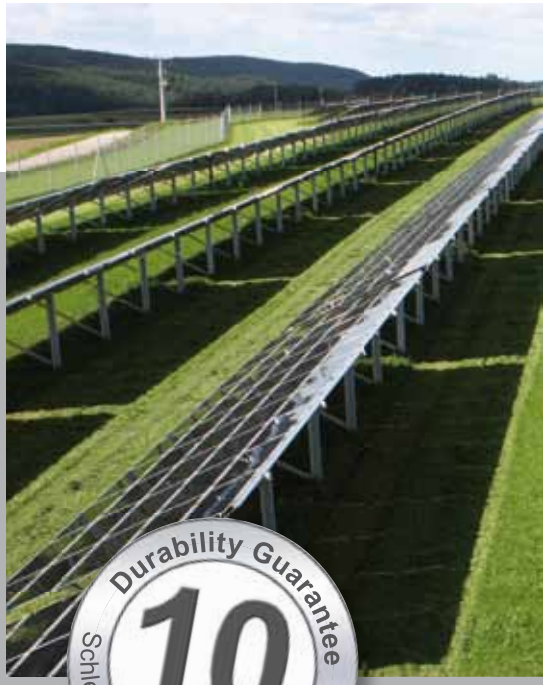
Professional solar mounting systems
Open area systems

SCHLETTER GmbH



FS systems - innovations
...that´s the way to build big solar plants

The Schletter Open area system has been designed in order to provide an economic and convenient mounting solution that allows open area plants in always any landscape situation.

In many cases, Schletter could considerably reduce the overall cost for large photovoltaic plants by using pile-driven metal foundations. These metal supports that are pile-driven into the ground make the utilization of concrete foundations redundant and thus save both work and material cost.

The measurements and the design of the system depend on the exact and detailed analysis of every specific area, including a soil analysis and pressure tests and also on the wind and snow loads onto the specific area. Thus, we are able to install photovoltaic plants with verified long-term structural safety at fair prices!

Alternatively, the PvMax3 system allows open area mounting onto concrete foundations in cases in which the FS system is not economic due to the size of the plant or is not feasible because of the soil structure. The PvMax3 system (page 14) is mainly used for plant sizes up to about 100 kW. For big plants starting from about 100 kW, we recommend the utilization of pile-driven foundations.

State-of-the-art production procedures grant efficient manufacturing of standard components as well as quick and flexible realization of special constructions on customers' request.

The quality of our products is supervised according to DIN ISO 9001:2008. Being a founding member of RAL-Solar, we campaign for the further development of quality standards and for professional seperation of the areas of competence and responsibility.

Project procedure
From planning to completion

Check list

In order to be able to prepare the planning of an open area plant in an optimum manner, we offer our customers project-specific check lists that can be downloaded at www.schletter.eu. This first step is decisive for the further procedure and enables us to work out an individual offer for your location and your plant parameters.

Digitalized check lists for all systems are available for download in 8 languages on our website.

Project procedure

1) Complete the project check list and send it back to us 2) Creation of a guiding price offer	**1-3 days**
3) Geological analysis and creation of the soil survey 4) Planning and offer of the most economic rack size 5) Final offer and scheduling of the mounting operations	**2-3 weeks**
6) Customized production of the system components	**4-6 weeks**
7) Material delivery of the complete system to the installation site 8) Mounting of the plant up to the level of completetion that was agreed before	**Individual**

With a total capacity of more than 2GW, the open area mounting system FS is the figure-head of our Schletter open area systems.
Projects like Brandis (40MW), Lieberose (53MW) or San Alberto & Alfonsine (70MW) show that an unobjectionably verified structural safety, high-value materials and economic prices are no conflicting targets!

FS system Generation 6

Your advantages

- No soil sealing
- High durability due to ideal material combinations
- Extremely short mounting time
- Considerably reduced effort for planning and mounting due to the use of GPS technology
- Unapproachably fast and efficient with large plants
- Fewer screws
- Maximum level of pre-fabrication
- Optimized material utilization
- Perfectly synchronized system components
- Optimum setting options
- Optimum accessibility for site maintenance (central support)
- Filed for patent at the European Patent Office

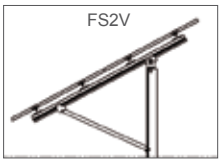
- **10-year durability warranty***

*Further information and warranty conditions at www.schletter.eu

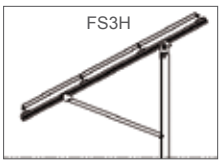
Open area mounting system FS

The FS system has been optimized in order to allow for a fast and economic realization of large photovoltaic plants with any desired kind of photovoltaic module. Pile-driven steel profiles with optimized geometry are the foundation of all systems of this design series and gurarantee long-term durability, optimum anchoring in the soil, minimum soil sealing and good accessibility for later maintenance operations on the installation site. The module bearing construction is made up of aluminum and is pre-fabricated to 100%, it can be delivered to the installation site just in time in any desired quantity. Unfold it − put it on − screw it − that´s it.
The mounting of the foundation, of the load-bearing structure and also the mounting of the modules can be integrated in the offer on customer request. A complete machinery park with more than 20 hydraulic pile-drivers and our experienced staff make short mounting times possilble, even with large projects.

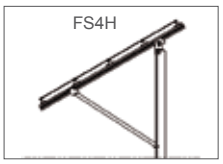
Examples for mounting variants



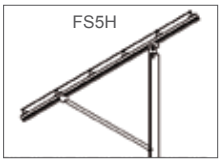
2 vertical modules



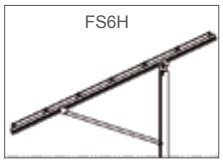
3 horizontal modules



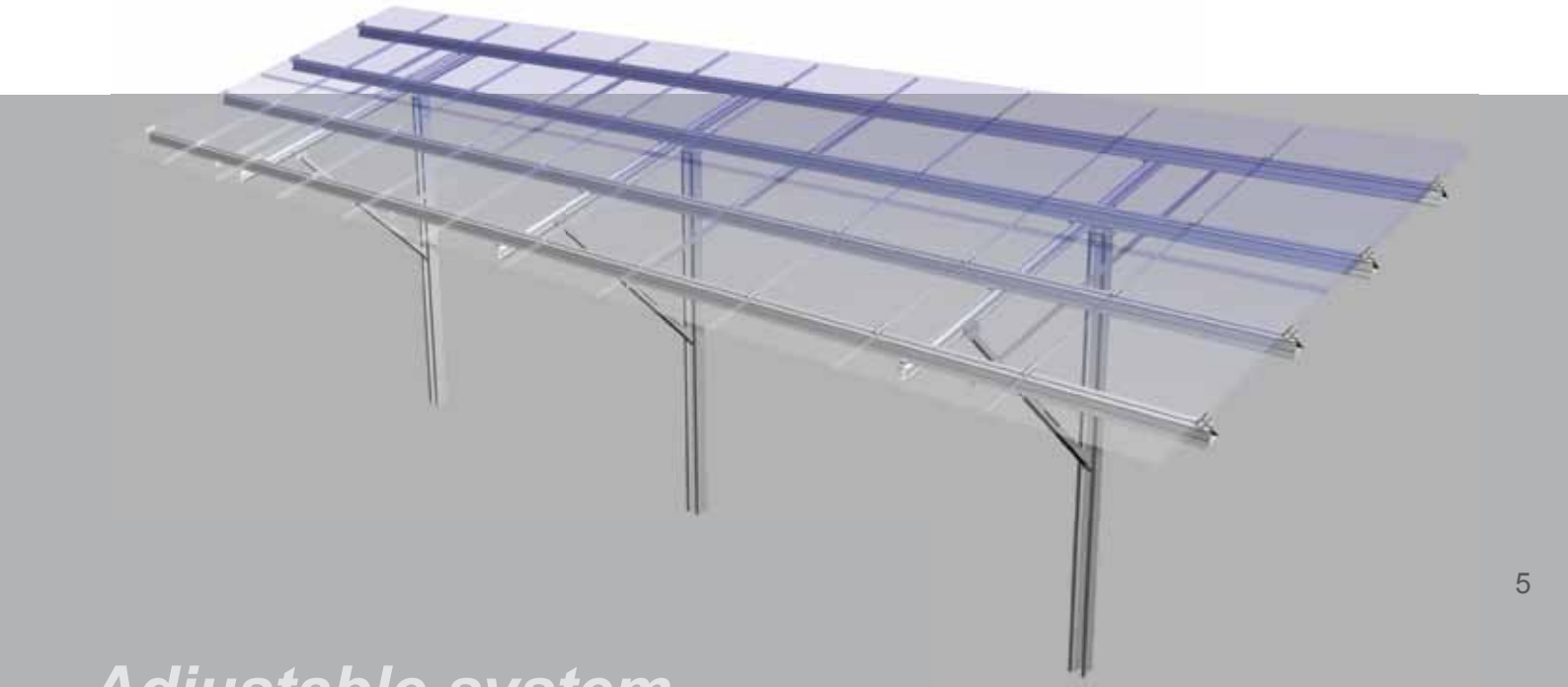
4 horizontal modules



5 horizontal modules



6 horizontal modules



Adjustable system FSVario

Your advantages

The stable and price-worthy system on the basis of the well-proven FS open area system Gen5 stands for.

- Additional yields due to seasonal optimization of the module angle
- Perfectly synchronized system components
- Optimum accessibility for terrain maintenance (central support)
- No soil sealing
- High durability due to ideal material combinations
- Extremely short mounting time

- **10-year durability warranty***

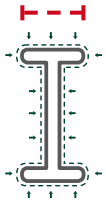
Adjustable system FSVario

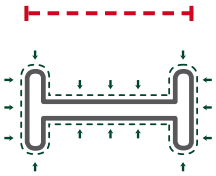
The FSVario system is the logical further development of the FS open area system series. Especially if there is a regular staff on the site, continuous optimization of the module angle is a welcome possibility to gain considerably higher yields.

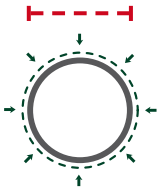
The minimization of mechnical interfaces and the purposeful abdication of automatic control systems results in a very price-efficient construction made of high-value materials and also very short mounting times. Due to the adaption of FSVario to Gen5, now the same configuration of the racks like for the usual FS system can be used. This means considerably more power per rack (for example FS2V-Vario).

*Further information and warranty conditions at www.schletter.eu

Important characteristics
Comparison of different pile driven profiles



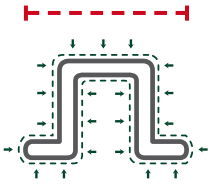




Steel girder in main bearing direction, e.g. IPE		**Steel girder 90° in main bearing direction, e.g. IPE**		**Round tube (for example screw foundation)**	
+	Bending stiffness x-direction (main direction of loading in installation position)	–	Bending stiffness x-direction (main direction of loading in installation position)	o	Bending stiffness x-direction (main direction of loading in installation position)
+	Effective contact surface for soil fricition (determines the maximum tensile force in the soil and the most economic rack size)	+	Effective contact surface for soil friciton (determines the maximum tensile force in the soil and thus the most economic rack size)	o	Only the outer side is relevant regarding soil friction; Thus, the material is only partially economically utilized! In comparison to pile-driven foundations, threads on the foundation only negibly increase the soil area that is important and effective for the tensile strength.
–	The effective counterforce of the soil anchoring determines the maximum admissible moment of load and thus the most economic rack size	+	The effective counterforce of the soil anchoring determines the maximum admissible moment of load and thus the most economic rack size	o	(The counterforce is limited by the wedge effect)
++ 	Uninterrupted profile without interface ➲ No corrosive action, no interfaces close to the ground	++ 	Uninterrupted profile without interface ➲ No corrosive action, no interfaces close to the ground	– 	Interfaces (welding seams, contact points, different material combinations are potential weak spots at the critical spot above the ground (vegetation, dampness, etc.)

– – – Effective soil anchoring in load direction

– – – Effective contact surface for soil friction



Load-bearing profile, roll-formed Developed by the Schletter GmbH	
++	High bending stiffness, economic material utilization.
++	Regarding soil friction, both inner and outer side are relevant ➲ optimum soil anchoring means economic material utilization
++	Reliable soil anchoring even in case of problematic soil compositions
++ 	Avoidance of interfaces (welding joints, contact points, different material combinations)

Summary

The choice of the right foundation profile shape is decisive for a safe and at the same time economic soil anchoring respectively foundation of the plant.

A technical comparison of the advantages and disadvantages shows: The trapezoidal profile shape combines most technical advantages and optimum material utilization.

Important characteristics
Comparison of load-bearing profile shapes

Extruded aluminum profile		Rolled steel profile, thick-wall		Rolled steel profile, thin-wall	
++	Corrosion resistance	+	Corrosion-resistant, because hot dip galvanizing is possible	–	Prone to corrosion (Hot dip galvanizing of thin metal sheets is not possible, the cutting edges are bare)
o	Material utilization, costs	–	Material utilization, costs	+	Material utilization, costs
++	Stable value	o	Scrap value >0	o	Scrap value >0
++	Constructional optimization of the mounting characteristics due to customized shaping	o	Only certain shapings are possible	o	Only certain shapings are possible
++	Optimum structural characteristics due to a closed cross section	o	Open cross sections	o	Open cross sections
++	Optimum structural characteristics due to a optimization of the material distribution	–	Only one wall thickness is possible	–	Only one wall thickness is possible
++	Optimum structural characteristics by adaption of the profile shape to the setting angle	–	In most cases, there are only rectangular cross sections	–	In most cases, there are only rectangular cross sections

The characteristics of the module bearing profile decisively determine the economic efficiency of the complete load-bearing system. Optimum material utilization and optimum adaption of the profile shape to the application case are especially important!

GPS pile driving - GPS-aided surveying, software-aided planning, driverless pile-driving systems including software-aided planning of lightning protection systems

A completely integrated software-aided concept of site measuring up to a driverless machine operation with straight to the point positioning allows for further advantages regarding work speed and prices. Lightning protection programs complete the range of services.

Hydraulic pile drivers
Simple and efficient

Your advantages

- Economically priced
- Structural safety verifiable by 100%
- Quick and efficient for large plants
- Optimum accessibility for site maintenance
- No interfaces close to the ground
- Efficient corrosion protection
- No painstaking screwing close to the ground
- No complicated flange components

Foundation

Generally, the foundation procedure determines the maximum mounting speed – especially with difficult soil conditions. Hot-dip galvanized pile-driven profiles in different size categories are used for the foundation. The specially developed kind of pile driving grants an optimum anchoring in the soil and maximum bending stiffness at the same time. Thus, the anchoring forces can also be transmitted up to the upper connection point, so that the plant will have optimum structural safety against wind and snow loads.

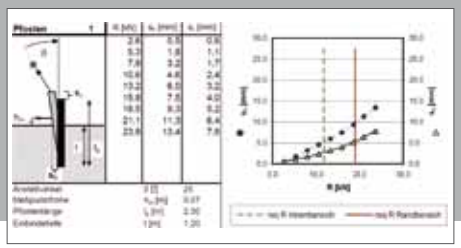
Pile driving technology with disperser equipping

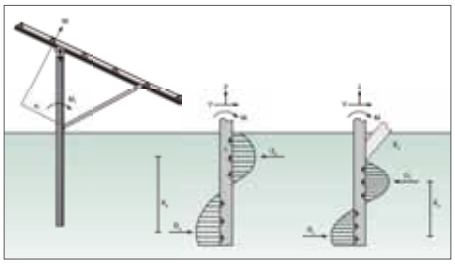
Pile-driving with disperser-equipping opens up a new dimension in the economically optimized mounting of large open area plants!

Special pile-driving procedure

The anchoring of the pile driven profiles in the soil is carried out using special terrain-friendly hydraulic pile drivers. This pile-driving technique is especially suitable for very big plants. Depending on the terrain, a pile-driving performance of 250 piles/day can be achieved. Pile-driving on difficult terrain (stones, etc.) is also possible. In case of rocky subsoils, the machine can be additionally equipped with a drilling unit. Mounting on slopes is also possible.

FS system
Geological analysis





System characteristics

For elevations in open areas with metal foundations (pile-driven piles), it is indispensable to carry out geological surveys to determine the accordant pile forces. The geological survey is the basis for the creation of the structural analysis of the foundation. In order to get the most exact picture of the situation on location, the following surveys are carried out by our specialists:

- Inclined pull tests in the effective load direction
- Horizontal pressure tests
- Creation of soil profiles
- Chemical analysis in a laboratory

Evaluation

The results of these examinations are compiled in a comprehensive report (German, English, Italian, French, or Spanish) and evaluated in a structural analysis (determination of the anchoring depth). A geological survey only gives an impression of the soil on the installation site. An evaluation can only be carried out by a specialized soil structural engineer. In order to get a testable evaluation, this structural engineer must be entitled to officially submit documents.

Mechanical background of inclined pulling

The basic idea of horizontal pull tests is the fact that the wind does not act in an isolated manner in vertical or horizontal direction, but almost perpendicular to the modulde surface. Thus, a surface pressure is created from the transmission of the bending moment in the form of a pair of forces. In case of inclinations of more than 15°, the frictional resistance between the pile and the surrounding ground is usually higher than the jacket friction, which leads to a higher pull-out resistance.

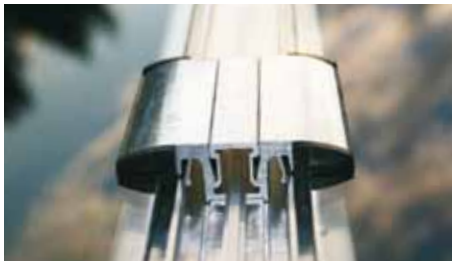
FS system
The universal unit assembly system

Cross beams

The cross beam always has a profile geometry that is aligned to the flow of forces (Schletter protection of utility models). Thus, the required structural features are achieved with minimum material utilization. Accordant fixation grooves are integrated in all profiles in order to make simple mounting possible. The cross beams are fastened to the supporting units by means of special mounting claws.

Module clamps

For any kind of module, especially for the very damageable thin-film modules, suitable clamps are available. In order to optimize the clamping geometry, we cooperate with the producers of thin-film modules and also carry out structural FEM-simulations.



Ideal surface utilization

Module mounting is carried out quickly and cost-savingly – according to the desired module laying either from the ground or with respective aid devices. Framed modules are usually mounted vertically above each other, unframed thin-film modules usually are mounted horizontally above each other, because like this the structural characteristics of the can be used in an optimum manner.

Comprehensive structural calculations according to the standards

A standard for "roofs of station platforms" with a maximum inclination of 10° simply is not applicable for photovoltaic plants with an inclination of 30°. This structural analysis based on an inapplicable standard may require only a lower material effort, but it will be irrelevant in case of emergency and does not safeguard the continued existence of the plant!


Lightning protection


Cable duct

Individual extensions
Optional accessories


Cable clip for purlin


Cable clip for girder


Pipe clamp for foundation


Cable tray for AC cabling


SecuFix

Lightning protection

On request, the complete plant can be equipped with an exterior lightning protection by adding just a few additional components. For this purpose, the Schletter GmbH offers you a special planning program.

Cable guiding

For an optimized cable guiding, we can offer you the following accessories:

- Cable duct
- Cable clip for purlin
- Cable clip for girder
- Pipe clamp for foundation
- Cable tray for AC cabling

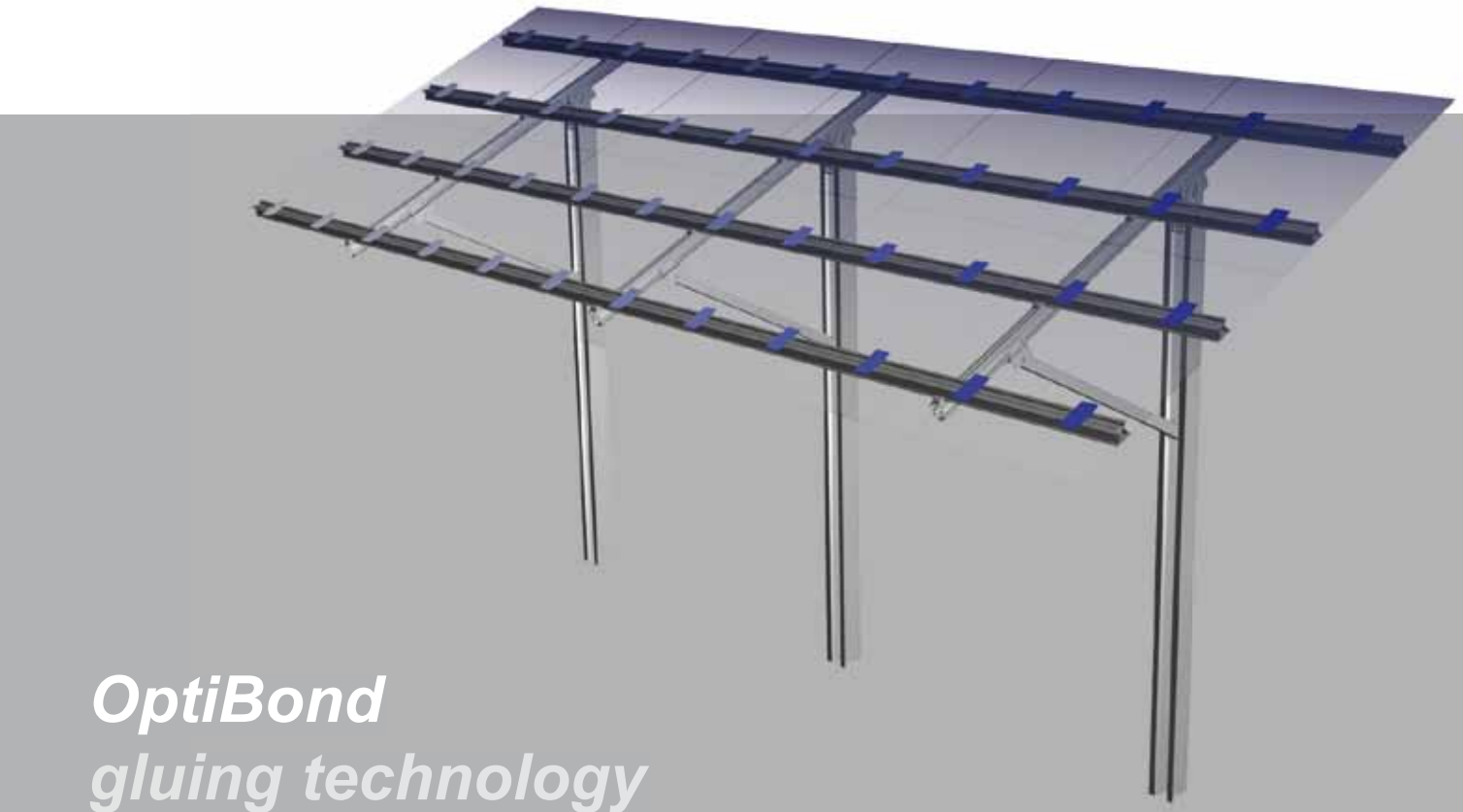
SecuFix / SecuFix2

Schletter SecuFix is an extended anti-theft device for your valuable modules!

- Can be upgraded anytime
- Almost unbreakable
- Unrivalled value for money

For ordinary socket head or Torx screws, we will deliver a quality steel ball with the exact diameter as an accessory on request. After the putting into operation of the plant, simply secure all screws by driving in the SecuFix ball − that´s it!

SecuFix2 is an ideal completion of SecuFix and an additional safety device to make the removal of modules really difficult. For this purpose, the first module of a row is fixed from below using a special additional kit. Thus, we can provide extra protection for your photovoltaic plant!



OptiBond
gluing technology

Your advantages

- Structurally optimized for big module surfaces
- Minimum mounting time
- with anti-theft device

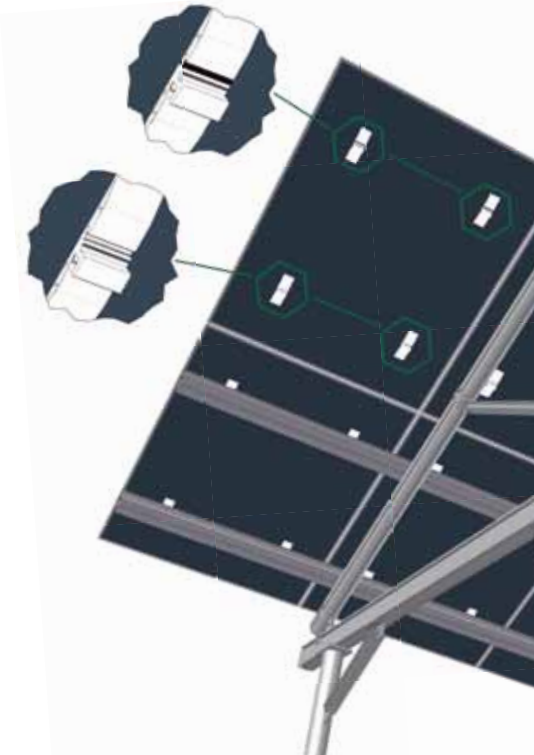
- **10-year durability warranty***

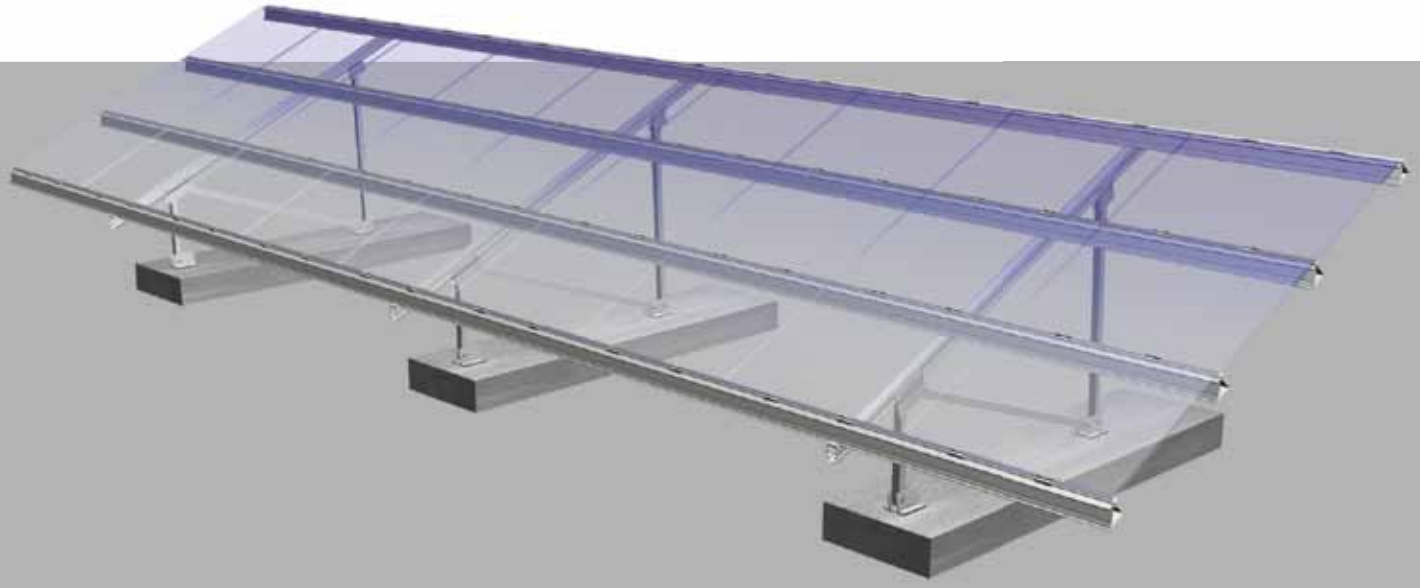
*Further information and warranty conditions at www.schletter.eu

Due to the cost pressure caused by the annual decrease of the compensation for electricity fed into the grid, there is a tendency towards thin-film modules especially with big plants in open areas. Thus, the aim of many module producers are often very big-surfaced modules in double glass-design, as they are likely to bring about a cost reduction both in the process of production and in the photovoltaic plant itself.

An increase of the bearing capacity and thereby an enlargement of the module measurements is only possible by suitable fixations within the module area. The Schletter GmbH has developed an appropriate glue procedure with numerous module manufacturers to connect also these big surface modules mechanically optimal to the substructure.

➲ OptiBond product sheet
➲ OptiBond mounting movie
(in the solar area on our website www.schletter.eu)





Aluminum unit assembly system PvMax3

Your advantages

- Stability and high durability
- Perfectly optimized components
- High corrosion resistance
- Quick and cost-efficient project planning, also in case of special plannings
- Complete structural analysis incl. foundation calculation with dowel recommendation
- The dimensioning is carried out strictly according to the current specific national standards
- Quick mounting (partially pre-assembled support kits)

- **10-year durability warranty***

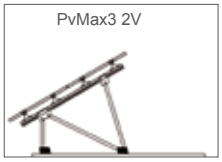
Individual special solutions

The PvMax3 system has been optimized for being mounted on concrete strip foundations in cast-in-place or pre-cast concrete design. In all cases where a pile driven foundation is not possible or not economic due to the local soil conditions or the size of the project, PvMax3 is an alternative with concrete foundations.

The universal unit assembly system is a further development on the basis of its predecessor PvMax2 and the profiles from the IsoTop program that have been well-proven thousands of times. The load-bearing capacity has been considerably improved, and both the mounting effort and the rack price could be considerably reduced. The soil surface area remains accessible in an optimum manner, and can be used for sheep grazing, for example.

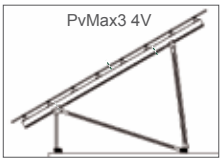
➲ PvMax3 product sheet

Examples for mounting variants

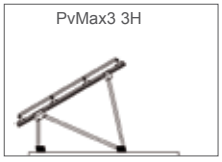


2 vertical modules

3 vertical modules

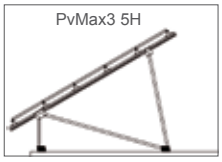


4 vertical modules

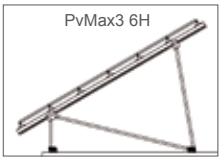


3 horizontal modules

4 horizontal modules

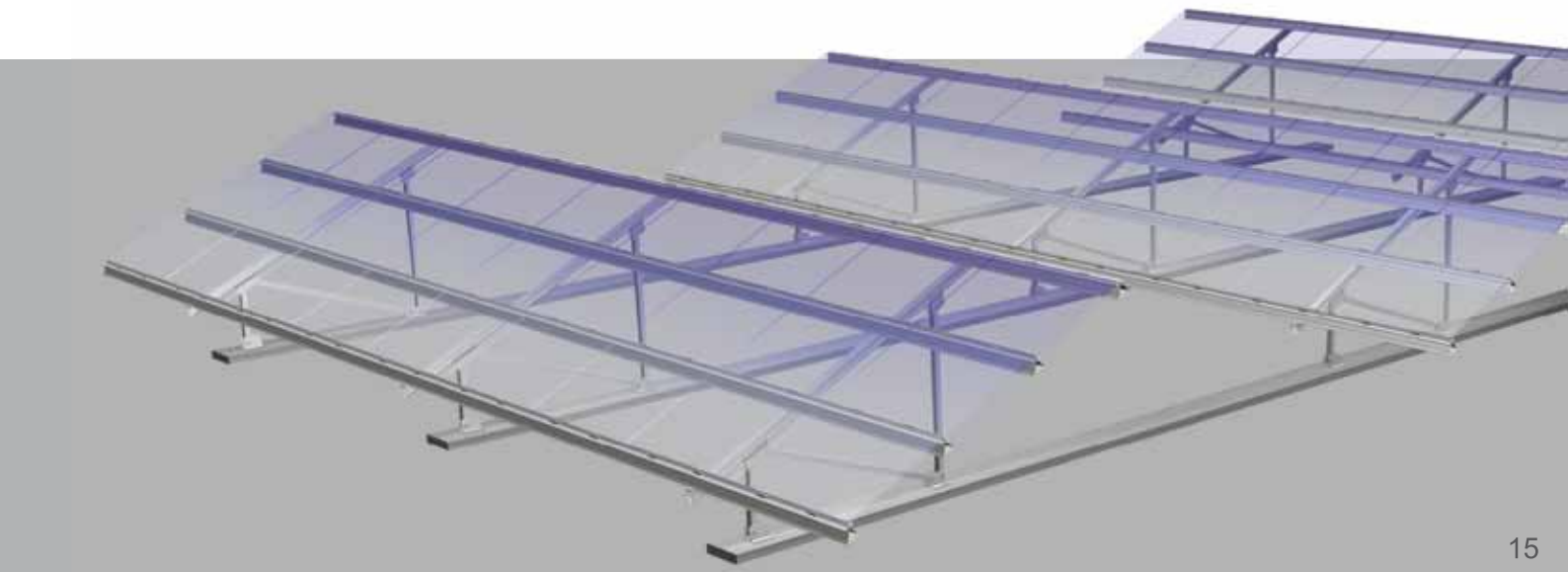


5 horizontal modules



6 horizontal modules

*Further information and warranty conditions at www.schletter.eu



Unit assembly system PvCombi

Your advantages

The well-proven modular system for open areas with optimized superimposed loads!

- Minimum loading is sufficient due to a multi-row construction
- Especially designed for application on landfill sites
- Well-proven unit assembly components based on PvMax2 / PvMax3
- Reduced soil pressings by minimized foundation weights

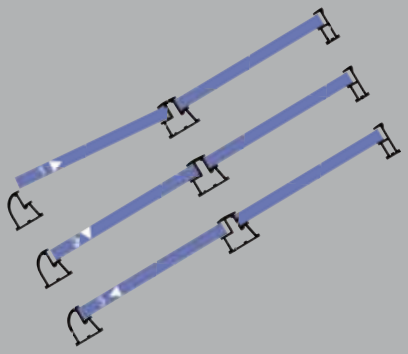
- **10-year durability warranty***

Optimum structural safety

Especially on waste disposal sites, it is mostly not possible to use grounding piles because there is a foil sealing that would be perforated by driven piles. The systems with the PvCombi design are especially optimized for these application cases by interconnecting the rows (see picture at the top). Due to the enlarged base contact area and the smaller moment of tilt resulting from this, the structural safety of the plant can be reached with less weight loads.

➲ PvCombi product sheet

*Further information and warranty conditions at www.schletter.eu



FsIn
The inlay system by Schletter

Mounting without clamps

The FsIn system has been designed especially for modules with an additional certification for "inlay mounting". In comparison to conventional mounting, this makes a more price-efficient rack dimensioning and also shorter mounting times possible. Thus, an improved overall economic efficiency of the plants is achieved.

• 10-year durability warranty*

*Further information and warranty conditions at www.schletter.eu

Information

Crystalline modules without additonal certification usually are installed on two horizontal purlins, both on roofs and in open areas, thus it is safeguarded that the module is mounted to the substructure correctly, as tested and certified in the certification procedure according to IEC 61215.

Modules with a special frame dimensioning can be alternatively mounted in inlay systems, as far as there is a special certification. But with these systems, the module frame has to be designed for bigger loads, as the unsupported span is much bigger if the modules are mounted vertically.

Technical data
Open area systems

Material

Fastening elements, bolts:
Quality steel 1.4301; Profiles: Aluminium MgSi05 /EN AW 6063, EN AW 6005
Pile driven foundations: Steel S380, hot-dip galvanized
- High life-expectancy, high residual value, no disposal costs
- Simple plant repowering due to modular design

Logistics

- Quick and simple mounting
- Maximum level of pre-fabrication
- Optimized transport to the construction site

Construction

- Adjustment options to equalize ground unevennesses
- Cost-optimized overall construction on the basis of structural optimization
- For framed and unframed modules

Site maintenance

- Optimum terrain maintenance due to central support
- Sheep grazing

Structural calculation

- Individual structural analysis of the site on the basis of a soil survey (for pile driven design)
- Individual structural analysis of the system on the basis of regional load values
- Load assumptions according to DIN 1055 Part 4 (03/2006), part 5 (06/2005), part 100 (03/2001), Eurocode 1 (06/2002), DIN 4113, DIN 18800, Eurocode 9 and others, respectively the accordant specific national standards
- Patented profile geometries with optimum material utilization
- Verification of all construction components based on FEM-calculation
- **Vibration simulation** of wind loads, optional
- **Earth quake simulation**, optional

Accessories

- Lightning protection system **(FSProtect system)**
- Cable channels, cable ducts
- Anti-theft device **(SecuFix / SecuFix2)**
- Components for internal potential equalization
- Clamps for different types of modules
- Fastening systems for big-surface laminated modules **(OptiBond system)**

Delivery and services

- Soil survey and soil structural analysis
- Individual structural analysis of the site on the basis of regional data
- Pile-driving of the foundations and delivery of the complete mounting material
- Starting from 100kWp, free of transportation charges on the European mainland
- Creation of all rack drawings
- **Optional:** Rack mounting
- **Optional:** Complete module mounting

Lightning protection, earthing, potential equalization

- Extension with exterior lightning protection systems is possible
- Components for internal potential equalization certified according to VDE 0100, part 712

Warranty and Certifications

- 10-year durability warranty on all Schletter solar mounting systems
- **Optional:** Extension of the durability warranty to 20-25 years - on the basis of a maintenance contract

FS 5H

Project:	Holzgünz
Module type:	1200 x 600
Plant size:	4.7 MWp
Customer:	JUWI

Reference examples
Open area systems

FS 5H

Project:	Ehekirchen
Module type:	1200 x 600
Plant size:	1.2 MWp
Customer:	JUWI

FS 2V

Project:	Sierra de Yeguas
Module type:	1600 x 980
Plant size:	2.2 MWp
Customer:	ESA

FS 3H

Project:	Antolin & Guadalin
Module type:	1673 x 983
Plant size:	11.2 MWp
Customer:	Systaic

Total power together with San Alberto: 70MW!

FS 2V

Project:	Alfonsine
Module type:	1650 x 992
Plant size:	36 MWp
Customer:	TRE Tozzi

FS 2V

Project:	Lobosillo
Module type:	1650 x 990
Plant size:	2.6 MWp
Customer:	Ecostream

FS 2V

Project:	Bovera
Module type:	1650 x 992
Plant size:	1.1 MWp
Customer:	Wirsol

FS 5H

Project:	El Cura
Module type:	1200 x 600
Plant size:	2 MWp
Customer:	JUWI

With a delivery quantity of components for solar plants of about 5MW/day, the Schletter GmbH is your partner with experience in safe and cost-efficient system dimensioning!

FS 5H

Project:	Eckendorf
Module type:	1200 x 600
Plant size:	1.62 MWp
Customer:	Solarpark Eckendorf

Reference examples
Open area systems

FS 2V

Project:	Lobosillo
Module type:	Top Solar/Yingli
Plant size:	14 MWp
Customer:	Ecostream

FS 1V – special design Vario

Project:	Muga II
Module type:	1667 x 1000
Plant size:	5 MWp
Customer:	Alfa

FS 5H

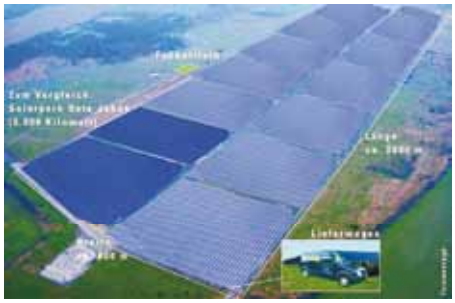
Project:	Lieberose
Module type:	1200 x 600
Plant size:	53 MWp
Customer:	JUWI

FS 2V

Project:	Rotthalmünster
Module type:	1580 x 808
Plant size:	1.5 MWp
Customer:	EEPro

FS 5H

Project:	Rote Jahne
Module type:	1200 x 600
Plant size:	6 MWp
Customer:	JUWI



FS 5H

Project:	Brandis
Module type:	1200 x 600
Plant size:	40 MWp
Customer:	JUWI

FS 3H

Project:	Menorca
Module type:	1680 x 990
Plant size:	3.2 MWp
Customer:	SunEnergy

Our service
Pre-assembly in our factory

„We don´t get any discount for wind and snow loads"
(Dr. Cedrik Zapfe; structural engineer with Schletter)

Necessary cost reductions (in view of the cutting of the compensation for electricity fed into the grid) are achieved by optimi-zed mounting. Especially for photovoltaic plants in open areas, the mounting structures are completely pre-assembled in our factory and delivered and installed "just in time" according to an exact delivery schedule.

Comprehensive structural calculations according to the standards

Some of our competitors often do not apply satisfactory structural standards for the structural analysis and the verification of structural safety of mounting systems. So, a technical standard for "station platform roofs with an inclination of max. 10 degrees" is just not applicable for photovoltaic plants with an inclination of 30 degrees.

This structural analysis may require only a lower material effort, but it will be irrelevant in case of emergency and does not safeguard the continued existence of the plant!

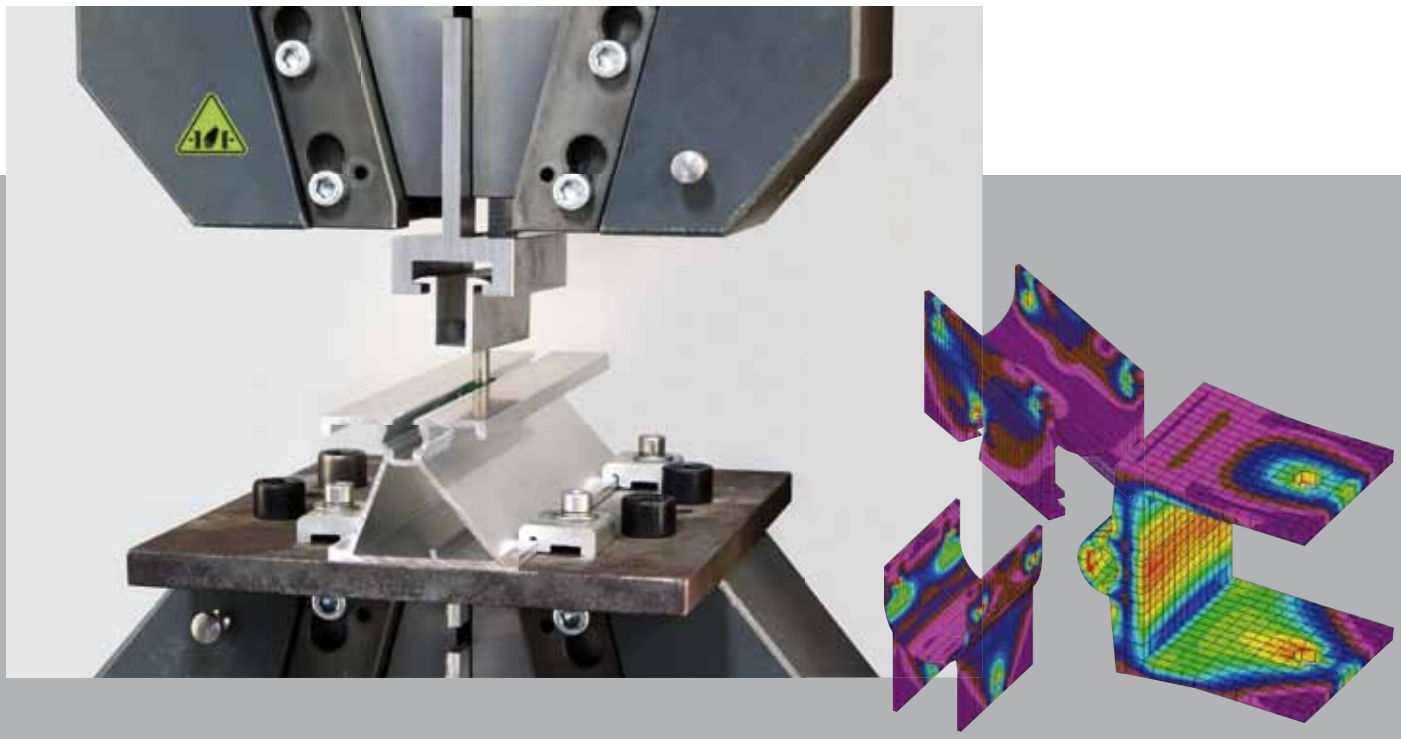
Statistics of refittings - especially with open area plants

Experiences gained in the last years show that mounting structures are permanently reinforced and re-fitted due to further technical developments. The fact that ever stronger dimensionings, re-fittings and bracings are added in each new generation of product series by some of our competitors show that maybe insufficient load assumptions were used when the first generation was designed.

This raises several questions:

- Who has to pay for these refittings?
- Who can compensate the (non-material) loss of trust of the end customer?
- If there is a recall, will all products be completely re-fitted or will only the most urgent problems be taken care of?
- Has the risk to the enormous overall plant value been underestimated just for the sake of a cost reduction on a scale of a few percent?

The first open area systems by Schletter were already installed in 2005. Ever since, there have been no refitting actions due to insufficient system dimensioning. Thus, you can confide in our long-term experience!

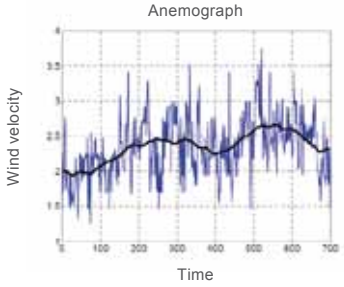


Material supervision and component analyses
Safety based on certified quality

Vibrations and resonance

Especially one-support open area systems are prone to vibrations. Vibrations that are too strong can lead to material fatigue and failure. Thus, we do not only carry out structural, but also dynamic calculations for our systems. The vibration frequency is determined and compared to the excitation frequency. By a sufficient stiffness and a vibration frequency of about 10Hz, a sufficient distance to the wind excitation frequency (about 0.5Hz) is achieved. Thus, no resonance effect can occur, vibrations are minimized.

Anemograph

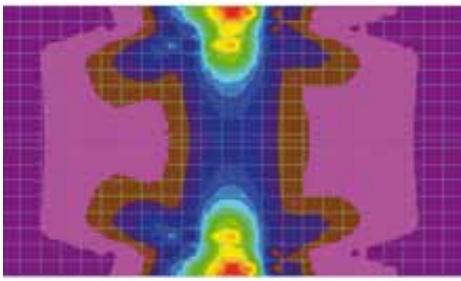


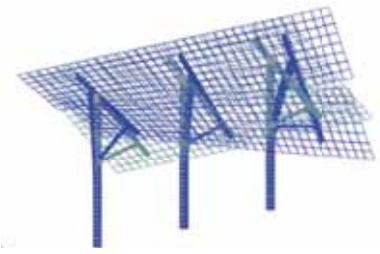
Comparison of aluminum and steel girders

The prices of aluminum and steel float independently of each other and will always shift the cost comparison in one or the other direction. Generally, aluminum is of higher value (no corrosion, stable value, etc.), but it can be a bit more expensive.

Structures made of hot-dip-galvanized steel are of comparable high value, but almost as expensive as aluminum in most cases. For hot-dip galvanizing, the steel profiles must have a minimum wall thickness, because otherwise they will deform in the hot-dip galvanizing process. Thus, structures are often built using thin, rolled profiles. Those are only electrolytically galvanized (limited durabilitiy in the exterior area) and sometimes even only strip-galvanized (thus, they have bare cutting edges)!

FEM simulation





Vibration analysis of the module rack

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For a comprehensive and competent consulting in the planning of your plant and for questions concerning logistics and order processing, our members of staff are available from Monday to Friday from 7 am to 5 pm.