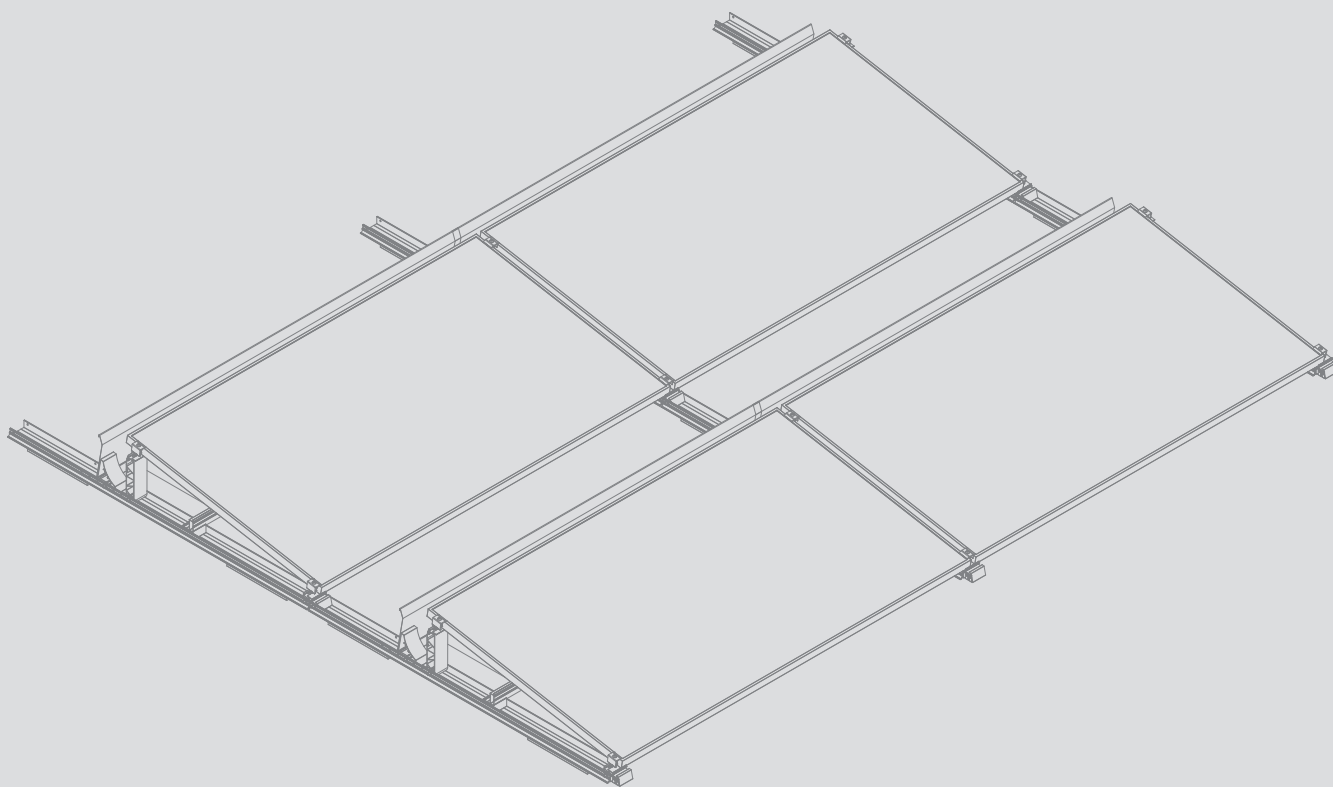
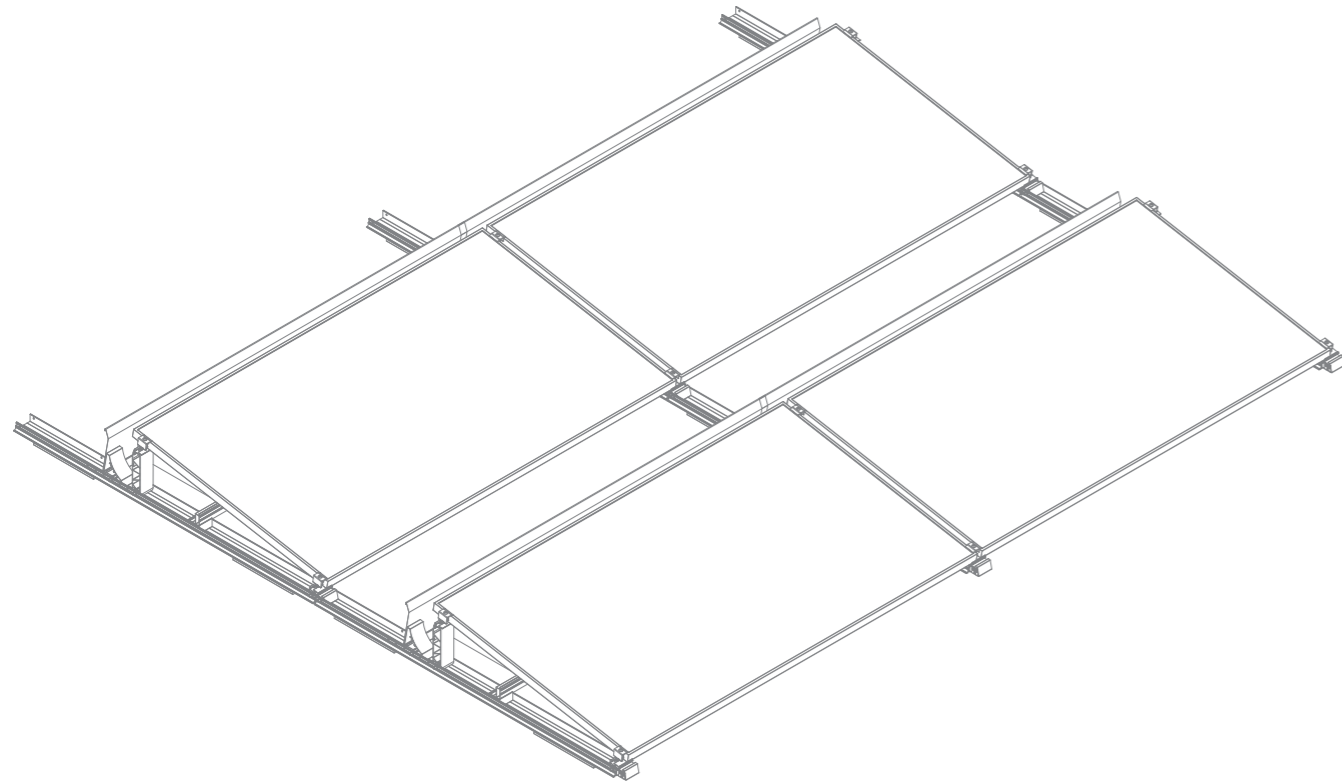


# Renusol *FS Pro 10-S*

EN | Installation Instructions



## Renusol FS Pro 10-S



### EN | Usage

Mounting system for the installation of framed PV modules on flat roofs with a roof inclination of up to 5° without roof penetration.

### Pre-installation considerations

The Renusol FS Pro is weighted with additional ballast (pavement slabs, etc.) to withstand wind loads. The required weight of the ballast depends on the building's height, location, the nature of the roof cover and wind loads.

The specified coefficient of friction in the calculation must be adhered to. This must be determined and documented on-site by a professional before installation at the customer's location. The coefficient of friction is a component for determining ballast and depends on local conditions.

Guidelines for the required ballast can be calculated according to Eurocode 1 (EN 1991).

For the Renusol FS Pro 10-S mounting system, the modules are fastened at the corner of the short module side. It is necessary to check whether the clamping area specified by the module manufacturer is adhered to and that the permissible module loads are not exceeded.

Drainage holes in PV module frames must be kept clear and must not be covered by the mounting system. The roof surface must be free of snow, ice, and dirt for installation. Consider the applicable regulations, state of the art and current occupational safety guidelines during installation.

A prerequisite for intended use is always a suitable substrate that can withstand the forces (weight, wind and snow loads) applied. The water drainage of the flat roof and its direction must be considered.

The roof surface must be suitable for placing building protection

mats. The compatibility between building protection mats and roof foil must be checked in advance.

### Wind Assessments

Suction and pressure coefficients have been determined through wind tunnel tests.

### Relevant Documents

"General Installation, Maintenance, and Mounting Instructions," "Safety Instructions for the Installation Manual," "Warranty Conditions, and Disclaimer."

These documents are available at [www.renusol.com](http://www.renusol.com)

### Warranty

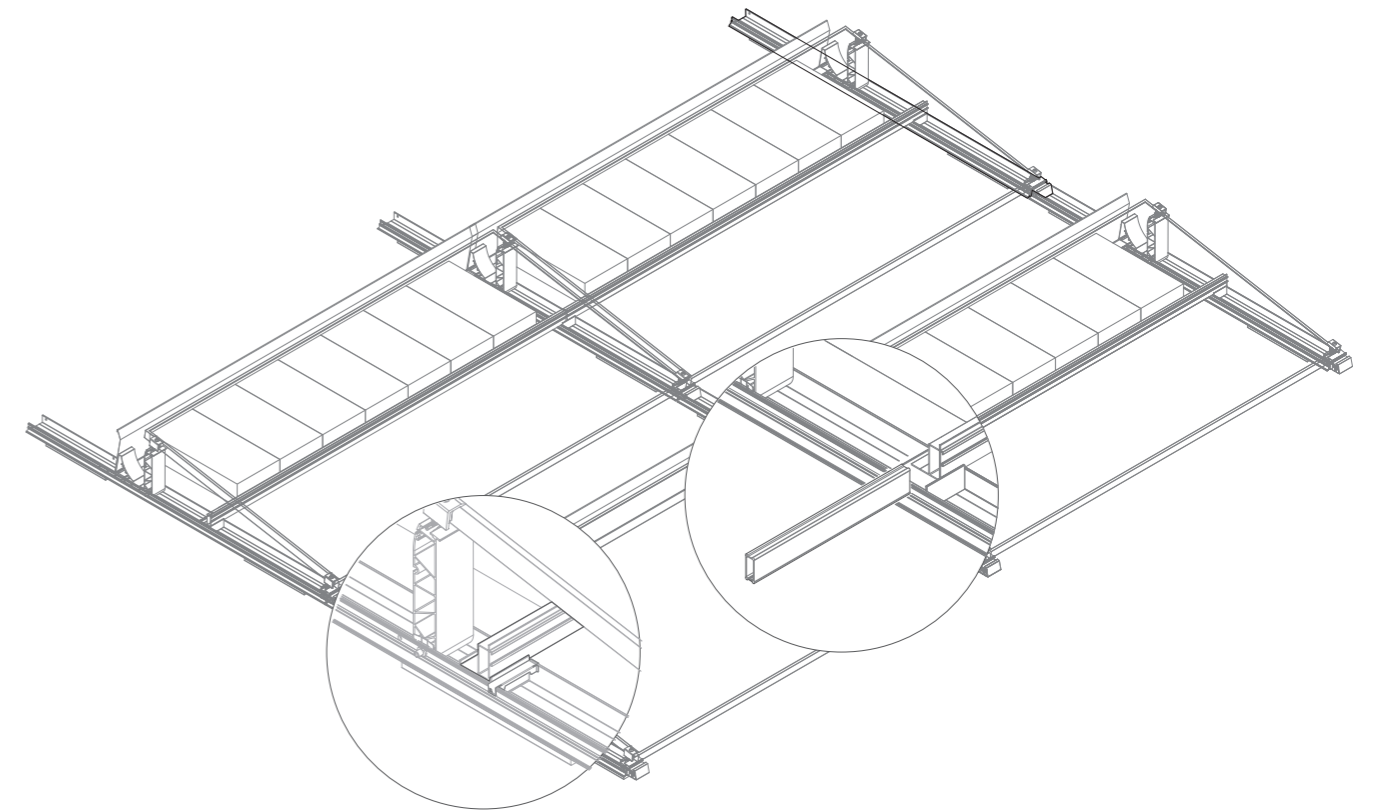
Renusol's warranty is valid only when using the original Renusol FS Pro complete system in accordance with the warranty conditions. For statutory warranty/liability, please refer to Renusol's general terms and conditions.

### Tests/certificates

MCS 012 certification relevant clauses see pages XX-XY

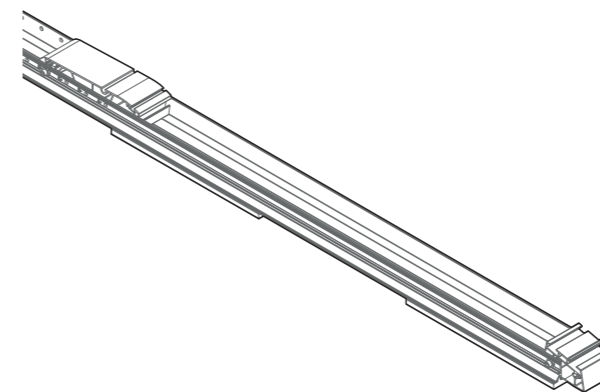
[www.renusol.com](http://www.renusol.com)

## Renusol FS Pro 10-S Component Overview



R520220  
FS Pro 10-S Base rail 1500 (Set)

R520224  
FS Pro 10-S-P Base rail 3000 (Set)



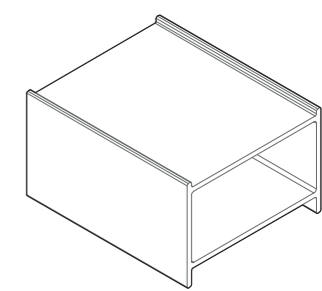
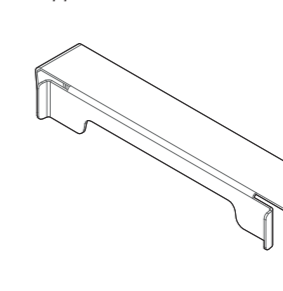
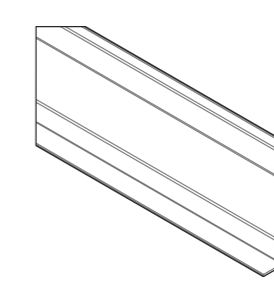
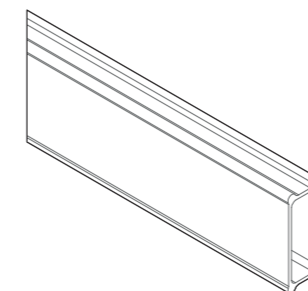
### Ballast Rail

R500251  
FS Pro Ballast profile connector

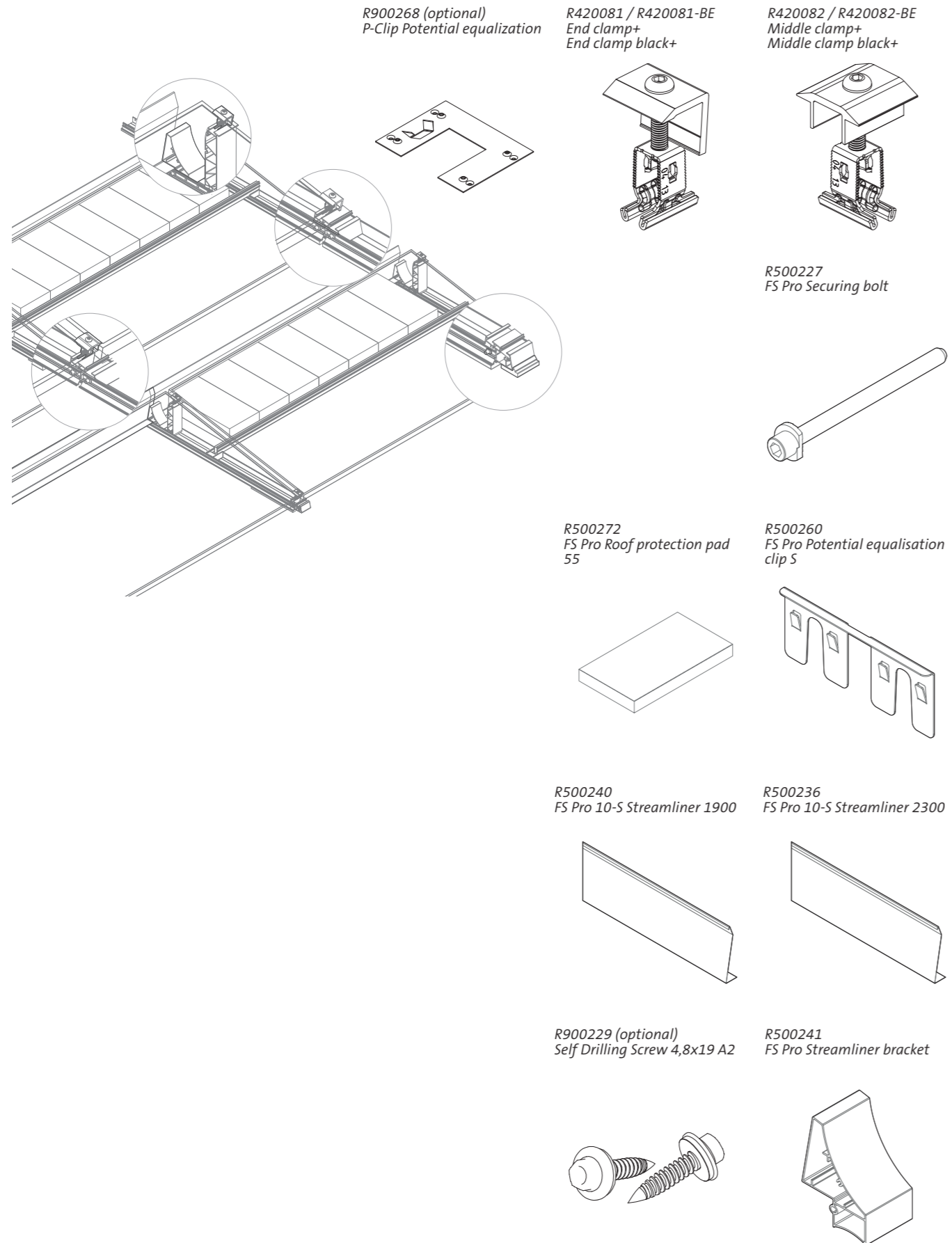
R500250  
FS Pro Ballast profile 1900

R500253  
FS Pro Securing clip ballast support

R500252  
FS Pro Ballast profile support



## Renusol FS Pro 10-S Component Overview



## Preparation / Preface

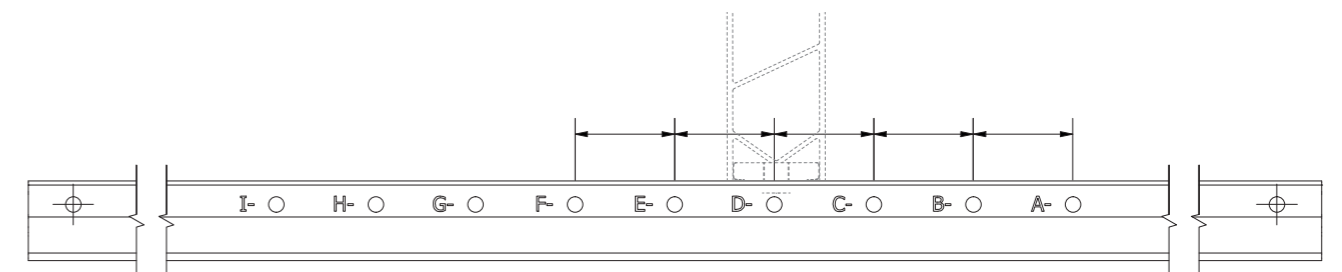
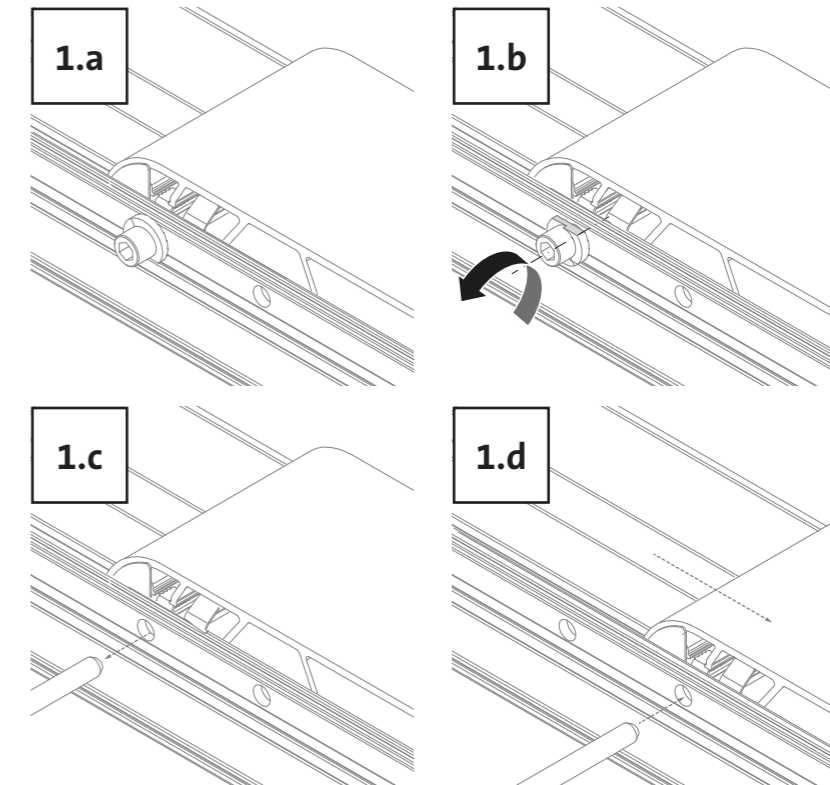


### EN | Usage

The ridge support is pre-assembled for modules with a width between 1110-1150 mm.

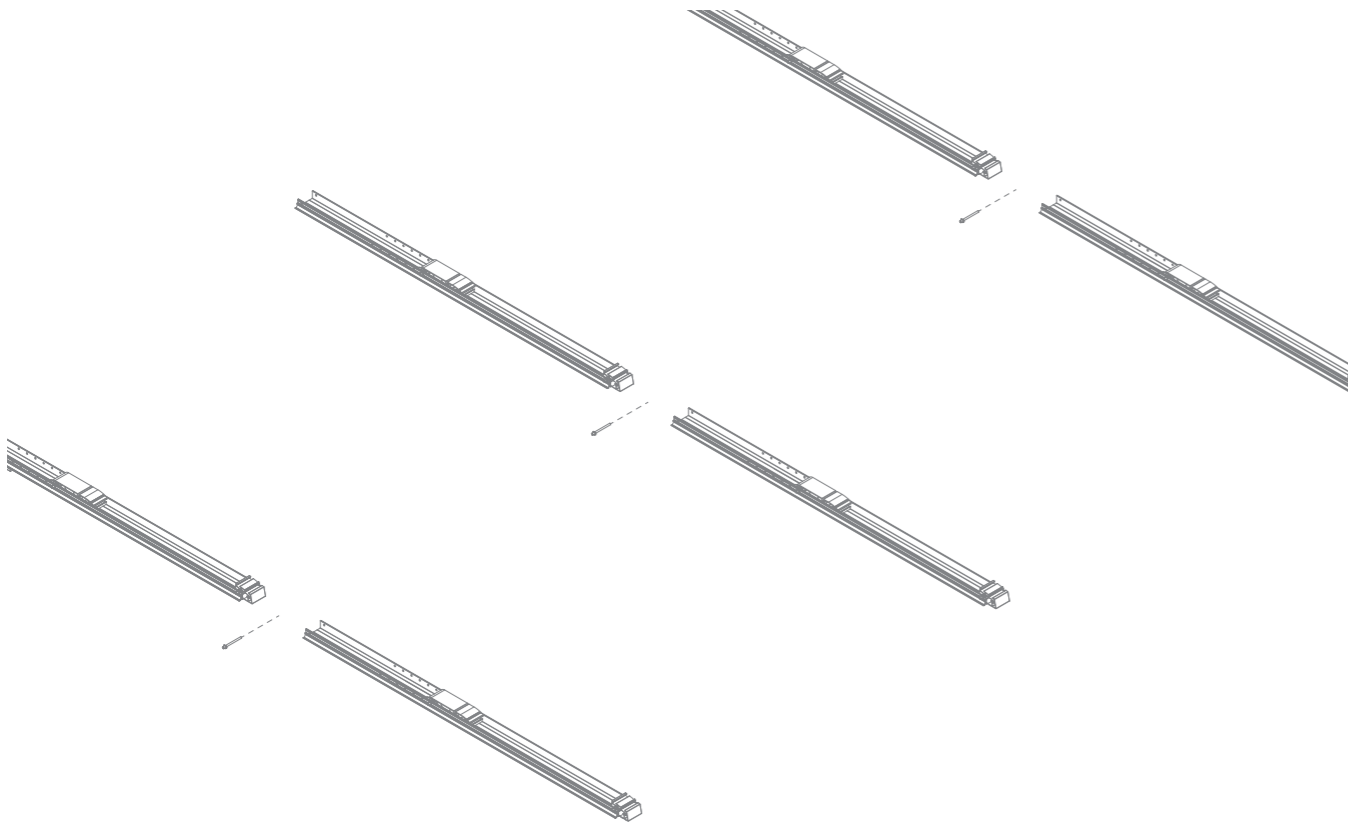
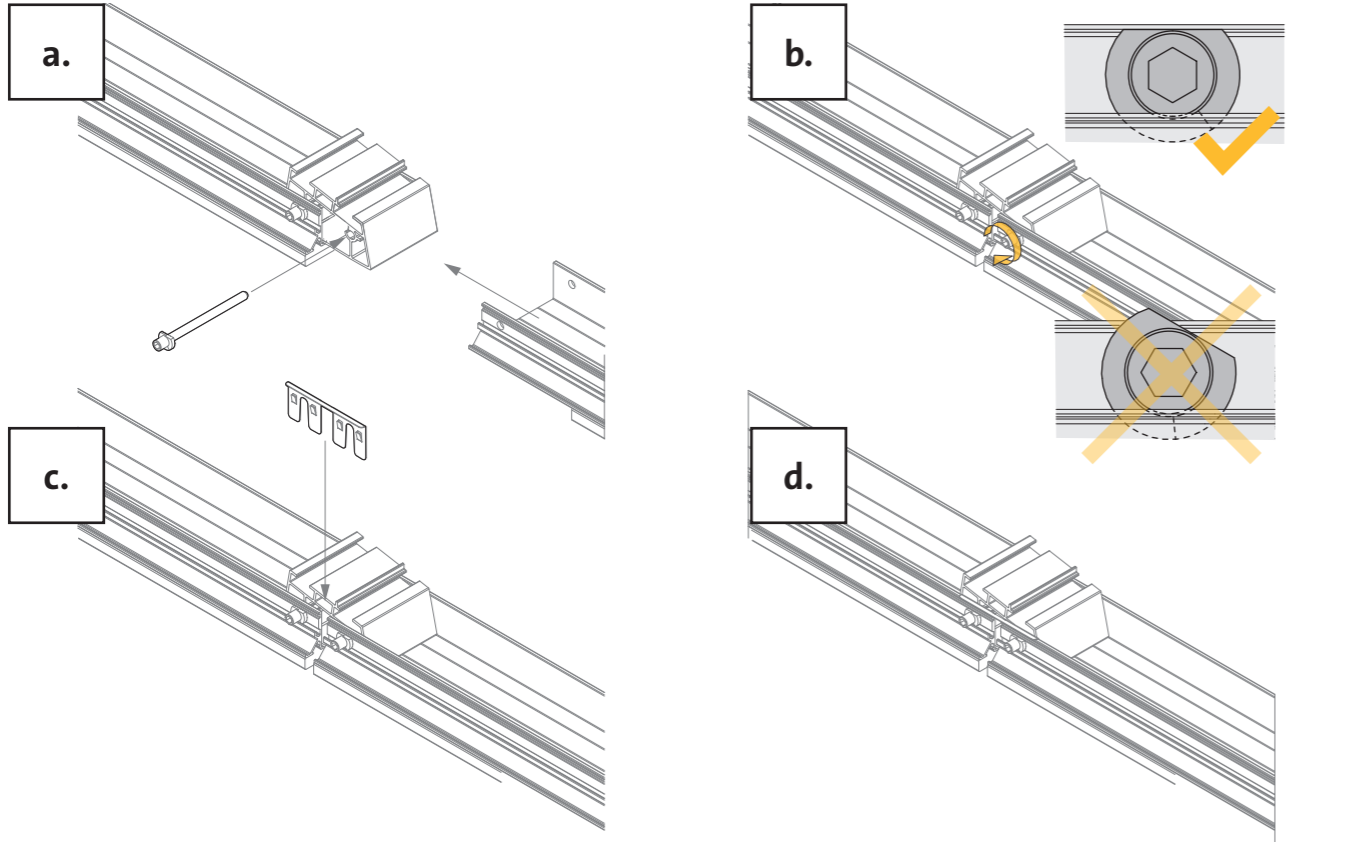
If your module dimensions differ, please relocate the ridge support as shown in steps 1a-d.

The support is to be repositioned horizontally.

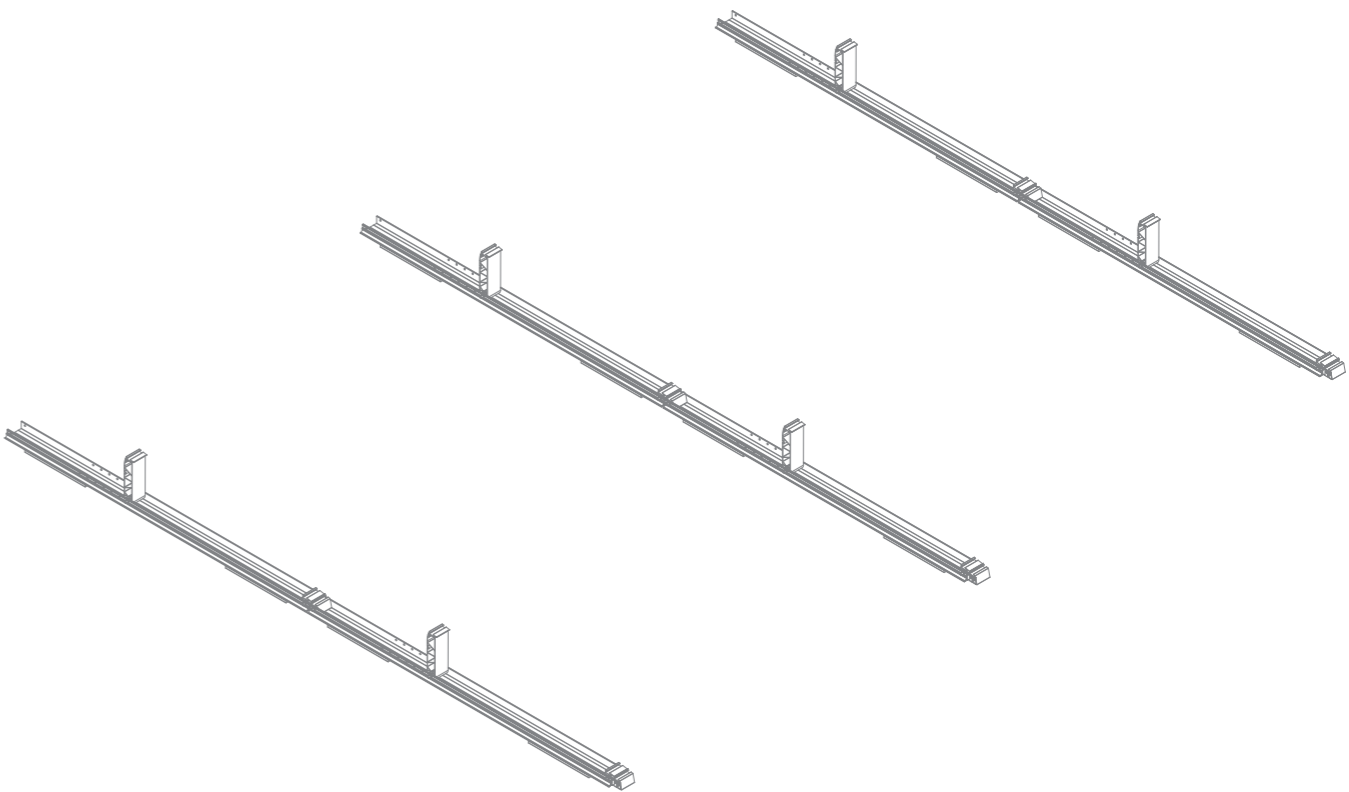
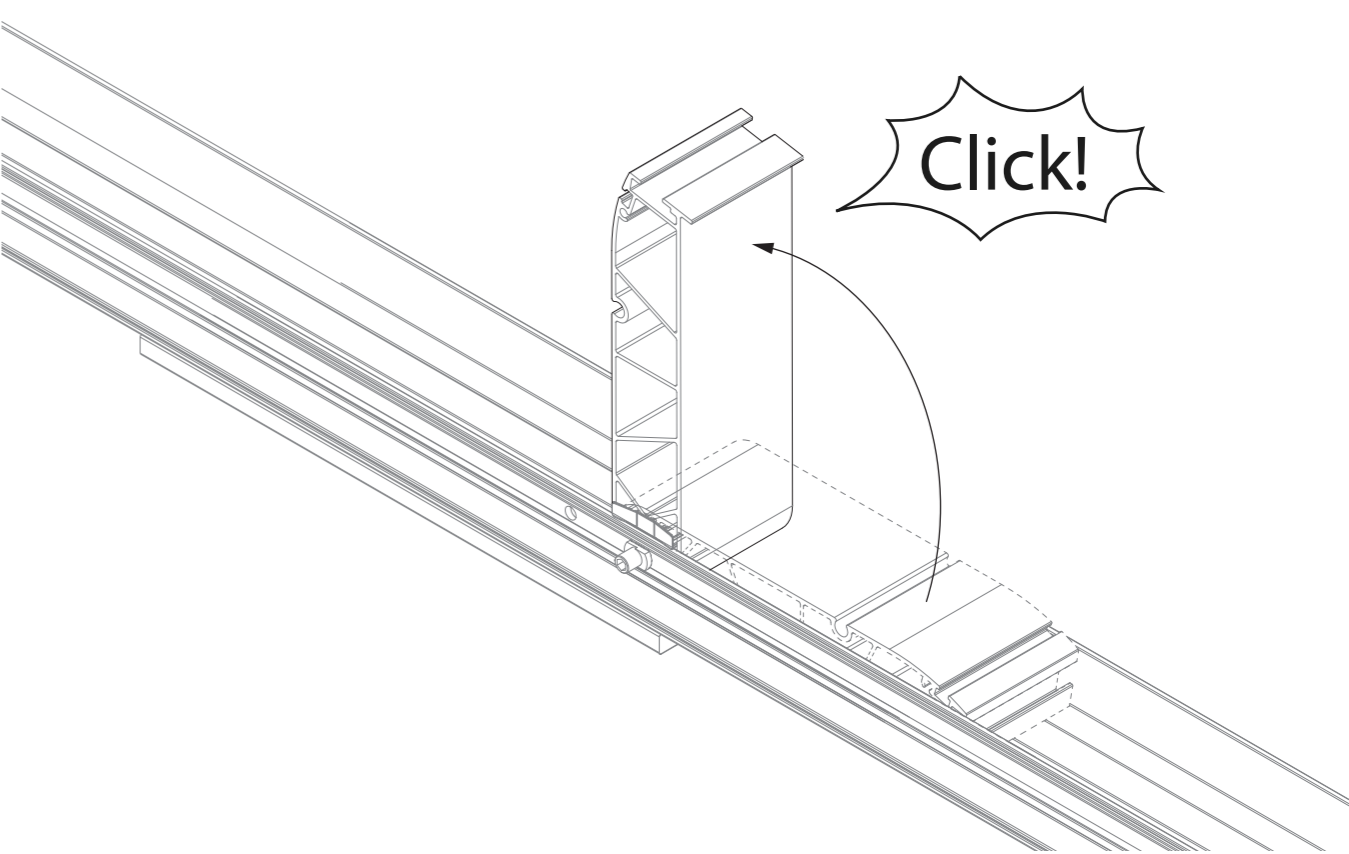


| Module Width | Ridge Support |
|--------------|---------------|
| 990-1030 mm  | A             |
| 1030-1070 mm | B             |
| 1070-1110 mm | C             |
| 1110-1150 mm | D             |
| 1150-1190 mm | E             |
| 1190-1230 mm | F             |

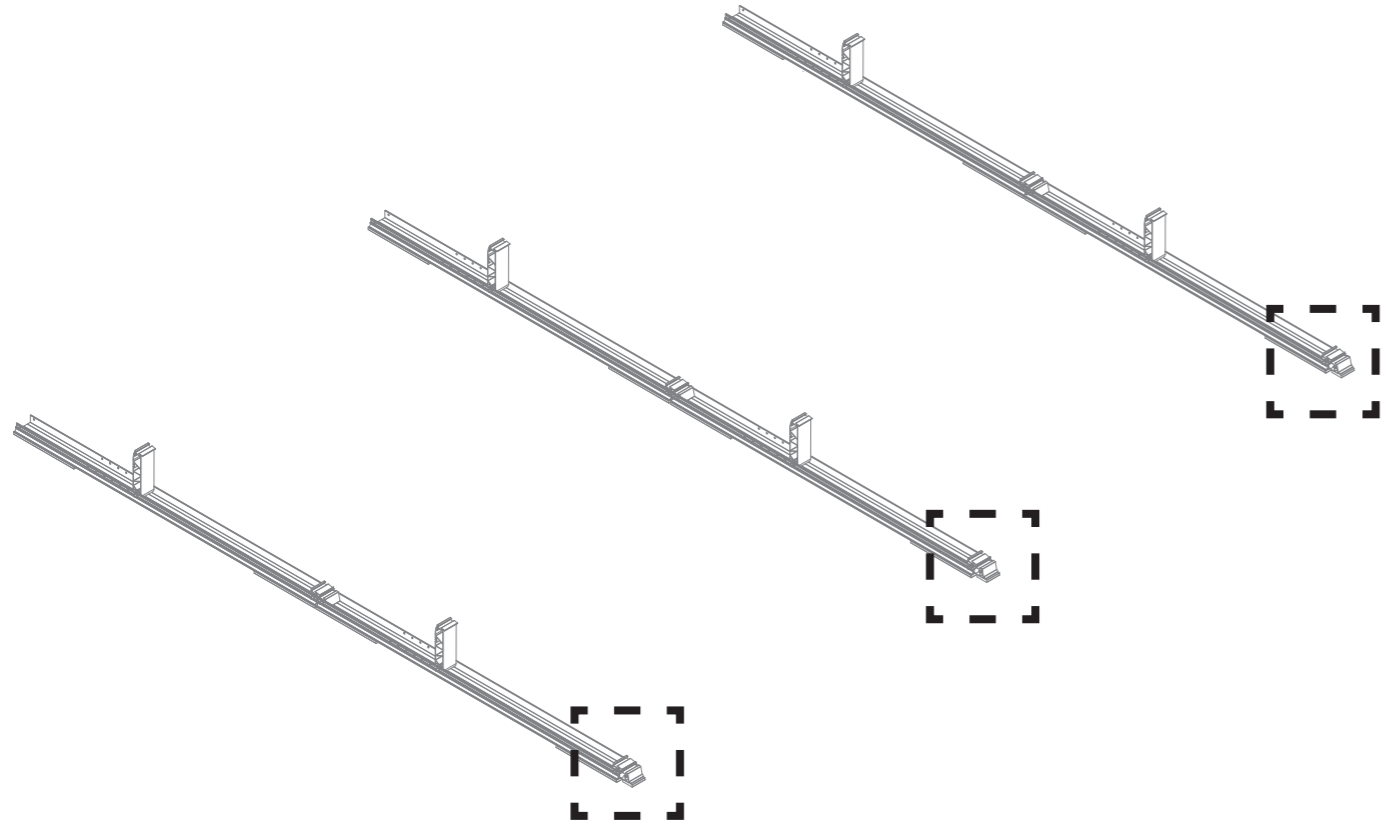
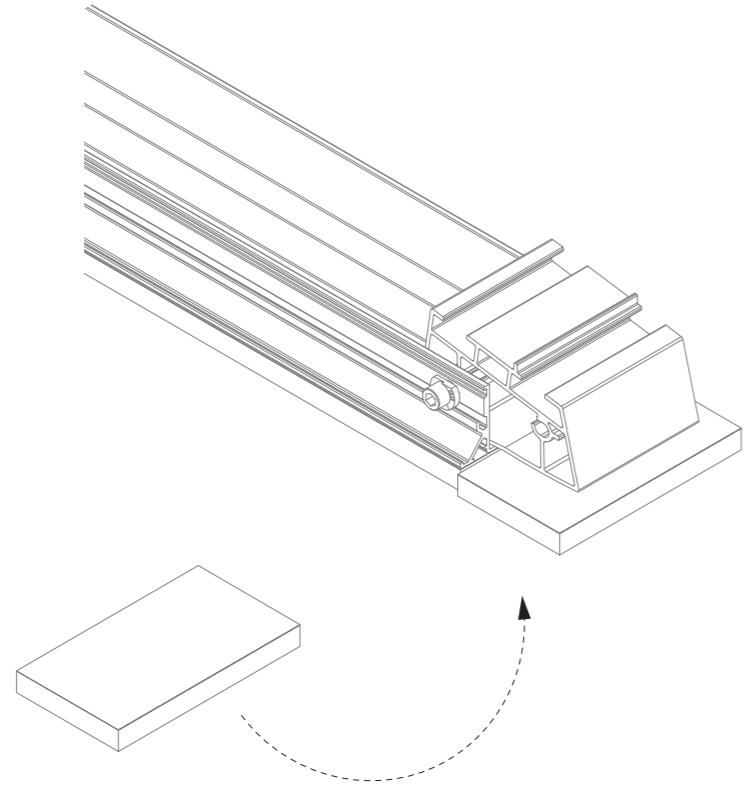
**2. Rail Connection**



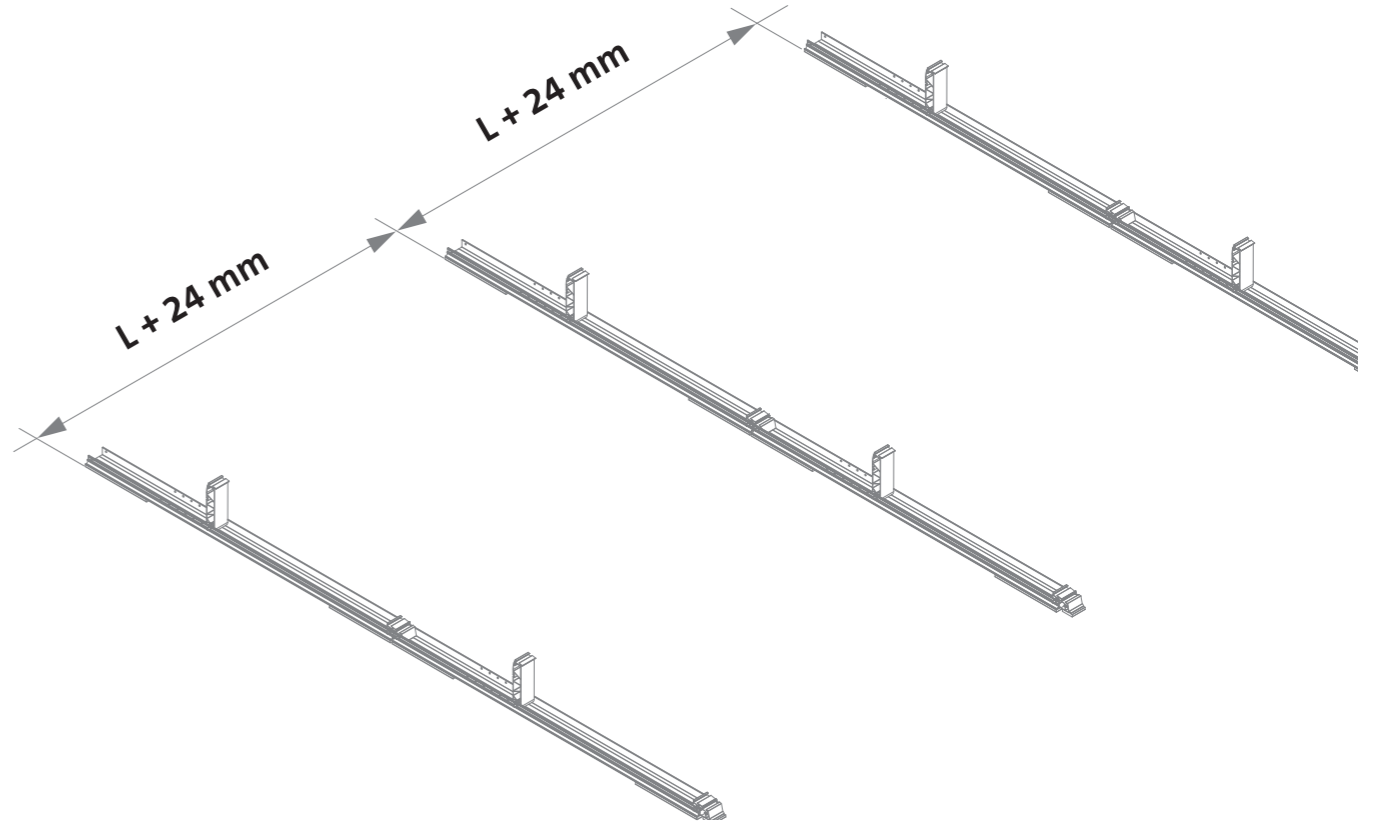
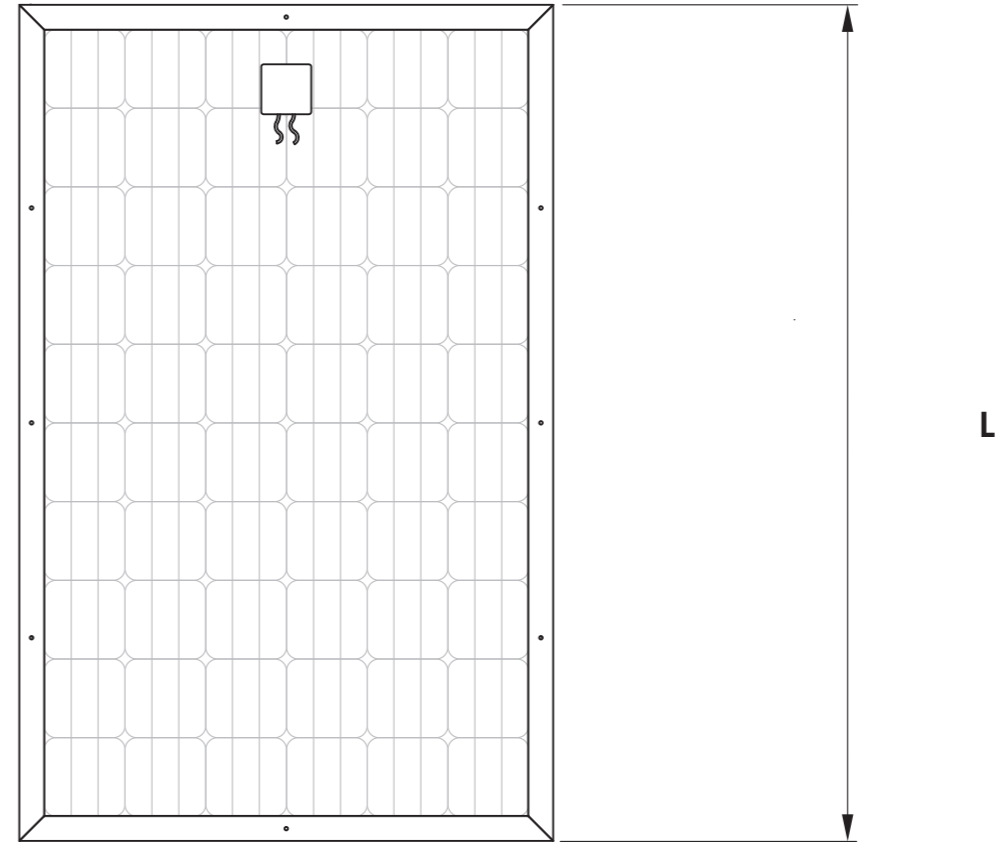
**3.**



4.



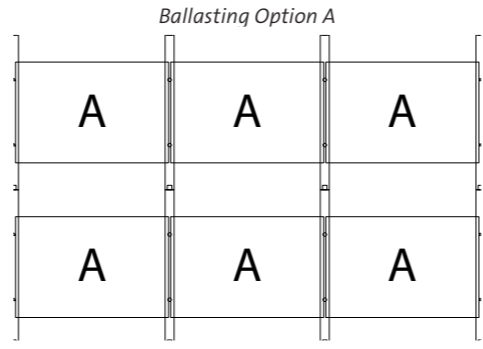
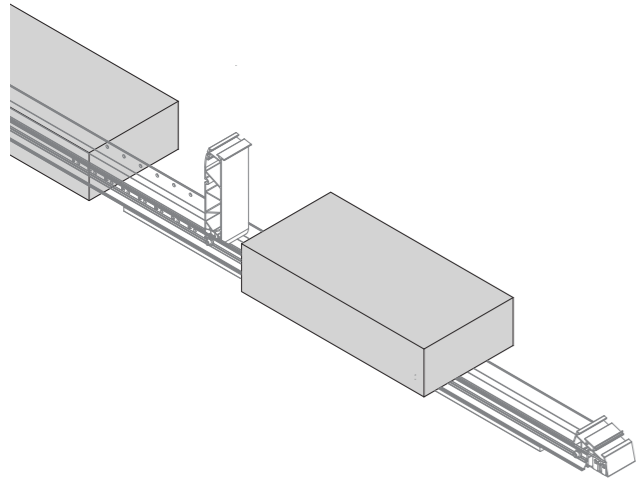
5.



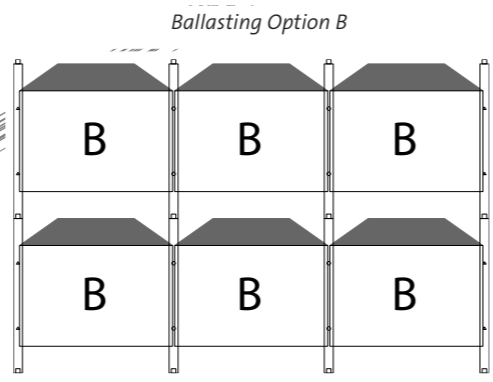
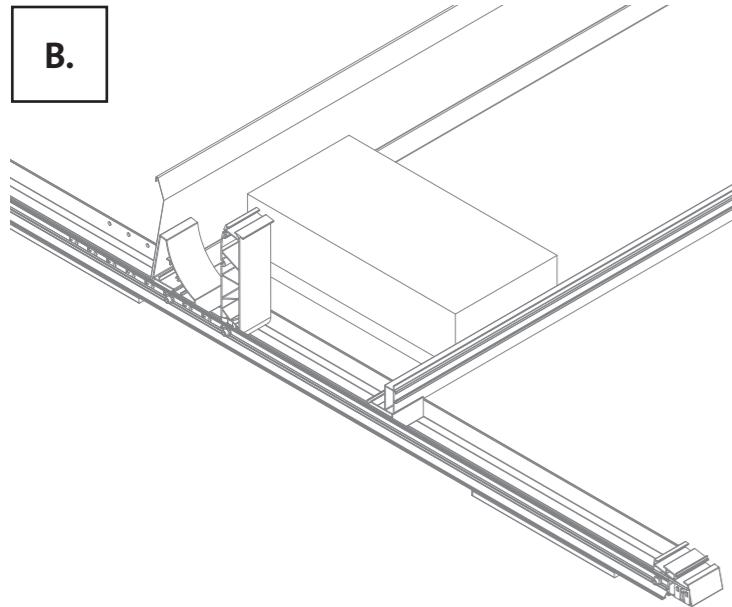
6.

Various ballasting options are possible (see project report)

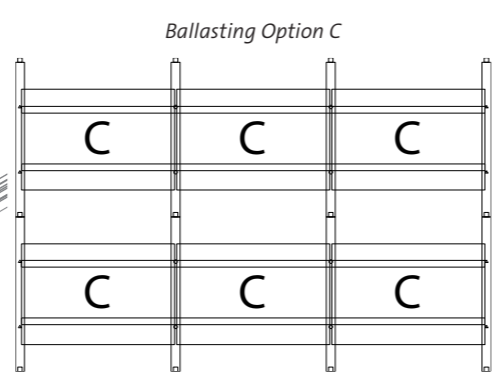
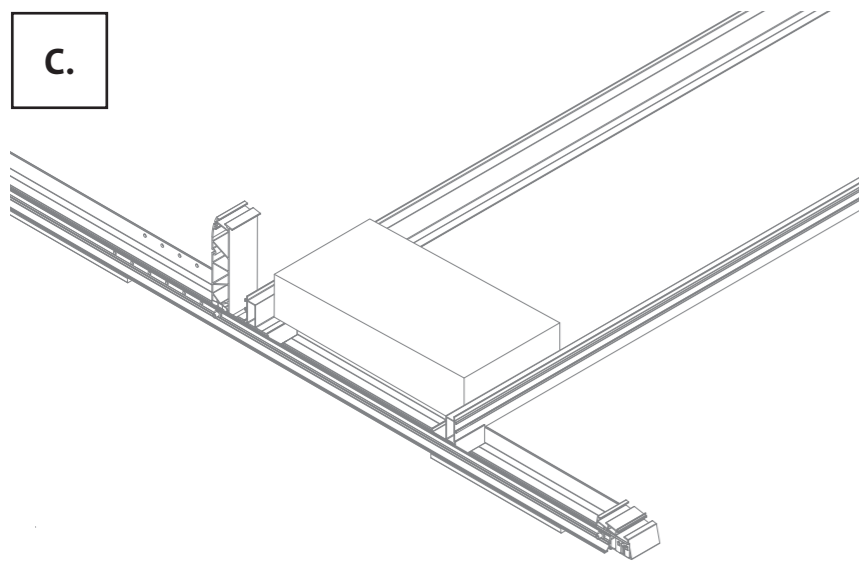
A.



B.

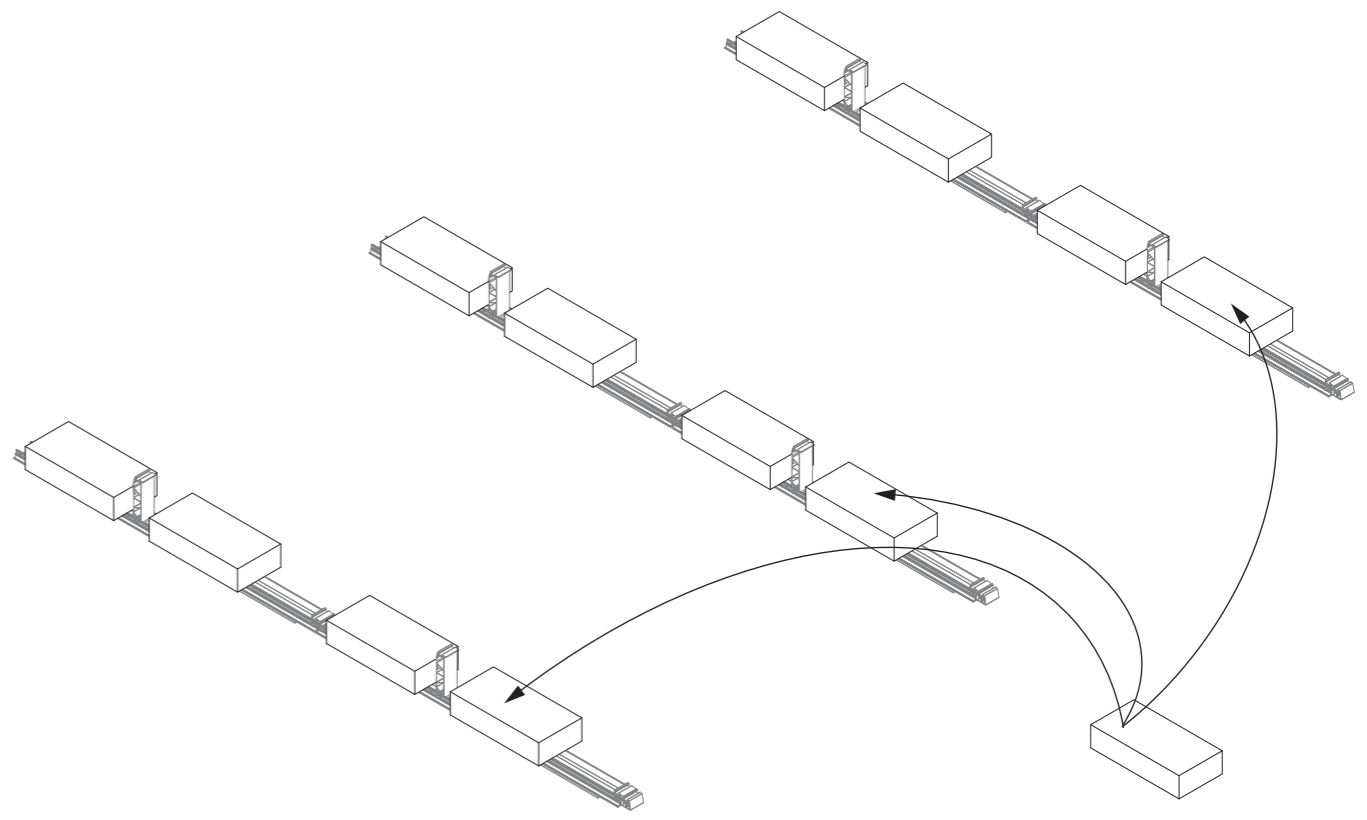


C.



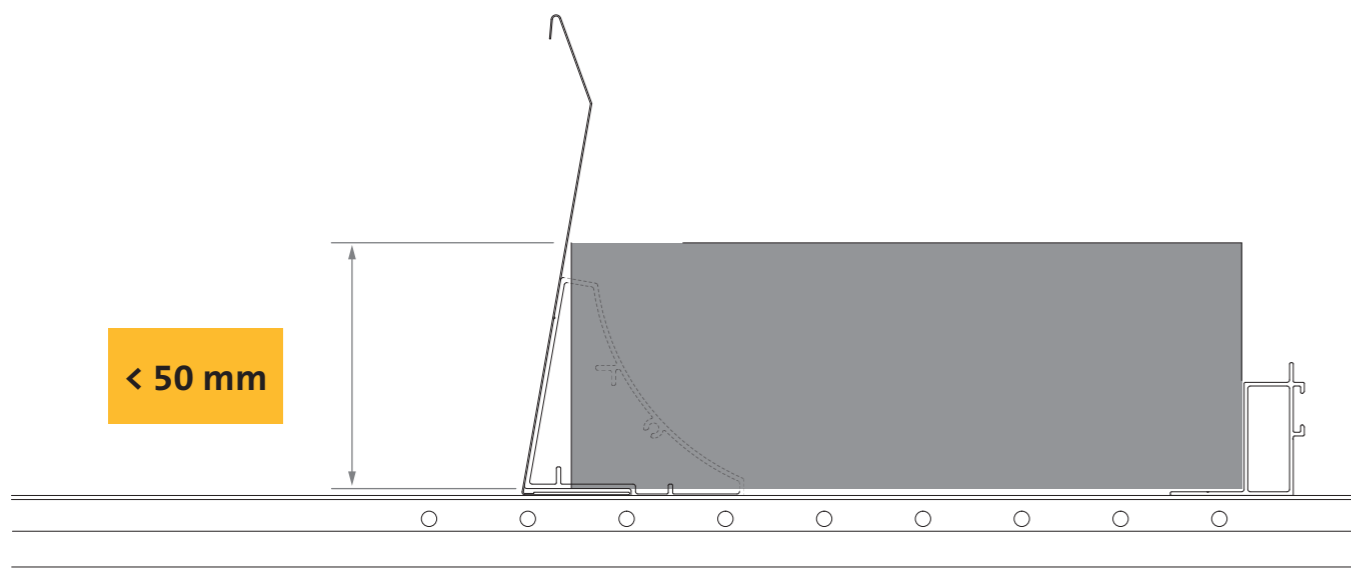
6A.

Ballasting Option A (see project report)

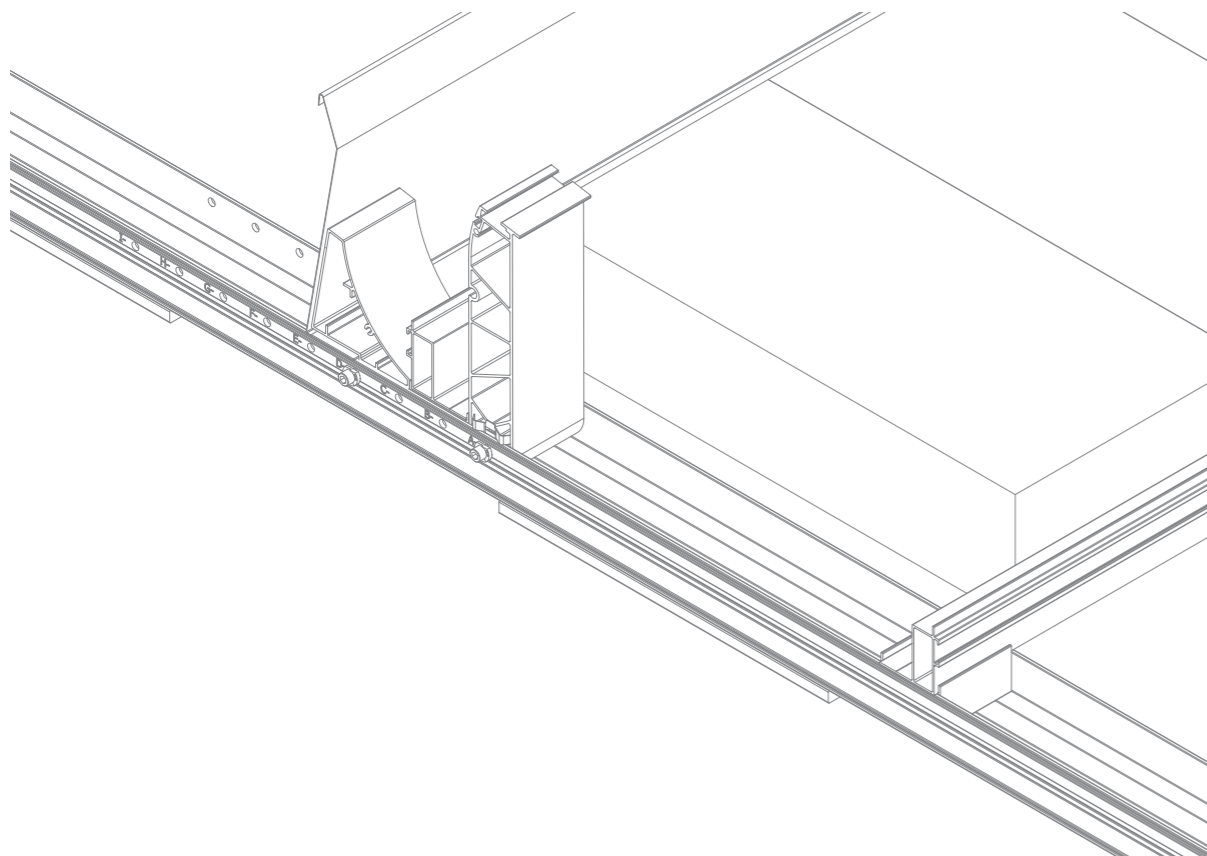


**6B. Ballasting Option B (see project report)**

 **Note the height of your ballast stone**

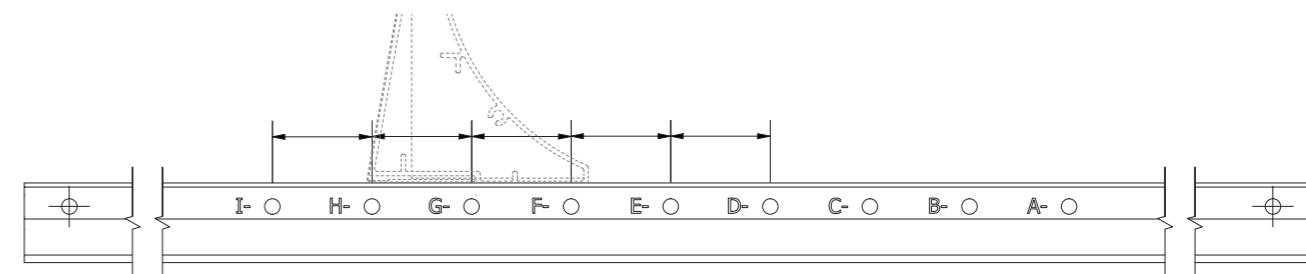


**For stones over 50 mm, the number of the following items is doubled:  
R500250, R500251, R500252  
The support requires an additional ballast rail here**

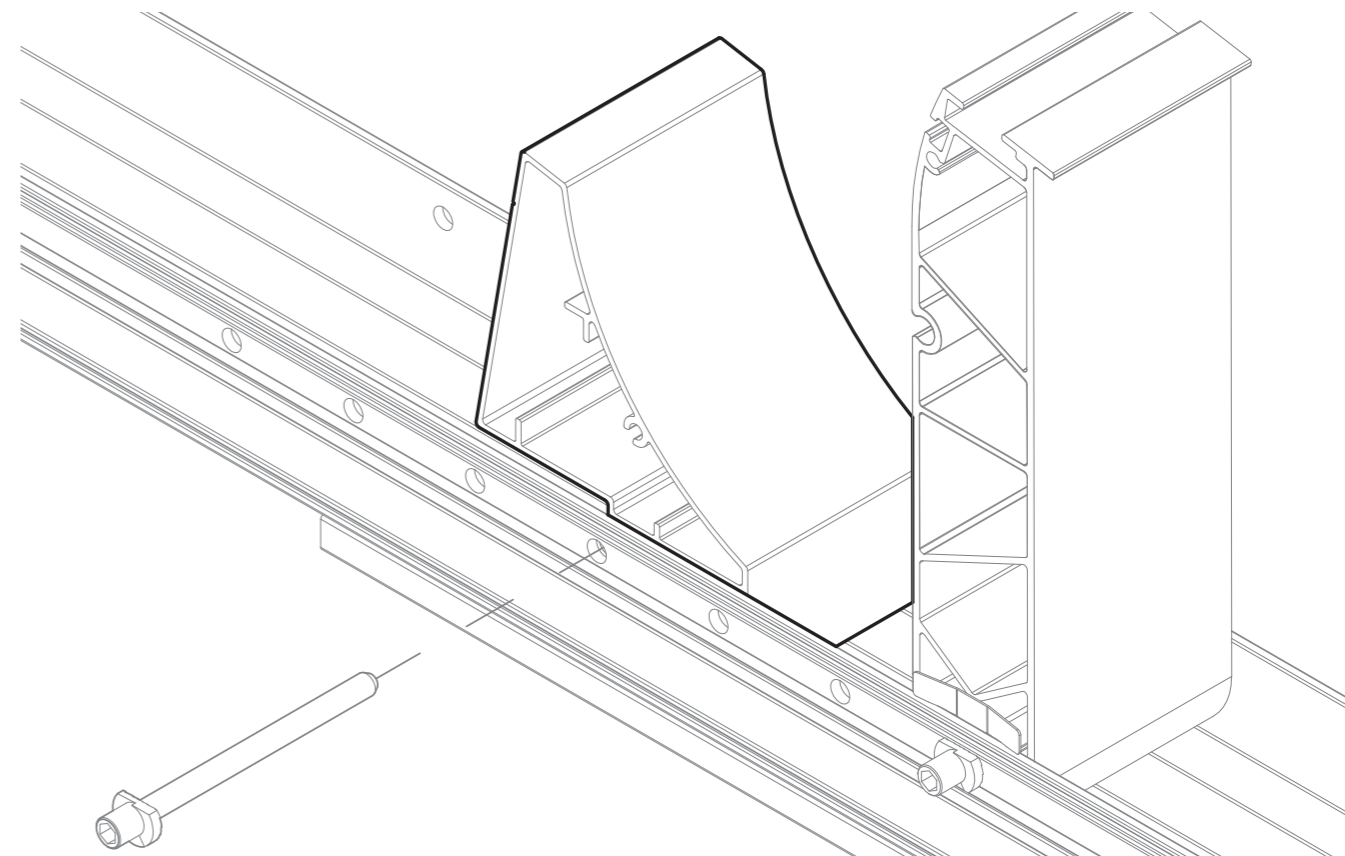


**6B. Ballasting Option B (see project report)**

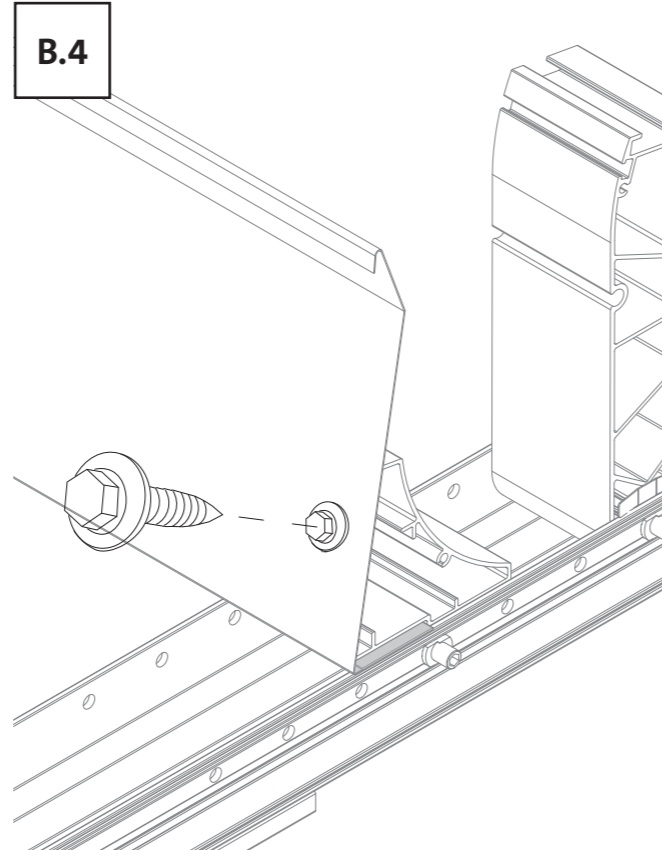
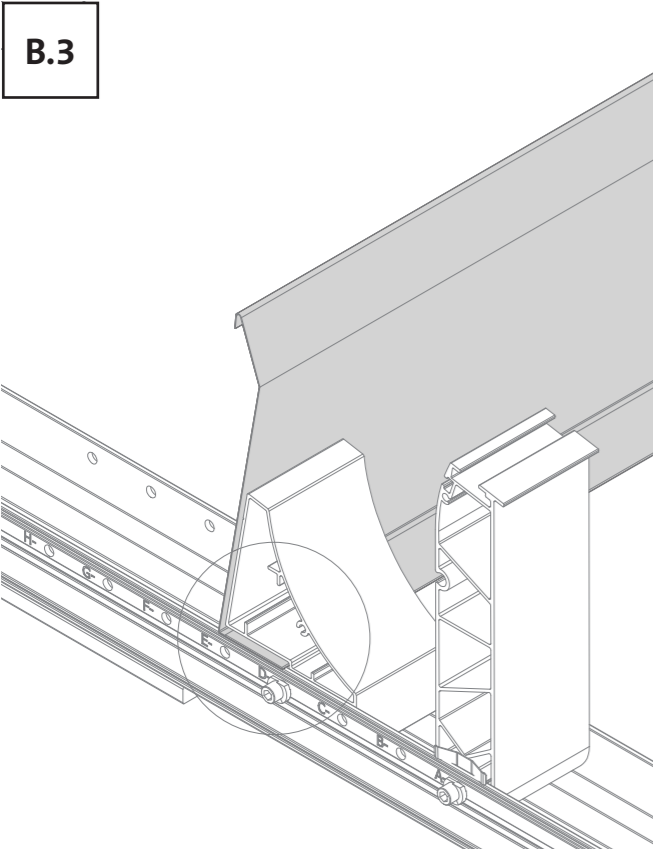
**B.1**



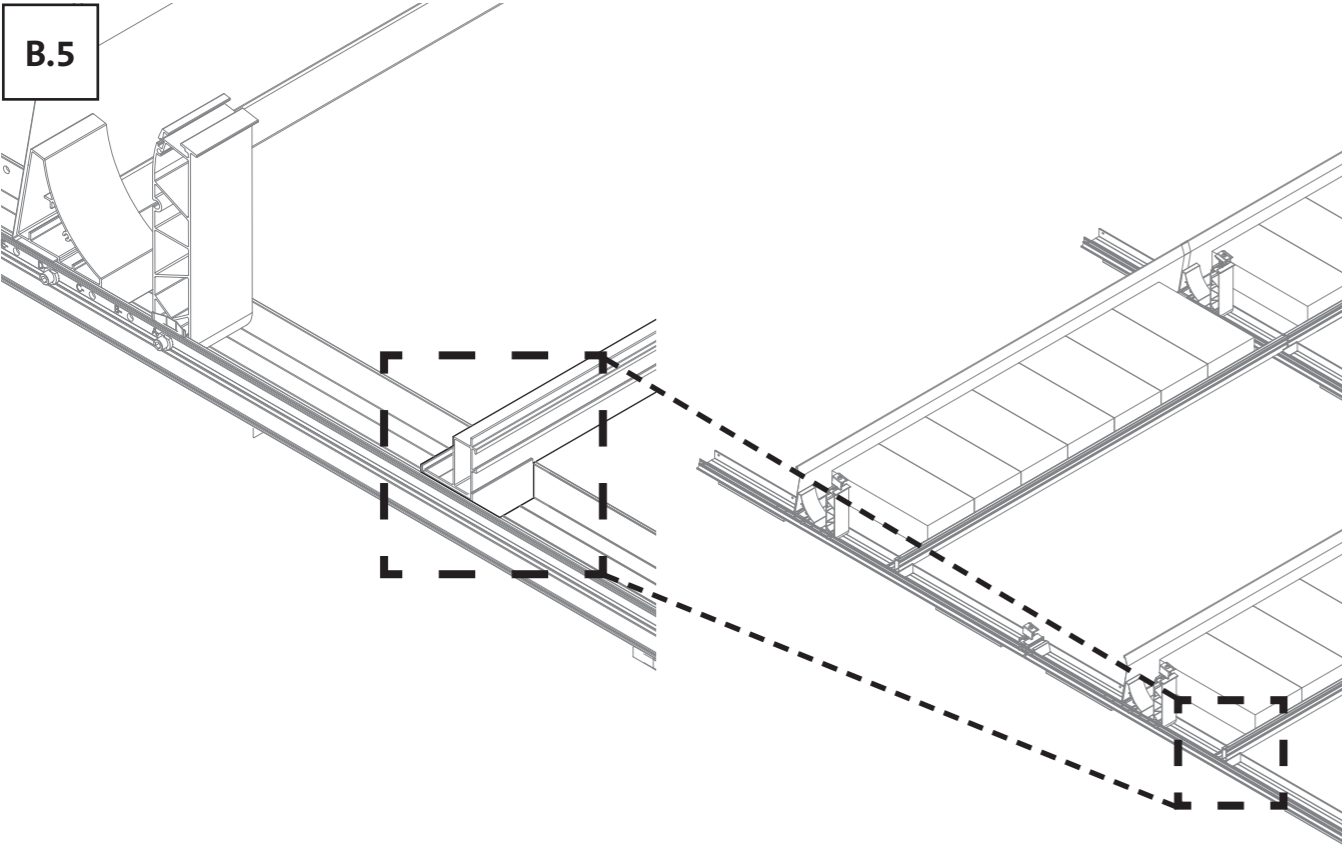
| Module width | Streamliner bracket |
|--------------|---------------------|
| 990-1030 mm  | D                   |
| 1030-1070 mm | E                   |
| 1070-1110 mm | F                   |
| 1110-1150 mm | G                   |
| 1150-1190 mm | H                   |
| 1190-1230 mm | I                   |



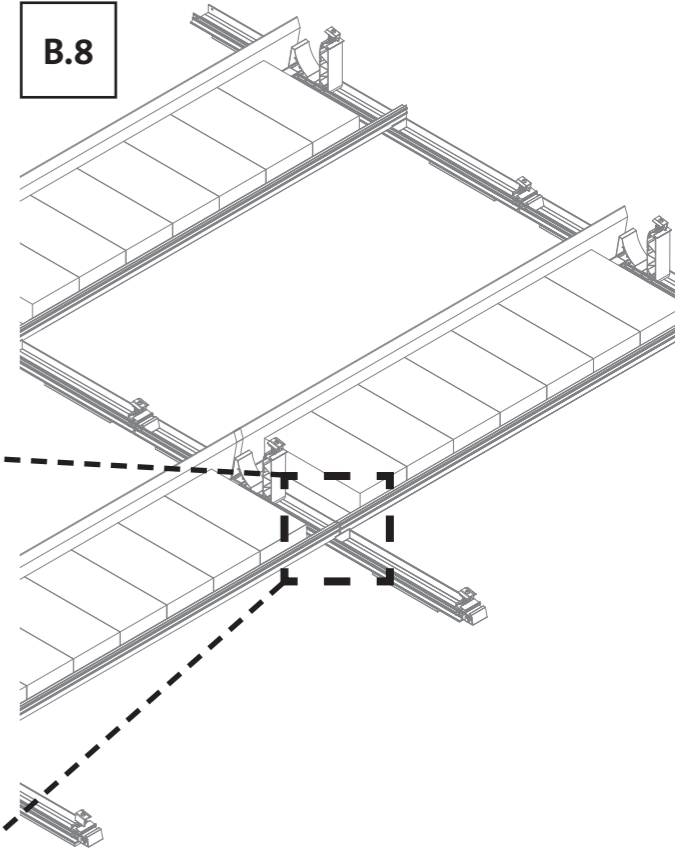
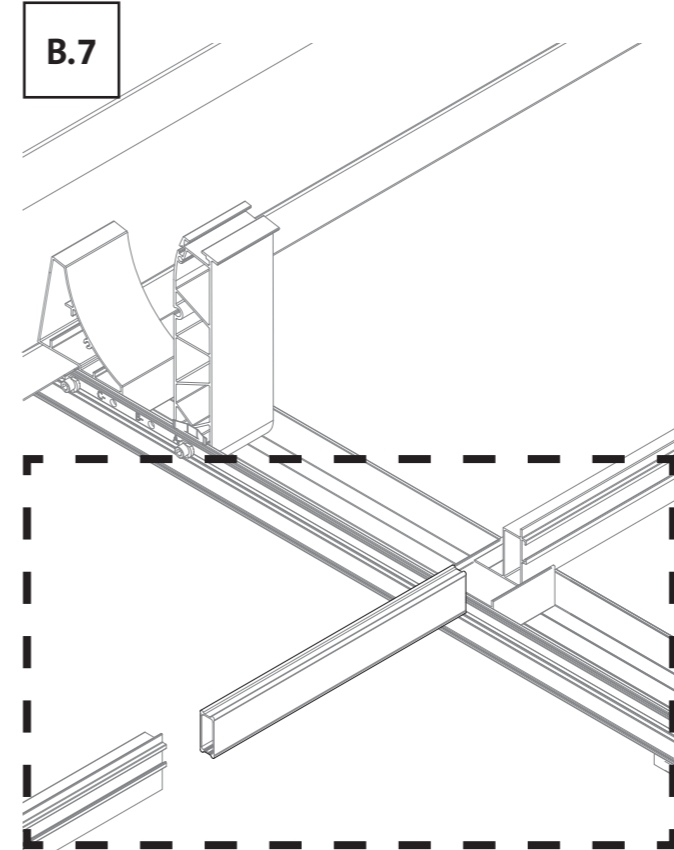
**6B.** Ballasting Option B (see project report)



**6B.** Ballasting Option B (see project report)

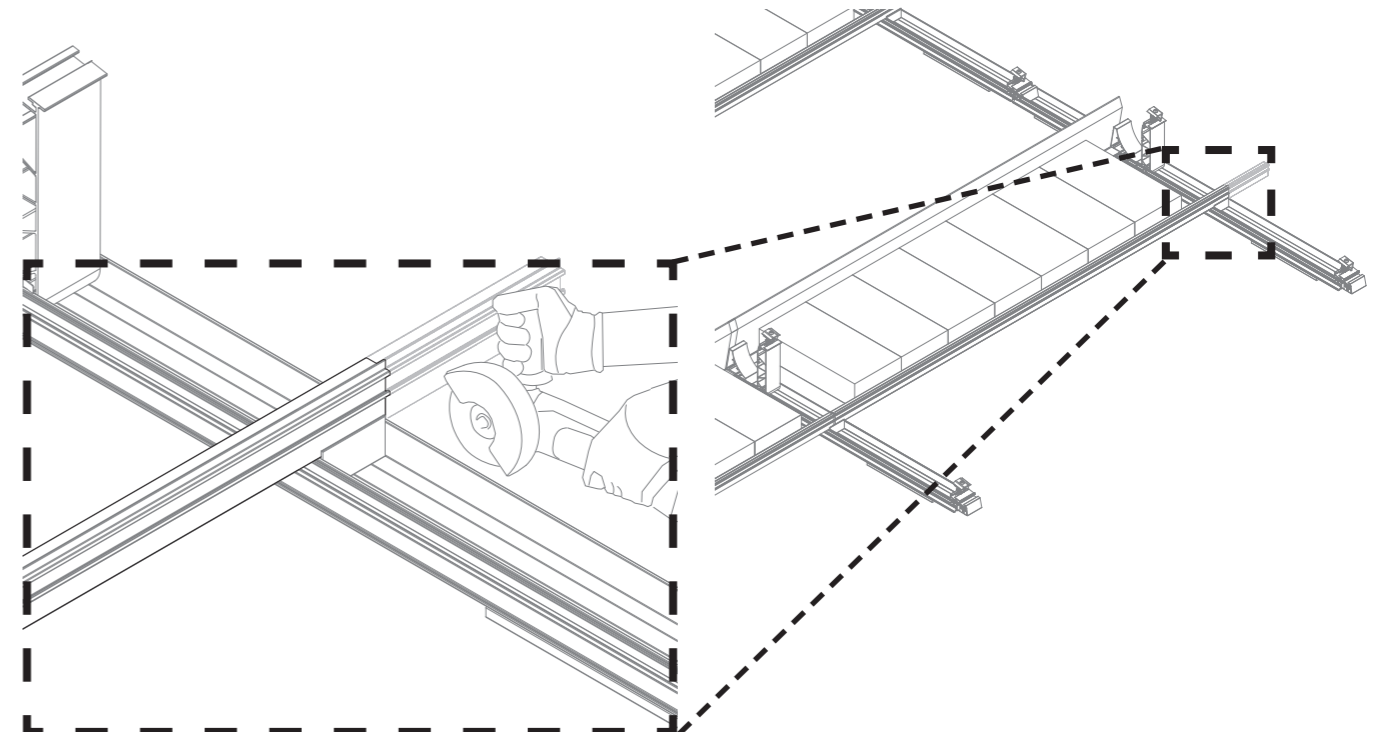


**6B.** Ballasting Option B (see project report)

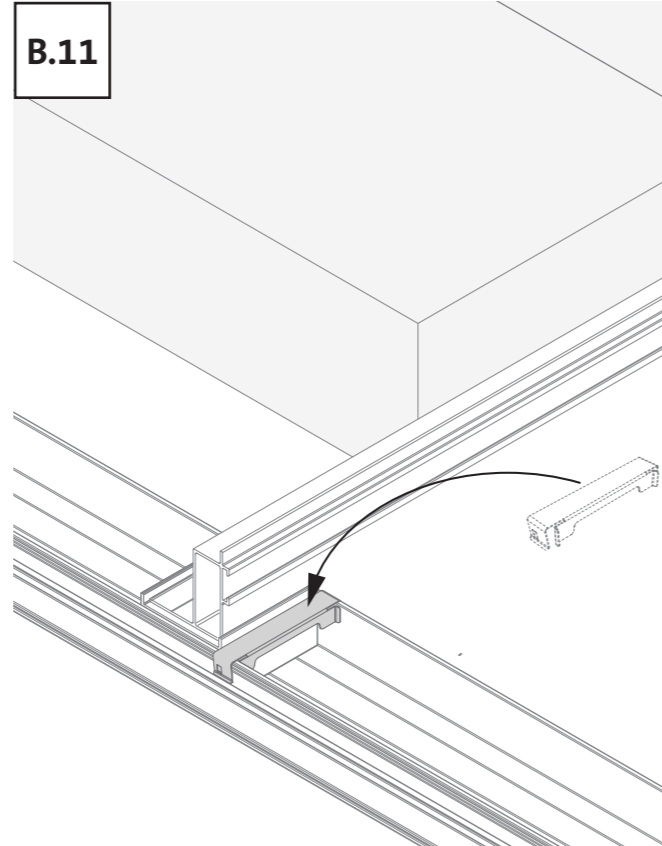
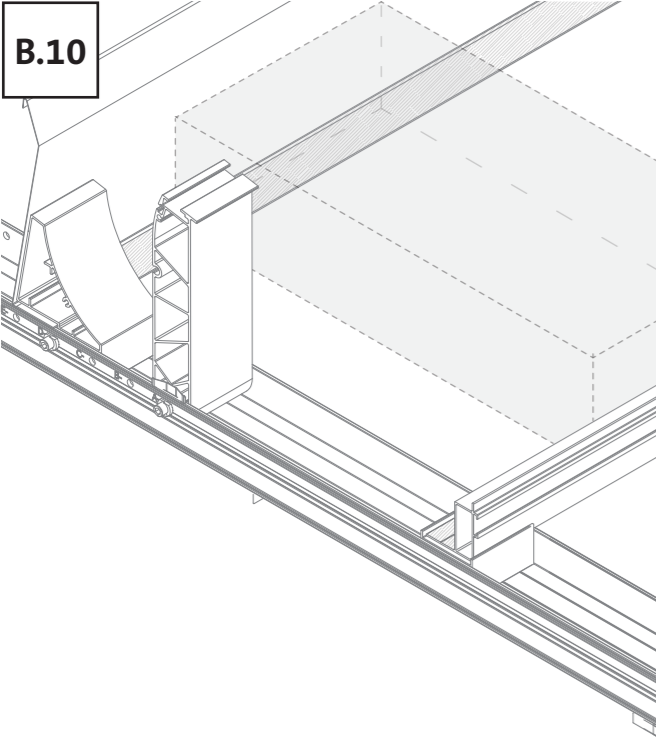


**6B.** Ballasting Option B (see project report)

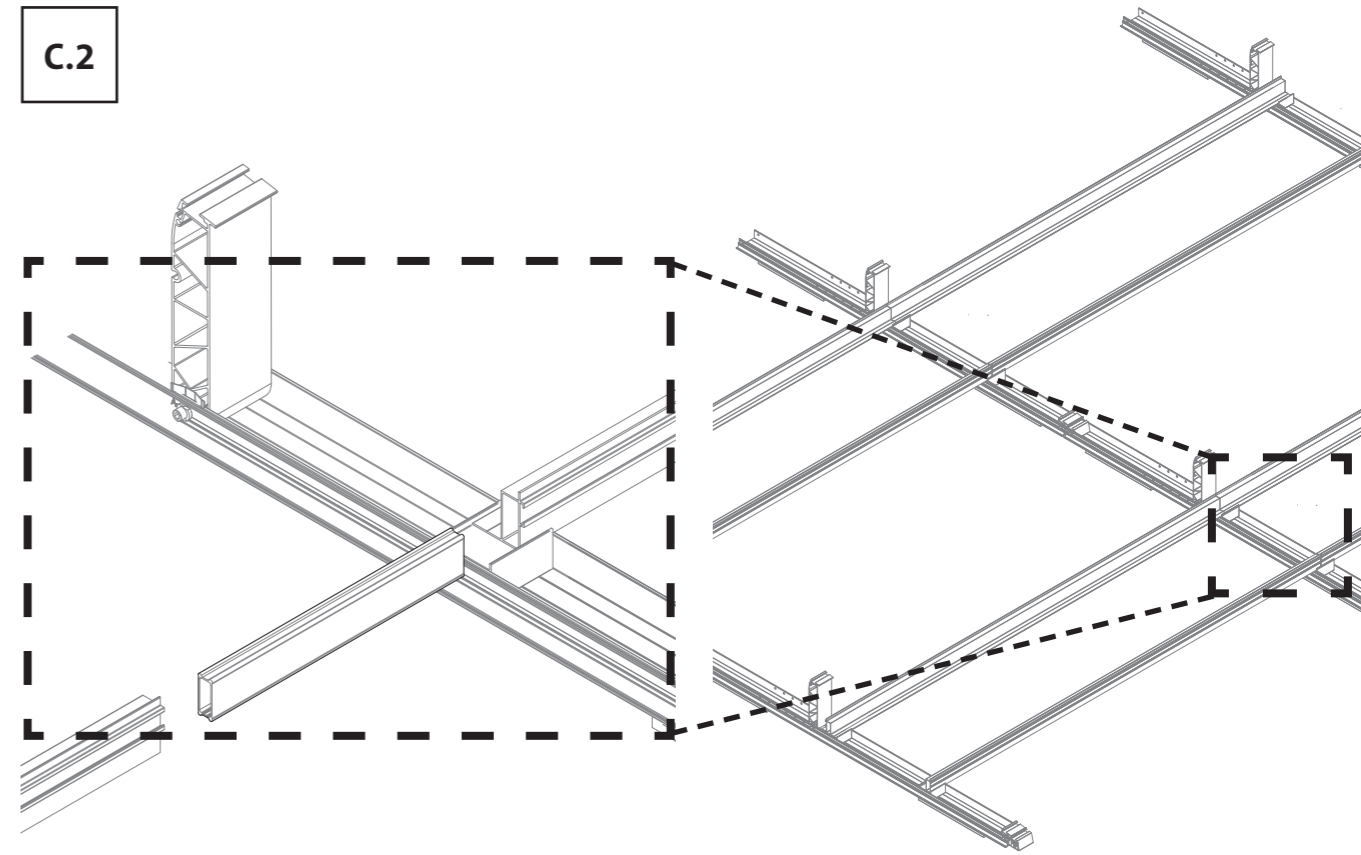
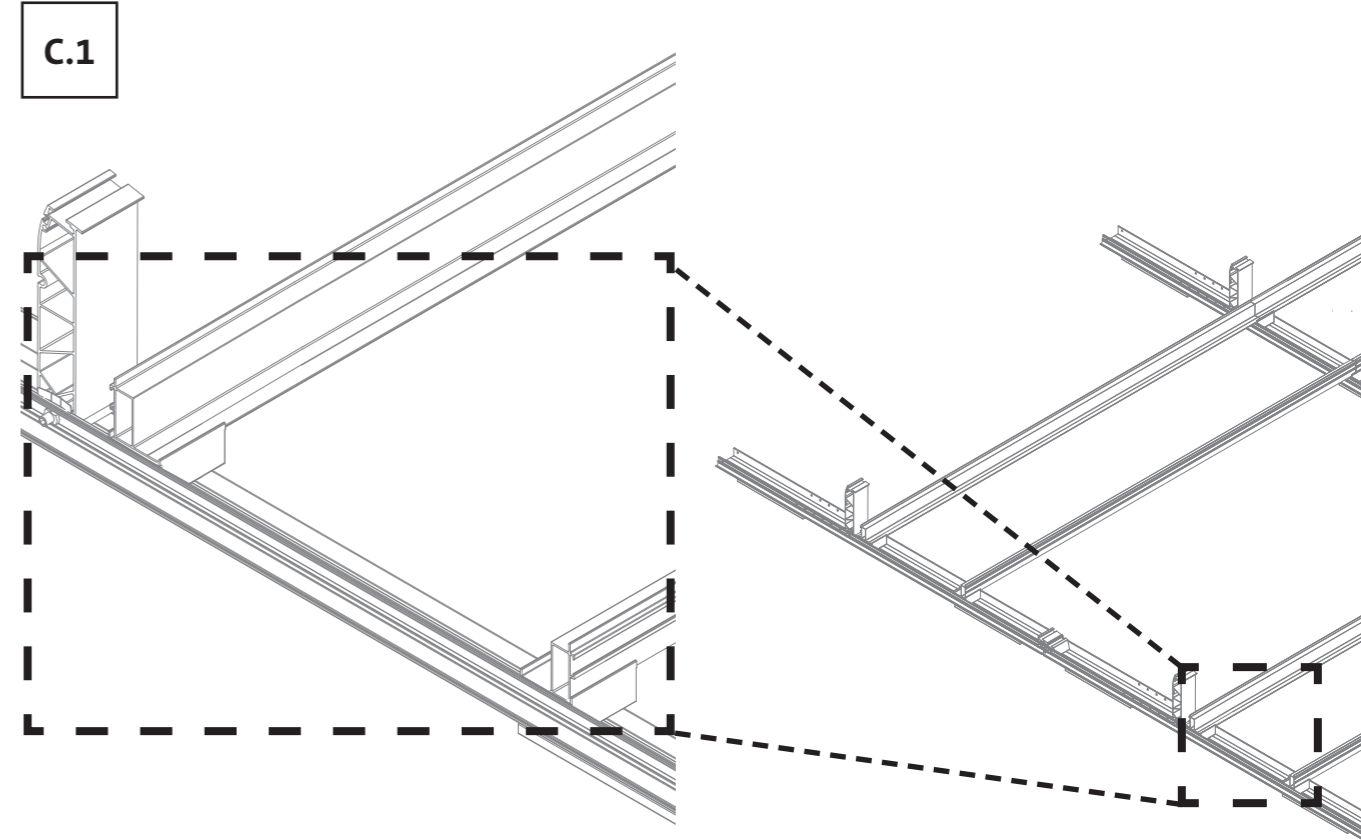
**B.9** Please do not cut on the roof membrane!



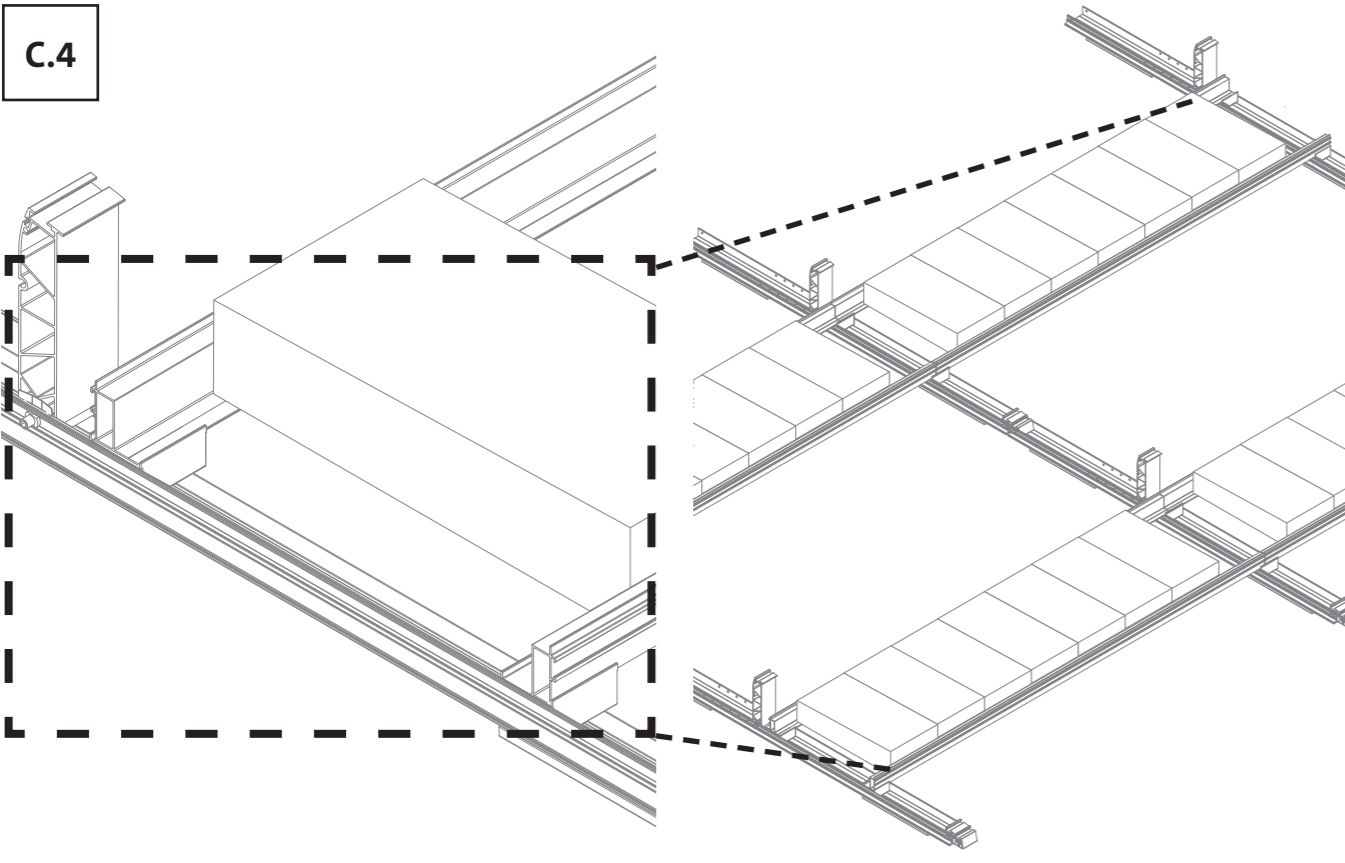
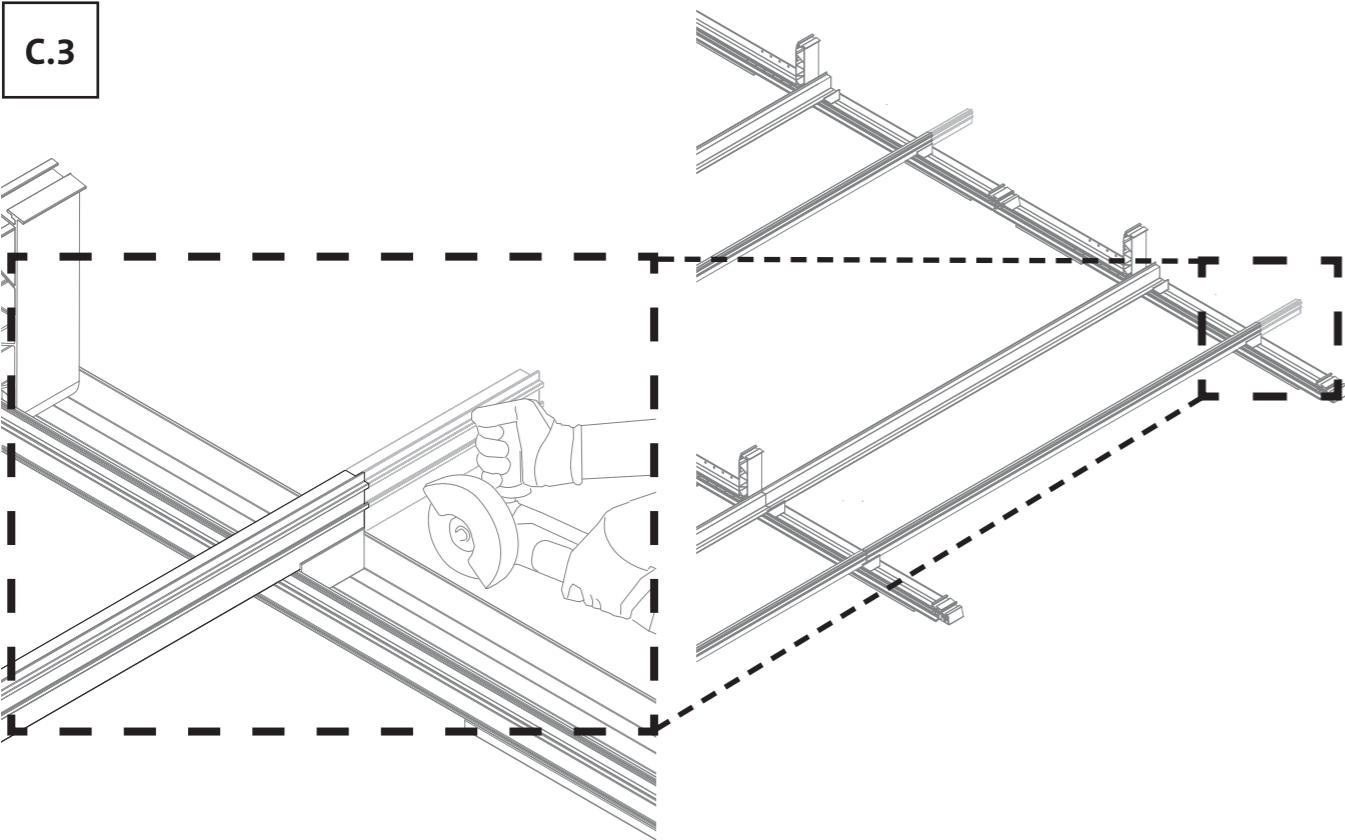
**6B. Ballasting Option B (see project report)**



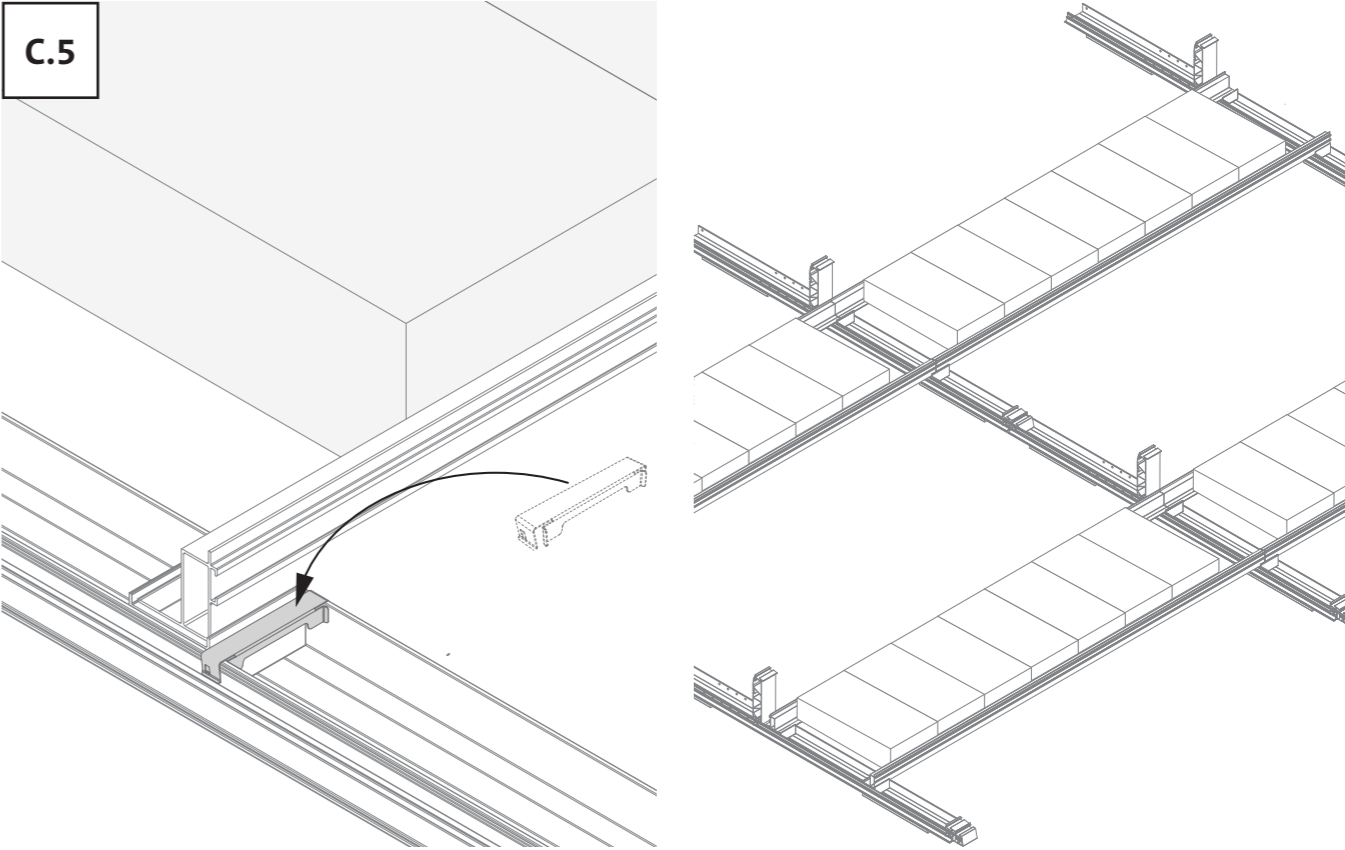
**6C. Ballasting Option C (see project report)**



6C. Ballasting Option C (see project report)

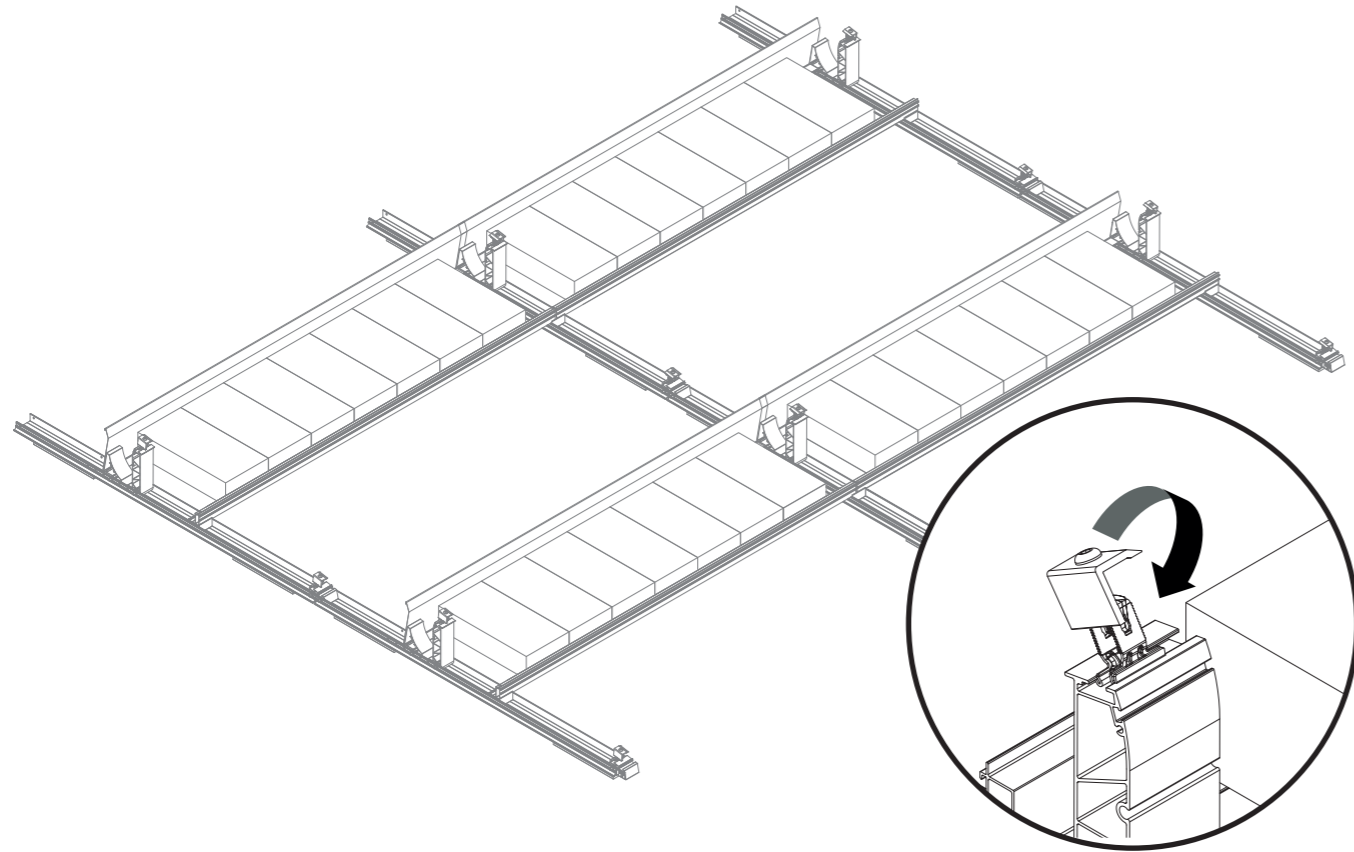


6C. Ballasting Option C (see project report)

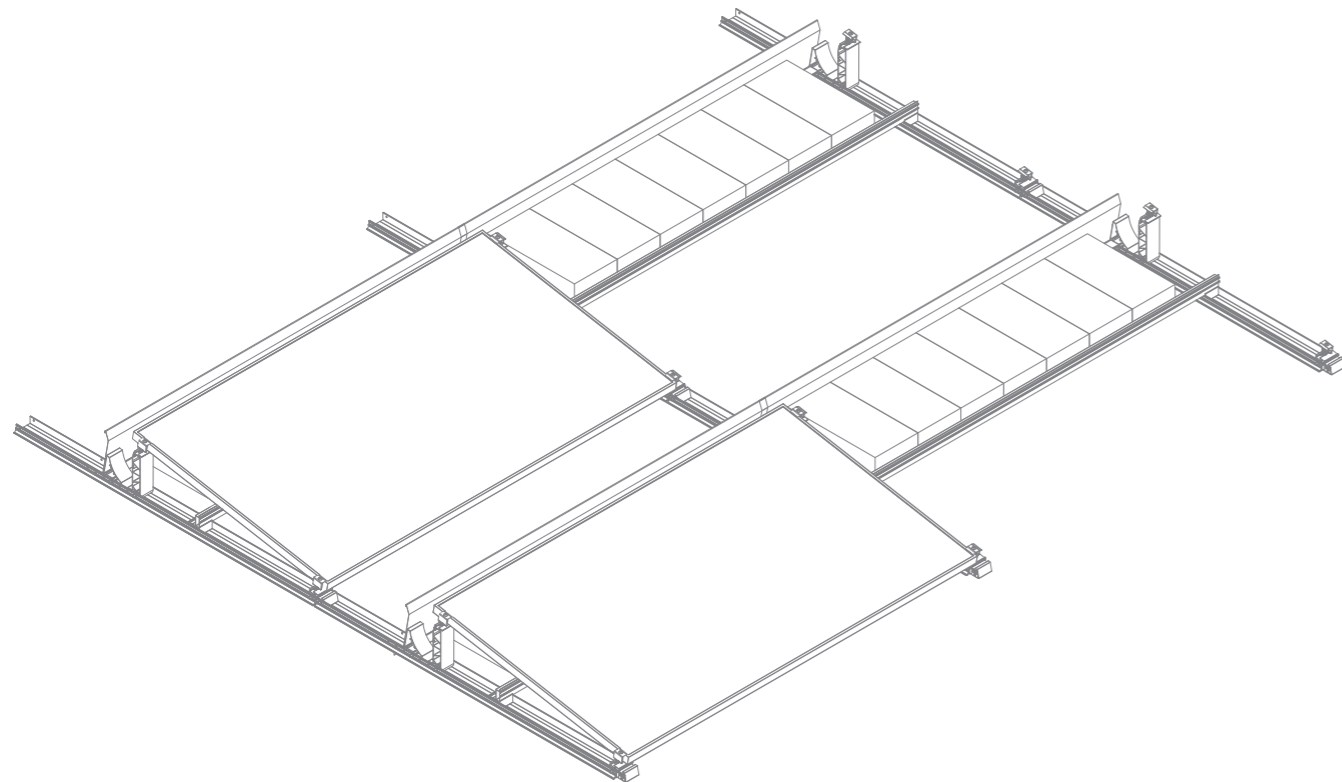


7.

Depending on the installation variant, the following graphics may vary slightly.

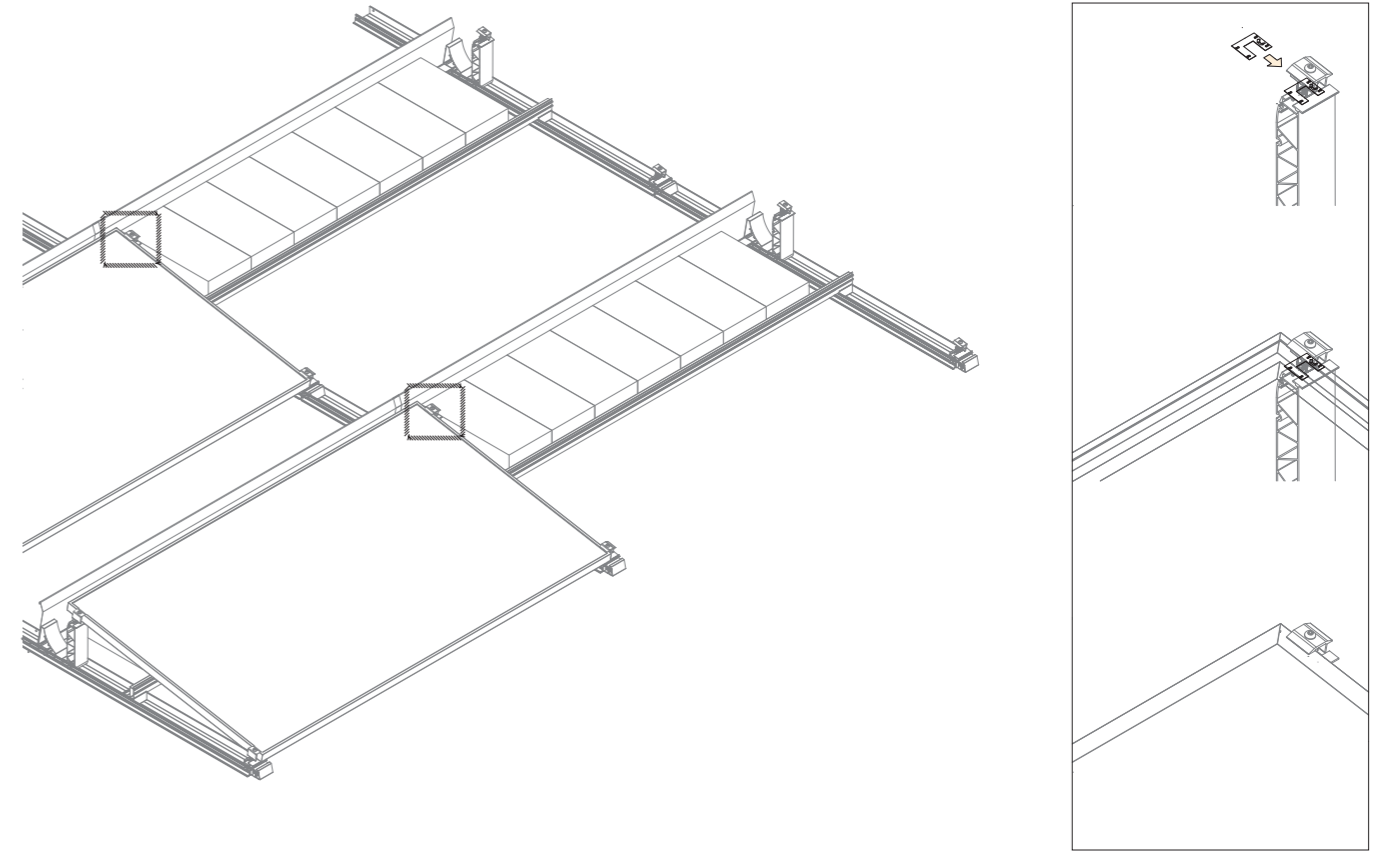


8.

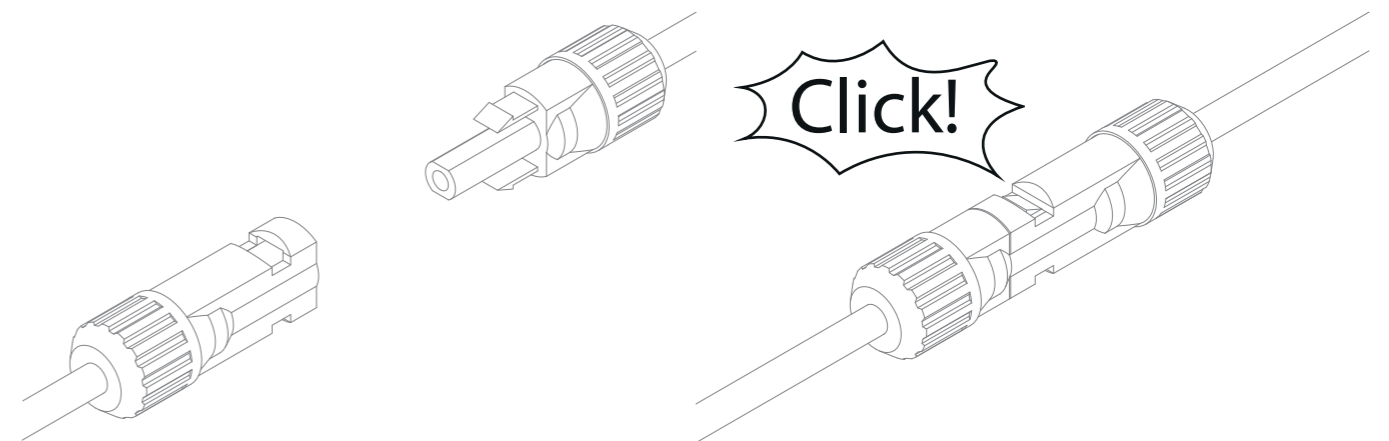


9.

Potential equalisation (optional) - Article number R900268

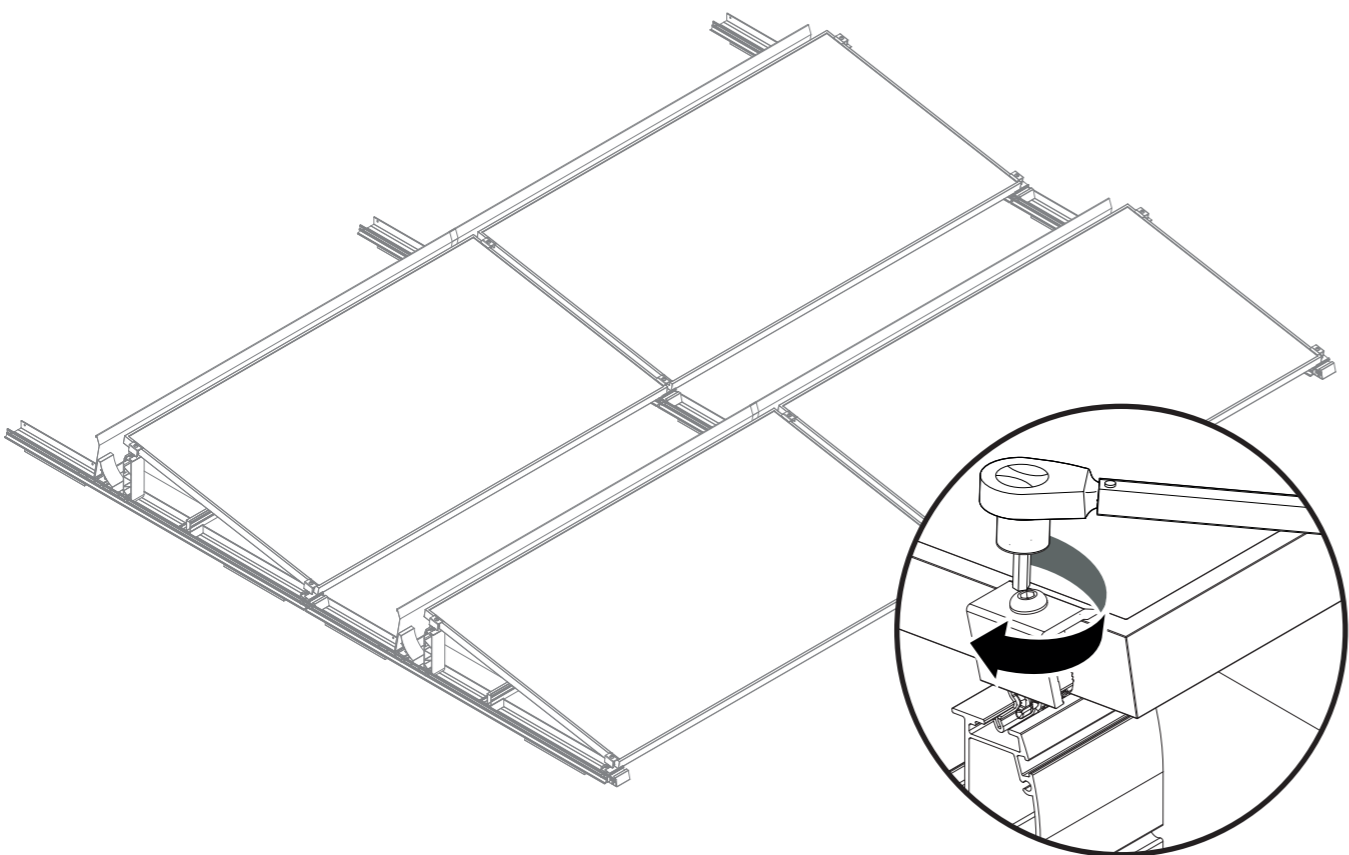


10.

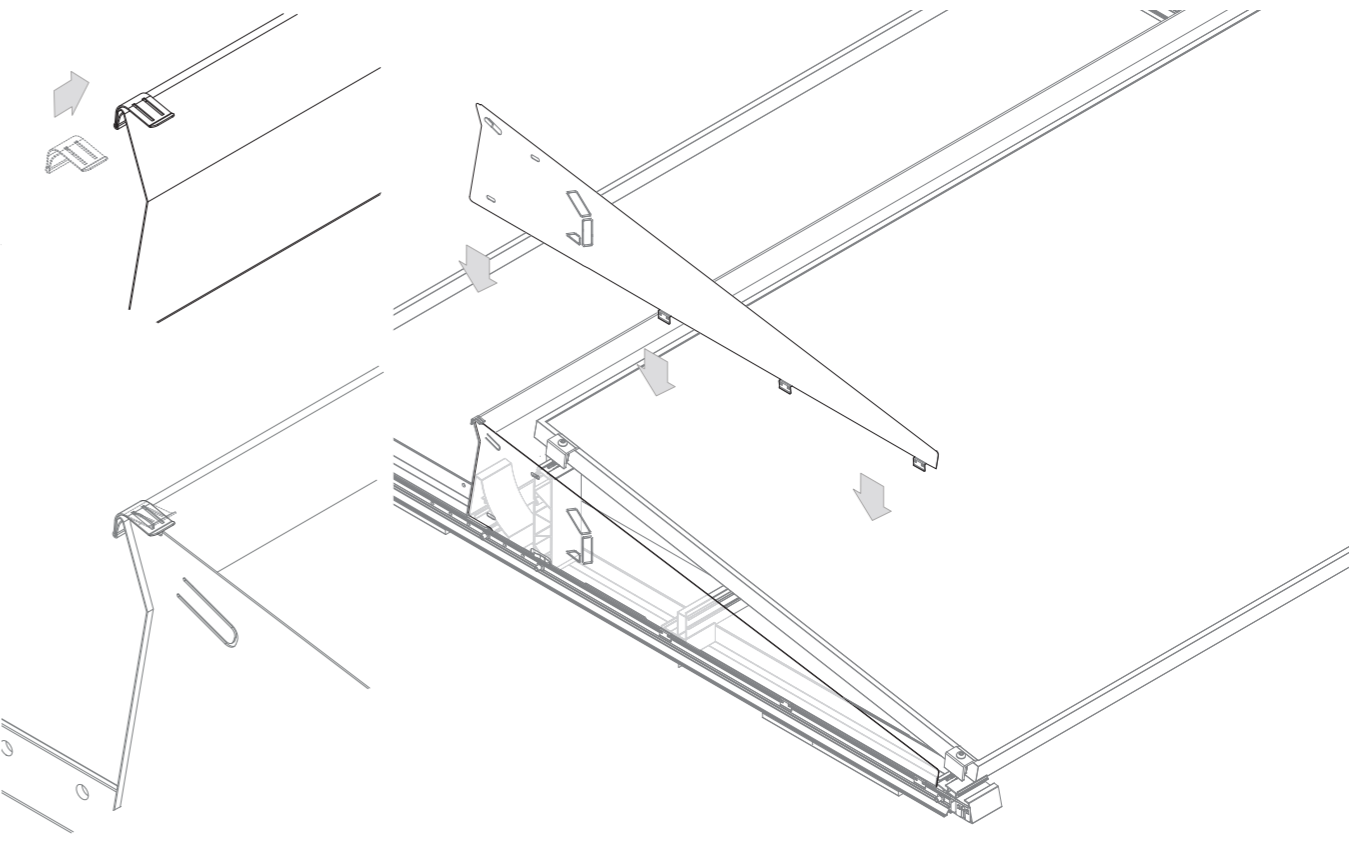


11.

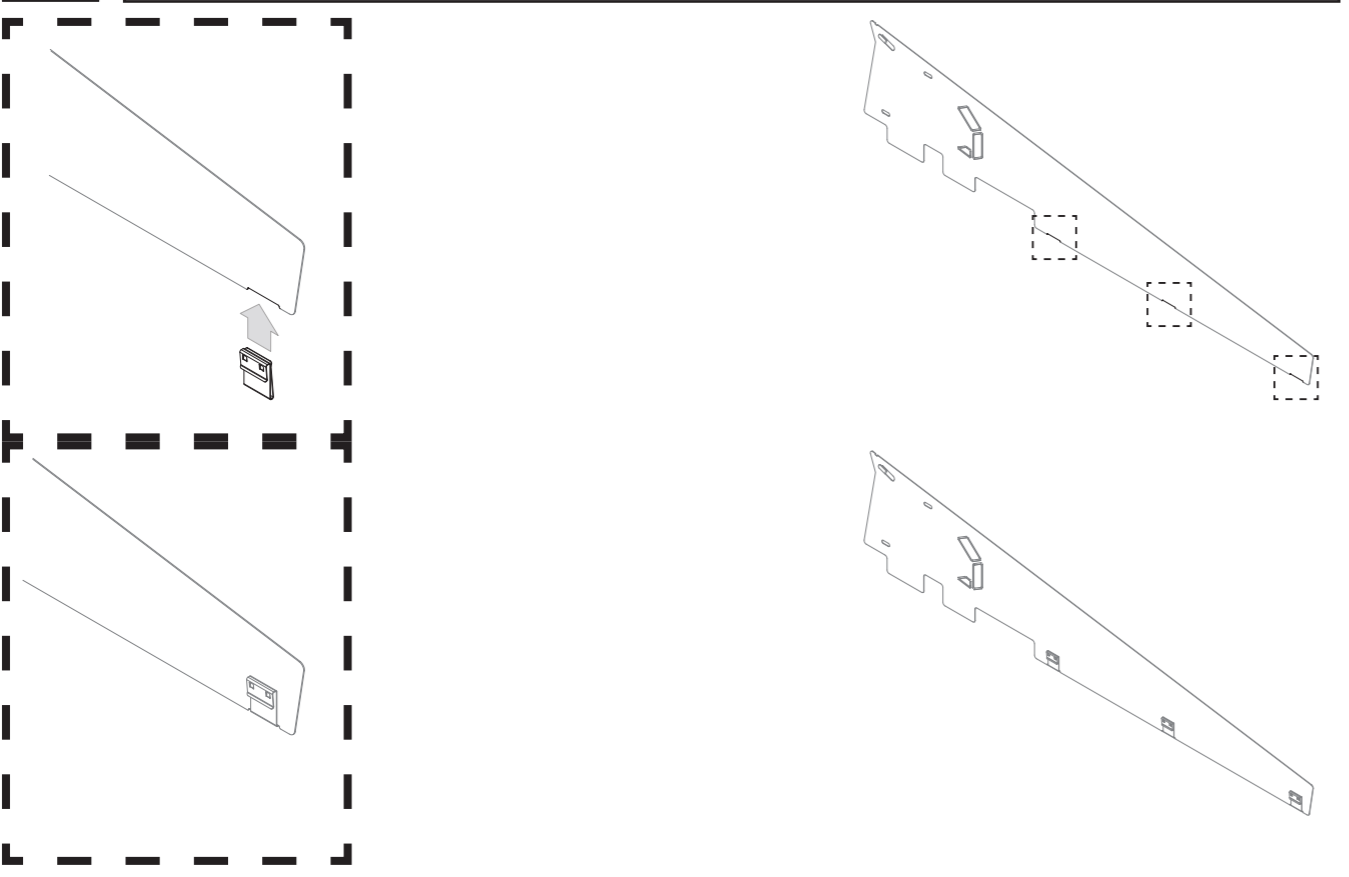
10 Nm 



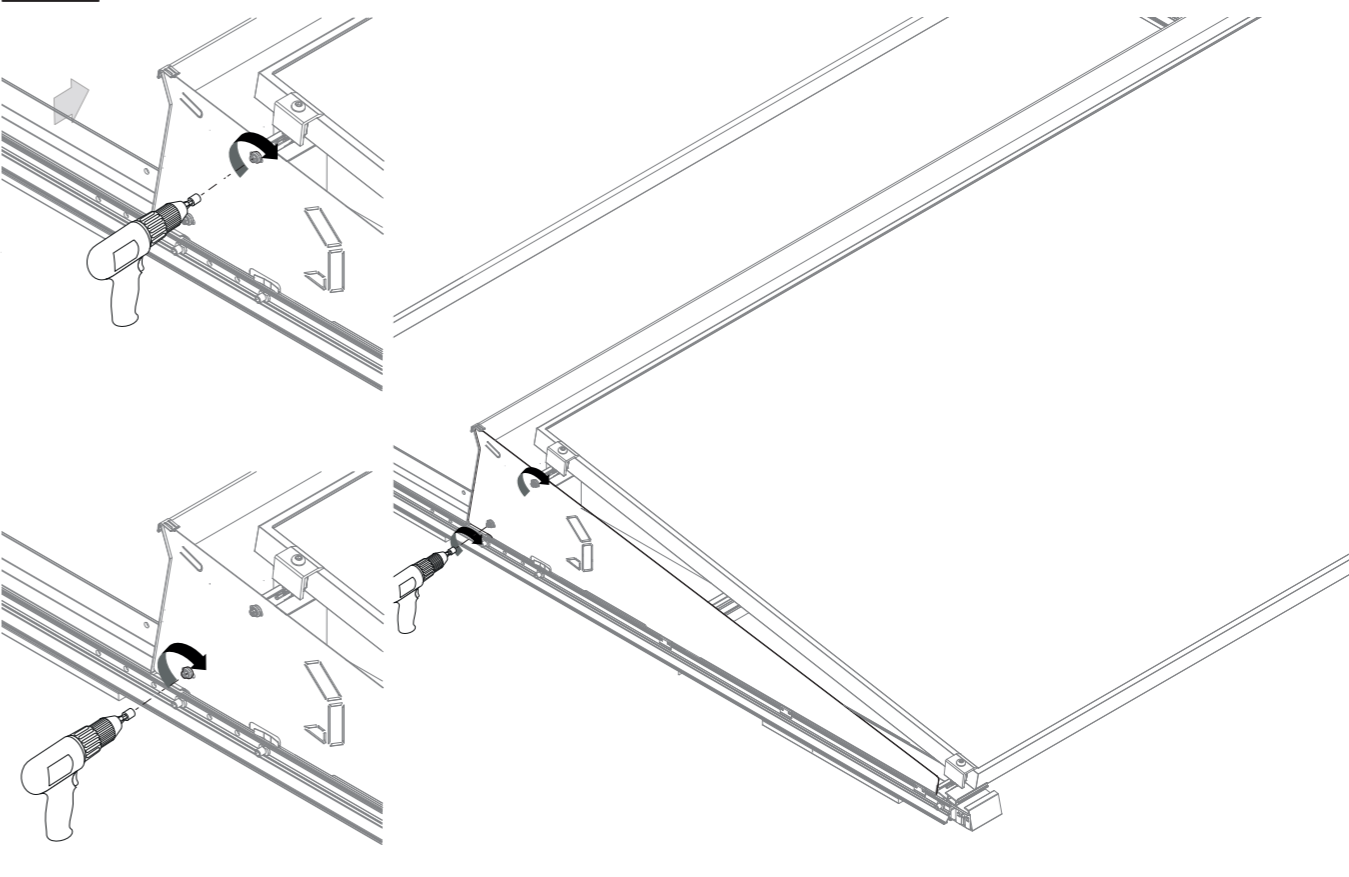
12.



12. Deflector (optional) - Article number R520265



12.



**13.**

**MCS012 Certification - Product overview -**

| Product name | Product Model name | Maximum Design Wind Uplift Resistance (kPa for full system) | Partial (safety) factor(s) |
|--------------|--------------------|---|----------------------------|
| FS Pro 10-EW | REN_FSPRO_02       | 0.7   | 1.00                       |

|  |                    |
|--|--------------------|
| <b>Product name certificated</b>       |                    |
| FS Pro 10-EW                           |                    |
| <b>Product Model name certificated</b> |                    |
| REN_FSPRO_02                           |                    |
|  |                    |
| <b>System component</b>                | <b>Part number</b> |
| End clamp+ (black)                     | R420081-BE         |
| Middle clamp+ (black)                  | R420082-BE         |
| End clamp+                             | R420081            |
| Middle clamp+                          | R420082            |
| RS1                                    | R420080            |
| RS1 (black)                            | R420080-BE         |
| RS Pro (black)                         | R420025-B          |
| RS Pro                                 | R420025            |
| FS Pro Mid clamp EW                    | R520282            |
| FS Pro End clamp LS                    | R520283            |
| FS Pro 10-EW Base rail 2100 (Set)      | R520222            |
| FS Pro 10-EW Base rail 2300 (Set)      | R520223            |
| FS Pro 10-EW Base rail 2380 (Set)      | R520244            |
| FS Pro 10-EW Base rail 2700 (Set)      | R520229            |
| FS Pro Ridge support                   | R500230            |
| FS Pro Securing clip ridge support     | R500228            |
| FS Pro Eave support 10-EW              | R500232            |
| FS Pro Securing bolt                   | R500227            |
| FS Pro Ballast profile 1900            | R500250            |
| FS Pro Ballast profile connector       | R500251            |
| FS Pro Ballast profile support         | R500252            |
| FS Pro Securing clip ballast support   | R500253            |
| FS Pro Roof protection pad 110         | R500271            |
| FS Pro Roof protection pad 300         | R500270            |
| FS Pro adapter LS                      | R500235            |
| FS Pro Potential equalisation clip EW  | R500261            |
| FS Pro Cable tray 450                  | R500262            |
| FS Pro Side deflector 10 (Set)         | R520265            |

### Determination of the coefficient of friction (static friction coefficient)

The coefficient of friction is a very important parameter for the stability of flat roof photovoltaic systems. It influences the amount of ballast required.

A friction coefficient of 0.3 can be assumed as the standard value. If on-site tests are carried out to determine the friction coefficient, deviating values are permissible.

These tests must be carried out in accordance with the MIS 3002 standard or the "Protocol for determining the coefficient of static friction"

[https://www.renusal.com/files/content/Downloads/Pruefprotokoll\\_Haftreibungskoeffizient/DE\\_Renusal\\_Bestimmung\\_Haftreibungskoeffizient.pdf](https://www.renusal.com/files/content/Downloads/Pruefprotokoll_Haftreibungskoeffizient/DE_Renusal_Bestimmung_Haftreibungskoeffizient.pdf)

and must be documented.

### Determination of the required ballast

Numerous parameters are taken into account when calculating the required ballast, such as wind pressure, building shape and height, module dimensions, module angle of attack, pressure coefficients, coefficient of static friction, geometry of the module field and connected surfaces, and others.

The pressure coefficients for Renusal mounting systems were determined in extensive wind tunnel tests at two renowned institutes. These are I.F.I Institut für Industrieaerodynamik GmbH, Aachen, Germany, and Ruscheweyh Consult GmbH, Würselen, Germany.

Specific pressure coefficients and wind tunnel test results are available from Renusal Europe GmbH on request.

We recommend using our PV-Configurator 3.0 planning software to calculate the ballast required for a specific project:

<https://www.pv-configurator.com/login>

This enables a verifiable static calculation and precise determination of the ballast values, taking into account all the parameters listed above and wind tunnel tests.

Alternatively, the approach according to BRE 489 can also be selected. We would like to point out that the calculation according to BRE 489 leads to different results, as mounting systems were considered generically there. Naturally, this does not include the exact values from Renusal-specific wind tunnel tests.

If you have any questions, please contact our technical team at [ts@renusal.com](mailto:ts@renusal.com) at any time.

- DE | Abbildungen und Texte entsprechen dem aktuellen technischen Stand bei Drucklegung, Änderungen vorbehalten.
- GB | The images and texts in these instructions relate to the latest technology at the time of printing, subject to modifications.
- FR | Les illustrations et textes sont conformes à l'état de la technique au moment de mise sous presse. Sous toutes réserves de modifications.
- IT | Figure e testi corrispondono allo stato più attuale della tecnica al momento dell'ordine di stampa. Con riserva di modifiche.
- ES | Las imágenes y los textos se corresponden al estado actual de la técnica en el momento de la impresión, reservado el derecho a las modificaciones.
- NL | Afbeeldingen en teksten voldoen aan de actuele stand van de techniek op het moment van ter perse gaan. Wijzigingen voorbehouden.
- DK | Afbildninger og tekster overholder den tekniske stand ved trykning, der tages forbehold for ændringer.
- SE | Bilder och texter motsvarar den nuvarande tekniska tillstånd vid tidpunkten för tryckning, med förbehåll för ändringar.
- CZ | Vyobrazení a texty odpovídají aktuálnímu technickému stavu při odevzdání do tisku. Změny vyhrazeny.
- PL | Ilustracje i teksty odpowiadają stanowi techniki aktualnemu w chwili oddania instrukcji do druku. Zastrzega się prawo do zmian.
- LT | Spausdinami paveikslėliai ir tekstas atitinka naujausią technikos lygį. Pasilieka me teisę į pakeitimus.
- HU | Az ábrák és a szövegek a nyomtatás időpontjában rendelkezésünkre álló legfrissebb műszaki ismereteknek felelnek meg; a módosítások jogát fenntartjuk.

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Deutschland

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E-Mail: [info@renusol.com](mailto:info@renusol.com)

[www.renusol.com](http://www.renusol.com)