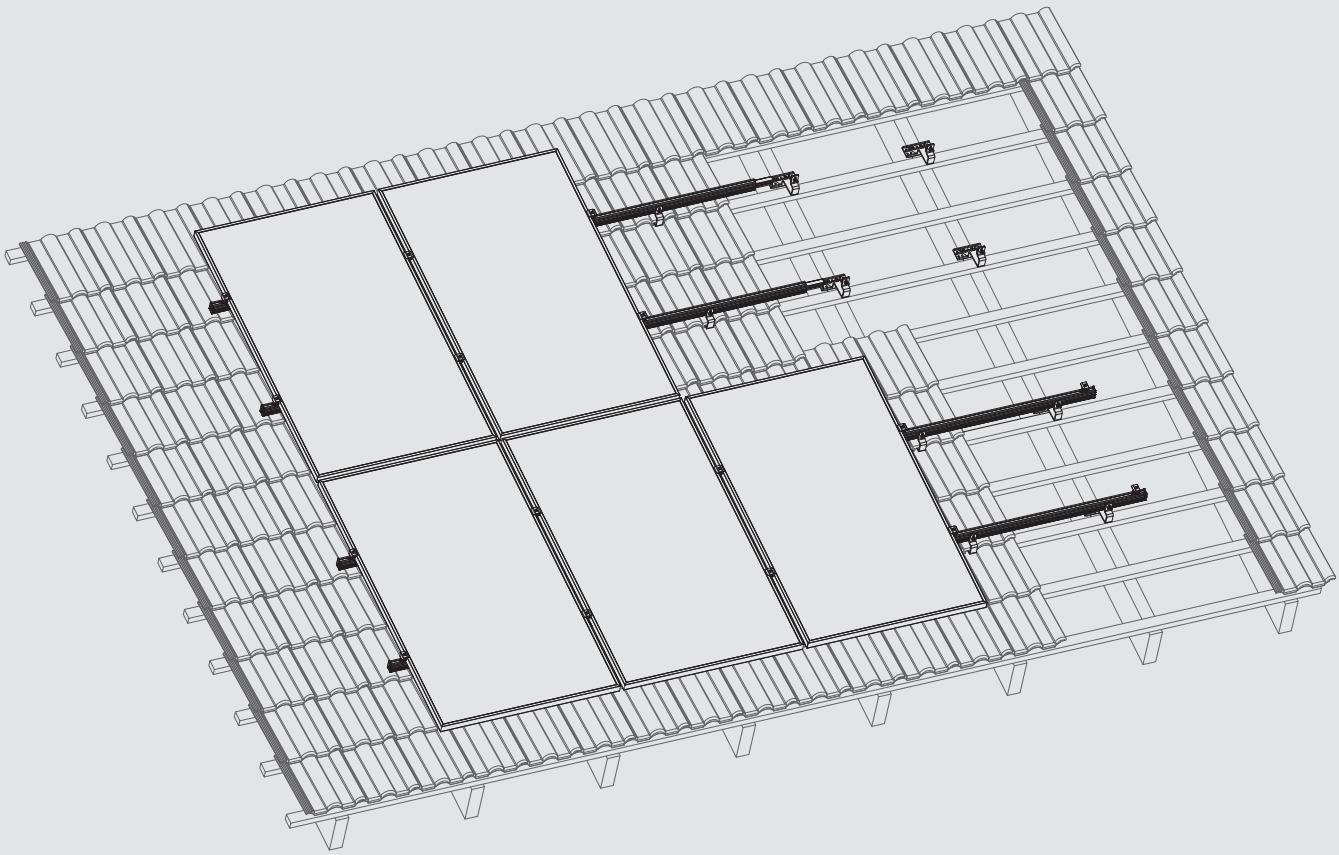
Renusol
Europe GmbH

VS+

EN | Installation instructions



DE | Read these installation instructions carefully before starting the installation!
Only competent, qualified persons are allowed to carry out the installation!

EN | Usage

Mounting system for the installation of framed PV modules with a frame thickness between 30 and 50 mm on pitched roofs with the following characteristics:

- Roof pitch 5° - 60° (solar fasteners) or 20°-60° (roof hooks).
- For roof pitches below 20° the permissible roof pitch of the used tile type shall apply.
- Various tile roofs (pan tile, flat tile, interlocking tile, shingle tile, etc.) on wood substructure.
- PV assembly in Portrait and Landscape is possible.

A proof of stability of the roof considering the additional loads from the photovoltaic system must be on hand before the assembly.

Installation guideline
To compensate the linear expansion of modules and mounting system, an interruption should be planned every 12m.

Please observe the specifications issued by the manufacturers of the modules, the manufacturers of the roofing, as well as the local regulations for woodwork. Do not use the installed roof fixations as stepping aid.

For installation, follow the requirements referring to lightning and overvoltage protection for photovoltaic systems, as well as the requirements on fire protection.

If the installation takes place in a distance of 10 km to the coasts, we advise against the use of galvanised components.

For further information, please contact your sales representative or the Technical Department of Renusol.

Installation instructions

Please, carefully read the last version of the installation instructions, before starting the installation. First, familiarise yourself with the system components. Check the condition of the roof construction before starting the installation. This includes quality and thickness of rafters, purlins and the roof sealing. The building structure must be able to safely and durably bear the additional loads of the photovoltaic system. During the installation, in particular while working on the roof, be sure to observe the relevant health and safety regulations and please follow the relevant professional rules.

The figures and texts in the installation instructions correspond to current technology at the time of printing. Printing errors are possible and we reserve the right to make technical changes. The individual installation instructions are merely recommendations in accordance with the current state of the art and are based on the experience of how systems by Renusol can be installed. If any special characteristics of the roof or object need to be considered, please consult specialists such as roofers or structural engineers, if necessary.

Check for the current version of our installation instructions on our website at www.renusol.com. Here, you can also find instructions in additional languages, if required.

Tests/certificates:
- TÜV
- MCS012 (IK0197)

Other applicable documents

“General installation, maintenance and assembly instructions”

“Safety instructions for installation guide”

“Terms of warranty and exclusion of liability”

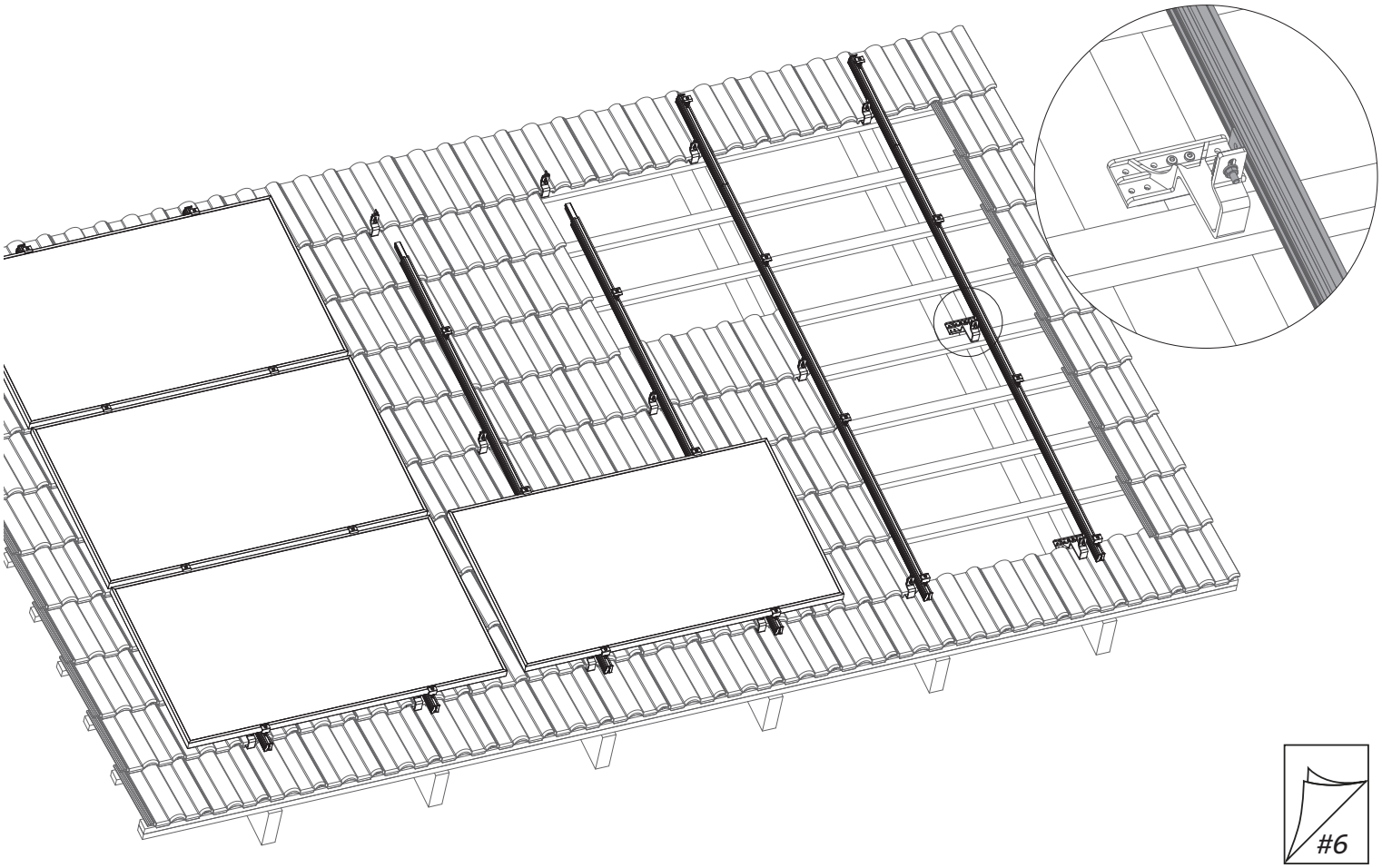
These documents are available in: www.renusol.com

Terms of warranty:

Renusol's warranty only applies if the original, complete Renusol system is used and the terms of warranty are met. For the legally provided liability for defects/warranty, please see the General Terms and Conditions issued by Renusol.

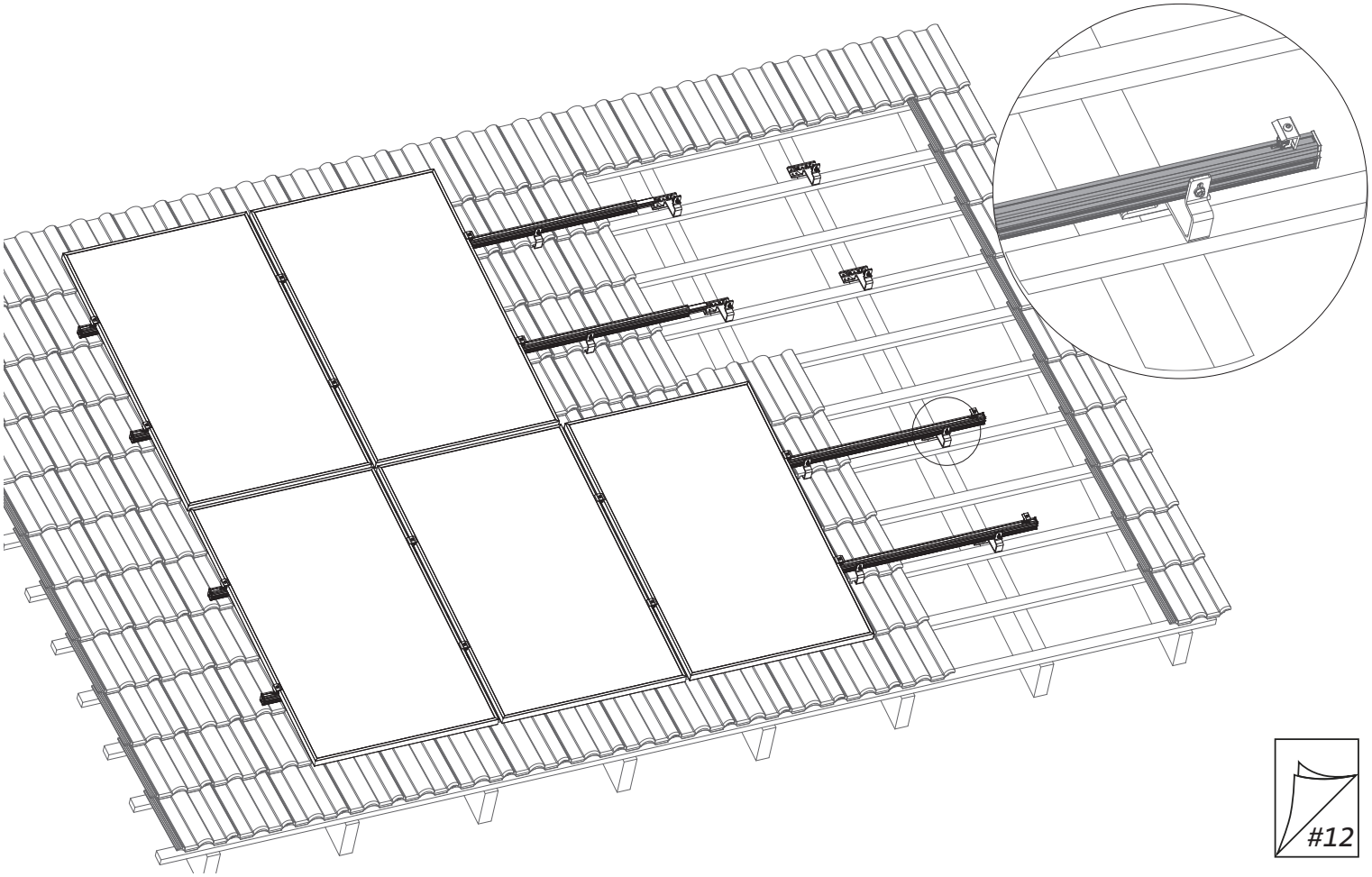
Check the structural loadability of the PV system before starting the installation. The building must be able to bear the additional weight

One-layer rail system - horizontal module alignment



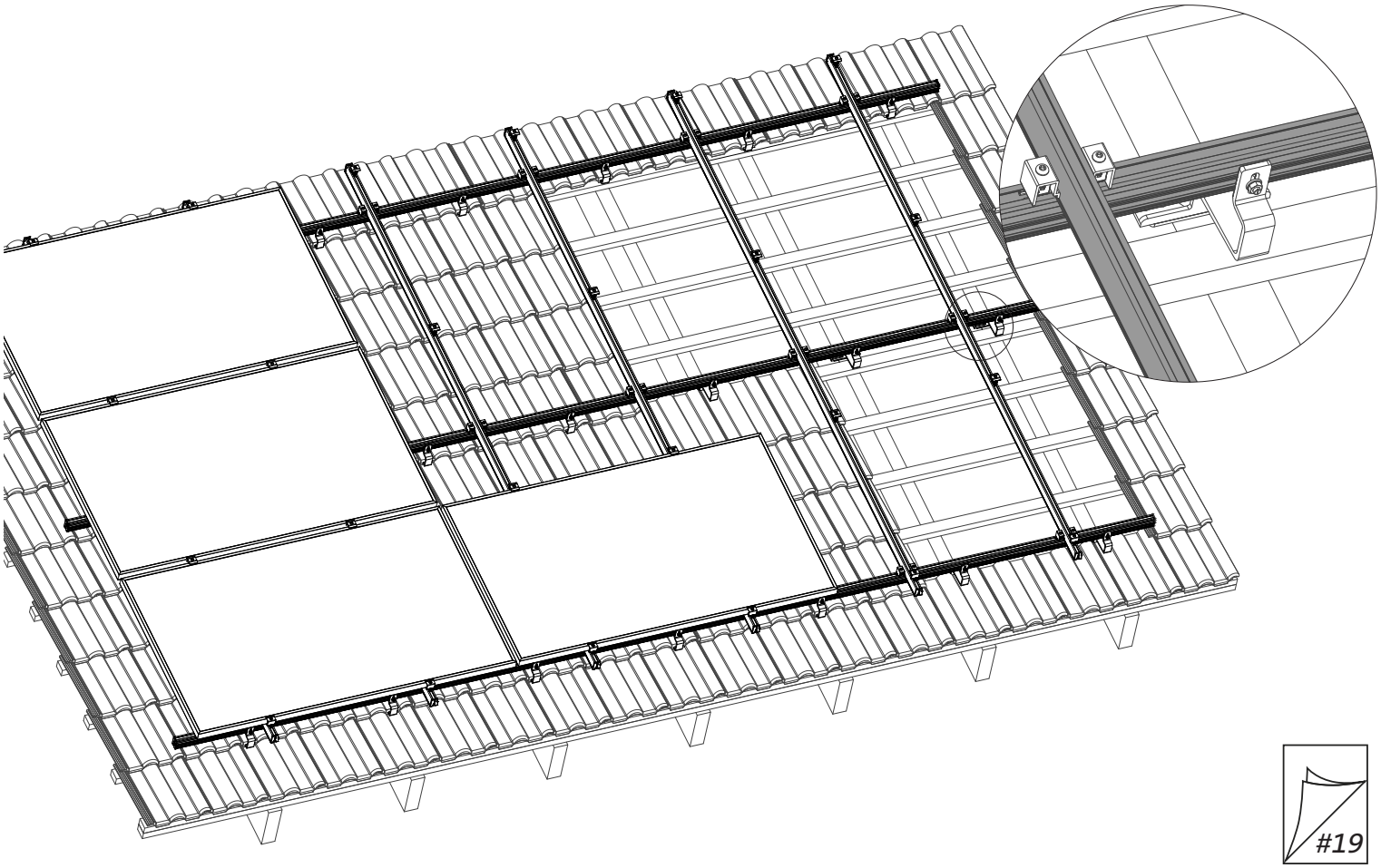
#6

One-layer rail system - vertical module alignment



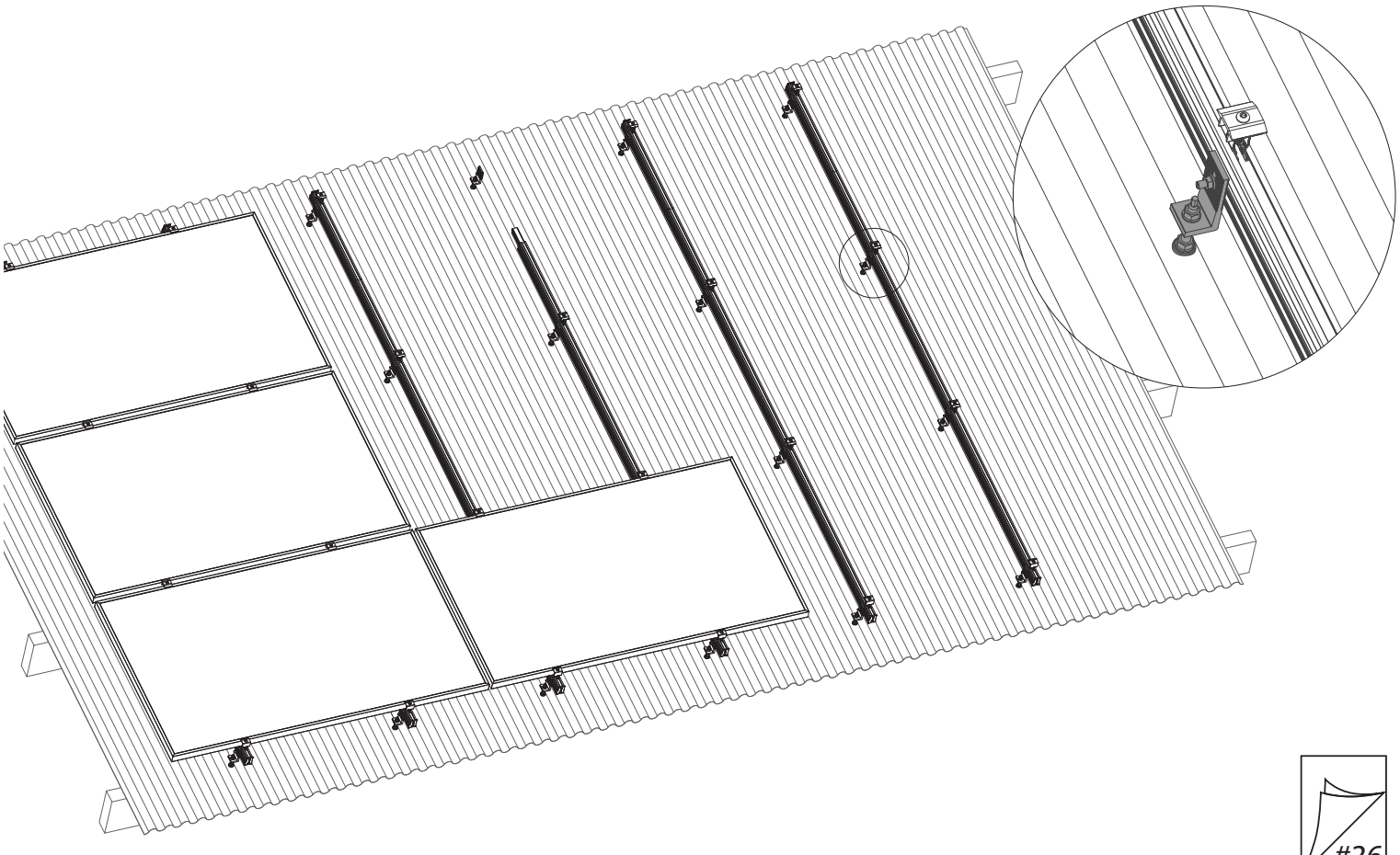
#12

Two-layer rail system /cross rail system - horizontal module alignment



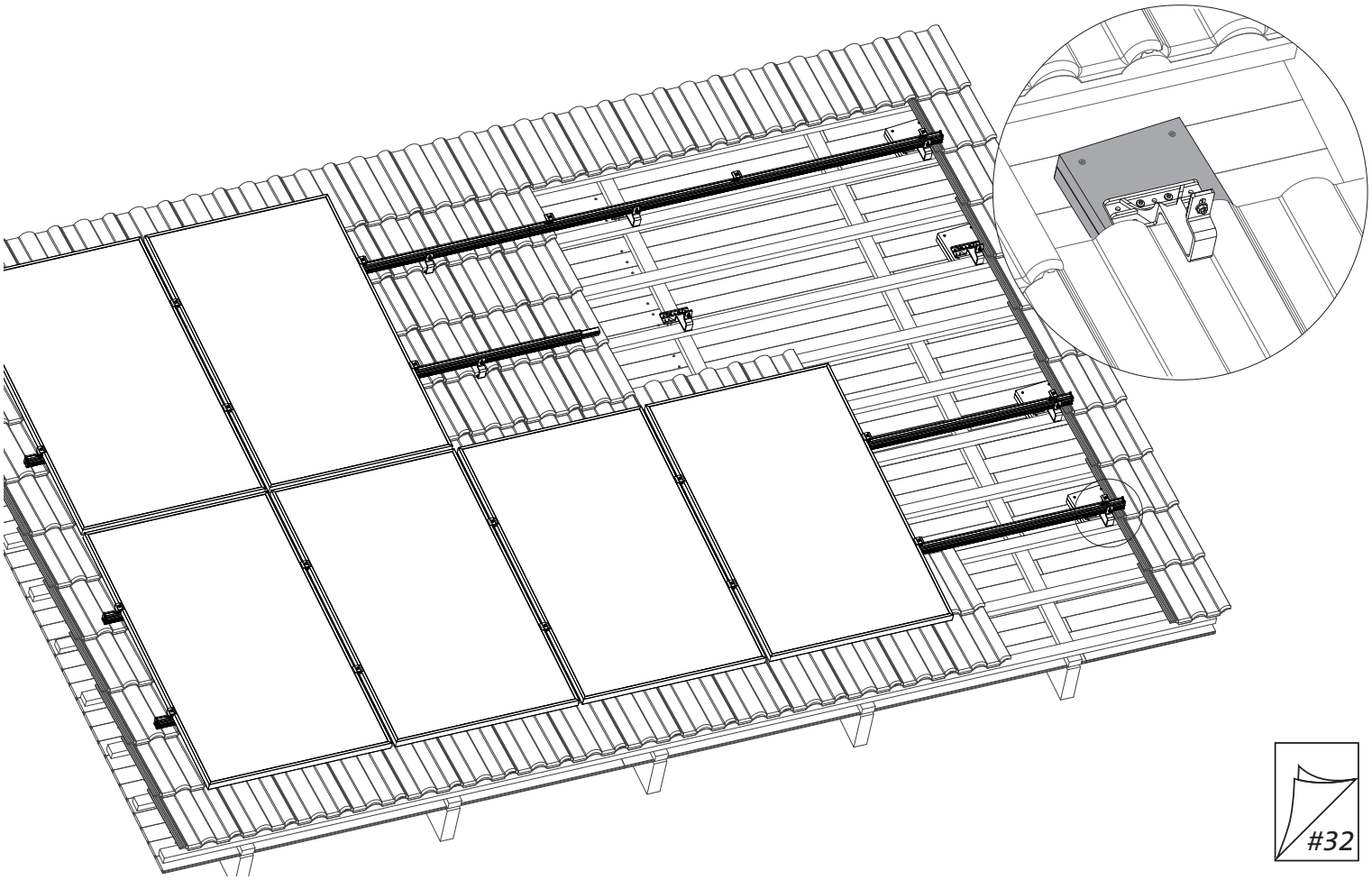
#19

One-layer rail system with hanger bolts, - connection of solar fasteners - horizontal module alignment



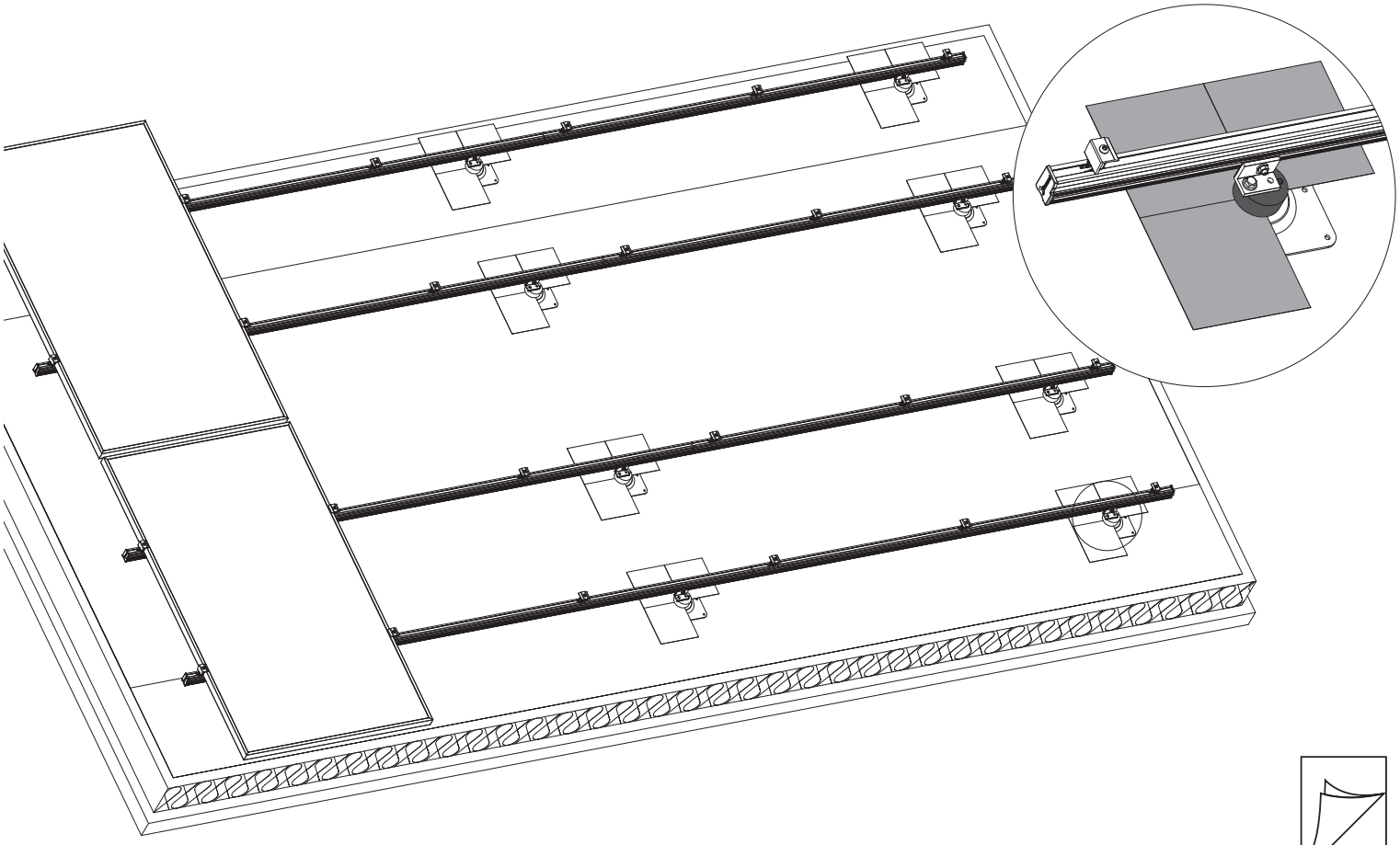
#26

One-layer rail system on tongue and groove boards fixation - vertical module alignment



#32

Connection to alternative fasteners



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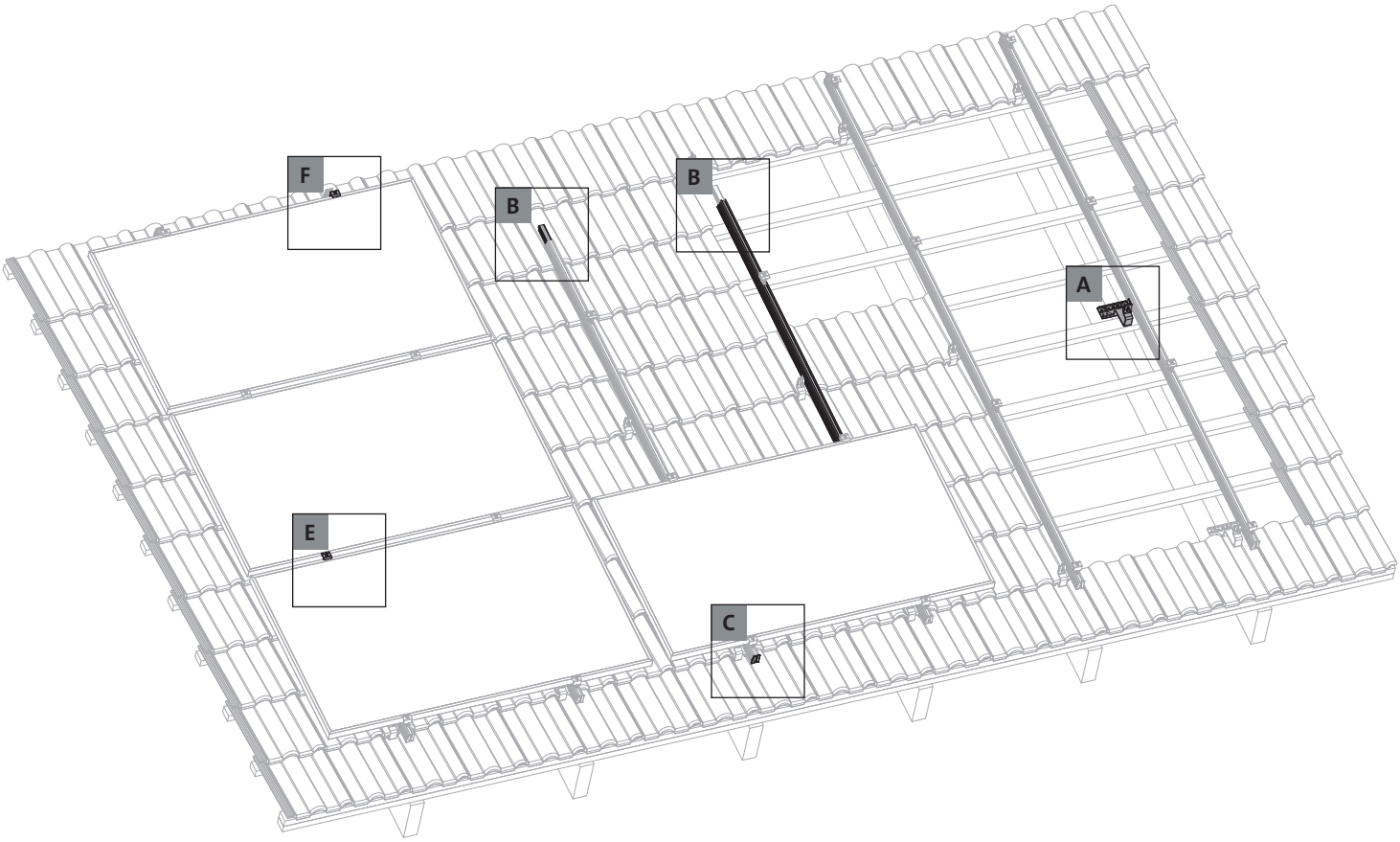
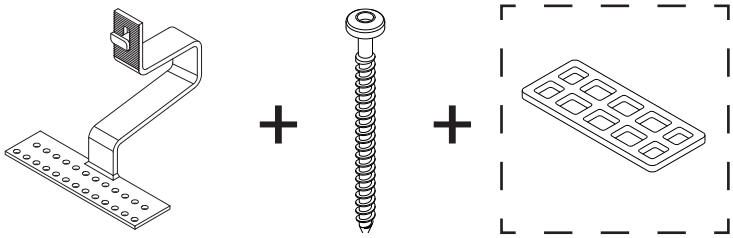
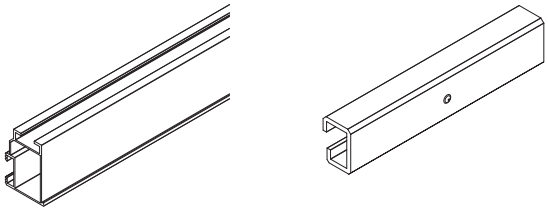


A



B



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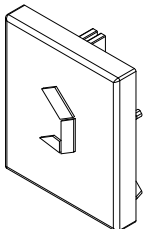

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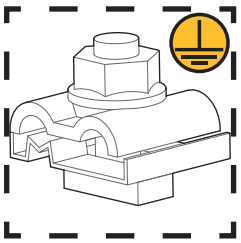
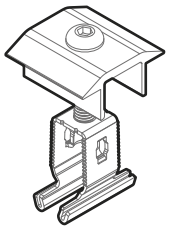
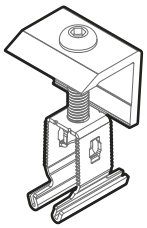


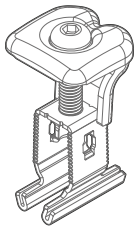
E

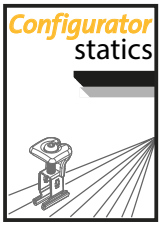


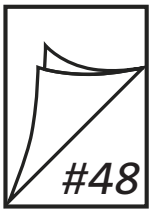
F



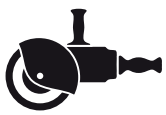
E + F







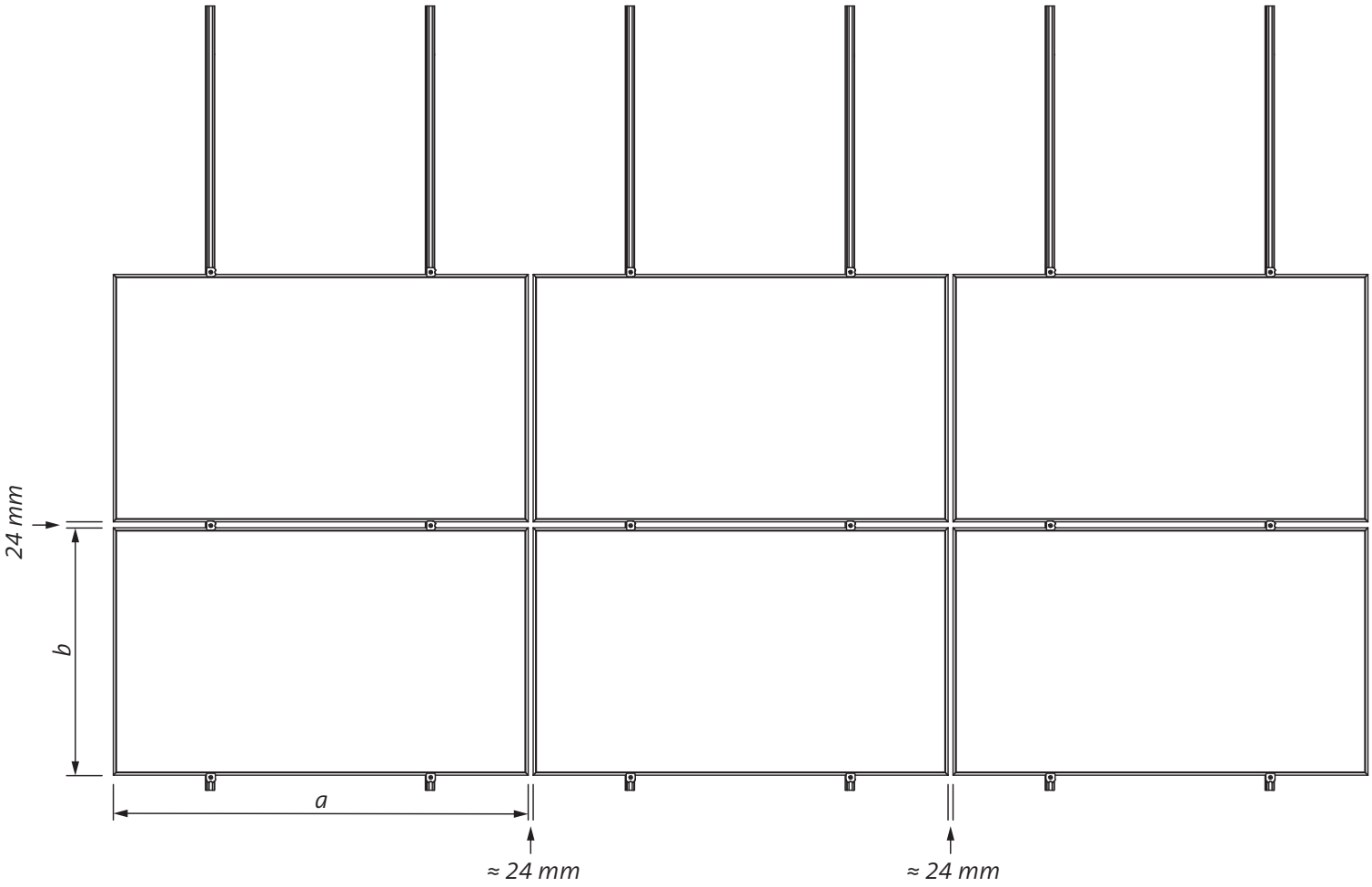
+

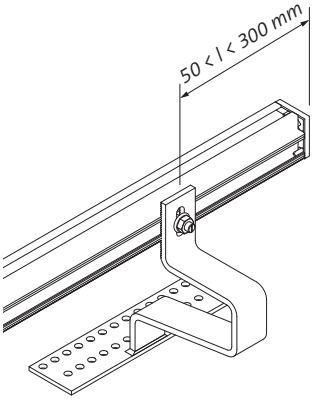


SIT 30
(TX 30)

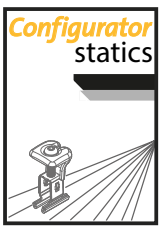
Nm

10mm / 13 mm



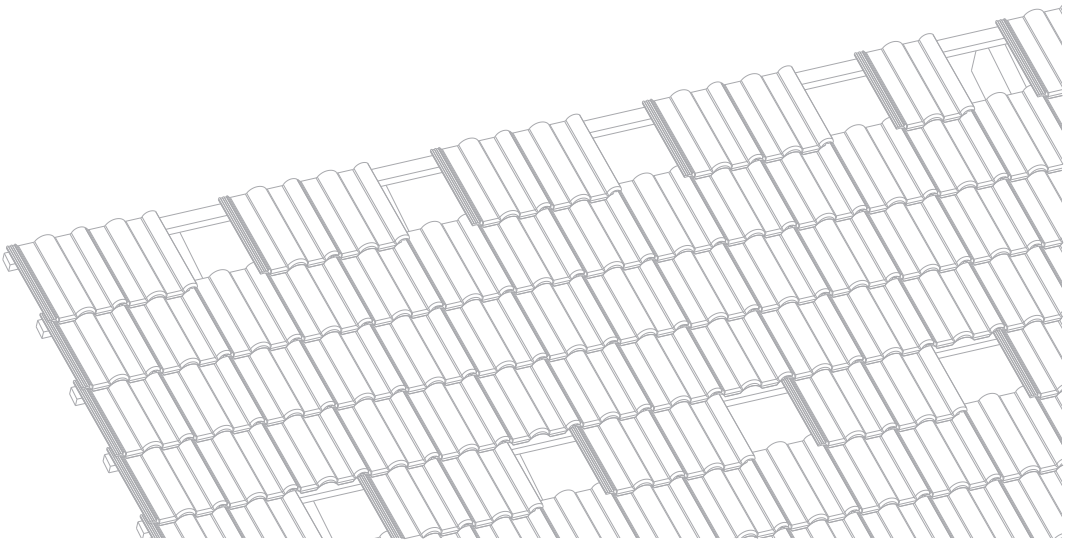


Without a structural analysis by means of the Renusol Configurator the length of the cantilever should not be longer than 300 mm.

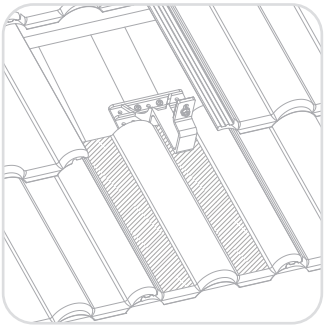


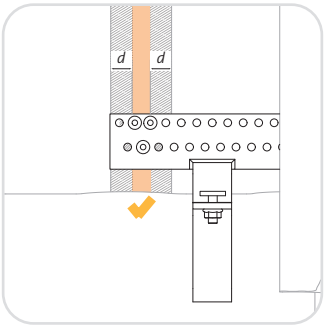
- **General instructions**
- **Static calculations**
- **Technical project overview**

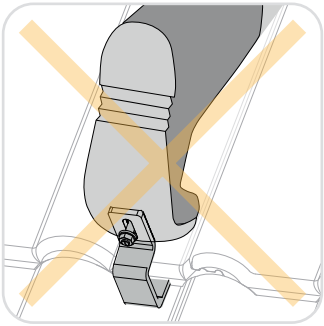
⇨ **www.pv-configurator.com**

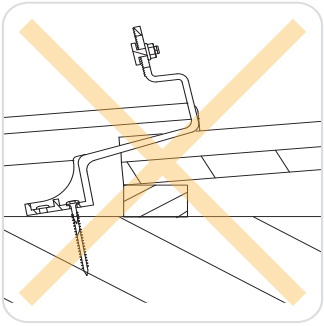


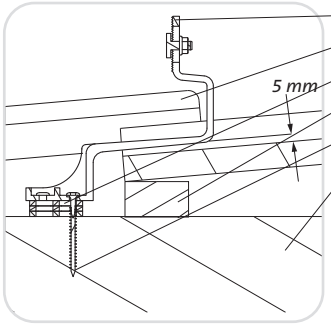
One-layer rail system - horizontal module alignment



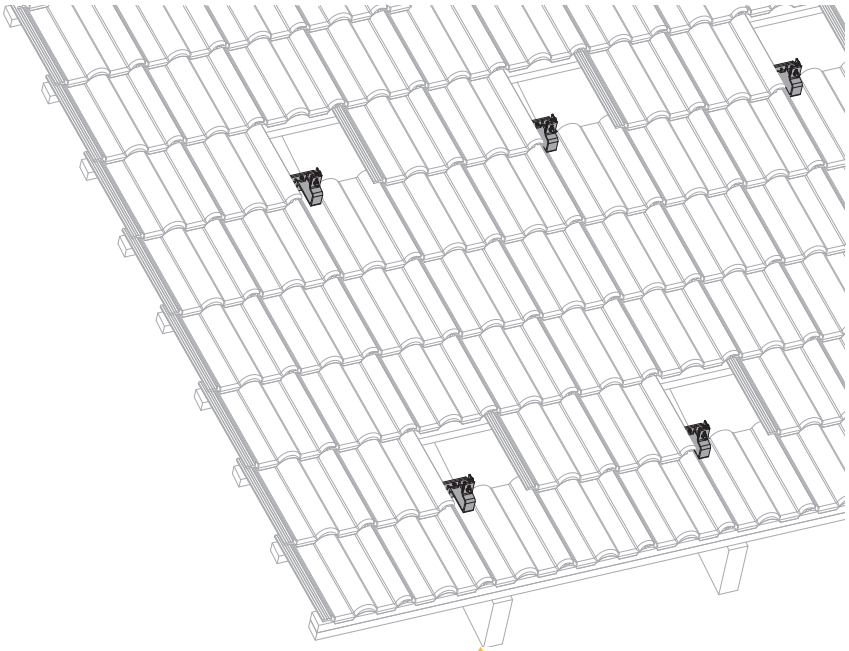








Roof hooks
Roof tiles
Distance plate
Batten
Wood screw
Rafter

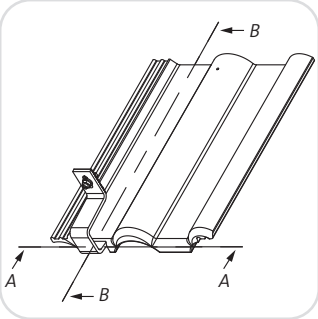


Warning!
Use the hole pattern of the roof hook to place the roof hook in the trough area of the tile. Screw the roof hook in the allowed area only. Keep a distance of 3x Ø of the wood screw to the outer edge of the rafter. Do not use the roof hook as step.

When mounted, the cantilever of the roof hook shall have a distance of approx. *5mm* to the roof tile.

Please find the number of screws on *page 49-50*.

One-layer rail system - horizontal module alignment



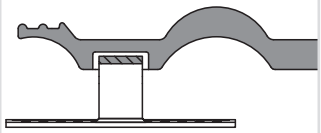
Warning!

The following treatment of tiles only applies to grooved tiles.

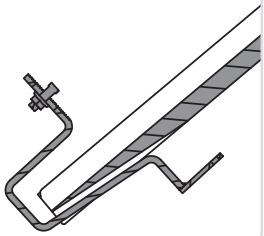
For flat tiles, please look at *page 44-46*.

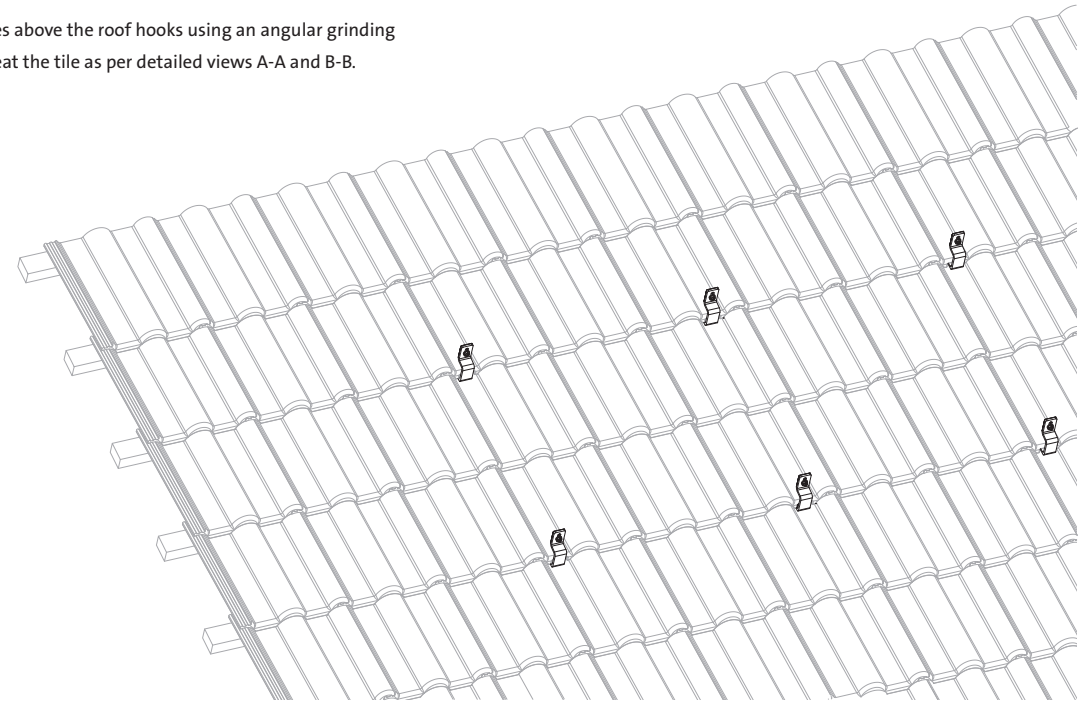
Treat the tiles above the roof hooks using an angular grinding machine. Treat the tile as per detailed views A-A and B-B.

A-A

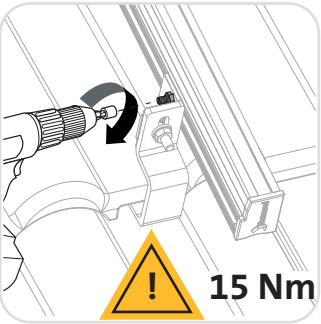


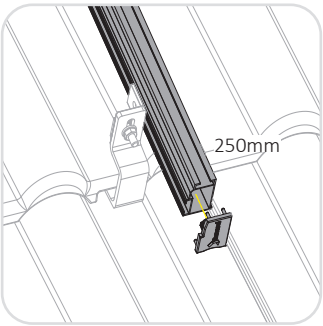
B-B

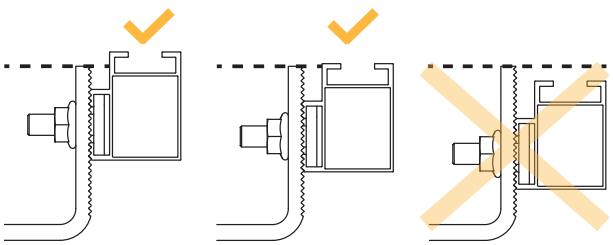


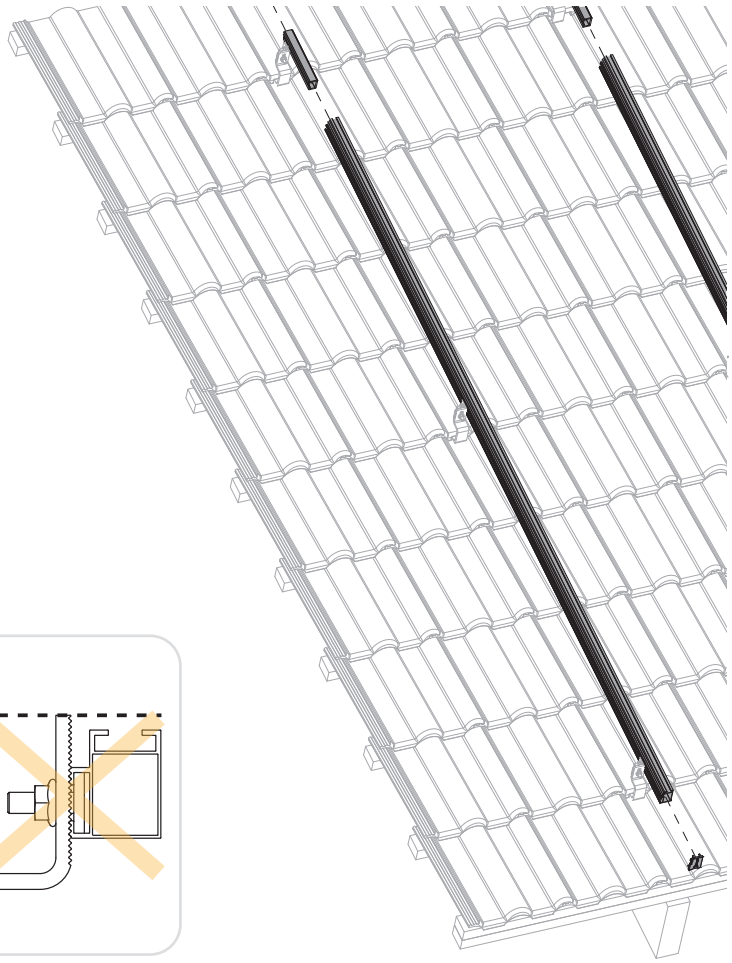


One-layer rail system - horizontal module alignment

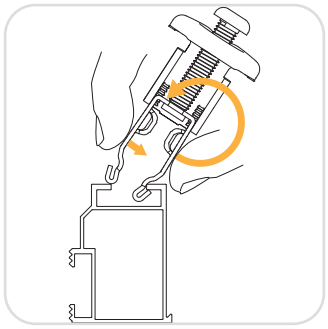


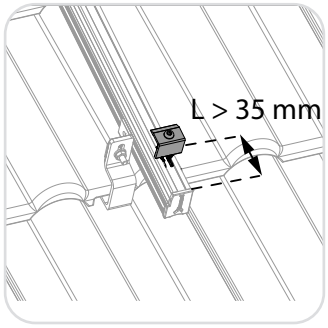


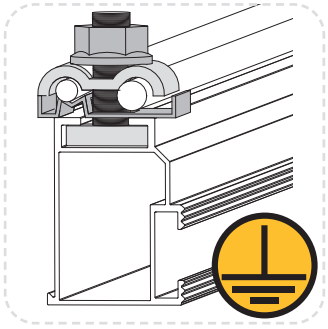


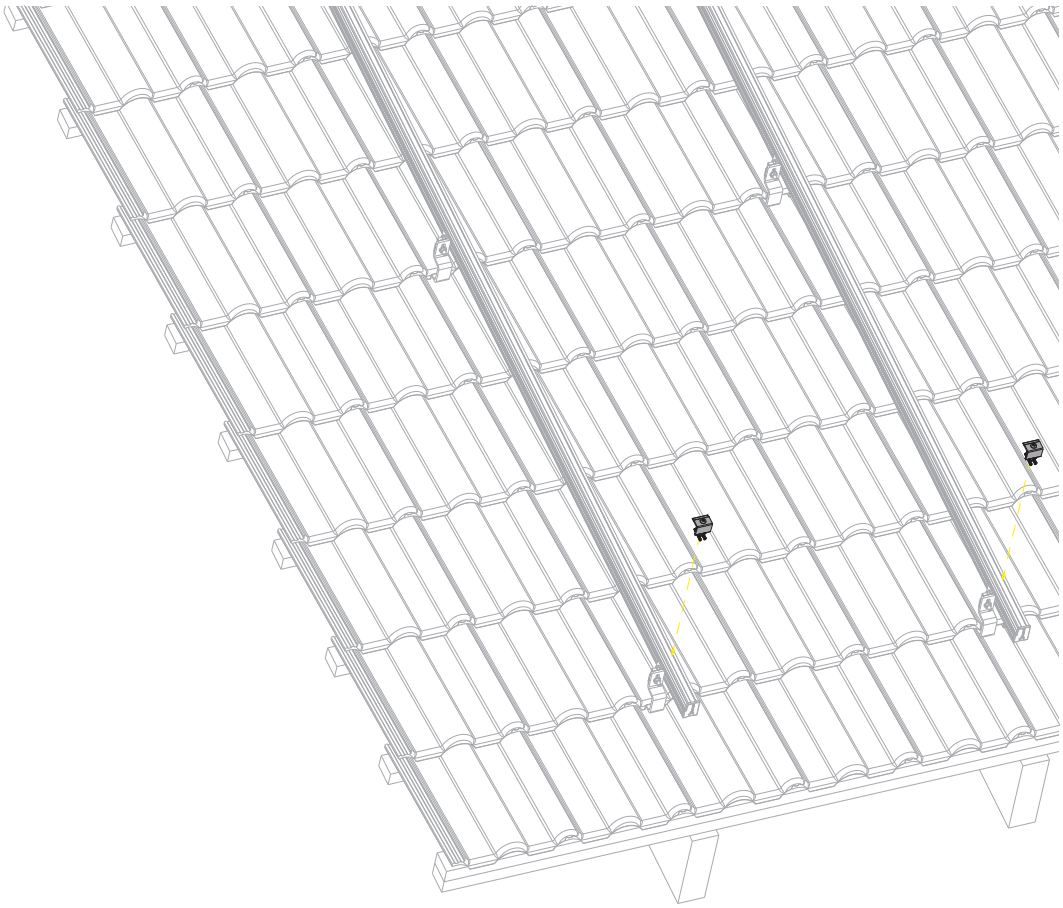


One-layer rail system - horizontal module alignment

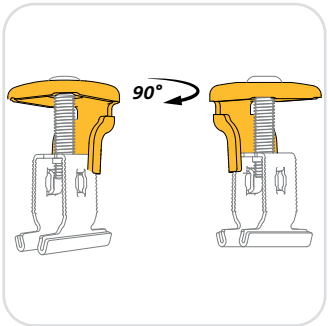


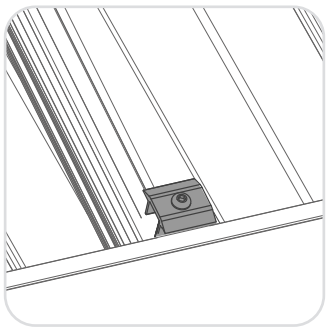


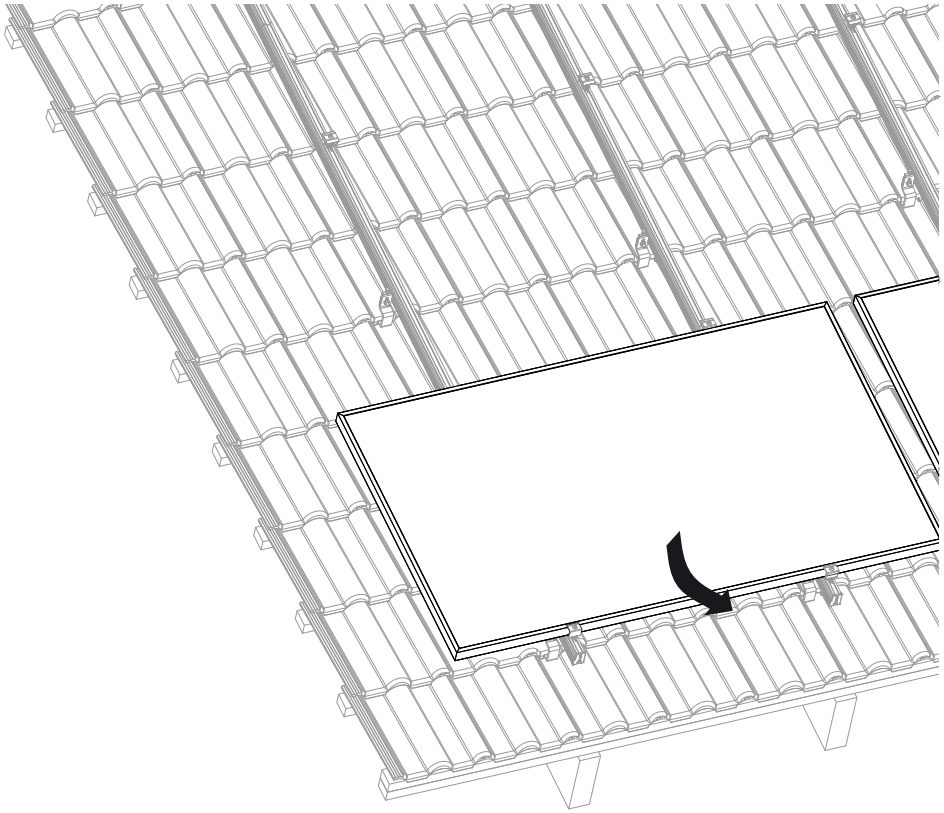


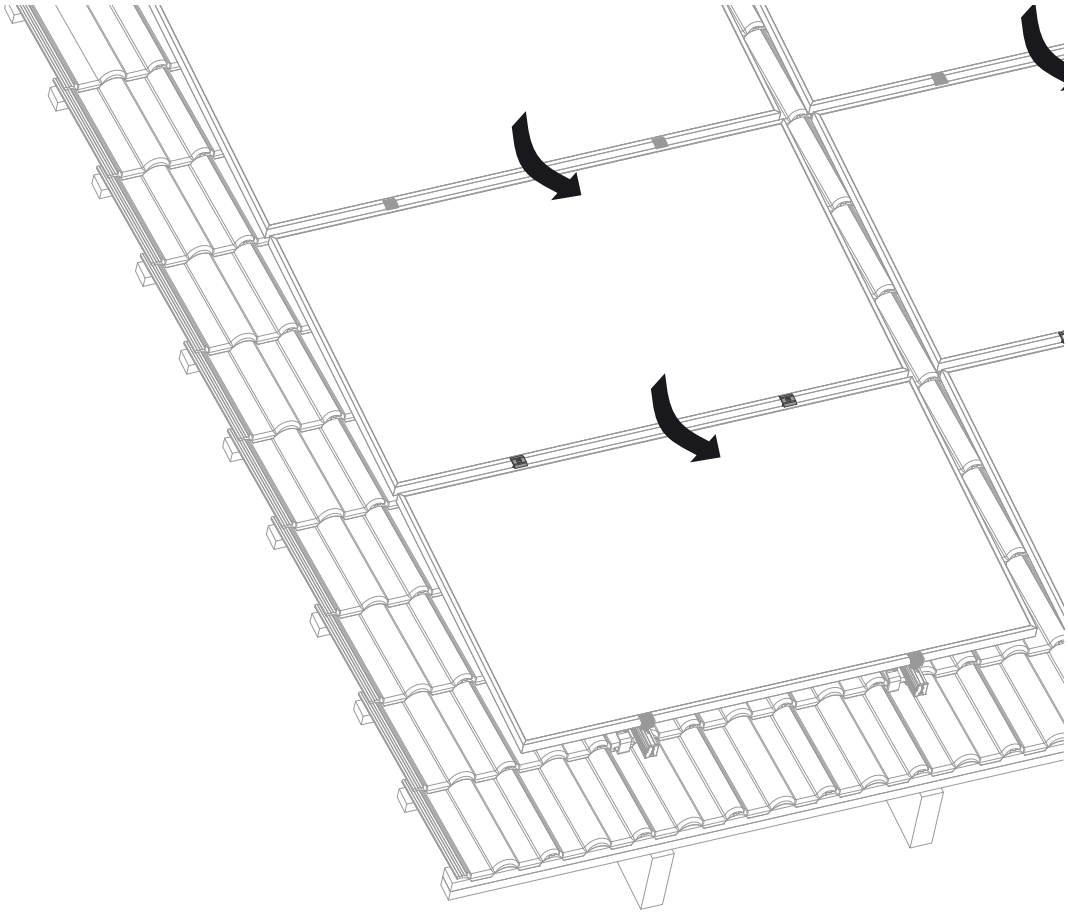


One-layer rail system - horizontal module alignment



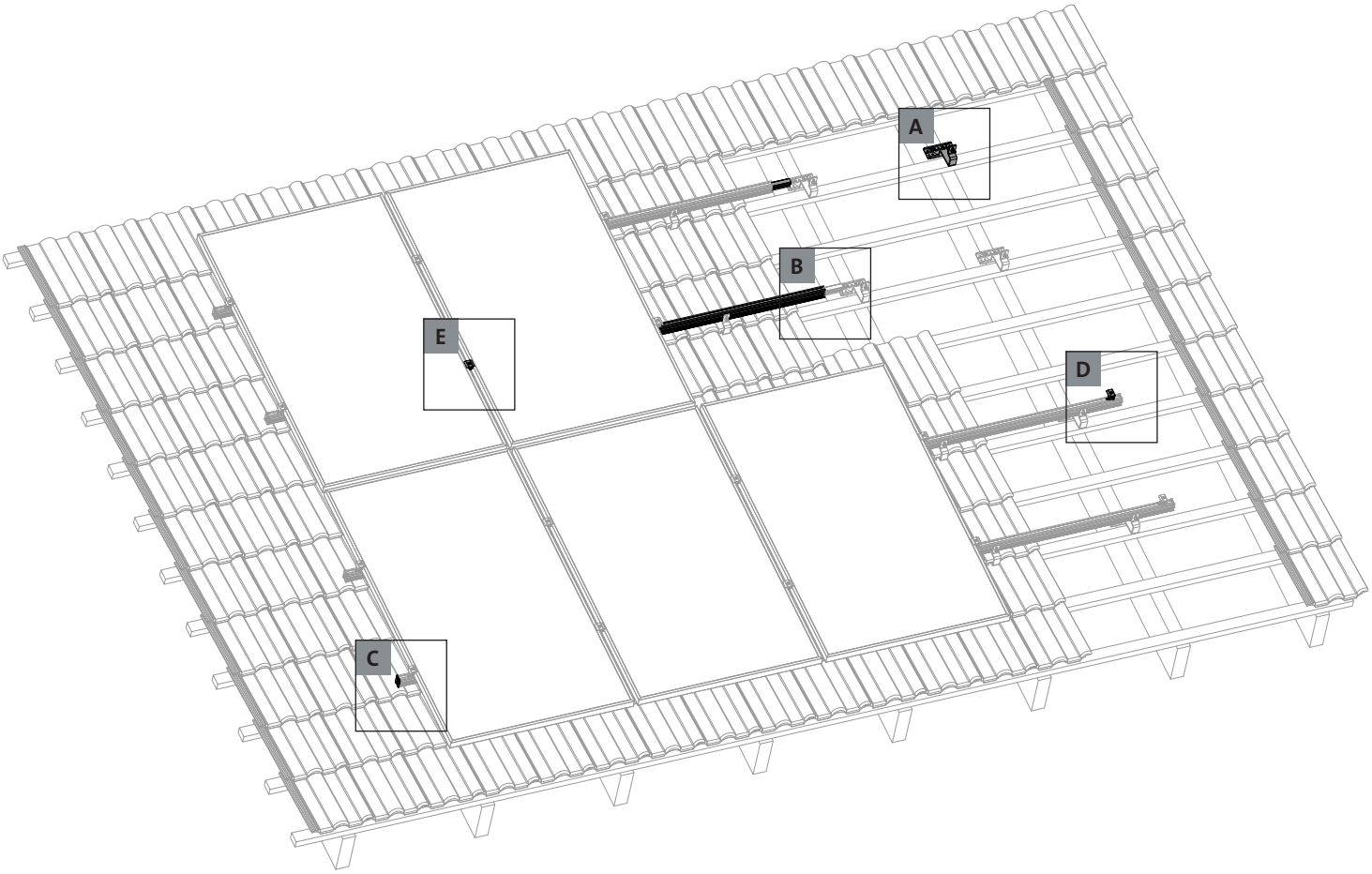




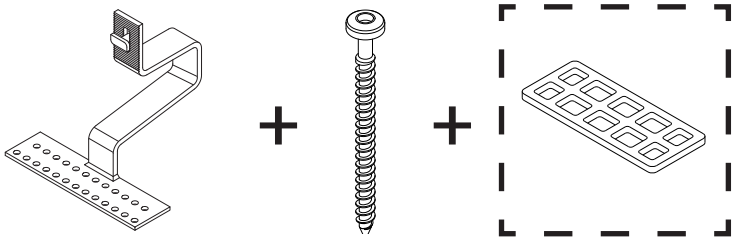


13 Nm

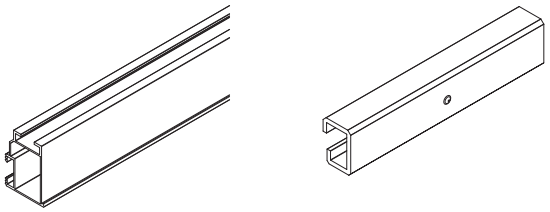
13 Nm



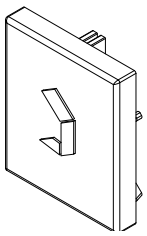
A



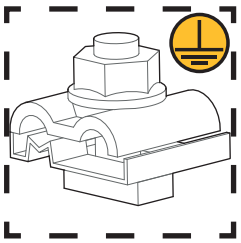
B



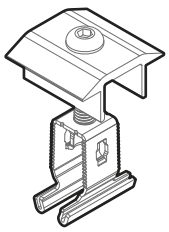
C



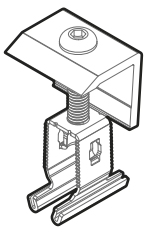
B



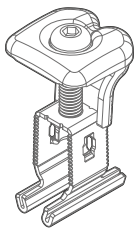
D

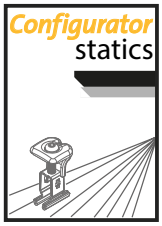


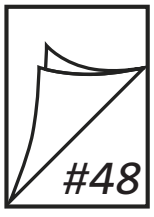
E



D + E







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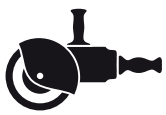
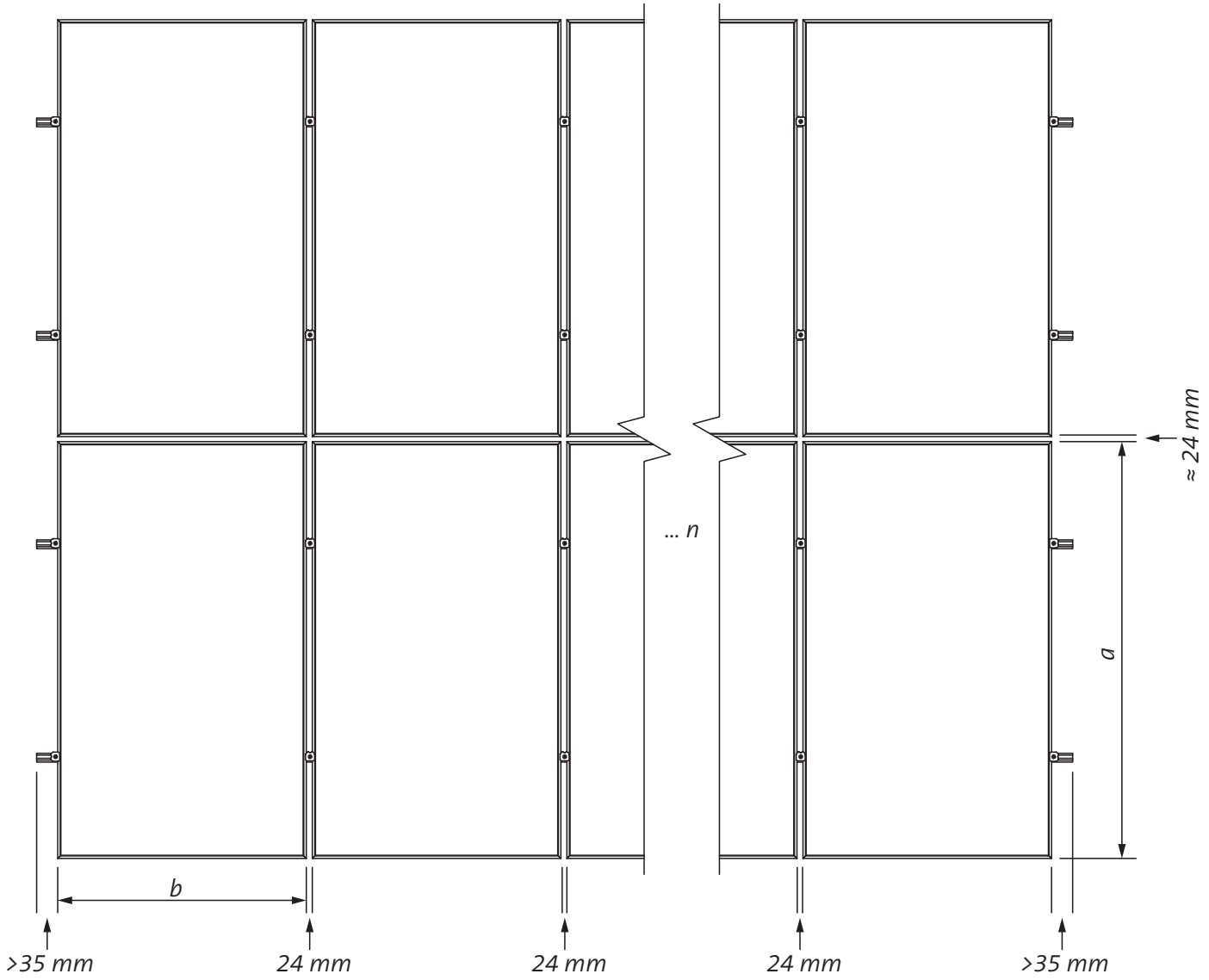
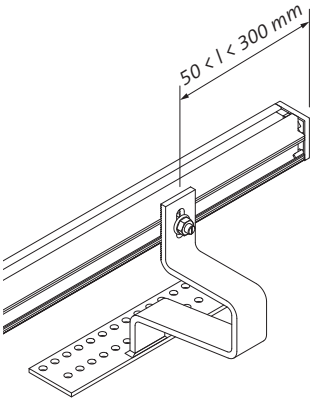


SIT 30
(TX 30)

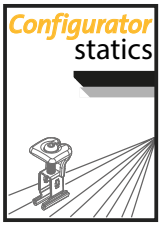
Nm

10mm / 13 mm



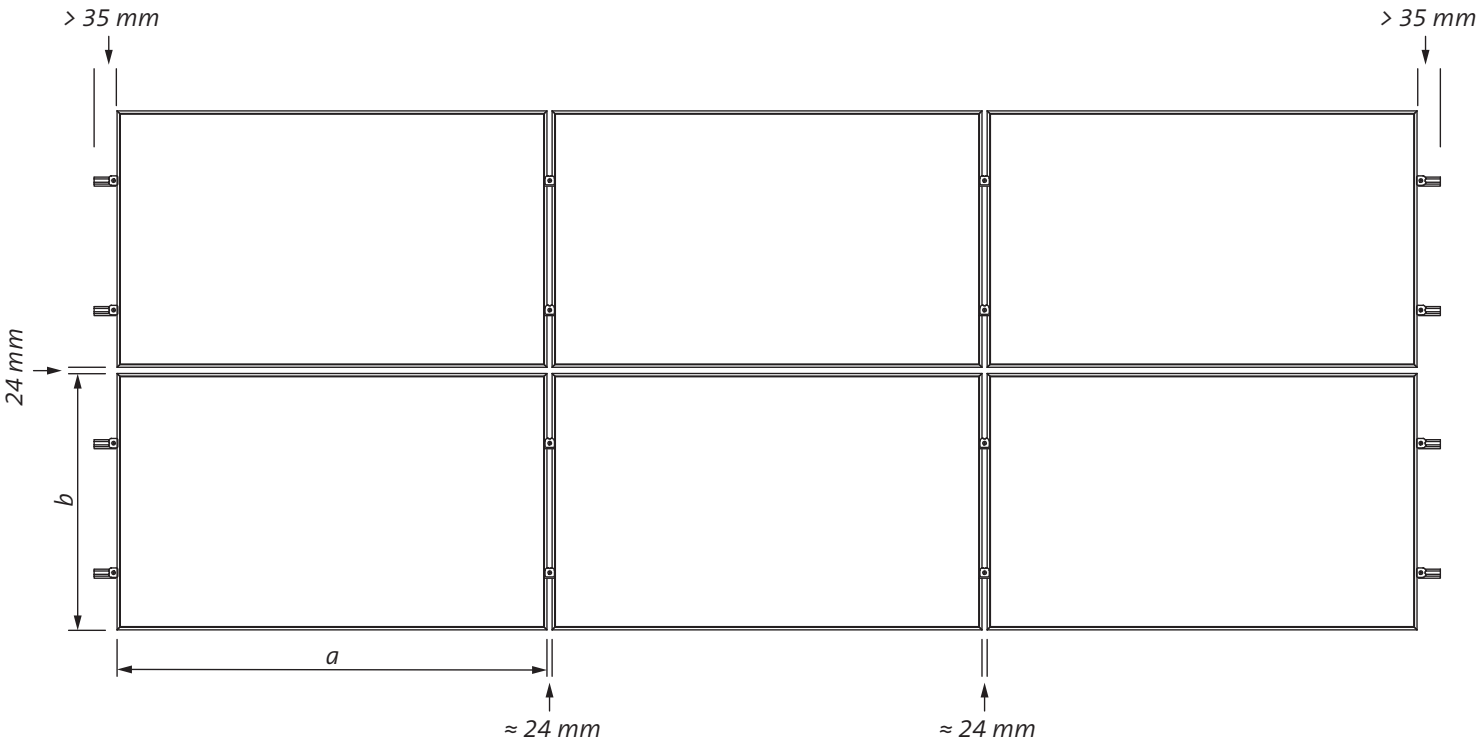


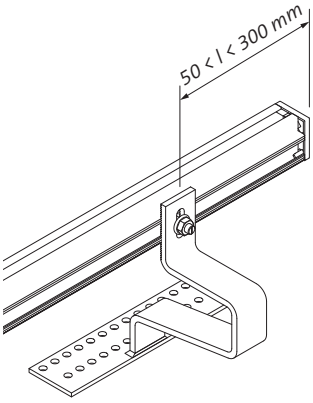
Without a structural analysis by means of the Renusol Configurator the length of the cantilever should not be longer than 300 mm.



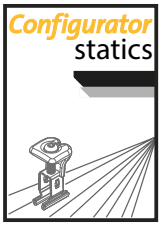
- **General instructions**
- **Static calculations**
- **Technical project overview**

⇨ **www.pv-configurator.com**





Without a structural analysis by means of the Renusol Configurator the length of the cantilever should not be longer than 300 mm.



- **General instructions**
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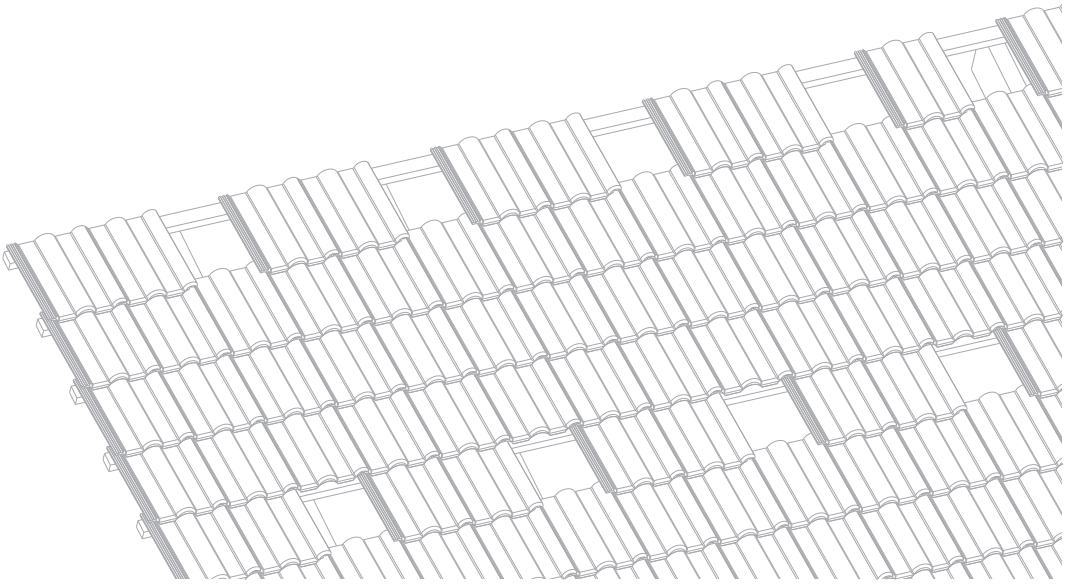
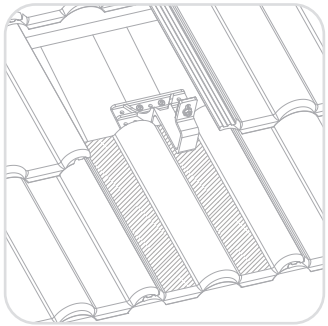
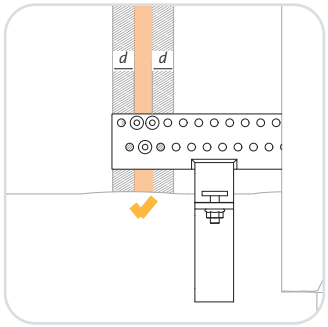
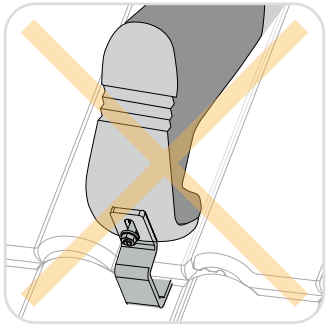
⇨ **www.pv-configurator.com**

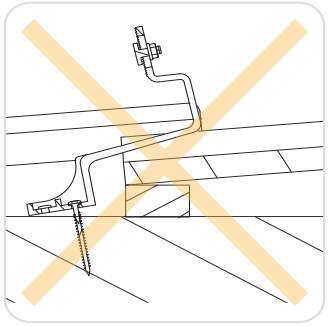


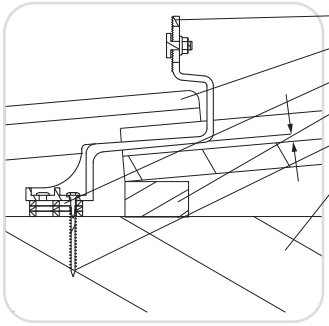
One-layer rail system - vertical module alignment

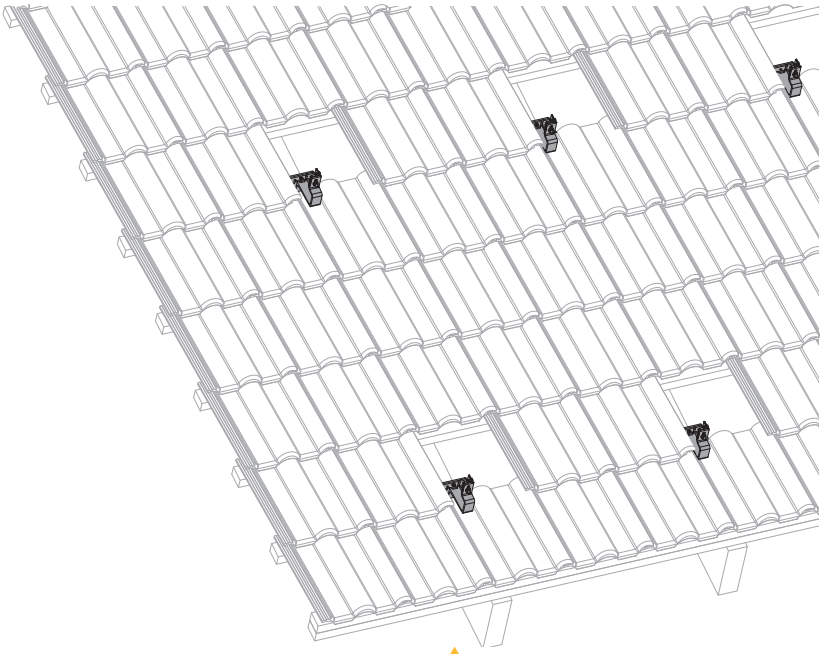










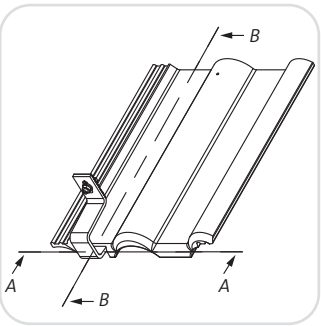


Warning!
Use the hole pattern of the roof hook to place the roof hook in the trough area of the tile. Screw the roof hook in the allowed area only. Keep a distance of 3x Ø of the wood screw to the outer edge of the rafter. Do not use the roof hook as step.

When mounted, the cantilever of the roof hook shall have a distance of approx. *5mm* to the roof tile.

Please find the number of screws on *page 49-50*.

One-layer rail system - vertical module alignment



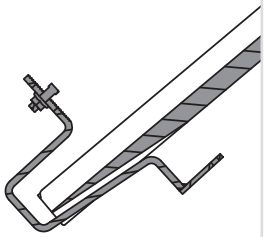
Warning!

The following treatment of tiles only applies to grooved tiles.

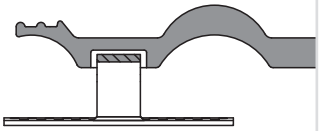
For flat tiles, please look at *page 44-46*.

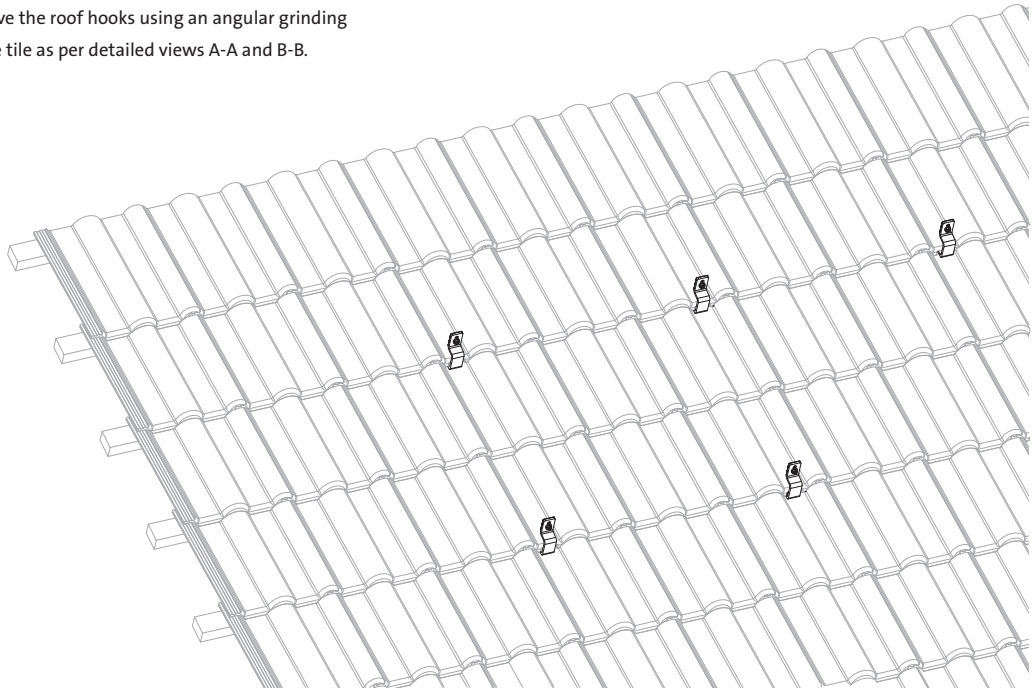
Treat the tiles above the roof hooks using an angular grinding machine. Treat the tile as per detailed views A-A and B-B.

A-A

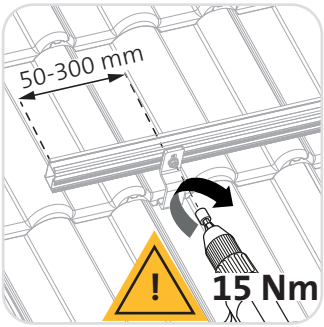


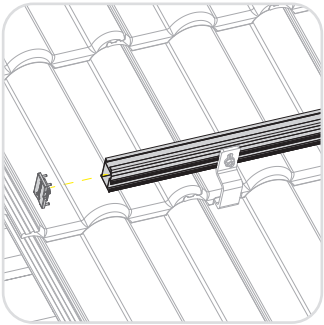
B-B

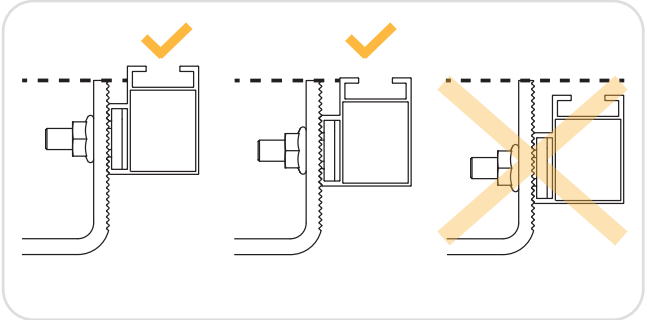


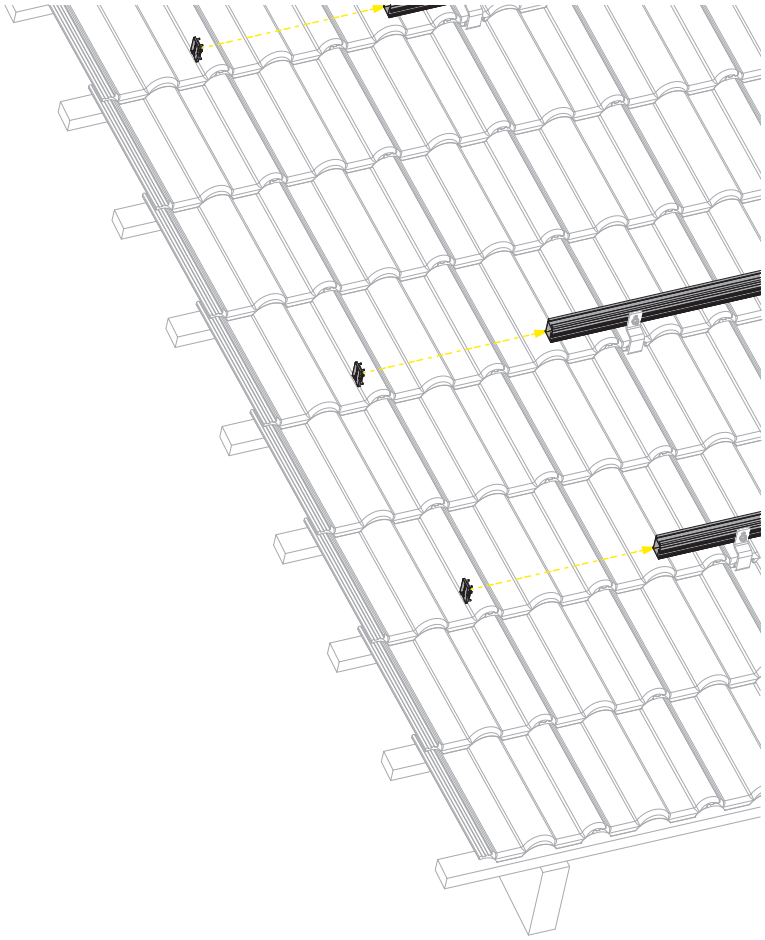


One-layer rail system - vertical module alignment

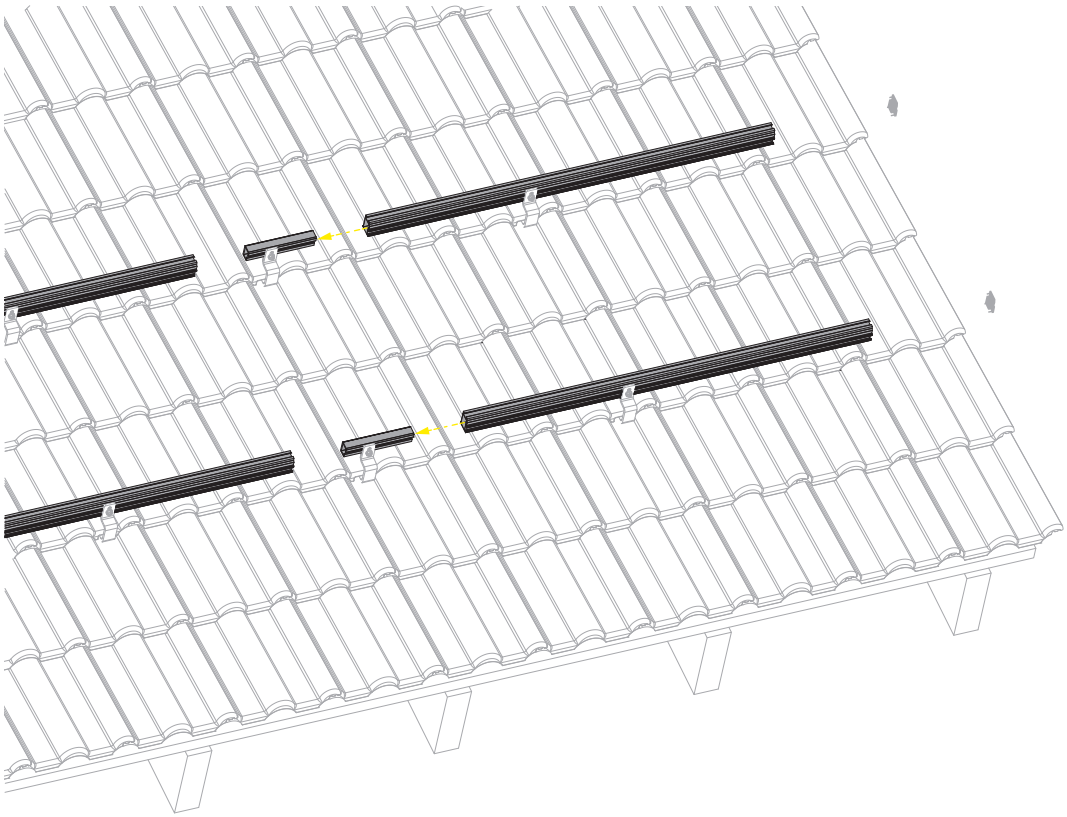


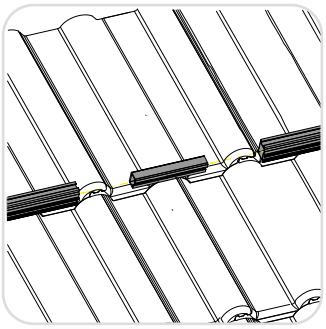


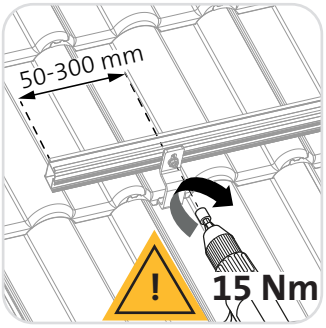


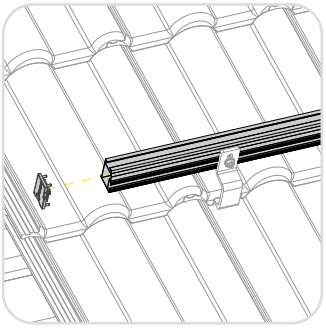


One-layer rail system - vertical module alignment

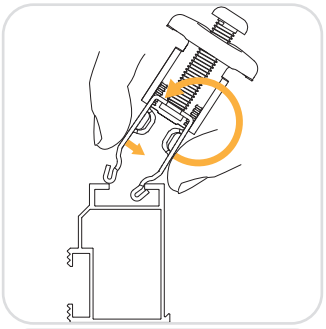


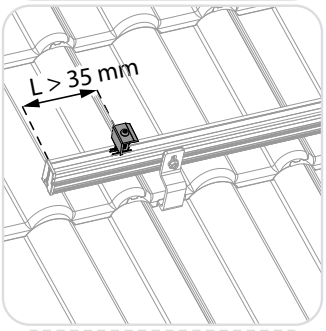


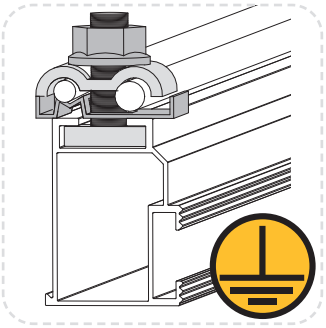


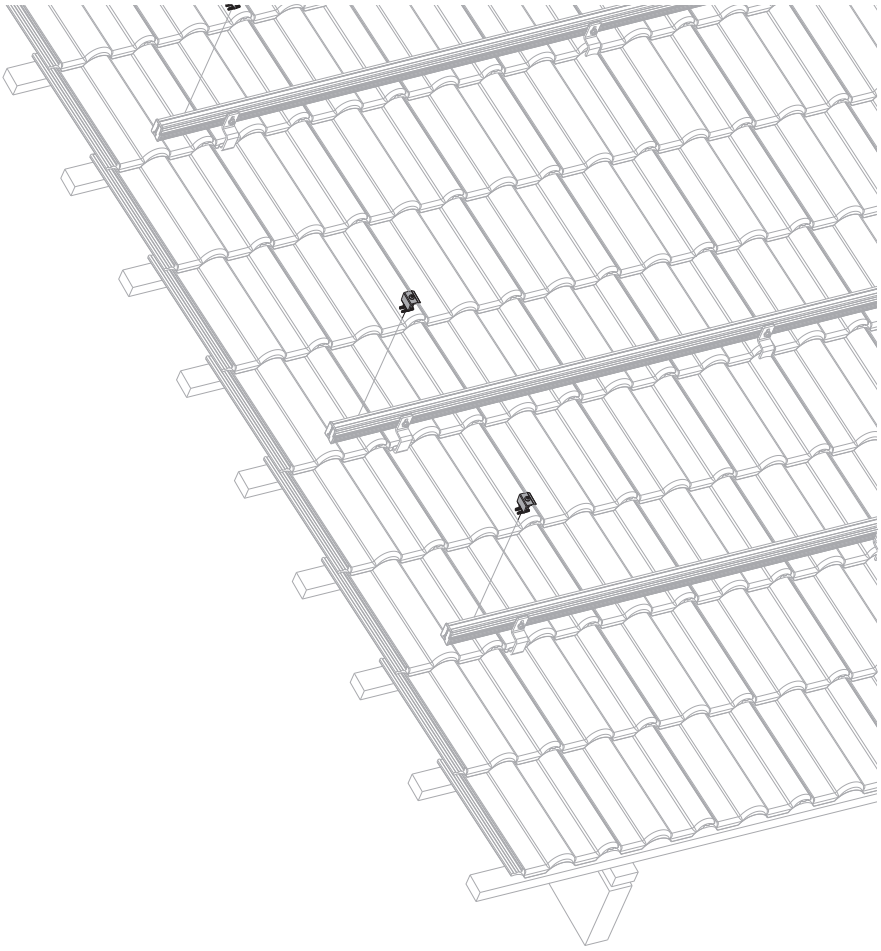


One-layer rail system - vertical module alignment

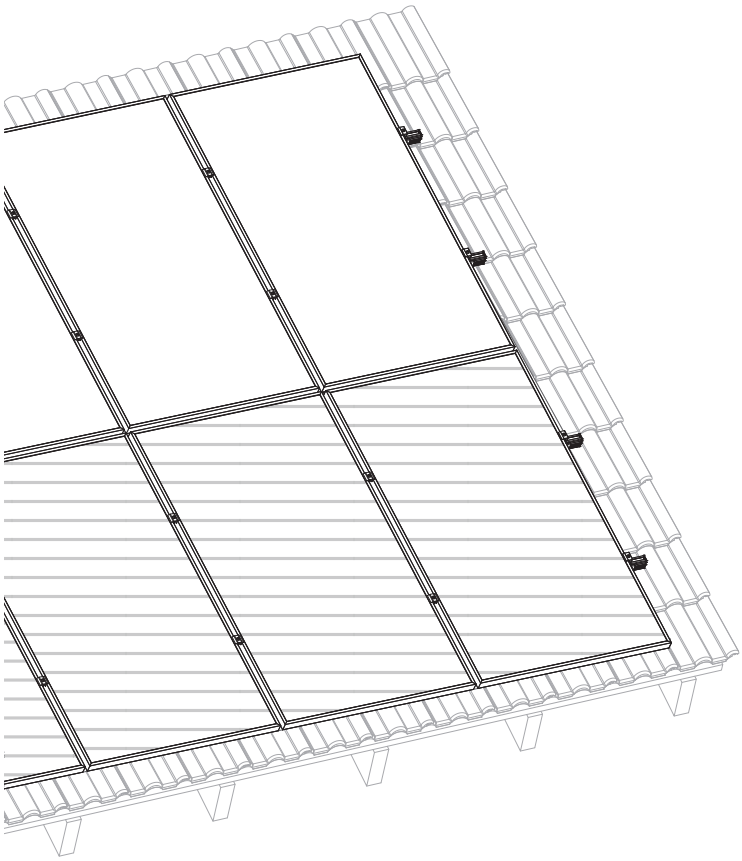








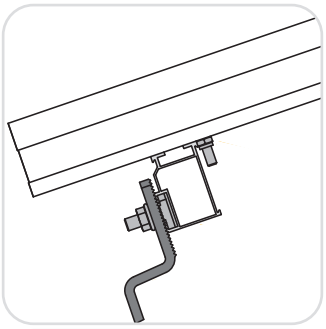
One-layer rail system - vertical module alignment

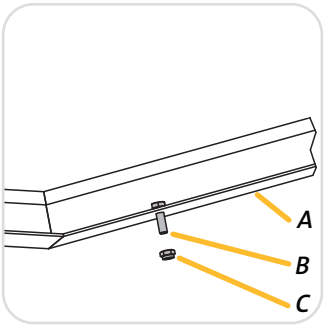


Warning!
Before installing the modules, the modules of the lowest row should be provided with anti-slip protection.

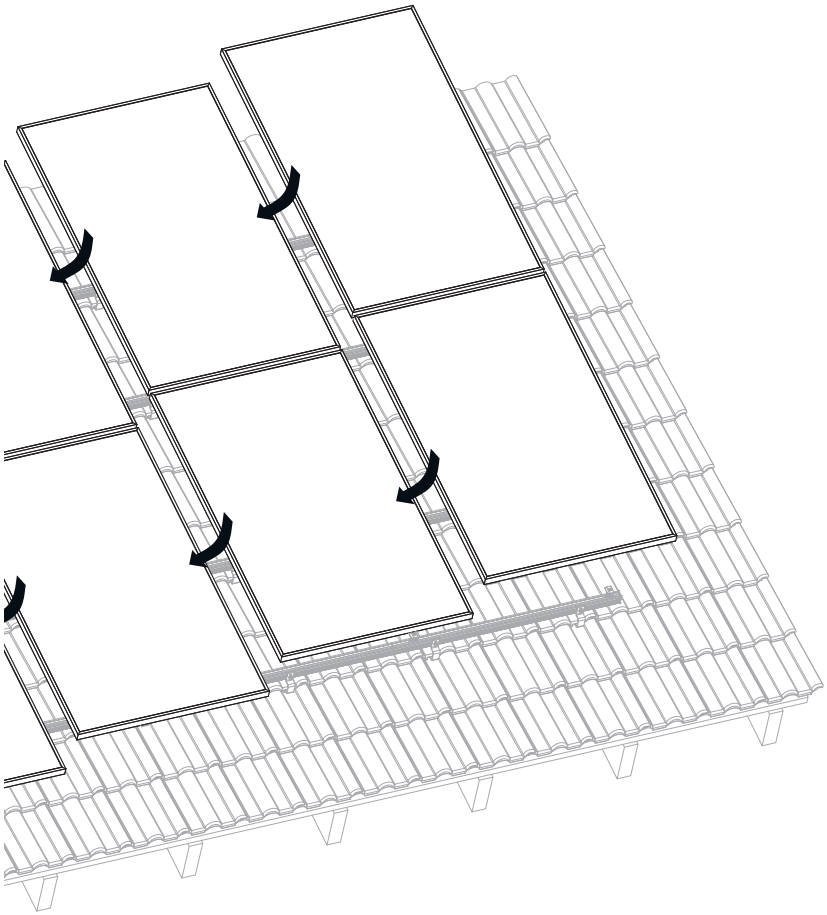
For this purpose fasten the M6x20 mm screws (with the shaft/thread pointing downwards) in the fastening points of the modules using M6 nuts. Place the modules in the lowest row in a way that the anti-slip protection abuts and the edge of the lowest mounting rail (Fig. B) touches.

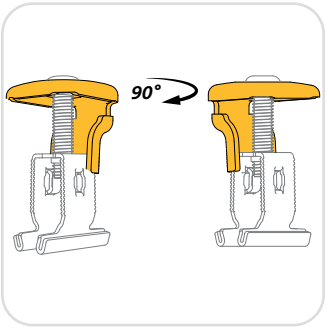
Note: The anti-slip protection can only be used with modules with the appropriate fastening holes.



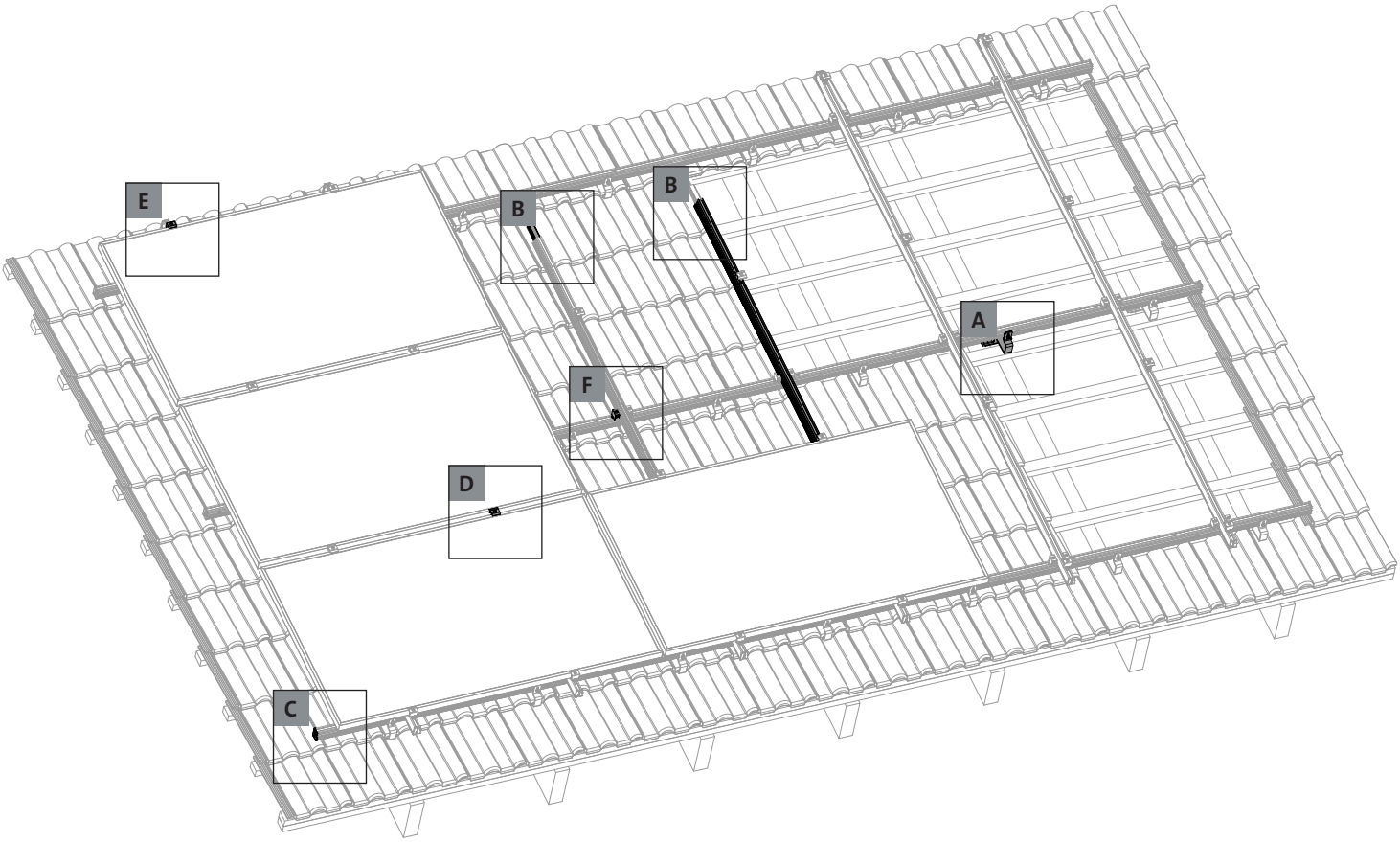


One-layer rail system - vertical module alignment

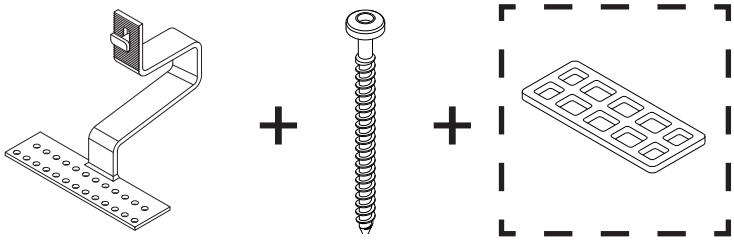




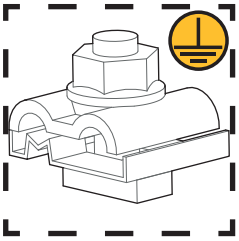
Two-layer rail system - horizontal module alignment - overview



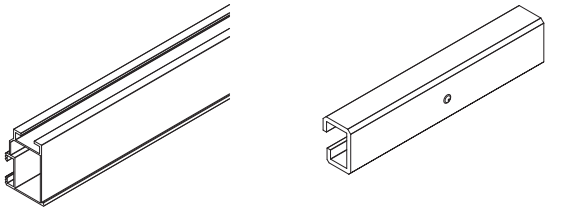
A



B



B



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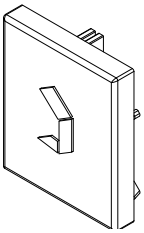
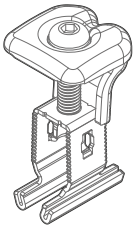
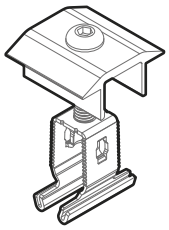


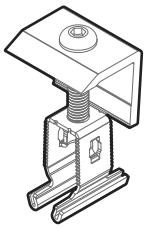
D + E



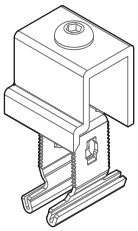
D

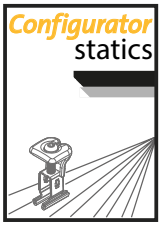


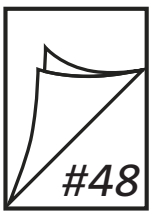
E



F







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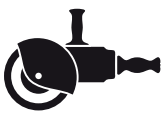
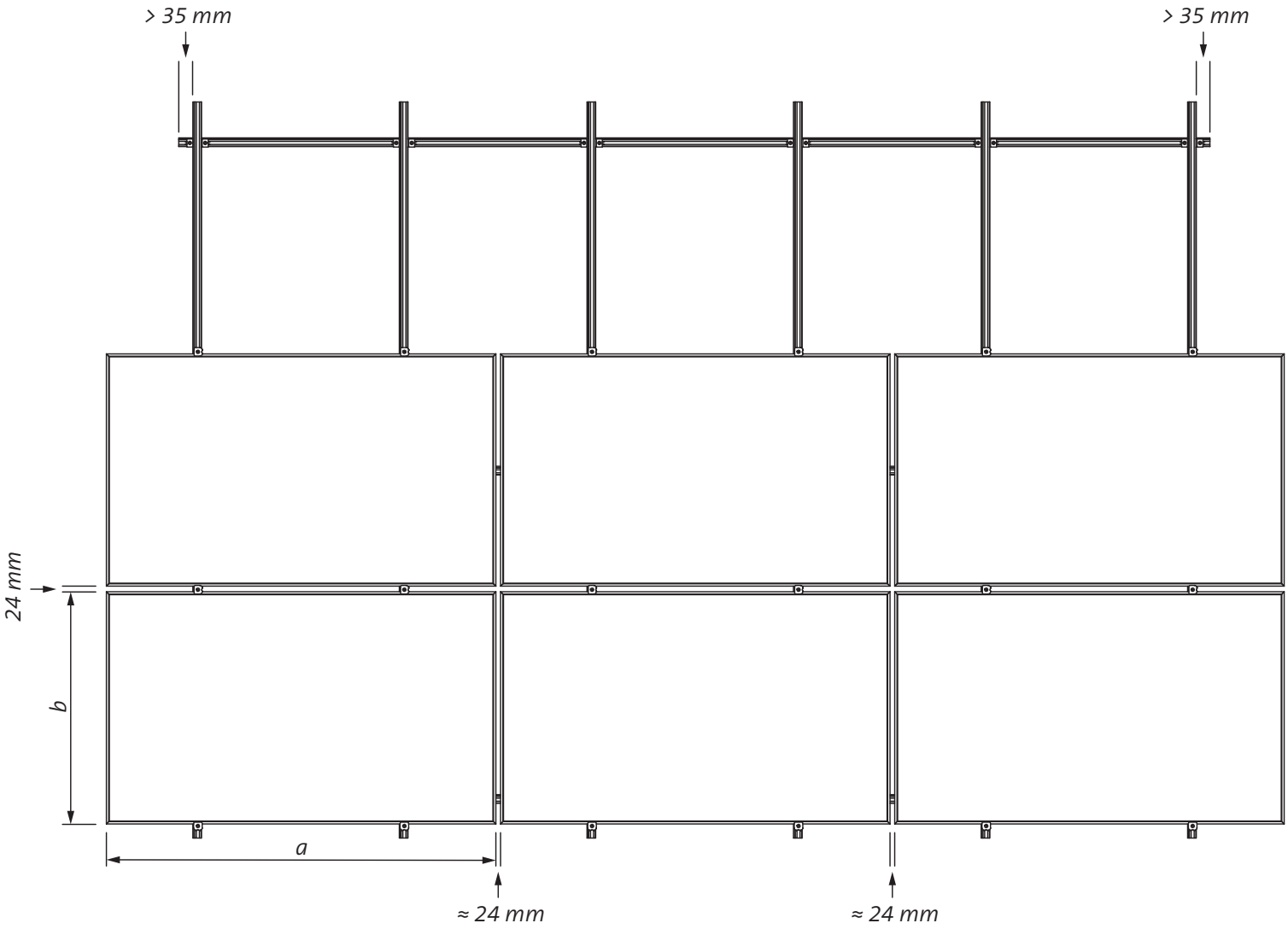


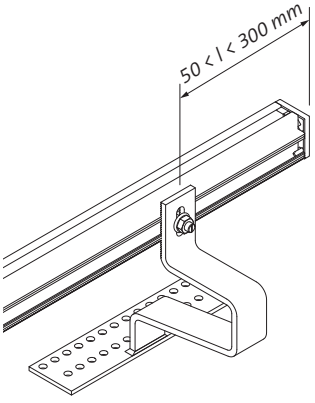
SIT 30
(TX 30)

Nm

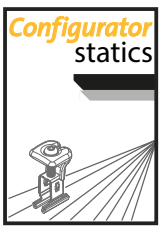
10mm / 13 mm

Two-layer rail system - horizontal module alignment





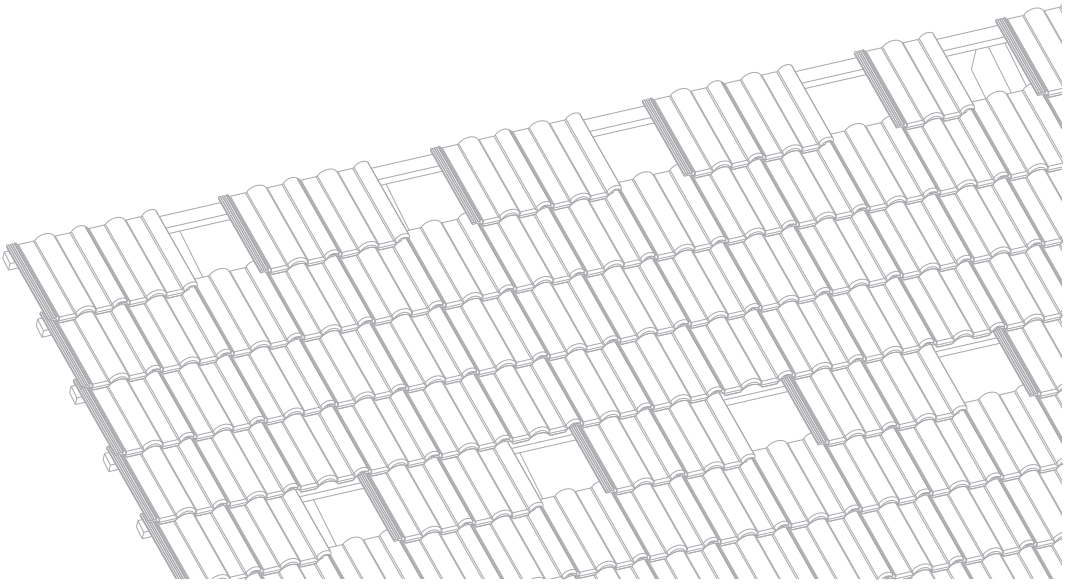
Without a structural analysis by means of the Renusol Configurator the length of the cantilever should not be longer than 300 mm.



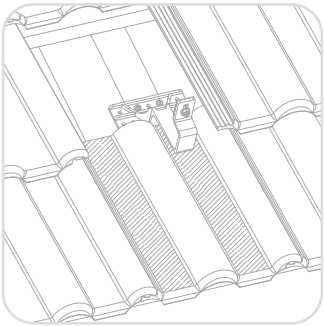
- **General instructions**
- **Static calculations**
- **Technical project overview**

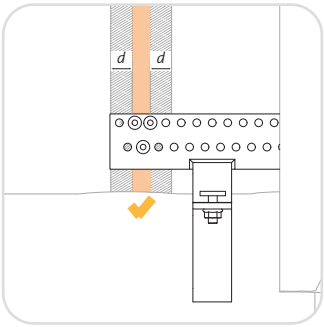
⇨ **www.pv-configurator.com**

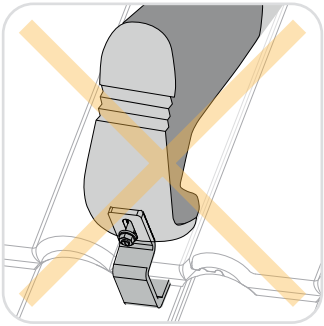
Two-layer rail system - horizontal module alignment

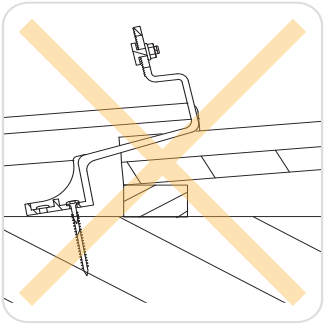


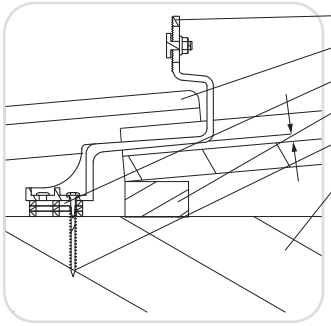
Two-layer rail system - horizontal module alignment

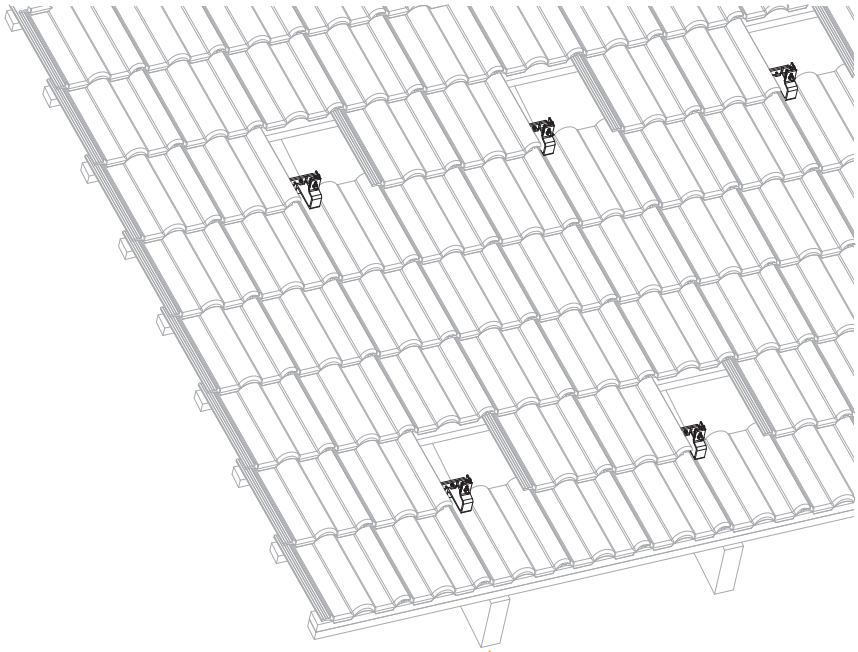










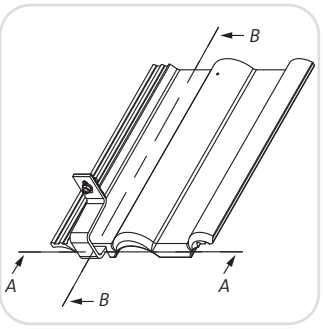


Warning!
Use the hole pattern of the roof hook to place the roof hook in the trough area of the tile. Screw the roof hook in the allowed area only. Keep a distance of 3x Ø of the wood screw to the outer edge of the rafter. Do not use the roof hook as step.

When mounted, the cantilever of the roof hook shall have a distance of approx. *5mm* to the roof tile.

Please find the number of screws on *page 49-50*.

Two-layer rail system - horizontal module alignment



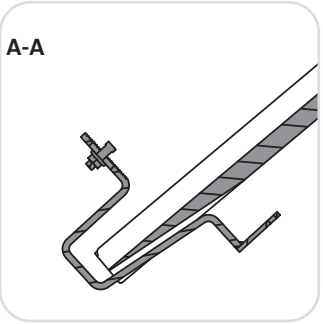
Warning!

The following treatment of tiles only applies to grooved tiles.

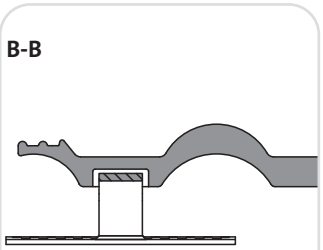
For flat tiles, please look at *page 44-46*.

Treat the tiles above the roof hooks using an angular grinding machine. Treat the tile as per detailed views A-A and B-B.

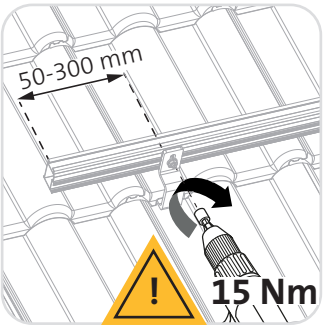
A-A

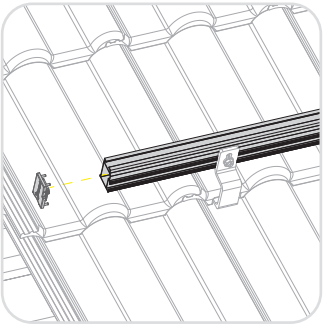


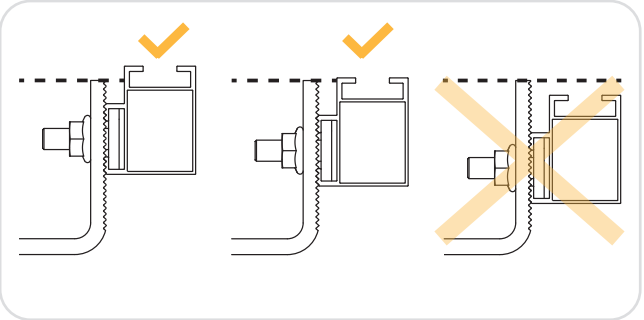
B-B

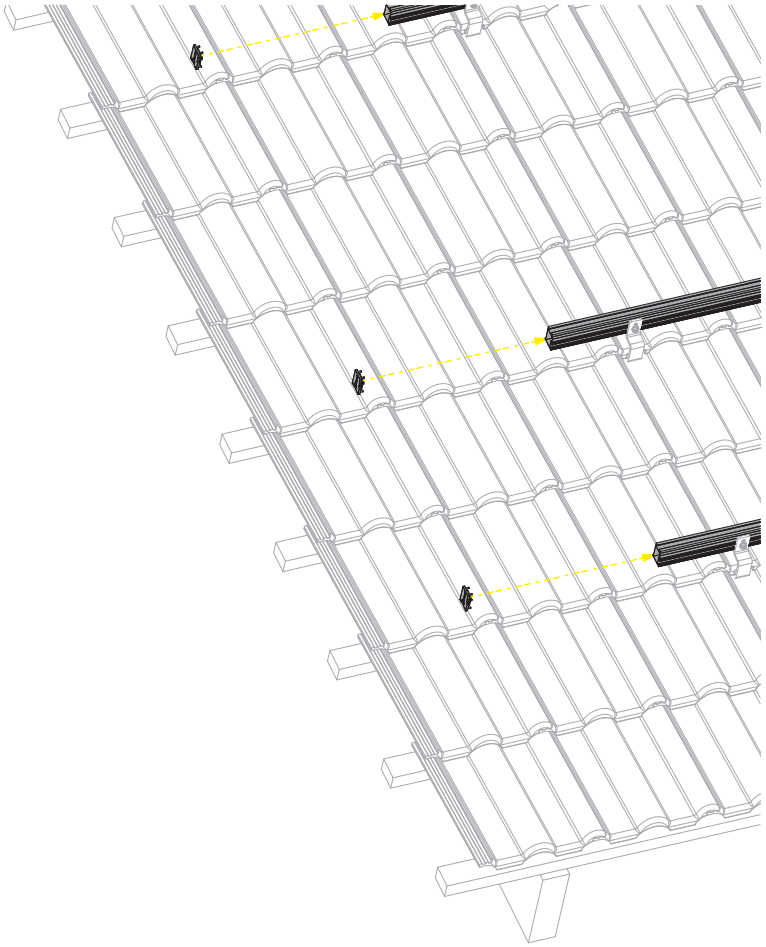


Two-layer rail system - horizontal module alignment

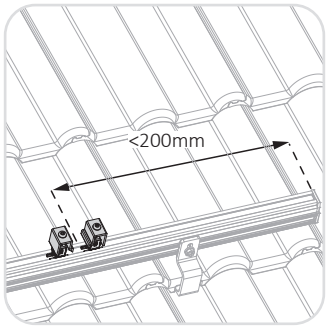


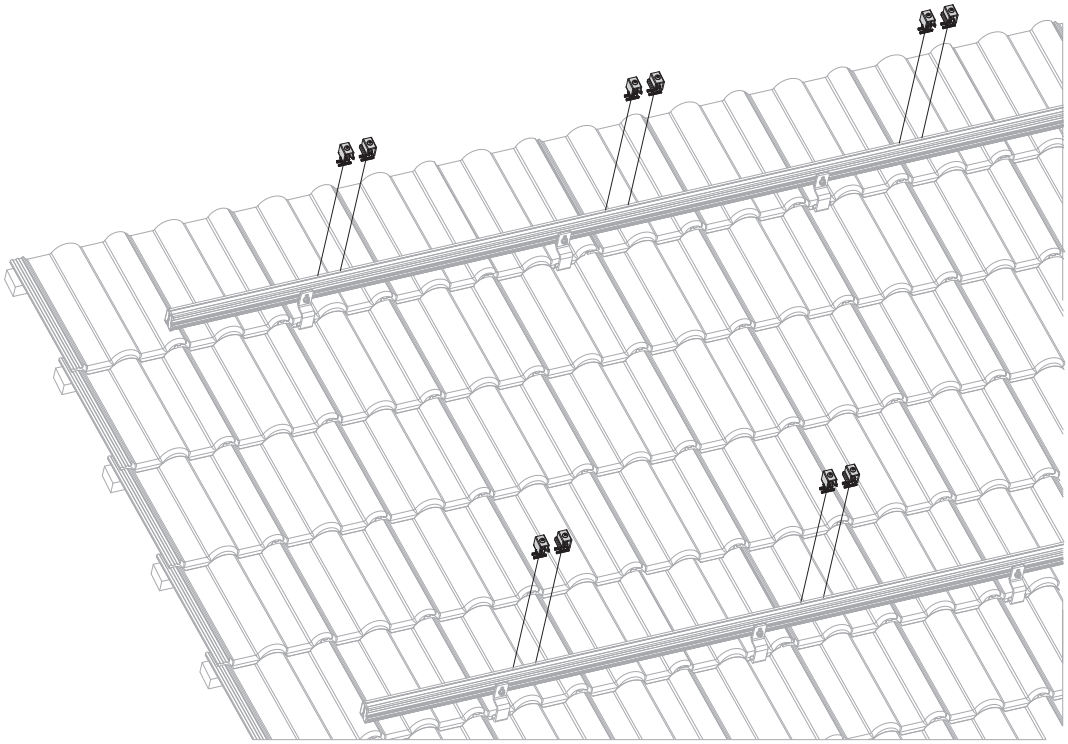




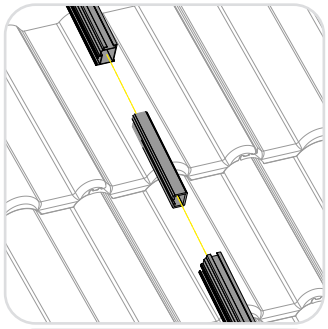


Two-layer rail system - horizontal module alignment

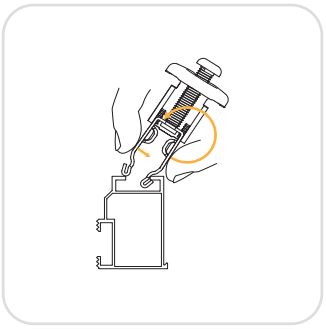


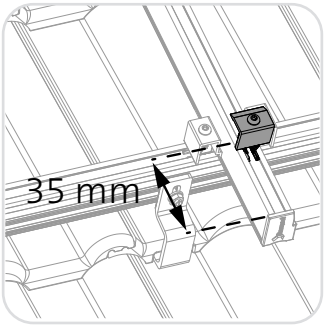


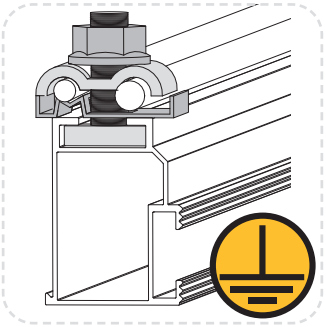
Two-layer rail system - horizontal module alignment

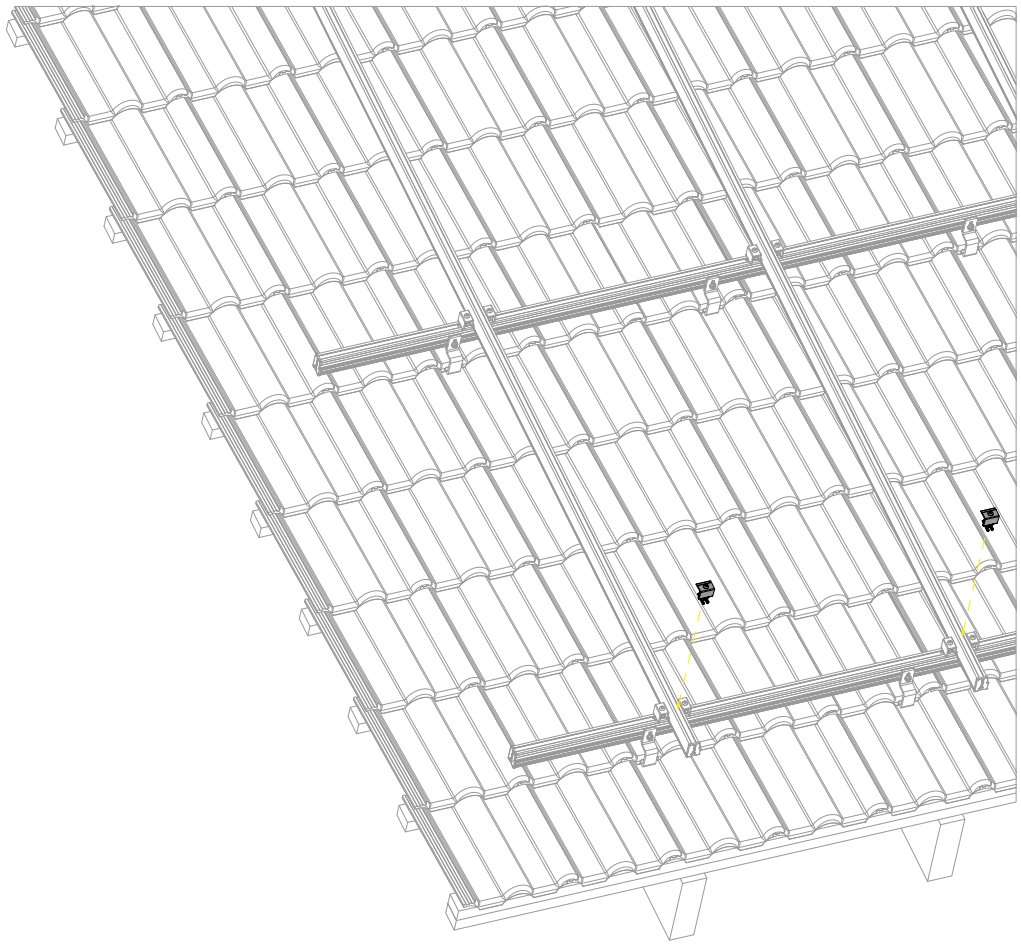


Two-layer rail system - horizontal module alignment

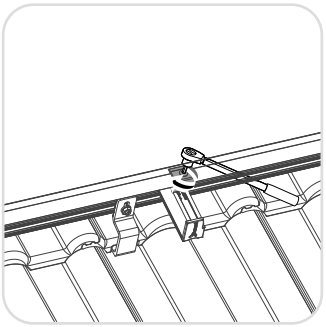


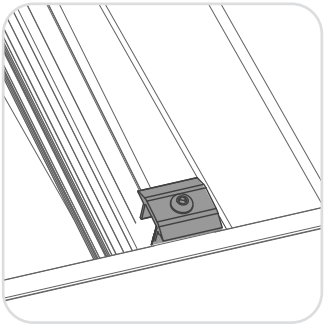


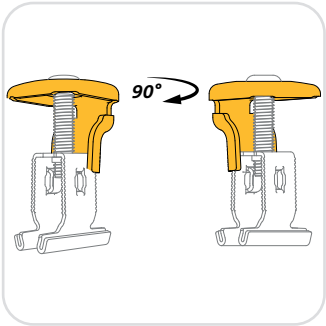


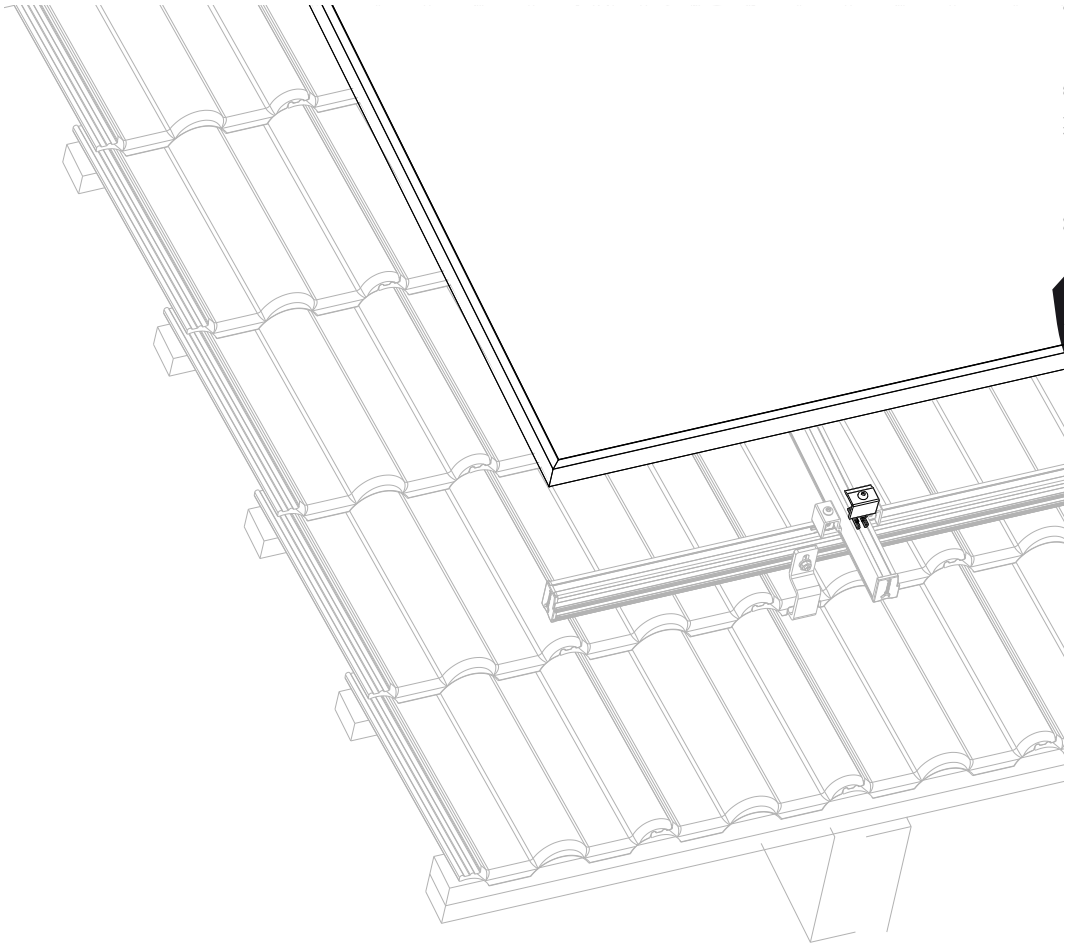


Two-layer rail system - horizontal module alignment

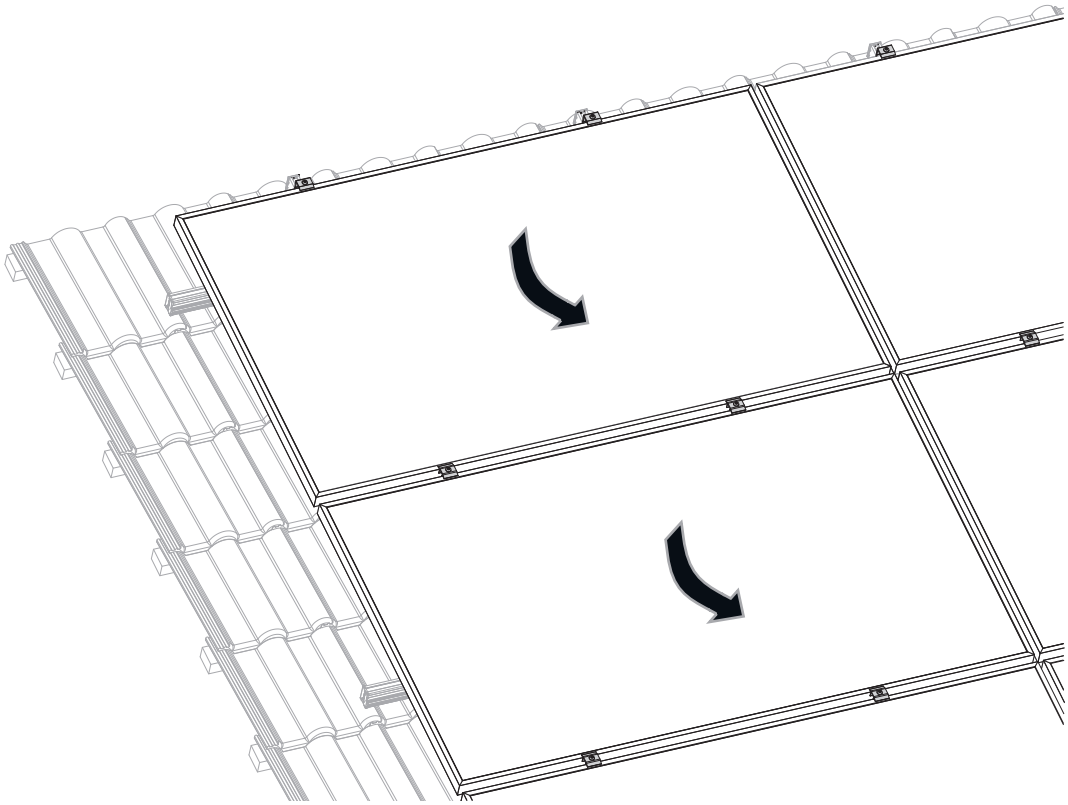




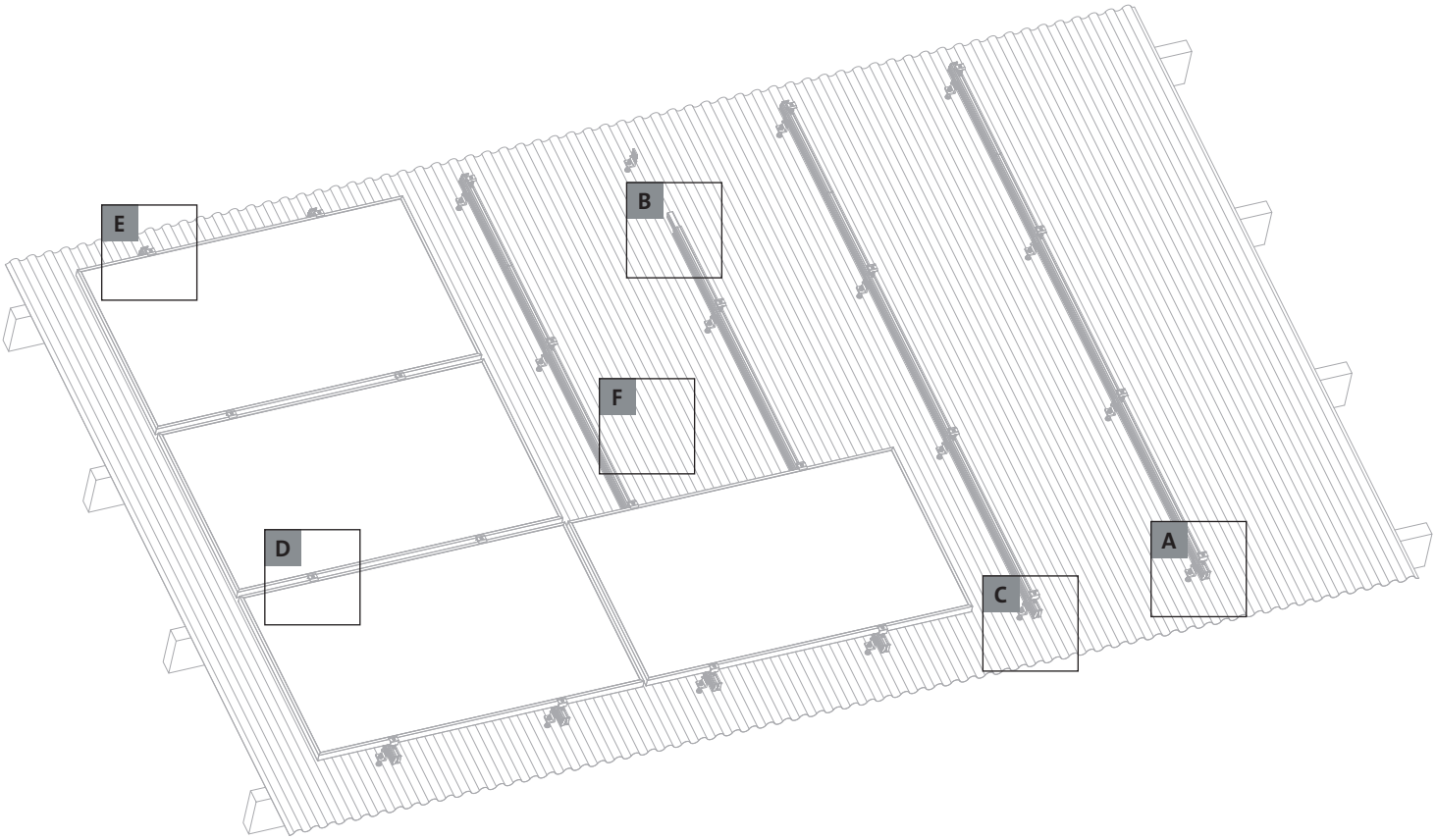




Two-layer rail system - horizontal module alignment

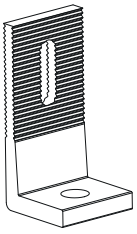


Hanger bolts - solar fastener connection - horizontal module alignment



A

+



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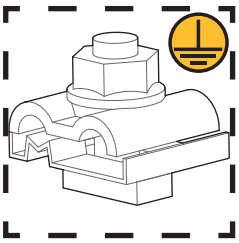
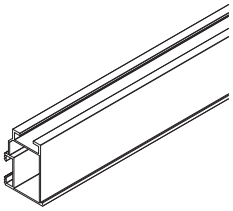
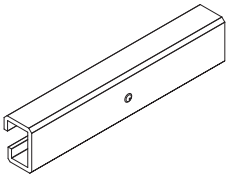
B



B





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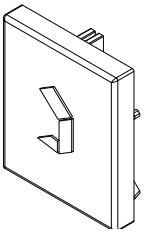
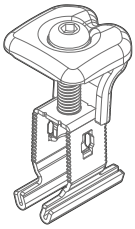
C



D + **E**



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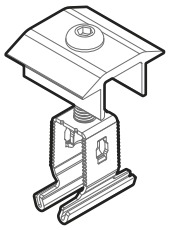

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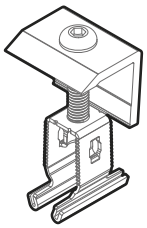
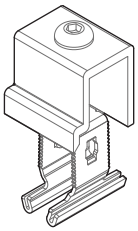
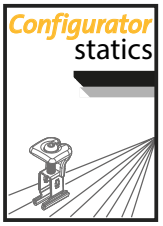
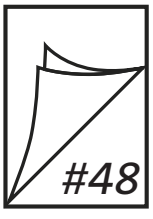


F







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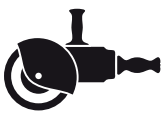
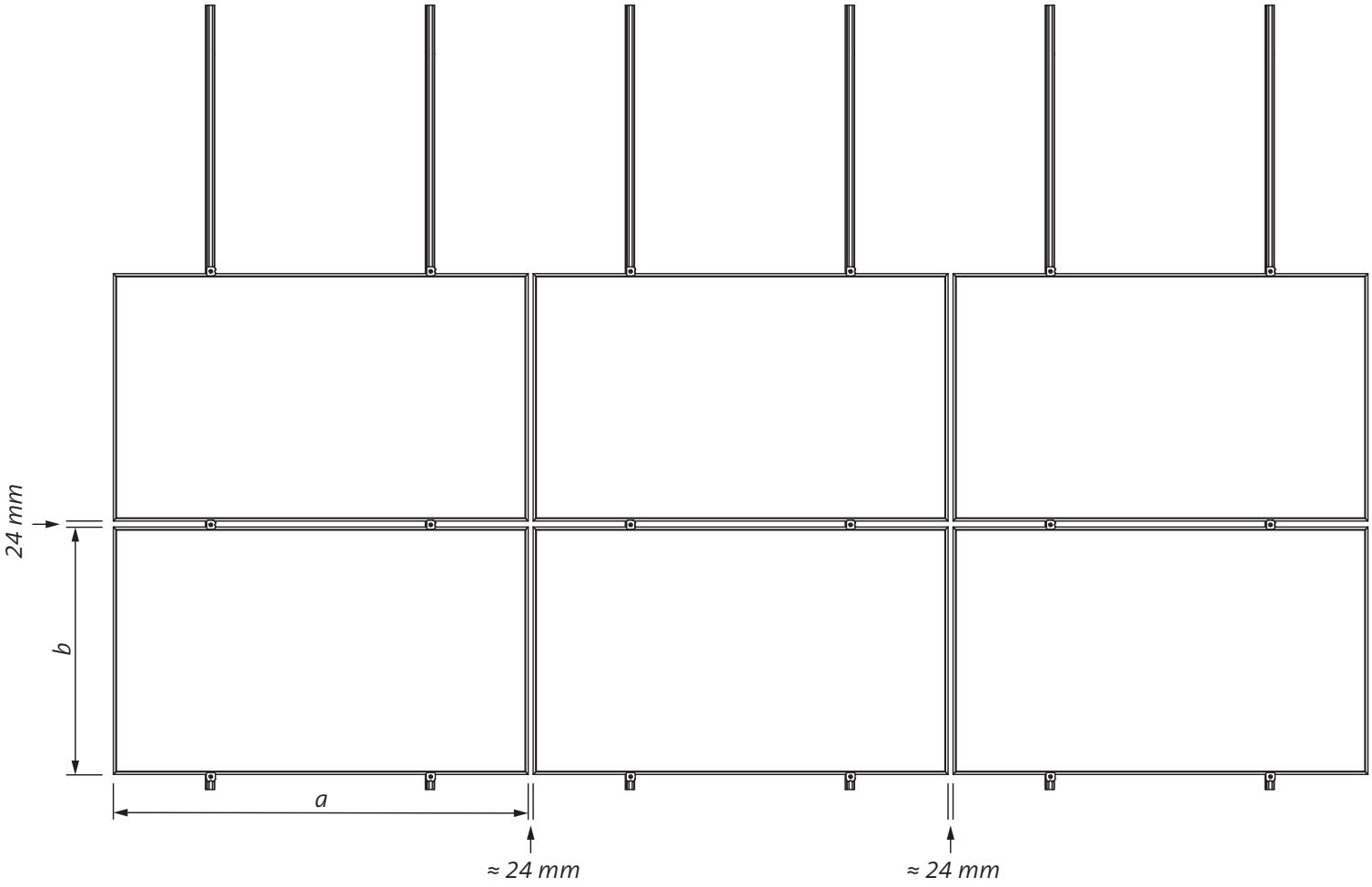


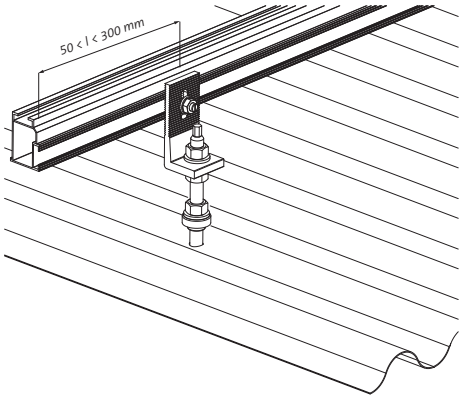
SIT 30
(TX 30)

Nm

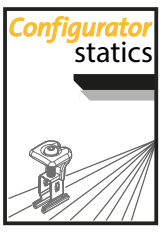
10mm / 13 mm

Hanger bolts - solar fastener connection - horizontal module alignment





Without a structural analysis by means of the Renusol Configurator the length of the cantilever should not be longer than 300 mm.



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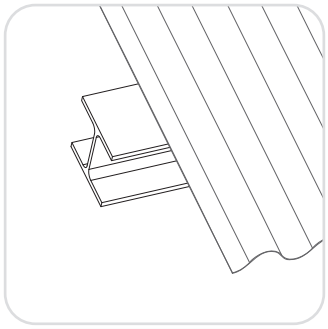
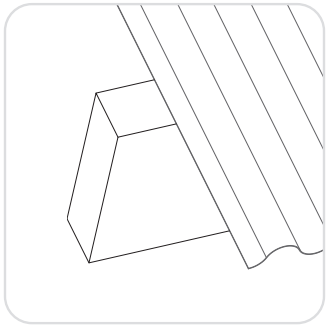
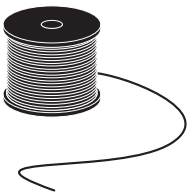
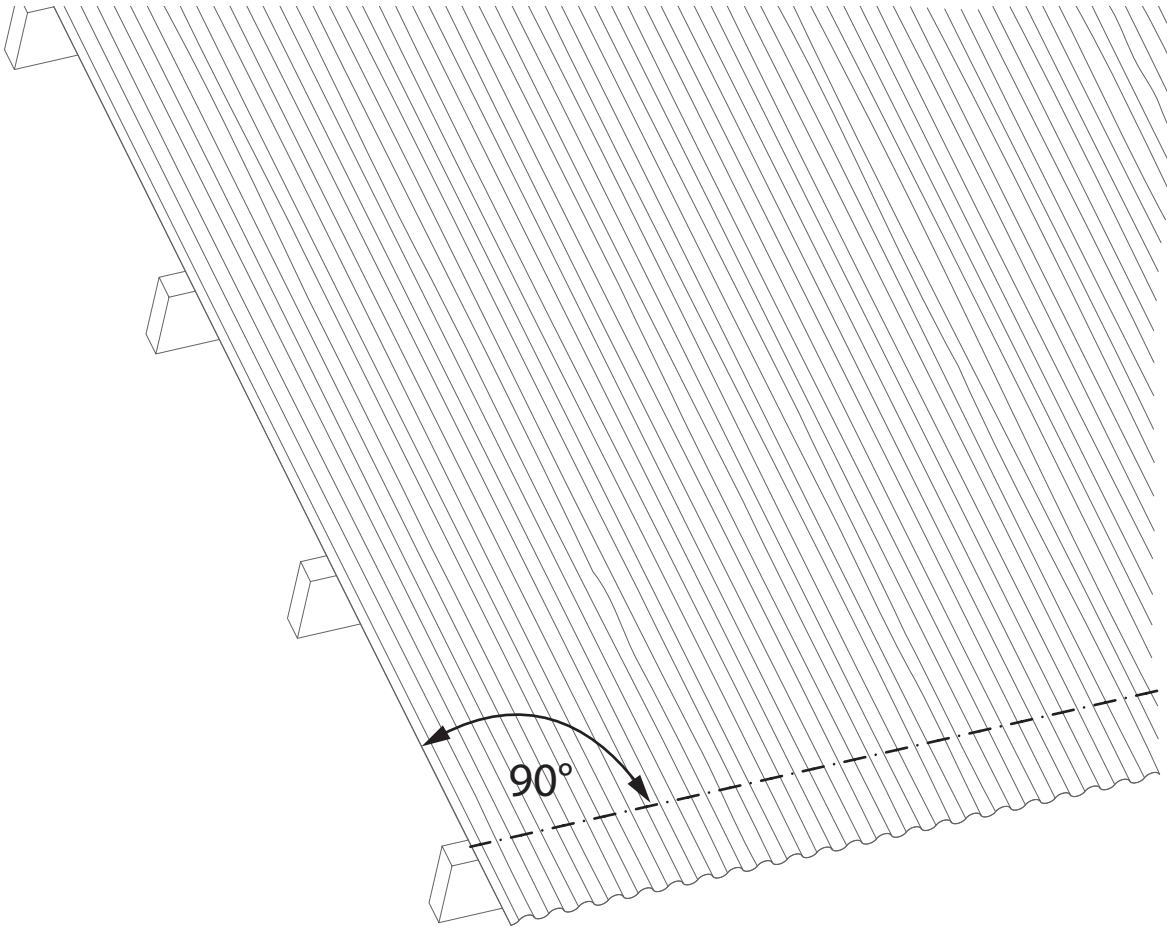
Hanger bolts - solar fastener connection - horizontal module alignment

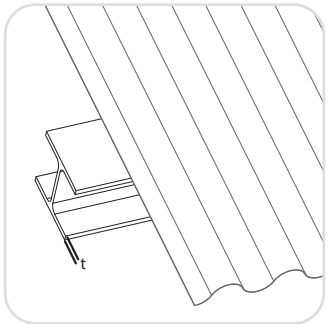


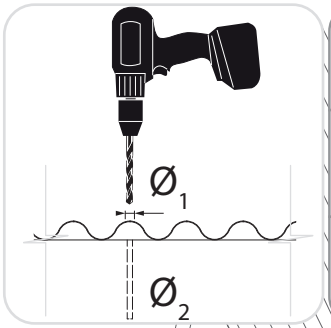




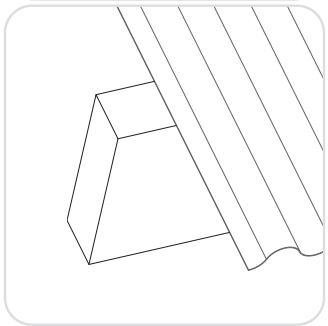


Hanger bolts - solar fastener connection - horizontal module alignment

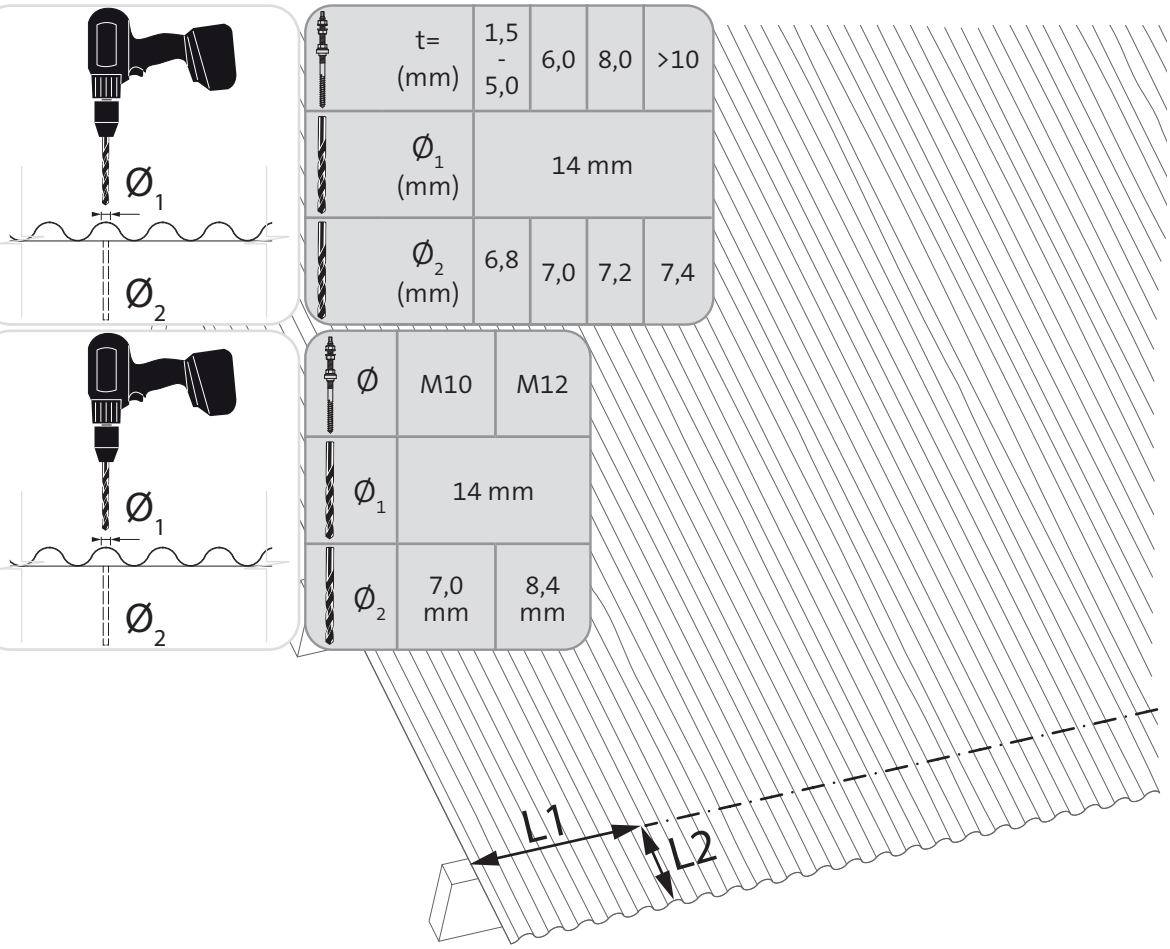




t= (mm)	1,5 - 5,0	6,0	8,0	>10
Ø1 (mm)	14 mm			
Ø2 (mm)	6,8	7,0	7,2	7,4

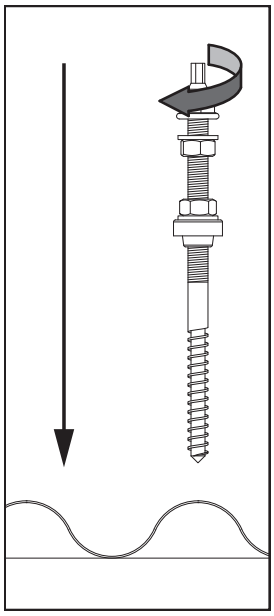


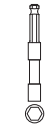
Ø	M10	M12
Ø1	14 mm	
Ø2	7,0 mm	8,4 mm



Hanger bolts - solar fastener connection - horizontal module alignment

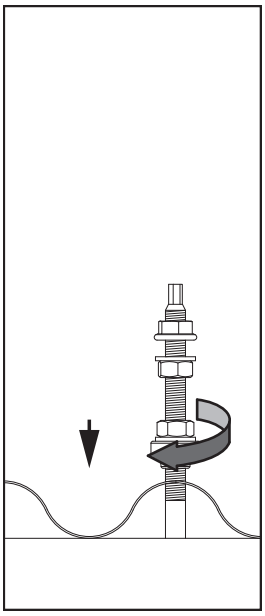
1



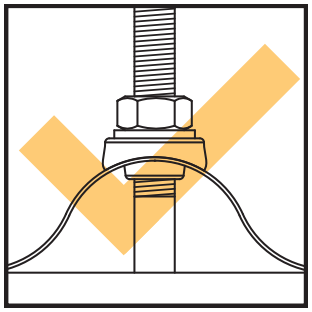


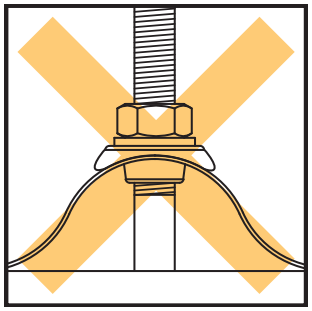
M10: S7
M12: S9

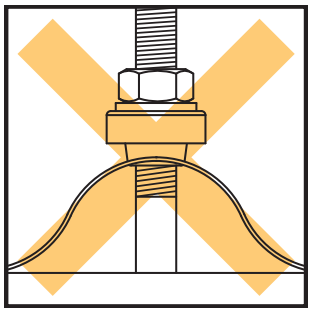
2



M10: SW17
M12: SW19

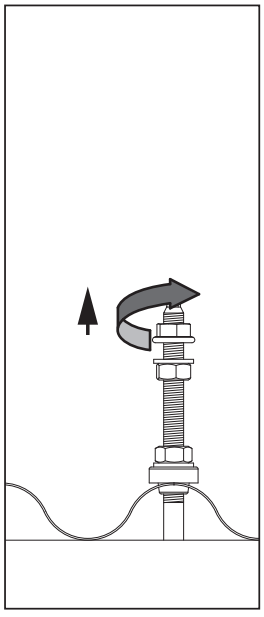






Hanger bolts - solar fastener connection - horizontal module alignment

3



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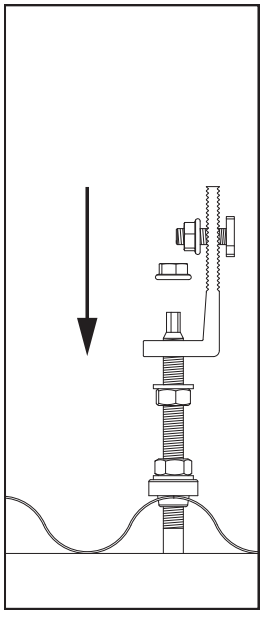
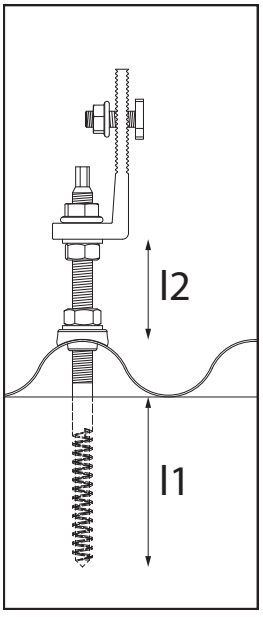


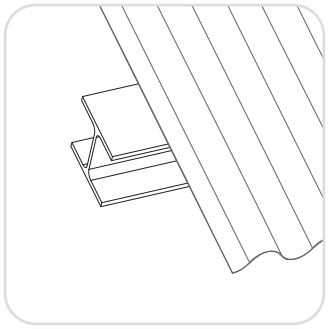
M10: SW17
M12: SW19

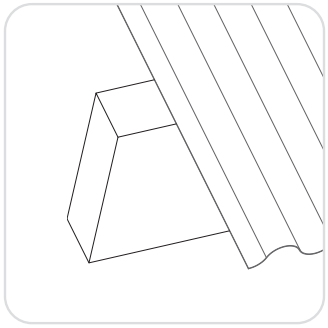
5

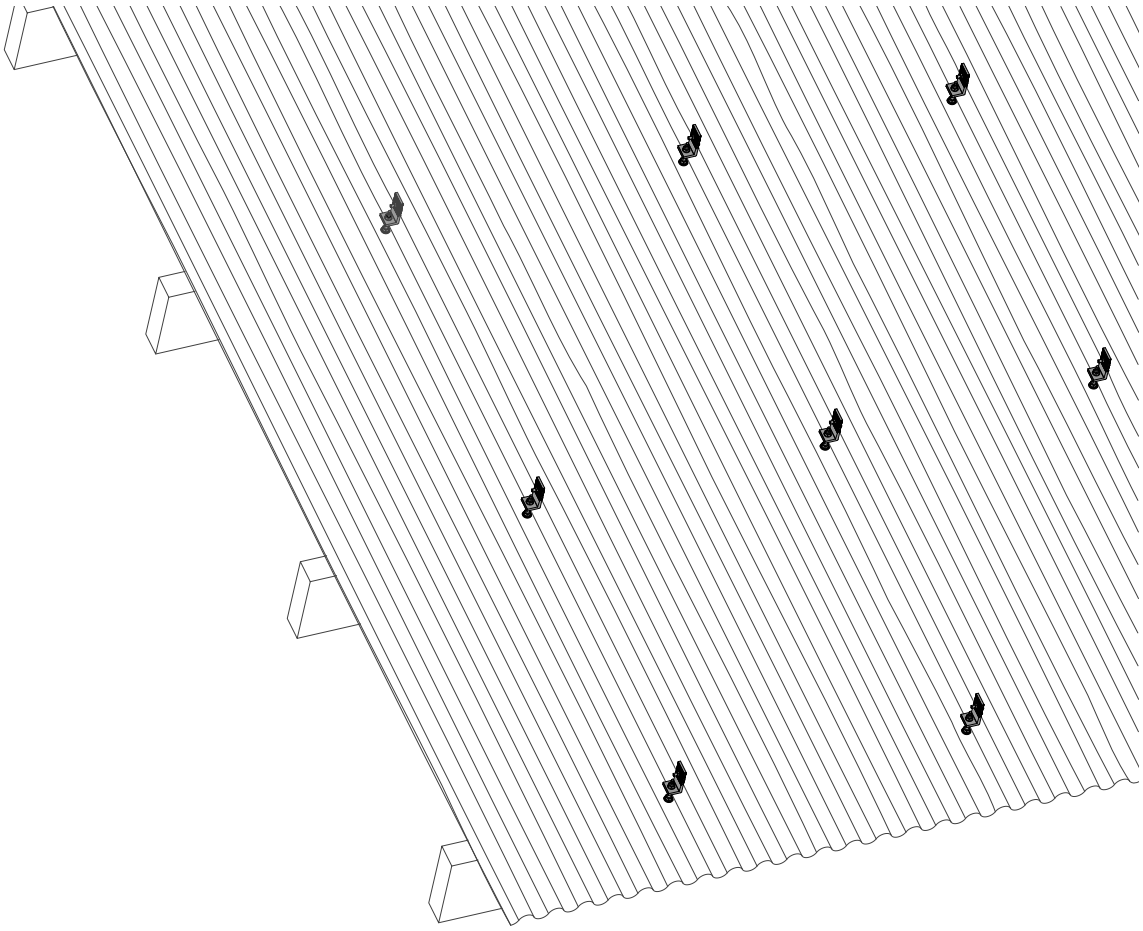


	M10	M12
l1	>40mm	>48mm
l2	<40 mm	

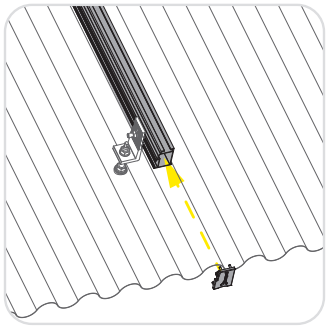
Hanger bolts - solar fastener connection - horizontal module alignment

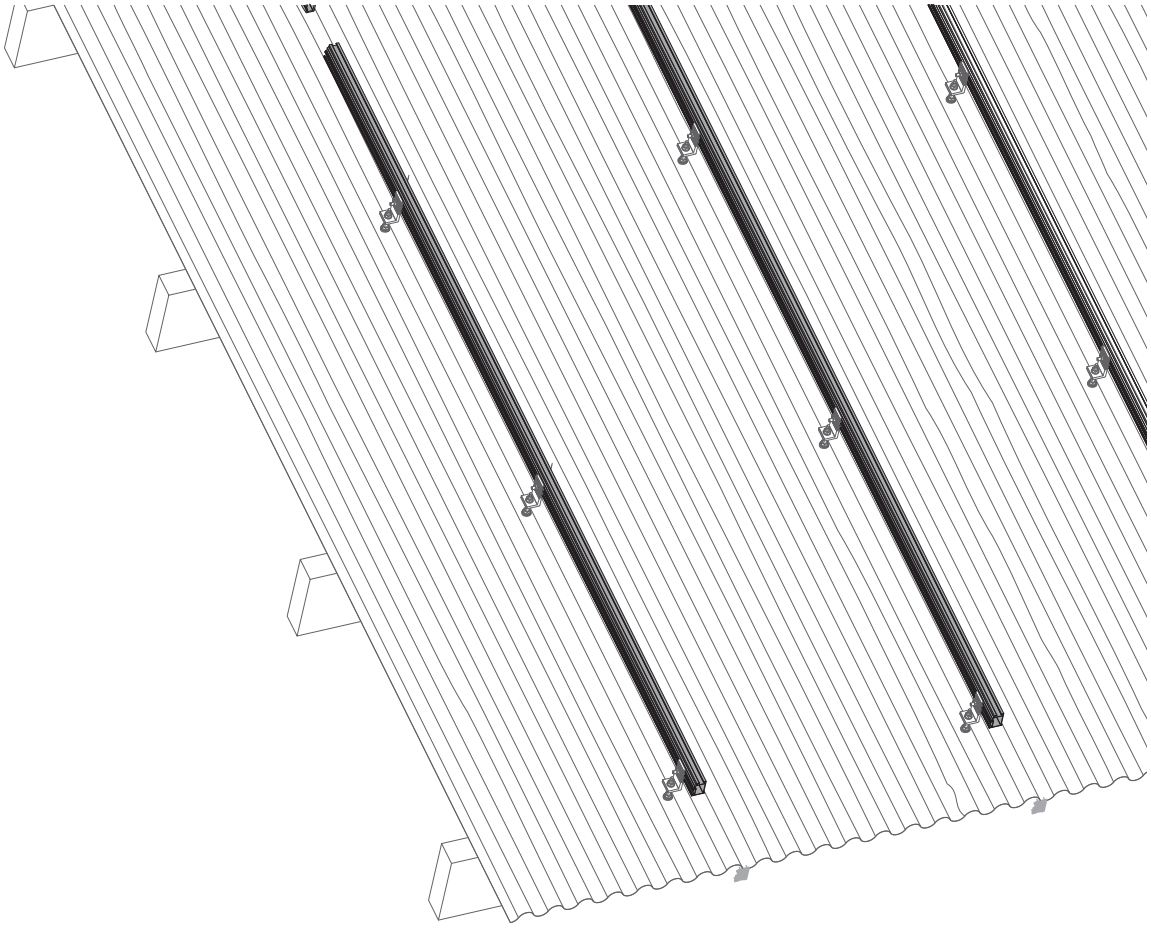




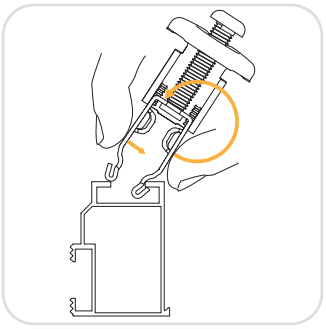


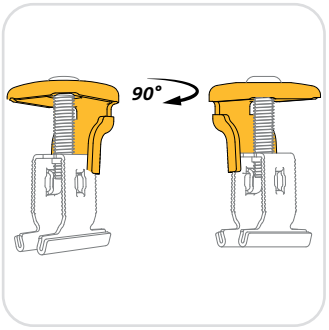
Hanger bolts - solar fastener connection - horizontal module alignment

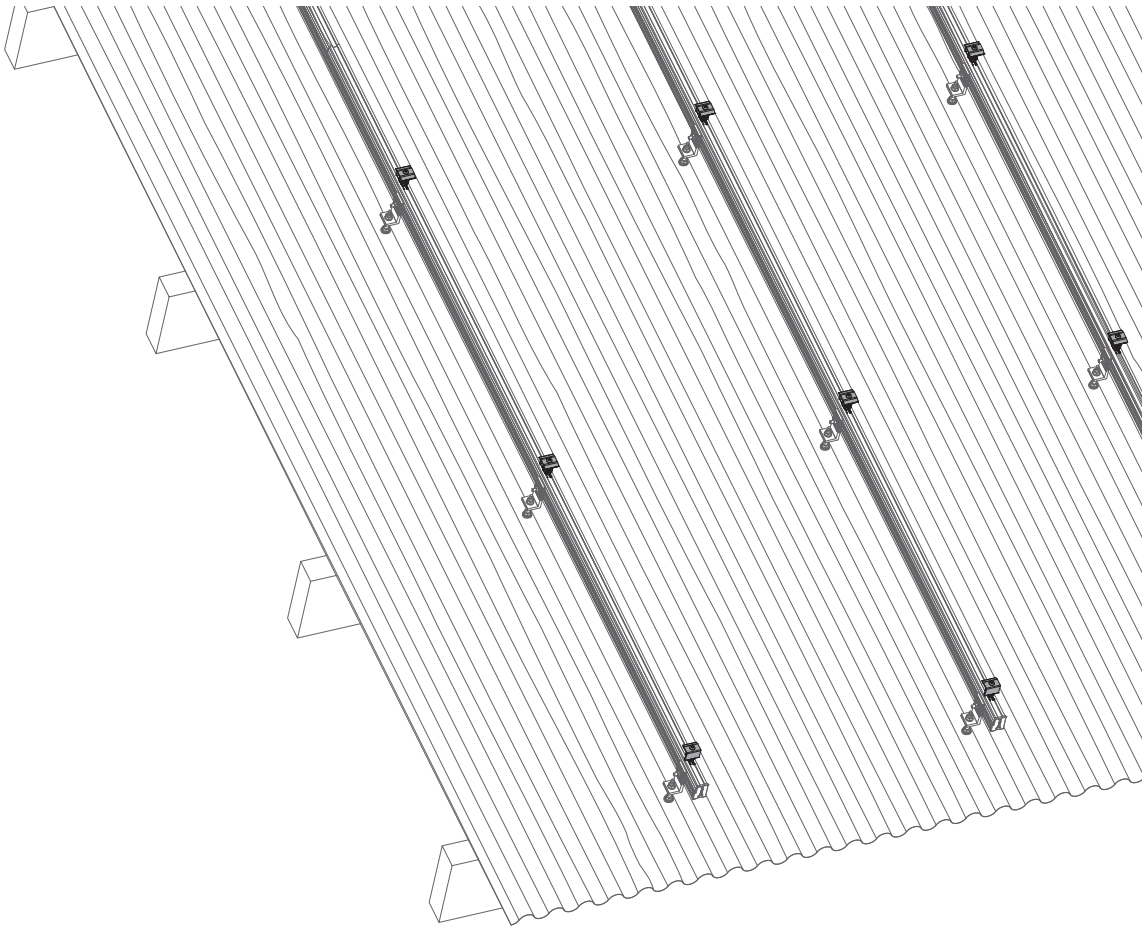




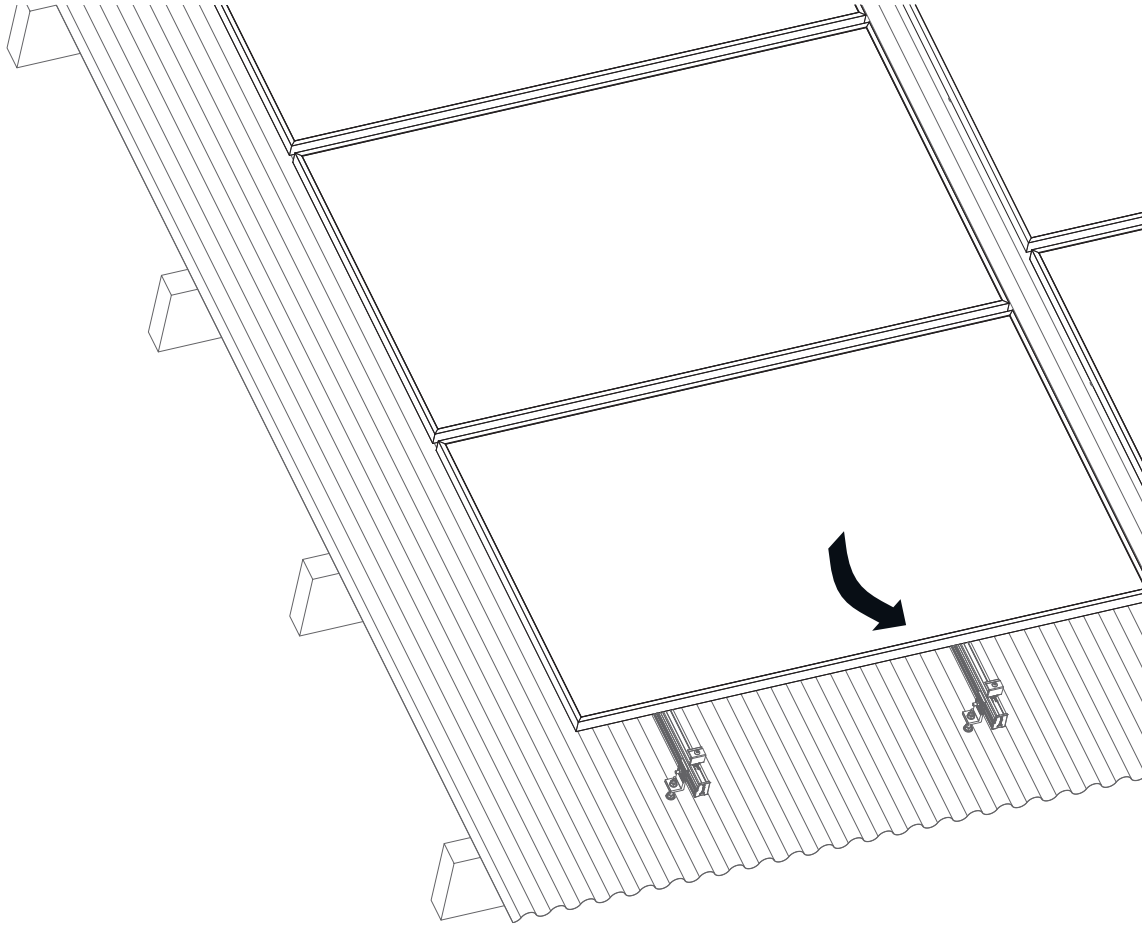
Hanger bolts - solar fastener connection - horizontal module alignment

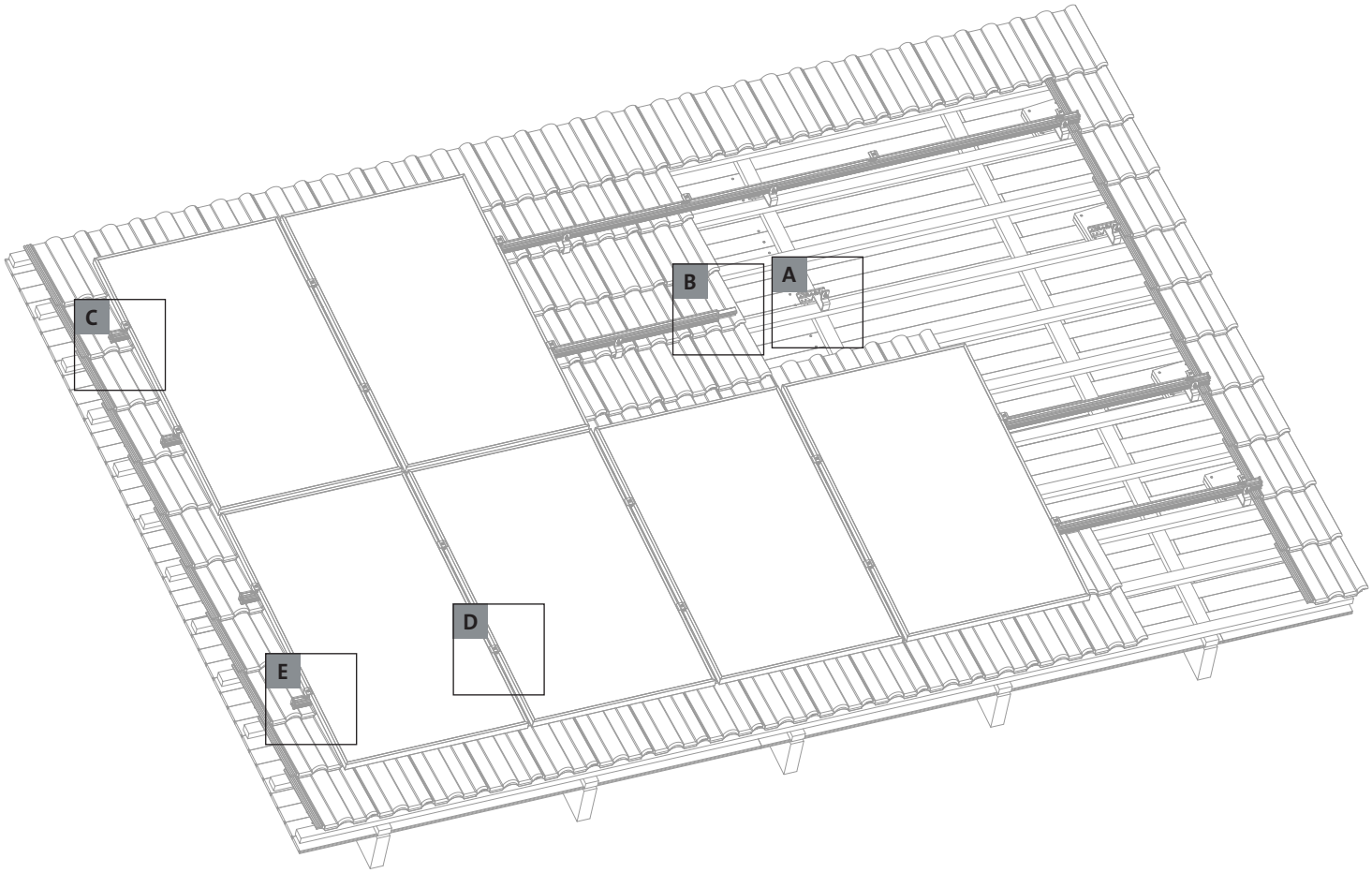




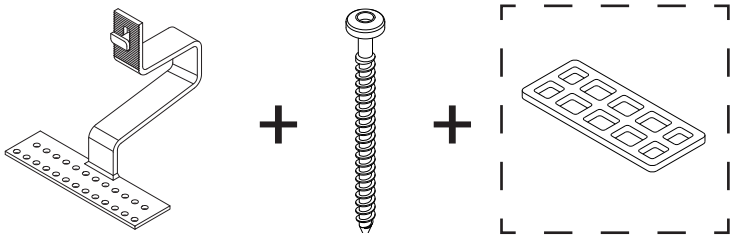


Hanger bolts - solar fastener connection - horizontal module alignment





A



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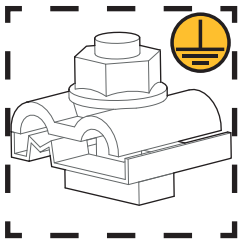
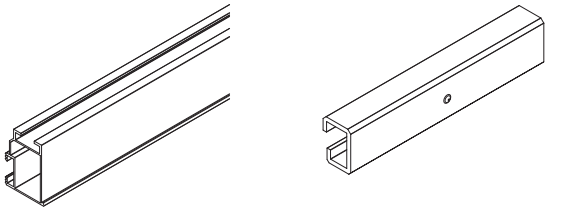
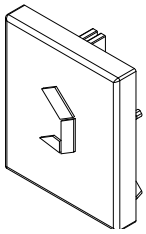


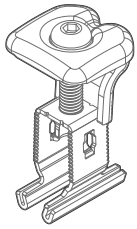
B



C



D + E



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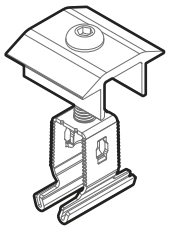

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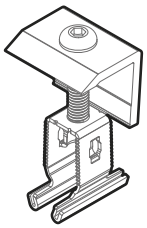

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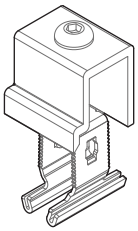
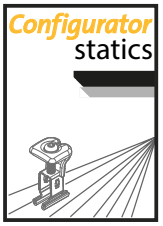
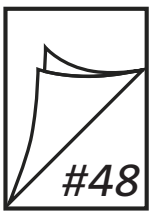
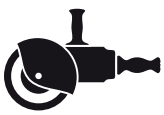






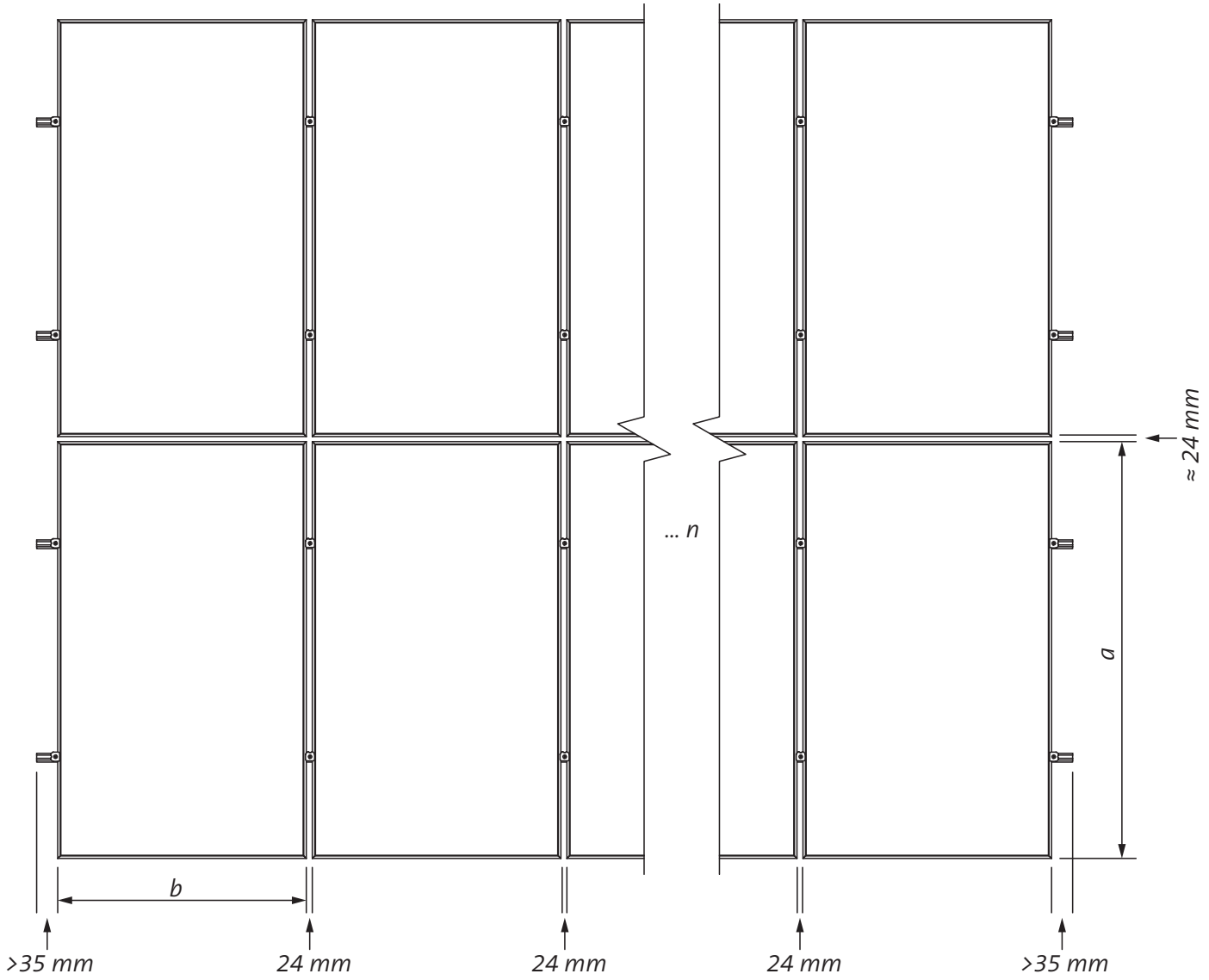
+

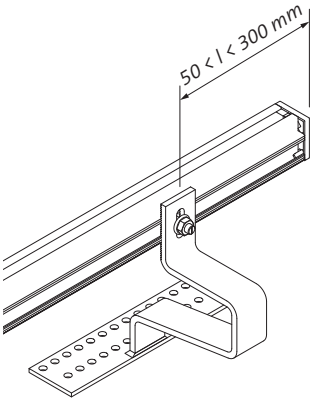


SIT 30
(TX 30)

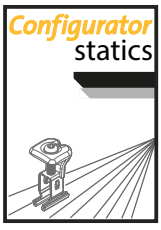
Nm

10mm / 13 mm





Without a structural analysis by means of the Renusol Configurator the length of the cantilever should not be longer than 300 mm.



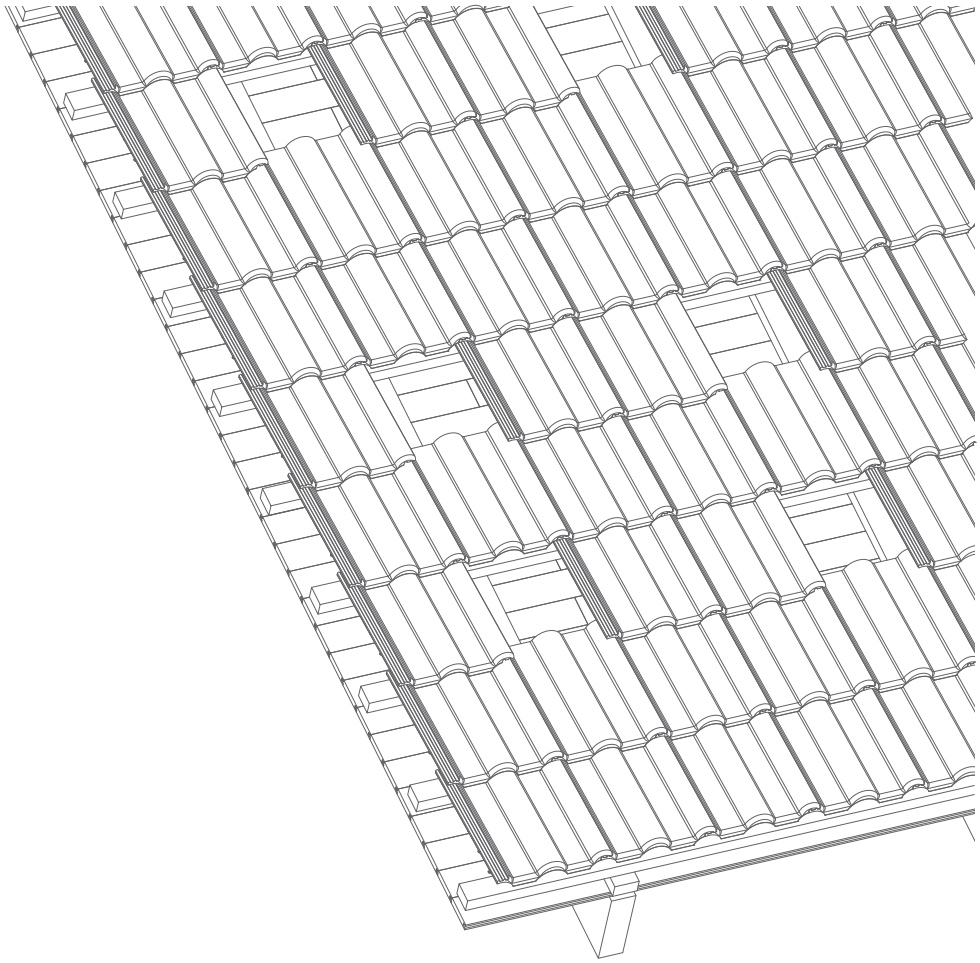
- **General instructions**
- **Static calculations**
- **Technical project overview**

⇨ **www.pv-configurator.com**

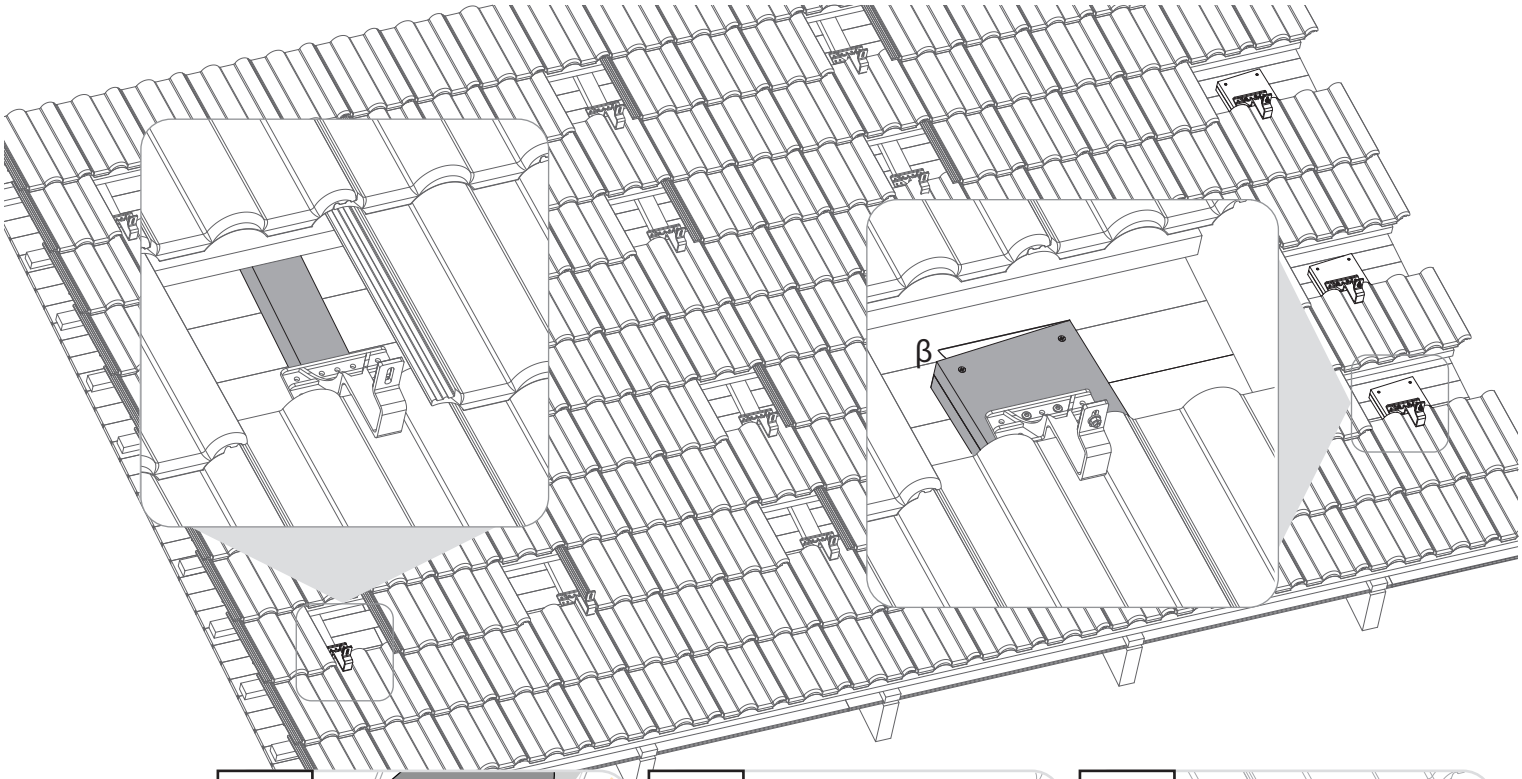
One-layer rail system on tongue and groove boards fixation - vertical module alignment

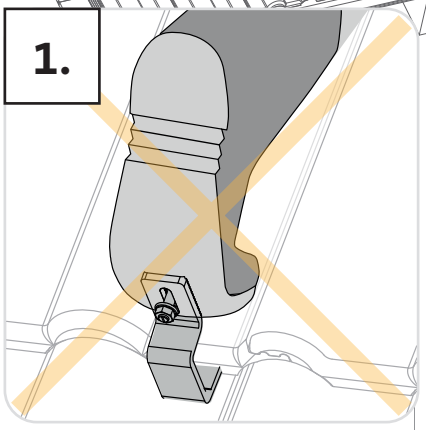
Remove the additional gutter tiles on the top side as per layout to have more work space.

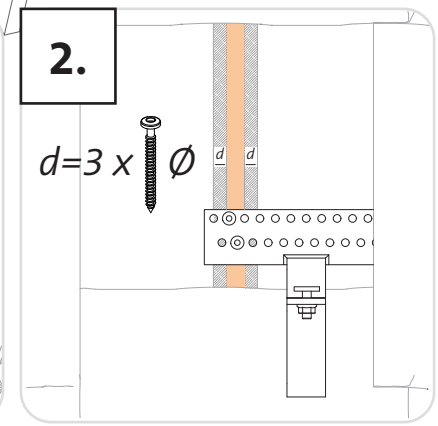
Warning!
Check the condition of the roof construction before starting the installation. This includes quality and thickness of rafters, purlins and the roof sealing. The building structure must be able to safely and durably bear the additional loads of the photovoltaic system.

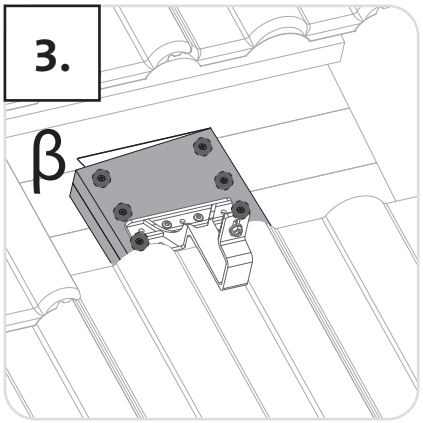


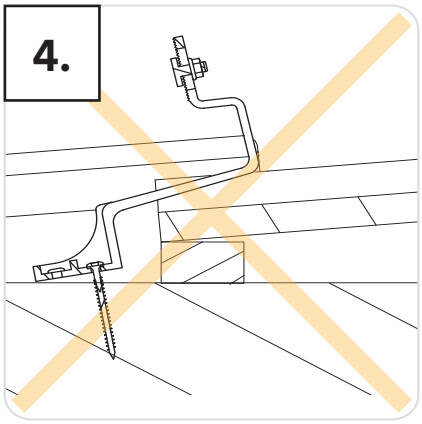
One-layer rail system on tongue and groove boards fixation - vertical module alignment

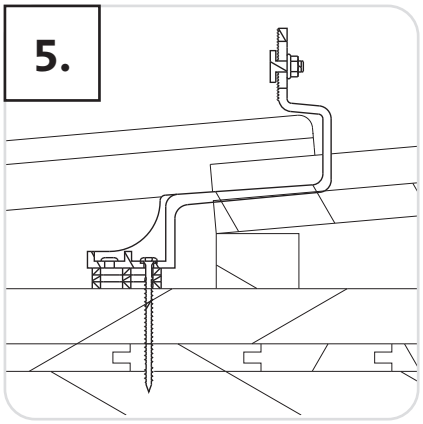












Warning!

A surveyor must assess the quality of the rafters, laths as well as the grooved board and the strictly required screwed fixations of the grooved board with the rafters and ascertain whether the roof is suitable for the installation of VarioSole taking into account the local wind and snow conditions. Replace bad or old roof laths as well as the grooved boards by new ones, which at least comply with the currently applicable regulations.

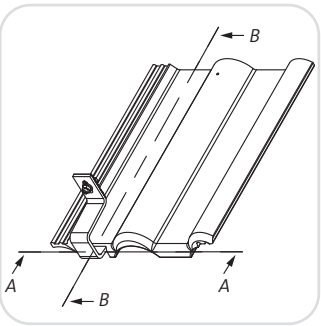
If mounted on grooved boards, the load capacity of the roof hook is clearly lower compared with the screwed connection on rafters.

The Renusol Europe GmbH will not accept liability for the direct screwed connection on the grooved board. The following steps shall only serve for illustration. To ensure warranty, please follow the instructions **"One-layer rail system - vertical module alignment"** and read our warranty conditions in *www.Renusol.com*. Only use the levelling element on a timber lining of at least 20 mm thickness with an NH strength class of min. C24.

Warning!

1. Do not use the roof hook as step
2. Screw the roof hooks fastened on the rafter within the allowed range only. Keep a distance of 3x Ø of the wood screw to the outer edge. Please find the number of screws on *page 49-50*.
3. Screw on the levelling elements in an angle of approx. $\beta \approx 5°$, to avoid stagnant water. Screw on 6 wood screws.
4. If screwed on grooved board and on roof rafters, make sure that the tile does not rest on.
5. Screw on the roof hooks though all levelling elements (incl. grooved board)

One-layer rail system on tongue and groove boards fixation - vertical module alignment



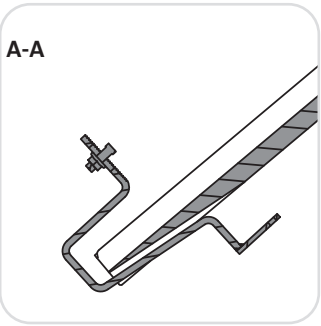
Warning!

The following treatment of tiles only applies to grooved tiles.

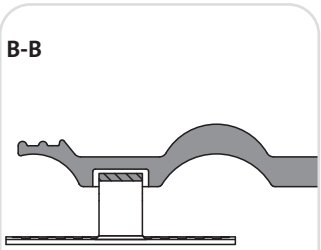
For flat tiles, please look at *page 44-46*.

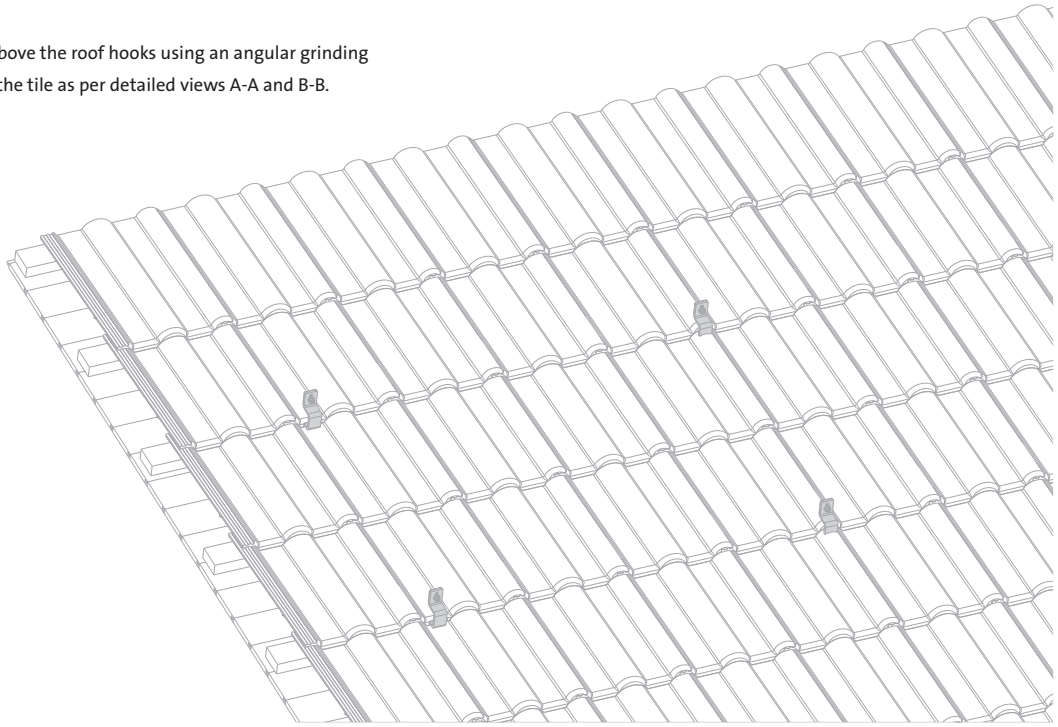
Treat the tiles above the roof hooks using an angular grinding machine. Treat the tile as per detailed views A-A and B-B.

A-A

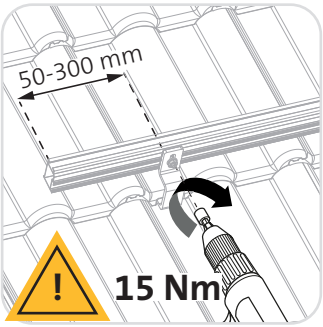


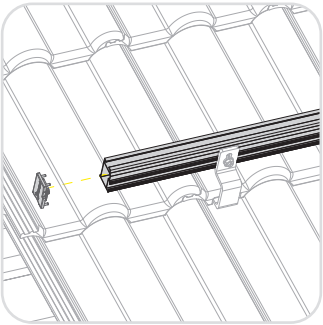
B-B

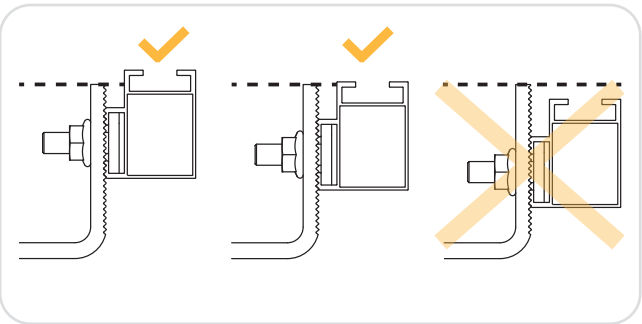


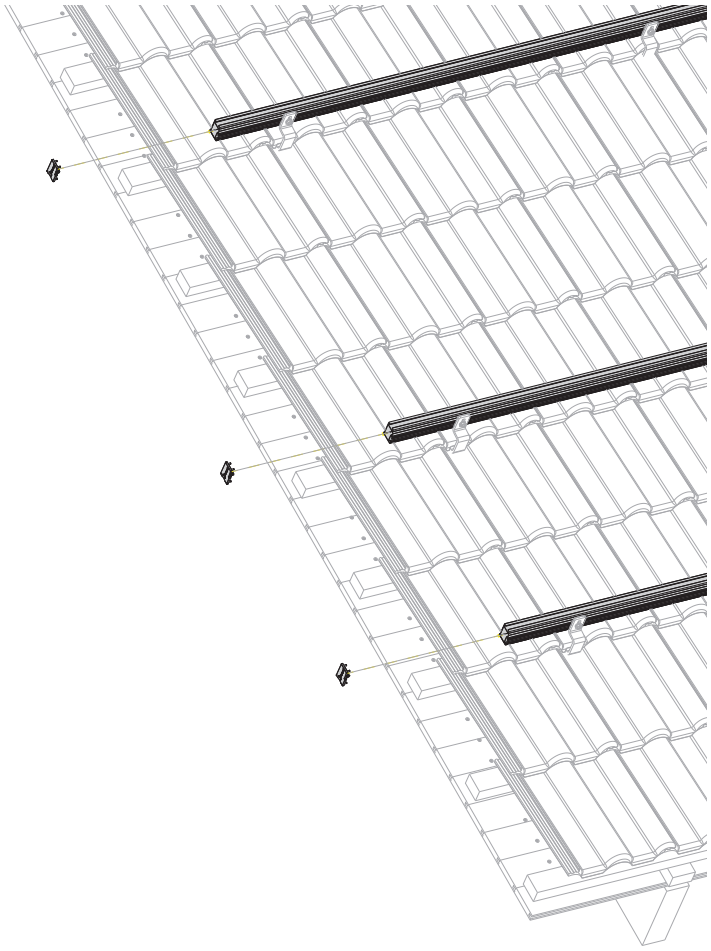


One-layer rail system on tongue and groove boards fixation - vertical module alignment

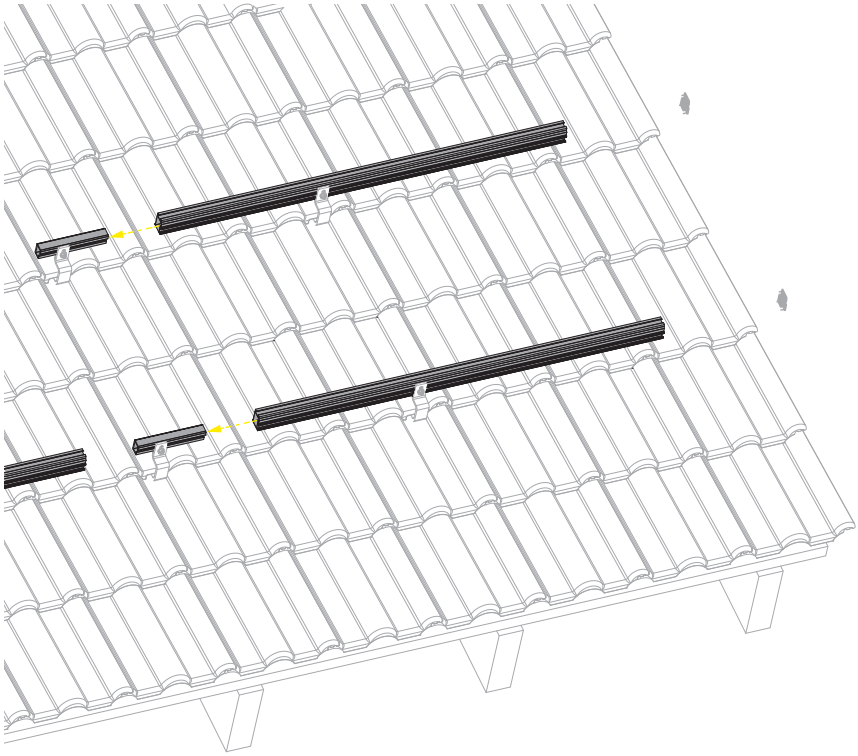


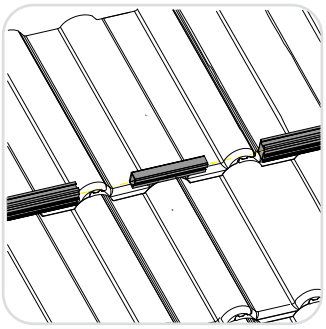


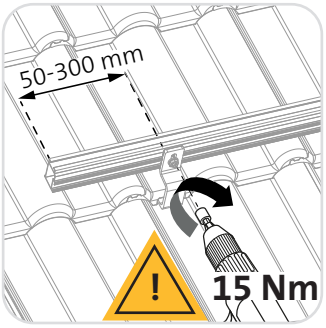


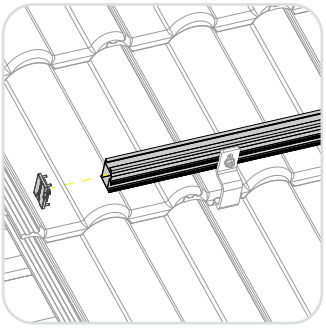


One-layer rail system on tongue and groove boards fixation - vertical module alignment

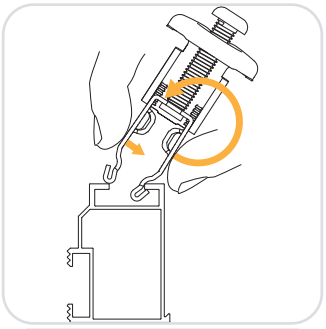


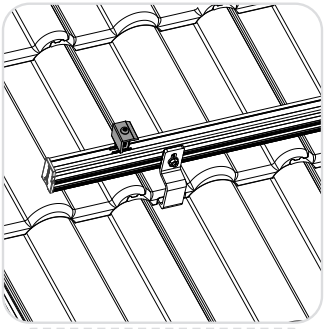


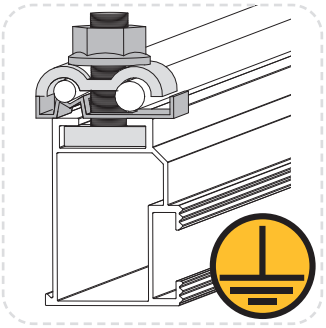


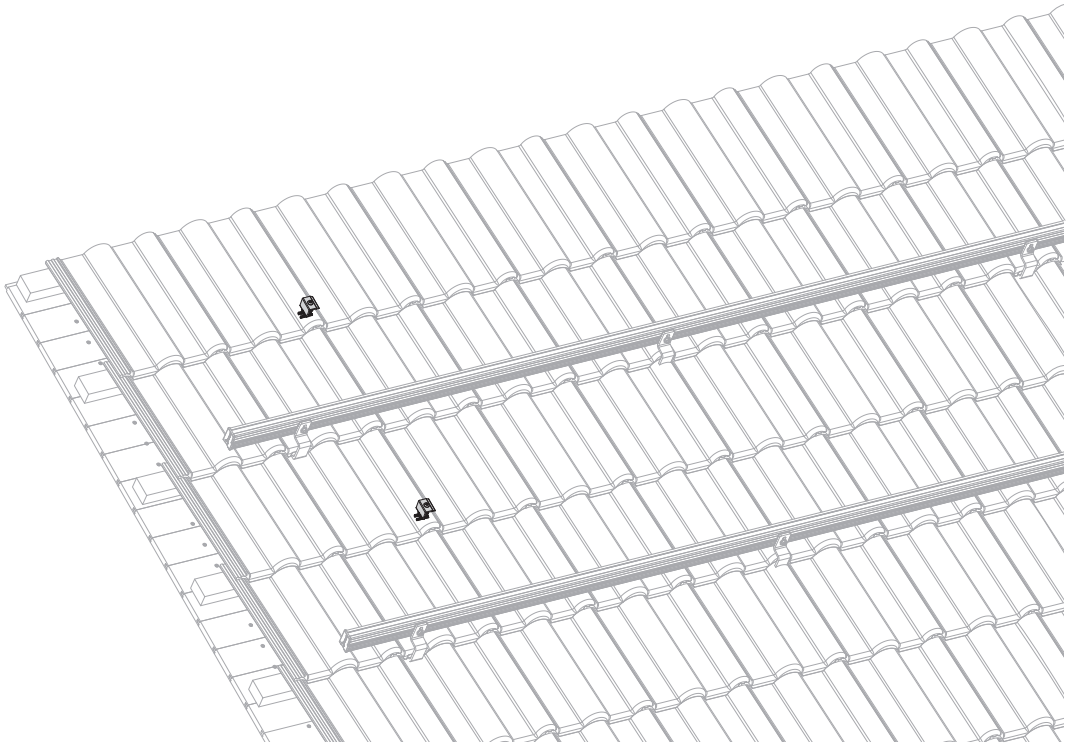


One-layer rail system on tongue and groove boards fixation - vertical module alignment

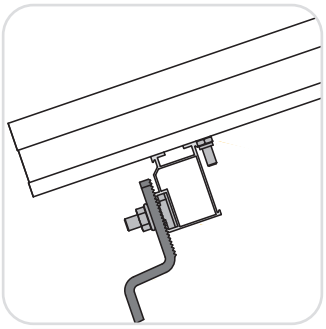


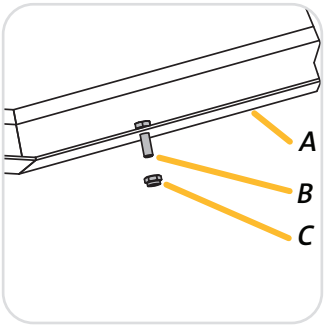






One-layer rail system on tongue and groove boards fixation - vertical module alignment

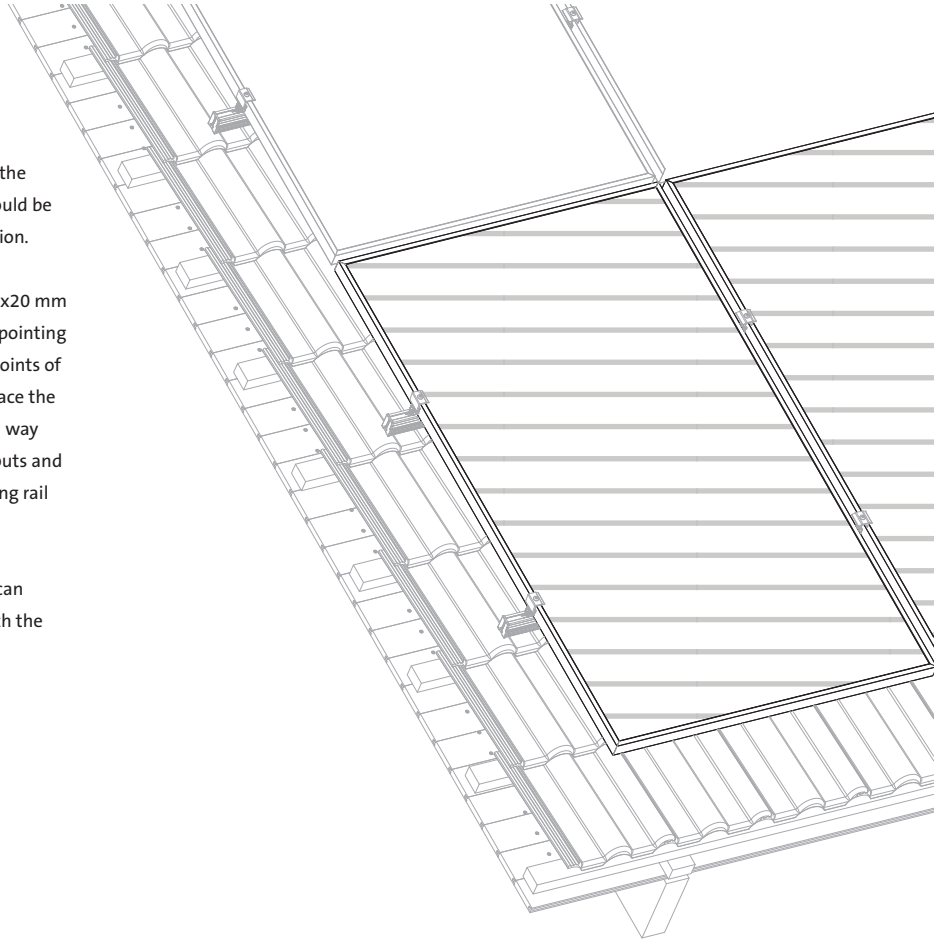




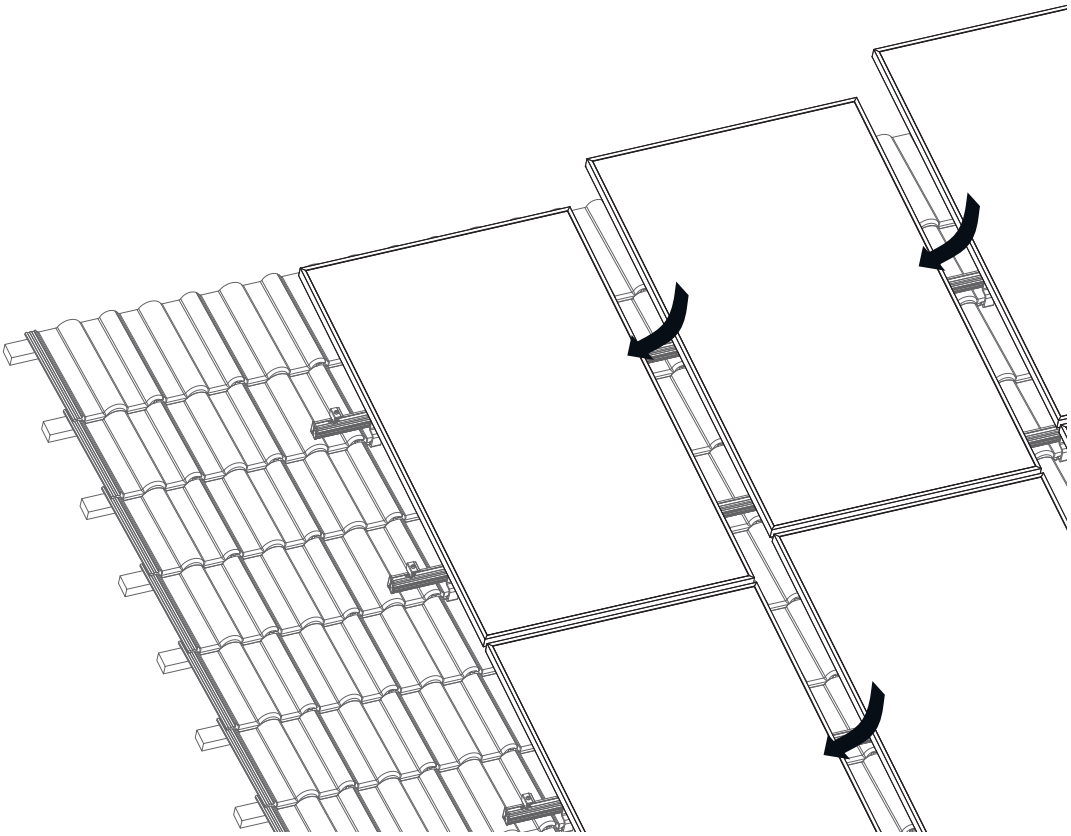
Warning!
Before installing the modules, the modules of the lowest row should be provided with anti-slip protection.

For this purpose fasten the M6x20 mm screws (with the shaft/thread pointing downwards) in the fastening points of the modules using M6 nuts. Place the modules in the lowest row in a way that the anti-slip protection abuts and the edge of the lowest mounting rail (Fig. B) touches.

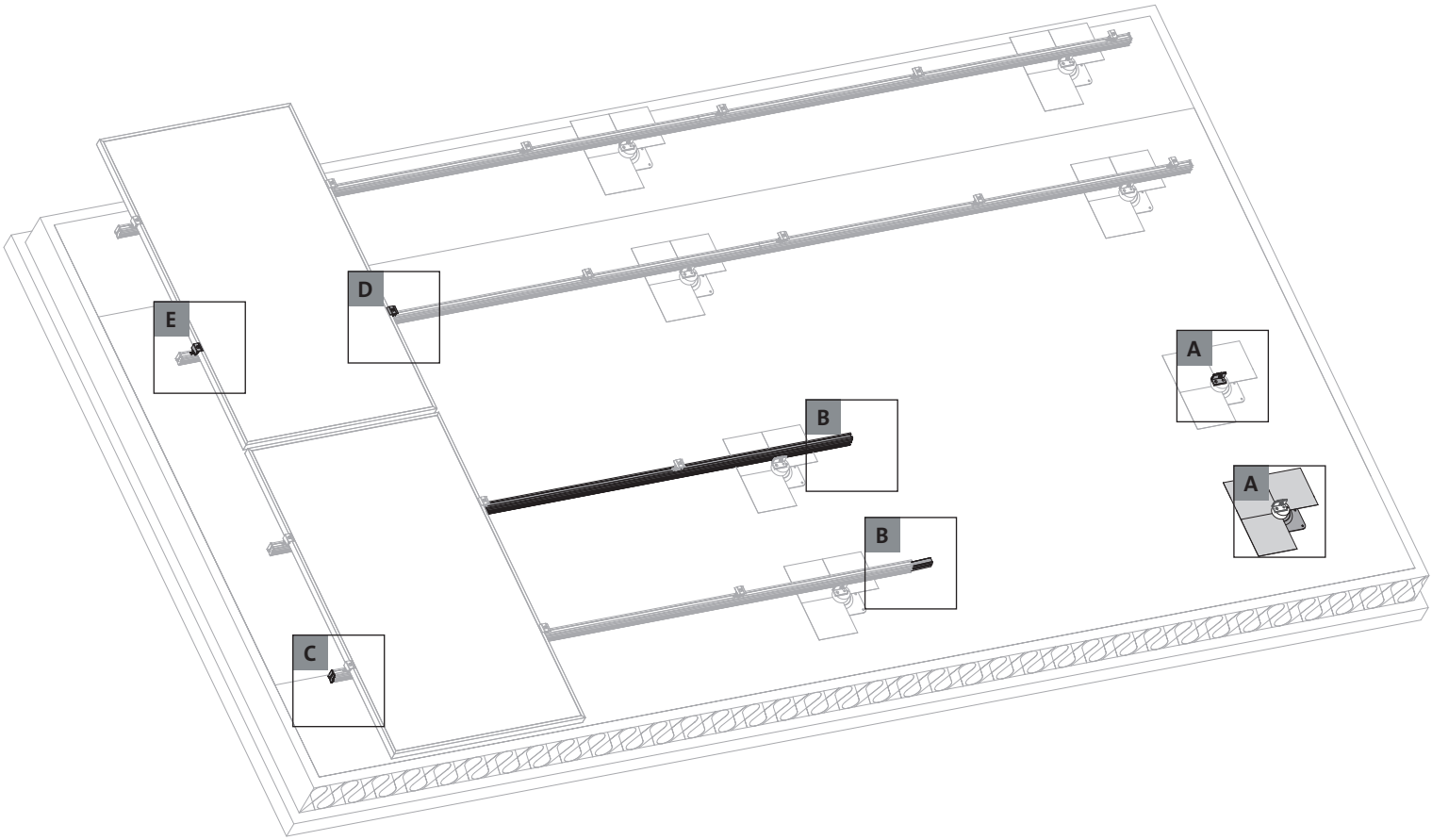
Note: The anti-slip protection can only be used with modules with the appropriate fastening holes.



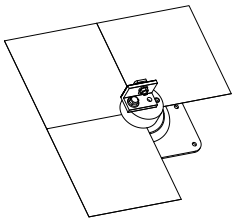
One-layer rail system on tongue and groove boards fixation - vertical module alignment



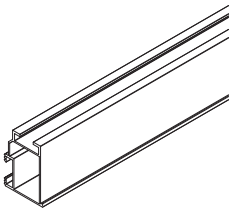
Connection to alternative fasteners

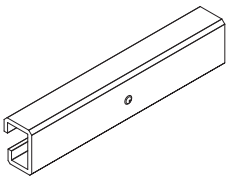


A



B





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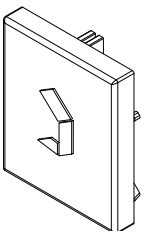

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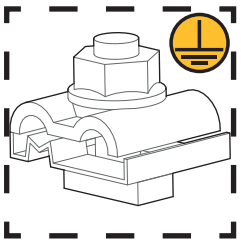
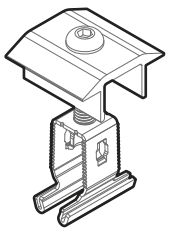
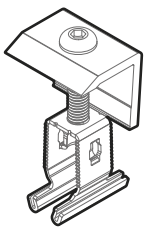


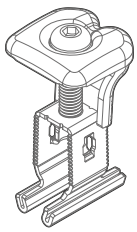
D

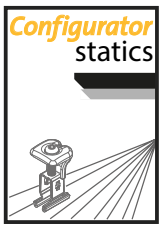


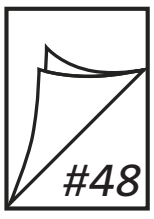
E



D + E







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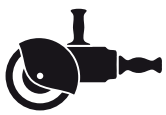
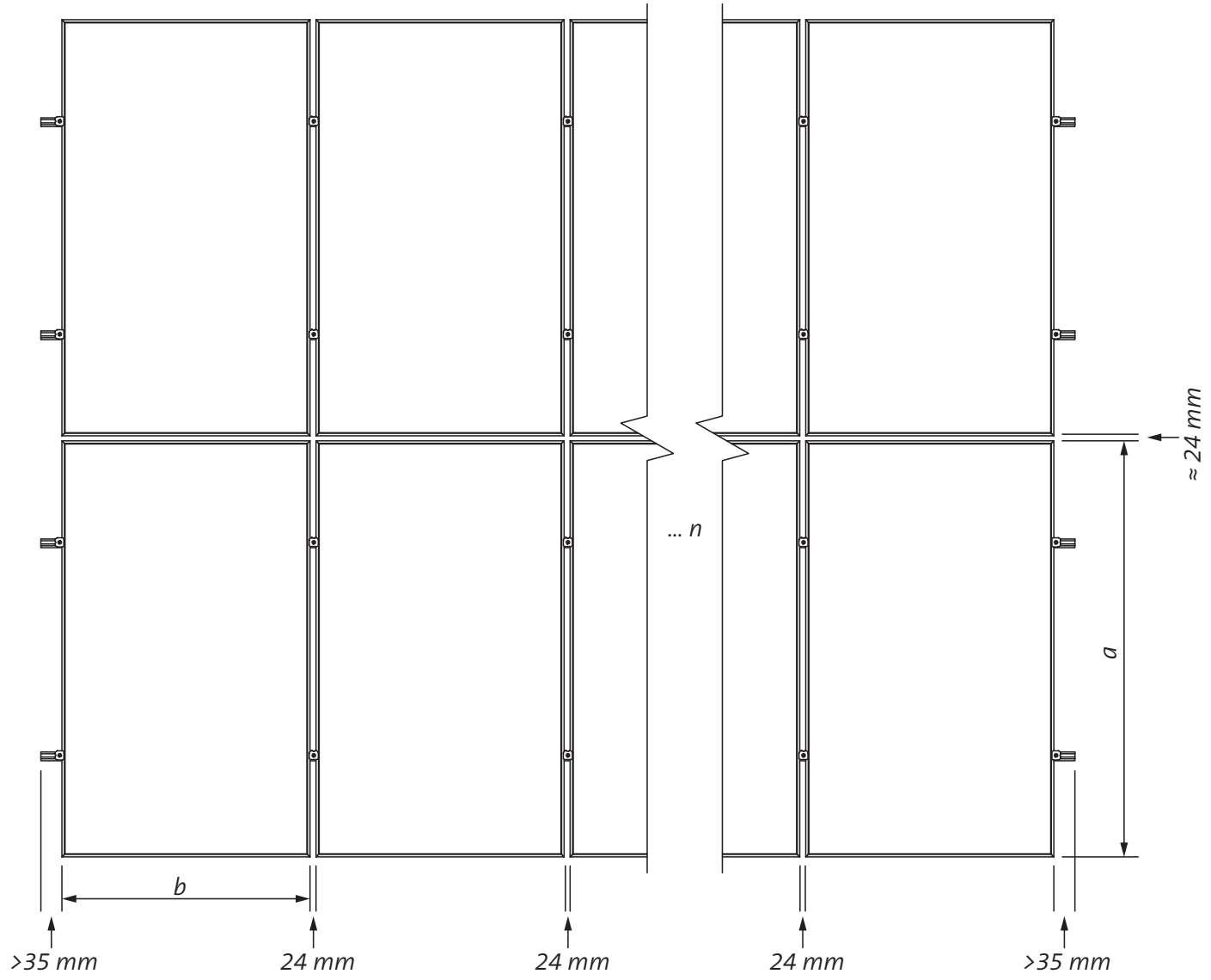
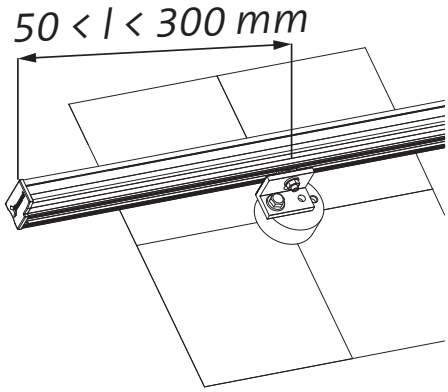
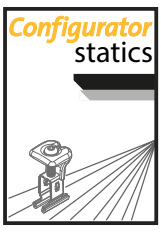




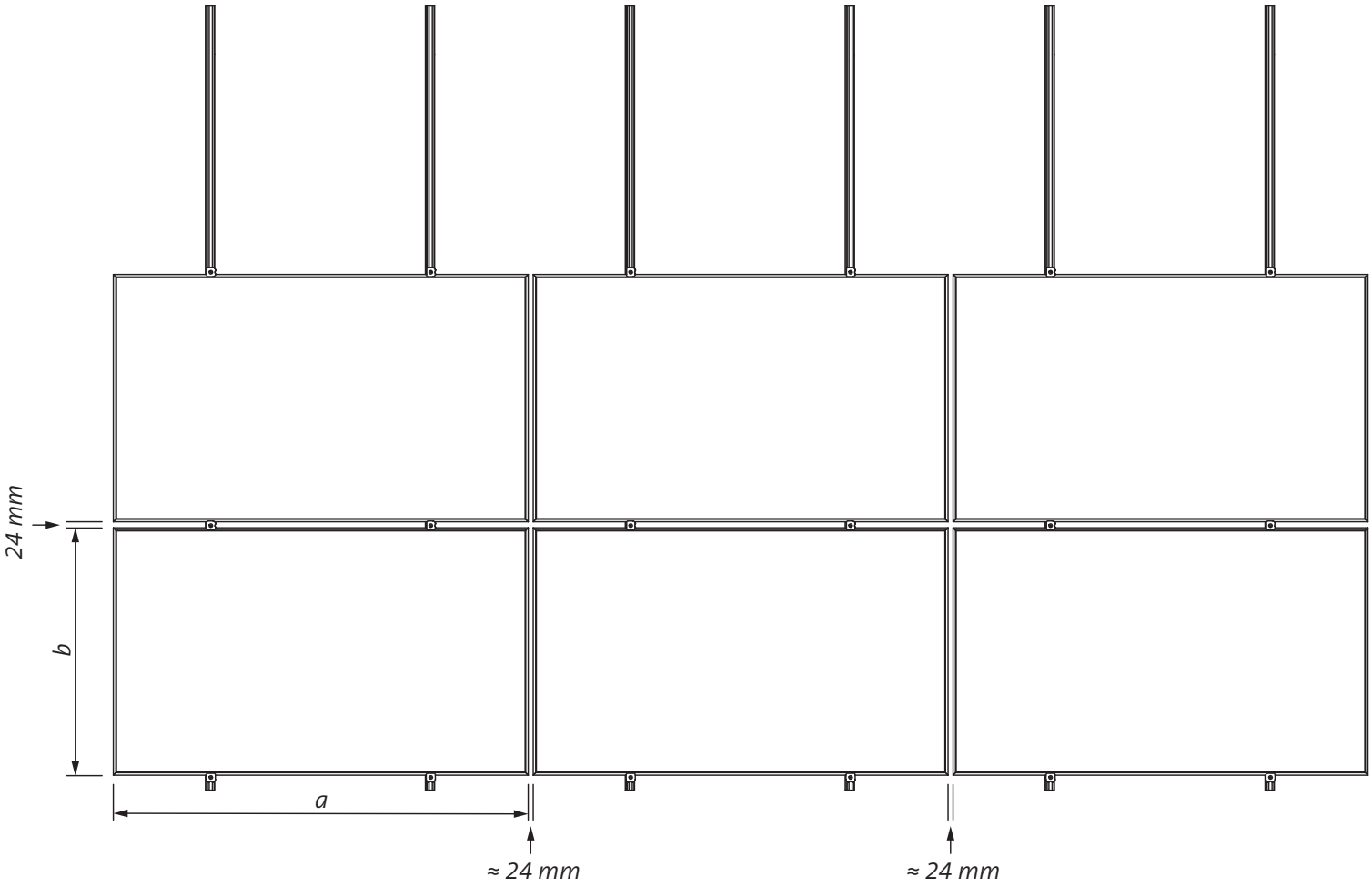


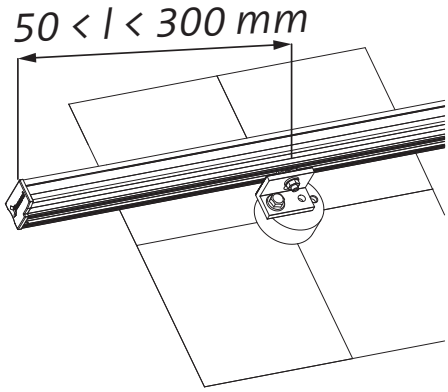
Without a structural analysis by means of the Renusol Configurator the length of the cantilever should not be longer than 300 mm.



- **General instructions**
- **Static calculations**
- **Technical project overview**

⇨ **www.pv-configurator.com**





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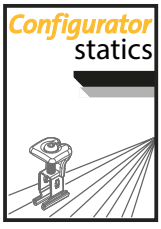

- **General instructions**
- **Static calculations**
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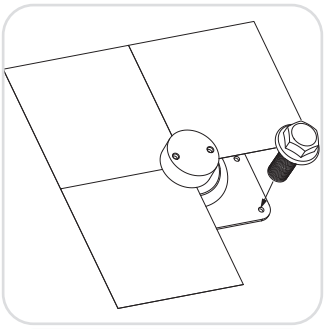
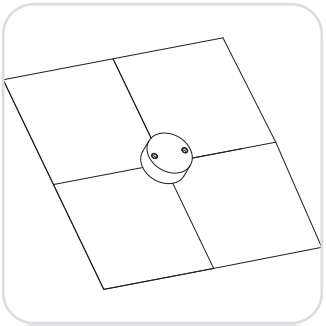
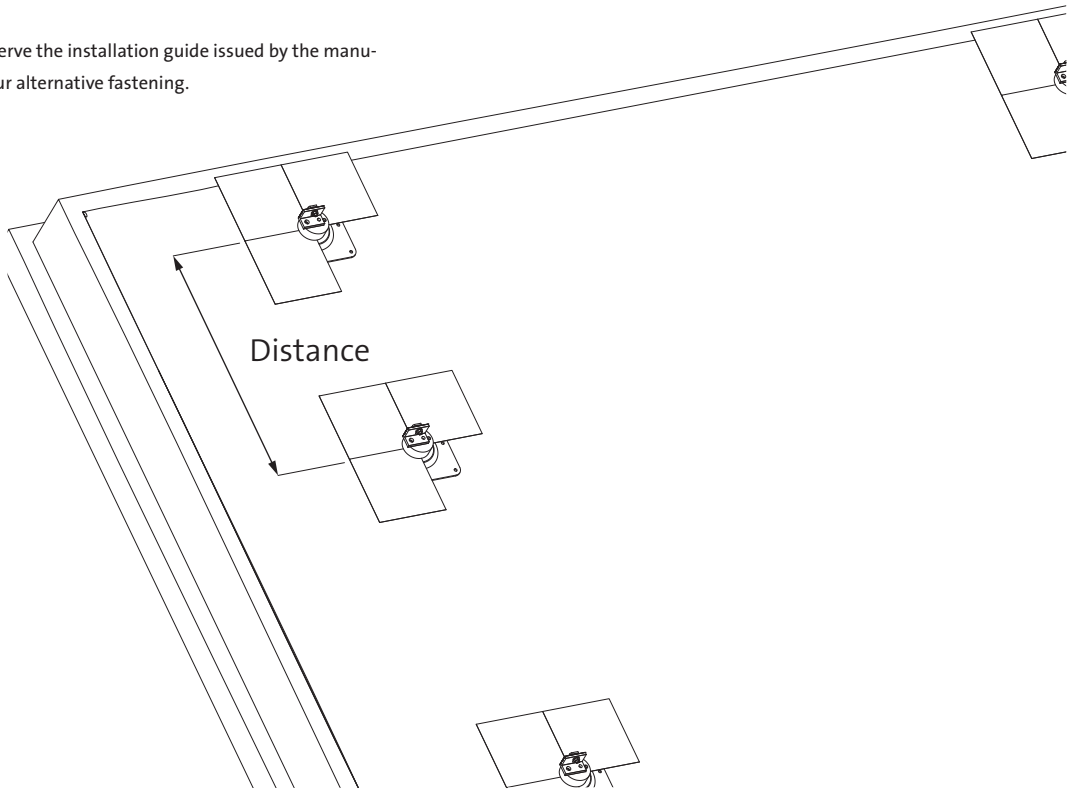
Connection to alternative fasteners

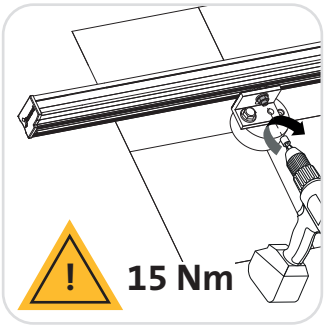


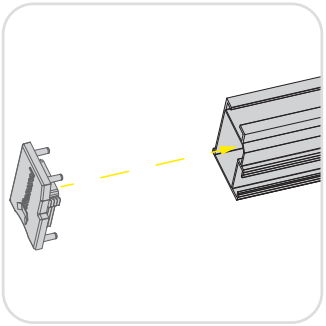
Warning!
With this, observe the installation guide issued by the manufacturer of your alternative fastening.

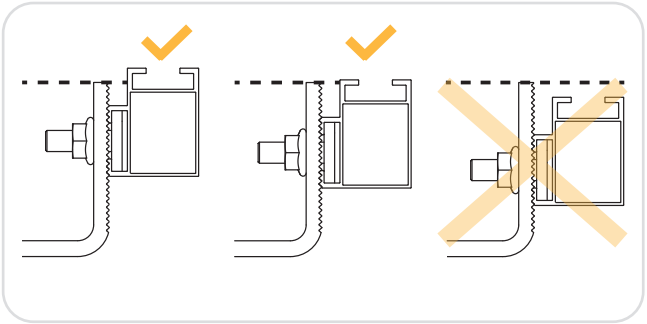


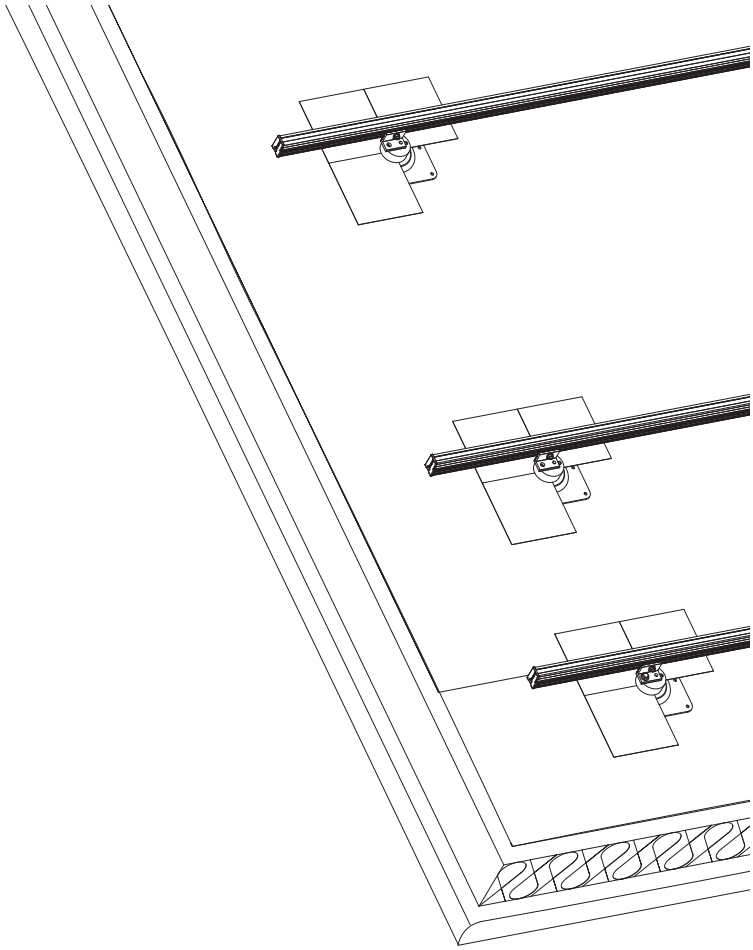


Connection to alternative fasteners

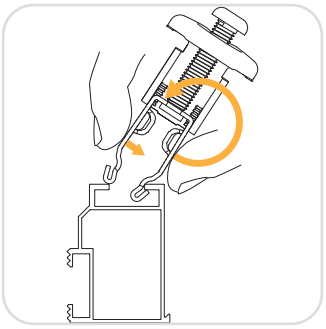


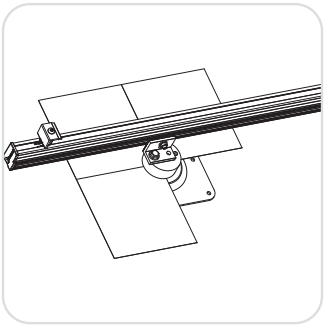


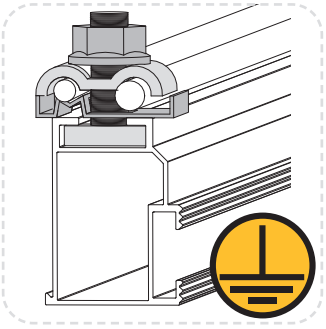


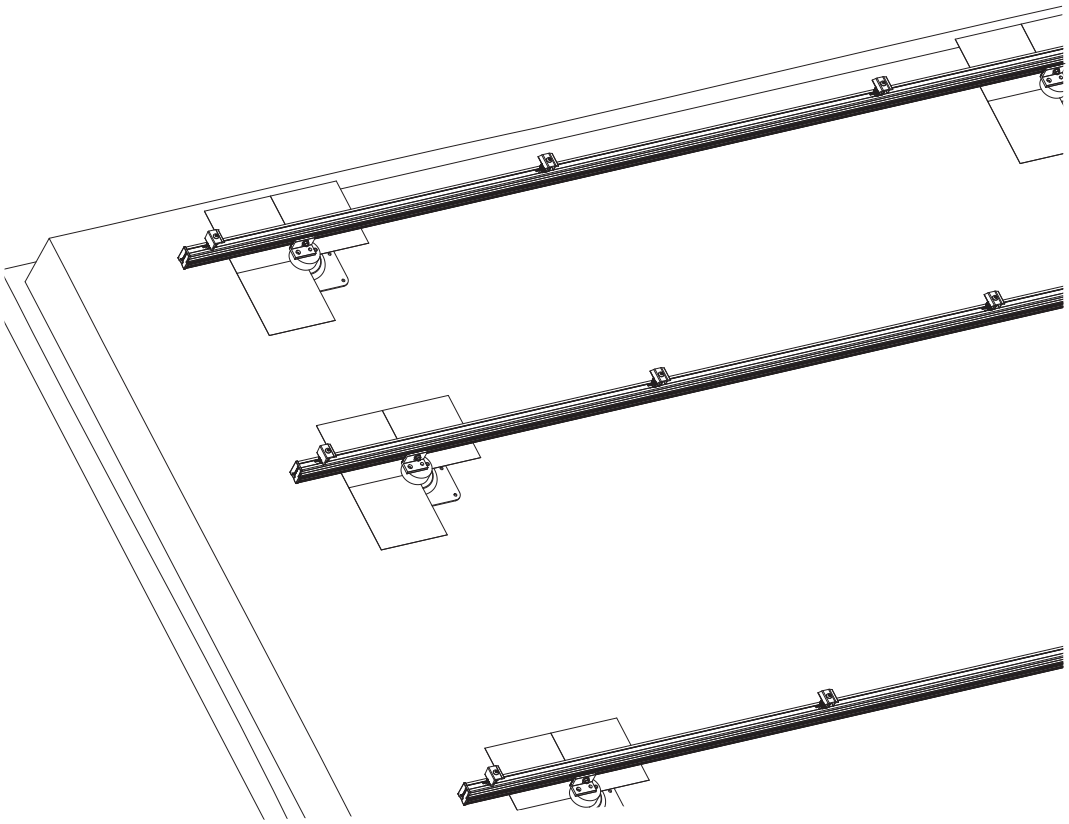


Connection to alternative fasteners

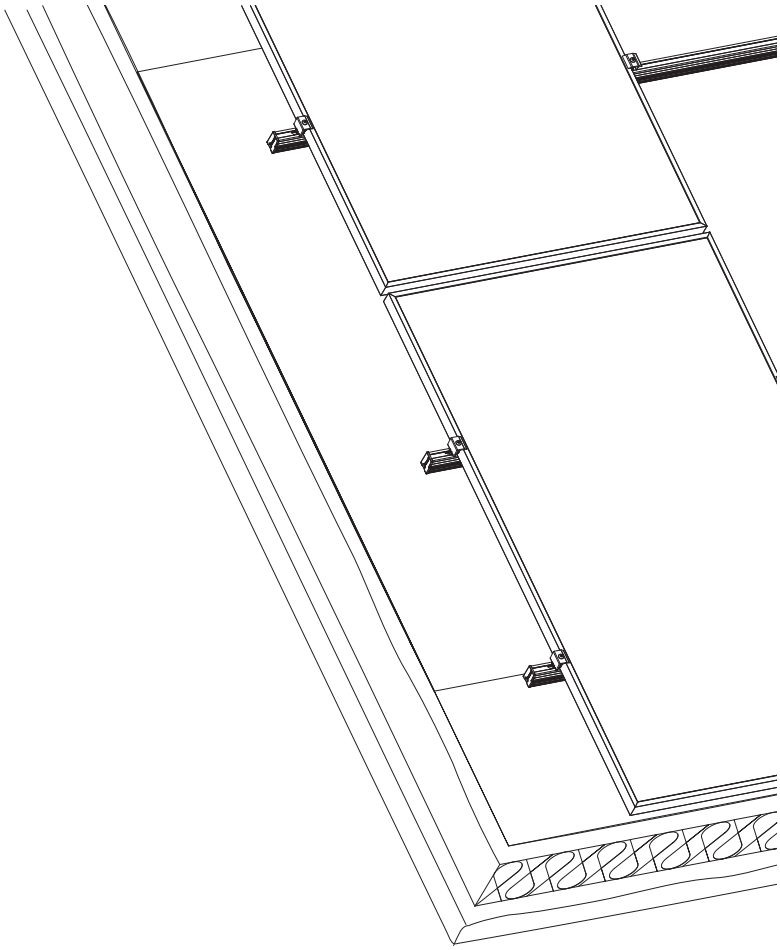




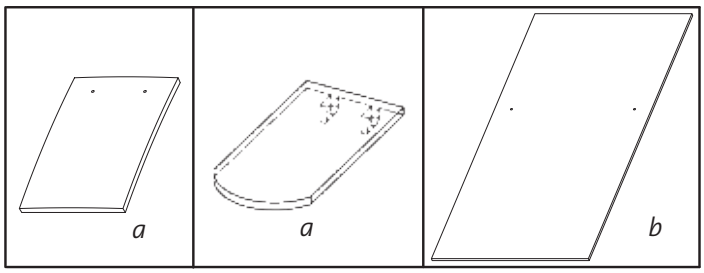




Connection to alternative fasteners

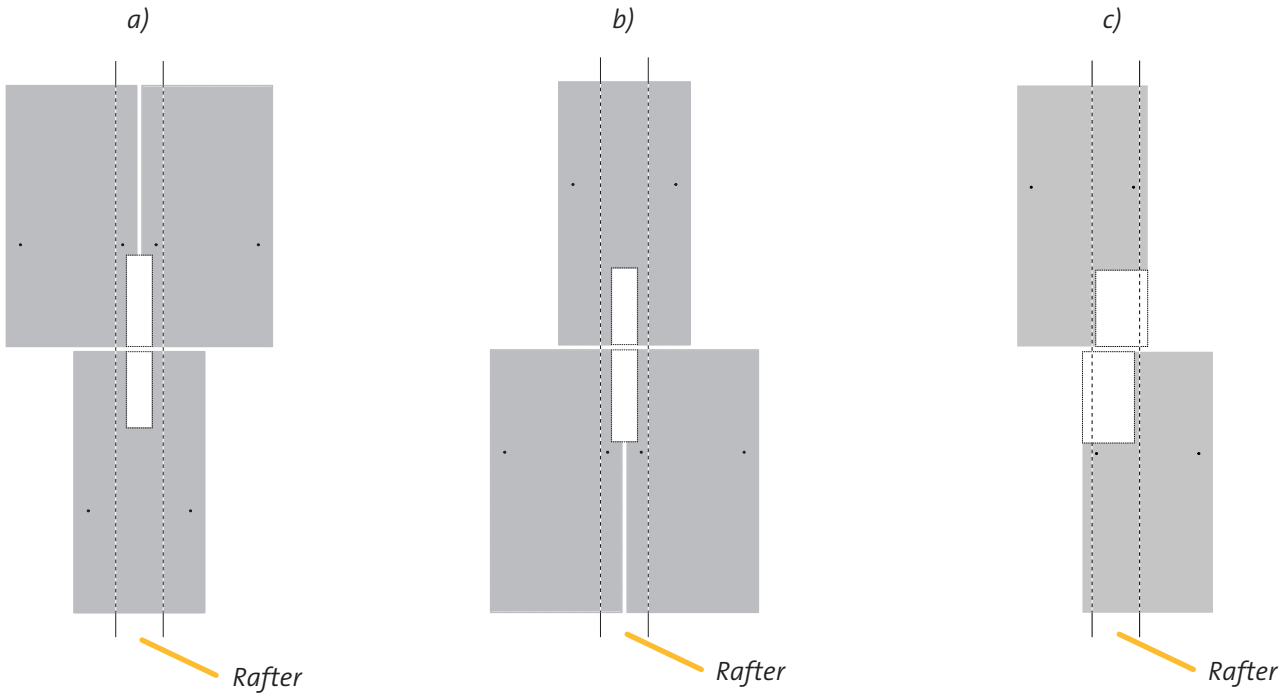


A



a Plain Tile
b Slate Tile

Processing of the bricks
Use an angle grinder or slate cutter to cut a recess in the tile at the point of insertion of the roof hook, which covers the roof hook so that the tile lies flat. If the roof tiles are grooved, a recess must also be cut in the top of the lower roof tile. Handling from three different positions:



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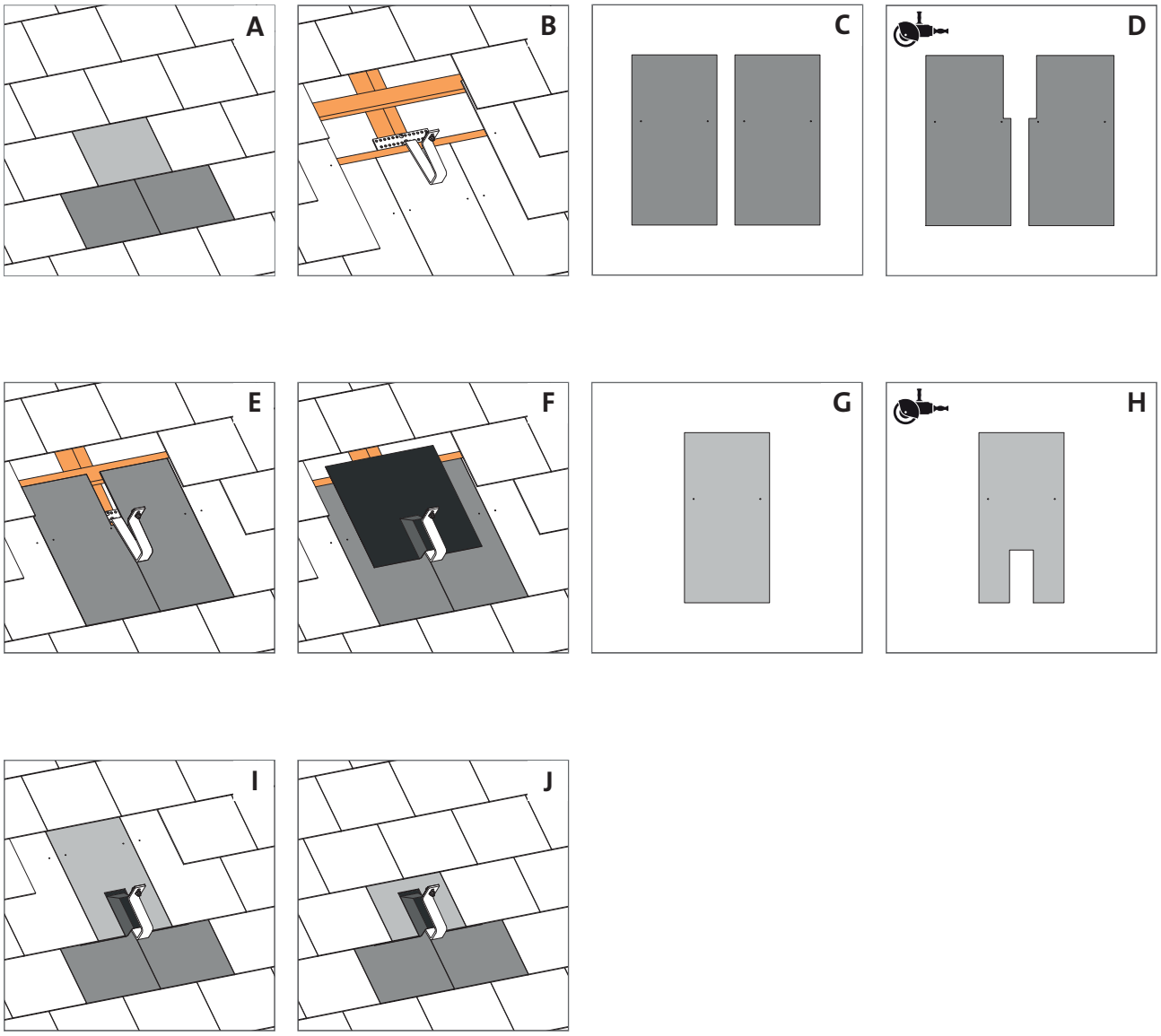

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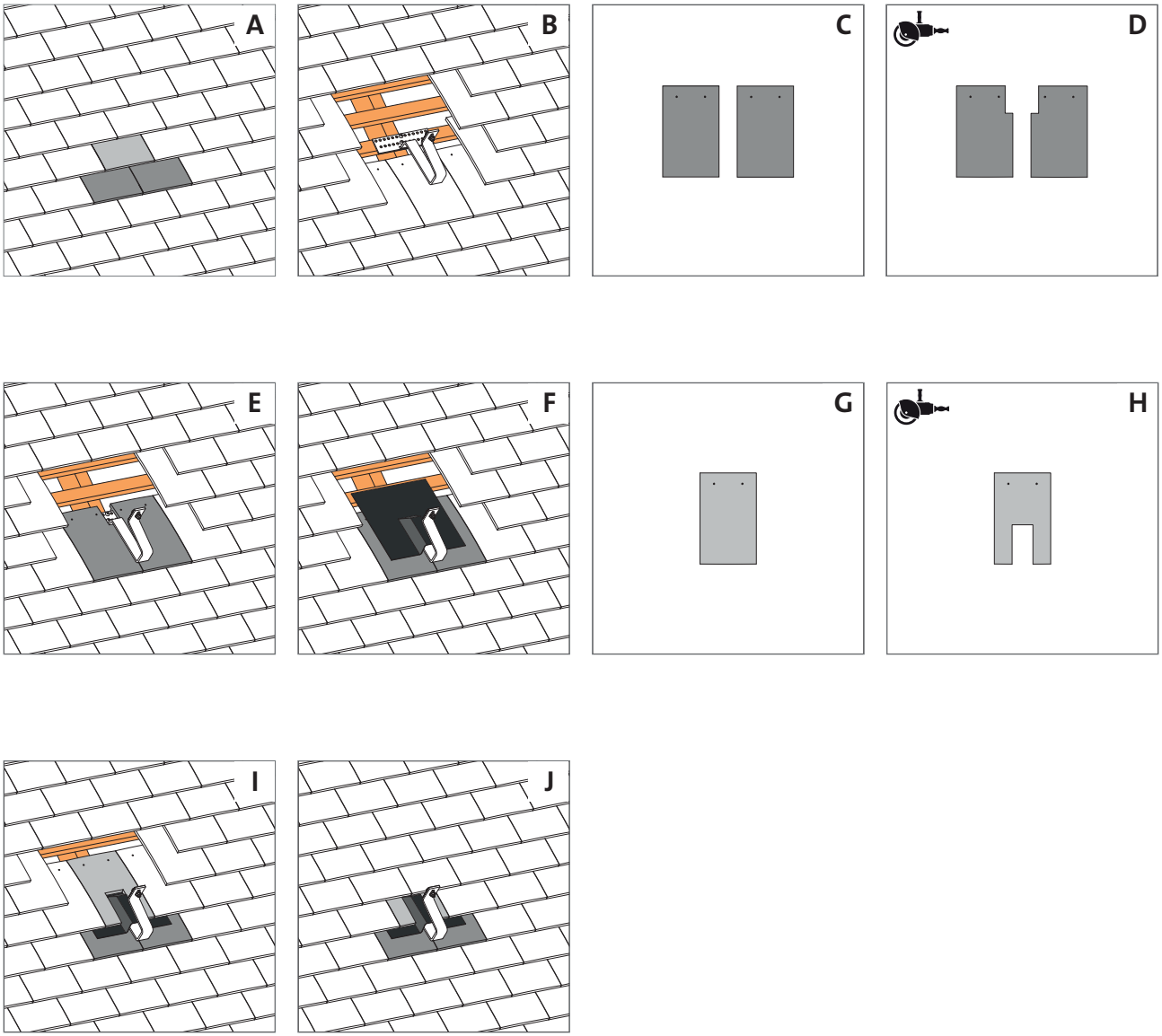
A



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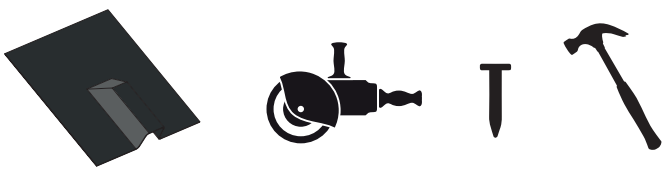

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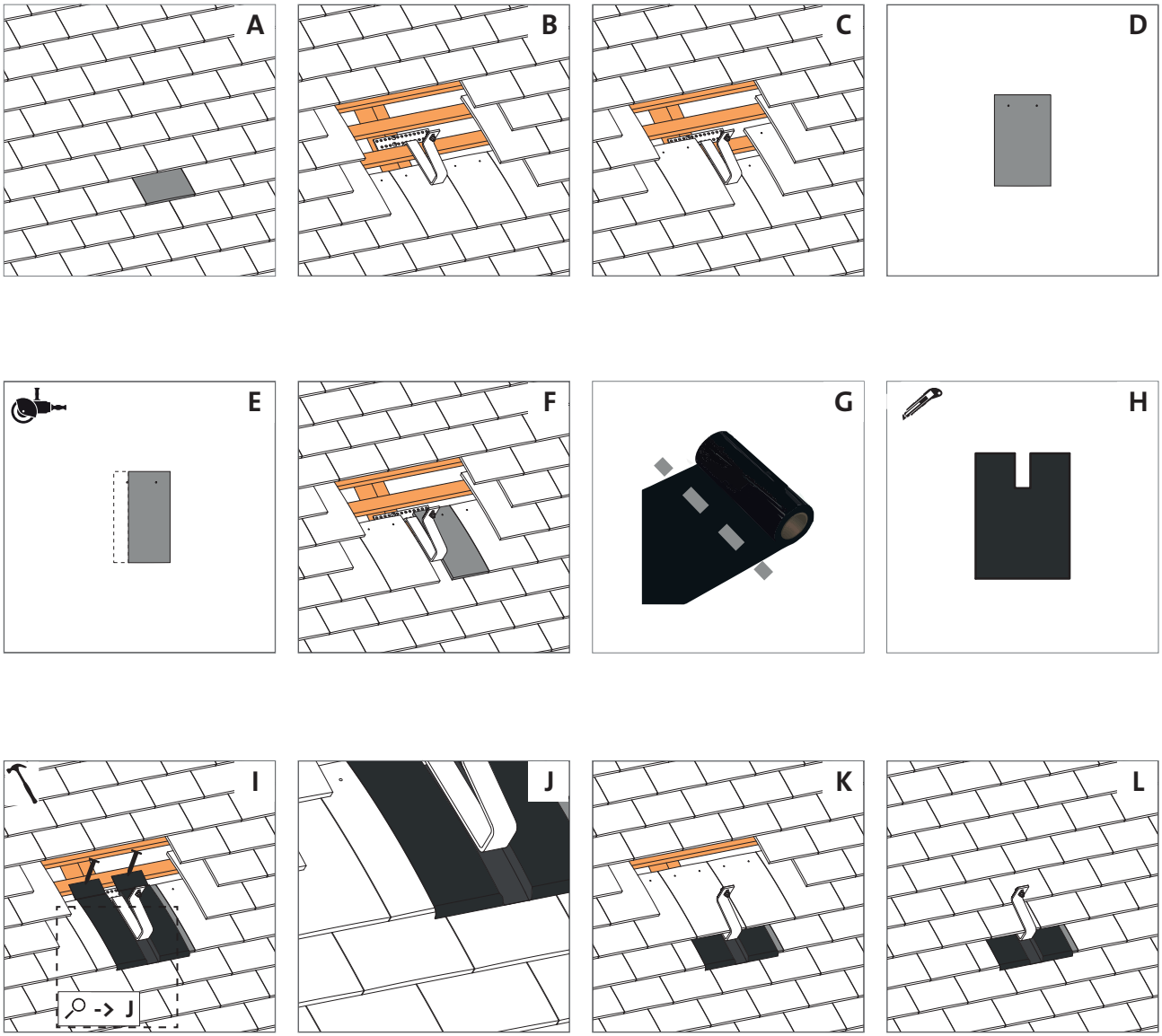

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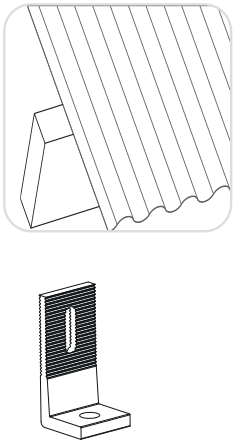
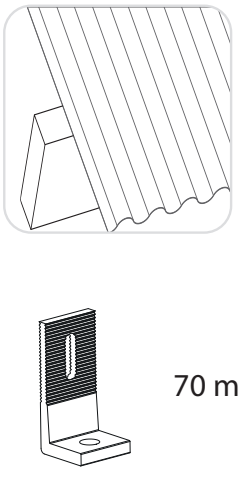
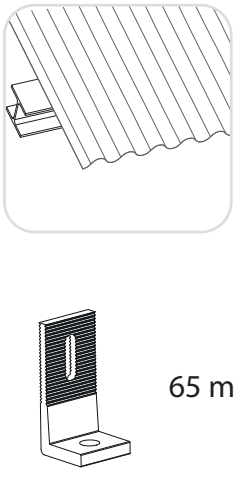
B



	Item No.	a:	b:	c:	
M10	920159	160 mm	71 mm	65 mm	(Connection offset/ connection)
M10	860020	180 mm	81 mm	65 mm	
M10	920008	200 mm	81 mm	65 mm	(Connection offset/ connection)
M10	860006	200 mm	81 mm	65 mm	
M12	920002	250 mm	91 mm	100 mm	(Offset connection)
M12	860007	250 mm	91 mm	100 mm	
M12	860017	300 mm	141 mm	100 mm	
M12	920136	350 mm	191 mm	100 mm	
M12	920137	400 mm	211 mm	100 mm	



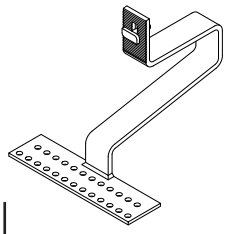
	Item No.	Lg/Lm:	L	Clamp area
M10	900187	80/50	136 mm	0 - 40 mm
M10	900188	100/50	156 mm	20 - 60 mm
M10	900189	130/50	186 mm	55 - 90 mm
M10	900190	150/50	206 mm	75 - 110 mm
M10	900191	180/50	236 mm	105-140 mm
M10	900192	200/50	256 mm	125 - 160 mm



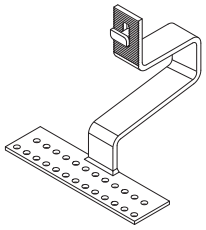
	Item No.	Lg/Lm:	L	Clamp area
M10	900181	80/50	136 mm	15 - 60 mm
M10	900182	100/50	156 mm	35 - 80 mm
M10	900183	125/50	181 mm	60 - 105 mm
M10	900184	150/50	206 mm	85 - 130 mm
M10	900185	160/50	216 mm	95 -140 mm
M10	900186	200/50	256 mm	135 - 180 mm

B

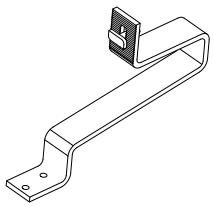
R420182
UK Roof hook,
Flexible



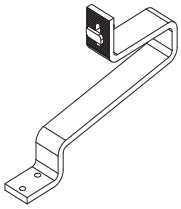
R420180
UK Roof hook,
Pantile



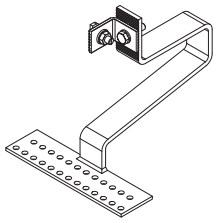
R420181
UK Roof hook,
Plain



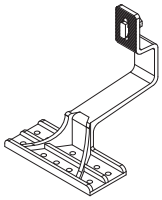
R420184
UK Roof hook,
Plain, Heavy Load



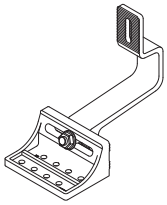
R420183
UK Roof hook 90°,
Flexible



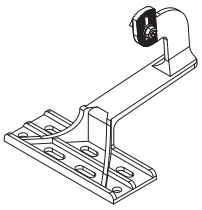
R420151
Roof hook,
aluminium, adjustable



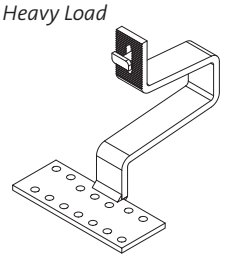
R420161
Roof hook,
aluminium, adjustable



R920003
Roof hook,
aluminium, 90°

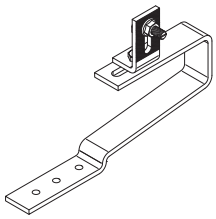


R420170
Roof hook,
Heavy Load

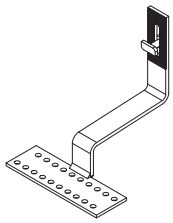


Galvanised steel as per EN ISO 1461. Suitable for corrosion class C3.

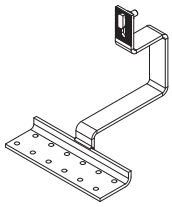
R420150
Roof hooks,
On-roof insulation



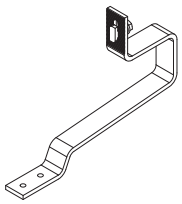
R420165
Roof hook,
Eco Basic



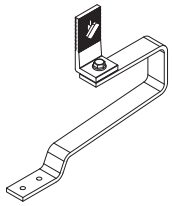
R420158
Roof hook,
Stainless steel TP



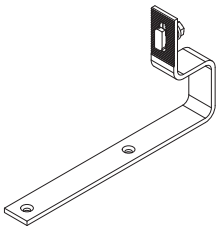
R420153
Plain tile roof hook



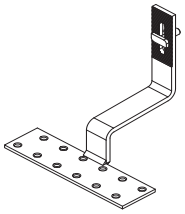
R420154
Plain tile roof hook,
90°



R420155
Slate roof hook



R420150
Dachhaken,
Edelstahl



R900050 5x30

R900305 6 x 80

R900127 6 x 120
R900145 6 x 160
R900129 8 x 100

R900013 6 x 80

B

1x

- D Dachhaken
- UK Roof hooks
- F Crochet de toit
- I Staffa
- E Gancho de tejado

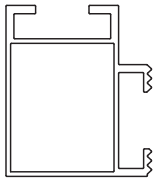
+ n

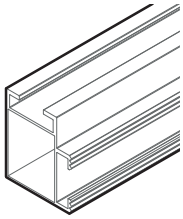
- D Holzschraube
- UK Wood screw
- F Vis a bois
- I Vite da legno
- E Tornillo de madera

	900305	900013	900129	900127	900145	900050
420151	3x	–	–	2x	2x	–
420161	3x	–	–	2x	2x	–
920003	–	–	2x	–	–	–
420150	3x	–	–	2x	2x	–
420153	2x	–	–	2x	2x	–
420154	2x	–	–	2x	2x	–
420155	–	2x	–	–	–	–
420158	3x		–	2x	2x	–
420160	–	–	–	–	–	3x
420165	3x	–	–	–	–	–
420180	2x	–	–	–	–	–
420181	2x	–	–	–	–	–
420182	2x	–	–	–	–	–
420183	2x	–	–	–	–	–

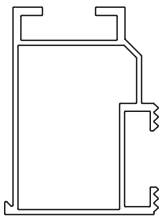
B

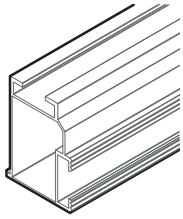
VS+ mounting rail 41 x 35



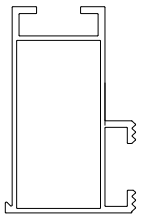


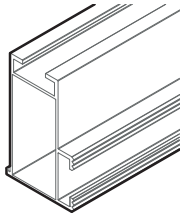
VS+ mounting rail 50 x 37



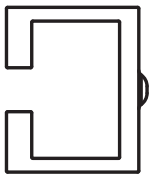


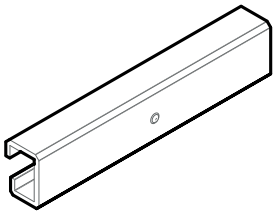
VS+ mounting rail 60 x 38



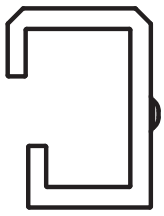


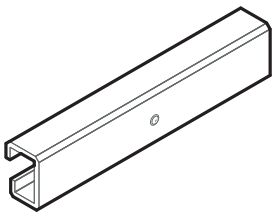
VS+ rail connector 41 x 35 - R400531



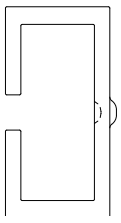


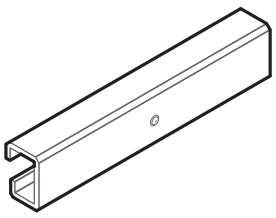
VS+ rail connector 50 x 37 - R400532



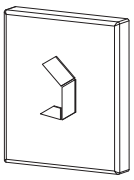


VS+ rail connector 60 x 38 - R400533



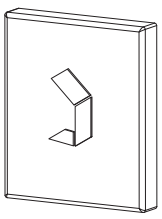


Cover cap for mounting rail 41 x 35



Item number	*Colour*
R900245	*Black*
R900246	*Blank*

Cover cap for mounting rail 50 x 37



Item number	*Colour*
R920043	*Black*
R920044	*Blank*

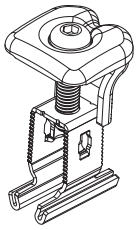
Mounting rail

Item number	*Length*	*Colour*
R400523	*41x35x**2250** mm*	*Blank*
R400511	*41x35x**3200** mm*	*Blank*
R500411-B		*Black*
R400524	*41x35x**3300** mm*	*Blank*
R400512	*41x35x**4200** mm*	*Blank*
R400512-B		*Black*
R400525	*41x35x**4400** mm*	*Blank*
R400513	*41x35x**6200** mm*	*Blank*
R400519	*Pre-cut part*	*Blank*
R400519		*Black*

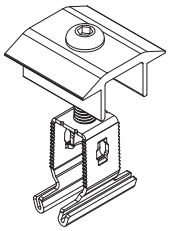
Item number	*Length*	*Colour*
R400527	*50x37x**2250** mm*	*Blank*
R400502	*50x37x**3200** mm*	*Blank*
R400502-B		*Black*
R400528	*50x37x**3300** mm*	*Blank*
R400505	*50x37x**4200** mm*	*Blank*
R400505-B		*Black*
R400529	*50x37x**4400** mm*	*Blank*
R400506	*50x37x**6200** mm*	*Blank*
R400509	*Pre-cut part*	*Blank*
R400509-B		*Black*

Item number	*Length*	*Colour*
R400535	*60x38x**3300** mm*	*Blank*

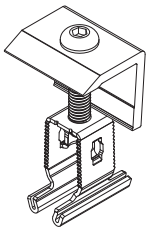
R420080/ R420080-BE
RS1 middle/ end clamp



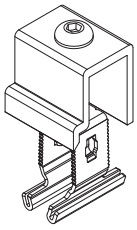
R420081/ R420081-BE
End clamp +



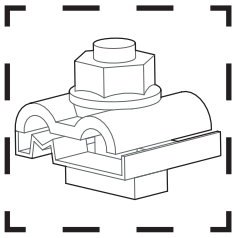
R420082/ R420082-BE
Middle clamp +



R420083/ R420083-BE
Cross rail connector+

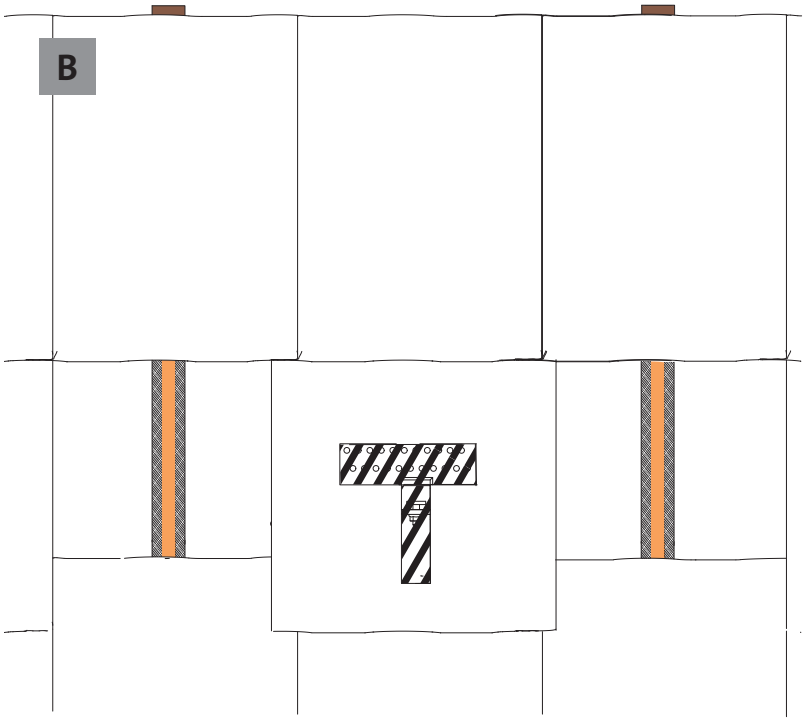


R900241
UNI earth clamp

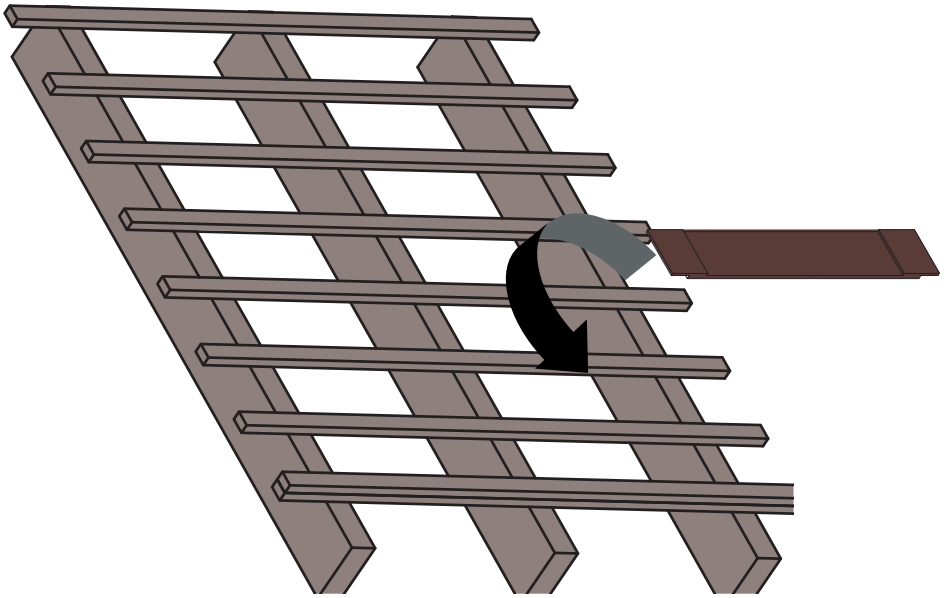


C

B



B



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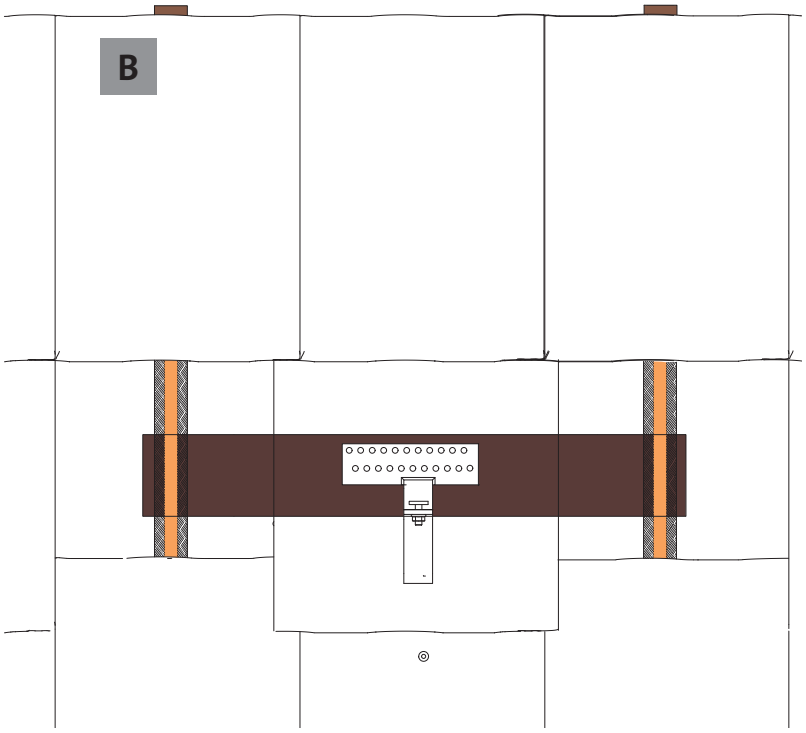

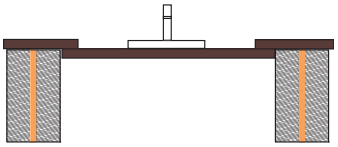
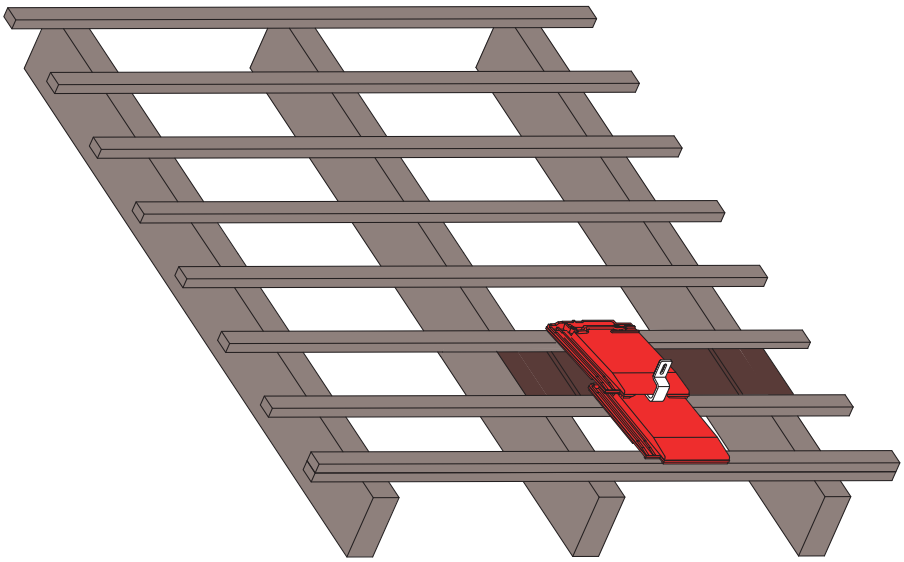
B