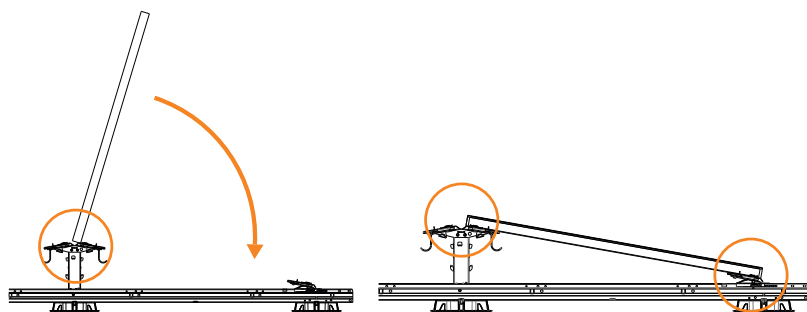
1. Place the 2 parts of the next ballast holder with overlap on the first ballast holder. Make sure that the parts always wrap around two base elements. Fold the lips, like the first ballast holder.



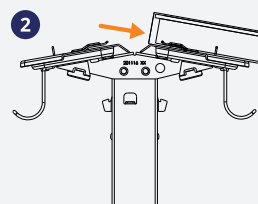
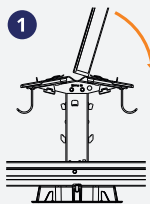
2. When placing ballast in the ballast holder, it must be placed symmetrically. Start with the outer stones and finish with the inner stones.

Note: The construction plan provides the guideline for the ballast positions. The ballast positions are determined using the calculator. Place the ballast at the points indicated by the calculator.

7 INSTALLATION OF SOLAR PANELS AND CABLES



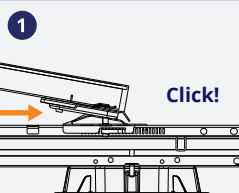
1 POSITION AND CLAMP THE SOLAR PANEL ON THE ADAPTERS OF THE HIGH BASE ELEMENTS



1. Position the first solar panel on the adapters of the 2 high base elements. Tilt the panel so that the lower edge of the panel is flush with the adapters. Make sure that the panel rests firmly against the upright spacer of the adapter.

2. Slide the panel edge under the clips of the adapters as far as it will go.

2 CLAMP THE SOLAR PANEL ON THE FRONT SIDE

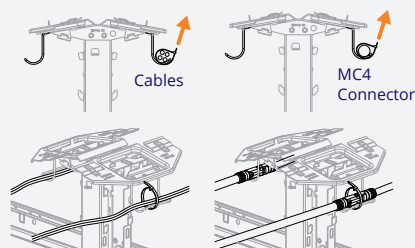


Click!

Slide the clips of 2 lower adapters on the panel locks over the edge of the front panel until the panel is firmly clamped in place.

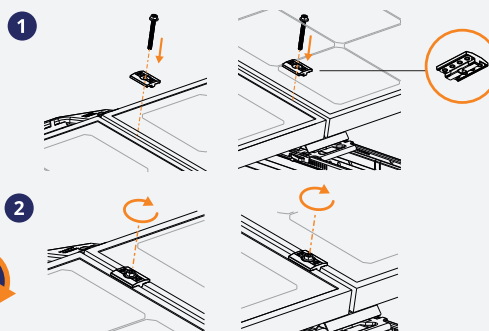
3 PLACING CABLES OR MC4 CONNECTOR

1. Insert the cables or the MC4 connector into the cable supports.
2. Connect the cables or MC4 connector to the cable supports using cable ties.



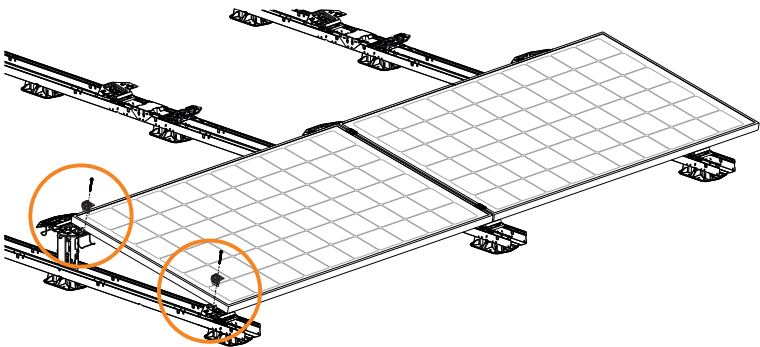
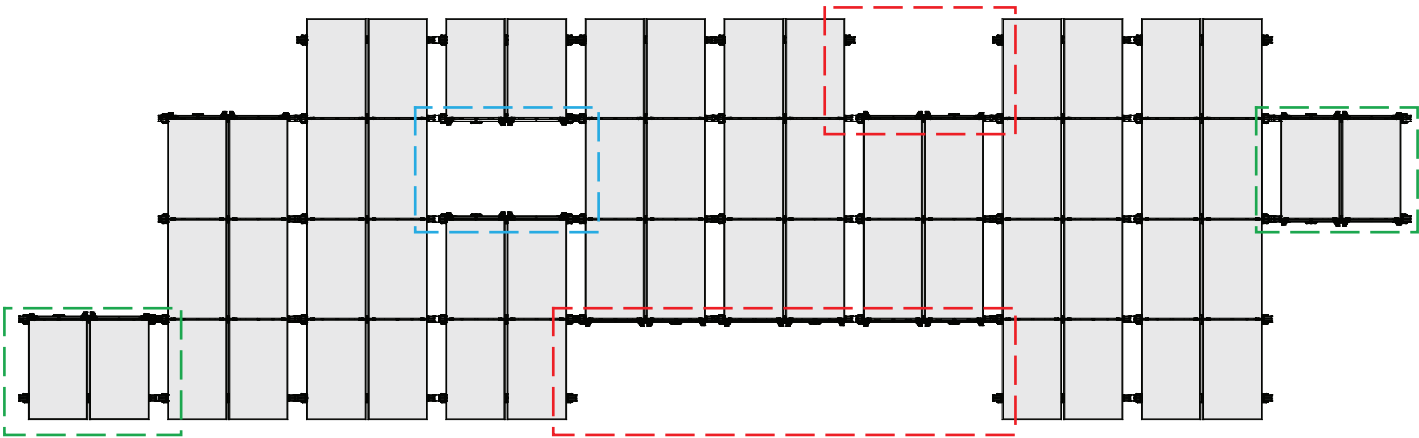
3. Connect the connectors of the cables of the first and second solar panel to one another.
4. Install the second solar panel.
5. Repeat the steps to complete the rows.
See Annex C for an explanation of cable management.

4 MOUNT THE UNIVERSAL MODULE CLAMPS



5,5 Nm



1. Position 2 universal module clamps with bonding between the panels.
2. Screw on the module clamps.
3. Repeat the steps to complete the rows.



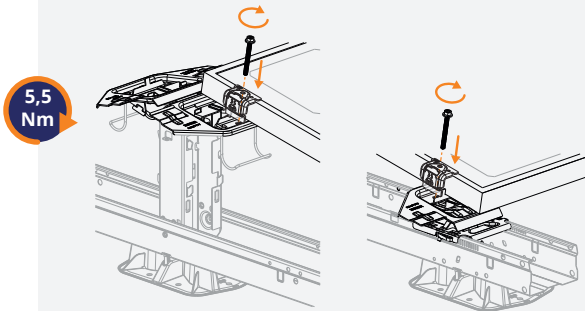
1 OPEN ENDS

- - - - - Spurs
- - - - - Obstacles in the edge
- - - - - Hole in the field

These open ends require the application of two end clamps and screws.

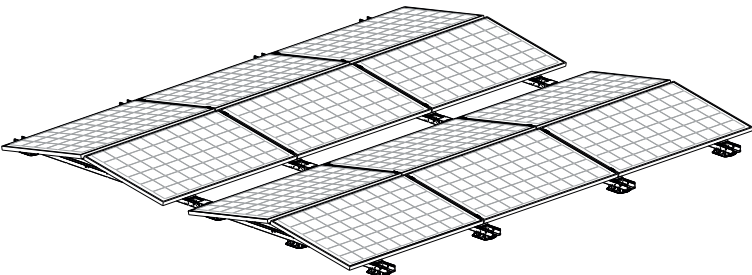
Panel thickness [mm]	End clamp
	
Article number	
30 mm	1004330
31 mm	1004331
32 mm	1004332
33 mm	1004333
34 mm	1004334
35 mm	1004335
36 mm	1004336
37 mm	1004337
38 mm	1004338
39 mm	1004339
40 mm	1004340
41 mm	1004341
42 mm	1004342
43 mm	1004343
44 mm	1004344
45 mm	1004345
46 mm	1004346
47 mm	1004347
48 mm	1004348
49 mm	1004349
50 mm	1004350

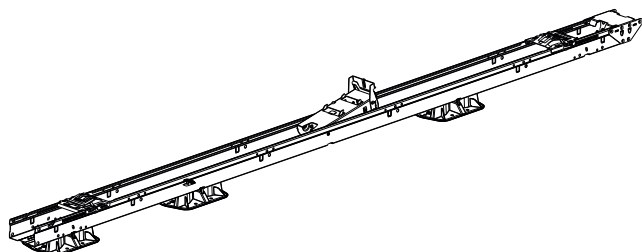
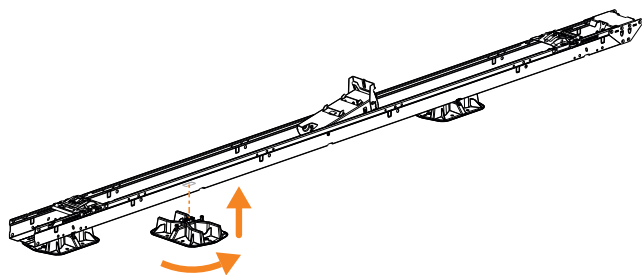
2 MOUNT THE END CLAMPS



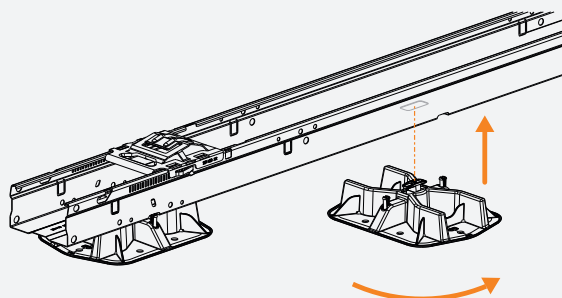
1. Position the end clamps on the open ends of the anchors.
2. Screw on the end clamps.
3. Repeat the steps to complete the rows.

3 THE PANEL FIELD IS NOW READY!

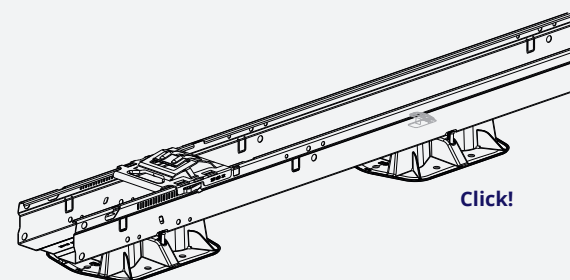




1 MOUNT THE ADDITIONAL ROOF SUPPORT TO THE UNIT

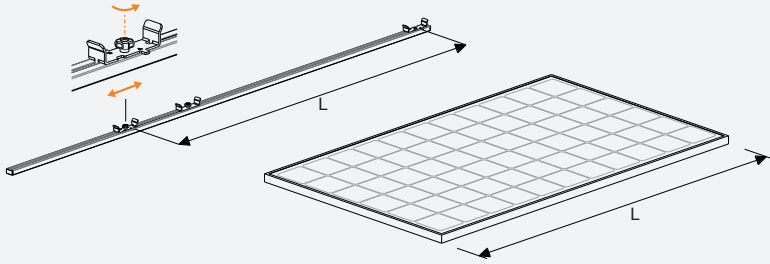


Place the roof support in the correct position underneath the unit. Place the hook of the roof support through the hole in the unit. Turn the roof support 90 degrees until it engages.

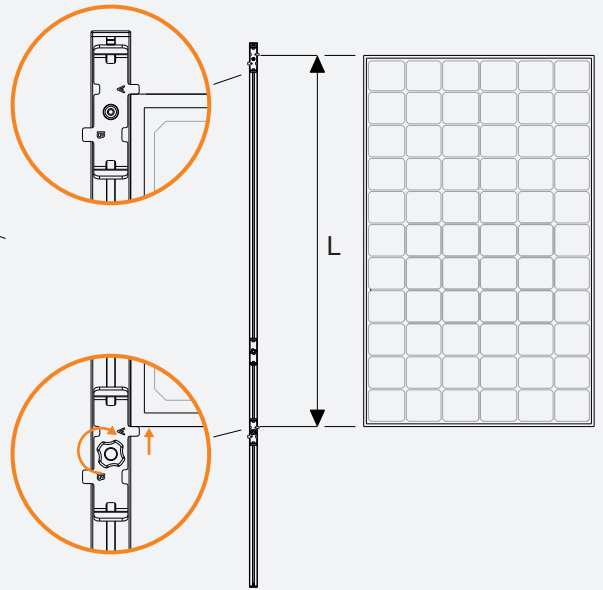


1 SETTING THE MEASURING BAR

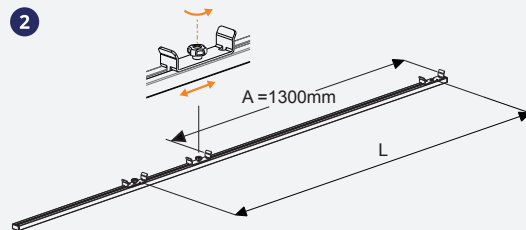
1



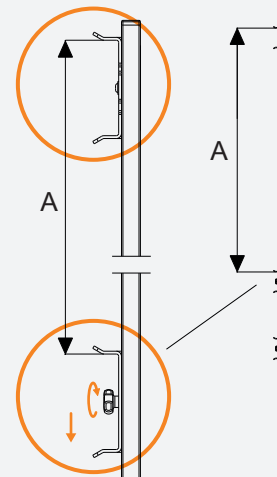
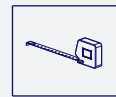
Take size L from the solar panel. Set size L on the Measuring bar (= 1st handle to the 3rd handle). Use indicator A on the handle as a reference.



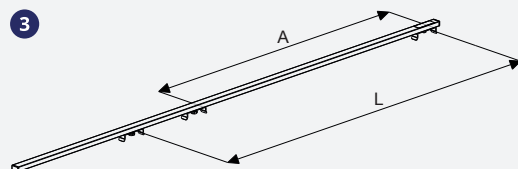
2



Set size A with a tape measure to 1300 mm (= 1st handle to 2nd handle).

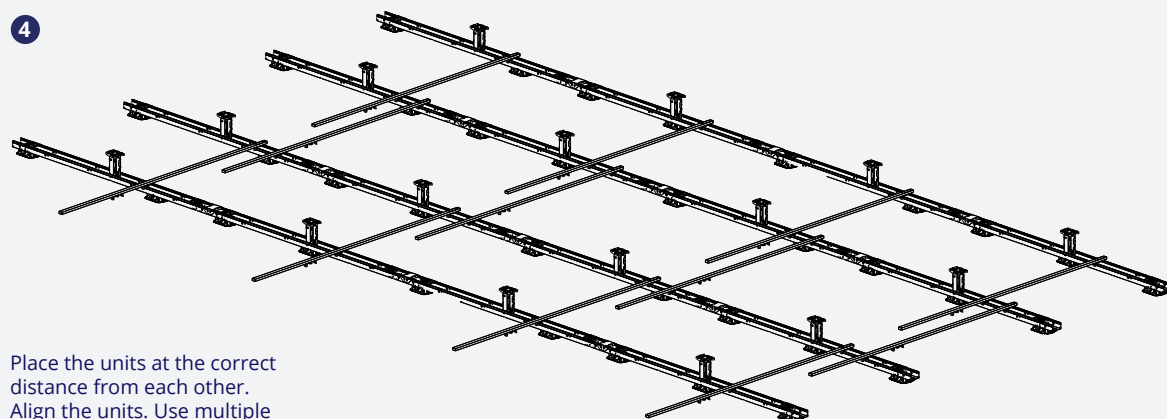


3

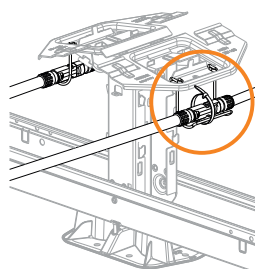
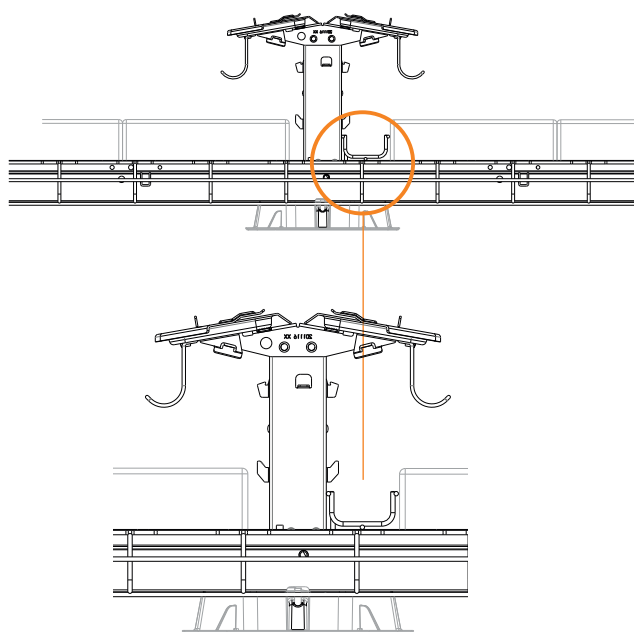
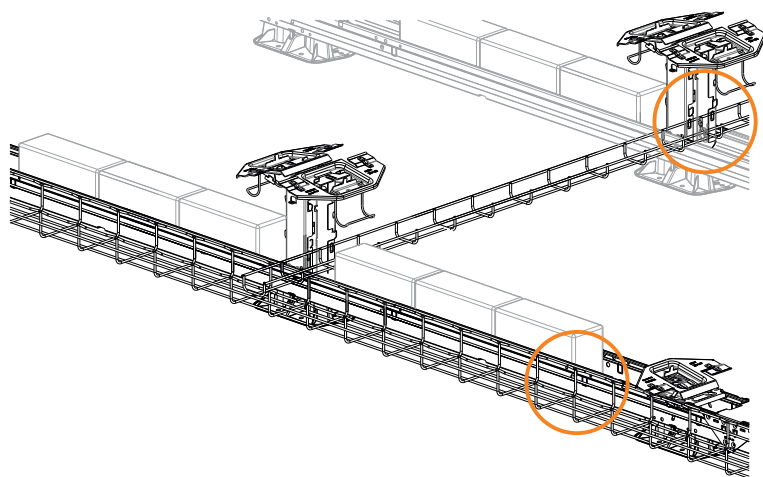


Turn the measuring bar so that the handles face down.

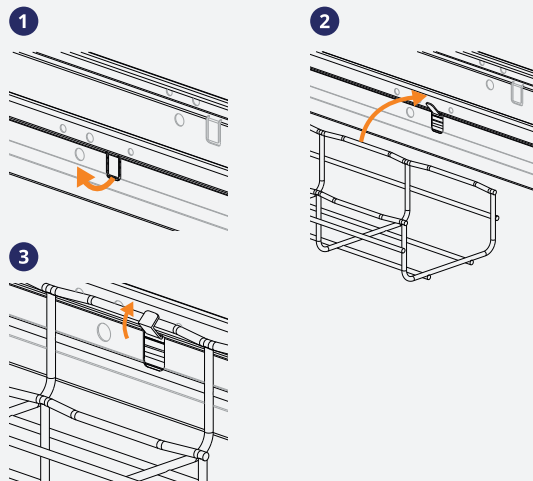
4



Place the units at the correct distance from each other. Align the units. Use multiple measuring bars for this.



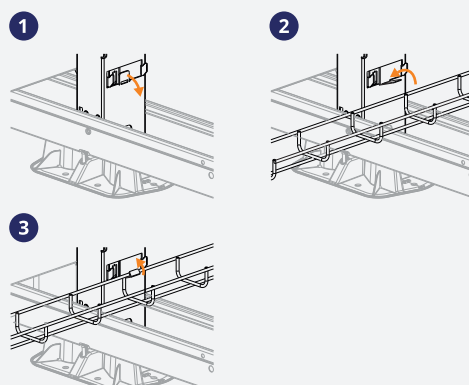
1 TIP: MOUNT A LARGE WIRE TRAY ON THE SIDE OF THE (START) UNITS



1. Fold out the lips on the side of the units.
2. Bring the top bar of the wire tray over these lips.
3. Fold the lips further around the rod to enclose it.

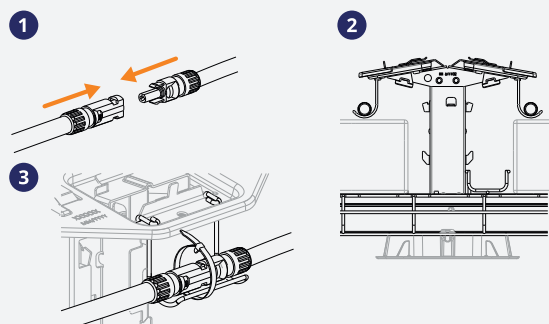
Make sure that the wire tray does not rise above the units.

2 TIP: MOUNT A SMALL WIRE TRAY ON THE HIGH BASE ELEMENTS OVER THE (START) UNITS



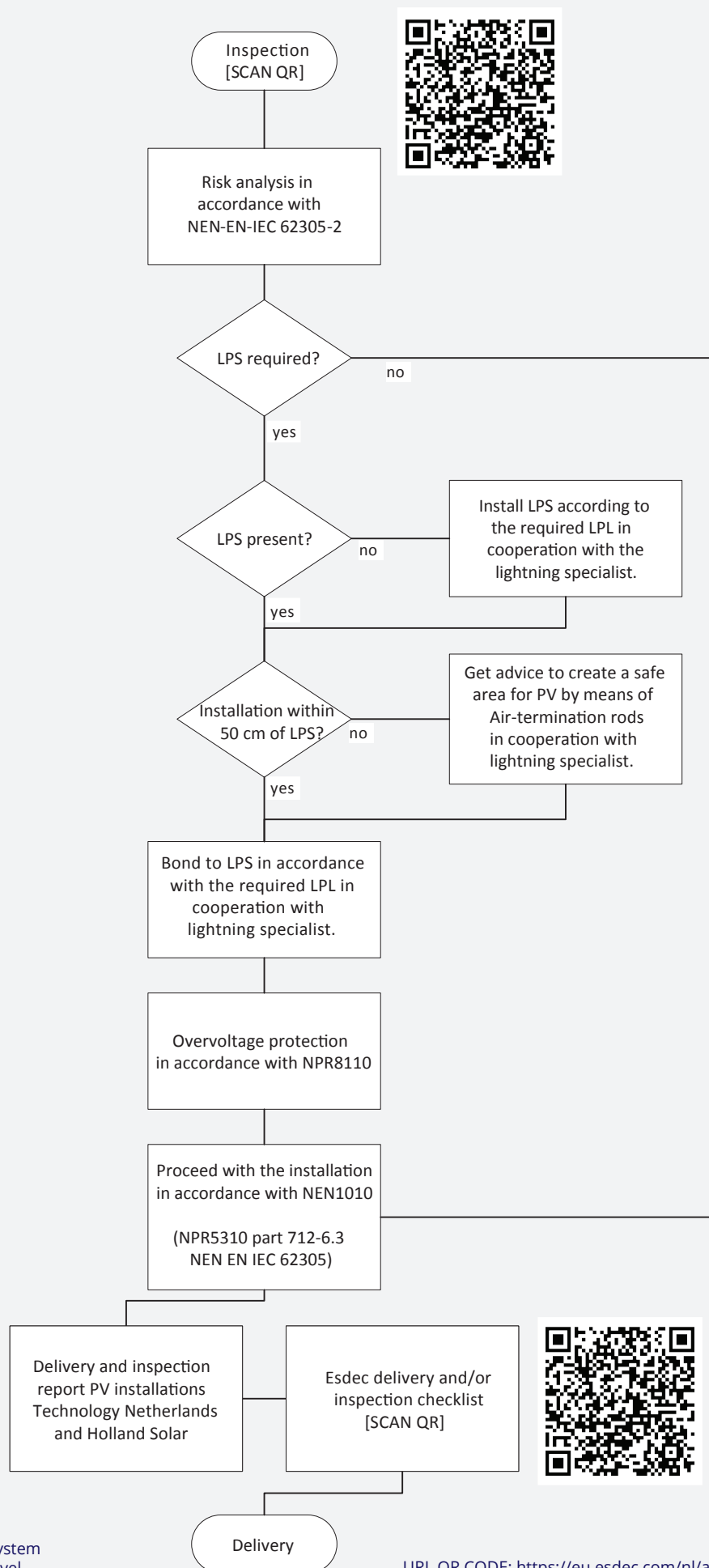
1. Fold out the lips of the high base elements.
2. Bring the top bar of the wire tray over these lips.
3. Fold the lips further around the rod to enclose it.

3 SECURE CONNECTORS AND CABLES IN THE CABLE BRACKETS



1. Connect the MC4 connectors.
2. Place the MC4 connector with the cables in the cable brackets.
3. Secure the MC4 connector and cables to the cable brackets using cable ties.

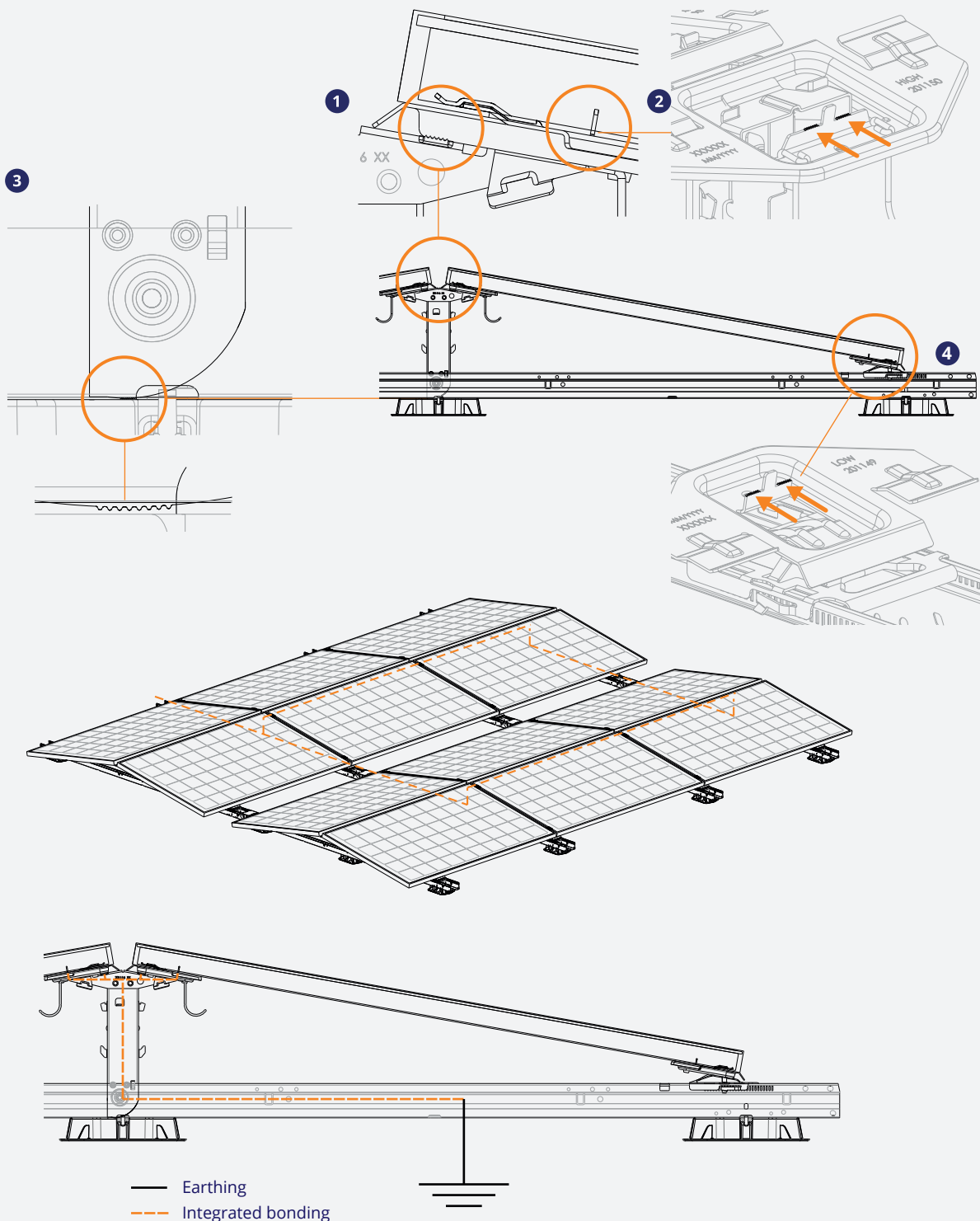
1 SELECTION DIAGRAM



2 METHOD OF EARTHING/BONDING

Thanks to the integrated part bonding, no additional bonding between the metal parts is required.

1. The toothing at the top of the high base elements engages with the adapter plates.
2. The teeth at the top of the adapter plates engage in the frame edge of the solar panels.
3. The toothing at the bottom of the high base elements engages with the back of the unit frame profile.
4. Fully tightening the panel lock ensures the correct contact of the panel frame with the high base.



INSTALLATION OF THE BONDING CONDUCTOR

- The earthing conductor ($\geq \varnothing 4\text{mm}^2$) runs parallel to the plus and min. conductors and is connected to a separate earthing point of the inverter.
- Connect at least one rail in a field to an earth rail.
- Each individual PV field will have its own bonding conductor.
- The earthing cable can be fitted with a cable eye and screwed to the rail together with serrated spring washers.
- Correct installation: protected against corrosion and firmly assembled.

3 LPS: LIGHTNING PROTECTION

Lightning protection guidelines.

CONSULT WITH YOUR LIGHTNING PROTECTION SPECIALIST TO ANALYSE YOUR PROJECT.

1 Desired application: Application of lightning detection system (with Air-termination rods)

- Determine the safe separation distance (S) according to NEN-EN-IEC 62305 (minimum 0.5 metres).
- Try to observe the separation distance between the PV system (PV) and lightning protection system (LPS).
- In this way, you can keep the PV system separate from the lightning protection system to prevent lightning current from entering.

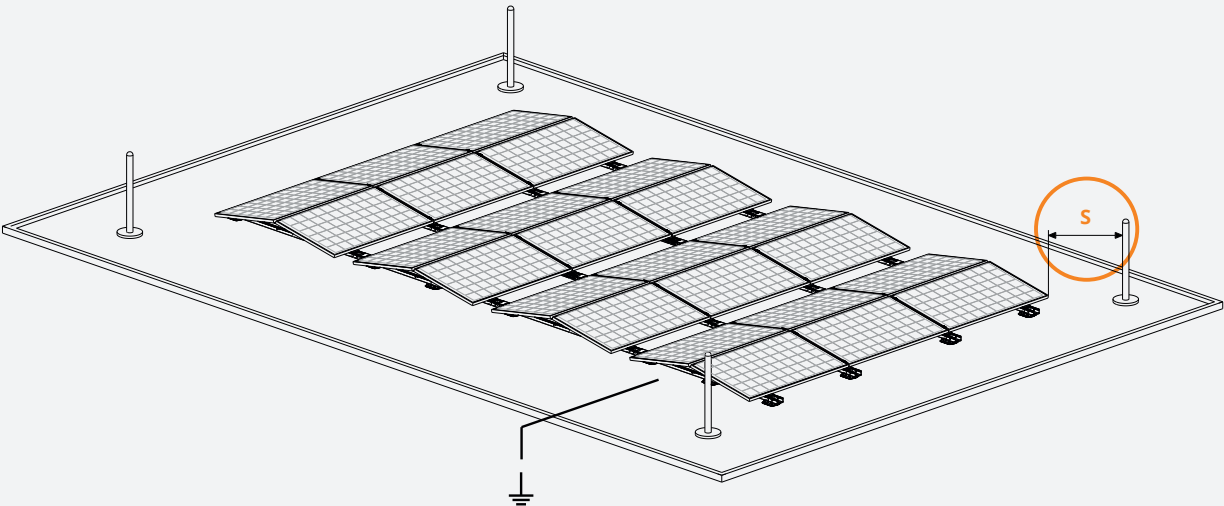
2 If this is not possible, connect the PV system to LPS according to the applicable lightning protection level (LPL);

- See table 1, use at least 16 mm² connections.
- Check the need for additional overvoltage protection type 1 and/or type 2.
- Make sure that the cable support systems are also earthed and connected to LPS. NB: Metal cable support systems also belong to the PV system.
- Make sure that the earthing cable is routed parallel to the DC cables.

IN EITHER CASE: CONSULT WITH YOUR LIGHTNING PROTECTION SPECIALIST BEFOREHAND TO ANALYSE YOUR PROJECT AND PREVENT UNWANTED SAFETY PROBLEMS. ESDC IS LIABLE UNDER NO CIRCUMSTANCES FOR THE APPLICATION AND/OR COMBINATION OF THE LIGHTNING PROTECTION ON THE ROOF. CONSULT WITH YOUR SPECIALIST AND ENSURE SAFE INSTALLATION ACCORDING TO NEN-EN-IEC 62305 - NEN1010 (NPR5310 - part 712 section 6.3)

table 1

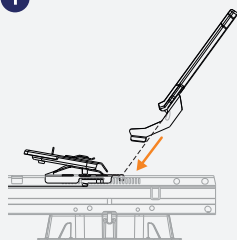
Mesh size	LPL level	Connect the PV system to the...
5x5 metres	I	5 metres
10x10 metres	II	10 metres
15x15 metres	III	15 metres
20x20 metres	IV	20 metres



LPS = lightning protection system
LPL = lightning protection level

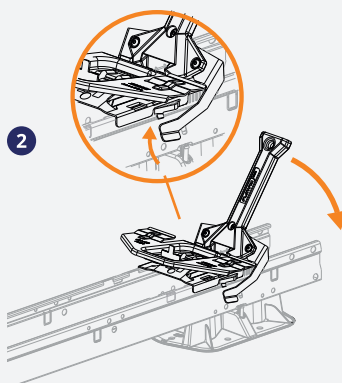
1 DISASSEMBLE THE PANELS

1



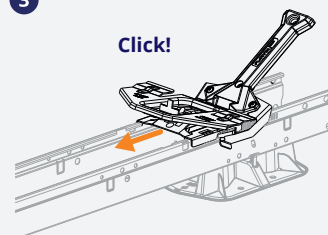
1. Place the unlocking tool on the locking lever.

2



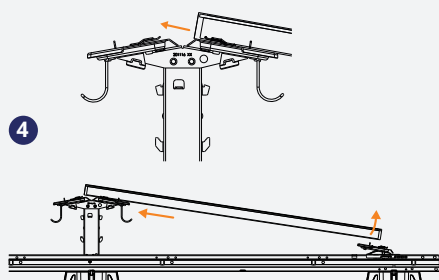
2. Carefully turn the unlocking tool downwards so that the panel latch can be slid back.

3



3. Slide the panel all the way back in the direction of the panel. This unlocks the low side of the panel.

4



4. Lift the panel a few cm and press the panel backwards out of the adapter of the high base elements.

5



5. Now you can lift the entire panel.

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16-05-2022

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