# Solar systems from Schweizer

## Installation instructions for PV mounting system
## Flat roof east-west MSP-FR-EW
## Green roof MSP-FR-G

**Read carefully before use and keep in a safe place.**

**MSP-FR-EW**

**MSP-FR-G**

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# 1 About these instructions

## 1.1 Basic notes on the installation instructions

The installation instructions contain important information on how to install the installation system safely, properly and correctly. By following the instructions, hazards are avoided and repair costs and downtimes are minimised.

These installation instructions must be kept for reference throughout the entire installation period of the PV mounting system.

## 1.2 Standards and technical guidelines

The MSP-FR-EW / MSP-FR-G PV mounting system from Schweizer complies with the following standards, among others:

| | |
|---|---|
| – DIN EN 1990: | Eurocode 0: Fundamentals of structural design |
| – DIN EN 1991-1-1: | Eurocode 1: Actions on structures<br>Part 1-1: General actions on structures - Weights, self-weight and live loads in buildings |
| – DIN EN 1991-1-3: | Eurocode 1: Actions on structures<br>Part 1-3: Snow loads including national annexes |
| – DIN EN 1991-1-4: | Eurocode 1: Actions on structures<br>Part 1-4: Wind loads including national annexes. The specific pressure coefficients were determined in wind tunnel tests. |
| – DIN EN 1999-1-1: | Eurocode 9: Design of aluminium structures |
| – DIN EN 18195-1: | Waterproofing of buildings - Part 2 - Materials |

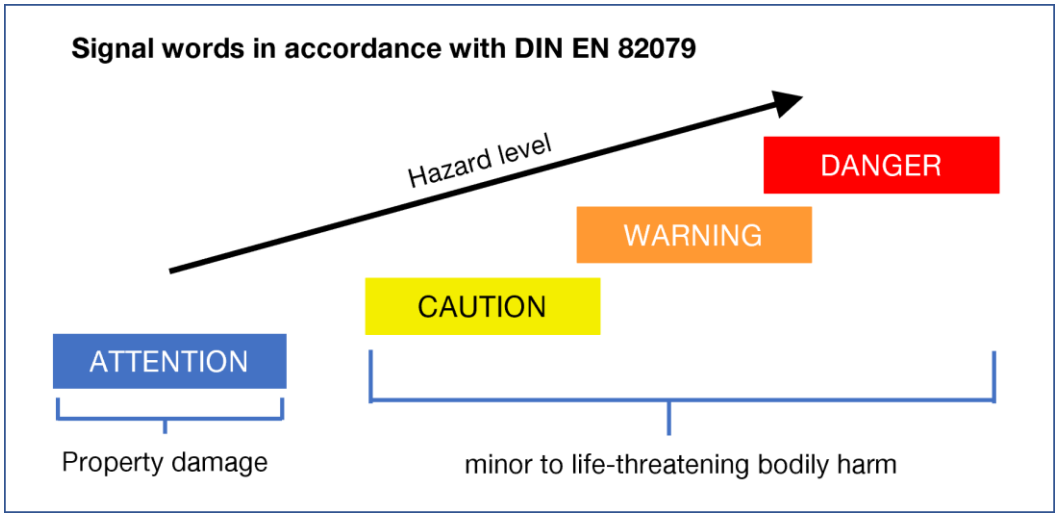
The tests were performed according to the following guidelines:

- VDE 0100
- Aerodynamic study according to WTG guidelines

## 1.3 Structure of the warnings according to hazard levels

### Differentiation of hazard levels

The following signal words indicate the different hazard levels by means of different colour backgrounds:



## 2 Copyright

### 2.1 Reservation of rights

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All appendices are integral parts of the installation instructions.

The PV mounting system was built in accordance with recognised safety regulations. However, improper use can endanger persons or cause damage to property.

### 2.2 Liability

Liability is governed by the General Terms and Conditions of Ernst Schweizer AG, Hedingen (CH) and Ernst Schweizer GmbH, Satteins (AT), which are available at General Terms and Conditions - Ernst Schweizer Solar Systems.

## 3 Security

### 3.1 Intended use

The Schweizer PV mounting system is designed exclusively for mounting framed photovoltaic modules on buildings with flat roofs with an angle of inclination of no more than 3°. Any other use is prohibited by Schweizer and is not in accordance with the intended use.
The definition of intended use includes compliance with the information in these installation instructions.
Schweizer cannot be held liable for damage or loss resulting from non-compliance with these installation instructions, in particular the safety instructions, or from misuse of the product.

### 3.2 Reasonably foreseeable misuse

The reasonably foreseeable misuse described here does not claim to be exhaustive. If necessary, the list must be expanded with documented incidents.

These include:

- Installation of photovoltaic systems with an angle greater than 3° (optionally with on-site connection to the roof substructure up to 10°).
- Persons standing under suspended loads (during assembly).
- Use of fittings and accessories such as screws or connectors when installing the supporting structure that are not originally included in the scope of delivery.
- Assembly of the supporting structure by unauthorised, technically qualified personnel.
- Damage to the roof cladding.
- Assembly of the supporting structure on a non-load-bearing substrate / roof.
- Incorrect positioning of the PV modules.
- When setting up the construction site on the roof, storing the installation material on the roof and when leaving the construction site, the construction site material (tools, packaging material, pallets, installation and system material not yet installed, etc.), as well as unfinished systems, must always be adequately secured against the effects of the weather.
- Failure to observe the safety equipment, safety regulations and current accident prevention regulations.
- When leaving the construction site, unfinished installations must be secured.

Faults can also occur if unauthorised components are used during repairs.

### 3.3 Requirements for safe operation

To avoid personal injury and damage to property, care must be taken during all activities in connection with the intended operation of the PV mounting system. In the event of non-compliance, Schweizer accepts no liability for any damage to property and/or personal injury.

**The following also applies:**

- The PV mounting system must only be operated in perfect, functional condition.
- All warnings and safety instructions in these installation instructions, as well as those of the suppliers, must be followed.
- Unauthorised modifications to the PV mounting system are prohibited.

### 3.4 Responsibility of the customer or installer

The customer or the installer is responsible for compliance with the following relevant points:

It must be ensured that:

- all applicable accident prevention regulations and occupational safety regulations (or equivalent regional standards) are complied with.
  - DGUV Regulation 1 - Principles of prevention (replaces BGV A1)
  - DGUV Regulation 3 - Electrical systems and equipment (replaces BGV A3)
  - DGUV Regulation 38 - Construction work (replaces BGV C22)
- assembly is only carried out by persons who have suitable basic technical and specialised knowledge of mechanics.
- the persons responsible for carrying out the work are able to assess the tasks assigned to them and recognise possible risks.
- the persons responsible for carrying out the work are familiar with the system components and its installation process.
- the project report for the project to be installed has been read and fully understood by the persons responsible for carrying out the work.
- the project report is available at all times during installation and the project report is an integral part of Schweizer's PV installation system.
- the permissible installation conditions are observed. Schweizer cannot be held liable for damage or losses resulting from non-compliance with these conditions.
- the correct assembly in accordance with the project report and the provision of any necessary tools is guaranteed.
- if necessary, a suitable lifting device is used for assembly.
- components with visible damage must not be used and replaced.
- each component and its accessories are used exclusively as intended and specified in the project report.
- only MSP-FR-EW / MSP-FR-G from Schweizer or other specified MSP components from Schweizer are used for assembly, even if parts have to be replaced. Otherwise, no warranty claims will be recognised.
- the roof cladding is not damaged in any way by parts of the PV mounting system falling down, being pulled on it or penetrating it.
- regular maintenance work is carried out once a year, including an inspection of the screw connections, the mechanical connections, the position of protective layers, the cabling, the earthing and the condition of the roof cladding.
- the roof on which the system is mounted is designed and constructed in such a way that it can withstand the PV mounting system adequately and safely. This includes, among other things, the structural strength of the roof, the condition and compatibility of the roof cladding, the required long-term load-bearing capacity of the insulation material, and the suitable drainage of water from the roof surface. Schweizer cannot be held responsible for damage to roofs where the construction or design of the roof is not suitable for accommodating the system installation.

- the Schweizer PV mounting system MSP-FR-EW / MSP-FR-G can be included in the design of the electrical potential equalisation system and connected to it by properly attaching a suitable earthing clamp or screw (not supplied by Schweizer). The customer must ensure compliance with current regulations, legal requirements and guidelines.
- installation is in accordance with current national regulations and guidelines, including, but not limited to, maintaining the required edge distance to the roof, installation of safety barriers, restricted access during operation or precautions for expected dynamic loads or special events such as earthquakes and extreme weather conditions.
- if the system is attached to the building in any way, this attachment must be appropriately designed and provided.
- any existing lightning protection system of the building must be adapted in accordance with the current technical regulations and statutory provisions. If necessary, observe the "Information sheet - lightning current carrying capacity with teh flat roof system MSP-FR".
- The following standards (or corresponding regional standards) must be observed for the design and installation of lightning protection, earthing and potential equalisation:
  - DIN EN 62305 Lightning protection
  - DIN VDE 0185 Part 1-4 Lightning protection
  - DIN VDE 0100 Part 410 Earthing
  - DIN VDE 0105 Operation of electrical installations
  - DIN VDE 0298 Electrical cables

Furthermore are:

- "The regulations of the Central Association of the German Roofing Trade (ZVDH)" or equivalent regionally applicable standards for work on roofs must be observed.
  - DIN 18338 Roofing work
  - DIN 18451 Scaffolding work

and:

- the guidelines for loss prevention VDS 2023 - Electrical installations in buildings with predominantly combustible building materials and DIN 4102 - Fire behaviour of building materials and components (or equivalent regionally applicable standards) must be observed.

### 3.5 Basic safety instructions

The following basic safety instructions and warnings are an integral part of this manual and are of fundamental importance when handling this product:

- Work clothing must be worn in accordance with national regulations.
- Occupational safety regulations must be observed.
- It must be ensured that all electrical work is carried out by qualified electricians. All relevant regulations and directives must be complied with.
- The presence of a second person who can provide assistance in the event of an accident is mandatory during the entire installation work.
- These installation instructions must be kept in the immediate vicinity of the system for use by the persons responsible for carrying out the work.
- Until the PV system is fully completed and ready for operation, all incomplete sections, components and materials must be secured in accordance with the applicable regulations.

## 4 Residual risks

The following safety instructions must be followed to avoid danger to people and damage to the PV mounting system and the PV modules.

**DANGER**

**Electric shock due to lightning striking the PV mounting system**

The supporting structure with the installed photovoltaic systems is operated outdoors. A lightning strike can lead to life-threatening injuries.

Ground the PV mounting system properly.

Do not carry out any maintenance or servicing work on the PV mounting system during a thunderstorm.

**DANGER**

**Electrical voltage due to loosened protective conductor or earthing connections**

If protective conductors or earthing connections have been disconnected, conductive parts including handles, covers and locks that appear insulated can cause an electric shock if touched. Check that all protective conductors and earthing connections are connected.

Leave the danger zone immediately in the event of an electric shock on defective components or cables.

**WARNING**

**Danger of falling**

Carelessness and tripping can result in a fall when working at height. This can result in life-threatening injuries.

- Access to the roof must be secured by the operator in such a way that no unauthorised persons can enter the roof area.
- For cleaning and maintenance work, provide suitable anchorage devices and a body holding device.

**CAUTION**

**Risk of tripping and falling**

Objects lying around or cable ducts attached to the floor can cause tripping and falling hazards, which can result in injuries.

- Avoid obstacles in the field of movement.
- Lay the cable ducts so that there are no obstacles.
- Do not store or place any objects in the danger zone.

## 5 Technical clarification before assembly begins

The suitability of the roof for supporting a PV system must be checked and confirmed by the customer (structural engineer / specialist planner) in accordance with the recognised rules, technology, legal requirements, standards and technical regulations.
The following points, among others, should be emphasised here:

- Sufficient structural load-bearing capacity for the additional loads of the PV system.
- Testing the load-bearing capacity of the insulating material with regard to the permissible contact pressure.
- Suitability and condition of the roof cladding.
- Inspection of the roof drainage with regard to unauthorised water accumulation.
- Condition of the roof (free of any damage).

## 6 Further documents

General Terms and Conditions - Ernst Schweizer Solar Systems

MSP-FR-EW MSP-FR-G

1. Important documents
2. Fact sheets
3. Audit results

## 7 Commissioning and maintenance

Installation and commissioning may only be carried out by authorised personnel.
Observe the safety instructions listed here as well as the instructions at the beginning of these operating instructions **Chapter 3Security**
Carry out regular maintenance once a year, including an inspection of the screw connections, the mechanical connections, the position of protective layers, the cabling, the earthing and the condition of the roof cladding.

## 8 Roof preparation

Before starting installation of the PV system, the roof must be thoroughly cleaned, removing all dirt and debris as well as snow and ice. The installer must ensure that the installation conditions required for MSP-FR-EW / MSP-FR-G are met and that the persons responsible for the installation work are professionally trained and fully familiar with the PV mounting system.

**NOTE**

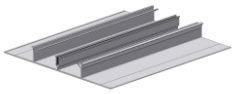
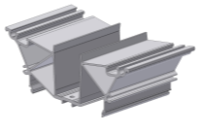
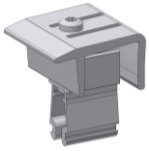
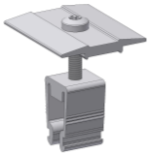
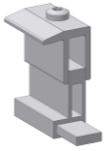
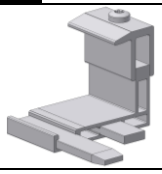
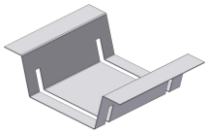
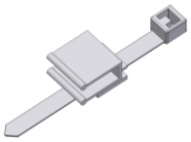
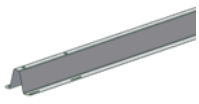
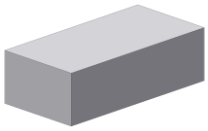
The material must be distributed on the roof in such a way that no excessive point loads occur.

## 9 Assembly conditions

The PV mounting system MSP-FR-EW / MSP-FR-G from Schweizer is designed for the following conditions:

- The installation of the system must be correctly adapted to the project and its local conditions, in particular with the necessary calculation of additional loads.
- For mounting framed photovoltaic modules with a frame height of 28-45 mm, or 28-40 mm when using the additional clamps.
- On flat roofs with a maximum pitch of 3° (optionally with on-site connection to the roof substructure up to 10°).
- For module sizes according to data sheet MSP-FR-EW / MSP-FR-G.
- A maximum block size of 14 m x 14 m is permitted in order to avoid unnecessary stresses on the roof covering due to thermal expansion.
- The minimum permissible coefficient of friction between the protective layer and the roof cladding is 0.3.
- Suitable for ambient conditions within the range of normal corrosive environments (e.g. at least 1 km from the seashore) and in more corrosive environments (e.g. C4) if regular maintenance is ensured.
- For all membrane roof coverings, including bitumen, as well as concrete roof surfaces. However, Schweizer is not responsible for ensuring the continued validity of the warranty provided by the roof covering manufacturer.
- When mounting on roofs with gravel backfill, the "Instruction sheet - PV mounting system MSP-FR on gravel roofs" must be observed.
- For modules that allow the use of clamps on the short edges in the corners (Schweizer can provide a list of authorised modules on request). Schweizer is not responsible for ensuring the continued validity of the warranty provided by the module manufacturer. However, Schweizer will assist customers as far as possible and appropriate in obtaining all necessary clamping authorisations from the module manufacturers.
- For roofs that can sufficiently withstand the additional load from the PV mounting system (as assessed by the customer and within his responsibility). The calculated total load applied to the roof by the MSP-FR-EW / MSP-FR-G PV mounting system includes the MSP mounting system, the modules (as specified in the project report) and the required ballast. All other loads are excluded (e.g. cables, inverters, etc.).

## 10 Components

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
|  |  |  |  |  |
| **Protective layer**<br>**MSP-FR-PSF** | **Base profile**<br>**MSP-FR-EW-BP** | **Support**<br>**MSP-FR-EW-SH** | **Support**<br>**MSP-FR-EW-SL 8**<br>**MSP-FR-EW-SL 10** | **Adapter support**<br>**MSP-FR-G-AS** |
| **6** | **7** | **8** | **9** | **10** |
|  |  |  |  |  |
| **Connection channel**<br>**MSP-FR-EW-C** | **End clamp**<br>**MSP-PR-EC**<br>**MSP-PR-ECG**<br>**MSP-PR-ECB**<br>**MSP-PR-ECBG**<br>**abZ-14.4-92** | **Middle clamp**<br>**MSP-PR-MC**<br>**MSP-PR-MCG**<br>**MSP-PR-MCB**<br>**MSP-PR-MCBG**<br>**abZ-14.4-92** | **Additional clamp high**<br>**MSP-FR-HC** | **Additional clamp low**<br>**MSP-FR-LC** |
| **11** | **12** | **13** | **14** | **15** |
|  |  |  |  |  |
| **Screw**<br>**MSP-FR-S M6x16** | **Screw**<br>**MSP-FR-TS 6.3x22**<br>**lightning current carrying capacity** | **Screw**<br>**MSP-FR-GS 6x60** | **Wind deflector / Ballast tray**<br>**MSP-FR-S-WD** | **Ballast tray holder**<br>**MSP-FR-S-SB** |
| **16** | **17** | **18** | **19** | **20** |
|  |  |  |  |  |
| **Wind deflector adapter**<br>**MSP-FR-EW-WDA** | **Cable holder with edge-clip**<br>**MSP-FR-CHE** | **Ballast tray holder**<br>**MSP-FR-BT** | **Ballast carrier start plate**<br>**MSP-FR-EW-BS** | **Ballast tray clamp**<br>**MSP-FR-BC** |
| **21** | **22** | **23** | **24** | **25** |
|  |  | | | |
| **Ballast stone** not included in the scope of delivery | **S.P.T**<br>**Project report** | | | |

## 11 Assembly



### 11.1 Caption

| | | | |
|---|---|---|---|
|  | |  | Warning of dangerous electrical electrical voltage |
|  | See project report |  | Audible click |
|  | Correct execution |  | Direction of movement |
|  | Faulty execution |  | Tightening / tightening torque |
| Option | Optional step |  | Earthing / earthing installation |
|  | Repeat steps | | |

### 11.2 Tools required

Cordless screwdriver

**If the cordless screwdriver is equipped with an impact drilling function, it must be switched off.**

T 30

Torx attachment TX30
Bit extension recommended for simplified installation with the support high (MSP-FR-EW-SH)

Torque spanner (10 Nm) with Torx TX30 attachment

**Assembly instructions for stainless steel screw connections:**
The installation must be carried out professionally.
To avoid cold welding between the bolt and nut, the nut must be:

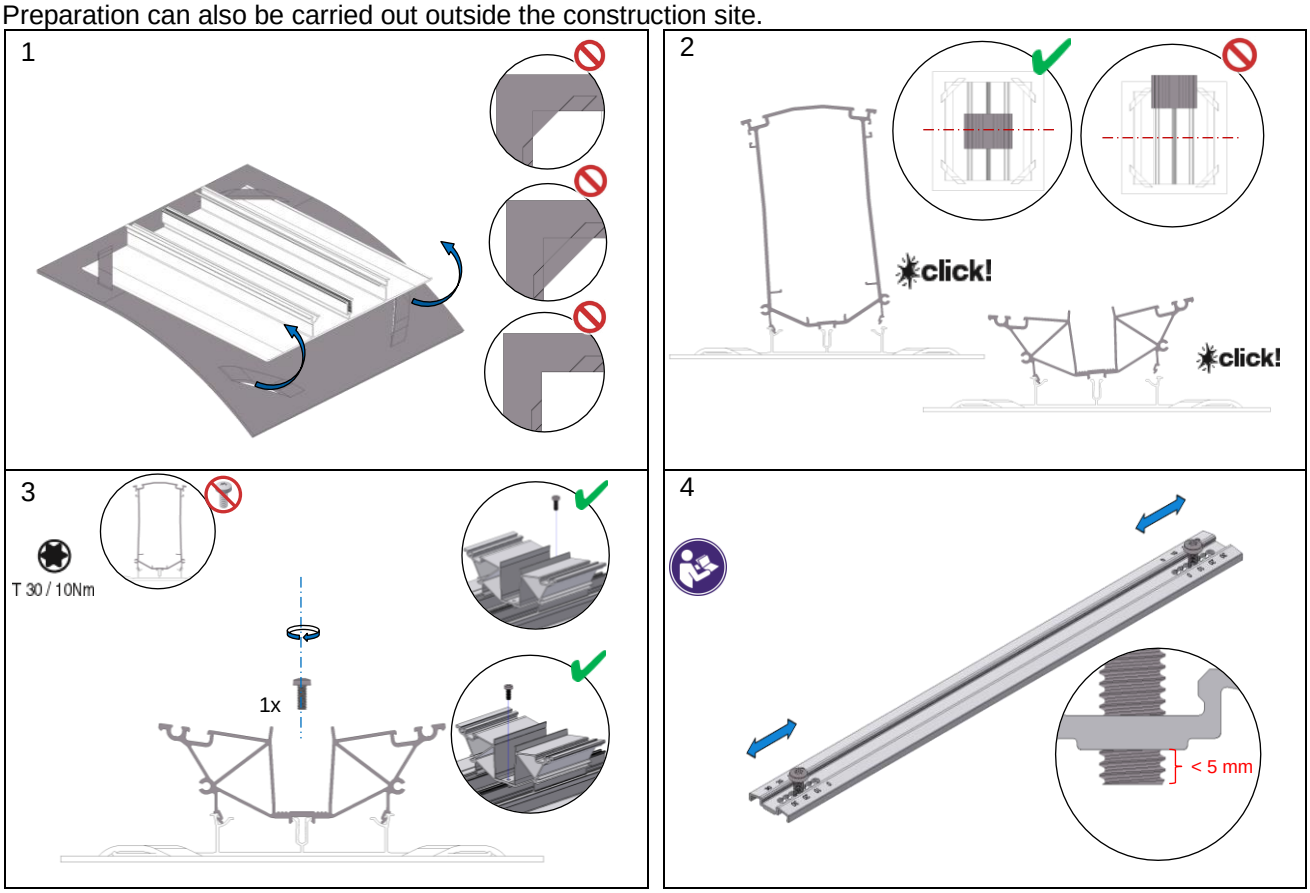
- a screwdriver without impact drilling function.
- set an appropriate speed that is not too high.
- no increased pressure on the screw.

### 11.3 Assembly preparation

before assembly:

- the S.P.T project report must be available.
- the material must be complete.

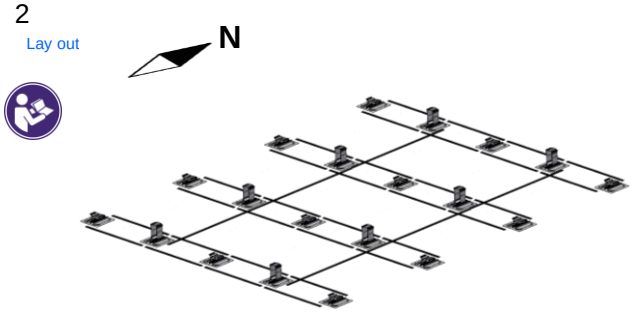
Preparation can also be carried out outside the construction site.



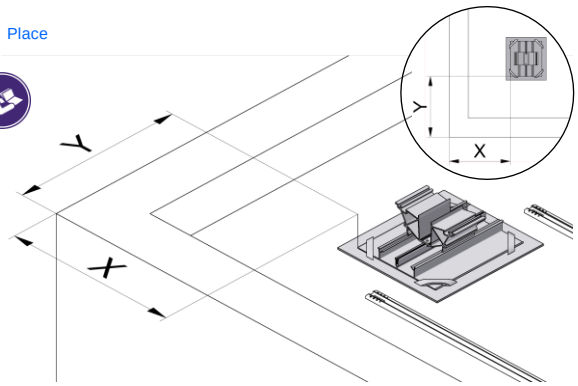
## 11.4 Assembly of the basic configuration

1
Overview


2
Lay out




3
Place

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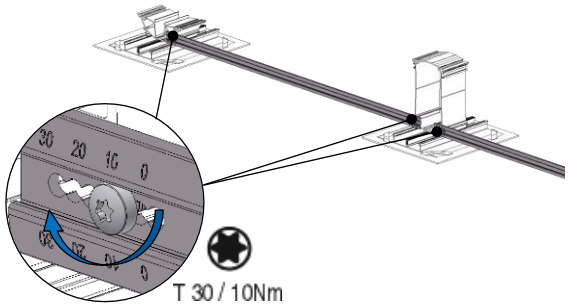


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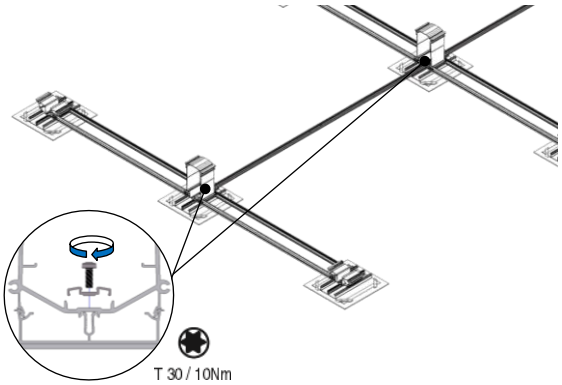
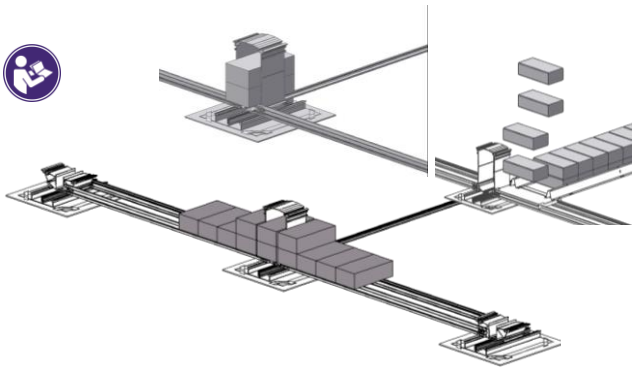
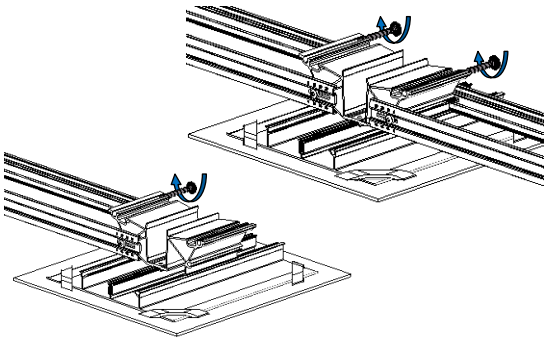



6
Ballast, see chapter 11.5



7
Option
One earthing screw per module.



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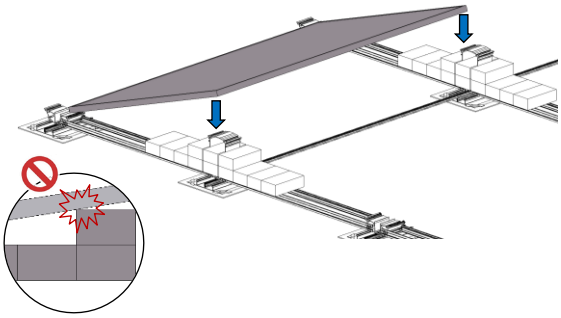

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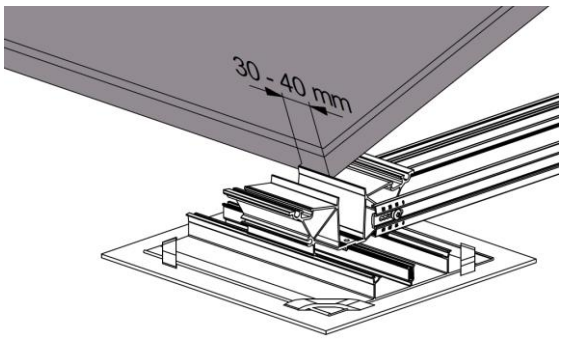


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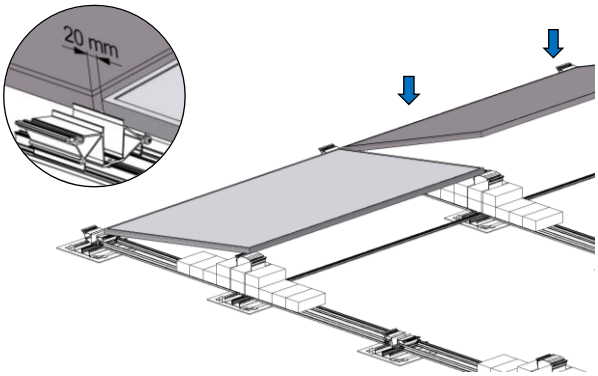
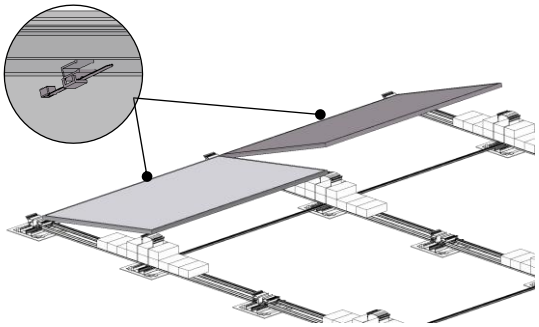
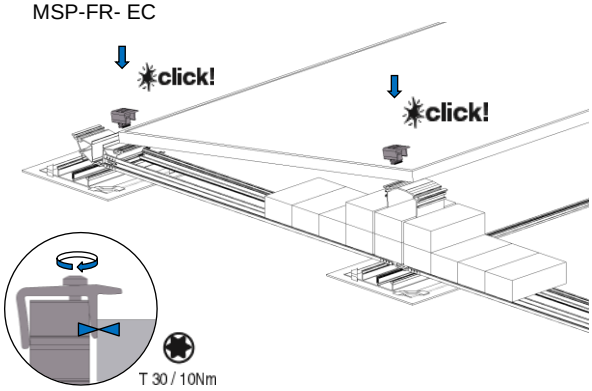


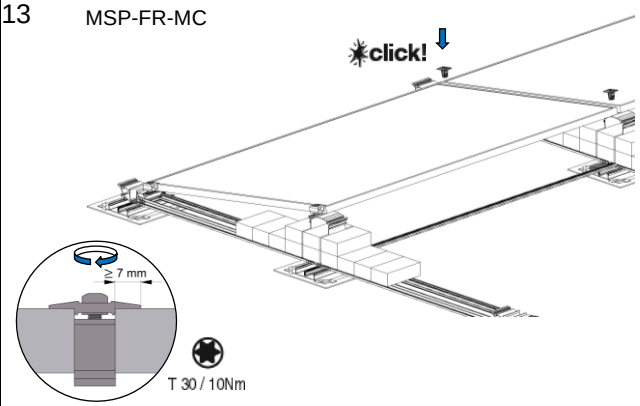

11 MSP-FR-CHE
Option



12 MSP-FR- EC




13 MSP-FR-MC

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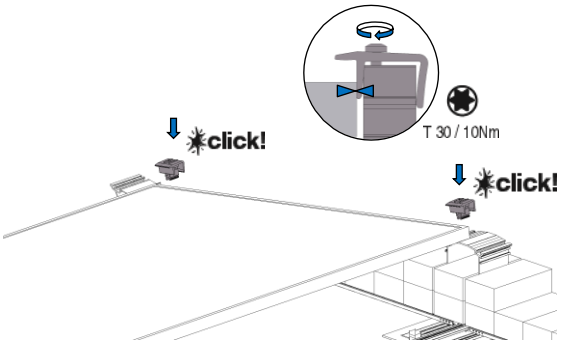
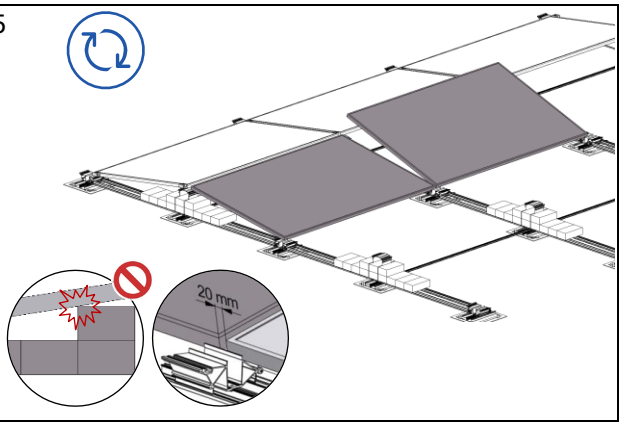
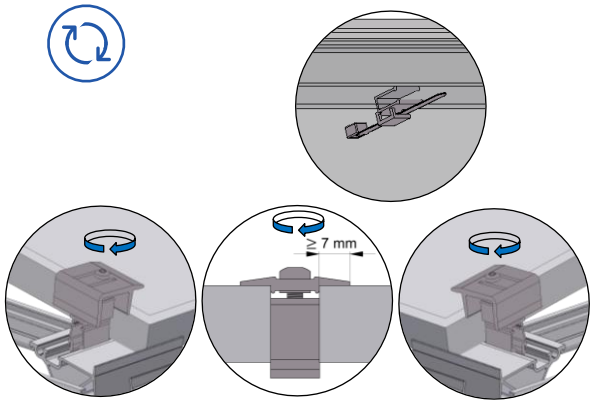


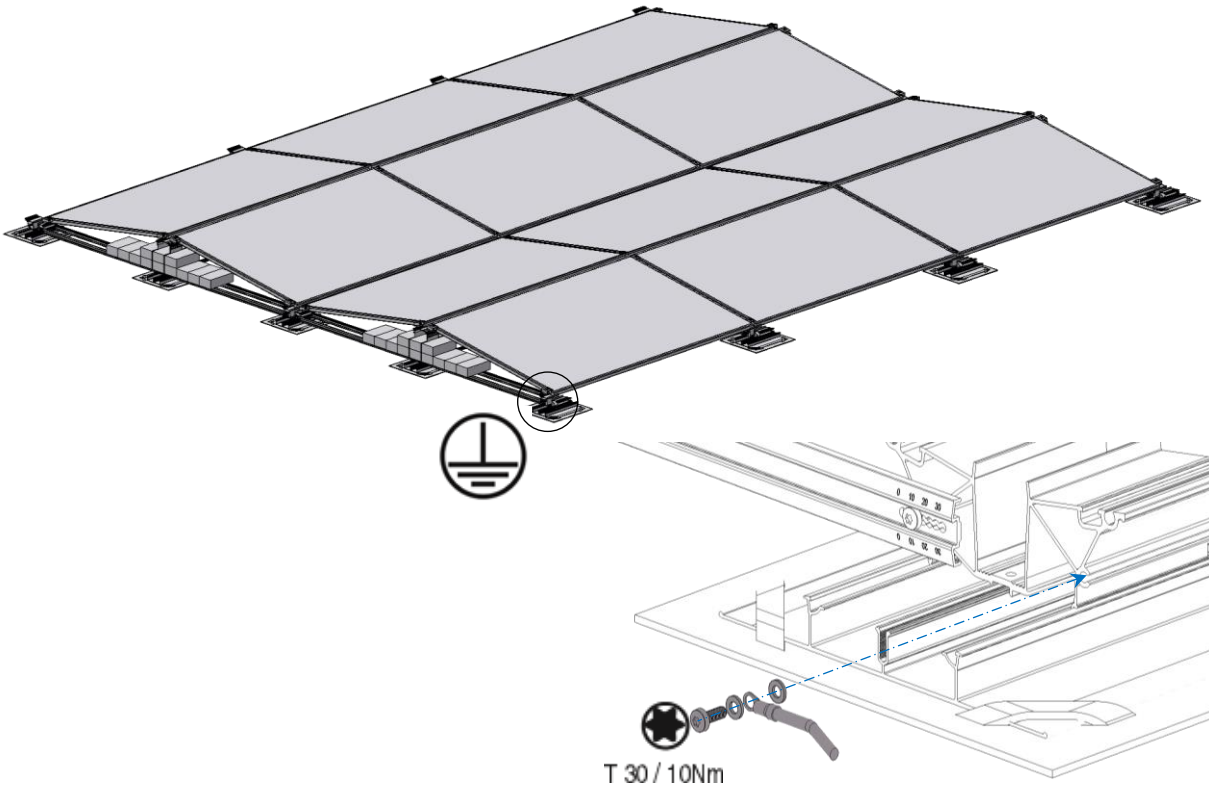

15




16

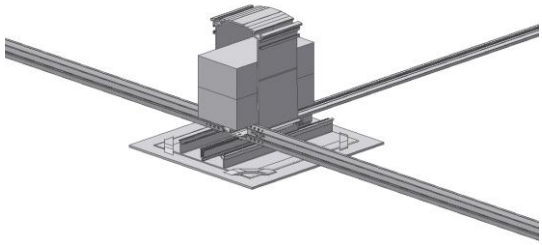


17 Conclusion
Optional suggestion for earthing



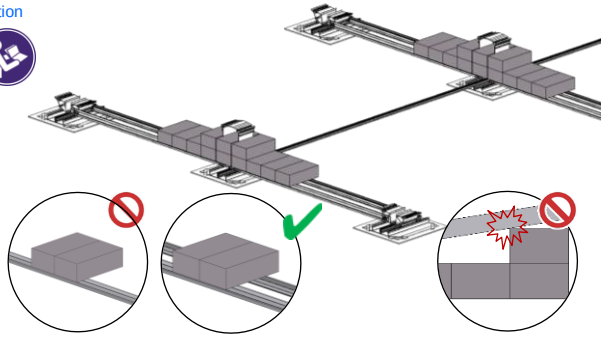
## 11.5 Assembly the ballast and the ballast trays (options 1-3)

1



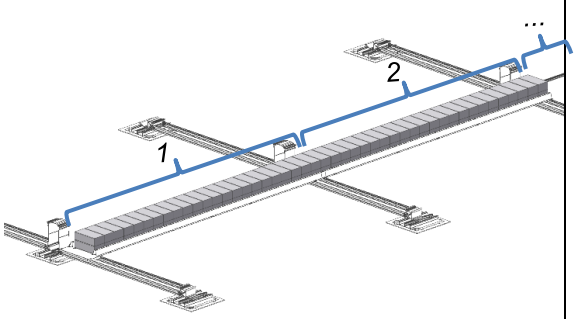
2
Option

Option 1: Ballast arrangement on connection channels

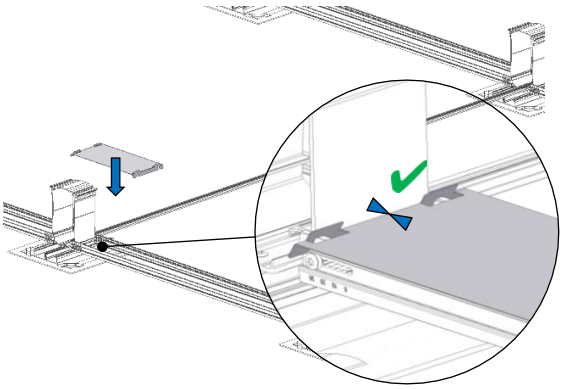


3
Option

Option 2: new ballast tray system (step 3-8)




4



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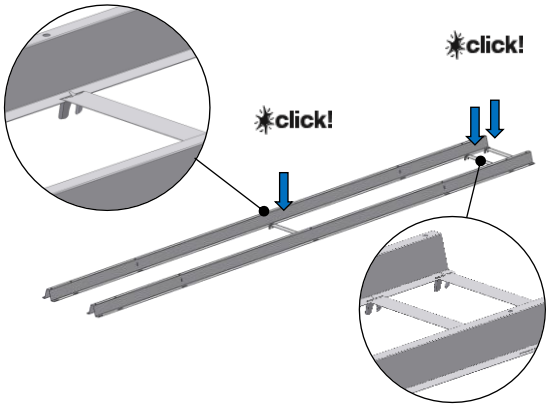


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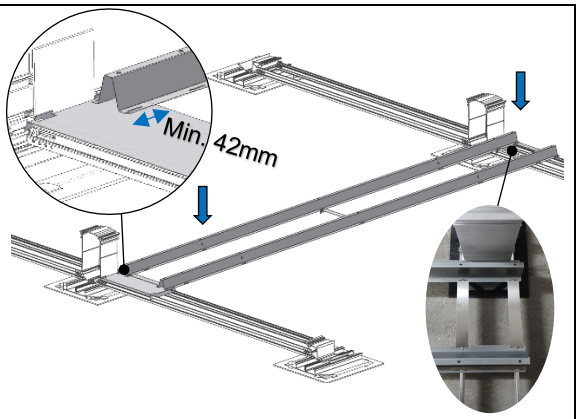
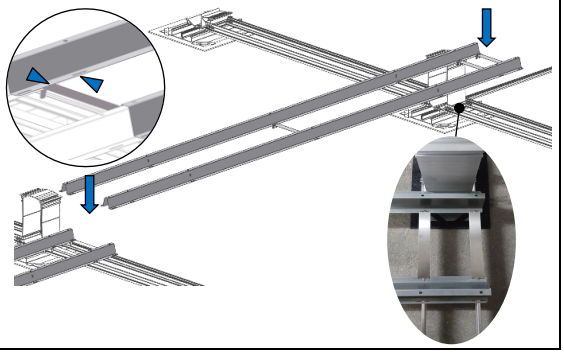
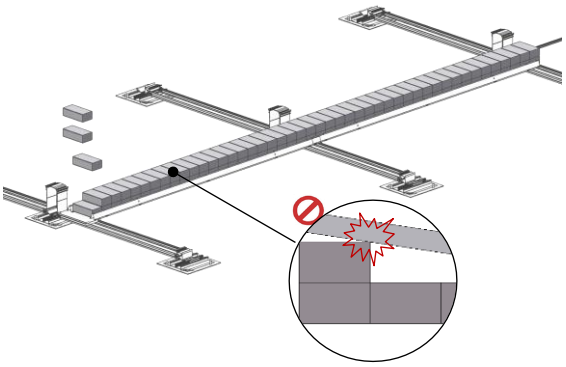


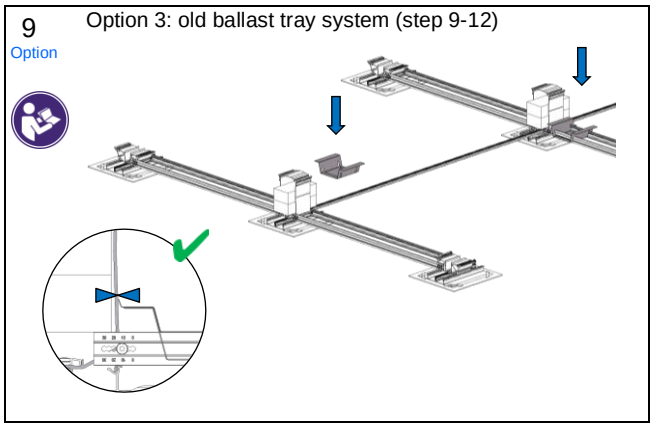

7

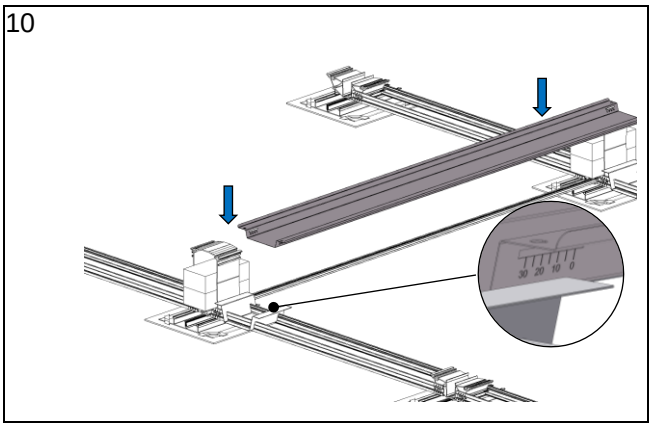


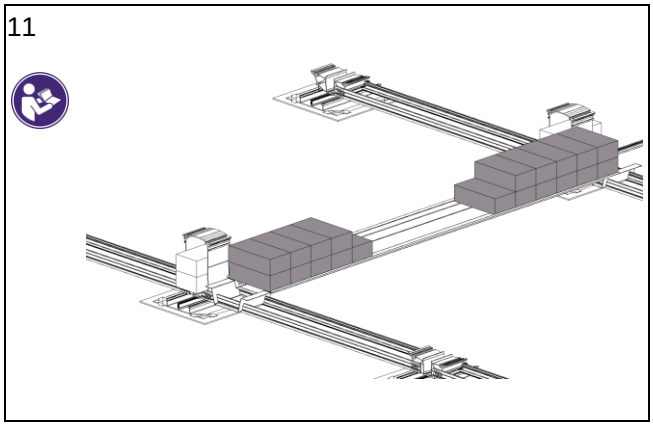
8

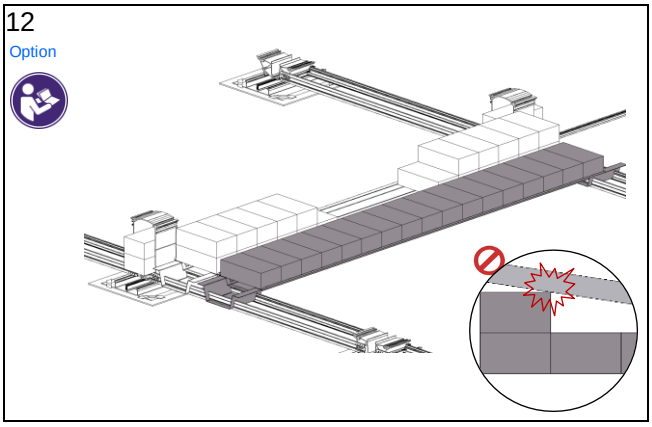


Additional illustration of ballast tray clamps



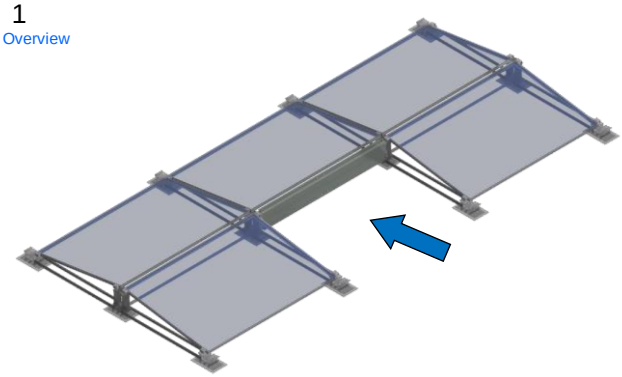



## 11.6 Assembly of half gables

1
Overview



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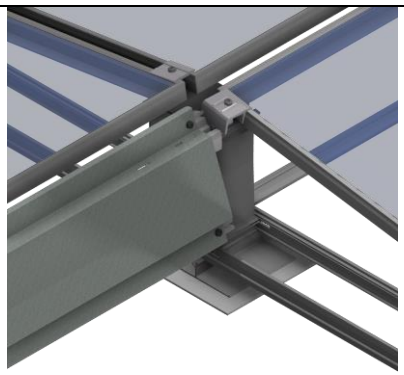
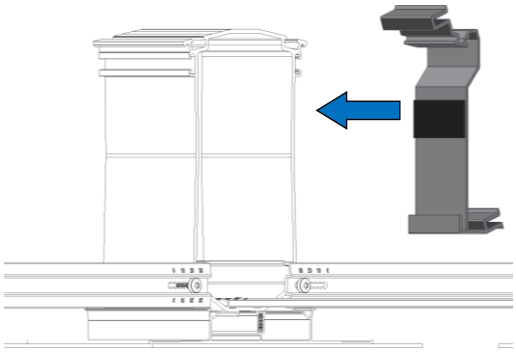


3
Place



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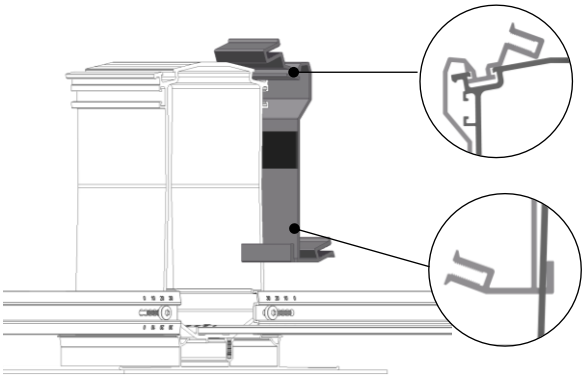

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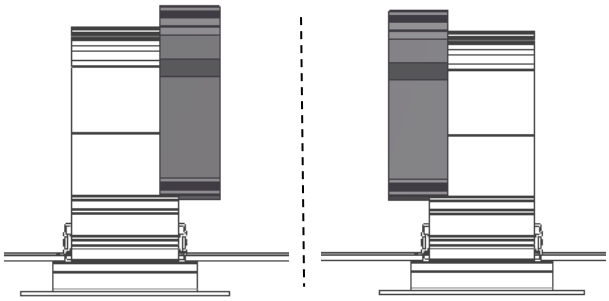
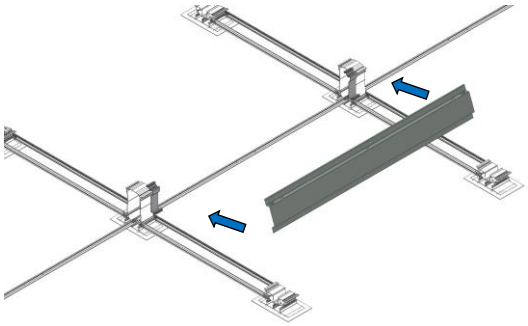
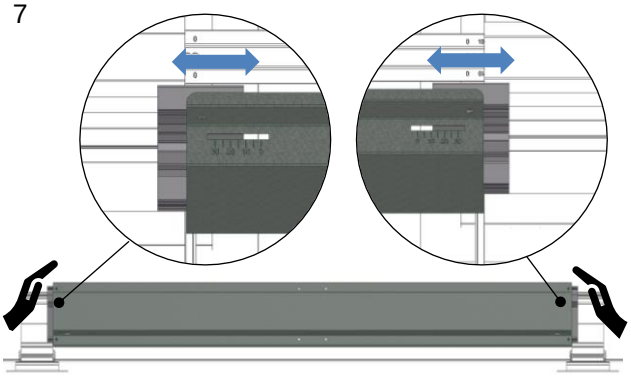


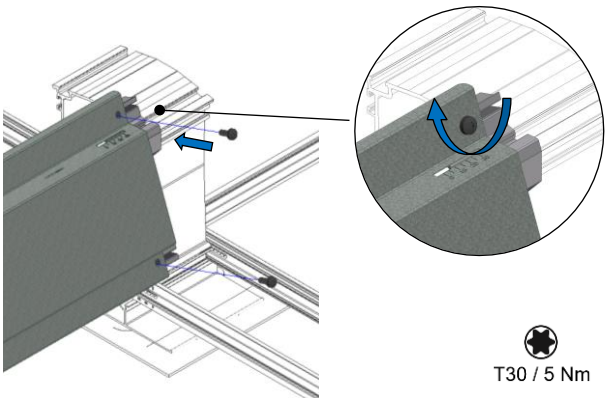
6



7

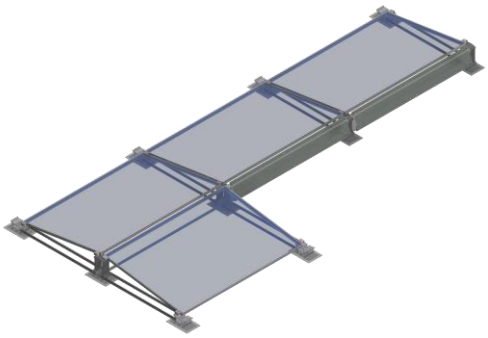


8



## 11.6.1 Assembly of several half gables

1
Overview



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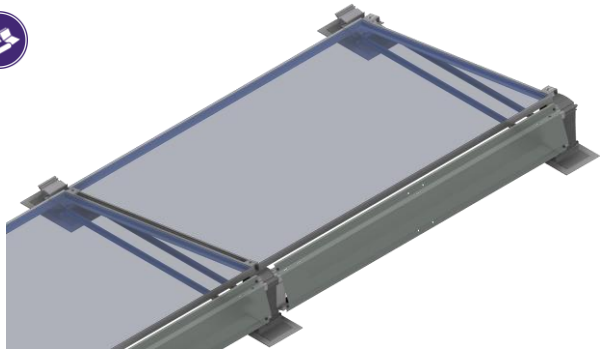
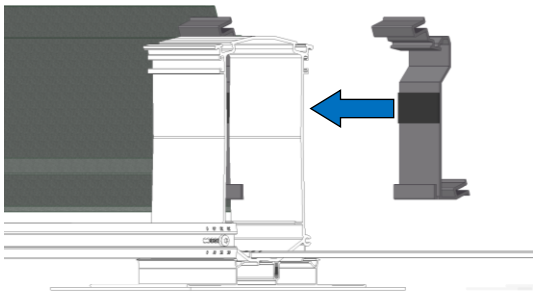


3
Place



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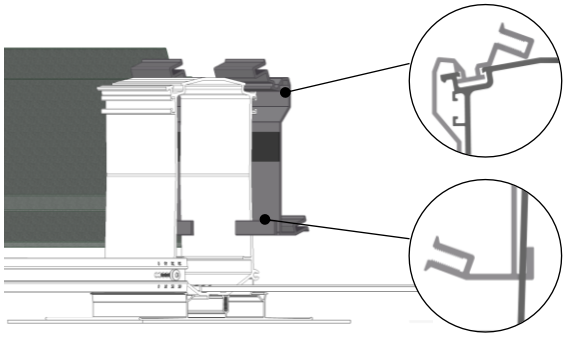

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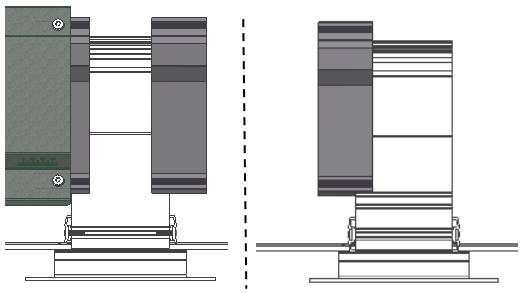

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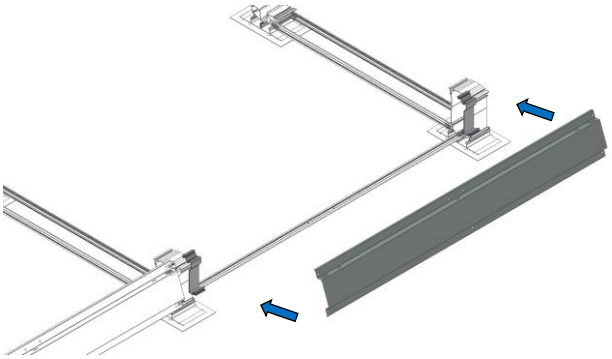

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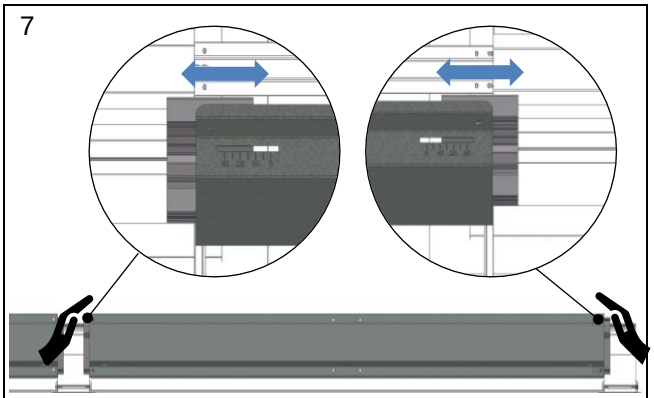
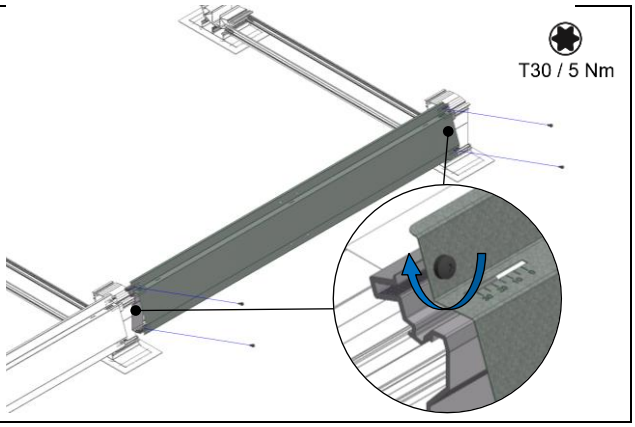
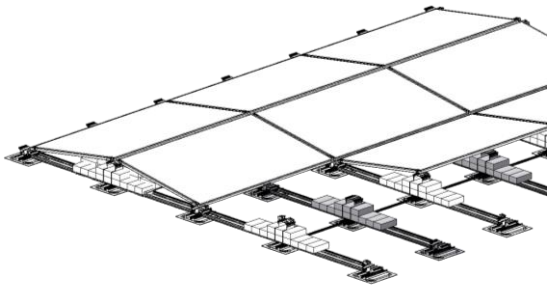


8
T30 / 5 Nm

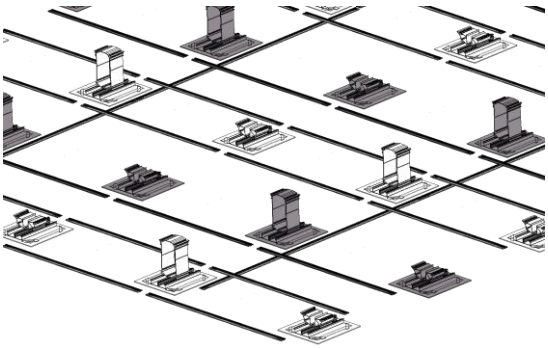


## 11.7 Assembly with middle support

1
Overview



2
Lay out



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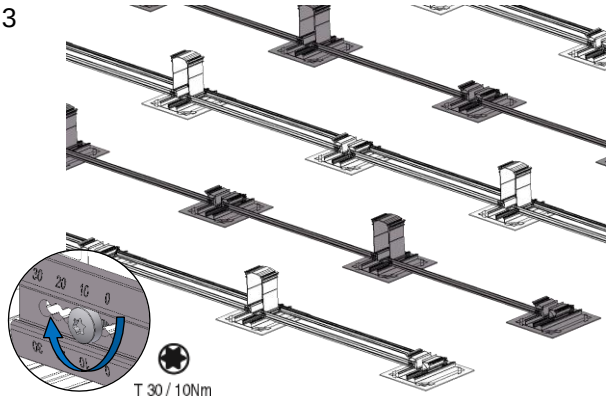


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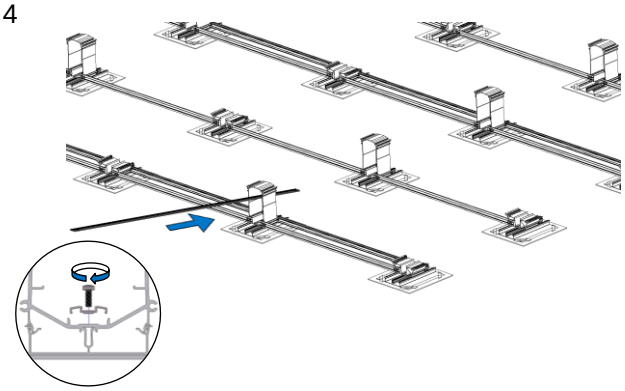

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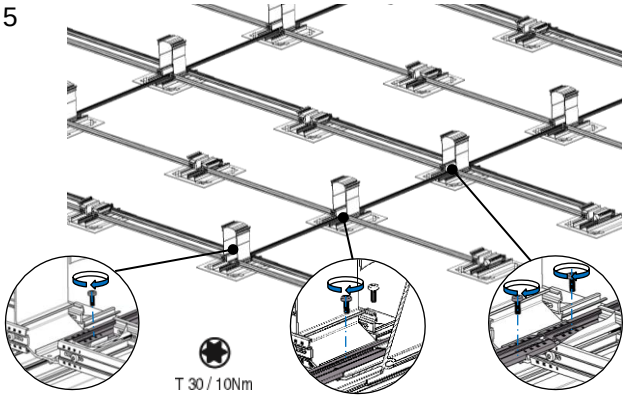
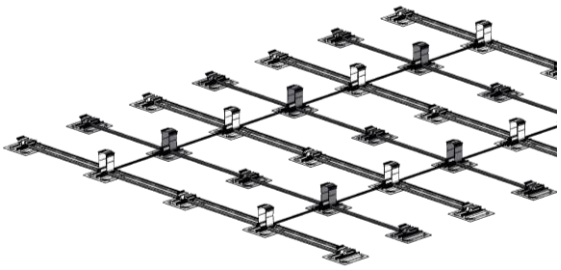
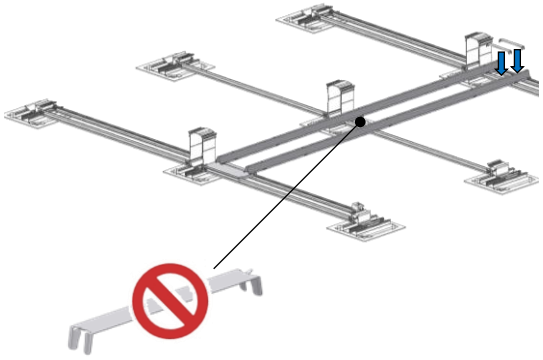



6

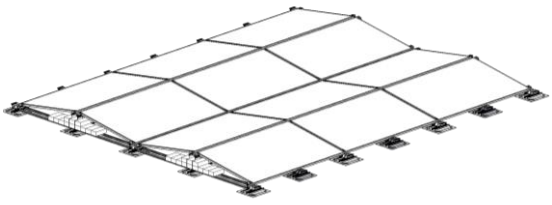


7
Option



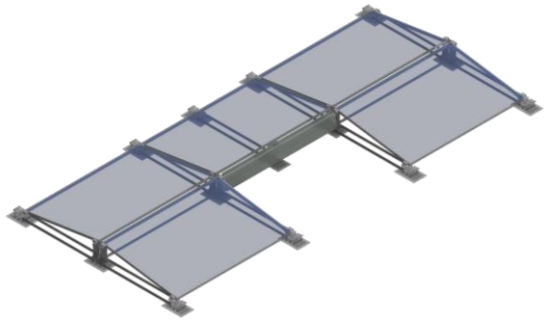
8

see 11.4

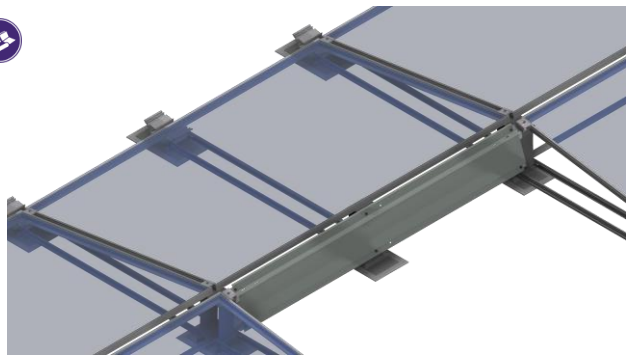


### 11.7.1 Middle support with half gables

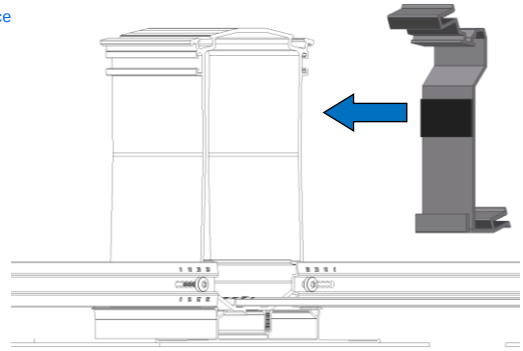
18
Overview



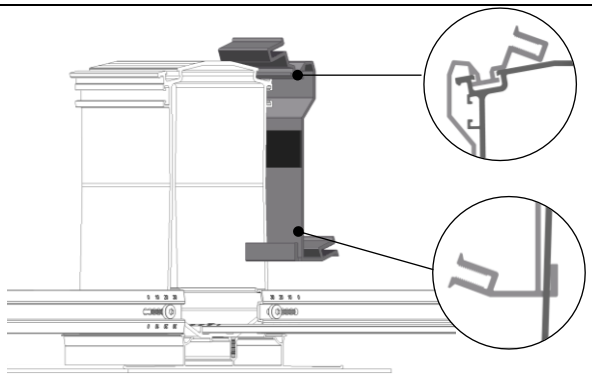
19



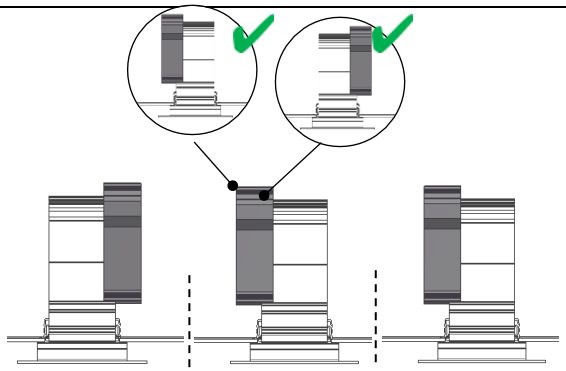
20
Place



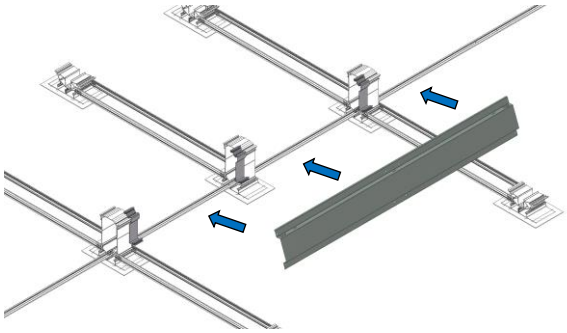
21



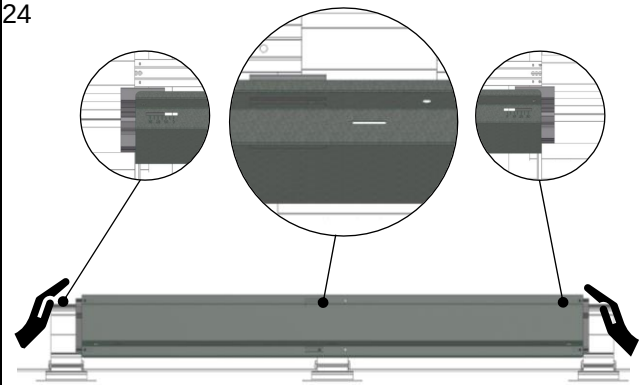
22



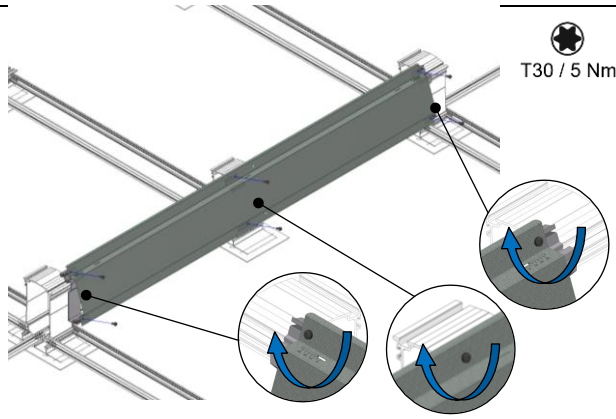
23



24

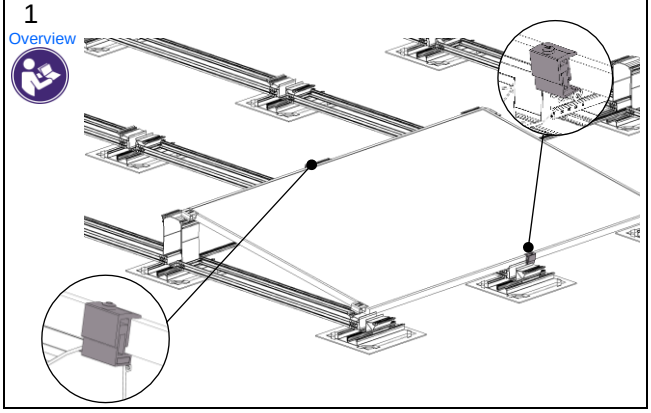


25
T30 / 5 Nm



## 11.8 Mounting the complementary clamp

1
Overview



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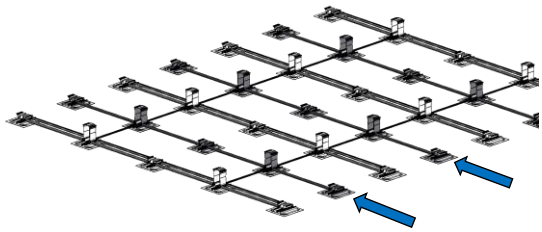
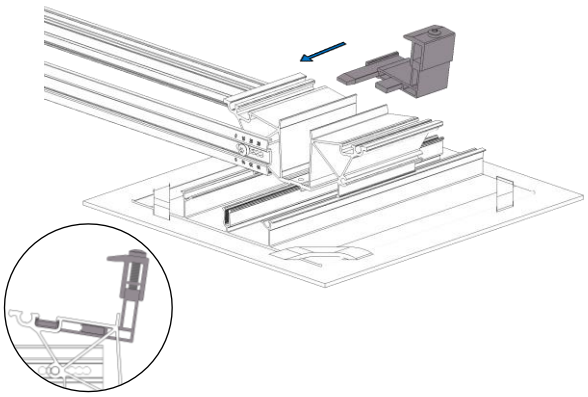
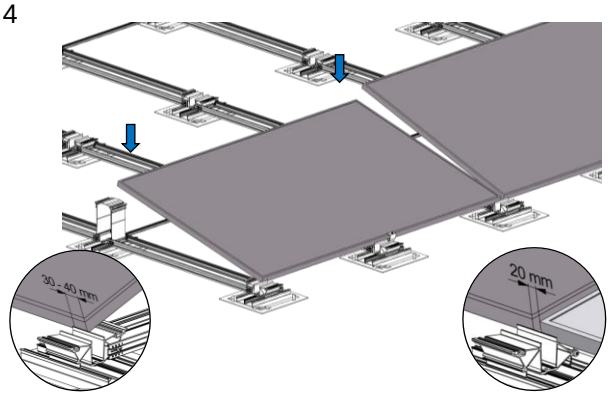


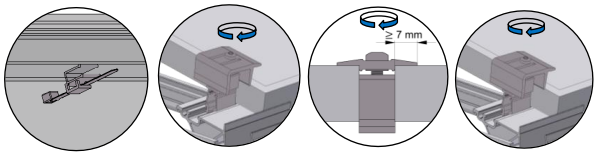
3



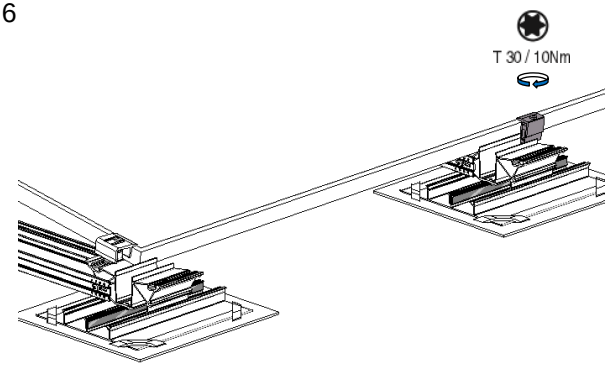
4



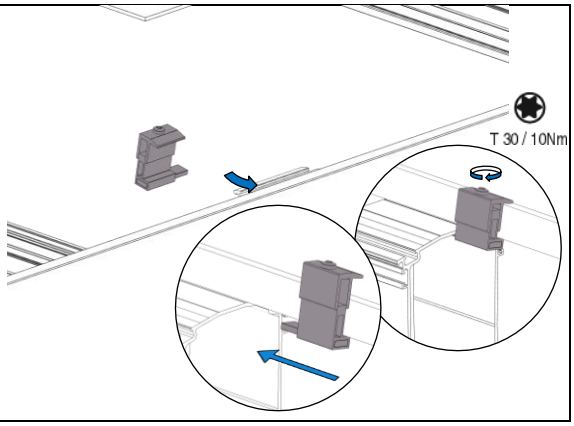

5
see 11.4



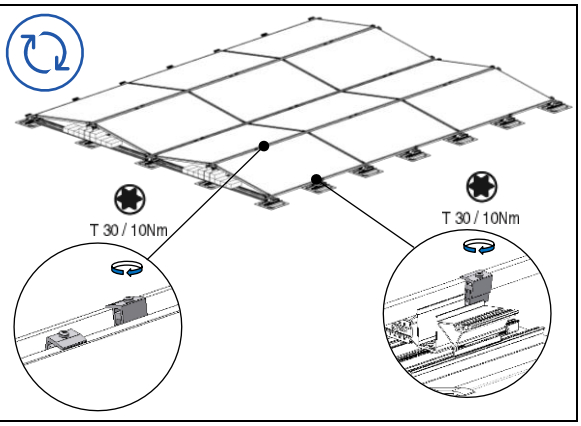

6




7

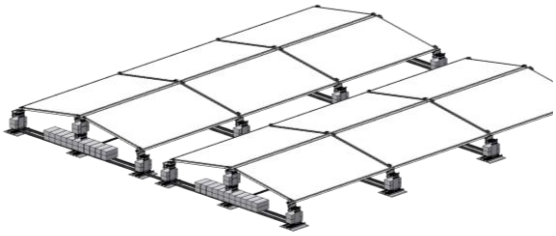



8

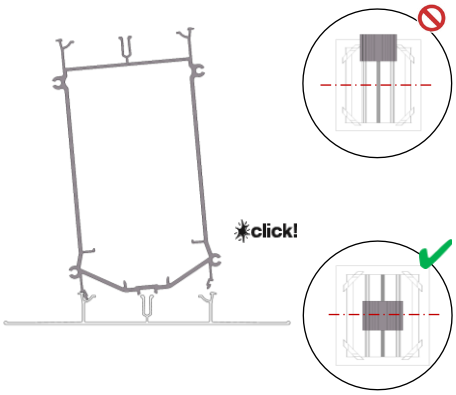


## 11.9 Installation add-on for a green roof

1
Overview

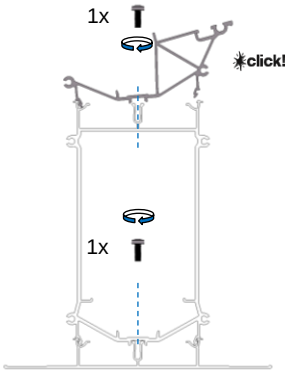


2



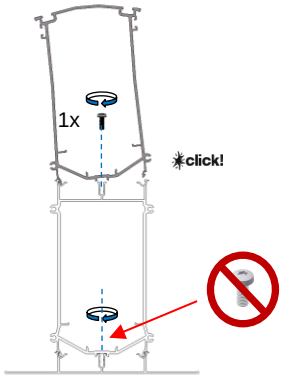

3

T 30 / 10Nm



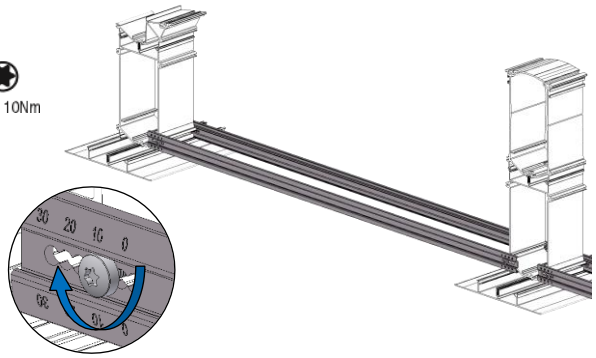

4

T 30 / 10Nm



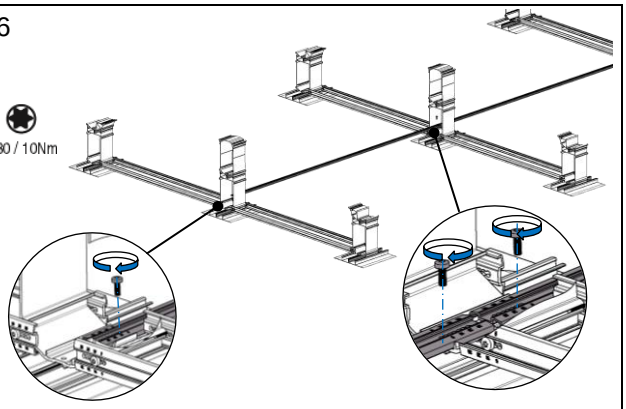

5

T 30 / 10Nm

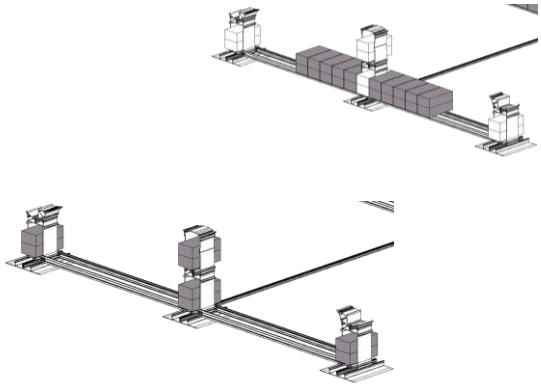


6

T 30 / 10Nm



7



8

see chapter11.4 , from Fig. 7