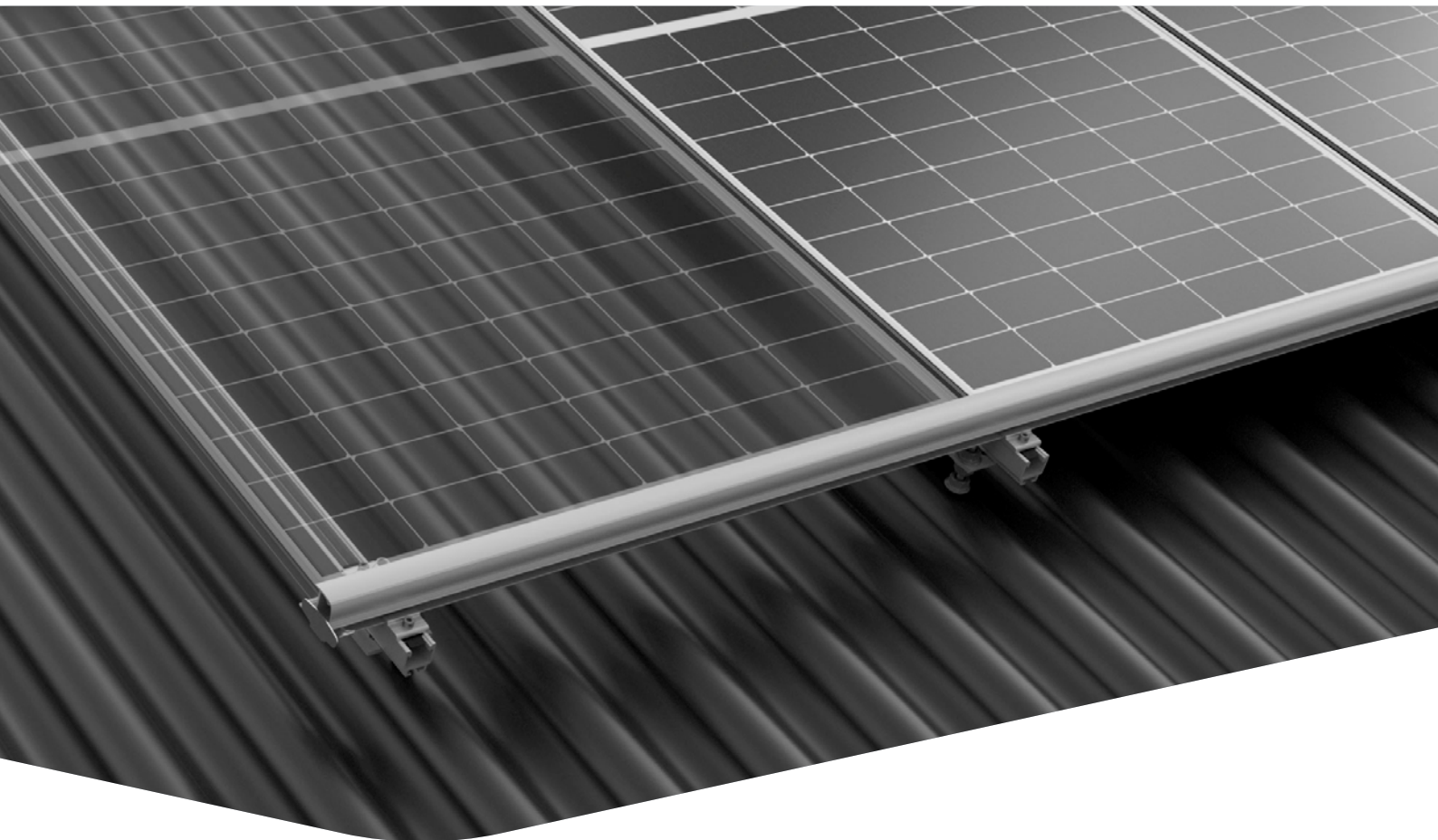




Connecting Strength



Assembly Manual

InsertionRail System

**with hanger bolts /
solar fasteners**

Content

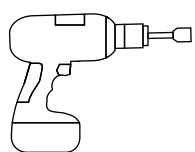
• Tool overview	3	• Assembly InsertionRail	20
• General safety information	4	• CrossConnector part 1	20
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• Planning with K2 Base	5	• CrossConnector part 2	21
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• Attach adapter plate	18	• Notes	29
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Tested quality - multiple certifications

K2 Systems stands for secure connections, top quality and maximum precision. Our customers and business partners have known this for a long time. Independent bodies have tested, verified and certified our competencies and components.

You can find our quality and product certificates at
k2-systems.com/en/technical-information

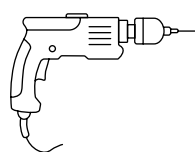
Tool overview



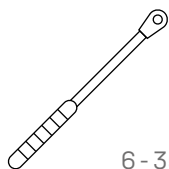
5/6 mm



7/9 mm



5.5 - 15 mm



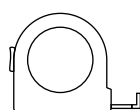
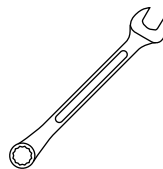
6 - 35 Nm
(4.5 - 22.2 lb-ft)



4/6 mm



13/15/16/17 mm



≥ 3.0 m



≥ 6.0 m

Digital Toolbox



Do you already know our digital services? Use our K2 DocuApp now and record the first important data directly at the customer or project site.

Simply transfer the data to our online planning software K2 Base. Here you can plan your project easily, safely and quickly. You receive a detailed project report with assembly plan and static report. The K2+ interface enables seamless project data transfer to the planning tools of well-known inverter manufacturers or yield planning tools.

Get started and register now:

docuapp.k2-systems.com →

base.k2-systems.com →

General safety information

Please note that our general mounting instructions must be followed at all times and can be viewed online at [k2-systems.com](https://www.k2-systems.com)

- The equipment may only be installed and operated by qualified and adequately trained installers.
- Prior to installation, ensure that the product complies with on-site static loading requirements. For roof-mounted systems, the roof load-bearing capacity must always be checked.
- National and local building regulations and environmental requirements must be adhered to.
- Compliance with health and safety regulations, accident prevention guidelines and applicable standards is required.
 - Protective equipment such as safety helmet, boots and gloves must be worn.
 - Roofing works must be in accordance with roofing regulations utilising fall protection safeguards when eaves height exceeds 3 m.
 - At least two people must be present for the duration of the installation work in order to provide rapid assistance in the event of an emergency.
- K2 mounting systems are continuously developed and improved and the installation process may thereby change at any time. Prior to installation consult our website at www.k2-systems.com/en/technical-information for up-to-date instructions. We can send you the latest version on request.
- The assembly instructions of the module manufacturer must be adhered to.
- Equipotential bonding/grounding/earthing between individual parts is to be performed according to country specific standards, as well as national laws and regulations.
- At least one copy of the assembly instructions should be available on site throughout the duration of the installation.
- Failure to adhere to our general safety and assembly instructions and not using all system components, K2 is not liable for any resulting defects or damages. We do not accept liability for any damage resulting in the use of competitor's parts. Warranty is excluded in such cases.
- K2 Systems GmbH reserves the right to exclude liability in case of disregard of our General Safety Instructions as well as in case of installation or mounting of components of a competitor.
- If all safety instructions are adhered to and the system is correctly installed, there is a product warranty entitlement of 12 years! We strongly recommend reviewing our terms of guarantee, which can be viewed at [k2-systems.com/en/warranty-terms-and-conditions](https://www.k2-systems.com/en/warranty-terms-and-conditions). We will also send this information on request.
- Dismantling of the system is performed in reverse order to the assembly.
- K2 stainless steel components are available in different corrosion resistance classes. Each structure or component must be carefully checked for possible corrosion exposure.

The following guidelines apply



This System can be used without further testing by K2 systems in the following standard conditions. It is also suitable for higher requirements. However, if a value exceeds the standard conditions, please contact K2 Systems.



Planning with K2 Base

We recommend our free online software K2 Base for the planning. In five steps you can plan the right assembly system and get an installation recommendation, a bill of materials and the structural analysis report. Simply register and start planning: base.k2-systems.com



Roof requirements

- It is essential to check that the roof structure has sufficient residual load capacity and that the pressure capacity of the roof insulation (where present) is not exceeded.
- Roof pitch of: 5 - 75°



Important mounting instructions

- On-site general standards and regulations for lightning protection must be observed and consultation with a specialist to create a lightning protection concept is recommended (use lightning protection clamp if necessary).
- The earthing must be undertaken by the customer and must be carried out according to the respective country-specific regulations.
- After 13.6 m (vertical) and 21.0 m (horizontal) a thermal separation must be installed.
- Observe the manufacturer's instructions for installing the modules.

Hanger bolt/solar fastener

- The hanger bolts are suitable for fastening to fibre cement profiles.
- The solar fasteners are suitable for fastening to steel/aluminium roof sheeting profiles and fibre cement profiles.
- It is also possible to install on slate roofing using metal roof plates.

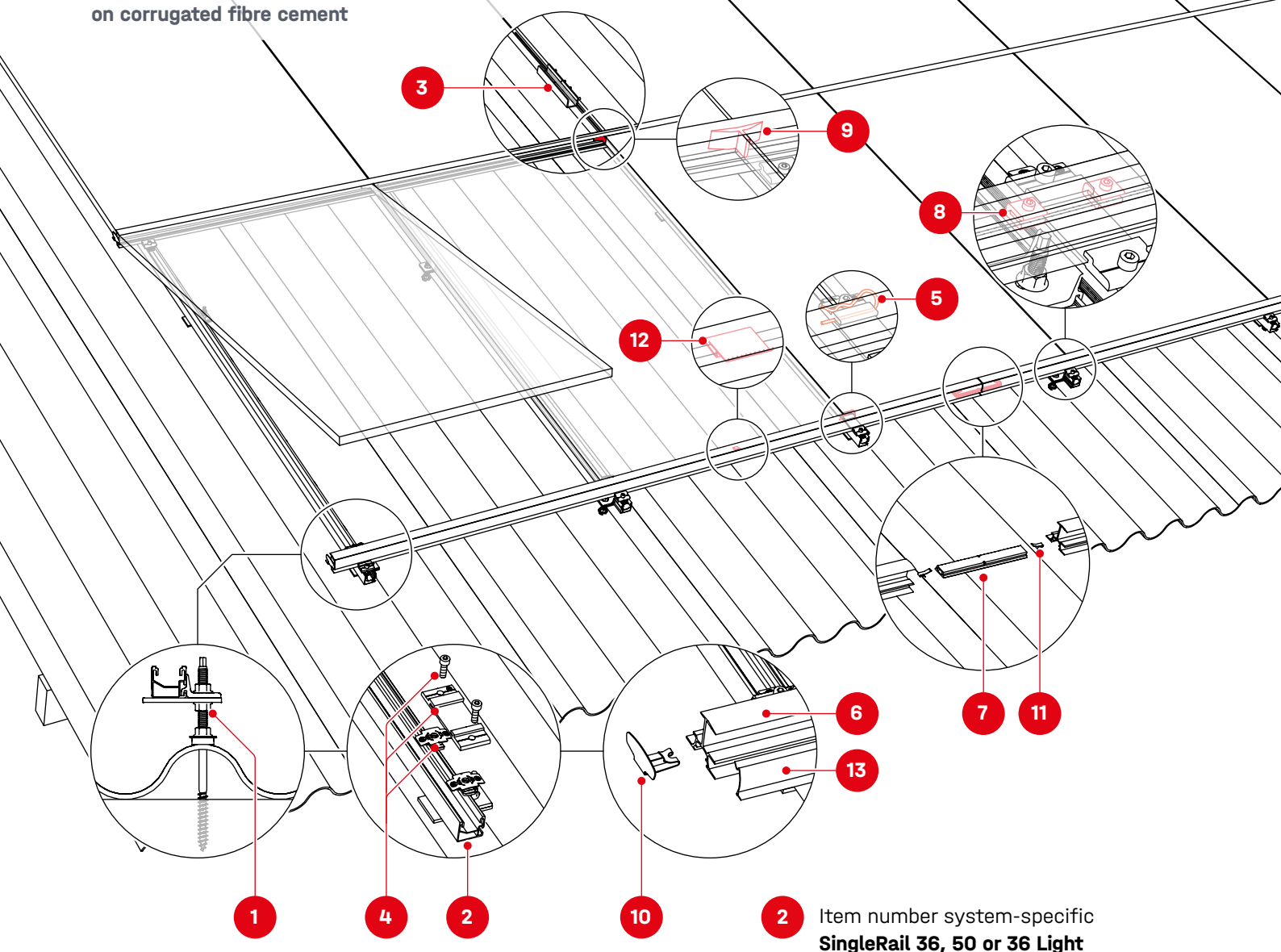
- Please observe the specified screw-in depth of the solar fasteners for wooden substructures. These can be found in our Base report under the heading Results. The specified load-bearing capacity values can only be achieved if the specified screw-in depth of the solar fasteners is observed.
- Do not step on hanger bolts or solar fasteners as these are not climbing assists.
- The processing instructions and the applicable specifications from screw manufacturers' European Technical Assessment (ETA) must be observed.
- When using hanger bolts and solar fasteners, it is essential to ensure that they are installed correctly and professionally, particularly to guarantee the roof is watertight. Installation must only be carried out by qualified specialists. K2 Systems accepts no liability for damage resulting from improper installation.

InsertionRail System

- Each cut-to-size rail section (InsertionRail) must have at least 2 fastening points (vertical rails).
- Rail cut (InsertionRail) ≥ 1100 mm
- Min. 50 mm projection from the end of the rail (InsertionRail) to the outer edge of the Cross-Connector.
- 5 mm horizontal distance between the modules (ModuleSafety).

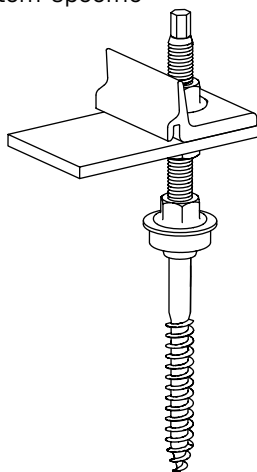
Components

Hanger bolts with SingleRail on corrugated fibre cement

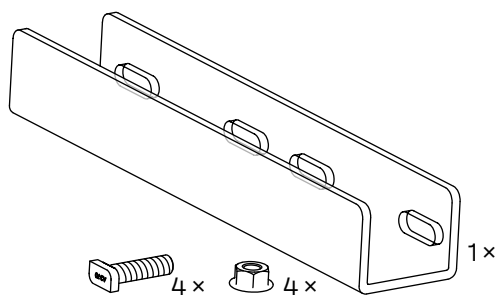


Components hanger bolts with SingleRail

- 1 Item number system-specific
Hanger bolt
M10/M12
for SingleRail

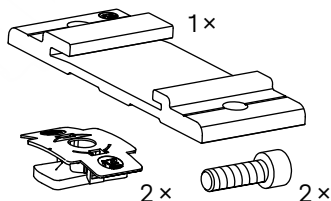


- 3 2001976 / 2002404
SingleRail 36/50 Connector Set



Components InsertionRail

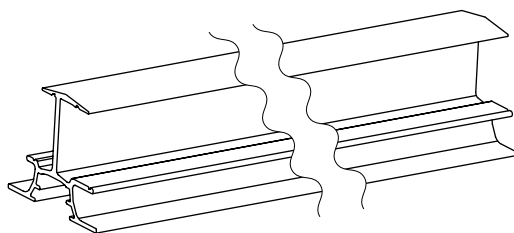
- 4** 2004374/2004375
CrossConnector 2.0 Set
silver/black



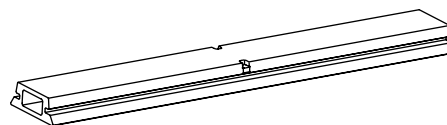
- 5** 2001196
Spring plug



- 6** Item number system-specific
InsertionRail 2.0 silver/black



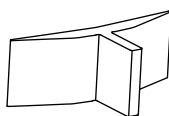
- 7** 2004355/2004322
RailConnector 2.0
silver/black



- 8** 2004370
FixStop 2.0



- 9** 2004290
ModuleSafety



- 10** 2004693/2004692
EndStop 2.0 silver/black

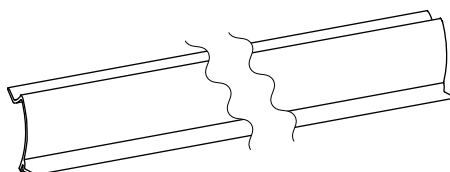


Optional

- 11** 2004102
TerraGrif PL



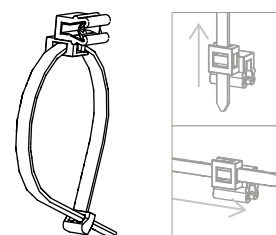
- 13** Item number system-specific
InsertionRail 2.0 Cover silver/black



- Item number
system-specific
EndCap



- 2002870
Cable Manager

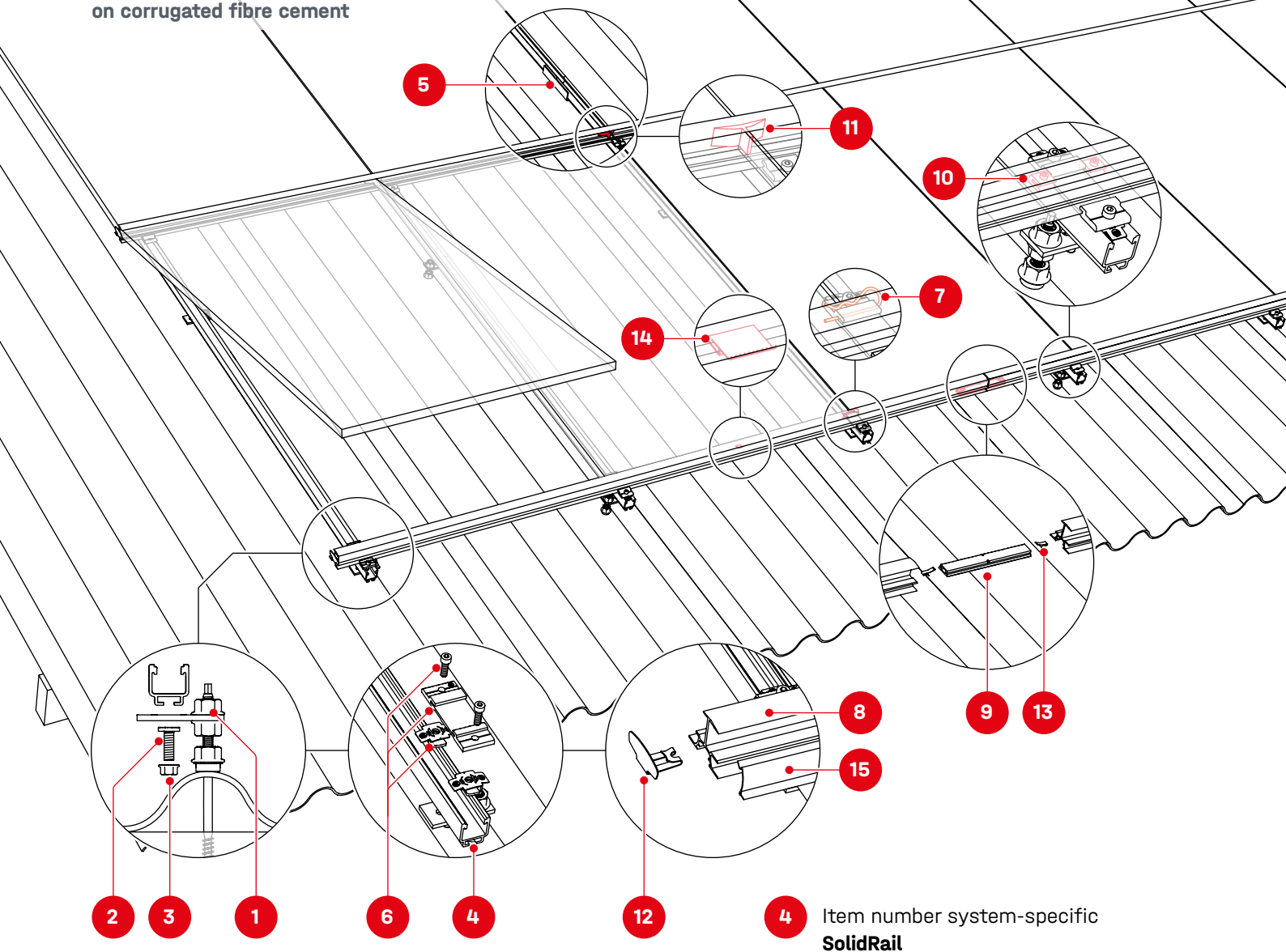


- 12** 2000056
TerraGrif K2U17



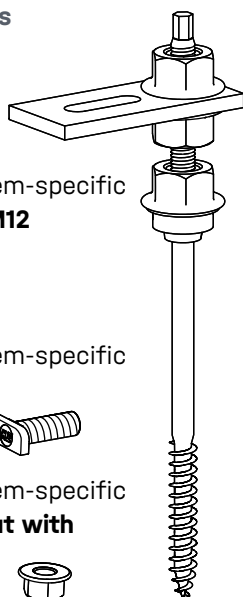
Components

Hanger bolts with SolidRail on corrugated fibre cement

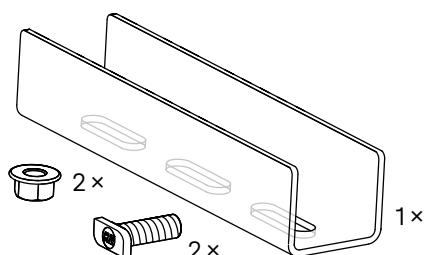


Components hanger bolts with SolidRail

- 1** Item number system-specific
**Hanger bolt M10/M12
for SolidRail**
- 2** Item number system-specific
**T-Bolt
M10/M12**
- 3** Item number system-specific
**Hexagon Flange nut with
serration M10/M12**

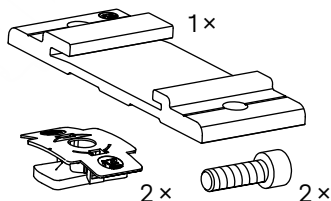


- 5** Item number system-specific
Rail connector Set SolidRail



Components InsertionRail

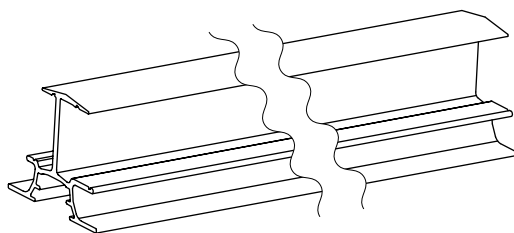
- 6** 2004374/2004375
CrossConnector 2.0 Set
silver/black



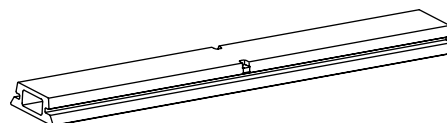
- 7** 2001196
Spring plug



- 8** Item number system-specific
InsertionRail 2.0 silver/black



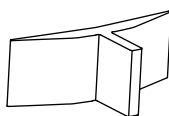
- 9** 2004355/2004322
RailConnector 2.0
silver/black



- 10** 2004370
FixStop 2.0



- 11** 2004290
ModuleSafety



- 12** 2004693/2004692
EndStop 2.0 silver/black

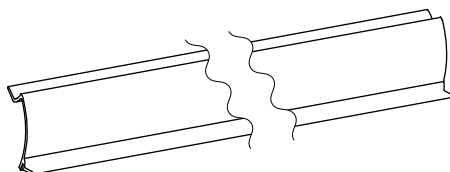


Optional

- 14** 2004102
TerraGrif PL



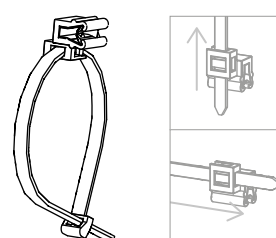
- 16** Item number system-specific
InsertionRail 2.0 Cover
silver/black



- Item number
system-specific
EndCap



- 2002870
Cable Manager



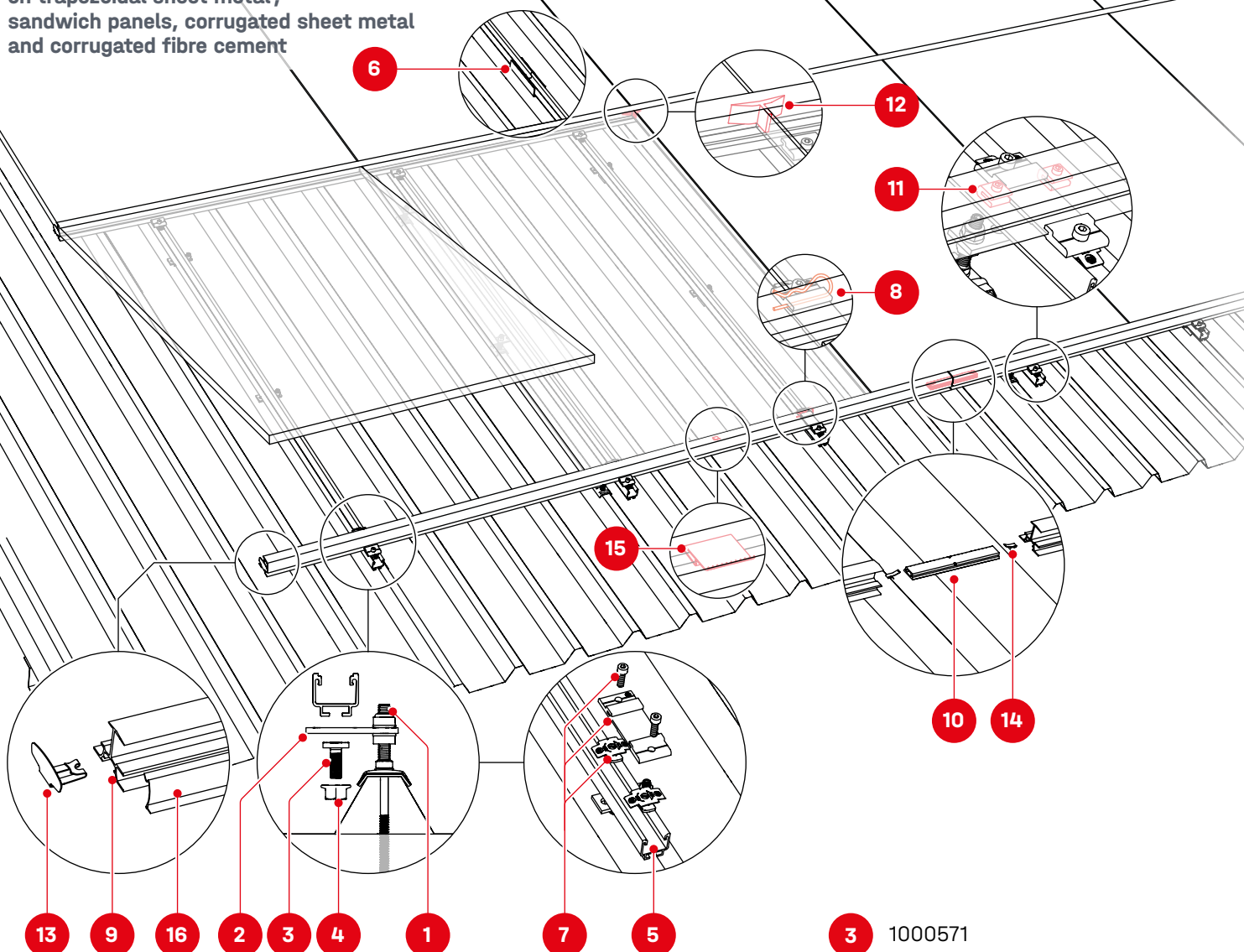
- 15** 2000056
TerraGrif K2U17



Components

Solar fasteners with SolidRail

on trapezoidal sheet metal,
sandwich panels, corrugated sheet metal
and corrugated fibre cement

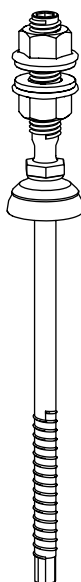
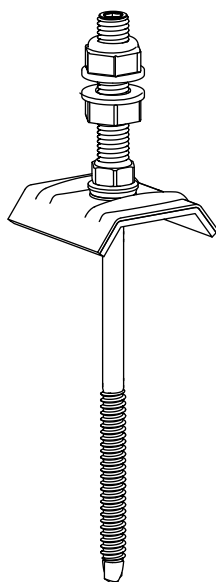
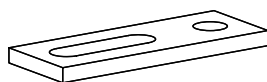


Components solar fasteners with SolidRail

- 1** Item number
system-specific
**Solar fasteners M10
for SolidRail**

Calotte also available for
corrugated sheet metal

- 2** 2002544
Adapter plate M10



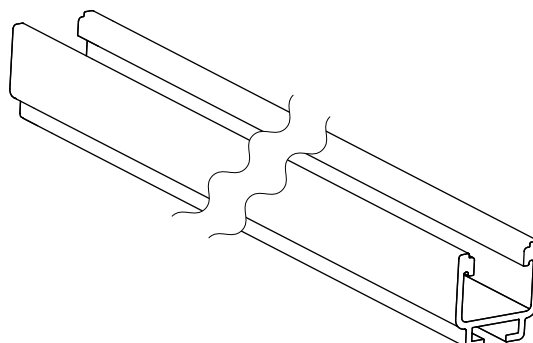
- 3** 1000571
T-Bolt M10

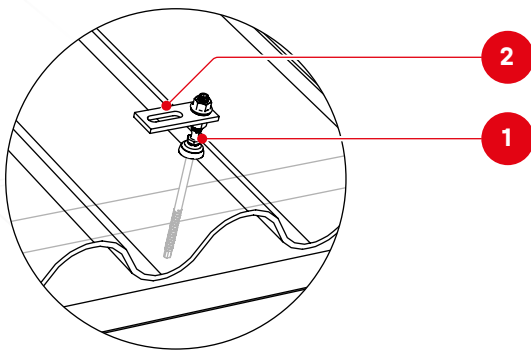


- 4** 1000042
**Hexagon Flange nut
with serration M10**



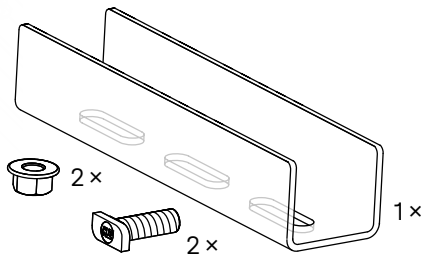
- 5** Item number system-specific
SolidRail



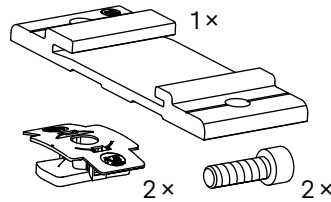


Components InsertionRail

- 6** Item number system-specific
Rail connector Set SolidRail



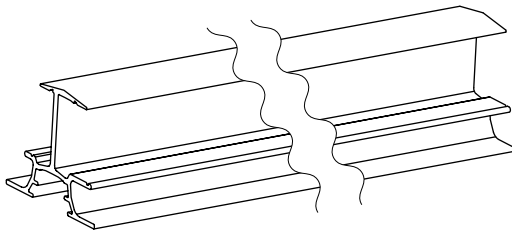
- 7** 2004374/2004375
CrossConnector 2.0 Set
silver/black



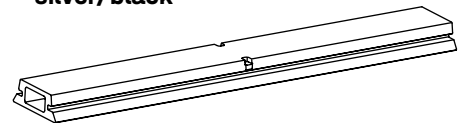
- 8** 2001196
Spring plug



- 9** Item number system-specific
InsertionRail 2.0 silver/black



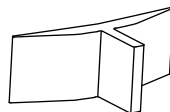
- 10** 2004355/2004322
RailConnector 2.0
silver/black



- 11** 2004370
FixStop 2.0



- 12** 2004290
ModuleSafety



- 13** 2004693/2004692
EndStop 2.0 silver/black

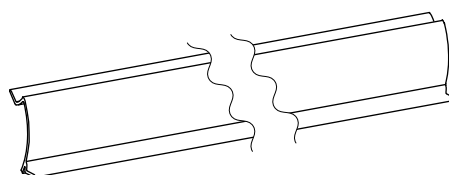


Optional

- 14** 2004102
TerraGrif PL



- 16** Item number system-specific
InsertionRail 2.0 Cover
silver/black



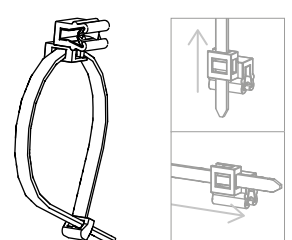
- 15** 2000056
TerraGrif K2U17



- Item number
system-specific
EndCap



- 2002870
Cable Manager



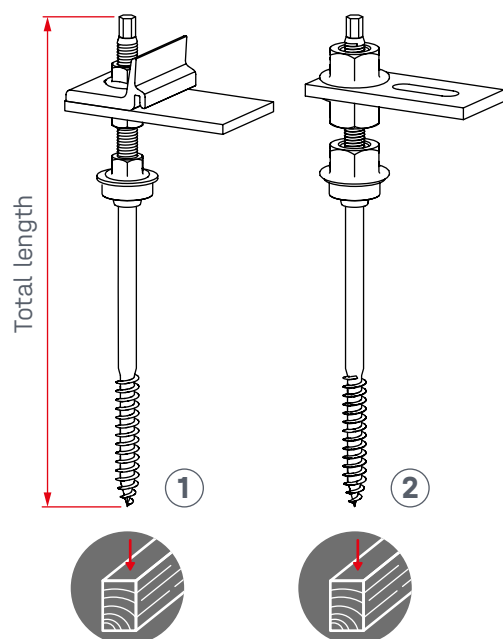
Fastener

Overview

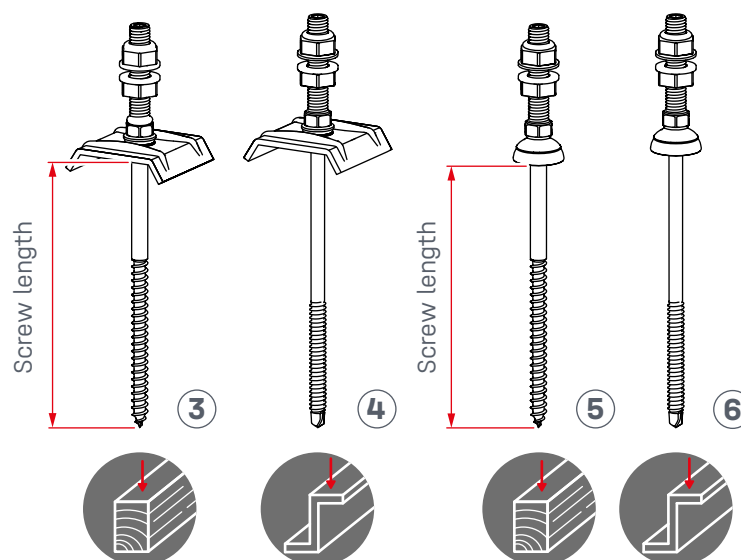
Fastener	Roof covering	Illustration	Substructure			
			Timber			
			Total length [mm] / Product number			
			M10	M12		
Hanger bolt SingleRail with fibre cement seal	Corrugated fibre cement 	①	180 / 2003272	200 / 2003275		
			200 / 2003273	250 / 2003276		
			250 / 2003274	300 / 2003277		
Hanger bolt SolidRail with fibre cement seal	Corrugated fibre cement 	②	180 / 2000120	200 / 2000123		
			200 / 2000121	250 / 2000124		
			250 / 2000122	300 / 2000125		

			Timber		Steel	
			Screw length [mm] / Product no.		Screw length [mm] / Product no.	
			M10 × 50	M10 × 70	M10 × 50	M10 × 70
Solar fastener with calotte (trapezoidal/ corrugated)	Trapezoidal sheet metal, sandwich panels, corrugated sheet metal 	③ ④	80 / 1002228	80 / 1004286	85 / 2003018	85 / 2003032
			100 / 1001770	100 / 1006125	115 / 2003019	115 / 2003033
			130 / 1001511	200 / 1005906	155 / 2003020	155 / 2003034
			150 / 1000807		195 / 2003021	195 / 2003035
			180 / 1001627			
			200 / 1002749			
Solar fastener with fibre-cement seal	Corrugated fibre cement 	⑤ ⑥	80 / 1002130	130 / 1006058	85 / 2003013	85 / 2003028
			100 / 1003029	150 / 1005263	115 / 2003012	115 / 2003029
			130 / 1001759	200 / 1001420	155 / 2003016	155 / 2003030
			150 / 1002001		195 / 2003017	195 / 2003031
			180 / 1002533			

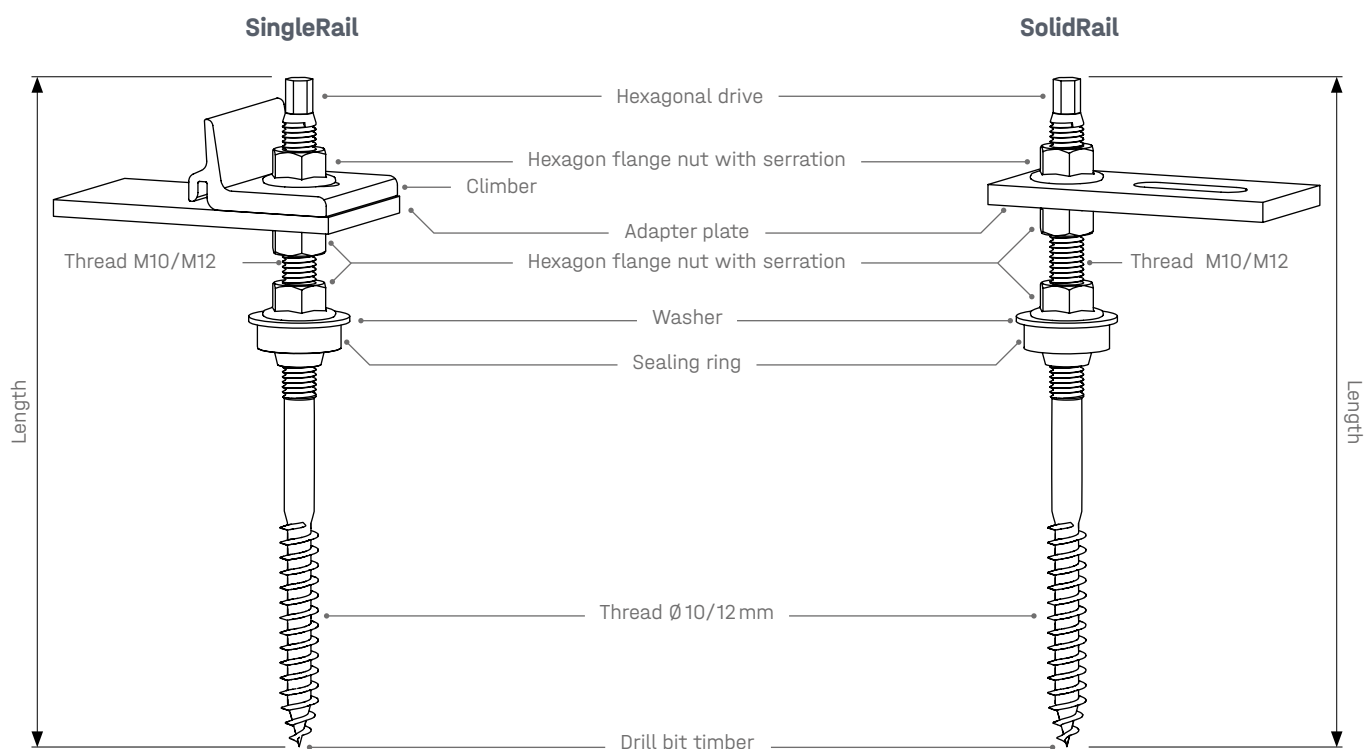
Hanger bolts



Solar fasteners



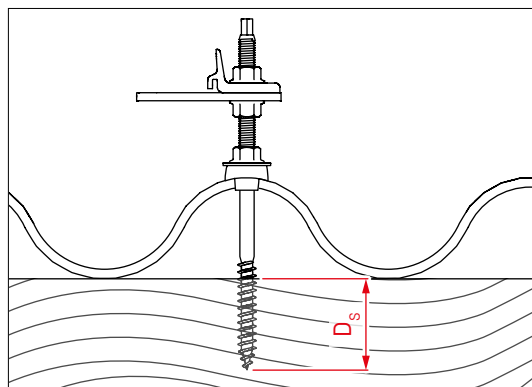
Hanger bolts



Roof covering, fastener types and pre-drilling diameters

Pre-drill level		Material	Pre-drilling diameters [mm]	
1	Substructure	Timber	M10	7.0
			M12	8.5
2	Roof covering	Corrugated fibre cement	M10	14.0
			M12	15.0

1 2 = Sequence of pre-drilling, see step 1b on page 16

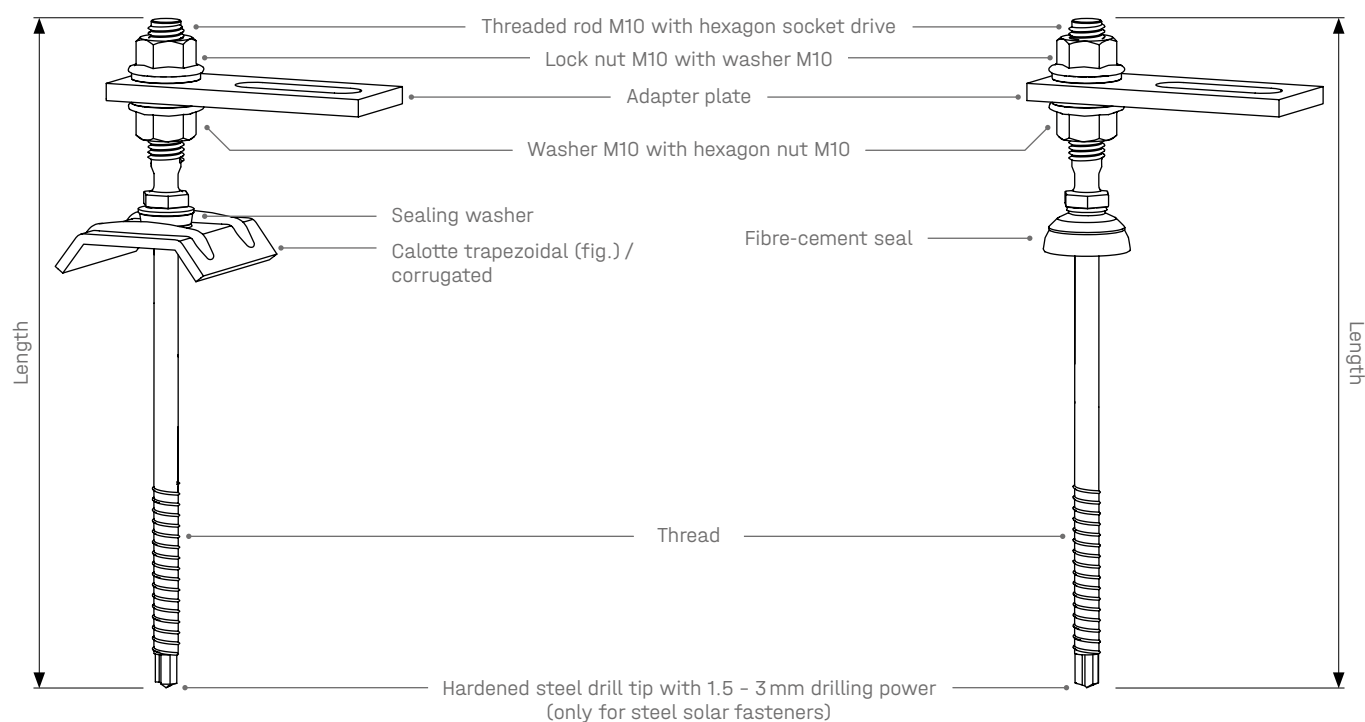


Observe minimum screw-in depth D_s
M10 = ≥ 40 mm / M12 = ≥ 48 mm, see also
"Calculation hanger bolt and solar fastener length" document.

Solar fastener

Trapezoidal sheet metal / sandwich panels / corrugated sheet metal

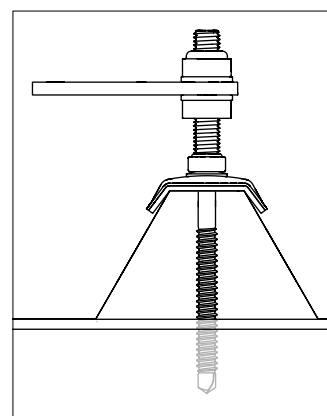
Corrugated fibre cement



The solar fasteners are available for different substructure materials (steel or timber). They differ in terms of **thread**, **sealing screw** and **drill tip**.

Roof coverings, fastener types and pre-drilling diameters

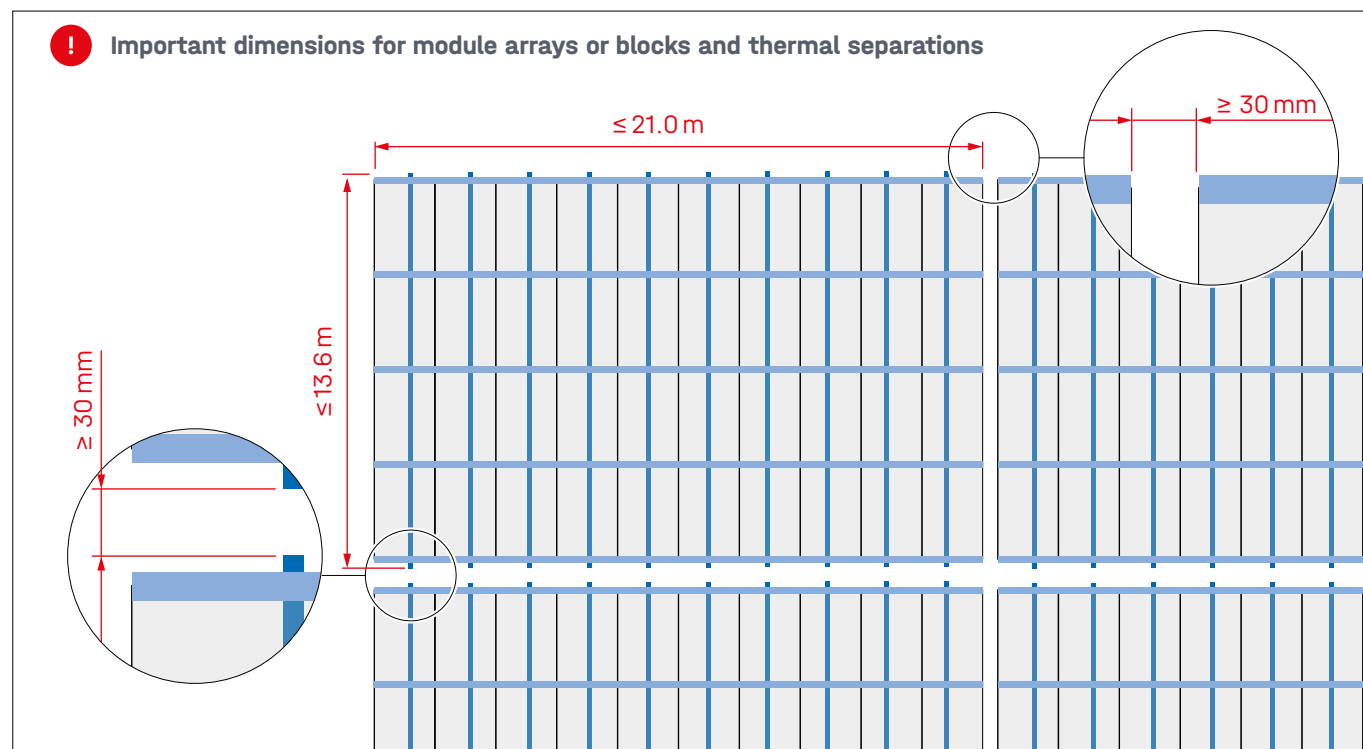
Pre-drilled level	Material	Ø Pre-drilling diameters [mm] Solar fastener Ø 8.0 mm					Substr.
		Substr. Steel *					Timber**
Roof covering	Corrugated fibre cement	11.0					
Roof covering	Trapezoidal sheet metal/ corrugated sheet metal/ sandwich panels	Roof covering and Substructure identical					5.5
Substructure (Substr.)	Steel/Timber	Material thickness [mm]					5.5
		1.5 - 3.0 none	3.0 - 5.0 6.8	5.0 - 7.5 7.0	7.5 - 10.0 7.2	> 10.0 7.4	



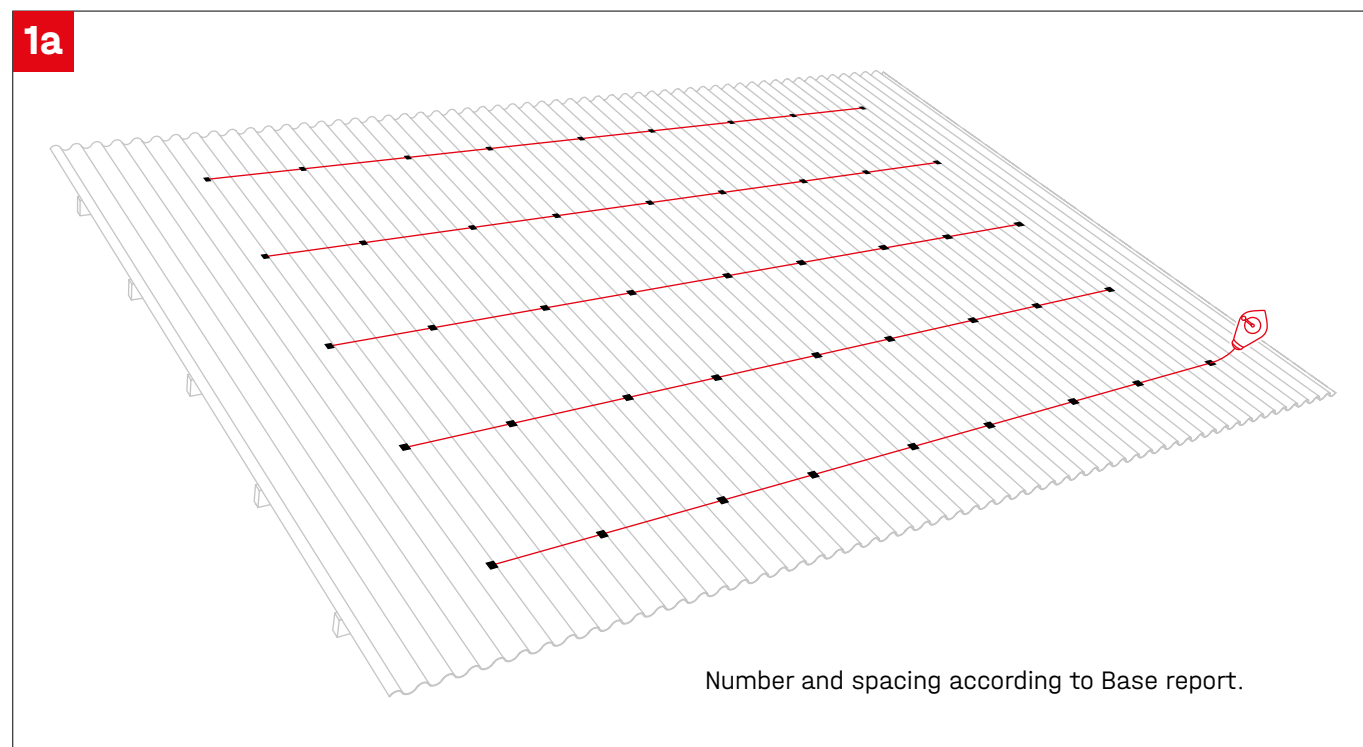
* Minimum screw-in depth steel: at least three complete threads through the profile - the drill tip must penetrate the steel beam, see also "Calculation hanger bolt and solar fastener length" document.

** Minimum screw-in depth timber: ≥ 32 mm,
see also "Calculation hanger bolt and solar fastener length" document.

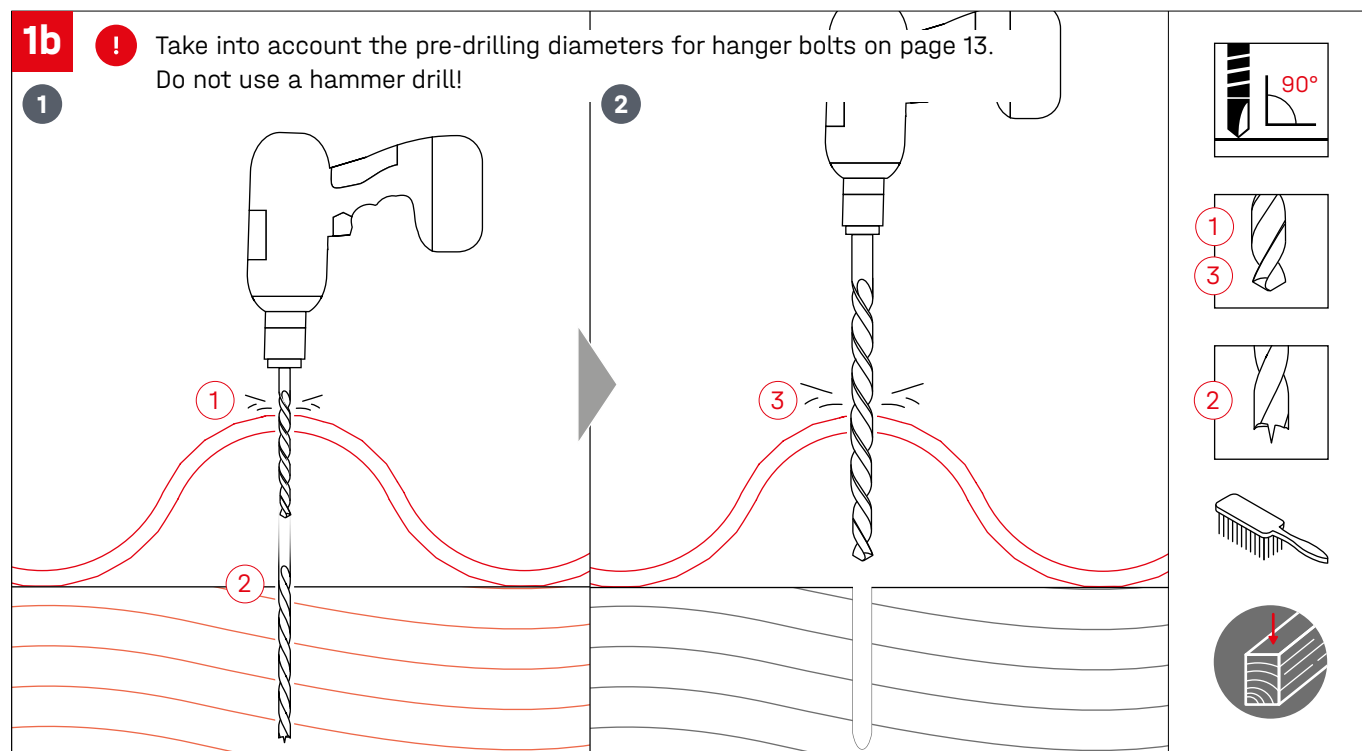
Module block



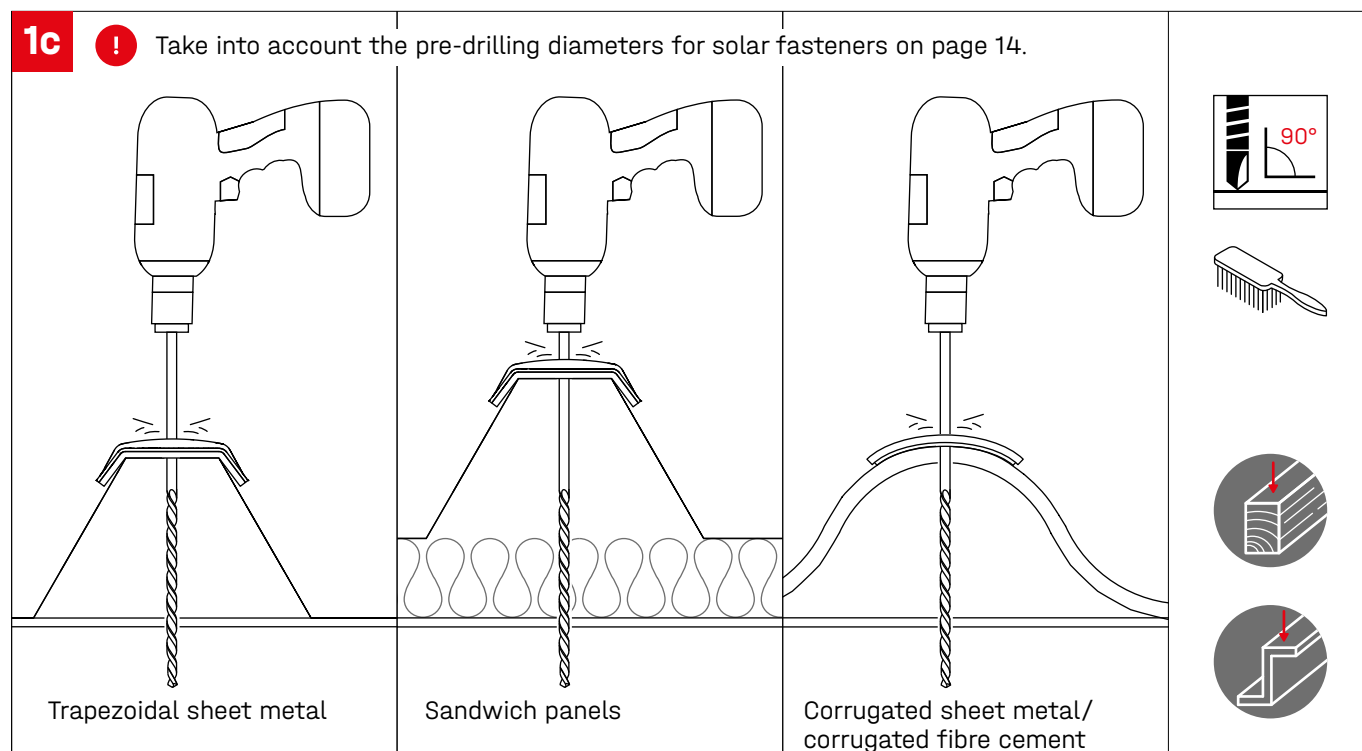
Pre-drilling



Hanger bolt



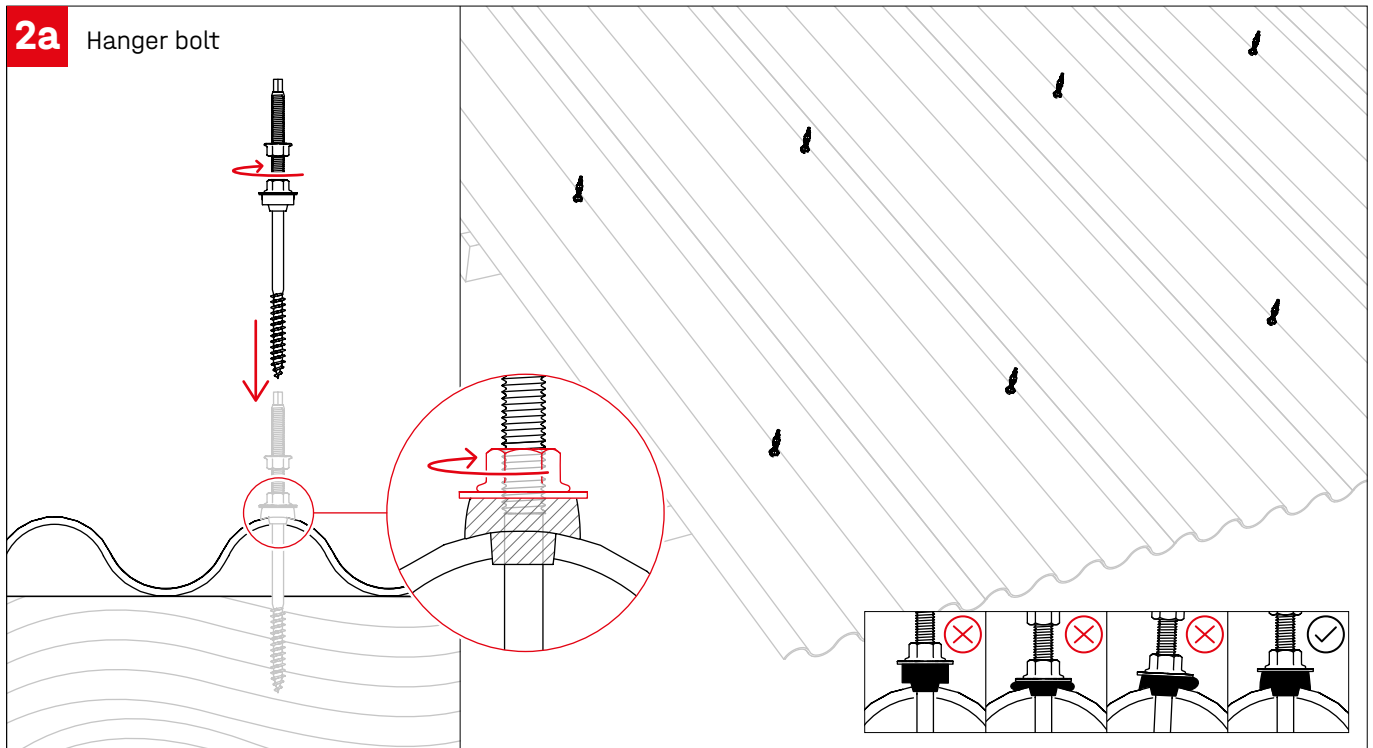
Solar fastener



Fasten screws

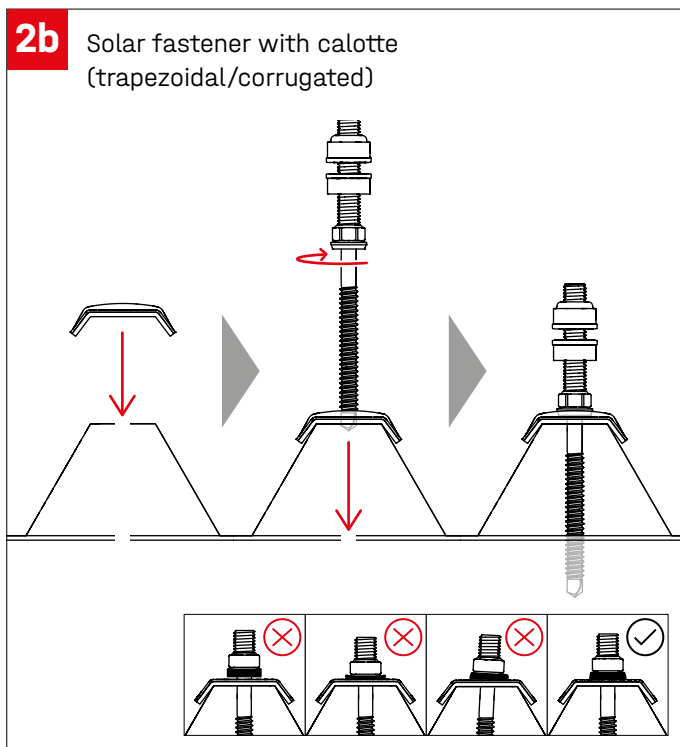
2a

Hangar bolt

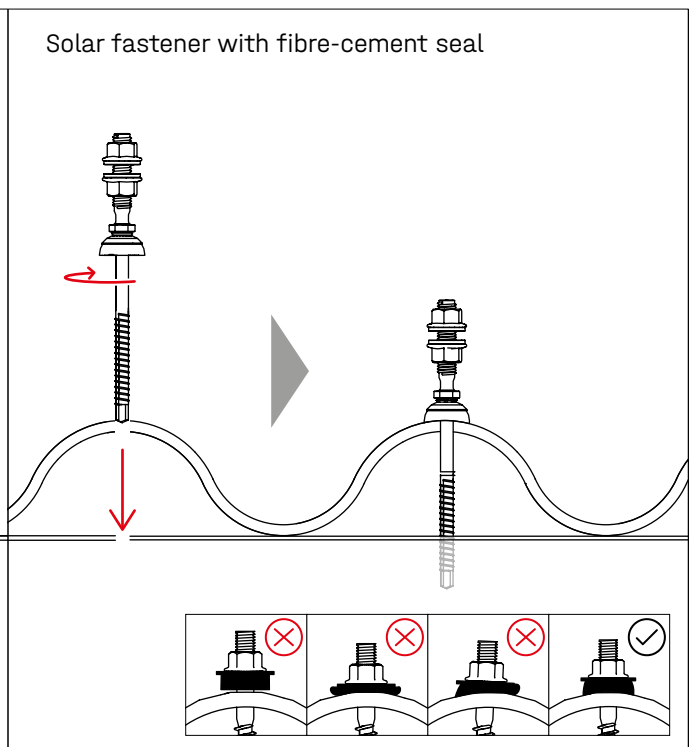


2b

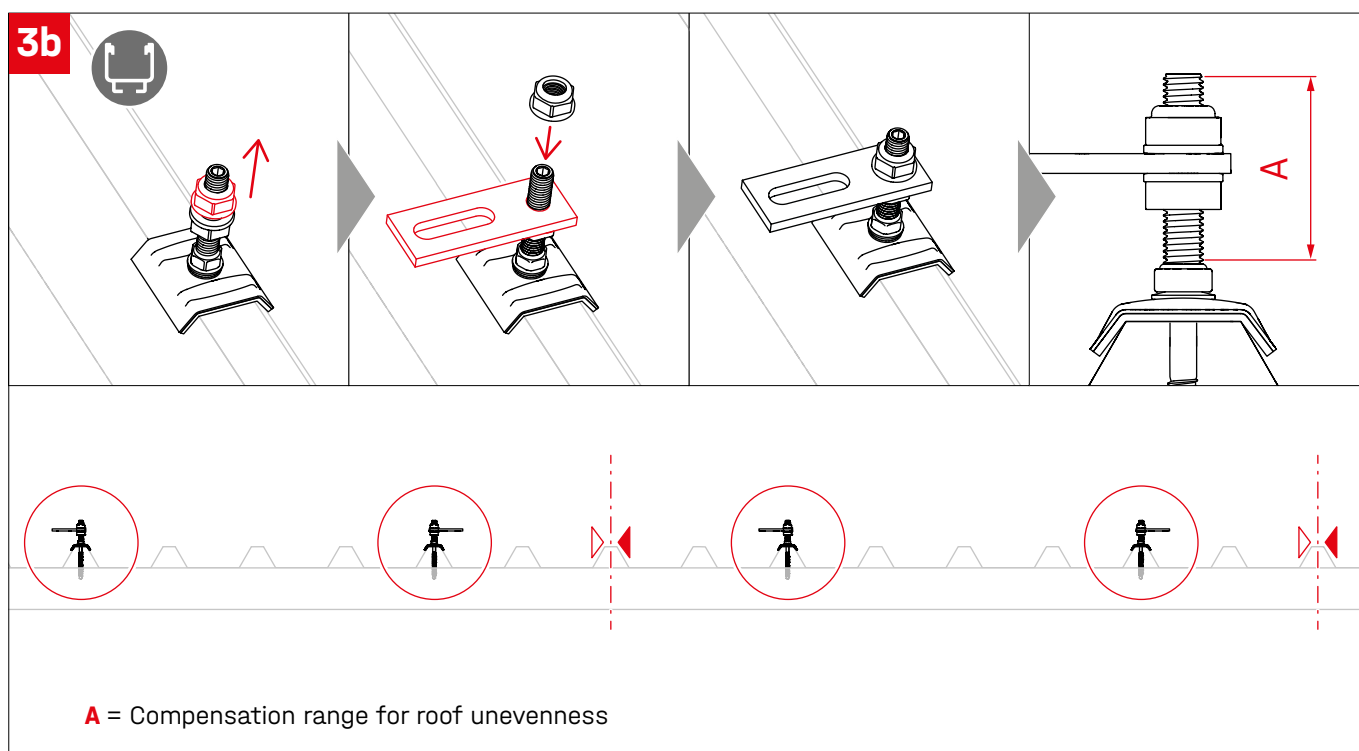
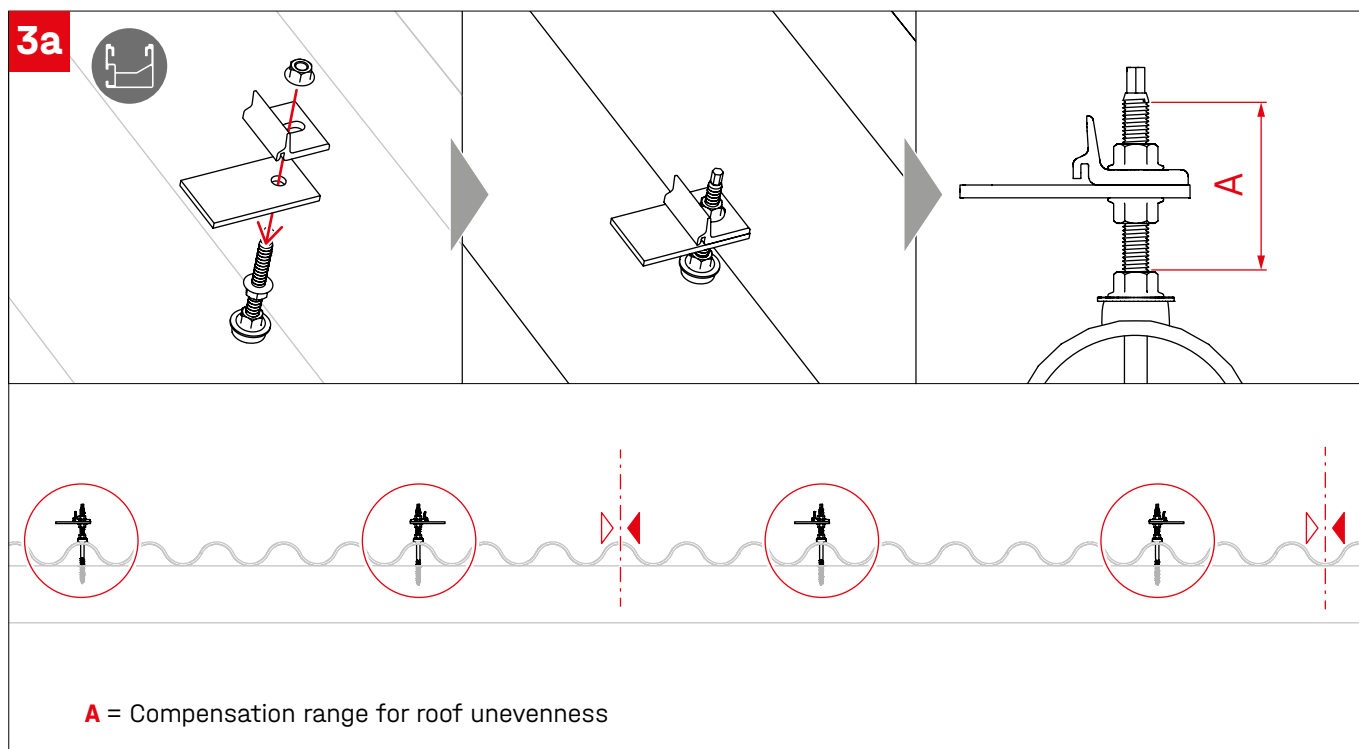
Solar fastener with calotte
(trapezoidal/corrugated)



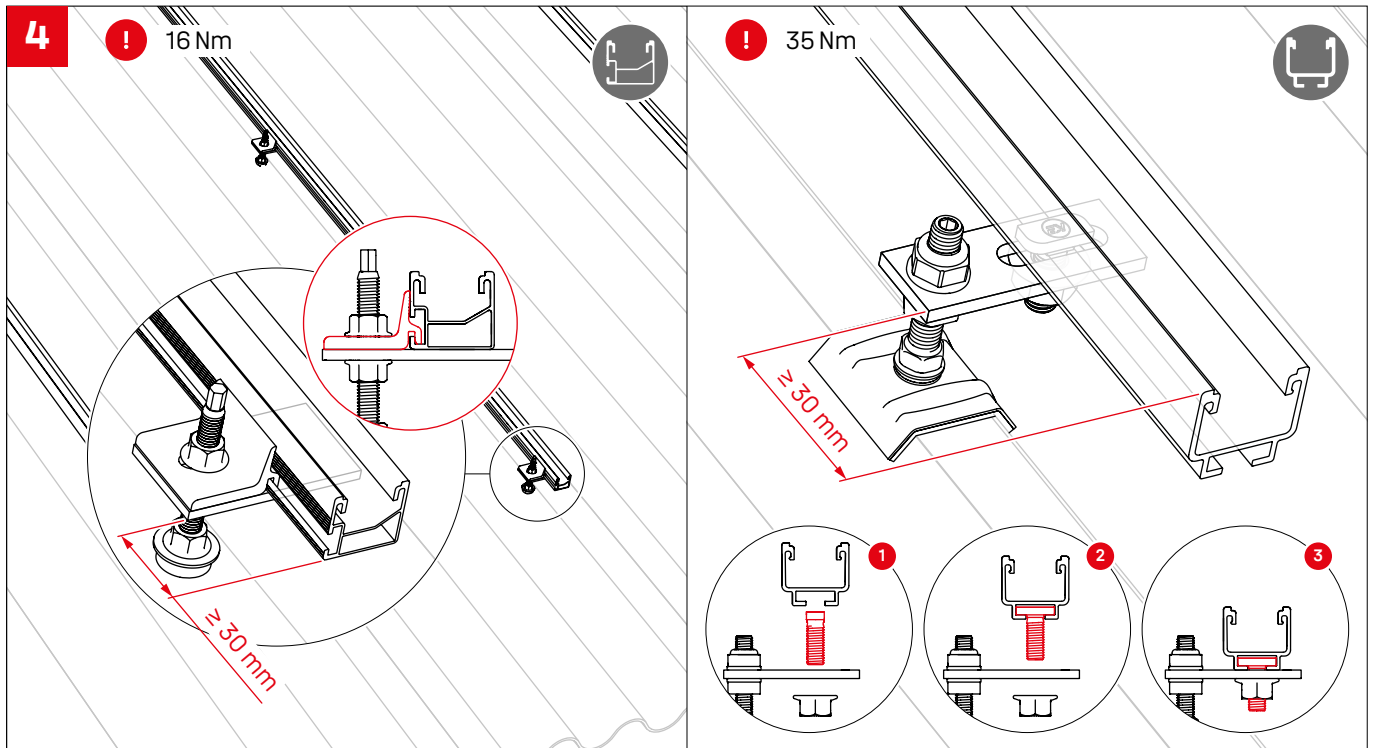
Solar fastener with fibre-cement seal



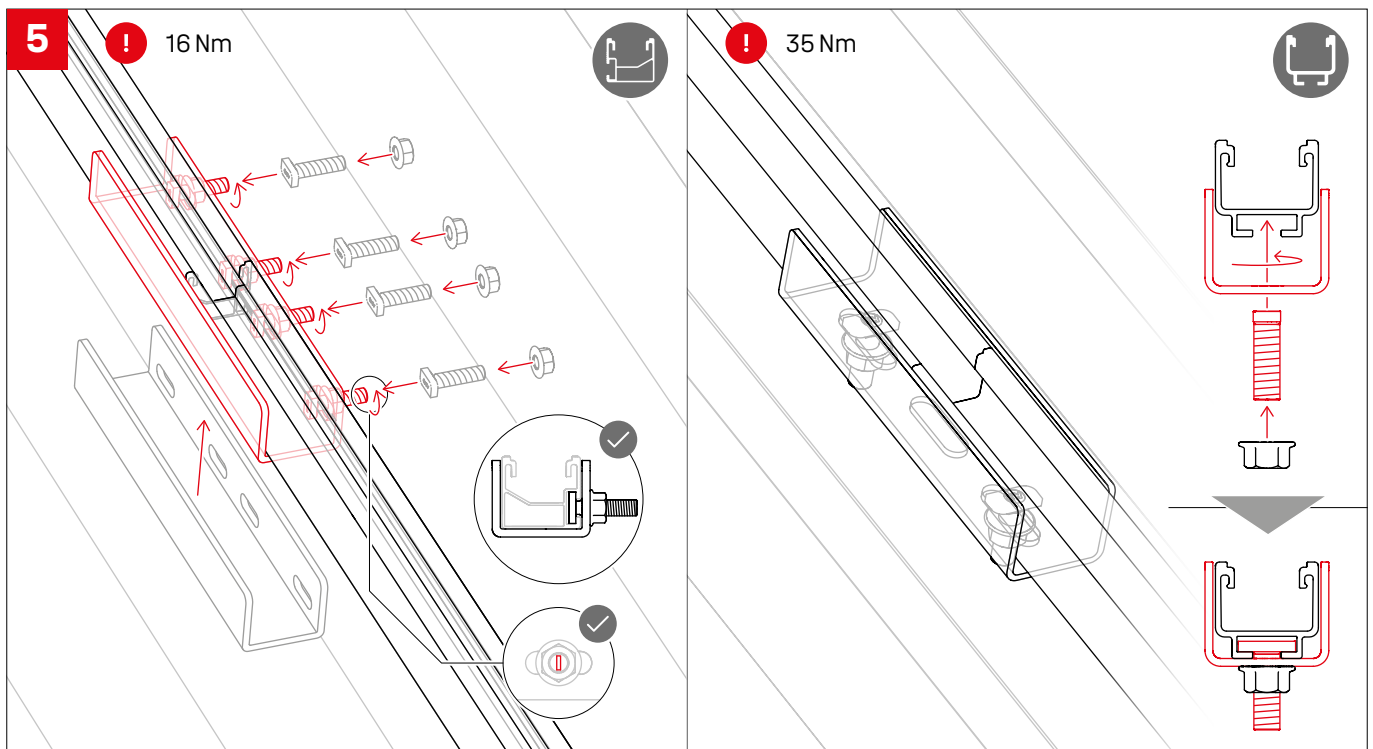
Attach adapter plate



Mount SingleRail/SolidRail to fasteners

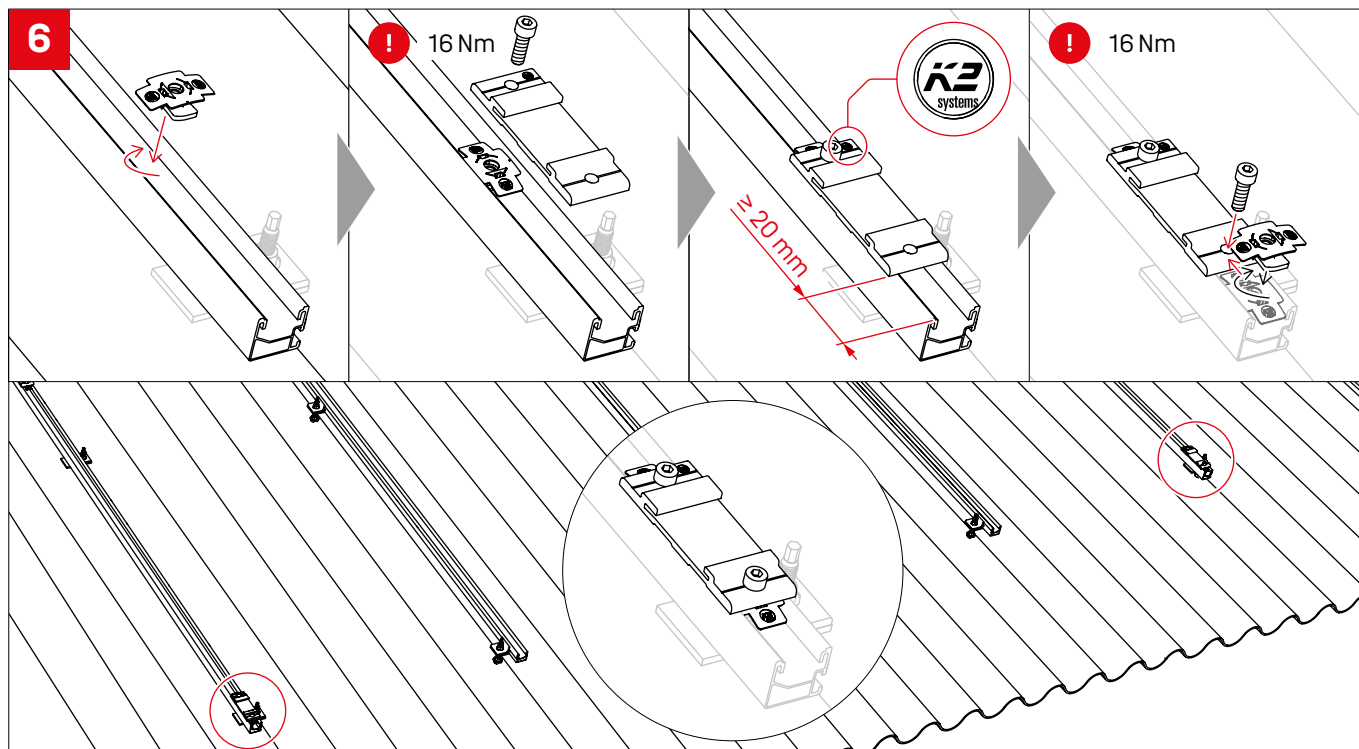


Connect SingleRail/SolidRail

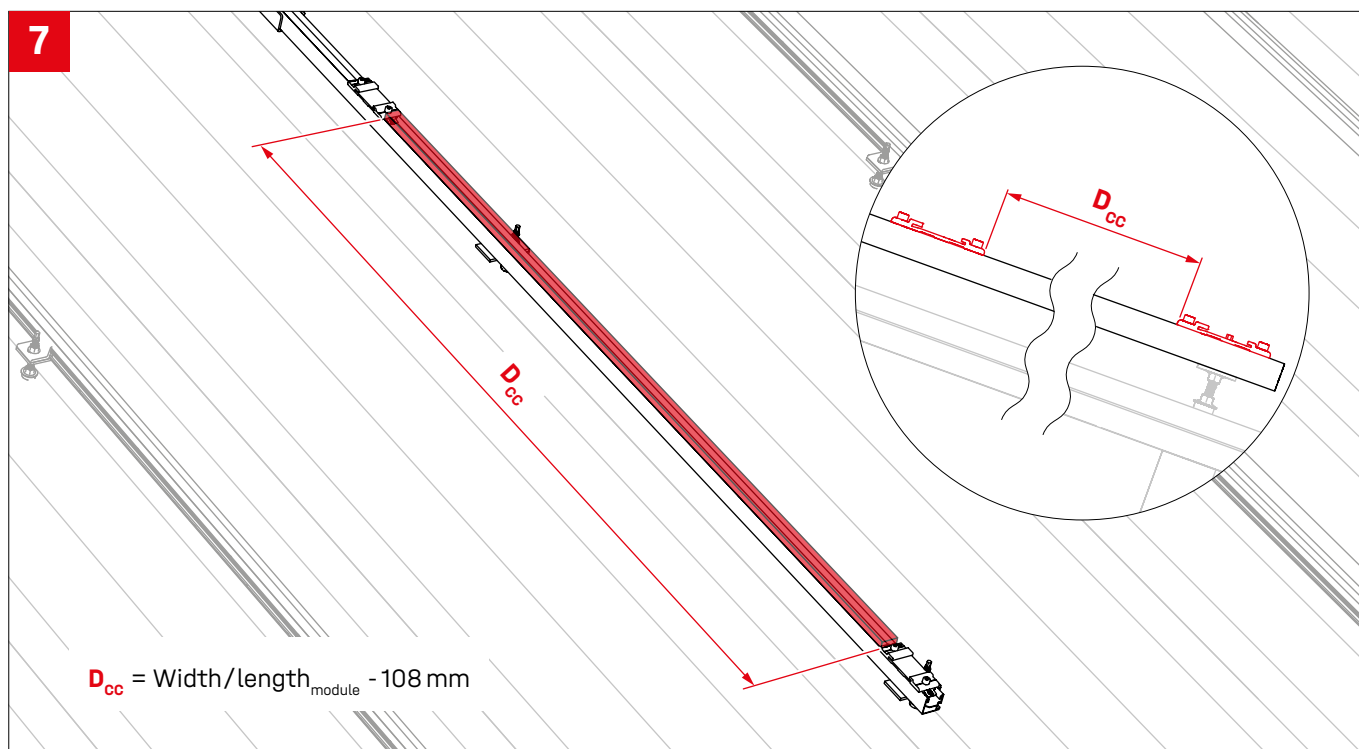


Assembly InsertionRail

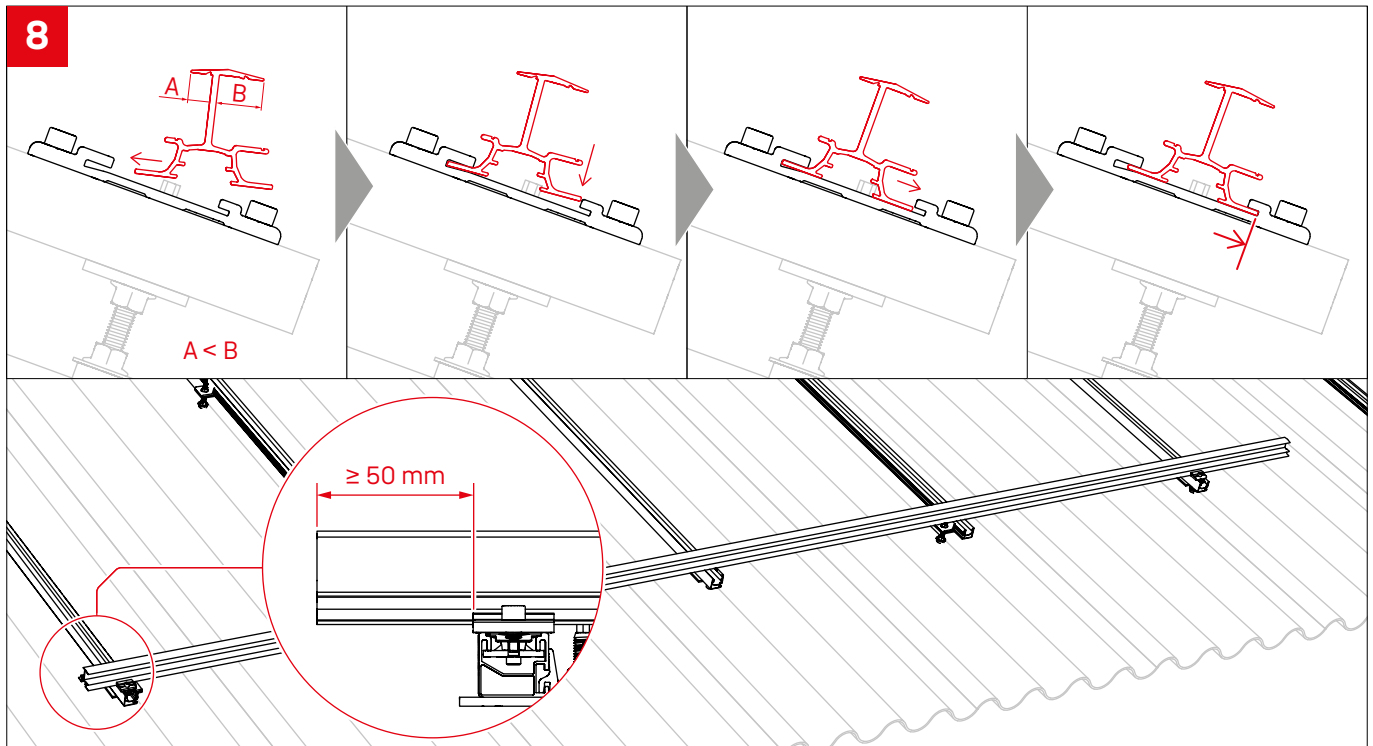
CrossConnector part 1 - mount outer CrossConnectors on rails



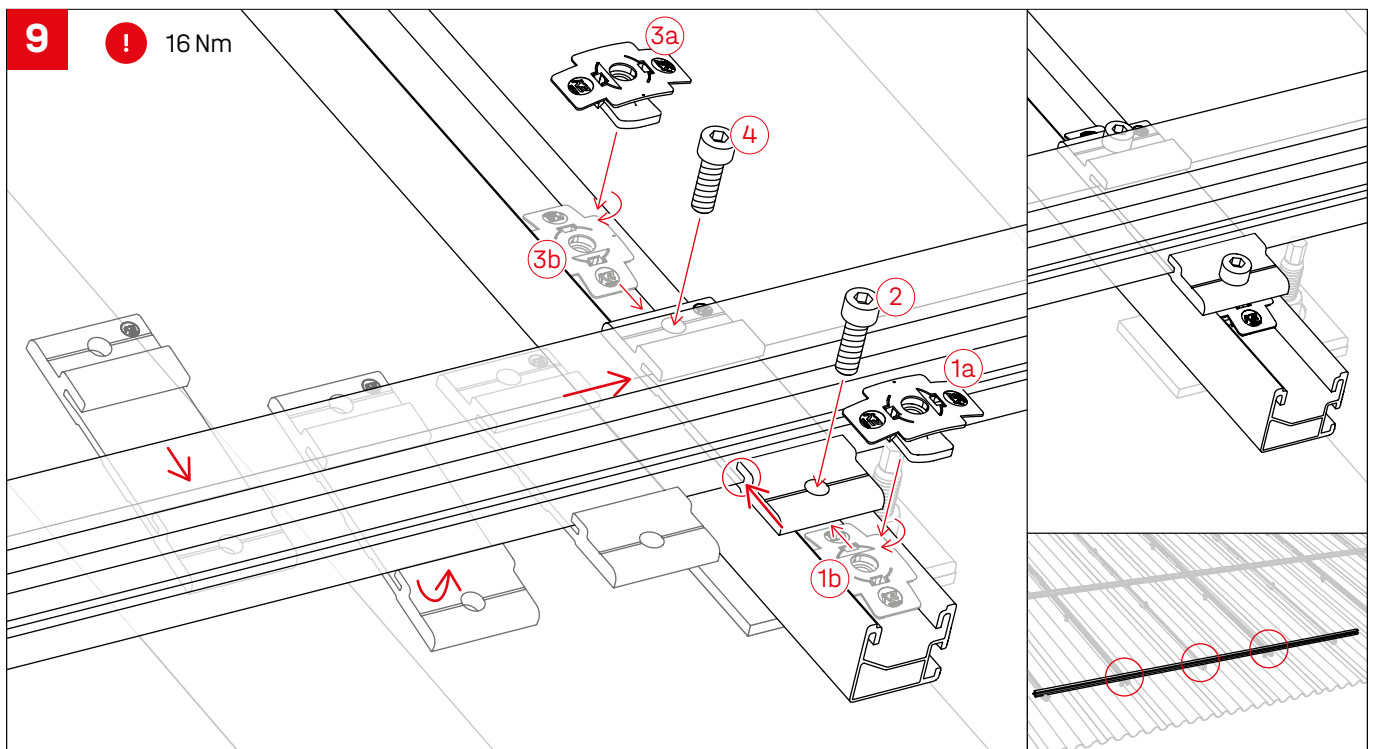
Vertical distance CrossConnectors



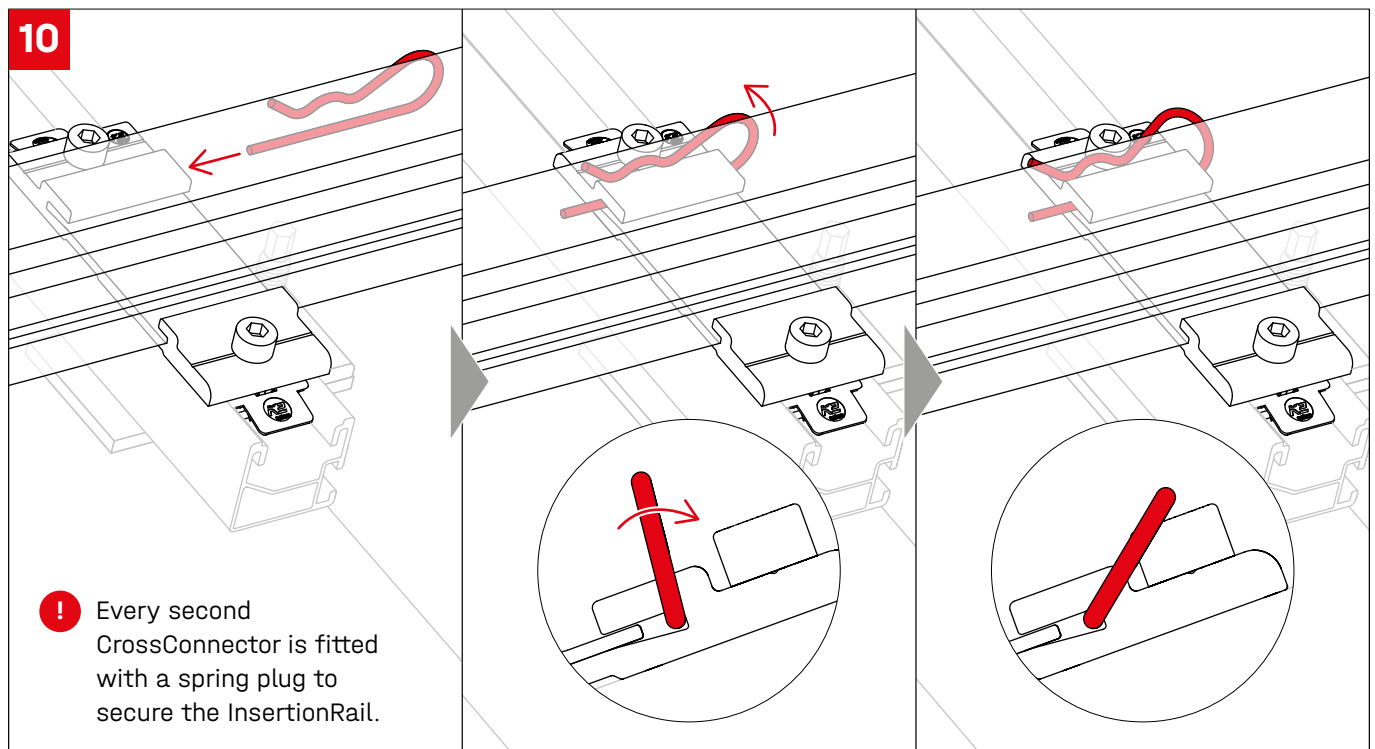
Insert InsertionRail



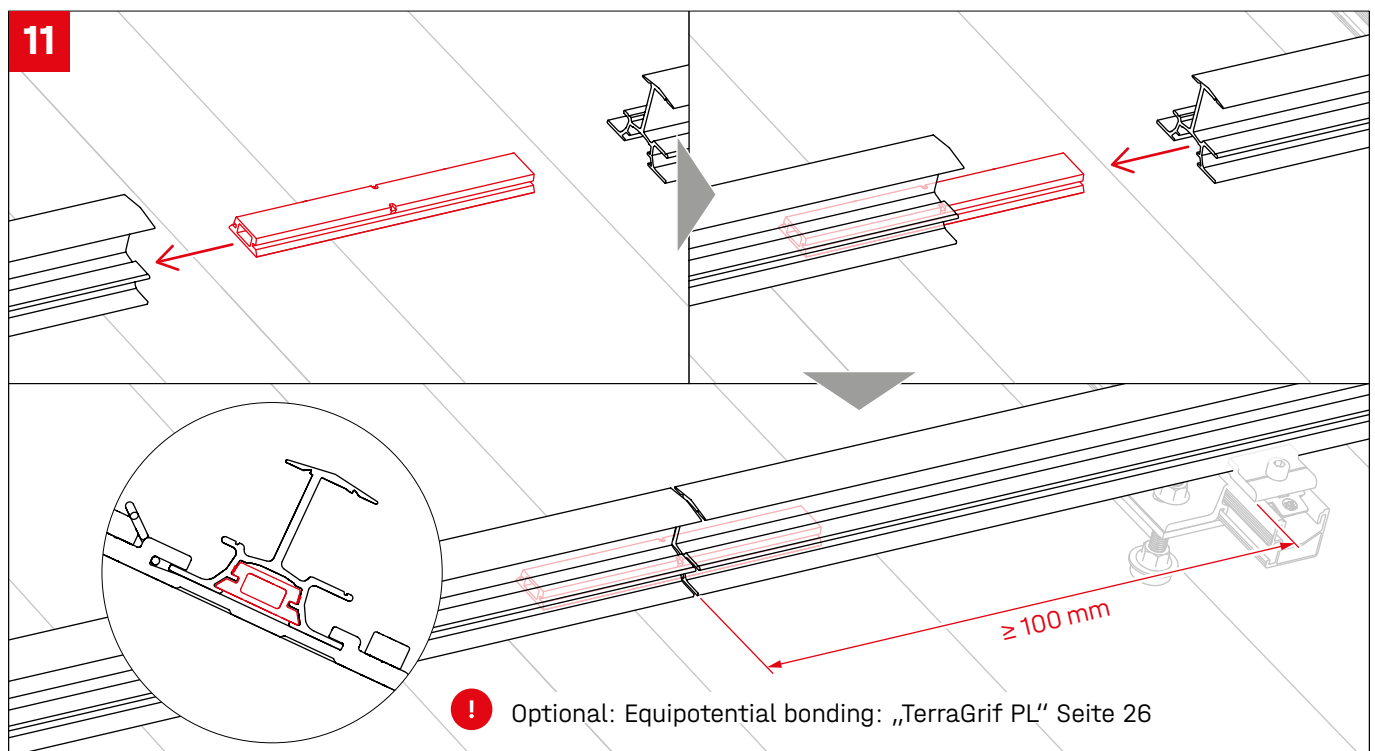
CrossConnector part 2 - mount inner CrossConnectors on rails



Fixing InsertionRail with spring plug



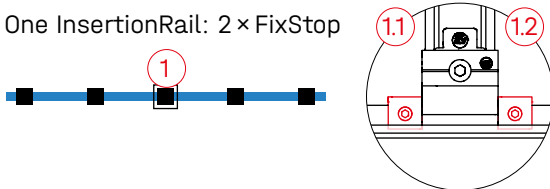
Rail connection with RailConnector



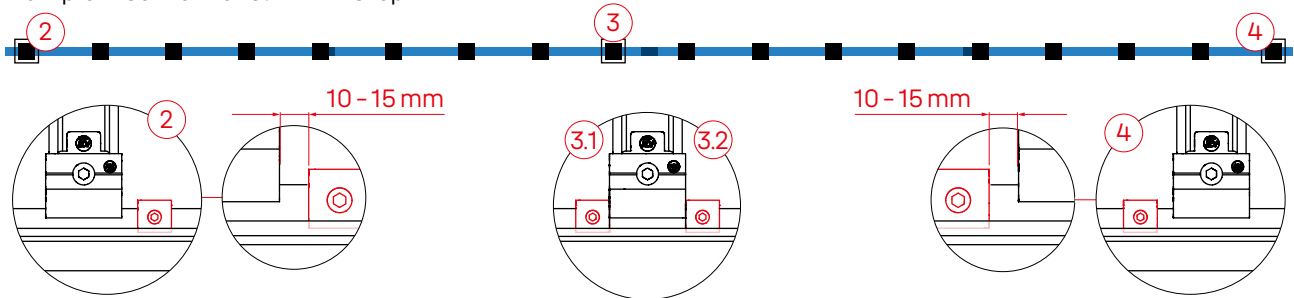
FixStop - positioning

12

One InsertionRail: 2 × FixStop



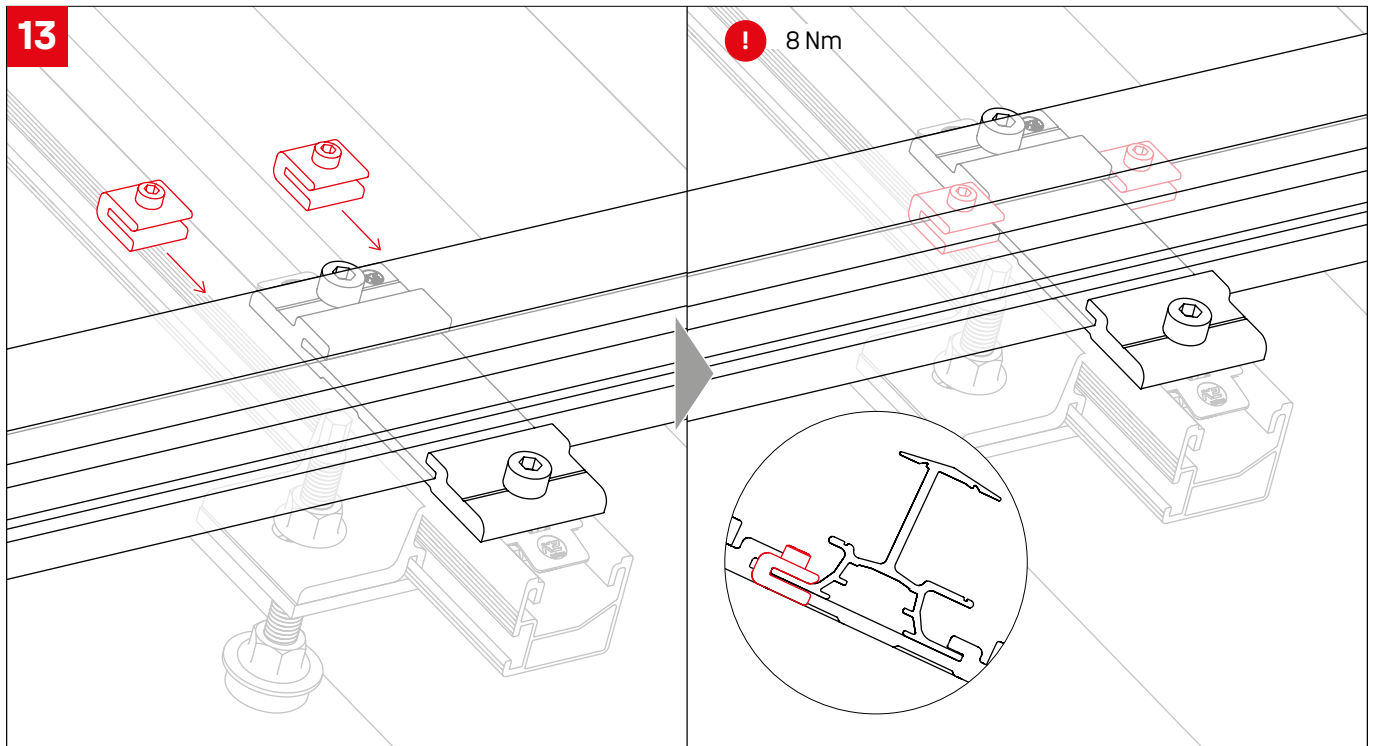
Multiple InsertionRails: 4 × FixStop



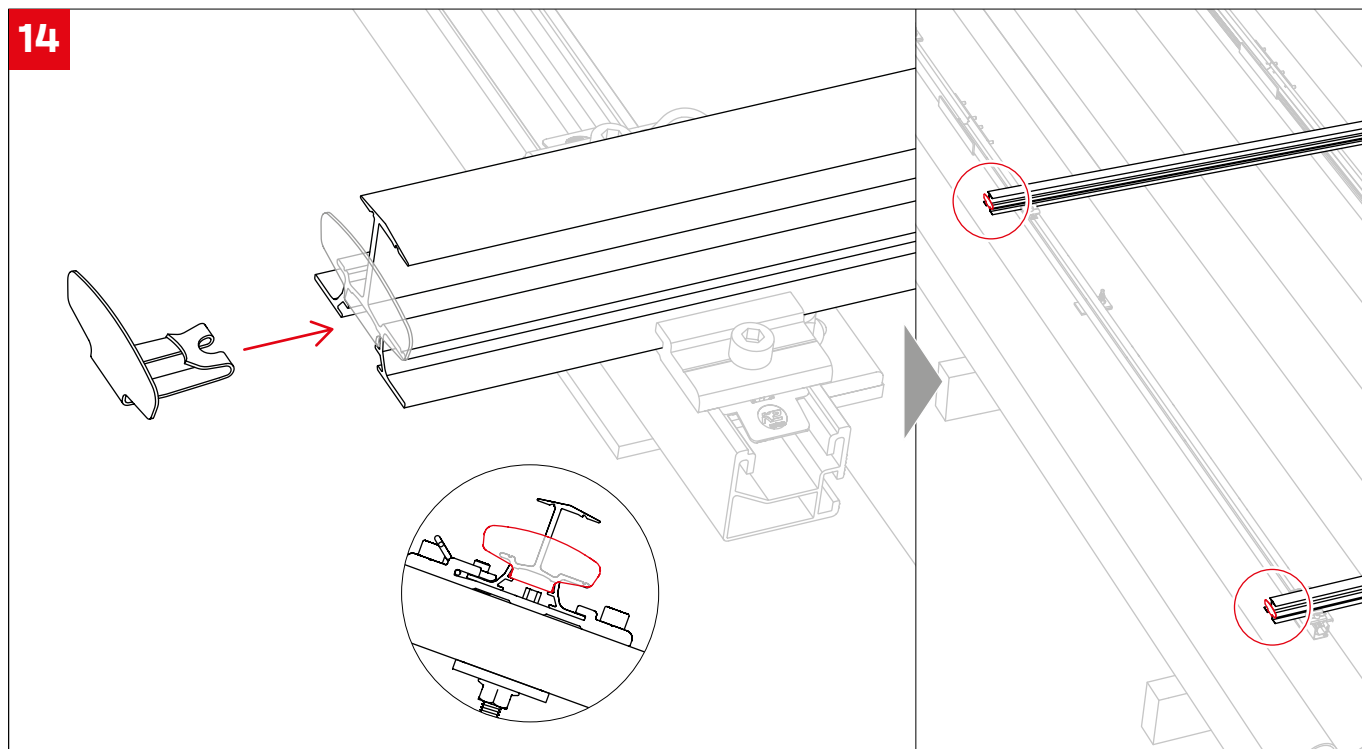
 CrossConnector + FixStop
  CrossConnector
  RailConnector
  InsertionRail

FixStop - assembly

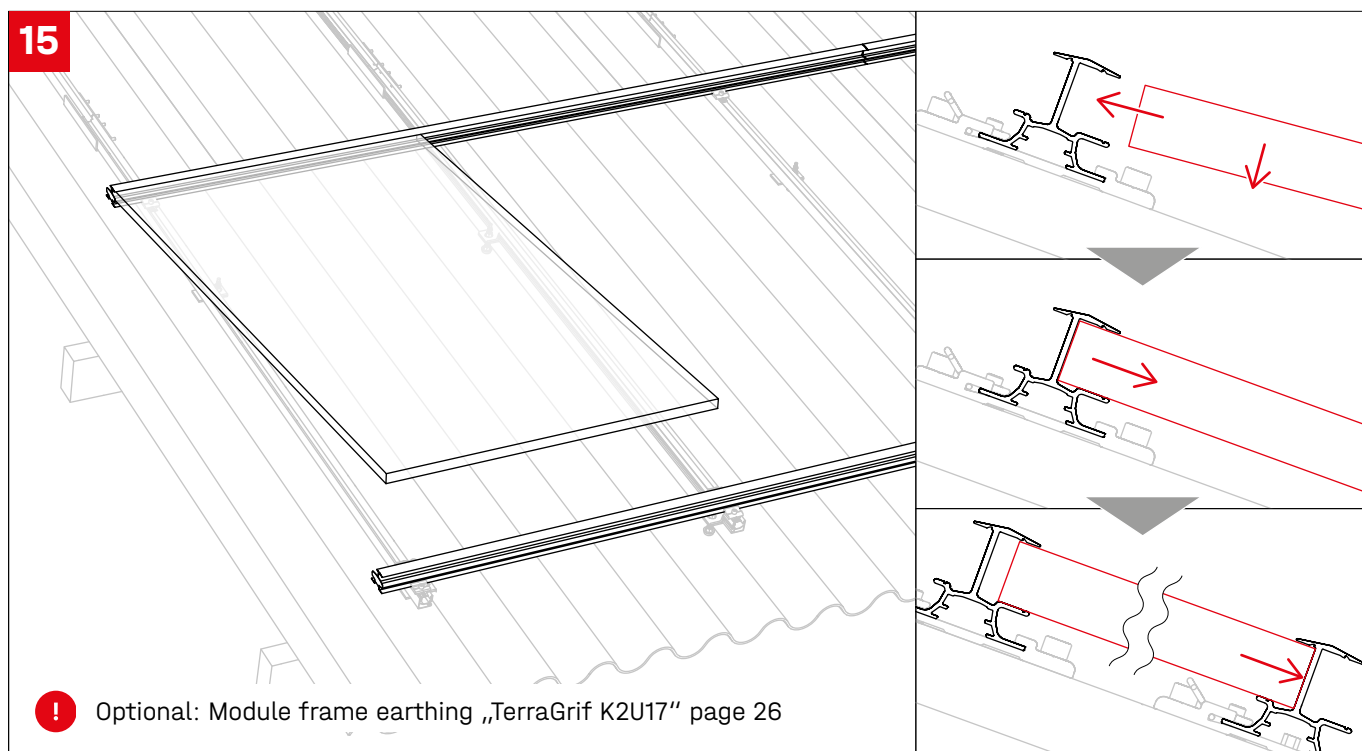
13



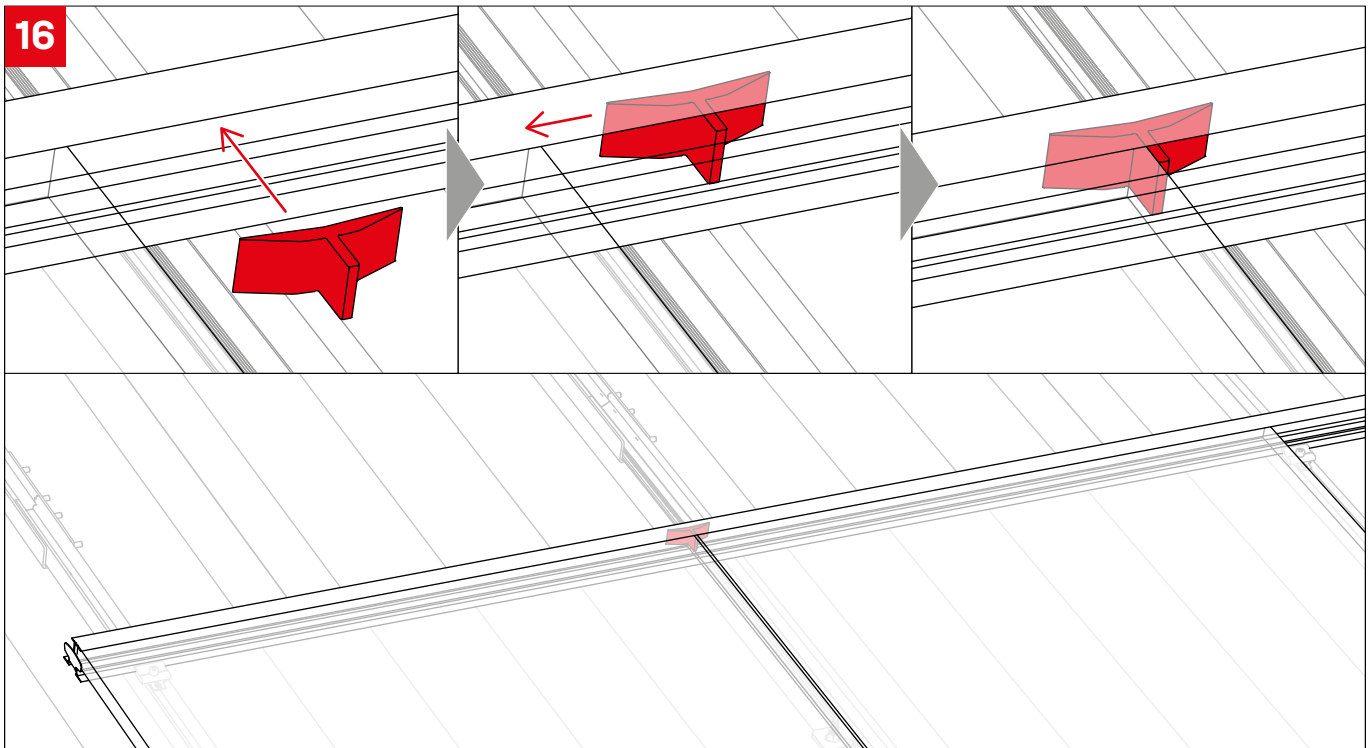
Side guarding with EndStop part 1



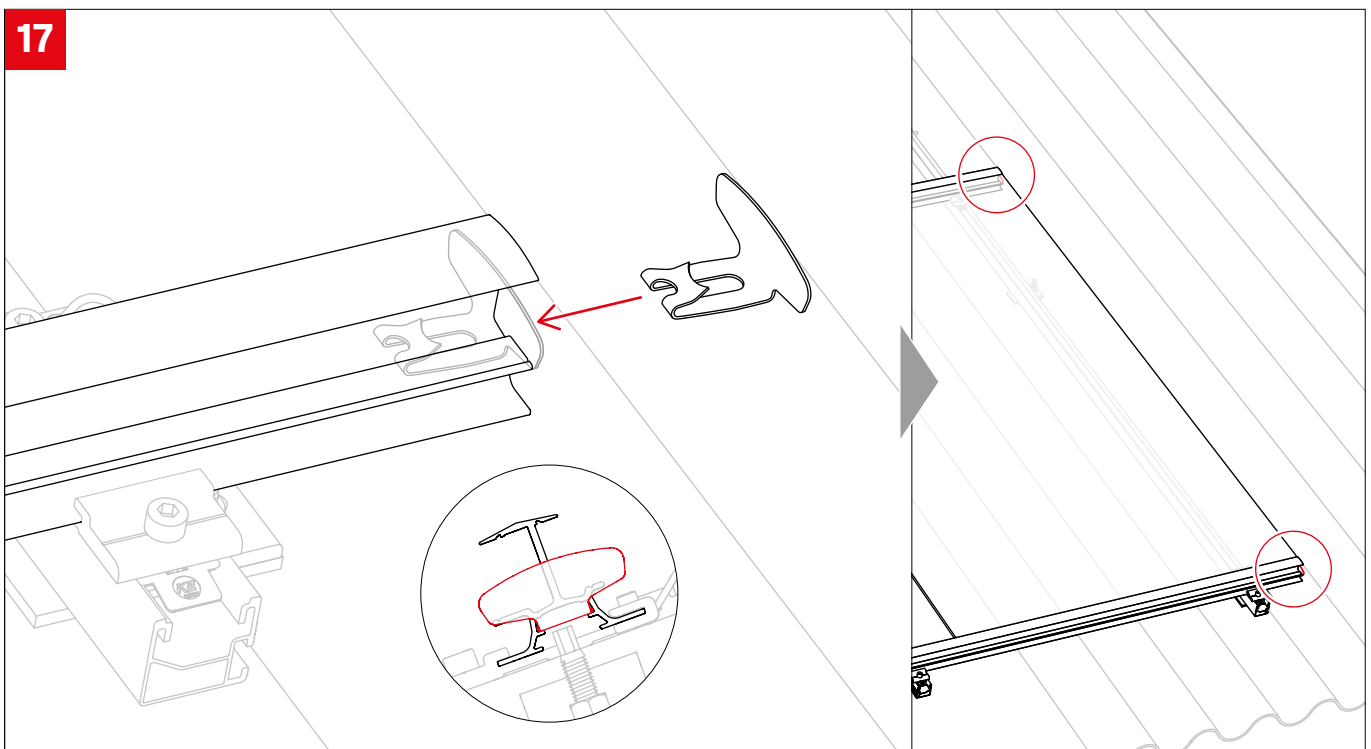
Insert modules



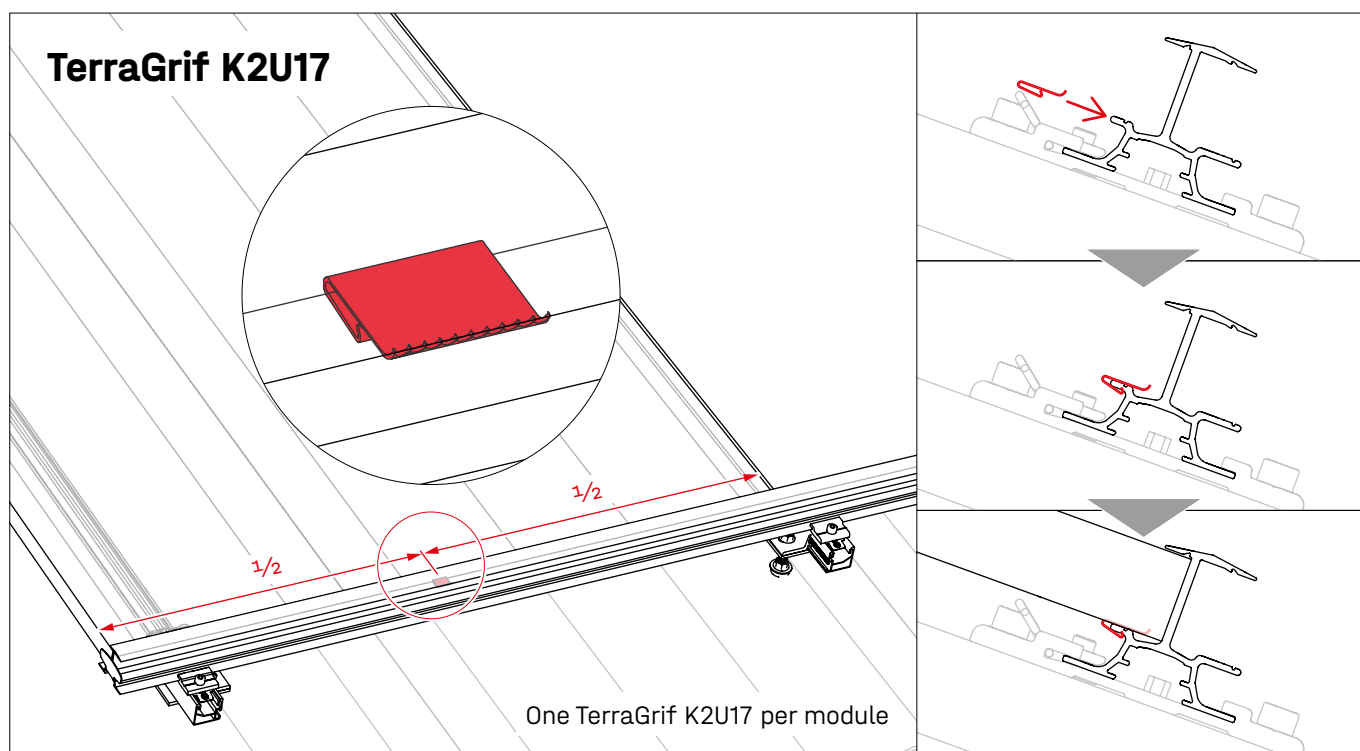
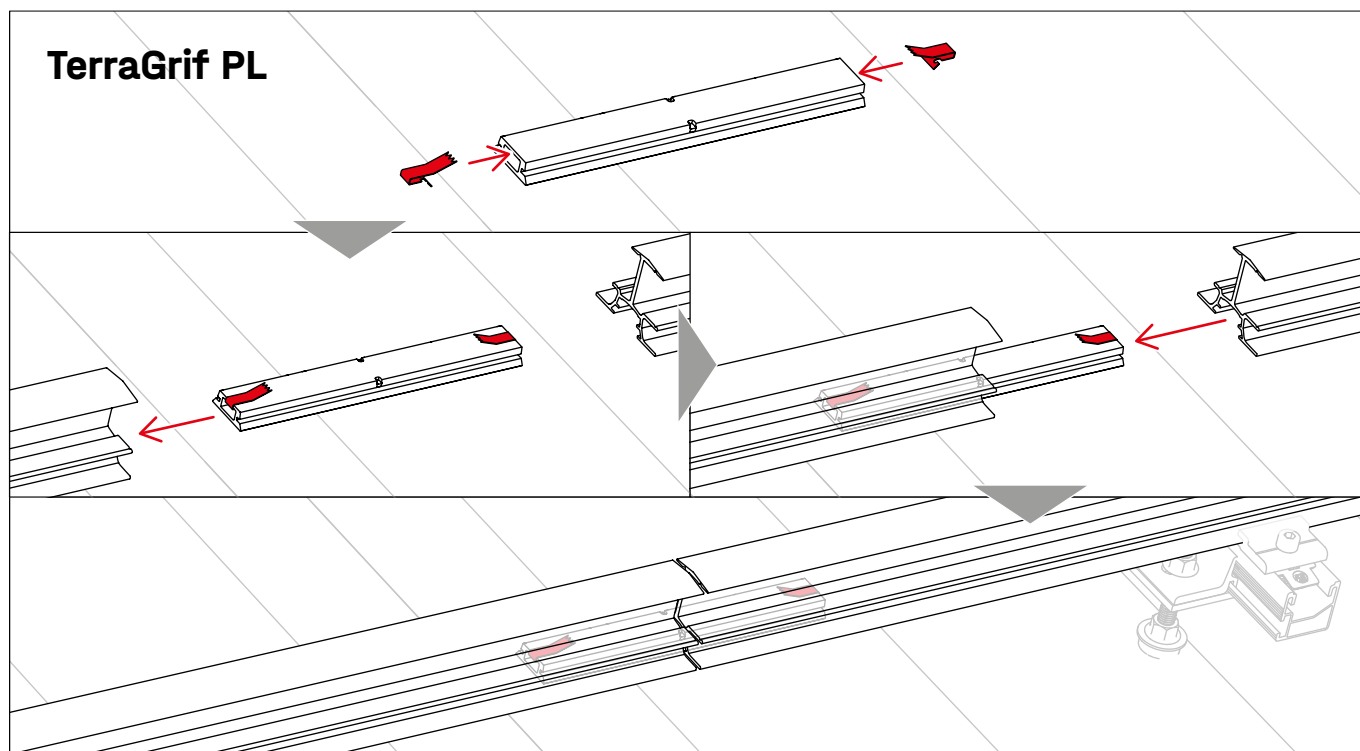
Placement ModuleSafety



Side guarding with EndStop part 2



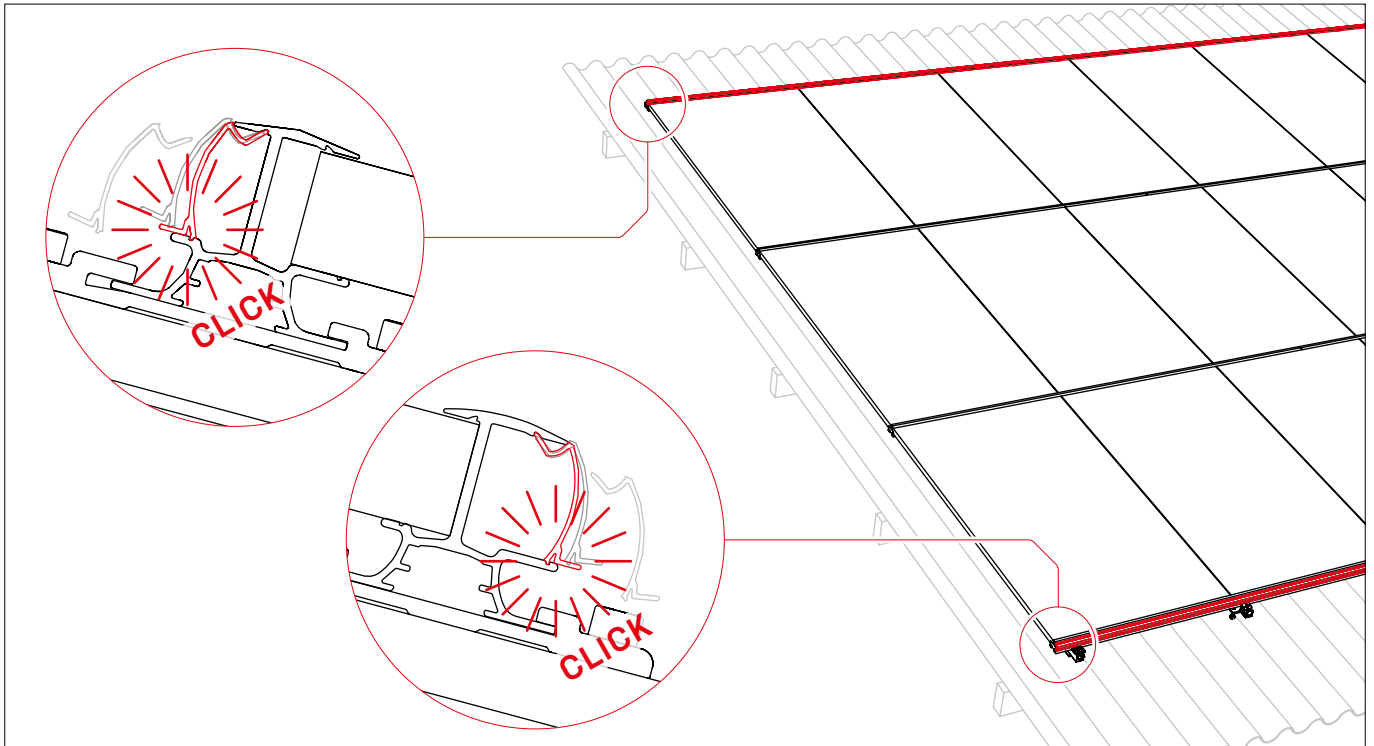
Equipotential bonding / module frame earthing



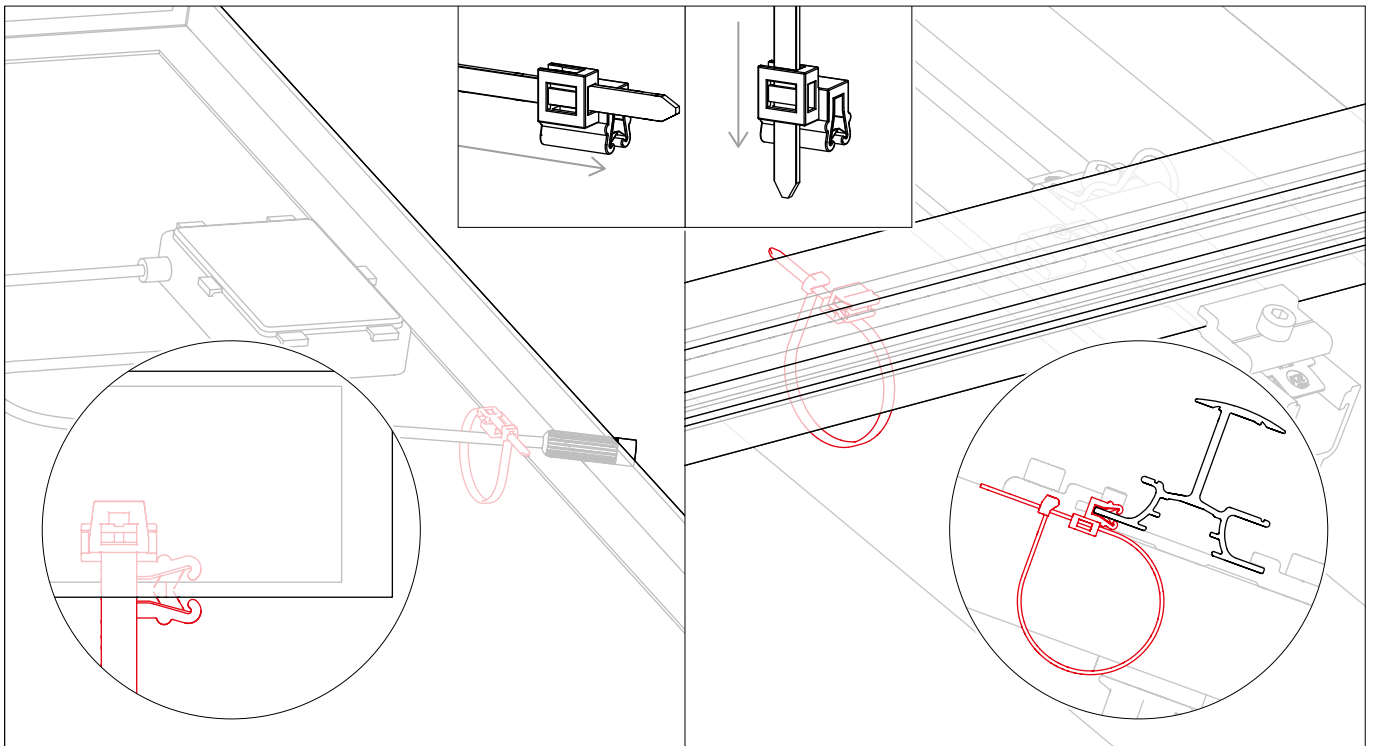
Optional



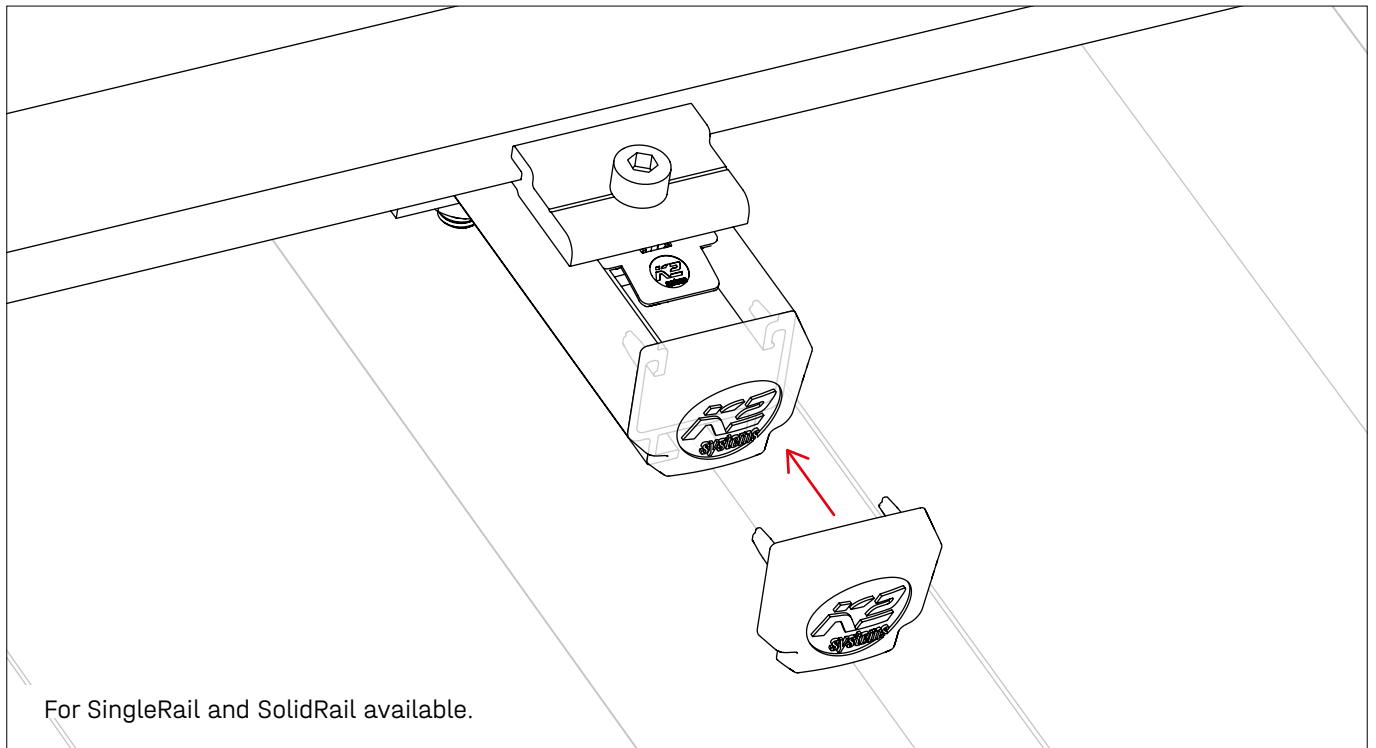
InsertionRail Cover



Cable management with Cable Manager



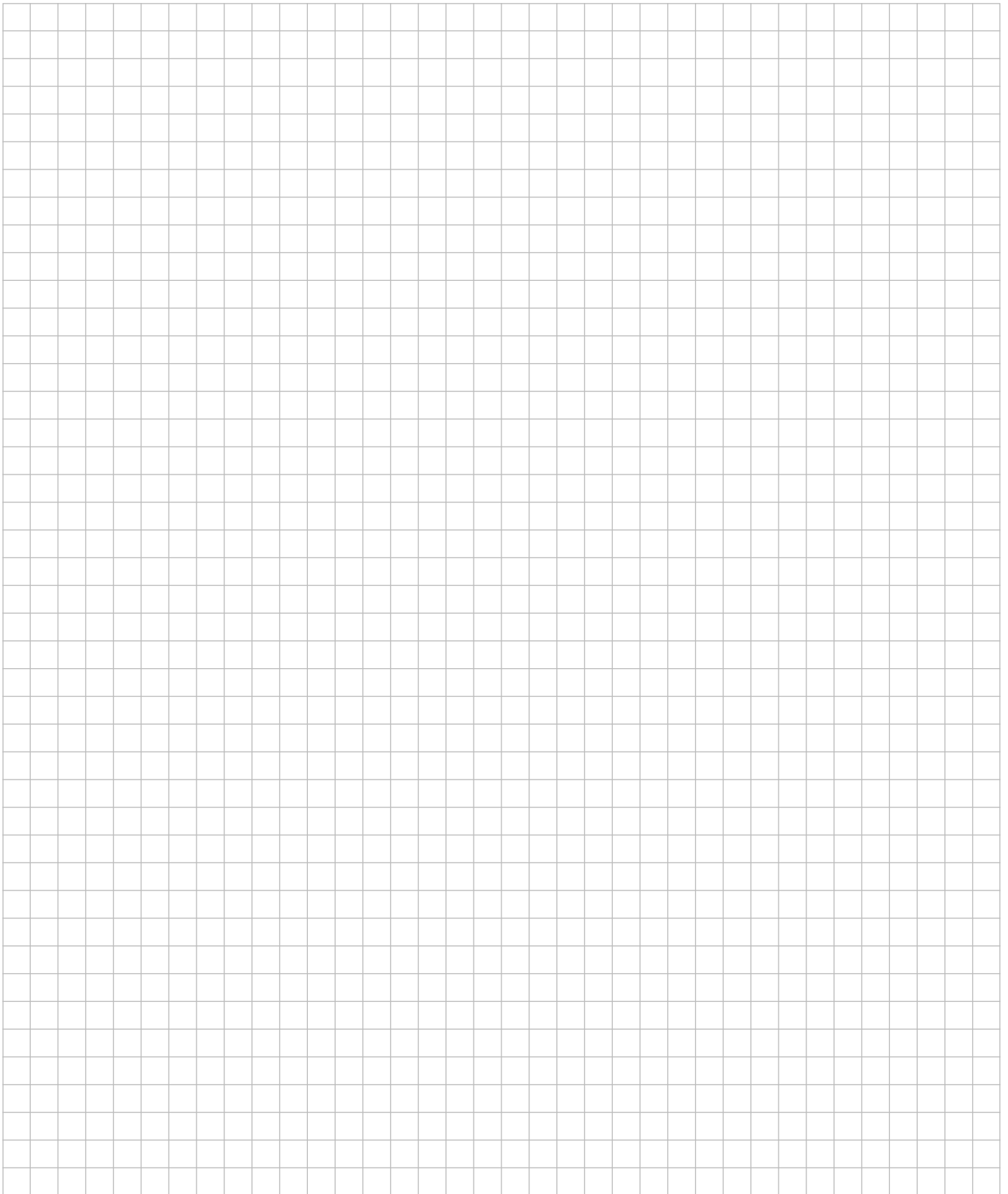
EndCap



Notes



Notes





Connecting Strength

Thank you for choosing a K2 mounting system.

Mounting systems from K2 Systems are quick and easy to install. We hope these instructions have helped. Please contact us with any questions or suggestions for improvement. Our contact data:

- k2-systems.com/en/contact
- **Service Hotline: +49 (0)7159 42059-0**

Our General Terms of Business apply. Please refer:
k2-systems.com

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InsertionRail hanger bolts solar fasteners Assembly DE V1 | 1225 · Subject to change without notice
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