ESDEC

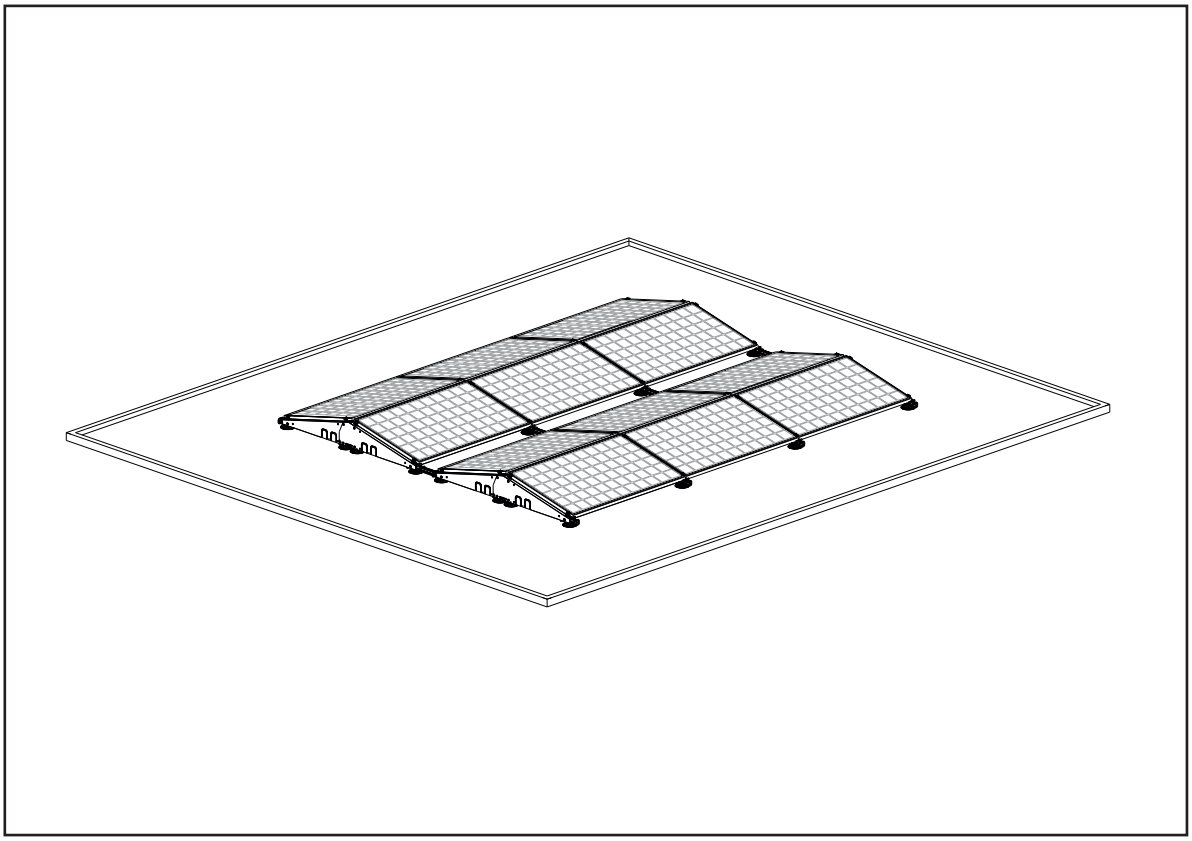
INNOVATIVE **MOUNTING SYSTEMS**

FLATFIX FUSION

MANUAL

EN

FLATFIX FUSION MOUNTING SYSTEM FOR FLAT ROOFS



FlatFix Fusion mounting system for flat roofs for solar panels in a dual landscape setup

Version 13/07/22

© ESDEC BV 2022

ESDEC
Londenstraat 16
7418 EE Deventer
The Netherlands

T +31 850 702 000
info@esdec.com
www.esdec.com

IBAN NL64 INGB 0658539531
BIC INGBNL2A
VAT NL813998955B01

CLICKFIT FLATFIX

All our transactions and sales apply our Terms and Conditions which are filed with the Chamber of Commerce (08127728). These can be downloaded at www.esdec.com

CONTENTS

	page
1. Introduction	**1**
2. General installation requirements	**1**
3. Product description	**3**
4. Parts overview	**3**
4.1 Exploded-view	**3**
4.2 List of parts	**4**
5. Preparation for installation	**5**
5.1 Checking if you have all necessary tools and accessories	**5**
5.2 Determining and measuring the position of solar panels	**6**
5.3 Cleaning the roof	**6**
6. Installation	**7**
6.1 Mounting roof support to bases	**7**
6.2 Mounting additional roof supports (optional)	**7**
6.3 Mounting TPO Protective Mat (optional)	**7**
6.4 Equipotential bonding and mounting base profile to bases	**8**
6.5 Positioning FlatFix Fusion segments	**10**
6.6 Mounting ballast containers	**10**
6.7 Installing 1st solar panel	**12**
6.8 Equipotential bonding and installing other solar panels	**13**
6.9 Mounting optimisers & cables	**14**
6.10 Equipotential bonding multiple rows (optional, see also section 7.3)	**15**
6.11 Equipotential bonding ballast containers (optional)	**16**
6.12 Placing ballast	**17**
6.13 Mounting and equipotential bonding of stabilisers	**18**
6.14 Equipotential bonding touchable metal parts (optional)	**20**
6.15 Mounting 2nd row of solar panels	**20**
6.16 Mounting wind deflector left/right	**21**
7. Annex	**23**
7.1 Dimensional variants	**23**
7.2 Installing cable exit guides, cables and wind deflectors	**26**
7.3 Schematic representation of earthing, equipotential bonding and lightning protection	**29**
7.4 Ballast configurations	**32**

THIS INSTALLATION MANUAL MUST BE KEPT IN A SAFE PLACE FOR FUTURE USE!

For the duration and conditions of the warranty, we recommend you to contact your supplier.

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

The manufacturer declines all responsibility for damage or injury resulting from failure to follow this installation manual carefully or failure to exercise the usual care when transporting, mounting and using the FlatFix Fusion mounting system.

Due to ongoing improvements, 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 referred to 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.

1. Introduction

This manual describes the installation of the FlatFix Fusion mounting system for flat roofs (for solar panels in landscape setup). Read the manual carefully so that you are completely familiarised with the contents of the manual. Follow the instructions in the manual carefully. Always perform the actions in the correct order.
Keep the manual in a safe and dry place. If the manual is lost, it is possible to order a new copy from Esdec BV or to download it at www.esdec.com. Where reference is made to the installation drawing, reference is also made to the FlatFix Calculator from which the installation drawing can be generated.

2. General installation conditions

General

Failure to comply with the instructions in this document and/or in the installation drawing may invalidate all warranty and product liability claims.
The specifications, comments and recommendations contained in this document are binding and it should be ensured that these are complete and 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 a good condition and strong enough to support the weight of the solar panels, including additional materials, ballast, wind and snow loads. Check the stability of the roof and adjust the roof/structure if necessary. If in doubt, consult a structural engineer. Ensure that the load threshold of the roof is not exceeded, either locally or in total.

Insulation/roofing

The continuous compressive load capacity (point load) of the insulation and the roof covering must be checked and approved before installation. The suitability of the roof supports in combination with the roof covering must be verified and found to be in order; if required or desired, place additional roof supports where necessary. If in doubt, consult a professional roofer.

Safety warnings

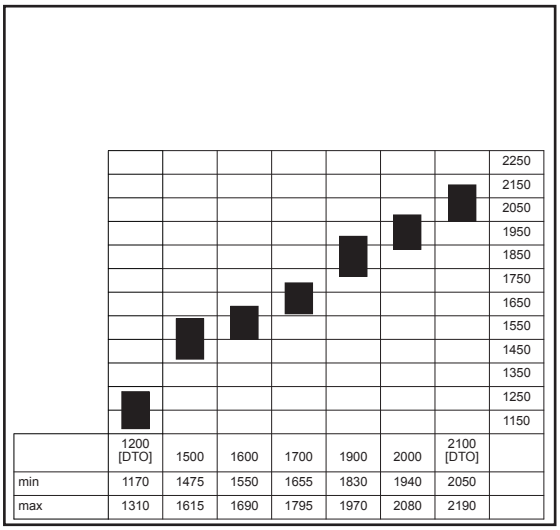
- The installation of the FlatFix Fusion mounting system must be carried out as standard by qualified technical personnel (at least 2 skilled persons).
- The addition or omission of components may adversely affect function and is strongly discouraged!
- Before installing the solar panels, the roof must be clean, dry, flat and free of algae, etc.
- Avoid installation in strong winds and on a wet and slippery roof surface.
- The FlatFix Fusion mounting system may only be installed at temperatures between -15ºC and 40º, due to mounting connections of the plastic parts.
- Always work on the roof with fall protection and, if necessary, with safety nets and edge protection.
- Wear shoes with a reinforced toe and firm, non-slip soles.
- Always wear suitable protective clothing when performing work.
- When moving the material (solar panels, etc.), always use a hoist/lifting aid.
- Always place ladders on a strong, stable surface.
- Always place the ladder at an angle of about 75º and make sure that it projects about 1 metre above the roof edge.
- If possible, secure the ladder at the top with a rope or strap.
- Preferably work according to the manual “Safe Working on Roofs”.

Range of application of FlatFix Fusion

- Installation temperature range: -15°C - +40°C.
- Wind zone (1 to 3 with the exception of the coastal zone).
- Roof height (1-20m). If your roof is higher, you should contact your supplier.
- Type of roofing: Concrete, Bitumen, EPDM/PVC/TPO.
- Roof pitch: maximum 3º. The base plates must be glued between 3º and 7º (with PVC between 2° and 7º).
- With a roof pitch of more than 7º, you should contact your supplier.
- Setup: Landscape array. Inclination angle of solar panels: 11,3º to 13º.
- Maximum solar panel dimensions: length 1170 – 1310 mm, 1475 – 1615 mm, 1550 – 1690 mm, 1655 mm – 1795 mm, 1830 – 1970 mm, 1940 – 2080 mm, 2050 – 2190 mm. Width 980 – 1016 mm, 1017 – 1053 mm, 1068 – 1104 mm, 1114 – 1150 mm, thickness 30 – 50 mm. (see table on page 02)

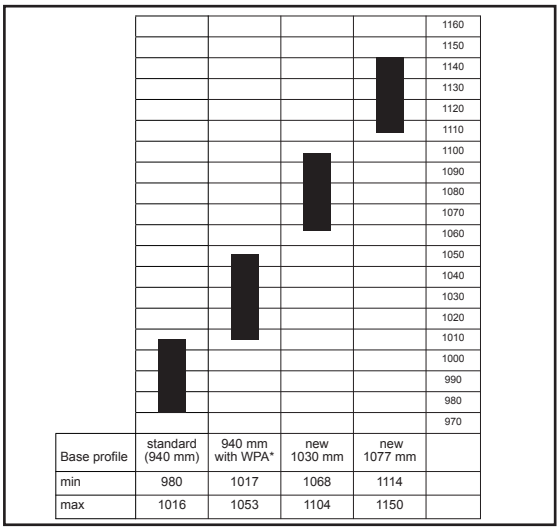
Table range panel dimensions

Panel length range



	1200 [DTO]	1500	1600	1700	1900	2000	2100 [DTO]	
min	1170	1475	1550	1655	1830	1940	2050	
max	1310	1615	1690	1795	1970	2080	2190	

Panel width range



Base profile	standard (940 mm)	940 mm with WPA*	new 1030 mm	new 1077 mm	
min	980	1017	1068	1114	
max	1016	1053	1104	1150	

*WPA = Wider Panel Adapter = 1007022-WP

Edge zone

The distance from the solar panels to the edge of the roof must be approximately 1/5 of the height of the building with a minimum distance of 30 cm, due to the very turbulent wind currents in this zone. No solar panels must be installed in this zone, either in whole or in part. The edge zone to be maintained is derived from the FlatFix Fusion calculator.

Ballast

If your roof is higher than 20 metres, we recommend that you consult with your supplier to help determine the correct ballast. Use stones or gravel as ballast. Consult the installation drawing.

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 & Volandis directivesafety 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 aluminium base profiles are attached to the bases by means of a click system. Use combination pliers to disassemble the base profile.

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.
• printing errors reserved

3. Product description

The mounting system is made up of high-quality plastic bases, which are connected to each other in the longitudinal direction with aluminium base profiles. In the lateral direction, the FlatFix Fusion segments are connected to each other with stabilisers. The necessary mounting materials are also available to mount the solar panels in a landscape setup on the roof. The FlatFix Fusion mounting system can be used for all types of roofing.

Placing ballast

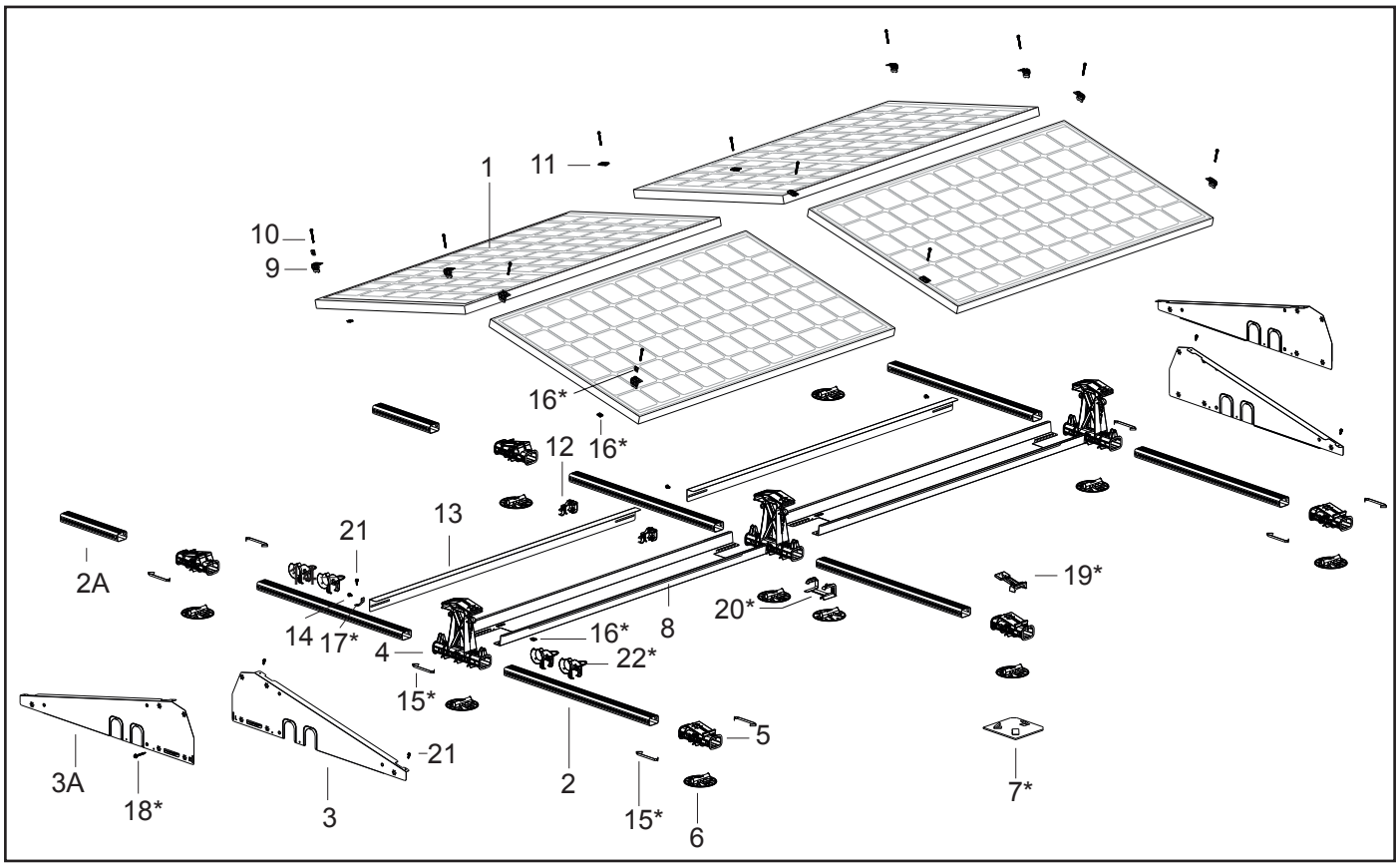
The FlatFix Fusion system is not normally fixed to the roof, but simply rests on it. Only with a roof pitch of more than 3° (2° for PVC) the roof supports have to be bonded to the roof. Please observe the processing instructions for the sealant and the roof covering in order to ensure these are compatible. The system is made resistant to the wind by weighing it down with ballast. The ballast weight is partly related to the height of the building and the configuration of the system. Place the ballast in the ballast containers. Consult the installation drawing for the positioning and quantity of ballast.

Fixing the solar panels

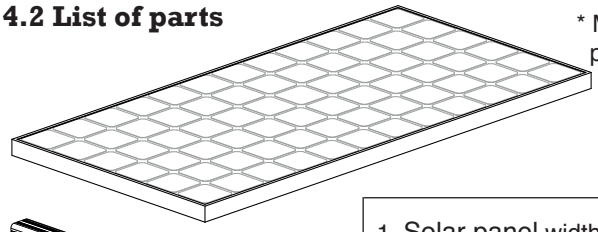
The solar panels are positioned on the top of the bases and are secured by means of universal module clamps, end clamps and mounting screws. The mounting screws are screwed directly into the mounting holes of the bases. The tightening torque of the mounting screws is specified in more detail in section 6.

4. Parts overview

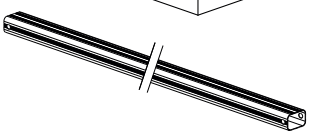
4.1 Exploded-view

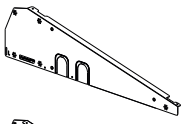


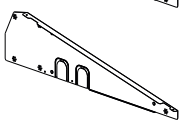
4.2 List of parts



* Measure the shortest side of the solar panel and select the base profile and the matching wind deflectors.





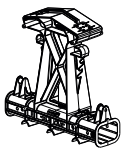


1. Solar panel width:	*1016 – 1053 mm	*1068 – 1104 mm	*1114 – 1150 mm
2. Base profile Article no.:	940 mm 1007194	1030 mm 1007195	1077 mm 1007196
3. Wind deflector left (also available in black) Article no.:	1007224(-B)	1007226(-B)	1007226(-B)
3A. Wind deflector right (also available in black) Article no.:	1007225(-B)	1007227(-B)	1007227(-B)

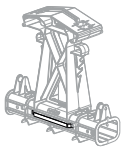
Then select the other parts below.



2A. Base profile
Article no.: 10071__
For length see annex section 7.1



4. High base
Article no.: 1007031



4A. High base
with equipotential bonding
Article no.: 1007031-S



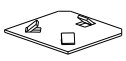
5. Low base
Article no.: 1007022



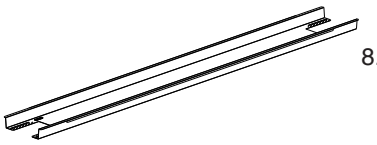
5A. Low base
with equipotential bonding
Article no.: 1007022-S



6. Roof support
Article no.: 1007012



7. TPO protective mat
Article no.: 1007015
*optional



8. Ballast container
Article no.: 10072__
For length see annex section 7.1



9. End clamp
Article no.: 1004__
For type see annex section 7.1



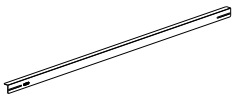
10. Mounting screw M6 x __
Article no.: 10006__(-B)
For type see annex section 7.1



11. Universal module clamp
Article no.: 1003022(-B)



12. Cable-clip optimiser ready
Article no.: 1007041



13. Stabiliser
Article no.: 10072__
For length see annex section



14. Mounting screw M6x12
Article no.: 1000612 (-B)



15. Grounding spring
Article no.: 1007502
*optional
Available pre-assembled:
Article no.: 1007022-S
Article no.: 1007031-S



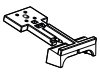
16. Grounding clamp
Article no.: 1007505
*optional



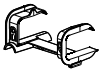
17. Grounding bracket
Article no.: 1007503
*optional



18. Self-tapping screw 6.3 x 32
Article no.: 1003015
*optional



19. Low base extension
Article no.: 1007022-WP
*optional and only in combination with base profile of 940 mm



20. Roof support adapter
Article no.: 1007011
*optional



21. Self-tapping sheet metal screw
6,0 x 25 SW10 HEX/T30
Article no.: 1008085



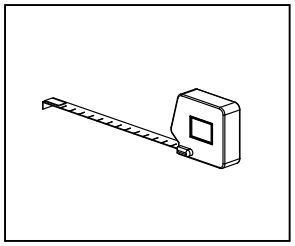
22. Cable exit guide
Article no.: 1005570
*optional

5. Preparation for installation

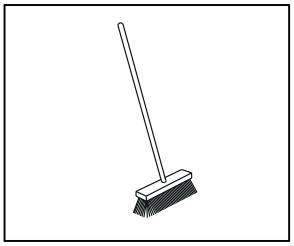
5.1 Checking if you have all necessary tools and accessories

Here is a list of the necessary tools/aids:

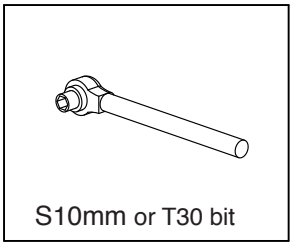
Tape measure



Broom



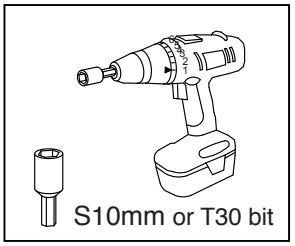
Hexagon socket ratchet



S10mm or T30 bit

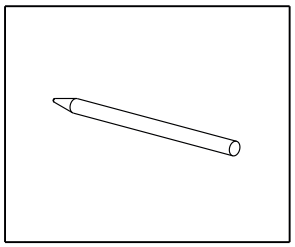
or

Cordless drill machine

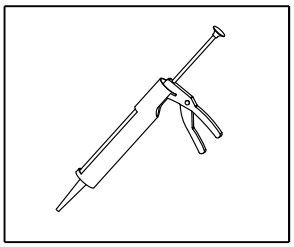


S10mm or T30 bit

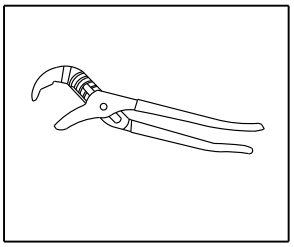
Marker/chalk



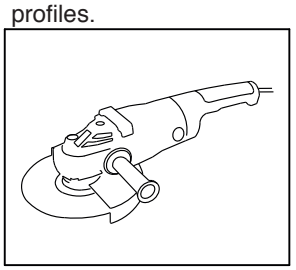
Mastic gun optional
For roof slope > 2º/3º



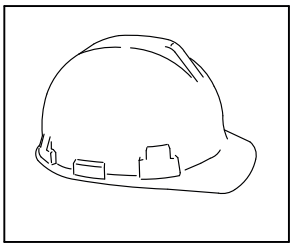
Adjustable pliers



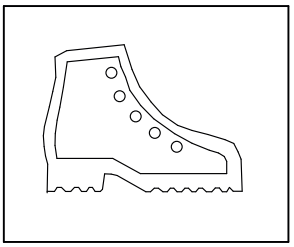
Grinder
For any shortening of the profiles.



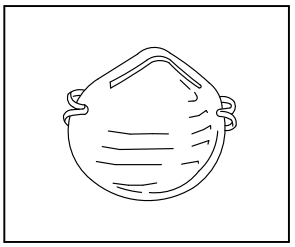
Safety helmet



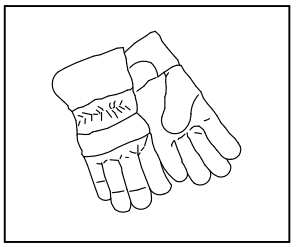
Safety shoes



Dust cap



Safety gloves

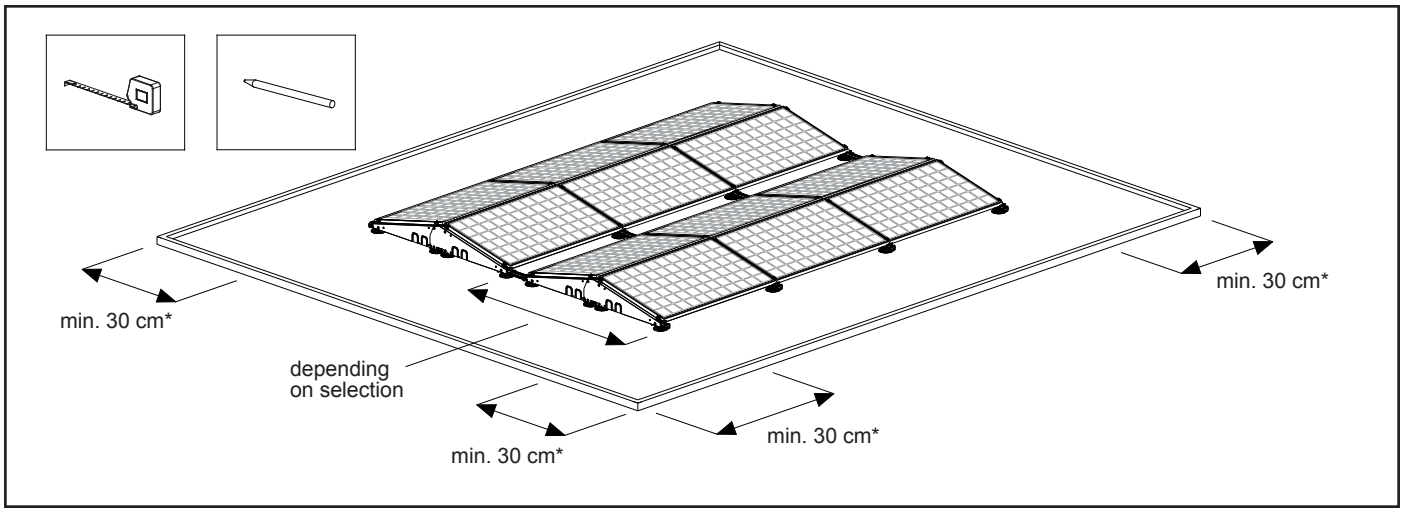


5.2 Determining and measuring the position of solar panels

When determining the position of the solar panels on the flat roof, it is very important to pay attention to the incidence of sunlight both throughout the day and throughout the year. Place the solar panels on a roof surface that does not stand in shadow. Shading from a chimney, trees and nearby buildings has a negative effect on the yield of the solar panels.

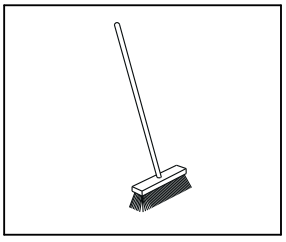
Measuring and marking out

To place the solar panel (in landscape setup) you need approximately a space per panel that is a long as the solar panel.
If several rows of solar panels are installed in succession, an intermediate distance must be maintained due to shading. The distance from the solar panels to the edge of the roof must be approximately 1/5 of the height of the building with a minimum distance of 30 cm, due to the very turbulent wind currents in this zone *(see installation drawing for the correct spacing).
Mark the outline of the panel field on the roof with chalk or a marker.



5.3 Cleaning the roof

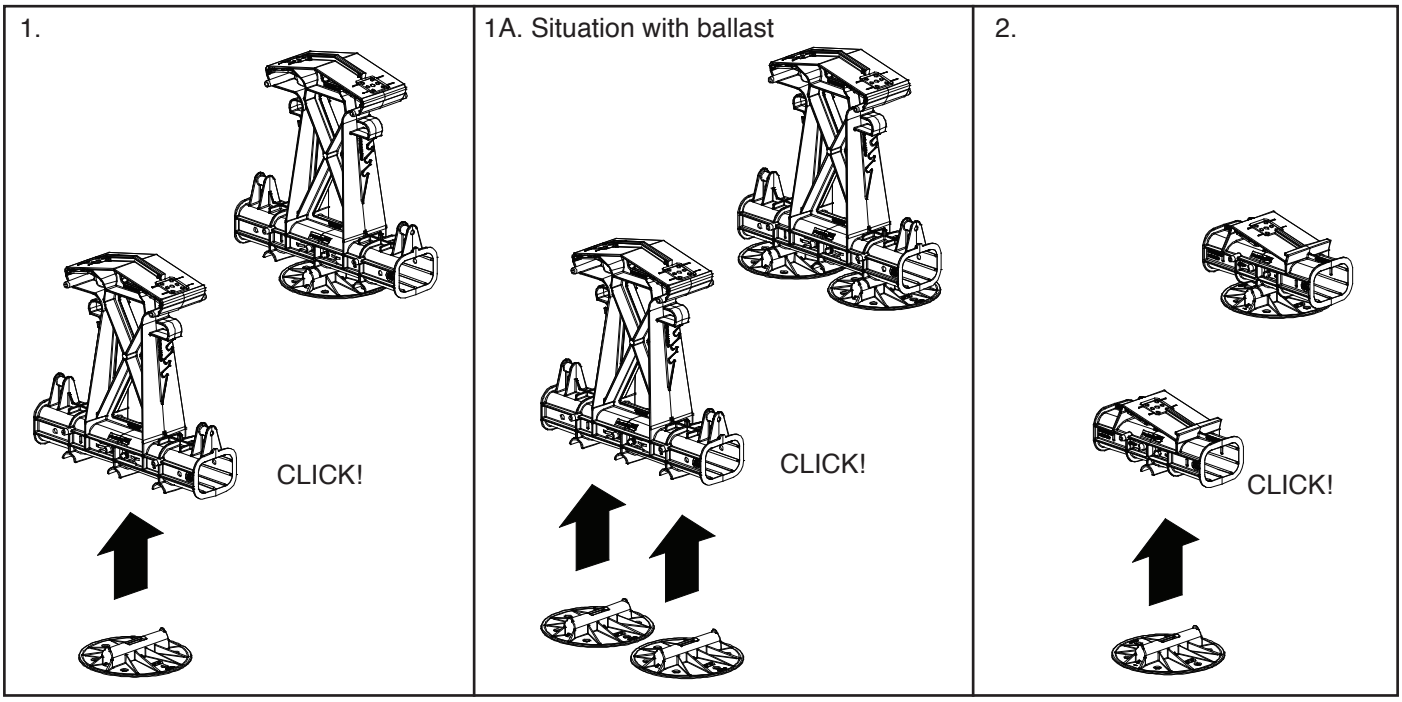
Sweep the roof clean with a broom.
Make sure that the place where the solar panels are to be installed on the roof is clean, dry and flat. The presence of gravel, sand, stones, algae, dust, etc. can lead to instability of the system and/or cause damage to the roof.



6. Installation

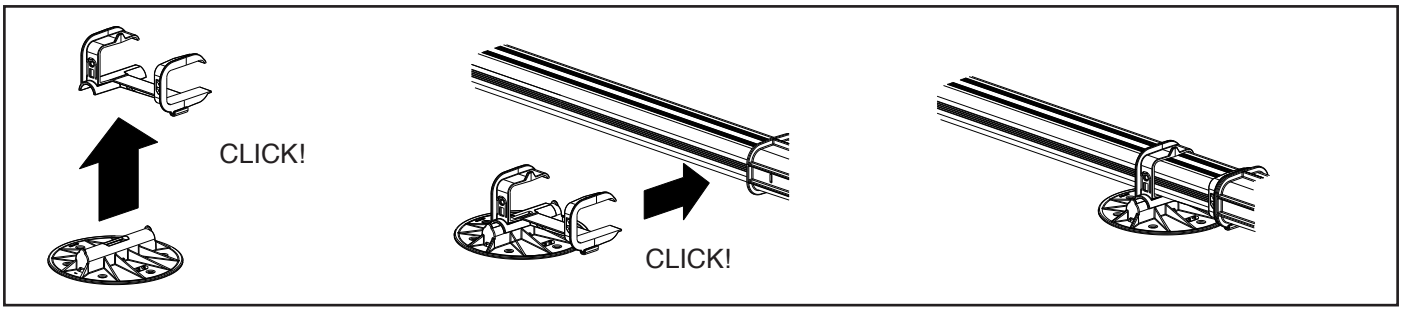
6.1 Mounting roof support to bases

As standard, the high base is placed on one roof support.
1. Attach the roof support to the high base by means of a click connection. For this purpose, use the middle click connection on the underside of the high base. Optional: In situations where ballast is placed, two roof supports are fixed under the high base. For this purpose, use the two click connections from the centre (1A).
2. Attach the roof support to the low base by means of the click connection.



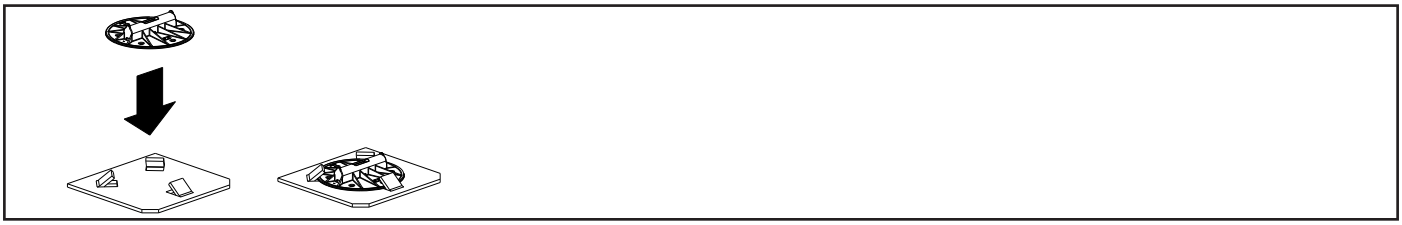
6.2 Mounting additional roof supports (optional)

If additional roof supports are required, these can be flexibly adjusted by means of the roof support adapter. Attach the roof support to the adapter by means of the click connection. This combination can then be snapped in place sideways anywhere on a base profile.



6.3 Mounting TPO Protective Mat (optional)

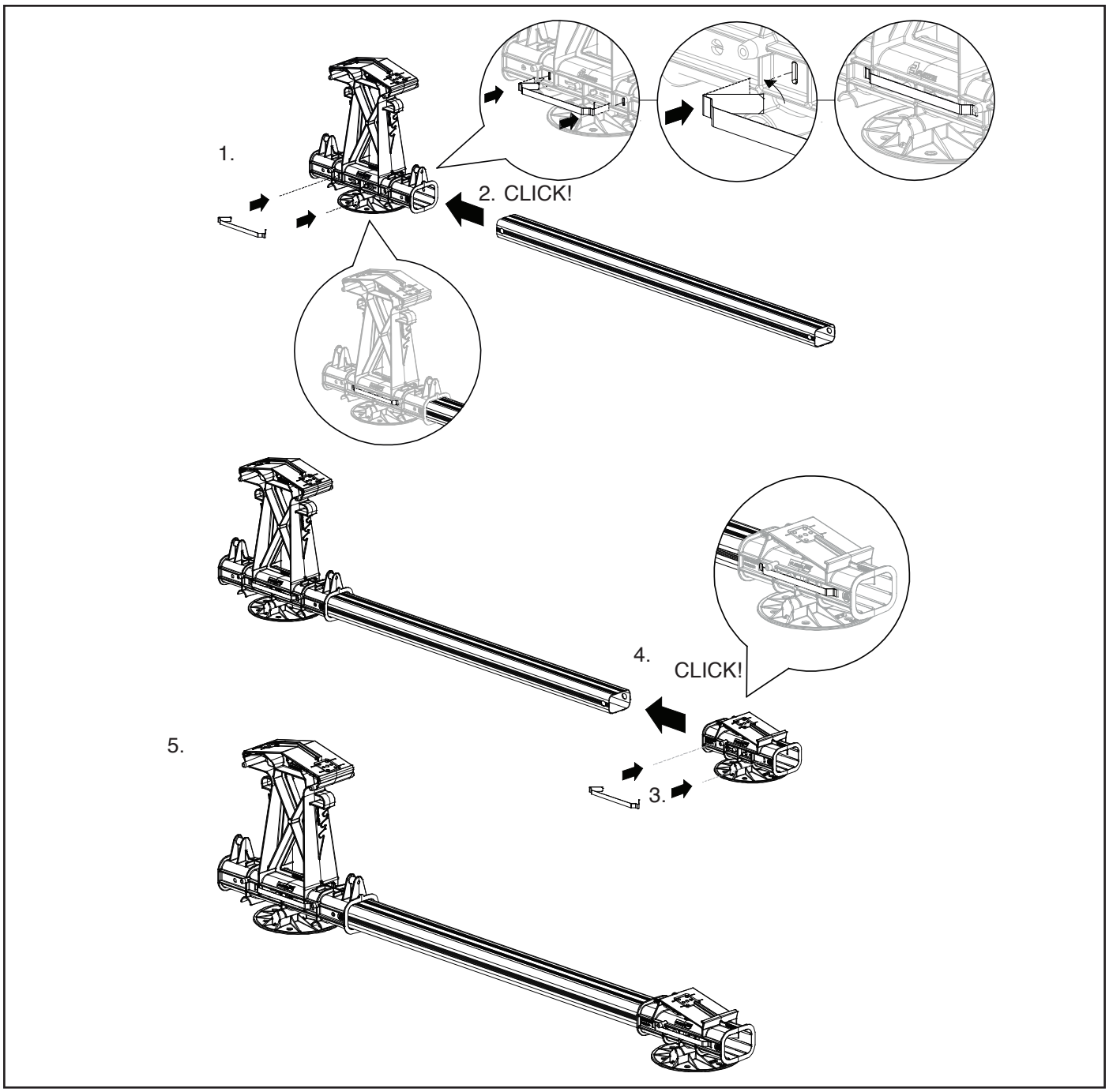
The optional TPO protection mat can be used to protect the TPO roofing. Press the 3 rubber lips of the protective mat open and place the roof support under the lips of the mat. Make sure that the roof support is properly enclosed by the rubber lips.



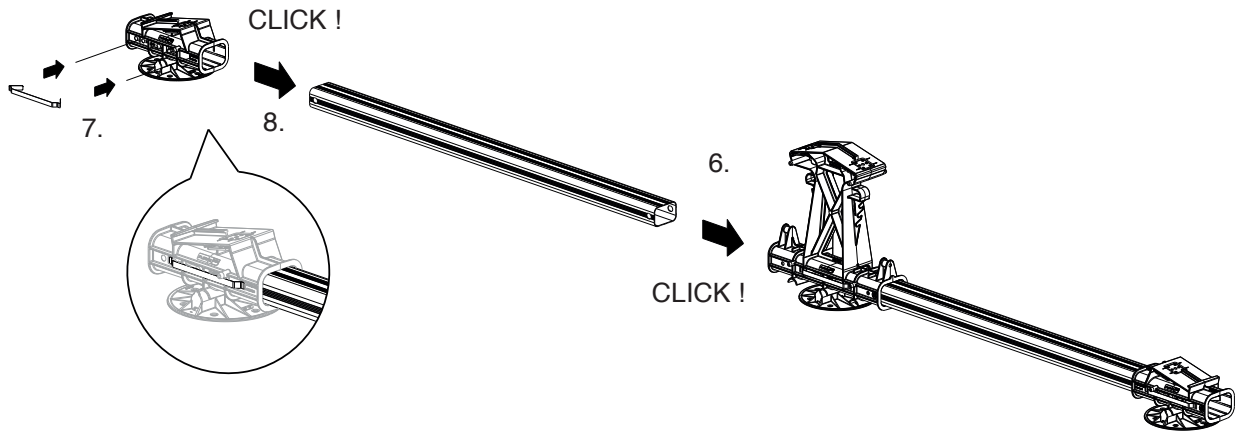
6.4 Equipotential bonding and mounting base profile on bases

The high and low bases are also available in pre-assembled form: 1007022-S and 1007031-S.
If you are assembling yourself, please follow the following instructions.

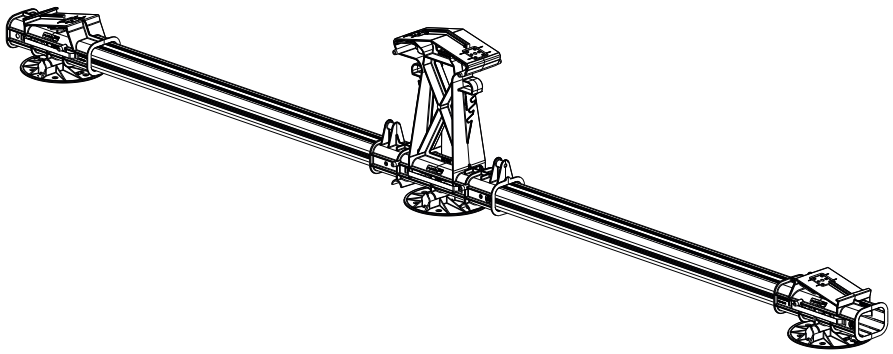
Earthing / equipotential bonding the base profiles (optional)
1. Place the grounding spring in the slots of the high base before the base profile is clicked into the high base. Or use the high base (article no. 1007031-S) in which the grounding spring has already been installed. The use of 1 grounding spring creates a connection area of 3mm^2. Two grounding springs (one spring on each side of the base) create a connection area of 6mm^2. The teeth on the grounding spring bite into the base profiles and create a solid and durable connection.
2. Put the high base (inc. roof support) upright and slide the end of the base profile into the opening of the high base until it clicks into place.
3. Place the grounding spring in the slots of the low base before the base profile is clicked into the low base.
4. Slide the low base (inc. roof support) onto the other end of the base profile until it clicks into place.
5. One side of the FlatFix Fusion segment is now ready.



6. Slide the end of the 2nd base profile into the opening of the high base until it clicks into place.
7. Place the grounding spring in the slots of the low base before the base profile is clicked into the ow base.
8. Slide the low base (inc. roof support) onto the other end of the base profile until it clicks into place.
9. The first FlatFix Fusion segment is ready. Repeat the above steps until you have enough FlatFix Fusion segments to place the first two rows of solar panels.

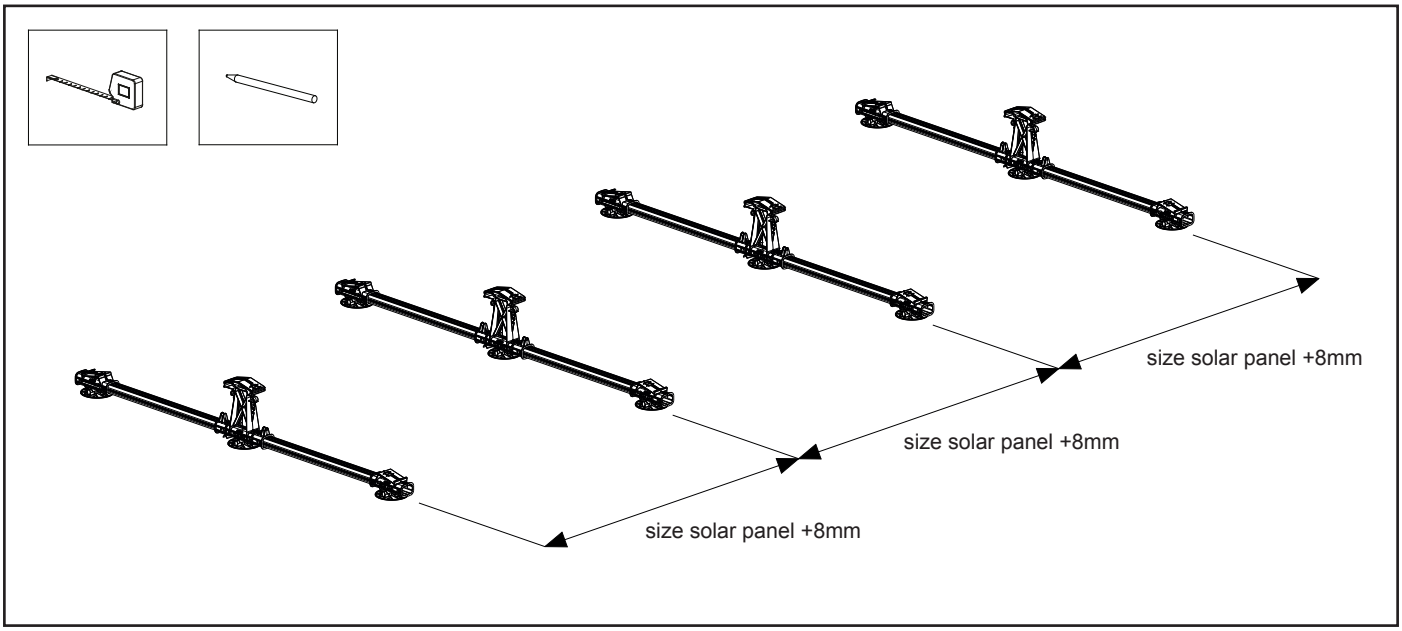


9.



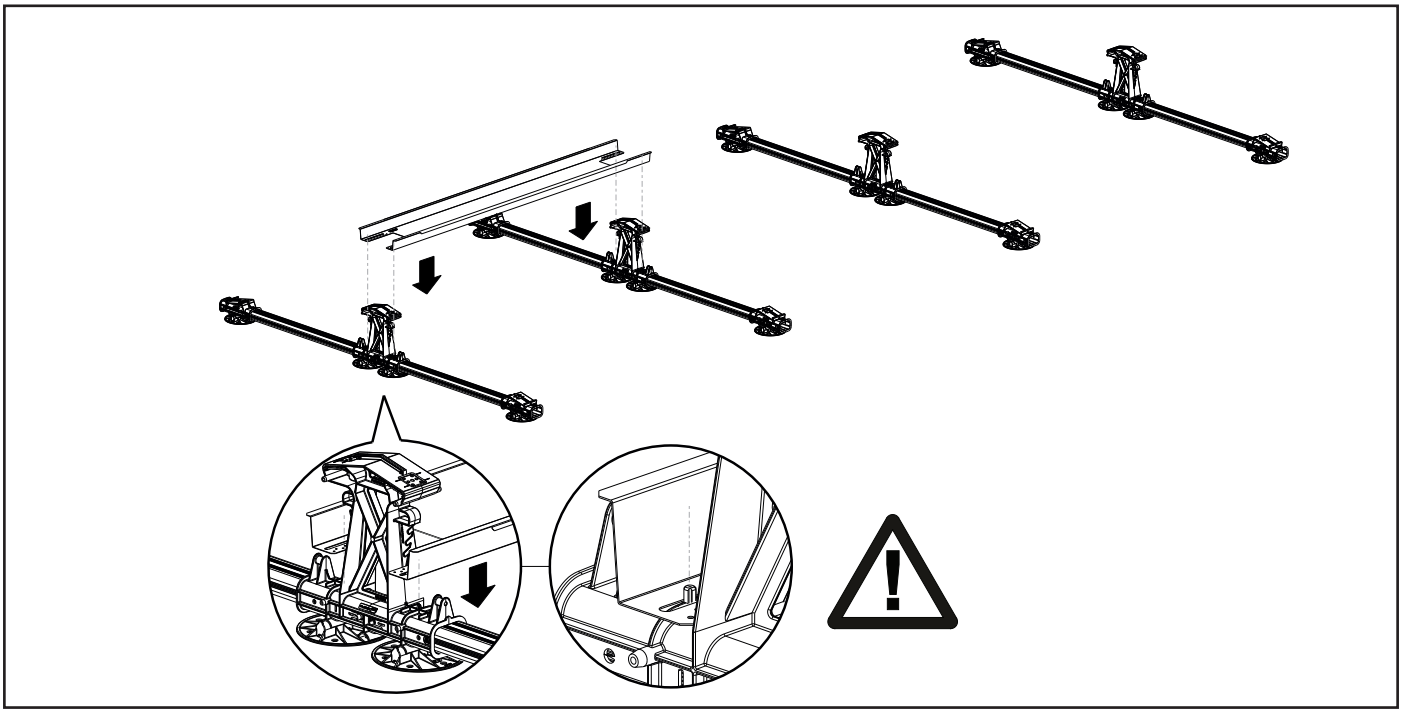
6.5 Positioning FlatFix Fusion segments

You determine the position of the FlatFix Fusion segments based on the position of the solar panels on the roof. Distribute the FlatFix Fusion segments evenly along the line where the solar panels are to be installed. The FlatFix Fusion segments may have a centre to centre spacing of up to 2 m (see calculator for spacing).
Mark with chalk or marker the place on the roof where the FlatFix Fusion segments are to be placed.
Ensure that the FlatFix Fusion segments are aligned with each other.

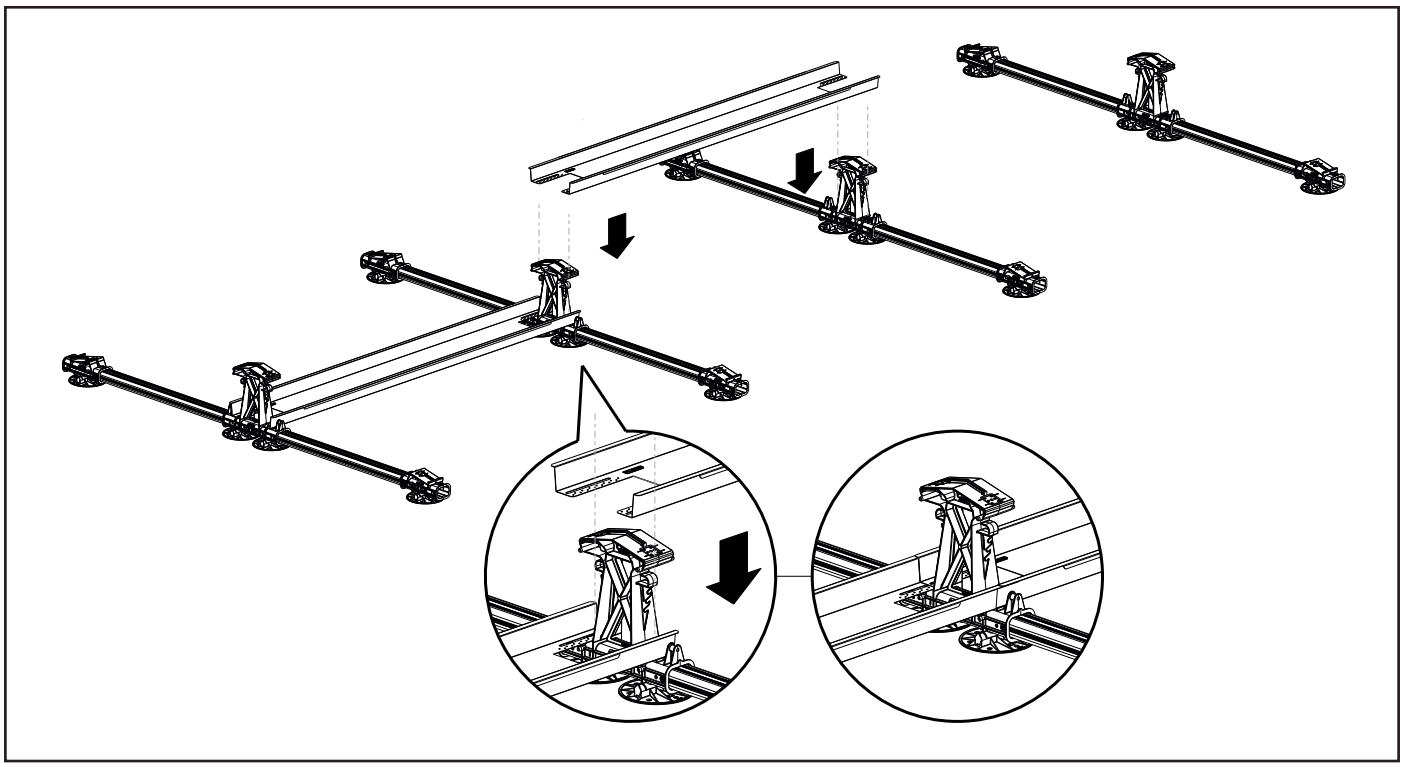


6.6 Mounting ballast containers

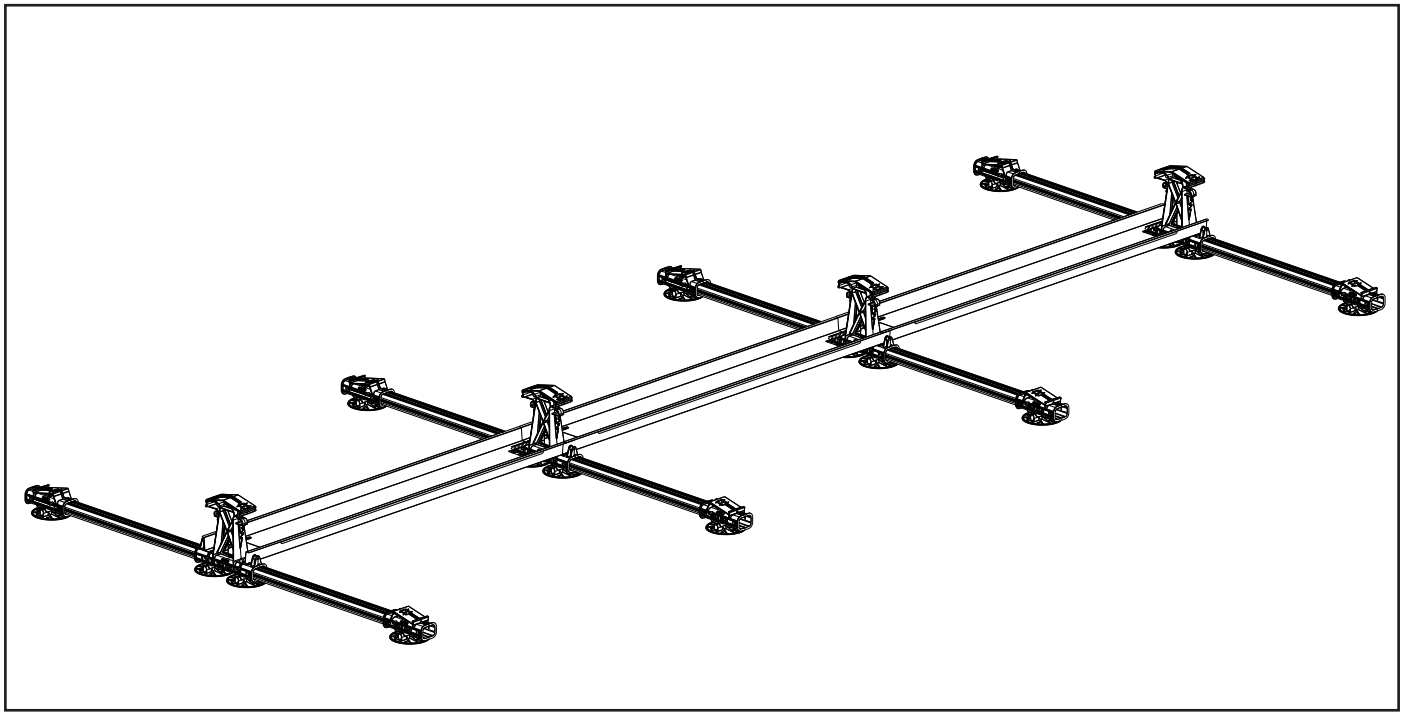
The ballast positions are determined using the calculator. Place the ballast container at the points indicated by the calculator. **NOTE!** Make sure that the high bases at the ballast containers are always fitted with two roof supports! The following instructions only relate to standard ballast container installation.
NOTE! For ballast configurations, see annex section 7.4.
Insert the first ballast container at an angle and place it between the FlatFix Fusion segments so that the slots of the ballast container are located over the upright lugs of the high base.
Note that the FlatFix Fusion segments are directly adjacent to each other because of the alignment of the solar panels!



Place the second ballast container between the FlatFix Fusion segments in such a way that it overlaps the first ballast container and so that the slots of the ballast container are positioned over the upright projections of the high base.



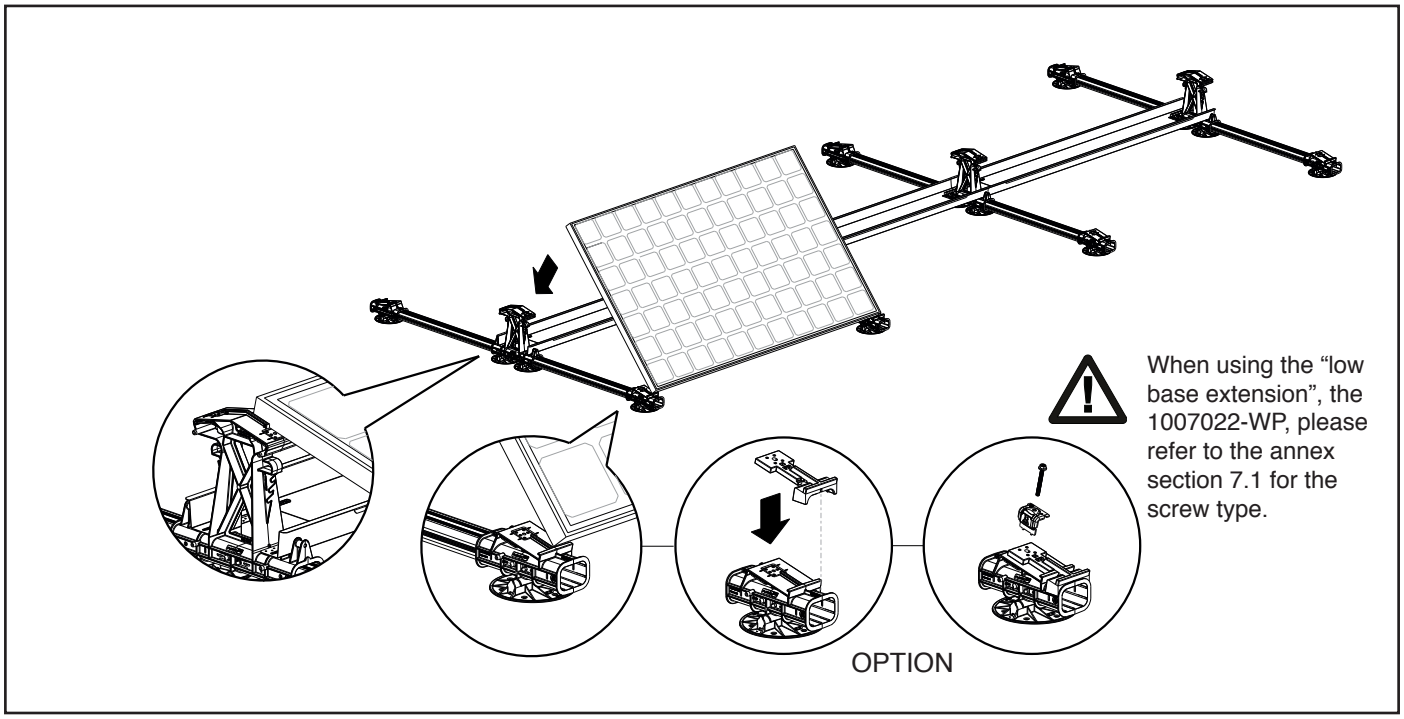
Locate the third ballast container between the FlatFix Fusion segments so that it overlaps the second ballast container and that the slots of the ballast container are positioned over the upright lugs of the high base. Repeat these steps until all ballast containers are installed.



6.7 Installing 1st solar panel

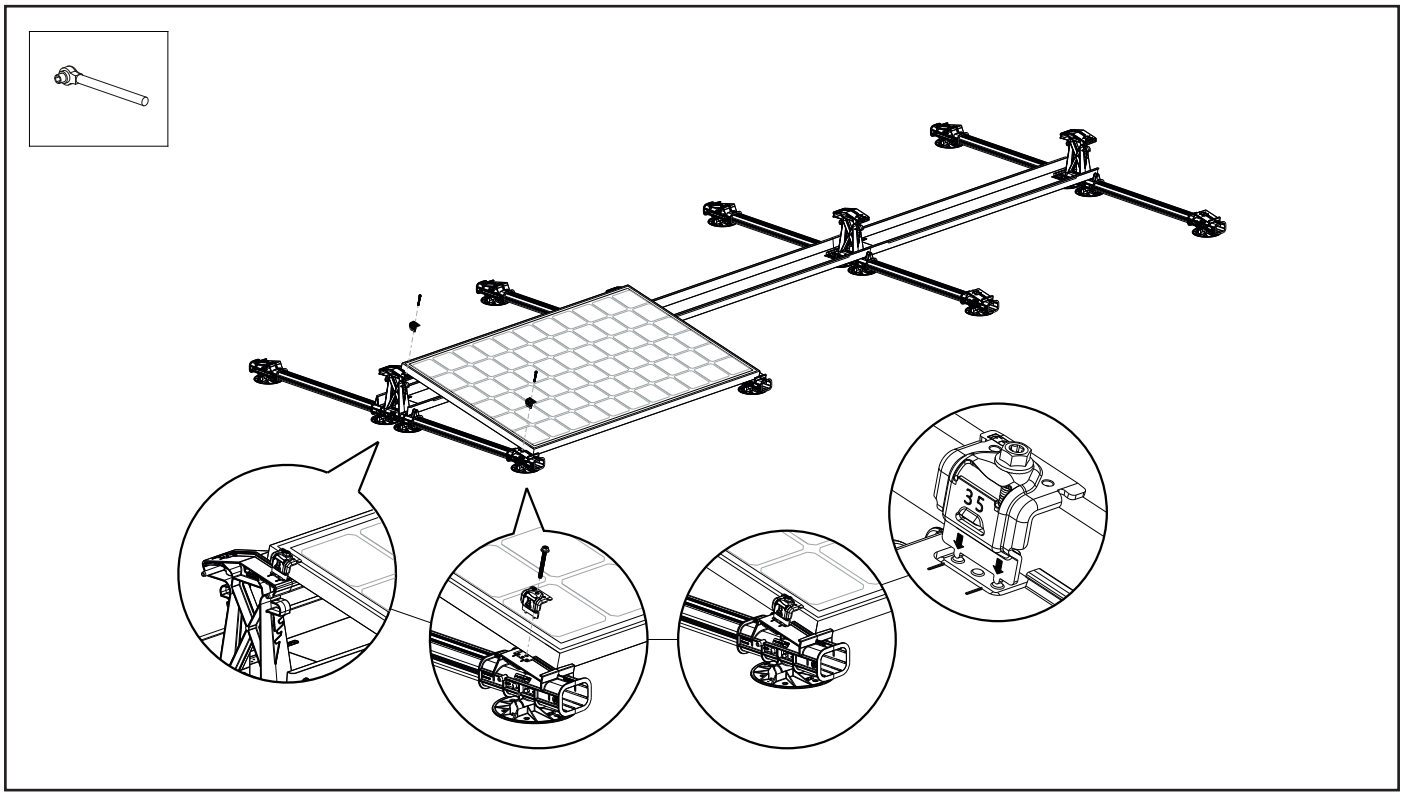
1. Place the 1st solar panel between the raised lugs of the low base.
2. Carefully tilt the solar panel so that it lies between the raised lugs of the bases.

NOTE! Optionally, a low base extension can be installed for a larger panel range. This can only be done in combination with the base profile of 940mm (see table range panel dimensions on page 02).



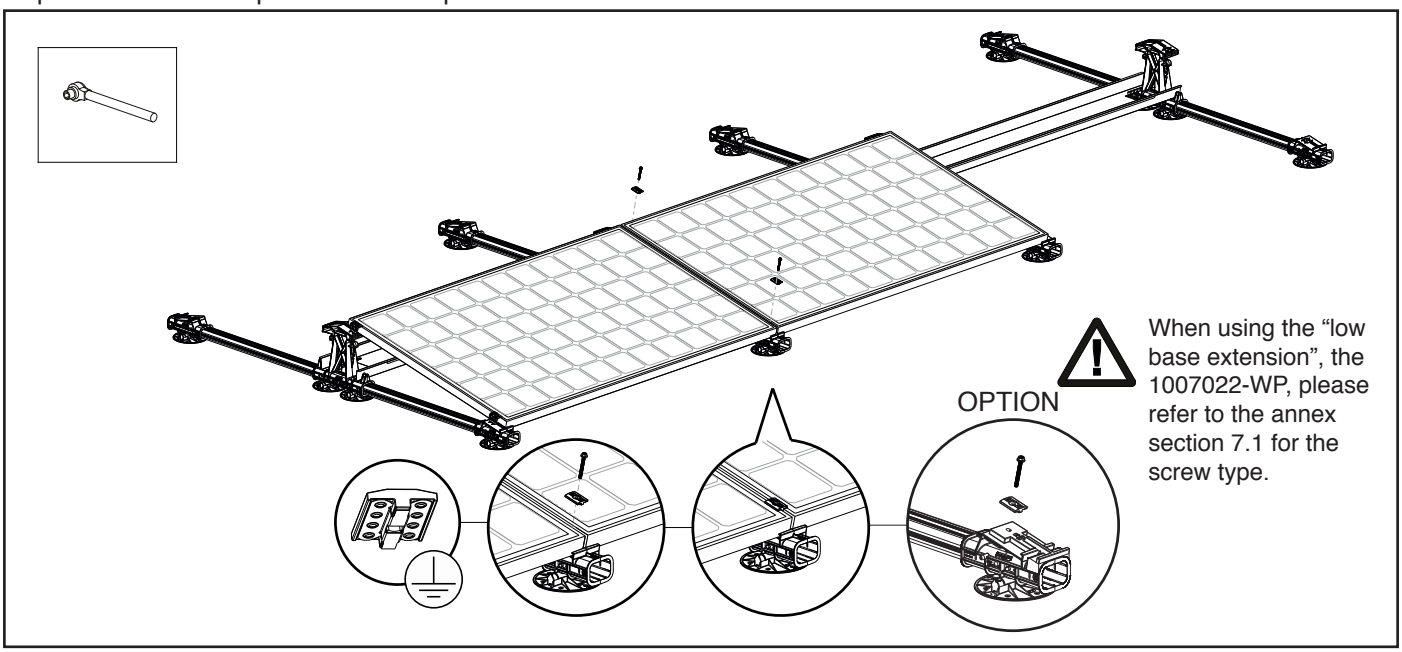
3. Place the end clamps on the edge of the solar panel and position them at the mounting holes in the high and low bases. Screw in the end clamp with the mounting screw into the mounting hole.

NOTE! The minimum tightening torque of the screw connection on **grey** clamps (10043xx) is 7Nm (maximum 8Nm). The minimum tightening torque of the screw connection on **black** clamps (10044xx) is 9Nm (maximum 10Nm). Refer to your tool manual to set it to the correct torque.

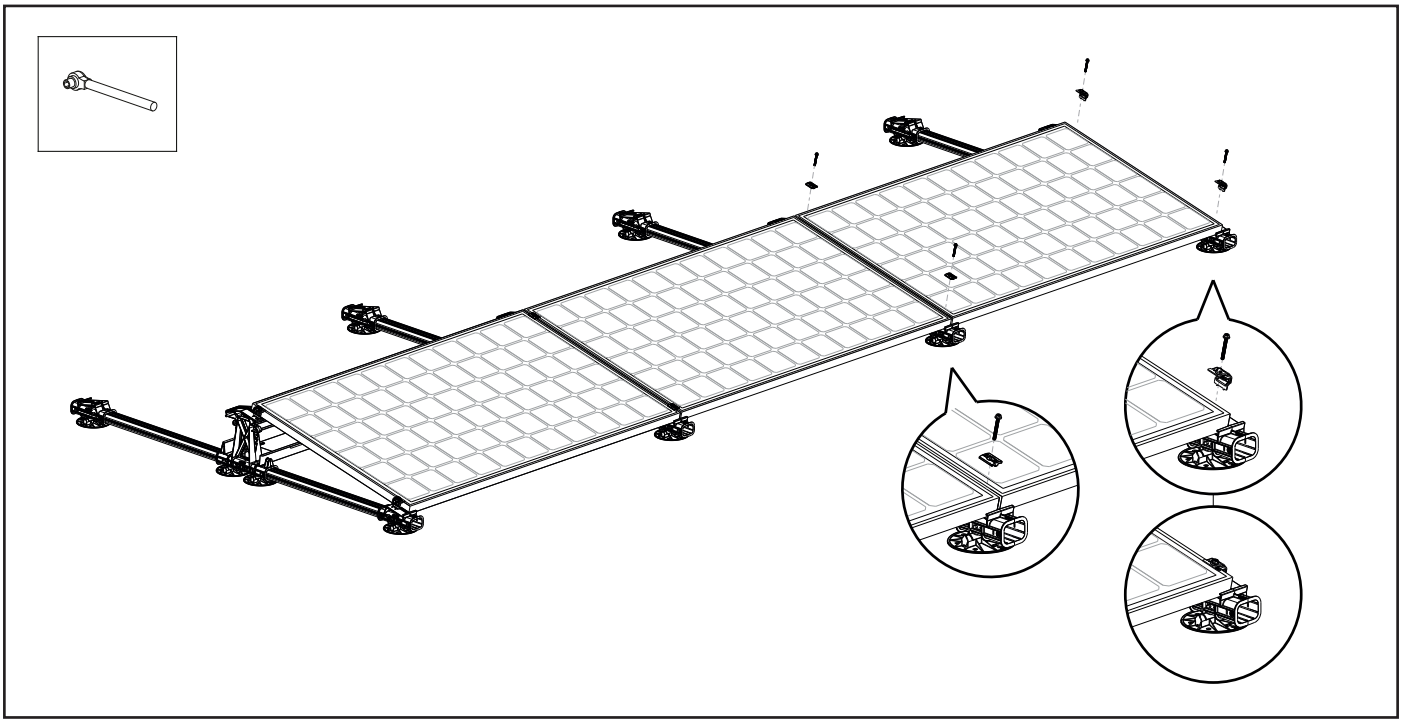


6.8 Equipotential bonding and installing other solar panels

Place the second solar panel on the bases so that it lies between the upright lugs. Then screw the mounting screw with a module clamp into the mounting holes of the bases.
The module clamp has an integrated equipotential bonding function so that the panels are equipotential bonded with each other, after which the entire row can be equipotential bonded to the earth rail. **NOTE!** See schematic representation in annex section 7.2. Make sure that the solar panels are properly aligned before tightening the screw!
NOTE! The minimum tightening torque of the screw connection on **grey** clamps (10043xx) is 7Nm (maximum 8Nm).
The minimum tightening torque of the screw connection on **black** clamps (10044xx) is 9Nm (maximum 10Nm).
Refer to your tool manual to set it to the correct torque.
Repeat the above steps for the other panels located between.



Place the last solar panel of the row on the bases so that it lies between the upright lugs. Then screw the mounting screw with a module clamp into the mounting holes of the bases. Then screw the two end clamps with the mounting screw into the mounting hole. Make sure that the solar panels are completely straight before tightening the screw!
NOTE! The minimum tightening torque of the screw connection on **grey** clamps (10043xx) is 7Nm (maximum 8Nm).
The minimum tightening torque of the screw connection on **black** clamps (10044xx) is 9Nm (maximum 10Nm).
Refer to your tool manual to set it to the correct torque.
Repeat the above steps for the other panels located between.

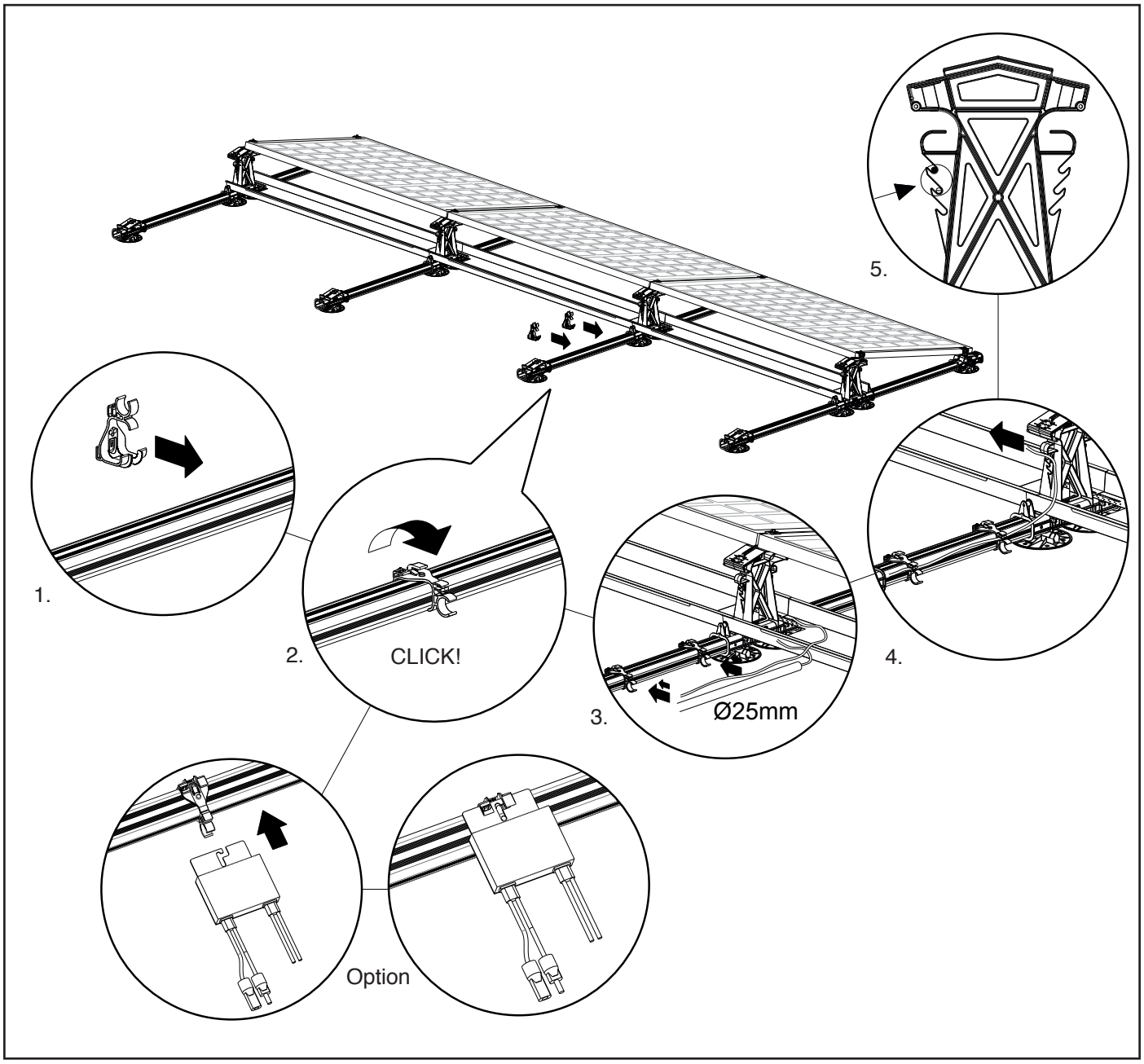


6.9 Mounting optimisers & cables

Clips are included with integrated cable management and optimiser fixing so that the cables are properly routed and stowed away. There are also cut-outs in the high bases through which the cables can be fed. This prevents the cables from lying directly on the (wet) roof. For installation follow the steps below:

1. Place the clips over the narrow side of the base profiles.
2. Turn the clips so that they are clamped over the wide side of the base profiles.
3. Feed the cables through the cut-outs. The clips also provide a holder for a Ø25 mm conduit.
4. Feed the end of the cable through one of the cable guides of the high base.
5. The cables of the solar panel can be attached to the high base in the cable guide.

Optional: Clip the optional optimiser onto the cable clip.

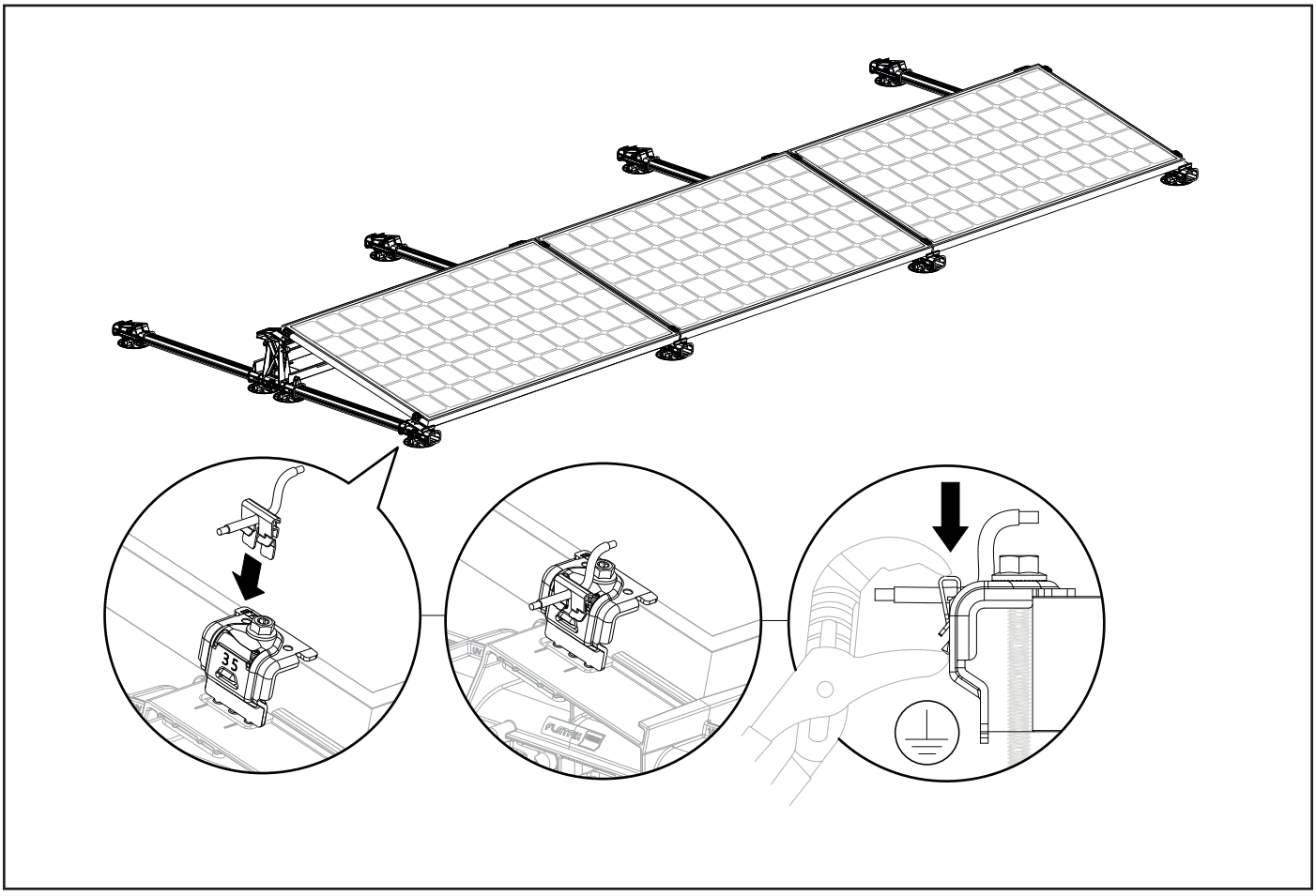


6.10 Equipotential bonding multiple rows (optional, see also section 7.3)

The module clamps ensure good equipotential bonding between panels in the row direction. The rows can easily be equipotential bonded to the earth busbar by connecting a 6mm^2 multi-core cable to 1 end clamp per row and finally to the earth busbar.
If a blind mounting is desired under the panels, the grounding clamps can also be attached directly to one of the panels per row. See section 7.3.2 for both options.

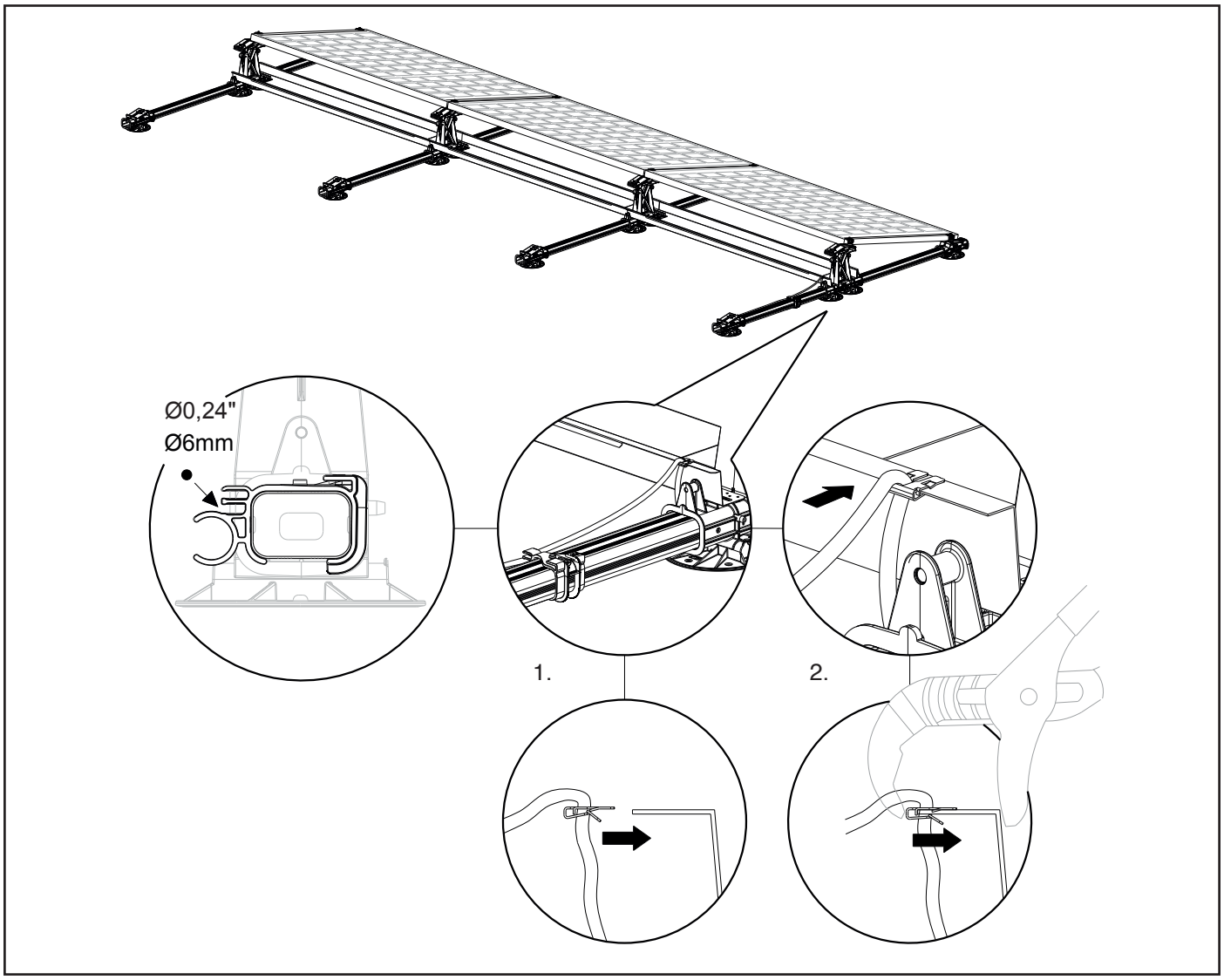
1. Place the multi-core cable at one side of the system. The multi-core cable can be easily clipped into the FlatFix Fusion cable clip. To connect the multi-core cable to the end clamp, a loop must be created to the end clamp.
2. Use the grounding clamp to connect the multi-core cable to the end clamp. Insert the multi-core cable into the grounding clamp and clamp the grounding clamp securely to the end clamp using pliers. Attach a grounding clamp to at least 1 end clamp per row.

NOTE! The diagram in annex section 7.3.2 shows the positions of multi-core cable and grounding clamps on the end clamps.



6.11 Equipotential bonding ballast containers (optional)

The ballast containers can easily be earthed in the same way as the rows.
The grounding clamps are pressed onto the ballast containers. The teeth of the grounding clamps will engage in the ballast container, creating a solid and durable connection.
The earthing cable for earthing the rows can also be used for earthing the ballast container.
Place a grounding clamp on each first and last ballast container in a row to earth all rows individually.

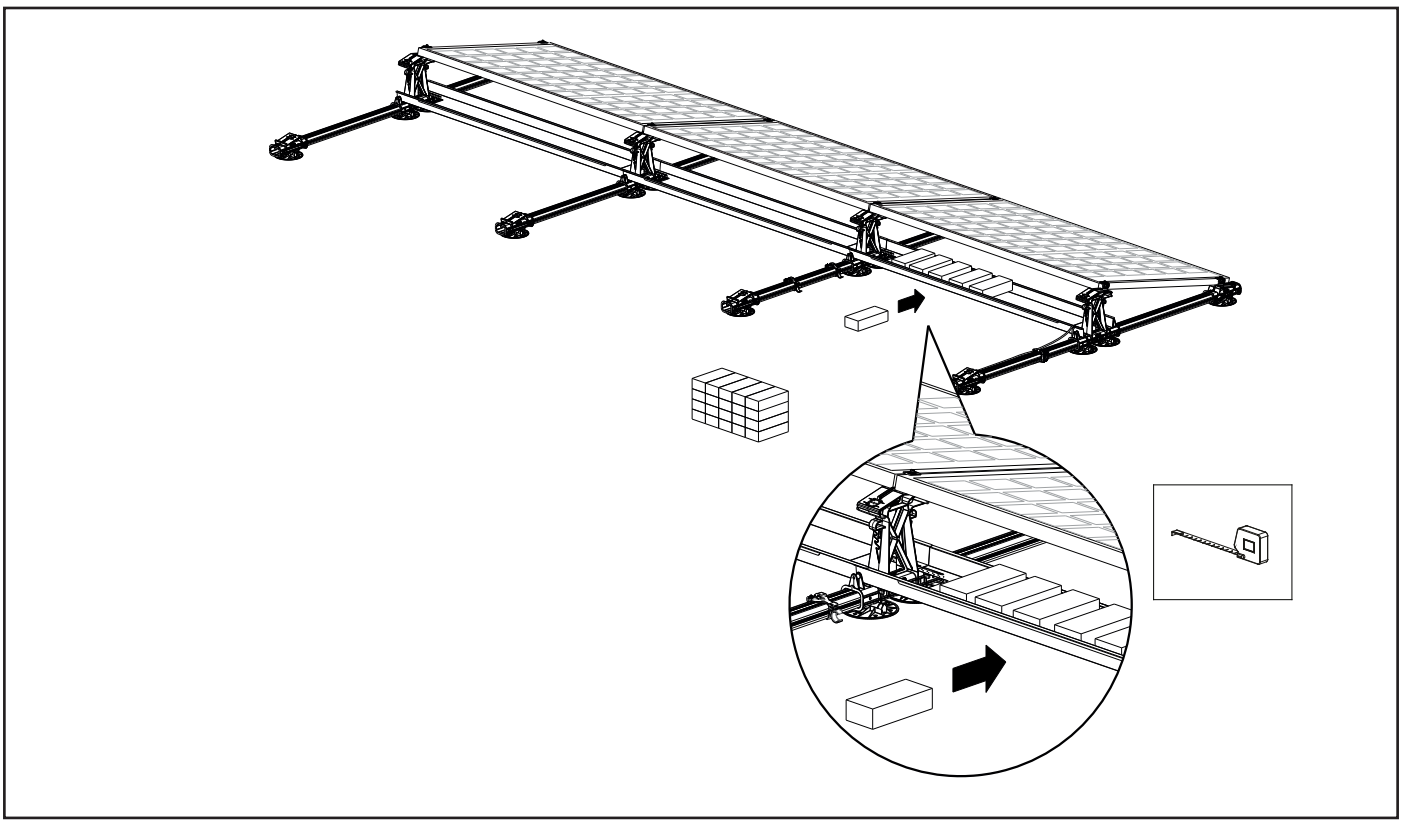


6.12 Locating ballast

To keep the solar panels in place, you must put ballast in the ballast containers.
As standard you can use concrete paving stones sized 21x10.5x8 cm as ballast. These weigh approximately 4 kg/ unit and fit well into the ballast containers. Alternatively, you can also use flagstones of max. 21x21 cm, kerb stones of 20x100 cm or gravel. If you use gravel, first place a concrete paving stone left and right in the ballast container. This prevents the gravel from sliding out of the ballast container.
Carefully comply with the ballast weights from the calculator! **NOTE!** For ballast configurations, see annex section 7.4.

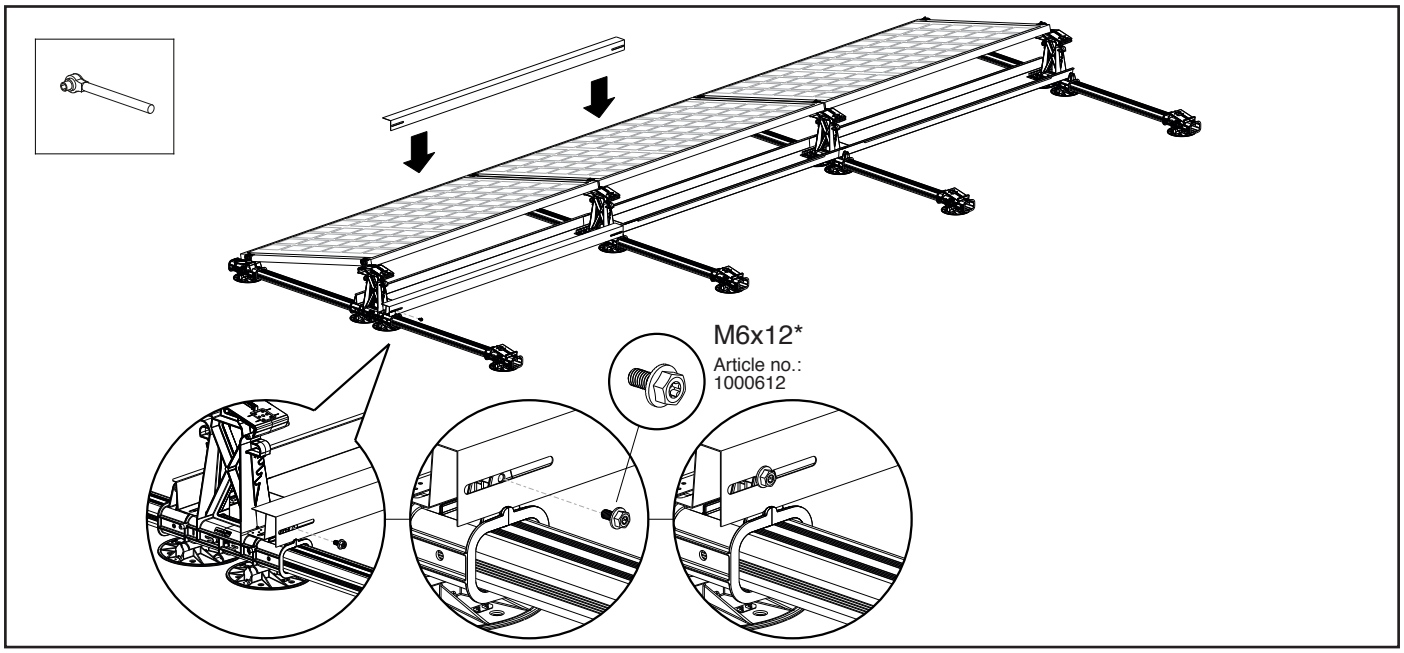
NOTE! Before placing the ballast, you should check whether the solar panel field is in the correct position and whether it is properly aligned with the roof edges. You can now still slightly correct the panel field. Once the ballast has been installed, correction is no longer possible!

If your roof is higher than 12 metres, we recommend that you contact your supplier.
They can then determine the correct weight depending on your situation.



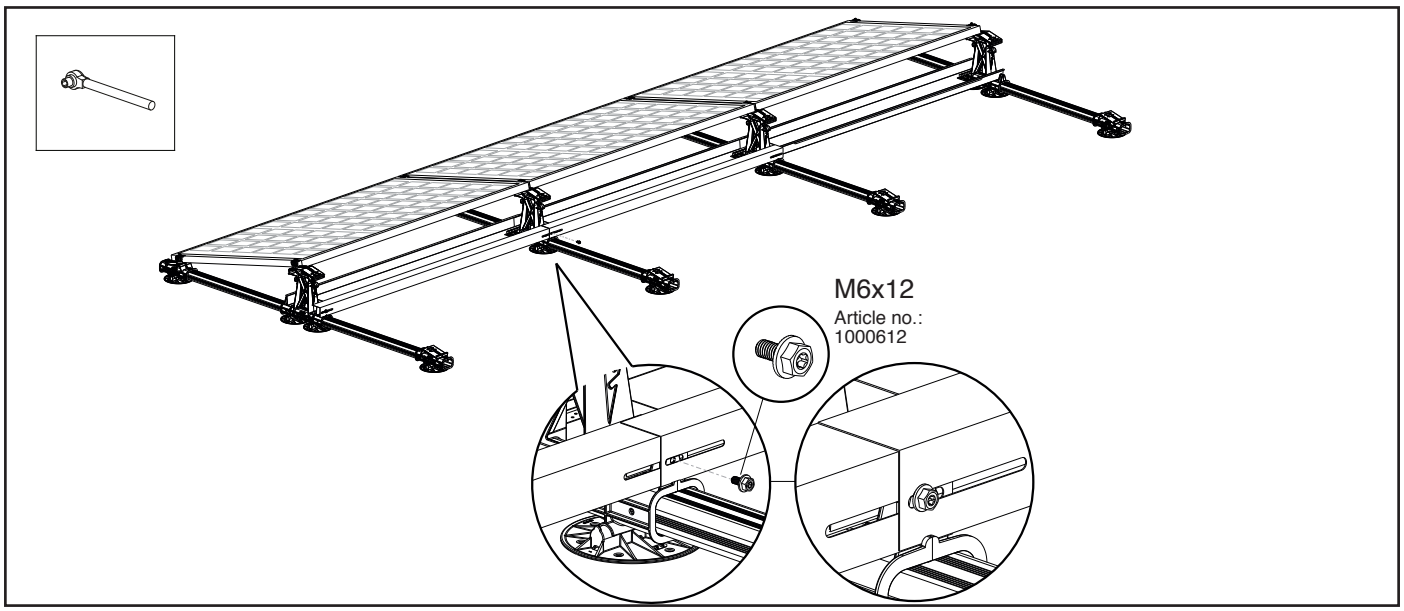
6.13 Mounting and equipotential bonding stabilisers

The stabilisers can optionally be earthed. The overlap that occurs between the stabilisers provides the earthing. Use the grounding bracket to connect the stabilisers to the rest of the system. **NOTE!** The diagram in annex section 7.3.2 shows the positions of the grounding brackets.
1. Place the 1st stabiliser at the rear of the solar panels, so that the bottom edge of the stabiliser falls between the raised lugs of the high bases and with the side of the stabiliser as level as possible with the outer edge of the high base.
2. Only attach one side of the stabiliser (instead of the edge of the panel field) to the high base. Place one mounting screw M6 x 12 in the slot of the stabiliser and screw it into the lower mounting hole of the high base. **NOTE!** The maximum tightening torque of the screw connections is 2 Nm. Make sure that the mounting screws do not slip in the base. Refer to your tool manual to set it to the correct torque.

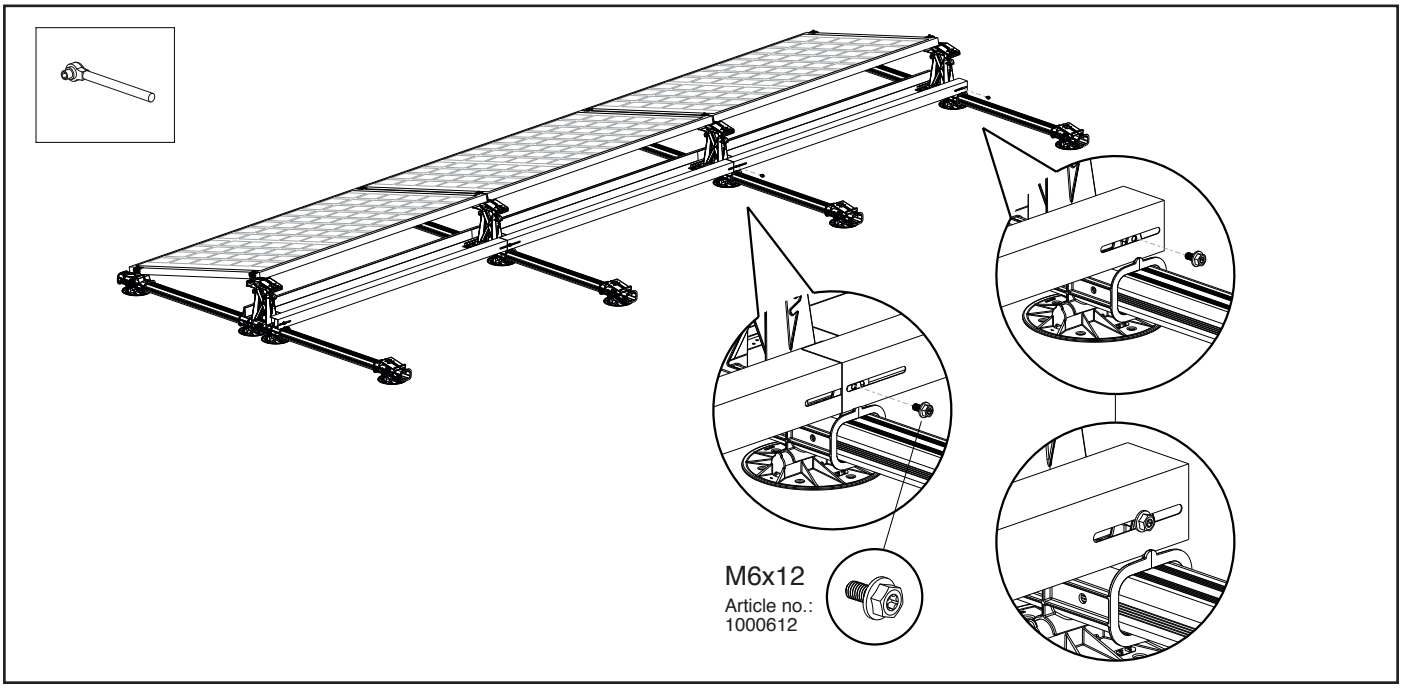


**Esdec tested and approved the M6 x 12 metric screw for fixing the stabilizer to the high plastic base.*

Place the 2nd stabiliser at the rear of the solar panels, so that the bottom edge of the stabiliser falls between the raised lugs of the high bases and the slots of the stabilisers, and the screw holes of the high bases overlap. Mount only one side of the stabiliser (instead of overlap) to the high base by placing the mounting screw M6 x 12 in the slot of the stabiliser and screw it into the mounting holes of the high base. Repeat the above steps for the other stabilisers between first and last stabilisers. **NOTE!** The maximum tightening torque of the screw connections is 2 Nm. Make sure that the mounting screws do not slip in the base. Refer to your tool manual to set it to the correct torque.



Place the last stabiliser at the rear of the solar panels, so that the bottom edge of the stabiliser falls between the raised lugs of the high bases and the slots of the stabilisers, and the screw holes of the high bases overlap.
Attach the stabiliser (on both sides) to the high bases by placing the mounting screw M6 x 12 in the slots of the stabiliser and screw it into the mounting holes of the high bases.
NOTE! The maximum tightening torque of the screw connections is 2 Nm. Make sure that the mounting screws do not slip in the base. Refer to your tool manual to set it to the correct torque.

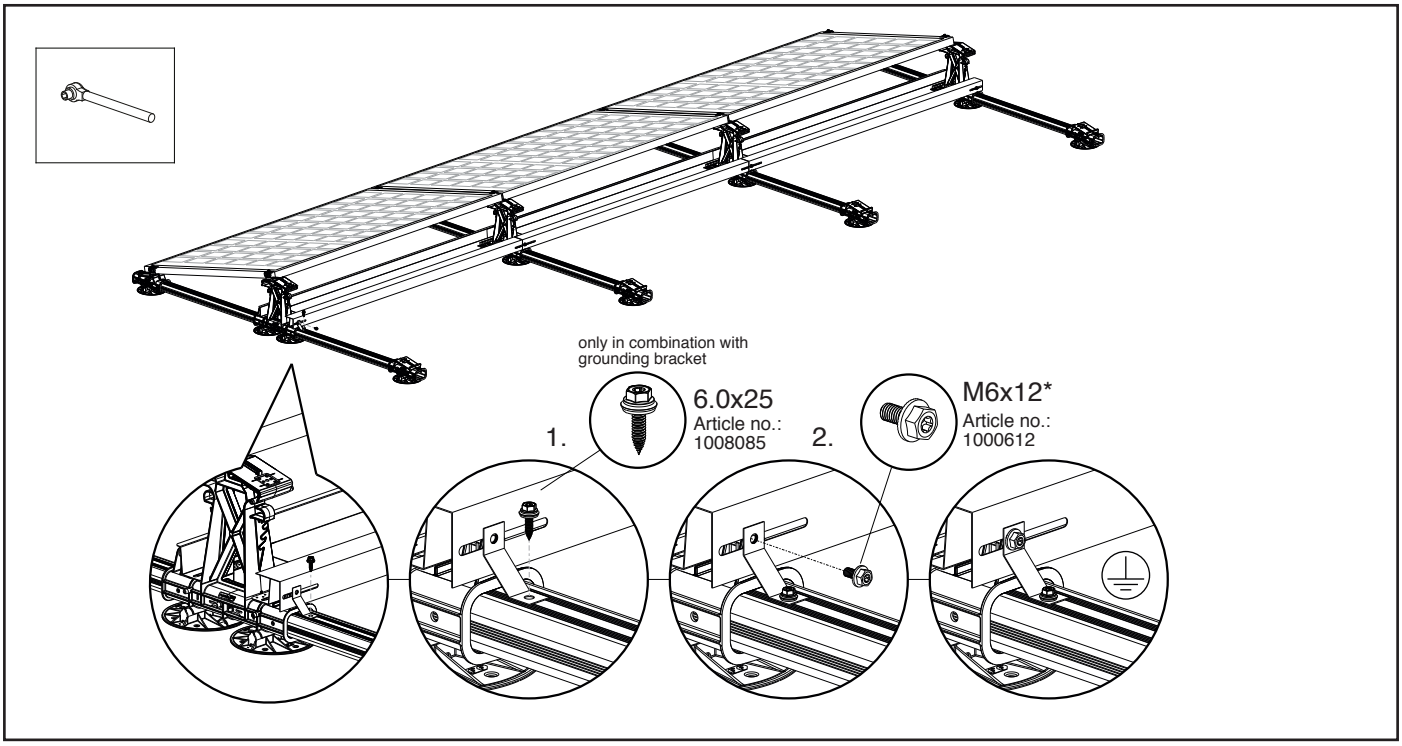


6.14 Equipotential bonding touchable metal parts (optional)

If a complete equipotential bonding of touchable metal parts is desired, the stabilisers can be bonded to the profiles by applying the grounding brackets. See section 7.3.2 for the correct positions where these should be attached. The grounding brackets can only be effectively used if the bases are equipped with grounding springs and the side deflectors are bonded with the self-tapping screw (see chapter 6.16).

NOTE! The diagram in annex section 7.3.2 shows the positions of the grounding brackets in order to connect the stabilisers to the rest of the system.

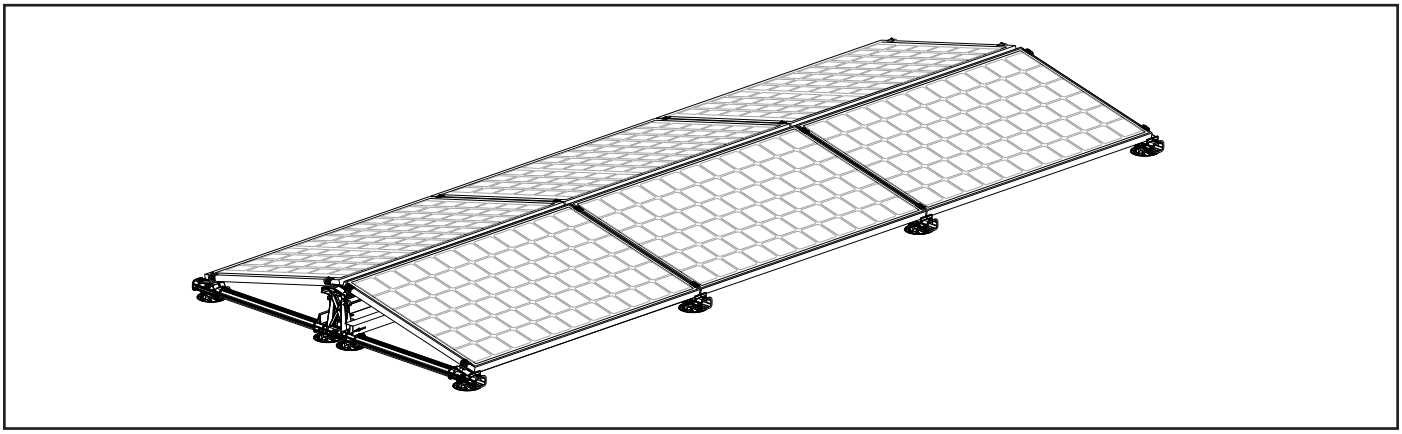
1. Place the grounding bracket on the base profile and on the back of the stabilisers. Attach the grounding bracket to the base profile with a self-tapping sheet metal screw 6.0 x 25 mm SW10 HEX/T30 (article no. 1008085).
2. Place onemounting screw M6 x 12 in the hole of the grounding bracket and the slot of the stabiliser and screw this tight into the lowest assembly hole of the high base. **NOTE!** The maximum tightening torque of the screw connections is 2 Nm. Make sure that the mounting screws do not slip in the base. Refer to your tool manual to set it to the correct torque.



**Esdec tested and approved the M6 x 12 metric screw for fixing the stabilizer to the high plastic base.*

6.15 Mounting 2nd row of solar panels

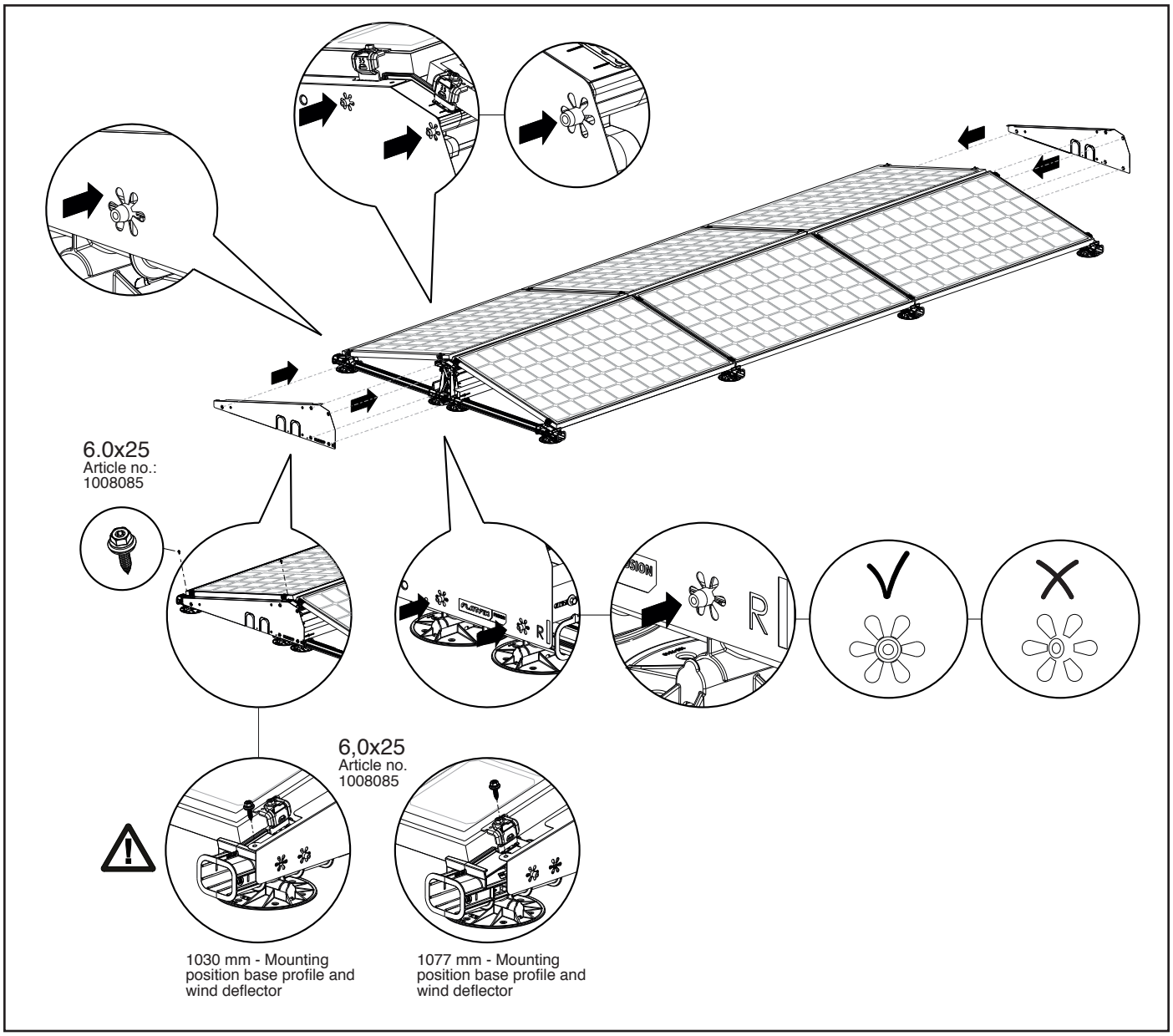
You can now mount the 2nd row of solar panels. To do this, follow the installation steps in sections 6.7 and 6.8.



6.16 Mounting wind deflector left/right

Place the left wind deflector next to the left side of the panel field and the right wind deflector next to the right side.
NOTE! The flange of the wind deflector must always face the panel field.
Mount the 2 wind deflectors (left and right) by pressing the starlock in the wind deflectors over the catches of the bases. Install the wind deflector carefully. Make sure that all tabs of the starlock engage evenly with the catch of the base. Press the wind deflector firmly so that it fits firmly to the base. The wind deflectors must then be additionally fixed by the self-tapping sheet metal screw 6.0 x 25 mm SW10 HEX/T30 (article no. 1008085) at the level of the high and low bases.

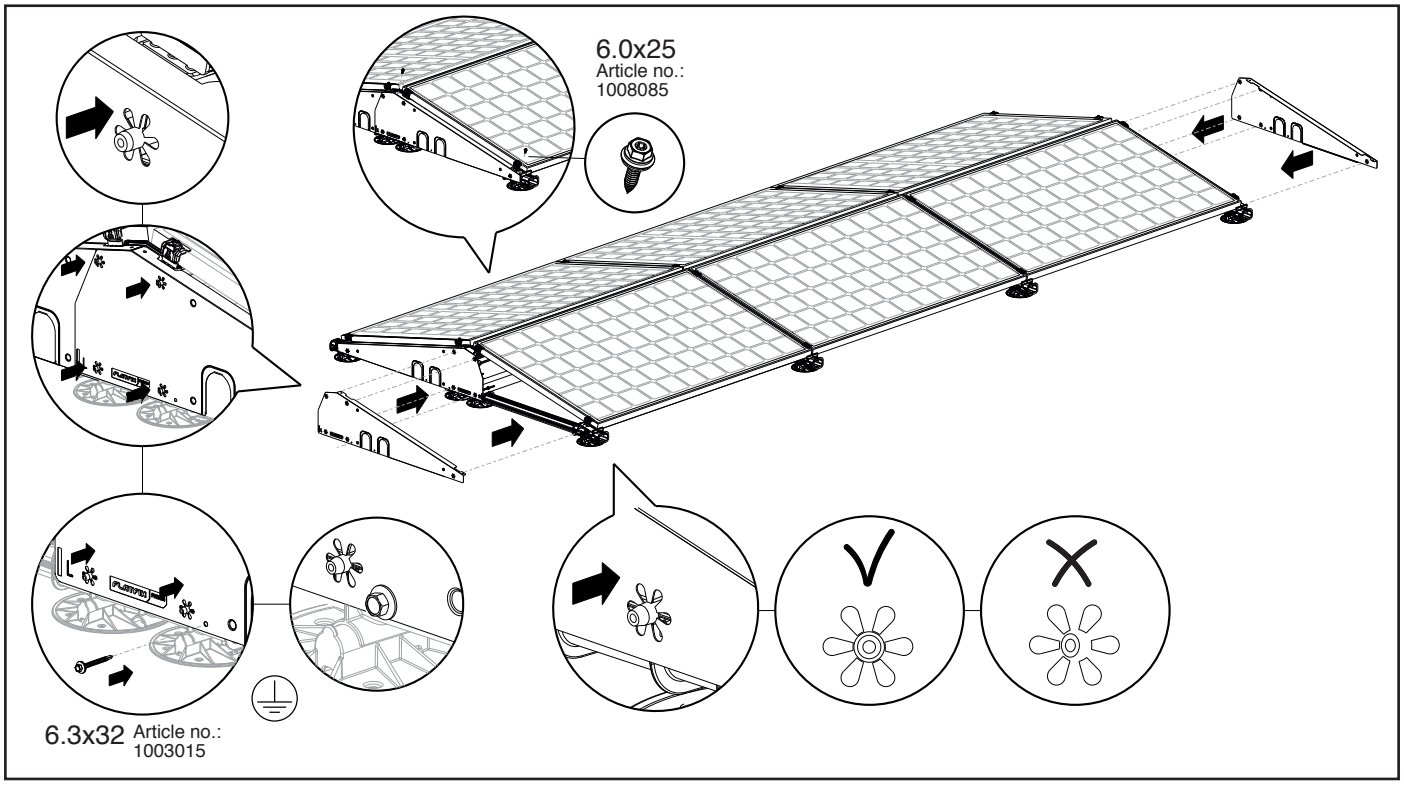
NOTE! If optional cable exit guides are used, then cut-outs must be made in the wind deflectors. See annex section 7.2.2 for the installation of wind deflectors at cable exit guides.



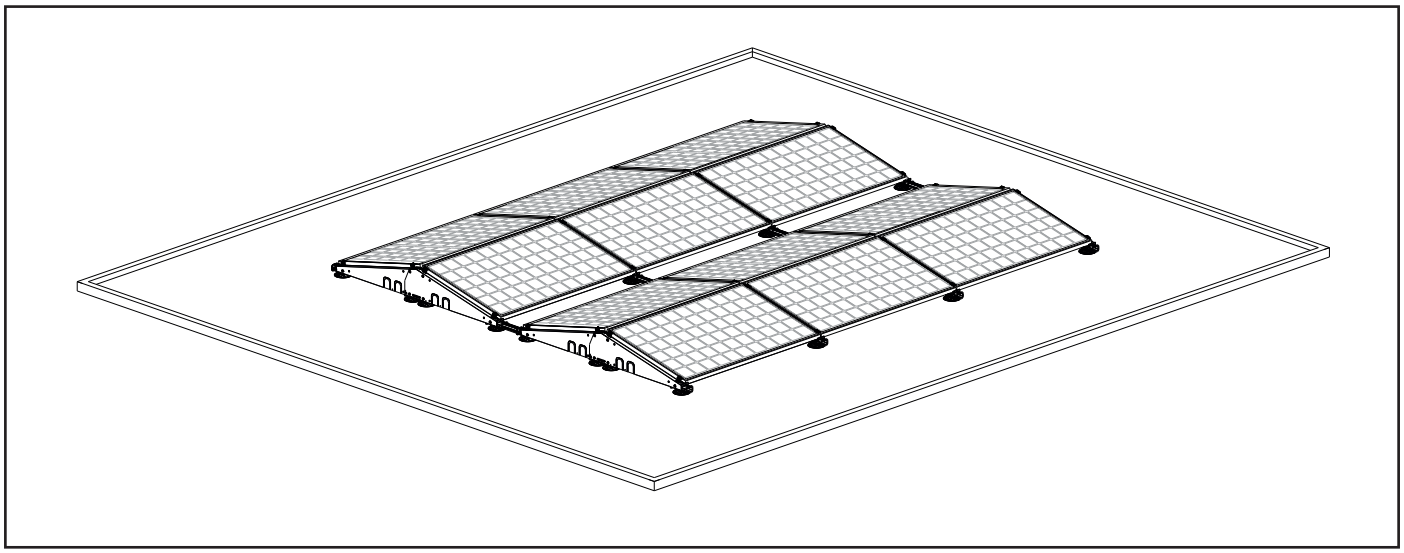
NOTE! If you are using the 1030 mm base profile (article no. 1007195) or the 1077 mm base profile (article no. 1007196), pay attention to how you position the wind deflectors on the left (article no. 1007226(-B)) and right (article no. 1007227(-B)) on the base profile. Use the appropriate starlock and fix the wind deflectors in place with the self-tapping sheet metal screw 6.0 x 25 mm SW10 HEX/T30 (article no. 1008085).

Place the 2nd left wind deflector next to the left side of the panel field and the 2nd right wind deflector next to the right side. **NOTE!** The flange of the wind deflector must always face the panel field.
Mount the 2 wind deflectors (left and right, with overlap) by pressing the starlock in the wind deflectors over the catches of the bases. Install the wind deflector carefully. Make sure that all tabs of the starlock engage evenly with the catch of the base. Press the wind deflector firmly so that it fits firmly to the base. The wind deflectors must then be additionally fixed by the self-tapping sheet metal screw 6.0 x 25 mm SW10 HEX/T30 (article no. 1008085) at the level of the high and low bases. If you want to earth this (optional), you can fix it with a self-tapping screw 6.3 x 32 mm (article no. 1003015). Run this screw through the wind deflector and the base profile. Use the pre-drilled hole next to the lower starlock in the wind deflector as a guide. The crosswind deflectors are now earthed and secured. And the first row of solar panels is now ready!

NOTE! If optional cable exit guides are used, then cut-outs must be made in the wind deflectors. See annex section 7.2.2 for the installation of wind deflectors at cable exit guides.

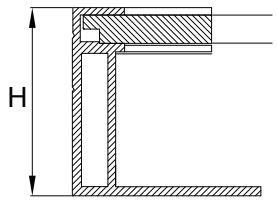
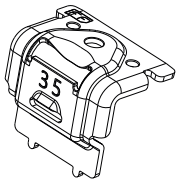
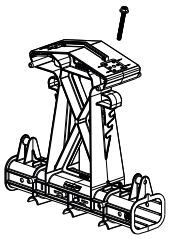
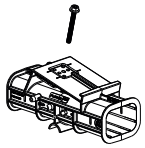
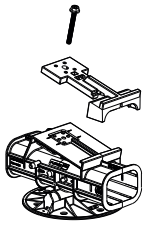


You can now mount several rows of solar panels. To do this, follow the installation steps in sections 6.7 to 6.16.
The panel field is now ready!



7. Annex

7.1 Dimensional variants

Frame thickness [mm]	End clamp		Mounting screw		
					
	Article number		Mounting screw - High base	Mounting screw - Low base	Mounting screw - Low base with extension
	Grey	Black			
30	1004330	1004430			
31	1004331	1004431			
32	1004332	1004432			1000655 (-B) (55mm)
33	1004333	1004433			
34	1004334	1004434			
35	1004335	1004435			
36	1004336	1004436			
37	1004337	1004437			
38	1004338	1004438	1000655 (-B) (55mm)	1000655 (-B) (55mm)	
39	1004339	1004439			
40	1004340	1004440			
41	1004341	1004441			1000670 (-B) (70mm)
42	1004342	1004442			
43	1004343	1004443			
44	1004344	1004444			
45	1004345	1004445			
46	1004346	1004446			
47	1004347	1004447	1000670 (-B) (70mm)	1000670 (-B) (70mm)	
48	1004348	1004448			
49	1004349	1004449			
50	1004350	1004450			n/a

All mounting screws are available in black (-B): 1000612(-B), 1000655(-B), 1000670(-B)

Row distance at base profile 940 mm (article no. 1007194 / 1007694)



Article number		Description	Row spacing dual [mm]
Grey	Black		
1007121	1007621	Base profile 210 mm	2100
1007137	1007637	Base profile 370 mm	2260 *
1007155	1007655	Base profile 550 mm	2440
1007175	1007675	Base profile 750 mm	2640
1007194	1007694	Base profile 940 mm	2830

** Standard length in the FlatFix Fusion calculator*

Row distance at base profile 1030 mm (article no. 1007195)



Article number		Description	Row spacing dual [mm]
Grey	Black		
1007121	1007621	Base profile 210 mm	2280
1007137	1007637	Base profile 370 mm	2440
1007155	1007655	Base profile 550 mm	2620
1007175	1007675	Base profile 750 mm	2820
1007194	1007694	Base profile 940 mm	3010

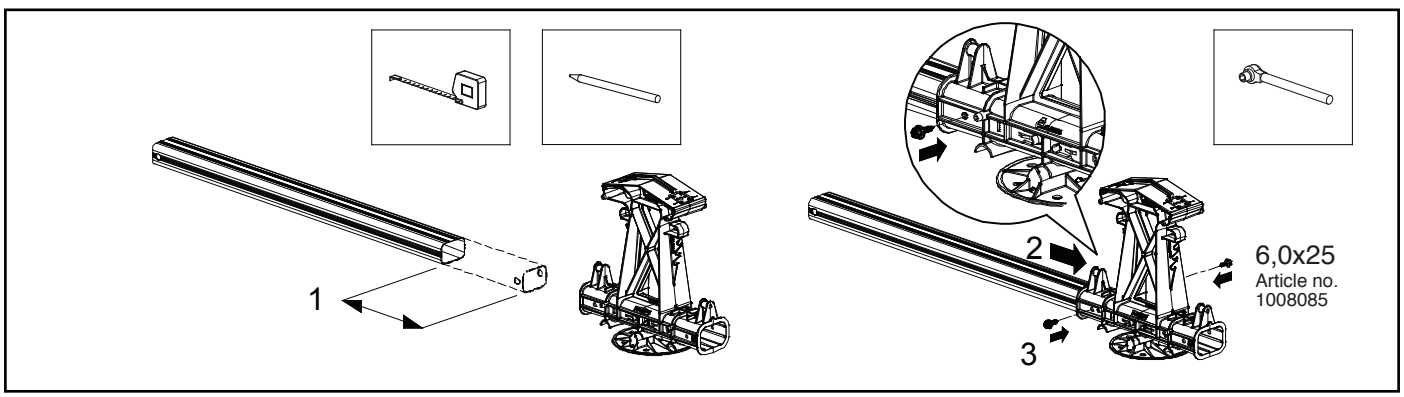
Row distance at base profile 1077 mm (article no. 1007196)

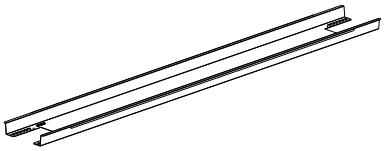


Article number		Description	Row spacing dual [mm]
Grey	Black		
1007121	1007621	Base profile 210 mm	2374
1007137	1007637	Base profile 370 mm	2534
1007155	1007655	Base profile 550 mm	2714
1007175	1007675	Base profile 750 mm	2914
1007194	1007694	Base profile 940 mm	3104

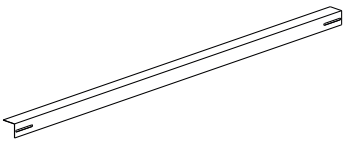
Shortening base profiles (optional)

The base profiles can be shortened between the rows of solar panels if required. Saw the profiles at the side of the high base to the desired length. Slide the base profile into the high base and secure it with two self-tapping sheet metal screws 6.0 x 25 mm SW10 HEX/T30 (article no. 1008085).





Article number	Description	Panel length [mm]	
		Min	Max
1007215	Ballast container 1200	1170	1310
1007207	Ballast container 1500	1475	1615
1007202	Ballast container 1600	1550	1690
1007210	Ballast container 1700	1655	1795
1007213	Ballast container 1900	1830	1970
1007086	Ballast container 2000	1940	2080
1007219	Ballast container 2100 (DTO)	2050	2190

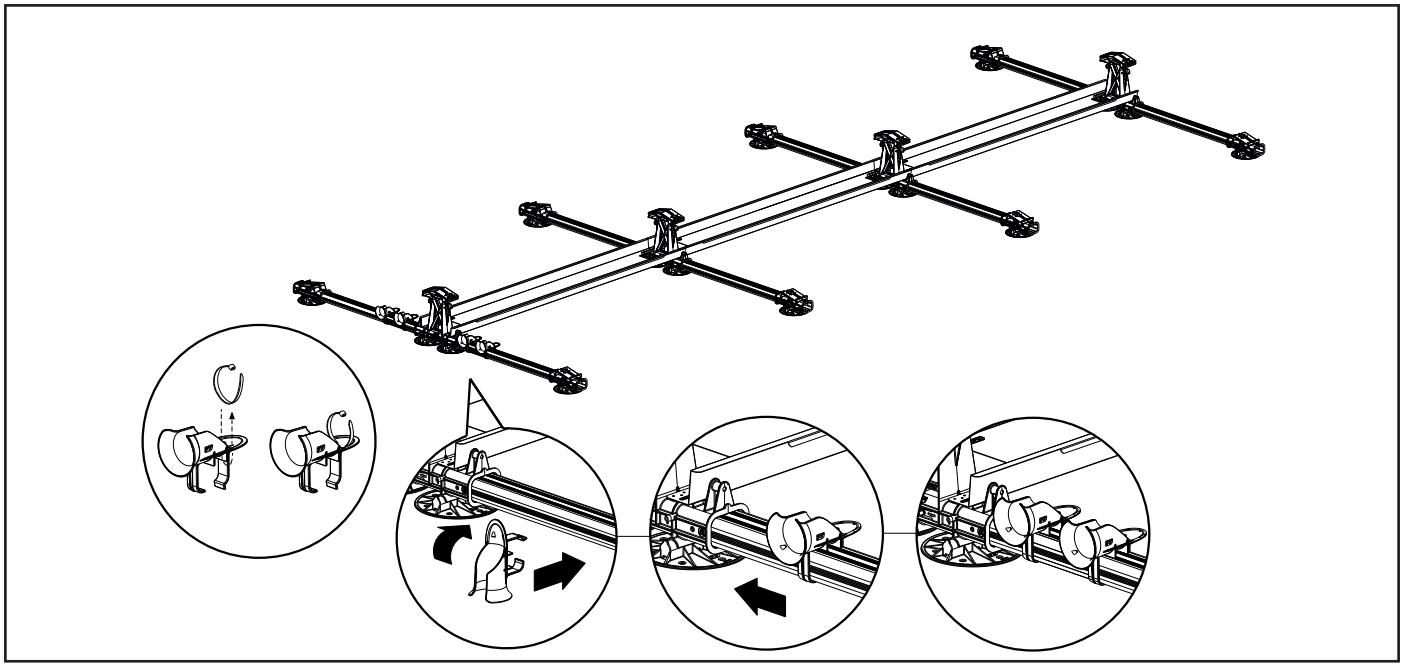


Article number	Description	Panel length [mm]	
		Min	Max
1007216	Stabiliser 1200	1170	1310
1007208	Stabiliser 1500	1475	1615
1007203	Stabiliser 1600	1550	1690
1007211	Stabiliser 1700	1655	1795
1007214	Stabiliser 1900	1830	1970
1007087	Stabiliser 2000	1940	2080
1007220	Stabiliser 2100 (DTO)	2050	2190

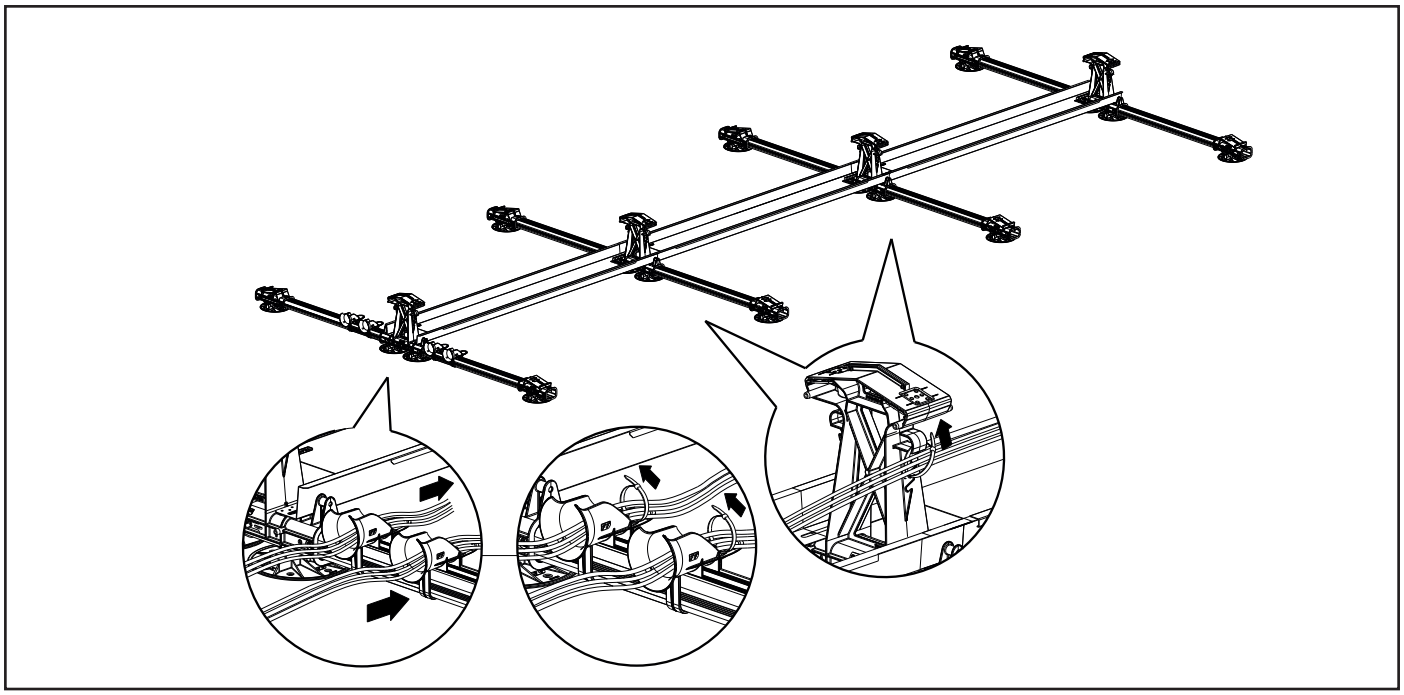
7.2 Installing cable exit guides, cables and wind deflectors

7.2.1 Mounting cable exit guides (optional)

Optional cable exit guides should be placed on the edge (left or right) of the panel array, on the first or last base profile of a row. Place 2 cable exit guides on the base profile and slide them towards the high base. Also place 2 cable exit guides on the base profile on the other side of the high base and slide them towards the high base
NOTE! Use cable ties (not supplied by Esdec BV) to fix the cables at the cable exit guides.
NOTE! Use cable ties that are compatible with the hole size of the cable exit guide (max. 7 mm width).

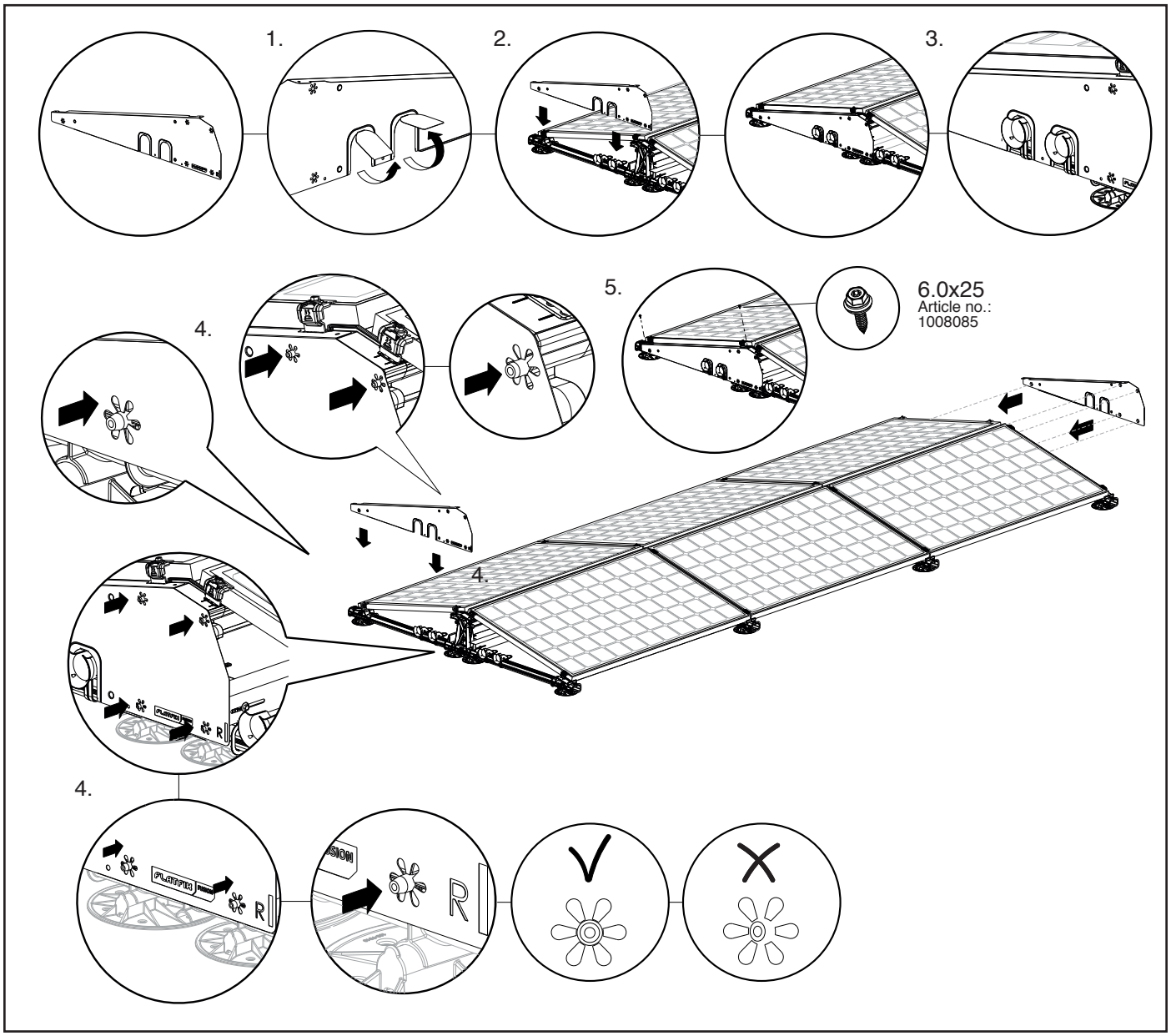


1. Feed all (+) cables through the 1st cable exit guide and all (-) cables through the 2nd cable exit guide. Secure the cables in the cable exit guides using cable ties to prevent cable play.
2. Fix the cables to the top cable guide of the 2nd high base using cable ties. Repeat this step until the cables are attached to all high bases except the last high base.
Make sure that the length of cable that hangs loose is limited as much as possible.
NOTE! Make sure the cables are securely tied to prevent the cables from slipping.

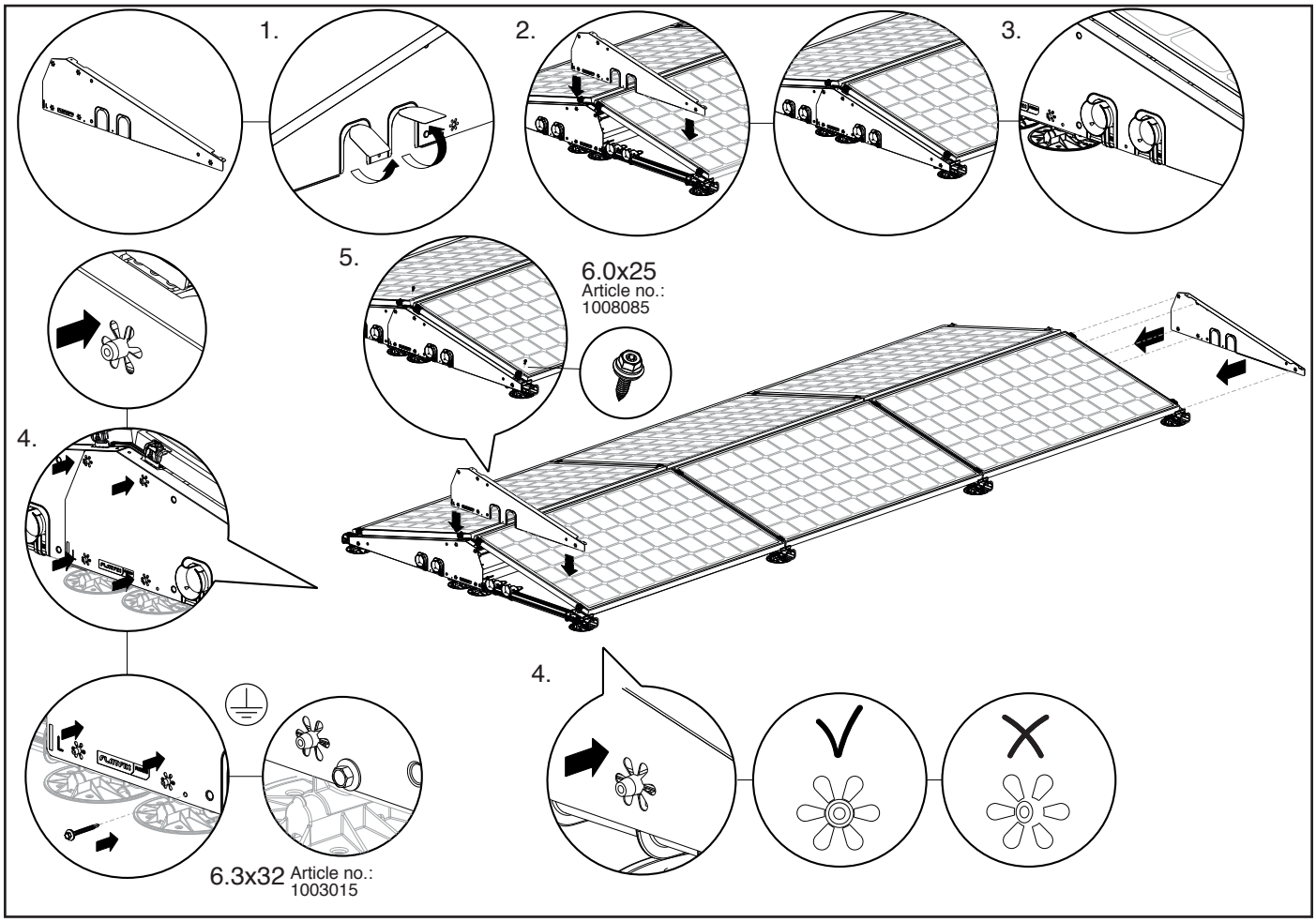


7.2.2 Mounting wind deflectors left/right

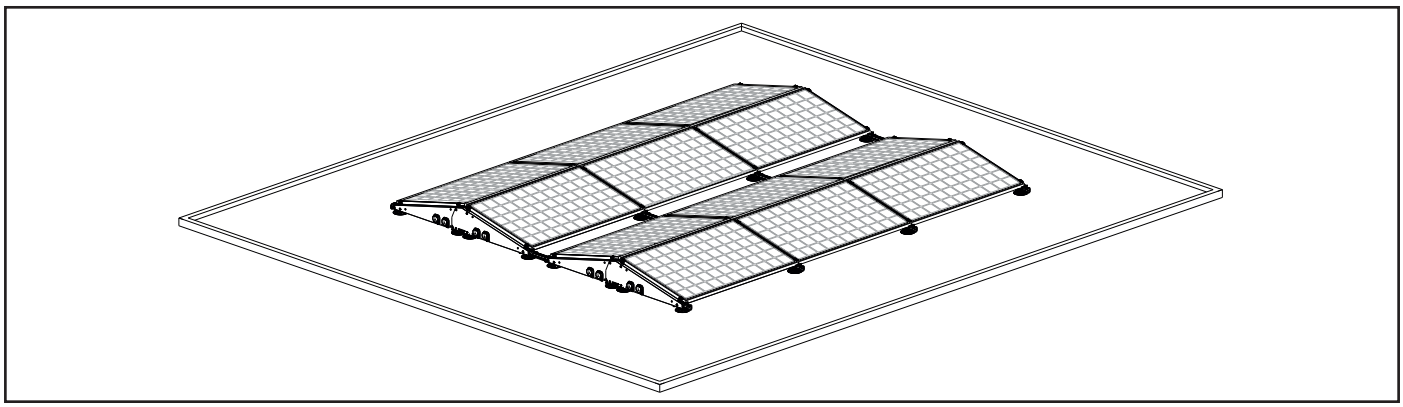
Place the left wind deflector next to the left side of the panel field and the right wind deflector next to the right side.
NOTE! The flange of the wind deflector must always face the panel field.
On the side where the cable exit guides are located, break open the push-through plates on the underside of the wind deflector and fold them **inwards** to create cut-outs where necessary. Place the wind deflector with cut-outs over the cable exit guides.
Mount the 2 wind deflectors (left and right) by pressing the starlock in the wind deflectors over the catches of the bases. Install the wind deflector carefully. Make sure that all tabs of the starlock engage evenly with the catch of the base. Press the wind deflector firmly so that it fits firmly to the base.
The wind deflectors must then be additionally fixed by the self-tapping sheet metal screw 6.0 x 25 mm SW10 HEX/T30 (article no. 1008085) at the level of the high and low bases.



Place the 2nd left wind deflector next to the left side of the panel field and the 2nd right wind deflector next to the right side. **NOTE!** The flange of the wind deflector must always face the panel field.
On the side where the cable exit guides are located, break open the push-through plates on the underside of the wind deflector and fold them **inwards** to create cut-outs where necessary. Place the wind deflector with cut-outs over the cable exit guides.
Mount the 2 wind deflectors (left and right, with overlap) by pressing the starlock in the wind deflectors over the catches of the bases. Install the wind deflector carefully. Make sure that all tabs of the starlock engage evenly with the catch of the base. Press the wind deflector firmly so that it fits firmly to the base. The wind deflectors should then be additionally fixed by the self-tapping sheet metal screw 6.0 x 25 mm SW10 HEX/T30 (article no. 1008085) at the height of the high and low bases. If you want to earth this (optional), you can fix it with a self-tapping screw 6.3 x 32 mm (article no. 1003015). Run this screw through the wind deflector and the base profile. Use the pre-drilled hole next to the lower starlock in the wind deflector as a guide. The crosswind deflectors are now earthed and secured. And the first row of solar panels is now ready!

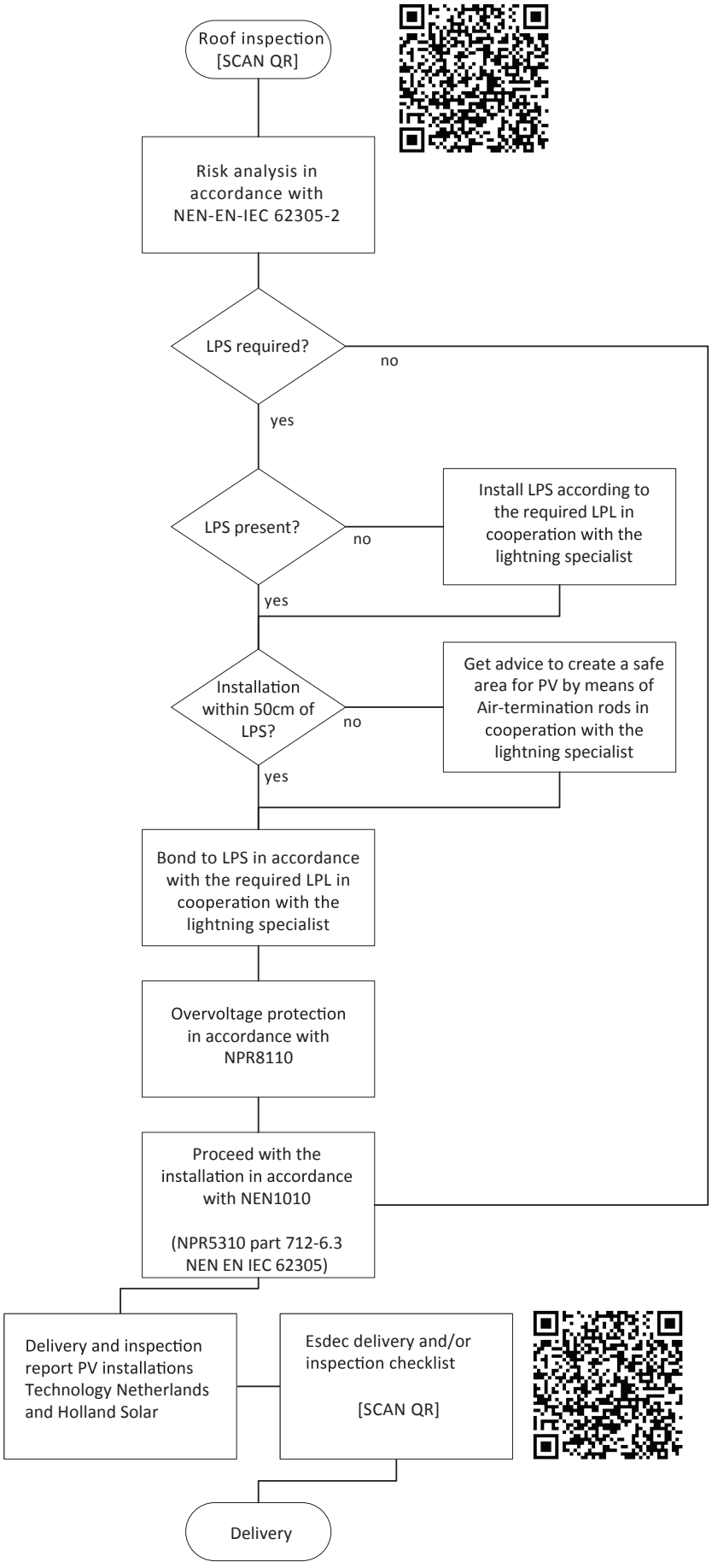


Now mount the next row of solar panels. The panel field is now ready!



7.3 Schematic representation of earthing, equipotential bonding and lightning protection

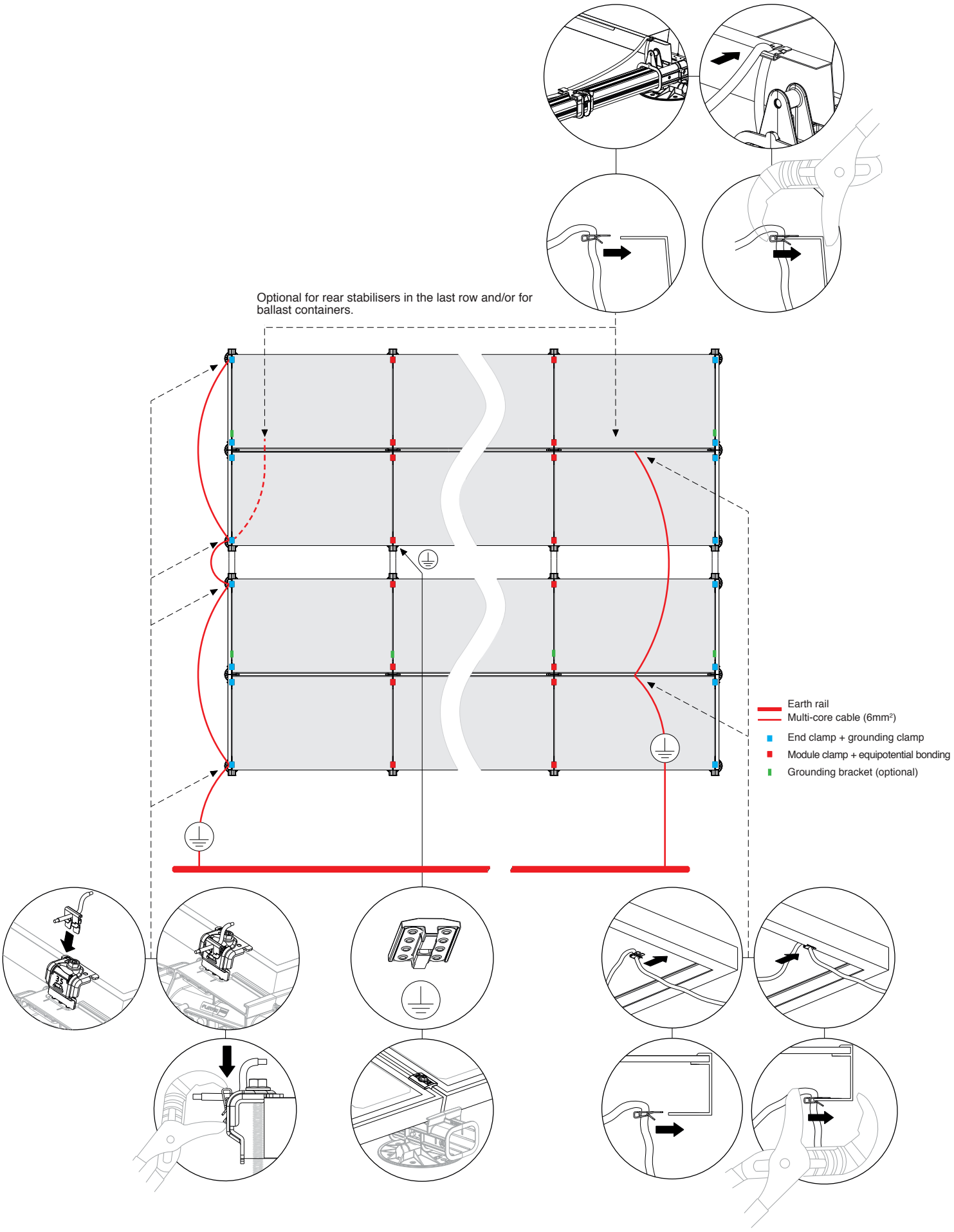
7.3.1 Selection chart



LPS = lightning protection system
LPL = lightning protection level

URL QR CODE: https://eu.esdec.com/nl/advies-en-voorwaarden/

7.3.2 Equipotential bonding and earth rail



7.3.3 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.

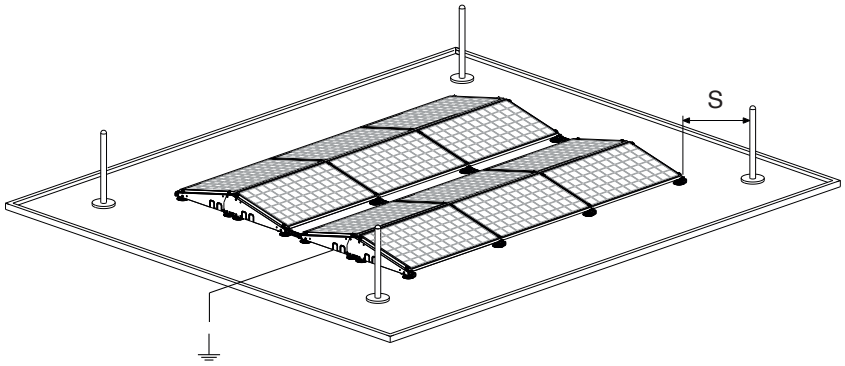
2. If this is not possible, connect the PV system to LPS according to the applicable lightning protection level (LPL);

- See table 1, use at least 16 mm^2 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 earth 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. ESDEC 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)

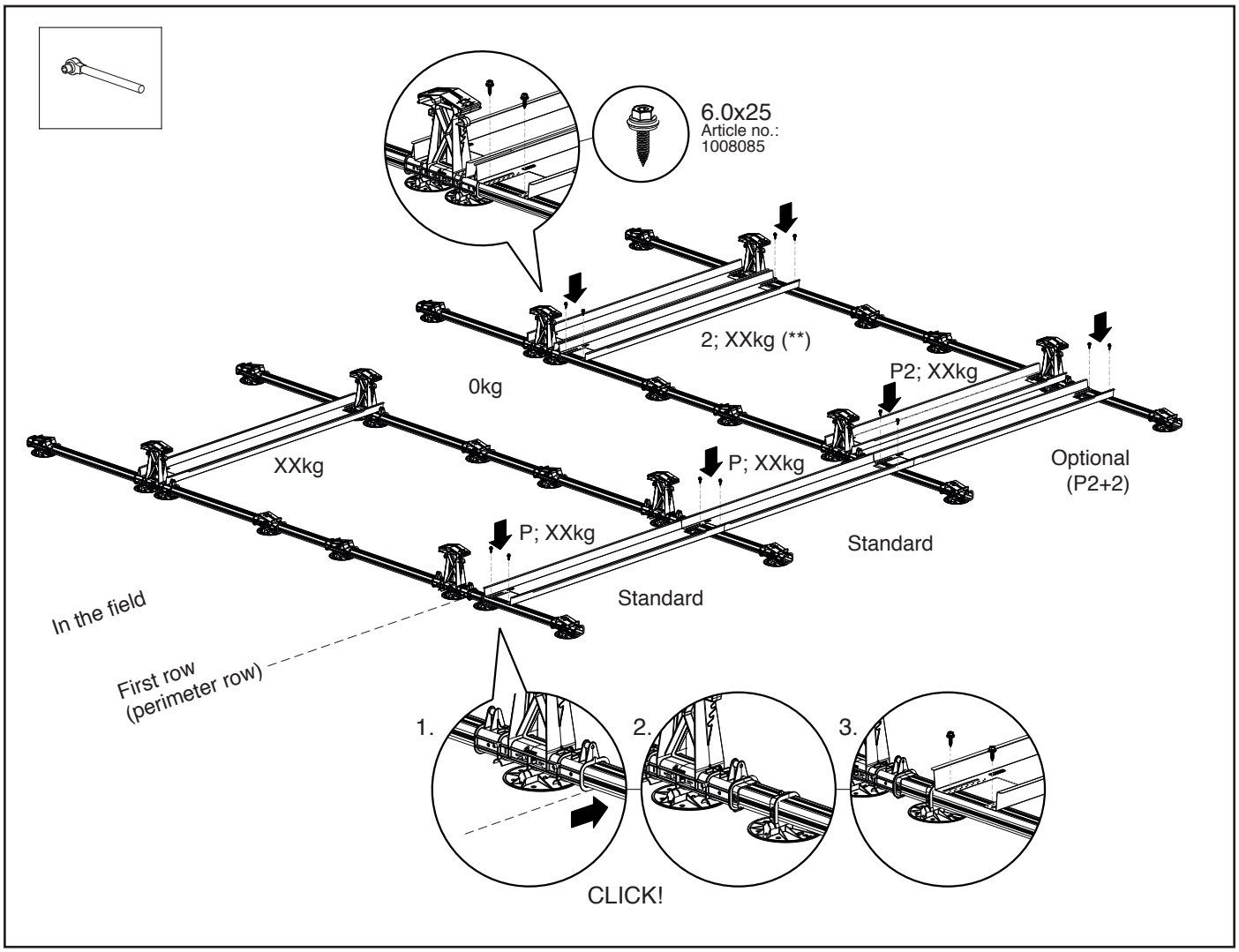
table 1

Mesh size	LPL level	Connect the PV system to the ..
5 x 5 metres	I	5 metres
10 x 10 metres	II	10 metres
15 x 15 metres	III	15 metres
20 x 20 metres	IV	20 metres



LPS = lightning protection system
LPL = lightning protection level

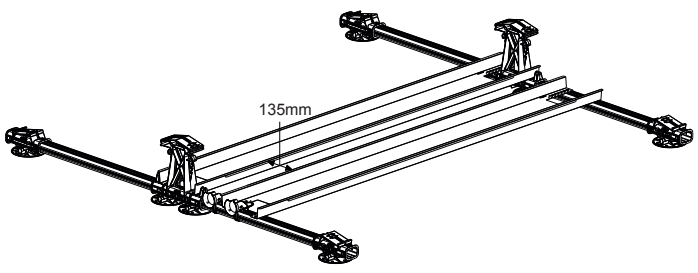
7.4 Ballast configurations



Ballast under the panel

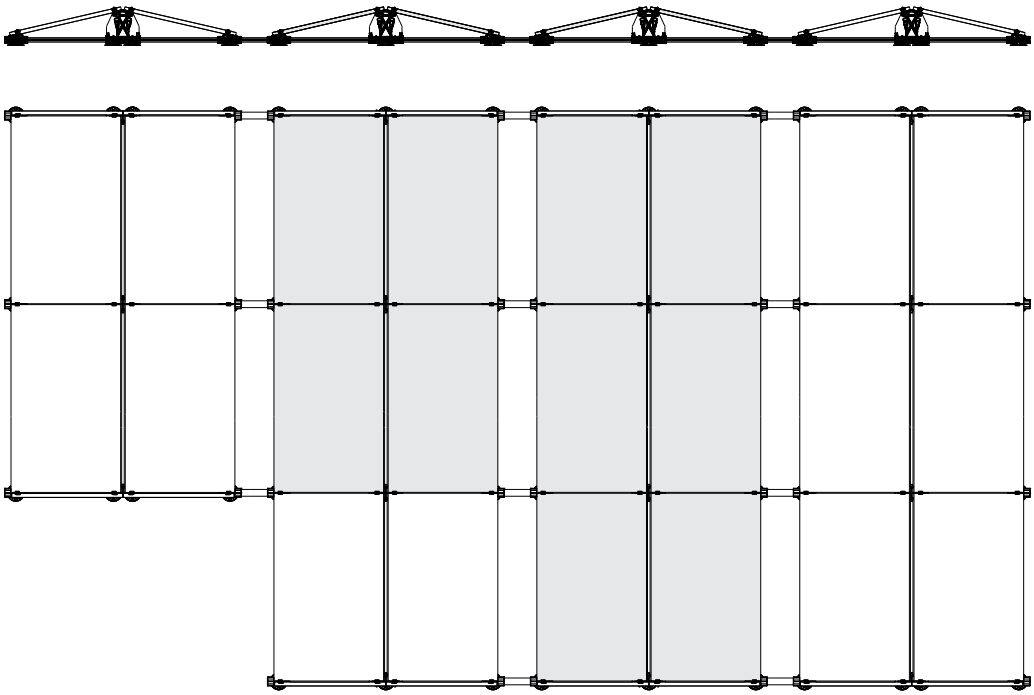
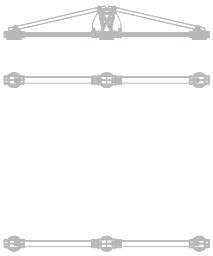
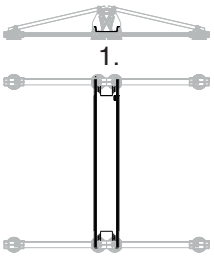
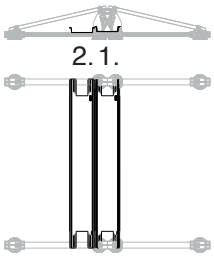
If the calculator prescribes situations 'P' or 'P2', an extra roof support with roof support adapter must be mounted on the base profile under the panel. Position the adapter so that it is also worked over the rib under the high base. The adapter also serves as a spacer for placing the ballast box(**). The ballast box must then be screwed onto the base profiles with the self-tapping sheet metal screw 6.0 x 25 mm SW10 HEX/T30 (article no. 1008085) through one of the pre-punched holes in the ballast box. Where two ballast boxes located next to each other overlap, one screw is sufficient.

** in the 2; XXkg situation it is not mandatory to use extra roof supports and adapters. The 2nd ballast box can be placed here against the high base before screwing it onto the profiles. If a cable exit guide must be located here, allow a distance of 135mm.



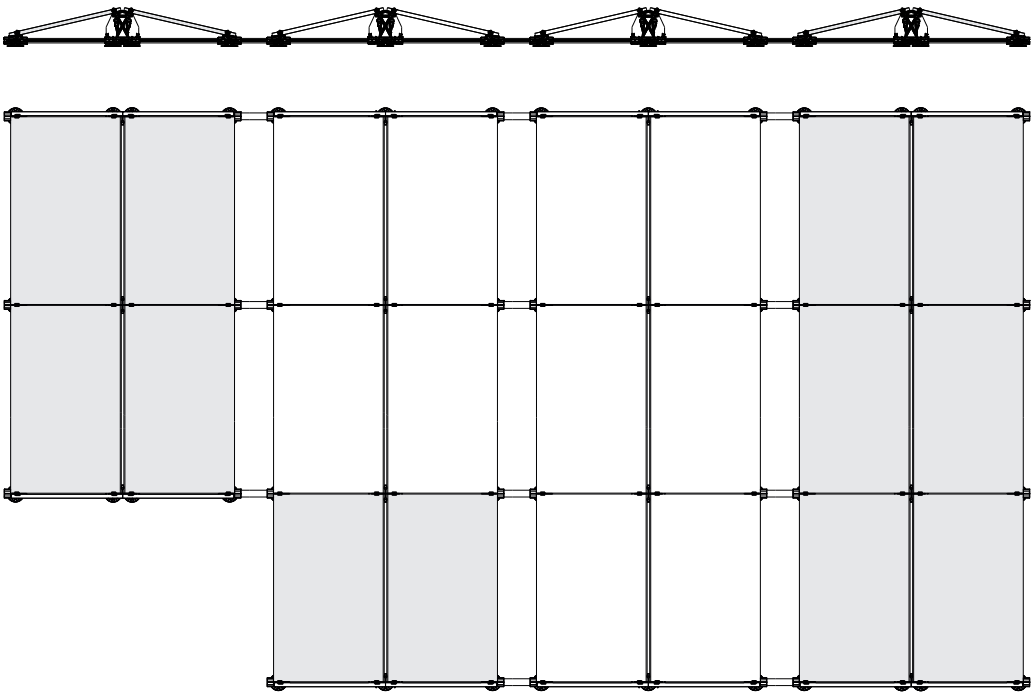
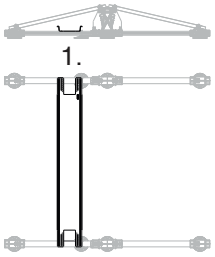
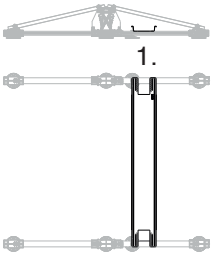
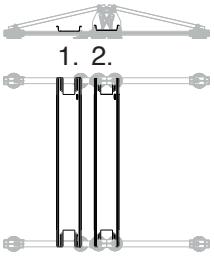
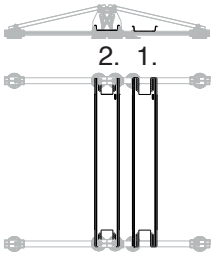
7.4 Ballast configurations (contd.)

Dual setup - 1/3

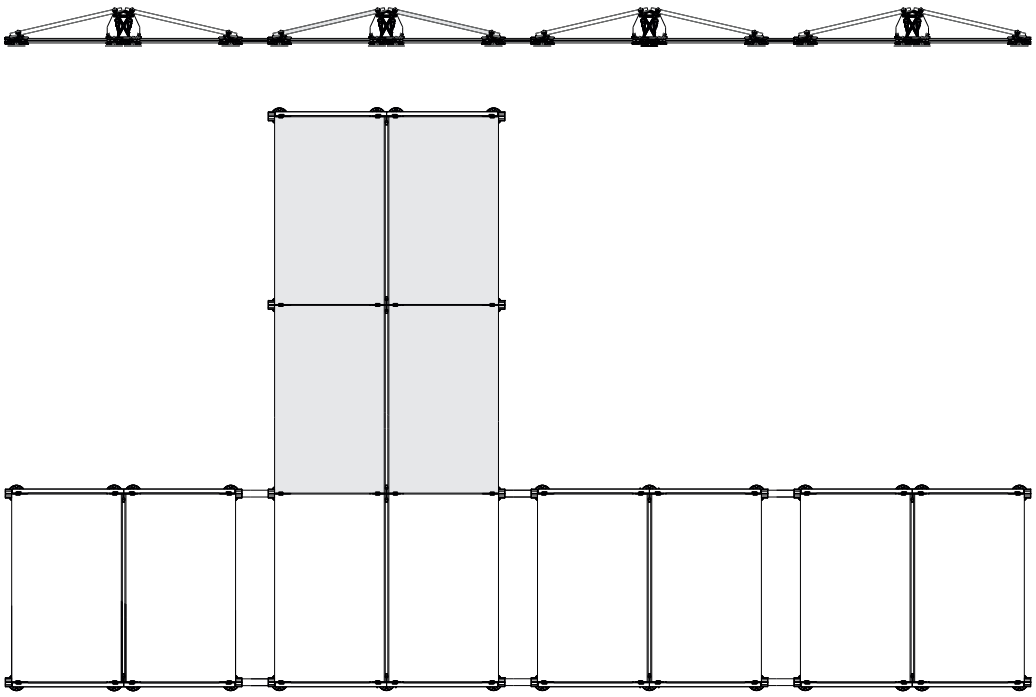
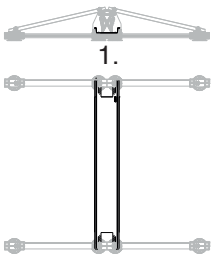
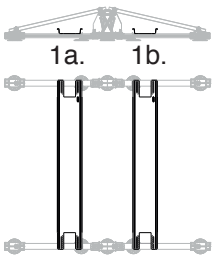
SEGMENT PLAN			
BALLAST POSITIONS			
NAME	no ballast	XXkg	2; XXkg
DESCRIPTION	No ballast required (weight distribution from adjacent positions and own weight)	Standard ‘in the segment’ ballast position	2nd ballast position added due to higher ballast requirements for positions ‘in the segment’
FIX / ALIGN		Place ballast container on the high bases, and align them using the slots (holder) and lugs (bases).	Position the 2nd ballast container directly against the high bases and screw it onto the base profiles
WEIGHT DISTRIB.	No ballast required	Specified quantity of ballast in ballast container 1	Fill ballast container 1 to the maximum level with ballast and place the remainder of the specified amount of ballast in ballast container 2 (do not stack)

Note: For positions ‘in the segment’ no additional roof supports and roof support adapters are required for the placement of the 2nd ballast container (optional)

Dual setup - 2/3

SEGMENT PLAN				
SIDE	LEFT	RIGHT	LEFT	RIGHT
BALLAST POSITIONS				
NAME	P; XXkg		P2; XXkg	
DESCRIPTION	Standard (perimeter) ballast position in front row		2nd ballast container added due to higher ballast requirements for positions in the first row	
FIX / ALIGN	Position the ballast container using the roof support adapters (spacers) and screw it to the base profiles		Place the 2nd ballast container on the high bases, and align them using the slots (holder) and lugs (bases).	
WEIGHT DISTRIB.	Specified quantity of ballast in ballast container 1		Fill ballast container 1 to the maximum level with ballast (do not stack) and place the remainder of the specified amount of ballast in ballast container 2	

Dual setup - 3/3

SEGMENT PLAN			
BALLAST POSITIONS			
NAME	XXkg	P2; XXkg	
DESCRIPTION	Ballast position for single rows with low ballast requirements	Standard (perimeter) ballast position for single rows	
FIX / ALIGN	Place ballast container on the high bases, and align them using the slotted holes (holder) and lugs (bases).	Position both ballast container using the roof support adapters (spacers) and screw them to the base profiles	
WEIGHT DISTRIB.	Specified quantity of ballast in ballast container 1	Fill ballast container 1a with 1/2 of the specified amount of ballast and ballast container 1b with the other 1/2 of the specified amount of ballast	

Points to consider during system design and installation:

The installation of a PV system on an existing building changes the building loads (e.g. snow / wind) or the building structures that previously applied. To prevent personal injury and/or material damage, it is necessary to have the static load calculations for the existing building revised by a qualified technician. The current regulations must be taken into account, in particular NEN6702, NEN7250, NEN1991-1-1-4 A1 + C2/NB. Failure to revise the static calculations of the building can, in the worst case, lead to collapse (of the supporting structure) of the building. Consultation with the insurer is recommended in case of structural changes. Roofs are always subject to vibration and movement. This can be caused by, for example, activities in the building, weather influences, thermal effects or seismic activity, which can cause PV systems to move, slide or sag. In some cases it may be necessary to fix/anchor the PV system to the roof. When setting out the edge and corner zone of a building, current regulations must be observed. When an edge-corner zone is specified by Esdec, this is the minimum edge-corner zone. Placing solar panels in the edge and corner zone of a building is always at your own risk and is strongly discouraged.

Among other things, the following items must be structurally checked and found to be in good order by, for example, a structural engineer:

- The loads occurring as a result of the additional weight of the complete PV system on the building.
- The loads occurring as a result of the changed geometry of the roof surface on the building.
- The loads occurring as a result of the static load of the PV system on the building.
- The loads occurring as a result of the dynamic wind pressure and possible accumulation of precipitation on the building and the PV system.
- The loads occurring during installation on the building, roof construction, roofing and insulation.
- The long-term compatibility of the insulation and roofing at the contact points of the PV system support structure due to the point pressure.
- The compatibility of the roof covering in combination with the PV system at the location of the contact points.
- The thermal effects of the building and the PV system on each other.
- The effect of any movement and vibrations of the roof and the PV system on each other.

Despite the care taken by Esdec employees and in the software to ensure that calculations are performed carefully, no rights can be derived from these calculations. Prices in the software, catalogues, quotations, etc. are advisory and may change as a result, for example, of rising commodity prices or levies. Calculations, drawings and dimensions in the software, catalogues, quotations, etc. are advisory and no rights can be derived from them. Our general terms and conditions apply to all systems and services supplied by us. In addition to the above points, our general terms and conditions must be read and understood in detail before proceeding with installation. When placing an order with Esdec, you fully agree with the above.