Solar systems from Schweizer

Installation instructions for PV mounting system
MSP flat roof east-west MSP-FR-EW
MSP green roof MSP-FR-G

Read carefully before use and keep for future reference.

MSP-FR-EW

MSP-FR-G

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Contents

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1 About these instructions

1.1 Basic information about the assembly instructions

The installation instructions contain important information on how to install the mounting system safely, correctly and properly. Following the instructions will prevent 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 Swiss MSP-FR-EW / MSP-FR-G PV mounting system complies with the following standards, among others:

- 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 – Weights, 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

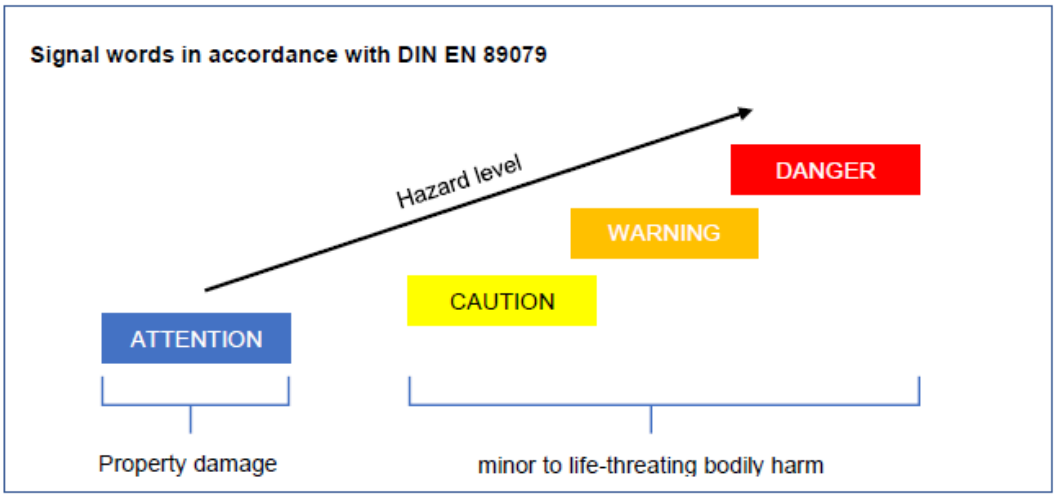
The tests were carried out in accordance with the following guidelines:

- 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 using different colour backgrounds:



2 Safety

2.1 Intended use

The Swiss PV mounting system is designed exclusively for mounting framed photovoltaic modules on buildings with flat roofs with a maximum angle of inclination of 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 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. If 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 standing under suspended loads (during installation).
- Use of fittings and accessories such as screws or connectors during installation of the support structure that are not originally included in the scope of delivery.
- Installation of the support structure by unauthorised, technically qualified personnel.
- Damage to the roof covering.
- Installation of the support structure on a non-load-bearing surface/roof.
- Incorrect positioning of the PV modules.
- When setting up the construction site on the roof, storing the assembly materials on the roof and leaving the construction site, the construction site materials (tools, packaging materials, pallets, assembly and system materials that have not yet been installed, etc.) and unfinished systems must be adequately protected from the effects of the weather in all cases.
- Failure to observe safety equipment, safety regulations and current accident prevention regulations.
- When leaving the construction site, unfinished systems must be secured.

Errors can also occur if unauthorised components are used for repairs.

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2.3 Requirements for safe operation

To avoid personal injury and property damage, caution must be exercised in all activities related to the intended operation of the PV mounting system. Schweizer accepts no liability for any property damage and/or personal injury resulting from non-compliance.

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 without exception.
- Unauthorised modifications to the PV mounting system are prohibited.

2.4 Responsibility of the customer or installer

The customer or installer is responsible for complying 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 the appropriate basic technical and specialist knowledge of mechanics.
- The persons commissioned to carry out the work are able to assess the tasks assigned to them and recognise possible risks.
- the persons commissioned to carry out the work are familiar with the system components and their 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 damage or loss resulting from non-compliance with these conditions.
- Correct installation in accordance with the project report and the provision of any necessary tools is ensured.
- A suitable lifting device is used for installation, if necessary.
- Components with visible damage are not used and are replaced.
- Each component and its accessories are used exclusively as intended and specified in the project report.
- Only Swiss MSP-FR-EW / MSP-FR-G or other specified MSP Swiss components are used for installation, even if parts need to be replaced. Otherwise, no warranty claims will be accepted.
- The roof covering is not damaged in any way by parts of the PV mounting system falling, being pulled or penetrating it.
- Regular maintenance work is carried out once a year, including an inspection of the screw connections, mechanical connections, position of protective layers, cabling, earthing and condition of the roof covering.

- The roof on which the system is mounted is designed and constructed in such a way that it can adequately and safely support the PV mounting system. This includes, among 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 responsible for damage to roofs where the design or construction of the roof is not suitable for supporting the system installation.
- The Schweizer PV mounting system MSP-FR-EW / MSP-FR-G can be incorporated into the design of the electrical equipotential bonding system and connected to it by properly installing a suitable earthing clamp or screw (not supplied by Schweizer). The customer must ensure compliance with current rules, legal regulations and guidelines.
- Installation is carried out in accordance with current national regulations and guidelines, including, but not limited to, compliance with the required edge distance to the roof, the 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. Schweizer is not liable for any resulting damage.
- Any lightning protection system in the building must be adapted in accordance with the current technical rules and legal regulations. If necessary, refer to the "Information sheet – Lightning current carrying capacity for MSP-FR flat roof systems".
- The following standards (or corresponding regionally applicable standards) must be observed for the design and installation of lightning protection, earthing and equipotential bonding :
  - 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 German Roofers (ZVDH)" or equivalent regionally applicable standards for work on roofs must be observed.
  - DIN 18338 Roof covering work
  - DIN 18451 Scaffolding work

as well as:

- the guidelines for damage 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.

2.5 Basic safety instructions

The following basic safety instructions and warnings are an integral part of these instructions 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.
- 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 during 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 incomplete sections, components and materials must be secured in accordance with the applicable regulations.

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3 Residual hazards

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

DANGER

Electric shock due to lightning striking the PV mounting system

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

Ground the PV mounting system properly.

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 grounding connections

If protective conductors or grounding connections have been loosened, conductive parts including handles, covers and locks that appear to be insulated may cause electric shock if touched. Check that all protective conductors and grounding connections are connected.

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

WARNING

Risk of falling

Carelessness and tripping can cause falls 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 anchorage devices and a body restraint device are available for cleaning and maintenance work.

CAUTION

Risk of tripping and falling

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

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

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4 Technical clarification before starting installation

The suitability of the roof for supporting a PV system must be checked and confirmed on site (by a structural engineer/specialist planner) in accordance with 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 insulation material with regard to the permissible contact pressure.
- Suitability and condition of the roof covering.
- Testing of the roof drainage system with regard to impermissible water accumulation.
- Condition of the roof (free of any damage).

5 Installation conditions

The Swiss PV installation system MSP-FR-EW / MSP-FR-G is designed for the following conditions:

- The system must be installed correctly in accordance with the project and local conditions, in particular with the necessary calculation of additional loads.
- For fastening 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 slope 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 15 m x 15 m is permitted in order 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) 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 manufacturer of the roof covering.
- When installing on roofs with gravel fill, the "Information sheet – MSP-FR PV mounting system 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 assist customers as far as possible and appropriate in obtaining all necessary clamp approvals from the module manufacturers.
- For roofs that can adequately 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 / 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.).

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6 Roof preparation

Before starting to install 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 commissioned to carry out 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.

7 Commissioning and maintenance

Installation and commissioning may only be carried out by authorised personnel.

Observe the safety instructions listed here and the instructions at the beginning of this operating manual, **Chapter 2 Safety**.

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

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

8 Supplementary documents

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MSP-FR-EW

MSP-FR-G

Important documents

Information sheets

Test results

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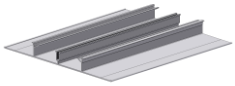
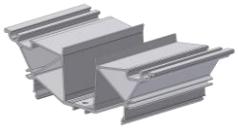
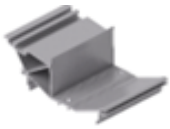
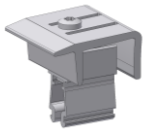
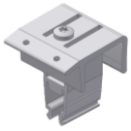
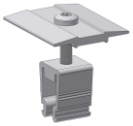
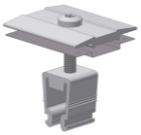
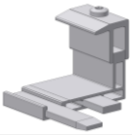
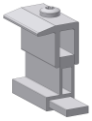
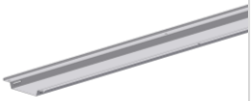
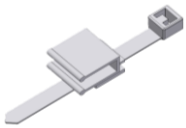
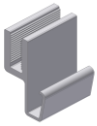
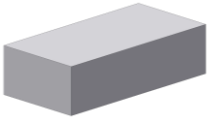
9 Components

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

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10 Assembly

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 execution		Repeat steps
	Incorrect execution		Grounding / Grounding installation
	Audible click		
	Direction of movement		

10.2 Required tools

	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 simplified installation with the support high (MSP-FR-EW-SH).
	Torque wrench (10 Nm) with Torx bit TX30		

10.2.1 Torques

8	+/- 2 N·m	
10	+/- 3 Nm	
4 Nm	+/- 1 Nm	

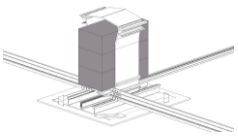
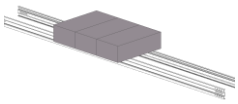
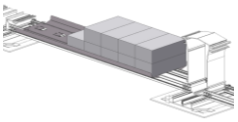
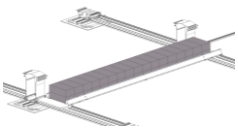
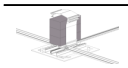
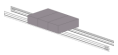
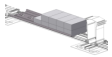
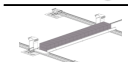
10.2.2 Assembly instructions for stainless steel screw connections

Assembly must be carried out professionally.

To prevent cold welding between the screw and nut:

- use a screwdriver without a hammer drill function.
- set an appropriate speed that is not too high.
- Do not apply excessive pressure to the screw.

10.3 Ballasting – possible combinations and load capacity

				
	✔	✔	✔	✔
	✔	✔	✔	⊘
	✔	✔	✔	⊘
	✔	⊘	⊘	✔

✔ Possible/permissible

⊘ Not possible/not permitted

For maximum permissible load (from support to support), see data sheet.
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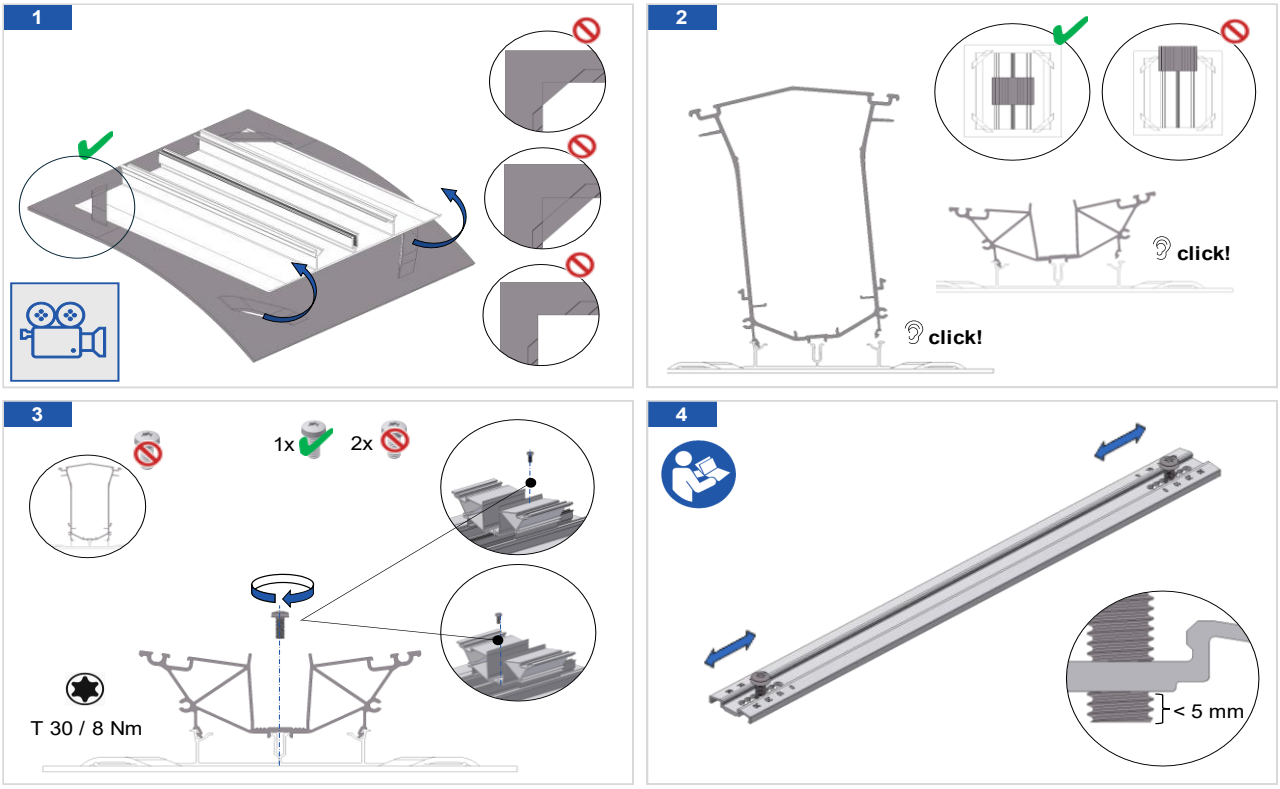
10.4 Pre-assembly

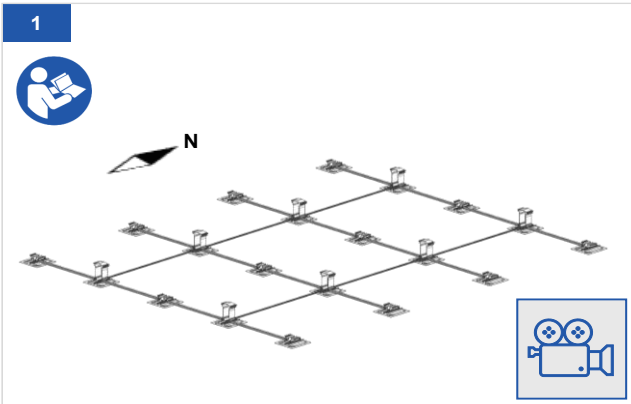
Before assembly, the following must be available:

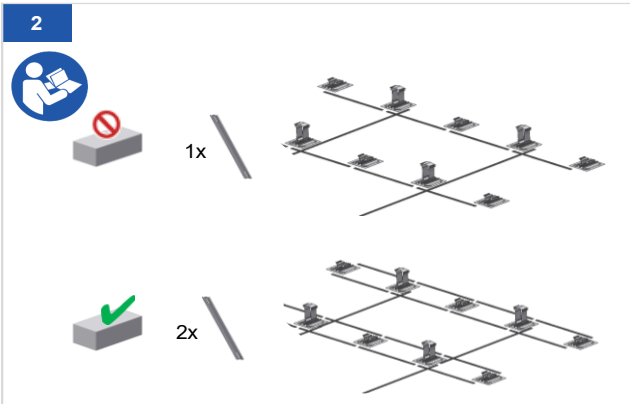
- The S.P.T project report must be available.
- The material must be complete.

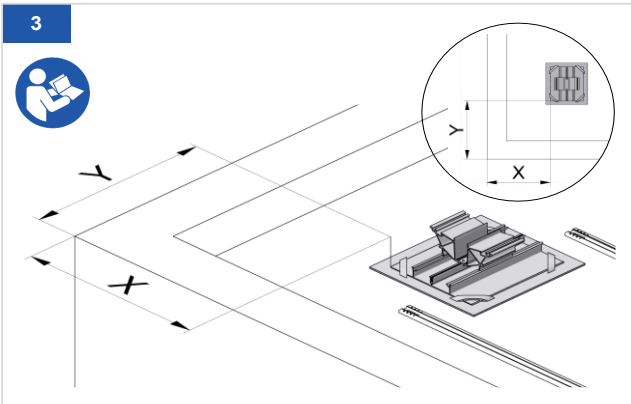
Preparation can also be carried out off-site.

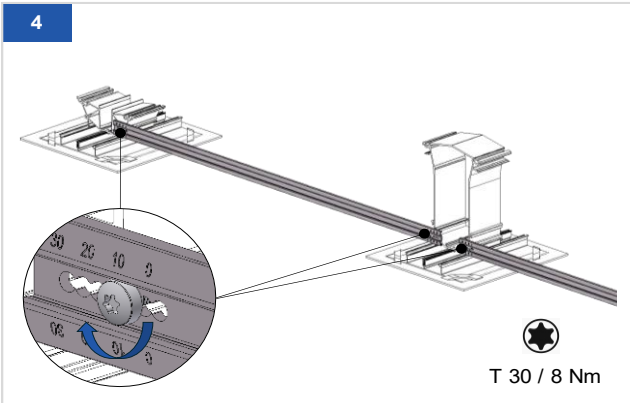


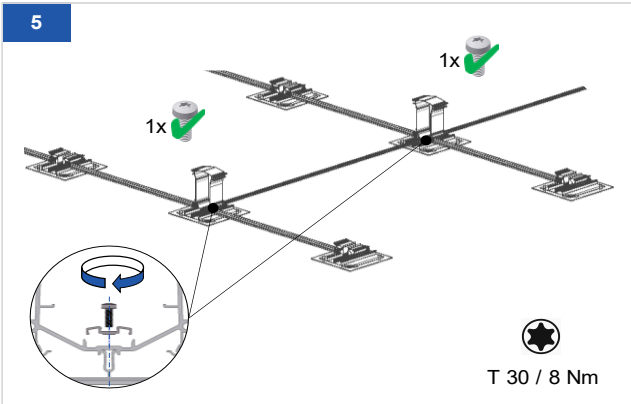
10.5 Assembly of the basic configuration





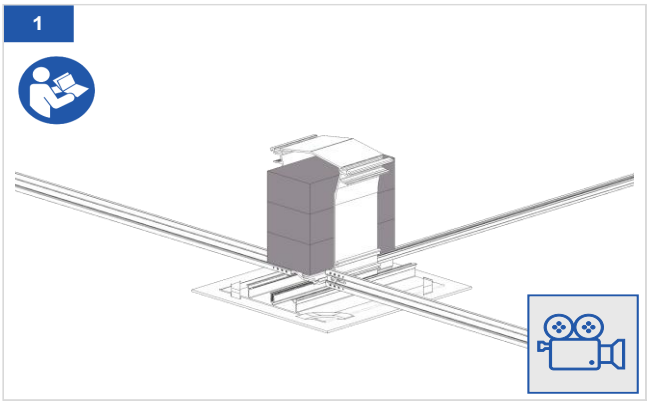




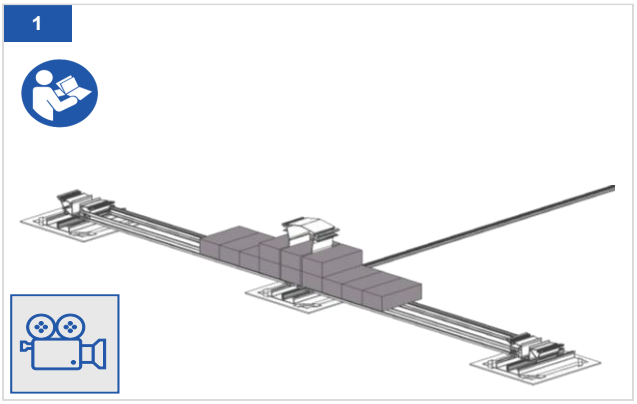


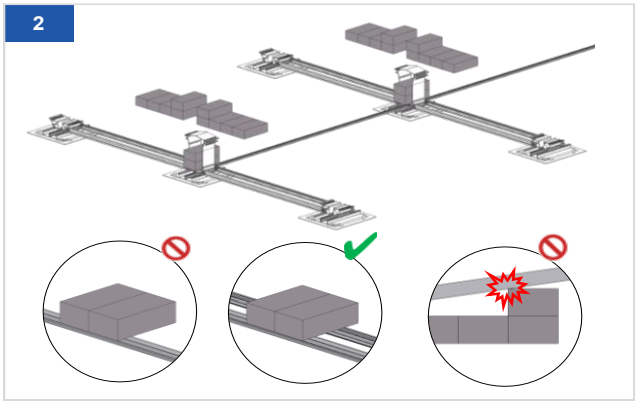
10.6 Assembly of ballast (4 variants)

10.6.1 Ballast in support

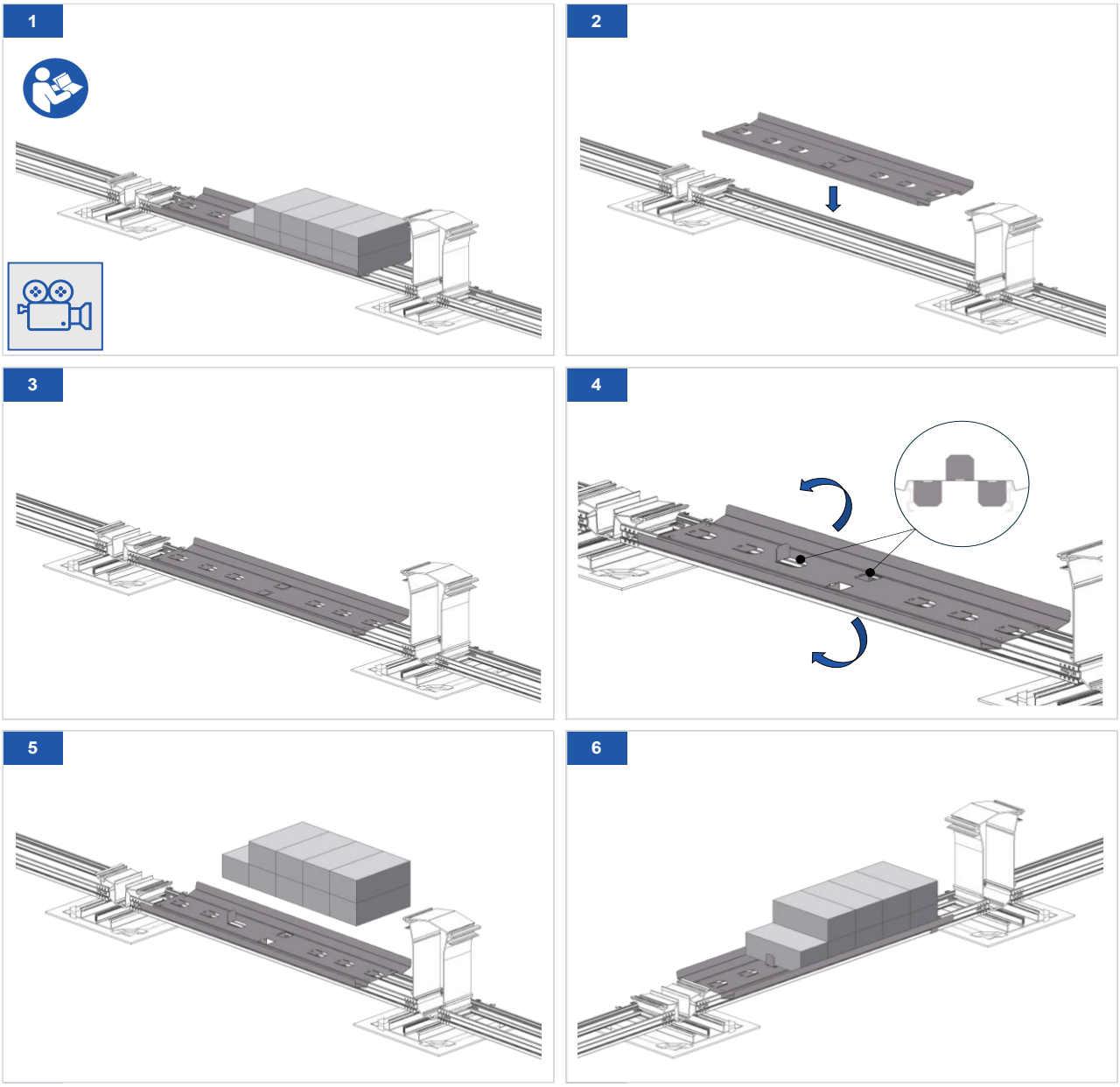


10.6.2 Ballast on connection channels

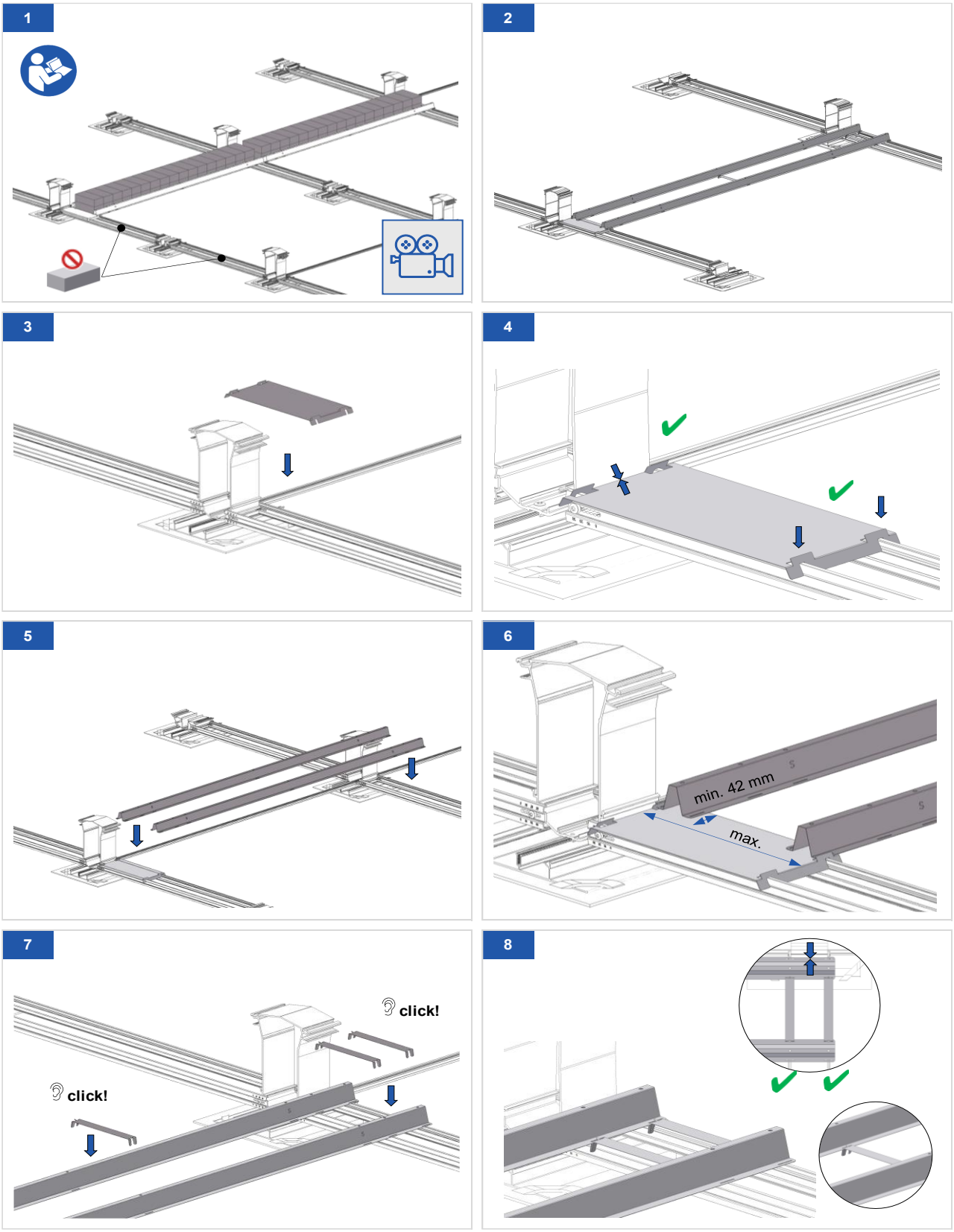


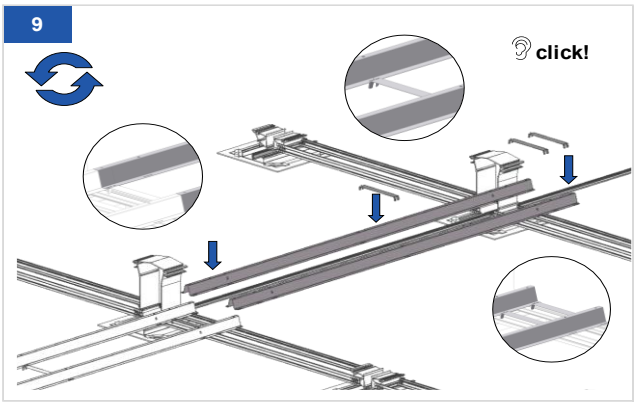


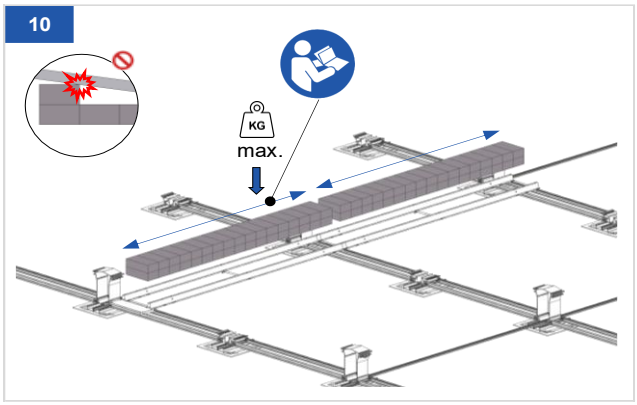
10.6.3 Ballast on ballast fixation



10.6.4 Ballast on ballast tray holder system

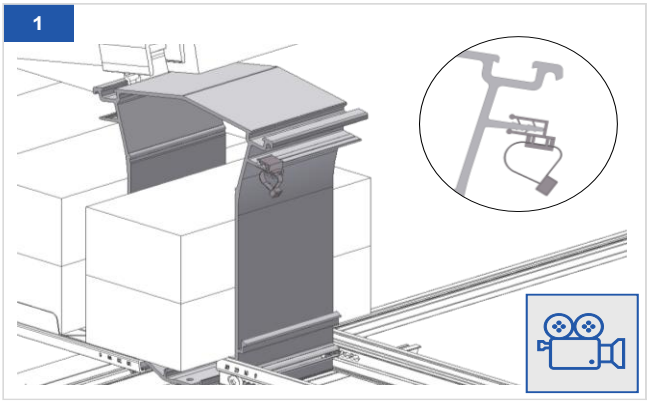




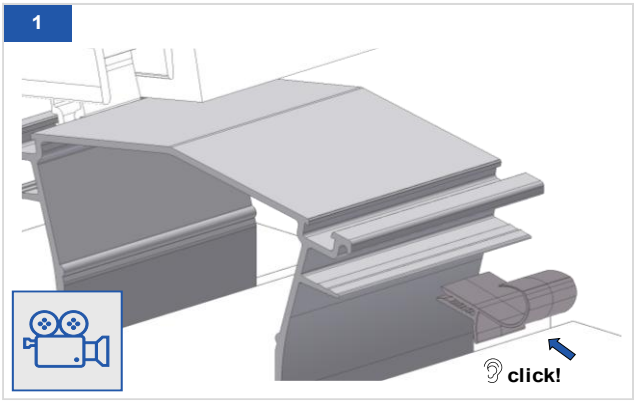


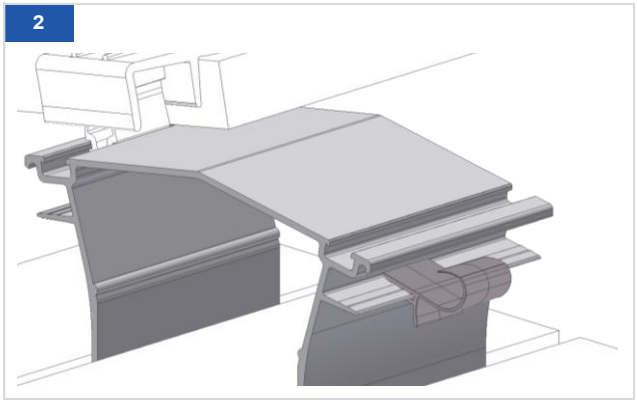
10.7 Cable management

10.7.1 Cable holder with edge-clip

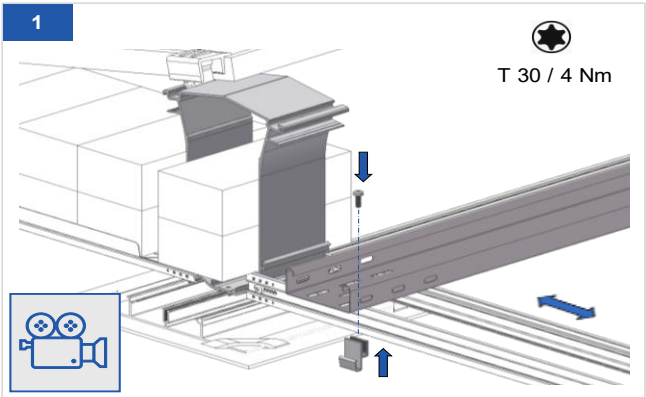


10.7.2 Cable holder clip

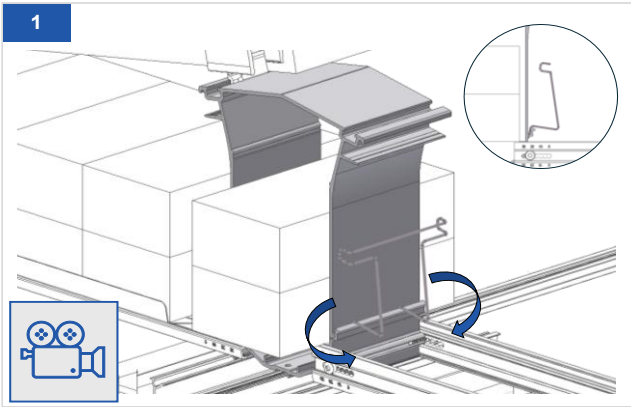


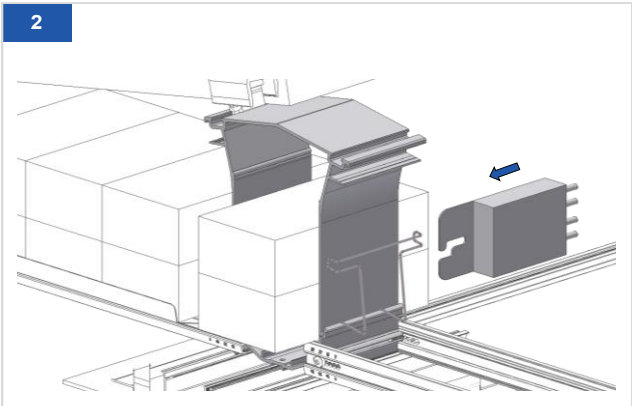


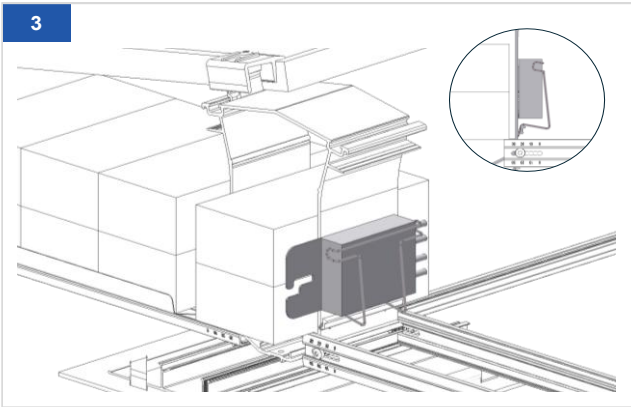
10.7.3 Connection channel clip for fastening cable ducts and accessories



10.7.4 Optimizer clamp



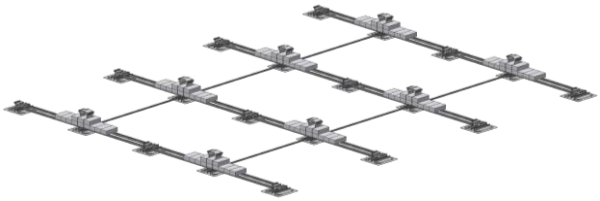




10.8 Assembly of the modules

1

2



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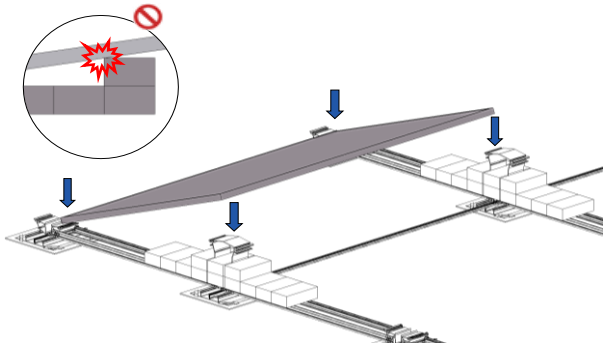

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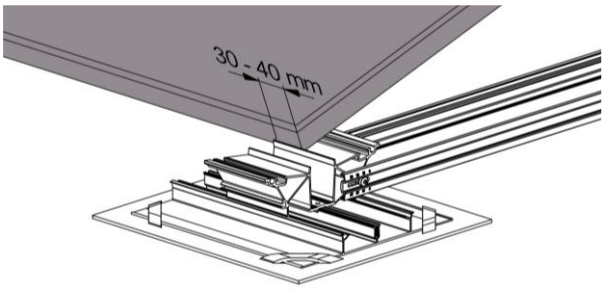

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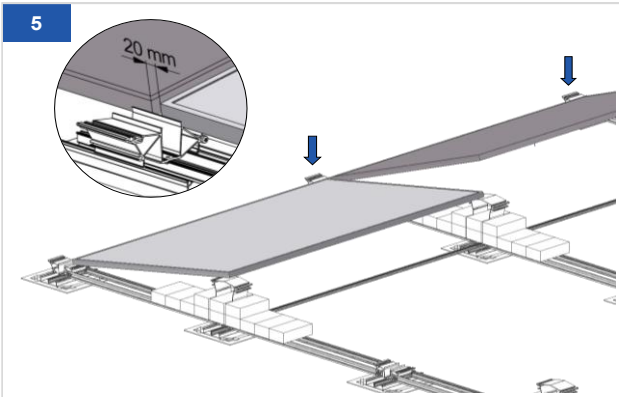

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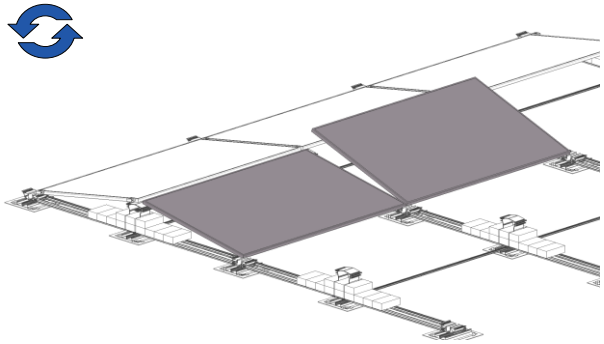

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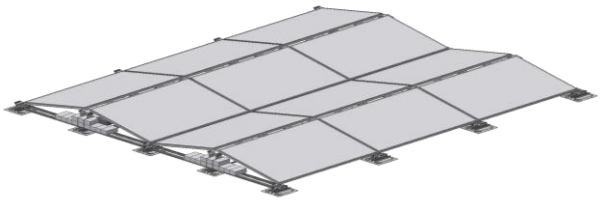

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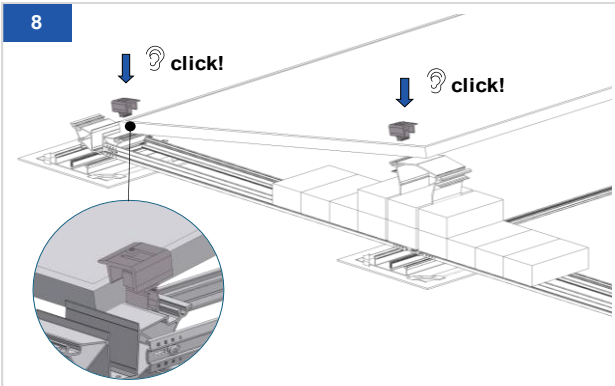
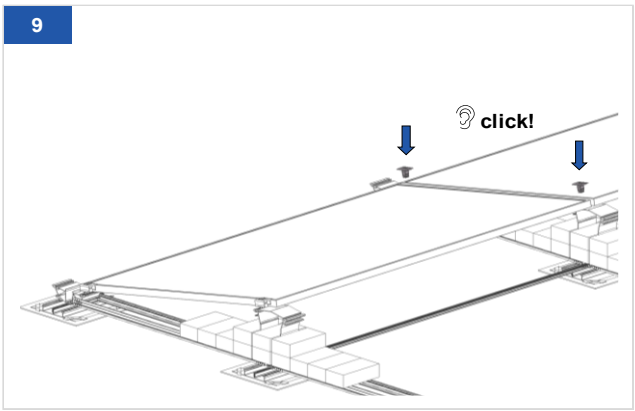
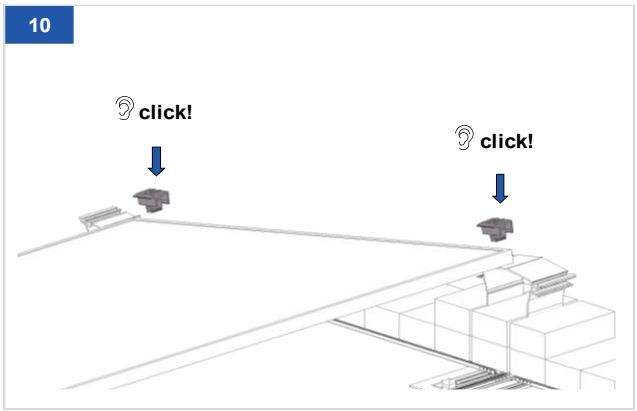
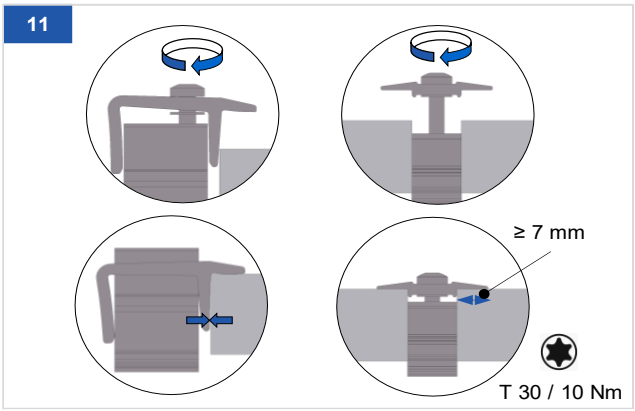
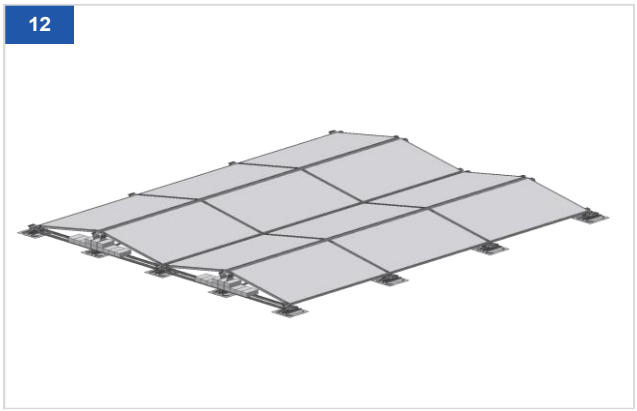


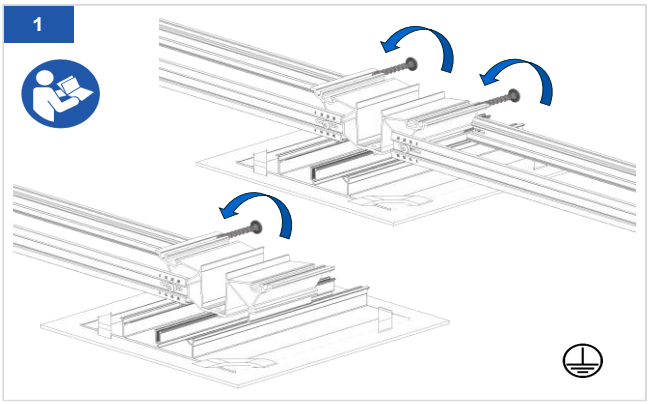






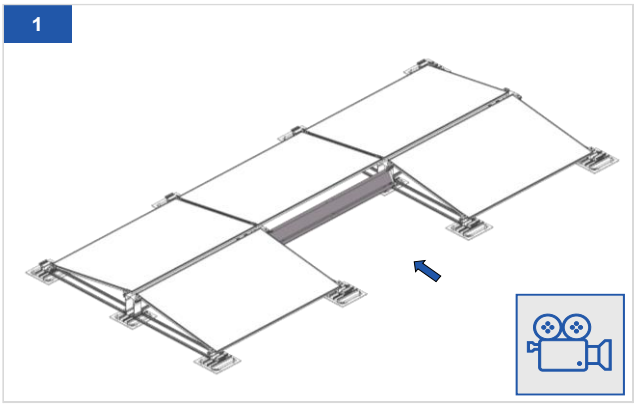


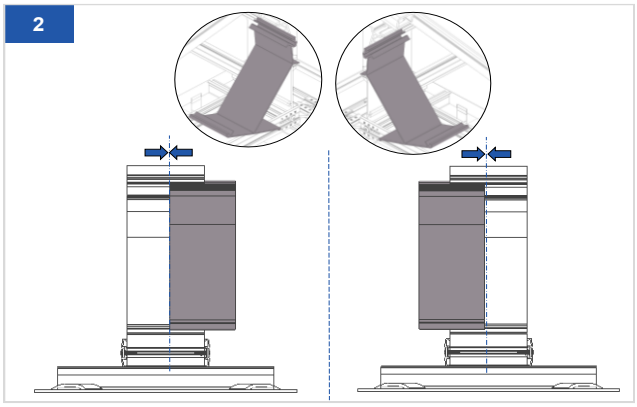
10.8.1 Potential equalisation (screwed version)

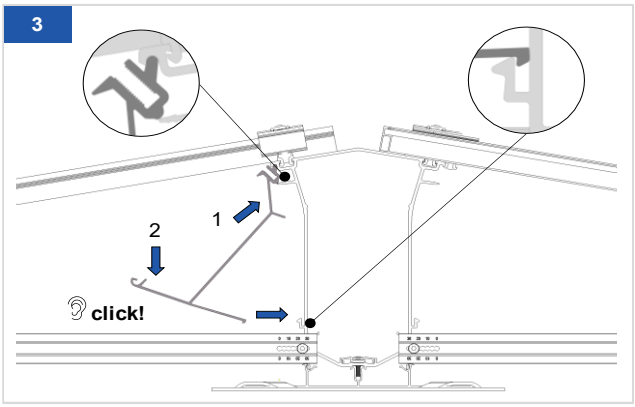


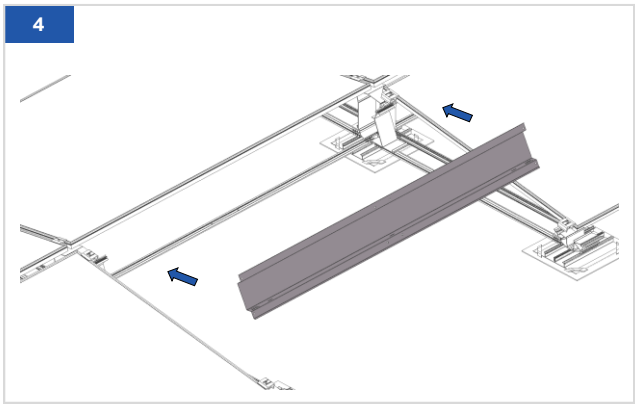
10.9 Installation of half gables

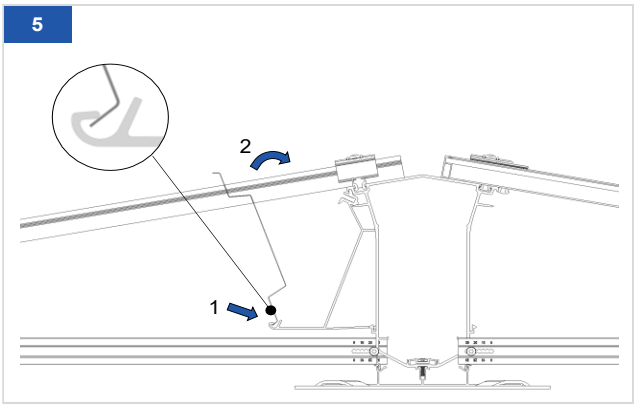
10.9.1 Installation of a half gable

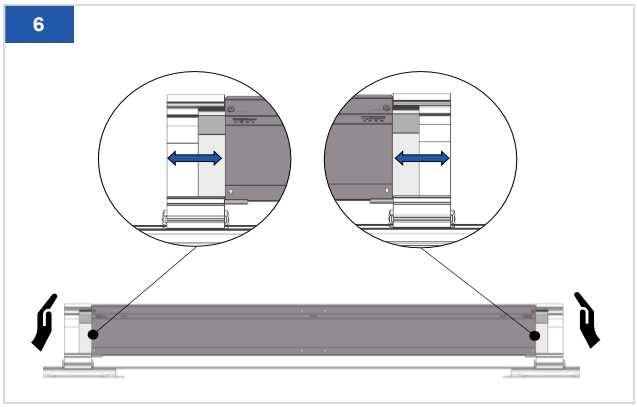


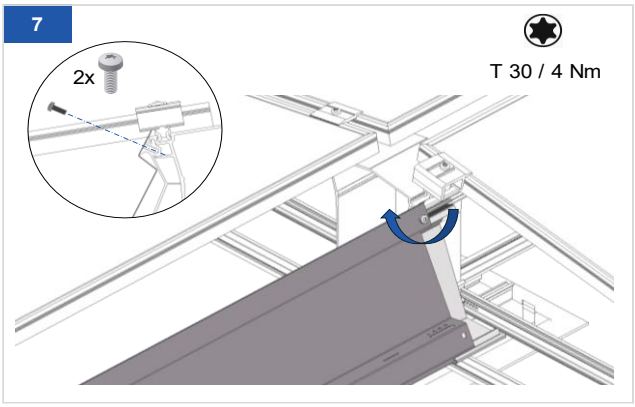




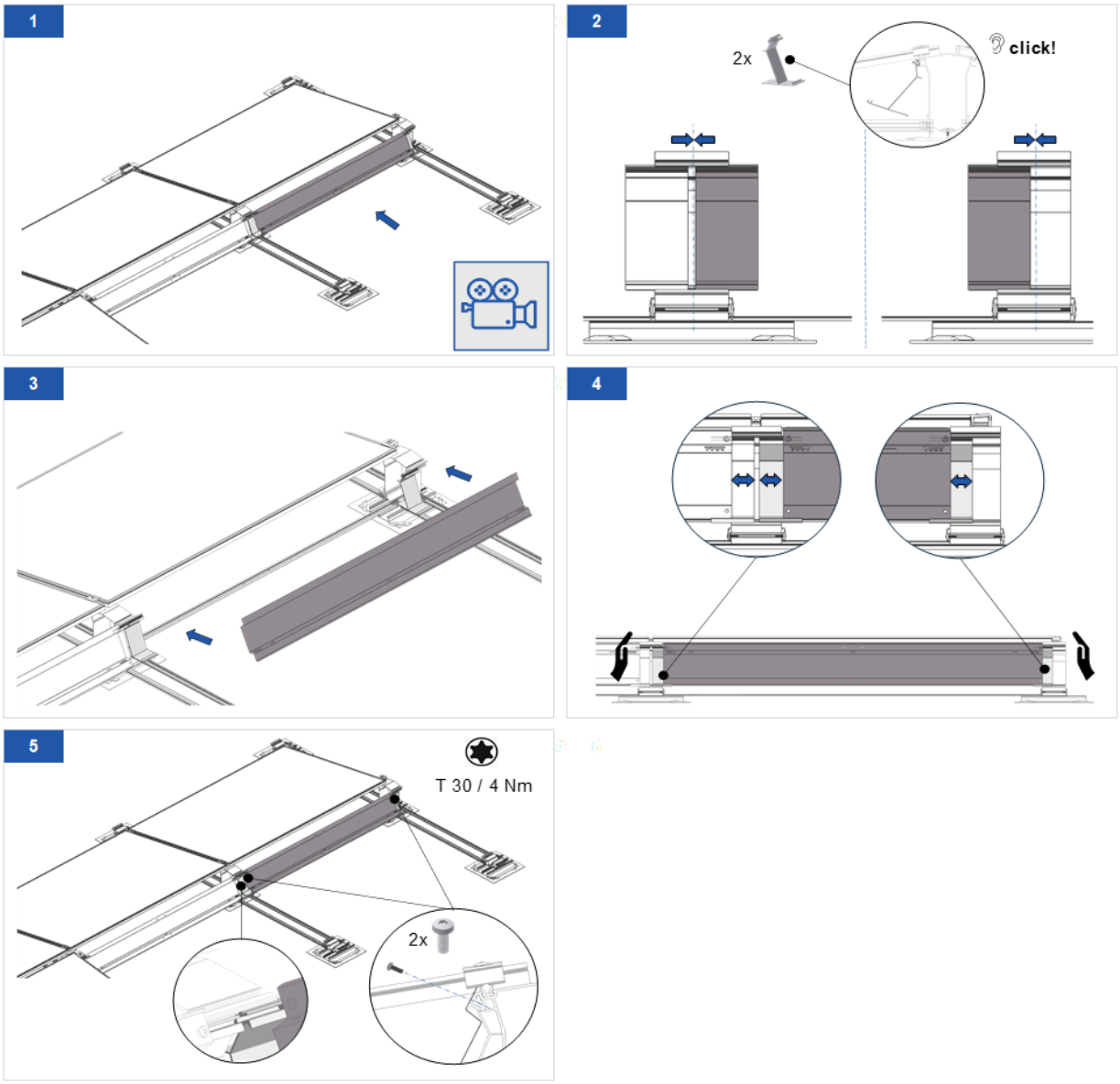






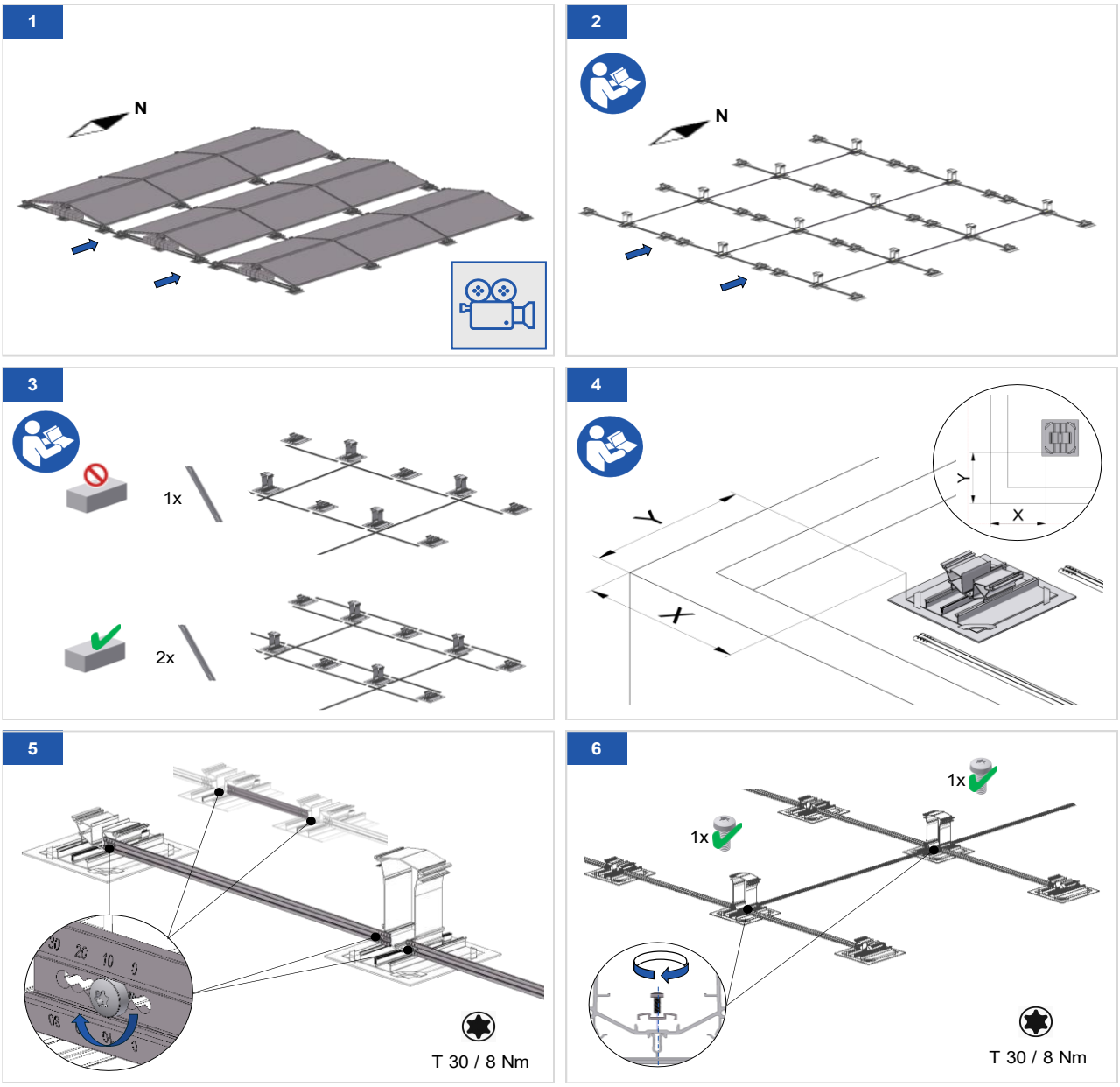


10.9.2 Installation of additional half gables



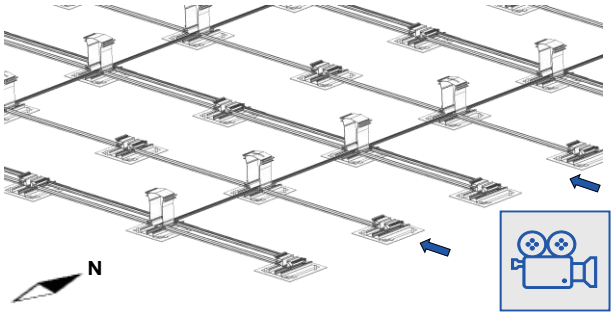
10.10 Variants of the basic configuration

10.10.1 Installation with walkway



10.10.2 Assembly with central support

1



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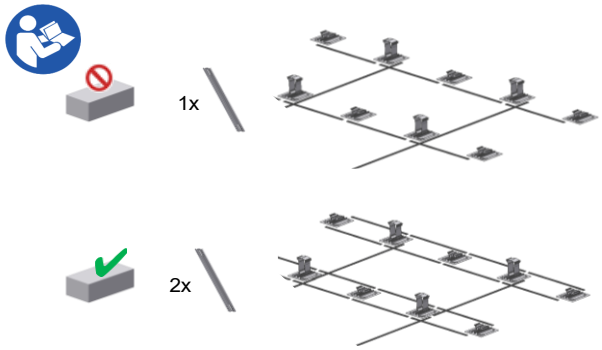

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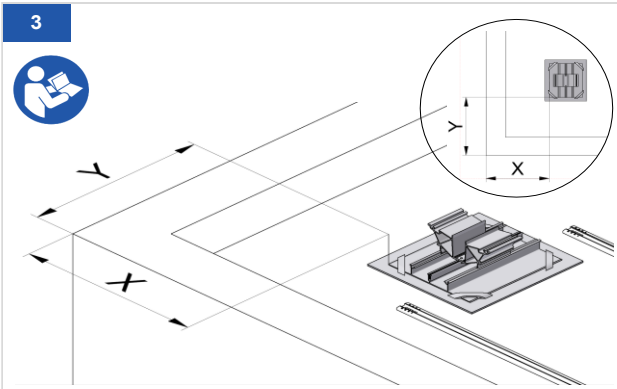

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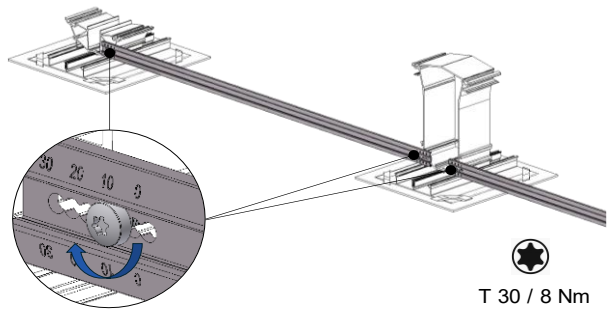

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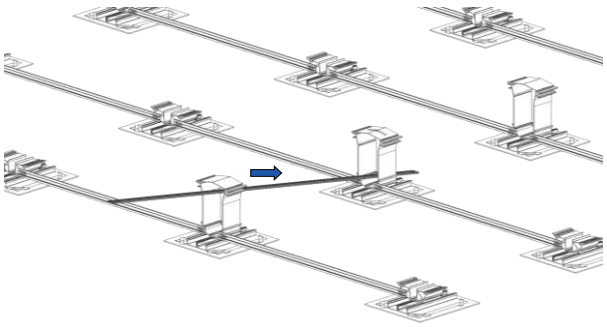

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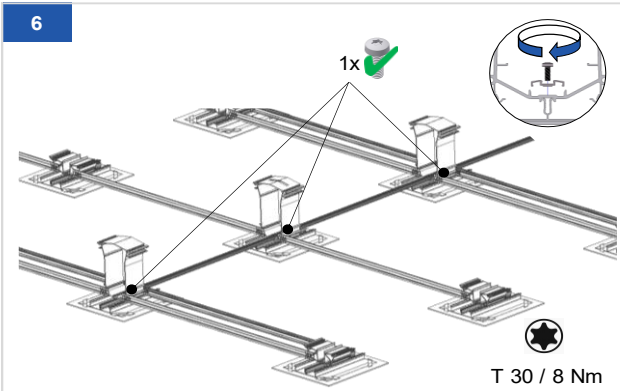

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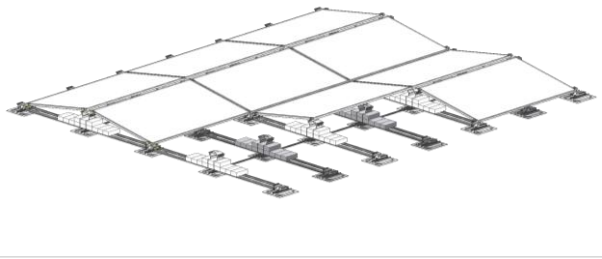
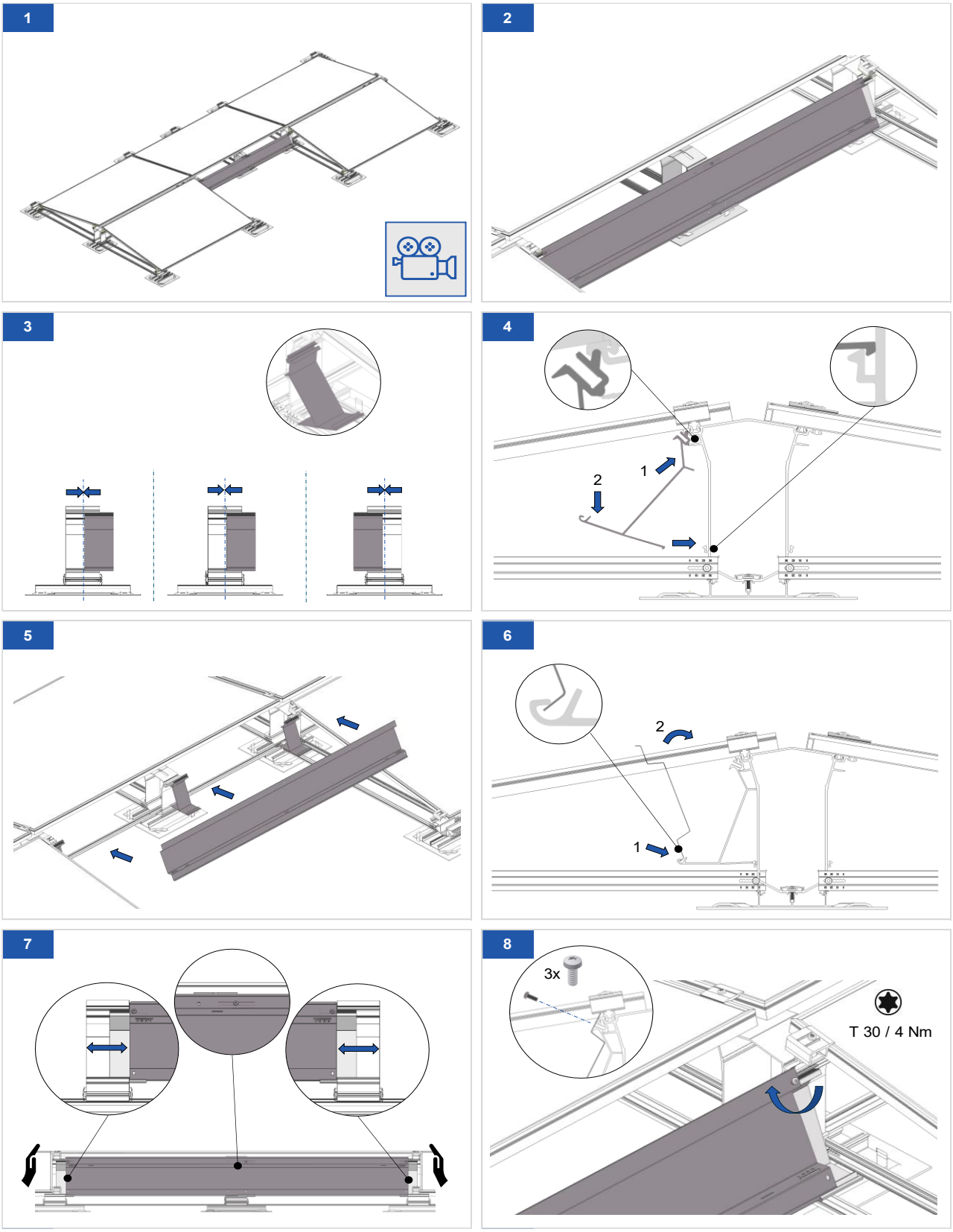
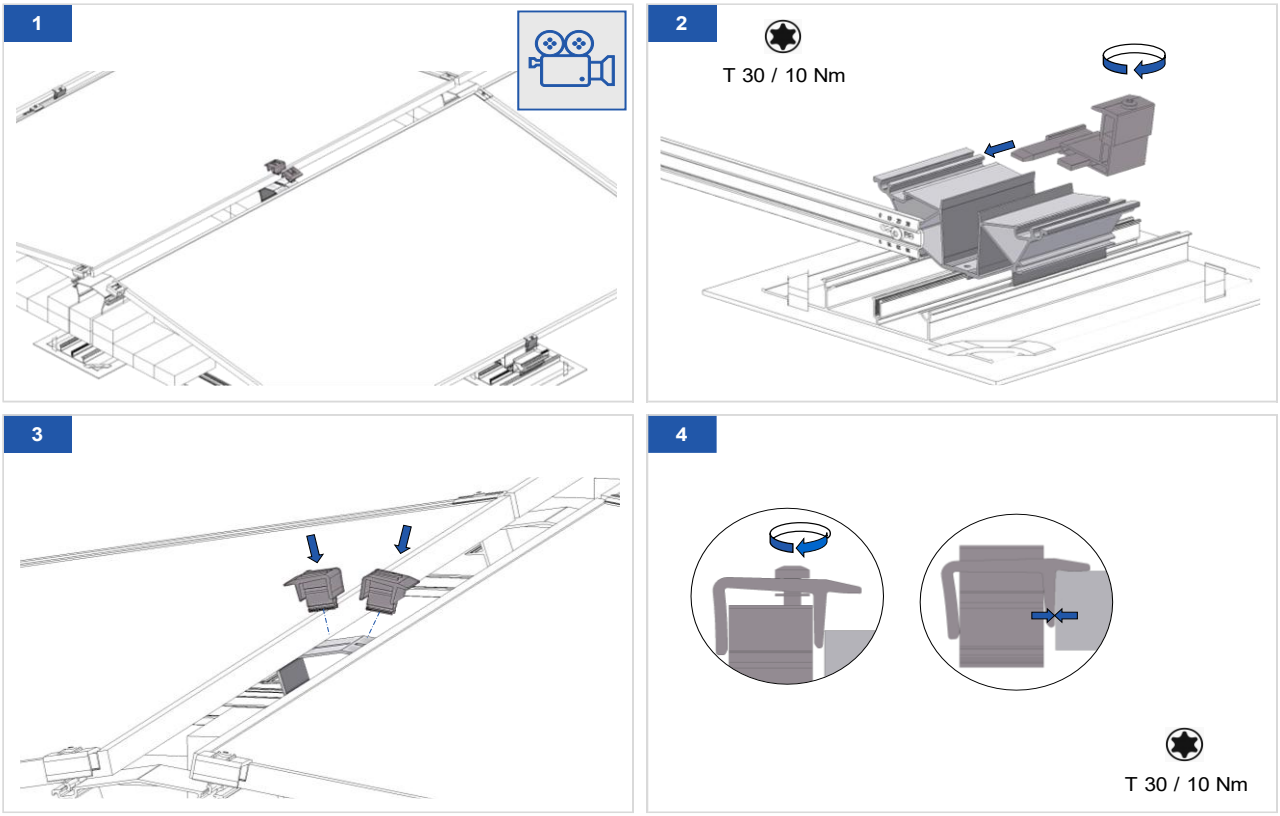


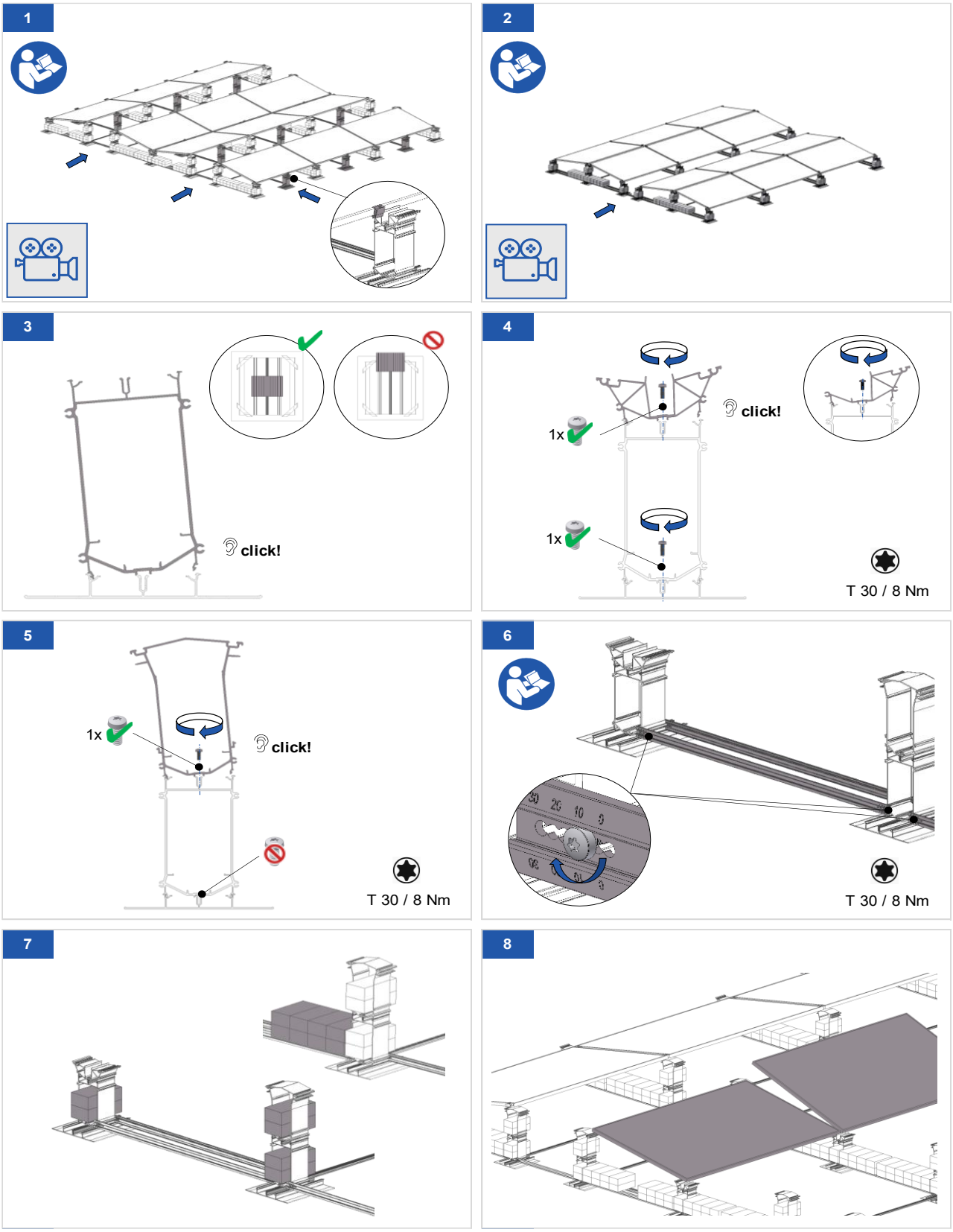
10.11 Installation with central support and half gables



10.12 Module installation with complementary clamp



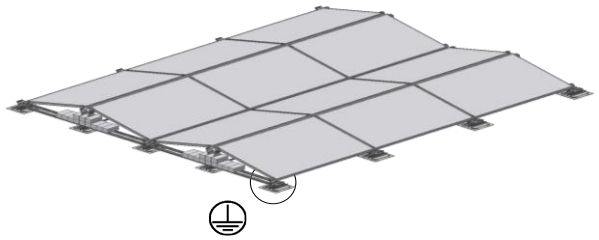
10.13 Addition – installation of a green roof



10.14 Additions, optional additions

10.14.1 Option – Earthing of the PV system

1



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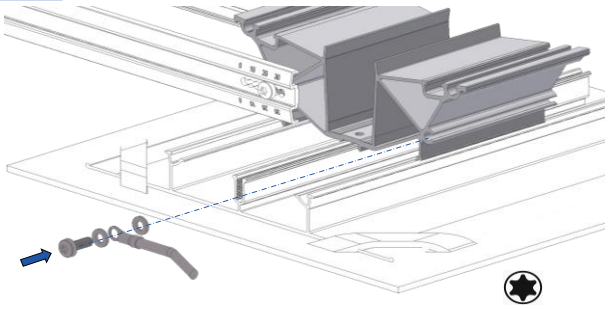

10.14.2 Checking screw connections

After completion of the installation, all screw connections must be checked with a torque wrench. The permissible torques can be found in **chapter 10.2.1.**

11 Rights and liability

11.1 Legal reservation

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All appendices are 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 property damage.

11.2 Liability

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

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