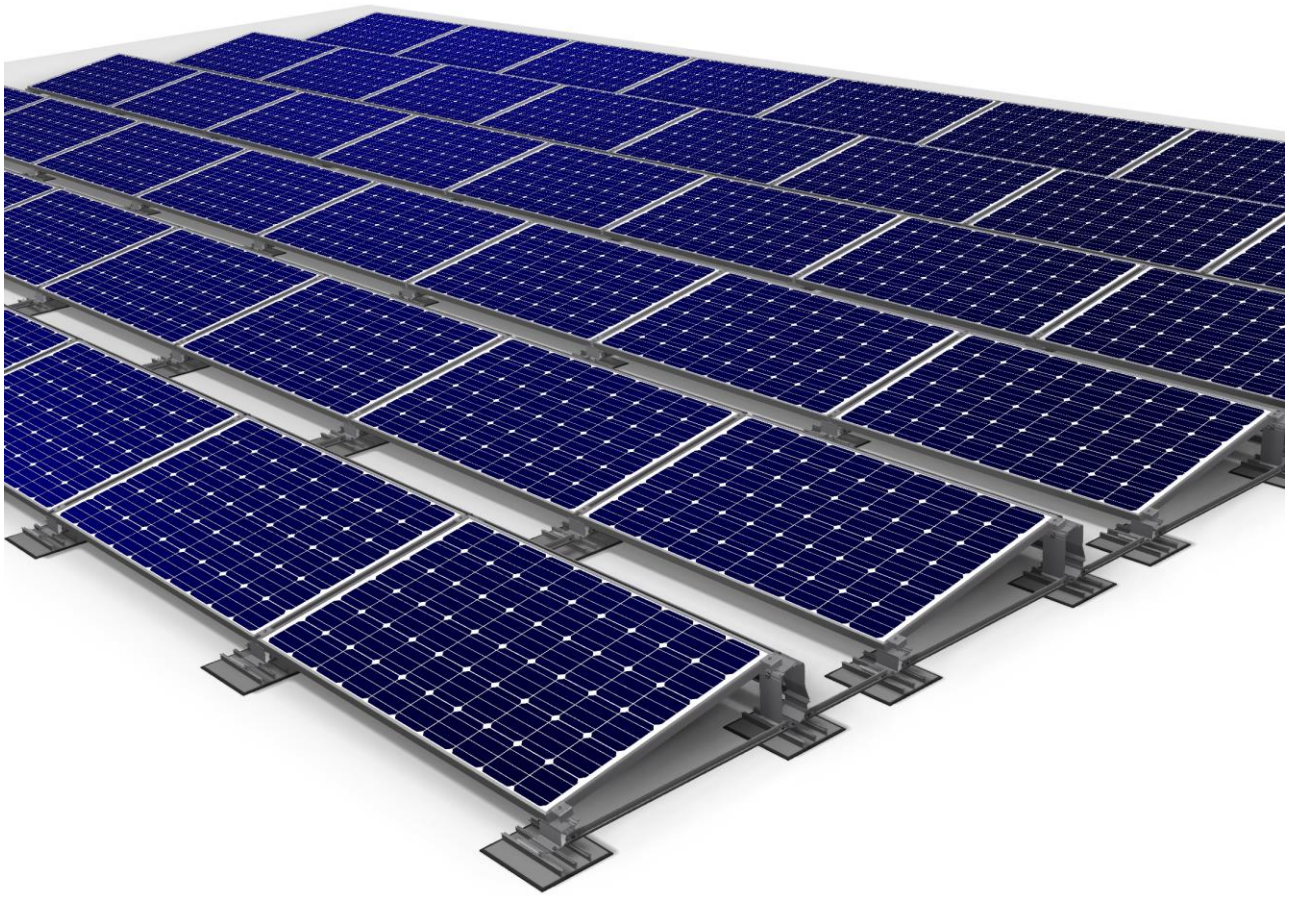
Solar Systems from Schweizer

Mounting instructions PV mounting system Flat roof south MSP-FR-S



Read carefully before use and keep in a safe place.

All information and illustrations are up to date at the time of publication.

The current version can be downloaded at any time at https://ernstschweizer.com/en/solarsystems-pv-mountingsystem-msp-flat-roof-south/.

Subject to technical changes, errors excepted.

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1 About these instructions

1.1 Basic information concerning the installation instructions

The installation instructions contain important information on how to install the mounting system safely, properly and correctly. Following the instructions avoids hazards and reduces repair costs and downtimes.

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

Applicable documents are listed in the appendix (**Chapter 10 Additional documents**).

1.2 Standards and technical guidelines

The Schweizer MSP-FR-S mounting system complies with standards which include the following:

- DIN EN 1990: Eurocode 0: Fundamentals of structural design
- DIN EN 1991-1-1: Eurocode 1: Actions on structures
Part 1-1: General actions on supporting structures – Densities, self-weight, imposed loads for buildings
- DIN EN 1991-1-3: Eurocode 1: Actions on structures
Parts 1–3: Snow loads, including national annexes
- DIN EN 1991-1-4: Eurocode 1: Actions on structures
Parts 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

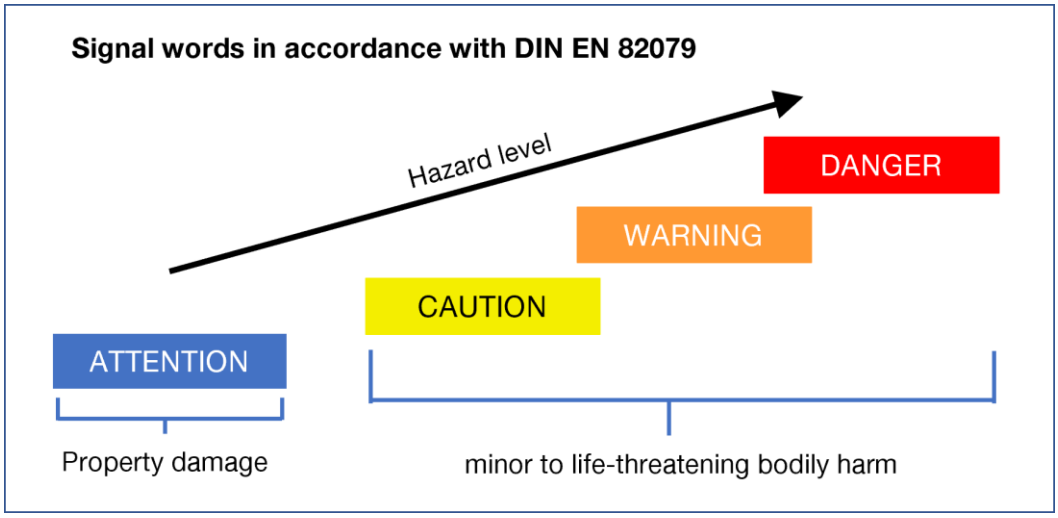
The tests were performed according to the following guidelines:

- VDE 0100
- Aerodynamic study according to WTG guidelines

1.3 Structure of warnings according to hazard levels

Differentiation of hazard levels

The following signal words indicate different hazard levels using different coloured backgrounds:



2 Caption key to installation instructions

	Attention		Warning of dangerous voltage
	See project report		Audible click
	Correct execution		Direction of movement
	Faulty execution		Tightening / Tightening torque
Option	Optional step		Earthing / Earthing installation

3 Copyright

3.1 Reservation of rights

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All appendices are integral parts of the installation instructions.

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

3.2 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 https://ernstschweizer.com/de/agb/ .

4 Safety

4.1 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 (strictly) prohibited by Schweizer and 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 resulting from non-compliance with these installation instructions, in particular the safety instructions, or from misuse of the product.

4.2 Reasonably foreseeable misuse

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

These include:

- Installation of photovoltaic systems with an angle greater than 3°
- Persons under suspended loads (during installation)
- 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
- Installation of the supporting structure by unauthorised technically qualified personnel
- Damage to the roof cladding
- Installation of the supporting structure on a surface/roof unsuitable for load bearing
- Incorrect positioning of the PV modules
- When setting up the construction site on the roof, storing installation material on the roof and when exiting the construction site, construction site material (tools, packaging material, pallets, installation and system material not yet installed, etc.) and unfinished systems must in all cases be adequately secured against the effects of the weather
- Failure to observe safety equipment, safety regulations and current accident prevention regulations
- The securing of unfinished systems when exiting the construction site

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

4.3 Requirements for safe operation

To avoid injuries and material damage, care must be taken during all activities relating to the intended operation of the PV mounting system. Ernst Schweizer AG assumes no liability for any damage to property and/or injury in the event of non-compliance.

The following also applies:

- The PV mounting system must only be operated in a perfect functional condition.
- All warnings and safety instructions in these installation instructions, including those of suppliers, must be observed.
- Unilateral modifications to the PV mounting system are prohibited.

4.4 Responsibility of the customer or installer

The customer or 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 regionally valid 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)

- installation is only realised by persons who have suitable basic and specialised technical knowledge of mechanics.
- persons responsible for realising the work are able to assess the tasks assigned to them and identify possible risks.
- persons responsible for realising the work are familiar with the system components and installation process.
- the project report for the project to be installed has been read and fully understood by those persons entrusted with realising 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.
- permissible installation conditions are observed. Schweizer cannot be held liable for damage or losses resulting from non-compliance with these conditions.
- correct installation is in accordance with the project report, and the provision of the required tools is assured.
- a suitable lifting device is used for installation where appropriate.
- components with visible damage are not used and are replaced.
- each component and its accessories are used exclusively as intended and as specified in the project report.
- only Schweizer MSP-FR-S or other specified MSP Schweizer components are used for installation, including where parts need to be replaced. No warranty claims will be recognised otherwise.
- the roof cladding is not damaged in any way by parts of the PV mounting system falling onto it, being dragged over it or penetrating it.
- regular maintenance work is realised once a year, including an inspection of screw connections, mechanical connections, the position of protective layers, wiring, earthing and the condition of the roof cladding.
- the roof on which the system is mounted is designed and built to support the PV mounting system adequately and safely. This includes 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 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 MSP-FR-S PV mounting system can be incorporated into the design of the electrical equipotential bonding system and connected to it by correctly attaching a suitable earthing clamp or screw (not supplied by Schweizer). The customer must ensure compliance with current rules, statutory provisions and guidelines.
- the installation complies with current national regulations and guidelines, including, but not limited to, maintaining the required edge distance to the roof, installing safety barriers, restricting access during operations or taking precautions with regard to anticipated dynamic loads or particular events such as earthquakes and extreme weather conditions.
- if the system is attached to the building in any way, this attachment must be provided and be of an appropriate design.
- any existing lightning protection system on the building must be adapted in accordance with current technical regulations and statutory provisions. Observe the "Information leaflet – Lightning current carrying capacity for the MSP-FR PV mounting system" where appropriate.

– The following standards (or corresponding regionally valid standards) must be observed for the design and installation of lightning protection, earthing and equipotential bonding:
  - DIN EN 62305 Protection against lightning
  - DIN VDE 0185 Parts 1–4 Protection against lightning
  - DIN VDE 0100 Part 410 Earthing
  - DIN VDE 0105 Operation of electrical installations
  - DIN VDE 0298 Electrical cables

Furthermore:

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

Also:

- 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 building components (or equivalent regionally applicable standards) must be observed.

4.5 Basic safety instructions

The following fundamental 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 that conforms to national regulations.

– Occupational safety regulations must be observed.

– It must be ensured that all electrical work is realised 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.

– A copy of these instructions must be provided in the immediate vicinity of the system for use by persons assigned to realise 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 applicable regulations.

5 Residual risks

The following safety instructions must be observed 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 supporting structure with installed photovoltaic systems is operated outdoors. A lightning strike can result in life-threatening injuries.

Earth the PV mounting system properly.

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

DANGER

Electrical voltage due to loosened protective conductors or earthing connections

If protective conductors or earthing connections have been disconnected, conductive parts including handles, covers and locks which appear to be 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 electricity transferring to defective components or cables.

WARNING

Risk of falling

Carelessness and tripping may result in a fall when working at a height. The consequence of this may be life-threatening injuries.

- Access to the roof must be secured by the operator to prevent any unauthorised persons from entering the roof area.
- When realising cleaning and maintenance work, ensure that suitable anchorage devices and a body-restraining device are available.

CAUTION

Risk of tripping and risk of falling

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

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

6 Technical clarification prior to commencing installation

The suitability of the roof for supporting a PV system must be checked and confirmed on site (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 insulating material with regard to permissible contact pressure
- Suitability and condition of the roof cladding
- Checking the roof drainage with regard to unauthorised water accumulation
- Condition of the roof (free of any damage)

7 Roof preparation

Prior to commencing installation of the PV system, the roof must be cleaned thoroughly, removing all dirt and deposits, including snow and ice. The installer must ensure that installation conditions required for the MSP-FR-S are met and that persons responsible for the installation work are professionally trained and completely familiar with the mounting system.

NOTE

The material must be distributed on the roof in a manner that avoids excessive localised loading.

8 Commissioning and maintenance

Installation and commissioning may only be realised by authorised personnel.
Observe the safety instructions listed here and the indications at the beginning of these operating instructions **Chapter 4 Safety**.
Realise regular maintenance once a year, including an inspection of screw connections, mechanical connections, the position of protective layers, wiring, earthing and the condition of the roof cladding.

9 Installation conditions

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

- Installation of the system must be correctly adapted to the project and its local conditions, in particular with regard to the required calculation of additional loads.
- For securing of framed photovoltaic modules with a frame height of 28–45 mm or 28–40 mm when using the additional clamps **Appendix 2 – Additional terminal**.
- Flat roofs with a slope of maximum 3°.
- For module sizes conforming to the MSP-FR-S data sheet.
- A maximum block size of 14 m x 14 m is permitted in order to avoid unnecessary stress on the roof cladding 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, and 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 covering, observe the "Information leaflet – MSP-FR PV mounting system on gravel roofs".
- For modules that allow the use of clamps on the short edges in the corners. Schweizer is not responsible for ensuring the continued validity of the warranty provided by the module manufacturer. However, Schweizer will support customers in as far as possible and appropriate in obtaining all necessary clamping authorisations from the module manufacturers.
- For roofs that can adequately withstand the additional load of the PV mounting system (as assessed by the customer and within the customer's remit). The total load calculated that the MSP-FR-S PV mounting system applies to the roof 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).

10 Additional documents

Document type	Designation	File
Installation instructions	MSP-FR-S PV mounting system	https://ernstschweizer.com/wp-content/uploads/sites/2/2023/02/Montageanleitung_MSP_FR_EW_de.pdf
Information leaflet	Information leaflet – Lightning current carrying capacity for MSP-FR flat roof system	https://ernstschweizer.com/wp-content/uploads/sites/2/2023/02/Merkblatt_Blitzstromfaehigkeit_MSP-FR.pdf
Information leaflet	Solar systems from Schweizer: Information leaflet – Height safety device for MSP-FR PV mounting system	https://ernstschweizer.com/wp-content/uploads/sites/2/2023/02/MB_Hoehensicherung_MSP-FR_DE.pdf
Information leaflet	Solar systems from Schweizer: Information leaflet on load reduction – MSP-FR-EW and MSP-FR-S	https://login.ernstschweizer.ch/fileadmin/user_upload/00_Produkte/80_Sonnenenergie-Systeme/merkblaetter/Hinweise_zu_Lastabminderung_MSP-FR_DE.pdf
Information leaflet	Solar systems from Schweizer: Information leaflet – MSP-FR PV mounting system on gravel roofs	https://login.ernstschweizer.ch/fileadmin/user_upload/00_Produkte/80_Sonnenenergie-Systeme/merkblaetter/MB_MSP-FR_auf_Kiesdaecher_DE.pdf
Information leaflet	Solar systems from Schweizer: Information leaflet – Equipotential bonding for MSP-FR flat roof system	https://login.ernstschweizer.ch/fileadmin/user_upload/00_Produkte/80_Sonnenenergie-Systeme/merkblaetter/MB_Potentialausgleich-durch-leitende-Mittelklemme_de.pdf

11 Required tools

Cordless screwdriver

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

Torx attachment TX30

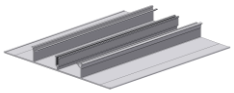
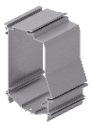
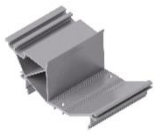
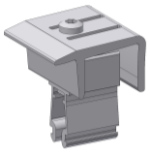
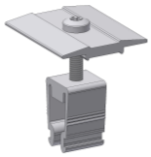
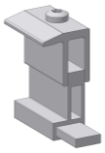
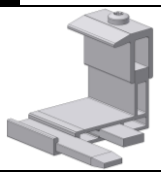
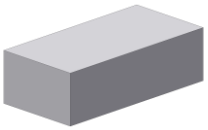
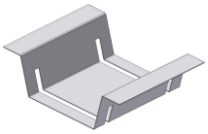
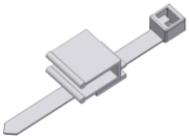
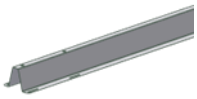
Torque spanner (10 Nm) for/with Torx attachment TX30

Installation instructions for stainless steel screw connections:

The installation must be realised professionally. To avoid cold welding between the bolt and nut:

- use a screwdriver without an impact drilling function
- set an appropriate speed that is not too high
- do not generate increased pressure on the screw

12 Components

1	2	3	4	5
				
Protective layer **MSP-FR-S PSF**	**Basic profile** **MSP-FR-S-BP** **-150, -300, -450, -600, -900, -1200**	**High support** **MSP-FR-S-SH**	**Low support** **MSP-FR-S-SL 8** **MSP-FR-S-SL 10**	**Connecting rail** **MSP-FR-S-C**
6	**7**	**8**	**9**	**10**
				
End clamp **MSP-PR-EC** **MSP-PR-ECB** **28–45 mm** **abZ-14.4-92**	**Middle clamp** **MSP-PR-MC** **MSP-PR-MCG** **MSP-PR-MCB** **MSP-PR-MCBG** **28–45 mm** **abZ-14.4-92**	**Additional high clamp** **MSP-FR-HC** **28–40 mm**	**Additional low clamp** **MSP-FR-LC** **28–40 mm**	**Ballast stone** ⚠ Not included in the scope of delivery
11	**12**	**13**	**14**	**15**
				
Screw **MSP-FR-S M6x16**	**Screw** **MSP-FR-TS 6.3x22** **Lightning current screw**	**Earthing screw** **MSP-FR-GS 6x60**	**Wind deflector /** **Ballast tray** **MSP-FR-S-WD**	**Ballast carrier** **MSP-FR-S-SB**
16	**17**	**18**	**19**	**20**
				
S.P.T **Project report**	**Fastening tie** **MSP-FR-CHE**	**Bracket** **MSP-FR-BC**	**Ballast carrier start-ing plate** **MSP-FR-S-BS**	**New ballast carrier** **MSP-FR-BT**

13 Preparation – the following must be realised before assembly:

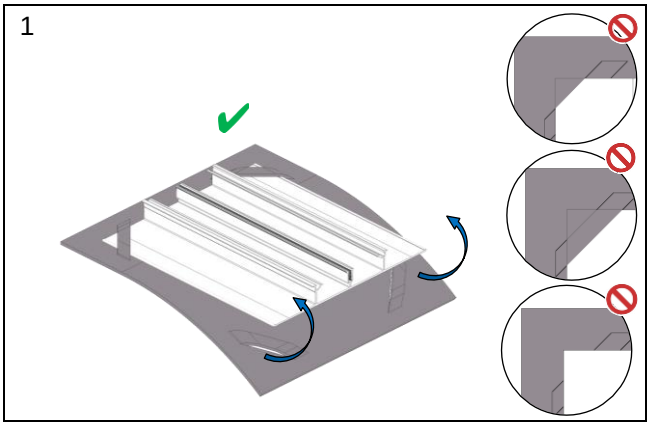
- The S.P.T project report must be available.
- The material required must be complete.

Options:

- **Middle support** – Appendix 1 – Middle support Page 19
- **Additional terminal** – Appendix 2 – Additional terminal Page 20

Steps 1 to 7 can also be realised outside the construction site.

1



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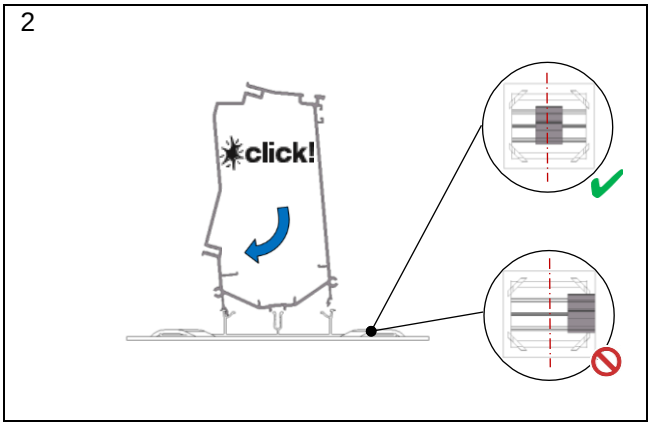

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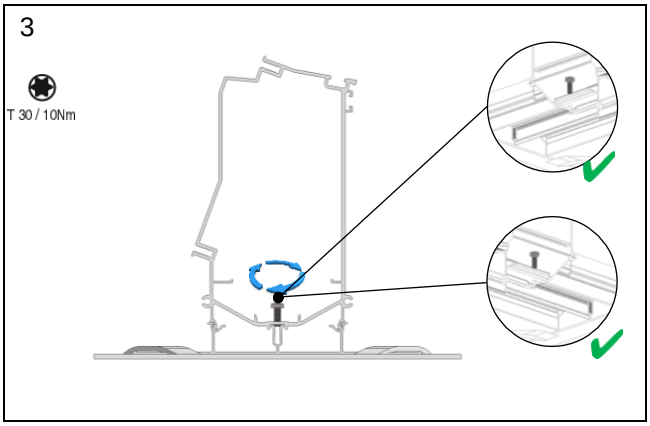

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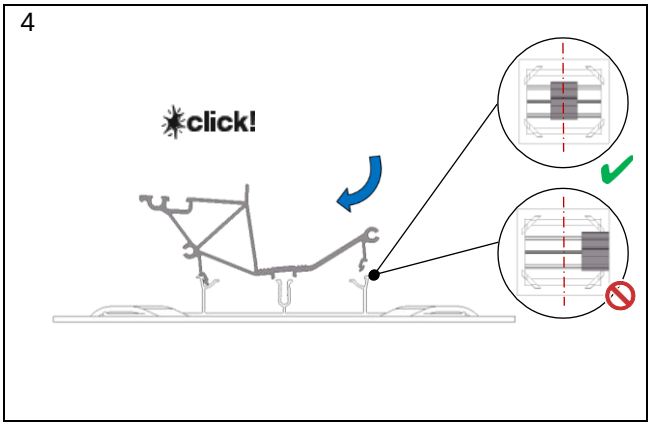

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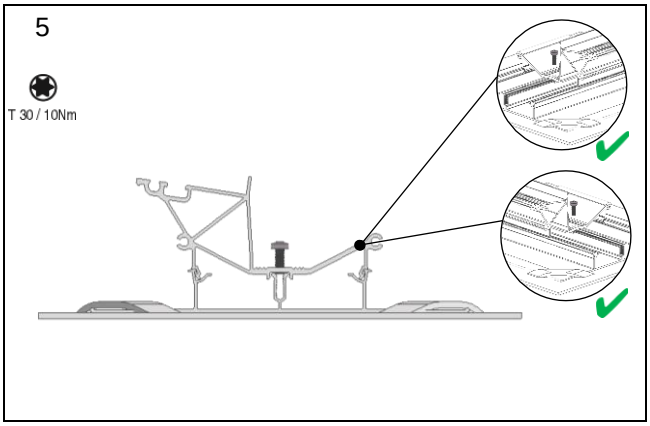

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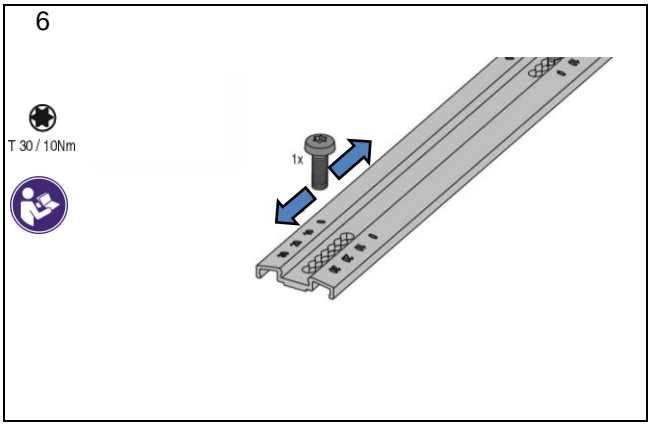

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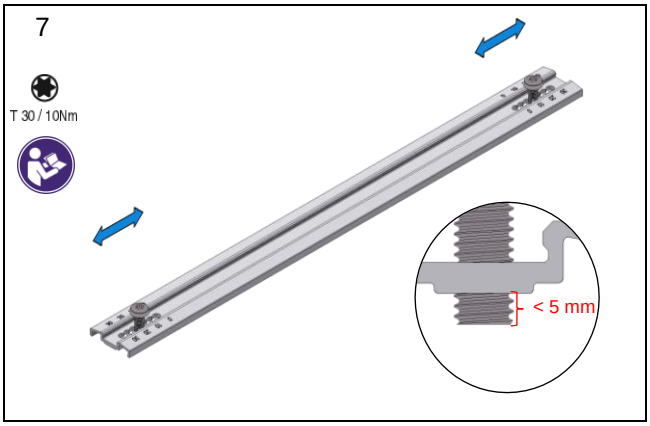
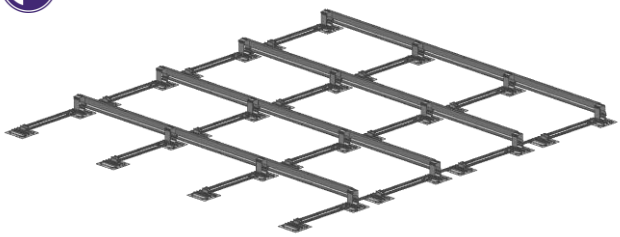


14 Assembly

1
Overview



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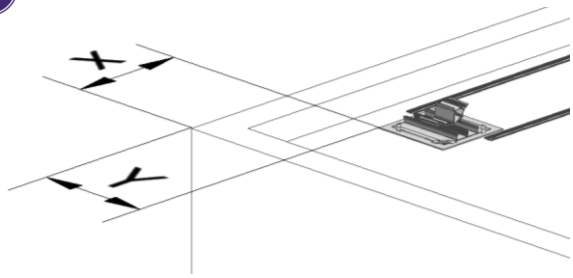
Position



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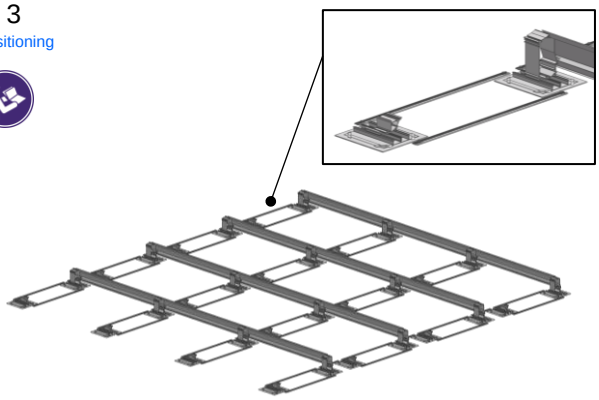
Positioning



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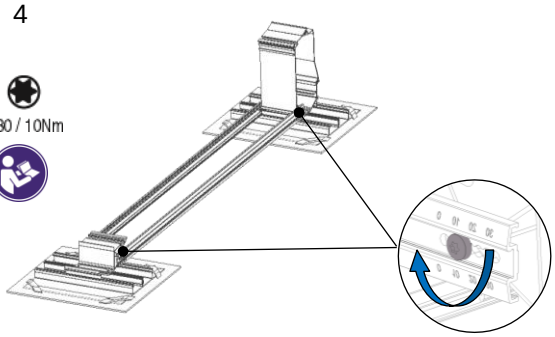
T 30 / 10Nm



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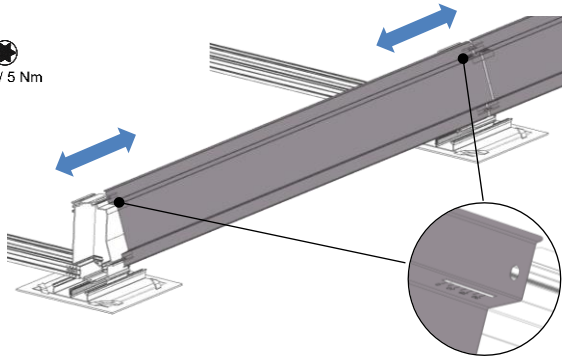
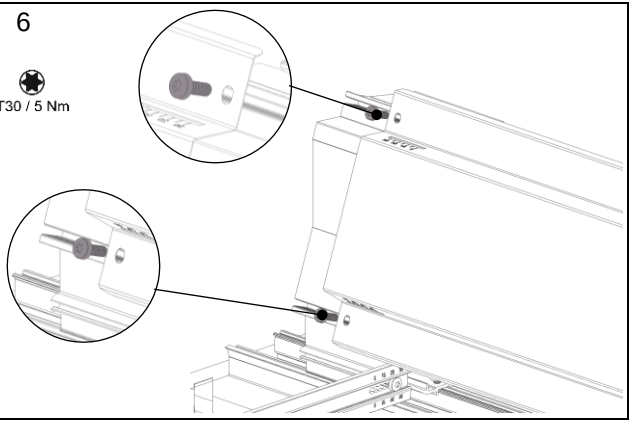
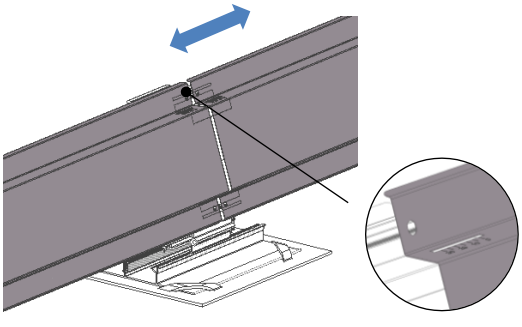
T30 / 5 Nm



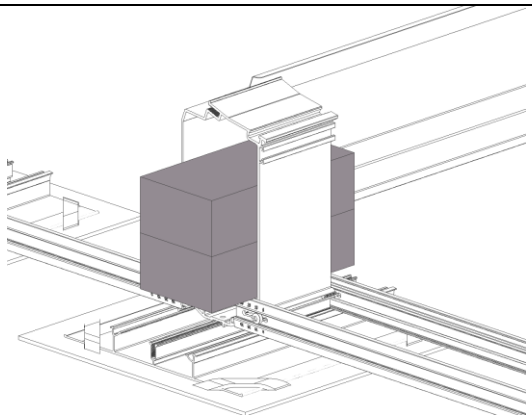
6
T30 / 5 Nm



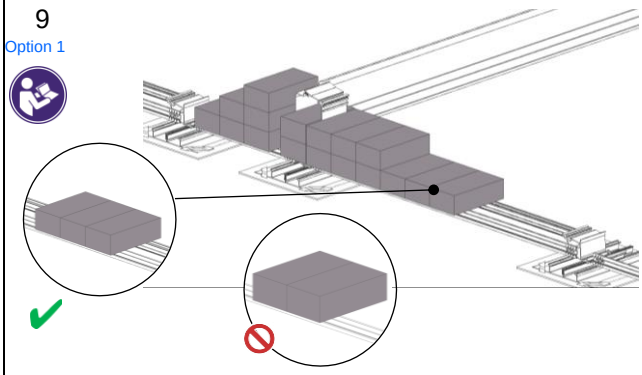
7
Further construction
T30 / 5 Nm



8
Option

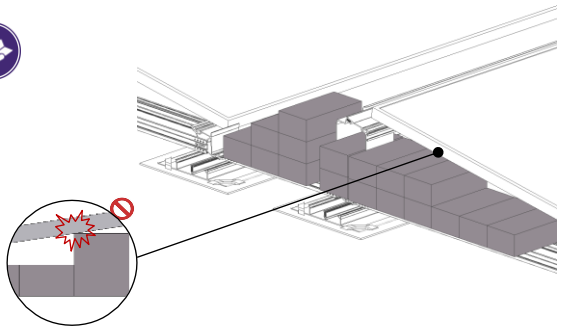


9
Option 1

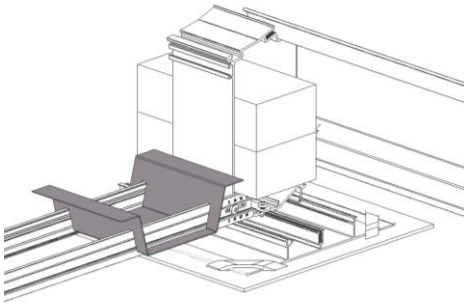


Ballast arrangement on connecting rails (steps 9+10)

10



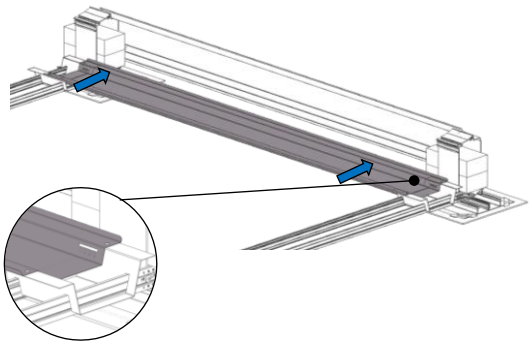
11
Option 2



Ballast on ballast carrier tray and wind deflector plates (steps 11–13)

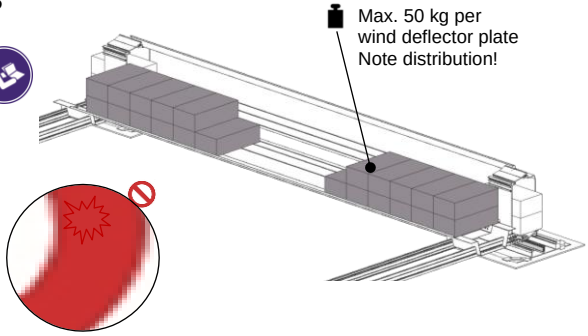
12

T 30 / 10Nm

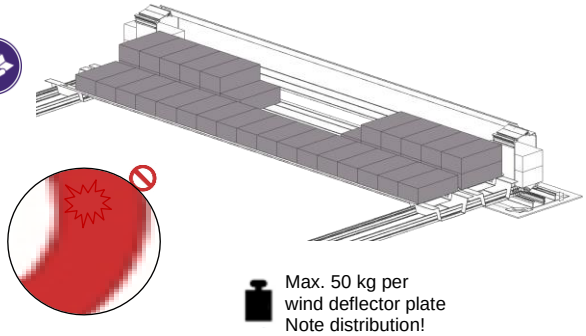


13

Max. 50 kg per
wind deflector plate
Note distribution!

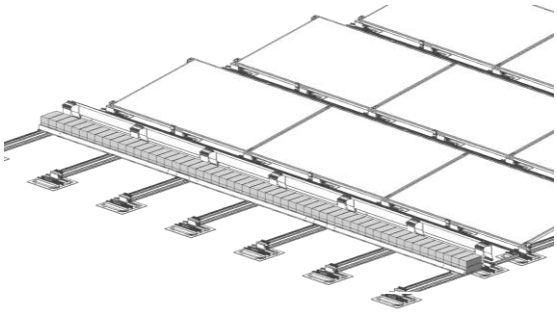


14



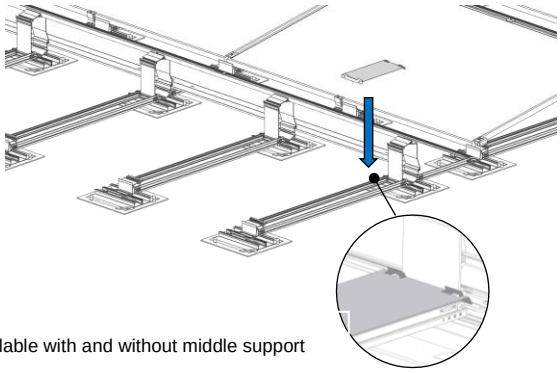
Max. 50 kg per
wind deflector plate
Note distribution!

15
Option 3



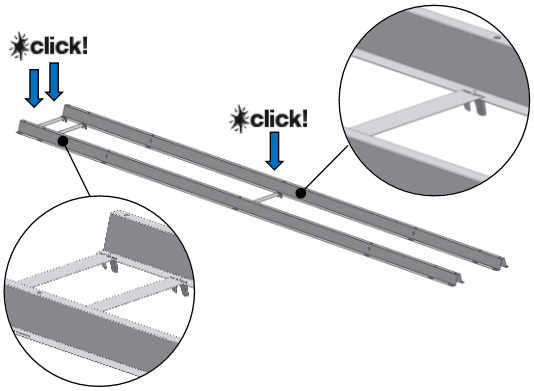
Ballast carrier system (steps 14–19)

16

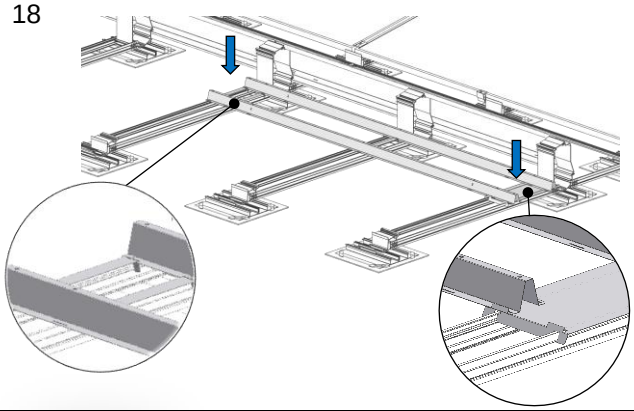


Available with and without middle support

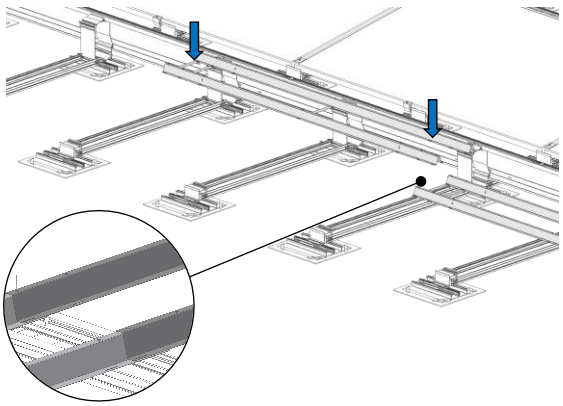
17



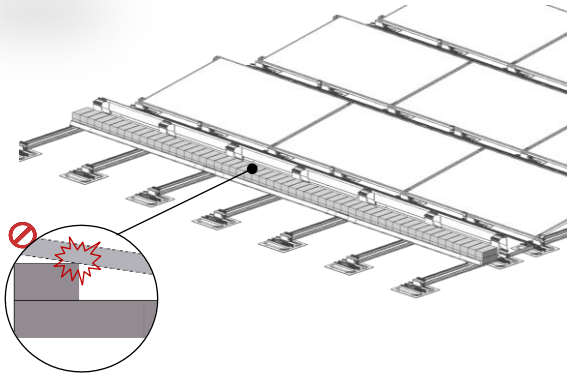
18



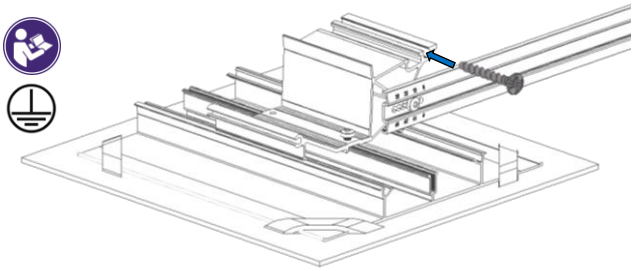
19



20

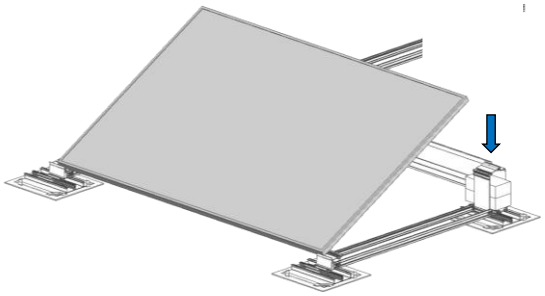


21
Earthing

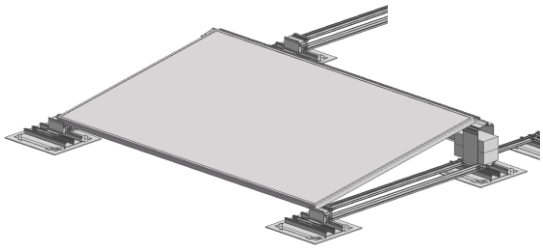


Per module, 1 earthing screw

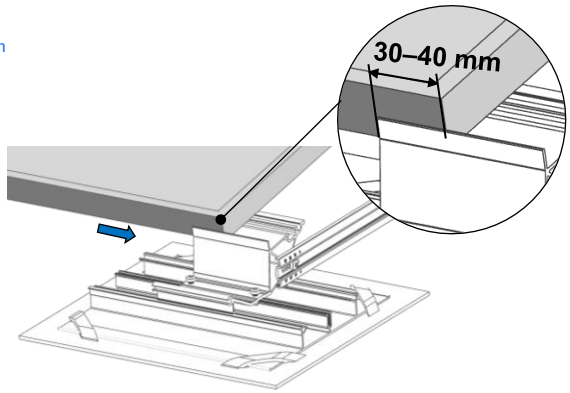
22



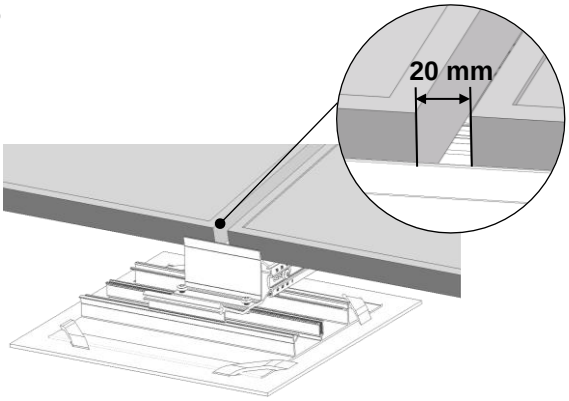
23



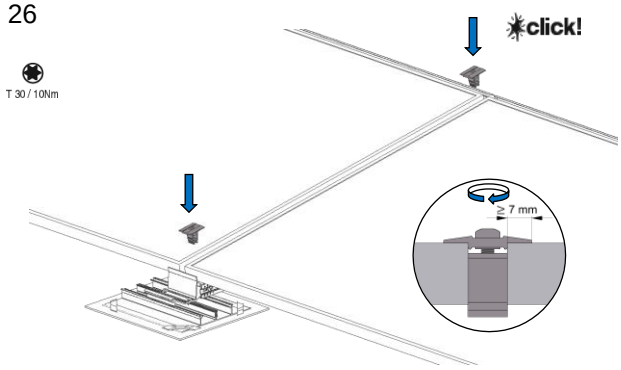
24
Option



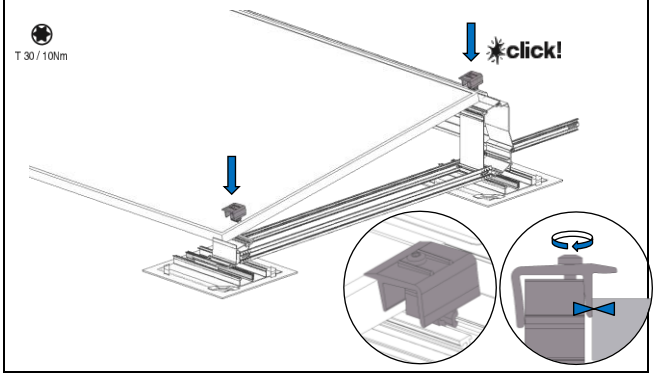
25



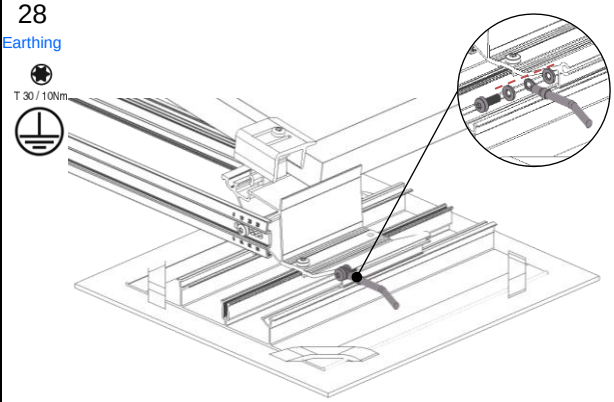
26



27

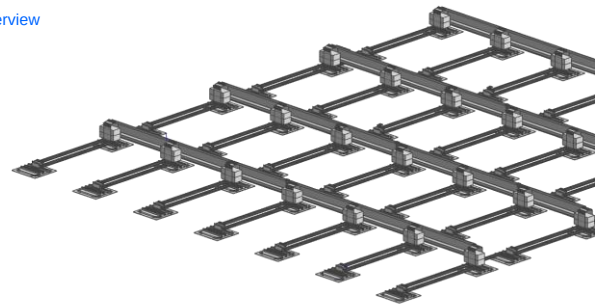


28
Earthing

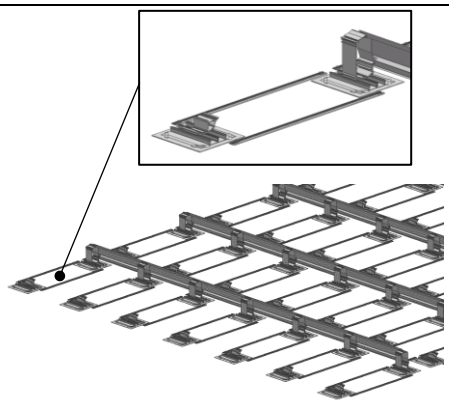


15 Appendix 1 – Middle support

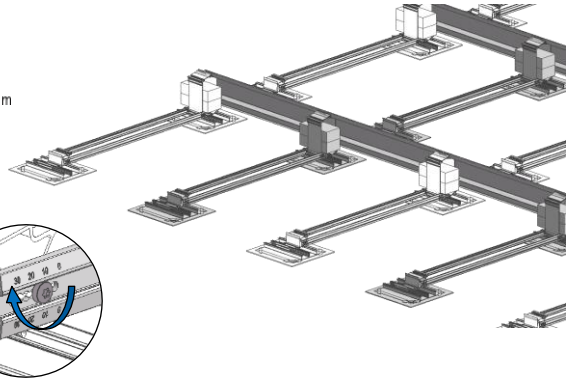
1
Overview



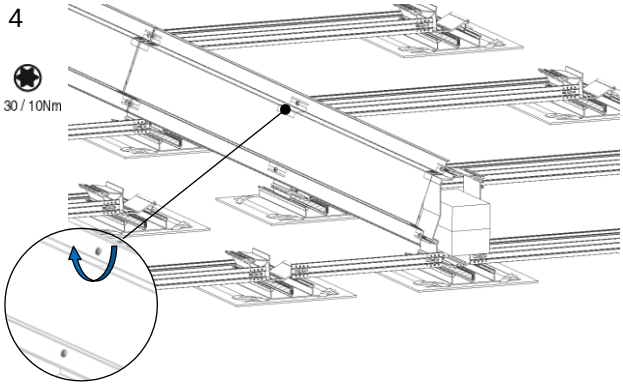
2
Layout



3

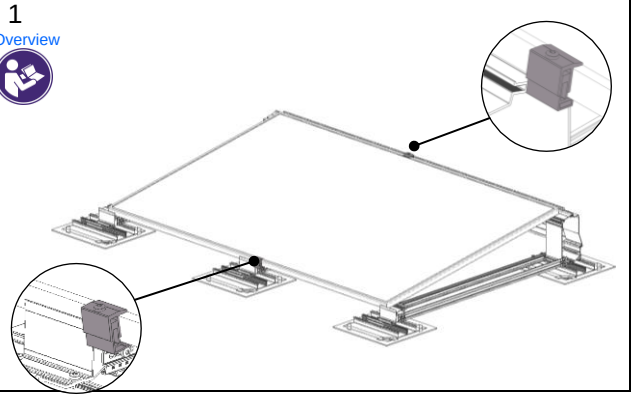


4

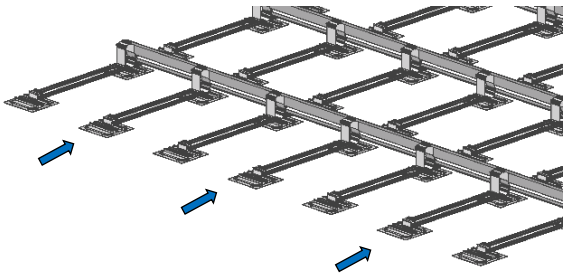


16 Appendix 2 – Additional terminal

1
Overview

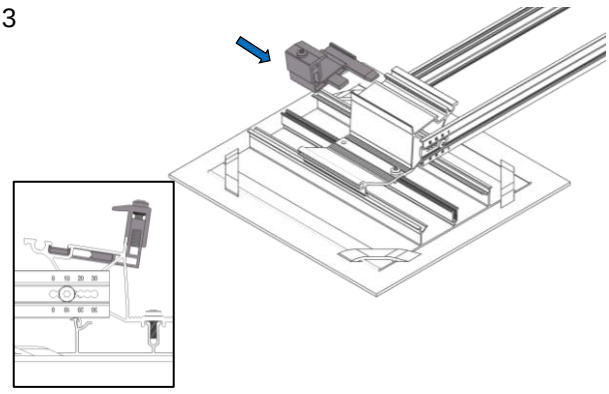


2

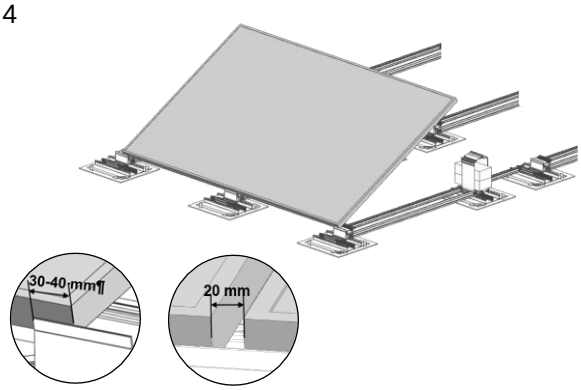


Additional clamp only in combination with middle

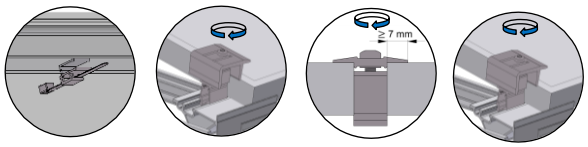
3



4

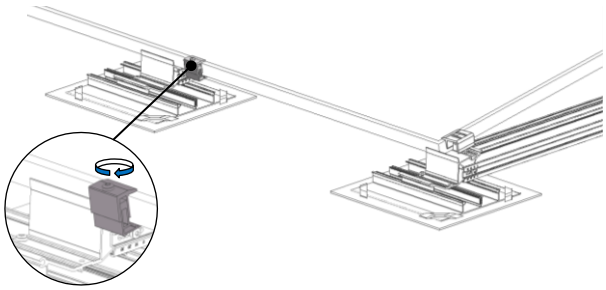


5

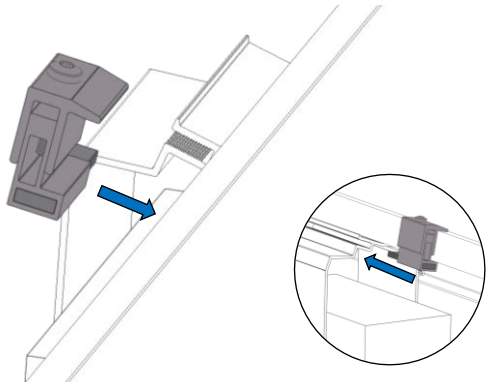


Continue with Chapter 14 / / steps 24–27
(main part of the installation instructions)

6
T 30 / 10Nm



7



8
T 30 / 10Nm