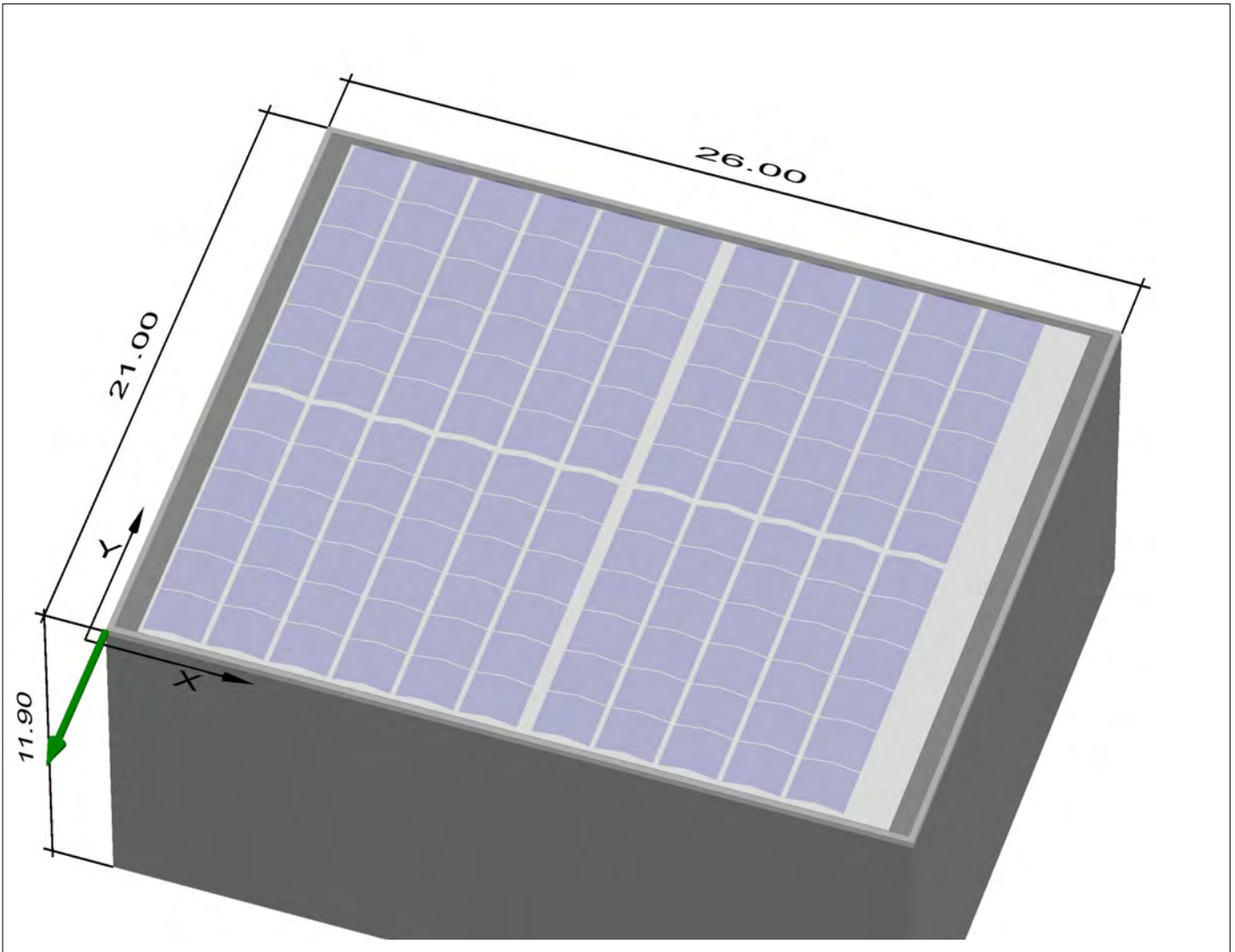


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Building data



Module properties

Module description	Suntech SPTxxxS-20/Wd	Module length [mm]	1640
Module power [Wp]	250.0	Module width [mm]	992
Number of modules	264	Frame height [mm]	35
Overall power output [Wp]	66,000.0	Module weight [kg]	18.2
		Tilt angle [°]	9.8

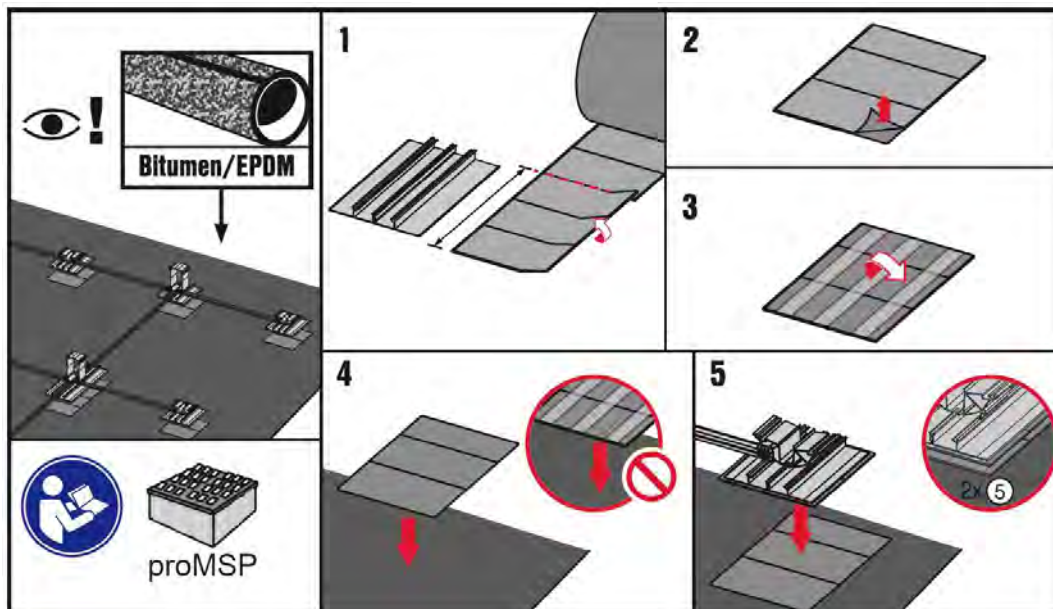
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Loads

Design code	based on EC	
Information to the location		
Terrain height [m]	50.00	
Snow load		
characteristic snowload on ground S_k [kN/m ²]	0.300	
Wind load		
characteristic peak velocity pressure $q_p(z)$ [kN/m ²]	1.000	

Specifications

Specifications of the building		Building orientation to the south [°]	
Building orientation to the south [°]	0		Building orientation to the south [°]
Building height [m]	12.00		
a [m]	26.00		
b [m]	21.00		



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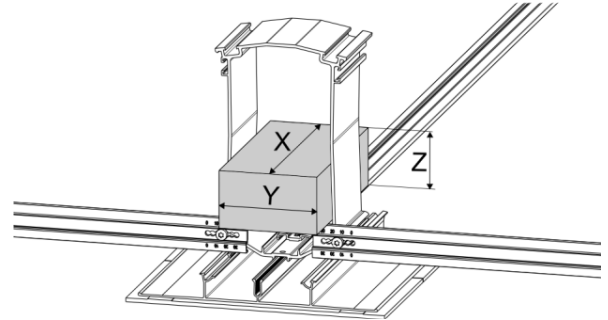
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Specifications of the roof

Dynamic load	No
Roof pitch [°]	2.00
Parapet height [m]	0.10
Parapet thickness [m]	0.20
Isolation material	EPS
Long term pressure load capacity (max 2% deformation) [kN/m ²]	30.000
Determination method	Tested
Roof membrane	EPDM
Brand name	-
Product name	-
Friction [μ]	0.40

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Date: 16/07/2015**Ballast plan**

Ballast description	20x10x8_4kg
LX [mm]	200
LY [mm]	100
LZ [mm]	80
Ballast weight [kg]	4
Quantity of ballast	482
Overall ballast weight [kg]	1928

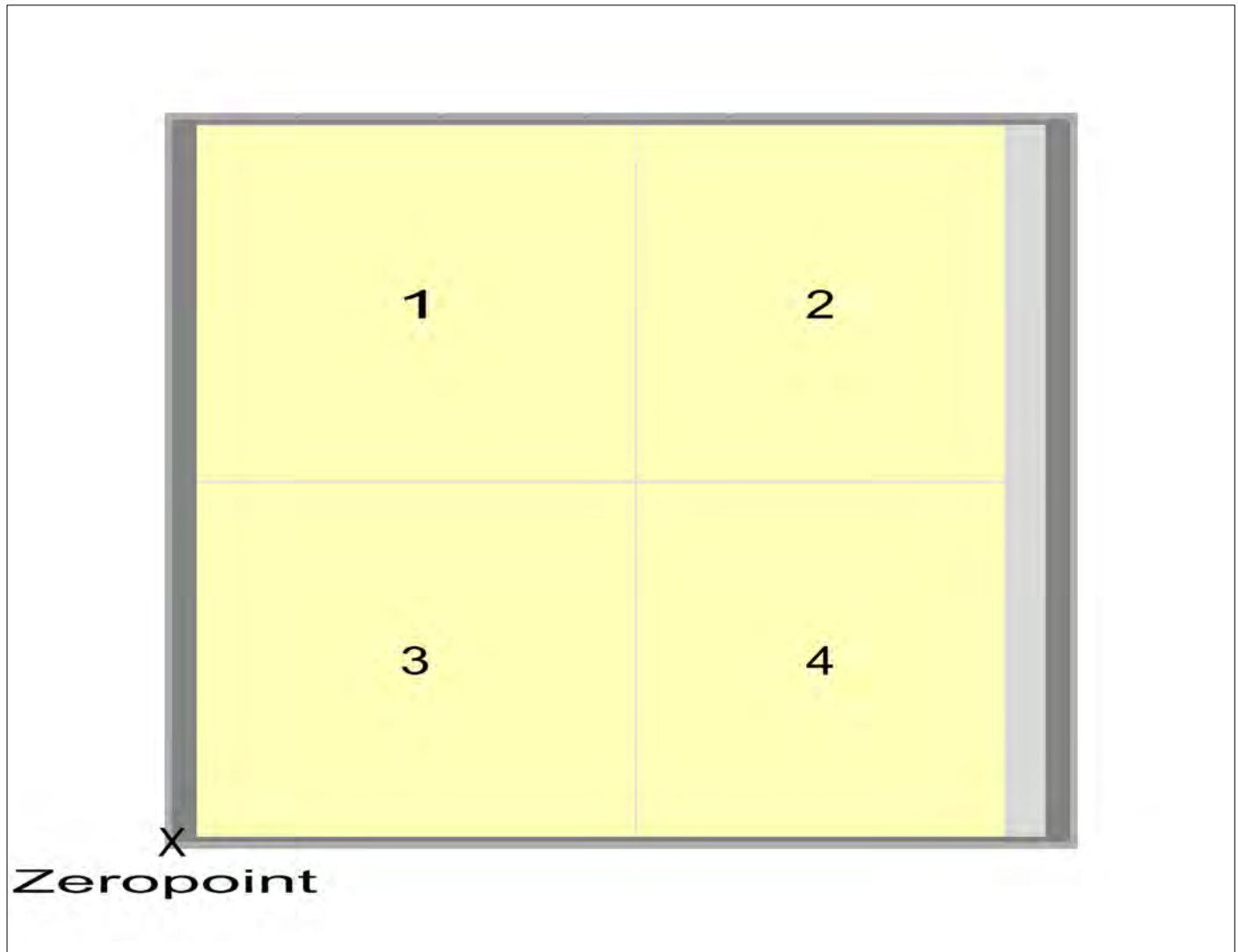


For the ballast calculation only the weight of the modules, the racking system and the additional ballast (concrete blocks) have been taken into account. For the structural check of the roof additional loads have to be taken into account such as cable trays, cables etc. The average roof loading is based on the covered roof area.

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Zero: corner of the roof (if parapet existing: inner corner of parapet)

Distance from Zero in [m], 12.03 / 14.00 refers to 12.03 [m] in x -> and 14.00 [m] in direction



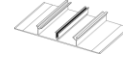
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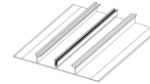
Legend



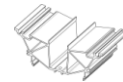
MSP-FR-EW-BP short



MSP-FR-EW-BP long



MSP-FR-EW SL



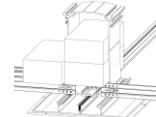
MSP-FR-EW SH



MSP-FR-EW-C short connection support low & support high



MSP-FR-EW-C 2nd short connection channel for ballast



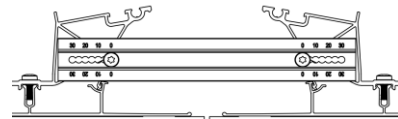
MSP-FR-EW-C 300-360 walking path

MSP-FR-EW-C 950-1010 walking path

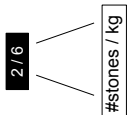
MSP-FR-EW-C 1620-1680 walking path



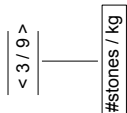
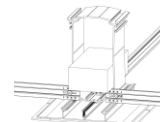
The walking path connection channels have to be mounted at position 0.



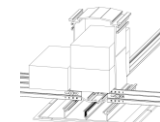
MSP-FR-EW-C long connection high support



Ballast on support high



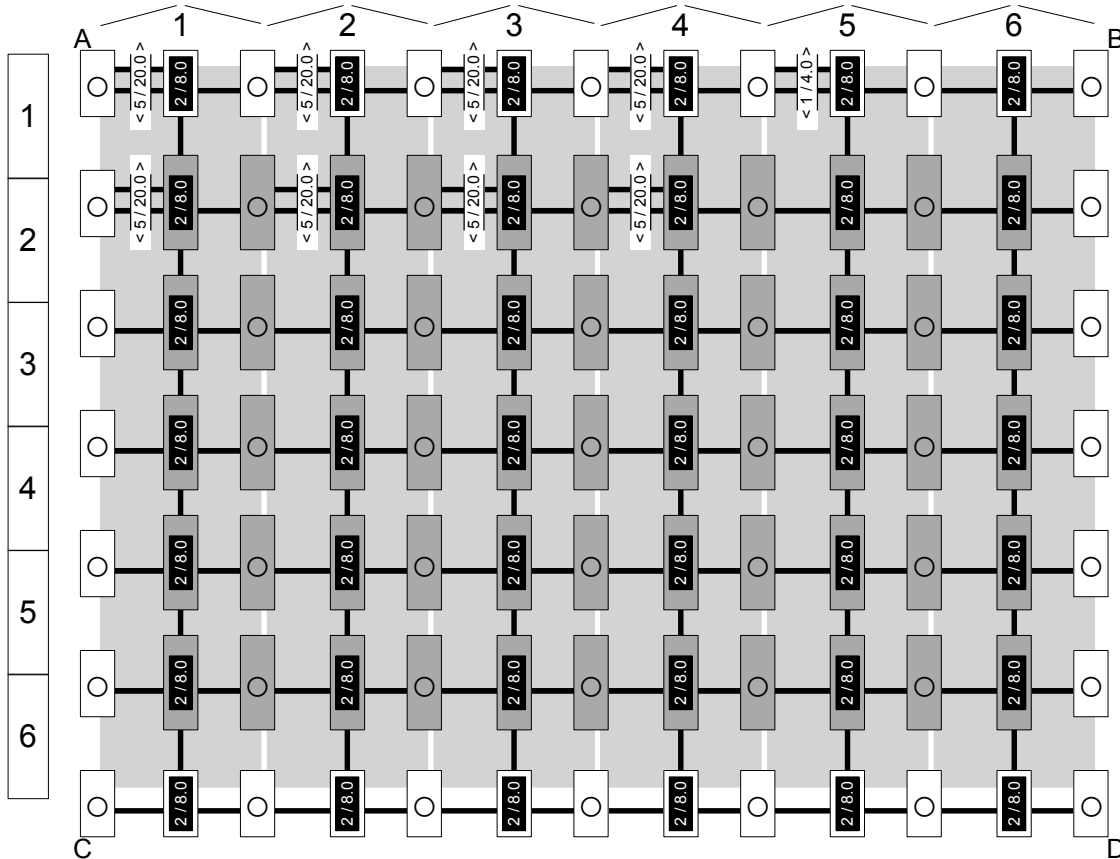
Ballast on two connection channels



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Block 1

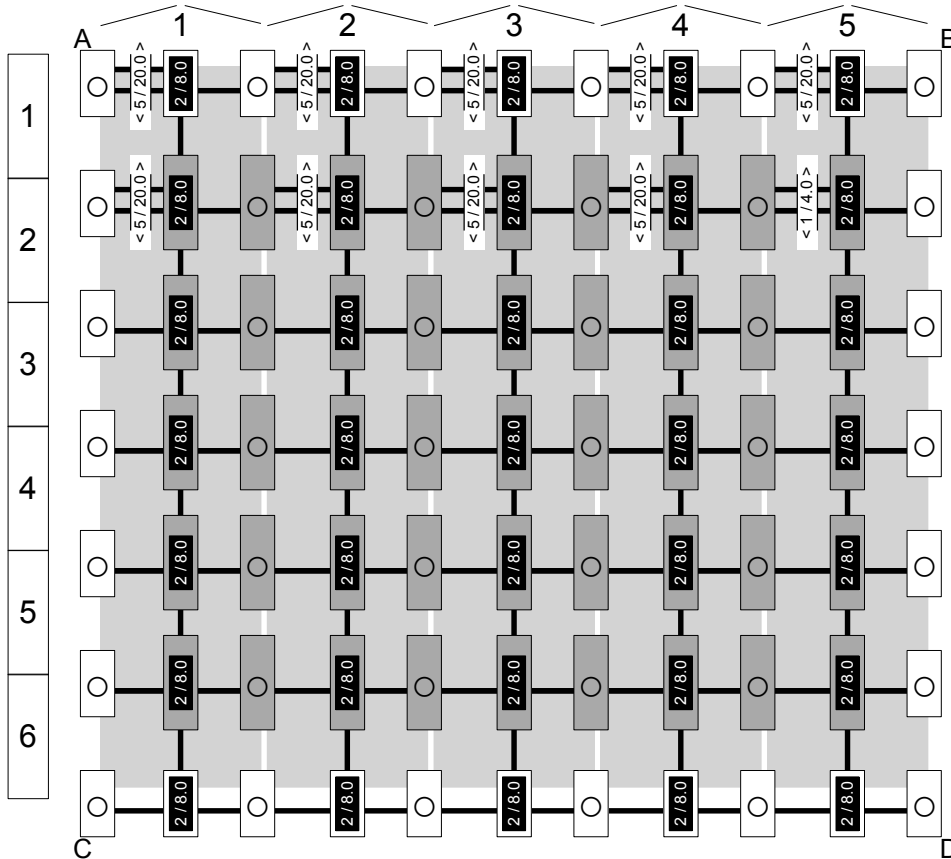


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Block 2

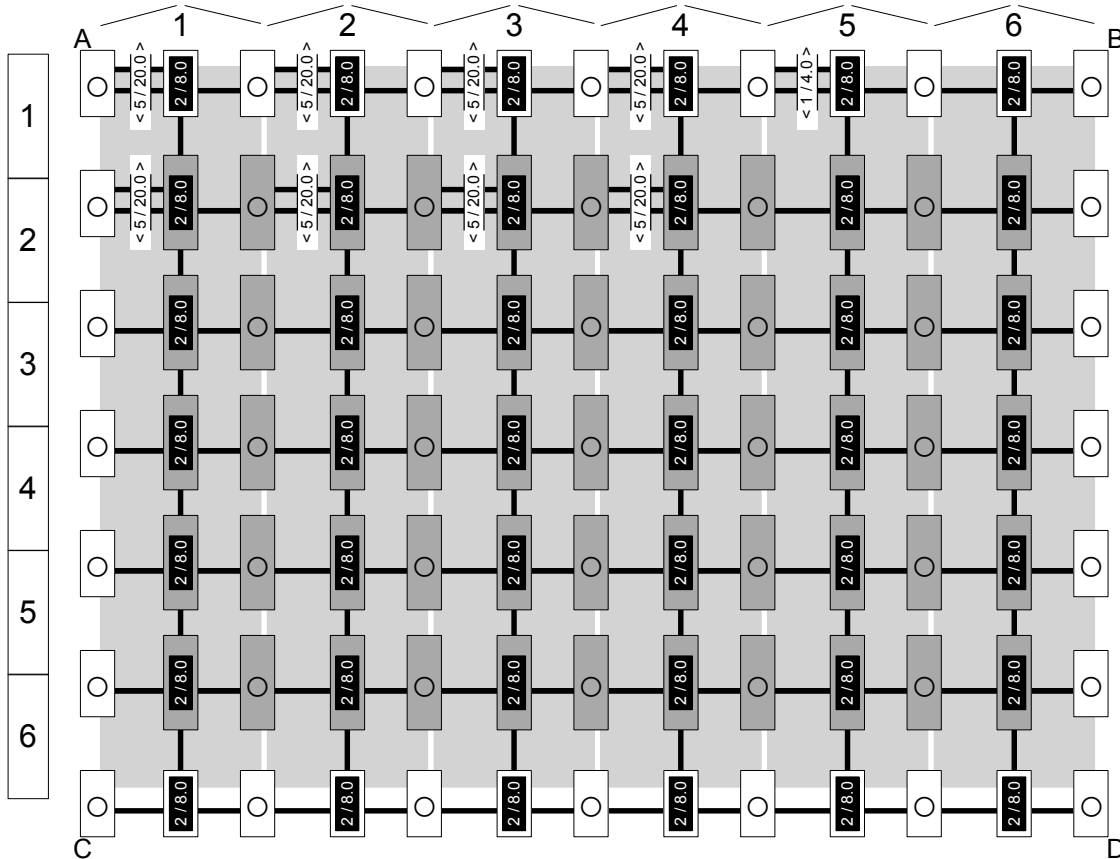


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Block 3

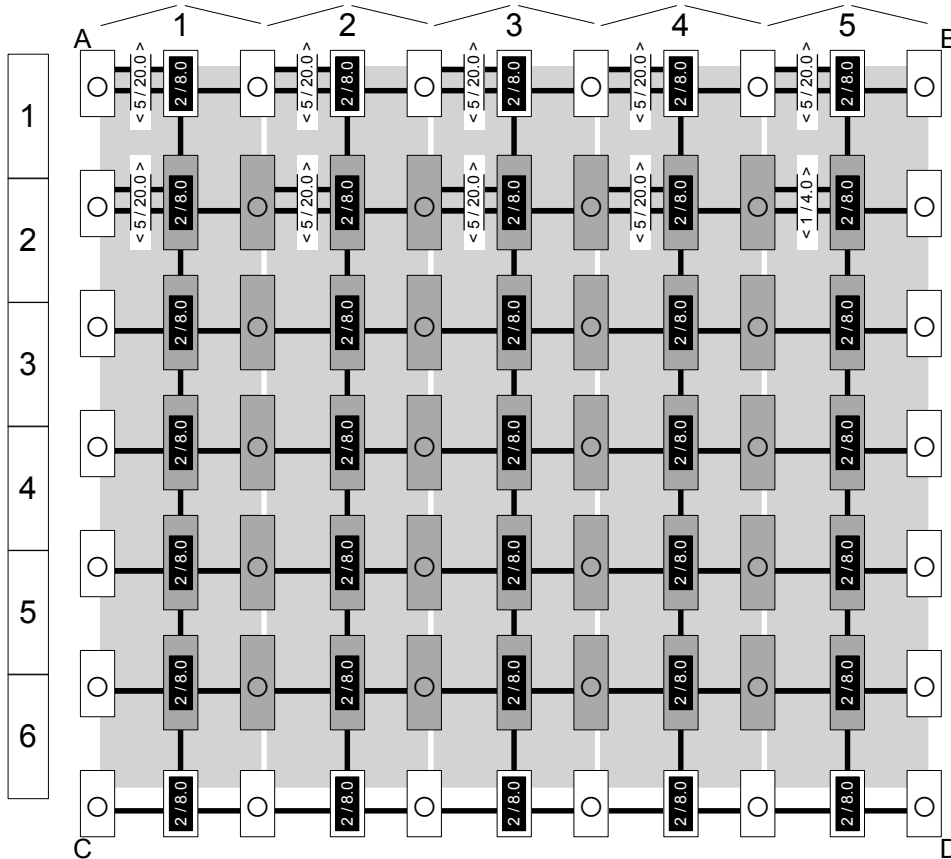


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Block 4



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Partlist

Item	Description	Weight [kg]	Qty
2072554	Support MSP-FR-EW-SH	107.8	154
2072553	Support MSP-FR-EW-SL	80.9	182
2072555	Base Profile MSP-FR-EW-BP 150	90.7	336
2072561	Protection Sheet MSP-FR-EW-PSF	16.5	11
2072369	Connection Channel MSP-FR-EW-C 950-1010	85.8	346
2072551	Connection Channel MSP-FR-EW-C 1620-1680	57.3	132
2013706	Screw MSP-FR-GS 6x60	5.4	264
2048616	End Clamp MSP-PR-EC 30 - 50mm	14.1	176
2048615	Middle Clamp MSP-PR-MC 30 - 50mm	17.6	440
418916	Cable Holder MSP-FR-CH8	0.3	154
2013705	Screw MSP-FR-S M6x16	6.4	1138

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Schweizer MSP-FR-EW Installation system Installation instruction

Legend to mounting instructions

	Observe additional information		Audible clicking sound
	Caution: check carefully		Mounting direction of part
	Correct operation		Tool type / required torque
		T 30 / 10Nm	
	Incorrect operation		Part identification

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 1991-1-1:2002-10	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 to 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 Solar software report (for the specific project being installed) is available during installation. The software report is an integral part of the product.

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- 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.
- 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 lightening 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, has 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.

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

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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 corrosively (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:

- 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, ☉) 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, ☉) 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, ☉) in order to exposure the sticky stripes
3. Ensure the sticky stripes are facing upwards and lower the base profiles (MSP-FR-EW-BP, ☉) into place.
4. The base profiles should be positioned so as no edges extend beyond the outer edge of the protection sheet (MSP-FR-EW-PSF, ☉). 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, ☉) and the correct number of each match of support type, whether high support (MSP-FR-EW-SH, ☉) and low support (MSP-FR-EW-SL, ☉), to lengths of (base profiles (MSPFR-EW-BP, ☉) is indicated in the software report.

1. Click into place the high supports (MSP-FR-EW-SH, ☉) into the base profiles (MSP-FR-EW-BP, ☉). 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.

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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, ⑩) with a torque of 10 Nm. Only one screw is needed per support.

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, ⑩) 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 two 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, ⑩) 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, ⑩) 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 south-north 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.

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

Note: 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 support (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-AL-CH 8, ⑧) 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 300mm, ③) (spanning across two) and screwed into place. Two screws (MSP-FR-S, ⑩) are required per cable tray, each on a separate base profile.
1. Free running cable trays can be positioned by using additional base profiles MSP-FR-EW-BP, ③) (with correctly attached protection sheet)

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positioned at each end of the cable tray. Base profiles can be shared by two cable trays in series.

- 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-EWPSF, 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 structure. It is very important that at least one grounding screw is in contact with every PV panel installed.

- 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).
- 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.

- 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).
- Complete process for all panels to be installed.
- 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.
- To enable the clamps to be positioned correctly, each subsequent panel should be placed with a 20mm 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 30-40mm.

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

- Click into the supports the end clamps (MSP-PR-EC, ⑩) (at the panel edges on the outer edge of the PV blocks) and middle clamps (MSP-PR-MC, ⑪) (locations between two adjoining panels).
- 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).
- 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.

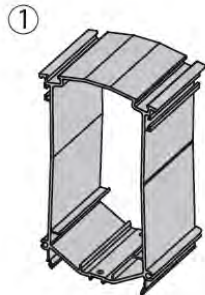
Fig. 26: Grounding PV installation

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 structure.

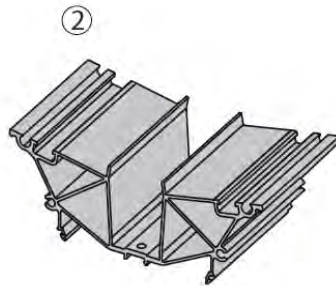
- Connect the earthing equipment by screwing into the side hole of a low support (MSP-FR-EW-SL, ②). Every PV block will need to be earthed individually.

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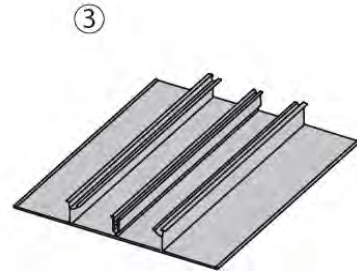
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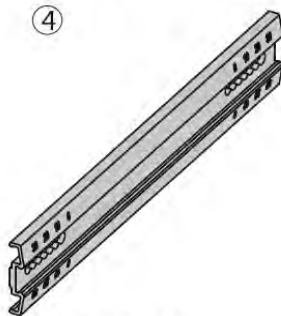
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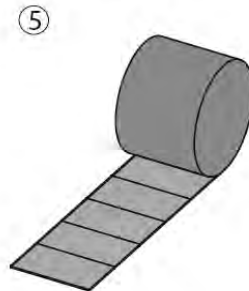
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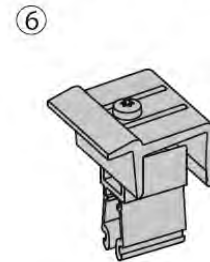
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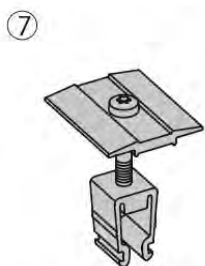
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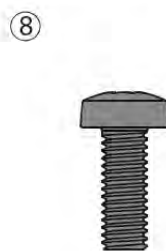
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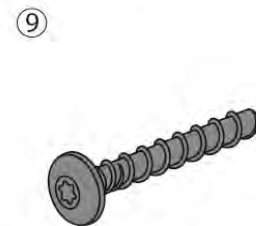
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MSP-PR-MC



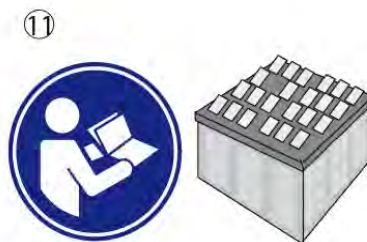
MSP-FR-S M6x16



MSP-FR-GS 6x60



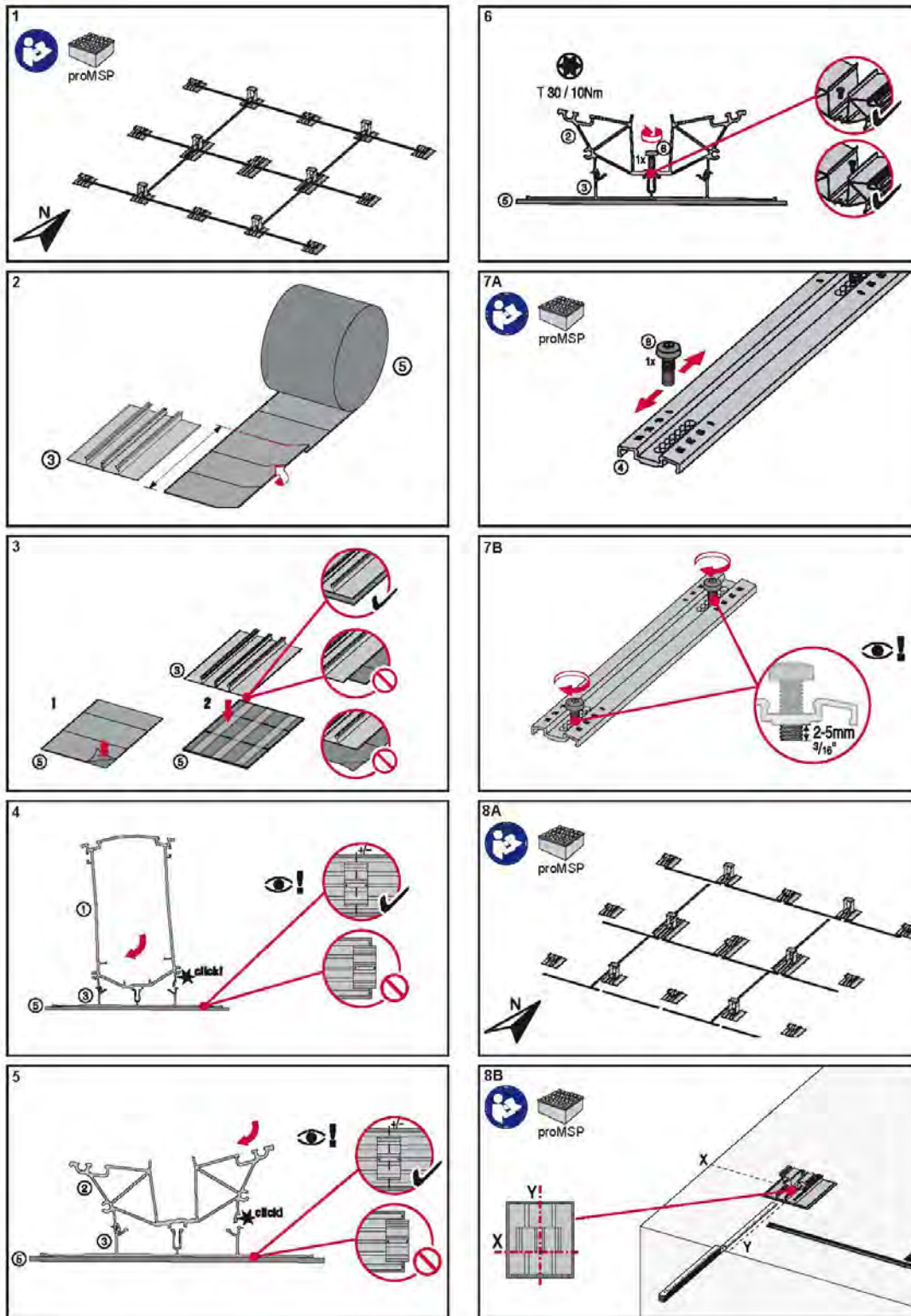
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proMSP

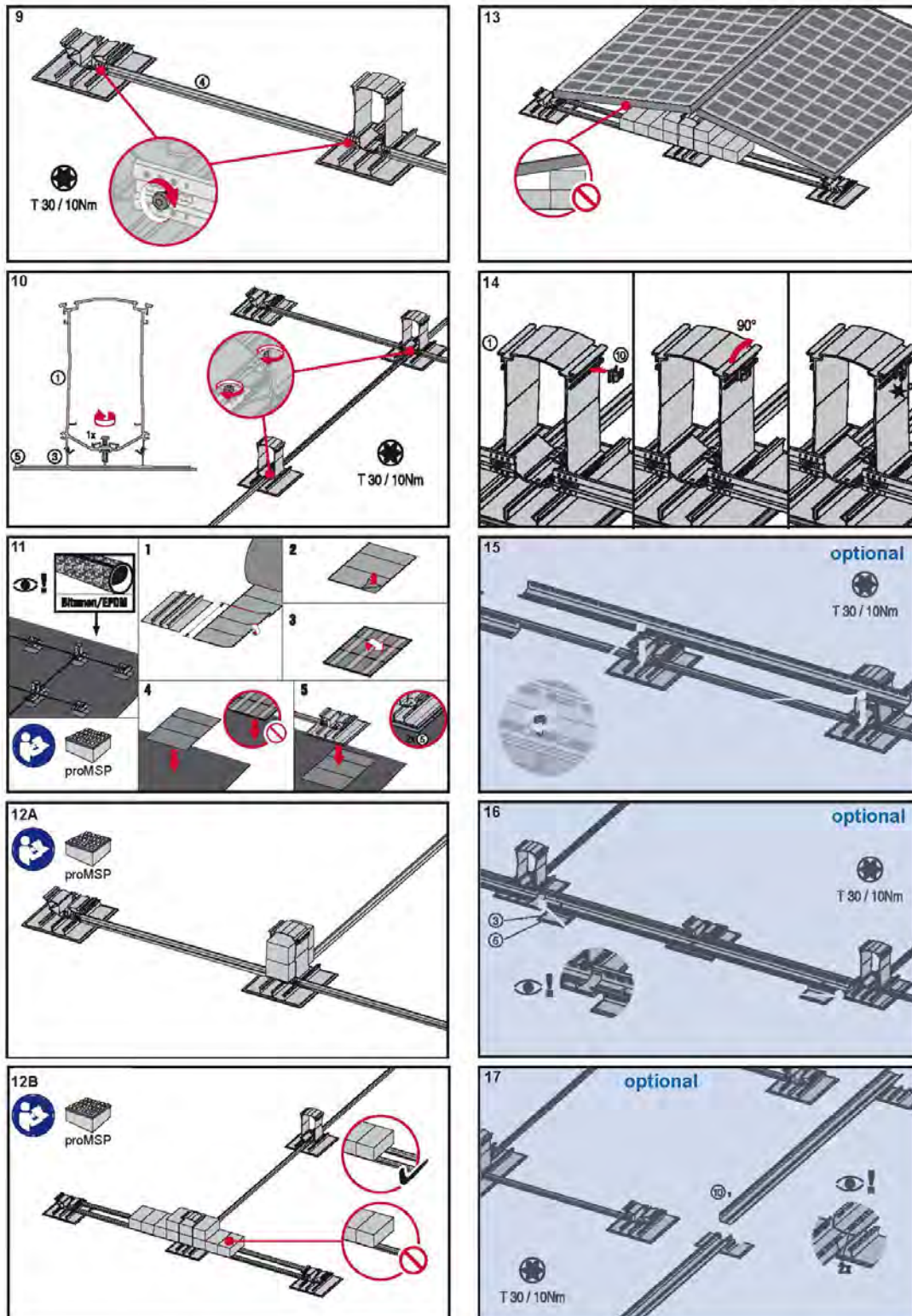
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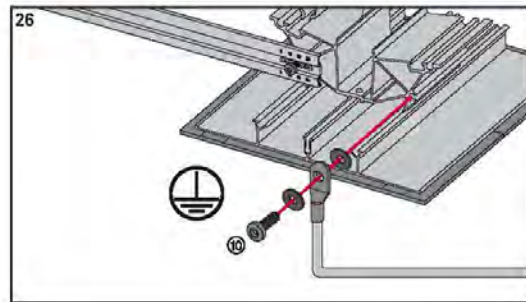
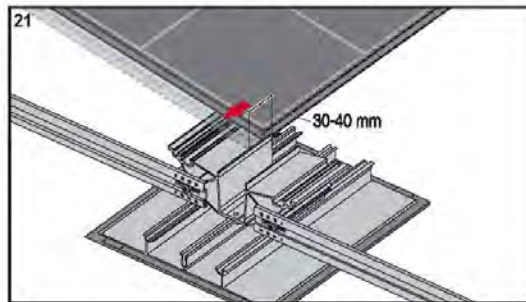
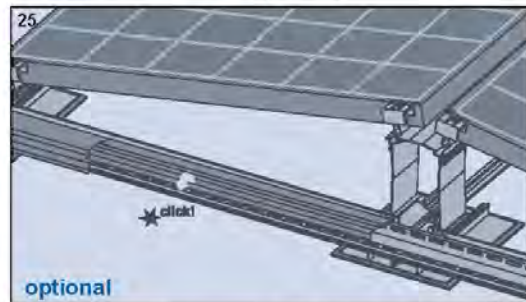
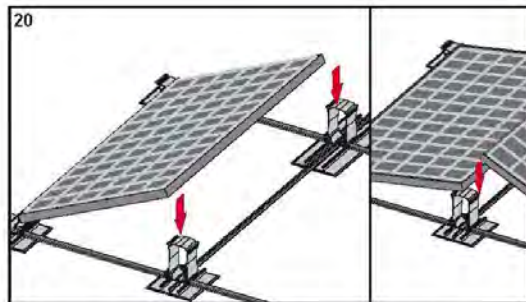
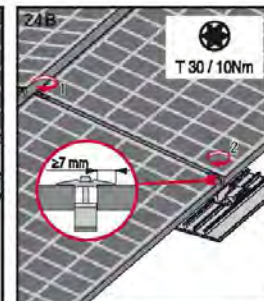
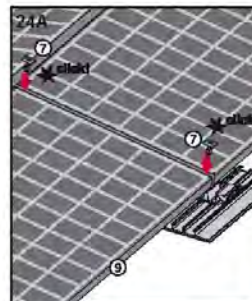
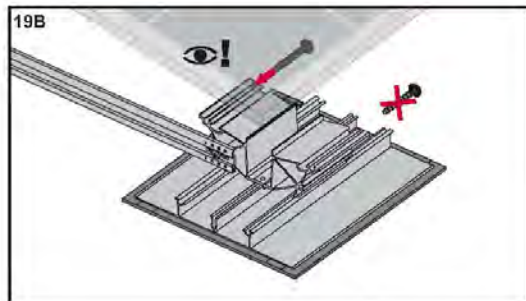
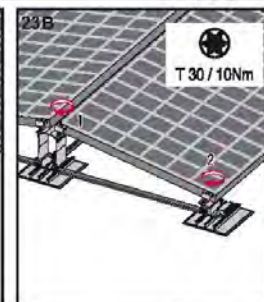
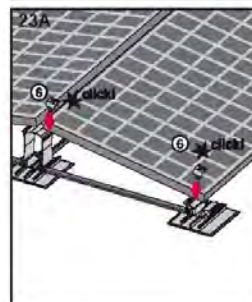
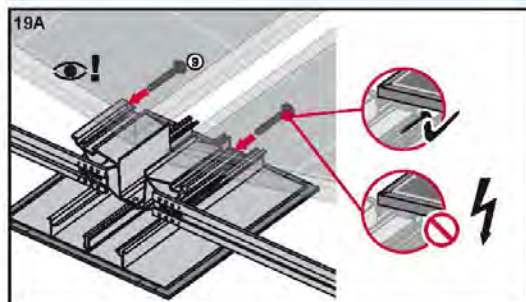
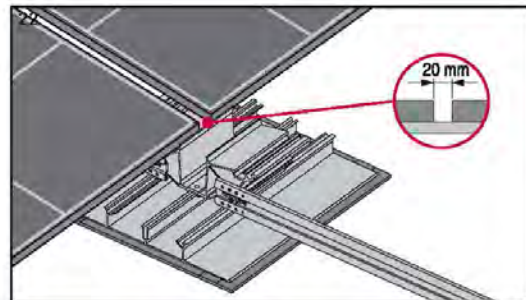
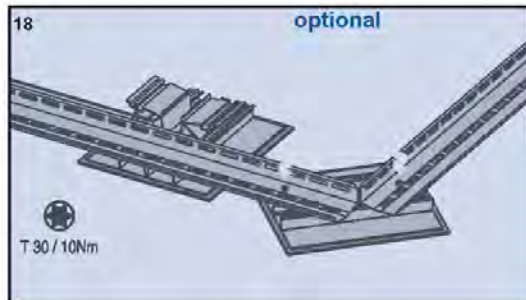
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Important notes and requirements

Input requirements for data entered into the software:

- The customer (user) has to verify thoroughly all required input parameters. In particular, the wind and snow load zones have to be verified with the local authorities. The project parameters must fit exactly the conditions on site and have to be determined at the customer's responsibility.
- Schweizer assumes no liability whatsoever for damages resulting from the use of incorrect data or incorrect software input from the customer (user).

Requirements concerning the output of the software ("software calculation"):

- The software calculation does not accommodate all individual specifics of a roof. The customer (user) is, at his own cost, obliged to have a skilled person check and approve the design of the photovoltaic substructure regarding a planned roof.
- The structural analysis is not part of the software calculation, but only the structural analysis of the solar mounting structure. The customer is at his own cost obliged to have a licensed engineer check the structural performance of the building and the suitability of the building and its roof for the installation of a photovoltaic structure. In particular, it has to be taken into account that the photovoltaic structure creates point loads that have to be supported by the building and its roof.

Further notes and requirements:

- The customer has to respect the instructions for use provided with the product, the operating instruction provided with the software report, as well as the appropriate norms and guidelines. The customer bears sole responsibility for the installation.
- The customer has to follow the mounting instruction of the module manufacturer and to observe the rules for accident prevention and safety regulations.

Technical notes concerning project and software:

General:

- The bill of material in the proMSP report contains the exact quantities of the individual items. There is a feature in the proMSP Software to round up the quantities of the individual items to the next bigger sales box quantity, due to the fact that only full sales box quantities can be ordered.
- The customer has to ensure to always use the latest version of the proMSP Software. The latest version will be provided by Schweizer on request and can be updated by using the update function of the software.

Design and calculation base:

- The design base depends on the selected country. The country can be selected under "Options" on the ribbon "Catalogue". Note: the language selection (options, ribbon settings) has no influence on the calculation base.
- For the country selection "Eurocode", the integrated "Load evaluation tool" on the ribbon "Wind and snow loads" can be used to determine the characteristic peak velocity pressure and the snow load according to the national annexes of Austria, Belgium, Bulgaria, Czech, Denmark, France, Greece, Hungary, Netherland, Slovakia, Slovenia, Spain and Sweden.
- Design and calculation base are the European Codes as well as their respective national annexes. At the time of proMSP Software development these were the following norms:

Design base for the country selection "Eurocode", "Germany" or "Great Britain":

- The basis for support structure planning is the European standard EN 1990:2010-04 including appendices.
- The design rules conform to the European standard EN 1991-1-1:2002-04 General actions; Densities, self-weight, imposed loads for buildings including appendices.

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- The determination of the snow load conforms to the European standard EN 1991-1-3:2003-07 Actions on structures – Snow loads including appendices.
- The determination of the wind loads conforms to the European standard EN 1991-1-4:2005-04 Actions on structures – Wind actions including appendices.
- The design of the support structures conforms to the European standard EN 1993-1-1:2005-05 Design of steel structures.
- The design of the support structures conforms to the European standard EN 1999-1-1:2007-05 Design of aluminium structures.
- The design of screw connections conforms to the German guideline VDI 2230 Blatt 1:2003-02 Systematische Berechnung hochbeanspruchter Schraubenverbindungen - Zylindrische Einschraubenverbindungen.

Design base for country selection “Italy”:

- The design rules conform to the European standard EN 1991-1-1:2002-04 General actions; Densities, self-weight, imposed loads for buildings including appendices.
- The determination of wind and snow loads conforms to Nuove norme tecniche costruzioni di cui al DM 01.14.2008. For roof types which are not covered by this Italian norm, the respective European standard is used.
- The design of the support structures conforms to the European standard EN 1993-1-1:2005-05 Design of steel structures, using the partial safety factors for the resistance of $\gamma_{M0} = 1.05$ und $\gamma_{M2} = 1.05$ according to the Nuove Norme tecniche per le costruzioni di cui al D.M 14/01/2008.
- The design of the support structures conforms to the European standard EN 1999-1-1:2007-05 Design of aluminium structures.
- The design of screw connections conforms to the german guideline VDI 2230 Blatt 1:2003-02 Systematische Berechnung hochbeanspruchter Schraubenverbindungen - Zylindrische Einschraubenverbindungen.

Design base for country selection „Switzerland“:

- The determination for snow loads conforms to SIA 261.
- The determination of wind loads is done with the basic wind velocity according to SIA 261 and the specific pressure coefficients according to the European standard EN 1991-1-4:2005-04 Actions on structures – Wind actions including appendices.
- The design of the support structures conforms to the European standard EN 1993-1-1:2005-05 Design of steel structures, using the partial safety factors for the resistance of $\gamma_{M0} = 1.05$ und $\gamma_{M2} = 1.05$ according to SIA 263.
- The design of the support structures conforms to the European standard EN 1999-1-1:2007-05 Design of aluminium structures.
- The design of screw connections conforms to the german guideline VDI 2230 Blatt 1:2003-02 Systematische Berechnung hochbeanspruchter Schraubenverbindungen - Zylindrische Einschraubenverbindungen.

Additional calculation base

- The customer is obliged at his own cost to prepare the roof before the installation of the solar mounting structure following the Schweizer assembly instructions, and to ensure all obligations as stated in the Operating Instructions are adhered to. During the installation the Schweizer assembly instructions need to be respected.
- For the calculation of the additionally required loads (“ballast”) the weight of the photovoltaic modules („PV modules“) and the Schweizer mounting structure are considered. The value of the total load per square meter in the report only includes the self weight of ballast, PV modules and the mounting structure and is referring to the total roof area. Further items such as cable trays, cables or similar are not considered in the calculation and need to be added manually.

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- Base for the software calculation is the module fastening using module clamps at the edge zone of the short side of the module. When using the released modules listed in this software this certificate has been given by the respective module manufacturer. If the customer (user) wants to use a different module it is his responsibility to clarify with the module manufacturer the suitability of the respective module for this fastening method. Further technical data of the modules incl. material data have to be taken from the module manufacturer's technical data sheets.
- If additional forces outside of dead weight, wind- and snow loads are acting on the structure, such as dynamic loads on the building, seismic loads etc. the situation has to be assessed by a licensed engineer. When indicated the mounting structure has to be additionally fastened.
- The determination of the windloads conforms to the European standard DIN EN 1991-1-4, Eurocode 1: Actions on structures – Part 1-4: Wind actions. There are also the National Annexes for the UK, Italy (Nuove norme tecniche costruzioni di cui al DM 01.14.2008), and valid for Switzerland SIA261.
- For the calculation of the required additional loads (ballast) Schweizer has determined the specific pressure coefficients experimentally according to WTG (Windtechnologische Gesellschaft) guidelines
- The friction coefficient values provided within the software are resulting from laboratory testing in ideal conditions with new materials. These values must be treated as representative values and the actual values for the installation in question will be impacted by environment factors and the condition of the roof. The friction coefficient used is the responsibility of the customer (user), whether provided within the software or determined in any other way. Note: Using a friction coefficient that is lower than the actual will have a detrimental effect on the safety of the installation.
- If the load distribution plate (MSP-FR-LDP) or base profile (MSP-FR-EW-BP) is positioned over an overlap of bitumen membrane layers, ensure a levelled surface by providing additional layers of protection sheet as appropriate (MSP-FR-EW-PSF).
- The bearing strength of the insulation must be the long term characteristic value.
- The customer is responsible for ensuring the compatibility of the load distribution plate (MSP-FR-LDP) with the roof skin and is responsible to determine if it is necessary to use the additional adhesive pads (MSP-FR-AP). If the customer determines that it is necessary to use the additional adhesive pads (MSP-FR-AP), the customer is also responsible for ensuring the compatibility of the adhesive pads (MSP-FR-AP) with the roof skin.
- The customer is responsible for ensuring the compatibility of protection sheet (MSP-FR-EW-PSF) with the roof skin.



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