

# Solar systems of Schweizer: Mounting instructions – MSP-FR-EW flat roof PV mounting system



## Legend to mounting instructions



Observe additional information



Audible clicking sound



Caution: check carefully



Mounting direction of part



Correct operation



Tool type / required torque



Incorrect operation



Part identification

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### Standards and technical guidelines

The Schweizer MSP-FR-EW installation system meets the following standards amongst others:

DIN EN 1990:2010-12	Eurocode 0: Basis of structural design
DIN EN 1991-1-1:2002-10	Eurocode 1: Actions on structures – Part 1-1: General actions on structures – Densities, selfweight and imposed loads for buildings
DIN EN 1991-1-3:2010-12	Eurocode 1: Actions on structures – Part 1-3: Snow load including national annexes
DIN EN 1991-1-4:2002-10	Eurocode 1 Part 1-4: Wind actions including national annexes. The specific pressure coefficients have been determined experimentally in wind tunnel tests.
DIN EN 1999-1-1:2010-05	Eurocode 9: Design of aluminium structures
DIN EN 18195-1:2008-11	Water-proofing of buildings – Part 2 - Materials

It has been tested in accordance to the following guidelines:

VDE 100

Aerodynamic study according the guidelines of WTG.

### Intended correct use

The Schweizer MSP-FR-EW installation system is designed exclusively for fastening of framed photovoltaic panels on building with a flat roof with a gradient not greater than three degrees. Any other use shall be considered a violation of the intended use.

Observance of the information provided in these installation instructions is included in the definition of the intended use.

Schweizer cannot be held liable for damage or loss resulting from the failure to observe these installation instructions, especially the safety instructions, or through misuse of the product.

### Responsibilities of the customer and installer

The customer and installer are responsible for observing the following relevant points:

- Ensuring compliance with all relevant accident prevention regulations and industrial safety provisions (or equivalent applicable regional standards).
  - BGV A1 – principles of accident prevention
  - BGV A3 – electrical installations and equipment
  - BGV C22 – construction work
- Ensuring installation is only performed by persons with the appropriate technical skills and basic knowledge of mechanics.
- Ensuring that those commissioned to perform the work can evaluate their assigned tasks and recognize possible risks.
- Ensuring that those commissioned to perform the work are familiar with the system components and logic of installation.
- Ensuring that the installation manual (instructions for use) is available during installation. The installation manual is an integral part of the product.
- Ensuring that the proMSP software report (for the specific project being installed) is available during installation. The software report is an integral part of the product.
- Ensuring that the installation manual and software report, and in particular the safety instructions, are read and fully understood by those commissioned to perform the work.
- Ensuring that the permissible installing conditions are observed. Schweizer cannot be held liable for damage or loss resulting from exceeding these conditions.
- Ensuring correct installation in accordance with the installation instructions/ installation manual and software report) and providing the necessary tools when required.



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- Ensuring that suitable lifting gear is used for installation as appropriate.
- Ensuring that visibly damaged components are not used and are replaced.
- Ensuring each component is used as intended and indicated in the instruction manual, and that components are not installed in a way as to perform other or additional tasks.
- Ensuring that only genuine Schweizer components are used when parts need to be replaced. Otherwise all warranty claims will not be recognized.
- Ensuring that only Schweizer MSP-FR-EW, or other indicated Schweizer MSP components, are used for the installation.
- Ensuring that the roof membrane is not damaged in any form by dropping, dragging or allowing the penetration of components of the installation system.
- Ensuring that regular scheduled maintenance work is performed once every year, including inspecting of screw connections, mechanical connections, positioning of protection sheets, cabling, electrical equalization, and the condition of the roof membrane.
- Where necessary, it is the responsibility of the customer to adapt the existing lightning protection system of the building in accordance with current technical rules and regulations.
- Prior to operating the PV system, the customer must ensure that the whole system, as well as each individual panel, have the adequate electrical potential equalization. This should be tested by an appropriate specialist.
- The Schweizer MSP-FR-EW system may be included in the design of, and connected to, the electrical potential equalization system, by correctly fitting a suitable earthing clamp or screw (not supplied by Schweizer). The customer must ensure compliance with current rules and codes.
- The standards (or the equivalent applicable regional standards) for the design and installation of lightning protection, grounding and equipotential bonding must be observed.
  - DIN EN 62305 – lightning protection
  - DIN VDE 0185 Parts 1-4 – lightning protection
  - DIN VDE 0100 Part 410 – grounding
  - DIN VDE 0105 – operation of electrical installations
  - DIN VDE 0298 – electric cables
- The customer is responsible for ensuring that the roof where the system is installed is designed and constructed so as to be able to adequately and safely withstand the system. This includes, amongst others, the structural capabilities of the roof, the condition and compatibility of the roofing membrane, the required long-term bearing strength of the insulation material, and the adequate drainage of water away from the roof surface. Schweizer cannot be held liable for damage to roofs where the roofs are not adequately designed or constructed to take the system installation.
- The customer is responsible for ensuring that the installation is in compliance with current national regulations and codes, including amongst others, maintaining the necessary edge distance to the roof, the provision of safety barriers, the restriction of access during operation, or precautions for expected dynamic loads or specific conditions such as earthquakes and severe weather patterns.
- If the system is fastened to the building in any form, it is the responsibility of the customer to ensure the adequate design and provision of that fastening.
- The rules and regulations of the Central Association of German Roofers (ZVDH) (or equivalent applicable regional standards) pertaining to working on roofs must be observed.
  - DIN 18338 roofing work
  - DIN 18451 scaffolding work
- Guideline VDS 2023 on damage prevention – electrical installations in buildings or structures with mainly flammable materials, and DIN 4102 – fire behavior of building materials and building components (or the equivalent applicable regional standards) must be observed.

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### Basic safety instructions

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

- Working clothing which complies with national regulations must be worn.
- Applicable industrial safety provisions must be observed.
- Ensure that all electrical work is carried out by an electrically qualified specialist. Observe all relevant regulations and codes.
- The presence of a second person who can provide help in the event of an accident is obligatory during the entire installation work.
- Keep a copy of these installation instructions to hand in the immediate vicinity of the system for use by those commissioned to perform the work.
- Until the PV installation is fully completed and in an operational state, all incomplete sections, components and materials must be secured in accordance with the prevailing regulations.

### Installation conditions

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

- To withstand all prevailing wind and snow load scenarios. However, it must be installed in the correct manner for the conditions for the specific location and project, especially the calculation of any additional ballast required.
- For fastening of framed photovoltaic panels, with a frame height between 30-50 mm.
- On flat roofs with an inclination not greater than three degrees.
- For panel sizes of length 1495-1159 mm, 1620-1682 mm and 1945-2005 mm and width 950-1010 mm and 1040-1095 mm.
- A maximum block size of 13.63 meters (north-south direction) by 13.20 meters (east-west direction) is permitted to avoid unnecessary stresses on the membrane roof covering from thermal expansion.
- The minimum allowable friction coefficient between the protection sheet and the roofing membrane is 0.3.
- Suitable for environmental conditions within the range of normal environmental corrosivity (e.g. at least 1 km from sea coasts), and in more corrosive environments (e.g. C4) if specific maintenance tasks are adhered to (guidelines/ instructions available from Schweizer upon request).
- For all membrane roof coverings, including bitumen, as well as concrete roof surfaces. However, Schweizer is not responsible for ensuring the continued validity of the warranty provided by the roof covering manufacturer.
- If installing on gravel covered roofs, the gravel must be removed during installation and replaced after completion so as the protection sheet is in direct contact with the roofing membrane.
- For panels that permit clamping on the short edges in the corner location (Schweizer can provide a list of approved panels on request). Schweizer is not responsible for ensuring the continued validity of the warranty provided by the panel manufacturer. However, Schweizer will support customers as much as feasibly and practically possible in obtaining any necessary clamping approvals from panel manufacturers.
- For roofs that can adequately withstand the additional load from the PV system (as verified by, and within the responsibility of, the customer). The calculated total load acting on the roof from the MSP-FR-EW system includes the MSP mounting structure, the panels (as indicated in the design) and the required ballast. All other loads are excluded (e.g. cables, non-Schweizer cable ducts, invertors etc.).

### Installation preparations

An expert assessment of the roof must be obtained in order to verify the suitability of the roof for supporting a PV system, including structural characteristics, construction standard, and condition.

If necessary, the roof should be tested for suitability, amongst others:





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- Sufficient structural capacity for the additional loads arising from the PV installation.
- Consideration of the permissible bearing pressure capacity of the insulation material.
- Compatibility and condition of the roofing membrane.
- Adequate water drainage and lack of water pooling.
- Condition of the roof (free from damage).

Prior to initiating the PV system installation, the roof must be:

- Brought to the minimal standards required.
- Thoroughly cleaned, with all dirt and debris removed.
- Free from snow and ice.

The customer must verify that the installing conditions required for MSP-FR-EW are satisfied. Ensure those commissioned with the work are fully familiar with the design layout created. Distribute the material evenly on the roof so as not to create concentrated loading. Make sure the required tools are available (a torque wrench, battery powered screwdriver and a size 30 Torx attachment).

### Installation

#### Fig. 1: proMSP software report

**Note:** The proMSP software report is created once the PV system has been designed using Schweizer proMSP software.

1. Make sure the proMSP report is available on site and that those commissioned with the work are fully familiar with the design layout.

#### Figs. 2 and 3: Assembly of protection sheets to base profiles

**Note:** This step is intended as a pre-assembly step that can be performed off the roof.

1. Separate pieces, of the required lengths, from the fleece roll protection sheet (MSP-FR-EW-PSF, ⑤) in the required quantity (as indicated in the proMSP software report). Two different lengths may be required to match the length of base profiles (MSP-FR-EW-BP, ③) used. The roll is divided into perforated sections and can be easily pulled apart without the use of a knife or cutting tool.
2. Peel off the plastic sheeting from fleece (MSP-FR-EW-PSF, ⑤) in order to exposure the sticky stripes
3. Ensure the sticky stripes are facing upwards and lower the base profiles (MSP-FR-EW-BP, ③) into place. The base profiles should be positioned so as no edges extend beyond the outer edge of the protection sheet (MSP-FR-EW-PSF, ⑤). There should be an approximate 10 mm width of protection sheet extending beyond all edges of the base profiles.

#### Figs. 4, 5 and 6: Assembly of supports to base profiles

**Note:** This step is intended as a pre-assembly step that can be performed off the roof. There may be two lengths of base profiles (MSP-FR-EW-BP, ③) and the correct number of each match of support type, whether high support (MSP-FR-EW-SH, ①) and low support (MSP-FR-EW-SL, ②), to lengths of (base profiles (MSP-FR-EW-BP, ③) is indicated in the software report.

1. Click into place the high supports (MSP-FR-EW-SH, ①) into the base profiles (MSP-FR-EW-BP, ③). The supports should be approximately centrally located within the base profiles, and must not overhang from the edge. They should not be screwed into place at this time.
2. Click into place the low supports (MSP-FR-EW-SL, ②) into the base profiles (MSP-FR-EW-BP, ③). The supports should be approximately centrally located within the base profiles, and must not overhang from the edge.
3. Screw the low support (MSP-FR-EW-SL, ②) into place using a screw (MSP-FR-S, ⑧) with a torque of 10 Nm. Only one screw is needed per support.

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### Figs. 7A and 7B: Insert screws into connection channels

**Note:** This step is intended as a pre-assembly step that can be performed off the roof.

1. Position the screws (MSP-FR-S, ⑧) into the connection channels (MSP-FR-EW-C, ④) in the correct hole. The correct hole is indicated in the software report.

**Note:** There are three lengths of connection channels and each length may require the use of different holes. Additionally, the holes at each end may differ by a space of one. The connection channels are symmetrical in design, so it does not matter which end each hole position is used.

2. When positioned in place the screws (MSP-FR-S, ⑧) should extrude approximately 2-5 mm through the underside of the connection channels (MSP-FR-EW-C, ④).

### Figs. 8A and 8B: Layout components on roof and measure out starting point

1. The components should be laid out so as to avoid concentrated loads on the roof, and appropriately to enable easy and quick installation.

**Note:** Short connection channels (MSP-FR-EW-C, ④) run in the east-west direction and longer connection channels run in the north-south direction. If two lengths of base profiles (MSP-FR-EW-BP, ③) are being used, the shorter ones will be placed around the edges of blocks while the longer length base profiles will be used in the block centers.

2. Following the details in the software report, measure out the position of the starting lower support (MSP-FR-EW-SL, ②) and place it appropriately.

**Note:** Ensure the correct base profile (MSP-FR-EW-BP, ③) length is used (it will be the shorter one if two lengths are being used).

### Figs. 9 and 10: Assemble connection channels

**Note:** No loose screws (MSP-FR-S, ⑧) will be needed on the roof since they are all preassembled in the preceding steps.

1. Fix the shorter connection channels (MSP-FR-EW-C, ④) (running in the east-west direction) to the sides of the high supports (MSP-FR-EW-SH, ①) and low supports (MSP-FR-EW-SL, ②), tightening the pre-assembled screws with a torque of 10 Nm. The connection channels (MSP-FR-EW-C, ④) can be fixed either side of the supports and in either direction.
2. Fix the longer connection channels (MSP-FR-EW-C, ④) (running in the north-south direction) within the high supports (MSP-FR-EW-SH, ①) so that the support is also screwed onto the base profile (MSP-FR-EW-BP, ③), tightening the pre-assembled screws with a torque of 10 Nm. Always use the hole nearest the edge of the high support for each connection channel.

**Note:** If any walking paths have been selected for the layout, refer to the software report to ensure correct placement (location and channel length) for the walking path inclusion.

### Fig. 11: Installation of additional layer of protection sheet

**Note:** This step is only required for roofs with a bitumen or EPDM roof covering. The software report will indicate if this step is necessary.

1. Under each base profile (MSP-FR-EW-BP, ③), position a second protection sheet piece (MSP-FR-EW-PSF, ⑤) of equal length to the protection sheet fixed to the base profile, so that it sticks down onto the roof surface. Subsequently, the two layers of protection sheets will be in contact with each other one-to-one.
2. If the base profile (MSP-FR-EW-BP, ③) is positioned over an overlap of membrane layers, ensure the protection sheet (MSP-FR-EW-PSF, ⑤) is level by providing additional layers of protection sheet as appropriate.

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### Figs. 12A, 12B and 13: Position ballast

**Note:** Ballast is not needed for every project. This step is only necessary if the software report indicates that ballast is needed. If ballast is required, it is very important to ensure the correct amount of ballast is positioned in the correct locations. The ballast stones are not supplied by Schweizer.

1. Where needed, position either one or two ballast stones with the center of the appropriate high supports (MSP-FR-EW-SH, ①).
2. If more than 2 ballast stones are needed at any locations, install a second shorter connection channel (MSP-FR-EW-C, ④) on the opposite side of the supports, running from a low (MSP-FR-EW-SL, ②) to a high support (MSP-FR-EW-SH, ①). The additional ballast stones can be positioned by laying them across the two parallel connection channels in a perpendicular direction. It is important to ensure that the ballast stones are not positioned in a manner that they are in contact with the roof membrane.
3. Ensure the ballast stones are positioned so that the panels do not come into contact with the stones once installed.

### Figs 14, 15, 16, 17 and 18: Provision of cable management

**Note:** Cable holders are supplied by Schweizer, other cable management components are optional.

1. For carrying the panel cables running in the north-south direction. The cable holder (MSP-FR-CH8, ⑩) is inserted into the high support (MSP-FR-EW-SH, ①) and clicked into place by turning.
2. For possible carrying cables in the east-west direction. On the outside of the panel block, a cable tray can be attached to the base profiles (MSP-FR-EW-BP, at least 300 mm, ③)(spanning across two) and screwed into place. Two screws (MSP-FR-S, ⑧) are required per cable tray, each on a separate base profile.
3. Free running cable trays can be positioned by using additional base profiles (MSP-FR-EW-BP, ③) (with correctly attached protection sheet) positioned at each end of the cable tray. Base profiles can be shared by two cable trays in series.
4. Free running cable trays can contain 90 degree turns. A longer base profile (MSP-FR-EW-BP, ③) with correctly attached protection sheet (MSP-FR-EW-PSF, ⑤) is needed.

### Figs. 19A and 19B: Installation of grounding screws

**Note:** Grounding screws (MSP-FR-GS, ⑨) are needed to create the electrical potential equalization of the PV panels to the MSP-FR-EW mounting system. It is very important that at least one grounding screw is in contact with every PV panel installed.

1. Under the location of every PV panel to be installed, a grounding screw (MSP-FR-GS, ⑨) must be installed onto that lip of the low support (MSP-FR-EW-SL, ②).
2. Where no PV panel will be in contact with a lip of a low support (MSP-FR-EW-SL, ②), a grounding screw (MSP-FR-GS, ⑨) is not required.

### Figs. 20, 21 and 22: Positioning PV panels

**Note:** Panels can only be installed in a landscape orientation.

1. Position edge of panel on lips of the low supports (MSP-FR-EW-SL, ②) and lower other edge of panel onto high support (MSP-FR-EW-SH, ①).
2. Complete process for all panels to be installed.
3. The first panel should be positioned so as to overlap the supports 30-40 mm in a north-south direction. If necessary, slide the panel to achieve this overlap.
4. To enable the clamps to be positioned correctly, each subsequent panel should be placed with a 20 mm gap to the previous panel in the north-south direction. Once all panels are in position, and prior to clamping, it should be ensured that the overlap of each panel to the supports is 30-40 mm.

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### **Figs. 23A, 23B, 24A, and 24B: Fixation of PV panels**

1. Click into the supports the end clamps (MSP-PR-EC, ⑥) (at the panel edges on the outer edge of the PV blocks) and middle clamps (MSP-PR-MC, ⑦) (locations between two adjoining panels).
2. Fix the panels into place by tightening the clamps with a torque of 10 Nm. The clamps positioned on high supports (MSP-FR-EW-SH, ①) should be tightened before tightening the corresponding clamps positioned on the low supports (MSP-FR-EW-SL, ②).
3. After tightening the clamps flanges should overlap the panel frames by a minimum of 7 mm.

### **Fig 25: Cover cable trays**

**Note:** This step shows an option for attaching cable trays. The cable tray covers are not provided.

### **Fig. 26: Grounding PV installation**

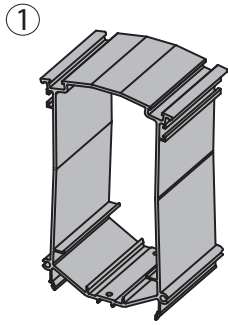
**Note:** The equipment required for this step is not supplied by Schweizer. The method indicated is only a suggestion, there are numerous ways to achieve this. The customer must decide how best to achieve a grounding of the PV system.

1. Connect the earthing equipment by screwing into the side hole of a low support (MSP-FR-EW-SL, ②).  
Every PV block will need to be earthed individually.

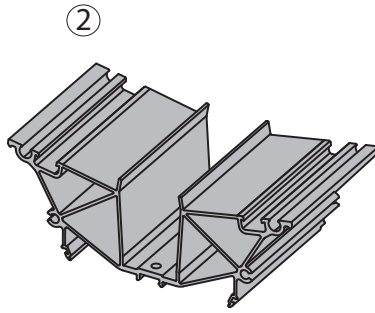


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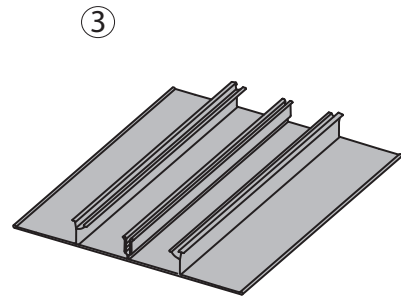
## Mounting instructions – MSP-FR-EW flat roof PV mounting system



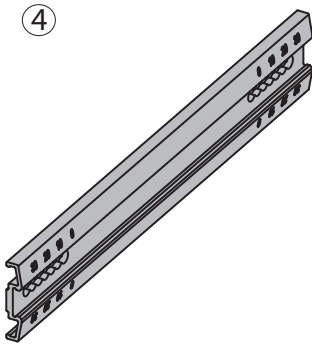
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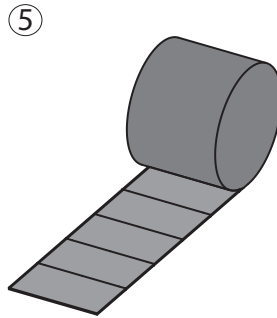
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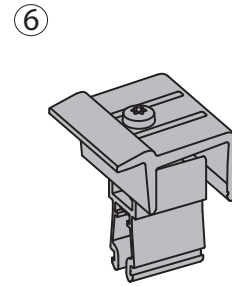
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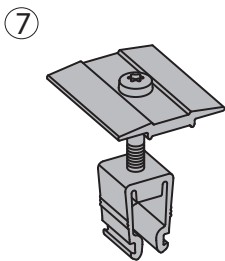
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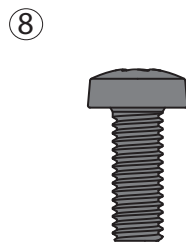
**MSP-FR-EW-PSF**



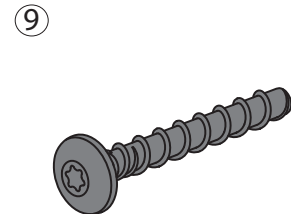
**MSP-PR-EC**



**MSP-PR-MC**



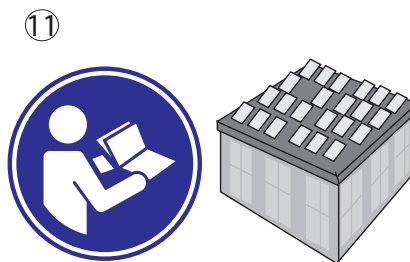
**MSP-FR-S M6x60**



**MSP-FR-GS 6x60**



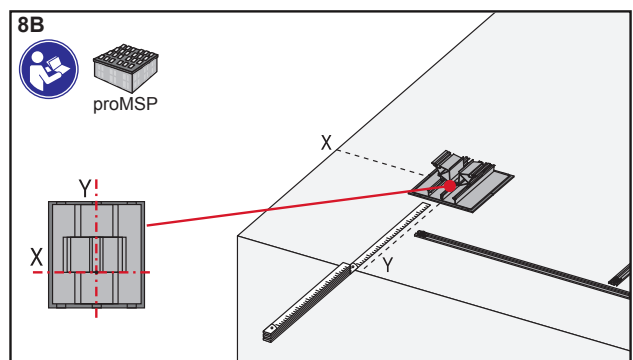
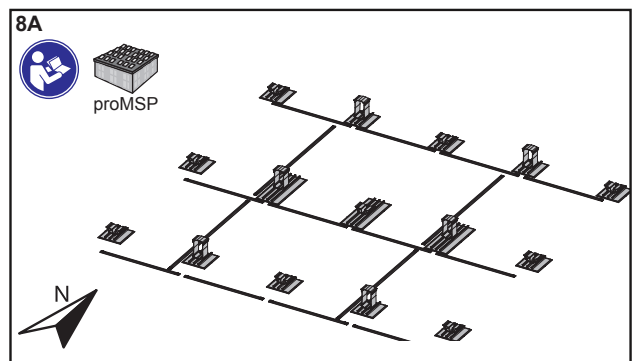
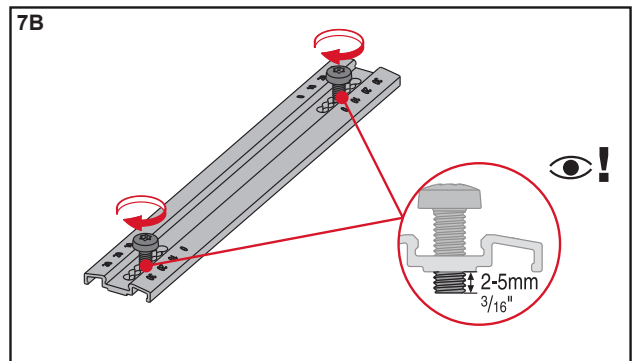
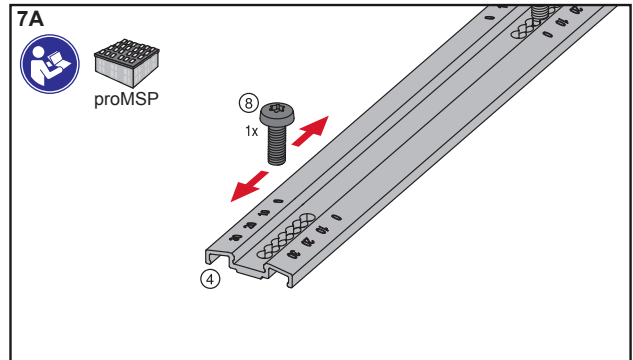
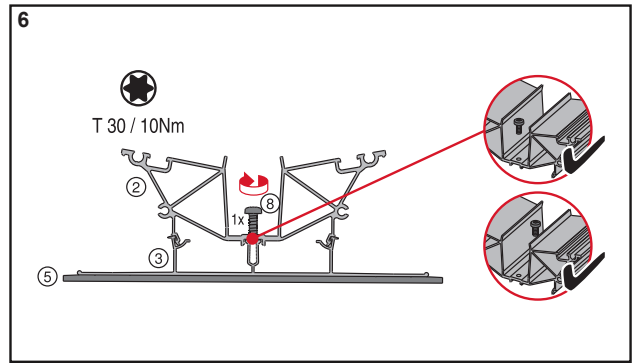
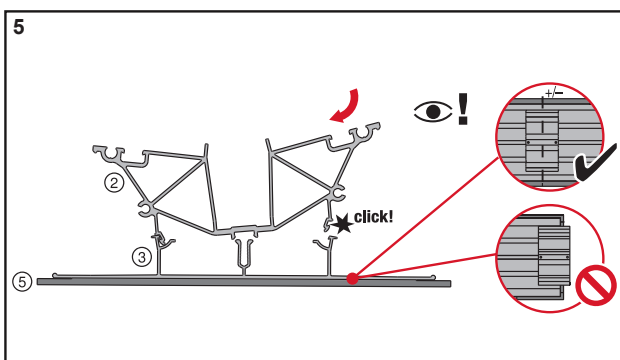
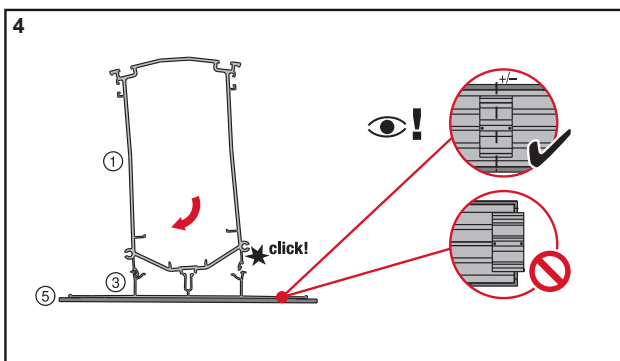
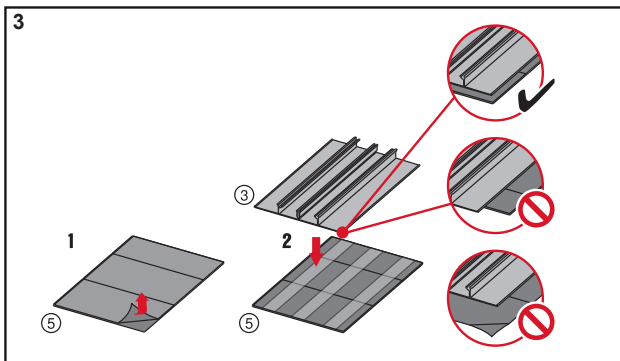
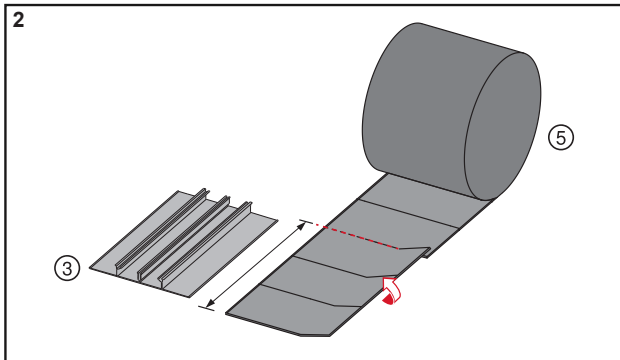
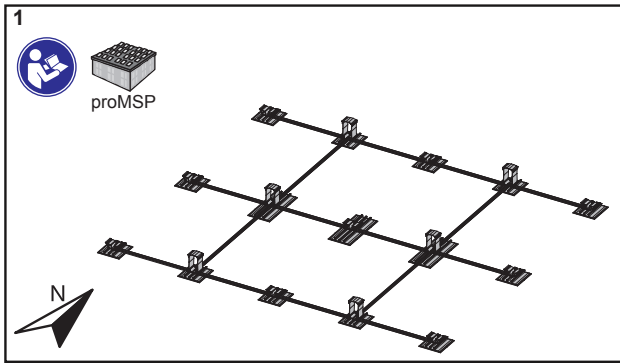
**MSP-FR-CH8**



**proMSP**

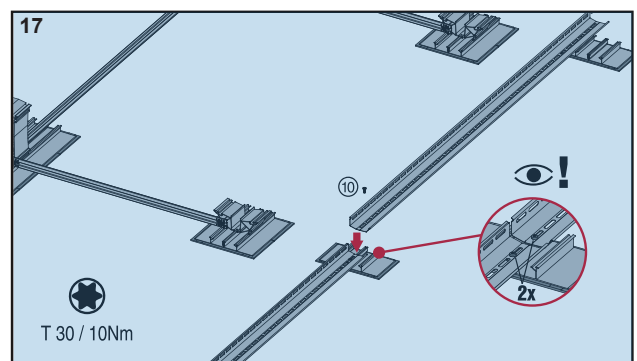
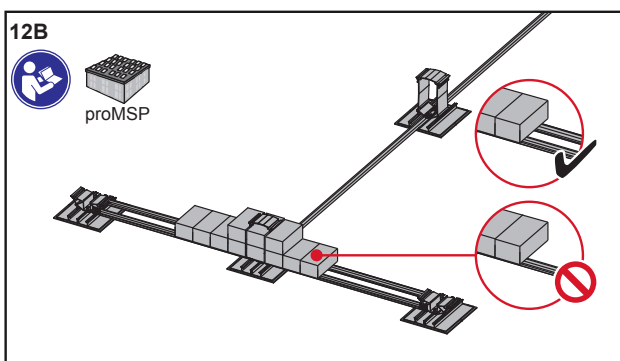
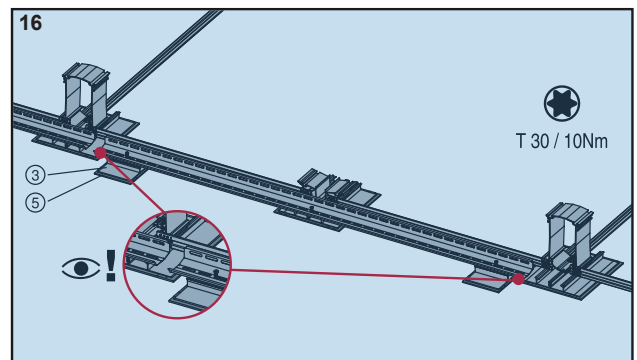
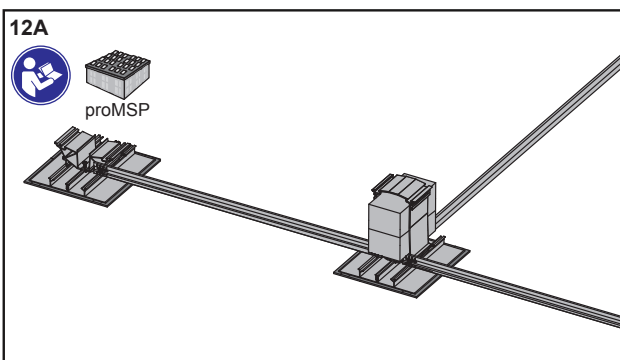
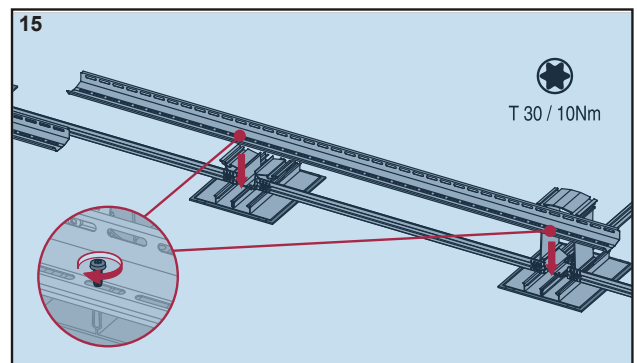
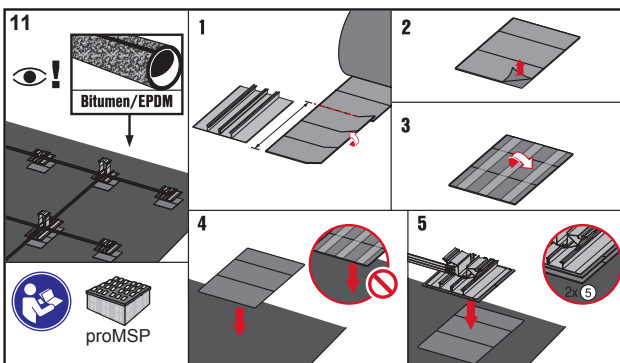
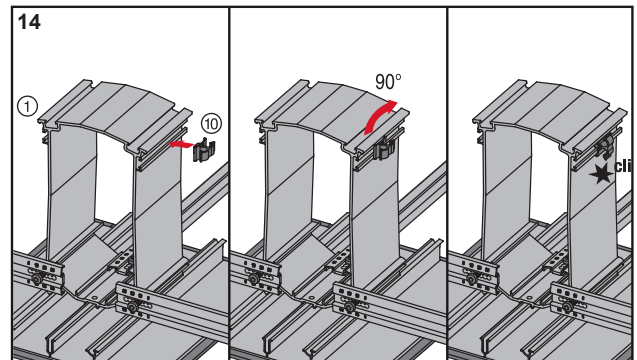
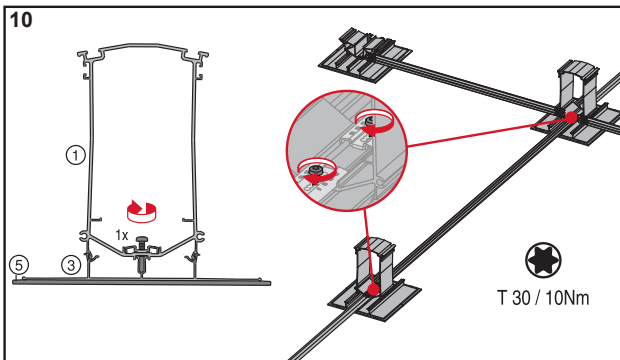
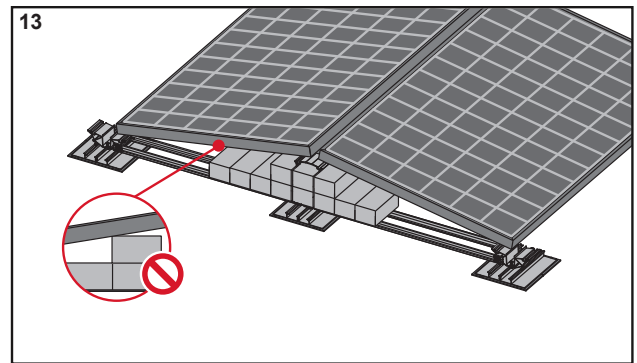
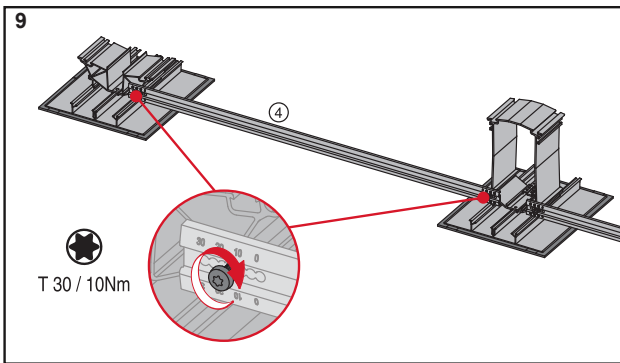
# Solar Energy Systems

## Mounting instructions – MSP-FR-EW flat roof PV mounting system



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