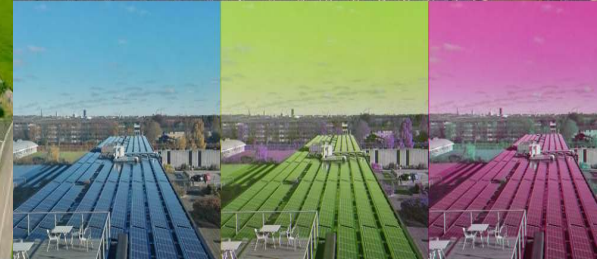


PV Mounting systems from Schweizer

The Easy and Reliable Mounting Solutions for PV Professionals

Markus Vogt
International Sales Manager
Solar System

04.03.2021



Agenda

- 14:00 h PROELEKTRO Welcome and Introduction
- 14:10 h Ernst Schweizer AG Introduction
- 14:20 h Flat roof mounting systems MSP FR EW and South
- 14:40 h PV roof tile Solrif® - The roof that earns money for you
- 15:00 h Layout Software Solar.Pro.Tool (SPT) from Schweizer
- 15:15 h Questions

The Company Ernst Schweizer

Family owned since 1920

Located in the village Hedingen (Zürich)

Switzerland



Facts and figures.

Founded	in 1920, as a family joint stock company
Market regions	Switzerland, Europe
Production sites	Hedingen, Möhlin, Satteins Austria
Sales offices	Berne, Hedingen, Lausanne, Lucerne, Möhlin, St. Gallen
Turnover	CHF 109 million
Number of employees	448, thereof 40 apprentices
Certifications	ISO 9001, ISO 14001, ISO 45001, Qualicoat, EN 1090

Owners since beginning: Today managed by the fourth generation.

100 years
Quality
Sustainability
Innovation



Jean Sessler
The founder

1920



Ernst Schweizer
The innovator

1930



Hans Ruedi Schweizer
The sustainability pioneer

1977



Samuel Schweizer
The future

2019+

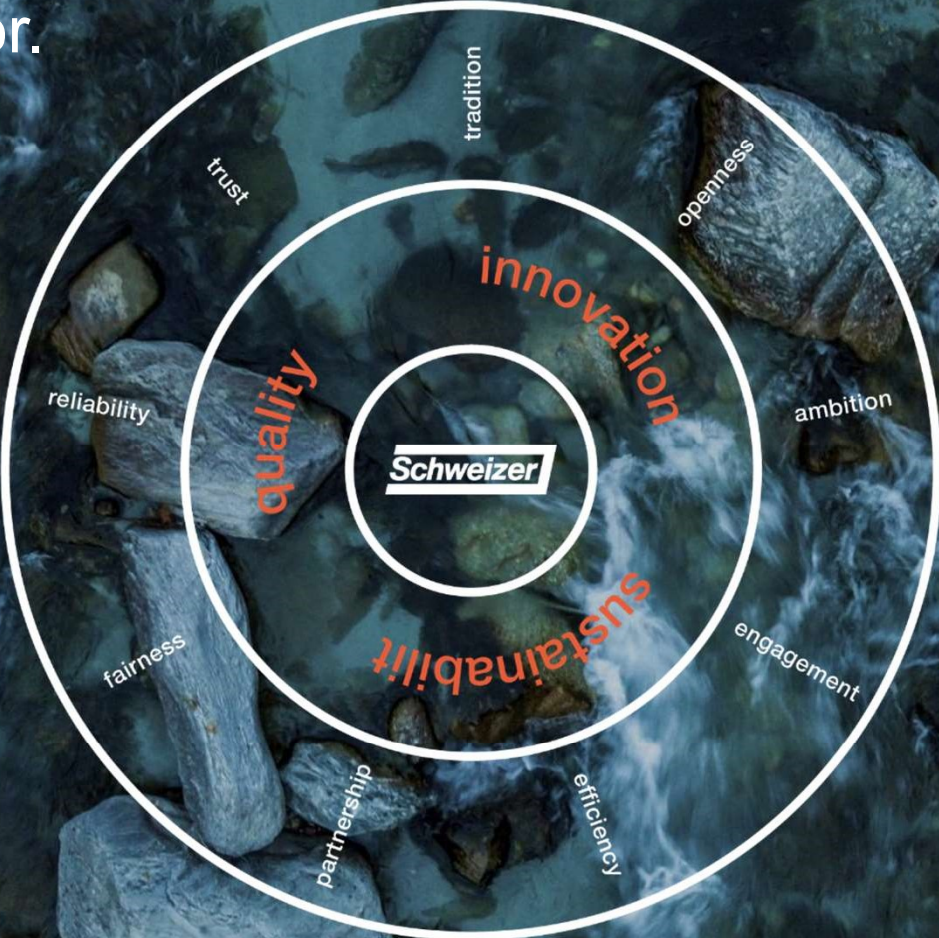


Samuel Schweizer
President of the corporate
executive board

Roman Berger
Member of the corporate
executive board

Aleksander Horvat
Member of the corporate executive board
Head of finance

What we stand for.



Prizes and awards

Sustainability



Prix solaire suisse
Schweizer Solarpreis

Gewinner des
Watt d'Or 2009
Die Auszeichnung für Erfindungen im Energiebereich
unter dem Patronat des Bundesamts für Energie

öbu
works for
sustainability.

Social commitment



WIRTSCHAFTSRAUM
ZÜRICH



Family
Business
Award



„This-Preis“
Preisverleihung 2010
24. Januar 2010

Innovation



GERMAN
DESIGN
AWARD
WINNER
2016



GERMAN
DESIGN
AWARD
SPECIAL
2017

Award



State visit
Switzerland-France 2015

Organised in six business units.



Façades



Wood/metal



Operable and sliding walls



Letter and parcel boxes

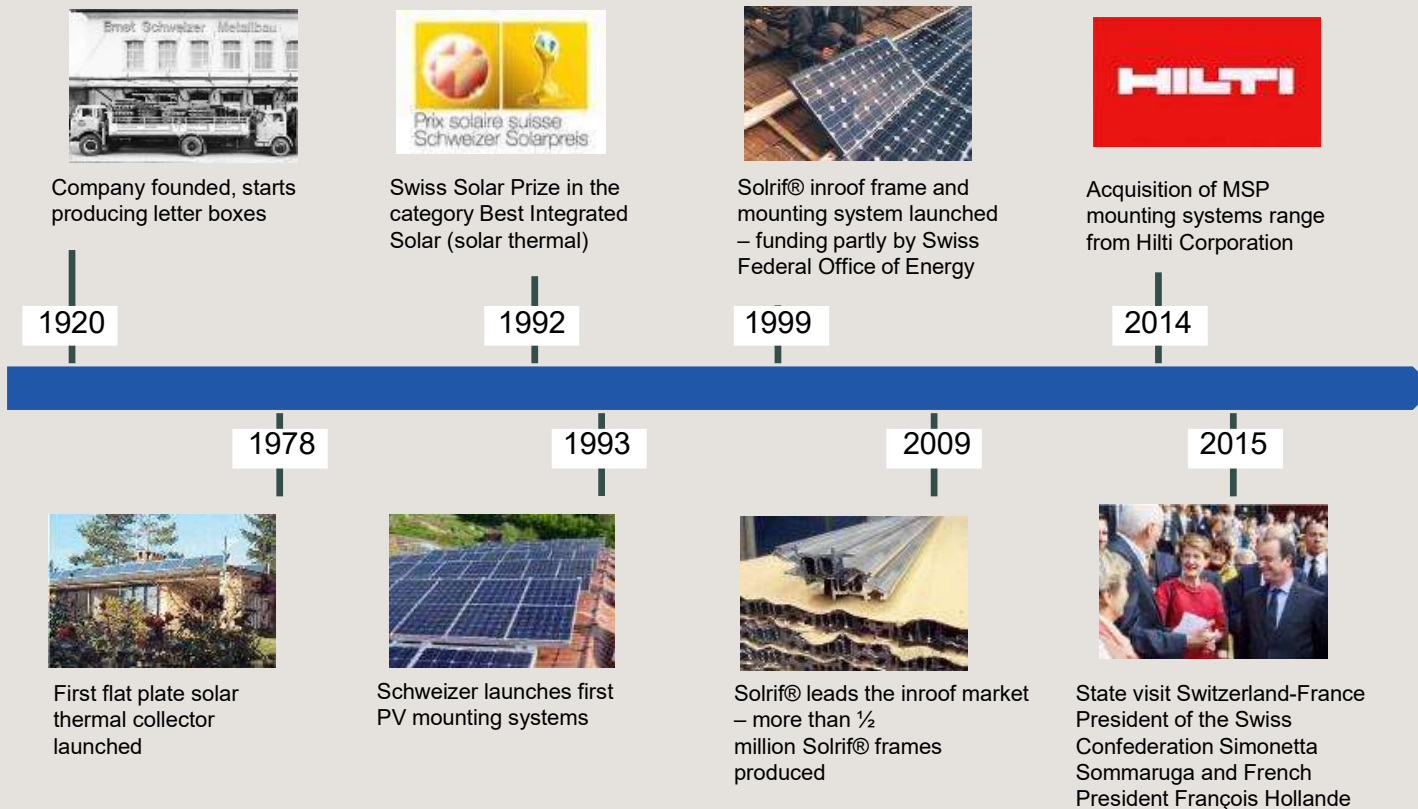


Solar systems



Production services

Solar history: Schweizer Solar and BIPV Pioneer



Solar and PV Products

Schweizer



- In-roof solar thermal collectors (also on-roof collectors available)



- Solar thermal collectors for flat roofs



- Solrif® in-roof PV (BIPV)



- Rooftop MSP PV mounting range (flat roofs, metal roofs and pitched roofs)

What is most relevant for your PV Mounting System ?



- Fast and reliable software tool



- Easy and quick installation



- Optimal storage and logistics



- Safe longterm energy production

MSP Product Range



MSP-PR for pitched roofs

Click-in system makes install easy and fast

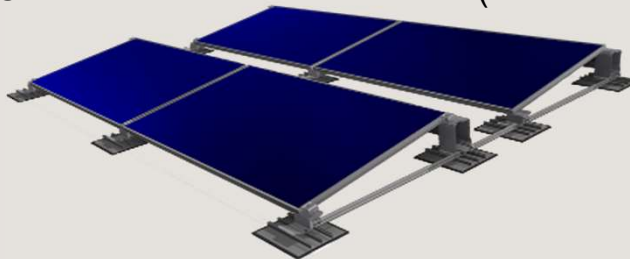


MSP-TT for trapezoidal metal roofs. Only 4 components for fast, cost effective installation



MSP-FR-S mounting system for flat roof (South)

Combinable with MSP-FR-EW (East-West)



MSP-FR-EW mounting system for flat roof (East-West)

Optimized for minimal ballast and installation costs



MSP Flat roof System East West (MSP FR EW)

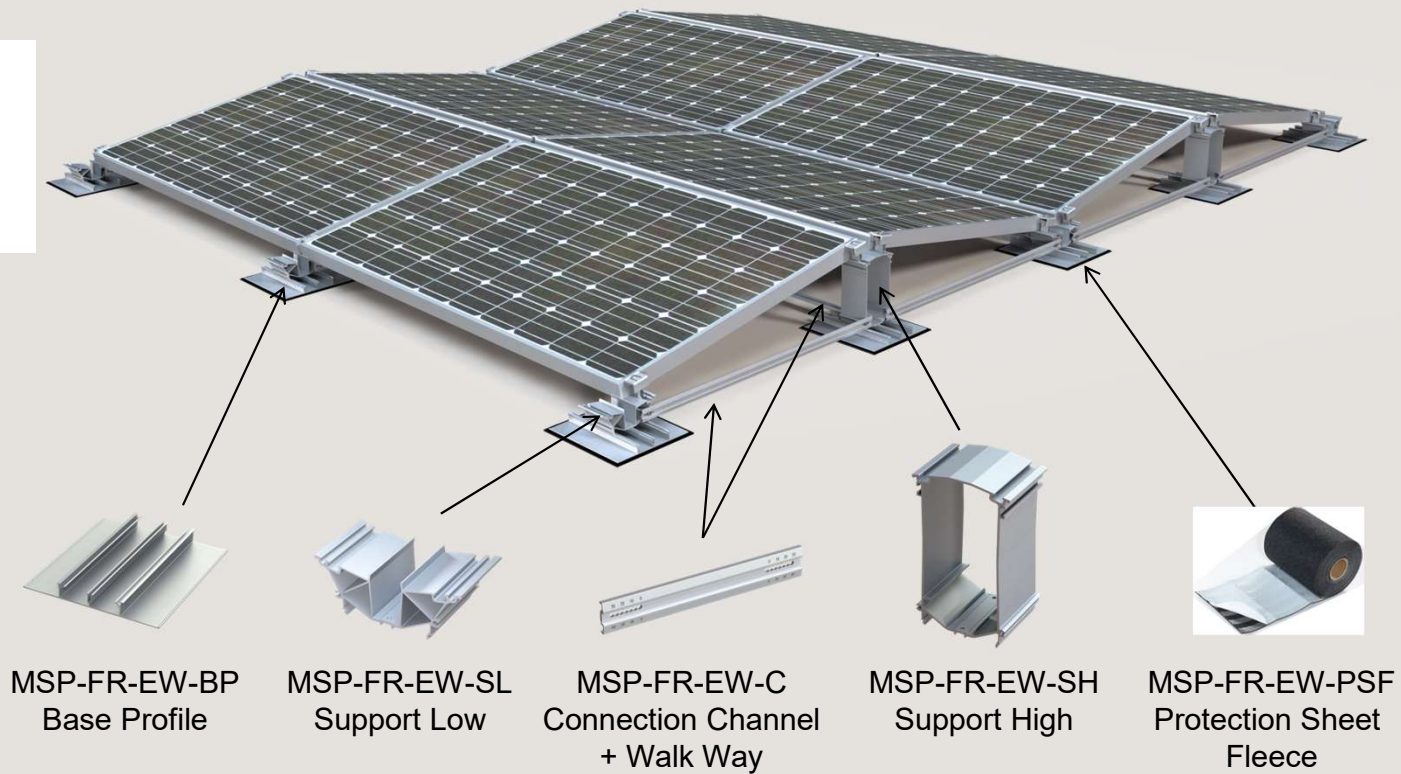


The Easy and Reliable Mounting Solutions for PV Professionals








- Design and quality from Switzerland
- Fast and easy installation
- Aerodynamic with little ballast
- Quick and flexible planning software

5 Main MSP FR EW Components

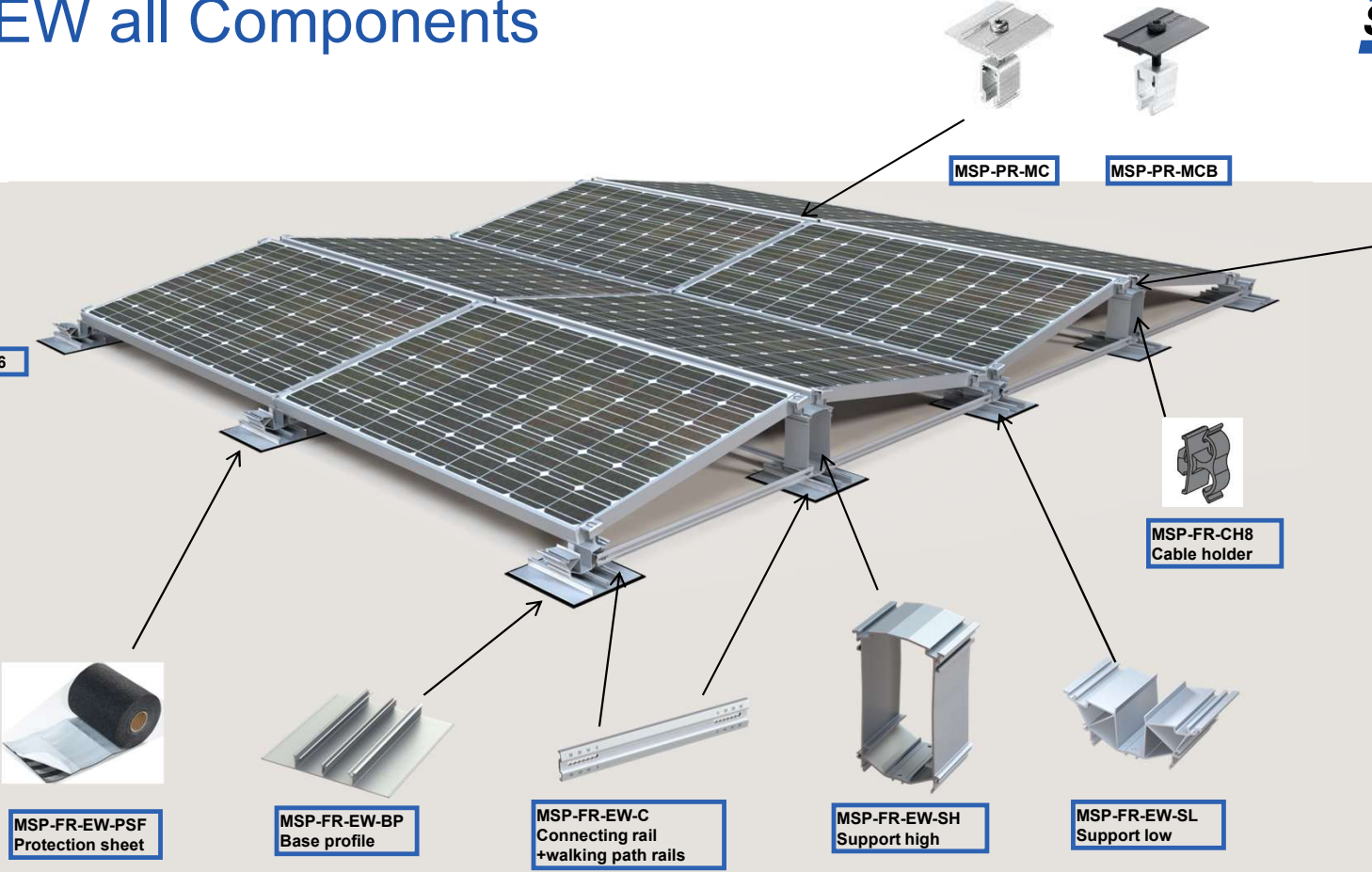


MSP-FR-EW – Further Components



Clamps	MSP-PR-MC (also in black) 	MSP-PR-EC (also in black) 
Screws	MSP-FR-S 6x16 	MSP-FR-GS 6x60 
Cable Management	MSP-AL-CH 8 	

MSP FR EW all Components



One Page System Overview



Modules Supported:

Width: 950-1075 mm
Length: 1495-1559, 1620-1780, 1945-2001, 1945-2139 mm
Type: Framed (30-50mm)

Speed steps

Preassembly friendly
Scaling of channels

Walk paths

Min width: 0.32m, max: 2m
Direction: North-South
Frequency: max after every gable, min is none
(not shown in pictured)

Block size (a x b)

Maximum: 14 m x 14 m
Minimum: 3 gables x 1 row or 1 gable x 3 rows

Clamps

Universal MSP clamps – one size fits all

System height
280-292mm

Clearance height
80 mm

Protection sheet

450g/m² / 4mm thick PES fleece
(on pre-perforated roll)

Ballast

Concrete Stones 200 x 100 x (50 -80) mm

Non-rail system

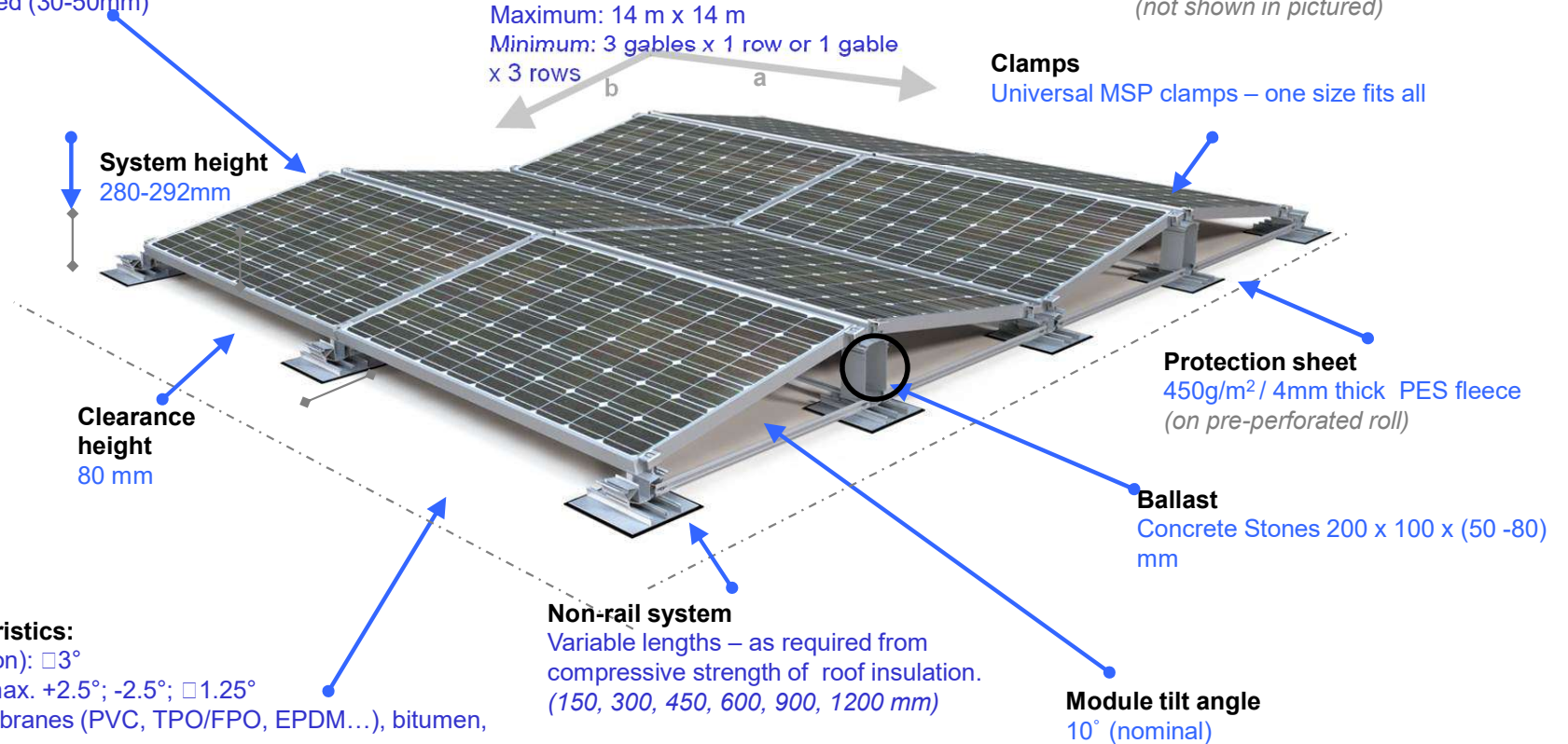
Variable lengths – as required from compressive strength of roof insulation.
(150, 300, 450, 600, 900, 1200 mm)

Module tilt angle

10° (nominal)

Roof Characteristics:

Pitch (w/o fixation): $\square 3^\circ$
Unevenness: max. $+2.5^\circ$; -2.5° ; $\square 1.25^\circ$
Covering: Membranes (PVC, TPO/FPO, EPDM...), bitumen,



Fleece Protection Sheet

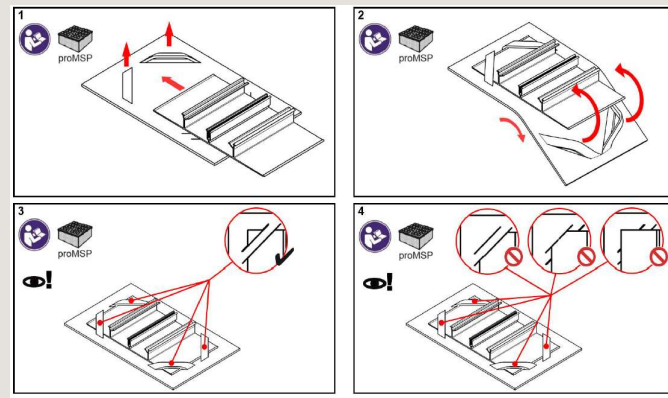
Two options 1 Roll (for all baseplate sizes) and 2 layer with corner slots (for 15 and 30 cm base plates)

- Pre-perforated roll – no need for measuring and cutting
- Cost effective and fast handling
- providing mechanical and chemical protection to all roof membranes
 - => *no issues due to softener movement*

1 Standard Pre-perforated roll



2 Layer with corner slots **reduces ballast** on high friction membranes

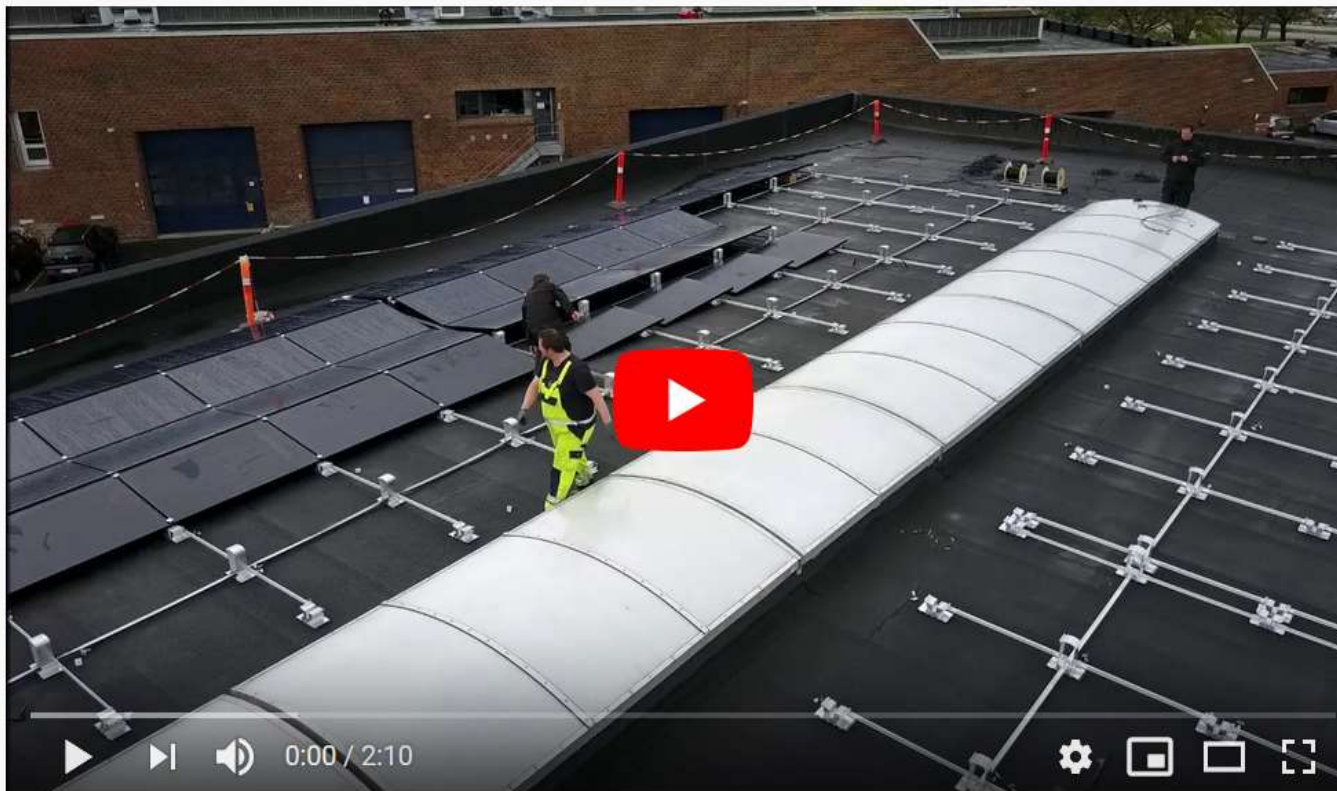


MSP-FR-EW mounting video



Further MSP FR EW Mounting Videos

Schweizer



- [Sample installation and explanation](#)
- [Mounting in customer project](#)
- [Mounting project in Germany](#)
- [Project Axpo Switzerland](#)

Installation Speed = 7 – 15 min / kWp

MSP-FR-EW: Speed of Installation

Study Project: 31 kWp / 124 panels / 6 blocks / 250 kWp panels / no walking paths
Project Location: Vorarlberg, Austria Date of study: August 2013

Per installer	Time/kWp (seconds)	Time/Panel (seconds)
1. Preparation		
Unpack Components	42	10
	0.7 mins	0.2 mins
2. Pre-assembly		
Separate protection sheet pieces	13	3
Attach protection to base profiles	65	16
Click low supports to base profiles (incl. screwing)	35	9
Click high supports to base profiles	12	3
Pre-install screws on channels	39	10
	2.8 mins	0.7 mins
3. Install mounting structure		
Locate block starting co-ordinates	10	3
Layout pre-assembled components	62	16
Screw channels to supports	111	28
Position ballast	0	0
Install grounding screws	28	7
	3.5 mins	0.9 mins
4. Fix panels (excl. electrical work)		
Place panels on mounting structure	161	40
Click clamps into supports	80	20
Align structure	151	38
Screw clamps onto panel frames	79	20
	7.8 mins	2.0 mins

MOUNTING STRUCTURE INSTALLATION:

7.0 mins/kWp/installer (1.7 mins/panel/installer)

PV INSTALLATION:

14.8 mins/kWp/installer (3.7 mins/panel/installer)

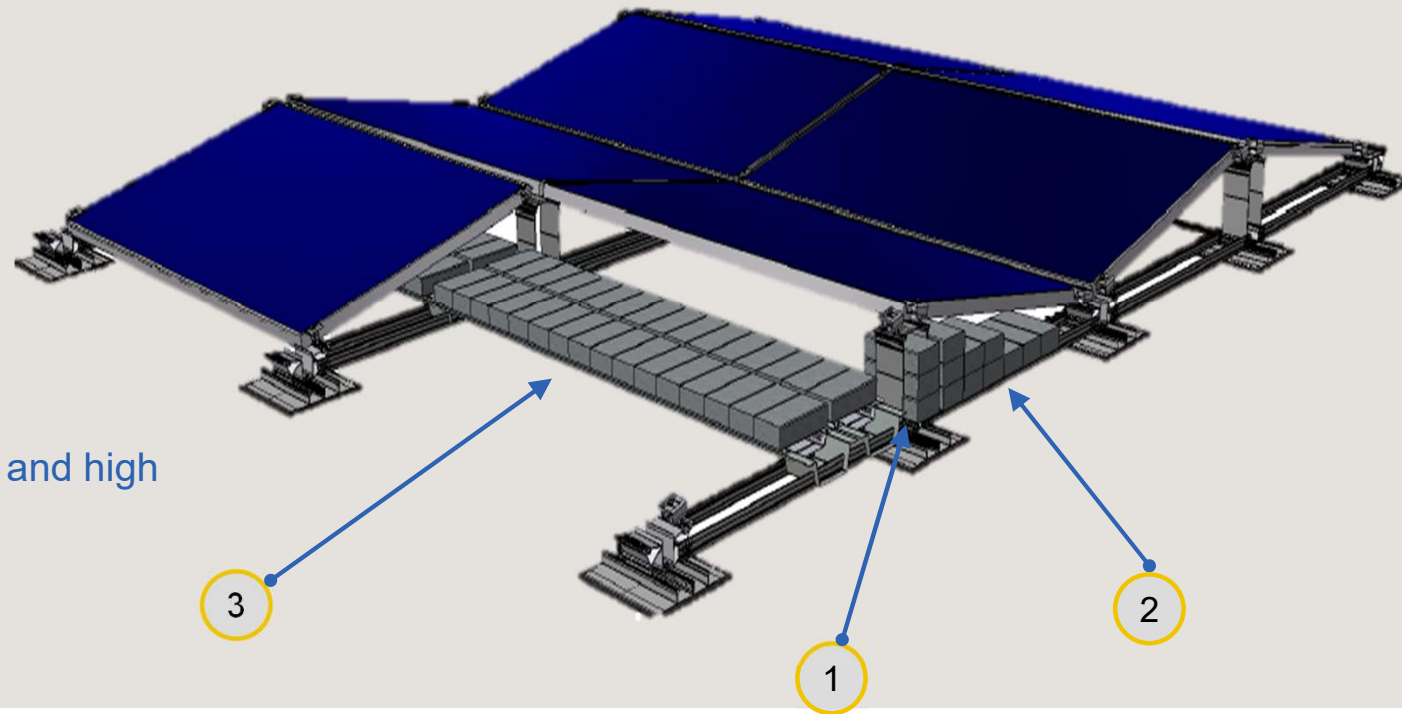
Installing with 250 kWp panel

- Mounting system 1.7 min / panel / worker
- PV installation = 3.7 min / panel / worker

MSP FR EW System is Generally Low in Ballast



Typical total project area load: 13 kg – 15 kg/m² (including module, system and ballast weight)



Ballast is Placed as Following

- 1 In support high
- 2 Over two rails between support low and high
- 3 On max 2 ballast trays (50 kg each)

Ballast in Projects



- Ballast in support high



- Ballast support high and on second rail



- Ballast side view under modules



- Project with 2 ballast stone types

Base Profiles Instead of Continuous Rails



6 Lengths - compatible with all Roof Insulation Types

- No **disruption of roof drainage** - increases roof durability
- **Uniform load transfer to roof** and tolerates uneven roof surfaces
- **Can be built on any roof insulation and membrane type** – no restrictions in use
- **Less material and short parts lower lowers** material and transport costs



Base profile	Length (mm)
MSP-FR-EW-BP 150	150
MSP-FR-EW-BP 300	300
MSP-FR-EW-BP 450	450
MSP-FR-EW-BP 600	600
MSP-FR-EW-BP 900	900
MSP-FR-EW-BP 1200	1200

Longer Base Profiles on Beer Brewery Waldhaus Black forest Germany



Installation and finalized Project Picture



Optional Walkways for access to modules or - to overcome roof obstacles



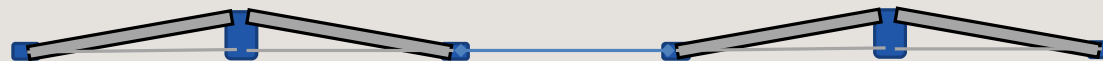
1. No walkway: panels share low shorts in east-west direction



2. Narrow walkway: small connection channel (MSP-FR-EW-C 300-360) installed – 300mm



3. Wide walkway: any of the longer connection channels installed – up to 2m



4. Positioning of walkway: completely flexible

Examples of Walkway Options



- Walkway after each module gable



- Walkway after every second module gable

Roof Inclination $> 3^\circ$ System Needs to be Fixed from Sliding - Here four Solution examples

(Maximal possible roof inclination = 10°)



- Fixing over roof gable



- Detail fixing over roof gable

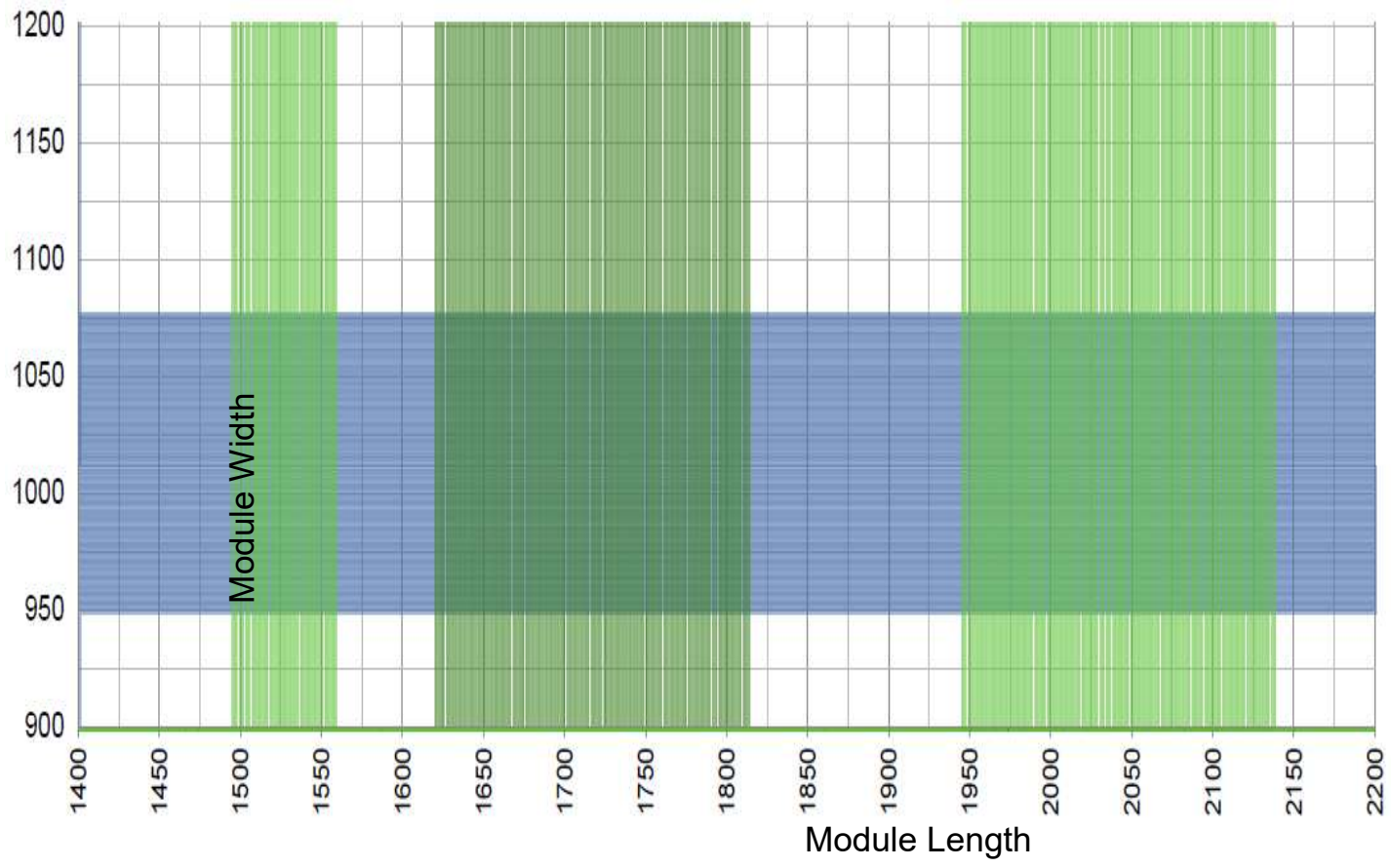


- Fixing on roof sink



- Fixing on roof life line fixing points

MSP FR Currently Possible Module Dimensions



- Module width in mm: 950 – 1075 mm
- Module length in mm: 1495 – 1559* / 1620 – 1814 / 1945 -2139*
- *Only MSP FR East West no ballast trays / wind shields

MSP-FR-EW – Benefits



Swiss Designed

- Compatible with any kind of flat roof membrane and insulation
- Wind canal tested for minimized ballast
- Installing in high wind and snow load areas possible (ex. coast of Norway)
- Optimal water flow due to use of base profiles ('feet') instead of long rails

Simple to Use

- Only single tool (Torx 30) necessary for complete installation
- Fast and simple installation 15 min / kWp
- Self measuring and non-error prone set-up
- Optimal logistics (few articles small packaging)

Cost Effective

- Minimal roof load = can be built on roofs with low load reserve (~ 13 – 15 kg/m² area load)
- Universal clamps (one clamp for all panels and all Schweizer systems)
- Can be part of lightning current carrying system of the roof
- Solid system => long-term low costs in maintenance
- Fast installation and low ballast => cost advantage 2 - 4 € /module

Reference Projects MSP FR EW, Denmark

Schweizer

- Hyvedove Hospital
Copenhagen
- Project size 1.3 MW
- Built in 2016



Reference Projects MSP FR, Norway



- Norwegian Petroleum Directorate
- In Stavanger Norway
400 kWp
- Built in Q2 2019

Reference Projects MSP-FR-EW, Norway



- Norway, Multifamily Homes
- Hovila Norway
- Built in 2018
- Picture Summer

Reference Projects MSP FR EW Norway



- Norway, Multifamily Homes
- Hovila Norway
- Built in 2018
- Picture Winter

Reference Projects MSP FR EW, Norway

Schweizer



- Bogafjell school
- Sandnes Norway
- Total project 744 kWh / kWp
- Built 2020
- Use of 2 types of ballast

Reference Projects MSP FR EW, Switzerland



- MSP Range customized black
- Lake Geneva Bath in Switzerland
- On demand anodized black is possible!

Example of Cable Management and Grounding



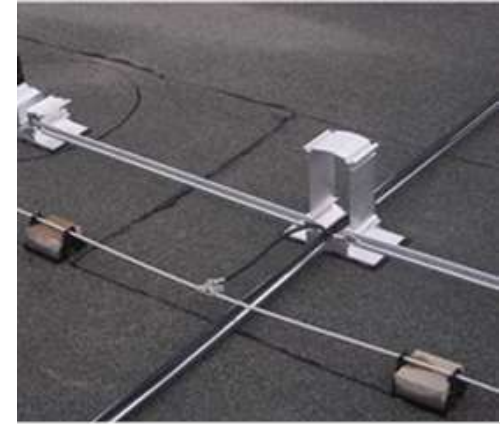
- Fixing in between support low



- Cable channel under modules



- Fixing on support low



- Grounding example

MSP Product Range



MSP-PR for pitched roofs

Click-in system makes install easy and fast

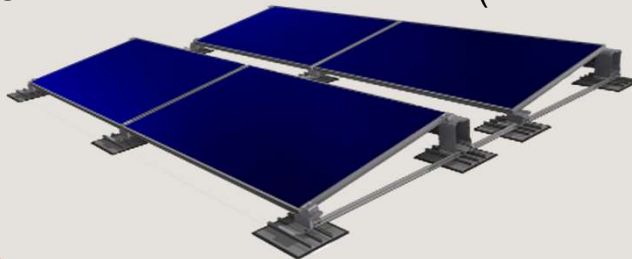


MSP-TT for trapezoidal metal roofs. Only 4 components for fast, cost effective installation



MSP-FR-S mounting system for flat roof (South)

Combinable with MSP-FR-EW (East-West)



MSP-FR-EW mounting system for flat roof (East-West)

Optimized for minimal ballast and installation costs



MSP Flat roof System South (MSP FR S)

The Easy and Reliable Mounting Solutions for PV Professionals

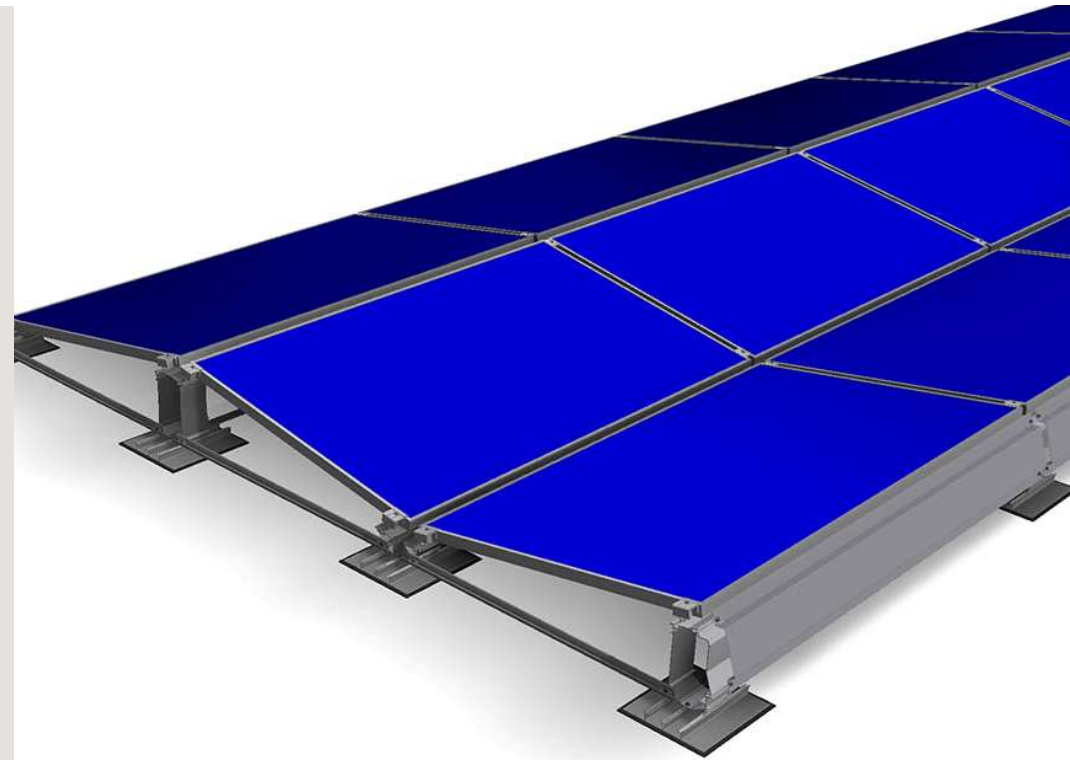


- Design and quality from Switzerland
- Fast and easy installation
- Combinable with MSP-FR-EW (East-West)
- Quick and flexible planning software

Useful Feature – Combine MSP-FR-East-West and -South

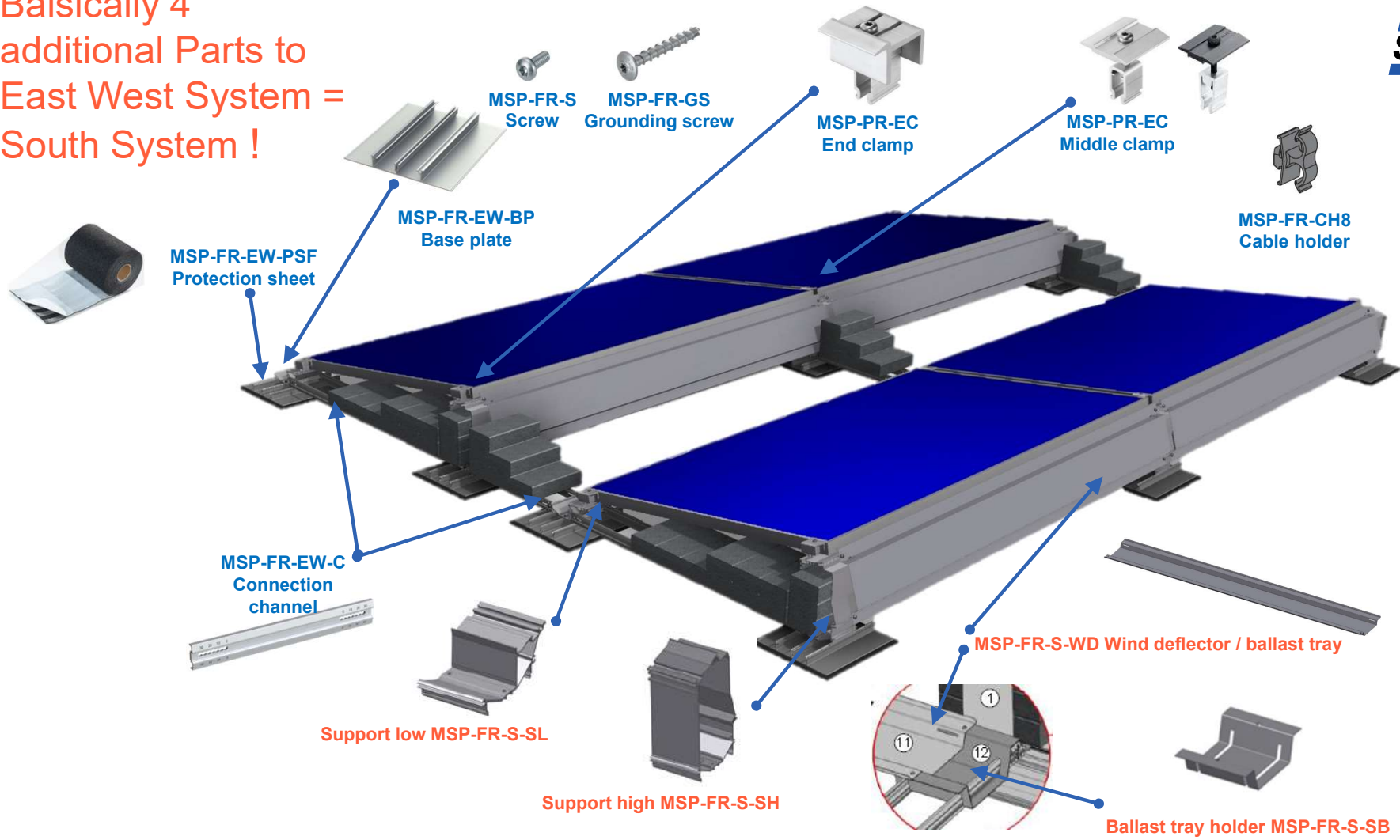


- MSP-FR-S is fully compatible and combinable with MSP-FR-EW
- For example a single column MSP-FR-S can be added to an MSP-FR-EW installation. See example below



Baisically 4
additional Parts to
East West System =
South System !

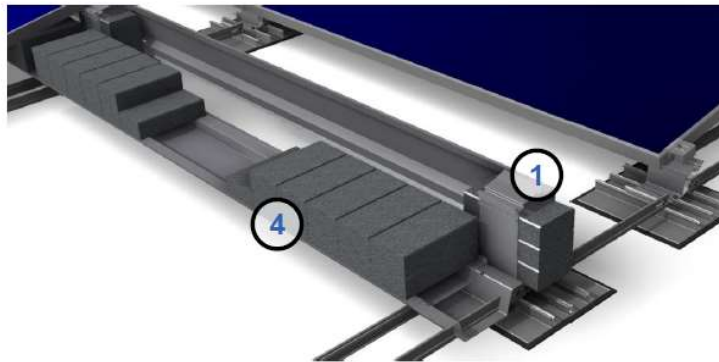
Schweizer



Dimension and Positioning of Ballast Stones

Dimension of ballast stones:

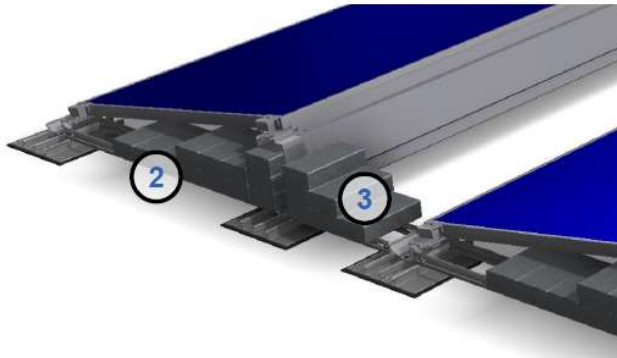
- length: 200 mm
- width: 100 mm
- thickness: 40 - 80 mm



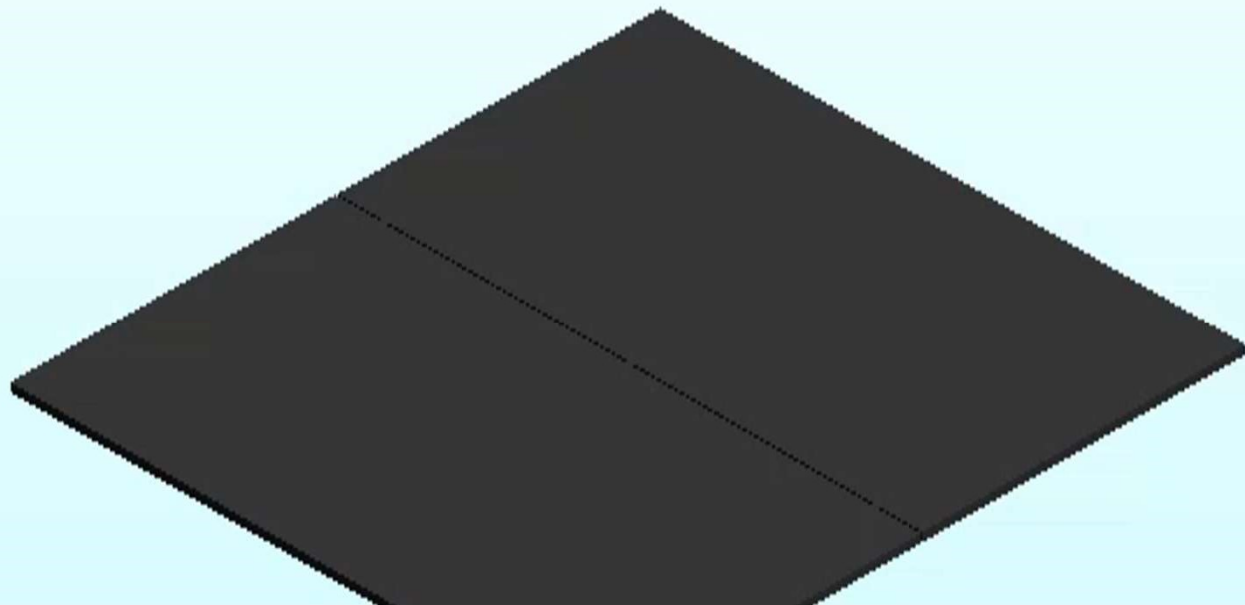
Positioning ballast

1. On supports high
2. On two connection channels
3. On two distance connection channels
4. On additional wind deflector(s) used as ballast trays

Amount of maximum ballast depends on used stone thickness, panel width and distance connection channel



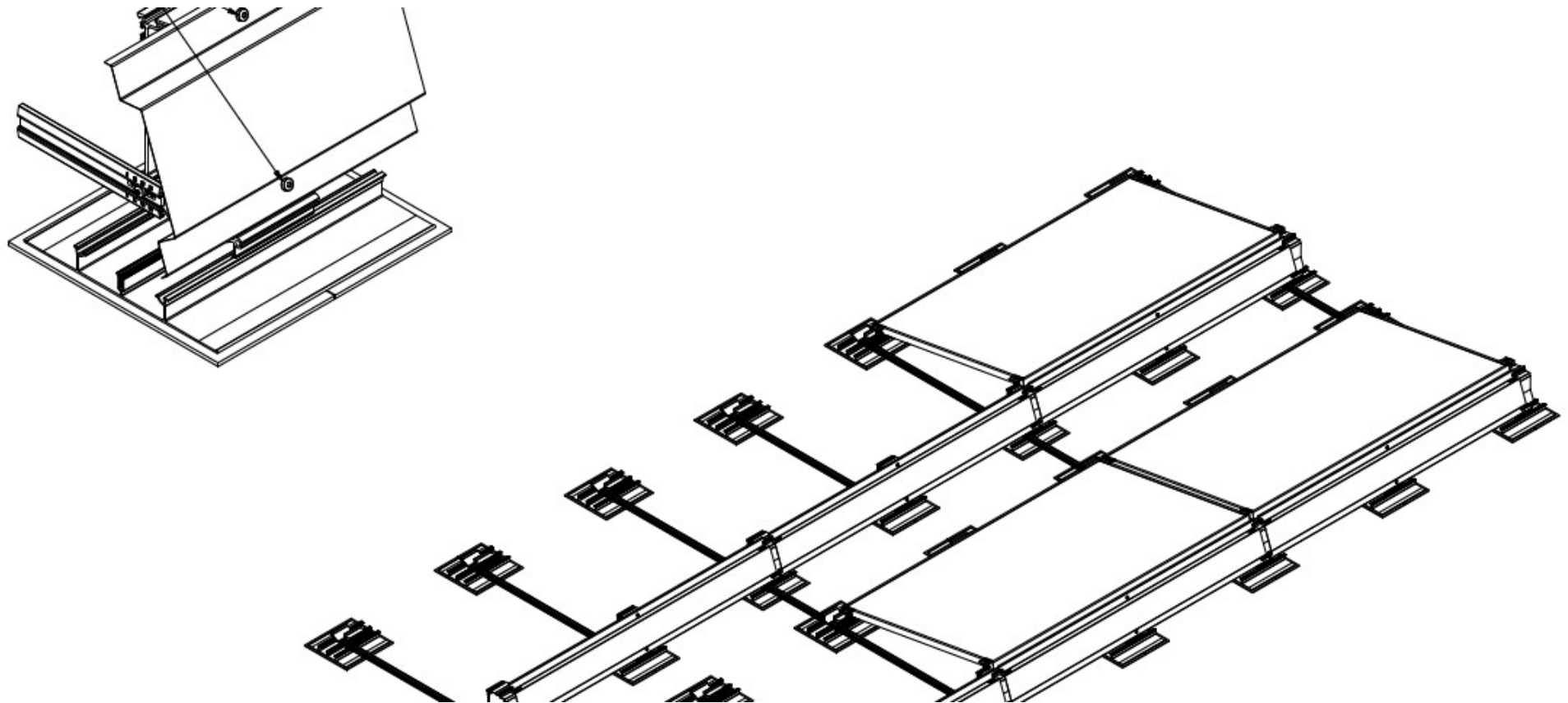
Mouting Video MSP FR S



MSP FR S during installation Two Ballast Trays with Ballast Stones in Project



Additional Support for High Snow Loads for MSP FR S



Reference Project MSP-FR-S, Germany



- Milk factory

Denmark, Sønderborg small 20 kWp installation Project with ballast trays



MSP-FR-S Special Solution in the NL Ground Mounted



Mounting MSP FR S on Trapezoidal Roof Customer Solution in Bulgaria



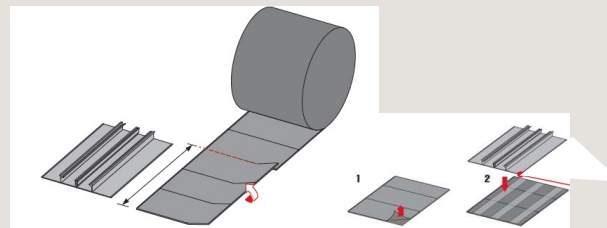
Important Preassembly Installation Steps MSP FR EW and South for Faster Installing



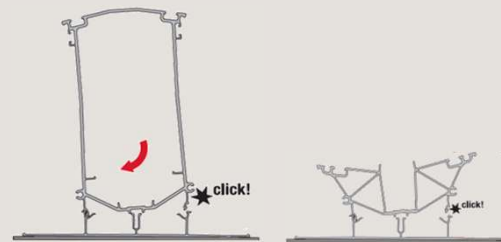
On-Site Preassembly in 3 Simple Steps



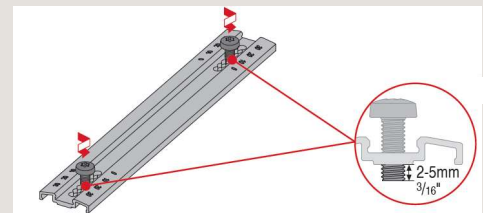
- 1) Adhesion of protection sheet to underside of base profiles



- 2) "Click-in" assembly of base profiles to supports



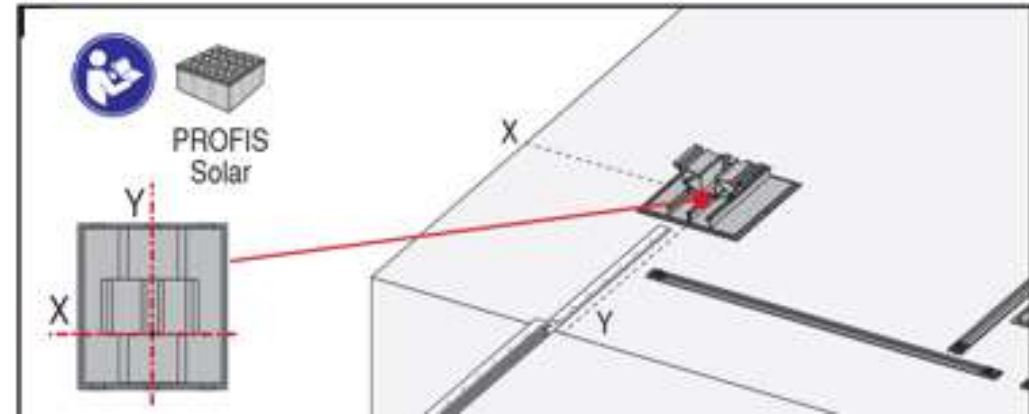
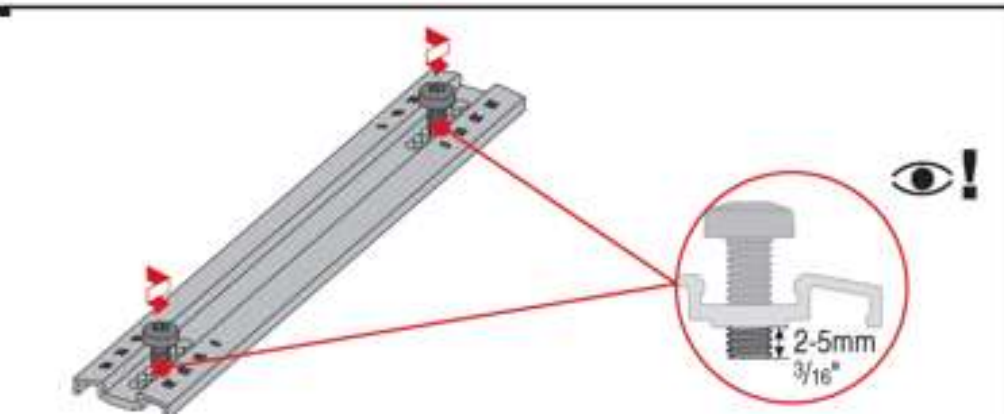
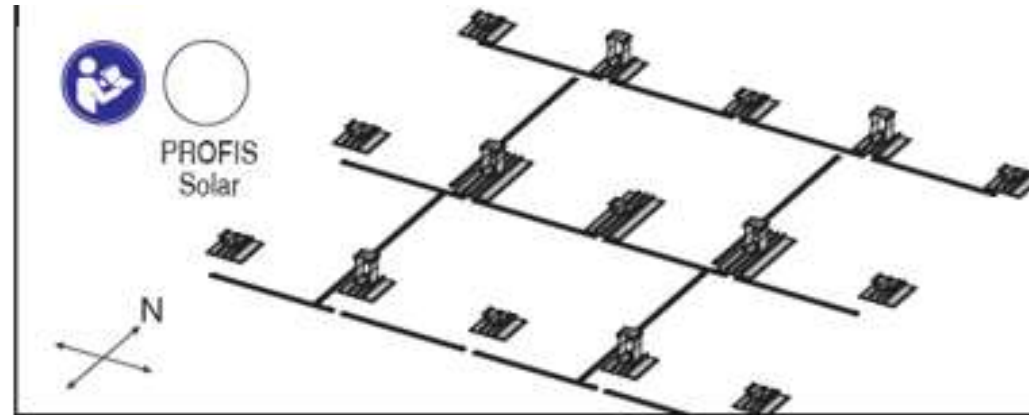
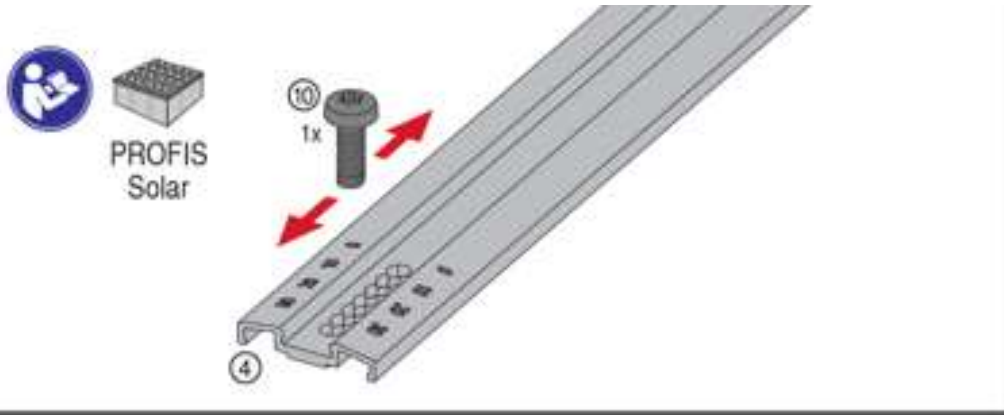
- 3) Pre-positioning of screws in connection channels



Preassembly of Protection Sheets, Protection Layer, Base Profiles and Supports Low and High



Preassembly of Screws in Connection Channels, and Layout on Roof









Preassembly of Screws on Table



Approvals and Certificates MSP-FR EW and South



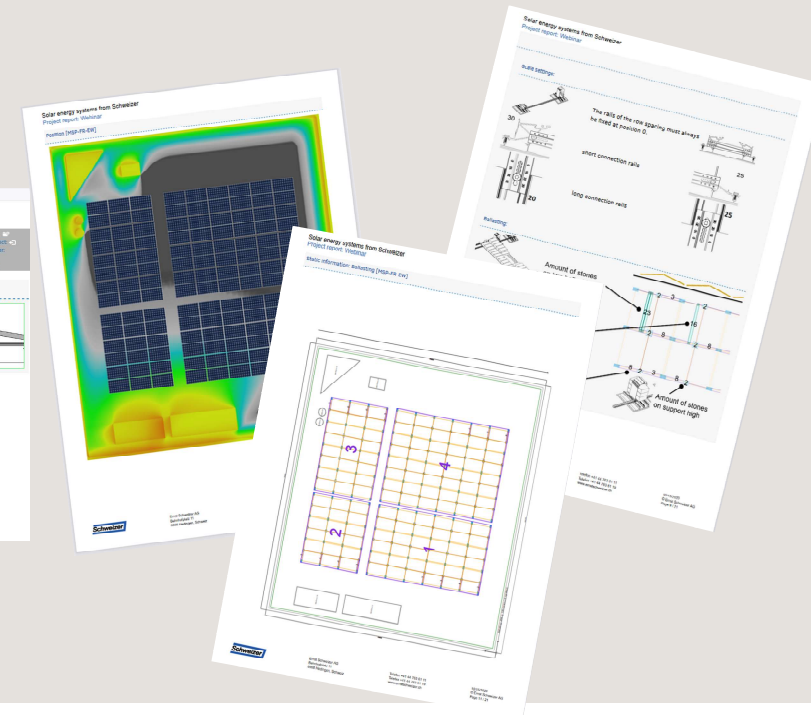
 	TÜV	Full system certification
	MPA	Durability of materials, including contact corrosion for a lifetime of 20+ years
	VDE	Equipotential resistance (DIN VDE)
	DiBT	no certificate (only for roof connected needed)
	Warranty	10 years

Fast, Flexible and Secure Planning with our Solar.Pro.Tool (SPT) by Schweizer



Solar.Pro.Tool design software offers layout planning for optimum utilisation

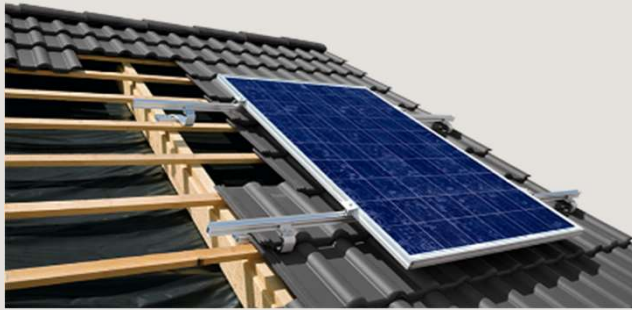
- Provides complete documentation incl. structural calculations, parts list, drawings, electrical planning and pricing
- Solar.Pro.Tool software is a cloud based solution (tutorials under <https://en.msp.solar/planungssoftware>)



MSP Product Range

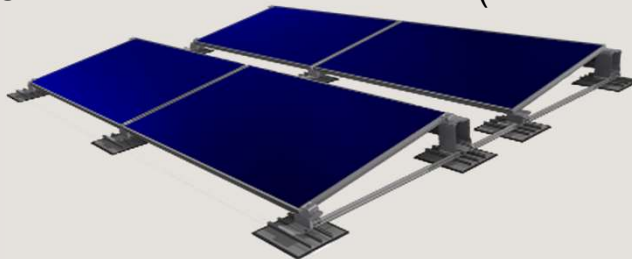
MSP-PR for pitched roofs

Click-in system makes install easy and fast



MSP-FR-S mounting system for flat roof (**South**)

Combinable with MSP-FR-EW (East-West)



MSP-TT for trapezoidal metal roofs. Only 4 components for fast, cost effective installation



MSP-FR-EW mounting system for flat roof (**East-West**)

Optimized for minimal ballast and installation costs



MSP-PR Mounting System for Pitched Roofs

Schweizer



The MSP-PR – Overview



MSP-PR –12 Components in Total for several applications

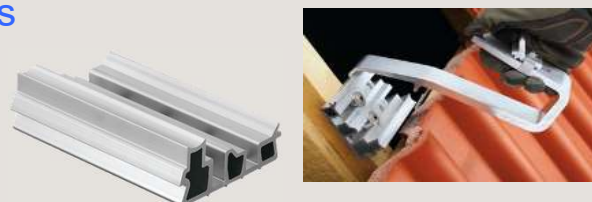


Roof hooks



MSP-PR-RHF **MSP-PR-RHA** **MSP-PR-RHC**

Base plates



MSP-PR-BP39 **MSP-PR-BP45**

Spacer



MSP-PR-SP10

Channel



MSP-PR-CH 6.0 m
MSP-PR-CH 3.3 m
MSP-PR-CH 2.07 m

Joiner / Sleeve



MSP-PR-SL



Clamps (also in black)








MSP-PR-MC **MSP-PR-EC** **MSP-PR-WHC**

Mouting Video



MSP PR – Advantages of the System



<p>System</p> 	<ul style="list-style-type: none"> ▪ All components can be installed using the Klick-In system ▪ Variable applications possible through modular system design ▪ Quick installation through click-in, universality and only 2 required tools ▪ Simplified stock-keeping ▪ Components can be positioned at any point
<p>Roofhooks /Base plates</p> 	<ul style="list-style-type: none"> ▪ Low weight and high performance ▪ Free positioning of the base plate on the rafter ▪ Fewer hooks means easier stock-keeping and lower costs ▪ Tool-free, quick and easy clicking into the base plate ▪ Flexible horizontal movement ▪ Pre-assembled and non-twisting wing clamp, no small parts
<p>Rails</p> 	<ul style="list-style-type: none"> ▪ Easy handling by mounting (click in) and screwing the rail from the top ▪ Rail geometry optimally matched to the system components ▪ Closed profile for better stability
<p>Connector</p> 	<ul style="list-style-type: none"> ▪ Continuous mounting over the installed rail connector is possible ▪ Tool-free working: Quick and easy assembly without screws
<p>Clamps</p> 	<ul style="list-style-type: none"> ▪ Universal clamps for all frames 30 – 50 mm (and MSP range) ▪ Preassembled parts: Time saving - no small parts necessary ▪ Simple and fast clicking in of the clamp into the rail from above ▪ Can be moved in the mounting rail ▪ Simple demounting of the modules possible

Fixing of Base Plate



Installed Hooks



Installation Examples

Schweizer



Optio for High Snow Loads and Flat Tiles

Schweizer



Hanger Bolts MSP-PR-HB, Self-tapping Screws MSP-STS and Adapter Plate MSP-PR-HBP



Benefits

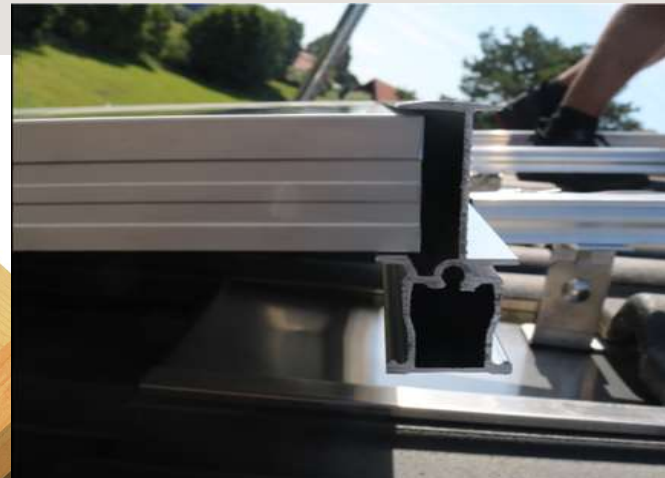
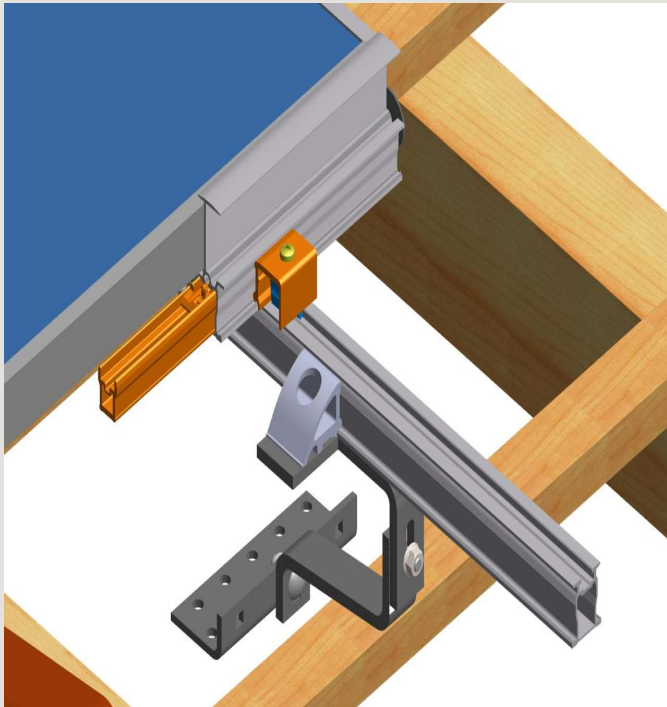
- **100% compatible with MSP-PR** (channel, sleeve, clamps)
- **For fixing into timber structures, self-tapping screws** for fixing into **steel structures**
- **One step klick-in of mounting channel**
- **Horizontal & vertical positioning possible**
- **Pre-assembled, no small parts**
- **One size fits all** (M10 & M12)

Technical data

Material (screw)	A2 stainless steel (1.4301)
Sealing material	EPDM
Diameter (HB)	10 mm, 12 mm
Diameter (STS)	M10 (tip), 8 mm (



MSP PR Inlay System = Option With Special Rails For High Snow Loads and Better Look



Installation Example (Two Layer Mounting)



Installation Hooks and Rails

Schweizer



MSP Product Range

MSP-PR for pitched roofs

Click-in system makes install easy and fast

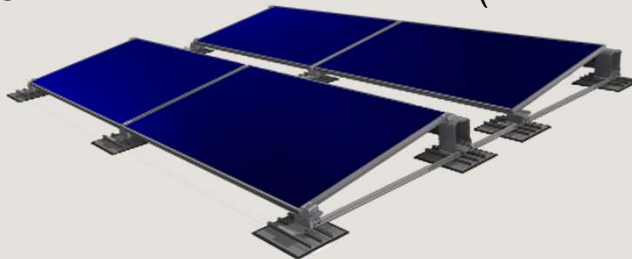


MSP-TT for trapezoidal metal roofs. Only 4 components for fast, cost effective installation



MSP-FR-S mounting system for flat roof (South)

Combinable with MSP-FR-EW (East-West)



MSP-FR-EW mounting system for flat roof (East-West)

Optimized for minimal ballast and installation costs



The MSP-TT – System Overview



A total of only 4 components required for fast and simple mounting.



Simple and reliable mounting.



Cutting on site or drilling are unnecessary.

Video of Installation MSP TT in Germany

Schweizer



– [Video TT](#)

March, 4th 2021 © Ernst Schweizer AG

MSP TT Project in Austria



Ernst Schweizer AG

Thank you for your interest and attention!

Markus Vogt

Sales Consultant Solar systems

Markus.vogt@ernstschweizer.ch

Direct +41 44 763 63 57

Mobile 079 311 56 55

www.msp.solar

www.solrif.com

www.ernstschweizer.ch

