Solar systems from Schweizer

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

Please read carefully before use and keep for future reference.

The latest version can be downloaded from our Website.

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Contents

1 About these instructions

1.1 Basic information regarding the installation instructions

These installation instructions contain important information on how to install the mounting system safely, correctly and in accordance with best practice. Following these instructions will help to avoid hazards and reduce repair costs and downtime.

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 Schweizer MSP-FR-EW PV mounting system complies with the following standards, among others, provided it has been designed using the Swiss Solar.Pro.Tool (S.P.T for short):

- DIN EN 1990: Eurocode 0: Basis of structural design
- DIN EN 1991-1-1: Eurocode 1: Actions on structures
  Part 1-1: General actions on structures – Densities, dead loads and live loads in building construction
- DIN EN 1991-1-3: Eurocode 1: Actions on structures
  Part 1-3: Snow loads, including national annexes
- DIN EN 1991-1-4: Eurocode 1: Actions on structures
  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: Building waterproofing – Part 2 – Materials

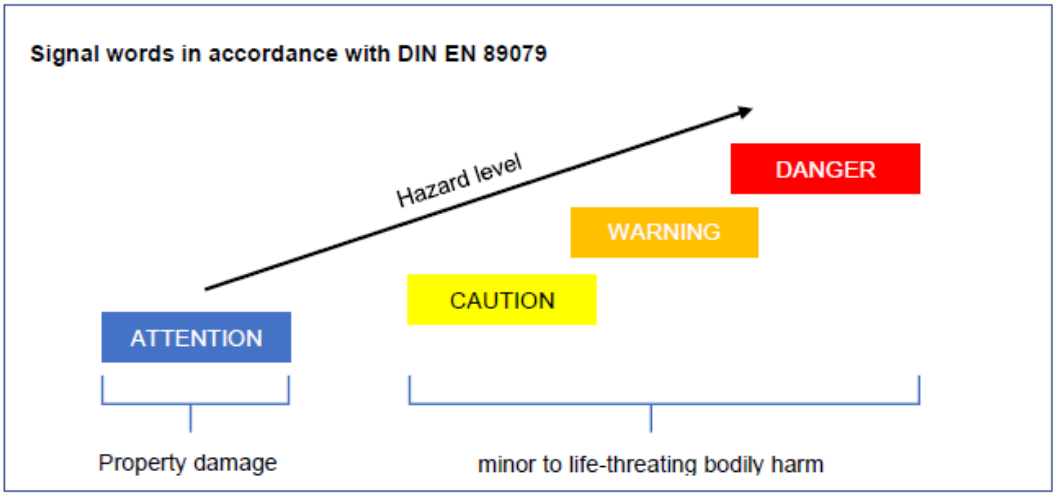
The tests were carried out in accordance with the following guidelines:

- VDE 0100
- Aerodynamic study in accordance with WTG guidelines

1.3 Structure of warning notices according to hazard levels

Distinction between hazard levels

The following signal words indicate the different hazard levels through different colour backgrounds:



2 Safety

2.1 Intended use

The Schweizer PV mounting system is designed exclusively for the installation of framed photovoltaic modules on buildings with flat roofs with a pitch 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 any damage or loss arising from failure to comply with these installation instructions, in particular the safety instructions, or from misuse of the product.

2.2 Reasonably foreseeable misuse

The reasonably foreseeable misuse described here is not exhaustive. Where necessary, the list must be expanded to include documented incidents.

These include:

- Installation of photovoltaic systems at an angle greater than 3° (optionally with on-site connection to the roof substructure up to 10°).
- Persons remaining under suspended loads (during installation).
- Use of fittings and accessories such as screws or connectors during the installation of the support structure that are not included in the original scope of delivery.
- Installation of the support structure by unauthorised, technically unsuitable personnel.
- Damage to the roof covering.
- Installation of the support structure on a non-load-bearing substrate/roof.
- Incorrect positioning of the PV modules.
- When setting up the worksite on the roof, storing installation materials on the roof and when leaving the worksite, all worksite materials (tools, packaging materials, pallets, installation and system materials not yet installed, etc.), as well as incomplete systems, must in all cases be adequately protected from the effects of the weather.
- Failure to observe safety equipment, safety regulations and standard accident prevention regulations.
- When leaving the site, systems that have not been fully completed must be secured.

Errors may also occur due to the use of unauthorised components during repairs.

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2.3 Requirements for safe operation

To avoid personal injury and damage to property, caution must be exercised during all activities relating to 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.

Furthermore:

- The PV mounting system must only be operated when it is in perfect, fully functional condition.
- All warning and safety instructions in these installation instructions, as well as those provided by suppliers, must be strictly followed.
- Unauthorised modifications to the PV mounting system are prohibited.

2.4 Responsibility of the customer or installer

The customer or installer is responsible for ensuring 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 observed.
- the installation is carried out only by persons who possess suitable basic technical and specialist knowledge.
- the persons assigned to carry out the work are able to assess the tasks assigned to them and identify potential risks.
- the persons responsible for carrying out the work are familiar with the system components and the installation procedure.
- the project report for the project to be installed has been read and fully understood by the persons entrusted with carrying out the work.
- the project report is available at all times during installation. The project report is an essential part of the Schweizer PV mounting system.
- the permissible installation conditions are observed. Schweizer cannot be held liable for any damage or loss resulting from a failure to comply with these conditions.
- Correct installation in accordance with the project report and the provision of any necessary tools are ensured.
- Where necessary, a suitable lifting device is used for installation.
- Components with visible damage are not used and are replaced.
- Each component, as well as its accessories, is used exclusively as intended and as specified in the project report.
- Only Schweizer MSP-FR-EW or other specified Schweizer MSP components are used for installation, even if parts need to be replaced. Otherwise, no warranty claims will be accepted.
- The roof cladding is not damaged in any way by parts of the PV mounting system falling onto it, being dragged across it or penetrating it.
- Maintenance work is carried out once a year, including an inspection of screw connections, mechanical connections, the position of protective layers, cabling, earthing and the condition of the roof covering.

- the roof on which the system is mounted must be designed and constructed in such a way that it can safely support the PV mounting system. This includes, amongst other things, the structural strength of the roof, the condition and compatibility of the roof covering, the required long-term load-bearing capacity of the insulation material, and the appropriate drainage of water from the roof surface. Schweizer cannot be held liable for damage to roofs.
- the Schweizer PV mounting system MSP-FR-EW can be incorporated into the design of the electrical equipotential bonding system and connected to it by correctly fitting a suitable earthing terminal or screw (not supplied by Schweizer). The customer must ensure compliance with current regulations, legal provisions and guidelines.
- the installation is carried out in accordance with current national regulations and guidelines, including, but not limited to, compliance with the required clearance from the roof, the installation of safety barriers, restricted access during operation, or precautions for anticipated dynamic loads or special events such as earthquakes and extreme weather conditions.
- if the system is fixed to the building in any way, this fixing must be appropriately designed and provided. Schweizer shall not be liable for any resulting damage.
- the building's lightning protection system, if any, must be adapted in accordance with current technical regulations and legal provisions. Where applicable, refer to the Information sheet « Lightning current carrying capacity for MSP-FR ».
- to this end, the following standards (or corresponding regionally applicable standards) for the design and installation of lightning protection, earthing and equipotential bonding must be observed:
  - 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 wiring

Furthermore, the following must be observed:

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

as well as:

  - the guidelines on damage prevention VDS 2023 – Electrical installations in buildings constructed predominantly of combustible materials and DIN 4102 – Fire behaviour of building materials and components (or equivalent regional standards) must be observed.

2.5 Basic safety instructions

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

- Work clothing in accordance with national regulations must be worn.
- Work safety regulations must be observed.
- Ensure that all electrical work is carried out by qualified electricians. All relevant regulations and guidelines must be observed.
- The presence of a second person who can provide assistance in the event of an accident is mandatory throughout the entire installation process.
- 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 unfinished sections, components and materials must be secured in accordance with the applicable regulations.

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3 Residual hazards

It is essential to follow the safety instructions below to avoid risks to people and damage to the PV mounting system and the PV modules.

DANGER

Electric shock due to a lightning strike on the PV mounting system

The support structure with the installed photovoltaic systems is operated outdoors. A lightning strike can result in life-threatening injuries.

Ensure the PV mounting system is properly earthed.

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

DANGER

Electrical voltage due to loose protective conductors or earth connections

If protective conductors or earth connections have become loose, conductive parts – including handles, covers and locks that appear to be insulated – may cause an electric shock if touched. Check that all protective conductors and earth connections are connected.

If current is flowing through defective components or cables, leave the danger zone immediately.

WARNING

Risk of falling

Carelessness and tripping can lead to 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.
- Ensure that suitable anchor points and a fall arrest system are in place during cleaning and maintenance work.

CAUTION

Risk of tripping and falling

Objects lying around or cable ducts fixed to the floor can pose a risk of tripping and falling, which may result in injury.

- Avoid obstacles in the area of movement.
- Lay cable ducts so that they do not create any obstacles.
- Do not store or leave objects in the danger zone.

4 Technical clarification prior to installation

The suitability of the roof for supporting a PV system must be checked and confirmed by the client (structural engineer / specialist planner) in accordance with recognised rules, technical standards, legal requirements, standards and specialist regulations.

The following points, among others, should be highlighted here:

- Sufficient structural load-bearing capacity for the additional loads of the PV system.
- Check of the load-bearing capacity of the insulation material with regard to the permissible contact pressure.
- Suitability and condition of the roof covering.
- Inspection of the roof drainage system to ensure there is no unauthorised water accumulation.
- Condition of the roof (free from any damage).

5 Installation conditions

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

- The system must be installed in a manner correctly adapted to the project and its local conditions, in particular taking into account the necessary calculation of additional loads.
- For the mounting of framed photovoltaic modules with a frame height of 28-45 mm, or 28-40 mm when using the complementary clamps.
- On flat roofs with a pitch of no more than 3° (optionally with on-site connection to the roof substructure up to 10°).
- For module sizes as per data sheet MSP-FR-EW.
- A maximum block size of 15 m x 15 m is permitted to avoid unnecessary stress on the roof covering due to thermal expansion.
- The minimum permissible coefficient of friction between the protective layer and the roof covering is 0.3.
- Suitable for environmental conditions within the range of normal corrosive environments (e.g. at least 1 km from sea coasts) and in more corrosive environments (e.g. C4), provided 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 manufacturer of the roof covering.
- When installing on roofs with a gravel ballast, the information sheet « 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 approved modules on request). Schweizer is not responsible for ensuring the continued validity of the warranty provided by the module manufacturer. However, Schweizer will, as far as possible and appropriate, assist customers in obtaining all necessary clamp approvals 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 their responsibility). The calculated total load exerted on the roof by the MSP-FR-EW 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.).

6 Roof preparation

Before installation of the PV system begins, 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 the MSP-FR-EW are met, and that the personnel carrying out the installation work are professionally trained and fully familiar with the PV mounting system.

NOTE

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

7 Commissioning and maintenance

Installation and commissioning must be carried out exclusively by authorised personnel.

Please observe the safety instructions listed here, as well as the instructions at the beginning of this operating manual, **Chapter 2: Safety**.

Carry out regular maintenance once a year, including an inspection of the screw connections, mechanical connections, the position of protective layers, the cabling, the earthing and the condition of the roof covering.

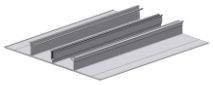
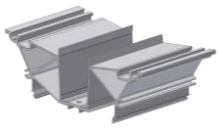
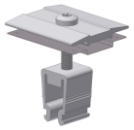
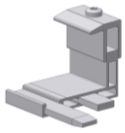
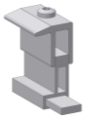
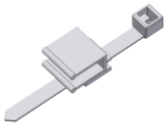
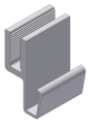
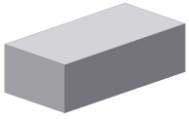
Clamps may be reused provided they are undamaged. The specified torque must be strictly adhered to. If visible damage, corrosion or over-tightening is detected, they must be replaced immediately. As a precaution, the clamps should be replaced after a maximum of 5 tightening and loosening cycles.

8 Supplementary documents

Download Center - Solar

- Important documents
- Information sheets
- Test results

9 Components

1 	2 	3 	4 	5 
Protective layer **MSP-FR-PSF**	**Base profile** **MSP-FR-EW-BP**	**Support high** **MSP-FR-EW-SH90**	**Support middle high** **MSP-FR-EW-SMH90**	**Support** **MSP-FR-EW-SL8** **MSP-FR-EW-SL10**
6 	7 	8 	9 	10 
Support **MSP-FR-S-SL8** **MSP-FR-S-SL10**	**End clamp** **MSP-PR-EC** **MSP-PR-ECB**	**End clamp grounding** **MSP-PR-ECG** **MSP-PR-ECBG**	**Middle clamp** **MSP-PR-MC** **MSP-PR-MCB**	**Middle clamp grounding** **MSP-PR-MCG** **MSP-PR-MCBG**
11 	12 	13 	14 	15 
Complementary clamp low **MSP-FR-LC** **MSP-FR-LCB**	**Complementary clamp high** **MSP-FR-HC** **MSP-FR-HCB**	**Connection channel** **MSP-FR-C**	**Ballast fixation** **MSP-FR-BF**	**Ballast tray holder** **MSP-FR-BT**
16 	17 	18 	19 	20 
Ballast carrier start plate **MSP-FR-EW-BS**	**Ballast tray clamp** **MSP-FR-BC**	**Wind deflector adapter** **MSP-FR-EW-WDA-SH90**	**Wind deflector / Ballast tray** **MSP-FR-S-WD**	**Cable holder with edge-clip** **MSP-FR-CHE**
21 	22 	23 	24 	25 
Cable holder clip **MSP-FR-CH**	**Connection channel clip** **MSP-FR-C-CL**	**Optimizer clamp** **MSP-FR-OC-33** **MSP-FR-OC-63**	**Screw** **MSP-FR-S M6x16**	**Screw** **MSP-FR-TS 6.3x20 R lightning current capable connection**
26 	27 	28 	29	30
Screw **MSP-FR-GS 6x60**	**Ballast stone** not included in delivery	**S.P.T** **Project report**		

10 Installation

10.1 Explanation of symbols

	Caution		Warning of dangerous electrical voltage
	See S.P.T. project report	 T 30 / 10 Nm	Tightening / Tightening torque
	Correct procedure		Repeat steps
	Incorrect procedure		Earthing / Earthing installation
	Audible click		
	Direction of movement		

10.2 Tools required

	Cordless screwdriver		If the cordless screwdriver is equipped with a hammer drill function, this must be switched off.
 T 30	Torx bit TX30		
	Bit extension		Bit extension recommended for easier installation with the strut raised (MSP-FR-EW-SH).
	Torque wrench (10 Nm) with Torx attachment TX30		

10.2.1 Torques

8 Nm	+/- 2 Nm	
10 Nm	+/- 3 Nm	
4 Nm	± 1 Nm	

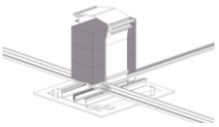
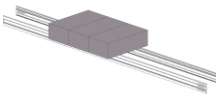
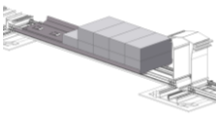
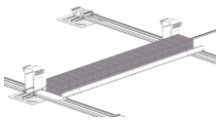
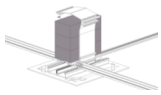
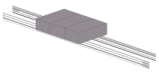
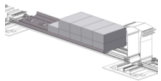
10.2.2 Installation instructions for stainless steel screw connections

The assembly must be carried out correctly.

To prevent cold welding between the bolt and nut, you should:

- use a screwdriver without a hammer drill function.
- set an appropriate, not too high, speed.
- do not apply excessive pressure to the bolt.

10.3 Ballasting – possible combinations and load-bearing capacity

				
		✔	✔	✔
	✔		✔	⊘
	✔	✔		⊘
	✔	⊘	⊘	

✔ Possible / permitted

⊘ Not possible / not permitted

Maximum permissible load (from support to support) – see data sheet.
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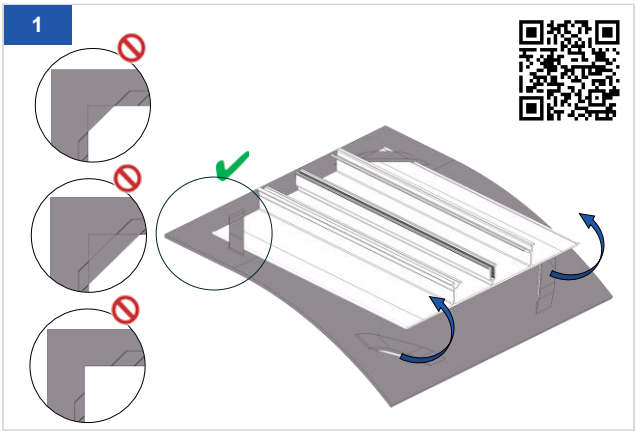
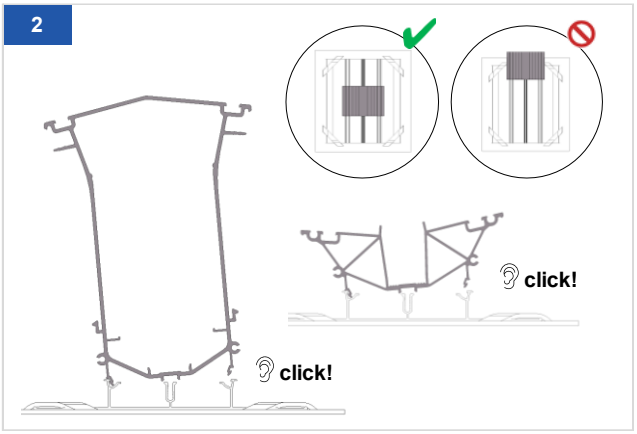
10.4 Pre-assembly

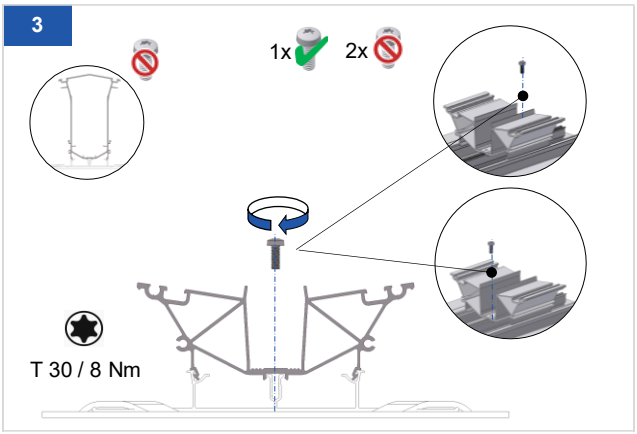
Before installation, the following must be in place:

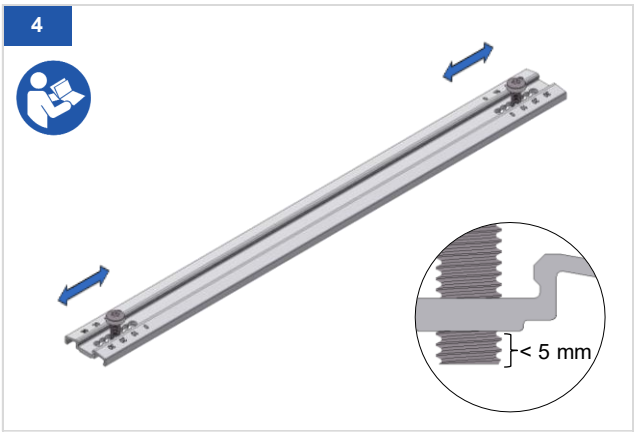
- the S.P.T project report must be available.
- the materials must be complete.

Preparation can also be carried out off-site.

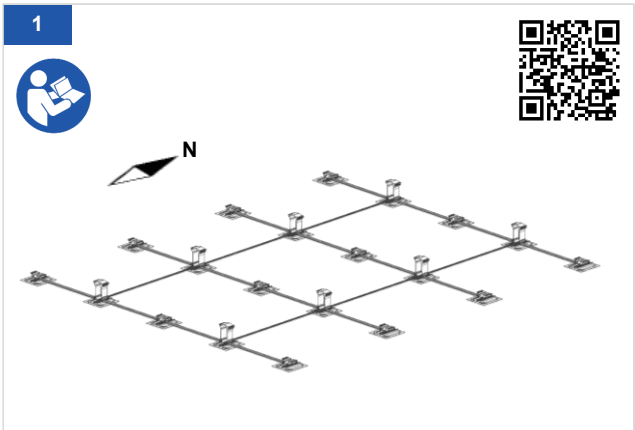


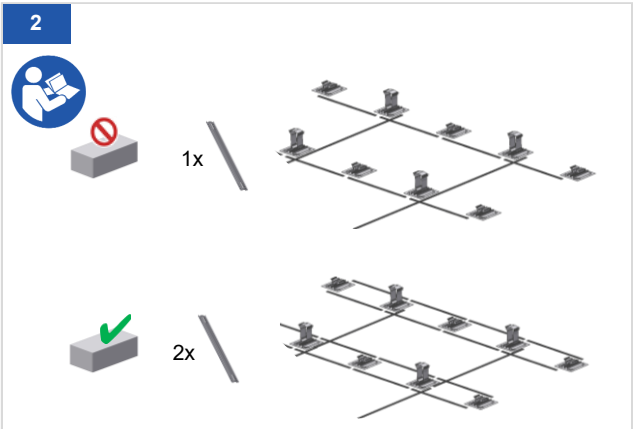


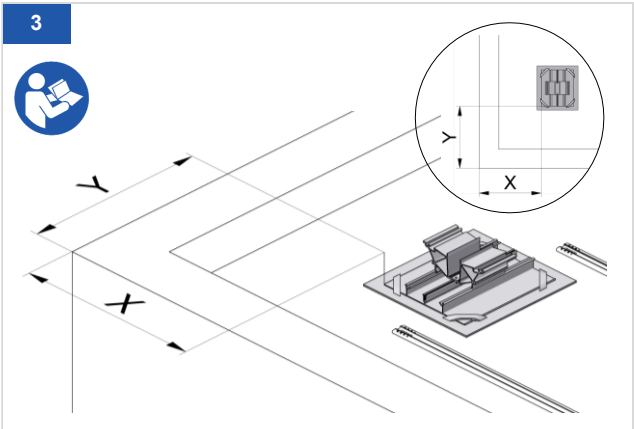


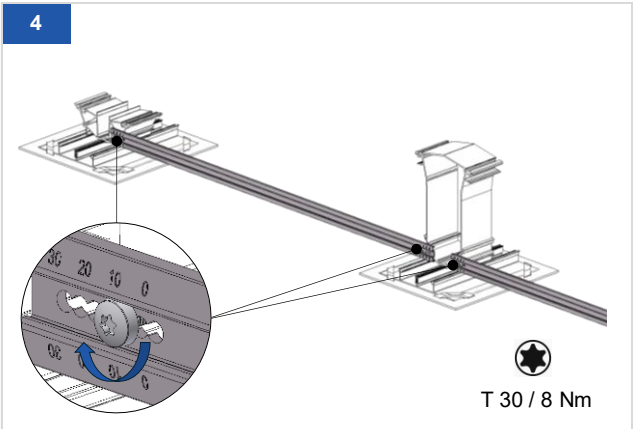


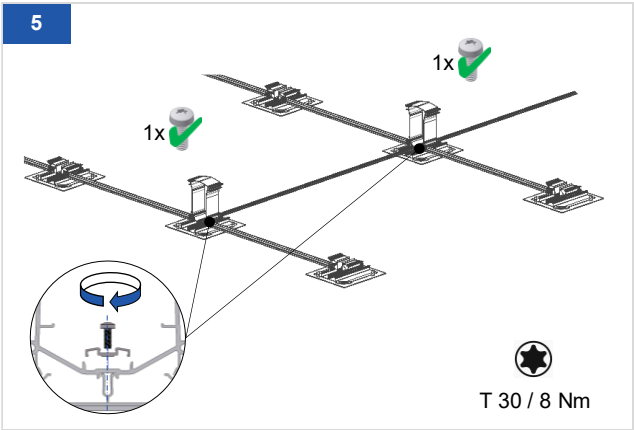
10.5 Basic configuration





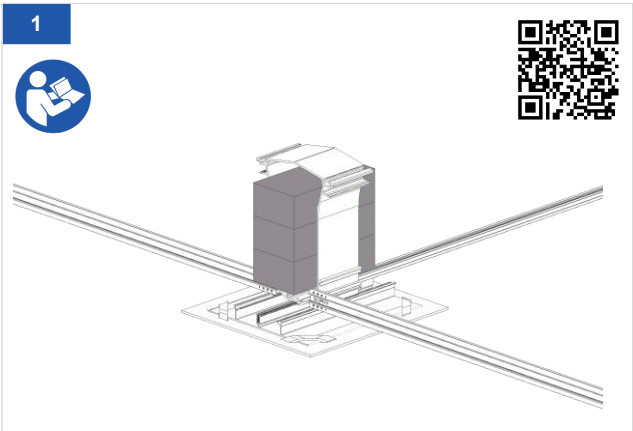




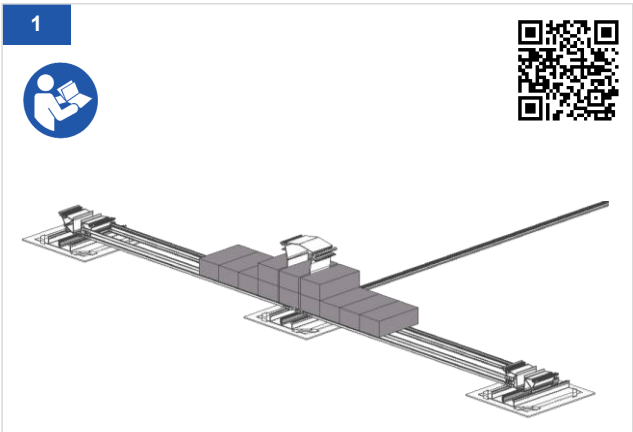


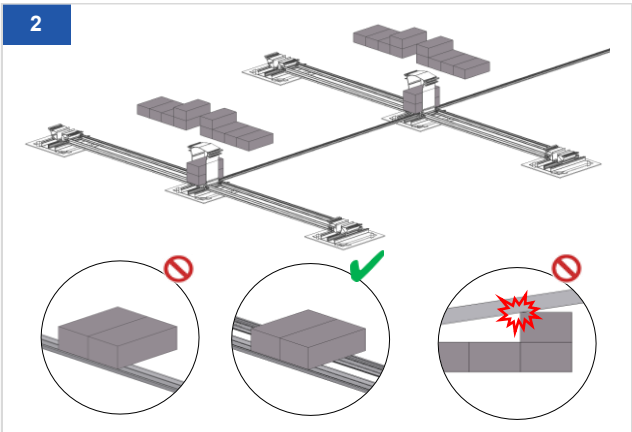
10.6 Ballasting

10.6.1 Ballast in support

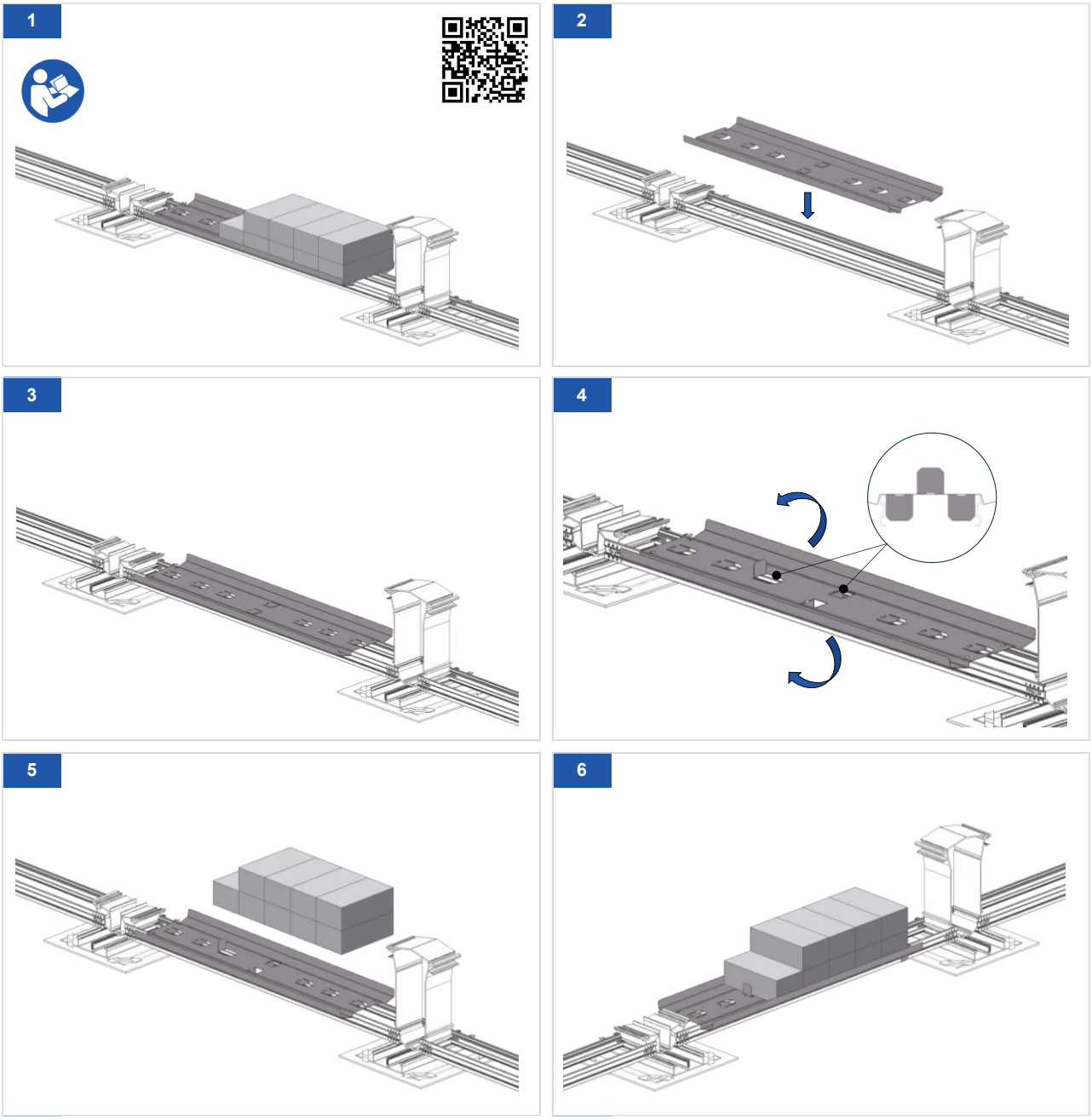


10.6.2 Ballast on connection channels

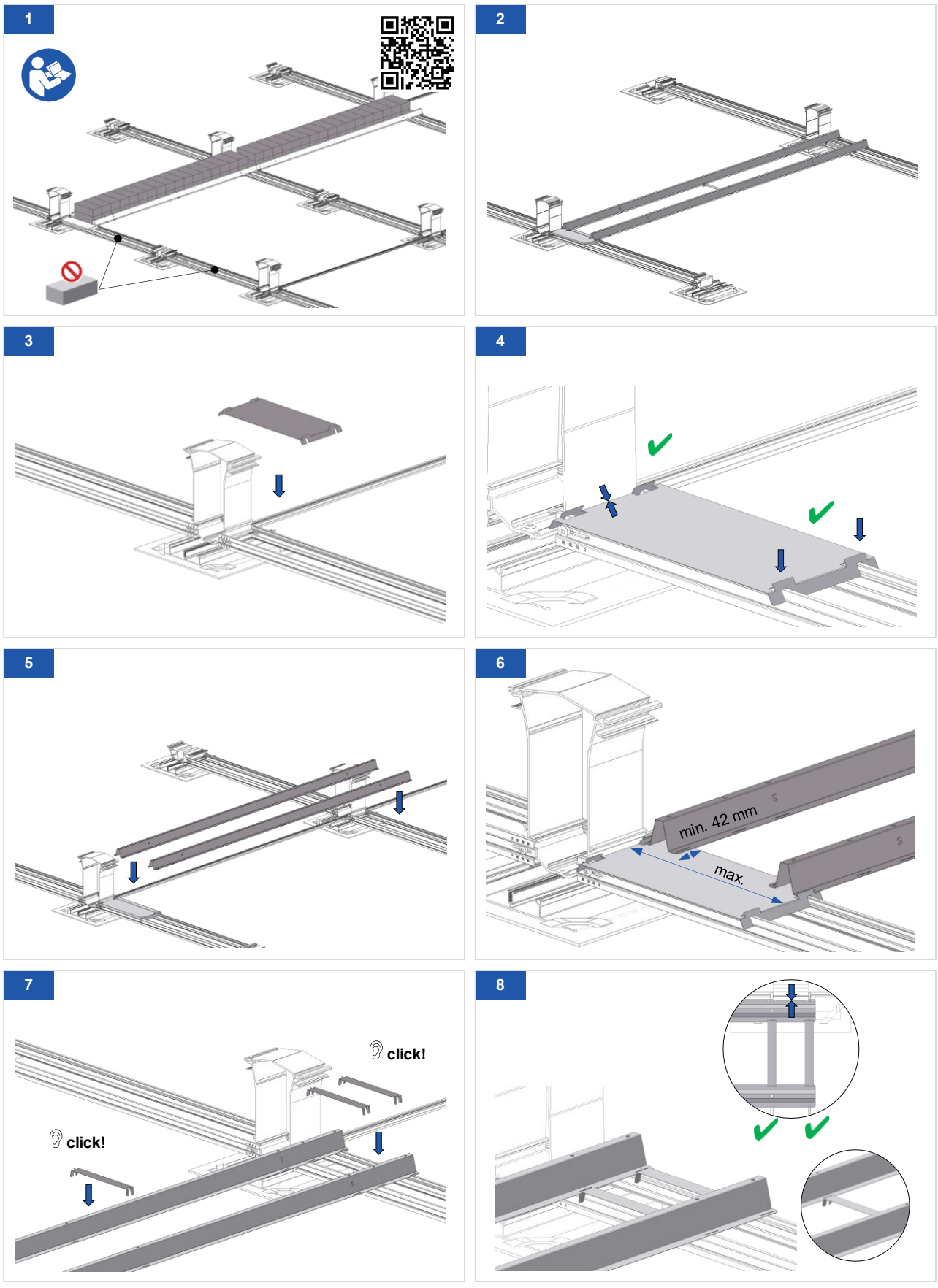


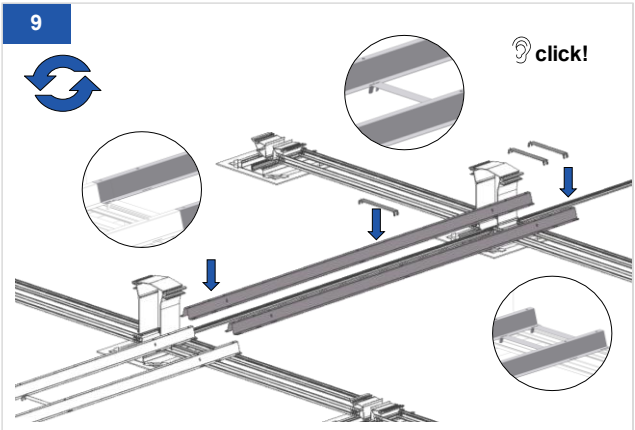


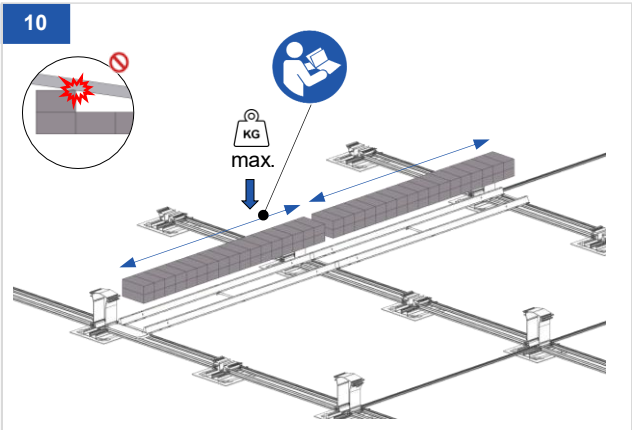
10.6.3 Ballast on ballast fixation



10.6.4 Ballast on ballast tray holder system

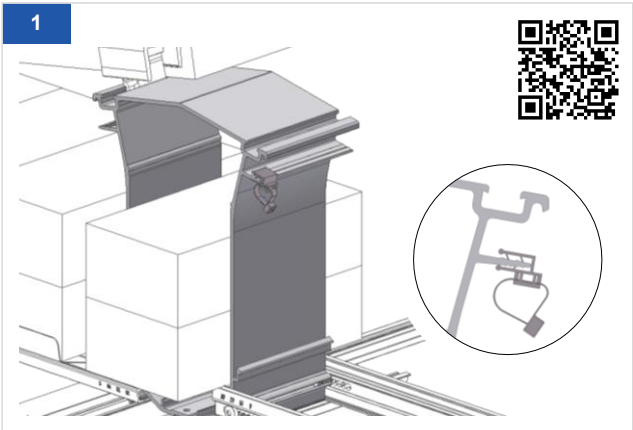




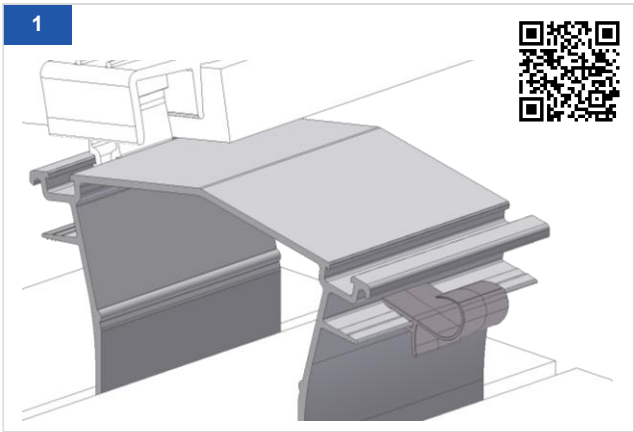


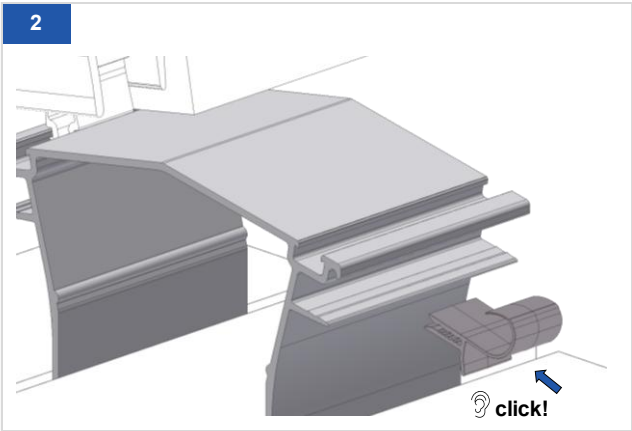
10.7 Cable management

10.7.1 Cable holder with edge-clip

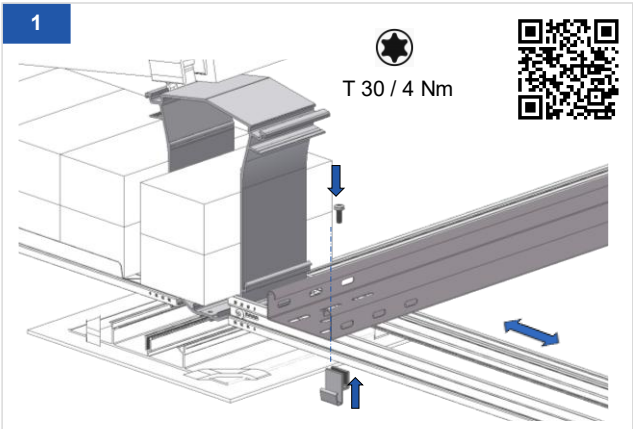


10.7.2 Cable holder clip

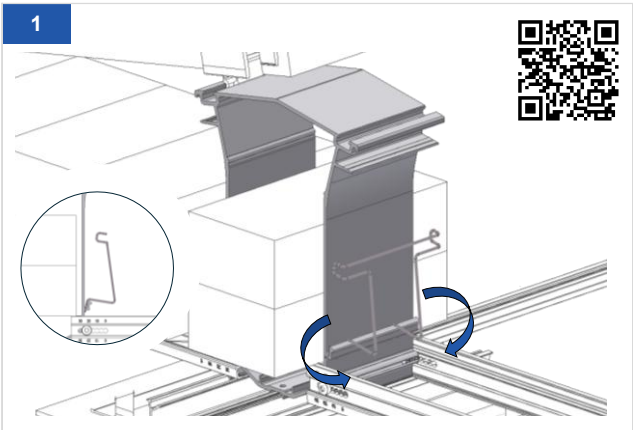


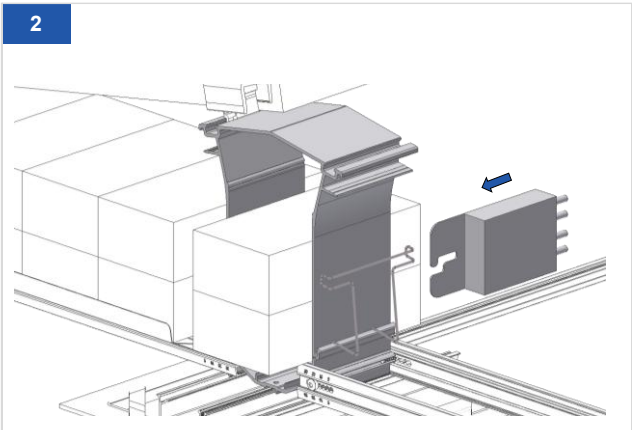


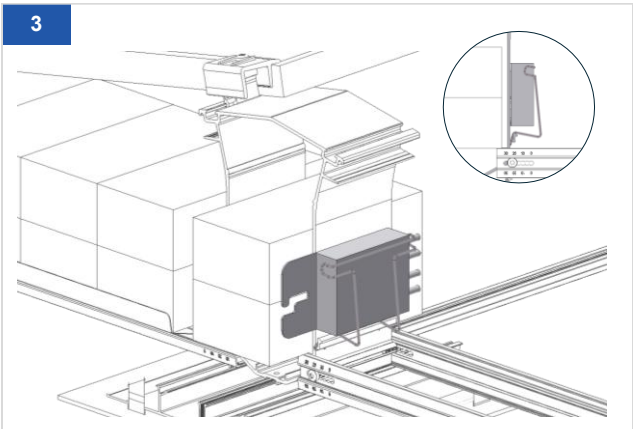
10.7.3 Connection channel clip for fastening cable ducts and accessories



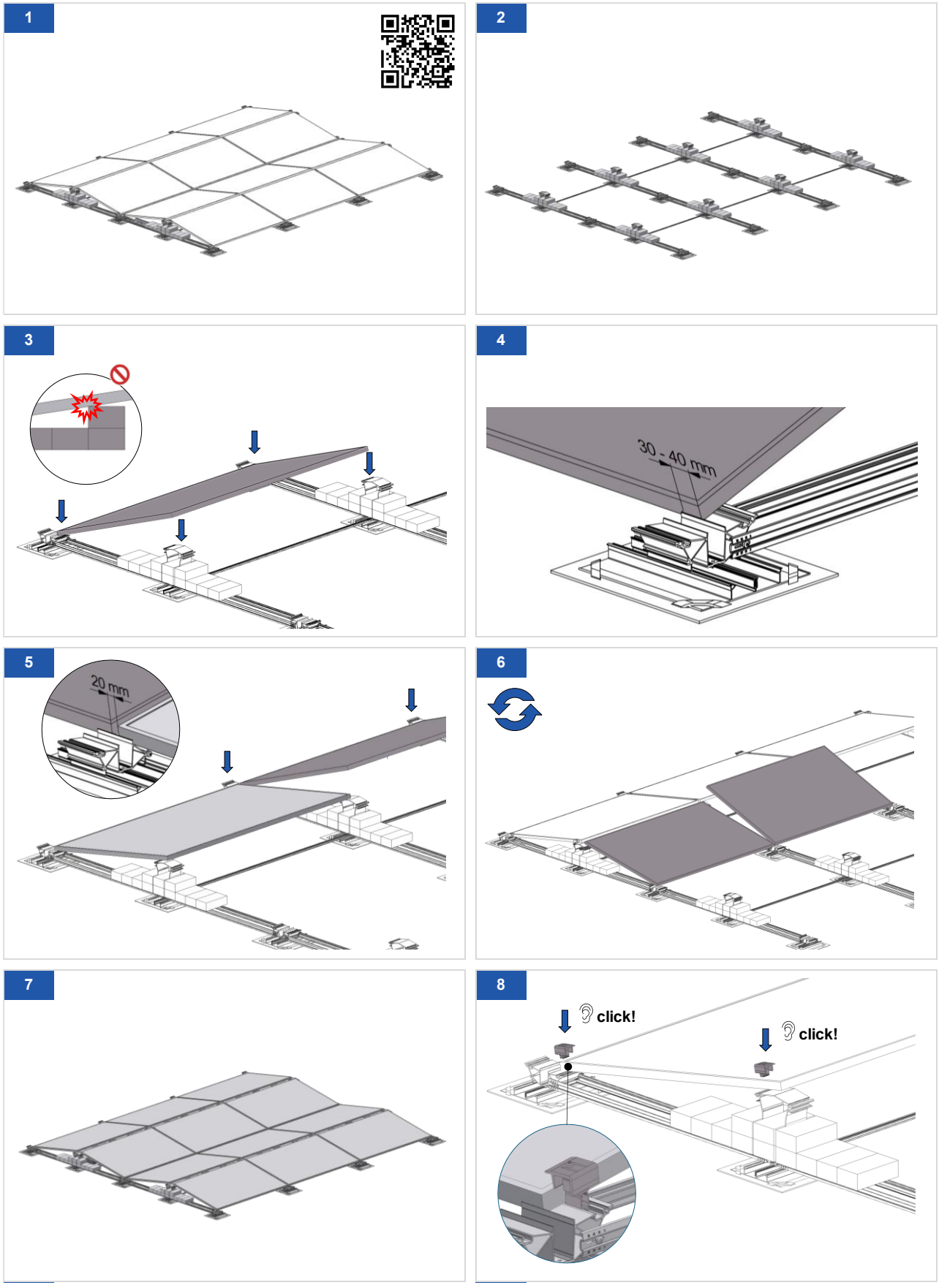
10.7.4 Optimizer clamp

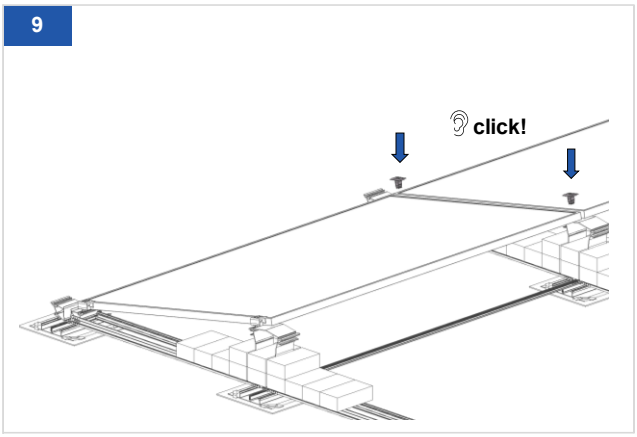


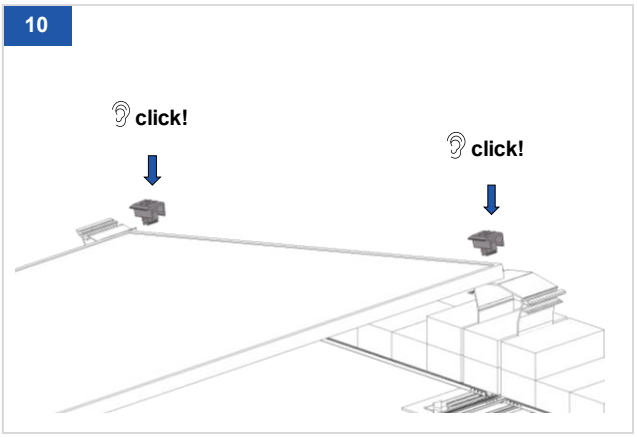


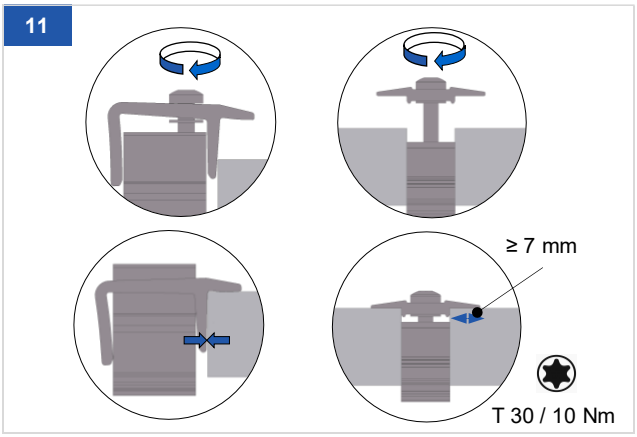


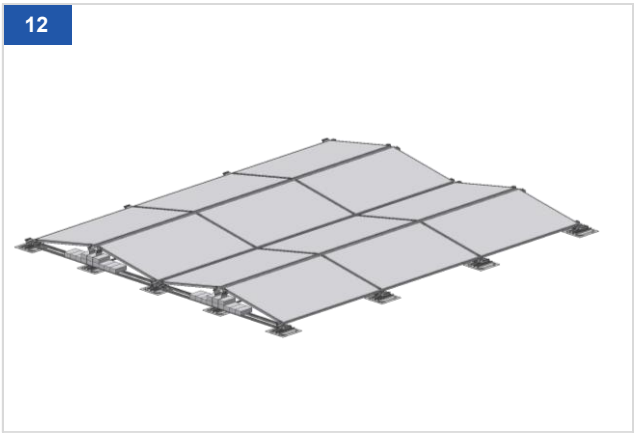
10.8 Module mounting with potential equalisation (screwed version)



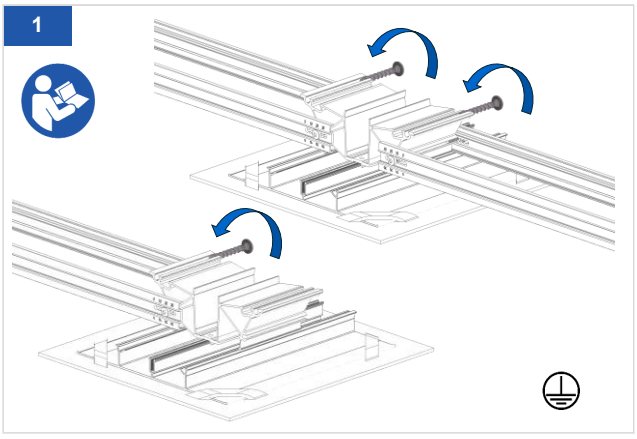




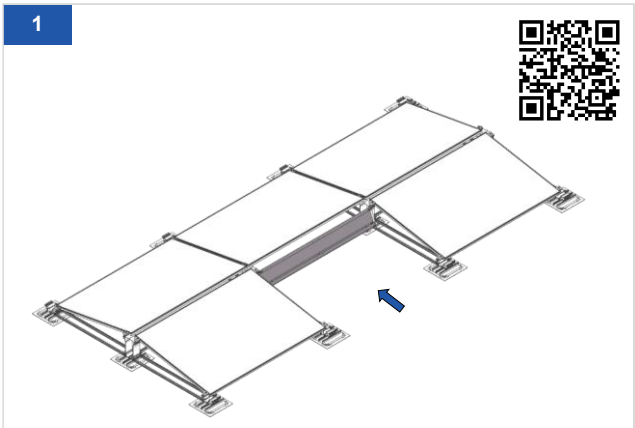


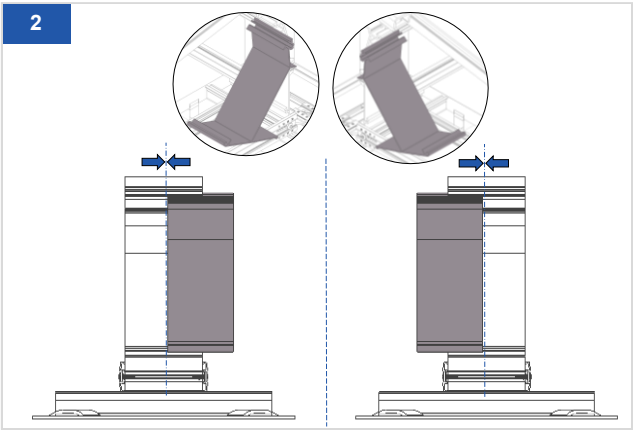


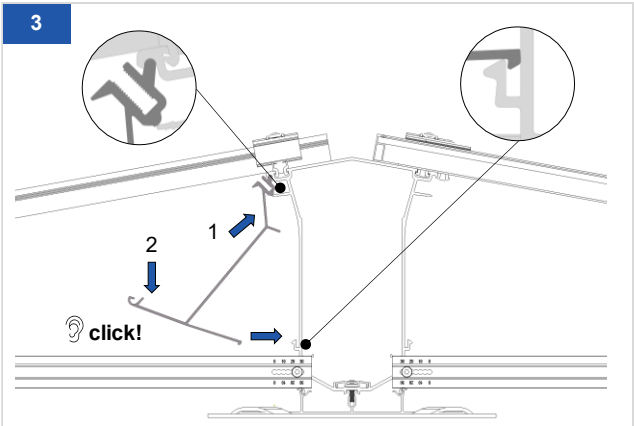
10.8.1 Potential equalisation (screwed version)

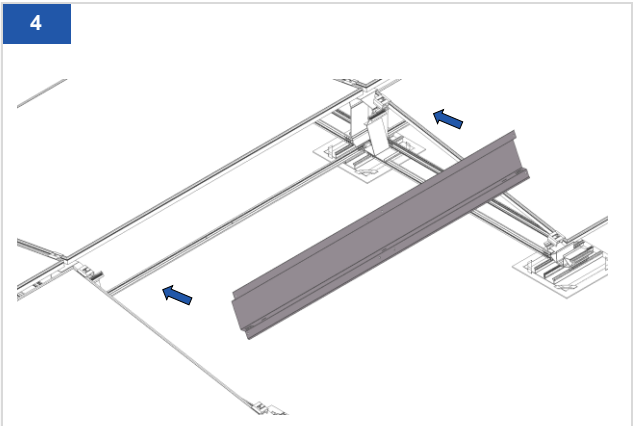


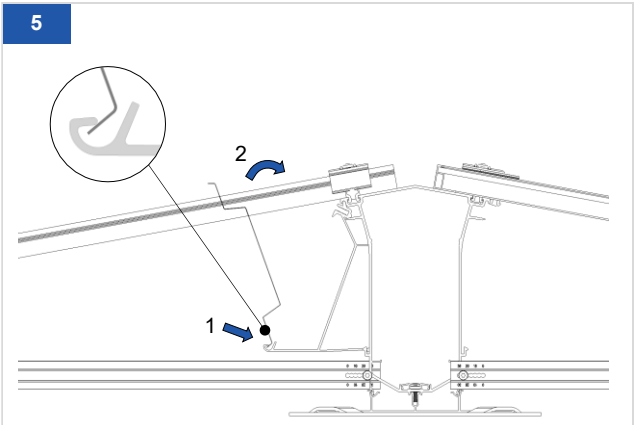
10.9 Half gables

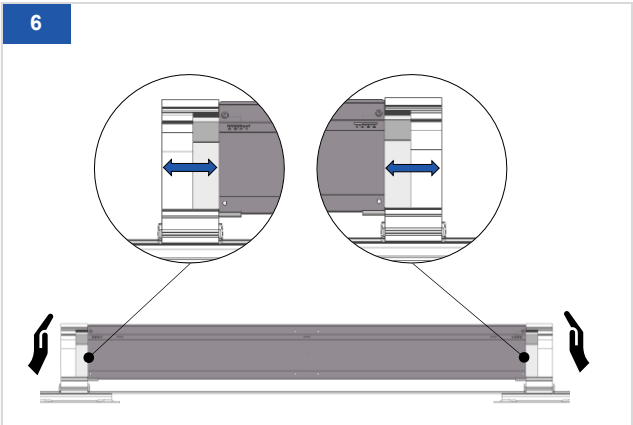


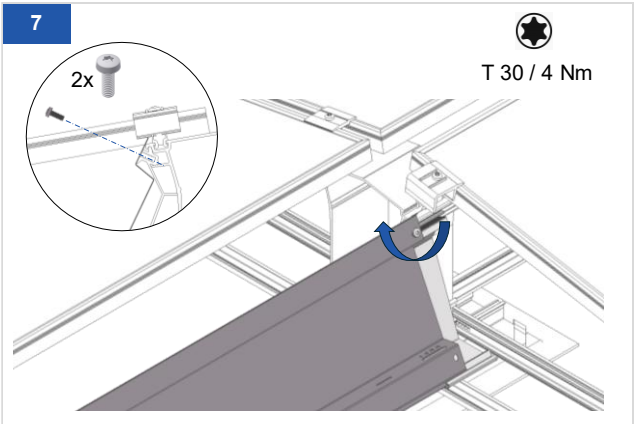




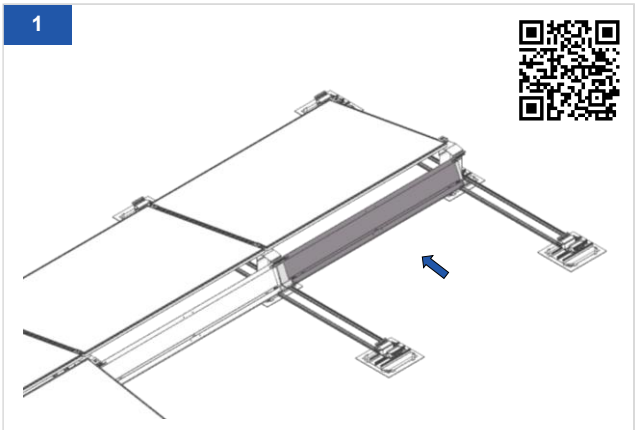


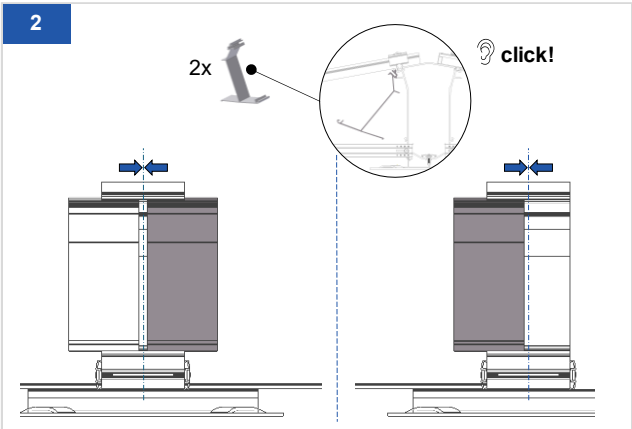


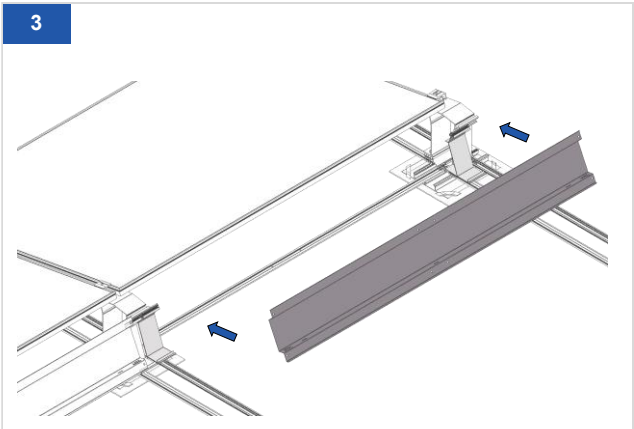


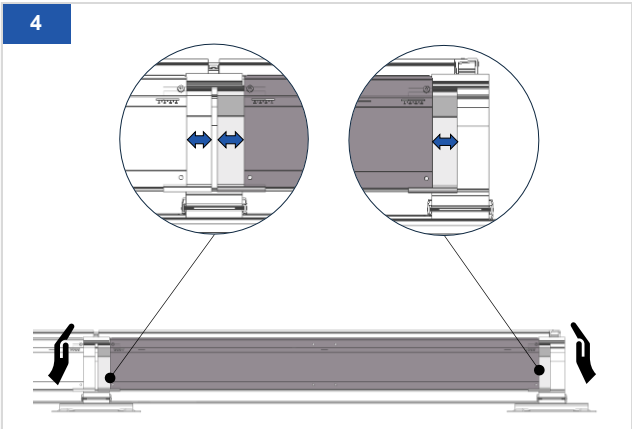


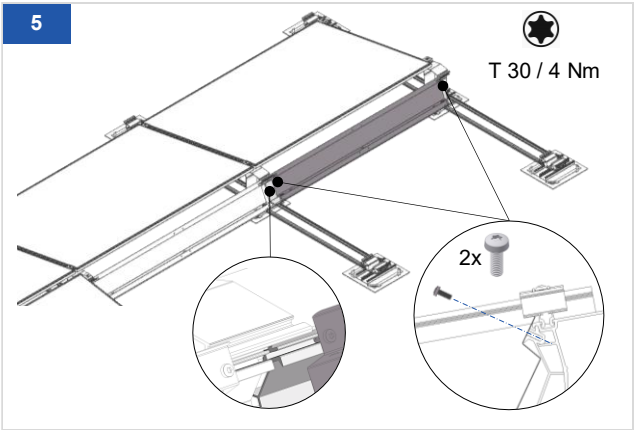
10.9.1 Additional half-gables





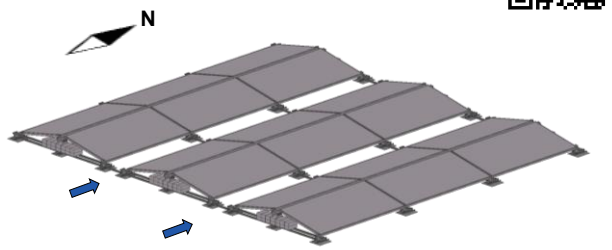






10.10 Walkway along the eaves

1



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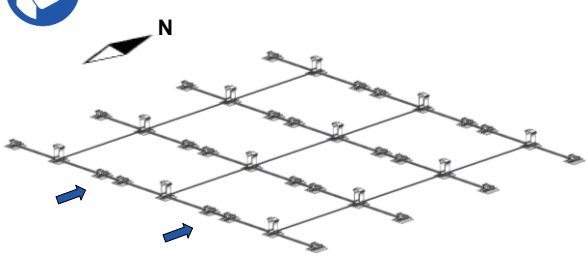

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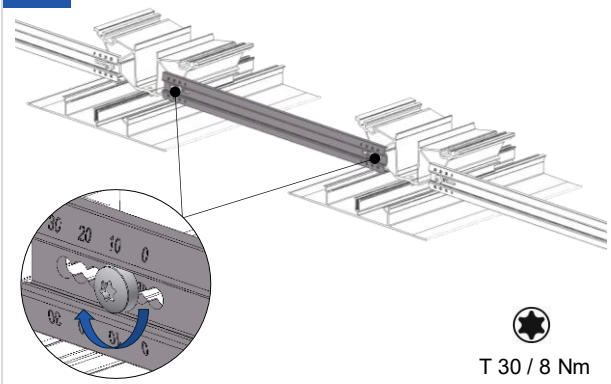
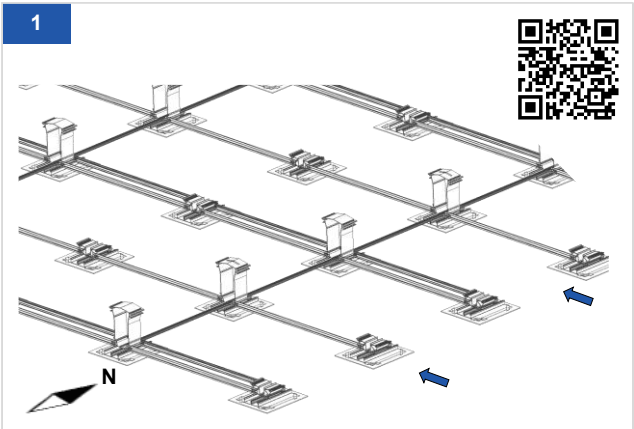
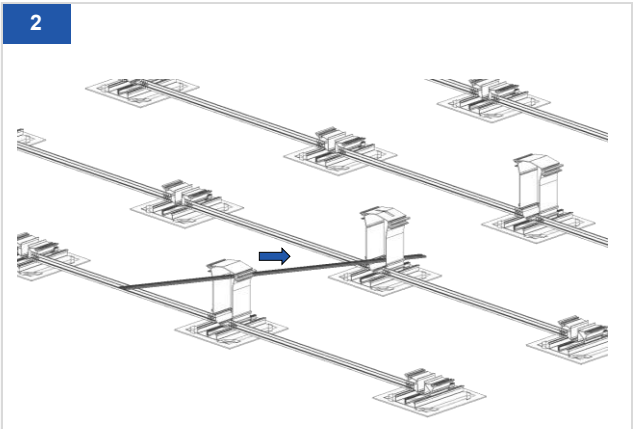
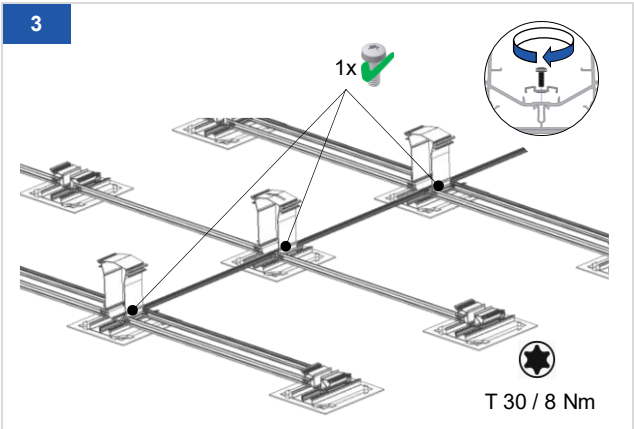
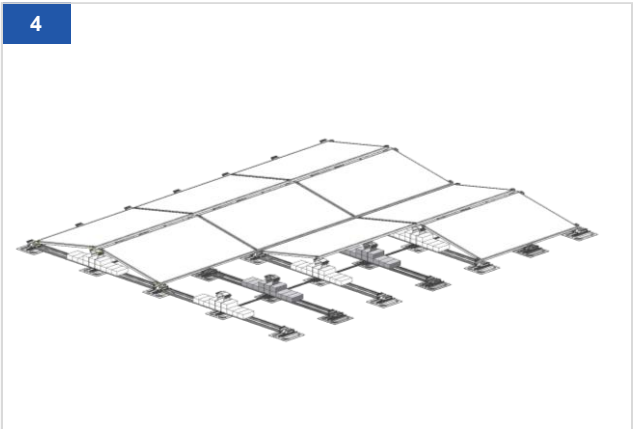


10.11 Central support



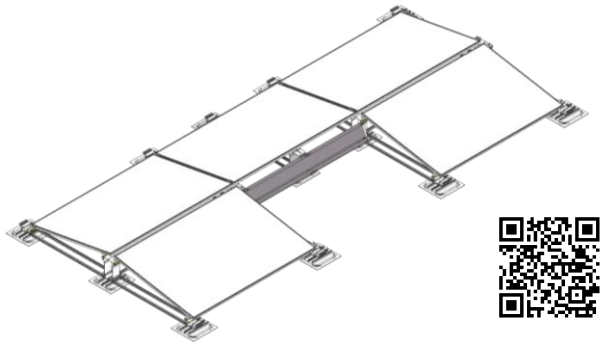






10.12 Half gable with central support

1



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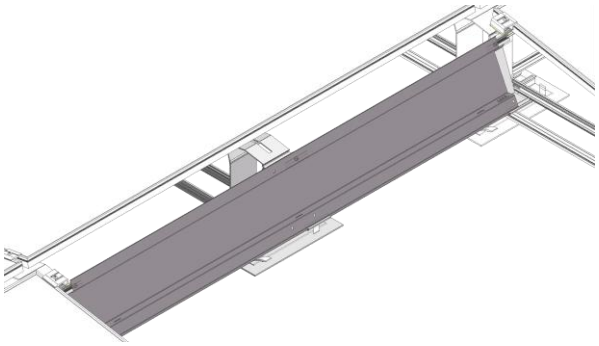

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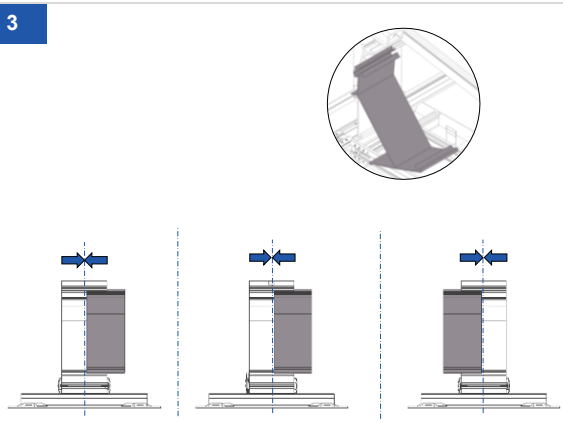

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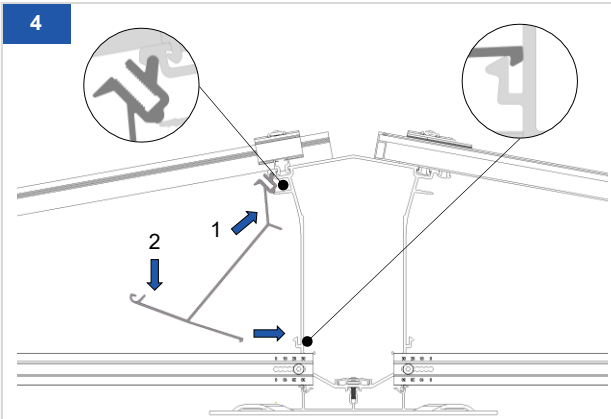

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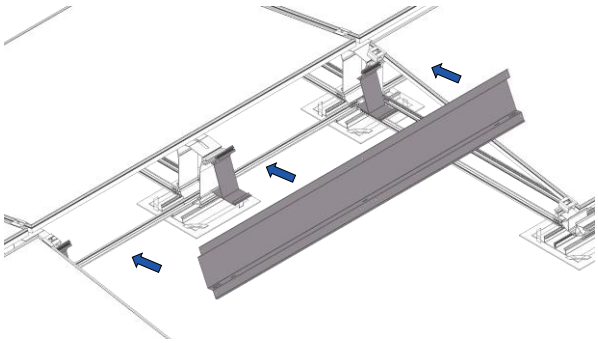

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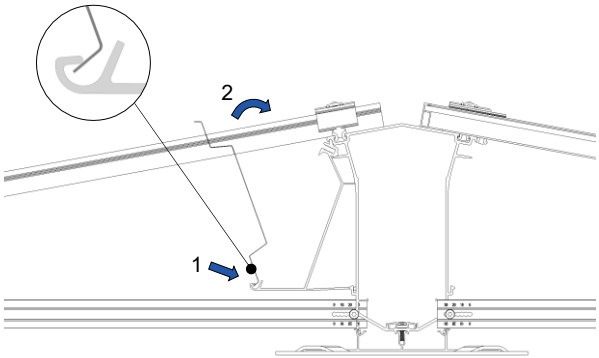

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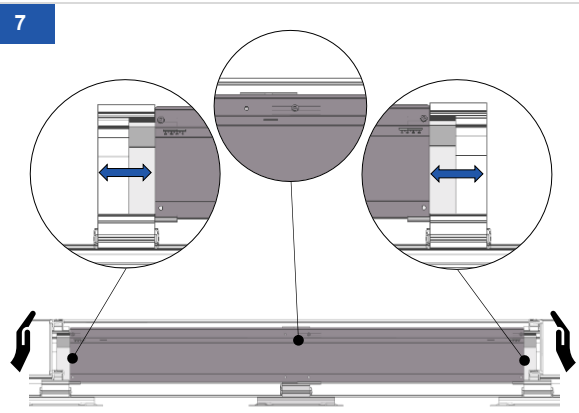

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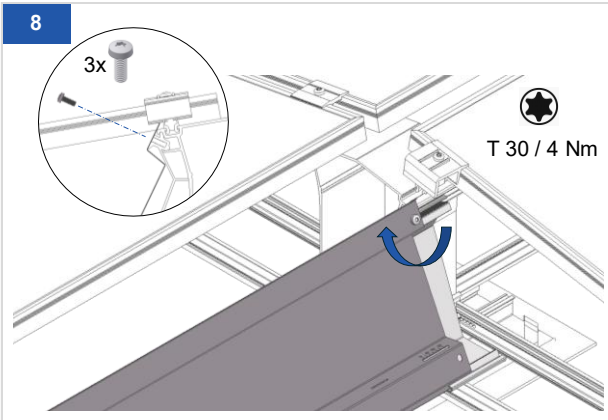
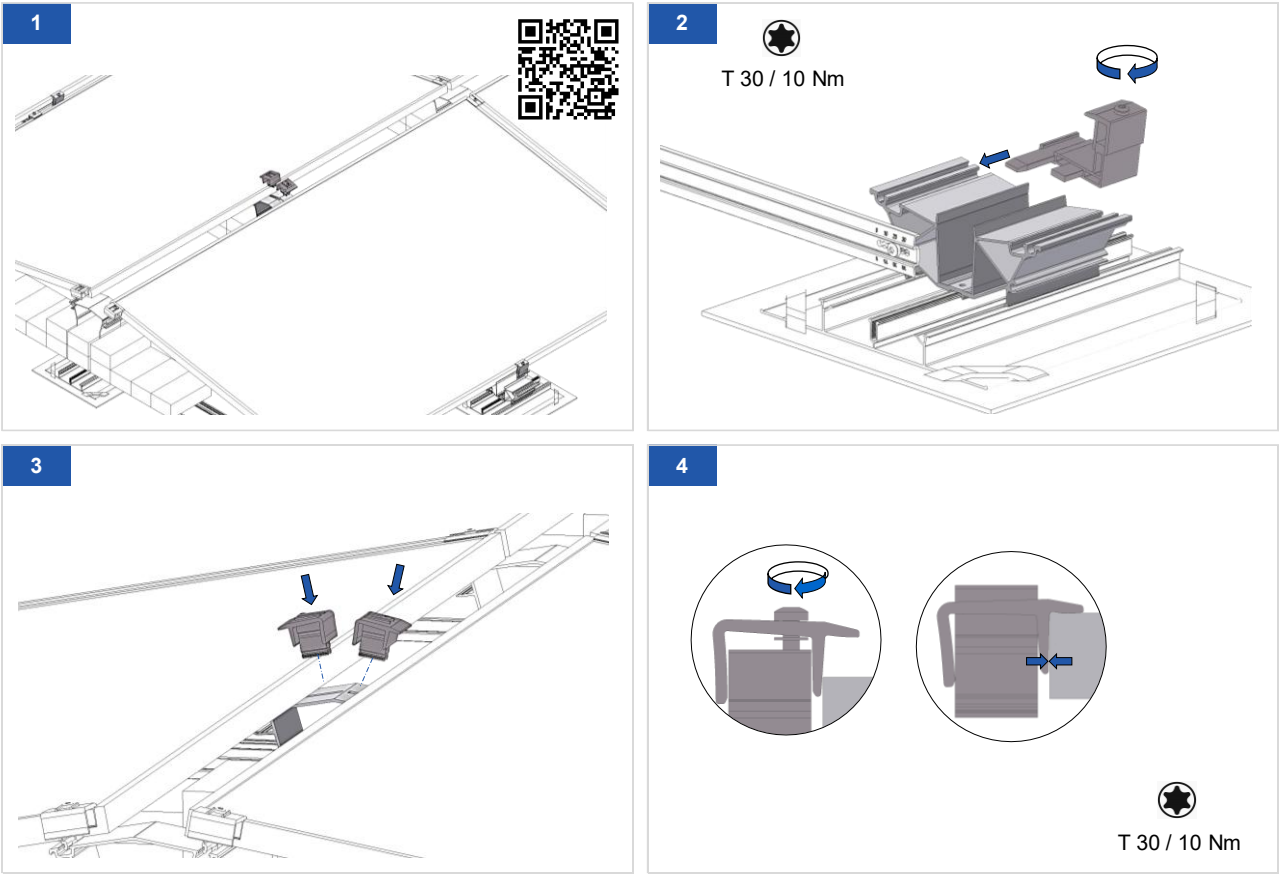
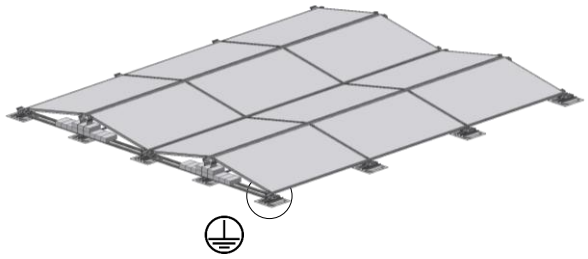


10.13 Module installation with central support



10.14 Option – Earthing of the PV system

1



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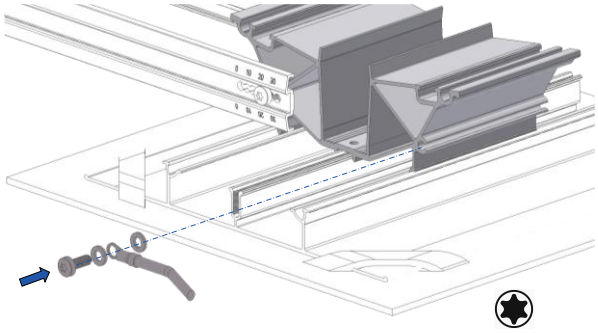

10.15 Checking screw connections

Once installation is complete, all screw connections must be checked using a torque wrench. The permissible torques are specified in **Section 10.2.1**

11 Rights and liability

11.1 Legal notice

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All appendices form an integral part of the installation instructions.

The PV mounting system has been constructed in accordance with recognised safety regulations. However, improper use may result in personal injury or damage to property.

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